Abstract

tcolorbox provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part. The package tcolorbox can be used for the setting of \LaTeX examples where one part of the box displays the source code and the other part shows the output. Another common use case is the setting of theorems. The package supports saving and reuse of source code and text parts.
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1 Introduction

The package originates from the first edition of my book «\LaTeX– Einführung in das Textsatzsystem» [18] in about 2006. For the \LaTeX examples and tutorials given there, I wanted to have accentuated and colored boxes to display source code and compiled text in combination. Since, in my opinion, this type of boxes is also quite useful to highlight definitions and theorems, I applied them for my lecture notes in mathematics [19–21] as well. With this package, you are invited to apply these boxes for similar projects.

The breaking news for version 2.00 was the support for breakable boxes. This feature allows new applications of the package without affecting the core package too much if you do not need boxes to break automatically. With version 2.20, the often requested “side by side” mode for listings has been added. With version 3.00, boxed titles are introduced together with improved customization options for overlays, underlays, finishes, and own code extensions.

Since the first public release in 2011, I received a lot of feedback from all over the world. I want to thank all who wrote me for supporting this package by sending bug reports and ideas for new or better features.

1.1 Installation

Typically, \texttt{tcolorbox} will be installed as part of a major \LaTeX distribution and there is nothing special to do for a user.

If you intend to make a local installation \textit{by hand}, see the README file of the \texttt{tcolorbox} package for some hints. The short story is: you have to install not only \texttt{tcolorbox.sty}, but also all \texttt{*.code.tex} files in the local \texttt{texmf} tree.

1.2 Loading the Package

The base package \texttt{tcolorbox} loads the packages \texttt{pgf} [22], \texttt{verbatim} [17], \texttt{etoolbox} [7], and \texttt{environ} [16]. \texttt{tcolorbox} itself is loaded in the usual manner in the preamble:

\begin{verbatim}
\usepackage{tcolorbox}
\end{verbatim}

The package takes option keys in the key-value syntax. Alternatively, you may use these keys later in the preamble with \texttt{\tcbuselibrary*P.9} (see there). For example, the key to typeset listings is:

\begin{verbatim}
\usepackage[ listings]{tcolorbox}
\end{verbatim}
1.3 Libraries

The base package \texttt{tcolorbox} is extendable by program libraries. This is done by using option keys while loading the package or inside the preamble by applying the following macro with the same set of keys.

\begin{verbatim}
\tcbuselibrary{(key list)}
\end{verbatim}

Loads the libraries given by the \texttt{(key list)}.

\begin{verbatim}
\tcbuselibrary{listings, theorems}
\end{verbatim}

The following keys are used inside \texttt{\tcbuselibrary} respectively \texttt{\usepackage} without the key tree path /tcb/library/.

\begin{itemize}
  \item /tcb/library/skins
    Loads the package \texttt{tikz} \cite{tikz} and provides additional styles (skins) for the appearance of the colored boxes; see Section 10 from page 156.
  \item /tcb/library/vignette
    Provides code for more ornamental; see Section 15 from page 285.
  \item /tcb/library/raster
    Provides additional macros and options for typesetting multiple boxes arranged in a kind of raster; see Section 16 from page 298.
  \item /tcb/library/listings
    Loads the package \texttt{listings} \cite{listings} and provides additional macros for typesetting listings which are described in Section 17 from page 320.
  \item /tcb/library/listingsutf8
    Loads the packages \texttt{listings} \cite{listings} and \texttt{listingsutf8} \cite{listingsutf8} for UTF-8 support. This is a variant of the library \texttt{listings} and is described in Section 17 from page 320.
  \item /tcb/library/minted
    Loads the package \texttt{minted} \cite{minted} to typeset listings with the \texttt{Pygments} \cite{pygments} tool, also see Section 17 on page 320.
  \item /tcb/library/theorems
    Provides additional macros for typesetting theorems which are described in Section 18 from page 362.
  \item /tcb/library/breakable
    Provides support for automatic box breaking from one page to another; see Section 19 on page 388.
  \item /tcb/library/magazine
    Provides support for storing broken box parts to be used later or in interchanged order, Section 20 on page 415.
  \item /tcb/library/poster
    Provides support for creating posters, Section 21 on page 425.
  \item /tcb/library/fitting
    Provides support for font size adaption of the box content to the box dimensions; see Section 22 from page 439.
  \item /tcb/library/hooks
    Extends several option keys to “hookable” keys; see Section 23 from page 451.
\end{itemize}
/tcb/library/xparse

Provides document command production with \texttt{xparse} for \texttt{tcolorbox}; see Section 24 from page 462.

/tcb/library/external

Provides externalization support for stand-alone document snippets, see Section 25 on page 475.

/tcb/library/documentation

Provides additional macros for typesetting \LaTeX\ documentations which are described in Section 26 from page 487.

/tcb/library/many

Loads the libraries \texttt{skins}, \texttt{breakable}, \texttt{raster}, \texttt{hooks}, \texttt{theorems}, \texttt{fitting}, \texttt{hooks} and \texttt{xparse}. Use this shortcut, if you want to use all features of \texttt{tcolorbox} with exception of typesetting listings and using the specialized \texttt{documentation} library.

/tcb/library/most

Loads all libraries except \texttt{minted} and \texttt{documentation}. Use this shortcut, if you want to use all features of \texttt{tcolorbox} with exception of using the \texttt{minted} package and using the specialized \texttt{documentation} library.

/tcb/library/all

Loads all libraries. Use this shortcut only, if you intend to use the \texttt{documentation} library.
3 Macros for Box Creation

\begin{tcolorbox}[(options)]
\begin{environment content}
\end{environment content}
\end{tcolorbox}

This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts. The appearance of this box is controlled by numerous options. In the most simple case the source code

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

creates the following compiled text box:

This is a \textbf{tcolorbox}.

The text content of the box can be divided in an upper and a lower part by the command \texttt{\textbackslash tcblower}. Visually, both parts are separated by a line. For example:

\begin{tcolorbox}
This is another \textbf{tcolorbox}.
\tcblower
Here, you see the lower part of the box.
\end{tcolorbox}

This code gives the following box:

\textbf{tcolorbox}.

\texttt{\textbackslash tcblower}

Here, you see the lower part of the box.

The \texttt{(options)} control the appearance and several functions of the boxes, see Section 4 on page 18 for the complete list. A quick example is given here:

\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black,title=My nice heading]
This is another \textbf{tcolorbox}.
\tcblower
Here, you see the lower part of the box.
\end{tcolorbox}

\texttt{My nice heading}

\textbf{tcolorbox}.

\texttt{\textbackslash tcblower}

Here, you see the lower part of the box.

\texttt{\textbackslash tcblower}

Used inside \texttt{tcolorbox} to separate the upper box part from the optional lower box part. The upper and the lower part are treated as separate functional units. If you only want to draw a line, see \texttt{\textbackslash tcpline} \textsuperscript{P.221}. 

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\tcbset\{\texttt{options}\}\}

Sets options for every following \texttt{tcolorbox} inside the current \TeX{} group. By default, this does not apply to nested boxes, see Section 4.16 on page 97. For example, the colors of the boxes may be defined for the whole document by this:

\begin{tcolorbox}
\tcbset\{colback=red!5!white, colframe=red!75!black\}
\end{tcolorbox}

\tcbsetforeverylayer\{\texttt{options}\}\}

Sets options for every following \texttt{tcolorbox} inside the current \TeX{} group. In contrast to \texttt{tcbset}, this does also apply to nested boxes, see Section 4.16 on page 97. Technically, the \texttt{\texttt{options}} are appended to the default values for every \texttt{tcolorbox} which are applied by /tcb/reset. You should not use this macro, if you are not completely sure that you want to have the \texttt{\texttt{options}} also for boxes in boxes (in boxes in boxes \ldots).
\texttt{\texttt{tcbox}}\{\texttt{options}\}\{\texttt{box content}\}\}

Creates a colored box which is fitted to the width of the given \texttt{box content}. In principle, most \texttt{options} for a \texttt{tcolorbox} \textsuperscript{p. 12} can be used for \texttt{tcbox} with some restrictions. A \texttt{tcbox} cannot have a lower part and cannot be broken.

\begin{verbatim}
\tcset{colframe=blue!50!black,colback=white,colupper=red!50!black,  
fonttitle=\textbf{series},nobeforeafter,center title}

Text \tcbox[tcbox raise base]{Hello World}\hfill
\%
\tcbox[left=0mm,right=0mm,top=0mm,bottom=0mm,boxsep=0mm,  
toptitle=0.5mm,bottomtitle=0.5mm,title=My table]{\%
\arrayrulecolor{blue!50!black}\renewcommand{\arraystretch}{1.2}\%
\begin{tabular}{r|c|l}
One & Two & Three \\
\hline
Men & Mice & Lions \\
\hline
Upper & Middle & Lower
\end{tabular}\%
\%
\tcbox[colback=blue!85!black,  
left=0mm,right=0mm,top=0mm,bottom=0mm,boxsep=1mm,arc=0mm,boxrule=0.5pt,  
title=My picture}{\%
\includegraphics[width=5cm]{Basilica_5.png}}
\%
\end{verbatim}

% usepackage{tikz}
\tcset{colframe=blue!50!black,colback=white,colupper=red!50!black,  
fonttitle=\textbf{series},center title}

% Fixed width box
\begin{tcolorbox}Hello\World!\end{tcolorbox}

% Fitted width box (like hbox or makebox)
\tcbox{Hello\World!}

% Fitted width box (using a \texttt{tikznode} node)
\tcbox[tikznode]{Hello\World!}

\begin{tikzpicture}
\node[text=red] at (0,0) {Hello World!};
\node[text=blue] at (1,0) {Hello World!};
\node[text=black] at (2,0) {Hello World!};
\end{tikzpicture}
See Section 24.2 on page 464 and Section 24.3 on page 467 for more elaborate methods to create new environments and commands.

\newtcolorbox\{\(init\ options\)\}{\(name\)}\[\{\(number\)\}\{\(default\)\}{\(options\)}

Creates a new environment \(\langle name\rangle\) based on \texttt{tcolorbox}\footnote{P.12}. Basically, \texttt{\newtcolorbox} operates like \texttt{\newenvironment}. This means, the new environment \(\langle name\rangle\) optionally takes \(\langle number\rangle\) arguments, where \(\langle default\rangle\) is the default value for the optional first argument. The \(\langle options\rangle\) are given to the underlying \texttt{tcolorbox}. Note that \texttt{/tcb/savedelimiter}\footnote{P.26} is set to the given \(\langle name\rangle\) automatically. The \(\langle init\ options\rangle\) allow setting up automatic numbering, see Section 5 from page 114.

\begin{quote}
\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black]
This is my own box.
\end{tcolorbox}
\end{quote}

\begin{quote}
\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries, title=\textit{Hello there}]
This is my own box with a mandatory title.
\end{tcolorbox}
\end{quote}

\begin{quote}
\begin{tcolorbox}[colback=yellow,colbacktitle=red!85!black,enhanced, attach boxed title to top center=\{yshift=-2mm\}, title=\textit{Hello there}]
This is my own box with a mandatory title and options.
\end{tcolorbox}
\end{quote}

\begin{quote}
\textbf{Definition in the preamble:}

\begin{tcolorbox}[auto counter,number within=section]
\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries, title=Examp.~\thetcbcounter: \textit{Hello there}]
This is my own box with a mandatory numbered title.
\end{tcolorbox}
\end{tcolorbox}
\end{quote}

\begin{quote}
\begin{tcolorbox}[colback=yellow]
This is my own box.
\end{tcolorbox}
\end{quote}

\begin{quote}
\begin{tcolorbox}[colback=yellow,title=\textit{Examp. 3.1: Hello there}]
This is my own box with a mandatory numbered title and options.
\end{tcolorbox}
\end{quote}

\renewtcolorbox\{\(init\ options\)\}{\(name\)}\[\{\(number\)\}\{\(default\)\}{\(options\)}

Operates like \texttt{\newtcolorbox}, but based on \texttt{\renewenvironment} instead of \texttt{\newenvironment}. An existing environment is redefined.
\newtcbox[⟨init options⟩]{⟨name⟩}{⟨number⟩}{⟨default⟩}{⟨options⟩}

Creates a new macro ⟨name⟩ based on \tcbox→P.14. Basically, \newtcbox operates like \newcommand. The new macro ⟨name⟩ optionally takes ⟨number⟩+1 arguments, where ⟨default⟩ is the default value for the optional first argument. The ⟨options⟩ are given to the underlying \tcbox. The ⟨init options⟩ allow setting up automatic numbering, see Section 5 from page 114.

\newtcbox{mybox}{colback=red!5!white, colframe=red!75!black}\mybox{This is my own box.}

\newtcbox{mybox}[1]{colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries, title=#1}\mybox{Hello there}{This is my own box.}

\newtcbox{mybox}[2][]{colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries, title=#2,#1}\mybox[colback=yellow]{Hello there}\% {This is my own box.}

Definition in the preamble:
\begin{verbatim}
\newtcbox[use counter from=pabox]{pbbox}[2][]{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=\thetcbcounter #2,#1}\pbbox[colback=yellow]{Hello there}\% {This is my own box.}
\end{verbatim}

The \mybox[green]{quick} brown \mybox{fox} \mybox[blue]{jumps} over the \mybox[green]{lazy} \mybox{dog}.\par

\renewtcbox[⟨init options⟩]{⟨name⟩}{⟨number⟩}{⟨default⟩}{⟨options⟩}

Operates like \newtcbox, but based on \renewcommand instead of \newcommand. An existing macro is redefined.
\colorboxenvironment{(name)}{(options)}

An existing environment \langle name \rangle is redefined to be boxed inside a tcolorbox with the given \langle options \rangle.

\begin{tcolorboxenvironment}{myitemize}{blanker, before skip=6pt, after skip=6pt, borderline west={3mm}{0pt}{red}}
\begin{itemize}
\item Alpha
\item Beta
\item Gamma
\end{itemize}
\end{tcolorboxenvironment}

Some text.

See further examples in Section 18.4 on page 387.
4 Option Keys

For the ⟨options⟩ in tcolorbox^\textsuperscript{P.12} respectively \texttt{tcbset}^\textsuperscript{P.13} the following \texttt{pgf} keys can be applied. The key tree path /tcb/ is not to be used inside these macros. It is easy to add your own style keys using the syntax for \texttt{pgf} keys, see [18, 22] or the examples starting from page 349.

4.1 Title

\texttt{/tcb/title}=⟨text⟩  
(no default, initially empty)

Creates a heading line with ⟨text⟩ as content.

\begin{tcolorbox}[title=My heading line]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}  
My heading line  
This is a \textcolor{red}{tcolorbox}.

\texttt{/tcb/notitle}  
(no value, initially set)

Removes the title line if set before.

\texttt{/tcb/adjusted title}=⟨text⟩  
(style, no default, initially unset)

Creates a heading line with ⟨text⟩ as content. The minimal height of this line is adjusted to fit the text given by /tcb/adjust text. This option makes sense for single line headings if boxes are set side by side with equal height. Note that it is very easy to trick this adjustment.

\texttt{\tcbset{colback=White,arc=0mm,width=(\linewidth-4pt)/4,  
equal height group=AT,before=,after=\hfill,fonttitle=\bfseries}}

The following titles are not adjusted:\
\begin{tcolorbox}[title=\texttt{xxx},colframe=red!75!black]  
Some content.  
\end{tcolorbox}  
\begin{tcolorbox}[title=\texttt{ggg},colframe=red!75!black]  
Some content.  
\end{tcolorbox}  
\begin{tcolorbox}[title=\texttt{AAA},colframe=red!75!black]  
Some content.  
\end{tcolorbox}  
\begin{tcolorbox}[title=\texttt{"Agypten"},colframe=red!75!black]  
Some content.  
\end{tcolorbox}

Now, we try again with adjusted titles:\
\begin{tcolorbox}[adjusted title=\texttt{xxx},colframe=blue!75!black]  
Some content.  
\end{tcolorbox}  
\begin{tcolorbox}[adjusted title=\texttt{ggg},colframe=blue!75!black]  
Some content.  
\end{tcolorbox}  
\begin{tcolorbox}[adjusted title=\texttt{AAA},colframe=blue!75!black]  
Some content.  
\end{tcolorbox}  
\begin{tcolorbox}[adjusted title=\texttt{"Agypten"},colframe=blue!75!black]  
Some content.  
\end{tcolorbox}

\texttt{/tcb/adjust text}=⟨text⟩  
(no default, initially \texttt{"Åpgjy"})

This sets the reference text for /tcb/adjusted title. If your texts never exceed “\texttt{"Åpgjy"}” in depth and height you don’t need to care about this option.
\texttt{/tcb/squeezed title\{text\}} \hspace{2cm} \text{(style, no default, initially unset)}

Creates a single heading line with \textit{text} as content. If the \textit{text} is longer than the available space, the text is squeezed to fit into the available space.

\% \texttt{\tcbuselibrary{raster}}
\begin{tcbitemize}[raster columns=3,raster equal height,  
colframe=red!75!black,colback=red!5!white,fonttitle=\bfseries]
\tcbitem{squeezed title={Short title}}
 First box
\tcbitem{squeezed title={This is a very very long title}}
 Second box
\tcbitem{squeezed title={This title is clearly to long for this application}}
 Third box
\end{tcbitemize}

\textbf{Short title} \hspace{2cm} \textbf{This is a very very long title} \hspace{2cm} \textbf{This title is clearly to long for this application}

\textit{First box} \hspace{2cm} \textit{Second box} \hspace{2cm} \textit{Third box}

---

\texttt{/tcb/squeezed title*=\{text\}} \hspace{2cm} \text{(style, no default, initially unset)}

This is a combination of \texttt{/tcb/adjusted title} \textsuperscript{P.18} and \texttt{/tcb/squeezed title}.

\% \texttt{\tcbuselibrary{raster}}
\begin{tcbitemize}[raster columns=3,raster equal height,  
colframe=red!75!black,colback=red!5!white,fonttitle=\bfseries]
\tcbitem{squeezed title*={Short title}}
 First box
\tcbitem{squeezed title*={This is a very very long title}}
 Second box
\tcbitem{squeezed title*={This title is clearly to long for this application}}
 Third box
\end{tcbitemize}

\textbf{Short title} \hspace{2cm} \textbf{This is a very very long title} \hspace{2cm} \textbf{This title is clearly to long for this application}

\textit{First box} \hspace{2cm} \textit{Second box} \hspace{2cm} \textit{Third box}

---

\texttt{/tcb/titlebox\{mode\}} \hspace{2cm} \text{(no default, initially \textit{visible})}

Controls the treatment of the title part of the box. Feasible values for \textit{mode} are:

- \textbf{visible}: usual type setting of the title box,
- \textbf{invisible}: empty space instead of the title contents.

\begin{tcolorbox}[title=My invisible title,  
titlebox=invisible]
 This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.  

\begin{tcolorbox}
 This is a \textbf{tcolorbox}.
\end{tcolorbox}
Detaches the title from its normal position. The text of the title is stored into \texttt{tcbtitletext} and the formatted title is available by \texttt{tcbtitle}. The main application is to move the title from its usual place to another one.

\begin{mybox}{My title}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}[detach title,before upper={\tcbtitle}]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}[detach title,after upper={\par\hfill \tcbtitle}]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

Attaches the title to its normal position. This option is used to reverse \texttt{/tcb/detach title}.

/\texttt{tcb/attach title} (no value)

Attaches the title to the begin of the upper part of the box content. The optional \texttt{⟨text⟩} is set between the formatted title and the box content.

\begin{mybox}[attach title to upper={---}]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}[attach title to upper,:]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

More title options are documented in Section 4.11 on page 64 and Section 10.2 on page 163.
4.2 Subtitle

Inside the box content, one or more subtitles can be added. In general, a subtitle is a further \texttt{tcolorbox} \textsuperscript{P.12} which inherits some color and geometry options from the enclosing box. It may be customized just like any other \texttt{tcolorbox} \textsuperscript{P.12}.

\texttt{\textbackslash tcs_subtitle[\langle options\rangle]\{\langle text\rangle\}}

Used inside a \texttt{tcolorbox} \textsuperscript{P.12} to add a subtitle box with the given \langle text\rangle. This is an independent \texttt{tcolorbox} \textsuperscript{P.12} which is formatted by several inherited properties of the enclosing box, by further settings from \texttt{/tcb/subtitle style}, and by the given \langle options\rangle.

\begin{tcolorbox}
\texttt{title=My title,}
\texttt{colback=red!5!white,}
\texttt{colframe=red!75!black,}
\texttt{fonttitle=\bfseries}
\end{tcolorbox}
This is a \texttt{tcolorbox}.

\begin{tcolorbox}
\texttt{[before skip=\baselineskip]}%
\texttt{\textbackslash tcsubtitle\{My subtitle\}}
\texttt{Further text.}
\end{tcolorbox}

\begin{tcolorbox}
\texttt{title=My title,}
\texttt{colback=red!5!white,}
\texttt{colframe=red!75!black,}
\texttt{colbacktitle=yellow!50!red,}
\texttt{coltitle=red!25!black,}
\texttt{fonttitle=\bfseries}
\end{tcolorbox}
This is a \texttt{tcolorbox}.

\begin{tcolorbox}
\texttt{[before skip=\baselineskip]}%
\texttt{\textbackslash tcsubtitle\{My subtitle\}}
\texttt{Further text.}
\end{tcolorbox}

\texttt{/tcb/subtitle style=\langle options\rangle}
(no default, initially empty)

Adds \texttt{tcolorbox} \langle options\rangle to the settings for \texttt{\textbackslash tcs_subtitle}.

\begin{tcolorbox}
\texttt{title=My title,}
\texttt{colback=red!5!white,}
\texttt{colframe=red!75!black,}
\texttt{colbacktitle=yellow!50!red,}
\texttt{coltitle=red!25!black,}
\texttt{fonttitle=\bfseries,}
\texttt{subtitle style={boxrule=0.4pt,}
\texttt{colback=yellow!50!red!25!white} ]
\end{tcolorbox}
This is a \texttt{tcolorbox}.

\begin{tcolorbox}
\texttt{\textbackslash tcsubtitle\{My subtitle\}}
\texttt{Further text.}
\texttt{\textbackslash tcsubtitle\{Second subtitle\}}
\texttt{Further text.}
\end{tcolorbox}
4.3 Upper Part

The text content of a \texttt{tcolorbox} may be parted into a mandatory \textit{upper part} and an optional \textit{lower part}. These parts are separated by \texttt{tcblower}. If there is no \texttt{tcblower} present, there is no \textit{lower part} and the \textit{upper part} forms the complete text content.

\begin{tcolorbox}[upperbox=\texttt{invisible},colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=\texttt{invisible},colback=white]
This is a \textbf{tcolorbox} (but invisible).
\texttt{tcblower}
This is the lower part.
\end{tcolorbox}

\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[invisible]
This is the lower part.
\end{tcolorbox}

\texttt{/tcb/upperbox=\texttt{mode}}
(no default, initially \texttt{visible})

Controls the treatment of the upper part of the box. If there is no lower part, this is the complete text content. Feasible values for \texttt{(mode)} are:

- \texttt{visible}: usual type setting of the upper part,
- \texttt{invisible}: empty space instead of the upper part contents.

\begin{Verbatim}
\begin{tcolorbox}[upperbox=\texttt{invisible},colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=\texttt{invisible},colback=white]
This is a \textbf{tcolorbox} (but invisible).
\texttt{tcblower}
This is the lower part.
\end{tcolorbox}
\end{Verbatim}

\texttt{/tcb/visible}
(style, no value)

Shortcut for setting \texttt{/tcb/upperbox}, \texttt{/tcb/lowerbox} and \texttt{/tcb/titlebox} to be \texttt{visible}.

\texttt{/tcb/invisible}
(style, no value)

Shortcut for setting \texttt{/tcb/upperbox}, \texttt{/tcb/lowerbox} and \texttt{/tcb/titlebox} to be \texttt{invisible}.
Saves the content of the box into a file for an optional later usage. This is the counterpart of \texttt{/tcb/savelowerto} \textsuperscript{P. 24}, but is saves not only the upper part but the whole content. If a lower part is present, it is also saved including \texttt{\tcblower} \textsuperscript{P. 12}.

\begin{tcolorbox}[invisible,saveto=\jobname_mysave1.tex,colback=white]
This is a \textbf{tcolorbox} which seems to be empty. The content is saved for later usage.
\end{tcolorbox}

Now, we load the saved text:\
\input{\jobname_mysave1.tex}

\begin{tcolorbox}[saveto=\jobname_mysave2.tex]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

Now, we load the saved text:
\begin{tcolorbox}[colframe=red,colback=red!10,coltitle=black,colbacktitle=red!20,sidebyside,title=Here we see the saved content including the lower part]
\input{\jobname_mysave2.tex}
\end{tcolorbox}

Now, we load the saved text:
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
This is the lower part.
\end{tcolorbox}

Here we see the saved content including the lower part
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
This is the lower part.
\end{tcolorbox}
4.4 Lower Part

\[\texttt{/tcb/lowerbox=(mode)}\] (no default, initially \textbf{visible})

Controls the treatment of the lower part of the box. Feasible values for \(\textit{mode}\) are:

- \textbf{visible}: usual type setting of the lower part,
- \textbf{invisible}: empty space instead of the lower part contents,
- \textbf{ignored}: the lower part is not used (here).

The last two values are usually applied in connection with \texttt{savelowerto}.

\begin{tcolorbox}[lowerbox=invisible,colback=white]
This is a \textbf{tcolorbox}.
\texttt{\textbf{tcblower}}
This is the lower part (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[lowerbox=ignored,colback=white]
This is a \textbf{tcolorbox}.
\texttt{\textbf{tcblower}}
This is the lower part (but ignored).
\end{tcolorbox}

\begin{tcolorbox}[lowerbox=invisible,savelowerto=\jobname_bspsave.tex,colback=white]
This is a \textbf{tcolorbox}.
\texttt{\textbf{tcblower}}
This is the lower part which may be quite complex:
\[f(x) = \frac{1+x^2}{1-x^2}\].
\end{tcolorbox}

Now, we load the saved text:
\begin{verbatim}
\input{\jobname_bspsave.tex}
\end{verbatim}

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
Now, we load the saved text:
This is the lower part which may be quite complex: \[f(x) = \frac{1+x^2}{1-x^2}\].
\end{tcolorbox}
If set to `true`, the lower part is visually separated from the upper part. It depends on the chosen skin how the visualization of the separation is done.
/tcb/savedelimiter=(name)

Used in connection with new environment definitions which extend \tcolorbox and use or allow the option \savelowerto. To catch the end of the new box environment \langle name \rangle has to be the name of this environment. Additionally, the environment definition has to use \textbackslash{tcolorbox} instead of \textbackslash{begin\{tcolorbox\}} and \textbackslash{\end{tcolorbox}} instead of \textbackslash{end\{tcolorbox\}}.

\begin{mybox}{My Example}
Upper part.
\tcblower
Saved lower part!
\end{mybox}

Now, the saved part is used:
\begin{tcolorbox}[colback=green!5]
\input{\jobname_bspsave2.tex}
\end{tcolorbox}

The \texttt{savedelimiter} is used implicitly with \texttt{\newtcolorbox} on P.15 which allows a more convenient usage:

\begin{mybox}{My Example}
Upper part.
\tcblower
Saved lower part!
\end{mybox}

Now, the saved part is used:
\begin{tcolorbox}[colback=green!5]
\input{\jobname_bspsave2.tex}
\end{tcolorbox}
4.5 Colors and Fonts

\[/tcb/colframe=\langle color\rangle\] (no default, initially black!75!white)
Sets the frame \(\langle color\rangle\) of the box.

\[
\begin{tcolorbox}[colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\]
This is a \textbf{tcolorbox}.

\[/tcb/colback=\langle color\rangle\] (no default, initially black!5!white)
Sets the background \(\langle color\rangle\) of the box.

\[
\begin{tcolorbox}[colback=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\]
This is a \textbf{tcolorbox}.

Also see \(/tcb/colbacklower\) \→ P.232 of the \texttt{ skins} library.

\[/tcb/title filled=true|false\] (default true, initially false)
Switches the drawing of the title background according to the given value. This option is set to true automatically by \(/tcb/colbacktitle\), \(/tcb/opacitybacktitle\) \→ P.51, and \(/tcb/title style\) \→ P.159, and \(/tcb/title code\) \→ P.147.

\[
\begin{tcolorbox}[title=My title,title filled]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\]
My title
This is a \textbf{tcolorbox}.

\[
\begin{tcolorbox}[title=My title, title filled=false]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\]
My title
This is a \textbf{tcolorbox}.

\[/tcb/colbacktitle=\langle color\rangle\] (no default, initially black!50!white)
Sets the background \(\langle color\rangle\) of the title area of the box.

\[
\begin{tcolorbox}[colbacktitle=red!50!white, title=My title, coltitle=black, fonttitle=\bfseries]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\]
My title
This is a \textbf{tcolorbox}.
/tcb/colupper=(color) (no default, initially black)
Sets the text (color) of the upper part.

\begin{tcolorbox}[colupper=red!75!black]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tcb/collower=(color) (no default, initially black)
Sets the text (color) of the lower part.

\begin{tcolorbox}[collower=red!75!black]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tcb/coltext=(color) (style, no default, initially black)
Sets the text (color) of the box. This is an abbreviation for setting colupper and collower to the same value.

\begin{tcolorbox}[coltext=red!75!black]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tcb/coltitle=(color) (no default, initially white)
Sets the title text (color) of the box.

\begin{tcolorbox}[coltitle=red!75!black, colbacktitle=black!10!white, title=Test]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
/tcb/fontupper=(text)  (no default, initially empty)
Sets <text> before the content of the upper part (e.g. font settings).

\begin{tcolorbox}[fontupper=Hello!\sffamily]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Hello! This is a \textbf{tcolorbox}.

/tcb/fontlower=(text)  (no default, initially empty)
Sets <text> before the content of the lower part (e.g. font settings).

\begin{tcolorbox}[fontlower=\sffamily\bfseries]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

This is the lower part.

/tcb/fonttitle=(text)  (no default, initially empty)
Sets <text> before the content of the title text (e.g. font settings).

\begin{tcolorbox}[fonttitle=\sffamily\bfseries\large,title=Hello]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Hello

This is a \textbf{tcolorbox}.

More color options are provided by using skins documented in Section 10 from page 156.
4.6 Text Alignment

/\texttt{tcb/halign}=⟨alignment⟩
(no default, initially \texttt{justify})

If there is no lower part, \texttt{halign} determines the horizontal ⟨alignment⟩ of the text content. Otherwise, \texttt{halign} determines the horizontal ⟨alignment⟩ of the upper part of the box only. The feasible values for ⟨alignment⟩ are more or less identical to the corresponding \texttt{/tikz/align} settings, even if the implementation differs.

- \texttt{justify}: usual left and right justified type setting.
- \texttt{left}: left border justification in analogy to plain \texttt{\LaTeX}.
- \texttt{flush left}: left border justification with \texttt{\raggedright} of \texttt{\LaTeX}.
- \texttt{right}: right border justification in analogy to plain \texttt{\LaTeX}.
- \texttt{flush right}: right border justification with \texttt{\raggedleft} of \texttt{\LaTeX}.
- \texttt{center}: centering in analogy to plain \texttt{\LaTeX}.
- \texttt{flush center}: centering with \texttt{\centering} of \texttt{\LaTeX}.

The differences between the flush and non-flush version are explained in detail in the \texttt{TikZ} manual [22]. The short story is that the non-flush versions will often look more balanced but with more hyphenations.

\begin{tcolorbox}[adjusted title=flush center, halign=flush center]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=flush left, halign=flush left]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=flush right, halign=flush right]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=center, halign=center]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=left, halign=left]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=right, halign=right]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=flush center, halign=flush center, colback=red!5!white, colframe=red!75!black, size=small, fonttitle=\bfseries, width=3.5cm, box align=top, nobeforeafter]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=flush left, halign=flush left, colback=red!5!white, colframe=red!75!black, size=small, fonttitle=\bfseries, width=3.5cm, box align=top, nobeforeafter]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=flush right, halign=flush right, colback=red!5!white, colframe=red!75!black, size=small, fonttitle=\bfseries, width=3.5cm, box align=top, nobeforeafter]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=center, halign=center, colback=red!5!white, colframe=red!75!black, size=small, fonttitle=\bfseries, width=3.5cm, box align=top, nobeforeafter]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=left, halign=left, colback=red!5!white, colframe=red!75!black, size=small, fonttitle=\bfseries, width=3.5cm, box align=top, nobeforeafter]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=right, halign=right, colback=red!5!white, colframe=red!75!black, size=small, fonttitle=\bfseries, width=3.5cm, box align=top, nobeforeafter]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\texttt{tcbset}={colback=red!5!white, colframe=red!75!black, size=small, fonttitle=\bfseries, width=3.5cm, box align=top, nobeforeafter}

/\texttt{tcb/halign upper}=⟨alignment⟩
(no default, initially \texttt{justify})

Alias for /\texttt{tcb/halign}.
halign lower determines the horizontal \textit{alignment} of the lower part of the box. The feasible values for \textit{alignment} are the same as for /tcbl align \textsuperscript{P.30}. 

\begin{tcbraster}[raster columns=3,fonttitle=\bfseries,  
colback=red!5!white,colframe=red!75!black]
\begin{tcolorbox}[adjusted title=flush center,halign lower=flush center]  
Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush left,halign lower=flush left]  
Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush right,halign lower=flush right]  
Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=center,halign lower=center]  
Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=left,halign lower=left]  
Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=right,halign lower=right]  
Upper part. \tcblower Lower part.
\end{tcolorbox}
\end{tcbraster}
/tcb/halign title={alignment}  

*halign lower* determines the horizontal *(alignment)* of the title of the box. The feasible values for *(alignment)* are the same as for */tcb/halign* → P.30.

```
\begin{tcbraster}
[raster columns=3,fonttitle=\bfseries, colback=red!5!white,colframe=red!75!black]
\begin{tcolorbox}[adjusted title=flush center,halign title=flush center]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush left,halign title=flush left]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush right,halign title=flush right]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=center,halign title=center]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=left,halign title=left]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=right,halign title=right]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcbraster}
```

**flush center**

This is a tcolorbox.

**flush left**

This is a tcolorbox.

**flush right**

This is a tcolorbox.

**center**

This is a tcolorbox.

**left**

This is a tcolorbox.

**right**

This is a tcolorbox.

/tcb/flushleft upper  

Shortcut for setting */tcb/halign* → P.30 to **flush left**.

/tcb/center upper  

Shortcut for setting */tcb/halign* → P.30 to **flush center**.

/tcb/flushright upper  

Shortcut for setting */tcb/halign* → P.30 to **flush right**.

/tcb/flushleft lower  

Shortcut for setting */tcb/halign lower* → P.31 to **flush left**.

/tcb/center lower  

Shortcut for setting */tcb/halign lower* → P.31 to **flush center**.

/tcb/flushright lower  

Shortcut for setting */tcb/halign lower* → P.31 to **flush right**.
The vertical alignment settings are only relevant for boxes which are larger than their natural height, see Section 4.10 on page 53.

/tcb/valign\langle alignment\rangle (no default, initially top)

If the height of a tcolorbox is not the natural height, valign determines the vertical \langle alignment\rangle of the upper part. Feasible values are:
- top: Anchor text at top.
- center: Anchor text at center.
- bottom: Anchor text at bottom.
- scale: Scale text vertically to fit into the available space. This is brutal and may not look very good. Consider Section 22 on page 439 alternatively.
- scale*: Like scale, but scaling is bounded by /tcb/valign scale limit.

For a box with natural height, these settings are meaningless.

\begin{tcolorbox}
  \begin{tcolorbox}[valign=\textbf{top}]
  This is a \textbf{tcolorbox}.
  \end{tcolorbox}
  \begin{tcolorbox}[valign=\textbf{center}]
  This is a \textbf{tcolorbox}.
  \end{tcolorbox}
  \begin{tcolorbox}[valign=\textbf{bottom}]
  This is a \textbf{tcolorbox}.
  \end{tcolorbox}
  \begin{tcolorbox}[valign=\textbf{scale}]
  This is a \textbf{tcolorbox}.
  \end{tcolorbox}
\end{tcolorbox}

/tcb/valign upper\langle alignment\rangle (no default, initially top)

Alias for /tcb/valign.

/tcb/valign lower\langle alignment\rangle (no default, initially top)

This key has the same meaning for the lower part as valign for the upper part, i.e., it determines the vertical \langle alignment\rangle of the lower part with feasible values top, center, bottom, scale, and scale*.

/tcb/valign scale limit\langle real number\rangle (no default, initially 1.1)

Sets an upper scale limit for the scale* setting in /tcb/valign and /tcb/valign lower. Note that this value is not reset by /tcb/reset\rightarrow P.112. So, changes also apply to embedded boxes.

Also see /tcb/sidebyside align\rightarrow P.124 for alignment settings when upper part and lower part are set side-by-side.
4.7 Geometry

4.7.1 Width

\texttt{/tcb/width=(length)} \hspace{1cm} (no default, initially \texttt{\linewidth})

Sets the total width of the colored box to \texttt{\linewidth}. See also \texttt{/tcb/height} \textsuperscript{P.53}.

\begin{verbatim}
\tcset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[width=\linewidth/2]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

This is a \textbf{tcolorbox}.

\texttt{/tcb/text width=(length)} \hspace{1cm} (style, no default)

Sets the text width of the upper part to \texttt{\linewidth}. See also \texttt{/tcb/text height} \textsuperscript{P.54}.

\begin{verbatim}
\tcset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[text width=4cm]
This is a \textbf{tcolorbox} where the text has a width of 4cm.
\end{tcolorbox}
\end{verbatim}

This is a \textbf{tcolorbox} where the text has a width of 4cm.

\texttt{/tcb/add to width=(length)} \hspace{1cm} (style, no default)

Adds \texttt{\linewidth} to the current total width of the colored box.

\begin{verbatim}
\tcset{width=4cm,colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[add to width=1cm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

This is a \textbf{tcolorbox}.

This is a \textbf{tcolorbox}.

See Section 4.10 on page 53 for setting fixed height values.
4.7.2 Rules

/\texttt{tcbrule}=\langle length \rangle  
(no default, initially 0.5mm)
Sets the line width of the top rule to \langle length \rangle.

\begin{tcolorbox}[toprule=3mm]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a tcolorbox.

/\texttt{tcbrule}=\langle length \rangle  
(no default, initially 0.5mm)
Sets the line width of the bottom rule to \langle length \rangle.

\begin{tcolorbox}[bottomrule=3mm]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a tcolorbox.

/\texttt{tcbrule}=\langle length \rangle  
(no default, initially 0.5mm)
Sets the line width of the left rule to \langle length \rangle.

\begin{tcolorbox}[leftrule=3mm]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a tcolorbox.

/\texttt{tcbrule}=\langle length \rangle  
(no default, initially 0.5mm)
Sets the line width of the right rule to \langle length \rangle.

\begin{tcolorbox}[rightrule=3mm]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a tcolorbox.
\texttt{/tcb/titlerule=\langle length \rangle} \hspace{1cm} (no default, initially 0.5\text{mm})

Sets the line width of the rule below the title to \langle length \rangle.

```
\tcbset{enhanced,colback=red!5!white,colframe=red!75!black, colbacktitle=red!90!black}
\begin{tcolorbox}[titlerule=3mm,title=This is the title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

```
This is the title
This is a tcolorbox.
```

\texttt{/tcb/boxrule=\langle length \rangle} \hspace{1cm} (style, no default, initially 0.5\text{mm})

Sets all rules of the frame to \langle length \rangle, i.e. \texttt{/tcb/toprule \rightarrow P.35}, \texttt{/tcb/bottomrule \rightarrow P.35}, \texttt{/tcb/leftrule \rightarrow P.35}, \texttt{/tcb/ritrue \rightarrow P.35}, and \texttt{/tcb/titlerule}.

```
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[boxrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

```
This is a tcolorbox.
```

More options for drawing a \texttt{/tcb/borderline \rightarrow P.186} are provided by using skins documented in Section 10 from page 156.

### 4.7.3 Arcs

\texttt{/tcb/arc=\langle length \rangle} \hspace{1cm} (no default, initially 1mm)

Sets the inner radius of the four frame arcs to \langle length \rangle.

```
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[arc=0mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

```
This is a tcolorbox.
```

```
\begin{tcolorbox}[arc=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

```
This is a tcolorbox.
```

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If the height of the box is smaller than the width, the result will look quite ugly.

\begin{tcolorbox}[width=3cm, colback=red!5!white, colframe=red!75!black, halign=center,valign=center, square,circular arc]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This only works for a fixed \texttt{tcb/height}\textsuperscript{P.53}. Also, \texttt{tcb/bean arc} must be used after \texttt{width} and \texttt{height} are set by option keys.

\begin{tcolorbox}[width=3cm,height=2cm, bean arc]
Box A
\end{tcolorbox}

\begin{tcolorbox}[width=2cm,height=3cm, bean arc]
Box B
\end{tcolorbox}

Sets \texttt{tcb/arc}\textsuperscript{P.36} to match \(\frac{1}{2+\sqrt{2}}\) of the inner width of the colored box. If width and height of the box are identical, the interior is a regular octogon.

\begin{tcolorbox}[enhanced, size=minimal,auto outer arc, width=2.1cm,octogon arc, colback=red,colframe=white,colupper=white, fontupper=\fontsize{7mm}{7mm}\selectfont\bfseries\sffamily, halign=center,valign=center, square,arc is angular, borderline={0.2mm}{-1mm}{red} ]
STOP
\end{tcolorbox}
/tcb/arc is angular (no value, initially unset)

Using this option applies a patch which straightens the corners arcs of the boxes. The little arcs are replaced by little straight lines.

This patch is considered as an experimental feature. It changes some of the original TikZ code. This change may break with future updates of TikZ.

\tcbset{colback=red!5!white,colframe=red!75!black, arc=3mm}
\begin{tcolorbox}[arc is angular]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[arc is curved]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/arc is curved (no value, initially set)

This option resets the patch from /tcb/arc is angular. The original TikZ code is activated.

/tcb/outer arc=(length) (no default, initially unset)

Sets the outer radius of the four frame arcs to \langle length \rangle.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[arc=4mm,outer arc=1mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/auto outer arc (no value, initially set)

Sets the outer radius of the four frame arcs automatically in dependency of the inner radius given by /tcb/arc \textsuperscript{P.36}. 

This is a \textbf{tcolorbox}. 

This is a \textbf{tcolorbox}. 

This is a \textbf{tcolorbox}. 

This is a \textbf{tcolorbox}. 

This is a \textbf{tcolorbox}.
4.7.4 Spacing

\texttt{/tcb/boxsep=⟨\textit{length}⟩} (no default, initially 1mm)

Sets a common padding of \textit{⟨length⟩} between the text content and the frame of the box. This value is added to the key values of \texttt{left}, \texttt{right}, \texttt{top}, \texttt{bottom}, and \texttt{middle} at the appropriate places.

\begin{verbatim}
\tcbs{
colback=red!5!white, colframe=red!75!black, width=(\linewidth-4mm)/2,
before=,after=\hfill}

\begin{tcolorbox}[boxsep=5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[boxsep=5mm,draft]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

This is a tcolorbox.

\texttt{/tcb/left=⟨\textit{length}⟩} (style, no default, initially 4mm)

Sets the left space between all text parts and frame (additional to boxsep). This is an abbreviation for setting \texttt{lefttitle}, \texttt{leftupper}, and \texttt{leftlower} to the same value.

\begin{verbatim}
\tcbs{
colback=red!5!white, colframe=red!75!black}

\begin{tcolorbox}[left=0mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

This is a tcolorbox.

\texttt{/tcb/left*=⟨\textit{length}⟩} (style, no default)

Sets \texttt{/tcb/left} such that \textit{⟨length⟩} is the distance between the left bounding box and the text parts.

\begin{verbatim}
\tcbs{
colback=red!5!white, colframe=red!75!black}

This is some text.
\begin{tcolorbox}[grow to left by=5mm, left*=0mm,
                 enhanced, show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

This is some text.
/tcb/lef	title\!(length)  
(no default, initially 4mm)  
Sets the left space between title text and frame (additional to boxsep).

\begin{tcolorbox}  
\[\text{lefttitle}=3cm,\text{title}=\text{My Title}\]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My Title  

This is a \textbf{tcolorbox}.

/tcb/lef	upper\!(length)  
(no default, initially 4mm)  
Sets the left space between upper text and frame (additional to boxsep).

\begin{tcolorbox}  
\[\text{leftupper}=3cm,\text{title}=\text{My Title}\]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My Title  

This is a \textbf{tcolorbox}.

/tcb/lef	lower\!(length)  
(no default, initially 4mm)  
Sets the left space between lower text and frame (additional to boxsep).

\begin{tcolorbox}  
\[\text{leftlower}=3cm\]  
\tcblower  
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

This is the lower part.

/tcb/right\!(length)  
(style, no default, initially 4mm)  
Sets the right space between all text parts and frame (additional to boxsep). This is an abbreviation for setting \textit{righttitle}, \textit{rightupper}, and \textit{rightlower} to the same value.

\begin{tcolorbox}  
\[\text{width}=5cm,\text{right}=2cm\]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.  

This is a \textbf{tcolorbox}.  

This is a \textbf{tcolorbox}.
Sets \texttt{/tcb/right**}=\langle length\rangle such that \langle length\rangle is the distance between the right bounding box and the text parts.

\begin{quote}
\verb|\flushright| This is some text.
\verb|\begin{tcolorbox}[grow to right by=5mm, right**=0mm, halign=right,enhanced,show bounding box]|
This is a \texttt{\textbf{tcolorbox}}.
\verb|\end{tcolorbox}|
\end{quote}

\begin{quote}
This is some text.
\end{quote}

\begin{quote}
This is a \texttt{tcolorbox}.
\end{quote}

\begin{quote}
\verb|\begin{tcolorbox}[width=5cm, righttitle=2cm, title=My very long title text]|
This is a \texttt{tcolorbox} with standard upper box dimensions.
\verb|\end{tcolorbox}|
\end{quote}

\begin{quote}
This is a \texttt{tcolorbox} with compressed upper box dimensions.
\end{quote}

\begin{quote}
\verb|\begin{tcolorbox}[width=5cm, rightupper=2cm, title=My very long title text]|
This is a \texttt{tcolorbox} with standard upper box dimensions.
\verb|\end{tcolorbox}|
\end{quote}

\begin{quote}
This is a \texttt{tcolorbox} with compressed upper box dimensions.
\end{quote}
/tcb/rightlower=(length) 
(no default, initially 4mm)
Sets the right space between lower text and frame (additional to boxsep).

\begin{tcolorbox}
\tcblower
This is the lower part with large space at right.
\end{tcolorbox}

/tcb/top=(length) 
(no default, initially 2mm)
Sets the top space between text and frame (additional to boxsep).

\begin{tcolorbox}
\tcblower
This is the lower part.
\end{tcolorbox}

/tcb/toptitle=(length) 
(no default, initially 0mm)
Sets the top space between title and frame (additional to boxsep).

\begin{tcolorbox}
\tcblower
This is the lower part.
\end{tcolorbox}
/tcb/bottom=(length) (no default, initially 2\,mm)
Sets the bottom space between text and frame (additional to boxsep).

\begin{tcolorbox}[bottom=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/bottomtitle=(length) (no default, initially 0\,mm)
Sets the bottom space between title and frame (additional to boxsep).

\begin{tcolorbox}[bottomtitle=3mm,title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.

/tcb/middle=(length) (no default, initially 2\,mm)
Sets the space between upper and lower text to the separation line (additional to boxsep).

\begin{tcolorbox}[middle=0mm,boxsep=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.
4.7.5 Size Shortcuts

\tcb{size=(name)} \hspace{1cm} \text{(no default, initially \texttt{normal})}

Sets all geometry keys with exception of \texttt{/tcb/width}^P.34 to predefined length values. For \texttt{(name)}, the following values are feasible:
- \texttt{normal}: normal sized boxes e.g. of width \texttt{\linewidth}.
- \texttt{title}: title line sized boxes.
- \texttt{small}: small boxes e.g. for keyword highlighting.
- \texttt{fbox}: identical to the standard \texttt{\fbox}.
- \texttt{tight}: no padding space at all.
- \texttt{minimal}: no padding space, no box rules.

\begin{verbatim}
\tcset{colback=red!5!white,colframe=red!75!black}
\foreach \s in {normal,title,small,fbox,tight,minimal} { \tcbox[size=\s,on line]{\s} }
\foreach \s in {normal,title,small,fbox,tight,minimal} { \tcbox[size=\s,on line,title=Test]{\s} }
\foreach \s in {normal,title,small,fbox,tight,minimal} { \begin{tcolorbox}[size=\s,on line,title=Test,width=2.2cm] \s \tcblower\end{tcolorbox} }
\end{verbatim}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|c|}
\hline
 & normal & title & small & fbox & tight & minimal \\
\hline
\texttt{boxrule} & 0.5mm & 0.4mm & 0.3mm & 0.4pt & 0.4pt & 0.0pt \\
\texttt{boxsep} & 1.0mm & 1.0mm & 1.0mm & 3.0pt & 0.0pt & 0.0pt \\
\texttt{left} & 4.0mm & 2.0mm & 1.0mm & 0.0pt & 0.0pt & 0.0pt \\
\texttt{right} & 4.0mm & 2.0mm & 1.0mm & 0.0pt & 0.0pt & 0.0pt \\
\texttt{top} & 2.0mm & 0.25mm & 0.0mm & 0.0pt & 0.0pt & 0.0pt \\
\texttt{bottom} & 2.0mm & 0.25mm & 0.0mm & 0.0pt & 0.0pt & 0.0pt \\
\texttt{toptitle} & 0.0mm & 0.0mm & 0.0mm & 0.0pt & 0.0pt & 0.0pt \\
\texttt{bottomtitle} & 0.0mm & 0.0mm & 0.0mm & 0.0pt & 0.0pt & 0.0pt \\
\texttt{middle} & 2.0mm & 0.75mm & 0.5mm & 1.0pt & 0.2pt & 0.0pt \\
\texttt{arc} & 1.0mm & 0.75mm & 0.5mm & 1.0pt & 0.0pt & 0.0pt \\
\texttt{outer arc} & auto & auto & auto & auto & 0.0pt & 0.0pt \\
\hline
\end{tabular}
\caption{Predefined values}
\end{table}
Sets the text width of the upper part to the current line width plus an optional \textit{length}. This is achieved by changing the keys \texttt{/tcb/width} \cite{page 34} \texttt{/tcb/enlarge left by} \cite{page 89}, and \texttt{/tcb/enlarge right by} \cite{page 89} appropriately. The resulting box is overlapping into the left and right margin of the page. Note that this style option has to be given \textit{after} all other geometry keys! Also see \texttt{/tcb/grow sidewards by} \cite{page 91} and \texttt{/tcb/spread sidewards} \cite{page 94}.

\begin{tcolorbox}[oversize,title=Oversized box]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[title=Normal box]
\lipsum[2]
\end{tcolorbox}


4.7.6 Toggle Left and Right

\[ \text{/tcb/toggle left and right}=(\text{toggle preset}) \quad (\text{default evenpage, initially none}) \]

According to the \textit{(toggle preset)}, the left and the right settings of the \texttt{tcolorbox} are switched or not. Feasible values are:

- \texttt{none}: no switching.
- \texttt{forced}: the values of the left and right rules, spaces, and corners are switched.
- \texttt{evenpage}: if the page is an even page, the values of the left and right rules, spaces, and corners are switched. This value also sets \texttt{/tcb/check odd page}\textsuperscript{\texttt{P.107}} to \texttt{true}.

Horizontal bounding box enlargements are not toggled by this option. They can be toggled independently by \texttt{/tcb/toggle enlargement}\textsuperscript{\texttt{P.92}}. For example, \texttt{/tcb/oversize}\textsuperscript{\texttt{P.45}} changes the bounding box.

\begin{tcolorbox}
\[ \begin{aligned}
\text{\texttt{\begin{tcolorbox}[enhanced,breakable, toggle left and right,sharp corners, boxrule=0mm,top=0mm,bottom=0mm,left=1mm,right=1mm, rightrule=1cm,colupper=blue!25!black, interior style={fill overzoom image=lichtspiel.jpg,fill image opacity=0.25}, frame style={pattern=crosshatch dots light steel blue}, overlay={(\% \begin{tcbclipframe}
\texttt{\tcbifoddpage}{\coordinate (X) at ([xshift=-5mm]frame.east);}
{\coordinate (X) at ([xshift=5mm]frame.west);}
{\fill[shading=ball,ball color=blue!50!white,opacity=0.5] (X) circle (4mm);}
\end{tcbclipframe})}}\texttt{\lipsum[1-6]}\end{aligned}}\]
\end{tcolorbox}

This example switches a 1cm thick rule from the left to the right side depending on the page number. Thereby, the rule is always on the outer side of the double-sided paper. Additionally, a ball is drawn on the outer side with help of an overlay.


4.8 Corners

The four corners of any \texttt{tcolorbox} can be set individually as \texttt{/tcb/sharp corners} or as \texttt{/tcb/rounded corners} \textsuperscript{P.49}. These settings are also reflected in the behavior of \texttt{/tcb/borderline} \textsuperscript{P.186} and \texttt{/tcb/shadow} \textsuperscript{P.197} as one would expect.

By default, all four corners are \textit{rounded}. So, only the \texttt{/tcb/sharp corners} option will be necessary for most use cases. The \texttt{/tcb/rounded corners} \textsuperscript{P.49} option can be used to revert a \texttt{/tcb/sharp corners} setting.

\texttt{/tcb/sharp corners=⟨position⟩}  
(default all, initially unset)

The \texttt{⟨position⟩} denotes one or more of the four box corners to be set as \textit{sharp} corners. The not assigned corners will retain their mode. Feasible values for \texttt{⟨position⟩} are:

- northwest
- northeast
- southwest
- southeast
- north
- south
- east
- west
- downhill
- uphill
- all

\begin{verbatim}
\begin{tcolorbox}[colback=red!5!white,  
colframe=red!75!black,  
sharp corners=northwest ]  
This is a \textbf{tcolorbox}. 
\end{tcolorbox}
\end{verbatim}

This is a \textbf{tcolorbox}.

\begin{verbatim}
\begin{tcolorbox}[colback=red!5!white,  
colframe=red!75!black,  
sharp corners ]  
This is a \textbf{tcolorbox}. 
\end{tcolorbox}
\end{verbatim}

This is a \textbf{tcolorbox}.
/tcb/rounded corners=(position)  
(default all, initially all)

The /tcb/rounded corners can be used to revert a /tcb/sharp corners → P.48 setting. The (position) denotes one or more of the four box corners to be set as rounded corners. The not assigned corners will retain their mode. Feasible values for (position) are:

- northwest
- northeast
- southwest
- southeast
- north
- south
- east
- west
- downhill
- uphill
- all

\begin{tcolorbox}[colback=red!5!white,  
colframe=red!75!black,sharp corners,  
rounded corners=northwest ]  
This is a \textbf{tcolorbox}.  
@end{tcolorbox}

\begin{tcolorbox}[colback=red!5!white,  
colframe=red!75!black,sharp corners ]  
This is a \textbf{tcolorbox}.  
@end{tcolorbox}

/tcb/sharpish corners  
(style, no value)

Shortcut for setting /tcb/arc → P.36 and /tcb/outer arc → P.38 to 0pt. With this setting, rounded corners will appear as quasi-sharp, but e.g. the shadow will be somewhat rounder than the shadow of really sharp corners.

! Corners are still of type rounded with this option, but appear sharp. To switch back to rounded corners, one has to adapt /tcb/arc → P.36 and /tcb/outer arc → P.38.

\begin{tcolorbox}[colback=red!5!white,  
colframe=red!75!black, sharpish corners ]  
This is a \textbf{tcolorbox}.  
@end{tcolorbox}

\begin{tcolorbox}[colback=red!5!white,  
colframe=red!75!black, sharpish corners ]  
This is a \textbf{tcolorbox}.  
@end{tcolorbox}

\footnotesize{The graphical examples assume that the boxes where set to have sharp corners before.}
The following examples will show the differences between \texttt{tcb/rounded corners} \textsuperscript{P.49}, \texttt{tcb/sharpish corners} \textsuperscript{P.49}, and \texttt{tcb/sharp corners} \textsuperscript{P.48}. The later two give the same core box, but \texttt{tcb/borderline} \textsuperscript{P.186} and \texttt{tcb/shadow} \textsuperscript{P.197} settings are slightly different. The following examples use \texttt{tcb/drop fuzzy shadow} \textsuperscript{P.191}. 

\begin{tcolorbox}
My title
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\textit{rounded corners}

\begin{tcolorbox}
My title
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\textit{sharpish corners}

\begin{tcolorbox}
My title
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\textit{sharp corners}
4.9 Transparency

Transparency effects are likely to be used in conjunction with jigsaw skin variants, see Section 10.11 on page 210.

/tcb/opacityframe=(fraction) (no default, initially 1.0)
Sets the frame opacity of the box to the given \texttt{(fraction)}.

\begin{tcolorbox}[opacityframe=0.25, colframe=red]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Also see \texttt{/tcb/opacitybacklower}\textsuperscript{P.232} of the \texttt{skins} library.

/tcb/opacityback=(fraction) (no default, initially 1.0)
Sets the background opacity of the box to the given \texttt{(fraction)}.

\begin{tcolorbox}[standard jigsaw, colframe=red, opacityframe=0.5, opacityback=0.5]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/opacitybacktitle=(fraction) (no default, initially 1.0)
Sets the title background opacity of the box to the given \texttt{(fraction)}.

\begin{tcolorbox}[standard jigsaw, colframe=red, opacityframe=0.5, opacitybacktitle=0.5, title filled, title=This is a title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/opacityfill=(fraction) (style, no default, initially 1.0)
Sets the fill opacity for frame, interior and optionally the title background to the given \texttt{(fraction)}.

\begin{tcolorbox}[standard jigsaw, colframe=red, opacityfill=0.7, title=This is a title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
/tcb/opacityupper = \langle fraction \rangle  
(no default, initially 1.0)
Sets the text opacity of the upper box part to the given \langle fraction \rangle.

\begin{tcolorbox}
[enhanced, opacityupper=0.5, interior] 
\begin{itemize}
\item This is a \textbf{tcolorbox}.
\end{itemize}
\end{tcolorbox}

/tcb/opacitylower = \langle fraction \rangle  
(no default, initially 1.0)
Sets the text opacity of the lower box part to the given \langle fraction \rangle.

\begin{tcolorbox}
[enhanced, opacitylower=0.5, interior] 
\begin{itemize}
\item This is a \textbf{tcolorbox}.
\end{itemize}
\end{tcolorbox}

/tcb/opacitytext = \langle fraction \rangle  
(no default, initially 1.0)
Sets the text opacity of the upper and the lower box part to the given \langle fraction \rangle.

\begin{tcolorbox}
[enhanced, opacitytext=0.5, interior] 
\begin{itemize}
\item This is a \textbf{tcolorbox}.
\end{itemize}
\end{tcolorbox}

/tcb/opacitytitle = \langle fraction \rangle  
(no default, initially 1.0)
Sets the text opacity of the box title to the given \langle fraction \rangle.

\begin{tcolorbox}
[enhanced, opacitytitle=0.7, coltitle=black, fonttitle=\bfseries, title=This is a title, title] 
\begin{itemize}
\item This is a \textbf{tcolorbox}.
\end{itemize}
\end{tcolorbox}
4.10 Height Control

In a typical usage scenario, the height of a \texttt{tcolorbox} is computed automatically to fit the content. Nevertheless, the height can be set to a fixed value or to fit commonly for several boxes, e.g. if boxes are set side by side.

\begin{tcolorbox}[height=1cm, valign=center]
This box has a height of 1cm.
\end{tcolorbox}

\begin{tcolorbox}[height=2cm, valign=center]
This box has a height of 2cm.
\end{tcolorbox}

\begin{tcolorbox}[height=3cm, split=0.5, valign=center, valign lower=center]
This box has a height of 3cm.
tcblower
Lower part.
\end{tcolorbox}

\begin{tcolorbox}[height=1cm]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[height=1cm, height plus=1cm]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[height=1cm, height plus=1cm]
This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, left=1mm, top=1mm, bottom=1mm, right=1mm, boxsep=0mm, width=3cm, nobeforeafter]
\begin{tcolorbox}[height=1cm]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[height=1cm, height plus=1cm]
This is a tcolorbox. This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[height=1cm, height plus=1cm]
This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.
\end{tcolorbox}

The height control keys are only applicable to unbreakable boxes. If a box is set to be \texttt{/tcb/breakable} \cite{P.390}, the height is always computed according to the \textit{natural height}.

\texttt{/tcb/natural height} \hfill (no value, initially set)

Sets the total height of the colored box to its natural height depending on the box content.

\texttt{/tcb/height=⟨length⟩} \hfill (no default)

Sets the total height of the colored box to \langle length \rangle independent of the box content. \langle length \rangle is the minimum height of the box, if \texttt{/tcb/height plus} is larger than zero.

\texttt{/tcb/height plus=⟨length⟩} \hfill (no default, initially \texttt{0pt})

The box may extend a given fixed \texttt{/tcb/height} up to the given \langle length \rangle.
Sets the box height to a dimension between \( \min \) and \( \max \).

\%
\usepackage{lipsum}
\newtcolorbox{mybox}{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,
bottom=1mm,right=1mm,boxsep=0mm,width=4.5cm,nobeforeafter,
height from=2cm to 8cm}
\begin{mybox}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}
This is a \textbf{tcolorbox}. This is a \textbf{tcolorbox}. This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}
\lipsum[2]
\end{mybox}
\begin{mybox}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}
This is a \textbf{tcolorbox}. This is a \textbf{tcolorbox}. This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}
\lipsum[2]
\end{mybox}
\begin{mybox}
This is a \textbf{tcolorbox} where the text area has a height of 2cm.
\end{mybox}

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[text height=2cm]
This is a \textbf{tcolorbox} where the text area has a height of 2cm.
\end{tcolorbox}

/tcb/add to height=$\langle length \rangle$

(Style, no default)

Adds $\langle length \rangle$ to the current height of the colored box. /tcb/height\textsuperscript{p. 53} has to be set before this key is used! If this option is used several times, then the /tcb/height\textsuperscript{p. 53} is also increased several times.

\begin{tcolorbox}
\begin{tcolorbox}[add to height=1cm]
This box has a height of 3cm.
\end{tcolorbox}
\end{tcolorbox}
\begin{tcolorbox}
This box has a height of 2cm.
\end{tcolorbox}

/tcb/add to natural height=$\langle length \rangle$

(Style, no default)

The application of this option generates a box with natural height plus the given $\langle length \rangle$. If this option is used several times, then the last setting of $\langle length \rangle$ wins. The resulting box is not considered a fixed height box and the implementation is quite different to /tcb/add to height.

\begin{tcolorbox}
\begin{tcolorbox}[add to natural height=1cm]
This box has natural height plus 1 cm.
\end{tcolorbox}
\end{tcolorbox}
\begin{tcolorbox}
This box has natural height.
\end{tcolorbox}
If set to `true`, the height of the `tcolorbox` is set to the rest of the available vertical space of the current page. If set to `maximum`, the page is compressed as much as possible. Note that the `tcolorbox` is always set as its own paragraph using this option. Also see `/tcb/text fill` → P.69.

Note that the library `breakable` has to be loaded to use this key!

This height control key is only applicable to unbreakable boxes, but it uses code from the library `breakable`. The counterpart for breakable boxes is `/tcb/height fixed` → P.396.

This option can and should not be used for boxes in boxes, but it can be used for boxes inside a `tcbraster` → P.300.

```latex
\begin{tcolorbox}[height fill,  
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,  
title=Box which fills the rest of the page]
\lipsum[1]
\end{tcolorbox}
```

If this option is used for a \texttt{tcolorbox} which is embedded inside another (outer) \texttt{tcolorbox} and if this outer \texttt{tcolorbox} has a fixed height, then the given \texttt{(fraction)} of the available text height of the outer \texttt{tcolorbox} is used as \texttt{/tcb/height^\textit{P.53}} for the current \texttt{tcolorbox}. Otherwise, \texttt{/tcb/natural\ height^\textit{P.53}} is applied for the current \texttt{tcolorbox}.

\begin{verbatim}
\tcbset{colframe=blue!75!black,colback=white,fonttitle=\bfseries}

\begin{tcolorbox}[title=Outer box with fixed height 4cm,height=4cm]
  \begin{tcolorbox}[title=Inner box,nobeforeafter,inherit height]
    This inner box matches the available space.
  \end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}[title=Outer box with natural height]
  \begin{tcolorbox}[title=Inner box,nobeforeafter,inherit height]
    This inner box has its natural height.
  \end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}[title=Outer box with fixed height 5cm,height=5cm]
  \begin{tcolorbox}[colframe=red,beforeafter skip=0pt,inherit height=0.6]
    Deeply nested box using 60 percent of the available space.
  \end{tcolorbox}
  \begin{tcolorbox}[colframe=red,beforeafter skip=0pt,inherit height=0.4]
    Deeply nested box using 40 percent of the available space.
  \end{tcolorbox}
\end{tcolorbox}
\end{verbatim}
Sets `/tcb/height` to match the width of the colored box.

```
\begin{tcolorbox}
[width=3cm, 
colback=red!5!white, 
colframe=red!75!black, 
halign=center, valign=center, 
square]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a `tcolorbox`.

If the height of a `tcolorbox` is not the natural height, the space difference between the forced and the natural size is distributed between the upper and the lower part of the box. This space could also be negative. \textit{(fraction)} with a value between 0 and 1 is the amount of space which is added to the upper part, the rest is added to the lower part. If there is no lower part, then all of the space is added to the upper part always.

```
\tcbset{width=(\linewidth-2mm)/3,before=,after=\hfill, 
colframe=blue!75!black,colback=white,height=3cm} 
\foreach \f in {0.2,0.4,0.7} 
{\begin{tcolorbox}[space=\f] 
  This is the upper part. 
  \tcblower 
  This is the lower part. 
\end{tcolorbox}}
```

This is the upper part.

This is the lower part.

This is the upper part.

This is the lower part.

This is the upper part.

This is the lower part.

This is the upper part.

This is the lower part.

This is an abbreviation for `space=1`, i.e. all extra space is added to the upper part.

This is an abbreviation for `space=0`, i.e. all extra space is added to the lower part (if there is any).
/tcb/space to both

This is an abbreviation for \texttt{space=0.5}, i.e. the extra space equally distributed between the upper and the lower part.

\begin{tcolorbox}[width=(\linewidth-2mm)/3,before=,after=\hfill, colframe=blue!75!black,colback=white,height=3cm]
\foreach \myspace in {space to upper,space to both,space to lower}
{\begin{tcolorbox}\\[2mm]\myspace\\[1mm]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[colframe=blue!75!black,colback=white,height=3cm, space to=\myspace]
This is my box of height 3cm. The space is filled with a picture:\\\[2mm]\includegraphics[width=\linewidth,height=\myspace]{goldshade.png}\\[1mm]
This is some other text.
\end{tcolorbox}

\texttt{/tcb/space to=\langle macro\rangle}

(no default, initially unset)

If the height of a \texttt{tcolorbox} is not the natural height, the space difference between the forced and the natural size is saved into the given local \langle \textit{macro}\rangle. This \langle \textit{macro}\rangle can and should be used inside the box content to add content which is vertically sized to match \langle \textit{macro}\rangle.

\begin{itemize}
\item The actual length saved into \langle \textit{macro}\rangle is adapted dynamically during several compilations – at least two, but maybe more.
\item Due to the adaption algorithm, objects can be sized with \langle \textit{macro}\rangle plus any offset length.
\item Never ever use \langle \textit{macro}\rangle multiplied with a factor. The only exception to this rule is that the space can be split into parts which sum to \langle \textit{macro}\rangle.
\item Never use this in combination with \texttt{/tcb/fit} \textsuperscript{P.442}.
\end{itemize}

\begin{tcolorbox}[colframe=blue!75!black,colback=white,height=3cm, space to=\myspace]
This is my box of height 3cm. The space is filled with a picture:\\\[2mm]\includegraphics[width=\linewidth,height=\myspace]{goldshade.png}\\[1mm]
This is some other text.
\end{tcolorbox}
\begin{tcolorbox}[colframe=blue!75!black,colback=white,height=3cm, space to=\myspace]
\includegraphics[width=\linewidth, height=0.33\dimexpr\myspace\]{blueshade.png}
This is my box of height 3cm.\[2mm]\includegraphics[width=\linewidth, height=0.67\dimexpr\myspace\]{goldshade.png}
\end{tcolorbox}

\begin{tcolorbox}[split=\f]
This is the upper part.
\tcblower
This is the lower part with a lot of text in several lines.
\end{tcolorbox}

\tcbset{width=(\linewidth-2mm)/3,before=,after=\hfill,height=3cm, colback=white,colframe=blue!75!black,valign=center,valign lower=center}
\foreach \f in {0.1,0.5,0.8}
\{\begin{tcolorbox}[split=\f]
This is the upper part.
\tcblower
This is the lower part with a lot of text in several lines.
\end{tcolorbox}\}
Boxes which are members of an equal height group will all get the same height, i.e. the maximum of all their natural heights. The \langle id \rangle serves to distinguish between different height groups. Note that you have to compile twice to see changes and that height groups are global definitions.

\begin{tcolorbox}[equal height group=A,adjusted title={One}]
My smallest box.
\end{tcolorbox}

\begin{tcolorbox}[equal height group=A,adjusted title={Two}]
This box is also small. \tcblower
But with a lower part.
\end{tcolorbox}

\begin{tcolorbox}[equal height group=A,adjusted title={Three}]
This box contains a lot of text just to fill the space with word flowing and flowing and flowing until the box is filled with all of it.
\end{tcolorbox}

\begin{tcolorbox}[equal height group=B]
Now, we use another equal height group.
\end{tcolorbox}

\begin{equation*}
\int_{0}^{1} x^2 = \frac{1}{3}.
\end{equation*}

See Section 16 on page 298 for more equal height options.
Plants a \langle length \rangle into the equal height group with the given \langle id \rangle. This ensures that the height will not drop below \langle length \rangle. Note that you cannot reduce a computed height value by using this key with a small value. The difference to applying /tcb/height\rightarrow P.53 directly is that the boxes are never too small for their content.

\begin{tcolorbox}
My first box. All boxes will get 3.5cm times 3.5cm if the content height is not too large.
\end{tcolorbox}

\begin{tcolorbox}
My second box.
\tcblower
This is the lower part.
\end{tcolorbox}

\begin{tcblisting}
\textbf{Mixed} with a listing.
\end{tcblisting}

\begin{tcolorbox}[title={Fourth box}]
My final box.
\end{tcolorbox}

Sets /tcb/minimum for equal height group for the current equal height group. Apparently, this only works for an already known equal height group, i.e. /tcb/equal height group\rightarrow P.61 has to be set before this option is used. This option is likely to be used in combination with /tcb/raster equal height\rightarrow P.309

\begin{tcbitemize}[raster equal height,colframe=blue!75!black,colback=white,raster every box/.style={minimum for current equal height group=2cm}]
  \tcbitem A
  \tcbitem B
\end{tcbitemize}
/tcb/use height from group=(id) (style, default current group)

Sets the current box to a fixed /tcb/height which is copied from an equal height group with the given \langle id \rangle. If this height is not available during the current compilation, no fixed height setting is used. If \langle id \rangle is omitted, the current equal height group is used which has to be set before by /tcb/equal height group. Note that the natural height of the current box is not considered for computation of the group height. The main application for /tcb/use height from group is that the height can be adapted further by /tcb/add to height.

\begin{tcolorbox}
[use height from group=C,add to height=-2cm,
colframe=blue!75!black,colback=white]
Height from group \enquote{C} of the previous example, but reduced by 2cm.
\end{tcolorbox}

\% \tcbuselibrary{raster}
Every line is inside an equal height group:
\begin{tcbraster}[raster equal height=rows,
title=Box \thetcbrasternum,
enhanced,size=small,colframe=red!50!black,colback=red!10!white]
\begin{tcolorbox}First line\second line\The height of this box rules.\end{tcolorbox}
\begin{tcolorbox}[use height from group]Test\end{tcolorbox}
\begin{tcolorbox}[use height from group]First line\second line\The height of this box rules.\end{tcolorbox}
\end{tcbraster}

\begin{tcolorbox}
\texttt{\textbackslash tcbheightfromgroup\{\langle macro \rangle\}\{\langle id \rangle\}}
\end{tcolorbox}

Saves the height from an equal height group with the given \langle id \rangle to a \langle macro \rangle. If this height is not available during the current compilation, \langle macro \rangle is set to 0\text{pt}.
4.11 Box Content Additions

The following options introduce some arbitrary (code) to the content of a \textcolor{yellow}{	extbf{tcolorbox}}. These additions can be given at the beginning or at the ending of the title, the upper part, or the lower part.

/\textcolor{yellow}{	extbf{tcb}}/before title=(\textcolor{yellow}{\textbf{code}}) \hspace{1cm} (no default, initially unset)

The given (code) is placed after the color and font settings and before the content of the title.

\begin{\textcolor{yellow}{\textbf{tcolorbox}}}[title=My title]
This is a \textcolor{yellow}{\textbf{tcolorbox}}.
\end{\textcolor{yellow}{\textbf{tcolorbox}}}

\textcolor{yellow}{Important: My title}

This is a tcolorbox.

/\textcolor{yellow}{\textbf{tcb}}/after title=(\textcolor{yellow}{\textbf{code}}) \hspace{1cm} (no default, initially unset)

The given (code) is placed after the content of the title.

\begin{\textcolor{yellow}{\textbf{tcolorbox}}}[title=My title]
This is a \textcolor{yellow}{\textbf{tcolorbox}}.
\end{\textcolor{yellow}{\textbf{tcolorbox}}}

My title

This is a tcolorbox.
The given \textit{code} is placed \textit{after} the color and font settings and \textit{before} the content of the upper part. The \textit{code} is appended by a final \texttt{\ignorespaces}.

\begin{tcolorbox}
\textbf{My title}

The story:
This is a \textbf{tcolorbox}.
\end{tcolorbox}

The given \textit{code} is placed \textit{after} the color and font settings and \textit{before} the content of the upper part. In contrast to /tcb/before upper, no \texttt{\ignorespaces} is appended. Use this for situations where \texttt{\ignorespaces} is not needed or causes harm.

\begin{tcolorbox}[size=small,tile,
  colback=yellow!20,colbacktitle=yellow!70!black,
  title=My table,hbox,center,center title,
  before upper*=\begin{tabular}{cc},
  after upper*=\end{tabular},
]
\begin{tabular}{cc}
  one & two \\
  three & four \\
\end{tabular}
\end{tcolorbox}
The given \texttt{code} is placed \textit{after} the content of the upper part. The \texttt{code} is prepended by a leading \unskip.

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[before upper=\flqq,after upper=\frqq, colback=red!5!white,colframe=red!75!black] This is a \textbf{tcolorbox}.
\end{tcolorbox}

\textit{Read more next week}

\textbf{Read more next week}

From version 3.80 to 3.94, this option prepended an \unskip to the given \texttt{code}. From version 3.95 to 4.15, this option was deprecated. From version 4.20, this option is re-established with changed semantic (no \unskip!).
The given \textlangle code\rangle is placed after the color and font settings and before the content of the lower part. The \textlangle code\rangle is appended by a final \textbackslash ignorespaces.

\begin{tcolorbox}{before lower=\textit{Behold:~},colback=red!5!white,colframe=red!75!black}
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textit{tcolorbox}.

Behold: This is the lower part.

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The given \langle code\rangle is placed after the color and font settings and before the content of the lower part. In contrast to \texttt{/tcb(before lower)}, no \texttt{\ignorespaces} is appended. Use this for situations where \texttt{\ignorespaces} is not needed or causes harm.

\begin{tcolorbox}{size=small,bicolor,sidebyside,center lower,}
\begin{tabular}{cc}
    \texttt{before lower==\begin{tabular}{cc}
        one & two \\
        three & four
    \end{tabular},}
\end{tabular}
\end{tcolorbox}

My table
\tcblower
\multicolumn{2}{c}{Title}\
 one & two  \\
 three & four
\end{tcolorbox}

My table

\begin{tabular}{|ll|}
\hline
Title & \\
 one & two \\
 three & four \\
\hline
\end{tabular}
The given \langle code \rangle is placed after the content of the lower part. The \langle code \rangle is prepended by a leading \unskip.

\begin{tcolorbox}[after lower=\textit{This is the end.},
colback=red!5!white,colframe=red!75!black]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a tcolorbox.

This is the lower part. This is the end.

From version 3.80 to 3.94, this option prepended an \unskip to the given \langle code \rangle. From version 3.95 to 4.15, this option was deprecated. From version 4.20, this option is re-established with changed semantic (no \unskip!).

\begin{tcolorbox}[before lower=\textit{This is the end.},
after lower=\textit{This is the end.},
colback=red!5!white,colframe=red!75!black]
This is a \textbf{tcolorbox}.
\tcblower
\sin^2(x)+\cos^2(x)=1.
\end{tcolorbox}

\begin{tcolorbox}[before lower=\textit{This is the end.},
after lower=\textit{This is the end.},
colback=red!5!white,colframe=red!75!black]
This is a tcolorbox.

\begin{itemize}
\item \sin^2(x) + \cos^2(x) = 1.
\end{itemize}
If `/tcb/text fill` is used, one cannot have a lower part and the box is unbreakable.

This style sets `/tcb/before upper`→P.65 and `/tcb/after upper`→P.66 to embed the upper part with a minipage. If a fixed height was applied e.g. by `/tcb/height`→P.53 or `/tcb/height fill`→P.56, this minipage gets a matching height. This allows to use vertical glue macros like \vfill to act like expected. If the box has no fixed height, setting `/tcb/text fill` has no other effect as making the box unbreakable.

\begin{tcolorbox}
[colback=red!5!white,colframe=red!75!black,fonttitle=\textbf, height=8cm,text fill, title=My filled box]
This is a tcolorbox.
\par\vfill
\begin{center}
My middle text.
\end{center}
\par\vfill
This is the end of my box.
\end{tcolorbox}
This style sets \texttt{/tcb/before upper} \textsuperscript{P.65} and \texttt{/tcb/after upper} \textsuperscript{P.66} and several geometry keys to support a \texttt{tabular*} with the given \langle preamble \rangle. The packages \texttt{array} and \texttt{colortbl} have to be loaded separately.

\begin{tcolorbox}
\begin{tabular}{@{}lrrrrr@{}}
\textbf{Group} & \textbf{One} & \textbf{Two} & \textbf{Three} & \textbf{Four} & \textbf{Sum} \\
\hline
\textcolor{red}{Red} & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
\hline
\textcolor{green}{Green} & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
\hline
\textcolor{blue}{Blue} & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\hline
\textbf{Sum} & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\end{tabular}
\end{tcolorbox}

This is a variant of \texttt{/tcb/tabulars} which adds some \langle code \rangle before the table starts.

\begin{tcolorbox}
\begin{tabular}{@{}lll@{}}
\textbf{Group} & \textbf{One} & \textbf{Two} & \textbf{Three} & \textbf{Four} & \textbf{Sum} \\
\hline
\textcolor{red}{Red} & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
\hline
\textcolor{green}{Green} & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
\hline
\textcolor{blue}{Blue} & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\hline
\textbf{Sum} & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\end{tabular}
\end{tcolorbox}
If `/tcb/tabularx` or `/tcb/tabularx*` are used, one cannot have a lower part.

### `/tcb/tabularx=\langle preamble\rangle` (style)

This style sets `/tcb/before upper` \textsuperscript{P.65} and `/tcb/after upper` \textsuperscript{P.66} and several geometry keys to support a `tabularx` with the given \textit{(preamble)}. The packages `tabularx` \cite{tabularx}, `array`, and `colortbl` have to be loaded separately.

```latex
\usepackage{array,tabularx}
\usepackage{colortbl} % or % \usepackage[|table|]{xcolor}
\tcbset{enhanced,fonttitle=\bfseries\large,fontupper=\normalsize\sffamily,\colback=yellow!10!white,\colframe=red!50!black,\colbacktitle=Salmon!30!white,\coltitle=black,center title}
\begin{tcolorbox}[tabularx={X||Y|Y|Y|Y||Y},title=My table]
\hline
\textbf{Group} & One & Two & Three & Four & \textbf{Sum} \\
\hline
Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\hline
\textbf{Sum} & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\end{tcolorbox}
```

### `/tcb/tabularx*=\langle code\rangle\{\langle preamble\rangle\}` (style)

This is a variant of `/tcb/tabularx` which adds some \textit{(code)} before the table starts.

```latex
\usepackage{array,tabularx}
\usepackage{colortbl} % or % \usepackage[|table|]{xcolor}
\tcbset{enhanced,fonttitle=\bfseries\large,fontupper=\normalsize\sffamily,\colback=yellow!10!white,\colframe=red!50!black,\colbacktitle=Salmon!30!white,\coltitle=black,center title}
\begin{tcolorbox}[tabularx*={\arrayrulewidth0.5mm}{X|X|X},title=My table]
\hline
One & Two & Three \\
\hline
1000.00 & 2000.00 & 3000.00 \\
2000.00 & 3000.00 & 4000.00 \\
\end{tcolorbox}
```
The \texttt{tcb/tikz upper} (style) adds a centered \texttt{tikzpicture} environment to the start and end of the upper part. The \texttt{⟨options⟩} may be given as TikZ picture options.

\begin{tcolorbox}[tikz upper,fonttitle=\bfseries,colback=white,colframe=black, title=⟨tikzname\ drawing⟩]
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tcolorbox}

\texttt{TikZ drawing}

\begin{tikzpicture}
\draw (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tikzpicture}

The \texttt{tcb/tikz lower} (style) adds a centered \texttt{tikzpicture} environment to the start and end of the lower part. The \texttt{⟨options⟩} may be given as TikZ picture options.

\begin{tcblisting}{tikz lower,listing side text,fonttitle=\bfseries,bicolor,colback=LightBlue!50!white,colbacklower=white,colframe=black, righthand width=3cm,title=⟨tikzname\ drawing⟩}
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tcblisting}

\texttt{TikZ drawing}

\begin{tikzpicture}
\draw (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tikzpicture}
/tcb/tikznode upper=\langle options \rangle (style)
This style places the upper part content into a centered Ti\kZ node. The \langle options \rangle may be given as Ti\kZ node options. This style is especially useful for boxes with multiline texts which are fitted to the text width.

% \usepackage{tikz}
\newtcbbox{\headline}[1][]{enhanced,center, ignore nobreak,fontupper=\Large\bfseries, colframe=red!50!black,colback=red!10!white, drop fuzzy shadow=yellow,tikznode upper,#1}
\headline{Important\Headline}

/tcb/tikznode lower=\langle options \rangle (style)
This style places the lower part content into a centered Ti\kZ node. The \langle options \rangle may be given as Ti\kZ node options.

% \usepackage{tikz}
\begin{tcolorbox}[bicolor,colback=LightBlue!50!white,colbacklower=white, colframe=black,tikznode lower={inner sep=2pt,draw=red,fill=yellow}]
Upper part.
\tcblower
Lower part.
\end{tcolorbox}

/tcb/tikznode=\langle options \rangle (style)
Shortcut for setting /tcb/tikznode upper and /tcb/tikznode lower the same time.

/tcb/varwidth upper=\langle length \rangle (style, default /tcb/width $^*$P.34)
This style places the upper part content into a varwidth environment. This style needs the varwidth package [1] to be loaded manually. The resulting box has a maximal width of \langle length \rangle. This option is only senseful for a \tcbox $^*$P.14.

% \usepackage{varwidth}
\newtcbbox{\varbox}[1][]{colframe=red!50!black, colback=red!10!white, varwidth upper}
\varbox{Short text.}
\varbox{This box contains is a longer text which is broken.}

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4.12 Overlays

With an overlay, arbitrary ⟨graphical code⟩ can be added to a \texttt{tcolorbox}. This code is executed after the frame and interior are drawn and before the text content is drawn. Therefore, you can decorate the \texttt{tcolorbox} with your own extensions. Common special cases are \textit{watermarks} which are implemented using overlays. See Subsection 10.3 from page 174 if you want to add \textit{watermarks}.

If you use the core package only, the ⟨graphical code⟩ has to be \texttt{pgf} code and there is not much assistance for positioning. Therefore, the usage of the \texttt{/tcb/enhanced} from the library \texttt{skins} is recommended which allows \texttt{tikz} code and gives access to \texttt{/tcb/geometry nodes} for positioning.

\texttt{/tcb/overlay=⟨graphical code⟩} (no default, initially unset)

Adds ⟨graphical code⟩ to the box drawing process. This ⟨graphical code⟩ is drawn after the frame and interior and before the text content.

\begin{tcolorbox}
\textbf{My title}

This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
\textbf{My title}

This is the lower part.
\end{tcolorbox}
/tcb/no overlay (style, no default, initially set)

Removes the overlay if set before.

/tcb/overlay broken={(graphical code)} (no default, initially unset)

If the box is set to be /tcb/breakable → P.390 and is broken actually, then the (graphical code) is added to the box drawing process. /tcb/overlay → P.74 overwrites this key.

/tcb/overlay unbroken={(graphical code)} (no default, initially unset)

If the box is set to be /tcb/breakable → P.390 but is not broken actually or if the box is set to be /tcb/unbreakable → P.391, then the (graphical code) is added to the box drawing process. /tcb/overlay → P.74 overwrites this key.

/tcb/overlay first={(graphical code)} (no default, initially unset)

If the box is set to be /tcb/breakable → P.390 and is broken actually, then the (graphical code) is added to the box drawing process for the first part of the break sequence. /tcb/overlay → P.74 overwrites this key.

/tcb/overlay middle={(graphical code)} (no default, initially unset)

If the box is set to be /tcb/breakable → P.390 and is broken actually, then the (graphical code) is added to the box drawing process for the middle parts (if any) of the break sequence. /tcb/overlay → P.74 overwrites this key.

/tcb/overlay last={(graphical code)} (no default, initially unset)

If the box is set to be /tcb/breakable → P.390 and is broken actually, then the (graphical code) is added to the box drawing process for the last part of the break sequence. /tcb/overlay → P.74 overwrites this key.

/tcb/overlay unbroken and first={(graphical code)} (no default, initially unset)

This is an optimized abbreviation for setting /tcb/overlay unbroken and /tcb/overlay first together. /tcb/overlay → P.74 overwrites this key.

/tcb/overlay middle and last={(graphical code)} (no default, initially unset)

This is an optimized abbreviation for setting /tcb/overlay middle and /tcb/overlay last together. /tcb/overlay → P.74 overwrites this key.

/tcb/overlay unbroken and last={(graphical code)} (no default, initially unset)

This is an optimized abbreviation for setting /tcb/overlay unbroken and /tcb/overlay last together. /tcb/overlay → P.74 overwrites this key.

/tcb/overlay first and middle={(graphical code)} (no default, initially unset)

This is an optimized abbreviation for setting /tcb/overlay first and /tcb/overlay middle together. /tcb/overlay → P.74 overwrites this key.

This example demonstrates the application of break sequence specific overlay options. Here, we define an environment myexample based on tcolorbox where the visible drawing is done totally by overlay keys.

Here, the first application of myexample produces an unbroken tcolorbox. The frame is drawn by the code given with /tcb/overlay unbroken.

The second application of myexample is broken into several parts which are drawn by the codes given with /tcb/overlay first, /tcb/overlay middle, and /tcb/overlay last.

% Preamble:
%\usepackage{tikz,lipsum}
%\tcbuselibrary{skins,breakable}
%\newcounter{example}
Example 1

Example 2


Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero.


4.13 Floating Objects

\texttt{/tcb/floatplacement=\{values\}} \quad \text{(no default, initially htb)}

Sets \texttt{\{values\}} as default values for the usage of \texttt{/tcb/float} and \texttt{/tcb/float*}. Feasible are the usual parameters for floating objects.

\begin{tcolorbox}[floatplacement=t, float, title=\textit{Floating box from \texttt{|floatplacement|}}, watermark text=\textit{I am floating}]
This floating box is placed at the top of a page.
\end{tcolorbox}

\texttt{/tcb/float=\{values\}} \quad \text{(default from \texttt{floatplacement})}

Turns the box to a floating object where \texttt{\{values\}} are the usual parameters for such floating objects. If they are not used, the placement uses the default values given by \texttt{floatplacement}.

\begin{tcolorbox}[float, title=\textit{Floating box from \texttt{|float|}}, enhanced, watermark text=\textit{I'm also floating}]
This box floats to a feasible place automatically. You do not have to use a numbering for this floating object.
\end{tcolorbox}

\texttt{/tcb/float*=\{values\}} \quad \text{(default from \texttt{floatplacement})}

Identical to \texttt{/tcb/float}, but for wide boxes spanning the whole page width of two column documents or in conjunction with the packages \texttt{multicol} or \texttt{paracol}. Note that you have to set \texttt{width=\textwidth} additionally, if the box should span the whole page width in these cases!

\begin{tcolorbox}[float=b, title=\textit{Floating box from \texttt{|float*|}}, width=\textwidth, enhanced, watermark text=\textit{I'm also floating}]
In this single column document, you will see no difference to \texttt{|float|}.
\end{tcolorbox}

\texttt{/tcb/nofloat} \quad \text{(style, initially set)}

Turns the floating behavior off.

\begin{tcolorbox}[float*, title=\textit{Floating box from \texttt{|float*|}}]
In this single column document, you will see no difference to \texttt{float}.
\end{tcolorbox}
For floating objects, the /tcb/before→P.81 and /tcb/after→P.81 settings are ignored. Instead, the given ⟨code⟩ is inserted before a floating box. If the box is /tcb/breakable→P.390, the given ⟨code⟩ is inserted before every part of the break sequence. The most common use case is every float=\centering.

\tcbox[float=htb,title={Floating box},every float=\centering, colback=blue!50!black,colframe=blue!50!white,colbacktitle=blue!10!white, coltitle=black,center title]{\includegraphics[height=6cm]{lichtspiel.jpg}}
4.14 Embedding into the Surroundings

Typically, but not necessarily, a \texttt{tcolorbox} is put inside a separate paragraph and has some vertical space before and after it. This behavior is controlled by the keys \texttt{/tcb/before} and \texttt{/tcb/after}.

Before version 4.40, the default setting for \texttt{/tcb/before} and \texttt{/tcb/after} was given by \texttt{/tcb/autoparskip} \textsuperscript{-P.85}. Starting with version 4.40, the default setting is given by \texttt{/tcb/before skip balanced} \textsuperscript{-P.82} and \texttt{/tcb/after skip balanced} \textsuperscript{-P.82}.

Note that old documents may need adaptions of page breaks. Alternatively, the old default setting can be restored by using

\begin{verbatim}
\tcbseteverylayer{autoparskip}
\end{verbatim}

inside the document preamble.

\texttt{/tcb/before} = \texttt{\langle code \rangle} (no default, initially see \texttt{/tcb/before skip balanced} \textsuperscript{-P.82})

Sets the \texttt{\langle code \rangle} which is executed before the colored box. It is not used for floating boxes. Also, it is not used, if the box follows a heading immediately and \texttt{/tcb/ignore nobreak} \textsuperscript{-P.87} is set to \texttt{false}.

\texttt{/tcb/after} = \texttt{\langle code \rangle} (no default, initially see \texttt{/tcb/after skip balanced} \textsuperscript{-P.82})

Sets the \texttt{\langle code \rangle} which is executed after the colored box. It is not used for floating boxes.

\texttt{/tcb/nobeforeafter} (style, no value)

Abbreviation for clearing the keys \texttt{before} and \texttt{after}. The colored box is not put into a paragraph and there is no space before or after the box.

\begin{verbatim}
\tcbset{myone/.style={colback=LightGreen,colframe=DarkGreen,}
   equal height group=nobefaf,width=\linewidth/4,nobeforeafter}}
\begin{tcolorbox}[myone,title=Box 1]Box 1\end{tcolorbox}%
\begin{tcolorbox}[myone,title=Box 2]Box 2\end{tcolorbox}%
\begin{tcolorbox}[myone,title=Box 3]Box 3\end{tcolorbox}%
\begin{tcolorbox}[myone,title=Box 4]Box 4\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/force nobeforeafter} (style, no value)

Forces the setting of \texttt{/tcb/nobeforeafter} even if \texttt{/tcb/before} and \texttt{/tcb/after} are set to other values later. Do not use this option globally unless you \textit{really} know what you do. Note that embedded boxes do not inherit this forced clearance.
Inserts some vertical space before the colored box. This style sets \texttt{/tcb/before \textsuperscript{P.81}}.

If the depth of the preceding \texttt{TeX} box is between $0\text{pt}$ and $0.3\text{\baselineskip}$, the distance between the \texttt{baseline} of the preceding \texttt{TeX} box and the \texttt{tcolorbox} ist set to \texttt{⟨glue⟩}+0.3\text{\baselineskip}.

If the depth is larger, the distance of the preceeding \texttt{TeX} box and the \texttt{tcolorbox} ist set to \texttt{⟨glue⟩}.

Alternatively, see \texttt{/tcb/before skip \textsuperscript{P.83}} which ignores the \texttt{baseline}.

\begin{tcolorbox}[before skip balanced=1cm, colframe=red!50!white]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

Some text.

\begin{tcolorbox}
This is a \texttt{tcolorbox}.
\end{tcolorbox}

Some text.

\begin{tcolorbox}[after skip balanced=1cm, colframe=red!50!white]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

Some text.

\begin{tcolorbox}[after skip balanced=1cm, colframe=red!50!white]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

Some text.

\begin{tcolorbox}[after skip balanced=1cm, colframe=red!50!white]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

Some text.

\begin{tcolorbox}[after skip balanced=1cm, colframe=red!50!white]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

Some text.
\texttt{/tcb/before skip=(glue)} \hspace{10cm} \texttt{(style, no default)}

Inserts some vertical space of the given \textit{(glue)} before the colored box. This style sets \texttt{/tcb/before} \textsuperscript{P.81}. In contrast to \texttt{/tcb/before skip balanced} \textsuperscript{P.82}, this \textit{(glue)} is relative to the lower edge of the preceding box and not to the baseline.

\begin{tcolorbox}
[before skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Some text.
\begin{tcolorbox}[left skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.  

\begin{tcolorbox}[right skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.  

\begin{tcolorbox}[leftright skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.  

\textbf{/tcb/left \_skip=(length)}  
\hspace{1.5cm} (\text{style, no default, initially 0mm})

Inserts some horizontal space of the given \textit{(length)} before the colored box. This style sets \texttt{/tcb/grow to left} by \texttt{^P.90} with the negated \textit{(length)}, i.e. the bounding box and box width are changed.

\textbf{/tcb/right \_skip=(length)}  
\hspace{1.5cm} (\text{style, no default, initially 0mm})

Inserts some horizontal space of the given \textit{(length)} after the colored box. This style sets \texttt{/tcb/grow to right} by \texttt{^P.90} with the negated \textit{(length)}, i.e. the bounding box and box width are changed.

\textbf{/tcb/leftright \_skip=(length)}  
\hspace{1.5cm} (\text{style, no default})

Inserts some horizontal space of the given \textit{(length)} before \textit{and} after the colored box. This style changes the bounding box and the box width.
This option is considered to be superseded by \texttt{/tcb/before skip balanced} \footnote{P.82} and \texttt{/tcb/after skip balanced} \footnote{P.82} (see note on page 81).

Sets the keys \texttt{before} and \texttt{after} to values which are recommended, if the package \texttt{parskip} is used and there is no better idea for \texttt{before} and \texttt{after}. This is similar to:

\begin{verbatim}
\tcbset{parskip/.style={before={\par\pagebreak[0]\parindent=0pt},
after={\par}}}
\end{verbatim}

This option is considered to be superseded by \texttt{/tcb/before skip balanced} \footnote{P.82} and \texttt{/tcb/after skip balanced} \footnote{P.82} (see note on page 81).

Sets the keys \texttt{before} and \texttt{after} to values which are recommended, if the package \texttt{parskip} is \textit{not} used and there is no better idea for \texttt{before} and \texttt{after}. This is similar to:

\begin{verbatim}
\tcbset{noparskip/.style={before={\par\pagebreak[0]\smallskip\parindent=0pt},
after={\par\smallskip}}}
\end{verbatim}

This option is considered to be superseded by \texttt{/tcb/before skip balanced} \footnote{P.82} and \texttt{/tcb/after skip balanced} \footnote{P.82} (see note on page 81).

Tries to detect the usage of the package \texttt{parskip} and sets the keys \texttt{before} and \texttt{after} accordingly. Actually, the following is done:

- If the length of \texttt{parskip} is greater than \texttt{0pt} at the beginning of the document, \texttt{/tcb/parskip} is executed. Here, the usage of package \texttt{parskip} is \textit{assumed}.
- Otherwise, if the length of \texttt{parskip} is not greater than \texttt{0pt} at the beginning of the document, \texttt{/tcb/noparskip} is executed. Here, the absence of package \texttt{parskip} is \textit{assumed}.
/tcb/baseline=(/length)

(no default, initially 0pt)

Used to set the \pgfsetbaseline value of the resulting tcolorbox.

\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
Some text\dotfill
\begin{tcolorbox}[baseline=3mm]
One line.
\end{tcolorbox}
\begin{tcolorbox}[baseline=3mm]
First line.\Second line.
\end{tcolorbox}

\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
Some text \ldots \ldots \ldots One line. \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ First line. \Second line.

\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
\begin{tcolorbox}[box align=bottom]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=bottom]
First line.\Second line.
\end{tcolorbox}

\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
\begin{tcolorbox}[box align=top]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=top]
First line.\Second line.
\end{tcolorbox}

\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
Some text \ldots \ldots \ldots One line. \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ First line. \Second line.

\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
Some text
\begin{tcolorbox}[box align=center]
One line.
\end{tcolorbox}
First line. \Second line.
\end{tcolorbox}

\tcbox
\begin{tcolorbox}[nobeforeafter,box align=base]{One line}
\end{tcolorbox}
\tcbox
\begin{tcolorbox}[nobeforeafter,box align=base,size=fbox]{Another line}
\end{tcolorbox}

\tcbox\dotfill
\begin{tcolorbox}[box align=center]
One line.
\end{tcolorbox}
First line. \Second line.
\end{tcolorbox}

\begin{tcolorbox}[box align=base]
Some text
\begin{tcolorbox}[box align=base]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=base]
First line. \Second line.
\end{tcolorbox}
\end{tcolorbox}

/tcb/ignore nobreak=\texttt{true}|\texttt{false}
(default \texttt{true}, initially \texttt{false})

After a heading, \LaTeX{} tries to avoid a break by setting a \texttt{nobreak} boolean value. Starting from version 3.33, the \texttt{/tcb/before \hfill P.81} respectively \texttt{/tcb/before skip \hfill P.83} settings are not used after a heading if \texttt{/tcb/ignore nobreak} is set to \texttt{false}. For an unbreakable box, \texttt{/tcb/before nobreak} is used instead. Further, a \texttt{/tcb/breakable \hfill P.390} box will also try to avoid a break between a heading and a directly following first part of a break sequence. Set \texttt{/tcb/ignore nobreak} to \texttt{true}, if \texttt{nobreak} should be ignored as prior to version 3.33. Also, such a setting may be used locally to enforce the \texttt{/tcb/before \hfill P.81} setting.

/tcb/before nobreak=(\texttt{code})
(no default, initially \texttt{\noindent})

Sets the \texttt{(code)} which is executed before the colored box if it is unbreakable, if \texttt{/tcb/ignore nobreak} is not set, and if the box follows a heading.

/tcb/parfillskip restore=\texttt{true}|\texttt{false}
(default \texttt{true}, initially \texttt{true})

If this option is set to be \texttt{true}, the minimum value of \texttt{\parfillskip} is tested at specific spots, if it is greater than \texttt{0pt}. If so, \texttt{\parfillskip} is restored to \texttt{\@flushglue} which happens to be the default value.

These tests are executed for \texttt{/tcb/parskip \hfill P.85}, \texttt{/tcb/nopar \hfill P.85}, \texttt{/tcb/after \hfill P.83}, \texttt{/tcb/breakable \hfill P.390}, and \texttt{tcbraster \hfill P.300}.

This option was created to automatically avoid overfull box warnings with \texttt{\parfillskip} changing packages.
4.15 Bounding Box

Normally, every \texttt{tcolorbox} has a bounding box which fits exactly to the dimensions of the outer frame. Therefore, \LaTeX{} reserves exactly the space needed for the box. This behavior can be changed by enlarging (or shrinking) the bounding box. If the bounding box is enlarged, the \texttt{tcolorbox} will get some clearance around it. If the bounding box is shrunk, i.e. enlarged with negative values, the \texttt{tcolorbox} will overlap to other parts of the page. For example, the \texttt{tcolorbox} could be stretched into the page margin.

The following examples use \texttt{/tcb/show bounding box} \textsuperscript{P.188} to display the actual bounding box. For this, the library \texttt{skins} has to be included and \texttt{/tcb/enhanced} \textsuperscript{P.218} has to be set.

4.15.1 Shifting Bounding Box Borders

\texttt{/tcb/enlarge top initially by}=\langle\texttt{length}\rangle \quad \text{(no default, initially 0mm)}

Enlarges the bounding box distance to the top of the box by \langle\texttt{length}\rangle. If the box is \texttt{breakable}, only the first box of the break sequence gets enlarged. \texttt{/tcb/enlarge top by} \textsuperscript{P.89} overwrites this key.

\begin{verbatim}
\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[enlarge top initially by=-5mm] This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge top initially by=5mm,enhanced,show bounding box] This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\text{This is a tcolorbox.}

\text{This is a tcolorbox.}

\texttt{/tcb/enlarge bottom finally by}=\langle\texttt{length}\rangle \quad \text{(no default, initially 0mm)}

Enlarges the bounding box distance to the bottom of the box by \langle\texttt{length}\rangle. If the box is \texttt{breakable}, only the last box of the break sequence gets enlarged. \texttt{/tcb/enlarge bottom by} \textsuperscript{P.89} overwrites this key.

\begin{verbatim}
\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[enlarge bottom finally by=5mm] This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge bottom finally by=-5mm,enhanced,show bounding box] This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\text{This is a tcolorbox.}

\text{This is a tcolorbox.}
/tcb/enlarge top at break by={length} (no default, initially 0mm)
Enlarges the bounding box distance to the top of the box by \textit{\langle length \rangle}, if the box is \verb=/tcb/breakable\verb/=P.390. In this case, it is applied to \textit{middle} and \textit{last} parts in a break sequence. \verb=/tcb/enlarge top\verb/= overwrites this key.

/tcb/enlarge bottom at break by={length} (no default, initially 0mm)
Enlarges the bounding box distance to the bottom of the box by \textit{\langle length \rangle}, if the box is \verb=/tcb/breakable\verb/=P.390. In this case, it is applied to \textit{first} and \textit{middle} parts in a break sequence. \verb=/tcb/enlarge bottom\verb/= overwrites this key.

/tcb/enlarge top by={length} (no default, initially 0mm)
Enlarges the bounding box distance to the top of the box by \textit{\langle length \rangle}. \verb=/tcb/enlarge top\verb/ initially by=P.88 and \verb=/tcb/enlarge top at break by\verb/= are set to \textit{\langle length \rangle}.

/tcb/enlarge bottom by={length} (no default, initially 0mm)
Enlarges the bounding box distance to the bottom of the box by \textit{\langle length \rangle}. \verb=/tcb/enlarge bottom finally by=P.88 and \verb=/tcb/enlarge bottom at break by\verb/= are set to \textit{\langle length \rangle}.

/tcb/enlarge left by={length} (no default, initially 0mm)
Enlarges the bounding box distance to the left side of the box by \textit{\langle length \rangle}.

/tcb/enlarge right by={length} (no default, initially 0mm)
Enlarges the bounding box distance to the right side of the box by \textit{\langle length \rangle}. 

\begin{tcolorbox}
\verb|\tcbset\{}colframe=blue!75!black,colback=white\verb|
\begin{tcolorbox}[enlarge left by=2cm,width=5cm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge left by=-2cm,width=\linewidth+2cm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}
\verb|\tcbset\{}colframe=blue!75!black,colback=white\verb|
\begin{tcolorbox}[enlarge right by=-2cm,width=\linewidth+2cm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge right by=2cm,width=\linewidth-2cm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

This is a \textbf{tcolorbox}.

This is a \textbf{tcolorbox}.
\texttt{/tcb/enlarge by=\{\textit{length}\}} (no default, initially \texttt{0mm})

Enlarges the bounding box distance to all sides of the box by \texttt{\{length\}}.

\begin{tcolorbox}
\texttt{\textbackslash cbset\{colframe=blue!75!black, colback=white, width=5cm, nobeforeafter\}}
\begin{tcolorbox}
\texttt{This is a \textbf{tcolorbox}.}
\end{tcolorbox}
\begin{tcolorbox}[enlarge by=5mm, enhanced, show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

\texttt{/tcb/grow to left by=\{length\}} (no default, initially \texttt{0mm})

Enlarges the current box width by \texttt{\{length\}} and enlarges (shrinks) the bounding box distance to the left side of the box by \texttt{\{-\{length\}\}}. Also see \texttt{/tcb/left skip \textae P.84}.

\begin{tcolorbox}
\texttt{\textbackslash cbset\{colframe=blue!75!black, colback=white\}}
\begin{tcolorbox}[width=5cm, grow to left by=2cm, enhanced, show bounding box]
This is a \textbf{tcolorbox} with a width of 7cm.
\end{tcolorbox}
\end{tcolorbox}

\texttt{/tcb/grow to right by=\{length\}} (no default, initially \texttt{0mm})

Enlarges the current box width by \texttt{\{length\}} and enlarges (shrinks) the bounding box distance to the right side of the box by \texttt{\{-\{length\}\}}. Also see \texttt{/tcb/right skip \textae P.84}.

\begin{tcolorbox}
\texttt{\textbackslash cbset\{colframe=blue!75!black, colback=white\}}
\begin{tcolorbox}[grow to right by=2cm, enhanced, show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[grow to right by=2cm, grow to left by=1cm, enhanced, show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}
Shortcut for setting \tcb/grow to left by → P.90 and \tcb/grow to right by → P.90 to (length). Also see \tcb/oversize → P.45 and \tcb/spread sidewards → P.94.

4.15.2 Box Alignment

\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}
\textbf{tcolorbox}.
\end{tcolorbox}
This is a \textbf{tcolorbox}.

\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}
\textbf{tcolorbox}.
\end{tcolorbox}
This is a \textbf{tcolorbox}.

\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}
\textbf{tcolorbox}.
\end{tcolorbox}
This is a \textbf{tcolorbox}.
4.15.3 Toggle Enlargements

\[\texttt{tcb/toggle enlargement=\{toggle preset\}}\]  
\[\texttt{(default evenpage, initially none)}\]

According to the \(\{\text{toggle preset}\}\), the left and the right enlargements of the bounding box are switched or not. Feasible values are:

- **none**: no switching.
- **forced**: the values of the left and right enlargement are switched.
- **evenpage**: if the page is an even page, the values of the left and right enlargement are switched. This value also sets \texttt{/tcb/check odd page} \[\rightarrow \texttt{P.107}\] to true.

See \texttt{/tcb/toggle left and right} \[\rightarrow \texttt{P.46}\] to toggle geometry settings.

\[
\texttt{tcbset\{colframe=blue!75!black, colback=white,}
\texttt{\hspace{1em}grow to left by=20mm, grow to right by=-5mm\}}
\]

\[
\texttt{\begin{tcolorbox}\{toggle enlargement=none, enhanced, show bounding box\}}
\texttt{This is a \textbf{tcolorbox}.}
\texttt{\end{tcolorbox}}
\]

\[
\texttt{\begin{tcolorbox}\{toggle enlargement=forced\}}
\texttt{This is a \textbf{tcolorbox}.}
\texttt{\end{tcolorbox}}
\]

\[
\texttt{\begin{tcolorbox}\{toggle enlargement=evenpage\}}
\texttt{This page is an \texttt{tcbifoddpage\{odd\}\{even\} page. Therefore, the left and right enlargements \texttt{tcbifoddpage\{are not\}\{are\} toggled.}}
\texttt{\end{tcolorbox}}
\]

\[
\texttt{\begin{tcolorbox}\{colframe=red!60!black, colback=red!15!white,}
\texttt{\hspace{1em}fonttitle=\bfseries, title=Floating box from \texttt{toggle enlargement},}
\texttt{\hspace{1em}width=\textwidth, grow to right by=2cm, toggle enlargement, float=t\}}
\texttt{This page is an \texttt{tcbifoddpage\{odd\}\{even\} page. Therefore, the left and right enlargements \texttt{tcbifoddpage\{are not\}\{are\} toggled. This box stretches to the right margin on odd pages and to the left margin on even pages. The current document is one-sided -- this feature makes sense for two-sided documents only.}
\texttt{\end{tcolorbox}}
\]
4.15.4 Spread Box to Page Borders

The following border options are *not* applicable to nested boxes, boxes inside tables, etc. For boxes inside lists, the options *may* work, but not necessarily. Also, boxes should be set with `\noindent` and full width.

\[\textbf{tcolorbox}\]

This is a `tcolorbox`.

\[\textbf{tcolorbox}\]

This is a `tcolorbox`.

\[\textbf{tcolorbox}\]

This is a `tcolorbox`.

\[\textbf{tcolorbox}\]

This is a `tcolorbox`.

\[\textbf{tcolorbox}\]

This is a `tcolorbox`.

\[\textbf{tcolorbox}\]

This is a `tcolorbox`.

\[\textbf{tcolorbox}\]

This is a `tcolorbox`.

\[\textbf{tcolorbox}\]

This is a `tcolorbox`.
This is an example for “spread upwards”.

\begin{tcolorbox}[enhanced,spread upwards,sharp corners=north,height=3cm,
colframe=blue!75!black,interior style={top color=blue!50,bottom color=white}]
This is an example for \enquote{spread upwards}.
\end{tcolorbox}

Identical to \texttt{/tcb/move upwards} \texttt{\textit{P.\hspace{1em}93}}, but without starting a new page.

\textbf{This is a \textbf{tcolorbox}}.

\begin{tcolorbox}[enhanced,spread sidewards,
colframe=blue!75!black,colback=white,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textit{tcolorbox}.

\begin{tcolorbox}[enhanced,spread downwards,sharp corners=south,
colframe=red!75!black,interior style={top color=white,bottom color=red!50}]
This is an example for \enquote{spread downwards}.
\end{tcolorbox}

This is an example for “spread downwards”.

\begin{tcolorbox}[enhanced,spread downwards,sharp corners=south,
colframe=red!75!black,interior style={top color=white,bottom color=red!50}]
This is an example for \enquote{spread downwards}.
\end{tcolorbox}
4.15.5 Box Extrusion

The following keys should not be used with breakable boxes or boxes with a lower part.

/tcb/shrink tight

The total colored box is shrunk to the dimensions of the upper part. There should be no lower part and no title. This style sets the /tcb/boxsep to 0pt and other geometry keys to fitting values. This option is likely to be used with the following extrusion keys.

```
tcbset{colframe=blue!75!black,colback=white,arc=0mm,boxrule=0.4pt, nobeforeafter,tcbox raise base,shrink tight}
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}
Lorem \tcbox{ipsum} dolor sit amet, consectetuer adipiscing elit.

This is a \textbf{tcolorbox}.
Lorem \textit{ipsum} dolor sit amet, consectetuer adipiscing elit.
```

/tcb/extrude left by=(length)

The (upper part of the) colored box is extruded by the given \(\text{length}\) to the left side. The inner width and the bounding box is kept unchanged and the operation is additive!

```
tcbset{enhanced,colframe=red,colback=yellow!25!white, frame style={opacity=0.25},interior style={opacity=0.5}, nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}
Lorem \textit{ipsum} dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \tcb[extrude left by=1cm]{Curabitur} dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

Lorem \textit{ipsum} dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.
```

/tcb/extrude right by=(length)

The (upper part of the) colored box is extruded by the given \(\text{length}\) to the right side. The inner width and the bounding box is kept unchanged and the operation is additive!

```
tcbset{enhanced,colframe=red,colback=yellow!25!white, frame style={opacity=0.25},interior style={opacity=0.5}, nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}
Lorem \textit{ipsum} dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \tcb[extrude right by=1cm]{Curabitur} dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

Lorem \textit{ipsum} dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.
```
/tcb/extrude top by=(length)  (style, no default, initially unset)

The (upper part of the) colored box is extruded by the given \textit{<length>} to the top side. The inner width and the bounding box is kept unchanged and the operation is additive!

\tcbset{enhanced,colframe=red,colback=yellow!25!white, 
frame style={opacity=0.25},interior style={opacity=0.5}, 
nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, 
vestibulum ut, placerat ac, adipiscing vitae, felis. \tcbox[extrude top by=1cm]{Curabitur} dictum gravida mauris. 
Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

/tcb/extrude bottom by=(length)  (style, no default, initially unset)

The (upper part of the) colored box is extruded by the given \textit{<length>} to the bottom side. The inner width and the bounding box is kept unchanged and the operation is additive!

\tcbset{enhanced,colframe=red,colback=yellow!25!white, 
frame style={opacity=0.25},interior style={opacity=0.5}, 
nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, 
vestibulum ut, placerat ac, adipiscing vitae, felis. \tcbox[extrude bottom by=1cm]{Curabitur} dictum gravida mauris. 
Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

/tcb/extrude by=(length)  (style, no default, initially unset)

The (upper part of the) colored box is extruded by the given \textit{<length>} to all sides. The inner width and the bounding box is kept unchanged and the operation is additive!

\tcbset{enhanced,colframe=red,colback=yellow!25!white, 
frame style={opacity=0.25},interior style={opacity=0.5}, 
nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, 
vestibulum ut, placerat ac, adipiscing vitae, felis. \tcbox{Curabitur} dictum gravida mauris. \tcbox[colframe=Green,interior style={opacity=0.0}]{Nam} arcu libero, nonummy eget, consectetuer id, \tcbox[vulputate] a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. \tcbox{Mauris ut leo.}

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, 
vestibulum ut, placerat ac, adipiscing vitae, felis. \tcbox[colframe=Green,interior style={opacity=0.0}]{Nam} arcu libero, nonummy eget, consectetuer id, \tcbox[vulputate] a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. \tcbox{Mauris ut leo.}
4.16 Layered Boxes and Every Box Settings

A \texttt{tcolorbox} may contain another \texttt{tcolorbox} and so on. The package takes track of the nesting level using a counter \texttt{tcbayer}. Counter values may be used for doing some fancy things, but you should never change the counter value yourself.

The package takes special care for the first four layers or nesting levels, called managed layers. Here, footnote texts are administrated to find their intended place and specific layer dependent options may be set by changing \texttt{/tcb/every box on layer n} \textsuperscript{\texttt{P.98}}. If needed, the number of managed layers can be increased by setting \texttt{\texttt{tcbsetmanagedlayers}} \textsuperscript{\texttt{P.98}} to a higher value than 4.

The following styles have a considerable influence on how layered boxes are processed. Note especially that nested boxes are getting a \texttt{/tcb/reset} \textsuperscript{\texttt{P.112}} by default. You can change this, but be prepared for surprises if you do.

If the defaults are \textit{not changed}, a \texttt{tcolorbox} gets its options in the following order. Following options overwrite preceding options.

1. On package load, all options are set to default values.
2. Every \texttt{\texttt{tcbset}} \textsuperscript{\texttt{P.13}} command adds or changes options for the following boxes inside the current \TeX{} group.
3. While entering a \texttt{tcolorbox}, a \texttt{/tcb/every box on layer n} \textsuperscript{\texttt{P.98}} or \texttt{/tcb/every box on higher layers} \textsuperscript{\texttt{P.98}} option list is applied. With default settings this means:
   - For layer 1 (lowest layer), the \texttt{/tcb/every box} option list is applied. Not overwritten options given by a preceding \texttt{\texttt{tcbset}} \textsuperscript{\texttt{P.13}} survive.
   - For layer 2 and above (nested boxes), a \texttt{/tcb/reset} \textsuperscript{\texttt{P.112}} followed by \texttt{/tcb/every box} option list is applied. Every resettable options given by a preceding \texttt{\texttt{tcbset}} \textsuperscript{\texttt{P.13}} and by the surrounding box(es) are reset.
4. The \textit{\langle options \rangle} given to the \texttt{tcolorbox} are applied. Or, if the box was generated by \texttt{\texttt{newtcolorbox}} \textsuperscript{\texttt{P.15}} or friends, the \textit{\langle options \rangle} given there are applied.
5. If the box was generated by \texttt{\texttt{newtcolorbox}} \textsuperscript{\texttt{P.15}} or friends, some automated options are applied.

\texttt{/tcb/every box} (style)

By default, this style is empty.

\begin{verbatim}
% default setting:
\texttt{\texttt{tcbset}}\{every box/.style={}
\end{verbatim}

It may be changed by redefining this style.

\begin{verbatim}
% setting all boxes to be enhanced:
\texttt{\texttt{tcbset}}\{every box/.style={enhanced}
\end{verbatim}

The alternative for setting something for every box (on every layer) is \texttt{\texttt{tcbsetforeverylayer}} \textsuperscript{\texttt{P.13}}:

\begin{verbatim}
% setting all boxes to be enhanced:
\texttt{\texttt{tcbsetforeverylayer}}\{enhanced
\end{verbatim}
/tcb/\texttt{every box on layer n}\ (style)

Here, \texttt{n} has to be replaced by a number ranging from 1 to the highest managed layer number (4 by default).

\begin{verbatim}
\% default settings:
\tcbset{
    every box on layer 1/.style={every box},
    every box on layer 2/.style={reset,every box},
    every box on layer 3/.style={reset,every box},
    every box on layer 4/.style={reset,every box},
}
\end{verbatim}

/tcb/\texttt{every box on higher layers}\ (style)

Higher layers are layers above the highest managed layer number (4 by default).

\begin{verbatim}
\tcbset{every box on higher layers/.style={reset,every box}}
\end{verbatim}

\texttt{\tcbsetmanagedlayers}\{\texttt{\langle number\rangle}\}

Replaces the highest managed layer number by \texttt{\langle number\rangle} where 4 is the default. This macro can only be used inside the preamble. Using a \texttt{\langle number\rangle} lower than 4 typically makes no sense, but is not forbidden.

\begin{verbatim}
\% \usepackage{lipsum}
\% \tcbsetlibrary{skins,breakable}
\tcbset{colframe=red!75!black,fonttitle=\bfseries,
    colback=red!5!white,
    every box/.style={enhanced,watermark text=\texttt{\the\tcblayer},
        before=\par\smallskip,after=\par\smallskip},
    every box on layer 2/.style={reset,every box,colback=yellow!10!white,
        drop fuzzy shadow},
\begin{tcolorbox}[enhanced jigsaw,breakable,title=Layer 1 Box]
Here comes a footnote\footnote{Footnote from layer 1 box}.
\lipsum[2]
\begin{tcolorbox}[title=Layer 2 Box]
abc\footnote{The footnote of abc}
\end{tcolorbox}
\begin{tcolorbox}[title=Another Box,ams equation]
\begin{tcolorbox}[height=2cm]{\lipsum[1]}
My text.
\end{tcolorbox}
Another lipsum text\footnote{A lipsum text}. \lipsum[3]
\begin{tcolorbox}[title=Layer 4,colframe=blue,colback=white]
Layer 4\footnote{Layer 4 footnote}
\end{tcolorbox}
The End\footnote{Last footnote}.
\end{tcolorbox}
\end{verbatim}

Layer 2 Box

abc\(^a\)

\(^a\)The footnote of abc

Another Box

\[\sum_{n=1}^{\infty} \frac{1}{n} = \infty.\] (1)

Some text\(^b\).

Yet Another Box


My text.


Layer 4

Layer 4\(^a\)

\(^a\)Layer 4 footnote

The End\(^b\).

\(^a\)A lipsum text

\(^b\)Last footnote

\(^a\)Footnote from layer 1 box

\(^b\)Footnote from some text
4.17 Capture Mode

\texttt{/tcb/capture\{mode\}} \hspace{1cm} (no default, initially \texttt{minipage})

The capture \texttt{\{mode\}} defines how the box content is processed. Feasible values for \texttt{\{mode\}} are:

- \texttt{minipage}:
  This is the default \texttt{\{mode\}} for \texttt{tcolorbox} \cite{tcolorbox}. The content may have an upper and a lower part. Optionally, the box can be \texttt{/tcb/breakable} \cite{tcb:breakable}. The box content is put into a minipage or into something similar to a minipage.

- \texttt{hbox}:
  This is the default \texttt{\{mode\}} for \texttt{tcb} \cite{tcbox}. The content cannot have a lower part and cannot be broken. The colored box is sized according to the dimensions of the content. A shortcut to set this mode is \texttt{/tcb/hbox}.

- \texttt{fitbox} (needs the \texttt{fitting} library):
  This is the default \texttt{\{mode\}} for \texttt{tcbfit} \cite{tcbfit}. The content cannot have a lower part and cannot be broken. The content is sized according to the dimensions of the colored box. A shortcut to set this mode is \texttt{/tcb/fit} \cite{tcb:fit}.

\begin{verbatim}
\tcbset{colframe=blue!75!black, colback=white}
\begin{tcolorbox}[capture=minipage]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[capture=hbox]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[capture=fitbox, height=9mm] % needs the `fitting' library
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/hbox} \hspace{1cm} (style, no default)

Shortcut for capture=\texttt{hbox}.

\begin{verbatim}
\tcbset{colframe=blue!75!black, colback=white}
\begin{tcolorbox}[hbox]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/minipage} \hspace{1cm} (style, no default)

Shortcut for capture=\texttt{minipage}.

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4.18 Text Characteristics

The text inside a tcolorbox is formatted using a \LaTeX\ minipage if the box is unbreakable. If breakable, the box tries a mimicry of a minipage. In a minipage or parbox, paragraphs are formatted slightly different as the main text. If the key value is set to false, the normal main text behavior is restored. In some situations, this has some unwanted side effects. It is recommended that you use this experimental setting only where you really want to have this feature.

\begin{tcolorbox}[parbox,adjusted title={parbox=true (normal)}]
\lipsum[1-2]
\end{tcolorbox}
\begin{tcolorbox}[parbox=false,adjusted title={parbox=false}]
\lipsum[1-2]
\end{tcolorbox}

\begin{tabular}{|p{0.5\textwidth}|p{0.5\textwidth}|}
\hline
	extbf{parbox=true (normal)} & \textbf{parbox=false} \\
\hline


\hline
\end{tabular}

\begin{tcolorbox}[left=2mm,right=2mm,top=1mm,bottom=1mm] % default true, initially true
\begin{verbatim}
\begin{verbatim}
\end{verbatim}
\end{tcolorbox}

\begin{verbatim}
\end{verbatim}
Long words at the beginning of paragraphs in very narrow boxes will not be hyphenated using \pdflatex. This problem is circumvented by applying the \hyphenationfix option.

\begin{tcolorbox}
Rechnungsadjunktentochter. Statthalttereikonzipist.
\end{tcolorbox}

\begin{tcolorbox}[\hyphenationfix]
Rechnungsadjunktentochter. Statthalttereikonzipist.
\end{tcolorbox}

!\parbox=false and \hyphenationfix should not be used together. They are targeting different box types and they do not blend very well.

4.19 Files

/\texttt{tcb/\texttt{tempfile}}=(\texttt{file name}) (no default, initially \texttt{\jobname.tcbtemp})

Sets (\texttt{file name}) as name for the temporary file which is used inside \texttt{tcbwritetemp} \textsuperscript{P.133} and \texttt{\texttt{tcbusetemp}} \textsuperscript{P.133} implicitly.

4.20 \texttt{tcbbox} Specials

The following options are applicable for \texttt{\texttt{tcbbox}} \textsuperscript{P.14} and \texttt{\texttt{tcbboxmath}} \textsuperscript{P.364} only.

/\texttt{tcb/\texttt{tcbbox raise}}=(\texttt{length}) (no default, initially \texttt{0pt})

Raises the \texttt{\texttt{tcbbox}} \textsuperscript{P.14} by the given (\texttt{length}).

/\texttt{tcb/\texttt{tcbbox raise base}} (style, no value, initially unset)

Raises the \texttt{\texttt{tcbbox}} \textsuperscript{P.14} such that the base of its content matches the base of the environmental line; see example above.

/\texttt{tcb/on line} (style, no value, initially unset)

Combines \texttt{tcb/tcbbox raise base} with \texttt{tcb/nobeforeafter} \textsuperscript{P.81}. The resulting box behaves analogue to \texttt{fbox}.
Controls how \texttt{tcbox} respects a \texttt{/tcb/width} setting. Feasible values for \texttt{(mode)} are:

- \texttt{auto} (initial setting): ignore \texttt{/tcb/width} and set box width according to its content.
- \texttt{auto limited}: Set box width according to its content, if it is smaller than \texttt{/tcb/width}. Otherwise, the content is set like in a \texttt{tcolorbox} with line breaks.
- \texttt{forced center}: Set box width according to \texttt{/tcb/width}. The content is centered and may overlap the box borders.
- \texttt{forced left}: Set box width according to \texttt{/tcb/width}. The content is left aligned and may overlap the box borders.
- \texttt{forced right}: Set box width according to \texttt{/tcb/width}. The content is right aligned and may overlap the box borders.
- \texttt{minimum center}: Set box width according to \texttt{/tcb/width}, if the content fits into. The content is centered and the box width may grow beyond \texttt{/tcb/width}.
- \texttt{minimum left}: Set box width according to \texttt{/tcb/width}, if the content fits into. The content is left aligned and the box width may grow beyond \texttt{/tcb/width}.
- \texttt{minimum right}: Set box width according to \texttt{/tcb/width}, if the content fits into. The content is right aligned and the box width may grow beyond \texttt{/tcb/width}.

\begin{verbatim}
\tcset{size=small, on line, before upper=\strut,
    colframe=blue!75!black, colback=blue!5!white,
    fontupper=\normalsize, width=4cm}

\tcbox[tcbox width=auto]{auto} \quad \tcbox[tcbox width=auto limited]{auto limited}
\tcbox[tcbox width=forced center]{forced center} \quad \tcbox[tcbox width=forced left]{forced left}
\tcbox[tcbox width=minimum center]{minimum center} \quad \tcbox[tcbox width=minimum left]{minimum left}
\tcbox[tcbox width=minimum right]{minimum right}
\end{verbatim}
4.21 Counters, Labels, and References

\verb+/tcb/phantom=⟨code⟩/ (no default, initially unset)

The \langle code\rangle is put in a box at the upper left corner of the \texttt{tcolorbox}. If the \texttt{tcolorbox} is breakable, the \langle code\rangle is executed for the first box of the break sequence only. If there already was some phantom code given, the new \langle code\rangle is appended.

The \langle code\rangle is intended to be used for counter stepping, labelling, and related operations which do not produce visible text.

- The \langle code\rangle is executed before the title and box content, i.e. counter values are ensured to be increased before usage.
- Labels are ensured to reference the correct page number.
- The \langle code\rangle is executed only once even during fitting operations for title and box content.
- In combination with the \texttt{hyperref} package, the hyper anchor is set to the upper left corner of the \texttt{tcolorbox}, i.e. links inside the pdf document will jump to the box pleasantly.
- Since the \langle code\rangle is executed inside a \TeX group, only global operations can survive this group.

Examples for the \texttt{phantom} usage are given in Section 17.9 from page 356, e.g. Example 17.1 on page 357.

\verb+/tcb/nophantom/ (no value, initially set)

Removes the phantom code if set before.

\verb+/tcb/label=⟨marker⟩/ (no default, initially unset)

The \langle marker\rangle is set as label text for a reference with the \texttt{\ref} macro. Typically, this option is used for numbered boxes, see Subsection 5.1 from page 114, e.g. \verb+/tcb/new/auto counter\verb+\ref+P.114.

\verb+/tcb/phantomlabel=⟨marker⟩/ (no default, initially unset)

Equivalent to \verb+/tcb/label/ for an \textit{unnumbered} box. A \texttt{\phantomsection} from the package \texttt{hyperref} [15] is used to set a correct hyperlink target. This is not needed for a numbered box.

\verb+/tcb/label type=⟨type⟩/ (no default, initially unset)

This option key can be used only in conjunction with the \texttt{cleveref} package [5] which has to be loaded separately. \langle type\rangle has to be a cross-reference type known to \texttt{cleveref} like \texttt{theorem}, \texttt{algorithm}, \texttt{result}, etc. References made with \texttt{cleveref} will use this type. Note that using \texttt{label type} will result in compilation errors, if \texttt{cleveref} is not loaded. For an example, see Theorem 18.3.5 on page 384.

\verb+/tcb/no label type/ (no value, initially set)

Removes a \verb+/tcb/label type/, if set before.

\verb+/tcb/step=⟨counter⟩/ (no default, initially unset)

Shortcut for \texttt{phantom=\refstepcounter{#1}}. The given \langle counter\rangle is increased and ready for labelling. This option is not needed when using the convenient automated numbering introduced with version 2.40, see Subsection 5.1 from page 114.

\verb+/tcb/step and label=⟨{counter}⟩{⟨marker⟩}/ (no default, initially unset)

Shortcut for using \verb+/tcb/step/ and \verb+/tcb/label/. This option is not needed when using the convenient automated numbering introduced with version 2.40, see Subsection 5.1 from page 114.
If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 121 is used, this key describes the \textit{⟨text⟩} for an entry into the generated list, e.g.

```
list entry={\protect\numberline{\thetcbcounter}My beautiful Example}
```

See Section 17.9 from page 356 for a complete example.

```
\begin{pabox}[label={mynamelabel},nameref={Title or anything else}]{Title text}
This is a tcolorbox.
\end{pabox}
```

This box is automatically numbered with \ref{mynamelabel} on page \pageref{mynamelabel}.

The box is titled \enquote{\nameref{mynamelabel}}.

```
\begin{pabox}[label={mynamelabel},nameref={Title or anything else}]{Title text}
This is a tcolorbox.
\end{pabox}
```

Examp. 4.1: Title text

This box is automatically numbered with 4.1 on page 105.

The box is titled “Title or anything else”.

```
\begin{pabox}[label={mynamelabel},nameref={Title or anything else}]{Title text}
This is a tcolorbox.
\end{pabox}
```

/tcb/nameref is used automatically inside \texttt{\newtcbtheorem} → P.362.
\texttt{/tcb/hypertarget=\{marker\}} (no default, initially unset)

A \texttt{\textbackslash hypertarget} from the package \texttt{hyperref} \cite{hyperref} is used to create an internal link of an anchor \texttt{\{marker\}}. This \texttt{\{marker\}} can be referenced by \texttt{\textbackslash hyperlink} or \texttt{/tcb/hyperlink} \textsuperscript{\textit{P.208}}.

\begin{tcolorbox}[enhanced, colback=red!10, colframe=red!50!black, hypertarget= hypertwinA, hyperlink=hypertwinB, title=Box A]
Click me to jump to Box A.
\end{tcolorbox}

\texttt{/tcb/bookmark=\{text\}} (no default, initially unset)

Sets a PDF bookmark with the given \texttt{\{text\}}, if the package \texttt{bookmark} \cite{bookmark} is loaded. This bookmark is set with an automated destination (the current box) and is set one level below the current bookmark level.

\begin{tcolorbox}[colback=blue!10, colframe=blue!50!black, bookmark=Example for using a bookmark, title=Example for using a bookmark]
Open the bookmark view of the previewer to see the bookmark.
\end{tcolorbox}

\texttt{/tcb/bookmark*=\{\{options\}\}\{\text\}} (no default, initially unset)

Identical to \texttt{/tcb/bookmark}, but additional \texttt{\{options\}} from the package \texttt{bookmark} \cite{bookmark} can be given.

\begin{tcolorbox}[colback=red!10, colframe=red!50!black, bookmark*=\{color=red, italic, bold\}, title=Red and bold bookmark]
Open the bookmark view of the previewer to see the bookmark.
\end{tcolorbox}

\texttt{/tcb/index=\{entry\}} (no default, initially unset)

Adds an index \texttt{\{entry\}} for the box. This is a shortcut for setting \texttt{\textbackslash index\{\{entry\}\}} to \texttt{/tcb/phantom} \textsuperscript{\textit{\textit{P.104}}}.

\texttt{/tcb/index*=\{name\}\{\{entry\}\}} (no default, initially unset)

Adds an \texttt{\{entry\}} to an index with a specific \texttt{\{name\}}. This is a shortcut for setting \texttt{\textbackslash index[\{name\}]\{\{entry\}\}} to \texttt{/tcb/phantom} \textsuperscript{\textit{\textit{P.104}}}. An index extension package like \texttt{imakeidx} has to be loaded to use this option key.
4.22 Even and Odd Pages

Also see /tcb/toggle left and right \textsuperscript{P.46} and /tcb/toggle enlargement \textsuperscript{P.92} for further even/odd options.

\texttt{U 2015-11-13 /tcb/check odd page=true|false} \hspace{1cm} (default true, initially false)

If set to true, a precise even/odd page testing for the current box is applied. This is done by using labels. If a box moves to another page, the document has to be compiled twice for the correct settings. If set to false, even/odd page tests may give wrong results for the first box of a page.

/tcb/toggle left and right \textsuperscript{P.46}, /tcb/toggle enlargement \textsuperscript{P.92}, and /tcb/if odd page automatically set check odd page, but for \texttt{tcbifoddpage} \textsuperscript{P.109} this option has to be set explicitly.

\texttt{N 2015-11-13 /tcb/if odd page\{\langle odd options\rangle\}\{\langle even options\rangle\}} \hspace{1cm} (style, no default)

If the current box is on an odd page, the \langle odd options\rangle are applied. On an even page, the \langle even options\rangle are applied. /tcb/check odd page is automatically set for precise even/odd page testing.

\begin{tcolorbox}
\texttt{\begin{tcbox}[if odd page={colback=yellow!50}{colback=red!50}]
This box is colored in yellow on an odd page
and is colored in red on an even page.
\end{tcbox}}

This box is colored in yellow on an odd page and is colored in red on an even page.
\end{tcolorbox}

If a box is /tcb/breakable \textsuperscript{P.390}, using /tcb/if odd page only acts upon the first box. If the setting should be repeated for every partial box of the break sequence, the option should be packed into /tcb/extras \textsuperscript{P.397}. In this case, /tcb/check odd page has to be set explicitly! Also see /tcb/if odd page* \textsuperscript{P.108}.

\texttt{N 2016-11-18 /tcb/if odd page or oneside\{\langle odd options\rangle\}\{\langle even options\rangle\}} \hspace{1cm} (style, no default)

For onesided documents, the \langle odd options\rangle are applied always. For twosided documents, this style is identical to /tcb/if odd page.
\textbf{/tcb/if odd page*} = \{\textit{odd options}\}\{\textit{even options}\} \hspace{1cm} \text{(style, no default)}

This option needs the \texttt{breakable} library, see Section 19 on page 388.

For breakable boxes, if the current partial box is on an odd page, the \textit{odd options} are applied. On an even page, the \textit{even options} are applied. \texttt{/tcb/check odd page} \textsuperscript{P.107} is automatically set for precise even/odd page testing.

In contrast to \texttt{/tcb/if odd page} \textsuperscript{P.107}, \texttt{/tcb/if odd page*} is used on every partial box of a break sequences and not only on the first box. Another difference is that \texttt{/tcb/if odd page*} is applied quite late during option processing, while \texttt{/tcb/if odd page} \textsuperscript{P.107} is applied immediately.

\texttt{/tcb/if odd page*} is implemented as \texttt{/tcb/if odd page} \textsuperscript{P.107} packed into \texttt{/tcb/extras} \textsuperscript{P.397}.

\begin{tcolorbox}
  \[\text{breakable, if odd page* = \{colback=yellow!50\}\{colback=red!50\}}\]
  This breakable box is colored in yellow on an odd page and is colored in red on an even page. For every partial box, the test is repeated, i.e. this would give a yellow, red, yellow, red, \ldots sequence for a long content.
\end{tcolorbox}

\begin{tcolorbox}
  \[\text{This breakable box is colored in yellow on an odd page and is colored in red on an even page. For every partial box, the test is repeated, i.e. this would give a yellow, red, yellow, red, \ldots sequence for a long content.}\]
\end{tcolorbox}

\textbf{/tcb/if odd page or oneside*} = \{\textit{odd options}\}\{\textit{even options}\} \hspace{1cm} \text{(style, no default)}

For onesided documents, the \textit{odd options} are applied always. For twosided documents, this style is identical to \texttt{/tcb/if odd page*}.

\textbf{108}
If the current box is on an odd page, the \textsf{(odd code)} is executed. On an even page, the \textsf{(even code)} is executed. For precise even/odd page testing, the \texttt{/tcb/check odd page} \textsuperscript{P.107} has to be set manually inside the box options. The macro \texttt{tcbifoddpage} can be used inside underlay, overlay, or watermark code to test if the box is on an odd page. This will work also for boxes in a break sequence. The macro can also be used inside the box \texttt{content text}. For unbreakable boxes, the correct page test is applied. But for \texttt{/tcb/breakable} \textsuperscript{P.390} boxes, \texttt{tcbifoddpage} will always give the result for the page of the first box inside the box \texttt{content text}. If needed, the methods from the packages \texttt{changepage} or \texttt{ifoddpage} could be used here.

\begin{tcolorbox}
\textbf{Example for a box on an odd page}

\end{tcolorbox}

For onesided documents, the \textsf{(odd code)} is executed always. For twosided documents, this macro is identical to \texttt{tcbifoddpage}.

\texttt{tcbset}{colframe=blue!75!black,colback=white,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,check odd page, title={Example for a box on an \texttt{tcbifoddpage}{odd}{even} page}, watermark text={\texttt{tcbifoddpage}(Odd){Even} page!}]
\lipsum[1]
\end{tcolorbox}
This is a unique identifier (arabic number) for a tcolorbox. It is locally defined inside boxes and has no meaning outside. It is used for precise even/odd page testing, but may also be valuable for elaborate user code.

\begin{tcolorbox}[colback=yellow!5,title=Box \thetcolorboxnumber]
This box is \thetcolorboxnumber.
\tcbox[on line,size=fbox]{This box is \thetcolorboxnumber} and \tcbox[on line,size=fbox]{this box is \thetcolorboxnumber}.
This box is \thetcolorboxnumber.
\end{tcolorbox}

Box 1162
This box is 1162. This box is 1163 and this box is 1164. This box is 1162.

Box on page \thetcolorboxpage
This box is located on page \thetcolorboxpage.

\begin{tcolorbox}[colback=yellow!5,check odd page,
title=Box on page \thetcolorboxpage]
This box is located on page \thetcolorboxpage.
\end{tcolorbox}

Box on page 110
This box is located on page 110.
4.23 Externalization

See Section 25 on page 475 for the \external library of tcolorbox.

If the externalization library of the tikz package is used and /tcb/graphical environment \(\Rightarrow \) P.142 is set to tikzpicture, a tcolorbox could trigger the externalization process which will arise a compilation error.

To avoid this, there are two possible strategies:

- Ensure, that \\texttt{\tikzexternaldisable} is set before a tcolorbox is used. If you typically use the pattern \texttt{\tikzexternalenable some picture \tikzexternaldisable}, there is nothing to care about.

- If externalization is enabled globally, use /tcb/shield externalize to shield any tcolorbox. The preamble code could look like this:

\begin{verbatim}
\usetikzlibrary{external}
\tikzexternalize
\tcbset{shield externalize}
\end{verbatim}

/tcb/shield externalize=true|false (default true, initially false)

If set to true, the drawing part of the tcolorbox is not being externalized which is a good thing at the current state of art. Nevertheless, if the tcolorbox contains a tikzpicture, this picture is still externalized. Pictures drawn with help of /tcb/tikz upper \(\Rightarrow \) P.72 or alike are not externalized.

If a tcolorbox is used inside a node of an encircling tikzpicture which is externalized, do not use \texttt{\tikzexternaldisable} in front of the tcolorbox. /tcb/shield externalize is deactivated automatically inside a tikzpicture.

/tcb/shield externalize is applied for every following tcolorbox inside the current \TeX{} group and is not affected by /tcb/reset \(\Rightarrow \) P.112.

/tcb/external=(file name) (no default, initially unset)

Convenience option which calls \texttt{\tikzsetnextfilename{(file name)}}. Typically, it may be used inside the option list of a tcolorbox to set the externalization \texttt{(file name)} for the first tikzpicture which is discovered inside the box content. The package tikz \[22\] or the library \external{skins} has to be loaded to use this option. Additionally, \texttt{\usetikzlibrary{external}} has to be used.

/tcb/remake=true|false (default true, initially false)

Convenience option which calls /tikz/external/remake next. Typically, it may be used inside the option list of a tcolorbox to force the remake of the first tikzpicture which is discovered inside the box content. The package tikz \[22\] or the library \external{skins} has to be loaded to use this option. Additionally, \texttt{\usetikzlibrary{external}} has to be used.
4.24 Miscellaneous

\tcb/reset (no value, initially set)

Sets (nearly) all \tcolorbox settings (including loaded libraries) back to their default values plus any settings given by \textbf{\tcbsetforeverylayer} \textsuperscript{P.13}, \textbf{\tcb/savedelimiter} \textsuperscript{P.26}, \textbf{\tcb/capture} \textsuperscript{P.100}, and \textbf{\tcb/shield externalize} \textsuperscript{P.111} keep their values. Also, all raster values (see Section 16 on page 298) are not resetted.

This option is useful for boxes in boxes where the inner box should not inherit the settings of the outer box. Note that for boxes inside boxes the \texttt{reset} is done automatically, if the standard settings of the package are used (v2.40 and above), see Section 4.16 from page 97.

\tcb/code=\texttt{\textbackslash{\texttt{code}}} (no default, initially unset)

The given \texttt{\texttt{code}} is executed immediately. This option is useful to place some arbitrary code into an option list.

\begin{tcolorbox}
\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,
   code={Useless at this spot but functional.},
   fonttitle=bfseries}

\begin{tcolorbox}[code={\newcommand{\mycommand}{\textit{working}}},
   title=My \mycommand\ title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

Useless at this spot but functional.

**My working title**

This is a \textbf{tcolorbox}. 
Annihilates the current \texttt{tcolorbox} as far as possible. Basically, this comments out the whole \texttt{tcolorbox} by using a key. If the option list of the current \texttt{tcolorbox} contains arbitrary code with global impact (like counter settings), these actions are not undone automatically. Nevertheless, the effects of \texttt{/tcb/phantom} \footnote{P.104}, \texttt{/tcb/step} \footnote{P.104}, \texttt{/tcb/new/auto counter} \footnote{P.114}, etc., are removed by \texttt{/tcb/void}.

\begin{tcolorbox}[title=This box is completely removed by the following key,\texttt{void}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This option key cannot be applied for every situation. For example, if several box environments with the same environment name are nested, for the outer environment \texttt{/tcb/void} cannot be used, since the end of the inner environment will be misinterpreted as end of the outer environment. Also, \texttt{/tcb/void} cannot be used for environments wrapped with \texttt{\textcolorboxenvironment} \footnote{P.17}.

\begin{tcolorbox}[title=This box is completely removed by the following key,\texttt{nirvana}]
\begin{tcolorbox}
\texttt{Nested Box}
\end{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

The contents of the current \texttt{tcolorbox} are processed including counter settings, but the box is just not drawn. Therefore, \texttt{/tcb/nirvana} is less radical than \texttt{/tcb/void} and several box environments can be nested without problems.

\begin{tcolorbox}[title=This box is completely removed by the following key,\texttt{nirvana}]
\begin{tcolorbox}
\texttt{Nested Box}
\end{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}
5 Initialization Option Keys

The initialization options are only applicable for the generation of new environments and commands based on \texttt{tcolorbox} and friends. Particularly, they can be used for

- \texttt{\newtcolorbox} → P.15
- \texttt{\newtcb} → P.16
- \texttt{\newtcblisting} → P.324
- \texttt{\newtcbinputlisting} → P.326
- \texttt{\newtcbtheorem} → P.362, and
- \texttt{\newtcbfit} → P.440.

Typically, these options may generate counters and alike. It is strongly recommended that you use initialization options inside the preamble only. Otherwise, you may get trouble when using \LaTeX{}’s \texttt{\include} features. Also, it is recommended to generate new environments and commands with these options after \texttt{hyperref} is loaded to avoid warnings about duplicate identifiers.

5.1 Numbered Boxes

Counters assigned using the initialization options are administrated automatically. Especially, they are increased for each new box. Independent from the real counter name, the counter value can be referenced by \texttt{\thetcbcounter}, e.g. inside the title of the box. The real counter name is stored inside \texttt{\tcbcounter}.

\texttt{/tcb/new/auto counter} (no value, initially unset)

Creates a new counter automatically. With \texttt{/tcb/new/number format} → P.116 and \texttt{/tcb/new/number within} → P.116, the appearance and behavior of the counter can be changed. The counter value is referenced by \texttt{\thetcbcounter}.

\texttt{\begin{pabox}[label={myautocounter}]{Title with number}}
This box is automatically numbered with \texttt{\ref{myautocounter}} on page \texttt{\pageref{myautocounter}}. Inside the box, the \texttt{\thetcbcounter} can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{\tcbcounter}.
\texttt{\end{pabox}}

Examp. 5.1: Title with number

This box is automatically numbered with 5.1 on page 114. Inside the box, the 5.1 can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{tcb@cnt@pabox}. 
Here, a counter from another \texttt{tcolorbox} is reused. Note that the settings for \texttt{/tcb/new/number format} \rightarrow \texttt{P.116} and \texttt{/tcb/new/number within} \rightarrow \texttt{P.116} are inherited and cannot be changed. The counter value is referenced by \texttt{\thetcbcounter}.

\begin{tcolorbox}[use counter from=pabox]{\mybox}{2}{\%}
  \begin{mybox}{\label={myusecounterfrom}}{Title with continued number}
    This box is automatically numbered with \ref{myusecounterfrom} on page \pageref{myusecounterfrom}. Inside the box, the \texttt{\thetcbcounter} can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{\tcbcounter}.
  \end{mybox}
\end{tcolorbox}

Some Box 5.2: Title with continued number

This box is automatically numbered with 5.2 on page 115. Inside the box, the 5.2 can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{\tcbcounter}.

\begin{tcolorbox}[use counter=myexample,number format=\Alph]{\mybox}{2}{\%}
  \begin{mybox}{\label={myusecounter}}{Title with \LaTeX\ number}
    This box is automatically numbered with A on page 115. Inside the box, the A can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{myexample}.
  \end{mybox}
\end{tcolorbox}

Some Box A: Title with \LaTeX\ number

An existing \LaTeX\ \texttt{counter} is used for numbering. In contrast to \texttt{/tcb/new/use counter}, the options \texttt{/tcb/new/number format} \rightarrow \texttt{P.116} and \texttt{/tcb/new/number within} \rightarrow \texttt{P.116} are ignored. Use this for counters which are already configured outside the \texttt{tcolorbox} package, e.g. the standard \texttt{figure} counter.

\begin{tcolorbox}[use counter=]{\mybox}{2}{\%}
  \begin{mybox}{\label={myusecounter}}{Title with \LaTeX\ number}
    This box is automatically numbered with \texttt{myexample} on page 115. Inside the box, the \texttt{\thetcbcounter} can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{myexample}.
  \end{mybox}
\end{tcolorbox}

Some Box 5.2: Title with \LaTeX\ number

An existing \LaTeX\ \texttt{counter} is used for numbering. In contrast to \texttt{/tcb/new/use counter}, the options \texttt{/tcb/new/number format} \rightarrow \texttt{P.116} and \texttt{/tcb/new/number within} \rightarrow \texttt{P.116} are ignored. Use this for counters which are already configured outside the \texttt{tcolorbox} package, e.g. the standard \texttt{figure} counter.

The created boxes are not numbered. This is the default. The option may be used to overrule a previous option.

For \texttt{beamer} slides, this invokes the \texttt{\resetcounteronoverlays} command for the box counter. The counter is automatically reset on subsequent overlay slides of a frame. Thereby, the counter will be the same on all slides of every frame.
The automatic counter is set to zero, if \langle \textit{counter} \rangle is increased. Additionally, during output, the value of \langle \textit{counter} \rangle is prepended to the value of the automatic counter. To prepend the automatic counter with the chapter number and to reset it with every new chapter, use:

\begin{flushleft}
\texttt{number within=chapter}
\end{flushleft}

See /\texttt{tcb/new/use\ counter} for a complete example.

\begin{flushleft}
\texttt{number format=\langle format macro \rangle}
\end{flushleft} (no default, initially \texttt{\arabic})

Declares the format of the automatic counter. The \langle \textit{format macro} \rangle can be any valid \LaTeX number formatting macro like \texttt{\arabic}, \texttt{\roman}, etc. To display the counter value in large roman numbers, use:

\begin{flushleft}
\texttt{number format=\Roman}
\end{flushleft}

See /\texttt{tcb/new/auto\ counter} for a complete example.

\begin{flushleft}
\texttt{number freestyle=\langle code \rangle}
\end{flushleft} (no default, initially unset)

Allows advanced control over the complete number format. This option overrules the format given by /\texttt{tcb/new/number within} and /\texttt{tcb/new/number format}. Nevertheless, you can combine it with /\texttt{tcb/new/number within} to get the desired reset property.

The \langle \textit{code} \rangle is some formatting code which should contain \texttt{\tcbcounter} to reference the automated counter. Since this \langle \textit{code} \rangle is expanded, you have to secure each macro with \texttt{\noexpand} with exception of \texttt{\tcbcounter}.

\begin{flushleft}
\texttt{Definition in the preamble:}
\end{flushleft}

\begin{flushleft}
\texttt{\newtcolorbox[auto\ counter,number within=section, number freestyle={(Q/\noexpand\thesection/\noexpand\Alph{\tcbcounter})},]{phbox}{2}{2}{% colback=yellow!15!white,colframe=blue!75!black,fonttitle=\bfseries, title=Question~\thetcbcounter: #2,#1}}
\end{flushleft}

\texttt{\begin{phbox}[label={myfreestyle}]\{Title with freestyle number\}}
This box is automatically numbered with \texttt{\ref{myfreestyle}} on page \texttt{\pageref{myfreestyle}}. Inside the box, the \texttt{\thetcbcounter} can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{\texttt{tcb@cnt@phbox}}.
\texttt{\end{phbox}}
The following options /tcb/new/crefname and /tcb/new/Crefname need to be set inside the preamble.

\texttt{\usepackage{cleveref}}
\begin{tcolorbox}[auto counter,number within=section, crefname={bluebox}{blueboxes}]
\(
\{\text{mybluebox}\}[2]\)[colback=blue!5!white,colframe=blue!75!black,fonttitle=\bfseries, title=Bluebox \thetcbcounter: #2,#1]
\end{tcolorbox}

\texttt{\usepackage{varioref}}
\texttt{\usepackage{cleveref}}
\begin{mybluebox}[label={myreference}]{My title}
This is an example.
\end{mybluebox}
\Cref{myreference}, \cref{myreference}.\\Cpageref{myreference}, \cpageref{myreference}.\\nameCref{myreference}, \namecref{myreference}.\\labelcref{myreference}, \labelcpageref{myreference}.\With \texttt{varioref}:
\Vref{myreference}, \vref{myreference}.\Vref*{myreference}, \vref*{myreference}.\Bluebox 5.1: My title
This is an example.

Bluebox 5.1, bluebox 5.1.
Page 117, page 117.
Bluebox, bluebox. 
5.1, 117. 
With \texttt{varioref}:
Bluebox 5.1, bluebox 5.1. 
Bluebox 5.1, bluebox 5.1.
/tcb/new/blend into ⟨name⟩

(style, no default, initially unset)

Used to comfortably blend into an existing schema of naming and numbering for some selected cases. For example, a tcolorbox can be used to display and entitle an image pretending to be a standard figure environment. Here, /tcb/title → P.18 is used instead of the standard \caption and /tcb/list text → P.105 can be used instead of the optional parameter of the standard \caption.

Feasible values for ⟨name⟩ are:

- **figures**: blend into the standard figure environment.
- **tables**: blend into the standard table environment.
- **listings**: blend into the standard lstlisting environment of the package listings [6].

Note that blend into=listings can only be used in the document content or, preferably, inside a \AtBeginDocument clause! Using it without \AtBeginDocument inside the preamble does not work since the listings packages initializes its counter also inside \AtBeginDocument.

\begin{figure}[htb]
\centering\includegraphics[height=4cm]{lichtspiel.jpg}
\caption{A standard figure}
\end{figure}

\newtcolorbox[blend into=figures]{myfigure}[2]{float=htb,capture=hbox, title={#2},every float=\centering,#1}

\begin{myfigure}{A tcolorbox figure}
\includegraphics[height=4cm]{lichtspiel.jpg}
\end{myfigure}

Figure 1: A standard figure

Figure 2: A tcolorbox figure
/tcb/blend before title={(value)} (no default, initially colon)

This option formats the title output of \tcb/new/blend into P.118. Note that this is a common tcolorbox option which should be set globally or in the normal option part of \newtcolorbox P.15.

Feasible values for \langle value \rangle are:
- \texttt{colon}: use name/number plus colon.
- \texttt{dash}: use name/number plus dash.
- \texttt{colon hang}: use name/number plus colon with hanging indent.
- \texttt{dash hang}: use name/number plus dash with hanging indent.

\begin{myfigure}{A tcolorbox figure with quite a long title}
\includegraphics[height=5cm]{lichtspiel.jpg}
\end{myfigure}

Figure 3 – A tcolorbox figure with quite a long title
This option formats the title output of `/tcb/new/blend` into \textsuperscript{P.118}. The \texttt{code} takes one parameter, the name/number. Use this, if `/tcb/blend before title` \textsuperscript{P.119} is not flexible enough.

\begin{myfigure}{A tcolorbox figure}
\includegraphics[height=6cm]{lichtspiel.jpg}
\end{myfigure}

**Figure 4** A tcolorbox figure
5.2 Lists of \texttt{tcolorbox}

For figures and tables, \LaTeX{} provides the \texttt{listoffigures} and \texttt{listoftables} commands to create lists of these numbered entities. Also, a \texttt{tcolorbox} can be part of such a kind of list.

1. Assign a list \langle name \rangle by the \textit{initialization} option \texttt{/tcb/new/list inside}.

2. Optionally, a new \langle type \rangle for list entries may be assigned by the \textit{initialization} option \texttt{/tcb/new/list type}.

3. List entries a generated automatically within each new \texttt{tcolorbox} using the above initialization.
   - If \texttt{/tcb/list entry=P.105} is set, the entry is generated with it.
   - Otherwise, if \texttt{/tcb/title=P.18} is set, the entry is generated with it.
   - Otherwise, the entry is generated with the current number and the environment name.

4. The generated list is displayed by \texttt{tcblistof=P.122}.

\texttt{/tcb/new/list inside=(name)} \hspace{1cm} \text{(no default, initially unset)}

Assigns a list or contents file to the generated \texttt{tcolorbox}es. Entries to this list are saved to a file which gets the \langle name \rangle as file name extension. The list is referenced by this name in \texttt{tcblistof=P.122}. For example:

\begin{verbatim}
list inside=exam
\end{verbatim}

See Section 17.9 from page 356 for a complete example.

\texttt{/tcb/new/list type=(type)} \hspace{1cm} \text{(no default, initially \texttt{tcolorbox})}

Optionally, some \langle type \rangle can be assigned to the list entries. For a new \langle type \rangle, a macro \texttt{l@\langle type \rangle} has to exist which controls the format of the list entry. The default type is defined by

\begin{verbatim}
\newcommand*{\l@tcolorbox}{\@dottedtocline{1}{1.5em}{2.3em}}
\end{verbatim}

This is identical to the \texttt{l@section} setting of \LaTeX{}. \texttt{l@tcolorbox} can be redefined or a new \langle type \rangle can be assigned.
\tcblistof\{(macro)\}{\langle name\rangle}{\langle short\rangle}{\langle title\text{ text}\rangle}

Displays the generated list of \texttt{tcolorbox}es with the given \texttt{\langle name\rangle}. The heading is generated by \texttt{\langle macro\rangle}\{(\langle short\rangle)\}{\langle title\text{ text}\rangle}\} where \texttt{\section} is the default setting for \texttt{\langle macro\rangle}. Here, as usual, \texttt{\langle title\text{ text}\rangle} is the title of the section or chapter while \texttt{\langle short\rangle} is a shorter title for headings and table of contents.

- If \texttt{\langle macro\rangle} ends with a *, \texttt{\tcblistof} mimics the behavior of \texttt{\listoffigures} from the standard \texttt{\LaTeX} classes and adds the title to the left and right mark for headings.
- If \texttt{\langle macro\rangle} starts with \texttt{\chapter}, a possible two column document setting is restored to one column (as standard \texttt{\LaTeX} classes do for \texttt{\listoffigures}).

To display the list inside a subsection, use for example:

\begin{itemize}
  \item \texttt{\tcblistof[subsection]\{exam\}\{List of Exercises\}}
\end{itemize}

The result of the example is found as Subsection 17.10 on page 359.

To apply the list similar to \texttt{\listoffigures} for a report or book, use for example:

\begin{itemize}
  \item \texttt{\tcblistof[chapter\*]\{exam\}\{List of Exercises\}}
\end{itemize}

To set a short title for headings with the default \texttt{\section} setting, use for example:

\begin{itemize}
  \item \texttt{\tcblistof\{exam\}\{List of Exercises\}\{Elaborate List of Fine Exercises for all Students of my Course\}}
\end{itemize}

\begin{itemize}
  \item \texttt{The core of the list is generated by \texttt{\@starttoc\{\langle name\rangle\}}} which can be wrapped into an own macro.}
\end{itemize}
6 Side by Side

A side by side box is a special \texttt{tcolorbox} where the upper and lower part of the box are set side by side. All boxes of this kind are unbreakable.

Further side by side options for code examples are \texttt{/tcb/listing side text}, \texttt{/tcb/text side listing}, \texttt{/tcb/listing outside text}, and \texttt{/tcb/text outside listing}.

### 6.1 Basic Settings

\texttt{/tcb/sidebyside=true|false} (default true, initially false)

Normally, the upper part and the lower part of the box have their positions as their names suggest. If \texttt{sidebyside} is set to true, the upper part is drawn \textit{left-handed} and the lower part is drawn \textit{right-handed}. Both parts are drawn together with the geometry settings of the upper part but the space is divided horizontally according to the following options. Colors, fonts, and box content additions are used individually. The resulting box is unbreakable.

\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title,sidebyside]
   This is the upper (\textit{left-handed}) part.
   \tclower
   This is the lower (\textit{right-handed}) part.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
% \usepackage{lipsum}
% \tcbuselibrary{skins}
\begin{tcolorbox}[bicolor,sidebyside,righthand width=3cm, sharp corners,boxrule=.4pt,colback=green!5,colbacklower=green!50!black!50]
   \lipsum[2]
\end{tcolorbox}
\end{verbatim}

Sets the vertical \(\langle alignment\rangle\) for the left-handed and right-handed part.

Feasible values for \(\langle alignment\rangle\) are:

- **center**: identical to \texttt{minipage} option \texttt{c}.
- **top**: identical to \texttt{minipage} option \texttt{t} (aligns the top lines of the left-handed and right-handed side according to their baselines).
- **bottom**: identical to \texttt{minipage} option \texttt{b} (aligns the bottom lines of the left-handed and right-handed side according to their baselines).
- **center seam**: aligns the center of the left-handed and right-handed side.
- **top seam**: aligns the very top seam of the left-handed and right-handed side.
- **bottom seam**: aligns the very bottom seam of the left-handed and right-handed side.

\begin{tcolorbox}[adjusted title=center,sidebyside align=center]
This is a text which is too long for one line.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=top,sidebyside align=top]
This is a text which is too long for one line.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=bottom,sidebyside align=bottom]
This is a text which is too long for one line.
\end{tcolorbox}

\texttt{center}, \texttt{top}, and \texttt{bottom} are identical to the known corresponding \texttt{minipage} options. While this is the preferred approach for text content, the result for boxed content like tables or images may not be as expected.

For such content, one may use \texttt{center seam}, \texttt{top seam}, and \texttt{bottom seam}. For example, \texttt{top seam} aligns the very top seam of the left-handed and right-handed side.
\begin{tcolorbox}[adjusted title=center seam, sidebyside, sidebyside align=center seam]
This is my description text for the pictures displayed on the right-handed side.
\tcblower
\includegraphics[width=\linewidth/2]{goldshade} \\
\includegraphics[width=\linewidth/2]{blueshade}
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=top seam, sidebyside, sidebyside align=top seam]
This is my description text for the pictures displayed on the right-handed side.
\tcblower
\includegraphics[width=\linewidth/2]{goldshade} \\
\includegraphics[width=\linewidth/2]{blueshade}
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=bottom seam, sidebyside, sidebyside align=bottom seam]
This is my description text for the pictures displayed on the right-handed side.
\tcblower
\includegraphics[width=\linewidth/2]{goldshade} \\
\includegraphics[width=\linewidth/2]{blueshade}
\end{tcolorbox}

**center seam**

This is my description text for the pictures displayed on the right-handed side.

**top seam**

This is my description text for the pictures displayed on the right-handed side.

**bottom seam**

This is my description text for the pictures displayed on the right-handed side.
/tcb/sidebyside gap = (length)  
(no default, initially 10mm)

Sets the horizontal distance between the left-handed and right-handed part to \langle length \rangle.

```
\begin{tcolorbox}[adjusted title=Wide gap,sidebyside gap=30mm]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}
```

Wide gap

This is a text which is too long for one line.

This is a short text.

```
\begin{tcolorbox}[adjusted title=Narrow gap,sidebyside gap=1mm]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}
```

Narrow gap

This is a text which is too long for one line.

This is a short text.

/tcb/lefthand width = (length)  
(no default, initially unset)

Sets the width of the left-handed part to the given \langle length \rangle.

```
\begin{tcolorbox}[title=My title,sidebyside,lefthand width=3cm]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}
```

My title

This is the upper (left-handed) part.

This is the lower (right-handed) part.

/tcb/righthand width = (length)  
(no default, initially unset)

Sets the width of the right-handed part to the given \langle length \rangle.

```
\begin{tcolorbox}[title=My title,sidebyside,righthand width=3cm]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}
```

My title

This is the upper (left-handed) part.

This is the lower (right-handed) part.
\texttt{/tcb\/lefthand ratio}=\langle fraction \rangle 
(no default, initially 0.5)
Sets the width of the left-handed part to the given \texttt{\langle fraction \rangle} of the available space. \texttt{\langle fraction \rangle} is a value between 0 and 1.

\begin{tcolorbox}[title=My title,sidebyside,lefthand ratio=0.25]
This is the upper \texttt{(left-handed)} part.
\tcblower
This is the lower \texttt{(right-handed)} part.
\end{tcolorbox}

\texttt{/tcb\/righthand ratio}=\langle fraction \rangle 
(no default, initially 0.5)
Sets the width of the right-handed part to the given \texttt{\langle fraction \rangle} of the available space. \texttt{\langle fraction \rangle} is a value between 0 and 1.

\begin{tcolorbox}[title=My title,sidebyside,righthand ratio=0.25]
This is the upper \texttt{(left-handed)} part.
\tcblower
This is the lower \texttt{(right-handed)} part.
\end{tcolorbox}
If one side of a side-by-side box should be adapted to the width of its content, this width has to be computed beforehand. The following example uses a savebox `\mysavebox` to store the picture to determine its width. A more convenient way to handle this task is to use the methods from Section 6.2 on page 129.

```latex
\begin{tikzpicture}
\path[fill=red!20,draw=red!50!black]
(0,0) node[below]{A} -- (3,1) node[below right]{B}
-- (1,4) node[above]{C} -- cycle;
\end{tikzpicture}
```

```latex
\lipsum[1]
```

The Triangle

6.2 Advanced Settings from the \texttt{xparse} Library

All following macros and options need the \texttt{xparse} library to be loaded, see Section 24 on page 462.

\texttt{\textbackslash tcb\textbackslash sidebyside\{\textlangle options\}\}\{\langle left-handed content\}\}\{\langle right-handed content\}\}

Creates a colored box using more or less arbitrary \textlangle options\rangle for a \texttt{tcolorbox} \textsuperscript{P.12}. The /tcb/sidebyside \textsuperscript{P.123} option is set to \texttt{true} and the \textlangle left-handed content\rangle and \textlangle right-handed content\rangle is filled into the box appropriately. The resulting box is unbreakable. \texttt{\textbackslash tcb\textbackslash sidebyside} is not only a shortcut for using a normal \texttt{tcolorbox} \textsuperscript{P.12} with /tcb/sidebyside \textsuperscript{P.123}, but allows setting further options like /tcb/sidebyside adapt \textsuperscript{P.130} and /tcb/sidebyside switch \textsuperscript{P.132}.

\%
\textbackslash usepackage\{skins,\texttt{xparse}\}
\textbackslash usepackage\{\texttt{lipsum}\}
\textbackslash tcb\textbackslash sidebyside\{\texttt{title=The Triangle,}
sidebyside adapt=left,
bicolor,colback=white,colbacklower=yellow!10,
fonttitle=\texttt{\textbfseries},center title,drop lifted shadow,\}
\{\%
\textbackslash begin\{tikzpicture\}
\textbackslash path\{fill=red\!20,draw=red\!50\!black\}
\node\{A\} at \{0,0\} \textbackslash node\{below\}\{A\} -- \{3,1\} \node\{right\}\{B\}
\node\{above\}\{C\} -- cycle;
\textbackslash end\{tikzpicture\}\%
\%
\textbackslash \texttt{\textbackslash lipsum\[1\]}\}

\begin{tikzpicture}
\node at (0,0) {A};
\node at (3,1) {B};
\node at (1,4) {C};
\end{tikzpicture}
\lipsum[1]

The Triangle

The option allows the left-handed and/or right-handed side to determine the dimensions of the box. This option is only valid inside \tcbsidebyside \textsuperscript{P.129}. Feasible values for (side(s)) are:

- **none**: no measurement of left-handed and right-handed side.
- **left**: the actual width of the left-handed content is used to set /tcb/lefthand width \textsuperscript{P.126}.
- **right**: the actual width of the right-handed content is used to set /tcb/righthand width \textsuperscript{P.126}.
- **both**: the actual width of the left-handed and right-handed content is used to set /tcb/lefthand width \textsuperscript{P.126}, /tcb/righthand width \textsuperscript{P.126}, and the overall /tcb/width \textsuperscript{P.34}.

\begin{tikzpicture}
\path[fill=yellow,draw=yellow!75!red](0,0) circle (1cm);
\fill[red](45:5mm) circle (1mm);
\fill[red](135:5mm) circle (1mm);
\draw[line width=1mm,red](215:5mm) arc (215:325:5mm);
\end{tikzpicture}
Both sides adapted

<table>
<thead>
<tr>
<th>left</th>
<th>center</th>
<th>right</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
</tbody>
</table>
\tcbsidebyside \{title=Very important table, if odd page={sidebyside switch,sidebyside adapt=right,flushright title}\%
  {sidebyside adapt=left},
  beamer,colframe=blue!50!black,colback=blue!10,
  lower separated=false,sidebyside gap=5mm
\begin{tabular}{|l|c|r|}
\hline
left & center & right \\
A & B & C \\
D & E & F \\
\hline
\end{tabular}
\%
This table contains the most important figures for all future actions. You may notice that B follows A, C follows B, and so on.

<table>
<thead>
<tr>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>Left</td>
</tr>
</tbody>
</table>

Very important table

<table>
<thead>
<tr>
<th>left</th>
<th>center</th>
<th>right</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
</tbody>
</table>

This table contains the most important figures for all future actions. You may notice that B follows A, C follows B, and so on.
7 Saving and Loading of Verbatim Texts

The following macros are slightly modified versions of the original macros from the known packages moreverb and verbatim. They are used implicitly inside of a tcolorbox environment, but they can be used outside also.

\begin{tcbverbatimwrite}{⟨file name⟩}
⟨environment content⟩
\end{tcbverbatimwrite}

Saves the ⟨environment content⟩ to a file named by ⟨file name⟩. TeX macros inside the environment are not expanded.

\begin{tcbverbatimwrite}{\jobname_verbexp.tex}
This text is saved \textit{as is}.
\end{tcbverbatimwrite}

This environment may be used inside an own environment. Note, that inside the environment definition \tcbverbatimwrite has to be used instead of \begin{tcbverbatimwrite} and \end{tcbverbatimwrite} instead of \end{tcbverbatimwrite}.

\begin{myverbatim}
This is the text which is saved by my own environment.
\end{myverbatim}

\begin{tcbwritetemp}
⟨environment content⟩
\end{tcbwritetemp}

Has the same function as tcbverbatimwrite, but uses the key value of tempfile for the file name.

\begin{tcbwritetemp}
This text is saved \textit{as is}.
\end{tcbwritetemp}

\tcbusetemp

Loads the current temporary file which was saved by tcbwritetemp.
If this option is set to be `true`, the percent sign `%` is silently ignored for `tcbverbatimwrite` and all macros and environments which are built using `tcbverbatimwrite`, e.g. `tcbwritetemp`, `tcblisting`, or `dispExample`.

This option may be useful for creating some special effects, but mainly it is intended to be applied for documentation with DocStrip. The creation of this option was motivated by Yudai Nakata. Note that this option is not getting reset by `/tcb/reset`.

Normal usage:
\begin{tcbwritetemp}
%\begin{center}\bfseries
This is my text.
%\end{center}
\end{tcbwritetemp}
\tcbusetemp
\tcbset{verbatim ignore percent}

Option applied:
\begin{tcbwritetemp}
%\begin{center}\bfseries
This is my text.
%\end{center}
\end{tcbwritetemp}
\tcbusetemp

Normal usage:
This is my text.

Optional applied:
This is my text.

Note that every percent sign is removed, also escaped ones.

Normal
\begin{tcblisting}{title=Normal}
%\begin{center}\bfseries
This is my 5\% text and this is my 10\% text.
%\end{center}
\end{tcblisting}

Option applied
\begin{tcblisting}{title=Option applied, verbatim ignore percent}
\begin{center}\bfseries
This is my 5\% text and this is my 10\% text.
\end{center}
\end{tcblisting}
8 Recording

The package provides some macros and options to take records during compilation. This is done by \LaTeX\ file operations to save some data to a file for later usage. The main application scenario is depicted in Section 8.3 on the next page where information about example solutions is recorded and read again in Section 8.4 on page 139.

8.1 Macros

\texttt{\textbackslash tcbstartrecording[(file name)]}

Opens a file denoted by \texttt{(file name)} for writing the records. The default file name is \texttt{\jobname.records}. See Section 8.3 on the next page for an example application.

\begin{itemize}
  \item \texttt{\textbackslash tcbstartrecording\relax}
  \item \texttt{\textbackslash tcbstartrecording[\jobname.records]}
\end{itemize}

\texttt{\textbackslash tcbrecord{⟨content⟩}}

Records any \texttt{⟨content⟩} to the record file. \texttt{\textbackslash tcbrecord} is implemented as \texttt{\immediate\write}. \texttt{\textbackslash tcbstartrecording} has to be called before; otherwise, \texttt{\textbackslash tcbrecord} is silently ignored.

\texttt{\textbackslash tcbrecord{\string\solution{\thetcbcounter}{solutions/exercise-\thetcbcounter.tex}}}

\texttt{\textbackslash tcbstoprecording}

Closes the current record file which was opened by \texttt{\textbackslash tcbstartrecording} before.

\texttt{\textbackslash tcbinputrecords[(file name)]}

Opens a file denoted by \texttt{(file name)} for reading the records via \texttt{\input}. The default file name is the name of the last used record file for saving. \texttt{\textbackslash tcbstoprecording} has to be called before.

8.2 Options

\texttt{/tcb/record=⟨content⟩} \hspace{1cm} (style, no default)

Records any \texttt{⟨content⟩} to the record file, see \texttt{\textbackslash tcbrecord}. This key can be used several times to write several lines.

\texttt{record={\string\solution{\thetcbcounter}{solutions/exercise-\thetcbcounter.tex}}}

\texttt{/tcb/no recording}

Disables \texttt{\textbackslash tcbrecord} and \texttt{/tcb/record} inside the current group.
8.3 Example: Exercises

The following application example creates exercises and their corresponding solutions. Each pair is generated inside a single \texttt{tcolorbox} where the solution is given below \texttt{tcblower}. For every example, the solution part is saved by \texttt{/tcb/savelowerto} to a file. The saving is recorded using \texttt{/tcb/record}. To enlighten the possibilities, the second exercise has no solution. Finally, the solutions are input in Section 8.4 on page 139.

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x) = \sin((\sin x)^2)
\end{equation*}
\end{exercise}

\begin{align*}
f'(x) &= \left( \sin((\sin x)^2) \right)' \\
&= \cos((\sin x)^2) 2 \sin x \cos x.
\end{align*}
\begin{exercise}[no solution]
It holds:
\begin{equation*}
\frac{d}{dx}\ln|x| = \frac{1}{x}.
\end{equation*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x) = (\sin(\sin x))^2
\end{equation*}
The derivative is:
\begin{align*}
f'(x) &= 2\sin(\sin x)\cos(\sin x)\cos x.
\end{align*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x) = \sqrt{x^3-6x^2+2x}
\end{equation*}
The derivative is:
\begin{align*}
f'(x) &= \frac{3x^2-12x+2}{2\sqrt{x^3-6x^2+2x}}.
\end{align*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x) = \left(\frac{2+3x}{1-2x}\right)^3
\end{equation*}
The derivative is:
\begin{align*}
f'(x) &= 3 \left(\frac{2+3x}{1-2x}\right)^2 \frac{(1-2x)3-(2+3x)(-2)}{(1-2x)^2}
= \frac{21(2+3x)^2}{(1-2x)^4}.
\end{align*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x) = \frac{\cos x}{(\tan 2x)^2}
\end{equation*}
The derivative is:
\begin{align*}
f'(x) &= \frac{\cos(2x) \left[\sin x \sin 2x \cos 2x + 4\cos x \sin 2x (-\sin 2x)\right] + 4 \cos x (\cos 2x)^2}{(\sin 2x)^3}.
\end{align*}
\end{exercise}
Compute the derivative of the following function:

\[
\begin{align*}
f(x) &= \cos((2x^2+3)^3) \\
\end{align*}
\]

The derivative is:

\[
\begin{align*}
f'(x) &= \left( \cos((2x^2+3)^3) \right)' \\
&= -\sin((2x^2+3)^3) \cdot 3(2x^2+3)^2 \cdot 2x \\
&= -12x(2x^2+3)^2 \sin((2x^2+3)^3).
\end{align*}
\]

Compute the derivative of the following function:

\[
\begin{align*}
f(x) &= (x^2+1)\sqrt{x^4+1} \\
\end{align*}
\]

The derivative is:

\[
\begin{align*}
f'(x) &= \left( (x^2+1)\sqrt{x^4+1} \right)' \\
&= 2x\sqrt{x^4+1} + \frac{2x^3(x^2+1)}{\sqrt{x^4+1}}.
\end{align*}
\]

Exercise 8.1: Compute the derivative of the following function:

\[ f(x) = \sin((\sin x)^2) \]

Solution on page 139

Exercise 8.2: It holds:

\[ \frac{d}{dx} (\ln x) = \frac{1}{x} \]

Exercise 8.3: Compute the derivative of the following function:

\[ f(x) = (\sin(\sin x))^2 \]

Solution on page 139

Exercise 8.4: Compute the derivative of the following function:

\[ f(x) = \sqrt{x^3 - 6x^2 + 2x} \]

Solution on page 139
Exercise 8.5: Compute the derivative of the following function:

\[ f(x) = \left(\frac{2 + 3x}{1 - 2x}\right)^3 \]

Solution on page 140

Exercise 8.6: Compute the derivative of the following function:

\[ f(x) = \frac{\cos x}{(\tan 2x)^2} \]

Solution on page 140

Exercise 8.7: Compute the derivative of the following function:

\[ f(x) = \cos((2x^2 + 3)^3) \]

Solution on page 140

Exercise 8.8: Compute the derivative of the following function:

\[ f(x) = (x^2 + 1)\sqrt{x^4 + 1} \]

Solution on page 140

8.4 Example: Solutions

This concludes the example given in Section 8.3 on page 136. Now, the saved and recorded solutions are included.

\[
\text{Solution of Exercise 8.1 on page 138: } \\
\text{The derivative is: } \\
f'(x) = \left(\sin((\sin x)^2)\right)' = \cos((\sin x)^2)2\sin x \cos x.
\]

\[
\text{Solution of Exercise 8.3 on page 138: } \\
\text{The derivative is: } \\
f'(x) = \left((\sin(x))^2\right)' = 2\sin(x) \cos(x) \cos x.
\]

\[
\text{Solution of Exercise 8.4 on page 138: } \\
\text{The derivative is: } \\
f'(x) = \left(\sqrt{x^3 - 6x^2 + 2x}\right)' = \frac{3x^2 - 12x + 2}{2\sqrt{x^3 - 6x^2 + 2x}}
\]
Solution of Exercise 8.5 on page 139:
The derivative is:

\[ f'(x) = \left( \frac{2 + 3x}{1 - 2x} \right)^3 = 3 \left( \frac{2 + 3x}{1 - 2x} \right)^2 \frac{(1 - 2x)3 - (2 + 3x)(-2)}{(1 - 2x)^2} = \frac{21(2 + 3x)^3}{(1 - 2x)^4}. \]

Solution of Exercise 8.6 on page 139:
The derivative is:

\[
\begin{align*}
n'(x) &= \left( \frac{\cos x}{(\tan 2x)^2} \right)' = \left( \frac{\cos x (\cos 2x)^2}{(\sin 2x)^2} \right)' \\
&= \frac{(\sin 2x)^2[-\sin x(\cos 2x)^2 + (\cos x)4\cos 2x(-\sin 2x)] - \cos x(\cos 2x)^24\sin 2x\cos 2x}{(\sin 2x)^4} \\
&= \frac{\cos(2x)[\sin x\sin 2x\cos 2x + 4\cos x(\sin 2x)^2 + 4\cos x(\cos 2x)^2]}{(\sin 2x)^3} \\
&= \frac{-\cos(2x)[\sin x\sin 2x\cos 2x + 4\cos x]}{(\sin 2x)^3}.
\end{align*}
\]

Solution of Exercise 8.7 on page 139:
The derivative is:

\[
\begin{align*}
n'(x) &= \left( \cos((2x^2 + 3)^3) \right)' = -\sin((2x^2 + 3)^3)3(2x^2 + 3)^22 \cdot 2x \\
&= -12x(2x^2 + 3)^2\sin((2x^2 + 3)^3).
\end{align*}
\]

Solution of Exercise 8.8 on page 139:
The derivative is:

\[
\begin{align*}
n'(x) &= \left( (x^2 + 1)\sqrt{x^4 + 1} \right)' = 2x\sqrt{x^4 + 1} + \frac{2x^3(x^2 + 1)}{\sqrt{x^4 + 1}}.
\end{align*}
\]
This section provides a technical overview of the skin concept of `tcolorbox`. For most applications of `tcolorbox`, one will not need to know the bells and whistles described herein. You may proceed to Section 10 on page 156 where the customization options for most users are documented.

The following explanations also cover options and settings from the `skins` library, see Section 10 on page 156.

### 9.1 Skins and Drawing Engines

From a technical point of view, a *skin* is a style definition for the appearance of a `tcolorbox`. The core package provides some additional option keys for skins but only two skins called `standard`\(^\text{P.216}\) and `standard jigsaw`\(^\text{P.217}\). The `skins` library adds several more skins. To change to a skin, only one option from the core package has to be set.

```
\tcb/skin = ⟨name⟩ (style, no default, initially standard)
```

Sets the current skin to ⟨name⟩. This is a style definition which sets all the following keys, i.e. for many use cases there is nothing more to do.

```
\tcbset{colback=Salmon!50!white,colframe=FireBrick!75!black, width=(\linewidth-8mm)/2,before=,after=\hfill,equal height group=ske}

\begin{tcolorbox}[adjusted title=My title]
  This is my content.
\end{tcolorbox}
\begin{tcolorbox}[beamer,adjusted title=My title]
  This is my content.
\end{tcolorbox}
```

```
\tcb/skin first = ⟨name⟩ (style, no default, initially standard)
```

If the box is set to be `/tcb/breakable`\(^\text{P.390}\) and is broken actually, then the skin for the *first* part of the break sequence is set to ⟨name⟩, see Subsection 19.8 on page 404. Typically, this key is set by a `/tcb/skin`.

```
\tcb/skin middle = ⟨name⟩ (style, no default, initially standard)
```

If the box is set to be `/tcb/breakable`\(^\text{P.390}\) and is broken actually, then the skin for the *middle* parts (if any) of the break sequence is set to ⟨name⟩, see Subsection 19.8 on page 404. Typically, this key is set by a `/tcb/skin`.

```
\tcb/skin last = ⟨name⟩ (style, no default, initially standard)
```

If the box is set to be `/tcb/breakable`\(^\text{P.390}\) and is broken actually, then the skin for the *last* part of the break sequence is set to ⟨name⟩, see Subsection 19.8 on page 404. Typically, this key is set by a `/tcb/skin`. 

141
Sets the graphical environment for the \texttt{tcolorbox} to \langle\texttt{name}\rangle. Feasible values are \texttt{pgfpicture} and \texttt{tikzpicture} or environments which inherit from one of these two. This key is set by a \texttt{/tcb/skin} \textsuperscript{P.141} and may seldom be used directly.

The skin of a \texttt{tcolorbox} is drawn by up to four \textit{engines}. Afterwards, the text content is drawn which is not part of a skin. The four steps are:

1. The \textit{frame} of the box, drawn by \texttt{/tcb/frame engine}.

2. The \textit{interior} of the box. The interior of a box with title is drawn differently from a box without title. \texttt{/tcb/interior titled engine} or \texttt{/tcb/interior engine} \textsuperscript{P.143} is used to draw the interior.

3. The \textit{segmentation} (line) of the box, if there is a lower part; drawn by \texttt{/tcb/segmentation engine} \textsuperscript{P.143}.

4. The \textit{title area} of the box, if there is a title and \texttt{/tcb/title filled} \textsuperscript{P.27} is set to \texttt{true}; drawn by \texttt{/tcb/title engine} \textsuperscript{P.143}.

\texttt{/tcb/frame engine} \texttt{=(name)} \textsuperscript{P.141} (no default, initially \texttt{standard})

Sets the \textit{frame} drawing engine for a box to \langle\texttt{name}\rangle. Typically, this key is set by a \texttt{/tcb/skin}. Feasible values for \langle\texttt{name}\rangle are:

- \texttt{standard}: the original code from the core package,
- \texttt{path}: a \texttt{tikz} path which is controlled by \texttt{/tcb/frame style} \textsuperscript{P.156},
- \texttt{pathjigsaw}: a \texttt{tikz} path which is controlled by \texttt{/tcb/frame style} \textsuperscript{P.156},
- \texttt{pathfirst}: a \texttt{tikz} path which is controlled by \texttt{/tcb/frame style} \textsuperscript{P.156},
- \texttt{pathfirstjigsaw}: a \texttt{tikz} path which is controlled by \texttt{/tcb/frame style} \textsuperscript{P.156},
- \texttt{pathmiddle}: a \texttt{tikz} path which is controlled by \texttt{/tcb/frame style} \textsuperscript{P.156},
- \texttt{pathmiddlejigsaw}: a \texttt{tikz} path which is controlled by \texttt{/tcb/frame style} \textsuperscript{P.156},
- \texttt{pathlast}: a \texttt{tikz} path which is controlled by \texttt{/tcb/frame style} \textsuperscript{P.156},
- \texttt{pathlastjigsaw}: a \texttt{tikz} path which is controlled by \texttt{/tcb/frame style} \textsuperscript{P.156},
- \texttt{freelance}: deprecated.
- \texttt{spartan}: a quite spartan code.
- \texttt{empty}: draw nothing.

\texttt{/tcb/interior titled engine} \texttt{=(name)} \textsuperscript{P.141} (no default, initially \texttt{standard})

Sets the \textit{interior} drawing engine for a titled box to \langle\texttt{name}\rangle. Typically, this key is set by a \texttt{/tcb/skin}. Feasible values for \langle\texttt{name}\rangle are:

- \texttt{standard}: the original code from the core package,
- \texttt{path}: a \texttt{tikz} path which is controlled by \texttt{/tcb/interior style} \textsuperscript{P.157},
- \texttt{pathfirst}: a \texttt{tikz} path which is controlled by \texttt{/tcb/interior style} \textsuperscript{P.157},
- \texttt{pathmiddle}: a \texttt{tikz} path which is controlled by \texttt{/tcb/interior style} \textsuperscript{P.157},
- \texttt{pathlast}: a \texttt{tikz} path which is controlled by \texttt{/tcb/interior style} \textsuperscript{P.157},
- \texttt{freelance}: deprecated.
- \texttt{spartan}: a quite spartan code.
- \texttt{empty}: draw nothing.
/tcb/interior engine=⟨name⟩ (no default, initially standard)

Sets the interior drawing engine for an untitled box to ⟨name⟩. Typically, this key is set by a /tcb/skin → P.141. Feasible values for ⟨name⟩ are:
- standard: the original code from the core package,
- path: a \tikz \text{path} which is controlled by /tcb/interior style → P.157,
- pathfirst: a \tikz \text{path} which is controlled by /tcb/interior style → P.157,
- pathmiddle: a \tikz \text{path} which is controlled by /tcb/interior style → P.157,
- pathlast: a \tikz \text{path} which is controlled by /tcb/interior style → P.157,
- freelance: deprecated.
- spartan: a quite spartan code.
- empty: draw nothing.

/tcb/segmentation engine=⟨name⟩ (no default, initially standard)

Sets the segmentation (line) drawing engine for a box to ⟨name⟩. Typically, this key is set by a /tcb/skin → P.141. Feasible values for ⟨name⟩ are:
- standard: the original code from the core package,
- path: a \tikz \text{path} which is controlled by /tcb/segmentation style → P.159,
- freelance: deprecated.
- spartan: a quite spartan code.
- empty: draw nothing.

/tcb/title engine=⟨name⟩ (no default, initially standard)

Sets the title area drawing engine for a titled box to ⟨name⟩. Typically, this key is set by a /tcb/skin → P.141. Feasible values for ⟨name⟩ are:
- standard: the original code from the core package,
- path: a \tikz \text{path} which is controlled by /tcb/title style → P.159,
- pathfirst: a \tikz \text{path} which is controlled by /tcb/title style → P.159,
- pathmiddle: a \tikz \text{path} which is controlled by /tcb/title style → P.159,
- pathlast: a \tikz \text{path} which is controlled by /tcb/title style → P.159,
- freelance: deprecated.
- spartan: a quite spartan code.
- empty: draw nothing.

After an engine is set to an initializing value, the resulting graphical code can be changed using code option keys, see Section 9.2 on page 145.
/tcb/geometry nodes=true|false (default true, initially false)

If set to true, up to four tikz nodes are defined for a \tcolorbox which are named frame, interior, segmentation, and title. These nodes describe the boundaries of the equally named parts of a \tcolorbox. They are used by most engines based on Ti\kZ. Typically, this key is set automatically by a /tcb/skin \textsuperscript{P.141}.

\begin{tcolorbox}[adjusted title=The title]
The upper part. \tcblower The lower part.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,adjusted title=The title,frame code={\path[draw=red,fill=red!25] (frame.south west) rectangle (frame.north east);},interior titled code={\path[draw=blue,fill=blue!25] (interior.south west) rectangle (interior.north east);},segmentation code={\path[draw=green,fill=green!25] (segmentation.south west) rectangle (segmentation.north east);},title code={\path[draw=black,fill=brown!75!black] (title.south west) rectangle (title.north east);}]
The upper part. \tcblower The lower part.
\end{tcolorbox}
9.2 Code Option Keys

The following code options are applicable for all skins. The used \textit{(graphical code)} can be any \texttt{pgf} code. For all skins with exception of \texttt{standard} \textsuperscript{P.216} and \texttt{standard jigsaw} \textsuperscript{P.217}, the \texttt{(graphical code)} can also be any \texttt{TikZ} code.

\texttt{/tcb/frame code=\langle graphical code \rangle} \hspace{1cm} \text{(code, default from \texttt{standard})}

The given \texttt{⟨graphical code⟩} is used for drawing the \texttt{frame} of the box.

\begin{tcolorbox}
\tcset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[enhanced,frame code={
\foreach \n in {north east,north west,south east,south west}
{\path [fill=red!75!black] (interior.\n) circle (3mm); }); }]
This is a \texttt{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{tcolorbox}

\texttt{/tcb/frame empty} \hspace{1cm} \text{(style, no value)}

This is a shortcut for setting \texttt{/tcb/frame code} to empty. This option removes the drawing of the frame. Alternatively, use \texttt{/tcb/frame hidden} \textsuperscript{P.157}.

\texttt{/tcb/interior titled code=\langle graphical code \rangle} \hspace{1cm} \text{(code, default from \texttt{standard})}

The given \texttt{⟨graphical code⟩} is used for drawing the \texttt{interior} of the box, if the box comes with a title.

\begin{tcolorbox}[enhanced,title=My title,interior titled code={
\path[draw=red!5!white,line width=5mm,line cap=round]
{{[xshift=3mm,yshift=-3mm]interior.north west}
--([xshift=-3mm,yshift=3mm]interior.south east)
{([xshift=3mm,yshift=3mm]interior.south west)
--([xshift=-3mm,yshift=-3mm]interior.north east);};}]
This is a \texttt{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

\texttt{/tcb/interior titled empty} \hspace{1cm} \text{(style, no value)}

This is a shortcut for setting \texttt{/tcb/interior titled code} to empty. This option removes the drawing of the untitled interior. Alternatively, use \texttt{/tcb/interior hidden} \textsuperscript{P.158}.
/tcb/interior code\=(graphical code) \hspace{1cm} (code, default from standard)

The given \( (graphical code) \) is used for drawing the \textit{interior} of the box, if the box is without a title.

\begin{tcolorbox}
\begin{tcbclipper}
\path\[draw=red!5!white,line width=5mm,line cap=round\]
([xshift=3mm,yshift=-3mm]interior.north west)
--([xshift=-3mm,yshift=3mm]interior.south east)
([xshift=3mm,yshift=3mm]interior.south west)
--([xshift=-3mm,yshift=-3mm]interior.north east);\]
\end{tcbclipper}
\end{tcolorbox}

This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/interior empty \hspace{1cm} (style, no value)

This is a shortcut for setting \texttt{/tcb/interior code} to empty. This option removes the drawing of the interior. Alternatively, use \texttt{/tcb/interior hidden} \textsuperscript{P.158}.

/tcb/segmentation code\=(graphical code) \hspace{1cm} (code, default from standard)

The given \( (graphical code) \) is used for drawing the \textit{segmentation} area of the box.

\begin{tcolorbox}
\begin{tcbclipper}
\path\[top color=red!5!white,bottom color=red!5!white,middle color=blue\]
(segmentation.south west) rectangle (segmentation.north east);\]
\end{tcbclipper}
\end{tcolorbox}

This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/segmentation empty \hspace{1cm} (style, no value)

This is a shortcut for setting \texttt{/tcb/segmentation code} to empty. This option removes the drawing of the segmentation line. Alternatively, use \texttt{/tcb/segmentation hidden} \textsuperscript{P.159}.

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/tcb/title code=(graphical code) (code, default from standard)

The given (graphical code) is used for drawing the title area of the box.

\begin{tcolorbox}[enhanced, title=My title, title code={
\path[draw=yellow, solid, decorate, line width=2mm, 
  decoration={coil, aspect=0, segment length=10.1mm}] 
  ([xshift=1mm]title.west) -- ([xshift=-1mm]title.east);}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title

This is a tcolorbox.

This is the lower part.

/tcb/title empty (style, no value)

This is a shortcut for setting /tcb/title code to empty. This option removes the drawing of the title area. Alternatively, use /tcb/title hidden→P.160.
9.3 Subskins

A subskin is a new \texttt{/tcb/skin} based on an existing skin which is extended or changed.

\begin{itemize}
  \item Never use geometry settings or bounding box options inside a subskin definition! If one skin is replaced by another skin, the overall bounding box should stay constant. Especially, if a skin is used for a breakable box, unpredictable and unpleasant results could arise otherwise. If you want to change the geometry also, use an additional style. See the skin \texttt{beamer} and the style \texttt{/tcb/beamer} as pattern.
\end{itemize}

\texttt{\textbackslash tcbsubskin\{}\langle name\rangle\}\{}\langle base skin\rangle\}\{}\langle options\rangle\}\}

Creates a new skin \langle name\rangle which inherits all properties of an existing \langle base skin\rangle plus the given \langle options\rangle. The new skin \langle name\rangle can be used as value for the keys \texttt{/tcb/skin}, \texttt{/tcb/skin first}, \texttt{/tcb/skin middle}, and \texttt{/tcb/skin last}. As \langle base skin\rangle, one can take \texttt{standard}, \texttt{empty}, \texttt{enhanced}, or any skin from the \texttt{skins} library, see Section 10 on page 156.

\begin{verbatim}
\% \tcbsuselibrary{skins}
\tcbsubskin{mycross}\{}\empty\}\{frame code={%
  \draw[red, line width=5pt] (frame.south west)--(frame.north east);
  \draw[red, line width=5pt] (frame.north west)--(frame.south east);},
  skin first=mycross, skin middle=mycross, skin last=mycross \}
\begin{tcolorbox}\{skin=mycross\}
  This is my content.
\end{tcolorbox}
\end{verbatim}

\begin{itemize}
  \item \texttt{/tcb/skin first is subskin of=\langle base skin\rangle\{}\langle options\rangle\} (no default, initially unset)
    Creates a new unnamed skin which inherits all properties of an existing \langle base skin\rangle plus the given \langle options\rangle. This skin is set as \texttt{/tcb/skin first}.
    See a detailed example on page 257.
  \item \texttt{/tcb/skin middle is subskin of=\langle base skin\rangle\{}\langle options\rangle\} (no default, initially unset)
    Creates a new unnamed skin which inherits all properties of an existing \langle base skin\rangle plus the given \langle options\rangle. This skin is set as \texttt{/tcb/skin middle}.
    See a detailed example on page 257.
  \item \texttt{/tcb/skin last is subskin of=\langle base skin\rangle\{}\langle options\rangle\} (no default, initially unset)
    Creates a new unnamed skin which inherits all properties of an existing \langle base skin\rangle plus the given \langle options\rangle. This skin is set as \texttt{/tcb/skin last}.
    See a detailed example on page 257.
\end{itemize}
9.4 Drawing Scheme

Depending on the complexity of a `tcolorbox` definition, the resulting box is drawn in a more or less complex series of steps.

To document and demonstrate these drawing steps, we consider the following box definition:

```latex
\newtcolorbox{testbox}[1]\{enhanced,title=Test Box,
  boxrule=1mm,titlerule=0.5mm,colframe=blue!50!black,
  interior style={top color=blue!20!green!50!white,bottom color=blue!20!yellow!50!white},
  colbacktitle=blue!50!green!90!white,segmentation style={solid},
  fonttitle=\bfseries,drop fuzzy shadow,borderline={0.3mm}{0.35mm}{yellow!50!white},
  underlay={\path\fill image opacity=0.15,fill image scale=0.9,
    fill stretch picture={\draw\fill [blue,line width=2mm] circle (1);}}
  (interior.south west) rectangle (interior.north east);},
  watermark text={Watermark},watermark color={green!20!white},
  finish={\begin{tcbclipframe}
    \path\fill [bottom color=black,top color=black!50!white,opacity=0.1]
    (frame.south west) -- (frame.south east) -- (frame.north east) -- cycle;
    \path\fill [top color=white,bottom color=black!50!white,opacity=0.1]
    (frame.south west) -- (frame.north east) -- (frame.north west) -- cycle;
    \end{tcbclipframe}},#1
```

For this definition, we get the maximal number of drawing steps:

- Section 10.6 on page 191.

1. shadow

2. frame

- `/tcb/colframe` → P.27, `/tcb/opacityframe` → P.51
- `/tcb/frame code` → P.145
- `/tcb/frame style` → P.156

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• Section 10.5 on page 186
• Section 10.2 on page 163
• Section 10.8 on page 204
• Section 4.12 on page 74
• Section 10.3 on page 174

All together, the box is drawn:

```latex
% \usepackage{lipsum}
\begin{testbox}
\lipsum[2]
\end{testbox}
```

Section 10.9 on page 206
9.5 Color Names

Color settings for a tcolorbox are saved into named colors which may be used inside a box, e.g. for an overlay. These color names are

- \texttt{tcbcolframe} set by /tcb/colframe \textsuperscript{P.27} (frame color)
- \texttt{tcbcolback} set by /tcb/colback \textsuperscript{P.27} (background color)
- \texttt{tcbcolbacktitle} set by /tcb/colbacktitle \textsuperscript{P.27} (background color of the title)
- \texttt{tcbcolbacklower} set by /tcb/colbacklower \textsuperscript{P.232} (skin dependend background color of the lower part; needs \texttt{skins} to be loaded)
- \texttt{tcbcolupper} set by /tcb/colupper \textsuperscript{P.28} (text color upper part)
- \texttt{tcbcollower} set by /tcb/collower \textsuperscript{P.28} (text color lower part)
- \texttt{tcbcoltitle} set by /tcb/coltitle \textsuperscript{P.28} (text color title)

% \tcbuselibrary{skins}
\begin{tcolorbox}[title=Color names, colframe=blue!50!black, colback=blue!5, colbacktitle=blue!50, colupper=red!35!black]
\foreach \name in {tcbcolframe,tcbcolback,tcbcolbacktitle,tcbcolbacklower, t cbcolupper,tcbcollower,tcbcoltitle}
{\tikz\path[draw,fill=\name] (0,0) rectangle node[right=4mm,font=\ttfamily]{\name} (0.8,0.8);\par}
\end{tcolorbox}
9.6 Useful Properties

The following macros describe certain properties which may be used for the drawing scheme, see Section 9.4 on page 149. Sometimes, they are even available inside the box content. All of them are considered to be read-only and should never be redefined by the user.

\tcbheightspace

If the height of a tcolorbox is not the natural height, the space difference between the forced and the natural size is hold by \tcbheightspace. This macro is not usable inside the box content, but for skins or inside /tcb/underlay→P.204, /tcb/overlay→P.74, etc. If such a space information is needed inside the box content, see /tcb/space to→P.59 instead.

% \tcbuselibrary{skins}
\newtcolorbox{testbox}[2][]{enhanced,size=fbox,
colframe=blue!75!black,colback=white,height=#2,
underlay={\node[above,inner sep=3pt] at (interior.south){% 
\includegraphics[width=\tcbtextwidth,height=\tcbheightspace-3pt]{goldshade.png}};
},
#1}
\begin{testbox}{3cm}
This is my box. The space is filled with a picture.
\end{testbox}
\begin{testbox}{2cm}
This is my box. The space is filled with a picture.
\end{testbox}

This is my box. The space is filled with a picture.

This is my box. The space is filled with a picture.

\tcbtextwidth

This property describes the box content width.

• If there also is a lower part, it describes the width of the upper part.
• For /tcb/sidebyside→P.123 boxes, it describes the combined text width plus segmentation.
• This property can be used inside the box content text with exception of /tcb/fit→P.442 boxes.
• \tcbtextwidth can be used for all box types for skins or inside /tcb/underlay→P.204, /tcb/overlay→P.74, etc.

\begin{tcolorbox}[colframe=blue!75!black]
Inside a box: \tcbtextwidth ( =\the\linewidth).
\end{tcolorbox}

\tcbtextheight

This property describes the designated box content height. If the box is larger than the natural height, the actual content will be smaller than \tcbtextheight.

- For boxes with a fixed /tcb/height \(^{P.53}\), this property can be used inside the box content text. For other boxes, it denotes 0pt inside the box content.
- \tcbtextheight can be used for all box types for skins or inside /tcb/underlay \(^{P.204}\), /tcb/overlay \(^{P.74}\), etc.

\begin{tcolorbox}
\begin{tcolorbox}[enhanced,colframe=blue!75!black,
    underlay={\node[red] at (frame.east) {Here: \tcbtextheight};}]
Inside a box with natural height: \tcbtextheight.
\end{tcolorbox}
\begin{tcolorbox}[enhanced,colframe=blue!75!black,height=1cm,
    underlay={\node[red] at (frame.east) {Here: \tcbtextheight};}]
Inside a box with fixed height: \tcbtextheight.
\end{tcolorbox}
\end{tcolorbox}

Here: 7.95pt
Inside a box with natural height: 0pt.

Here: 8.5359pt
Inside a box with fixed height: 8.5359pt.

\tcbsegmentstate

This macro contains 0, 1, or 2. It is set for every unbroken box and every broken partial box with the following meaning:

- 0: The current (partial) box contains only an upper part.
- 1: The current (partial) box contains an upper and a lower part. The segmentation node can be used for positioning.
- 2: The current (partial) box contains only a lower part. This can only be true for parts of breakable boxes.

Skins like \texttt{bicolor} \(^{P.230}\) use this property to paint the (partial) boxes.

\begin{tcb(raster)
\begin{tcolorbox}[raster equal height,enhanced,
    watermark text={\tcbsegmentstate}]
\begin{tcolorbox}Upper part\end{tcolorbox}
\begin{tcolorbox}Upper part \tcblower Lower part\end{tcolorbox}
\end{tcolorbox}
\end{tcb(raster)}
The library is loaded by a package option or inside the preamble by:

```latex
\tcbuselibrary{skins}
```

This also loads the package \texttt{tikz} \cite{tikz}. Typically but not necessarily, the following skins use \texttt{tikz} instead of \texttt{pgf}.

In the following, general settings and options of the library are documented. The actual catalog of skins is found in Section 11 on page 214.

### 10.1 Style Option Keys

The following style options are applicable for all skins which use engines of type \texttt{path}, \texttt{pathfirst}, \texttt{pathmiddle}, or \texttt{pathlast}. Especially, the skin \texttt{enhanced} \footnote{P.218} supports \textit{all} of them and \texttt{standard} \footnote{P.216} \texttt{none}.

\texttt{/tcb/frame style=}\texttt{(tikz keys)} \hspace{1cm} (style, no default)

The \texttt{(tikz keys)} are used inside the \texttt{tikz} path command for drawing the \texttt{frame} of the box. This option is available if the \texttt{/tcb/frame engine} \footnote{P.142} is set to \texttt{path}, \texttt{pathfirst}, \texttt{pathmiddle}, or \texttt{pathlast}. It is \textit{not} available for \texttt{standard}.

\texttt{/tcb/frame style image=}\texttt{(file name)} \hspace{1cm} (no default, initially unset)

Fills the frame with an external image referenced by \texttt{(file name)}. For advanced features like blending of a picture with the background, use \texttt{/tcb/frame style} together with \texttt{/tikz/fill stretch image} \footnote{P.271}.
/tcb/frame style tile={(graphics options)}{(file name)} (no default, initially unset)

Fills the frame with a tile pattern based on an external image referenced by \(\text{(file name)}\). The \(\text{(graphics options)}\) are given to the underlying \texttt{\includegraphics} command. For advanced features like blending of a picture with the background, use /tcb/frame style ·P.156 together with /tikz/fill tile image ·P.275.

\begin{tcolorbox}
\[\text{enhanced, title=My title,}
\text{frame style tile={width=1cm}{pink_marble.png}}\]
This is a \texttt{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \texttt{tcolorbox}.

This is the lower part.

/tcb/frame hidden (style, no value)

This is a shortcut for frame style={draw=none, fill=none}. Depending on the skin, this option switches off the drawing of the frame. Alternatively, use /tcb/frame empty ·P.145.

\begin{tcolorbox}
\[\text{enhanced, title=My title,}
\text{frame hidden}\]
This is a \texttt{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \texttt{tcolorbox}.

This is the lower part.

/tcb/interior style={(tikz keys)} (style, no default)

The \(\text{(tikz keys)}\) are used inside the \texttt{tikz} path command for drawing the interior of the box. They are used for the titled and for the untitled version as well. This option is available if the /tcb/interior titled engine ·P.142 or /tcb/interior engine ·P.143 is set to \texttt{path}, \texttt{pathfirst}, \texttt{pathmiddle}, or \texttt{pathlast}. It is \textit{not} available for standard.

\begin{tcolorbox}
\[\text{enhanced, title=My title,}
\text{interior style={left color=red\!20\!white,}
\text{right color=yellow\!50\!white}}\]
This is a \texttt{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \texttt{tcolorbox}.

This is the lower part.
/tcb/interior style image=(file name)  (no default, initially unset)

Fills the interior with an external image referenced by (file name). For advanced features like blending of a picture with the background, use /tcb/interior style→P.157 together with /tikz/fill stretch image→P.271.

\begin{tcolorbox}[enhanced,title=My title, interior style image=goldshade.png]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tcb/interior style tile={(graphics options)}{(file name)}  (no default, initially unset)

Fills the interior with a tile pattern based on an external image referenced by (file name). The (graphics options) are given to the underlying \includegraphics command. For advanced features like blending of a picture with the background, use /tcb/interior style→P.157 together with /tikz/fill tile image→P.275.

\begin{tcolorbox}[enhanced,title=My title, interior style tile={width=2cm}{crinklepaper.png}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tcb/interior hidden  (style, no value)

This is a shortcut for \texttt{interior style=\{draw=none,fill=none\}}. Depending on the skin, this option switches off the drawing of the interior. Alternatively, use /tcb/interior empty→P.146 and/or /tcb/interior titled empty→P.145.

\begin{tcolorbox}[enhanced,title=My title, interior hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
/tcb/segmentation style=(tikz keys) (style, no default)

The \{tikz keys\} are used inside the \texttt{tikz} path command for drawing the \textit{segmentation} line of the box.

This option is available if the /tcb/segmentation engine \(\rightarrow\) P.143 is set to \texttt{path}. It is \textit{not} available for \texttt{standard}.

\begin{tcolorbox}
\begin{verbatim}
\tcset{colback=red!5!white,colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title, segmentation style={double=white,draw=blue, double distance=1pt,solid}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

My title
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tcb/segmentation hidden (style, no value)

This is a shortcut for \texttt{segmentation style=\{draw=none,fill=none\}}. Depending on the skin, this option switches off the drawing of the segmentation line. See also /tcb/lower separated \(\rightarrow\) P.25 which has the same effect for most skins. Alternatively, use /tcb/segmentation empty \(\rightarrow\) P.146.

\begin{tcolorbox}
\begin{verbatim}
\tcset{colback=red!5!white,colframe=red!75!black, coltitle=blue!50!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title, enhanced,segmentation hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

My title
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tcb/title style=(tikz keys) (style, no default)

The \{tikz keys\} are used inside the \texttt{tikz} path command for drawing the \textit{title area} of the box.

This option is available if the /tcb/title engine \(\rightarrow\) P.143 is set to \texttt{path}, \texttt{pathfirst}, \texttt{pathmiddle}, or \texttt{pathlast}. It is \textit{not} available for \texttt{standard}.

\begin{tcolorbox}
\begin{verbatim}
\tcset{colback=red!5!white,colframe=red!75!black, coltitle=blue!50!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title, title style={left color=blue!15!yellow, right color=red!85!black}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

My title
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
/tcb/title style image=⟨file name⟩
(no default, initially unset)
Fills the title area with an external image referenced by ⟨file name⟩. For advanced features like blending of a picture with the background, use /tcb/title style → P.159 together with /tikz/fill stretch image → P.271.

\begin{tcolorbox}[enhanced,title=My title,
  title style image=blueshade.png]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tcb/title style tile=⟨graphics options⟩{⟨file name⟩}
(no default, initially unset)
Fills the title area with a tile pattern based on an external image referenced by ⟨file name⟩. The ⟨graphics options⟩ are given to the underlying \includegraphics command. For advanced features like blending of a picture with the background, use /tcb/title style → P.159 together with /tikz/fill tile image → P.275.

\begin{tcolorbox}[enhanced,title=My title,
  title style tile={width=1cm}{pink_marble.png}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tcb/title hidden
(style, no value)
This is a shortcut for title style={draw=none,fill=none}. Depending on the skin, this option switches off the drawing of the title background. See also /tcb/title filled → P.27 for a similar effect. Alternatively, use /tcb/title empty → P.147.

\begin{tcolorbox}[title=My title,
  enhanced,title hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
The `(tikz keys)` are used to draw a title rule, i.e. a rule below the optional title. The width of the rule is controlled by `/tcb/titlerule` \(^{P.36}\). It may be set directly to a smaller width to create mixed effects with the standard rule. This option is implemented as an `/tcb/underlay` \(^{P.204}\). Thus, it is not available for `standard` \(^{P.216}\) and `standard jigsaw` \(^{P.217}\), but for all other skins, e.g. `enhanced` \(^{P.218}\). As an underlay, this option can be used multiple times and is removed by `/tcb/no underlay` \(^{P.204}\).

\begin{tcolorbox}
[enhanced,
  colback=red!5!white,colframe=red!75!black,
  colbacktitle=red!50!yellow,fonttitle=\bfseries,
  title=My title,
  titlerule=1mm,
  titlerule style=yellow ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
[enhanced,
  colback=red!5!white,colframe=red!75!black,
  colbacktitle=red!50!yellow,fonttitle=\bfseries,
  title=My title,
  titlerule=1mm,
  titlerule style={yellow,line width=0.5mm} ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
[enhanced,
  colback=red!10!white,colframe=red!75!black,
  colbacktitle=red!50!yellow,fonttitle=\bfseries,
  title=My title,
  boxrule=0pt,titlerule=1mm,
  titlerule style=red!50!black ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
[empty,
  coltitle=red!75!black,fonttitle=\bfseries,
  borderline horizontal={0.5mm}{0pt}{red!50!white},
  title=My title,
  titlerule style={red,arrows = {Hooks[arc=270]-Hooks[arc=270]}} ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
The combined Ti\kZ style applied to frame, interior, and title background can be used by authors in customizing code.

\texttt{/tikz/tcb fill frame} (style, no value)

This is a Ti\kZ style which is finally applied to the \texttt{frame} of the box.

\begin{tcolorbox}
\[\text{title=My title}\]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

\texttt{/tikz/tcb fill interior} (style, no value)

This is a Ti\kZ style which is finally applied to the \texttt{interior} of the box.

\begin{tcolorbox}
\[\text{title=My title}\]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

\texttt{/tikz/tcb fill title} (style, no value)

This is a Ti\kZ style which is finally applied to the \texttt{title area} of the box.

\begin{tcolorbox}
\[\text{title=My title}\]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
10.2 Boxed Title Option Keys

10.2.1 Boxed Title Placement

The following options place the title text into an own \tcbox \p.14. This boxed title can be customized independently from the main box using /tcb/boxed title style \p.168. The placement can be influenced by ⟨boxtitle options⟩.

/tcb/attach boxed title to top left=⟨(boxtitle options)⟩ (style, default empty)

The title is boxed with a \tcbox \p.14 and attached to the top left corner of the main box.

```
\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top left]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

/tcb/attach boxed title to top text left=⟨(boxtitle options)⟩ (style, default empty)

The title is boxed with a \tcbox \p.14 and attached to the top left corner of the main box and shifted to match title text and box text.

```
\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top text left]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

/tcb/attach boxed title to top center=⟨(boxtitle options)⟩ (style, default empty)

The title is boxed with a \tcbox \p.14 and attached to the top of the main box.

```
\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top center]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

/tcb/attach boxed title to top text right=⟨(boxtitle options)⟩ (style, default empty)

The title is boxed with a \tcbox \p.14 and attached to the top right corner of the main box and shifted to match title text and box text.

```
\begin{tcolorbox}[enhanced,title=My title, halign=right, attach boxed title to top text right]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

/tcb/attach boxed title to top right=⟨(boxtitle options)⟩ (style, default empty)

The title is boxed with a \tcbox \p.14 and attached to the top right corner of the main box.

```
\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top right]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```
The title is boxed with a `\tcbox` and attached to the bottom left corner of the main box.

```
\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to bottom left]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

The title is boxed with a `\tcbox` and attached to the bottom left corner of the main box and shifted to match title text and box text. Note that this matches the upper part, even, if there is a lower part.

```
\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to bottom text left]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

The title is boxed with a `\tcbox` and attached to the bottom of the main box.

```
\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to bottom center]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

The title is boxed with a `\tcbox` and attached to the bottom right corner of the main box and shifted to match title text and box text. Note that this matches the upper part, even, if there is a lower part.

```
\begin{tcolorbox}[enhanced,title=My title,
halign=right,
attach boxed title to bottom text right]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

The title is boxed with a `\tcbox` and attached to the bottom right corner of the main box.

```
\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to bottom right]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```
This is a convenient style to mimic a standard title. It uses /tcb/attach boxed title to top, /tcb/minipage boxed title, and sizes the boxed title to match the base box.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top, boxed title style={colframe=red}]
This is a tcolorbox.
\end{tcolorbox}

My title
This is a tcolorbox.

In contrast to /tcb/attach boxed title to top, this style uses smaller left and right rules to avoid previewer glitches. Typically, one would not use different colors for the frame as in the example below.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top*, boxed title style={colframe=red}]
This is a tcolorbox.
\end{tcolorbox}

My title
This is a tcolorbox.

This is a convenient style to produce a standard-like title at the bottom of the box. It uses /tcb/attach boxed title to bottom center, /tcb/minipage boxed title, and sizes the boxed title to match the base box.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to bottom, boxed title style={colframe=red}]
This is a tcolorbox.
\end{tcolorbox}

This is a tcolorbox.

In contrast to /tcb/attach boxed title to top, this style uses smaller left and right rules to avoid previewer glitches.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to bottom]
This is a tcolorbox.
\end{tcolorbox}

This is a tcolorbox.

This style combines /tcb/attach boxed title to bottom* with /tcb/boxed title style. The <options> are given to /tcb/boxed title style.
10.2.2 Options for the Boxed Title Placement

The \langle boxtitle options \rangle of the keys described above are shift values. The dimensions of the boxed title are stored into two macros \texttt{\tcboxedtitleheight} and \texttt{\tcboxedtitlewidth}. These macros can be used inside the following \texttt{\boxtitle}:

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top left={xshift=-2mm}, boxed title style={size=small,colback=blue}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top center={yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=blue}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top left={xshift=-2mm,yshift=-2mm}, boxed title style={size=small,colback=blue}, show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

The bounding box of the resulting total \texttt{tcolorbox} is adapted automatically to the vertical dimensions of the boxed title. Possible horizontal enlargements are not automatically computed.
10.2.3 Options for the Boxed Title Box

The boxed title options are implemented as an underlay, see Section 10.8 on page 204. Therefore, a boxed title is not drawn, if a skin does not support underlays like standard. Still, the room for the boxed titles gets reserved in these cases.

A TiKZ node title is produced by a boxed title which can be used inside /tcb/frame code, /tcb/interior code, underlays, overlays, and finishes.

A boxed title is almost always the first underlay. The only exceptions are underlays defined by /tcb/underlay boxed title which are drawn before. Additionally, underlays defined by /tcb/underlay boxed title are only drawn, if a boxed title is actually set. They are ignored, if there is no boxed title.

\tcbboxed title size=(size)

(no default, initially title)

This setting defines the basic size for the title box. Further settings can be applied using /tcb/boxed title style. Feasible values for (size) are:

- title: Sets the size according to /tcb/size = title.
- standard: No size setting. Typically, this is identical to /tcb/size \texttt{normal}.
- copy: The size values for a title of the base box are copied for the title box.

\begin{tcbraster}[raster columns=3,enhanced,boxrule=0.4pt, title=My title,attach boxed title to top center]
\begin{tcolorbox}[boxed title size=title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[boxed title size=standard]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[boxed title size=copy]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcbraster}
By default, a boxed title is dimensioned with \texttt{/tcb/size=\texttt{title}} and inherits the \texttt{/tcb/skin} and \texttt{/tcb/colframe} of the main box. Also, the \texttt{/tcb/colback} is inherited from the main \texttt{/tcb/colbacktitle}. Font and color of the title text are set as usual. All other \texttt{(options)} are set by the \texttt{/tcb/boxed title style} key. Since a boxed title is set by \texttt{\tcbox}, all \texttt{tcolorbox} options are applicable here. If \texttt{/tcb/boxed title style} is used several times, the \texttt{(options)} are appended.

\begin{tcolorbox}[enhanced,\texttt{title=My title,\atboxenoptxttop}, \texttt{boxed title style={colframe=green!75!black,\atboxenoptxttop}}] This is a \textbf{tcolorbox}. \end{tcolorbox}

\begin{tcolorbox}[enhanced,\texttt{title=My title,\atboxenoptxtleft}, \texttt{boxed title style={colframe=red!50!black,\atboxenoptxtleft}}] This is a \textbf{tcolorbox}. \end{tcolorbox}

\begin{tcolorbox}[enhanced,\texttt{title=My title,\atboxenoptxttop, \atboxenoptxtleft}, \texttt{boxed title style={boxrule=0.5mm,\atboxenoptxttop,\atboxenoptxtleft}}] \lipsum[2] \end{tcolorbox}

My title


My title


\begin{mybox}[colbacktitle=green]{My title}
\lipsum[2]
\end{mybox}

\begin{mybox}[colbacktitle=red]{My title}
\lipsum[3]
\end{mybox}
/tcb/hbox boxed title

The title text content is captured with a horizontal box. Especially, there are no linebreak possible.

\newtcolorbox{mybox}[1]{hbox boxed title, enhanced,attach boxed title to top center={yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, title={#1}}
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}

/tcb/minipage boxed title=(\textit{length})

The title text content is captured with a minipage with a width of \textit{(length)}. By default, the resulting boxed title is somewhat smaller than the main box.

\newtcolorbox{mybox}[1]{minipage boxed title, enhanced,attach boxed title to top center={yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, center title,title={#1}}
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}

/tcb/minipage boxed title*=\textit{(length)}

The title text content is captured with a minipage with a width of main box width plus \textit{(length)}. By default, the resulting boxed title is somewhat smaller than the main box.

\newtcolorbox{mybox}[1]{minipage boxed title*=\textit{-2cm}, enhanced,attach boxed title to top center={yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, center title,title={#1}}
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}
The title text content is captured with a TikZ node with given TikZ (options). The text is centered by default.

```
\newtcolorbox{mybox}[1][]{tikznode boxed title, enhanced,attach boxed title to top center= {yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, title={#1})
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
```

```
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}
```

The title text content is captured with a varwidth environment with a width of (length). This style needs the varwidth package [1] to be loaded manually. By default, the resulting boxed title is somewhat smaller than the main box.

```
% \usepackage{varwidth}
\newtcolorbox{mybox}[1][]{varwidth boxed title, enhanced,attach boxed title to top center= {yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, center title,title={#1}}
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
```

```
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}
```

The title text content is captured with a varwidth environment with a width of main box width plus (length). This style needs the varwidth package [1] to be loaded manually. By default, the resulting boxed title is somewhat smaller than the main box.

```
% \usepackage{varwidth}
\newtcolorbox{mybox}[1][]{varwidth boxed title*=2cm, enhanced,attach boxed title to top center= {yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, center title,title={#1}}
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
```

```
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}
```
10.3 Watermark Option Keys

The following watermark options are applicable for all skins which use \tikzpicture as \texttt{/tcb/graphical environment} \textsuperscript{p.142}. Therefore, the skin \texttt{standard} \textsuperscript{p.216} does not support these watermarks, but all other skins, e.g. \texttt{enhanced} \textsuperscript{p.218}.

The watermark options rely on the more general overlay options described in Section 4.12 from page 74. Therefore, \texttt{watermarks} and \texttt{overlays} cannot be used mixed. But a mixture is possible with the \texttt{\textgreater hooks\textless} library, see Section 23.

\begin{tcolorbox}
\begin{Verbatim}
\texttt{\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}}
\begin{Verbatim}
\begin{tcolorbox}[enhanced,title=My title,watermark text=My Watermark]
\lipsum[1]
\tcbloaer
\lipsum[2]
\end{tcolorbox}
\end{Verbatim}
\end{Verbatim}
\end{tcolorbox}

\begin{tcolorbox}
\begin{Verbatim}
\texttt{\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}}
\begin{Verbatim}
\begin{tcolorbox}[enhanced,title=My title,watermark text=My Watermark]
\lipsum[1]
\tcbloaer
\lipsum[2]
\end{tcolorbox}
\end{Verbatim}
\end{Verbatim}
\end{tcolorbox}

\texttt{/tcb/watermark text=\langle text \rangle} \hspace{1em} (no default, initially unset)

Writes some \langle text \rangle in the center of the interior region of a \texttt{tcolorbox}. This \langle text \rangle is written \textit{after} the frame and interior are drawn and \textit{before} the text content is drawn. It is zoomed or stretched according the values of \texttt{/tcb/watermark zoom} \textsuperscript{p.177} or \texttt{/tcb/watermark stretch} \textsuperscript{p.179}.

\begin{tcolorbox}
\begin{Verbatim}
\texttt{\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}}
\begin{Verbatim}
\begin{tcolorbox}[enhanced,title=My title,watermark text=My Watermark]
\lipsum[1]
\tcbloaer
\lipsum[2]
\end{tcolorbox}
\end{Verbatim}
\end{Verbatim}
\end{tcolorbox}

\texttt{/tcb/watermark text on=(part) is (text)} \hspace{1em} (no default, initially unset)

This option writes some \langle text \rangle in the center of the interior region of a \texttt{tcolorbox} as described for \texttt{/tcb/watermark text}. But this is done only for boxes named \langle part \rangle of a break sequence, see \texttt{/tcb/breakable} \textsuperscript{p.390}.

Feasible values for \langle part \rangle are:

- \texttt{broken}: all broken box parts,
- \texttt{unbroken}: unbroken boxes only,
- \texttt{first}: first parts of a break sequence,
- \texttt{middle}: middle parts of a break sequence,
- \texttt{last}: last parts of a break sequence,
- \texttt{unbroken and first}: unbroken boxes and first parts of a break sequence,
- \texttt{middle and last}: middle and last parts of a break sequence,
- \texttt{first and middle}: first and middle parts of a break sequence.
Draws an external picture referenced by \( file \)name in the center of the interior region of a tcolorbox. The picture is drawn after the frame and interior are drawn and before the text content is drawn. It is zoomed or stretched according the values of /tcb/watermark zoom \(^{\text{177}}\) or /tcb/watermark stretch \(^{\text{179}}\).

\[
\begin{tcolorbox}[enhanced,title=My title,watermark graphics=Basilica_5.png, watermark opacity=0.15]
\lipsum[1-2]
\tcblower
This example uses a public domain picture from\[
\url{http://commons.wikimedia.org/wiki/File:Basilica_5.png}
\end{tcolorbox}
\]

/\texttt{tcb/watermark graphics=}\( (file \)name) \hspace{1cm} \text{(no default, initially unset)}

This option draws a picture referenced by \( file \)name in the center of the interior region of a tcolorbox as described for /tcb/watermark graphics. But this is done only for boxes named \( part \) of a break sequence, see /tcb/breakable \(^{\text{390}}\).

Feasible values for \( part \) are:

- **broken**: all broken box parts,
- **unbroken**: unbroken boxes only,
- **first**: first parts of a break sequence,
- **middle**: middle parts of a break sequence,
- **last**: last parts of a break sequence,
- **unbroken and first**: unbroken boxes and first parts of a break sequence,
- **middle and last**: middle and last parts of a break sequence.
Draws the given \texttt{tikz} \textit{(graphical code)} in the center of the interior region of a \texttt{tcolorbox}. The code is executed \textit{after} the frame and interior are drawn and \textit{before} the text content is drawn. The result is zoomed or stretched according the values of /\texttt{tcb/watermark zoom} \textsuperscript{P.177} or /\texttt{tcb/watermark stretch} \textsuperscript{P.179}.

\begin{tcolorbox}[enhanced,title=My title, watermark tikz={\draw[line width=2mm] circle (1cm) node{\fontfamily{ptm}\fontseries{b}\fontsize{20mm}{20mm}\selectfont ?};}]
\lipsum[1]
\end{tcolorbox}

\lipsum[2]

This option draws the given \texttt{tikz} \textit{(graphical code)} in the center of the interior region of a \texttt{tcolorbox} as described for /\texttt{tcb/watermark tikz}. But this is done only for boxes named \textit{(part)} of a break sequence, see /\texttt{tcb/breakable} \textsuperscript{P.390}.

Feasible values for \textit{(part)} are:
- \texttt{broken}: all broken box parts,
- \texttt{unbroken}: unbroken boxes only,
- \texttt{first}: first parts of a break sequence,
- \texttt{middle}: middle parts of a break sequence,
- \texttt{last}: last parts of a break sequence,
- \texttt{unbroken and first}: unbroken boxes and first parts of a break sequence,
- \texttt{middle and last}: middle and last parts of a break sequence.

Removes the watermark if set before. This is an alias for /\texttt{tcb/no overlay} \textsuperscript{P.75}.
Sets the opacity value $\in [0,1]$ for a watermark.

```latex
\begin{tcolorbox}[title=Opacity 1.00,watermark opacity=1.00]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[title=Opacity 0.50,watermark opacity=0.50]
\lipsum[2]
\end{tcolorbox}
```

Sets the zoom value for a watermark. The zoom respects the aspect ratio. The value 1.0 means to fill the whole box until the watermark touches the frame.

```latex
\begin{tcolorbox}[title=Zoom 1.0,watermark zoom=1.0]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[title=Zoom 0.5,watermark zoom=0.5]
\lipsum[2]
\end{tcolorbox}
```
Identically to \textit{/tcb/watermark zoom}\footnote{P.177}, but the watermark never gets enlarged. Thus, the watermark keeps its original size or is shrunk.

\textbf{/tcb/watermark overzoom}=(\textit{fraction}) \ (no default, initially unset)

Sets the overzoom value for a watermark. The overzoom respects the aspect ratio. The value 1.0 means to fill the whole box until the watermark touches all four sides of the frame.

\begin{tcolorbox}[title=Zoom 1.0,watermark zoom=1.0]
\lipsum[1]
\end{tcolorbox}

\begin{tcolorbox}[title=Overzoom 1.0,watermark overzoom=1.0]
\lipsum[1]
\end{tcolorbox}

\textbf{Zoom 1.0}


\textbf{Overzoom 1.0}


If a \textit{/tcb/watermark overzoom} value of 1.0 is used in connection with invisible top and bottom rules which still have a thickness greater than \texttt{0pt}, the space of these invisible rules may not be covered by the watermark. For example, this situation may occur during the breaking of \textit{/tcb/enhanced}\footnote{P.218} boxes. To avoid this optical glitch, just set \textit{/tcb/pad at break}\footnote{P.393} to any desired value.
/tcb/watermark stretch=(fraction) (no default, initially unset)
Sets the stretch value for a watermark. The stretch value is applied to width and height in relation to the box dimensions. It does not respect the aspect ratio. The value 1.0 means to fill the whole box.

\tcbset{enhanced,colback=white,colframe=blue!50!black,fonttitle=\bfseries, watermark graphics=lichtspiel.jpg,watermark opacity=0.5, nobeforeafter,width=(\linewidth-2mm)/2}
\begin{tcolorbox}[title=Stretch 1.00,watermark stretch=1.00]
\lipsum[2]
\end{tcolorbox}
\hfill
% \begin{tcolorbox}[title=Stretch 0.50,watermark stretch=0.50]
\lipsum[2]
\end{tcolorbox}%

Stretch 1.00

Stretch 0.50

/tcb/watermark color=(color) (no default, initially mixed background and frame color)
Sets the color for the watermark.

\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,watermark text=My Watermark, watermark color=yellow!50!red]
\lipsum[1]
\end{tcolorbox}

My title
Sets the watermark to be clipped to the interior area.

\tcbset{enhanced,colback=white,colframe=blue!50!white,fonttitle=\bfseries,watermark opacity=0.5,watermark stretch=1.00,arc=3mm,watermark graphics=lichtspiel.jpg}

\begin{tcolorbox}[title=Clip (default),clip watermark]
\lipsum[1]
\end{tcolorbox}

\begin{tcolorbox}[title=No clip,clip watermark=false]
\lipsum[1]
\end{tcolorbox}
10.4 Clip Environments

The following clip environments are applicable for all skins which use engines of type path, pathfirst, pathmiddle, or pathlast. Especially, the skin enhanced \textsuperscript{P.218} supports all of them and standard \textsuperscript{P.216} none. The typical area of application is inside overlay code, see Section 4.12 from page 74.

\begin{tcbclipframe}
\langle\text{environment content}\rangle
\end{tcbclipframe}

Defines a Tikz scope which clips to the frame area path.

\makeatletter
\newtcolorbox{picturebox}[2][]{
\text{\begin{tcbclipframe}\node at (frame)
\includegraphics[width=\tcb@width,height=\tcb@height]{#2};\end{tcbclipframe}\begin{tcbclipinterior}\fill[white,opacity=0.75]
(frame.south west) rectangle (frame.north east);\end{tcbclipinterior}},#1}
\makeatother

\begin{picturebox}[title=My Picture Box]{lichtspiel.jpg}
\lipsum[1]
\end{picturebox}

My Picture Box

\begin{tcbinvclipframe}
\begin{environment content}
\end{tcbinvclipframe}

Defines a \texttt{Tikz} scope which clips to the \textit{outside} of the frame area path.

\begin{tcbset}{enhanced jigsaw,fonttitle=\textbf,opacityback=0.35,colback=blue!5!white, frame style={left color=red!75!black,right color=red!10!yellow}}
\begin{tikzpicture}
% draw two balls
\path[use as bounding box] (0,0.8) rectangle +(0.1,0.1);
\shadedraw [shading=ball] (0,0) circle (1cm);
\shadedraw [ball color=red] (3,-2.2) circle (1cm);
\end{tikzpicture}
\end{tcbset}

\begin{tcolorbox}[title=A translucent box, overlay={\begin{tcbinvclipframe}
\draw[red,line width=1cm] ([xshift=-2mm,yshift=2mm]frame.north west) --([xshift=2mm,yshift=-2mm]frame.south east);
\draw[red,line width=1cm] ([xshift=-2mm,yshift=-2mm]frame.south west) --([xshift=2mm,yshift=2mm]frame.north east);
\end{tcbinvclipframe}]}
\lipsum[2]
\end{tcolorbox}

A translucent box

\begin{tcbclipinterior}
\begin{environment content}
\end{environment content}
\end{tcbclipinterior}

Defines a Tikz scope which clips to the interior area path.

\begin{tcolorbox}
[enhanced,title=My Title, overlay={\begin{tcbclipinterior}
\draw[red,line width=1cm] (interior.north west)--(interior.south east);
\draw[red,line width=1cm] (interior.south west)--(interior.north east);
\end{tcbclipinterior}}]
\lipsum[1]
\end{tcolorbox}

\begin{tcbcliptitle}
\begin{environment content}
\end{environment content}
\end{tcbcliptitle}

Defines a Tikz scope which clips to the title area path.

\begin{tcolorbox}
[enhanced,title=My Title,colframe=blue,colback=yellow!10!white, overlay={\begin{tcbcliptitle}
\node at (title)\{\includegraphics[width=\linewidth]{lichtspiel.jpg}\};\end{tcbcliptitle}}]
\lipsum[1]
\end{tcolorbox}
/tcb/clip title=true|false
(default true, initially false)

Sets the title to be clipped to the title area.

\tcbset{enhanced,width=5cm,colframe=red!50!white,coltitle=black, colbacktitle=yellow!50!white}
\begin{tcolorbox}[title=\mbox{This is a title which is unbreakable and far too long}]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=\mbox{This is a title which is unbreakable and far too long}, clip title]
This is a tcolorbox.
\end{tcolorbox}

\tcbset{enhanced,width=5cm,colframe=red!50!white,coltitle=black, colbacktitle=yellow!50!white}
\begin{tcolorbox}[title=\mbox{This is a title which is unbreakable and far too long}]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=\mbox{This is a title which is unbreakable and far too long}]
This is a tcolorbox.
\end{tcolorbox}

/tcb/clip upper=true|false
(default true, initially false)

Sets the upper part to be clipped to the interior area.

\texttt{\newcommand{\mygraphics}[2]\{}\%
\texttt{\tcbox\{enhanced,boxsep=0pt,top=0pt,bottom=0pt,left=0pt, right=0pt,boxrule=0.4pt,drop fuzzy shadow,clip upper, colback=black!75!white,toptitle=2pt,bottomtitle=2pt,nobeforeafter, center title,fonttitle={\small\sffamily,title={\detokenize{#2}}\}}
\texttt{\}\{\includegraphics\{width=\the\dimexpr(\textwidth-4mm)/2\relax\{#2}\}}\%
\mygraphics{lichtspiel.jpg}\hfill
\mygraphics{Basilica_5.png}
The example for `/tcb/clip upper` sizes the box according to the dimensions of the picture. To do it the other way around, the watermark options provide an easy solution.

```latex
\newcommand{\mygraphics}[2][{}]{%
\tcbox[enhanced,capture=minipage,boxsep=0pt,top=0pt,bottom=0pt,left=0pt,
right=0pt,boxrule=0.4pt,drop fuzzy shadow,nobeforeafter,
colback=black!75!white,toptitle=2pt,bottomtitle=2pt,
centertitle,fonttitle=\textsmall\textfamily\textsl\title=\detokenize{#2},
width=(\linewidth-4mm)/2,height=6cm,colbacktitle=black,
watermark zoom=1.0,watermark graphics={#2}]{}}
\mygraphics{lichtspiel.jpg}\hfill\mygraphics{Basilica_5.png}
```

```
\mygraphics{lichtspiel.jpg}\hfill\mygraphics{Basilica_5.png}
```

`/tcb/clip lower=true|false` (default `true`, initially `false`)

Sets the lower part to be clipped to the interior area.
10.5 Border Line Option Keys

The following borderline options are applicable for most skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment} \cite[p.142]{P.142}. Therefore, the skin \texttt{standard} \cite[p.216]{P.216} does not support these border lines, but most other skins, e.g. \texttt{enhanced} \cite[p.218]{P.218}.

The borderlines are independent from the normal \texttt{tcolorbox} rules. They may be used with or without the \texttt{/tcb/segmentation engine} \cite[p.143]{P.143}.

The borderlines are stackable, i.e. several different border lines can be used on the same \texttt{tcolorbox}. They are drawn after the box frame and box interior and before overlays or watermarks.

\begin{tcolorbox}
\[\begin{tcolorbox}[enhanced,title=Rounded corners,fonttitle=\bfseries,boxsep=5pt, arc=8pt, borderline={0.5pt}{0pt}{red}, borderline={0.5pt}{5pt}{blue,dotted}, borderline={0.5pt}{-5pt}{green} ]
\begin{tcolorbox}
\end{tcolorbox}
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}
\[\begin{tcolorbox}[enhanced,title=Sharp corners,fonttitle=\bfseries,boxsep=5pt, arc=8pt, sharp corners=downhill, borderline={0.5pt}{0pt}{red}, borderline={0.5pt}{5pt}{blue,dotted}, borderline={0.5pt}{-5pt}{green} ]
\begin{tcolorbox}
\end{tcolorbox}
\end{tcolorbox}

Technically, the normal \texttt{tcolorbox} rules result from a \texttt{TikZ} filling process. The border lines are created by a \texttt{TikZ} drawing process. This can be used to apply different effects.

\begin{tcolorbox}
\begin{verbatim}
\begin{tcolorbox}
[enhanced,title=Rounded corners,fonttitle=\bfseries,boxsep=5pt, arc=8pt, borderline={0.5pt}{0pt}{red}, borderline={0.5pt}{5pt}{blue,dotted}, borderline={0.5pt}{-5pt}{green} ]
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

\begin{tcolorbox}
\begin{verbatim}
\begin{tcolorbox}
[enhanced,title=Sharp corners,fonttitle=\bfseries,boxsep=5pt, arc=8pt, sharp corners=downhill, borderline={0.5pt}{0pt}{red}, borderline={0.5pt}{5pt}{blue,dotted}, borderline={0.5pt}{-5pt}{green} ]
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}
My title


\begin{mygreenbox}{My title}
\lipsum[4]
\end{mygreenbox}

/\tcb/no borderline  (no default, initially set)
Removes all borderlines if set before.

/\tcb/show bounding box=(color)  (default red, initially unset)
Displays the bounding box borderline of a tcolorbox. Its intended use is debugging and fine tuning. It should not be part of a final document. The optional (color) is the base color for the bounding box borderline.

/\tcbset{enhanced,nobeforeafter,width=4cm,fonttitle=\bfseries}

\begin{tcolorbox}[show bounding box,title=Normal]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[show bounding box=blue,title=Shadow,drop fuzzy shadow]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[show bounding box=green,title=Enlarged,drop fuzzy shadow,\
enlarge by=2mm]
This is a tcolorbox.
\end{tcolorbox}
The following *partial* borderlines act slightly different from the complete borderlines described before. They ignore rounded corner settings, their length is not modified by their *(offset)*, they ignore skin settings but adapt to breakable boxes.

```
\begin{tcolorbox}[enhanced, borderline north={2pt}{-2pt}{red}]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a *tcolorbox*.

```
\begin{tcolorbox}[enhanced, borderline south={2pt}{-2pt}{red}]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a *tcolorbox*.

```
\begin{tcolorbox}[enhanced, borderline east={2pt}{-2pt}{red}]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a *tcolorbox*.

```
\begin{tcolorbox}[enhanced, borderline west={2pt}{-2pt}{red}]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a *tcolorbox*. 
/tcb/borderline horizontal\{⟨width⟩\}\{⟨offset⟩\}\{⟨options⟩\}  
(no default, initially unset)

Adds a new borderline with the given ⟨width⟩ to the north and south of the tcolorbox. A positive ⟨offset⟩ value moves the borderlines inside the tcolorbox and a negative ⟨offset⟩ value moves them outside without changing the bounding box.

\begin{tcolorbox}[blanker,top=3mm,bottom=3mm, 
borderline horizontal={2pt}{0pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a tcolorbox.

/tcb/borderline vertical\{⟨width⟩\}\{⟨offset⟩\}\{⟨options⟩\}  
(no default, initially unset)

Adds a new borderline with the given ⟨width⟩ to the east and west of the tcolorbox. A positive ⟨offset⟩ value moves the borderlines inside the tcolorbox and a negative ⟨offset⟩ value moves them outside without changing the bounding box.

\begin{tcolorbox}[blanker,left=3mm,right=3mm, 
borderline vertical={2pt}{0pt}{red}]
This is a \textbf{tcolorbox}.\newpage 
My second line.
\end{tcolorbox}

This is a tcolorbox. My second line.

\begin{tcolorbox}[enhanced,colback=yellow!10!white,boxrule=0pt,frame hidden, 
borderline north={1mm}{-2mm}{red}, 
borderline south={1mm}{-2mm}{blue}, 
borderline west={1mm}{-2mm}{green}, 
borderline east={1mm}{-2mm}{yellow}]
\lipsum[1]
\end{tcolorbox}

10.6 Shadow Option Keys

The following shadow options are applicable for most skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment} \footnote{P.142}. Therefore, the skin \texttt{standard} \footnote{P.216} does not support these shadows, but most other skins, e.g. \texttt{enhanced} \footnote{P.218}.

The shadows are stackable, i.e. several different shadows can be used on the same \texttt{tcolorbox}. They are drawn \textit{before} the box frame is drawn.

\begin{itemize}
\item \texttt{/tcb/no shadow} \hspace{1cm} (no default)
\begin{itemize}
\item Removes all shadows if set before.
\end{itemize}
\end{itemize}

10.6.1 Common Shadows and Halos

\begin{itemize}
\item \texttt{/tcb/drop shadow=⟨color⟩} \hspace{1cm} (style, default \texttt{black!50!white})
\begin{itemize}
\item Adds a new shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{⟨color⟩} for the shadow can be changed.
\end{itemize}
\begin{tcolorbox}
\tcbset{enhanced, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcbox}[drop shadow]
This is a tcolorbox.
\end{tcbox}
\par
\begin{tcbox}[title=Another shadow, drop shadow=blue]
This is a tcolorbox.
\end{tcbox}
\end{tcolorbox}
\end{itemize}

\begin{itemize}
\item \texttt{/tcb/drop fuzzy shadow=⟨color⟩} \hspace{1cm} (style, default \texttt{black!50!white})
\begin{itemize}
\item Adds a new fuzzy shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{⟨color⟩} for the shadow can be changed.
\end{itemize}
\begin{tcolorbox}
\tcbset{enhanced, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcbox}[drop fuzzy shadow]
This is a tcolorbox.
\end{tcbox}
\par
\begin{tcbox}[title=Another shadow, drop fuzzy shadow=blue]
This is a tcolorbox.
\end{tcbox}
\end{tcolorbox}
\end{itemize}

\begin{itemize}
\item \texttt{/tcb/drop midday shadow=⟨color⟩} \hspace{1cm} (style, default \texttt{black!50!white})
\begin{itemize}
\item Adds a new shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{⟨color⟩} for the shadow can be changed.
\end{itemize}
\begin{tcolorbox}
\tcbset{enhanced, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcbox}[drop midday shadow]
This is a tcolorbox.
\end{tcbox}
\par
\begin{tcbox}[title=Another shadow, drop midday shadow=blue]
This is a tcolorbox.
\end{tcbox}
\end{tcolorbox}
\end{itemize}
/tcb/drop fuzzy midday shadow=\langle color \rangle

Adds a new fuzzy shadow with standard dimensions to the stack of shadows. Optionally, the \langle color \rangle for the shadow can be changed.

\begin{tcolorbox}
\[ \text{drop fuzzy midday shadow} \]
This is a tcolorbox.
\end{tcolorbox}

/tcb/halo=\langle size \rangle with \langle color \rangle

Adds a new halo shadow with the given \langle color \rangle which overlaps the colorbox on all sides by \langle size \rangle.

\begin{tcolorbox}
\[ \text{halo=2mm with green} \]
This is a tcolorbox.
\end{tcolorbox}

/tcb/fuzzy halo=\langle size \rangle with \langle color \rangle

Adds a new fuzzy halo shadow with the given \langle color \rangle which overlaps the colorbox on all sides by \langle size \rangle plus 0.48mm.

\begin{tcolorbox}
\[ \text{fuzzy halo=2mm with red!50!white, fuzzy halo=1mm with white} \]
\end{tcolorbox}
For all following shadows, the optionally given \textit{\langle color\rangle} for the shadow can be changed equivalent to the preceding examples.

\textbf{/tcb/drop shadow southeast=\langle color\rangle} \quad \text{(style, default \texttt{black!50!white})}

Adds a new shadow with standard dimensions to the stack of shadows. This shadow is identical to \texttt{/tcb/drop shadow} \textsuperscript{p.191}.

\begin{tcolorbox}
\begin{verbatim}
\begin{tcolorbox}[drop shadow southeast, 
enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

\textbf{/tcb/drop shadow south=\langle color\rangle} \quad \text{(style, default \texttt{black!50!white})}

Adds a new shadow with standard dimensions to the stack of shadows. This shadow is identical to \texttt{/tcb/drop midday shadow} \textsuperscript{p.191}.

\begin{tcolorbox}
\begin{verbatim}
\begin{tcolorbox}[drop shadow south, 
enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

\textbf{/tcb/drop shadow southwest=\langle color\rangle} \quad \text{(style, default \texttt{black!50!white})}

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\begin{verbatim}
\begin{tcolorbox}[drop shadow southwest, 
enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

\textbf{/tcb/drop shadow west=\langle color\rangle} \quad \text{(style, default \texttt{black!50!white})}

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\begin{verbatim}
\begin{tcolorbox}[drop shadow west, 
enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

\textbf{/tcb/drop shadow northwest=\langle color\rangle} \quad \text{(style, default \texttt{black!50!white})}

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\begin{verbatim}
\begin{tcolorbox}[drop shadow northwest, 
enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

\textbf{/tcb/drop shadow north=\langle color\rangle} \quad \text{(style, default \texttt{black!50!white})}

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\begin{verbatim}
\begin{tcolorbox}[drop shadow north, 
enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}
/tcb/drop shadow northeast\(= \text{(color)}\) \hspace{1em} \text{(style, default black!50!white)}

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\[\text{drop shadow northeast,}
\text{enhanced, colback=red!5!white, colframe=red!75!black}\]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop shadow east\(= \text{(color)}\) \hspace{1em} \text{(style, default black!50!white)}

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\[\text{drop shadow east,}
\text{enhanced, colback=red!5!white, colframe=red!75!black}\]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow southeast\(= \text{(color)}\) \hspace{1em} \text{(style, default black!50!white)}

Adds a new fuzzy shadow with standard dimensions to the stack of shadows. This shadow is identical to /tcb/drop fuzzy shadow\(^*\)P.191.

\begin{tcolorbox}
\[\text{drop fuzzy shadow southeast,}
\text{enhanced, colback=red!5!white, colframe=red!75!black}\]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow south\(= \text{(color)}\) \hspace{1em} \text{(style, default black!50!white)}

Adds a new fuzzy shadow with standard dimensions to the stack of shadows. This shadow is identical to /tcb/drop fuzzy midday shadow\(^*\)P.192.

\begin{tcolorbox}
\[\text{drop fuzzy shadow south,}
\text{enhanced, colback=red!5!white, colframe=red!75!black}\]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow southwest\(= \text{(color)}\) \hspace{1em} \text{(style, default black!50!white)}

Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\[\text{drop fuzzy shadow southwest,}
\text{enhanced, colback=red!5!white, colframe=red!75!black}\]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow west\(= \text{(color)}\) \hspace{1em} \text{(style, default black!50!white)}

Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\[\text{drop fuzzy shadow west,}
\text{enhanced, colback=red!5!white, colframe=red!75!black}\]
This is a tcolorbox.
\end{tcolorbox}
/tcb/drop fuzzy shadow northwest={(color)} (style, default black!50!white)
Add a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow northwest, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow north={(color)} (style, default black!50!white)
Add a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow north, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow northeast={(color)} (style, default black!50!white)
Add a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow northeast, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow east={(color)} (style, default black!50!white)
Add a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow east, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
## Lifted Shadows

**/tcb/drop lifted shadow**\(^{(color)}\) (style, default **black!50!white**)

Adds a new lifted shadow with standard dimensions to the stack of shadows. Optionally, the \((color)\) for the shadow can be changed.

```
\tcbset{enhanced,colback=red!5!white, boxrule=0.4pt,sharp corners, colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[drop lifted shadow]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Another shadow, drop lifted shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
```

**/tcb/drop small lifted shadow**\(^{(color)}\) (style, default **black!50!white**)

Adds a new small lifted shadow with standard dimensions to the stack of shadows. Optionally, the \((color)\) for the shadow can be changed.

```
\tcbset{enhanced,colback=red!5!white, boxrule=0.4pt,sharp corners, colframe=red!75!black,fonttitle=\bfseries}
\tcbx[drop small lifted shadow,size=fbox]
{This is a tcolorbox.}
\par
\begin{tcolorbox}[title=Another shadow, drop small lifted shadow=black]
This is a tcolorbox.
\end{tcolorbox}
```

**/tcb/drop large lifted shadow**\(^{(color)}\) (style, default **black!50!white**)

Adds a new large lifted shadow with standard dimensions to the stack of shadows. Optionally, the \((color)\) for the shadow can be changed.

```
\tcbset{enhanced,colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[drop large lifted shadow]
This is a tcolorbox.
\end{tcolorbox}
\par
\begin{tcolorbox}[title=Another shadow, drop large lifted shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
```
10.6.3 Generic Shadows

/\texttt{tcb/shadow}\{{\langle xshift\rangle}\}\{{\langle yshift\rangle}\}\{{\langle offset\rangle}\}\{{\langle options\rangle}\} \quad \text{(no default)}

Adds a new shadow to the stack of shadows. This shadow follows the outline of the \texttt{tcolorbox} but is shifted by \langle xshift\rangle and \langle yshift\rangle. The \langle offset\rangle value is a distance value from the frame outline. A positive \langle offset\rangle value shrinks the shadow and a negative \langle offset\rangle value enlarges the shadow. The shadow is filled along a Ti\kern-0.05em kZ path with the given Ti\kern-0.05em kZ \langle options\rangle.

The shadows adapt to the rounded corners of the \texttt{tcolorbox}. An shrunked shadow will switch to sharp corners if necessary, an enlarged shadow may become more rounded depending on several factors. But /\texttt{tcb/sharp corners} P.48 have sharp shadows.

Shadows are not considered for the bounding box computation by default. Large shadows may be overlaped by the following content. But, the bounding box can be adapted if necessary.

\begin{tcolorbox}[title=My own shadow, shadow={2mm}{-1mm}{0mm}{black!50!white}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Another shadow, shadow={-1mm}{-2mm}{0mm}{fill=blue, opacity=0.5}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Double shadow, shadow={-1.5mm}{-1.5mm}{0mm}{fill=blue, opacity=0.25}, shadow={1.5mm}{-1.5mm}{0mm}{fill=red, opacity=0.25}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Far shadow, shadow={5.5mm}{-3.5mm}{2mm}{fill=black, opacity=0.25}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Halo shadow, shadow={0mm}{0mm}{-1.5mm}\
{fill=yellow!75!red,opacity=0.5}]
This is a tcolorbox.
\end{tcolorbox}
\tcb/fuzzy shadow={\langle xshift \rangle}\{\langle yshift \rangle\}\{\langle offset \rangle\}\{\langle step \rangle\}\{\langle options \rangle\} (no default)

Adds a new fuzzy shadow to the stack of shadows. Actually, this option adds several shadows which appear like a shadow with a fuzzy border. This fuzzy shadow follows the outline of the \texttt{tcolorbox} but is shifted by $\langle xshift \rangle$ and $\langle yshift \rangle$. The $\langle offset \rangle$ value is a distance value from the frame outline. A positive $\langle offset \rangle$ value shrinks the shadow and a negative $\langle offset \rangle$ value enlarges the shadow. The $\{\langle step \rangle\}$ value describes a shrink offset used for the combination of the partial shadows. The shadow is filled along a Ti\textit{k}Z path with the given Ti\textit{k}Z $\langle options \rangle$ but any opacity value will be ignored.

\begin{tcolorbox}
\tcbset{enhanced,colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries}
\end{tcolorbox}

\begin{tcolorbox}[title=Another shadow, fuzzy shadow={-1mm}{-2mm}{0mm}{0.2mm} \{fill=blue\}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Double shadow, fuzzy shadow={-1.5mm}{-1.5mm}{0mm}{0.1mm} \{blue\}, fuzzy shadow={1.5mm}{-1.5mm}{0mm}{0.1mm} \{red\}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Far shadow, fuzzy shadow={5.5mm}{-3.5mm}{0mm}{0.3mm} \{black\}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Glow shadow, fuzzy shadow={0mm}{0mm}{-1.5mm}{0.15mm} \{yellow!75!red\}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=A multi shadow box]
This is a tcolorbox.
\end{tcolorbox}
If set to `true`, the shadow drawing algorithm tries to do a somewhat smart calculation of the arc for the shadow. The result is pleasing for typical boxes with rounded corners, but gives strange results for circular boxes.

\begin{tcolorbox}
Smart shadow arc (arguably better than normal)
\end{tcolorbox}

\begin{tcolorbox}[smart shadow arc=false, drop shadow]
Normal shadow arc
\end{tcolorbox}

\begin{tcolorbox}[circular arc, drop shadow]
Smart shadow arc (worse than normal)
\end{tcolorbox}

\begin{tcolorbox}[circular arc, smart shadow arc=false, drop shadow]
Normal shadow arc
\end{tcolorbox}

/\texttt{tcb/lifted shadow}={⟨xshift⟩}{⟨yshift⟩}{⟨bend⟩}{⟨step⟩}{⟨options⟩}
(no default)

Adds a new lifted shadow to the stack of shadows. Actually, this option adds several shadows which appear like a shadow with a fuzzy border. This lifted shadow follows the outline of the \texttt{tcolorbox} but is shifted by ⟨xshift⟩ and ⟨yshift⟩ on the lower left corner and by −⟨xshift⟩ and ⟨yshift⟩ on the lower right corner. Additionally, there is a ⟨bend⟩ in the middle. The {⟨step⟩} value describes a shrink offset used for the combination of the partial shadows. The shadow is filled along a TikZ path with the given TikZ ⟨options⟩ but any opacity value will be ignored.

\begin{tcolorbox}
My own shadow
\end{tcolorbox}
10.6.4 TikZ Shadows

Alternativ to the package shadow options described before, shadows from the «Shadows Library» of TikZ can be used. Such shadows can be added directly to the frame path using \texttt{/tcb/frame style}.\textsuperscript{p. 156}.

\begin{verbatim}
% \usetikzlibrary{shadows}
\begin{tcolorbox}[enhanced, 
    colback=red!5!white,colframe=red!75!black, 
    frame style={drop shadow} ]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
% \usetikzlibrary{shadows}
\begin{tcolorbox}[enhanced,height=3cm, 
    colback=red!5!white,colframe=red!75!black, 
    halign=center,valign=center, 
    frame style={circular drop shadow} ]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
% \usetikzlibrary{shadows}
\begin{tcolorbox}[enhanced,width=2.5cm, 
    square,circular arc, 
    halign=center,valign=center, 
    colback=red!5!white,colframe=red!75!black, 
    frame style={circular glow={fill=red}} ]
tcolorbox
\end{tcolorbox}
\end{verbatim}
10.7 TikZ Picture Option Keys

The following general options are applicable for skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment} \cite{tikzpicture}. Therefore, the skin \texttt{standard} \cite{tcbgraphicalenvironment} does not support these options, but most other skins, e.g. \texttt{enhanced} \cite{tcbgraphicalenvironmentenhanced}.

\texttt{/tcb/tikz=\{tikz option list\}} \hfill (no default, initially empty)

Adds the given \texttt{(tikz option list)} to the main \texttt{tikzpicture} environment used to draw the color box, see \cite{tikzpicture}. If this option is applied a second time, the new \texttt{(tikz option list)} is appended to the current option list.

\begin{tcolorbox}[title=Transparent box, tikz={opacity=0.5,transparency group}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Rotated box, tikz={rotate=30}]
Sold!
\end{tcolorbox}

\texttt{/tcb/tikz reset} \hfill (initially set)

Removes all options given by \texttt{/tcb/tikz}.

\texttt{/tcb/at begin tikz=\{tikz code\}} \hfill (no default, initially empty)

The given \texttt{(tikz code)} is executed at the beginning of the \texttt{tikzpicture} environment after the TikZ option \texttt{execute at begin picture} was applied. If this option is applied a second time, the new \texttt{(tikz code)} is appended to the current code.

\texttt{/tcb/at begin tikz reset} \hfill (initially set)

Removes all code given by \texttt{/tcb/at begin tikz}.

\texttt{/tcb/at end tikz=\{tikz code\}} \hfill (no default, initially empty)

The given \texttt{(tikz code)} is executed at the ending of the \texttt{tikzpicture} environment before the TikZ option \texttt{execute at end picture} was applied. If this option is applied a second time, the new \texttt{(tikz code)} is appended to the current code.

\texttt{/tcb/at end tikz reset} \hfill (initially set)

Removes all code given by \texttt{/tcb/at end tikz}.
/tcb/rotate={angle}  (no default, initially unset)
Rotates the tcolorbox by the given \textit{angle}. Note that this is a \LaTeX\ coordinate transformation i.e. not all graphical elements like shadings will really be rotated.

\begin{tcolorbox}[title=Rotated box,rotate=30]
This is a tcolorbox.
\end{tcolorbox}

/tcb/scale={fraction}  (no default, initially unset)
Scales the tcolorbox by the given \textit{fraction}. Note that this is a \LaTeX\ coordinate transformation i.e. not all graphical elements like line widths will really be scaled.

\begin{tcolorbox}[title=Scaled box,scale=0.5]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=Scaled box,scale=1.25]
This is a tcolorbox.
\end{tcolorbox}

/tcb/remember  (style, initially unset)
Shortcut for \texttt{tikz={remember picture}}. This allows one to reference nodes in other \LaTeX\ pictures.

\begin{tcolorbox}[enhanced,remember,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,title=The four corners of a paper,overlay={\draw[red!50!white,line width=1mm,opacity=0.5,shorten >=3mm](frame.north west) edge[->] (current page.north west) (frame.north east) edge[->] (current page.north east) (frame.south west) edge[->] (current page.south west) (frame.south east) edge[->] (current page.south east);}]
This is a tcolorbox.
\end{tcolorbox}
The `frame` node will be remembered by the given \texttt{\textit{name}} to be referenced in other TikZ pictures.

% \usepackage{lipsum}
\newtcolorbox{mybox}[1][\{}[enhanced,colframe=blue!75!black,colback=blue!10!white,fonttitle=\bfseries,#1]
\begin{mybox}[title=First Box,nobeforeafter,width=\linewidth/4,remember as=one]
This is a test.
\end{mybox}
\hfill
\begin{mybox}[title=Second Box,nobeforeafter,width=\linewidth/4,remember as=two]
This is a test.
\end{mybox}
\hfill
\begin{mybox}[title=Third Box,nobeforeafter,width=\linewidth/4,remember as=three]
This is a test.
\end{mybox}
\hfill
\begin{mybox}[title=Fourth Box,remember as=four]
This is a test.
\end{mybox}
\lipsum[2]
\begin{tikzpicture}[overlay,remember picture,line width=1mm,draw=red!75!black]
\draw[-] (one.east) to[bend right] node[above] {A} (two.west);
\draw[-] (two.east) to[bend left] node[above] {B} (three.west);
\draw[-] (three.east) to[bend left=90] node[right] {C} (four.east);
\draw[-] (four.west) to[bend left=90] node[left] {D} (one.west);
\end{tikzpicture}

10.8 Underlay Option Keys

Underlays are quite similar to overlays described in Section 4.12 on page 74. Underlays are drawn after the frame and interior are drawn and before overlays and the text content is drawn; see Section 9.4 on page 149 for the general drawing scheme.

The differences between underlays and overlays are:

- Underlays are not applicable for the skins \texttt{standard}\textsuperscript{P.216} and \texttt{standard jigsaw}\textsuperscript{P.217}, whereas overlays are applicable also for these skins. The skin \texttt{spartan}\textsuperscript{P.261} supports underlays but no overlays.

  \textbf{If an underlay is used with the \texttt{standard}\textsuperscript{P.216} skin, it is silently ignored.}

- Underlays are stackable, i.e. several different underlays can be used on the same \tcolorbox. Overlays are not stackable by default (but with some help of the library \texttt{LIB hooks}).

- Boxed titles are implemented with underlays (Section 10.2 on page 163), watermarks are implemented with overlays (Section 10.3 on page 174).

\texttt{/tcb/underlay=⟨graphical code⟩} \hspace{1cm} (no default, initially unset)

Adds \langle graphical code \rangle to the box drawing process. This \langle graphical code \rangle is drawn after the frame and interior and before the text content.

\begin{mybox}[title=My box,watermark text=My Watermark]
\lipsum[2]
\end{mybox}

\begin{verbatim}
\newtcolorbox{mybox}[1][]{enhanced,colback=red!5!white,
colbacktitle=red!85!black!50!white,
colframe=red!75!black,fonttitle=\bfseries,watermark color=yellow!50!white,
underlay={\begin{tcbclipinterior}
\draw[red!40!white,line width=1cm] (interior.south west)--(interior.north east);
\end{tcbclipinterior}},
attach boxed title to top center={yshift=-2mm},#1}
\end{verbatim}

\begin{mybox}[title=My box,watermark text=My Watermark]
\lipsum[2]
\end{mybox}

\texttt{/tcb/no underlay} \hspace{1cm} (style, no default, initially set)

Removes the underlay if set before.

\lipsum[2]
<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/tcb/underlay broken</code></td>
<td>(graphical code)</td>
</tr>
<tr>
<td></td>
<td>If the box is set to be <code>/tcb/breakable</code> and is broken actually, then the</td>
</tr>
<tr>
<td></td>
<td>(graphical code) is added to the box drawing process. <code>/tcb/underlay</code></td>
</tr>
<tr>
<td></td>
<td>overwrites this key.</td>
</tr>
<tr>
<td><code>/tcb/underlay unbroken</code></td>
<td>(graphical code)</td>
</tr>
<tr>
<td></td>
<td>If the box is set to be <code>/tcb/breakable</code> but is not broken actually or the</td>
</tr>
<tr>
<td></td>
<td>box is set to be <code>/tcb/unbreakable</code>, then the (graphical code) is added to</td>
</tr>
<tr>
<td></td>
<td>the box drawing process. <code>/tcb/underlay</code> overwrites this key.</td>
</tr>
<tr>
<td><code>/tcb/no underlay unbroken</code></td>
<td>(style, no default, initially set)</td>
</tr>
<tr>
<td></td>
<td>Removes the unbroken underlay if set before.</td>
</tr>
<tr>
<td><code>/tcb/underlay first</code></td>
<td>(graphical code)</td>
</tr>
<tr>
<td></td>
<td>If the box is set to be <code>/tcb/breakable</code> and is broken actually, then the</td>
</tr>
<tr>
<td></td>
<td>(graphical code) is added to the box drawing process for the first part of</td>
</tr>
<tr>
<td></td>
<td>the break sequence. <code>/tcb/underlay</code> overwrites this key.</td>
</tr>
<tr>
<td><code>/tcb/no underlay first</code></td>
<td>(style, no default, initially set)</td>
</tr>
<tr>
<td></td>
<td>Removes the first underlay if set before.</td>
</tr>
<tr>
<td><code>/tcb/underlay middle</code></td>
<td>(graphical code)</td>
</tr>
<tr>
<td></td>
<td>If the box is set to be <code>/tcb/breakable</code> and is broken actually, then the</td>
</tr>
<tr>
<td></td>
<td>(graphical code) is added to the box drawing process for the middle parts</td>
</tr>
<tr>
<td></td>
<td>(if any) of the break sequence. <code>/tcb/underlay</code> overwrites this key.</td>
</tr>
<tr>
<td><code>/tcb/no underlay middle</code></td>
<td>(style, no default, initially set)</td>
</tr>
<tr>
<td></td>
<td>Removes the middle underlay if set before.</td>
</tr>
<tr>
<td><code>/tcb/underlay last</code></td>
<td>(graphical code)</td>
</tr>
<tr>
<td></td>
<td>If the box is set to be <code>/tcb/breakable</code> and is broken actually, then the</td>
</tr>
<tr>
<td></td>
<td>(graphical code) is added to the box drawing process for the last part of</td>
</tr>
<tr>
<td></td>
<td>the break sequence. <code>/tcb/underlay</code> overwrites this key.</td>
</tr>
<tr>
<td><code>/tcb/no underlay last</code></td>
<td>(style, no default, initially set)</td>
</tr>
<tr>
<td></td>
<td>Removes the last underlay if set before.</td>
</tr>
<tr>
<td><code>/tcb/underlay boxed title</code></td>
<td>(graphical code)</td>
</tr>
<tr>
<td></td>
<td>If the box has a boxed title, see Section 10.2 on page 163, then the</td>
</tr>
<tr>
<td></td>
<td>(graphical code) is added to the box drawing process before the boxed title</td>
</tr>
<tr>
<td></td>
<td>is drawn.</td>
</tr>
<tr>
<td><code>/tcb/no underlay boxed title</code></td>
<td>(style, no default, initially set)</td>
</tr>
<tr>
<td></td>
<td>Removes the boxed title underlay if set before.</td>
</tr>
<tr>
<td><code>/tcb/underlay unbroken and first</code></td>
<td>(graphical code)</td>
</tr>
<tr>
<td></td>
<td>This is an abbreviation for setting <code>/tcb/underlay unbroken</code> and `/tcb/</td>
</tr>
<tr>
<td></td>
<td>underlay first together. <code>/tcb/underlay</code> overwrites this key.</td>
</tr>
<tr>
<td><code>/tcb/underlay middle and last</code></td>
<td>(graphical code)</td>
</tr>
<tr>
<td></td>
<td>This is an abbreviation for setting <code>/tcb/underlay middle</code> and `/tcb/</td>
</tr>
<tr>
<td></td>
<td>underlay last together. <code>/tcb/underlay</code> overwrites this key.</td>
</tr>
<tr>
<td><code>/tcb/underlay unbroken and last</code></td>
<td>(graphical code)</td>
</tr>
<tr>
<td></td>
<td>This is an abbreviation for setting <code>/tcb/underlay unbroken</code> and `/tcb/</td>
</tr>
<tr>
<td></td>
<td>underlay last together. <code>/tcb/underlay</code> overwrites this key.</td>
</tr>
<tr>
<td><code>/tcb/underlay first and middle</code></td>
<td>(graphical code)</td>
</tr>
<tr>
<td></td>
<td>This is an abbreviation for setting <code>/tcb/underlay first</code> and `/tcb/</td>
</tr>
<tr>
<td></td>
<td>underlay middle together. <code>/tcb/underlay</code> overwrites this key.</td>
</tr>
</tbody>
</table>
10.9 Finish Option Keys

Finishes are quite similar to underlays described in Section 10.8 on page 204 and overlays described in Section 4.12 on page 74. Finishes are drawn after the text content is drawn; see Section 9.4 on page 149 for the general drawing scheme. Therefore, a finish will reduce the readability of the text content.

Finishes are intended for special effects like highlights or glosses or text over text.

- Finishes are only applicable for the skins enhanced\textsuperscript{P.218}, empty\textsuperscript{P.251}, freelance\textsuperscript{P.264}, bicolor\textsuperscript{P.230}, beamer\textsuperscript{P.244}, and widget\textsuperscript{P.248}.

  If a finish is used with the standard\textsuperscript{P.216} skin, it is silently ignored.

- Finishes are stackable, i.e. several different finishes can be used on the same \texttt{tcolorbox}.

\begin{tabular}{p{0.8\textwidth}}
\texttt{/tcb/finish} = \langle graphical code \rangle \\
(no default, initially unset)
\end{tabular}

Adds \langle graphical code \rangle to the box drawing process. This \langle graphical code \rangle is drawn after the text content.

\begin{verbatim}
\newtcolorbox{mybox}[1][]{enhanced,colback=red!5!white, colbacktitle=red!85!black!50!white,colframe=red!75!black,fonttitle=\bfseries, finish={\begin{tcbclipframe}
\path[bottom color=black,top color=black!50!white,opacity=0.1] (frame.south west) -- (frame.south east) -- (frame.north east) -- cycle;
\path[top color=white,bottom color=black!50!white,opacity=0.1] (frame.south west) -- (frame.north east) -- (frame.north west) -- cycle;
\end{tcbclipframe}},#1}
\begin{mybox}[title=My box]\lipsum[2]\end{mybox}
\end{verbatim}

\begin{verbatim}
\newtcolorbox{mybox}[1][]{enhanced,colback=red!5!white, colbacktitle=red!85!black!50!white,colframe=red!75!black,fonttitle=\bfseries, finish={\node[draw,fill=white,fill opacity=0.85,inner sep=5mm, rounded corners] at (frame.center) {\Huge\bfseries Finish!}};,#1}
\begin{mybox}[title=My box]\lipsum[2]\end{mybox}
\end{verbatim}

My box


Finish!
/tcb/no finish  (style, no default, initially set)

Removes the finish if set before.

/tcb/finish broken= ⟨graphical code⟩  (no default, initially unset)

If the box is set to be /tcb/breakable \textsuperscript{P.390} and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process. /tcb/finish \textsuperscript{P.206} overwrites this key.

/tcb/finish unbroken= ⟨graphical code⟩  (no default, initially unset)

If the box is set to be /tcb/breakable \textsuperscript{P.390} but is not broken actually or if the box is set to be /tcb/unbreakable \textsuperscript{P.301}, then the ⟨graphical code⟩ is added to the box drawing process. /tcb/finish \textsuperscript{P.206} overwrites this key.

/tcb/no finish unbroken  (style, no default, initially set)

Removes the unbroken finish if set before.

/tcb/finish first= ⟨graphical code⟩  (no default, initially unset)

If the box is set to be /tcb/breakable \textsuperscript{P.390} and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process for the first part of the break sequence. /tcb/finish \textsuperscript{P.206} overwrites this key.

/tcb/no finish first  (style, no default, initially set)

Removes the first finish if set before.

/tcb/finish middle= ⟨graphical code⟩  (no default, initially unset)

If the box is set to be /tcb/breakable \textsuperscript{P.390} and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process for the middle parts (if any) of the break sequence. /tcb/finish \textsuperscript{P.206} overwrites this key.

/tcb/no finish middle  (style, no default, initially set)

Removes the middle finish if set before.

/tcb/finish last= ⟨graphical code⟩  (no default, initially unset)

If the box is set to be /tcb/breakable \textsuperscript{P.390} and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process for the last part of the break sequence. /tcb/finish \textsuperscript{P.206} overwrites this key.

/tcb/no finish last  (style, no default, initially set)

Removes the last finish if set before.

/tcb/finish unbroken and first= ⟨graphical code⟩  (no default, initially unset)

This is an abbreviation for setting /tcb/finish unbroken and /tcb/finish first together. /tcb/finish \textsuperscript{P.206} overwrites this key.

/tcb/finish middle and last= ⟨graphical code⟩  (no default, initially unset)

This is an abbreviation for setting /tcb/finish middle and /tcb/finish last together. /tcb/finish \textsuperscript{P.206} overwrites this key.

/tcb/finish unbroken and last= ⟨graphical code⟩  (no default, initially unset)

This is an abbreviation for setting /tcb/finish unbroken and /tcb/finish last together. /tcb/finish \textsuperscript{P.206} overwrites this key.

/tcb/finish first and middle= ⟨graphical code⟩  (no default, initially unset)

This is an abbreviation for setting /tcb/finish first and /tcb/finish middle together. /tcb/finish \textsuperscript{P.206} overwrites this key.
10.10 Hyper Option Keys

All options of this section need the package \texttt{hyperref} [15] to be loaded separately. All these options are implemented as \texttt{/tcb/finish} \textsuperscript{P.206} and can be disabled by \texttt{/tcb/no finish} \textsuperscript{P.207}.

If the package \texttt{hyperref} [15] is not loaded or if the standard \textsuperscript{P.216} skin is used, all hyper option are silently ignored.

\begin{verbatim}
\begin{tcolorbox}[beamer,colback=red!50, hyperref=sec:skins]
Jump to the heading of Section~\ref*{sec:skins}.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
\begin{tcolorbox}[enhanced,colback=blue!10,colframe=blue!50!black, hypertarget=hypertwinB, hyperlink=hypertwinA, title=Box B]
Click me to jump to Box A.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
\begin{tcolorbox}[enhanced, colback=blue!10,colframe=blue!50!black, hypertarget=hypertwinB, hyperlink=hypertwinA, title=Box B]
Click me to jump to Box A.
\end{tcolorbox}
\end{verbatim}
Identical to /tcb/hyperlink → P.208, but only the \textit{interior} of a \texttt{tcolorbox} is made a hyperlink (without frame and title).

\begin{tcolorbox}[enhanced,colback=red!50, hyperurl=https://www.ctan.org/pkg/tcolorbox] View CTAN with a browser. \end{tcolorbox}

Identical to /tcb/hyperurl, but only the \textit{interior} of a \texttt{tcolorbox} is made a hyperlink (without frame and title).

\begin{tcolorbox}[enhanced,colback=green!50, hyperurl*={page=3,pdfnewwindow=true}] Open example file on Page~3. \end{tcolorbox}

Identical to /tcb/hyperurl, but only the \textit{title} of a \texttt{tcolorbox} is made a hyperlink.

Identical to /tcb/hyperurl, but only the given \LaTeX\ \texttt{node} is made a hyperlink. This \texttt{node} may be \texttt{frame}, \texttt{interior}, \texttt{title}, or any other named node used for drawing the \texttt{tcolorbox}. The \texttt{node} may be defined inside /tcb/underlay → P.204, /tcb/overlay → P.74 or /tcb/finish → P.206. If the later is used, define the node \textit{before} /tcb/hyperurl node is applied.

Identical to /tcb/hyperurl, but additional \texttt{hyperref [15]} \texttt{options} are applied.

Identical to /tcb/hyperurl, but additional \texttt{hyperref [15]} \texttt{options} are applied.

Identical to /tcb/hyperurl, but additional \texttt{hyperref [15]} \texttt{options} are applied.
10.11 Jigsaw Skin Variants

As described in Section 9.1 on page 141, a \texttt{tcolorbox} is drawn by up to four \textit{engines}. Typically, the \textit{frame} engine fills the complete box area with color and the other engines fill certain areas with other colors. Finally, only the area which you see as \textit{frame} of the box will display the frame color. For most applications, this is a good approach.

For certain boxes, a more delicate procedure is needed. E.g., if the box should be translucent, an already painted area cannot be made unpainted. Therefore, more elaborate frame engines saw holes into the frame where the interior area and optionally the title area will be painted. The resulting skins are called \textit{jigsaw} skins. For \texttt{standard} \texttt{\rightarrow} P.216, \texttt{enhanced} \texttt{\rightarrow} P.218, and \texttt{bicolor} \texttt{\rightarrow} P.230, there are variants called \texttt{standard jigsaw} \texttt{\rightarrow} P.217, \texttt{enhanced jigsaw} \texttt{\rightarrow} P.224, and \texttt{bicolor jigsaw} \texttt{\rightarrow} P.236.

\begin{tikzpicture}
\path[use as bounding box] (0,0.8) rectangle +(0.1,0.1);
\shadedraw [shading=ball] (0,0) circle (1cm);
\shadedraw [ball color=red] (3,-2.2) circle (1cm);
\end{tikzpicture}

\tcbset{enhanced,colback=blue!5!white, frame style={left color=red!75!black,right color=red!10!yellow}, fonttitle=\bfseries }

\begin{tcolorbox}[title=A normal box]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[title=A translucent jigsaw box, enhanced jigsaw,opacityback=0.35]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[title=A normal box]
\end{tcolorbox}

\begin{tcolorbox}[title=A translucent jigsaw box]
\end{tcolorbox}
A normal box with hidden interior and title
This is a tcolorbox.

A jigsaw box with hidden interior and title
This is a tcolorbox.

```latex
\newtcolorbox{mybox}{
    skin=enhanced middle jigsaw,
    leftrule=5mm, rightrule=5mm,
    boxsep=0mm, top=0mm, bottom=0mm,
    frame style={top color=blue, bottom color=red}, interior hidden}
\begin{mybox}
\lipsum[2]
\end{mybox}
```

10.12 Draft Mode

To reduce the compilation time while drafting a document, the *draft mode* can be applied. Basically, it changes all skins to *spartan* \^P.261 and sets the \texttt{/tcb/fit algorithm} \^P.448 to \texttt{squeeze}. Especially, when fuzzy shadows are used, the speedup will be considerable high.

\begin{itemize}
\item It is strongly recommended that the draft mode is *not* used for the final document. Use \texttt{spartan} \^P.261 directly, if you want to stay with it. The draft mode implementation may change in future.
\item Normally, switching to the draft mode should not alter the geometry of your document. Since overlays are deactivated, any code placed there (e.g. counter changes) is not executed anymore! Also, \texttt{/tcb/remember as} \^P.203 will not have any effect. You may exclude critical code with \texttt{\tcbininterruptdraftmode / \tcbcontinuedraftmode} from converting to draft mode.
\end{itemize}

\texttt{\tcbstartdraftmode}

Any following \texttt{tcolorbox} code is put into *draft mode*. All skin settings are overruled with \texttt{spartan} \^P.261. Overlays, watermarks, shadows, borderlines, and rounded corners are deactivated for all \texttt{tcolorbox} layers.

\texttt{\tcstopdraftmode}

The *draft mode* is deactivated for the following code.

\texttt{\tcbininterruptdraftmode}

If the compilation is in *draft mode*, the *draft mode* is deactivated until a following \texttt{\tcbcontinuedraftmode} is detected.
If the compilation is not in *draft mode*, nothing happens and a following \texttt{\tcbcontinuedraftmode} will not start the *draft mode*.

\texttt{\tcbininterruptdraftmode} and \texttt{\tcbcontinuedraftmode} cannot be used nested.

\texttt{\tcbcontinuedraftmode}

Continues the *draft mode* which was suspended by a preceding \texttt{\tcbininterruptdraftmode}. Nothing happens, if there was no draft mode before \texttt{\tcbininterruptdraftmode}.

\texttt{\tcbininterruptdraftmode} and \texttt{\tcbcontinuedraftmode} is shielded from *draft mode*. 
If set to `true`, the `draft mode` is started. If set to `false`, the `draft mode` is stopped.

```latex
\newtcolorbox{mybeamer}[2]{beamer, colback=Salmon!50!white, colframe=FireBrick!75!black, adjusted title={#2},#1}
\begin{mybeamer}{Beamer box}
This box looks like a box provided by the `beamer` class.
\end{mybeamer}
\begin{mybeamer}[draftmode]{Beamer box}
This box looks like a box provided by the `beamer` class.
\end{mybeamer}
```
11 Library skins - Catalog of Skins

The skins library provides a catalog of skins to choose from which is documented in the following. The skins library has to be loaded by a package option or inside the preamble by:

```
\tcbuselibrary{skins}
```

See Section 10 on page 156 for the documentation of all other options of the skins library.

- In principle, a skin is applied by choosing a value for \texttt{/tcb/skin} \footnote{P.141}, e.g. \texttt{enhanced}. Since the parts of a breakable box should look different, there are individual skins for breakable boxes, also see Section 19.8 on page 404. Skins for breakable boxes derived from a base skin are called a skin family in the following.

- Instead of setting values for \texttt{/tcb/skin} \footnote{P.141}, equally named options can be used which are shortcuts and which sometimes also change some geometry or style settings. These are the intended options for normal users. Typically, one of the following options is sufficient to select a skin:

  - \texttt{/tcb/standard} \footnote{P.216}
  - \texttt{/tcb/standard jigsaw} \footnote{P.217}
  - \texttt{/tcb/enhanced} \footnote{P.218}
  - \texttt{/tcb/enhanced jigsaw} \footnote{P.224}
  - \texttt{/tcb/enhanced standard} \footnote{P.220}
  - \texttt{/tcb/enhanced standard jigsaw} \footnote{P.224}
  - \texttt{/tcb/bicolor} \footnote{P.231}
  - \texttt{/tcb/tile} \footnote{P.240}
  - \texttt{/tcb/beamer} \footnote{P.244}
  - \texttt{/tcb/widget} \footnote{P.248}
  - \texttt{/tcb/empty} \footnote{P.251}
  - \texttt{/tcb/spartan} \footnote{P.261}
  - \texttt{/tcb/draft} \footnote{P.262}

Additionally, there are some special applications:

  - \texttt{/tcb/marker} \footnote{P.226}
  - \texttt{/tcb/blank} \footnote{P.220}
  - \texttt{/tcb/blanker} \footnote{P.252}
  - \texttt{/tcb/blankest} \footnote{P.253}
The auxiliary macro \texttt{\textbackslash skinExampleSet} is used for the following examples to display skin applications. Note that \texttt{\textbackslash skinExampleSet} is not part of the package, but is defined just for this documentation.

\begin{verbatim}
\NewDocumentCommand{\skinExampleSet}{m}{% 
  \begin{tcbraster}[raster equal height,raster columns=3, 
    colback=LightGreen, colframe=DarkGreen, colbacktitle=LimeGreen!75!DarkGreen, 
    #1, 
    left=1mm, right=1mm, top=1mm, bottom=1mm, middle=1mm, 
    sidebyside gap=4mm]
    \begin{tcolorbox}
      This is my content.
    \end{tcolorbox}
    \begin{tcolorbox}
      This is my content.
      \tcblower
      More content.
    \end{tcolorbox}
    \begin{tcolorbox}[sidebyside]
      My content.
      \tcblower
      More content.
    \end{tcolorbox}
    \begin{tcolorbox}[adjusted title=My title]
      This is my content.
    \end{tcolorbox}
    \begin{tcolorbox}[adjusted title=My title]
      This is my content.
      \tcblower
      More content.
    \end{tcolorbox}
    \begin{tcolorbox}[adjusted title=My title, sidebyside]
      My content.
      \tcblower
      More content.
    \end{tcolorbox}
  \end{tcbraster}
\end{verbatim}
11.1 Skin Family “standard”

Note that the option keys /tcb/frame style, /tcb/interior style, /tcb/segmentation style, and /tcb/title style are not applicable to the standard skin. Also, watermarks (see Subsection 10.3) are not usable with the standard skin.

\texttt{/tcb/skin=standard} (skin)

This is the standard skin from the core package. All drawing engines are set to type \texttt{standard}. The drawing is based on \texttt{pgf} commands and does not need the \texttt{tikz} package.

\begin{tcbitemize}
\item \texttt{/tcb/graphical environment}: \texttt{pgfpicture}
\item \texttt{/tcb/frame engine}: \texttt{standard}
\item \texttt{/tcb/interior titled engine}: \texttt{standard}
\item \texttt{/tcb/interior engine}: \texttt{standard}
\item \texttt{/tcb/segmentation engine}: \texttt{standard}
\item \texttt{/tcb/title engine}: \texttt{standard}
\end{tcbitemize}

\texttt{/tcb/standard} (style, no value)

This is an abbreviation for setting \texttt{skin=standard}.

\begin{tcbexample}[title={My title}, colback=green!20]
This is my content. \\
My title \\
This is my content. \\
More content. \\
My content. \\
More content. \\
\end{tcbexample}
This is the standard jigsaw skin from the core package. It differs from the skin \texttt{standard\textsuperscript{P.216}} by its frame engine, see Section 10.11 on page 210.

**Environment and engines for the skin “standard jigsaw”**

\begin{verbatim}
/tcb/graphical environment\^P.142: pgfpicture
/tcb/frame engine\^P.142: standardjigsaw
/tcb/interior titled engine\^P.142: standard
/tcb/interior engine\^P.143: standard
/tcb/segmentation engine\^P.143: standard
/tcb/title engine\^P.143: standard
\end{verbatim}

This is an abbreviation for setting \texttt{skin=standard\ jigsaw}.

\texttt{\skinExampleSet{standard\ jigsaw, opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5,}
}

This is my content.

\texttt{My title}

This is my content.

\texttt{My title}

This is my content.

\texttt{My title}

This is my content.

\texttt{My title}

More content.

More content.

More content.
11.2 Skin Family “enhanced”

If you like the standard appearance of a \texttt{tcolorbox} but you want to have some “enhanced” features, the \texttt{enhanced} skin is what you are looking for.

\texttt{/tcb/skin=enhanced} \hspace{1cm} (skin)

This skin translates the drawing commands of the core package into \texttt{tikz} path commands. Therefore, it allows all \texttt{tikz} high level options for these paths and has more flexibility compared to the \texttt{standard} \textsuperscript{P.216} skin. You pay for this with some prolonged compilation time. The \texttt{tikz} path options can be given with the option keys \texttt{/tcb/frame style} \textsuperscript{P.156}, \texttt{/tcb/interior style} \textsuperscript{P.157}, \texttt{/tcb/segmentation style} \textsuperscript{P.159}, and \texttt{/tcb/title style} \textsuperscript{P.159}.

Environment and engines for the skin “enhanced”

\begin{verbatim}
\begin{tabular}{ll}
/tcb/graphical environment & \texttt{tikzpicture} \\
/tcb/frame engine & \texttt{path} \\
/tcb/interior titled engine & \texttt{path} \\
/tcb/interior engine & \texttt{path} \\
/tcb/segmentation engine & \texttt{path} \\
/tcb/title engine & \texttt{path} \\
\end{tabular}
\end{verbatim}

\texttt{/tcb/enhanced} \hspace{1cm} (style, no value)

This is an abbreviation for setting \texttt{skin=enhanced}.

\begin{verbatim}
\begin{tcbox}[enhanced]
This is my content.
This is my content.
More content.
\end{tcbox}

This is my content.
This is my content.
More content.
\end{verbatim}
Nice box in rainbow colors

With the “enhanced” skin, it is quite easy to produce fancy looking effects.

Note that this is still a \texttt{tcolorbox}.

A listing box with shadow and some specials

Of course, skins can be used for listings also.
\begin{equation}
\int_1^2 \frac{1}{x} \, dx = \ln(2).
\end{equation}

Of course, skins can be used for listings also.

\[
\int_1^2 \frac{1}{x} \, dx = \ln(2). \tag{2}
\]
For unbreakable boxes, this is identical to using `/tcb/enhanced` \(^{\text{P.218}}\). But, for breakable boxes, the *break sequence* is identical to the `standard` \(^{\text{P.216}}\) skin, see Section 19.8 from page 404.

This style relies on the skin `enhanced` \(^{\text{P.218}}\). All drawing operations are hidden and all margins are set to 0pt. See `/tcb/blanker` \(^{\text{P.252}}\) for switching off the drawing engines.

\begin{tcolorbox}[blank,watermark text=A blank box]
\lipsum[1]
\end{tcolorbox}

Sometimes, a line is only a line. With `\tcbline` you separate the box content into two functional units. `\tcbline` draws only a line which looks like the segmentation line between upper and lower part. Furthermore, you can use `\tcbline` more than just once. `\tcbline` always uses the path drawing engine. Therefore, the `/tcb/segmentation style` can be applied.

\begin{tcolorbox}[colupper=red!50!black,collower=green!50!black]
\lipsum[1]
\lipsum[2]
\lipsum[3]
\lipsum[4]
\end{tcolorbox}


\begin{tcolorbox}[enhanced,colframe=blue!50!black,colback=white]
\lipsum[1]
\lipsum[2]
\lipsum[3]
\lipsum[4]
\end{tcolorbox}

\begin{tcolorbox}[colupper=red!50!black,collower=green!50!black]
\lipsum[1]
\lipsum[2]
\lipsum[3]
\lipsum[4]
\end{tcolorbox}


\begin{tcolorbox}[enhanced,colframe=blue!50!black,colback=white]
\lipsum[1]
\lipsum[2]
\lipsum[3]
\lipsum[4]
\end{tcolorbox}

\begin{tcolorbox}[colupper=red!50!black,collower=green!50!black]
\lipsum[1]
\lipsum[2]
\lipsum[3]
\lipsum[4]
\end{tcolorbox}


\textbf{\tcbline*}

Equivalent to `\tcbline`, but in a breakable box, `\tcbline*` is removed if at a page/box break. Also, it is removed at the end of a box.
This is a flavor of enhanced which is used as a first part in a break sequence for enhanced. Nevertheless, this skin can be applied independently.

**Environment and engines for the skin “enhancedfirst”**

```latex
\skinExampleSet{skin=enhancedfirst}
```

This is my content. This is my content. My content. More content.

My title

This is my content. This is my content. My content. More content.

More content.

This is my content. This is my content. My title

This is my content. This is my content. My content. More content.

More content.

Environment and engines for the skin “enhancedmiddle”

```latex
\skinExampleSet{skin=enhancedmiddle}
```

This is a flavor of enhanced which is used as a middle part in a break sequence for enhanced. Nevertheless, this skin can be applied independently.

More content.

My title

More content.
This is a flavor of `enhanced` which is used as a `last` part in a break sequence for `enhanced`. Nevertheless, this skin can be applied independently.

Environment and engines for the skin “enhancedlast”

```
\skinExampleSet{skin=enhancedlast}
```

This is my content.
This is the jigsaw variant of skin \texttt{enhanced}. It differs by its frame engine, see Section 10.11 on page 210.

**Environment and engines for the skin “enhanced jigsaw”**

- `/tcb/graphical environment`: \texttt{tikzpicture}
- `/tcb/frame engine`: \texttt{pathjigsaw}
- `/tcb/interior titled engine`: \texttt{path}
- `/tcb/interior engine`: \texttt{path}
- `/tcb/segmentation engine`: \texttt{path}
- `/tcb/title engine`: \texttt{path}

This is an abbreviation for setting \texttt{skin=enhanced jigsaw}.

For unbreakable boxes, this is identical to using \texttt{/tcb/standard jigsaw}. But, for breakable boxes, the \texttt{break sequence} is identical to the \texttt{standard jigsaw} skin, see Section 19.8 from page 404.
This is the jigsaw variant of skin `enhancedfirst` \(^{\text{\textsuperscript{P.222}}}\). It differs by its frame engine, see Section 10.11 on page 210.

### Environment and engines for the skin “enhancedfirst jigsaw”

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>graphical environment</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>frame engine</td>
<td>pathfirstjigsaw</td>
</tr>
<tr>
<td>interior titled engine</td>
<td>pathfirst</td>
</tr>
<tr>
<td>interior engine</td>
<td>pathfirst</td>
</tr>
<tr>
<td>segmentation engine</td>
<td>path</td>
</tr>
<tr>
<td>title engine</td>
<td>pathfirst</td>
</tr>
</tbody>
</table>

```latex
\skinExampleSet{skin=enhancedfirst jigsaw, 
opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5, }
```

This is my content.

My title

This is my content.

More content.

My content.  More content.

This is my content.

My title

This is my content.

More content.
This is the jigsaw variant of skin enhancedmiddle. It differs by its frame engine, see Section 10.11 on page 210.

Environment and engines for the skin “enhancedmiddle jigsaw”

/tcb/graphical environment → P.142: tikzpicture
/tcb/frame engine → P.142: pathmiddlejigsaw
/tcb/interior titled engine → P.142: pathmiddle
/tcb/interior engine → P.143: pathmiddle
/tcb/segmentation engine → P.143: path
/tcb/title engine → P.143: pathmiddle

\skinExampleSet{skin=enhancedmiddle jigsaw,
opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5,}

This styles relies on the skin enhancedmiddle jigsaw. It is intended to be used as an optical marker like a highlighter pen.

\begin{tcolorbox}[marker]
\lipsum[2]
\end{tcolorbox}

This examples demonstrates the creation of several text marker environments based on enhancedmiddle on page 222.

\tcbset{textmarker/.style={%
  skin=enhancedmiddle jigsaw,breakable,parbox=false,
  boxrule=0mm,lefterule=5mm,rightrule=5mm,boxsep=0mm,arc=0mm,
  left=3mm,right=3mm,top=1mm,bottom=1mm,toptitle=1mm,bottomtitle=1mm,oversize}}

\newtcolorbox{yellow}{textmarker,colback=yellow!5!white,colframe=yellow}
\newtcolorbox{orange}{textmarker,colback=DarkOrange!5!white,colframe=DarkOrange!75!yellow}
\newtcolorbox{red}{textmarker,colback=red!5!white,colframe=red}
\newtcolorbox{blue}{textmarker,colback=DeepSkyBlue!5!white,colframe=DeepSkyBlue}
\newtcolorbox{green}{textmarker,colback=Chartreuse!5!white,colframe=Chartreuse}
\newtcolorbox{rainbow}{textmarker,interior hidden,
  frame style={top color=blue,bottom color=red,middle color=green}}

\begin{yellow}
\lipsum[1-3]
\end{yellow}
\begin{orange}
\lipsum[4]
\end{orange}
\begin{red}
\lipsum[5]
\end{red}
\begin{green}
\lipsum[6]
\end{green}
\begin{blue}
\lipsum[7]
\end{blue}
\begin{rainbow}
\lipsum[8]
\end{rainbow}


Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique,


This is the jigsaw variant of skin `enhancedlast`\textsuperscript{P.233}. It differs by its frame engine, see Section 10.11 on page 210.

### Environment and engines for the skin “enhancedlast”

- /tcb/graphical environment\textsuperscript{P.142}: \texttt{tikzpicture}
- /tcb/frame engine\textsuperscript{P.142}: \texttt{pathlastjigsaw}
- /tcb/interior titled engine\textsuperscript{P.142}: \texttt{pathlast}
- /tcb/interior engine\textsuperscript{P.143}: \texttt{pathlast}
- /tcb/segmentation engine\textsuperscript{P.143}: \texttt{path}
- /tcb/title engine\textsuperscript{P.143}: \texttt{pathlast}

\begin{verbatim}
\skinExampleSet{skin=enhancedlast jigsaw, 
opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5, 
}
\end{verbatim}

This is my content.  
This is my content.  
My content.  
More content.  

My title

This is my content.  
This is my content.  
My content.  
More content.  

My title

This is my content.  
This is my content.  
My content.  
More content.  

My title
11.3 Skin Family “bicolor”

\texttt{/tcb/skin=bicolor} (skin)

This skin is quite similar to the standard\textsuperscript{P.216} and enhanced\textsuperscript{P.218} skin. But instead of a segmentation line, the optional lower part of the box is filled with a different color or drawn with a different style.

\begin{tcolorbox}
\[\text{The title,} \\
\text{frame style=\{top color=FireBrick,} \\
\hspace{1cm} \text{bottom color=FireBrick!15!white,draw=black\},} \\
\text{interior style=\{left color=Salmon,} \\
\hspace{1cm} \text{right color=Salmon!50!white\},} \\
\text{segmentation style=\{right color=Salmon,} \\
\hspace{1cm} \text{left color=Salmon!50!white\}\}}
\]

\text{The upper part.}
\tcblower
\text{The lower part.}
\end{tcolorbox}

• The most basic usage of this skin is to set the background color of the lower part by \texttt{/tcb/colbacklower\textsuperscript{P.232}} and all other options like for the standard\textsuperscript{P.216} skin.

\begin{tcolorbox}
\[\text{The title,} \\
\text{colframe=FireBrick!75!black, colback=Salmon!50!white, colbacklower=Salmon}\]
\text{The upper part.}
\tcblower
\text{The lower part.}
\end{tcolorbox}

• The more advanced usage of this skin is to apply the \texttt{/tcb/frame style\textsuperscript{P.156}} and the \texttt{/tcb/interior style\textsuperscript{P.157}} like for the enhanced\textsuperscript{P.218} skin. Also, the \texttt{/tcb/segmentation style\textsuperscript{P.159}} can be used, but it is applied to the whole lower part.

\begin{tcolorbox}
\[\text{The title,} \\
\text{frame style=\{top color=FireBrick,} \\
\hspace{1cm} \text{bottom color=FireBrick!15!white,draw=black\},} \\
\text{interior style=\{left color=Salmon,} \\
\hspace{1cm} \text{right color=Salmon!50!white\},} \\
\text{segmentation style=\{right color=Salmon,} \\
\hspace{1cm} \text{left color=Salmon!50!white\}\}}
\]

\text{The upper part.}
\tcblower
\text{The lower part.}
\end{tcolorbox}
This is an abbreviation for setting \texttt{skin=bicolor}.

\begin{verbatim}
\skinExampleSet{biclor,
  colbacklower=LimeGreen!75!LightGreen,
}
\end{verbatim}

This is my content.

More content.

My content. More content.

My title
This is my content.

My title
This is my content.

My title
My content. More content.

231
The following options /tcb/colbacklower and /tcb/opacitybacklower are executed before /tcb/segmentation style \(^\text{P.159}\), i.e. /tcb/segmentation style \(^\text{P.159}\) overrules them.

\textcolor{red}{/tcb/colbacklower}(\textit{color})

(no default, initially black!15!white)

Sets the background \textit{(color)} of the lower part. It depends on the skin, if this value is used.

\textcolor{red}{/tcb/opacitybacklower}(\textit{fraction})

(no default, initially 1.0)

Sets the background opacity of the lower part to the given \textit{(fraction)}. It depends on the skin, if this value is used.

\begin{tcolorbox}[bicolor, frame style={preaction={fill=blue!50!black}, pattern=checkerboard,pattern color=blue!50!gray}, fonttitle=\textbfseries, colback=blue!10, colbacklower=white, opacitybacklower=0.65, title={Example for a semilucent lower part}]

This is the upper part.

\tcblower

And that is the lower part.
\end{tcolorbox}

\textcolor{red}{/tcbset}{gitexample/.style={listing and comment,comment={#1}, skin=bicolor,boxrule=1mm,fonttitle=\textbfseries,coltitle=black, frame style={draw=black,left color=Gold,right color=Goldenrod!50!Gold}, colback=black,colbacklower=Goldenrod!75!Gold, colupper=white,collower=black, listing options={language={bash},aboveskip=Opt,belowskip=Opt,nolol, basicstyle=\ttfamily\bfseries,extendedchars=true}}}

\begin{tcblisting}{title={Snapshot of the staging area}, gitexample={The option \texttt{`}\texttt{-a}'\texttt{'} automatically stages all tracked and modified files before the commit.\par This can be combined with the message option \texttt{`}\texttt{-m}'\texttt{'} as seen in the third line.}}

\textcolor{red}{git commit}

\textcolor{red}{git commit -a}

\textcolor{red}{git commit -am \texttt{`}\texttt{changes to my example}'\texttt{'}

\end{tcblisting}

\textcolor{red}{/tcb/colbacklower}(⟨\textit{color}⟩)

Sets the background \textit{⟨color⟩} of the lower part. It depends on the skin, if this value is used.

\begin{tcolorbox}[bicolor, frame style={preaction={fill=blue!50!black}, pattern=checkerboard,pattern color=blue!50!gray}, fonttitle=\textbfseries, colback=blue!10, colbacklower=white, opacitybacklower=0.65, title={Example for a semilucent lower part}]

This is the upper part.

\tcblower

And that is the lower part.
\end{tcolorbox}
This is a flavor of `bicolor` which is used as a first part in a break sequence for `bicolor`. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “bicolorfirst”

<table>
<thead>
<tr>
<th>Environment/Engine</th>
<th>Engine Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>pathfirst</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>pathfirst</td>
</tr>
</tbody>
</table>

```latex
\skinExampleSet{skin=bicolorfirst, colbacklower=LimeGreen!75!LightGreen, }
```

This is my content.

This is my content.

My content.

More content.

My title

This is my content.

More content.

My title

This is my content.

More content.

My title

This is my content.

More content.
This is a flavor of \texttt{bicolor} which is used as a middle part in a break sequence for \texttt{bicolor}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “\texttt{bicolormiddle}”

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{tcb/graphical environment}</td>
<td>\texttt{tikzpicture}</td>
</tr>
<tr>
<td>\texttt{tcb/frame engine}</td>
<td>\texttt{pathmiddle}</td>
</tr>
<tr>
<td>\texttt{tcb/interior titled engine}</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>\texttt{tcb/interior engine}</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>\texttt{tcb/segmentation engine}</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>\texttt{tcb/title engine}</td>
<td>\texttt{pathmiddle}</td>
</tr>
</tbody>
</table>

\begin{verbatim}
\skinExampleSet{skin=bicolormiddle, 
colbacklower=LimeGreen!75!LightGreen, 
}
\end{verbatim}
This is a flavor of \texttt{bicolor}\textsuperscript{P.230} which is used as a \textit{last} part in a break sequence for \texttt{bicolor}\textsuperscript{P.230}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin “bicolorlast”

\begin{itemize}
  \item [/tcb/graphical environment\textsuperscript{P.142}: \texttt{tikzpicture}]
  \item [/tcb/frame engine\textsuperscript{P.142}: \texttt{pathlast}]
  \item [/tcb/interior titled engine\textsuperscript{P.142}: \texttt{special}]
  \item [/tcb/interior engine\textsuperscript{P.143}: \texttt{special}]
  \item [/tcb/segmentation engine\textsuperscript{P.143}: \texttt{special}]
  \item [/tcb/title engine\textsuperscript{P.143}: \texttt{pathlast}]
\end{itemize}

\begin{Verbatim}
\skinExampleSet{skin=bicolorlast,  
colbacklower=LimeGreen!75!LightGreen,  
}
\end{Verbatim}
This is the jigsaw variant of skin `bicolor`\(^{230}\). It differs by its frame engine, see Section 10.11 on page 210.

### Environment and engines for the skin “bicolor jigsaw”

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>graphical environment</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>frame engine</td>
<td>pathjigsaw</td>
</tr>
<tr>
<td>interior titled engine</td>
<td>special</td>
</tr>
<tr>
<td>interior engine</td>
<td>special</td>
</tr>
<tr>
<td>segmentation engine</td>
<td>special</td>
</tr>
<tr>
<td>title engine</td>
<td>path</td>
</tr>
</tbody>
</table>

This is an abbreviation for setting `skin=enhanced jigsaw`.

```latex
\skinExampleSet{bicolor jigsaw,  
colbacklower=LimeGreen!75!LightGreen,  
opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5,  
opacitybacklower=0.5,}
```

This is my content. More content.

This is the jigsaw variant of skin \texttt{bicolorfirst} \cite{P.233}. It differs by its frame engine, see Section 10.11 on page 210.

Environment and engines for the skin “bicolorfirst jigsaw”

\begin{verbatim}
\skinExampleSet{skin=bicolorfirst jigsaw,  
colbacklower=LimeGreen!75!LightGreen,  
opacityframe=0.5, opacityback=0.5, opacitybacktitle=0.5,  
opacitybacklower=0.5,}
\end{verbatim}

This is my content.  
This is my content.  
My content.  
More content.

My title

This is my content.  
This is my content.  
My content.  
More content.

My title

This is my content.  
This is my content.  
My content.  
More content.
This is the jigsaw variant of skin \textit{bicolormiddle}\textsuperscript{P.234}. It differs by its frame engine, see Section 10.11 on page 210.

\begin{table}
\begin{tabular}{|l|l|}
\hline
\texttt{/tcb/graphical environment\textsuperscript{P.142}} & \texttt{tikzpicture} \\
\texttt{/tcb/frame engine\textsuperscript{P.142}} & \texttt{pathmiddlejigsaw} \\
\texttt{/tcb/interior titled engine\textsuperscript{P.142}} & \texttt{special} \\
\texttt{/tcb/interior engine\textsuperscript{P.143}} & \texttt{special} \\
\texttt{/tcb/segmentation engine\textsuperscript{P.143}} & \texttt{special} \\
\texttt{/tcb/title engine\textsuperscript{P.143}} & \texttt{pathmiddle} \\
\hline
\end{tabular}
\end{table}

\setcounter{equation}{0}
\begin{equation}
\texttt{\backslash skinExampleSet\{skin=bicolormiddle jigsaw,}
\texttt{  colbacklower=LimeGreen!75!LightGreen,}
\texttt{  opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5,}
\texttt{  opacitybacklower=0.5,}
\texttt{\}}
\end{equation}

This is my content. This is my content. My content. More content.

My title

This is my content. This is my content. My content. More content.
This is the jigsaw variant of skin \textit{bicolorlast}\textsuperscript{P.235}. It differs by its frame engine, see Section 10.11 on page 210.

\begin{center}
\begin{tabular}{|c|c|c|c|}
\hline
\textbf{Environment and engines for the skin “bicolorlast jigsaw”} & \textbf{tikzpicture} & \textbf{pathlastjigsaw} & \textbf{P.142} \\
\hline
\textbf{/tcb/graphical environment} & \textbf{P.142} & \textbf{tikzpicture} & \textbf{P.142} \\
\hline
\textbf{/tcb/frame engine} & \textbf{P.142} & \textbf{pathlastjigsaw} & \textbf{P.142} \\
\hline
\textbf{/tcb/interior titled engine} & \textbf{P.142} & \textbf{special} & \textbf{P.142} \\
\hline
\textbf{/tcb/interior engine} & \textbf{P.143} & \textbf{special} & \textbf{P.143} \\
\hline
\textbf{/tcb/segmentation engine} & \textbf{P.143} & \textbf{special} & \textbf{P.143} \\
\hline
\textbf{/tcb/title engine} & \textbf{P.143} & \textbf{pathlast} & \textbf{P.143} \\
\hline
\end{tabular}
\end{center}
11.4 Skin Family “tile”

This skin is a variant of skin `bicolor`\(^{P.230}\). Especially, the optional lower part of the box is colored by `colbacklower`\(^{P.232}\). The main difference to `bicolor`\(^{P.230}\) is that `tile` has no frame.

Environment and engines for the skin “tile”

<table>
<thead>
<tr>
<th>Engine</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/tcb/graphical environment</code>(^{P.142})</td>
<td><code>tikzpicture</code></td>
</tr>
<tr>
<td><code>/tcb/frame engine</code>(^{P.142})</td>
<td><code>empty</code></td>
</tr>
<tr>
<td><code>/tcb/interior titled engine</code>(^{P.142})</td>
<td><code>special</code></td>
</tr>
<tr>
<td><code>/tcb/interior engine</code>(^{P.143})</td>
<td><code>special</code></td>
</tr>
<tr>
<td><code>/tcb/segmentation engine</code>(^{P.143})</td>
<td><code>special</code></td>
</tr>
<tr>
<td><code>/tcb/title engine</code>(^{P.143})</td>
<td><code>path</code></td>
</tr>
</tbody>
</table>

This key applies `skin=tile` and in addition changes the geometry and some style options.

```latex
\skinExampleSet{tile, colbacklower=LimeGreen!75!LightGreen, }
```

This is my content. This is my content. My content. More content.

More content.

My title

This is my content. This is my content. My title

My content. More content.

More content.
This is a flavor of \texttt{tile}\textsuperscript{P.240} which is used as a \textit{first} part in a break sequence for \texttt{tile}\textsuperscript{P.240}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “\texttt{tilefirst}”

- \texttt{/tcb/graphical environment}\textsuperscript{P.142}: \texttt{tikzpicture}
- \texttt{/tcb/frame engine}\textsuperscript{P.142}: \texttt{empty}
- \texttt{/tcb/interior titled engine}\textsuperscript{P.142}: \texttt{special}
- \texttt{/tcb/interior engine}\textsuperscript{P.143}: \texttt{special}
- \texttt{/tcb/segmentation engine}\textsuperscript{P.143}: \texttt{special}
- \texttt{/tcb/title engine}\textsuperscript{P.143}: \texttt{pathfirst}

\begin{verbatim}
\skinExampleSet{skin=tilefirst, 
  colbacklower=LimeGreen!75!LightGreen, 
  boxrule=0pt, 
}
\end{verbatim}
This is a flavor of \texttt{tile} \textsuperscript{P.240} which is used as a \textit{middle} part in a break sequence for \texttt{tile} \textsuperscript{P.240}. Nevertheless, this skin can be applied independently.

\begin{table}[h]
\centering
\begin{tabular}{|l|l|}
\hline
\textbf{Environment and engines for the skin “tilemiddle”}  \\
\hline
\texttt{/tcb/graphical environment} \textsuperscript{P.142}: & \texttt{tikzpicture}  \\
\texttt{/tcb/frame engine} \textsuperscript{P.142}: & \texttt{empty}  \\
\texttt{/tcb/interior titled engine} \textsuperscript{P.142}: & \texttt{special}  \\
\texttt{/tcb/interior engine} \textsuperscript{P.143}: & \texttt{special}  \\
\texttt{/tcb/segmentation engine} \textsuperscript{P.143}: & \texttt{special}  \\
\texttt{/tcb/title engine} \textsuperscript{P.143}: & \texttt{pathmiddle}  \\
\hline
\end{tabular}
\end{table}

\begin{code}
\begin{verbatim}
\skinExampleSet{skin=tilemiddle,  
  colbacklower=LimeGreen!75!LightGreen, 
  boxrule=0pt, 
}
\end{verbatim}
\end{code}
This is a flavor of \texttt{tile} \textsuperscript{P.240} which is used as a last part in a break sequence for \texttt{tile} \textsuperscript{P.240}. Nevertheless, this skin can be applied independently.

**Environment and engines for the skin “tilelast”**

\begin{tabular}{|l|l|}
\hline
//tcb/graphical\ environment \textsuperscript{P.142}: & \texttt{tikzpicture} \\
//tcb/frame\ engine \textsuperscript{P.142}: & \texttt{empty} \\
//tcb/interior\ titled\ engine \textsuperscript{P.142}: & \texttt{special} \\
//tcb/interior\ engine \textsuperscript{P.143}: & \texttt{special} \\
//tcb/segmentation\ engine \textsuperscript{P.143}: & \texttt{special} \\
//tcb/title\ engine \textsuperscript{P.143}: & \texttt{pathlast} \\
\hline
\end{tabular}

```
\skinExampleSet{skin=tilelast, 
  colbacklower=LimeGreen!75!LightGreen, 
  boxrule=0pt, 
}
```

This is my content.

This is my content.

My content. More content.

My title

This is my content.

This is my content.

My title

More content.

More content.
11.5 Skin Family “beamer”

This skin resembles boxes known from the \texttt{beamer} class and therefore is called “beamer”. It uses the normal colors from the core package but shades them a little bit.

Environment and engines for the skin “beamer”

\begin{tcolorbox} \[\texttt{beamer},\ \texttt{colback=Salmon!50!white},\ \texttt{colframe=FireBrick!75!black},\ \texttt{adjusted title=A colored box with the \enquote{beamer} skin}\]
This box looks like a box provided by the \texttt{beamer} class.
\end{tcolorbox}

A colored box with the “beamer” skin

This box looks like a box provided by the \texttt{beamer} class.
This is a flavor of \texttt{beamer} which is used as a \textit{first} part in a break sequence for \texttt{beamer}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin “\texttt{beamerfirst}”

\begin{itemize}
  \item \texttt{/tcb/graphical environment}: \texttt{tikzpicture}
  \item \texttt{/tcb/frame engine}: \texttt{pathfirst}
  \item \texttt{/tcb/interior titled engine}: \texttt{special}
  \item \texttt{/tcb/interior engine}: \texttt{special}
  \item \texttt{/tcb/segmentation engine}: \texttt{special}
  \item \texttt{/tcb/title engine}: \texttt{pathfirst}
\end{itemize}

This is my content.

This is my content.

More content.

This is my content.

This is my content.

More content.

My title

This is my content.

This is my content.

More content.

My title

This is my content.

This is my content.

More content.

My title

This is my content.

This is my content.

More content.

My title

This is my content.

This is my content.

More content.

This is a flavor of \texttt{beamer} which is used as a \textit{middle} part in a break sequence for \texttt{beamer}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin “\texttt{beamermiddle}”

\begin{itemize}
  \item \texttt{/tcb/graphical environment}: \texttt{tikzpicture}
  \item \texttt{/tcb/frame engine}: \texttt{pathmiddle}
  \item \texttt{/tcb/interior titled engine}: \texttt{special}
  \item \texttt{/tcb/interior engine}: \texttt{special}
  \item \texttt{/tcb/segmentation engine}: \texttt{special}
  \item \texttt{/tcb/title engine}: \texttt{pathmiddle}
\end{itemize}

This is my content.

This is my content.

More content.

This is my content.

This is my content.

More content.

My title

This is my content.

This is my content.

More content.

My title

This is my content.

This is my content.

More content.

My title

This is my content.

This is my content.

More content.
This is a flavor of `beamer` which is used as a *last* part in a break sequence for `beamer`. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “beamerlast”

- `/tcb/graphical environment`: `tikzpicture`
- `/tcb/frame engine`: `pathlast`
- `/tcb/interior titled engine`: `special`
- `/tcb/interior engine`: `special`
- `/tcb/segmentation engine`: `special`
- `/tcb/title engine`: `pathlast`

```latex
\skinExampleSet{beamer,title filled=false,skin=beamerlast}
```

This is my content.

This is my content.

My content. More content.

My title

This is my content.

This is my content.

My content. More content.

My title

This is my content.

This is my content.

My content. More content.
11.6 Skin Family “widget”

This skin uses the normal colors from the core package but shades them a little bit. The appearance of the skin can be controlled by \texttt{/tcb/frame style} → P.156, \texttt{/tcb/interior style} → P.157, and \texttt{/tcb/segmentation style} → P.159, if needed.

Environment and engines for the skin “widget”

\begin{itemize}
\item \texttt{/tcb/graphical environment} → P.142: \texttt{tikzpicture}
\item \texttt{/tcb/frame engine} → P.142: \texttt{path}
\item \texttt{/tcb/interior titled engine} → P.142: \texttt{path}
\item \texttt{/tcb/interior engine} → P.143: \texttt{path}
\item \texttt{/tcb/segmentation engine} → P.143: \texttt{special}
\item \texttt{/tcb/title engine} → P.143: \texttt{special}
\end{itemize}

This key applies \texttt{skin=widget} and in addition changes the geometry and some style options.
This is a flavor of \textit{widget} \textsuperscript{P.248} which is used as a \textit{first} part in a break sequence for \textit{widget} \textsuperscript{P.248}. Nevertheless, this skin can be applied independently.

\begin{center}
\underline{Environment and engines for the skin “widgetfirst”}
\end{center}

\begin{itemize}
\item [/ tcb/graphical environment \textsuperscript{P.142}: \texttt{tikzpicture}]
\item [/ tcb/frame engine \textsuperscript{P.142}: \texttt{pathfirst}]
\item [/ tcb/interior titled engine \textsuperscript{P.142}: \texttt{pathfirst}]
\item [/ tcb/interior engine \textsuperscript{P.143}: \texttt{pathfirst}]
\item [/ tcb/segmentation engine \textsuperscript{P.143}: \texttt{special}]
\item [/ tcb/title engine \textsuperscript{P.143}: \texttt{special}]
\end{itemize}

\texttt{\textbackslash skinExampleSet\{widget, skin=widgetfirst\}}

This is my content.

More content.

My title
This is my content.

More content.

This is my content.

More content.

My title
This is my content.

More content.

\begin{center}
\underline{Environment and engines for the skin “widgetmiddle”}
\end{center}

\begin{itemize}
\item [/ tcb/graphical environment \textsuperscript{P.142}: \texttt{tikzpicture}]
\item [/ tcb/frame engine \textsuperscript{P.142}: \texttt{pathmiddle}]
\item [/ tcb/interior titled engine \textsuperscript{P.142}: \texttt{pathmiddle}]
\item [/ tcb/interior engine \textsuperscript{P.143}: \texttt{pathmiddle}]
\item [/ tcb/segmentation engine \textsuperscript{P.143}: \texttt{special}]
\item [/ tcb/title engine \textsuperscript{P.143}: \texttt{special}]
\end{itemize}

\texttt{\textbackslash skinExampleSet\{widget, skin=widgetmiddle\}}

This is my content.

More content.

My title
This is my content.

More content.

This is my content.

More content.

My title
This is my content.

More content.
This is a flavor of \texttt{widget} which is used as a last part in a break sequence for \texttt{widget}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin “widgetlast”

\begin{itemize}
  \item \texttt{/tcb/graphical environment}: \texttt{tikzpicture}
  \item \texttt{/tcb/frame engine}: \texttt{pathlast}
  \item \texttt{/tcb/interior titled engine}: \texttt{pathlast}
  \item \texttt{/tcb/interior engine}: \texttt{pathlast}
  \item \texttt{/tcb/segmentation engine}: \texttt{special}
  \item \texttt{/tcb/title engine}: \texttt{special}
\end{itemize}

\begin{tcbexampleset}[widget,skin=widgetlast]
\begin{tabular}{|c|c|c|}
  \hline
  This is my content. & This is my content. & My content. \hline
  & More content. & More content. \hline
  \hline
  My title & My title & My title \hline
  This is my content. & This is my content. & This is my content. \hline
  & More content. & More content. \hline
\end{tabular}
\end{tcbexampleset}
11.7 Skin Family “empty”

\texttt{/tcb/skin=empty}  
This skin sets all engines to \texttt{empty}, i.e. nothing is drawn at all. Therefore, this skin is a good starting point to create a complete new style by yourself.

Environment and engines for the skin “empty”

\begin{verbatim}
\begin{tabular}{ll}
/tcb/graphical environment & \texttt{tikzpicture} \\
/tcb/frame engine & \texttt{empty} \\
/tcb/interior tilted engine & \texttt{empty} \\
/tcb/interior engine & \texttt{empty} \\
/tcb/segmentation engine & \texttt{empty} \\
/tcb/title engine & \texttt{empty} \\
\end{tabular}
\end{verbatim}

Note that the text colors stay unchanged when a skin is applied. Since the standard title color is white, the title of a box with skin \texttt{empty} becomes invisible, if not set to another color by \texttt{/tcb/coltitle}. 

\texttt{/tcb/empty}  
This is an abbreviation for setting \texttt{skin=empty}.

\begin{verbatim}
\skinExampleSet{empty, coltitle=Navy,borderline={2pt}{0pt}{black!10!white}, }
\end{verbatim}

This is my content.  
This is my content.  
My content.  
More content.  
More content.  
My title  
This is my content.  
My title  
This is my content.  
My title  
My content.  
More content.  
More content.
This style relies on the skin `empty`\textsuperscript{P.251}. All engines are set to empty and all margins are set to 0pt. In contrast to `/tcb/blank`\textsuperscript{P.220}, the graphical paths are not constructed with exception of the geometry nodes.

\begin{tcolorbox}\[blanker,watermark text=A blank box\]
\lipsum[1]
\end{tcolorbox}

% \tcbuselibrary{fitting}
\newtcbboxfit{\mybox}[1]{\[blanker,width=4cm,height=7cm,top=4pt,watermark text=#1\]}

\begin{tabular}{|c|c|c|}
\hline
A & B & C \\
\hline
\mybox{A}{\lipsum[1]} & \mybox{B}{\lipsum[2]} & \mybox{C}{\lipsum[3]} \\
\hline
\end{tabular}
This style extends \texttt{/tcb/blanker} \textsuperscript{P.252}. All engines are set to empty and all margins are set to 0pt. In contrast to \texttt{/tcb/blanker} \textsuperscript{P.252}, also title, shadow, underlay, overlay, finish and borderline are removed.

\begin{tcbraster}[raster columns=3,raster equal height, title=Box \texttt{tcbrasternum}, enhanced, size=small, colframe=red!50!black, colback=red!10!white, coltitle=yellow!85!black, drop fuzzy shadow, watermark text={Box \texttt{tcbrasternum}}, borderline={.25mm}{-.5mm}{green!40!black}, finish=\begin{tcbclipframe}\draw[blue, opacity=0.1, line width=1cm](frame.south west) -- (frame.north east);\end{tcbclipframe},]
\begin{tcolorbox}\lipsum[4]\end{tcolorbox}
\begin{tcolorbox}[blanker]\lipsum[4]\end{tcolorbox}
\begin{tcolorbox}[blankest]\lipsum[4]\end{tcolorbox}
\end{tcbraster}


This is a flavor of \textit{empty} \textsuperscript{P.251} which is used as a \textit{first} part in a break sequence for \textit{empty} \textsuperscript{P.251}. Nevertheless, this skin can be applied independently.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|}
\hline
Environment and engines for the skin “emptyfirst” & \hfill \textit{empty} \hfill \\
\hline
\texttt{/tcb/graphical environment} & \texttt{tikzpicture} \\
\texttt{/tcb/frame engine} & \texttt{empty} \\
\texttt{/tcb/interior titled engine} & \texttt{empty} \\
\texttt{/tcb/interior engine} & \texttt{empty} \\
\texttt{/tcb/segmentation engine} & \texttt{empty} \\
\texttt{/tcb/title engine} & \texttt{empty} \\
\hline
\end{tabular}
\end{table}

\begin{verbatim}
\skinExampleSet{skin=emptyfirst, 
    coltitle=Navy,borderline={2pt}{0pt}{black!10!white}, 
}
\end{verbatim}
This is a flavor of \texttt{empty} which is used as a \textit{middle} part in a break sequence for \texttt{empty}. Nevertheless, this skin can be applied independently.

\begin{tabular}{|l|}
\hline
Environment and engines for the skin \texttt{“emptymiddle”} \tabularnewline \hline
\texttt{/tcb/graphical environment} \tab \texttt{tikzpicture} \tabularnewline
\texttt{/tcb/frame engine} \tab \texttt{empty} \tabularnewline
\texttt{/tcb/interior titled engine} \tab \texttt{empty} \tabularnewline
\texttt{/tcb/interior engine} \tab \texttt{empty} \tabularnewline
\texttt{/tcb/segmentation engine} \tab \texttt{empty} \tabularnewline
\texttt{/tcb/title engine} \tab \texttt{empty} \tabularnewline
\hline
\end{tabular}

\begin{Verbatim}
\verb|\skinExampleSet{| \texttt{skin=emptymiddle,}
\verb|coltitle=Navy,borderline={2pt}{0pt}{black!10!white},|}
\end{Verbatim}

\begin{tabular}{|l|l|l|}
\hline
This is my content. & This is my content. & My content. \\
& More content. & More content. \\
\hline
My title & My title & My title \\
This is my content. & This is my content. & More content. \\
& & \hline
\end{tabular}
This is a flavor of empty\textsuperscript{P.251} which is used as a last part in a break sequence for empty\textsuperscript{P.251}. Nevertheless, this skin can be applied independently.

<table>
<thead>
<tr>
<th>Environment and engines for the skin “emptylast”</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/tcb/graphical environment</code>\textsuperscript{P.142} \hspace{1em} <code>tikzpicture</code></td>
</tr>
<tr>
<td><code>/tcb/frame engine</code>\textsuperscript{P.142} \hspace{1em} <code>empty</code></td>
</tr>
<tr>
<td><code>/tcb/interior titled engine</code>\textsuperscript{P.142} \hspace{1em} <code>empty</code></td>
</tr>
<tr>
<td><code>/tcb/interior engine</code>\textsuperscript{P.143} \hspace{1em} <code>empty</code></td>
</tr>
<tr>
<td><code>/tcb/segmentation engine</code>\textsuperscript{P.143} \hspace{1em} <code>empty</code></td>
</tr>
<tr>
<td><code>/tcb/title engine</code>\textsuperscript{P.143} \hspace{1em} <code>empty</code></td>
</tr>
</tbody>
</table>

\CodeInput{\skinExampleSet{skin=emptylast,  
coltitle=Navy,borderline={2pt}{0pt}{black!10!white},  
}}

This is my content. This is my content. My content. More content.

More content. This is my content. My title

My title This is my content. My title

This is my content. My content. More content.
This example demonstrates a breakable customized box. Here, we define an environment \texttt{freebox}. The first application of \texttt{freebox} produces an unbroken \texttt{tcolorbox}. The box is drawn by the code given by /tcb/frame code \textsuperscript{P.145} and /tcb/interior code \textsuperscript{P.146}.

The second application of \texttt{freebox} is broken into several parts which are drawn by the codes given by /tcb/skin first is subskin of \textsuperscript{P.148}, /tcb/skin middle is subskin of \textsuperscript{P.148}, and /tcb/skin last is subskin of \textsuperscript{P.148}.

% Preamble:
\usepackage{tikz,lipsum}
\usetikzlibrary{skins,breakable}
\tikzset{coltria/.style={fill=red!15!white}}
\newtcolorbox{freebox}{empty, breakable,height fixed for=first and middle, leftrule=5mm,left=2mm, frame style={fill,top color=red!75!black,bottom color=red!75!black,middle color=red}, colback=yellow!50!white, watermark color=red!50!yellow!75!white, watermark text on=unbroken is unbroken box, watermark text on=first is first part, watermark text on=middle is middle part, watermark text on=last is last part, \% code for unbroken boxes:
frame code={\path\(\texttt{tcb fill frame}\) (frame.south west)--(frame.north west)
\hspace{1.2cm}--([xshift=-5mm]frame.north east)--([yshift=-5mm]frame.north east)
\hspace{1.2cm}--([yshift=5mm]frame.south east)--([xshift=-5mm]frame.south east)--cycle; },\%
interior code={\path\(\texttt{tcb fill interior}\) (interior.south west)--(interior.north west)
\hspace{1.2cm}--([xshift=-4.8mm]interior.north east)--([yshift=-4.8mm]interior.north east)
\hspace{1.2cm}--([yshift=4.8mm]interior.south east)--([xshift=-4.8mm]interior.south east)--cycle; },\%
\% code for the first part of a break sequence:
\% skin first is subskin of=emptyfirst{\%
frame code={\path\(\texttt{tcb fill frame}\) (frame.south west)--(frame.north west)
\hspace{1.2cm}--([xshift=-5mm]frame.north east)--([yshift=-5mm]frame.north east)
\hspace{1.2cm}--([yshift=5mm]frame.south east)--cycle; }\%
\textcolor{red!50!yellow!75!white}{\path\[\texttt{coltria}\] (\[xshift=2.5mm,yshift=1mm\]frame.south west) -- +(120:2mm)
\hspace{1.2cm}+ (60:2mm) -- cycle; },\%
interior code={\path\(\texttt{tcb fill interior}\) (interior.south west)--(interior.north west)
\hspace{1.2cm}--([xshift=-4.8mm]interior.north east)--([yshift=-4.8mm]interior.north east)
\hspace{1.2cm}--([yshift=4.8mm]interior.south east)--(interior.south east|--frame.south)
\hspace{1.2cm}--cycle; },\%
\},\%
\% code for the middle part of a break sequence:
\% skin middle is subskin of=emptymiddle{\%
frame code={\path\(\texttt{tcb fill frame}\) (frame.south west)--(frame.north west)
\hspace{1.2cm}--(frame.north east)--cycle; }\%
\textcolor{red!50!yellow!75!white}{\path\[\texttt{coltria}\] (\[xshift=2.5mm,yshift=-1mm\]frame.north west) -- +(240:2mm)
\hspace{1.2cm}+ (300:2mm) -- cycle; }\%
\textcolor{red!50!yellow!75!white}{\path\[\texttt{coltria}\] (\[xshift=2.5mm,yshift=1mm\]frame.south west) -- +(120:2mm)
\hspace{1.2cm}+ (60:2mm) -- cycle; },\%
interior code={\path\(\texttt{tcb fill interior}\) (interior.south west)--(interior.north west)
\hspace{1.2cm}--(interior.north east)--cycle; },\%
\},\%
\% code for the last part of a break sequence:
\% skin last is subskin of=emptylast{\%
frame code={\path\(\texttt{tcb fill frame}\) (frame.south west)--(frame.north west)
\hspace{1.2cm}--(frame.north east)--([xshift=5mm]frame.north east)
\hspace{1.2cm}--([yshift=-5mm]frame.south east)--cycle; }\%
\textcolor{red!50!yellow!75!white}{\path\[\texttt{coltria}\] (\[xshift=2.5mm,yshift=-1mm\]frame.north west) -- +(240:2mm)
\hspace{1.2cm}+ (300:2mm) -- cycle; }\%


11.8 Skin “spartan”

\( /\text{tcb/skin=spartan} \) (skin)

This skin is quite ... spartan. It supports no rounded corners, no overlays, no shadows, no borderlines, and no finishes. The only exception are underlays. One cannot do very fancy things with this skin, but it compiles very fast. Therefore, the spartan skin is used for the draft mode, see Section 10.12 on page 212. Nevertheless, it can be used as a normal skin.

**Environment and engines for the skin “spartan”**

\( /\text{tcb/graphical environment} \rightarrow \text{P.142}: \text{tikzpicture} \)
\( /\text{tcb/frame engine} \rightarrow \text{P.142}: \text{spartan} \)
\( /\text{tcb/interior titled engine} \rightarrow \text{P.142}: \text{spartan} \)
\( /\text{tcb/interior engine} \rightarrow \text{P.143}: \text{spartan} \)
\( /\text{tcb/segmentation engine} \rightarrow \text{P.143}: \text{spartan} \)
\( /\text{tcb/title engine} \rightarrow \text{P.143}: \text{spartan} \)

\( /\text{tcb/spartan} \) (style, no value)

This is an abbreviation for setting \texttt{skin=spartan}.

\( /\text{skinExampleSet} \{\text{spartan}\} \)

This is my content.

This is my content.

My content.

More content.

My title

This is my content.

This is my content.

My content.

More content.

This is my content.

This is my content.

My content.

More content.
11.9 Skin “draft”

This skin is intended to be used while drafting new geometric settings for a `tcolorbox`.

**Environment and engines for the skin “draft”**

- `/tcb/graphical environment`\(^\text{P.142}\): `tikzpicture`
- `/tcb/frame engine`\(^\text{P.142}\): `special`
- `/tcb/interior titled engine`\(^\text{P.142}\): `special`
- `/tcb/interior engine`\(^\text{P.143}\): `special`
- `/tcb/segmentation engine`\(^\text{P.143}\): `path`
- `/tcb/title engine`\(^\text{P.143}\): `path`

This is an abbreviation for setting `skin=draft`.

```
\skinExampleSet{draft}
```

This is my content.

```
\skinExampleSet{draft}
```

This is my content.

```
\skinExampleSet{draft}
```

More content.

```
\skinExampleSet{draft}
```

My title

```
\skinExampleSet{draft}
```

This is my content.

```
\skinExampleSet{draft}
```

More content.

```
\skinExampleSet{draft}
```

My title

```
\skinExampleSet{draft}
```

My content.
A colored box with the "draft" skin


This skin family “freelance” is deprecated with \tcolorbox 3.00. It is no longer needed, because \tcb/frame code \textsuperscript{P.145}, \tcb/interior code \textsuperscript{P.146}, \tcb/interior titled code \textsuperscript{P.145}, and \tcb/title code \textsuperscript{P.147} can be applied to every skin now. In this sense, everything has become \textit{freelance} now.

For users of \tcb/freelance: Old code should continue to work. There may be exceptions for breakable freelance boxes under certain circumstances. For new code, use \tcb/empty \textsuperscript{P.251} or \tcb/enhanced \textsuperscript{P.218} where you would have used \tcb/freelance before.

\tcb/skin=freelance \hspace{1cm} (skin)

This skin gives full freedom for the appearance of the \tcolorbox. All drawing engines are set to type \textit{freelance}; they use the \texttt{tikz} package and compute the \texttt{/tcb/geometry nodes} \textsuperscript{P.144}.

### Environment and engines for the skin “freelance”

\begin{itemize}
  \item \texttt{/tcb/graphical environment} \textsuperscript{P.142}: \texttt{tikzpicture}
  \item \texttt{/tcb/frame engine} \textsuperscript{P.142}: \texttt{freelance}
  \item \texttt{/tcb/interior titled engine} \textsuperscript{P.142}: \texttt{freelance}
  \item \texttt{/tcb/interior engine} \textsuperscript{P.143}: \texttt{freelance}
  \item \texttt{/tcb/segmentation engine} \textsuperscript{P.143}: \texttt{freelance}
  \item \texttt{/tcb/title engine} \textsuperscript{P.143}: \texttt{freelance}
\end{itemize}

\tcb/freelance \hspace{1cm} (style, no value)

This is an abbreviation for setting \texttt{skin=freelance}.

\tcb/skin=freelancefirst \hspace{1cm} (skin)

This skin equals \textit{freelance} with exception of the break sequence, see Section 19.8 on page 404.

\tcb/skin=freelancemiddle \hspace{1cm} (skin)

This skin equals \textit{freelance} with exception of the break sequence, see Section 19.8 on page 404.

\tcb/skin=freelancelast \hspace{1cm} (skin)

This skin equals \textit{freelance} with exception of the break sequence, see Section 19.8 on page 404.

\tcb/extend freelance=(options) \hspace{1cm} (no default, initially empty)

The \texttt{\langle options \rangle} are added to the skin definition of \textit{freelance}.

\tcb/extend freelancefirst=(options) \hspace{1cm} (no default, initially empty)

The \texttt{\langle options \rangle} are added to the skin definition of \textit{freelancefirst} which is used as first part of the break sequence of \textit{freelance}. See \texttt{/tcb/skin first is subskin of} \textsuperscript{P.148} for a substitute of this key.

\tcb/extend freelancemiddle=(options) \hspace{1cm} (no default, initially empty)

The \texttt{\langle options \rangle} are added to the skin definition of \textit{freelancemiddle} which is used as middle part of the break sequence of \textit{freelance}. See \texttt{/tcb/skin middle is subskin of} \textsuperscript{P.148} for a substitute of this key.

\tcb/extend freelancelast=(options) \hspace{1cm} (no default, initially empty)

The \texttt{\langle options \rangle} are added to the skin definition of \textit{freelancelast} which is used as last part of the break sequence of \textit{freelance}. See \texttt{/tcb/skin last is subskin of} \textsuperscript{P.148} for a substitute of this key.
The \texttt{skins} library adds some commands to conveniently include boxed image files. For the following macros and options, the \texttt{skins} library has to be loaded by a package option or inside the preamble by:

\enums
\begin{tcbslidenode}[offline,boxrighth=\textwidth,boxwidth=\textwidth,frame hidden=on,framed overhead,framed footnoteskip,framed title=12.1 Macros]
\begin{tcbitemize}
\item \texttt{\textbackslash tcbincludegraphics\{\langle options\rangle\}\{\langle file name\rangle\}}

In principle, this macro includes an image file denoted by \texttt{\langle file name\rangle} using the standard \texttt{\includegraphics} and puts it into a \texttt{tcolorbox} \textsuperscript{P.12}. The \texttt{\langle options\rangle} are \texttt{tcolorbox} keys to set up the colored box. Use \texttt{/tcb/graphics options} \textsuperscript{P.268} to specify options for the underlying \texttt{\includegraphics}. Some \texttt{tcolorbox} option keys are automatically set, namely \texttt{/tcb/enhanced} \textsuperscript{P.215} and options to center the image inside the box.

The sizing of the included image is done depending on the following:
\begin{itemize}
\item If a \texttt{/tcb/width} \textsuperscript{P.34} is specified, but no fixed \texttt{/tcb/height} \textsuperscript{P.53}, the image is sized to fill the inner width of the box. The height of the box adapts to the image.
\item If a fixed \texttt{/tcb/height} \textsuperscript{P.53} is specified, the image is sized to fill the fixed inner area of the box.
\item If the \texttt{/tcb/capture} \textsuperscript{P.100} mode \texttt{/tcb/hbox} \textsuperscript{P.100} is specified, the image is sized according to given \texttt{\includegraphics} options only. The box adapts to the image.
\end{itemize}
\end{tcbitemize}
\end{tcbslidenode}

See Section 10 on page 156 for the documentation of all other options of the \texttt{skins} library.
The auxiliary macro \texttt{\textbackslash imagename} may be used inside \texttt{\textbackslash tcbincludegraphics} \textsuperscript{P. 265} to display the name of the file. \texttt{\textbackslash imagename} is already partially detokenized and is allowed to contain special characters like the underscore. Note that an appropriate font is required to display such characters.

\begin{tcbraster}[size=fbox, colframe=red!50!black, colback=red!20!black, fonttitle=\bfseries\ttfamily,center title,drop fuzzy shadow]
\\tcbincludegraphics[title=\texttt{\textbackslash imagename}]{goldshade.png}
\\tcbincludegraphics[finish={
\node[fill=white,fill opacity=0.5,text opacity=1]
at (frame.center) {\texttt{\bfseries\ttfamily \textbackslash imagename};}]}{blueshade.png}
\end{tcbraster}
\tcbincludexpdf{options}{file name}

This is a generalized version of \tcbincludegraphics\^[P.265] which allows to include a complete PDF file denoted by (file name). Every page is boxed into an own \texttt{tcolorbox}\^[P.12] customized by the given (options). It is reasonable to put such a series of boxes inside a \texttt{tcb raster}\^[P.300] for alignment.

Use /tcb/graphics pages\^[P.268] to use a selection of pages instead of using the whole file. The auxiliary macro \texttt{imagepage} may be used inside \texttt{tcbincludexpdf} to display the current page number.

\begin{tcbaster}
\begin{tcbitemize}
\item \texttt{tcolorbox-example.pdf}
\item \texttt{tcolorbox-example.pdf}
\item \texttt{tcolorbox-example.pdf}
\item \texttt{tcolorbox-example.pdf}
\item \texttt{tcolorbox-example.pdf}
\item \texttt{tcolorbox-example.pdf}
\end{tcbitemize}
\end{tcbaster}
12.2 Option Keys

\texttt{/tcb/graphics options=(options)} (no default, initially empty)
Used for \texttt{\tcbincludegraphics} \textsuperscript{P.265} and \texttt{\tcbincludepdf} \textsuperscript{P.267} to specify \texttt{\includegraphics (options)}.

\begin{verbatim}
\% \tcbuselibrary{raster}
\begin{tcbraster}[raster columns=3, size=fbox, raster equal height, colframe=red!50!black, colback=red!20!black, drop fuzzy shadow]
  \tcbincludegraphics{goldshade.png}
  \newcommand{\myangle}{angle=20}\%
  \tcbincludegraphics[graphics options=\myangle]{goldshade.png}
  \tcbincludegraphics[graphics options={viewport=0cm 0cm 8cm 4cm, clip}]{goldshade.png}
\end{tcbraster}
\end{verbatim}

\texttt{/tcb/graphics directory=(directory)} (no default, initially empty)
Used for \texttt{\tcbincludegraphics} \textsuperscript{P.265} and \texttt{\tcbincludepdf} \textsuperscript{P.267} to specify a file system \texttt{(directory)} where the image files are located.

\begin{verbatim}
\tcbset{
  graphics directory={.},
  graphics directory={examples},
  graphics directory={../../pictures},
}
\end{verbatim}

The \texttt{\graphicspath} macro from the \texttt{graphics} package is superior to this option. \texttt{/tcb/graphics directory} may be used especially for \texttt{\tcbincludepdf} \textsuperscript{P.267}.

\texttt{/tcb/graphics pages=(selection)} (no default, initially \texttt{1,...,\pdfpages})
Used for \texttt{\tcbincludepdf} \textsuperscript{P.267} to specify a \texttt{(selection)} of pages to be included. The largest page number is accessible by \texttt{\pdfpages}. The \texttt{(selection)} has to be given using the \texttt{\foreach} syntax of \texttt{Ti\kern1pt kZ}.

\begin{verbatim}
\tcbset{
  graphics pages={1,3,7},
  graphics pages={1,...,10},
  graphics pages={1,3,...,18},
  graphics pages={100,...,\pdfpages},
}
\end{verbatim}
Used for \texttt{\textbackslash tcbincludegraphics} \citep{p.265} and \texttt{\textbackslash tcbincludepdf} \citep{p.267} to guarantee a certain \emph{orientation} of the included image. After all other options for the image are processed, the result is possibly rotated to be in landscape or portrait mode.

Feasible values for \emph{orientation} are:

- \texttt{as-is}: no rotation of the processed image.
- \texttt{landscape}: the processed image is possibly rotated by 90 degrees to ensure that the final width is not smaller than the final height.
- \texttt{landscape*}: the processed image is possibly rotated by -90 degrees to ensure that the final width is not smaller than the final height.
- \texttt{portrait}: the processed image is possibly rotated by 90 degrees to ensure that the final height is not smaller than the final width.
- \texttt{portrait*}: the processed image is possibly rotated by -90 degrees to ensure that the final height is not smaller than the final width.

% \texttt{\textbackslash tcbuselibrary{raster}}
\begin{tcbraster}[raster columns=6, size=fbox, raster equal height, colframe=red!50!black, colback=red!20!black, drop fuzzy shadow]
  \tcbincludegraphics{Basilica_5.png}
  \tcbincludegraphics[graphics orientation=landscape]{Basilica_5.png}
  \tcbincludegraphics[graphics orientation=portrait]{Basilica_5.png}
  \tcbincludegraphics[graphics orientation=portrait*]{Basilica_5.png}
  \tcbincludegraphics[graphics options={viewport=0cm 0cm 2cm 3cm, clip}]{goldshade.png}
  \tcbincludegraphics[graphics options={viewport=0cm 0cm 2cm 3cm, clip},
                     graphics orientation=landscape]{goldshade.png}
\end{tcbraster}
13 TikZ Image and Picture Fill Extensions; Auxiliary Macros

The \texttt{skins} library adds some image and picture fill options to the vast option set of TikZ \cite{tikz}. These options can be used in any \texttt{tikzpicture}. For the following options, the \texttt{skins} library has to be loaded by a package option or inside the preamble by:

\begin{tikzpicture}
\path[draw,fill plain image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

See Section 10 on page 156 for the documentation of all other options of the \texttt{skins} library.

13.1 Fill Plain

/\texttt{tikz/fill plain image}=\langle file name \rangle \quad \text{(no default, initially unset)}

Fills the current path with an external image referenced by \langle file name \rangle. The image is put in the center of the path, but it is not resized to fit into the path area.

\begin{tikzpicture}
\path[draw,fill plain image*=\langle width=2.5cm \rangle\{\text{goldshade.png}\}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/\texttt{tikz/fill plain picture}=\langle graphical code \rangle \quad \text{(no default, initially unset)}

Fills the current path with the given \langle graphical code \rangle. The result is put in the center of the path, but it is not resized to fit into the path area. Note that this is almost identical to the standard path picture option.

\begin{tikzpicture}
\path[draw,fill plain picture=%]
\draw[red!50!yellow,\text{line width=2mm}]
(0,0) circle (1cm);
\draw[red,\text{line width=5mm}]
(-1,-1) -- (1,1);
\draw[red,\text{line width=5mm}]
(-1,1) -- (1,-1);
\draw[red,\text{line width=5mm}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
13.2 Fill Stretch

/tikz/fill stretch image=(file name)  
(no default, initially unset)
Fills the current path with an external image referenced by (file name). The image is stretched to fill the path area.

\begin{tikzpicture}
  \path[fill stretch image=goldshade.png]
  (2.75, -0.75) -- (3, 0) -- (2.75, 0.75)
  \foreach \w in {45,90,...,315}
  { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill stretch image*={⟨graphics options⟩}{⟨file name⟩}  
(no default, initially unset)
Fills the current path with an external image referenced by (file name). The ⟨graphics options⟩ are given to the underlying \includegraphics command. The image is stretched to fill the path area.

\begin{tikzpicture}
  \path[fill stretch image*={angle=90,origin=c}{goldshade.png}]
  (2.75, -0.75) -- (3, 0) -- (2.75, 0.75)
  \foreach \w in {45,90,...,315}
  { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill stretch picture=(graphical code)  
(no default, initially unset)
Fills the current path with the given ⟨graphical code⟩. The result is stretched to fill the path area.

\begin{tikzpicture}
  \path[draw,fill stretch picture={
    \draw[red!50!yellow,line width=2mm]
    (0,0) circle (1cm);
    \draw[red,line width=5mm] (-1,-1) -- (1,1);
    \draw[red,line width=5mm] (-1,1) -- (1,-1);
  }]
  (2.75, -0.75) -- (3, 0) -- (2.75, 0.75)
  \foreach \w in {45,90,...,315}
  { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
13.3 Fill Overzoom

/tikz/fill overzoom image=(file name) (no default, initially unset)
Fills the current path with an external image referenced by (file name). The image is zoomed such that the path area fills the image.

\begin{tikzpicture}
\path[fill overzoom image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill overzoom image*=\{(graphics options)\} {(file name)} (no default, initially unset)
Fills the current path with an external image referenced by (file name). The (graphics options) are given to the underlying \includegraphics command. The image is zoomed such that the path area fills the image.

\begin{tikzpicture}
\path[fill overzoom image*=\{angle=90,origin=c\} goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill overzoom picture=\{graphical code\} (no default, initially unset)
Fills the current path with the given (graphical code). The result is zoomed such that the path area fills the image.

\begin{tikzpicture}
\path[draw,fill overzoom picture={
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
13.4 Fill Zoom

/tikz/fill zoom image=(file name) (no default, initially unset)

Fills the current path with an external image referenced by \textit{(file name)}. The image is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path [draw,fill zoom image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill zoom image*={(graphics options)}{(file name)} (no default, initially unset)

Fills the current path with an external image referenced by \textit{(file name)}. The \textit{(graphics options)} are given to the underlying \texttt{\includegraphics} command. The image is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path [draw,fill zoom image*=
{angle=90,origin=c}{goldshade.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill zoom picture=(graphical code) (no default, initially unset)

Fills the current path with the given \textit{(graphical code)}. The result is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path [draw,fill zoom picture={%
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
13.5 Fill Shrink

/\texttt{tikz/fill shrink image}=(\textit{file name}) (no default, initially unset)
Fills the current path with an external image referenced by \textit{(file name)}. The image is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill shrink image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/\texttt{tikz/fill shrink image*}=(\textit{file name}) (no default, initially unset)
Fills the current path with an external image referenced by \textit{(file name)}. The \texttt{(graphics options)} are given to the underlying \texttt{includegraphics} command. The image is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill shrink image*={width=1.5cm}{goldshade.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/\texttt{tikz/fill shrink picture}=(\textit{graphical code}) (no default, initially unset)
Fills the current path with the given \textit{(graphical code)}. The result is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill shrink picture={%}
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
]} (2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
13.6 Fill Tile

/tikz/fill tile image=⟨file name⟩ (no default, initially unset)
Fills the current path with a tile pattern using an external image referenced by ⟨file name⟩.

\begin{tikzpicture}
\path[fill tile image=pink_marble.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill tile image*=⟨⟨graphics options⟩}{⟨file name⟩⟩ (no default, initially unset)
Fills the current path with a tile pattern using an external image referenced by ⟨file name⟩. The ⟨graphics options⟩ are given to the underlying \includegraphics command.

\begin{tikzpicture}
\path[fill tile image*={width=1cm}{pink_marble.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill tile picture=⟨graphical code⟩ (no default, initially unset)
Fills the current path with a tile pattern using the given ⟨graphical code⟩.

\begin{tikzpicture}
\path[draw,fill tile picture={% 
\draw[red!50!yellow, line width=2mm]
(0,0) circle (1cm);
\draw[red, line width=5mm] (-1,-1) -- (1,1);
\draw[red, line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill tile picture*=⟨⟨fraction⟩}{⟨graphical code⟩⟩ (no default, initially unset)
Fills the current path with a tile pattern using the given ⟨graphical code⟩. The graphic is resized by ⟨fraction⟩.

\begin{tikzpicture}
\path[draw,fill tile picture*={0.25} {% 
\draw[red!50!yellow, line width=2mm]
(0,0) circle (1cm);
\draw[red, line width=5mm] (-1,-1) -- (1,1);
\draw[red, line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
13.7 Filling Options

/tikz/fill image opacity=⟨fraction⟩ (no default, initially 1.0)
Sets the fill opacity for the image or picture fill options to the given ⟨fraction⟩.

\begin{tikzpicture}
\path[fill stretch image=goldshade.png] (0,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.75] (2,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.5] (4,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.25] (6,0) circle (1cm);
\path[fill=red] (8,0) circle (1cm);
\end{tikzpicture}

/tikz/fill image scale=⟨fraction⟩ (no default, initially 1.0)
Stretches, zooms, overzooms or shrinks the image or picture to the given ⟨fraction⟩ of the width and height of the current path.

\begin{tikzpicture}
\path[draw,fill zoom image=goldshade.png] (0,0) rectangle +(2,2);
\path[draw,fill zoom image=goldshade.png,fill image scale=0.75] (3,0) rectangle +(2,2);
\path[draw,fill zoom image=goldshade.png,fill image scale=1.5] (6,0) rectangle +(2,2);
\end{tikzpicture}

/tikz/fill image options=⟨graphics options⟩ (no default, initially empty)
The ⟨graphics options⟩ are given to the underlying \includegraphics command for the image fill options. This can be just together with /tikz/fill stretch image → P.271, /tikz/fill overzoom image → P.272, /tikz/fill zoom image → P.273, and /tikz/fill tile image → P.275.

\begin{tikzpicture}
\path[fill image options={width=1cm},
    fill tile image=pink_marble.png] (2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
13.8 Straightening of the Arcs

This patch is considered as an experimental feature. It changes some of the original \textsf{TikZ} code. This change may break with future updates of \textsf{TikZ}.

\begin{tikzpicture}
\node [fill stretch image=blueshade.png] (A) at (120:3cm) {A};
\node [fill stretch image=goldshade.png] (B) at (60:3cm) {B};
\node [preaction={fill stretch image=blueshade.png},
\hspace{1cm}
fill stretch image=goldshade.png,
\hspace{1cm}
fill image opacity=0.5] (C) {C};
\path (A) -- node{$+$} (B);
\draw[->,very thick] (A)--(C);
\draw[->,very thick] (B)--(C);
\end{tikzpicture}

---

\texttt{\textbackslash tcbpatcharcmangle}

The \textsf{TikZ} package provides a nice \texttt{rounded corners} option to replace all corners by little arcs. \texttt{\textbackslash tcbpatcharcmangle} is a patch which straightens the arcs. To say it more prosaic, the little arcs are replaced by little straight lines.

\begin{tikzpicture}
\draw[thick,rounded corners=8pt]
(0,0) -- (0,2) -- (1,3.25) -- (2,2) -- (2,0)
-- (0,2) -- (2,2) -- (0,0) -- (2,0);
\tcbpatcharcmangle
\draw[thick,rounded corners=8pt,xshift=2.5cm]
(0,0) -- (0,2) -- (1,3.25) -- (2,2) -- (2,0)
-- (0,2) -- (2,2) -- (0,0) -- (2,0);
\end{tikzpicture}

---

\texttt{\textbackslash tcbpatcharcround}

This macro reverts \texttt{\textbackslash tcbpatcharcmangle}, i.e., the patch from \texttt{\textbackslash tcbpatcharcmangle} is replaced by the original code.
13.9 Extracting Node Dimensions

The following auxiliary macros are defined by the \texttt{skins} library. They allow to determine the width and height of an arbitrary \LaTeX{} node. To be more specific, they determine the east-to-west and the north-to-south dimensions which may be not the maximal dimensions for a non-rectangular node. Note that the following dimensions are measured exactly including the line width of the border line. If a new rectangle or node with the same dimensions and a border is to be drawn, this border width has to be substracted.

\begin{tikzpicture}
\node[align=center,draw=red,fill=yellow] (A) {This is my example node};\n\tcbsetmacrotowidthofnode\mywidth{A}\n\tcbsetmacrotoheightofnode\myheight{A}\n\path[fill=blue!25!white]
  % rectangle widthout border
  ([xshift=2mm]A.south east) rectangle node{Copy} +(%mywidth,\myheight);\n\node[draw=blue,fill=blue!25!white,
  % standard border width 0.4pt
  minimum width=\mywidth-0.4pt, % minus width of border
  minimum height=\myheight-0.4pt % minus height of border
  ]
  at ([xshift=5cm]A) {Copy 2};\n\end{tikzpicture}

13.10 Hyper Nodes

The following auxiliary macro is defined by the \texttt{skins} library.

\begin{tikzpicture}
\node[align=center,draw=red,fill=red!5] (mybutton) {Click me to jump to Section~\ref*{sec:tikzimagefilling}};\n\tcbhypernode{\hyperref[sec:tikzimagefilling]}{mybutton}\n\end{tikzpicture}

Click me to jump to Section 13

% \usepackage{hyperref}
% \begin{tikzpicture}
% \node[align=center,draw=red,fill=red!5] (mybutton) {Click me to jump to Section~\ref*{sec:tikzimagefilling}};\n% \tcbhypernode{\hyperref[sec:tikzimagefilling]}{mybutton}\n% \end{tikzpicture}
14 Beamer Support

The `skins` library adds some supporting options for the `beamer` package [23]. For the following options, the `skins` library has to be loaded by a package option or inside the preamble by:

\tcbuselibrary{skins}

See Section 10 on page 156 for the documentation of all other options of the `skins` library.

\documentclass{beamer}
\usepackage[many]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcolorbox}[title=My title,fonttitle=\bfseries, enhanced,colframe=red!50!black,colback=red!10,colbacktitle=red, sidebyside,righthand width=3cm, lowerbox=invisible,lower separated=false, drop lifted shadow, only=<1>{colbacktitle=yellow,coltitle=red!50!black,colframe=red}, only=<3>{colback=yellow!50,watermark text={Attention!}}, only=<3->{lowerbox=visible} ]
This is a test.
\begin{itemize}[<+->]
\item One
\item Two
\item \alert<3>{Three}
\item Four
\end{itemize}
\end{tcolorbox}
\end{frame}
\end{document}
\documentclass{beamer}
\usepackage[most]{tcolorbox}
\begin{document}
\begin{frame}[fragile]
\begin{tcblisting}{beamer,colback=blue!5,colframe=blue!20!gray,coltitle=yellow,
  title=Example,
  only=<1>{lowerbox=invisible},only=<2>{}
}
This is an \textbf{example listing}
\end{tcblisting}
\end{frame}
\end{document}

The option \texttt{/tcb/only} \cite{P.279} belonged to the base package before version 4.20.

\texttt{\ /tcb\ /hide} = \langle overlay specification \rangle  \quad \text{ (style, no default, initially unset)}

Sets the \texttt{/tcb/beamer hidden} style in dependency of a \texttt{beamer} \texttt{(overlay specification)}. \texttt{/tcb/beamer hidden} can be redefined for customization.

\texttt{\ /tcb\ /beamer\ hidden}  \quad \text{ (style, no options, initially nirvana)}

This style is not intended to be used directly, but in concealed way by applying \texttt{/tcb/\ hide}. The style can be redefined.

\texttt{\tcbset{}
  beamer hidden/.style={invisible,interior hidden,colframe=blue!20!gray!15},
  \}}
/tcb/alert=<\{overlay specification\}>

(style, no default, initially unset)

Sets the /tcb/beamer alerted style in dependency of a beamer \{overlay specification\}. /tcb/beamer alerted can be redefined for customization.

/tcb/beamer alerted

(style, no options, initially fuzzy halo)

This style is not intended to be used directly, but in concealed way by applying /tcb/alert. The style can be redefined.

```
\tcbset{
  beamer alerted/.style={colframe=red!50!gray},
}
```

The following examples use tcbitemize from \texttt{raster} for convenient use of a list of boxes which are uncovered one by one.

```latex
\documentclass{beamer}
\usepackage[most]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcbitemize}[raster equal height=rows, enhanced,colback=blue!5,colframe=blue!20!gray,coltitle=yellow,]
  \tcbitem[title=One,alert=<1>]
  First Statement
  \tcbitem[title=Two,hide=<-1>,alert=<2>]
  Second Statement
  \tcbitem[title=Three,hide=<-2>,alert=<3>]
  Test
  \tcbitem[title=Four,hide=<-3>,alert=<4>]
  \begin{equation*}
  \int_1^x \frac{1}{t} \, dt = \ln(x).
  \end{equation*}
  \tcbitem[title=Five,hide=<-4>,alert=<5>]
  \includegraphics[width=1cm]{goldshade.png}
  \tcbitem[title=Six,hide=<-5>,alert=<6>]
  Test
\end{tcbitemize}
\end{frame}
\end{document}
```
\documentclass{beamer}
\usepackage{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcbitemize}[raster equal height=rows, enhanced, colback=blue!5, colframe=blue!20!gray, coltitle=yellow, beamer hidden/.style={invisible, interior hidden, colframe=blue!20!gray!15}, beamer alerted/.style={colframe=red!50!gray},]
\tcbitem	cbitem
\tcbitem
\tcbitem
\tcbitem
\begin{equation*}
\int_{1}^{x} \frac{1}{t} \, dt = \ln(x).
\end{equation*}
\tcbitem
\tcbitem
\end{tcbitemize}
\end{frame}
\end{document}
\begin{frame}
\begin{tcbitemize}[raster equal height=rows, beamer,colback=blue!5,colframe=blue!20!gray,coltitle=yellow, beamer]
\tcbitem[title=One,alert=<1>]
First Statement
\tcbitem[title=Two,hide=<-1>,alert=<2>]
Second Statement
\tcbitem[title=Three,hide=<-2>,alert=<3>]
Third
Test
\tcbitem[title=Four]
\[
\int_{1}^{x} \frac{1}{t} \, dt = \ln(x).
\]
\end{tcbitemize}
\end{frame}
\begin{equation*}
\int_{1}^{x} \frac{1}{t} \, dt = \ln(x).
\end{equation*}
15 Library vignette

The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{vignette}

This also loads the skins library, see Section 10 on page 156, and the fadings library of tikz [22].

15.1 Vignette Drawing

\tcbvignette{⟨options⟩}

In this context, a vignette is a four part rectangular frame. It is constructed as several TikZ paths and, therefore, can only be used inside a \texttt{tikzpicture} environment or inside \texttt{tcolorbox} \textsuperscript{P.12} options.

The \texttt{⟨options⟩} control position, size and style settings of the vignette. These options have the common key path /tcb/vig/ and are described in the following.

The next examples show direct \texttt{tcbvignette} usage without a \texttt{tcolorbox} \textsuperscript{P.12}.

\begin{tikzpicture}
\tcbvignette{}
\end{tikzpicture}

\begin{tikzpicture}
\node[draw,fill=blue!15!white] (A) {Test};
\tcbvignette{outside node=A,raised color=blue}
\end{tikzpicture}

\begin{tikzpicture}
\node[draw,fill=blue!15!white] (A) {Another Test};
\tcbvignette{size=3mm,outside node=A, north style=red,east style=yellow, south style=blue,west style=green}
\end{tikzpicture}

\begin{tikzpicture}
\node[inner sep=3mm,fill=red!75] (A) {Test};
\tcbvignette{over node=A,fade in}
\end{tikzpicture}

\texttt{tcbvignette} can be used directly inside appropriate options keys for \texttt{tcolorbox} \textsuperscript{P.12}. Note that options like /tcb/underlay \textsuperscript{P.204} need /tcb/enhanced \textsuperscript{P.218} or similar settings.

\begin{tcolorbox}[enhanced,size=small,sharp corners, colback=green!10,colframe=green!50!black, boxrule=1mm,titlerule=0mm, title=My title,center title,fonttitle=\textbf, underlay={\tcbvignette{size=1mm,inside node=frame, raised color=green!50!black}}]
This is a tcolorbox.
\end{tcolorbox}
Mostly, convenient short cuts like /tcb/underlay vignette \(^{P.293}\) can be used to add a vignette to a tcolorbox \(^{P.12}\). Here, \texttt{tcbvignette} is used internally.

\begin{tcolorbox}[enhanced,size=small,sharp corners,colback=green!10,colframe=green!50!black,boxrule=1mm,titlerule=0mm,title=My title,center title,fonttitle=\bfseries,underlay vignette]
This is a tcolorbox.
\end{tcolorbox}

15.2 Generic Geometry Settings

\texttt{/tcb/vig/xmin}=(\texttt{length}) \hspace{1cm} (no default, initially 0pt)
Sets the lower horizontal limit of a \texttt{tcbvignette} \(^{P.285}\).

\texttt{/tcb/vig/xmax}=(\texttt{length}) \hspace{1cm} (no default, initially 1cm)
Sets the upper horizontal limit of a \texttt{tcbvignette} \(^{P.285}\).

\texttt{/tcb/vig/ymin}=(\texttt{length}) \hspace{1cm} (no default, initially 0pt)
Sets the lower vertical limit of a \texttt{tcbvignette} \(^{P.285}\).

\texttt{/tcb/vig/ymax}=(\texttt{length}) \hspace{1cm} (no default, initially 1cm)
Sets the upper vertical limit of a \texttt{tcbvignette} \(^{P.285}\).

\begin{tikzpicture}
\fill [black!20] (0,0) rectangle (3,2);
\path [pattern=checkerboard,pattern color=black!30](0,0) rectangle (3,2);
\texttt{tcbvignette}{xmin=1cm,xmax=2.5cm,ymin=0.5cm,ymax=1.75cm}
\end{tikzpicture}

\texttt{/tcb/vig/lower left corner}=(\texttt{coordinates}) \hspace{1cm} (style, initially 0,0)
Sets the lower left corner of a \texttt{tcbvignette} \(^{P.285}\). This style sets \texttt{/tcb/vig/xmin} and \texttt{/tcb/vig/ymin}.

\texttt{/tcb/vig/upper right corner}=(\texttt{coordinates}) \hspace{1cm} (style, initially 1,1)
Sets the upper right corner of a \texttt{tcbvignette} \(^{P.285}\). This style sets \texttt{/tcb/vig/xmax} and \texttt{/tcb/vig/ymax}.

\begin{tikzpicture}
\fill [black!20] (0,0) rectangle (3,2);
\path [pattern=checkerboard,pattern color=black!30](0,0) rectangle (3,2);
\texttt{tcbvignette}{lower left corner={(1,0.5)},
upper right corner={(2.5,1.75)}}
\end{tikzpicture}

\texttt{/tcb/vig/inside node}=(\texttt{name}) \hspace{1cm} (style, initially unset)
Places the \texttt{tcbvignette} \(^{P.285}\) inside the node with the given \texttt{name}. The outer limits of the \texttt{vignette} are adapted to the node geometry.

\begin{tikzpicture}
\node[minimum width=2cm,minimum height=1cm] (A) {Node A};
\texttt{tcbvignette}{inside node=A}
\draw[very thick] (A.south west) rectangle (A.north east);\end{tikzpicture}

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\texttt{/tcb/vig/outside node=\langle name\rangle} \hspace{1cm} \text{(style, initially unset)}

Places the \texttt{tcbvignette} \textsuperscript{P.\,285}{P.\,285} outside the node with the given \langle name\rangle. The inner limits of the \textit{vignette} are adapted to the node geometry.

\begin{verbatim}
\begin{tikzpicture}
\node[minimum width=2cm,minimum height=1cm] (A) {Node A};
\tcbvignette{outside node=A}
\draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}
\end{verbatim}

\texttt{/tcb/vig/over node=\langle name\rangle} \hspace{1cm} \text{(style, initially unset)}

Places the \texttt{tcbvignette} \textsuperscript{P.\,285}{P.\,285} over the node with the given \langle name\rangle. The outer limits of the \textit{vignette} are adapted to the node geometry, but are shifted to the outside by \texttt{/tcb/vig/over node offset}.

\begin{verbatim}
\begin{tikzpicture}
\node[minimum width=2cm,minimum height=1cm] (A) {Node A};
\tcbvignette{over node offset=1mm,over node=A}
\draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}
\end{verbatim}

\texttt{/tcb/vig/over node offset=\langle length\rangle} \hspace{1cm} \text{(no default, initially 0.1mm)}

Determines the shift value for \texttt{/tcb/vig/over node}. Note that \texttt{/tcb/vig/over node offset} has to be set before \texttt{/tcb/vig/over node} is used.

\texttt{/tcb/vig/north size=\langle length\rangle} \hspace{1cm} \text{(no default, initially 2mm)}

Sets the thickness of the north \textit{vignette} part.

\begin{verbatim}
\begin{tikzpicture}
\tcbvignette{north size=4mm}
\end{tikzpicture}
\end{verbatim}

\texttt{/tcb/vig/south size=\langle length\rangle} \hspace{1cm} \text{(no default, initially 2mm)}

Sets the thickness of the south \textit{vignette} part.

\begin{verbatim}
\begin{tikzpicture}
\tcbvignette{south size=4mm}
\end{tikzpicture}
\end{verbatim}

\texttt{/tcb/vig/east size=\langle length\rangle} \hspace{1cm} \text{(no default, initially 2mm)}

Sets the thickness of the east \textit{vignette} part.

\begin{verbatim}
\begin{tikzpicture}
\tcbvignette{east size=4mm}
\end{tikzpicture}
\end{verbatim}

\texttt{/tcb/vig/west size=\langle length\rangle} \hspace{1cm} \text{(no default, initially 2mm)}

Sets the thickness of the west \textit{vignette} part.

\begin{verbatim}
\begin{tikzpicture}
\tcbvignette{west size=4mm}
\end{tikzpicture}
\end{verbatim}
/tcb/vig/vertical size=(length) \hspace{1cm} (style, initially 2mm)

Sets /tcb/vig/north size \rightarrow P.287 and /tcb/vig/south size \rightarrow P.287, to the given ⟨length⟩.

\begin{tikzpicture}
\tcbvignette{vertical size=4mm}
\end{tikzpicture}

/tcb/vig/horizontal size=(length) \hspace{1cm} (style, initially 2mm)

Sets /tcb/vig/east size \rightarrow P.287 and /tcb/vig/west size \rightarrow P.287, to the given ⟨length⟩.

\begin{tikzpicture}
\tcbvignette{horizontal size=4mm}
\end{tikzpicture}

/tcb/vig/size=(length) \hspace{1cm} (style, initially 2mm)

Sets /tcb/vig/north size \rightarrow P.287, /tcb/vig/south size \rightarrow P.287, /tcb/vig/east size \rightarrow P.287, and /tcb/vig/west size \rightarrow P.287 to the given ⟨length⟩.

\begin{tikzpicture}
\tcbvignette{size=4mm}
\end{tikzpicture}

/tcb/vig/north size \rightarrow P.287, /tcb/vig/south size \rightarrow P.287, etc. have to be set before
/tcb/vig/outside node \rightarrow P.287 is used.

15.3 Generic Color and Style Settings

/tcb/vig/north style={(style)} \hspace{1cm} (no default, initially red!50!white)

Sets TikZ ⟨style⟩ options for the north vignette part.

\begin{tikzpicture}
\tcbvignette{north style=blue}
\end{tikzpicture}

/tcb/vig/south style={(style)} \hspace{1cm} (no default, initially red!50!black)

Sets TikZ ⟨style⟩ options for the south vignette part.

\begin{tikzpicture}
\tcbvignette{south style={draw=blue,fill=yellow}}
\end{tikzpicture}

/tcb/vig/east style={(style)} \hspace{1cm} (no default, initially red!75!black)

Sets TikZ ⟨style⟩ options for the east vignette part.

\begin{tikzpicture}
\tcbvignette{east style={left color=yellow!75!black, right color=blue!75!black}}
\end{tikzpicture}
Sets TikZ \texttt{style} options for the west \texttt{vignette} part.

\begin{tikzpicture}
\tcbvignette{west style={preaction={fill=black!20},
    pattern=checkerboard, pattern color=black!30}}
\end{tikzpicture}

The four \texttt{vignette} parts are drawn inside a TikZ \texttt{scope} environment which takes the given \texttt{style} as option.

\begin{tikzpicture}
\tcbvignette{scope={transparency group,opacity=0.25}}
\end{tikzpicture}

Creates a raised frame impression by setting the four style options \texttt{/tcb/vig/north style} → \texttt{P.288}, \texttt{/tcb/vig/south style} → \texttt{P.288}, \texttt{/tcb/vig/east style} → \texttt{P.288}, and \texttt{/tcb/vig/west style} to darkened and lightened variations of the given \texttt{color}.

\begin{tikzpicture}
\tcbvignette{raised color=blue}
\end{tikzpicture}

Creates a lowered frame impression by setting the four style options \texttt{/tcb/vig/north style} → \texttt{P.288}, \texttt{/tcb/vig/south style} → \texttt{P.288}, \texttt{/tcb/vig/east style} → \texttt{P.288}, and \texttt{/tcb/vig/west style} to darkened and lightened variations of the given \texttt{color}.

\begin{tikzpicture}
\tcbvignette{lowered color=green!75!black}
\end{tikzpicture}

Sets the four style options \texttt{/tcb/vig/north style} → \texttt{P.288}, \texttt{/tcb/vig/south style} → \texttt{P.288}, \texttt{/tcb/vig/east style} → \texttt{P.288}, and \texttt{/tcb/vig/west style} such that the color shades from the \texttt{inner} color to the \texttt{outer} color.

\begin{tikzpicture}
\tcbvignette{color from=red to blue!50}
\end{tikzpicture}

Sets the base color for \texttt{/tcb/vig/raised color}, \texttt{/tcb/vig/lowered color}, \texttt{/tcb/finish fading vignette} → \texttt{P.296}. Typically, this value has not to be set directly.
If shadings or fadings are used, the drawn vignette graphs are displayed sometimes not as perfect as expected. Glitches and imperfections are very dependent on the previewer software. The \texttt{/tcb/vig/draw method} intends to give a choice of alternative drawing methods.

- \textbf{direct}: The vignette parts are drawn/filled by using a single \texttt{TikZ} graph. This is the preferred (and default) method for solid color graphs.
- \textbf{clipped}: The vignette parts are drawn somewhat oversized and are clipped to the intended region. In combination with shadings and fadings this seems to give a better/different optical result (depends on the previewer).

\begin{tikzpicture}
\tcbvignette[color from=red to yellow]
\end{tikzpicture}

\begin{tikzpicture}
\tcbvignette[color from=red to yellow,draw method=clipped]
\end{tikzpicture}

This option is a stopgap and may be changed or preferably removed in future.

\section{Generic Fading Settings}

The \texttt{fadings} library of \texttt{tikz} \cite{tikz} is loaded automatically by the \texttt{vignette} library. Amongst others, the fadings \texttt{west}, \texttt{east}, \texttt{north}, and \texttt{south} are defined inside the \texttt{fadings} library.

The \texttt{vignette} library adds some more fadings called \texttt{semi west}, \texttt{semi east}, \texttt{semi north}, and \texttt{semi south}. These fadings are much \textit{weaker} than the normal fadings.

\begin{tikzpicture}
\fill [black!20] (0,0) rectangle (1,1);
\path [pattern=checkerboard,pattern color=black!30]
(0,0) rectangle (1,1);
\fill [path fading=semi west,blue] (0,0) rectangle (1,1);
\end{tikzpicture}

\subsection*{Comparison of the Fadings}

\begin{tabular}{llllll}
west & & east & &  \\
north & & south & &  \\
semi west & & semi east & &  \\
semi north & & semi south & & \\
\end{tabular}
Sets the four style options `/tcb/vig/north style` $\rightarrow$ P.288, `/tcb/vig/south style` $\rightarrow$ P.288, `/tcb/vig/east style` $\rightarrow$ P.288, and `/tcb/vig/west style` $\rightarrow$ P.289 such that the paths fade from outside to inside.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{fade in=blue}
\end{tikzpicture}

Sets the four style options `/tcb/vig/north style` $\rightarrow$ P.288, `/tcb/vig/south style` $\rightarrow$ P.288, `/tcb/vig/east style` $\rightarrow$ P.288, and `/tcb/vig/west style` $\rightarrow$ P.289 such that the paths fade from inside to outside.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{fade out=blue}
\end{tikzpicture}

Sets the four style options `/tcb/vig/north style` $\rightarrow$ P.288, `/tcb/vig/south style` $\rightarrow$ P.288, `/tcb/vig/east style` $\rightarrow$ P.288, and `/tcb/vig/west style` $\rightarrow$ P.289 such that the paths fade weak from outside to inside.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{semi fade in=blue}
\end{tikzpicture}

Sets the four style options `/tcb/vig/north style` $\rightarrow$ P.288, `/tcb/vig/south style` $\rightarrow$ P.288, `/tcb/vig/east style` $\rightarrow$ P.288, and `/tcb/vig/west style` $\rightarrow$ P.289 such that the paths fade weak from inside to outside.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{semi fade out=blue}
\end{tikzpicture}
It is possible to assign different fadings for each side of the vignette, if needed. Therefore, the fadings have to be applied individually with the four style options \texttt{/tcb/vig/north style} \textsuperscript{P.288}, \texttt{/tcb/vig/south style} \textsuperscript{P.288}, \texttt{/tcb/vig/east style} \textsuperscript{P.288}, and \texttt{/tcb/vig/west style} \textsuperscript{P.289}.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30] (-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{
    north style={blue,path fading=south},
    east style ={blue,path fading=semi west},
    south style={blue,path fading=semi north},
    west style ={blue,path fading=east}
}
\end{tikzpicture}

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30] (-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{
    north style={blue,path fading=west},
    east style = {blue,path fading=south},
    south style={red,path fading=east},
    west style = {red,path fading=north}
}
\end{tikzpicture}
15.5 Vignette as Underlay

\begin{tcolorbox}[enhanced,size=small,sharp corners, colback=green!10,colframe=green!50!black, boxrule=2mm,titlerule=0mm, title=My title,center title,fonttitle=\bfseries, underlay vignette]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,arc=0pt, colback=blue!10,colframe=blue,boxrule=2mm, underlay vignette={size=1.5mm}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,sharp corners, colframe=red,interior hidden,boxrule=2mm, colupper=white,center upper,fontupper=\bfseries, underlay vignette]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,sharp corners, colback=red!50!yellow,frame hidden,boxrule=2mm, underlay vignette={color from=red!50!yellow to white, draw method=clipped,size=2.1mm}]
This is a tcolorbox.
\end{tcolorbox}

\tcbox[enhanced,sharp corners,colback=red!10,colframe=red] {Test}
\tcbox[enhanced,sharp corners,colback=red!10,colframe=red, underlay vignette] {Test}
This is a special style derived from \texttt{/tcb/underlay vignette} \textsuperscript{P.293}, where the frame color is shaded to create a soft raised frame impression.

\begin{tcolorbox}[enhanced,sharp corners,
    colback=green!10,
    colframe=green!50!black,
    size=small,boxrule=2mm,titlerule=0mm,
    title=My title,center title,fonttitle=\bfseries,
    underlay raised shading vignette]
    This is a tcolorbox.
\end{tcolorbox}

This style gives a similar effect as \texttt{/tcb/underlay raised shading vignette}, but a path fading is used here. Different optical impression are very previewer-dependent.

\begin{tcolorbox}[enhanced,sharp corners,
    colback=green!10,
    colframe=green!50!black,
    size=small,boxrule=2mm,titlerule=0mm,
    title=My title,center title,fonttitle=\bfseries,
    underlay raised fading vignette]
    This is a tcolorbox.
\end{tcolorbox}

This is a special style derived from \texttt{/tcb/underlay vignette} \textsuperscript{P.293}, where the frame color is shaded into the interior color.

\begin{tcolorbox}[enhanced,sharp corners,frame hidden,
    colback=green!10,
    colframe=green!50!black,
    size=small,boxrule=2mm,titlerule=0mm,
    underlay shade in vignette]
    This is a tcolorbox.
\end{tcolorbox}
15.6 Vignette as Finish

\verb|/tcb/finish vignette={(options)}| (style, no default)

This puts a \verb|\tcbvignette| \footnote{P.285} with the given \langle options \rangle as \verb|/tcb/finish| \footnote{P.206} to a \verb|tcolorbox| \footnote{P.12}. The default style settings create a raised frame impression by drawing black and white color parts with reduced opacity.

\begin{tcolorbox}[enhanced,size=small,colback=green!10,colframe=green!50!black,boxrule=0.5mm,titlerule=0mm,title=My title,center title,fonttitle=\bfseries,finish vignette={size=1mm}]
This is a tcolorbox.
\end{tcolorbox}

\verb|\tcbincludegraphics|[blankest,width=3cm,finish vignette={size=3mm}]{pink_marble.png}

\verb|/tcb/finish raised fading vignette={(options)}| (style, no default)

This puts a \verb|\tcbvignette| \footnote{P.285} with the given \langle options \rangle as \verb|/tcb/finish| \footnote{P.206} to a \verb|tcolorbox| \footnote{P.12}. The default style settings create a soft raised frame impression by drawing fading black and white color parts.

\begin{tcolorbox}[enhanced,size=small,colback=green!10,colframe=green!50!black,boxrule=0.5mm,titlerule=0mm,title=My title,center title,fonttitle=\bfseries,finish raised fading vignette={size=1mm}]
This is a tcolorbox.
\end{tcolorbox}

\verb|\tcbincludegraphics|[blankest,width=3cm,finish raised fading vignette={size=3mm}]{pink_marble.png}
This puts a \texttt{tcbvignette} to a \texttt{tcolorbox}. The default style settings fade the box into white from inside to outside. Note that \texttt{/tcb/vig/over node} is used here. \texttt{/tcb/vig/over node offset} can be adapted to overlap the box more or less. The fade color can be set using \texttt{/tcb/vig/base color}.

\begin{tcolorbox}[enhanced,size=small, colback=green!10,colframe=green!50!black, boxrule=0.5mm,titlerule=0mm, title=My title,center title,fonttitle=\bfseries, finish fading vignette={size=2mm}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[colback=blue!50!black,size=small, title=Example]
\texttt{tcbincludegraphics}[blankest,width=3cm, finish fading vignette={base color=blue!50!black,size=3mm, over node offset=0.2mm}]{pink_marble.png}
\end{tcolorbox}
\begin{tcbitemize}[raster columns=3,bicolor,  
raster equal height,sharp corners,boxrule=2mm,  
colframe=red,colback=yellow!5,colbacklower=yellow!25!red!20]  
\tcbitem A  
\tcbitem[underlay vignette] B  
\tcbitem[underlay=\{tcbvignette\{inside node=interior,  
 lowered color=red,size=1mm\}\}] C  
\tcbitem[underlay vignette,  
 underlay=\{tcbvignette\{inside node=interior,  
 lowered color=red,size=1mm\}\}] D  
\tcbitem[boxrule=3mm,underlay vignette=\{size=2mm,  
 underlay=\{tcbvignette\{inside node=interior,  
 lowered color=red,size=1mm\}\}\}] E  
\tcbitem[underlay raised shading vignette] F  
\tcbitem[underlay raised shading vignette,  
 underlay=\{tcbvignette\{inside node=interior,  
 lowered color=red,size=1mm\}\}] G  
\tcbitem[title=H1,underlay=\{tcbvignette\{inside node=interior,  
 lowered color=red,size=1mm\}\},finish vignette] H1  
\tcbitem[boxrule=0.25mm,colback=red!30,finish vignette] I1 \tcblower I2  
\tcbitem[title,colback=red!30,finish raised fading vignette] J1 \tcblower J2  
\tcbitem[boxrule=1mm,underlay=\{tcbvignette\{inside node=interior,  
 raised color=red,size=1mm\}\}] K  
\tcbitem[boxrule=1mm,title=L1,underlay=\{tcbvignette\{inside node=title,  
 lowered color=red,size=0.5mm\}\}] L1  
\end{tcbitemize}
16 Library\raster

The library is loaded by a package option or inside the preamble by:

```
\usepackage{raster}
```

16.1 Concept of Rasters

A raster is used to align several colored boxes in a regular way. It can be seen as a far related counterpart to the matrix construct of TikZ, but it differs in many aspects.

In principle, tcolorboxes are arranged in rows and columns when put inside a \texttt{tcbraster} environment. The boxes are fluently added to the raster like adding text to a paragraph. Especially, line/row breaks are done automatically and one cannot end a line/row ahead of schedule. Further, a raster is not restricted to a single page but may break into an arbitrary series of pages.

A raster arranges enclosed boxes in a regular way, mainly into rows and columns. The \( \textit{options} \) are used to control the raster parameters and to set the properties for the enclosed boxes.

- The \textit{raster} is only allowed to contain a series of \texttt{tcolorbox} environments or derived constructs. With some small restrictions, boxes created with \texttt{tcboxfit} can also be added. Boxes created with \texttt{tcbox} are not reasonable here, but may be used to a certain degree.
- Do not add anything else between the boxes inside the raster with exception of whitespace. Especially, do not use `\` or `\par` to end a row; row breaks are done automatically.
- The boxes inside a raster are numbered automatically. \texttt{\thetcbasternum} may be used inside a box to access this number. The \LaTeX\ counter \texttt{tcbrastercolumn} holds the current column, the counter \texttt{tcbrasterrow} holds the current row, and the counter \texttt{tcbrasternum} holds the current box number.
This is a special case of a `tcbraster` with the given \( \langle \text{options} \rangle \).

- Here, the enclosed boxes are created using `\tcbitem`.
- There has to be at least one `\tcbitem`.
- One cannot use anything else than `\tcbitem` to add something to the `raster`.

This leads to a very compact syntax.

\begin{tcbitemize}[raster columns=2, raster equal height=rows, size=small,colframe=red!50!black,colback=red!10!white,colbacktitle=red!50!white, title={Box \# etcbrasternum}]
\tcbitem First box
\tcbitem Second box
\tcbitem This is a box\ with a second line
\tcbitem[colback=yellow,colbacktitle=yellow!50!black] Another box
\tcbitem A box again
\end{tcbitemize}

\begin{tcbitemize}
\item Box # 1
  First box
\item Box # 2
  Second box
\item Box # 3
  This is a box\ with a second line
\item Box # 4
  Another box
\item Box # 5
  A box again
\end{tcbitemize}

`tcbitemize` has more restrictions than `tcbraster`. Especially, the `/tcb/capture` mode has to be `minipage`. For example, `/tcb/fit` cannot be used safely. If `/tcb/fit` should be used, turn over to `tcbraster`.

\begin{tcbitemize}
\item Box # 1
  First box
\item Box # 2
  Second box
\item Box # 3
  This is a box\ with a second line
\item Box # 4
  Another box
\item Box # 5
  A box again
\end{tcbitemize}

\begin{tcbitemize}[options]
\item Used inside `tcbitemize` to create a new `tcolorbox` with the given \( \langle \text{options} \rangle \).
\end{tcbitemize}
This is a convenience environment which combines a \texttt{tcolorbox}$^\text{P.12}$ with an embedded \texttt{tcbraster}$^\text{P.300}$. The \texttt{⟨box options⟩} are given to the outer \texttt{tcolorbox}$^\text{P.12}$, while the \texttt{⟨raster options⟩} are given to the embedded \texttt{tcbraster}$^\text{P.300}$. This environment is especially useful for rasters inside rasters.

\begin{tcboxedraster}[
⟨raster options⟩]
{⟨box options⟩}
\end{tcboxedraster}

\begin{description}
\item[Box # 1]{First box}
\item[Box # 2]{Second box}
\item[Box # 3]{This is a box with a second line}
\item[Box # 4]{Another box}
\item[Box # 5]{A box again}
\end{description}

\begin{tcbraster}[
\text{raster columns=3, raster equal height,}
\text{size=small, colframe=red!50!black, colback=red!10!white, colbacktitle=red!50!white,}
\text{title={Box \# \texttt{tcbrasternum}}}]
⟨colback=yellow!10, fonttitle={$\bfseries$ title=Boxed Raster}⟩
\begin{tcolorbox}
First box
\end{tcolorbox}
\begin{tcolorbox}
Second box
\end{tcolorbox}
\begin{tcolorbox}
This is a box with a second line
\end{tcolorbox}
\begin{tcolorbox}
Another box
\end{tcolorbox}
\begin{tcolorbox}
A box again
\end{tcolorbox}
\end{tcbraster}

\begin{tcbraster}[
\text{raster columns=2, raster equal height,}
\text{raster every box/.style={size=small, colframe=red!50!black, colback=red!10!white, valign=center, halign=center}}]
\begin{tcolorbox}
One
\end{tcolorbox}
\begin{tcolorbox}
Two
\end{tcolorbox}
\begin{tcolorbox}[blankest]
\begin{tcboxedraster}
\begin{tcolorbox}
Three
\end{tcolorbox}
\begin{tcolorbox}
Four
\end{tcolorbox}
\begin{tcolorbox}
Five
\end{tcolorbox}
\begin{tcolorbox}
Six
\end{tcolorbox}
\end{tcboxedraster}
\end{tcolorbox}
\begin{tcolorbox}
Seven
\end{tcolorbox}
\end{tcbraster}
This is a convenience environment which combines a \texttt{tcolorbox} with an embedded \texttt{tcbitemize}. The \texttt{box options} are given to the outer \texttt{tcolorbox}, while the \texttt{raster options} are given to the embedded \texttt{tcbitemize}. This environment is especially useful for rasters inside rasters.

\begin{tcboxeditemize}[raster columns=3, raster equal height, size=small,colframe=red!50!black,colback=red!10!white,colbacktitle=red!50!white, title={Box \# \texttt{\thetcbrasternum}}] 
\{colback=yellow!10,fonttitle=\bfseries,title=Boxed Itemize\}
\tcbitem First box
\tcbitem Second box
\tcbitem This is a box with a second line
\tcbitem Another box
\tcbitem A box again
\end{tcboxeditemize}

\begin{tabular}{|c|c|c|}
\hline
Box \# 1 & Box \# 2 & Box \# 3 \\
First box & Second box & This is a box with a second line \\
\hline
Box \# 4 & Box \# 5 & \\
Another box & A box again & \\
\hline
\end{tabular}
16.3 Option Keys of the Library

\texttt{/tcb/raster columns=(number)} \hspace{2cm} (no default, initially 2)

Sets the \textit{(number)} of columns for a \textit{raster}.

\begin{verbatim}
\begin{tcbitemize}[raster columns=3,
   size=small,colframe=red!50!black,colback=red!10!white]
   \tcitem One
   \tcitem Two
   \tcitem Three
   \tcitem Four
\end{tcbitemize}
\begin{tcbitemize}[raster columns=4,
   size=small,colframe=blue!50!black,colback=blue!10!white]
   \tcitem One
   \tcitem Two
   \tcitem Three
   \tcitem Four
\end{tcbitemize}
\end{verbatim}

\texttt{/tcb/raster rows=(number)} \hspace{2cm} (no default, initially 2)

Sets the \textit{(number)} of rows for a \textit{raster}. Note that this is only relevant in connection with setting \texttt{/tcb/raster height} \hspace{0.5cm} (P.306) to a value greater than 0pt. Then, it defines the number of rows \textit{per} given height.

\texttt{/tcb/raster width=(length)} \hspace{2cm} (no default, initially \texttt{\linewidth})

Sets the total raster width to the given \textit{(length)}. \texttt{/tcb/raster left skip} \hspace{0.5cm} (P.307) and \texttt{/tcb/raster right skip} \hspace{0.5cm} (P.307) are part of the total width. Note that both skip values are not changed by this option.

\begin{verbatim}
\begin{tcbitemize}[raster width=\linewidth/2,
   size=small,colframe=red!50!black,colback=red!10!white]
   \tcitem One
   \tcitem Two
   \tcitem Three
   \tcitem Four
\end{tcbitemize}
\end{verbatim}
\begin{tcbitemize}[raster width flush left=\linewidth/2, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

Note that the results of \tcb/raster width \textsuperscript{P.304} and \tcb/raster width flush left look identical, but differ on technical side since the later always fills the available \texttt{\linewidth}.

\begin{tcbitemize}[raster width center=\linewidth/2, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

\begin{tcbitemize}[raster width flush right=\linewidth/2, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}
/tcb/raster height=(length)  (no default, initially 0pt)

Sets the raster height per /tcb/raster rows→P.304 to the given (length). This forces an appropriate height for the enclosed boxes. /tcb/raster before skip and /tcb/raster after skip are not part of this calculation. If the (length) is set to 0pt, this feature is deactivated.

\begin{tcbitemize}[raster height=4cm, raster rows=2, size=small,colframe=red!50!black,colback=red!10!white]
\tcitem One
\tcitem Two
\tcitem[enhanced, finish={\draw[blue,very thick,<->] (frame.south) -- node[right,pos=.75]{4cm} +(0,4); }] Three
\tcitem Four
\tcitem Five
\end{tcbitemize}

\begin{tcbitemize}
\tcitem One
\tcitem Two
\tcitem Three
\tcitem Four
\tcitem Five
\end{tcbitemize}

/tcb/raster before skip=(glue)  (no default, initially 2mm)

Space of the given (glue) is inserted vertically before the raster. This space is discardable.

/tcb/raster after skip=(glue)  (no default, initially 2mm)

Space of the given (glue) is inserted vertically after the raster. This space is discardable.

/tcb/raster equal skip=(length)  (style, no default)

Shortcut to set /tcb/raster before skip, /tcb/raster after skip, /tcb/raster column skip→P.307, and /tcb/raster row skip→P.307 to the same (length) value.

\begin{tcbitemize}[raster equal skip=4mm, size=small,colframe=red!50!black,colback=red!10!white]
\tcitem One
\tcitem Two
\tcitem Three
\tcitem Four
\end{tcbitemize}

\begin{tcbitemize}
\tcitem One
\tcitem Two
\tcitem Three
\tcitem Four
\end{tcbitemize}
Space of the given \langle length \rangle is inserted horizontally left of the raster.

\begin{tcbitemize}[raster left skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

Space of the given \langle length \rangle is inserted horizontally right of the raster.

\begin{tcbitemize}[raster right skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

Space of the given \langle length \rangle is inserted horizontally between the columns.

\begin{tcbitemize}[raster column skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

Space of the given \langle length \rangle is inserted vertically between the rows.

\begin{tcbitemize}[raster row skip=0pt, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}
/tcb/raster halign=⟨alignment⟩

Defines the horizontal alignment for the boxes of the rows of a raster, if these rows are not completely filled (mainly: the last one).

Feasible values for ⟨alignment⟩ are:
- **left**: align to the left side,
- **center**: align to the center,
- **right**: align to the right side.

\begin{tcbitemize}[raster halign=center, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\end{tcbitemize}

\begin{tcbitemize}[raster halign=left, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\end{tcbitemize}

\begin{tcbitemize}[raster halign=right, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\end{tcbitemize}

/tcb/raster valign=⟨alignment⟩

(no default, initially **center**)

Defines the vertical alignment for the boxes of a row, if the boxes do not have equal height. This sets the /tcb/box align → P.86 option.

Feasible values for ⟨alignment⟩ are:
- **top**: align to the top side,
- **center**: align to the center,
- **bottom**: align to the bottom side.

\begin{tcbitemize}[raster valign=top, raster columns=3, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem \Huge One
\tcbitem \Large Two
\tcbitem Three
\end{tcbitemize}

\begin{tcbitemize}[raster valign=center, raster columns=3, size=small,colframe=blue!50!black,colback=blue!10!white]
\tcbitem \Huge One
\tcbitem \Large Two
\tcbitem Three
\end{tcbitemize}

\begin{tcbitemize}[raster valign=bottom, raster columns=3, size=small,colframe=green!50!black,colback=green!10!white]
\tcbitem \Huge One
\tcbitem \Large Two
\tcbitem Three
\end{tcbitemize}
/tcb/raster equal height = (type) (default all, initially none)

Puts the enclosed boxes into a common /tcb/equal height group \(^{P.61}\). The \(<id>\) of the equal height group is chosen automatically, but it may be set manually by /tcb/raster equal height group. Also see /tcb/minimum for current equal height group \(^{P.62}\).

Feasible values for \(<type>\) are:

- none: no equal height setting,
- rows: all boxes in a row are set to equal height,
- all: all boxes in the raster are set to equal height.

Note that you have to compile twice to see changes.

\begin{tcbitemize}[raster equal height=rows,
  size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem \Huge Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}

\begin{tcbitemize}[raster equal height,
  size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem \Huge Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}

/tcb/raster equal height group = (id) (no default)

Overwrites the automatically chosen id with the given \(<id>\). If this is used to share a common height between the raster and another raster or box, the /tcb/raster equal height option should be set to all.

\begin{tcolorbox}[equal height group=raster-manual-id]
A single box
\end{tcolorbox}

\begin{tcbitemize}[raster equal height,raster equal height group=raster-manual-id]
  \tcbitem One
  \tcbitem \Huge Two
\end{tcbitemize}

A single box

\begin{tcbitemize}
  \tcbitem One
  \tcbitem \Huge Two
\end{tcbitemize}
Enforces the raster size computations onto the enclosed boxes. If set to `false`, individual settings can be used (for the better or worse).

\begin{tcbitenize}[raster force size=false, raster halign=center, size=small, colframe=red!50!black, colback=red!10!white]
\begin{tcbitenize}
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
  \tcbitem Five
  \tcbitem Six
\end{tcbitenize}
\end{tcbitenize}

\begin{tcbitenize}[raster force size=false, raster halign=center, size=small, colframe=red!50!black, colback=red!10!white, raster odd column/.style={colframe=blue!50!black, colback=blue!10!white}]
\begin{tcbitenize}
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitenize}
\end{tcbitenize}

Sets all raster settings back to their default values. Note that `/tcb/reset` does not execute this option. Style settings like `/tcb/raster odd column` etc. are not touched by `/tcb/raster reset`.

### 16.4 Adding Styles for Specific Boxes

The following styles can be defined to address certain boxes inside a `raster`. Note that such style definitions are not removed by `/tcb/reset` or `/tcb/raster reset`. The style definitions are used in the order given below.

**/tcb/raster every box**

This style is used for every box.

**/tcb/raster odd column**

This style is used for every box in an odd column.

\begin{tcbitenize}[size=small, colframe=red!50!black, colback=red!10!white, raster odd column/.style={colframe=blue!50!black, colback=blue!10!white}]
\begin{tcbitenize}
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitenize}
\end{tcbitenize}

**/tcb/raster even column**

This style is used for every box in an even column.

**/tcb/raster column n**

This style is used for every box in the n-th column. n has to be replaced by a number.

**/tcb/raster odd row**

This style is used for every box in an odd row.
This style is used for every box in an even row.

This style is used for every box in the $m$-th row. $m$ has to be replaced by a number.

This style is used for every box with an odd number.

This style is used for every box with an even number.

This style is used for the box in the $m$-th row and $n$-th column. $m$ and $n$ have to be replaced by numbers.

This style is used for the box with number $n$. $n$ has to be replaced by a number.
16.5 Combining Columns or Rows

\texttt{/tcb/raster\ multicolumn=\langle number\rangle} \hspace{1cm} (no default, initially unset)

This option has to be set inside the option list of a \texttt{tcolorbox} \textsuperscript{\(P.12\)} inside a \texttt{tcbraster} \textsuperscript{\(P.300\)} or inside \texttt{\tcbitem} \textsuperscript{\(P.301\)} inside \texttt{tcbitemize} \textsuperscript{\(P.301\)}. It merges the given \langle number\rangle of boxes into one single box on the same line. The resulting box gets the \texttt{\thetcbrasternum} of the first box. If there are not enough boxes available on the current line, this option is ignored and a warning is given.

\begin{tcbitemize}
\item \tcbitem\[colframe=blue!50!black, colback=blue!10!white, raster multicolumn=1\]
\item \tcbitem\[colframe=blue!50!black, colback=blue!10!white, raster multicolumn=2\]
\item \tcbitem\[colframe=blue!50!black, colback=blue!10!white, raster multicolumn=3\]
\end{tcbitemize}

\begin{tcbitemize}
\item \tcbitem\[colframe=red!50!black, colback=red!10!white, raster multicolumn=1\]
\item \tcbitem\[colframe=red!50!black, colback=red!10!white, raster multicolumn=2\]
\item \tcbitem\[colframe=red!50!black, colback=red!10!white, raster multicolumn=3\]
\end{tcbitemize}

\begin{itemize}
\item \texttt{multicolumn=1}
\item \texttt{multicolumn=2}
\item \texttt{multicolumn=3}
\end{itemize}
This option has to be set inside the option list of a `tcolorbox` P.12 inside a `tcbraster` P.300 or inside `	cbitem` P.301 inside `tcblemize` P.301. This option not really merges boxes, but simply sizes the current box to fit the space of ⟨number⟩ rows.

/tcb/raster multirow needs /tcb/raster height P.306 to be set. How to achieve a similar result for boxes without fixed /tcb/raster height P.306 is shown afterwards.

\begin{tcbitemize}[raster rows=3,raster columns=3,raster height=6cm, raster every box/.style={colframe=red!50!black,colback=red!10!white}]
\tcbitem
\tcbitem
\tcbitem[\begin{tcbitemize}[raster rows=2,raster columns=2,raster height=\tcbtextheight]\tcbitem\tcbitem\tcbitem\tcbitem\end{tcbitemize}]
\tcbitem[\begin{tcbitemize}[raster multicolumn=2,raster multirow=2,blankest]\tcbitem\tcbitem\tcbitem\tcbitem\tcbitem\tcbitem\tcbitem\tcbitem\tcbitem\tcbitem\tcbitem\tcbitem\end{tcbitemize}]
\tcbitem[\begin{tcbitemize}[raster columns=2,raster multirow=2,blankest]multirow=2\tcbitem\tcbitem\tcbitem\tcbitem\tcbitem\tcbitem\tcbitem\tcbitem\tcbitem\tcbitem\tcbitem\tcbitem\end{tcbitemize}]
\end{tcbitemize}
For rasters without fixed \texttt{/tcb/raster height} \textsuperscript{P.306}, \texttt{/tcb/raster multirow} \textsuperscript{P.313} cannot be used. Note that \texttt{/tcb\textsetlength\\textheight}{P.155} also cannot be used like in the previous example.

But, with combination of \texttt{/tcb/raster equal height} \textsuperscript{P.309} and \texttt{/tcb/space to} \textsuperscript{P.59}, a similar effect can be created:

\begin{tcbitemize}[raster columns=3,raster equal height=rows,\ntextbf{raster every box/.style={colframe=red!50!black,colback=red!10!white}}]
\tcbitem
\tcbitem
\tcbitem[colframe=blue!50!black,colback=blue!10!white]\n\textbf{lipsum}[2]\n\tcbitem[raster multicolumn=2,blankest,space to=\textbackslash myspace]\n\begin{tcbitemize}[raster columns=2]\n\tcbitem This is a box of the inner raster.\n\tcbitem[height=\textbackslash myspace]\n\tcbitem[height=\textbackslash myspace]\n\end{tcbitemize}\n\end{tcbitemize}

\begin{tcbitemize}[raster columns=3,raster equal height=rows,\ntextbf{raster every box/.style={colframe=red!50!black,colback=red!10!white}}]
\tcbitem
\tcbitem
\tcbitem[colframe=blue!50!black,colback=blue!10!white]\n\textbf{lipsum}[2]\n\tcbitem[raster multicolumn=2,blankest,space to=\textbackslash myspace]\n\begin{tcbitemize}[raster columns=2]\n\tcbitem This is a box of the inner raster.\n\tcbitem[height=\textbackslash myspace]\n\tcbitem[height=\textbackslash myspace]\n\end{tcbitemize}\n\end{tcbitemize}

16.6 Rasters inside Rasters

A *raster* inside a *raster* cannot be used directly, because a *raster* can only contain a *tcolorbox* or something derived from a *tcolorbox*. So, a *raster* can be put inside a *tcolorbox* inside a *raster*.

Some examples for such constructions can be found at \texttt{tcbboxedraster} \textsuperscript{P.302}, \texttt{/tcb/raster multicolumn} \textsuperscript{P.312}, \texttt{/tcb/raster multirow} \textsuperscript{P.313}.

16.6.1 Raster Setup

The intermediating \texttt{tcolorbox} \textsuperscript{P.12} can be made invisible by using \texttt{/tcb/blankest} \textsuperscript{P.253}.

```latex
\begin{tcbraster}[raster equal height=rows,
  raster every box/.style={colframe=red!50!black, colback=red!10!white}]
  \begin{tcolorbox}[blankest]
    \begin{tcbraster}[raster columns=1]
      \begin{tcolorbox}One\end{tcolorbox}
      \begin{tcolorbox}Two\end{tcolorbox}
    \end{tcbraster}
  \end{tcolorbox}
  \begin{tcolorbox}raster+tcolorbox+raster\end{tcolorbox}
\end{tcbraster}
```

One Two raster+tcolorbox+raster

```latex
\begin{tcbraster}[raster equal height=rows,
  raster every box/.style={colframe=red!50!black, colback=red!10!white}]
  \begin{tcbboxedraster}[raster columns=1]{blankest}
    \begin{tcolorbox}One\end{tcolorbox}
    \begin{tcolorbox}Two\end{tcolorbox}
  \end{tcbboxedraster}
  \begin{tcolorbox}raster+tcboxedraster\end{tcolorbox}
\end{tcbraster}
```

One Two raster+tcboxedraster

```latex
\begin{tcbitemize}[raster equal height=rows,
  raster every box/.style={colframe=red!50!black, colback=red!10!white}]
  \tcbitem[blankest]
    \begin{tcbitemize}[raster columns=1]
      \tcbitem One
      \tcbitem Two
    \end{tcbitemize}
  \tcbitem tcbitemize+tcbitem+tcbitemize
\end{tcbitemize}
```

One Two tcbitemize+tcbitem+tcbitemize
16.6.2 Placing Spaces

If the heights of boxes inside staggered rasters should be matched, the space has to be distributed accordingly.

- For fixed height boxes/rasters using `/tcb/raster height` → P.306, the height of boxes is available by `	cbtextheight` → P.155. This can be used to size deeper layered boxes/rasters.
- For boxes/rasters laid out using `/tcb/raster equal height` → P.309, space can be distributed by `/tcb/space to` → P.59. It can take several compilations until all spaces are distributed correctly.

\begin{tcbitemize}[raster rows=2,raster height=6cm, raster every box/.style={colframe=red!50!black,colback=red!10!white}]
\tcbitem[blankest]
\begin{tcbitemize}[raster columns=1,raster rows=2,raster height=\tcbtextheight]
  \tcbitem One
  \tcbitem Two
\end{tcbitemize}
\tcbitem This is a fixed height box.
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

One

Two

This is a fixed height box.

Three

Four
One
Two
Three
Four

Twelve
Eleven

This is an example with fixed height boxes.

Five
Six

Ten
Nine
Eight
Seven
One

This box will adapt its height.


This is a flexible height box.

One

This box will adapt its height.
One

This box will adapt its height.


This box will adapt its height.
17 Libraries \texttt{listings}, \texttt{listingsutf8}, and \texttt{minted}

17.1 Loading the Libraries

In contrast to other \texttt{tcolorbox} libraries, the libraries \texttt{listings}, \texttt{listingsutf8}, and \texttt{minted} are concurrent in the sense that they all do the same thing, i.e. displaying listings with or without typesetting the listing in \LaTeX{} parallel. The difference is the underlying \LaTeX{} package which does the core job for displaying a listing. So, typically, you need just one of these libraries. If you do not have a clue which one of them you should use and you are using \texttt{pdflatex}, you should take \texttt{listingsutf8}. If you are using \texttt{xelatex} or \texttt{lualatex}, you should take \texttt{listings} as \texttt{xelatex} and \texttt{lualatex} are not compatible with \texttt{listingsutf8}.

The order in which the libraries are included influences the default settings and the /tcb/reset $\rightarrow$ P.112 behavior. The settings of a later loaded library overwrite the settings of a previous loaded library. A library is never loaded twice.

17.1.1 Loading \texttt{listings}

This library uses the package \texttt{listings} [6] to typeset listings. It is loaded by a package option or inside the preamble by:

\texttt{$\backslash$tcbuselibrary\{listings\}}

This also loads the package \texttt{listings} [6].

The /tcb/listing engine $\rightarrow$ P.332 is set to \texttt{listings} by the library. To reactivate this setting, if overwritten by other libraries, use

\texttt{$\backslash$tcbset\{listing engine=listings\}}

17.1.2 Loading \texttt{listingsutf8}

This library is not needed (and troublesome) when using \texttt{XeLaTeX} or \texttt{LuaLaTeX}. Therefore, loading this library is automatically replaced by loading \texttt{listings} only, if \texttt{pdflatex} is not used.

To extend \texttt{listings} for UTF-8 encoded sources, you can use the support from the package \texttt{listingsutf8} [11] by loading the library variant \texttt{listingsutf8}.

\texttt{$\backslash$tcbuselibrary\{listingsutf8\}}
\texttt{$\backslash$tcbset\{listing utf8=latin1\} % optional; 'latin1' is the default.}

This also loads the library \texttt{listings} and the packages \texttt{listings} [6] and \texttt{listingsutf8} [11].

The /tcb/listing engine $\rightarrow$ P.332 is set to \texttt{listings} by the library. To reactivate this setting, if overwritten by other libraries, use

\texttt{$\backslash$tcbset\{listing engine=listings\}$

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17.1.3 Loading \texttt{minted}

This library uses the package \texttt{minted} \cite{12} to typeset listings. It is loaded by a package option or inside the preamble by:

\begin{tcbuselibrary}{minted}
\end{tcbuselibrary}

This also loads the package \texttt{minted} \cite{12}.

The \texttt{minted} package uses the external tool \texttt{Pygments} \cite{14} to apply syntax highlighting. It has to be installed and set up, before the library can be used, see \cite{12} and \cite{14}. The \texttt{tcolorbox} library \texttt{minted} does not work, if the package \texttt{minted} \cite{12} does not work.

The \texttt{/tcb/listing engine} \textsuperscript{P.332} is set to \texttt{minted} by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{tcbset}{listing engine=minted}
\end{tcbset}

17.2 Common Macros of the Libraries

\begin{tcblisting}{⟨options⟩}
⟨environment content⟩
\end{tcblisting}

Creates a colored box based on a \texttt{tcolorbox} \textsuperscript{P.12}. Controlled by the given \texttt{⟨options⟩}, the environment content is typeset normally and/or as a listing. Furthermore, the \texttt{⟨options⟩} control appearance and functions of the \texttt{tcolorbox}. By default, the listing is interpreted as a \LaTeX listing.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black}
This is a \LaTeX\ example which displays the text as source code and in compiled form.
\end{tcblisting}

This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code and in compiled form.
% \tcbslibrary{listings} /or/ \tcbslibrary{listingsutf8}
\begin{tcblisting}{colback=yellow!5,colframe=yellow!50!black,listing only,  
title=This is source code in another language (XML), fonttitle=\bfseries,  
listing options={language=XML,columns=fullflexible,keywordstyle=\color{red}}}
<?xml version="1.0"?>
<project name="Package tcolorbox" default="documentation" basedir=".">
  <description>
    Apache Ant build file (http://ant.apache.org/
  </description>
</project>
\end{tcblisting}

This is source code in another language (XML)

<?xml version='1.0'?>
<project name='Package tcolorbox' default='documentation' basedir='.'>
  <description>
    Apache Ant build file (http://ant.apache.org/
  </description>
</project>

% \tcbslibrary{minted}
\begin{tcblisting}{colback=yellow!5,colframe=yellow!50!black,listing only,  
title=This is source code in another language (XML), fonttitle=\bfseries,  
listing engine=minted,minted language=xml}
<?xml version="1.0"?>
<project name="Package tcolorbox" default="documentation" basedir=".">
  <description>
    Apache Ant build file (http://ant.apache.org/
  </description>
</project>
\end{tcblisting}

This is source code in another language (XML)

<?xml version="1.0"?>
<project name="Package tcolorbox" default="documentation" basedir=".">
  <description>
    Apache Ant build file (http://ant.apache.org/
  </description>
</project>

% This box is as wide as needed (listing only !!)
% \tcbslibrary{skins}
\begin{tcblisting}{colback=green!5!white,colframe=green!50!black,listing only,  
hbox,enhanced,drop fuzzy shadow,before=\begin{center},after=\end{center}}
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
\end{tcblisting}

\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
\begin{tcboutputlisting}
\begin{environment content}
\end{tcboutputlisting}

Saves the environment content to a file which is named by the key value of \texttt{listing file}. Later, this file can be loaded by \texttt{tcbinputlisting} or \texttt{tcbuselistingtext} or \texttt{tcbuselistinglisting}.

\begin{tcboutputlisting}
This \texttt{\textbf{text}} is written to a standardized file for later usage.
\end{tcboutputlisting}

\texttt{tcbinputlisting}\{\texttt{\textit{options}}\}

Creates a colored boxed based on a \texttt{tcolorbox}. The text content is read from a file named by the key value of \texttt{listing file}. Apart from that, the function is equal to that of \texttt{tcblisting} \texttt{\textasciitilde P.321}.

\begin{tcbinputlisting}
\begin{tcbinputlisting}
\texttt{colback=red!5!white,}
\texttt{colframe=red!75!black,}
\texttt{text only}
\end{tcbinputlisting}
\end{tcbinputlisting}

\begin{tcbinputlisting}
\begin{tcbinputlisting}
\texttt{colback=green!5,}
\texttt{colframe=green!75!black,}
\texttt{listing only}
\end{tcbinputlisting}
\end{tcbinputlisting}

\begin{tcbinputlisting}
\begin{tcbinputlisting}
\begin{tikzpicture}
\fill[\red] (0,0) rectangle (1,1);
\end{tikzpicture}
\end{tcbinputlisting}
\end{tcbinputlisting}

\texttt{tcbuselistingtext}

Loads text from a file named by the key value of \texttt{listing file}.

\begin{tcbuselistingtext}
\end{tcbuselistingtext}

\texttt{tcbuselistinglisting}

Typesets text as listing from a file named by the key value of \texttt{listing file}.

\begin{tcbuselistinglisting}
\begin{tcbuselistinglisting}
\begin{tikzpicture}
\fill[\red] (0,0) rectangle (1,1);
\end{tikzpicture}
\end{tcbuselistinglisting}
\end{tcbuselistinglisting}

\texttt{tcbusetemplisting}

Typesets text as listing from a temporary file which was written by \texttt{tcbwritetemp} \texttt{\textasciitilde P.131}.
See Section 24.4 on page 470 and Section 24.5 on page 472 for more elaborate methods to create new environments and commands.

If a new sort of \texttt{tcblisting} environments should be created with one optional argument only, one is highly recommended to use \texttt{\DeclareTCBListing} \textsuperscript{P.470} or \texttt{\NewTCBListing} \textsuperscript{P.470} instead of \texttt{\newtcblisting} to avoid content scanning problems.

\begin{verbatim}
\newtcblisting[(\texttt{init options})]\{⟨name⟩\}[⟨number⟩][⟨default⟩]{⟨options⟩}

Creates a new environment ⟨name⟩ based on tcblisting \textsuperscript{P.321}. Basically, \texttt{\newtcblisting} operates like \texttt{\newenvironment}. This means, the new environment ⟨name⟩ optionally takes ⟨number⟩ arguments, where ⟨default⟩ is the default value for the optional first argument. The ⟨options⟩ are given to the underlying tcblisting. Note that \texttt{/tcb/savedelimiter} \textsuperscript{P.26} is set to the given ⟨name⟩ automatically. The ⟨init options⟩ allow setting up automatic numbering, see Section 5 from page 114.

\begin{tabular}{|c|}
\hline
\texttt{\newtcblisting{mybox}\%} \hfill \texttt{\begin{mybox}} \hfill \texttt{\%} \hfill \texttt{\end{mybox}} \\
\hspace{1cm} \texttt{colback=red!5!white,} \hspace{1cm} \texttt{This is my \LaTeX\ box.} \hspace{1cm} \texttt{colframe=red!75!black} \hspace{1cm} \texttt{This is my \LaTeX\ box.} \\
\begin{mybox} \hfill This is my \LaTeX\ box. \hfill \end{mybox} \\
\hline
\end{tabular}

\begin{tabular}{|c|}
\hline
\texttt{\newtcblisting{mybox}[1]{\%} \hfill \texttt{\begin{mybox}} \hfill \texttt{\%} \hfill \texttt{\end{mybox}} \\
\hspace{1cm} \texttt{colback=red!5!white,} \hspace{1cm} \texttt{This is my \LaTeX\ box.} \hspace{1cm} \texttt{colframe=red!75!black,} \hspace{1cm} \texttt{This is my \LaTeX\ box.} \\
\hspace{1cm} \texttt{fonttitle=\bfseries,} \hspace{1cm} \texttt{Listing Box} \hspace{1cm} \texttt{Listing Box} \\
\hspace{1cm} \texttt{title=\#1}} \hfill \texttt{This is my \LaTeX\ box.} \hspace{1cm} \texttt{This is my \LaTeX\ box.} \\
\begin{mybox} \hfill Listing Box \hfill \end{mybox} \\
\hline
\end{tabular}

\begin{tabular}{|c|}
\hline
\texttt{\newtcblisting{mybox}[2]\{} \hfill \texttt{\begin{mybox}} \hfill \texttt{\{} \hfill \texttt{\end{mybox}} \\
\hspace{1cm} \texttt{colback=red!5!white,} \hspace{1cm} \texttt{This is my \LaTeX\ box.} \hspace{1cm} \texttt{colframe=red!75!black,} \hspace{1cm} \texttt{This is my \LaTeX\ box.} \\
\hspace{1cm} \texttt{fonttitle=\bfseries,} \hspace{1cm} \texttt{Listing Box} \hspace{1cm} \texttt{Listing Box} \\
\hspace{1cm} \texttt{title=\#2,\#1}} \hfill \texttt{This is my \LaTeX\ box.} \hspace{1cm} \texttt{This is my \LaTeX\ box.} \\
\begin{mybox} \hfill Listing Box \hfill \end{mybox} \\
\hline
\end{tabular}

\begin{tabular}{|c|}
\hline
\texttt{\newtcblisting{mybox}[listing only]} \hfill \texttt{\begin{mybox}} \hfill \texttt{\end{mybox}} \\
\hspace{1cm} \texttt{\begin{mybox}} \hfill \texttt{\end{mybox}} \\
\hline
\end{tabular}

\begin{tabular}{|c|}
\hline
\texttt{\newtcblisting{mybox}[listing side text]} \hfill \texttt{\begin{mybox}} \hfill \texttt{\end{mybox}} \\
\hspace{1cm} \texttt{\begin{mybox}} \hfill \texttt{\end{mybox}} \\
\hline
\end{tabular}

This is my \LaTeX\ box.

This is my \LaTeX\ box.

This is my \LaTeX\ box.

This is my \LaTeX\ box.

This is my \LaTeX\ box.

This is my \LaTeX\ box.
Definition in the preamble:
\newtcblisting{auto counter}{mycbox}[1]{%
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=Listing \thetcbcounter: #1}

\begin{mycbox}{Listing Box}
This is my \LaTeX\ box.
\end{mycbox}

\renewtcblisting{⟨init options⟩}{⟨name⟩}{⟨number⟩}{⟨default⟩}{⟨options⟩}

Operates like \newtcblisting \textsuperscript{\textendash}P.324, but based on \renewenvironment instead of \newenvironment. An existing environment is redefined.
\newtcbinputlisting[(\textit{init options})]{(\textit{name})}(\{\textit{number}\})[(\textit{default})]{(\textit{options})}

Creates a new macro \textit{name} based on \texttt{tcbinputlisting} \textsuperscript{p.323}. Basically, \newtcbinputlisting operates like \texttt{newcommand}. The new macro \textit{name} optionally takes \textit{number} arguments, where \textit{default} is the default value for the optional first argument. The \textit{options} are given to the underlying \texttt{tcbinputlisting}. The \textit{init options} allow setting up automatic numbering, see Section 5 from page 114.

\renewtcbinputlisting[(\textit{init options})]{(\textit{name})}(\{\textit{number}\})[(\textit{default})]{(\textit{options})}

Operates like \newtcbinputlisting, but based on \texttt{renewcommand} instead of \texttt{newcommand}. An existing macro is redefined.
17.3 Option Keys of the \textcolor{green}{listings} Library

/tcb/listing options\textcolor{red}{\textit{=(key list)}}
\textcolor{blue}{\texttt{(no default, initially style=tcblatex)}}

Sets the options from the package \texttt{listings} \textcolor{red}{[6]} which are used during typesetting of the listing. For \LaTeX listings, there is a predefined \texttt{listings} style named \texttt{tcblatex} which can be used.

\begin{tcblisting}{colback=red!5!white,colframe=red!25,left=6mm, listing options={style=tcblatex,numbers=left,numberstyle=\tiny\color{red!75!black}}}  
This is a \LaTeX example which displays the text as source code and in compiled form. Additionally, we use line numbers here.
\end{tcblisting}

\begin{minipage}{\linewidth}
\begin{verbatim}
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black, listing options={style=tcblatex}}
This is a \LaTeX example which displays the text as source code and in compiled form. Additionally, we use line numbers here.
\end{tcblisting}
\end{verbatim}
\end{minipage}

/tcb/no listing options
\textcolor{blue}{\texttt{(no value, initially unset)}}

Abbreviation for \texttt{listing options=\{}\texttt{\}. This removes all options for the \texttt{listings} package. This includes the \texttt{tcblisting} standard style \texttt{tcblatex} and the encoding presets. Use this option, if you want to set the \texttt{listings} options outside of \texttt{tcblisting}, e.g. globally in the preamble.

\begin{tcblisting}{no listing options}
All \textit{listings} options removed.
\end{tcblisting}

\begin{minipage}{\linewidth}
\begin{verbatim}
\begin{tcblisting}{no listing options}
All \textit{listings} options removed.
\end{tcblisting}
\end{verbatim}
\end{minipage}

/tcb/listing style\textcolor{red}{\textit{=(style)}}
\textcolor{blue}{\texttt{(no default, initially tcblatex)}}

Abbreviation for \texttt{listing options=\{style=\ldots\}}. This key sets a \texttt{\{}\texttt{style}\texttt{\}} for the \texttt{listings} package, see \textcolor{red}{[6]}. For \LaTeX, there is a predefined style named \texttt{tcblatex}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black, listing style=tcblatex}
Here, we use the predefined style.
\end{tcblisting}

\begin{minipage}{\linewidth}
\begin{verbatim}
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black, listing style=tcblatex}
Here, we use the predefined style.
\end{tcblisting}
\end{verbatim}
\end{minipage}
/tcb/listing inputencoding=⟨encoding⟩ (no default, initially \inputencodingname)
Sets the input encoding value for the predefined listing style tcblatex and
tcbdocumentation from the library \documentatoin. The initial value is derived
from the package inputenc if used.

/tcb/listing remove caption=⟨true|false⟩ (default true, initially true)
If set to true, some part of the caption building code of the listings package is silenced to
prevent some unwanted interaction with the hyperref package resulting in additional vertical space. If set to false, the listings package code is kept unchanged. Note that listings outside tcblisting → P.321 and \tcbinputlisting → P.323 are always processed normally. Typically, a user is not expected to use this key at all.

/tcb/every listing line=⟨text⟩ (no default, initially unset/empty)
Inserts some ⟨text⟩ to the begin of every line of a listing. Note that this a hack of the listings package code. This may become unusable or superfluous in the future.

\newtcblisting{commandshell}{colback=black,colupper=white,colframe=yellow!75!black,
listing only,listing options={style=tcblatex,language=sh},
every listing line={\textcolor{red}{\small\ttfamily\bfseries root \$> }}}
\begin{commandshell}
ls -al
cd /usr/lib
\end{commandshell}

\newtcblisting{commandshell}{colback=black,colupper=white,colframe=yellow!75!black,
listing only,listing options={style=tcblatex,language=sh},hbox,
every listing line*=\textcolor{red}{\small\ttfamily\bfseries root \$> }}}
\begin{commandshell}
ls -al
cd /usr/lib
\end{commandshell}

See further options in Section 17.6 on page 332.

\begin{itemize}
\item For an combined example of using \lstinline inside a tcolorbox, see \DeclareTotalTCBox \rightarrow P.468.
\end{itemize}
17.4 Option Keys of the \texttt{listingsutf8} Library

The \texttt{listingsutf8} library is not needed (and troublesome) when using \TeX{} or \LaTeX{}. Therefore, loading this library is automatically replaced by loading \texttt{listings} only, if \TeX{} is not used.

The \texttt{listingsutf8} library is an extension of the \texttt{listings} library, so all options from Section 17.3 on page 327 are applicable.

\texttt{/tcb/listing utf8=⟨one-byte-encoding⟩} (style, no default, initially \texttt{latin1})

Abbreviation for using \texttt{/tcb/listing inputencoding → P.328} together with UTF-8 support from the package \texttt{listingsutf8} [11]. This option is available only for the library variant \texttt{liblistingsutf8}. The \texttt{⟨one-byte-encoding⟩} is one of the applicable encodings from [11], e.g. \texttt{latin1} which is the default.

Be aware that this means restriction to this specific \texttt{⟨one-byte-encoding⟩}; e.g. \texttt{latin1} comprises umlauts and other accented characters, but not the Euro sign. If you want to use the \texttt{listings} package and «real» UTF-8 source code, then do not use \texttt{listingsutf8} but \texttt{listings} with \texttt{/tcb/listing inputencoding → P.328=utf8} and with specific manual hacks for specific UTF-8-encoded characters.

See further options in Section 17.6 on page 332.
17.5 Option Keys of the \texttt{minted} Library

/\texttt{tcb/minted language}=(\textit{programming language}) (no default, initially \texttt{latex})

Sets a (\textit{programming language}) known to Pygments [14].

\begin{tcblisting}{listing engine=minted,minted style=trac,minted language=java,colback=red!5!white,colframe=red!75!black,listing only}
public class HelloWorld {
    // A 'Hello World' in Java
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }
}
\end{tcblisting}

\begin{verbatim}
public class HelloWorld {
    // A 'Hello World' in Java
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }
}
\end{verbatim}

/tcb/minted options=(\textit{key list}) (no default, initially see /tcb/default minted options → P.331)

Sets the options from the package \texttt{minted} [12] which are used during typesetting of the listing. Also see /tcb/minted options app → P.461 and /tcb/minted options pre → P.461.

\begin{verbatim}
% \tcbuselibrary{skins}
\newtcblisting{myjava}{listing engine=minted,minted style=colorful,minted language=java,minted options={fontsize=\small,breaklines,autogobble,linenos,numbersep=3mm},colback=blue!5!white,colframe=blue!75!black,listing only,left=5mm,enhanced,overlay={\begin{tcbclipinterior}\fill[red!20!blue!20!white] (frame.south west) rectangle ([xshift=5mm]frame.north west);\end{tcbclipinterior}}}

\begin{myjava}
public class HelloWorld {
    // A 'Hello World' in Java
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }
}
\end{myjava}
\end{verbatim}

1 public class HelloWorld {
2     // A 'Hello World' in Java
3     public static void main(String[] args) {
4         System.out.println("Hello World!");
5     }
6 }

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/tcb/default minted options={(key list) (no default, initially \texttt{tabsize=2,fontsize=\texttt{\small},breaklines,autogobble})}

Sets the options from the package \texttt{minted} \cite{minted} which are used during typesetting of the listing, if /tcb/minted options \textsuperscript{P.330} are not used. The intended use is inside the preamble to change the default behavior. Note that setting /tcb/default minted options also resets /tcb/minted options \textsuperscript{P.330}.

\begin{verbatim}
% inside the preamble
\tcbset{%
default minted options={(tabsize=4,fontsize=\texttt{\normalsize}),}
}
\end{verbatim}

/tcb/minted style={(style)}

(no default, initially unset)

Sets a \texttt{(style)} known to \texttt{Pygments} \cite{pygments}. This is independent from /tcb/minted options \textsuperscript{P.330}. Note that styles are always applied globally; all following examples will be set in the given \texttt{(style)} until a new style is set. Also note that setting \texttt{\usemintedstyle{(style)}} only once per document is more economic, if all styles in a document are the same. For examples of different styles, see /tcb/minted language \textsuperscript{P.330} and /tcb/minted options \textsuperscript{P.330}.

See further options in Section 17.6 on the following page.

/tcbTemporaryPatchMintedFancyvrb

There is a package clash between the package \texttt{minted} (version 2.5) and the package \texttt{fancyvrb} (from version 4.0 on) which is used by package \texttt{minted}. This is results in compilation errors, if the \texttt{autogobble} option is used by the \texttt{minted} library. At the time of writing this package clash is unresolved by official releases. Therefore, the \texttt{minted} library contains a patch \texttt{/tcbTemporaryPatchMintedFancyvrb} which is automatically applied (do not use this manually).

To deactivate the patch, define \texttt{/tcbTemporaryPatchMintedFancyvrb} with any content \texttt{before} the \texttt{minted} library is loaded.

This patch is going to be removed as soon as the package clash is resolved by official releases of \texttt{minted} (or \texttt{fancyvrb}).
17.6 Common Option Keys of all Libraries

For the \langle \textit{options} \rangle in \texttt{tcblisting} \textsuperscript{\textsuperscript{P.321}} respectively \texttt{tcbinputlisting} \textsuperscript{\textsuperscript{P.323}} the following \texttt{pgf} keys can be applied. The key tree path /tcb/ is not to be used inside these macros.

/tcb/listing engine=\langle \textit{engine} \rangle \hspace{1cm} \text{(no default)}

Sets the \langle \textit{engine} \rangle which typesets the listings. Feasible values are
- \texttt{listings}, if library \texttt{listings} or \texttt{listingsutf8} is loaded.
- \texttt{minted}, if library \texttt{minted} is loaded.

/tcb/listing file=\langle \textit{file name} \rangle \hspace{1cm} \text{(no default, initially \texttt{\jobname.listing})}

Sets the \langle \textit{file name} \rangle of the file which is used to save listings.

/tcb/listing and text \hspace{1cm} \text{(no value, initially set)}

Typesets the environment content as listing in the upper part and as compiled text in the lower part.

/tcb/text and listing \hspace{1cm} \text{(no value)}

Typesets the environment content as compiled text in the upper part and as listing in the lower part.

/tcb/listing only \hspace{1cm} \text{(no value)}

Typesets the environment content as listing.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

This is a \LaTeX\ example.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text and listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

This is a \LaTeX\ example.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing only}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
/tcb/text only

Typesets the environment content as compiled text.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text only}
This is a \LaTeX example.
\end{tcblisting}

This is a \LaTeX example.

/tcb/comment\equal{(text)}

(no default, initially empty)

Records a comment with \langle text\rangle as content. The comment is displayed e.g. in conjunction with /tcb/listing and comment \rightarrow P.336 and /tcb/comment and listing \rightarrow P.336.

\begin{tcblisting}{comment={This comment is really only a comment},
colback=red!5!white,colframe=red!75!black}
This is a \textbf{tcolorbox}.
\end{tcblisting}

This is a \textbf{tcolorbox}.

This is a \textbf{tcolorbox}.

This is a \textbf{tcolorbox}.

This is a \textbf{tcolorbox}.

/tcb/comment only

Typesets the environment content with the comment text.

\begin{tcblisting}{comment only,
comment={This is a comment.},
colback=red!5!white,colframe=red!75!black}
This is a \textbf{tcolorbox}.
\end{tcblisting}

This is a comment.

/tcb/image comment\equal{⟨options⟩}{⟨filename⟩}

(style, no default, initially unset)

Uses an image denoted by \langle filename\rangle as comment for the listing. The image is included by the standard \includegraphics macro with given \langle options\rangle.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment,
image comment={width=2.5cm}{example-image-a.pdf},center lower}
This is a \LaTeX example.
\end{tcblisting}

This is a \LaTeX example.

A
Uses an image denoted by \texttt{<filename>} as \textit{comment} for the listing. The image is included by the \texttt{tcbincludegraphics} \footnote{P. 265} macro. The inclusion can be customized by \texttt{/tcb/comment style} \footnote{P. 336}.

\textbf{Important:} The library \texttt{skins} is needed to apply this option.

\begin{verbatim}
\% \tcbuselibrary{skins}
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment,  
 righthand width=3cm,lower separated=false,  
 tcbimage comment={example-image-a.pdf}, 
 comment style={size=fbox,colframe=blue,colback=blue!50,sharp corners, 
 drop fuzzy shadow}}
This is a \LaTeX\ example.
\end{tcblisting}
\end{verbatim}
The libraries \texttt{skins} and \texttt{raster} are needed to apply this option.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and comment,\%
\tcbuselibrary{skins,raster}\%
\begin{tcblisting}{}{}
% \texttt{tcbuselibrary(skins,raster)}
begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and comment,\%
\quad\texttt{righthand width=3cm,lower separated=false,middle=1mm,}\%
\quad\texttt{pdf comment=tcolorbox-example.pdf,}\%
\quad\texttt{comment style=[raster columns=3,graphics pages={1,2,3},}\%
\quad\texttt{colframe=blue,drop fuzzy shadow]}}\%
\begin{tcblistng}{colback=red!5!white,colframe=red!75!black,listing and comment,\%
\quad\texttt{righthand width=3cm,lower separated=false,middle=1mm,}\%
\quad\texttt{pdf comment=tcolorbox-example.pdf,}\%
\quad\texttt{comment style=[raster columns=3,graphics pages={1,2,3},}\%
\quad\texttt{colframe=blue,drop fuzzy shadow]}}\%
\end{tcblisting}\%\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and comment,\%
\quad\texttt{righthand width=3cm,lower separated=false,middle=1mm,}\%
\quad\texttt{pdf comment=tcolorbox-example.pdf,}\%
\quad\texttt{comment style=[raster columns=3,graphics pages={1,2,3},}\%
\quad\texttt{colframe=blue,drop fuzzy shadow]}}\%
\end{tcblisting}\%
This is a \LaTeX\ example.\%
\end{tcblisting}\%\end{tcblisting}\%
This is a \LaTeX\ example.

Sets the PDF file name extension for /tcb/pdf comment → P.335 to \langle extension \rangle. Note that \langle extension \rangle always overwrites any actual extension given inside /tcb/pdf comment → P.335.

Sets the \langle options \rangle for /tcb/tcbimage comment → P.334 and /tcb/pdf comment → P.335. These are tcolorbox options to customize the colored box drawn around the image(s), also image options encapsulated by /tcb/graphics options → P.268, and tcbraster → P.300 options for /tcb/pdf comment → P.335.

Typesets the environment content as listing in the upper part and a given comment in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and comment, comment={This is my comment. It may contain line breaks. \par It can even use the environment content «This is a \LaTeX\ example.}}
This is a \LaTeX\ example.
\end{tcblisting}

This is my comment. It may contain line breaks.
It can even use the environment content «This is a \LaTeX\ example.»

Typesets a given comment in the upper part and the environment content as listing in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment and listing, comment={This is my comment.}}
This is a \LaTeX\ example.
\end{tcblisting}

This is my comment.

This is a \LaTeX\ example.
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.  
This is a \LaTeX\ example.

Note that sidebyside=false has to be added, if the setting of /tcb/listing side text is to be annihilated.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text side listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.  
This is a \LaTeX\ example.

/tcb/listing outside text  (no value)

Typesets the environment content side by side as listing in a \texttt{tcolorbox} and as compiled text outside the box in the right part of the page. Nevertheless, the outside text is treated as \textit{lower} part of the \texttt{tcolorbox} and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 123.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing outside text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.  
This is a \LaTeX\ example.
Typesets the environment content side by side as listing in a `tcolorbox` and as compiled text outside the box in the left part of the page. Nevertheless, the outside text is treated as lower part of the `tcolorbox` and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 123.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text outside listing}
This is a \LaTeX\ example.
\end{tcblisting}
This is a \LaTeX\ example.

Typesets the environment content side by side as listing in the left (upper) part and a given comment in the right (lower) part. This is a shortcut for setting `/tcb/listing and comment → P.336` and `/tcb/sidebyside → P.123`.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment, righthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

Typesets the environment content side by side with a given comment in the left (upper) part and as listing in the right (lower) part. This is a shortcut for setting `/tcb/comment and listing → P.336` and `/tcb/sidebyside → P.123`.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment side listing, lefthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
/tcb/listing outside comment  (no value)
Typesets the environment content side by side as listing in a \texttt{tcolorbox} and a given comment outside the box in the right part of the page. Nevertheless, the outside text is treated as lower part of the \texttt{tcolorbox} and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 123.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing outside comment, righthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

/tcb/comment outside listing  (no value)
Typesets the environment content side by side as listing in a \texttt{tcolorbox} and a given comment outside the box in the left part of the page. Nevertheless, the outside text is treated as lower part of the \texttt{tcolorbox} and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 123.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment outside listing, lefthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

/tcb/listing above text  (no value)
Typesets the environment content as listing in a \texttt{tcolorbox} and as compiled text outside and below the box. The outside text is treated as lower part of the \texttt{tcolorbox} and can be formatted with all lower part options. The distance between box and text is controlled by \texttt{/tcb/middle} → P.43.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above text}
This is a \LaTeX\ example.
\end{tcblisting}

/tcb/listing above* text  (no value)
Widely equal to /tcb/listing above text, but the outside text is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and text is controlled by \texttt{/tcb/after} → P.81.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above* text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
/tcb/text above listing

Typesets the environment content as listing in a tcolorbox and as compiled text outside and above the box. The outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The distance between box and text is controlled by /tcb/middle → P.43.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,\text above listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/text above* listing

Widely equal to /tcb/text above listing, but the outside text is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and text is controlled by /tcb/before → P.81.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,\text above listing,\center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/listing above comment

Typesets the environment content as listing in a tcolorbox and a given comment outside and below the box. The outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The distance between box and comment is controlled by /tcb/middle → P.43.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,\text above comment,center lower,\image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/listing above* comment

Widely equal to /tcb/listing above comment, but the outside comment is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and comment is controlled by /tcb/after → P.81.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,\text above comment,center lower,\image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
\texttt{/tcb/comment above listing} \hspace{1cm} (no value)

Typesets the environment content as listing in a \texttt{tcolorbox} and a given comment outside and above the box. The outside text is treated as \textit{lower} part of the \texttt{tcolorbox} and can be formatted with all lower part options. The distance between box and comment is controlled by \texttt{/tcb/middle - P.43}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment above listing,center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

\begin{center}
\includegraphics[width=3cm]{example-image-a.pdf}
\end{center}

This is a \LaTeX\ example.

\texttt{/tcb/comment above* listing} \hspace{1cm} (no value)

Widely equal to \texttt{/tcb/comment above listing}, but the outside comment is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and comment is controlled by \texttt{/tcb/before - P.81}.
17.7 Option Keys for Processing and Full Document Examples

A complete \LaTeX document including \texttt{\documentclass}, \texttt{\begin{document}} and \texttt{\end{document}} cannot be processed directly by \texttt{tcolorbox}. It always has to be compiled separately. There are two methods supported by the package to process and display such a full document example:

- Prepare and compile the example document independent from your main document. The source file and the resulting PDF file can be included into the main document afterwards. This is the most economic way since the example document can be left untouched after the example is complete.

- The other possibility is to compile the example on the fly while the main document is compiled. This way has some charm, because the example can be edited inside the main document. But be aware that the compilation of the example is issued on every run of the main document. Also, there are fewer degrees of freedom how the example is compiled.

For both methods, the resulting example PDF file can be included as a \texttt{/tcb/pdf comment} \textsuperscript{+P.335}.

The following example shows how to apply the first method. There already is a file \texttt{tcolorbox-example.tex} and a PDF file \texttt{tcolorbox-example.pdf}. Both of them are input partly by the following:

```latex
% \tcbuselibrary{breakable,skins,raster}
\tcbinputlisting{
   enhanced jigsaw,breakable,pad at break*=2mm,height fixed for=first and middle,
   lower separated=false,
   leftlower=0pt,rightlower=0pt,middle=0pt,
   colframe=red!50!black,colback=yellow!10!white,
   listing and comment,
   listing file={tcolorbox-example},
   listing options=
   \{style=tcblatex,txcsstyle=\color{red!70!black},firstline=20,lastline=85\},
   after upper={\par\bigskip\texttt{\ldots}\par},
   pdf comment,
   comment style={drop lifted shadow,graphics pages={1,...,4}},
}
% arara: pdflatex: { }
% arara: pdflatex: { synctex: yes }
% \documentclass{article}
\usepackage{tikz,lipsum,lmodern}
\usepackage[most]{tcolorbox}
\begin{document}
%----------------------------------------------------------
\section{Colored boxes}
\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black]
My box.
\end{tcolorbox}
\begin{tcolorbox}[colback=blue!5!white,colframe=blue!75!black,title=My title]
My box with my title.
\end{tcolorbox}
\begin{tcolorbox}[colback=green!5!white,colframe=green!75!black]
```

342
Upper part of my box.
\tcblower
Lower part of my box.
\end{tcolorbox}

\begin{tcolorbox}[colback=yellow!5!white,colframe=yellow!50!black, colbacktitle=yellow!75!black,title=My title]
I can do this also with a title.
\tcblower
Lower part of my box.
\end{tcolorbox}

\begin{tcolorbox}[colback=yellow!10!white,colframe=red!75!black,lowerbox=invisible, savelowerto=\jobname_ex.tex]
Now, we play hide and seek. Where is the lower part?
\tcblower
I'm invisible until you find me.
\end{tcolorbox}

\begin{tcolorbox}[colback=yellow!10!white,colframe=red!75!black,title=Here I am]
\input{\jobname_ex.tex}
\end{tcolorbox}

\begin{tcolorbox}[enhanced,sharp corners=uphill, colback=blue!50!white,colframe=blue!25!black,coltext=yellow, fontupper=\Large\bfseries,arc=6mm,boxrule=2mm,boxsep=5mm, borderline={0.3mm}{0.3mm}{white}]
Funny settings.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,frame style image=blueshade.png, opacityback=0.75,opacitybacktitle=0.25, colback=blue!5!white,colframe=blue!75!black, title=My title]
This box is filled with an external image. \par
Title and interior are made partly transparent to show the image.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,attach boxed title to top center={yshift=-3mm,yshifttext=-1mm}, colback=blue!5!white,colframe=blue!75!black,colbacktitle=red!80!black, title=My title,fonttitle=\bfseries, boxed title style={size=small,colframe=red!50!black} ]
...
\end{tcolorbox}
1 Colored Boxes

- My box.
- My box with an title.
- Figure part of our box.

2 Infinite Boxes

- This box.
- I can do this also with infinite.

- You are hall of both. Where is the box now?

3 Breakable Boxes

- My box.
- I would need one tool see.

3.3 Theorem (Summation of Numbers): For all natural numbers \( n \) it holds:

\[
\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}.
\]

3 Watermarks

- How to watermark pages.

4 Boxes in Boxes

- This box is filled with an normal image and another as a watermark.

5 Colored boxes

- My box.
- My box with a watermark picture.

Here, you see my nice box with a picture as a watermark. This picture is automatically resized to fit the dimensions of my box. Instead of a grayscale picture text could be used or arbitrary graphical code. See the documentation for more options.

Here I am.

For all natural numbers \( n \) it holds:

\[
\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}.
\]

This is a LaTeX example:

\[
\begin{equation}
\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}.
\end{equation}
\]

\[
\begin{equation}
\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}.
\end{equation}
\]

4 Theorems

- Theorem 3.1: Summation of Numbers

\[
\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}.
\]

5 Boxes in boxes

- My box.
- My box with my title.

My title

- My box.
- My box with my title.

My title

7.1 Watermark

- This box is filled with an normal image and another as a watermark.

8 Breakable Boxes


8.1 Theorems

- Theorem 3.1: Summation of Numbers

\[
\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}.
\]

9 Watermarks

- How to watermark pages.

- This box is filled with an normal image and another as a watermark.

10 Breakable Boxes

- My box.
- My box with my title.

My title

- My box.
- My box with my title.

My title

7.1 Watermark

- This box is filled with an normal image and another as a watermark.

8 Breakable Boxes


8.1 Theorems

- Theorem 3.1: Summation of Numbers

\[
\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}.
\]

9 Watermarks

- How to watermark pages.

- This box is filled with an normal image and another as a watermark.

10 Breakable Boxes


8.1 Theorems

- Theorem 3.1: Summation of Numbers

\[
\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}.
\]

9 Watermarks

- How to watermark pages.

- This box is filled with an normal image and another as a watermark.

10 Breakable Boxes


8.1 Theorems

- Theorem 3.1: Summation of Numbers

\[
\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}.
\]

9 Watermarks

- How to watermark pages.

- This box is filled with an normal image and another as a watermark.

10 Breakable Boxes


8.1 Theorems

- Theorem 3.1: Summation of Numbers

\[
\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}.
\]

9 Watermarks

- How to watermark pages.

- This box is filled with an normal image and another as a watermark.

10 Breakable Boxes


8.1 Theorems

- Theorem 3.1: Summation of Numbers

\[
\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}.
\]

9 Watermarks

- How to watermark pages.

- This box is filled with an normal image and another as a watermark.

10 Breakable Boxes


8.1 Theorems

- Theorem 3.1: Summation of Numbers

\[
\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}.
\]
/tcb/no process (no default)

Removes all processing commands if set before.

/tcb/process code=(code) (no default, initially empty)

Adds \texttt{⟨code⟩} which is executed during \texttt{\_\textbf{tcbinputlisting}} \textsuperscript{P.323} and \texttt{tcblisting} \textsuperscript{P.321}. At the time of executing the given \texttt{⟨code⟩}, the listing is already written to \texttt{/tcb/listing} \textsuperscript{P.332}, but the colored box is not constructed yet. Its intended use is to process the listing somehow before displaying. The processing result can be used inside a \texttt{/tcb/comment} \textsuperscript{P.333}. Several \texttt{/tcb/process code} options can be given which are processed in the given order. Typically, \texttt{⟨code⟩} is added by using the following styles \texttt{/tcb/run system command}, \texttt{/tcb/run pdflatex}, etc.

To use the further options, the compiler has to be called with the \texttt{-shell-escape} permission to authorize potentially dangerous system calls. Be warned that this is a security risk. Anyway, it’s more economic to compile examples independent from the main document and to include them as shown in the previous pages.

/tcb/run system command=(system command) (style, no default, initially unset)

Runs a \texttt{⟨system command⟩}, if the document is compiled with the \texttt{-shell-escape} permission. The current listing file can be accessed as \texttt{\_\_filename\_area\_filename\_base\_filename\_ext}. This \texttt{⟨system command⟩} is added to \texttt{/tcb/process code}.

/tcb/compilable listing (style, no default)

Sets \texttt{/tcb/listing} \textsuperscript{P.332} to \texttt{\jobname\_listing\_⟨counter⟩}.

The default \texttt{/tcb/listing} \textsuperscript{P.332} setting cannot be used to compile a listing, since the base name equals the \texttt{\jobname} and the included PDF files should be unique. Therefore, to use \texttt{/tcb/run pdflatex} etc., the \texttt{/tcb/listing} \textsuperscript{P.332} has to be set to a unique value. One may use \texttt{/tcb/compilable listing} for this purpose.

/tcb/run pdflatex=(arguments) (style, no default, initially unset)

Issues a \texttt{pdflatex} compilation of the listing with the given \texttt{⟨arguments⟩}.

- The main document has to be compiled with the \texttt{-shell-escape} permission.
- The \texttt{/tcb/listing} \textsuperscript{P.332} has to be unique for the listing.
- If the listing has to be compiled twice, add \texttt{run pdflatex} two times to the option list.

\begin{verbatim}
\documentclass{beamer}
\usetheme{Warsaw}
\begin{document}
\begin{frame}{Beamer example}
\begin{block}{Hello World}
\begin{itemize}[<+->]
\item One
\item Two
\end{itemize}
\end{block}
\end{frame}
\end{document}
\end{verbatim}
\begin{alertblock}{Integral}
\begin{equation}
\visible<3->\int_1^x \frac{1}{t} \, dt
\visible<4-> = \ln(x).\)
\end{equation}
\end{alertblock}
\end{frame}
\end{document}
\documentclass{article}
\usepackage{pstricks,multido}
\begin{document}
\psset{unit=3}
\multido{\nHue=0.01+0.01}{100}{
\definecolor{MyColor}{hsb}{\nHue,1,1}
\pscircle[linewidth=0.01,linecolor=MyColor]{\nHue}}
\end{document}
For most applications, you will like to add `/tcb/freeze pdf` as option, since the included pdf file is only refreshed, if the source for this file has changed.

```
2016-07-14	/tcb/freeze file=(file)
              (no default, initially unset)

          Observes some ⟨file⟩, usually the final file produced by /
tcb/process code →P.345, /tcb/run system command →P.345, /tcb/run pdflatex →P.345, etc. If the MD5 checksum of the current /tcb/listing file →P.332 is unchanged and ⟨file⟩ exists, the processing is skipped and the ⟨file⟩ is kept (frozen). Typically, the style /tcb/freeze pdf can be used for convenience.

2016-07-14	/tcb/freeze none
              (no default, initially set)

          Freeze no file and always execute the given process commands.

2016-07-14	/tcb/freeze extension=(text)
              (style, no default)

          Calls /tcb/freeze file with the current /tcb/listing file →P.332 stripped with its extension plus ⟨text⟩ as new extension.
```

```
...            listing file=myfile.tex,
  freeze extension=-modified.pdf,  % -> myfile-modified.pdf is observed
...```

```
2016-07-14	/tcb/freeze pdf
              (no value)

          Calls /tcb/freeze file with the current /tcb/listing file →P.332 stripped with its extension plus .pdf as new extension.

2016-07-14	/tcb/freeze png
              (no value)

          Calls /tcb/freeze file with the current /tcb/listing file →P.332 stripped with its extension plus .png as new extension. See the examples for /tcb/run pdflatex →P.345 and /tcb/run ps2pdf →P.347.

2016-07-14	/tcb/freeze jpg
              (no value)

          Calls /tcb/freeze file with the current /tcb/listing file →P.332 stripped with its extension plus .jpg as new extension.
```
17.8 Creation of \LaTeX\ Tutorials

The following source code gives a guideline for the creation of \LaTeX\ tutorials. In the next section, a framework for \LaTeX\ exercises is described. All examples shall be numbered optionally.

Firstly, some additional \texttt{tcb} keys are defined for the appearance. For the examples, three environments \texttt{texexp}, \texttt{texexptitled}, and \texttt{texexptitledspec} are defined with automatic numbering.

- \texttt{texexp} is used for untitled examples,
- \texttt{texexptitled} is used for titled examples,
- \texttt{texexptitledspec} is used for titled examples with special treatment.

\textit{Definition in the preamble:}

\begin{verbatim}
\tcbset{
  texexp/.style={colframe=red!50!yellow!50!black, colback=red!50!yellow!5!white,
  coltitle=red!50!yellow!3!white,
  fonttitle=\small\textsf{\bfseries}, fontupper=\small, fontlower=\small},
example/.style 2 args={texexp,
  title={Example \thetcbcounter: #1},label={#2}},
}
\newtcblisting{texexp}
This is a \LaTeX\ example which displays the text as source code and in compiled form.
\end{tcblisting}

\begin{tcblisting}{texexp}
This is a \LaTeX\ example which displays the text as source code and in compiled form.
\end{tcblisting}

\begin{tcblisting}{texexp}
This is a \LaTeX\ example which displays the text as source code and in compiled form.
\end{tcblisting}

\begin{texexptitled}{First example with a title line}{firstExample}
Here, we use Example \ref{firstExample} with a title line.
\end{texexptitled}

\begin{example}
Example 17.1: First example with a title line
Here, we use Example \ref{firstExample} with a title line.
\end{example}

\begin{example}
Here, we use Example 17.1 with a title line.
\end{example}
This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code only.

This is a \LaTeX\ example which displays the text in compiled form only.

Example 17.2: An Example with a Heading

This is a \LaTeX\ example with a numbered heading line which can be referred to.

Here, we see Example 17.2.
The keys can be used in combination. Here, an example with a heading line and source code only is given.

Example 17.3: Another Example with a Heading

The keys can be used in combination. Here, an example with a heading line and source code only is given.

Here, we see Example 17.3.

Example 17.4: A floating Example with a Heading

This is another \LaTeX\ example with numbered heading line.
But now, the box is a floating object.

The floating box of the last example is seen as Example \ref{heading3} on page \pageref{heading3}.

The floating box of the last example is seen as Example 17.4 on page 351.

Example 17.5: Special application

Some \LaTeX\ source code.

For special cases, the environment \texttt{tcolorbox} with style \texttt{example} can be used directly. As one can see, the upper and the lower part of the box can be used uncoupled also.
Example 17.6: How to use options (1):
The basic example

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}

Example 17.7: How to use options (2):
The text output is centered and the segmentation line has vanished.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
Example 17.8: How to use options (3):
Here, the `tikzpicture` is totally hidden. The `bicolor` skin highlights the output.

```latex
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
```

Example 17.9: How to use options (4):
The `bicolor` skin also works with side by side mode.

```latex
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
```
Example 17.10: How to use options (5):
Putting our picture outside is just a matter of one word.
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
\(\w:1cm\) circle (7mm);}
\end{tikzpicture}

Example 17.11: How to use options (6):
The picture may also be put above the listing box.
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
\(\w:1cm\) circle (7mm);}
\end{tikzpicture}
Example 17.12: How to use options (7): Our style is easily transformed into a beamerish one.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
 (\w:1cm) circle (7mm);}
\end{tikzpicture}
17.9 Creation of \LaTeX{} Exercises

In the following, a guideline is given for the creation of \LaTeX{} exercises with solutions. These solutions are saved to disk for application at a place of choice. Therefore, all used exercises are logged to a file `jobname.records` for automatic processing. The solution contents themselves are saved to a subdirectory named `solutions`. Also see Section 8 on page 135.

- Before the first exercise is given, \texttt{\textbackslash tcbstartrecording} has to be called to start recording.
- The solution is given as content of a \texttt{tcboutputlisting} environment. Note, that you can use this content also inside the exercise with \texttt{\textbackslash tcbuselistingtext} in compiled form.
- After the last exercise is given (and before using the solutions), \texttt{\textbackslash tcbstoprecording} has to be called to stop recording.
- The solutions are loaded by \texttt{\textbackslash tcbinputrecords}.

Inside the exercise text, there may be text parts which are needed as \LaTeX{} source code and as compiled text as well. These parts can be saved by \texttt{\textbackslash tcbwritetemp} and used in compiled form by \texttt{\textbackslash tcbusetemp} or as source code by \texttt{\textbackslash tcbsetemplisting}.

At first, we generate some a common style for the exercises and the solutions. Further, since exercises and solutions should be numbered, we force to use a label `⟨marker⟩`. Automatically, the label `exe:⟨marker⟩` is used to mark the exercise and the label `sol:⟨marker⟩` is used to mark the solution.

\begin{quote}
\texttt{\textbackslash tcbset\{texercisestyle/.style={arc=0.5mm, colframe=blue!25!yellow!90!white, colback=blue!25!yellow!5!white, coltitle=blue!25!yellow!40!black, fonttitle=\small\textsf{bfseries}, fontupper=\small, fontlower=\small, listing options={style=tcblatex,tcxcsstyle=*$\textcolor{red!40!black}$},}}
\end{quote}

With these preparations, the kernel environment \texttt{texercise} for our exercises is created quickly:

\begin{quote}
\begin{verbatim}
\newtcolorbox[auto counter,number within=section,list inside=exam]{texercise}[2][]{%
texercisestyle, listing file={solutions/texercise\thetcbcounter.tex}, label={exe:#2}, record={\string\processsol{solutions/texercise\thetcbcounter.tex}{#2}}, title={Exercise \thetcbcounter\hfill Solution on page \pageref{sol:#2}}, list text={Exercise with solution on page \pageref{sol:#2},#1}}
\end{verbatim}
\end{quote}
The following examples demonstrate the application.

\begin{exercise}{tabular_example}
\begin{tcboutputlisting}
\begin{tabular}{|p{3cm}|p{3cm}|p{3cm}|p{3cm}|}
\hline
\multicolumn{4}{|c|}{\bfseries\itshape Das alte Italien}\\
\hline
\multicolumn{2}{|c|}{\bfseries\itshape Mittelalter}\\
\hline
\multicolumn{1}{|c|}{\itshape Republik} & \multicolumn{1}{c|}{\itshape Kaiserreich} & \multicolumn{1}{c|}{\itshape Franken} & \multicolumn{1}{c|}{\itshape Teilstaaten} \\
\hline
In den Zeiten der römischen Republik standen dem Staat jeweils zwei Konsuln vor, deren Machtbefugnisse identisch waren. & Das römische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser, regiert. & In der Völkerwanderungszeit übernahmen die Goten und später die Franken die Vorherrschaft. & Im späteren Mittelalter regierten Fürsten einen Fleckenteppich von Einzelstaaten. \\
\hline
\end{tabular}
\end{tcboutputlisting}
\end{exercise}

Exercise 17.1 Solution on page 360

Create the following table:

<table>
<thead>
<tr>
<th>Das alte Italien</th>
<th>Mittelalter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Republik</strong></td>
<td><strong>Kaiserreich</strong></td>
</tr>
</tbody>
</table>

357
Create a new macro \verb+\headingline+ which produces the following output:

\headingline{Very important heading}

Very important heading

Create a new macro \verb+\minitable+ which produces the following output:

\minitable{My heading}{In this tiny tabular, there is only a heading and some text below which has a width of ten centimeters.}

\begin{tabular}{p{10cm}}
\hline
\multicolumn{1}{c}{\bfseries My heading} \\
\hline
In this tiny tabular, there is only a heading and some text below which has a width of ten centimeters.
\end{tabular}
Create a new macro \verb+\synop+ which typesets a synoptic text according to the following example. Base your macro on a tabular which takes the total line width. \par
\smallskip
\synop{Neil Armstrong}{That’s one small step for a man, one giant leap for mankind.}{Das ist ein kleiner Schritt für einen Mann, ein riesiger Sprung für die Menschheit.}

\begin{tcbwritetemp}
\synop{Neil Armstrong}{That’s one small step for a man, one giant leap for mankind.}{Das ist ein kleiner Schritt für einen Mann, ein riesiger Sprung für die Menschheit.}
\end{tcbwritetemp}

Exercise 17.4

Create a new macro \verb+\synop+ which typesets a synoptic text according to the following example. Base your macro on a tabular which takes the total line width.

\synop{Neil Armstrong}{That’s one small step for a man, one giant leap for mankind.}{Das ist ein kleiner Schritt für einen Mann, ein riesiger Sprung für die Menschheit.}

\begin{tabular}{|p{\linewidth}|p{\linewidth}|}
\hline
\textbf{English} & \textbf{German} \\
\hline
That’s one small step for a man, one giant leap for mankind. & Das ist ein kleiner Schritt für einen Mann, ein riesiger Sprung für die Menschheit. \\
\hline
\end{tabular}

Now, we give a list of all exercises with:

\begin{tcblistof}{\subsection}{List of Exercises}{\label{listofexercises}}

17.1 Exercise with solution on page 360 ........................................ 357
17.2 Exercise with solution on page 360 ........................................ 358
17.3 Exercise with solution on page 360 ........................................ 358
17.4 Exercise with solution on page 361 ........................................ 359

17.10 List of Exercises

Exercise 17.1
Exercise 17.2
Exercise 17.3
Exercise 17.4
17.11 Solutions for the given \LaTeX\ Exercises

For all solutions, a macro \processsol was written to the file \jobname.records. Now, we need a definition for this macro to use the solutions.

% \usepackage{hyperref} % for phantomlabel
\newtcbinputlisting{\processsol}{\jobname.records}{%
texercisestyle,
listing only,
listing file={#1},
phantomlabel={sol:#2},% title={Solution for Exercise \ref{exe:#2} on page \pageref{exe:#2}},
}%
The loading of all solutions is done by:
\tcbinputrecords

With this, we get:

Solution for Exercise 17.1 on page 357

\begin{tabular}{|p{3cm}|p{3cm}|p{3cm}|p{3cm}|}
\hline
\multicolumn{4}{|c|}{\bfseries\itshape Das alte Italien}\\
\hline
\multicolumn{2}{|c|}{\bfseries Antike} & \multicolumn{2}{c|}{\bfseries Mittelalter}\\
\hline
\multicolumn{1}{|c|}{\itshape Republik} & \multicolumn{1}{c|}{\itshape Kaiserreich} & \multicolumn{1}{c|}{\itshape Franken} & \multicolumn{1}{c|}{\itshape Teilstaaten}\\
\hline
In den Zeiten der römischen Republik standen dem Staat jeweils zwei Konsuln vor, deren Machtbefugnisse identisch waren. & Das römische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser, regiert. & In der Völkerwanderungszeit übernahmen die Goten und später die Franken die Vorherrschaft. & Im späteren Mittelalter regierten Fürsten einen Fleckenteppich von Einzelstaaten.\\
\end{tabular}

Solution for Exercise 17.2 on page 358

\newcommand{\headingline}[1]{% 
\begin{center}\Large\bfseries #1\end{center}}

Solution for Exercise 17.3 on page 358

\newcommand{\minitable}[2]{% 
\begin{center}\begin{tabular}{p{10cm}}\hline 
\multicolumn{1}{c}{\bfseries#1}\\
#2\\
\end{tabular}\end{center}}
\newcommand{\synop}[3]{%
\begin{tabular}{@{}p{\linewidth-\tabcolsep*2-\arrayrulewidth}/2} | %
p{\linewidth-\tabcolsep*2-\arrayrulewidth}/2 \{\%
\multicolumn{2}{c}{\bfseries #1} \hline
\multicolumn{1}{c|}{\itshape English} & \multicolumn{1}{c}{\itshape German} \hline
#2 & #3 \\
\end{tabular}}

18 Library \theorems

The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{theorems}

This also loads the package \texttt{amsmath}.

18.1 Macros of the Library

\defn{newtcbtheorem}{(init options)}{(name)}{(display name)}{(options)}{(prefix)}

Creates new environments \langle name \rangle and \langle name \rangle* based on \texttt{tcolorbox} to frame a (mathematical) theorem. The \langle display name \rangle is used in the title line with a number, e.g. «Theorem 5.1». The \langle options \rangle are given to the underlying \texttt{tcolorbox} to control the appearance. The \langle init options \rangle allow setting up automatic numbering, see Section 5 on page 114. The new environment \langle name \rangle takes one optional and two mandatory parameters. The optional parameter supplements the options and should be used only in rare cases. The first mandatory parameter is the title text for the theorem and is also set as \verb+/tcb/nameref+/\textsuperscript{P.105} identifier. The second mandatory parameter is a \langle marker \rangle. The theorem is automatically labeled with \langle prefix\rangle\langle separator\rangle\langle marker \rangle where \langle separator \rangle is predefined as “:”, see \verb+/tcb/label separator+/\textsuperscript{P.369}.

The new environment \langle name \rangle* takes one optional and one mandatory parameter and represents an unnumbered variant of the environment \langle name \rangle. This variant is not labeled and not listed in lists of theorems.

\begin{example}
\begin{mytheo}{This is my title}{theoexample}
This is the text of the theorem. The counter is automatically assigned and, in this example, prefixed with the section number. This theorem is numbered with \ref{th:theoexample}, it is given on page \pageref{th:theoexample}, and it is titled «This is my title».
\end{mytheo}
\end{example}

\begin{example}
The label parameter can be left empty without \LaTeX\ error. Or you may use an own label to reference Theorem \ref{myownlabel}.
\end{example}

\begin{example}
The label parameter can be left empty without \LaTeX\ error. Or you may use an own label to reference Theorem 18.2.
\end{example}
\begin{mytheo}{}
The title can also be left empty without problem. Note that the \enquote{:} vanished magically.
\end{mytheo}

\begin{mytheo*}{Unnumbered Theorem}
This theorem is not numbered.
\end{mytheo*}

\begin{mytheo*}{}
This theorem has no number and no title.
\end{mytheo*}

\begin{mytheo}{}
My Theorem: Unnumbered Theorem
This theorem is not numbered.
\end{mytheo}

\begin{mytheo*}{}
My Theorem
This theorem has no number and no title.
\end{mytheo*}

To switch off the \texttt{nameref} feature permanently, add \texttt{nameref/.style={}} inside the \langle\texttt{options}\rangle list.

\renewtcbtheorem[\langle\texttt{init options}\rangle]{\langle\texttt{name}\rangle}{\langle\texttt{display name}\rangle}{\langle\texttt{options}\rangle}{\langle\texttt{prefix}\rangle}

Operates like \texttt{newtcbtheorem} \textsuperscript{p.362}, but based on \texttt{renewenvironment} instead of \texttt{newenvironment}. An existing environment is redefined.
\texttt{tcboxmath}[\{\textit{options}\}\{\textit{mathematical box content}\}]\\
Creates a \texttt{tcolorbox} \cite{P.12} which is fitted to the width of the given \textit{mathematical box content}. This box is intended to be applied as part of a larger formula and may be used as replacement for the \texttt{boxed} macro of \texttt{amsmath}.

\begin{equation}
\tcset{fonttitle=\scriptsize}
\tcboxmath[\textcolor{LightBlue!25!white},colframe=blue]{ a^2 = 16 }
\quad \Rightarrow 
\tcboxmath[\textcolor{Salmon!25!white},colframe=red,title=Implication]{ a = 4 \lor a = -4. }
\end{equation}

\texttt{tcboxhighmath}[\{\textit{options}\}\{\textit{mathematical box content}\}]\\
This is a special case of the \texttt{tcboxmath} macro which uses the style \texttt{/tcb/highlight math} \cite{P.374}. It is intended to provide context sensitive highlighting of formula parts. The color settings via \texttt{/tcb/highlight math style} \cite{P.374} may be different inside theorems or other colored areas and outside.

\begin{align}
\tcset{myformula/.style={colback=yellow!10!white,colframe=red!50!black, every box/.style={highlight math style={colback=LightBlue!50!white,colframe=Navy}}}}
\begin{align}
\tcboxhighmath{\sum\limits_{n=1}^{\infty} \frac{1}{n}} &= \infty. \\
\int x^2 ~\text{d}x &= \frac13 x^3 + c.
\end{align}
\end{align}

\begin{align}
\tcset{myformula/.style={colback=yellow!10!white,colframe=red!50!black, every box/.style={highlight math style={colback=LightBlue!50!white,colframe=Navy}}}}
\begin{align}
\tcboxhighmath{\sum\limits_{n=1}^{\infty} \frac{1}{n}} &= \infty. \\
\int x^2 ~\text{d}x &= \frac13 x^3 + c.
\end{align}
\end{align}
\texttt{\textbackslash tcbhighmath} \textsuperscript{\textcopyright P.364} can be used in symbiosis with the \texttt{empheq} package which allows to specify own boxing commands to mark multiline formulas.

\begin{empheq}[box=\tcbhighmath]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x \, dx
\end{empheq}

\begin{empheq}[box=\tcbhighmath]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x \, dx
\end{empheq}

Besides \texttt{\textbackslash tcbhighmath} \textsuperscript{\textcopyright P.364}, one can easily define an independent new box based on \texttt{\textbackslash tcbox} \textsuperscript{\textcopyright P.14} which acts like \texttt{\textbackslash tcbhighmath} \textsuperscript{\textcopyright P.364}:

\begin{empheq}[box=\tcbhighmath]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x \, dx
\end{empheq}

% \usepackage{empheq}
\begin{empheq}[box=\tcbhighmath]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x \, dx
\end{empheq}

\begin{equation}
E = mc^2
\end{equation}

\begin{empheq}[box=\tcbhighmath]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x \, dx
\end{empheq}

\begin{empheq}[box=\tcbhighmath]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x \, dx
\end{empheq}

% \usepackage{empheq}
\begin{empheq}[box=\tcbhighmath]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x \, dx
\end{empheq}

\begin{empheq}[box=\tcbhighmath]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x \, dx
\end{empheq}

\begin{equation}
E = mc^2
\end{equation}
18.2 Option Keys of the Library

/tcb/separatortext={sign} (no default, initially :)
The given \textit{sign} is used inside the title text of a theorem as separator between display name combined with number and the specific title text. It is omitted, if there is no specific title text.

\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,separator sign={\ $\blacktriangleright$}}{theo}
\begin{sometheorem}{My example}{My theorem text.}
\end{sometheorem}

Theorem 18.4 ▶ My example
My theorem text.

/tcb/separatortext colon (style, no value, initially set)
Sets /tcb/separatortext to the default colon : sign.

\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,separator sign dash}{theo}
\begin{sometheorem}{My example}{My theorem text.}
\end{sometheorem}

Theorem 18.5 – My example
My theorem text.

/tcb/separatortext none (style, no value)
Sets /tcb/separatortext to empty.

\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,separator sign none}{theo}
\begin{sometheorem}{My example}{My theorem text.}
\end{sometheorem}

Theorem 18.6 My example
My theorem text.
The given \langle left \rangle and \langle right \rangle delimiter signs are used to frame the descriptive title text of a theorem.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,description delimiters={\flqq}{\frqq}}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 18.7: «My example»
My theorem text.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,description delimiters parenthesis}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 18.8: (My example)
My theorem text.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,description delimiters none}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 18.9: My example
My theorem text.
/tcb/description font=(text)  
(default empty, initially empty)
Sets ⟨text⟩ (e.g. font settings) before the descriptive title text deviating from /tcb/fonttitle→P.29. The ⟨text⟩ is removed, if description font is used without value.

\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 18.10: „My example.“
My theorem text.

/tcb/description formatter=(macro)  
(default empty, initially empty)
Sets ⟨macro⟩ as formatter for the descriptive title text. The ⟨macro⟩ has to take one mandatory argument (the description text).
Note that /tcb/description delimiters→P.367, /tcb/description color→P.367, and /tcb/description font are ignored, if this option is used.
If description formatter is used without value, the formatter is reset to its standard behavior.

\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 18.11: My example.
My theorem text.

/tcb/terminator sign=(sign)  
(no default, initially empty)
The given ⟨sign⟩ is used as terminator at the end of the title text of a theorem.

\begin{sometheorem}{My example}{.}
My theorem text.
\end{sometheorem}

Theorem 18.12: My example.
My theorem text.
Sets `/tcb/terminator sign colon` to the colon : sign.

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}%
{colback=white,colframe=red!50!black,fonttitle=\bfseries, separator sign dash,terminator sign colon}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
```

Theorem 18.13 – My example:

My theorem text.

Sets `/tcb/terminator sign dash` to an en-dash sign.

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}%
{colback=white,colframe=red!50!black,fonttitle=\bfseries, terminator sign dash}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
```

Theorem 18.14: My example –

My theorem text.

Sets `/tcb/terminator sign none` to the default empty text.

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}%
{colback=white,colframe=red!50!black,fonttitle=\bfseries, label separator=*}{theo}
\begin{sometheorem}{My example}{myex}
My theorem text.
\end{sometheorem}
```

See Example~\ref{theo*myex}.

Theorem 18.15: My example

My theorem text.

See Example 18.15.
The given \textit{style} is used in connection with labels created with environments which are defined themselves by \texttt{\newtcbtheorem}. This \textit{style} uses one argument which is automatically set to the full label marker of the environment, i.e. a text consisting of \textit{prefix} (defined by \texttt{\newtcbtheorem}), \texttt{/tcb/label separator} (\texttt{\P.369}), and \textit{marker} (defined by an actual theorem environment).

\begin{tcbitemize}
\item \texttt{\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}}
\item \texttt{\begin{sometheorem}{My example}{myex2}}
\item My theorem text.
\item \texttt{\end{sometheorem}}
\end{tcbitemize}

This automated \texttt{\hyperlink{theo:myex2}{hyper target can be linked to with a hyper link}}.

A second usage of \texttt{/tcb/theorem full label supplement} overwrites the first setting.

\begin{tcbitemize}
\item \texttt{\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}}
\item \texttt{\begin{sometheorem}{My example}{myex3}}
\item My theorem text.
\item \texttt{\end{sometheorem}}
\end{tcbitemize}

This automated \texttt{\hyperlink{XYZ-myex3}{hyper target can be linked to with a hyper link}}.
/tcb\theorem\ hanging indent=auto|\langle length\rangle\ (default\ auto, initially\ auto)

Sets the hanging indent of the theorem title to auto or the given \langle length\rangle. For auto, the hanging indent matches the display name, number and separator sign of the theorem. If \langle length\rangle is negative, the theorem title is indented positively without hanging indent.

\begin{someexample}
\begin{someexample}[\text{\begin{quote}This is a very long and complicated title for a quite short and nearly empty theorem\end{quote}}]{myexA1}
My theorem text.
\end{someexample}
\end{someexample}

\begin{someexample}[\text{\begin{quote}This is a very long and complicated title for a quite short and nearly empty theorem\end{quote}}]{myexA2}
My theorem text.
\end{someexample}

\begin{someexample}[\text{\begin{quote}This is a very long and complicated title for a quite short and nearly empty theorem\end{quote}}]{myexA3}
My theorem text.
\end{someexample}

\begin{someexample}[\text{\begin{quote}This is a very long and complicated title for a quite short and nearly empty theorem\end{quote}}]{myexA4}
My theorem text.
\end{someexample}

\begin{someexample}[\text{\begin{quote}This is a very long and complicated title for a quite short and nearly empty theorem\end{quote}}]{myexA1}
My theorem text.
\end{someexample}

\begin{someexample}[\text{\begin{quote}This is a very long and complicated title for a quite short and nearly empty theorem\end{quote}}]{myexA2}
My theorem text.
\end{someexample}

\begin{someexample}[\text{\begin{quote}This is a very long and complicated title for a quite short and nearly empty theorem\end{quote}}]{myexA3}
My theorem text.
\end{someexample}

\begin{someexample}[\text{\begin{quote}This is a very long and complicated title for a quite short and nearly empty theorem\end{quote}}]{myexA4}
My theorem text.
\end{someexample}

Theorem 18.18: This is a very long and complicated title for a quite short and nearly empty theorem

My theorem text.

Theorem 18.19: This is a very long and complicated title for a quite short and nearly empty theorem

My theorem text.

Theorem 18.20: This is a very long and complicated title for a quite short and nearly empty theorem

My theorem text.

Theorem 18.21: This is a very long and complicated title for a quite short and nearly empty theorem

My theorem text.
/tcb/theorem name and number (style, no value, initially set)
Prints theorem name followed by theorem number inside the title.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}[
{colback=white,colframe=red!50!black,fonttitle=\bfseries,
theorem name and number}{theo}\]
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

**Theorem 18.22:** My example
My theorem text.

/tcb/theorem number and name (style, no value)
Prints theorem number followed by theorem name inside the title.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}[
{colback=white,colframe=red!50!black,fonttitle=\bfseries,
theorem number and name}{theo}\]
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

**18.23 Theorem:** My example
My theorem text.

/tcb/theorem name (style, no value)
Prints theorem name without number inside the title.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}[
{enhanced, colback=white, colframe=red!50!black, fonttitle=\bfseries,
theorem name, watermark text={\thetcbcounter}}]{theo}\]
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

**Theorem:** My example
18.24
My theorem text.

/tcb/theorem number (style, no value)
Prints theorem number without name inside the title.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}[
{enhanced, colback=white, colframe=red!50!black, fonttitle=\bfseries,
theorem number}{theo}\]
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

**18.25:** My example
My theorem text.
This key can be used directly in a \texttt{tcolorbox} for a more flexible approach to create a theorem type box. The \texttt{(display name)} is used together with the increased \texttt{(counter)} value and the \texttt{(title)} for the title line of the box. Additionally, a \texttt{\label} with the given \texttt{(marker)} is created.

\begin{tcolorbox}
\[\texttt{colback=green!10,} \texttt{colframe=green!50!black,} \texttt{arc=4mm,} \texttt{theorem={Test}{texercise}{Direct usage}{myMarker}]}
\end{tcolorbox}

\texttt{\ref{myMarker}}.

For a common appearance inside the document, the key \texttt{theorem} should not be used directly as in the example above, but as part of a new environment created by hand or using \texttt{\newtcbtheorem} \textsuperscript{P.362}. 

% \newcounter{texercise}\% preamble
\begin{tcolorbox}[colback=green!10, colframe=green!50!black, arc=4mm,
  theorem={Test}{texercise}{Direct usage}{myMarker}]}
\end{tcolorbox}

Test 1: Direct usage

Here, we see the test \ref{myMarker}.
/tcb/highlight math

A style which is used for \tcbhighmath and which is predefined as notitle, nophantom, colframe=red, colback=yellow!25!white. It can be changed with the usual \pgf techniques or with /tcb/highlight math style.

\begin{align*}
\tcbhighmath 1 + 1 &= 2, \\
\tcbset{highlight math/.append style={left=0mm,right=0mm,top=0mm,bottom=0mm}}
\tcbhighmath 1 + 1 &= 2.
\end{align*}

/tcb/highlight math style=(style definition)

Changes the definition for /tcb/highlight math to notitle, nophantom plus the given (style definition). See /tcb/highlight math \textsuperscript{P.364} for another example.

\begin{align*}
\tcbhighmath[remember as=fx]{f(x)}
&= \int_1^x \frac{1}{t^2} dt \\
&= -\left[ \frac{1}{t} \right]_1^x \\
&= -\frac{1}{x} + \frac{1}{1} \\
&= 1 - \frac{1}{x}.
\end{align*}
Sets the upper part to mathematical mode with font \textit{\textstyle}.

Sets the lower part to mathematical mode with font \textit{\textstyle}.

Sets the upper part and lower part to mathematical mode with font \textit{\textstyle}.

\begin{tcolorbox}[math,colback=yellow!10!white,colframe=red!50!black]
\sum_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}

The following styles are only tested to work with the original \textit{amsmath} environments. If e.g. the equation environment is redefined as \textit{gather}, then /tcb/ams equation should /could not be used. Obviously, you are encouraged to use /tcb/ams gather→P.377 in this case.

\begin{tcolorbox}[ams equation,colback=yellow!10!white,colframe=red!50!black]
\sum_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}

\begin{tcolorbox}[ams equation*,colback=yellow!10!white,colframe=red!50!black]
\sum_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}
/tcb/ams align upper (style, no value)

Adds an amsmath align environment to the start and end of the upper part.

/tcb/ams align lower (style, no value)

Adds an amsmath align environment to the start and end of the lower part.

/tcb/ams align (style, no value)

Adds an amsmath align environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams align,colback=yellow!10!white,colframe=red!50!black]
\[ \sum_{n=1}^{\infty} \frac{1}{n} = \infty. \]
\[ \int x^2 \, dx = \frac{1}{3} x^3 + c. \]
\end{tcolorbox}

/tcb/ams align* upper (style, no value)

Adds an amsmath align* environment to the start and end of the upper part.

/tcb/ams align* lower (style, no value)

Adds an amsmath align* environment to the start and end of the lower part.

/tcb/ams align* (style, no value)

Adds an amsmath align* environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams align*,colback=yellow!10!white,colframe=red!50!black]
\[ \sum_{n=1}^{\infty} \frac{1}{n} = \infty. \]
\[ \int x^2 \, dx = \frac{1}{3} x^3 + c. \]
\end{tcolorbox}
/tcb/ams gather upper

Adds an amsmath gather environment to the start and end of the upper part.

/tcb/ams gather lower

Adds an amsmath gather environment to the start and end of the lower part.

/tcb/ams gather

Adds an amsmath gather environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams gather,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.\int x^2 \text{d}x = \frac{1}{3} x^3 + c.
\end{tcolorbox}

\begin{tcb/a}{ams gather*,colback=yellow!10!white,colframe=red!50!black}
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.\int x^2 \text{d}x = \frac{1}{3} x^3 + c.
\end{tcb/a}
Neutralizes the \abovedisplayskip of a following \texttt{align} or \texttt{gather} environment for the upper part. Note that the text content has to start with such a formula.

Neutralizes the \abovedisplayskip of a following \texttt{align} or \texttt{gather} environment for the lower part. Note that the text content has to start with such a formula.

Neutralizes the \abovedisplayskip of a following \texttt{align} or \texttt{gather} environment for the upper part and lower part. Note that the text content has to start with such a formula.

\begin{tcolorbox}[ams nodisplayskip,colback=yellow!10!white,colframe=red!50!black]
\begin{align}
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \tag{20} \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c. \tag{21}
\end{align}
\end{tcolorbox}

And now for something completely different.

New colored mathematical environments are easily created using \texttt{newtcolorbox} \textbullet \texttt{P.15}:

\begin{newtcolorbox}[mymath]{ams gather*,colback=yellow!10!white,colframe=red!50!black}
\begin{align}
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{align}
\end{newtcolorbox}

And now for something completely different.

All described options like \texttt{/tcb/ams gather upper} \textbullet \texttt{P.377}, \texttt{/tcb/ams gather lower} \textbullet \texttt{P.377}, \texttt{/tcb/ams gather} \textbullet \texttt{P.377} are (partially) setting (overwriting) the keys \texttt{/tcb/before upper} \textbullet \texttt{P.65}, \texttt{/tcb/after upper} \textbullet \texttt{P.66}, \texttt{/tcb/before lower} \textbullet \texttt{P.67}, \texttt{/tcb/after lower} \textbullet \texttt{P.68}.

Therefore, e.g. \texttt{tcbset{ams gather,before upper=\text{Pythagoras:}}} produces an invalid result. For this case, you are invited to use \texttt{tcbset{ams gather,before upper app=\text{Pythagoras:}}}, see \texttt{/tcb/before upper app} \textbullet \texttt{P.452}.
\texttt{/tcb\theoremstyle=(name)} \hspace{1cm} \text{(no default, initially \textbf{standard})}

Applies a predefined style \texttt{(name)} to the theorem environment. Some of the feasible \texttt{(name)} values resemble style names from the packages \texttt{theorem} and \texttt{ntheorem} to give convenient access to known patterns.

The styles alter \texttt{/tcb/separator sign $\rightarrow$ P.366}, \texttt{/tcb/description delimiters $\rightarrow$ P.367}, \texttt{/tcb/terminator sign $\rightarrow$ P.368}, and more. Therefore, one should apply such keys \textit{after a theorem style}.

For the following examples, we use:

\texttt{\newtcbtheorem[use counter from=mytheo]{theorem}{Theorem}{%}
\hspace{1cm}fonttitle=\bfseries\upshape,fontupper=\itshape,
\hspace{1cm}colframe=green!50!black,colback=green!10!white,
\hspace{1cm}colbacktitle=green!20!white,coltitle=blue!75!black}{theo}

The predefined styles are:

- \textbf{standard}: This is the initial value.

\begin{verbatim}
\begin{theorem}[theorem style=standard]{standard}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}
\end{verbatim}

Theorem 18.26: standard
\begin{center}
This is my theorem.
\begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{center}

- \textbf{change standard}

\begin{verbatim}
\begin{theorem}[theorem style=change standard]{change standard}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}
\end{verbatim}

18.27 Theorem: change standard
\begin{center}
This is my theorem.
\begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{center}

- \textbf{plain}

\begin{verbatim}
\begin{theorem}[theorem style=plain]{plain}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}
\end{verbatim}

Theorem 18.28 (plain): This is my theorem.
\begin{center}
\begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{center}
• break

\begin{theorem}[theorem style=break]{break}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

Theorem 18.29 (break):
This is my theorem.
\[a^2 + b^2 = c^2.\]

• plain apart

\begin{theorem}[theorem style=plain apart]{plain apart}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

Theorem 18.30 (plain apart)
This is my theorem.
\[a^2 + b^2 = c^2.\]

• change

\begin{theorem}[theorem style=change]{change}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

18.31 Theorem (change): This is my theorem.
\[a^2 + b^2 = c^2.\]

• change break

\begin{theorem}[theorem style=change break]{change break}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

18.32 Theorem (change break):
This is my theorem.
\[a^2 + b^2 = c^2.\]

• change apart

\begin{theorem}[theorem style=change apart]{change apart}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

18.33 Theorem (change apart)
This is my theorem.
\[a^2 + b^2 = c^2.\]
• margin

\begin{theorem}[theorem style=margin, left=10mm]{margin}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

\begin{theorem}[theorem style=margin, left=10mm, oversize]{margin}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

18.34 Theorem (margin): This is my theorem.
\begin{equation*} a^2 + b^2 = c^2. \end{equation*}

18.35 Theorem (margin): This is my theorem.
\begin{equation*} a^2 + b^2 = c^2. \end{equation*}

• margin break

\begin{theorem}[theorem style=margin break, left=10mm]{margin break}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

\begin{theorem}[theorem style=margin break, left=10mm, oversize]{margin break}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

18.36 Theorem (margin break):
\begin{equation*} This is my theorem. 
\end{equation*}
\begin{equation*} a^2 + b^2 = c^2. \end{equation*}

18.37 Theorem (margin break):
\begin{equation*} This is my theorem. 
\end{equation*}
\begin{equation*} a^2 + b^2 = c^2. \end{equation*}

• margin apart

\begin{theorem}[theorem style=margin apart, left=10mm]{margin apart}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

\begin{theorem}[theorem style=margin apart, left=10mm, oversize]{margin apart}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

18.38 Theorem (margin apart)
\begin{equation*} This is my theorem. 
\end{equation*}
\begin{equation*} a^2 + b^2 = c^2. \end{equation*}

18.39 Theorem (margin apart)
\begin{equation*} This is my theorem. 
\end{equation*}
\begin{equation*} a^2 + b^2 = c^2. \end{equation*}
18.3 Examples for Definitions and Theorems

In the following, the application of \texttt{newtcbtheorem} \textsuperscript{P.362} to highlight mathematical definitions, theorems, or the like is demonstrated.

At first, additional \texttt{tcb} keys are created for the appearance of the colored boxes. It is assumed that theorems and corollaries should be identically colored. All following environments are numbered with a common counter, but this can be changed easily. Here, the counter output is supplemented by the subsection number. Further, the \texttt{cleveref} package \textsuperscript{5} is used for clever references.

\begin{tcblisting}{defstyle/.style={fonttitle=\bfseries\upshape, fontupper=\slshape, arc=0mm, colback=blue!5!white,colframe=blue!75!black}, theostyle/.style={fonttitle=\bfseries\upshape, fontupper=\slshape, colback=red!10!white,colframe=red!75!black},}
\newtcbtheorem[number within=subsection,crefname={definition}{definitions}]{Definition}{Definition}{defstyle}{def}
\newtcbtheorem[use counter from=Definition,crefname={theorem}{theorems}]{Theorem}{Theorem}{theostyle}{theo}
\newtcbtheorem[use counter from=Definition,crefname={corollary}{corollaries}]{Corollary}{Corollary}{theostyle}{cor}
\end{tcblisting}

By \texttt{newtcbtheorem} \textsuperscript{P.362}, commonly numbered theorem environments are created now. \texttt{defstyle} and \texttt{theostyle} are used for the appearance.

Now, everything is prepared for the following examples.

The following theorem is numbered as \texttt{Cref\{theo:diffbarstetig\} and referenced with the marker \texttt{theo:diffbarstetig}.

\begin{Theorem}{Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung zu Testzwecken ungewöhnlich lang ist}{diffbarstetig}
Eine Funktion $f:I\to\mathbb{R}$ ist in $x_0\in I$ stetig, wenn $f$ in $x_0$ differenzierbar ist.
\end{Theorem}

The following theorem is numbered as Theorem 18.3.1 and referenced with the marker \texttt{theo:diffbarstetig}.

\begin{Theorem}{18.3.1: Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung zu Testzwecken ungewöhnlich lang ist}{diffbarstetig}
Eine Funktion $f:I \to \mathbb{R}$ ist in $x_0 \in I$ stetig, wenn $f$ in $x_0$ differenzierbar ist.
\end{Theorem}
The following definition is numbered as Def:diffbarkeit and referenced with the marker def:diffbarkeit.

\begin{Definition}{Differenzierbarkeit}{diffbarkeit}
Eine Funktion $f: I \to \mathbb{R}$ auf einem Intervall $I$ heißt in $x_0 \in I$ differenzierbar oder linear approximierbar, wenn der Grenzwert
\begin{equation*}
\lim_{x \to x_0} \frac{f(x) - f(x_0)}{x - x_0} = \lim_{h \to 0} \frac{f(x_0 + h) - f(x_0)}{h}
\end{equation*}
existiert. Bei Existenz heißt dieser Grenzwert Ableitung oder Differentialquotient von $f$ in $x_0$ und man schreibt für ihn
\begin{equation*}
f'(x_0) \quad \text{oder} \quad \frac{df}{dx}(x_0).
\end{equation*}
\end{Definition}

The following corollary is numbered as Cor:nullstellen and referenced with the marker cor: nullstellen.

\begin{Corollary}{Nullstellenexistenz}{nullstellen}
Ist $f: [a,b] \to \mathbb{R}$ stetig und haben $f(a)$ und $f(b)$ entgegengesetzte Vorzeichen, also $f(a)f(b) < 0$, so besitzt $f$ eine Nullstelle $x_0 \in ]a,b[$, also $f(x_0) = 0$.
\end{Corollary}
\begin{Theorem}[boxrule=2mm,toptitle=-1.5mm,bottomtitle=-1.5mm]{
Hinreichende Bedingung f"{u}r Wendepunkte}

$\forall f$ sei eine auf einem Intervall $[a,b]$ dreimal stetig differenzierbare Funktion. Ist $f''(x_0)=0$ in $x_0 \in [a,b]$ und $f'''(x_0) \neq 0$, so ist $(x_0,f(x_0))$ ein Wendepunkt von $f$.
\end{Theorem}

Theorem 18.3.4: Hinreichende Bedingung für Wendepunkte

\begin{quote}
$f$ sei eine auf einem Intervall $[a,b]$ dreimal stetig differenzierbare Funktion. Ist $f''(x_0) = 0$ in $x_0 \in [a,b]$ und $f'''(x_0) \neq 0$, so ist $(x_0,f(x_0))$ ein Wendepunkt von $f$.
\end{quote}

Theorem 18.3.5: Mittelwertsatz für $n$ Variable

Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x] \subseteq D$ einen Punkt $x_1 \in [x_0,x]$, so dass gilt

\begin{equation*}
f(x) - f(x_0) = \langle \nabla f(x_1), x-x_0 \rangle
\end{equation*}

% \usepackage{varioref}
% \usepackage{cleveref}
% \tcbuselibrary{skins}
\newtcbtheorem[use counter from=Definition]{YetAnotherTheorem}{Theorem}[
theorem style=plain apart,label type=theorem,enhanced,frame hidden,
boxrule=2mm,titlerule=0mm,toptitle=1mm,bottomtitle=1mm,
fonttitle=\bfseries\Large,fontupper=\normalsize,
coltitle=green!35!black,colbacktitle=green!15!white,
colback=green!50!yellow!15!white,]
estyle={frameshadow,boxlinesoff,boxrighthidden,boxleftoff,backgroundcolor=green!50!yellow!15!white}

\begin{YetAnotherTheorem}{Mittelwertsatz für $n$ Variable}{meanvaluetheorem}

Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x] \subseteq D$ einen Punkt $x_1 \in [x_0,x]$, so dass gilt

\begin{equation*}
f(x) - f(x_0) = \langle \nabla f(x_1), x-x_0 \rangle
\end{equation*}
\end{YetAnotherTheorem}

\medskip

Here, \texttt{cleveref} support is used to reference \Cref{theo:meanvaluetheorem} on \Cpageref{theo:meanvaluetheorem}. This \texttt{namecref} can also be referenced by \texttt{\Vref} resulting in \texttt{Theorem 18.3.5}.

Note that /tcb/label type → P.104 was used in the example above to feed \texttt{cleveref} with the needed name information.
Here, using \Vref resulting in \Vref{theo:meanvaluetheorem} is more interesting...

Here, using \Vref resulting in Theorem 18.3.5 on the preceding page is more interesting...

\begin{YetAnotherTheorem}{Mittelwertsatz f"{u}r $n$ Variable}{mittelwertsatz_n2}\%
Es sei $n\in\mathbb{N}$, $D\subseteq\mathbb{R}^n$ eine offene Menge und $f\in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x]\subset D$ einen Punkt $\xi\in[x_0,x]$, so dass gilt
\begin{equation*}
 f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top (x-x_0)
\end{equation*}
\end{YetAnotherTheorem}

\begin{YetAnotherTheorem}{Mittelwertsatz f"{u}r $n$ Variable}{mittelwertsatz_n3}\%
Es sei $n\in\mathbb{N}$, $D\subseteq\mathbb{R}^n$ eine offene Menge und $f\in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x]\subset D$ einen Punkt $\xi\in[x_0,x]$, so dass gilt
\begin{equation*}
 f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top (x-x_0)
\end{equation*}
\end{YetAnotherTheorem}
Theorem 18.3.8: Fundamental Theorem of Theorems


Nam dui ligula, fringilla a, egestas vehicula ut, mollis et, tellus. Donec dui metus, accumsan sed, cursus eget, felis. Curabitur lacinia metus, bibendum eu, accumsan id, vehicula a, turpis. Sed eu justo sem, dignissim luctus.

Theorem 18.3.9 (Mittelwertsatz für n Variable): Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D, \mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0, x] \subset D$ einen Punkt $\xi \in [x_0, x]$, so dass gilt

$$f(x) - f(x_0) = \text{grad} f(\xi)^\top (x - x_0)$$
18.4 Using other theorem environments with \tcolorbox

Instead of creating theorem environments with the methods described before, environments from other packages can be boxed with a \tcolorbox.

Environments may be created e.g. by methods from the \texttt{theorem} package or the \texttt{amsthm} package. \texttt{\tcolorboxenvironment} \cite{P.17} can be used to put a box around these environments.

\begin{tcolorbox}
\textbf{Definition in the preamble:}

\begin{verbatim}
\usepackage{amsthm}
\theoremstyle{plain}% from `amsthm'
\newtheorem{lem}{Lemma}% from `amsthm'
\tcolorboxenvironment{lem}{
enhanced jigsaw,colframe=cyan,interior hidden,
breakable,before skip=10pt,after skip=10pt }
\tcolorboxenvironment{proof}{% `proof' from `amsthm'
blanker,breakable,left=5mm,
before skip=10pt,after skip=10pt,
borderline west={1mm}{0pt}{red}}
\begin{lem}
lipsum[2]
\end{lem}
\lipsum[3]
\begin{proof}
lipsum[4]
\end{proof}
\end{verbatim}
\end{tcolorbox}

\begin{itemize}


\end{itemize}

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The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{breakable}

This also loads the package \texttt{pdflc}.

### 19.1 Technical Overview

The library \texttt{breakable} supports the automatic breaking of a \texttt{tcolorbox}. This feature is enabled by \texttt{/tcb/breakable} \textsuperscript{\textit{P.390}} and disabled by \texttt{/tcb/unbreakable} \textsuperscript{\textit{P.391}}.

If a \texttt{tcolorbox} is set to be \texttt{/tcb/breakable} \textsuperscript{\textit{P.390}}, then the following algorithm is executed:

1. The box content is read to a box register similar but not identical to the unbreakable case.
2. If the total box fits into the current page, it is shipped out visibly unbroken and the algorithm stops.

   \textbf{Unbroken Box}

   The box.

3. Otherwise, it is checked if at least \texttt{/tcb/lines before break} \textsuperscript{\textit{P.391}} of the upper box can be placed on the current page. If not, a page break is inserted and the algorithm goes back to Step 2.
4. Now, the \textit{break sequence} starts. The upper box part or the lower box part is split such that it fits into the current page. The fitting part is named \textit{first part} of the \textit{break sequence} and shipped out.

   \textbf{Broken Box}

   The box.

5. If the remaining content of the total box fits into the current page, the algorithm continues with Step 7, else with Step 6.
6. The upper box part or the lower box part is split such that it fits into the current page. The fitting part is named \textit{middle part} of the \textit{break sequence} and shipped out. Then, the algorithm goes back to Step 5.

   The box.

7. The remaining part is named \textit{last part} of the \textit{break sequence} and shipped out. The algorithm stops.

   The box.

The algorithm takes care that the optional segmentation line never appears at the end of a box. The optional lower box part is also checked to have at least \texttt{/tcb/lines before break} \textsuperscript{\textit{P.391}}.
In principle, all boxes of the *break sequence* share the same geometric parameters. The differences are:

- The given /tcb/before \textsuperscript{P.81} and /tcb/after \textsuperscript{P.81} values are used only before the *first* and after the *last* part of the *break sequence*.

- A special behavior between the parts of the *break sequence* can be given by /tcb/toprule at break \textsuperscript{P.395}, /tcb/bottomrule at break \textsuperscript{P.395}, /tcb/enlarge top at break by \textsuperscript{P.89}, and /tcb/enlarge bottom at break by \textsuperscript{P.89}.

- The /tcb/skin \textsuperscript{P.141} decides how the first, middle, and last part look like. Actually, every part type has its own skin given by the options /tcb/skin first \textsuperscript{P.141}, /tcb/skin middle \textsuperscript{P.141}, and /tcb/skin last \textsuperscript{P.141}. Typically, these options are set automatically by the main skin, see Subsection 19.8 from page 404.

19.2 Limitations and Known Bugs

- The maximal total height of the upper and of the lower part of normal breakable *tcolorboxes* is about 65536pt (ca. 2300cm) apiece. If such a part gets longer, the output will get buggy without warning. For very oversized boxes which are longer than 65536pt, use the *unlimited* value for /tcb/breakable \textsuperscript{P.390}. With the *unlimited* setting, the applied algorithm has (virtually) no height limit for boxes, but very likely the compiler memory will have to be increased for boxes longer than 300 pages (depending on compiler settings and box content). But it is recommended to use *unlimited* for critical large boxes only.

- You can nest an unbreakable *tcolorbox* inside another *tcolorbox*, even inside a breakable one. But you cannot nest a breakable box inside a breakable box. The /tcb/breakable \textsuperscript{P.390} key for a nested box is ignored automatically\textsuperscript{3}, i.e. inner boxes are always unbreakable.

After all, in the unlikely case you really want to have the nested box to be breakable, use /tcb/enforce breakable \textsuperscript{P.391} for the nested box\textsuperscript{4}. But, a *breakable box inside a breakable box* will usually give a mess.

- Depending on the \LaTeX engine, if your text content contains some text color changing commands, your color may not survive the break to the next box. See the documentation for /tcb/use color stack \textsuperscript{P.393} for more information.

- The *perpage* option of the *footmisc* package is deliberately deactivated inside a breakable box since all footnotes are placed at the end of the box (possibly far away from the reference point).

- Making a box /tcb/breakable \textsuperscript{P.390} which actually is not broken creates a box which acts *almost* like an unbreakable box. Visual differences are kept as indiscernible as possible, but can appear with certain /tcb/before \textsuperscript{P.81} and /tcb/after \textsuperscript{P.81} settings, especially, if there is an automatic page break before the box.

- \texttt{LuaTeX} version 0.95 changes the behavior of the basic \texttt{\vsplit} (a bug?!) resulting in badly broken boxes. Thanks to Jeremy Engel, the \texttt{\textcolor{breakable}} library contains a patch for this which also loads the \texttt{\textcolor{ifluatex}} package.

\textsuperscript{3}Until \texttt{tcolorbox 3.04}, the /tcb/breakable \textsuperscript{P.390} key was not ignored for nested boxes.

\textsuperscript{4} /tcb/enforce breakable \textsuperscript{P.391} acts like /tcb/breakable \textsuperscript{P.390} until \texttt{tcolorbox 3.04}.
19.3 Main Option Keys

/\texttt{tcb/breakable=}true|false|unlimited\ (default \texttt{true}, initially \texttt{false})

Allows the \texttt{tcolorbox} to be breakable. If the box is larger than the available space at the current page, the box is automatically broken and continued to the next page. All sorts of \texttt{tcolorbox} can be made breakable. It depends on the skin how the breaking looks like. If you do not know better, use /\texttt{tcb/enhanced}\n→ P.218 for breaking a box. The parts of the \textit{break sequence} are numbered by the counter \texttt{tcbbreakpart}.

- \texttt{false}: Sets the \texttt{tcolorbox} to be unbreakable.
- \texttt{true}: Breaks the \texttt{tcolorbox} from one page to another. The maximal total height of the upper and of the lower part is about 65536pt (ca. 2300cm or ca. 90 pages) apiece.
- \texttt{unlimited}: Experimental code for unlimited total height of breakable boxes. For boxes longer than 300 pages (or even shorter ones) the compiler memory will have to be increased.

\begin{tcolorbox}[breakable, title=My breakable box]
\lipsum[1-6]
\end{tcolorbox}

\lipsum[1-390]


/tcb/unbreakable (no value, initially set)

Sets the tcolorbox to be unbreakable.

/tcb/enforce breakable (no value)

A tcolorbox inside a tcolorbox is automatically set to be unbreakable. Using /tcb/breakable→P.390 on such an inner box has no effect. If one really wants the inner box to be breakable, use /tcb/enforce breakable. This will usually give a mess of shattered boxes. You are advised to not use this option.

Note that /tcb/enforce breakable has the functionality that /tcb/breakable→P.390 had until package version 3.04 and exists for backward compatibility.

/tcb/title after break=(text) (no default, initially empty)

The /tcb/title→P.18 is used only for the first part of a break sequence. Use title after break to create a heading line with ⟨text⟩ as content for all following parts. Also see /tcb/extras title after break→P.398 for formatting the title text.

/tcb/notitle after break (no value, initially set)

Removes the title line or following parts in a break sequence if set before.

/tcb/adjusted title after break=(text) (style, no default, initially unset)

Works like /tcb/adjusted title→P.18 but applied to /tcb/title after break.

/tcb/lines before break=(number) (no default, initially 2)

Assures that the given ⟨number⟩ of lines of the upper box part or the lower box part are placed before a break happens.
/tcb/break at={⟨length⟩}/⟨length⟩/.../⟨length⟩

(no default, initially 0pt)

Defines break points at the given ⟨length⟩ values. The first ⟨length⟩ defines the (maximal) height of the first partial box, the second ⟨length⟩ defines the (maximal) height of the second partial box, and so on. The last ⟨length⟩ value is applied to all following partial boxes if any.

- Setting a ⟨length⟩ to Opt means that the naturally available space is used for breaking.
- Setting a ⟨length⟩ to a negative value means that the sum of this negative value and the naturally available space is used for breaking (boxes will shrink in height). Note that before version 4.10 negative values were treated like Opt.

\begin{tcolorbox}[enhanced jigsaw,size=small,vfill before first,colframe=red,colback=yellow!10!white,before title=\raggedright,title={Broken box inside a |multicols| environment},fonttitle=\bfseries,\enforce breakable,\emph{\footnotesize use only breakable in the real world!}],break at=3cm/6.3cm\end{tcolorbox}

\lipsum[1]

/tcb/height fixed for may also be considered for |multicols| environments.

/tcb/enlargepage={⟨length⟩}/⟨length⟩/.../⟨length⟩

(no default, initially 0pt)

Inserts a \enlargethispage{⟨length⟩} to the pages of the break sequence, i.e. allows one to enlarge (or shrink) partial boxes. The first ⟨length⟩ is applied to the first partial box, the second ⟨length⟩ is applied to the second partial box, and so on. The last ⟨length⟩ value is applied to all following partial boxes if any. Note that floating boxes will not be enlarged.

\begin{tcolorbox}[breakable,\enlargepage=0mm/\baselineskip/2\baselineskip/0mm,...\end{tcolorbox}

The example code enlarged the second partial box by one line, the third partial box by two lines, and all following parts are not enlarged.

/tcb/height fixed for \P 396

may also be considered for \texttt{multicols} environments.

\lipsum[1]
This allows an automated page enlargement for up to \( \text{length} \). The algorithm can use this to avoid breaking a box, if there is enough room after enlargement. Also, the last partial box of a break sequence may be enlarged to avoid further breaking.

Note that this potential enlargement is additive to settings of \verb|/tcb/enlargepage| \textsuperscript{P.392}. But \verb|/tcb/enlargepage flexible| overwrites settings of \verb|/tcb/pad before break*| \textsuperscript{P.395} or \verb|/tcb/pad at break*| \textsuperscript{P.395}.

% The following setting hinders orphan lines for the last partial box
\verb|
\tcbset{enlargepage flexible=\baselineskip}|

This option controls the space management on the page which contains the unbroken box or the first part of a break sequence. Feasible \( \text{option} \) values are:

- \texttt{all} (default value): All shrinkable glue on the page is potentially used for the unbroken box or the first part of a break sequence. Thus, all vertical spaces on the page will potentially be reduced to their minimal values.
- \texttt{baselineskip} (initial value): Shrinkable glue up to one \texttt{\baselineskip} on the page is potentially used for the unbroken box or the first part of a break sequence.
- \texttt{none}: The break algorithm respects the target size of the given glue values on the page. This was the initial value before version 3.34.

Note that the box content is not influenced by this option.

This is an emergency parameter if the break algorithm produces unpleasant breaks. It shrinks the goal height of the current box part by \( \text{length} \) which may result in smaller boxes. Never use negative values. \textit{Usually, this option will never be needed at all.}

Depending on the \LaTeX{} engine and loaded packages, if your text contains some color changing commands, your color may not survive the break to the next box. For some engines, there is support for additional color stacks which allow colors to survive breaks. Such an color stack can be activated by \verb|/tcb/use color stack| with help of the \verb|pdfcol| package. This can be done globally or per box.

Note that activating \verb|/tcb/use color stack| inserts a color command with a \texttt{whatsit} at the begin of the upper part and of the lower part of a \verb|tcolorbox| \textsuperscript{P.12}. This may add additional vertical space, e.g. if your box text starts with a list like \texttt{enumerate}!

- \verb|pdfTeX|: color stacks supported.
- \verb|LuaTeX|: color stacks supported, but you should consider loading the \verb|luacolor| package instead which avoids the spacing problem.
- \verb|XeTeX|: color stacks not supported (yet?). From hearsay, with the \verb|fontspec| package, you may use \texttt{\addfontfeatures{Color=mycolor}} to add a font color which survives the break.

If \verb|pdfcol| cannot initialize an additional color stack for the used engine, \verb|/tcb/use color stack| is silently ignored.
Breakable box without color stack.

- Some blue text.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, nisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspen-


More blue text.

Text after box.

We do again with /tcb/use color stack. Observe the additional spacing at the begin of the box:

Breakable box with color stack.

- Some blue text.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, nisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspen-


More blue text.

Text after box.
19.4 Option Keys for the Break Appearance

/\texttt{tcb/toprule at break}=(\texttt{length}) \hspace{1em} (no default, initially 0.5mm)

Sets the line width of the top rule to \texttt{\langle length \rangle} if the box is /\texttt{tcb/breakable} \textsuperscript{-P.390}. In this case, it is applied to middle and last parts in a break sequence. Note that /\texttt{tcb/toprule} \textsuperscript{-P.35} overwrites this value if used afterwards.

/\texttt{tcb/bottomrule at break}=(\texttt{length}) \hspace{1em} (no default, initially 0.5mm)

Sets the line width of the bottom rule to \texttt{\langle length \rangle} if the box is /\texttt{tcb/breakable} \textsuperscript{-P.390}. In this case, it is applied to first and middle parts in a break sequence. Note that /\texttt{tcb/bottomrule} \textsuperscript{-P.35} overwrites this value if used afterwards.

/\texttt{tcb/topsep at break}=(\texttt{length}) \hspace{1em} (no default, initially 0mm)

Additional vertical space of \texttt{\langle length \rangle} which is added at the top of middle and last parts in a break sequence. In general, it is not advisable to change this value if these parts start with a rule or a title.

/\texttt{tcb/bottomsep at break}=(\texttt{length}) \hspace{1em} (no default, initially 0mm)

Additional vertical space of \texttt{\langle length \rangle} which is added at the bottom of first and middle parts in a break sequence. In general, it is not advisable to change this value if these parts end with a rule.

/\texttt{tcb/pad before break}=(\texttt{length}) \hspace{1em} (style, no default, initially 3.5mm)

Sets the total amount of vertical space after the text content and before the break point to \texttt{\langle length \rangle}. This style sets /\texttt{tcb/toprule at break} to 0pt and changes /\texttt{tcb/topsep at break} as required. In general, it is not advisable to change this value if these parts start with a rule or a title.

/\texttt{tcb/pad before break}*=(\texttt{length}) \hspace{1em} (style, no default)

Sets /\texttt{tcb/pad before break} to \texttt{\langle length \rangle} and /\texttt{tcb/enlargepage flexible} \textsuperscript{-P.393} to an appropriate value such that empty closing frames are avoided.

/\texttt{tcb/pad after break}=(\texttt{length}) \hspace{1em} (style, no default, initially 3.5mm)

Sets the total amount of vertical space after the break point and before the text content to \texttt{\langle length \rangle}. This style sets /\texttt{tcb/bottomrule at break} to 0pt and changes /\texttt{tcb/bottomsep at break} as required. In general, it is not advisable to change this value if these parts end with a rule.

/\texttt{tcb/pad at break}=(\texttt{length}) \hspace{1em} (style, no default, initially 3.5mm)

Abbreviation for setting \texttt{\langle length \rangle} to /\texttt{tcb/pad before break} and /\texttt{tcb/pad after break}.

/\texttt{tcb/pad at break}*=(\texttt{length}) \hspace{1em} (style, no default)

Sets /\texttt{tcb/pad at break} to \texttt{\langle length \rangle} and /\texttt{tcb/enlargepage flexible} \textsuperscript{-P.393} to an appropriate value such that empty closing frames are avoided.

\begin{tcolorbox}[enhanced jigsaw,breakable,pad at break*=0mm, title={For this box, the pad space at the break point is set to 0mm}]
\lipsum[1-2]
\end{tcolorbox}

For this box, the pad space at the break point is set to 0mm

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis
fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est,
iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum.
Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur
auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan
eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.
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non justo. Nam lacinus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet,
tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi.
Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque
a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus
mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus
luctus mauris.

/tcb/pad after break  should be used as very last option in an option list, because they adapt other settings.

Also see /tcb/enlarge top at break by  and /tcb/enlarge bottom at break by  .

/tcb/height fixed for=⟨part⟩ (no default, initially none)
When certain amount of space is available for a partial box of a break sequence, the partial
box typically is smaller than this space (depending on the box content). For given ⟨part⟩(s),
the height can be set to all available space.
• none: Every partial tcolorbox is set with its natural height.
• first: The first partial box is set to a height which matches the available space.
• middle: All middle partial boxes are set to a height which matches the available space.
• last: The last partial box is set to a height which matches the available space.
• first and middle: The first and all middle partial boxes are set to a height which
  matches the available space.
• middle and last: All middle partial boxes and the last partial box are set to a height
  which matches the available space.
• all: All partial boxes are set to a height which matches the available space.

If the box keeps unbroken, this option is not applied. See /tcb/height  for setting a fixed height for unbroken boxes. See /tcb/height fill  for giving unbroken boxes maximum height.

/tcb/vfill before first=true|false (default true, initially false)
Inserts a \vfill at the begin of the first partial box to move this partial box to the end of
the current page. This may be used as an alternative to /tcb/height fixed for=first
to get justified columns or pages. The \vfill is not inserted, if the box gets not actually
broken.

/tcb/segmentation at break=true|false (default true, initially true)
If a breakable box contains an upper part and a lower part and the break happens at the
segmentation between both parts, then
• the segmentation line (or similar) is drawn as first element of the partial box containing
  the lower part, if /tcb/segmentation at break is set to be true.
• the segmentation line (or similar) is not drawn at all, if /tcb/segmentation at break
  is set to be false. This may be preferable for skins like bicolor  , tile  , or beamer  .

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19.5 Extra Options for Partial Boxes

Extra Options for Partial Boxes

N 2015-07-16 /tcb/extras={⟨options⟩} (no default, initially unset)

Adds \texttt{tcolorbox} \langle options \rangle to every box of a \textit{break sequence} after skin settings are done. This is quite late in box processing. Geometry and break settings should \textit{not be used} here, because they will either be ignored or have unexpected negative results. But it is possible to change most colors, skin effects, shadows, borders, frame code, etc. Note that using \texttt{/tcb/extras} for every box is very seldom an advantage over setting the options directly. Usually, \texttt{/tcb/extras} for every box is very seldom an advantage over setting the options directly.

N 2015-07-16 /tcb/no extras (style, no default, initially set)

Removes all extras if set before.

N 2015-07-16 /tcb/extras broken={⟨options⟩} (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \textsuperscript{P.390} and \textit{is} broken actually, then the \langle options \rangle are added to every box of the \textit{break sequence}. \texttt{/tcb/extras} overwrites this key.

N 2015-07-16 /tcb/extras unbroken={⟨options⟩} (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \textsuperscript{P.390} but \textit{is not} broken actually or if the box is set to be \texttt{/tcb/unbreakable} \textsuperscript{P.391}, then the \langle options \rangle are added to the box. \texttt{/tcb/extras} overwrites this key.

N 2015-07-16 /tcb/no extras unbroken (style, no default, initially set)

Removes the unbroken extras if set before.

N 2015-07-16 /tcb/extras first={⟨options⟩} (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \textsuperscript{P.390} and \textit{is} broken actually, then the \langle options \rangle are added to the first box of the break sequence. \texttt{/tcb/extras} overwrites this key.

N 2015-07-16 /tcb/no extras first (style, no default, initially set)

Removes the first extras if set before.

N 2015-07-16 /tcb/extras middle={⟨options⟩} (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \textsuperscript{P.390} and \textit{is} broken actually, then the \langle options \rangle are added to every \textit{middle} box (if any) of the break sequence. \texttt{/tcb/extras} overwrites this key.

N 2015-07-16 /tcb/no extras middle (style, no default, initially set)

Removes the middle extras if set before.

N 2015-07-16 /tcb/extras last={⟨options⟩} (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \textsuperscript{P.390} and \textit{is} broken actually, then the \langle options \rangle are added to the last box of the break sequence. \texttt{/tcb/extras} overwrites this key.

N 2015-07-16 /tcb/no extras last (style, no default, initially set)

Removes the last extras if set before.

N 2015-07-16 /tcb/extras unbroken and first={⟨options⟩} (no default, initially unset)

This is an abbreviation for setting \texttt{/tcb/extras unbroken} and \texttt{/tcb/extras first} together. \texttt{/tcb/extras} overwrites this key.

N 2015-07-16 /tcb/extras middle and last={⟨options⟩} (no default, initially unset)

This is an abbreviation for setting \texttt{/tcb/extras middle} and \texttt{/tcb/extras last} together. \texttt{/tcb/extras} overwrites this key.

N 2015-07-16 /tcb/extras unbroken and last={⟨options⟩} (no default, initially unset)

This is an abbreviation for setting \texttt{/tcb/extras unbroken} and \texttt{/tcb/extras last} together. \texttt{/tcb/extras} overwrites this key.
/tcb/extras first and middle={⟨options⟩} (no default, initially unset)

This is an abbreviation for setting /tcb/extras first→P.397 and /tcb/extras middle→P.397 together. /tcb/extras→P.397 overwrites this key.

/tcb/extras title after break={⟨options⟩} (no default, initially unset)

If the box has a /tcb/title after break→P.391, then the ⟨options⟩ are added for all titles after the first break, i.e. all middle and last. The color, font, and alignment of titles after break can be adapted choosing ⟨options⟩, e.g. by /tcb/coltitle→P.28, /tcb/fonttitle→P.29, /tcb/halign title→P.32. Note that /tcb/colbacktitle→P.27 has to be placed into /tcb/extras middle and last→P.397.

/tcb/no extras title after break (style, no default, initially set)

Removes the title after break extras if set before.

19.6 Breakable boxes and the multicol package

With version 4.10, the algorithm for detecting the available height for a tcolorbox inside a multicol environment was improved with help of Frank Mittelbach. This change may impact existing user code which may have to be adapted.

Unbreakable tcolorboxes can be used without special care inside a multicol environment from the multicol package [9]. Since version 3.10, a breakable tcolorbox detects, if it is used inside a multicol environment. But choosing break points for a breakable box cannot be done by the balancing routine of multicol. By default, boxes will break at maximum column height. To get pleasant results, use the \texttt{/tcb/break at} \texttt{P.392} and \texttt{/tcb/height fixed for} \texttt{P.396} options.

```latex
% \usepackage{lipsum,multicol} \% preamble
\begin{footnotesize}
\begin{multicols}{2}
\lipsum[1]
\begin{tcolorbox}[enhanced jigsaw,breakable,size=title, colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, title=My breakable box.pad at break=1mm, break at=-\baselineskip/0pt ]
\lipsum[2-4]
\end{tcolorbox}
\lipsum[4]
\end{multicols}
```


My breakable box


This example is already set inside a \texttt{multicols} environment. This time, a \texttt{middle} part has full column height (here \texttt{\textwidth}). \texttt{\texttt{\textbackslash tcolorbox/height fixed for=\texttt{\textbackslash P.396}}} is used to spread this box part over the full height to align with neighboring columns.

\begin{tcolorbox}
[enhanced jigsaw, breakable, size=title, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries, title=My breakable box, pad at break=2mm, break at=-\baselineskip/0pt, height fixed for=middle ]
\lipsum[2-7]
\end{tcolorbox}

\lipsum[8]


semper, nunc dui lobortis purus, quis congue purus metus ultricies tellus. Proin et quam. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Praesent sapien turpis, fermentum vel, eleifend faucibus, vehicula eu, lacus.


The following example has a \textcolorbox which fills the \multicols environment completely. Here, \textcolorbox\textit{height fixed for}~\textsuperscript{P.396} is used to give all three columns the full height. Note that the appropriate \textcolorbox\textit{break at}~\textsuperscript{P.392} value is not computed automatically but set manually.
19.7 Break Point Insertion

A \textit{breakable} box is not broken, if there is enough space on the current page or column. Therefore, typical penalty insertion with \texttt{\break}, \texttt{\pagebreak}, \texttt{\columnbreak}, \ldots may only work as expected, if the box is broken at least into two parts \textit{without} inserting the penalties.

To \textit{force} a page or column break, \texttt{\tcbbreak} starts a new paragraph and inserts an insane tall rule which causes a break and which is immediately discarded. You may ignore this technical information and just use it as you would use \texttt{\pagebreak}.

For an \textit{unbreakable box}, \texttt{\tcbbreak} is identical to insert \texttt{\par}, i.e. it just starts a new paragraph.

Also see \texttt{/tcb/break} at $\rightarrow$ \texttt{P.392} for defining height dependend breaks.

\begin{multicols}{3}
\begin{tcolorbox}[breakable,enhanced jigsaw,size=small, colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, title=Break into parts]
First part \tcbbreak
Second part \tcbbreak
Third part
\end{tcolorbox}
\end{multicols}

\begin{multicols}{3}
\begin{tcolorbox}[enhanced jigsaw,size=small, colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, title=You shall not break]
First part \tcbbreak
Second part \tcbbreak
Third part
\end{tcolorbox}
\end{multicols}
19.8 Break Sequence for the Skins

The following diagrams document the break sequence for different skins. Depending on the main skin of a tcolorbox, the actual skins of the break sequence parts are displayed.
<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=enhanced jigsaw</td>
<td>skin=enhancedfirst jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
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<td></td>
<td>skin=enhancedlast jigsaw</td>
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<td>Unbroken Box</td>
<td>Broken Boxes</td>
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<td>skin=enhancedfirst jigsaw</td>
<td>skin=enhancedfirst jigsaw</td>
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<td>skin=enhancedmiddle jigsaw</td>
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<tr>
<td>skin=bicolor</td>
<td>skin=bicolorfirst</td>
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<tr>
<td></td>
<td>skin=bicolormiddle</td>
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<tr>
<td></td>
<td>skin=bicolorlast</td>
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<td>skin=bicolorfirst</td>
<td>skin=bicolorfirst</td>
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<td>skin=bicolormiddle</td>
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<td>skin=bicolormiddle</td>
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<td>skin=bicolormiddle</td>
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<td>skin=bicolormiddle</td>
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<td></td>
<td>skin=bicolormiddle</td>
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<td>skin=bicolorlast</td>
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<td>Unbroken Box</td>
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</tr>
<tr>
<td>skin=bicolor jigsaw</td>
<td>skin=bicolorfirst jigsaw</td>
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<tr>
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<td>skin=bicolormiddle jigsaw</td>
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<td>skin=bicolorlast jigsaw</td>
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<td>Unbroken Box</td>
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<td>skin=freelancemiddle</td>
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<tr>
<td></td>
<td>skin=freelancelast</td>
</tr>
</tbody>
</table>
19.9 Break by Hand (Faked Break)

See Section 19.6 on page 400 for real column breaks.

Since the appearance of broken boxes is done by skins, it is quite easy to 'fake a break'. For this, you actually don’t need the \texttt{breakable} library at all.

\begin{tcolorbox}
\texttt{tcbset}\{enhanced,equal height group=fakedbreak,}
\texttt{\hspace{1mm}colback=LightGreen,colframe=DarkGreen,}
\texttt{\hspace{1mm}width=(\texttt{\textwidth}-6mm)/3,nobeforeafter,}
\texttt{\hspace{1mm}left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}\%
\begin{tcolorbox}[title=My broken box,skin=enhancedfirst]
This is a box which breaks from one column to another
\end{tcolorbox}\hspace{1mm}
\begin{tcolorbox}[skin=enhancedmiddle]
column. I am sorry to say that this is a trick. Nevertheless, you may use this trick for your\end{tcolorbox}\hspace{1mm}
\begin{tcolorbox}[skin=enhancedlast]
\hspace{1mm}\hspace{1mm}own purposes.\end{tcolorbox}\end{tcolorbox}
The main purpose of this library is to store a \texttt{tcolorbox} into an array of box registers for later usage.

If the \texttt{tcolorbox} is not breakable, there is not much add-on compared to usual \TeX/\LaTeX{} box storage and usage (and you do not really need this library for that use case). For a breakable \texttt{tcolorbox}, this library allows to capture all partial boxes into a sequence of registers. The partial boxes can be used anywhere in arbitrary order.

The name of this library indicates \textit{magazine} in the sense of storage, but also in the sense of a journal where an article often is \textit{continued on page x}. An example for this kind of application is given throughout this section starting on the right hand side. The creation of this library was motivated by Ulrike Fischer and Steven B. Segletes.

The library is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{magazine}
\end{verbatim}

This also loads the library \texttt{breakable}, see Section 19 on page 388.

The box register operations of this library are global. \TeX{} grouping will not clear the registers when leaving the current group. Also be aware that extensive use of large box arrays may eat up \TeX{}’s available memory and registers.

\section{Creation and Resetting of Box Arrays}

\begin{verbatim}
\newboxarray{⟨name⟩}
\end{verbatim}

This creates a new box array called \textit{⟨name⟩}. There already is a box array available with name \texttt{default} which can be used directly. Note that the creation is a global operation.

\begin{verbatim}
\newboxarray{myarray}
\end{verbatim}

\begin{verbatim}
\boxarrayreset[]{⟨name⟩}
\end{verbatim}

Resets the size counter of a box array \textit{⟨name⟩} to zero. If \textit{⟨name⟩} is not provided, \texttt{default} is used as name. Use this or \texttt{/tcb/reset box array} before you apply \texttt{/tcb/store to box array} \textsuperscript{\textsc{Page} 416}. Otherwise, all boxes would be appended to the already existing boxes. This command does not clear box registers.

\begin{verbatim}
\boxarrayreset{myarray} \% resets ‘myarray’
\end{verbatim}

\begin{verbatim}
/tcb/reset box array=⟨name⟩
\end{verbatim}

(default \texttt{default}, initially unset)

Resets the size counter of a box array \textit{⟨name⟩} to zero. Use this or \texttt{\boxarrayreset} (which does the same) before you apply \texttt{/tcb/store to box array} \textsuperscript{\textsc{Page} 416}.

\begin{verbatim}
\tcbset{
  reset box array, \% resets ‘default’
  reset box array=myarray, \% resets ‘myarray’
}
\end{verbatim}
\boxarrayclear[(name)]

Works like \boxarrayreset to reset the size counter of a box array \langle name \rangle to zero. Additionally, all allocated box registers of the box array are cleared of their content. Note that the allocated box registers stay allocated. So, this may be useful to clear memory, but not to free registers for other applications. If \consumeboxarray or \consumetcboxarray was used to apply the stored boxes, there is no advantage in using \boxarrayclear.

\begin{tcolorbox}[enhanced jigsaw,size=fbox,width=4cm,
colback=yellow!10,colframe=yellow!10!black,
enforce breakable,
break at=7cm/4cm,
height fixed for=all,
watermark text=\arabic{tcbbreakpart},
reset box array,
store to box array]
\lipsum[1]
\end{tcolorbox}

% \usepackage{lipsum}
\begin{tcolorbox}
\lipsum[1]
\end{tcolorbox}

% \usepackage{lipsum}
\useboxarray{1}\hfill
\useboxarray{2} & \useboxarray{3}
\end{tabular}

20.2 Storing Content

/tcb/store to box array=(name) (default default, initially unset)

Stores a tcolorbox or all parts of a break sequence of a tcolorbox into a box array \langle name \rangle. If no \langle name \rangle is given, the already existing default box array is used. Otherwise, the box array has to be created beforehand with \newboxarray. Note that the box has to be /tcb/breakable, if the box shall break into several parts. Typically, manual break points are additionally defined by /tcb/break at. Otherwise, the box parts will have a length of about \textwidth. For most use cases, a /tcb/reset box array should be applied to reset the box array counter.
If the first box part should fill the rest of the available space of the current page, you can use `\pagegoal-\pagetotal` minus some distance for the first element of `/tcb/break at` P.392. You may want to have some additional distance to the preceding text.

% \usepackage{lipsum}
\begin{tcolorbox}[enhanced,breakable,
    reset box array,
    store to box array,
    break at=\pagegoal-\pagetotal-5mm/0pt,
    height fixed for=first and middle]
\lipsum[1-15]
\end{tcolorbox}

% \consumetcboxarray{1}{blanker,before=\par\vfill\noindent}

\begin{tcolorbox}[blanker,width=4cm,
    fontupper=\footnotesize,
    enforce breakable,\% use only breakable in the real world!
    break at=4cm,
    height fixed for=all,
    watermark text=\arabic{tcbbreakpart},
    reset box array,
    store to box array\]
\includegraphics[width=\linewidth]{Basilica_5.png}\par
\lipsum[1-2]
\end{tcolorbox}

\begin{tcbitemize}[raster columns=3,raster equal height,
    size=small,halign=center,sharp corners,colback=blue!5]
\tcbitem\consumeboxarray{5}
\tcbitem\consumeboxarray{6}
\tcbitem\consumeboxarray{1}
\tcbitem\consumeboxarray{2}
\tcbitem\consumeboxarray{3}
\tcbitem\consumeboxarray{4}
\end{tcbitemize}

\hspace{1cm}

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dicitum gravida mauris. Nam


Combination of /tcb/reset box array →P.415 and /tcb/store to box array →P.416.

Disables the /tcb/store to box array →P.416 option, if set before.

\begin{boxarraystore}{⟨name⟩}
⟨environment content⟩
\end{boxarraystore}

Stores the environment content into a box array ⟨name⟩. This corresponds to the standard \LaTeX environment lrbox, but the storage operation is global. As long as \boxarrayreset →P.415 is not used, every new boxarraystore adds a further box to the array.

\boxarrayreset
\begin{boxarraystore}{default}\fbox{Mary}\end{boxarraystore}
\begin{boxarraystore}{default}\fbox{Had}\end{boxarraystore}
\begin{boxarraystore}{default}\fbox{a}\end{boxarraystore}
\begin{boxarraystore}{default}\fbox{Little}\end{boxarraystore}
\begin{boxarraystore}{default}\fbox{Lamb}\end{boxarraystore}
\useboxarray{5}\useboxarray{4}\useboxarray{3}\useboxarray{2}\useboxarray{1}\hfill
\useboxarray{1}\useboxarray{5}

\begin{tikzpicture}
\node [draw, inner sep=0pt, anchor=south west] at (0,0) {
\begin{tabular}{c}
Mary
\end{tabular}};
\node [draw, inner sep=0pt, anchor=south west] at (1,0) {
\begin{tabular}{c}
Lamb
\end{tabular}};
\node [draw, inner sep=0pt, anchor=south west] at (2,0) {
\begin{tabular}{c}
Little
\end{tabular}};
\node [draw, inner sep=0pt, anchor=south west] at (3,0) {
\begin{tabular}{c}
Had
\end{tabular}};
\end{tikzpicture}

20.3 Retrieving Content

\boxarraygetsize{⟨name⟩}{⟨macro⟩}

Stores the current size of a box array ⟨name⟩ into a given ⟨macro⟩. If no ⟨name⟩ is given, the already existing default box array is used.

\boxarraygetsize{\mysize}
Current size of the default box array: \mysize.

Current size of the default box array: 5.

\useboxarray{⟨name⟩}{⟨index⟩}

Typesets the box with the given ⟨index⟩ number from the box array ⟨name⟩. If no ⟨name⟩ is given, the already existing default box array is used. It is considered an error, if a not existing box array ⟨name⟩ is used. It is silently ignored, if the ⟨index⟩ is out of range. Note that \useboxarray corresponds to the standard \usebox macro, respectively, \copy.

\boxarraygetsize{\mysize}
\foreach \n in {1,...,\mysize} { \useboxarray{\n} }

Mary Had a Little Lamb
\useboxarray[(name)]{index}{options}

Typesets the box with the given \langle index \rangle number from the box array \langle name \rangle using \useboxarray \rightarrow P.418 as content of a \tcbox \rightarrow P.14. If no \langle name \rangle is given, the already existing default box array is used. It is considered an error, if a not existing box array \langle name \rangle is used. It is silently ignored, if the \langle index \rangle is out of range. The \tcbox \rightarrow P.14 can be customized by tcolorbox \langle options \rangle.

\begin{verbatim}
\boxarraygetsize{\mysize}
\foreach \n in {1,...,\mysize} { \usetcboxarray{\n}{on line,colframe=yellow, colback=yellow!10} }
\end{verbatim}

Mary Had a Little Lamb

\consumeboxarray[(name)]{index}

Typesets the box with the given \langle index \rangle number from the box array \langle name \rangle. If no \langle name \rangle is given, the already existing default box array is used. It is considered an error, if a not existing box array \langle name \rangle is used. It is silently ignored, if the \langle index \rangle is out of range. In contrast to \useboxarray \rightarrow P.418, \consumeboxarray corresponds to the standard \box macro, i.e. after typesetting the box register is cleared and cannot be used again.

\begin{verbatim}
\boxarraygetsize{\mysize}
\foreach \n in {1,...,\mysize} { \consumeboxarray{\n} }
\par
\foreach \n in {1,...,\mysize} { \consumeboxarray{\n} }
\end{verbatim}

First run: Mary Had a Little Lamb
Second run:

\consumetcboxarray[(name)]{index}{options}

Typesets the box with the given \langle index \rangle number from the box array \langle name \rangle using \consumetcboxarray as content of a \tcbox \rightarrow P.14. If no \langle name \rangle is given, the already existing default box array is used. It is considered an error, if a not existing box array \langle name \rangle is used. It is silently ignored, if the \langle index \rangle is out of range. The \tcbox \rightarrow P.14 can be customized by tcolorbox \langle options \rangle. After typesetting the box register is cleared and cannot be used again.


Assigns the box with the given \langle index\rangle number from the box array \langle name\rangle to a \langle macro\rangle. If no \langle name\rangle is given, the already existing default box array is used. It is considered an error, if a not existing box array \langle name\rangle is used. If the \langle index\rangle is out of range, the \langle macro\rangle will be undefined.

Tests the box with the given \langle index\rangle number from the box array \langle name\rangle for emptiness be empty and executes \langle true\rangle if it is empty, and \langle false\rangle otherwise. If no \langle name\rangle is given, the already existing default box array is used. It is considered an error, if a not existing box array \langle name\rangle is used.
20.4 Box Dimensions

\boxedarraygetwidth[(name)]{(macro)}{(index)}

Assigns the width of the box with the given \textit{index} number from the box array \textit{name} to a \textit{macro}. If no \textit{name} is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \textit{name} is used. If the \textit{index} is out of range, the \textit{macro} will be set to 0pt.

\begin{tcolorbox}[size=small,colframe=blue!20,colback=yellow!5,on line, reset and store to box array]{Test}
\begin{tabular}{ll}
\useboxedarray{1} & width of box 1: \boxedarraygetwidth{\mylen}{1} \mylen \\
\useboxedarray{2} & width of box 2: \boxedarraygetwidth{\mylen}{2} \mylen
\end{tabular}
\end{tcolorbox}

Test width of box 1: 30.35799pt  
width of box 2: 0pt

\boxedarraygetheight[(name)]{(macro)}{(index)}

Assigns the height of the box with the given \textit{index} number from the box array \textit{name} to a \textit{macro}. If no \textit{name} is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \textit{name} is used. If the \textit{index} is out of range, the \textit{macro} will be set to 0pt.

\begin{tcolorbox}[size=small,colframe=blue!20,colback=yellow!5,on line, reset and store to box array]{Test}
\begin{tabular}{ll}
\useboxedarray{1} & height of box 1: \boxedarraygetheight{\mylen}{1} \mylen \\
\useboxedarray{2} & height of box 2: \boxedarraygetheight{\mylen}{2} \mylen
\end{tabular}
\end{tcolorbox}

Test height of box 1: 9.89883pt  
height of box 2: 0pt

\boxedarraygetdepth[(name)]{(macro)}{(index)}

Assigns the depth of the box with the given \textit{index} number from the box array \textit{name} to a \textit{macro}. If no \textit{name} is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \textit{name} is used. If the \textit{index} is out of range, the \textit{macro} will be set to 0pt.

\begin{tcolorbox}[size=small,colframe=blue!20,colback=yellow!5,on line, reset and store to box array]{Test}
\begin{tabular}{ll}
\useboxedarray{1} & depth of box 1: \boxedarraygetdepth{\mylen}{1} \mylen \\
\useboxedarray{2} & depth of box 2: \boxedarraygetdepth{\mylen}{2} \mylen
\end{tabular}
\end{tcolorbox}

Test depth of box 1: 3.69884pt  
depth of box 2: 0pt
Assigns the total height of the box with the given \textit{index} number from the box array \textit{name} to a \textit{macro}. If no \textit{name} is given, the already existing default box array is used. It is considered an error, if a not existing box array \textit{name} is used. If the \textit{index} is out of range, the \textit{macro} will be set to 0pt.

\begin{verbatim}
\boxarrayreset
\tcbox[size=small,colframe=blue!20,colback=yellow!5,on line,
        store to box array]{Test}
\begin{tabular}{ll}
  \useboxarray{1} & total height of box 1: \boxarraygettotalheight{\mylen}{1} \mylen\
  \useboxarray{2} & total height of box 2: \boxarraygettotalheight{\mylen}{2} \mylen
\end{tabular}
\end{verbatim}

Test

- total height of box 1: 13.59767pt
- total height of box 2: 0pt

\textit{— continued from page 419 —}
for demonstration purposes. With the tools of this section, a magazine type document could be created, but this still needs a lot of manual control.
20.5  Leaflet Example

The following full application example can be used to create leaflets. Obviously, the code can be adapted and customized in many ways.

\documentclass[a4paper,landscape]{article}
\usepackage[noheadfoot,margin=0pt]{geometry}
\usepackage[skins,raster,magazine]{tcolorbox}
\usepackage{lipsum}
\newenvironment{leaflet}[1][]{
\begin{tcolorbox}[nobeforeafter,empty,colback=white,
    sharp corners,size=minimal,left=10mm,right=10mm,top=10mm,bottom=10mm,
    width=\textwidth/3,
    breakable,
    break at=\textwidth,
    height fixed for=all,
    reset box array,
    store to box array,#1]}
\begin{tcbitemize}[raster columns=3,raster equal skip=0pt,blankest]
\tcbitem\consumeboxarray{5}
\tcbitem\consumeboxarray{6}
\tcbitem\consumeboxarray{1}
\tcbitem\consumeboxarray{2}
\tcbitem\consumeboxarray{3}
\tcbitem\consumeboxarray{4}
\end{tcbitemize}
\end{tcolorbox}
\pagestyle{empty}
\begin{document}
\begin{leaflet}[underlay={\node[above=5mm,font=\footnotesize]
at (frame.south) {- \arabic{tcbbreakpart} -};}]
\includegraphics[width=\linewidth]{Basilica_5.png}
\begin{center}
\bfseries\LARGE Example
\end{center}
\section{Introduction}
\lipsum[1]
\section{Main Part A}
\lipsum[2-8]
\section{Main Part B}
\lipsum[9-15]
\section{Conclusion}
\lipsum[16-18]
\end{leaflet}
\end{document}

Suspendisse vitae elit. Aliquam arcu lorem, inceptos hymenaeos. Vivamus rhoncus tincidunt augue.

3 Main Part A


2 Main Part A


Suspendisse vitae elit. Aliquam arcu lorem, inceptos hymenaeos. Vivamus rhoncus tincidunt augue.

3 Main Part B


Suspendisse vitae elit. Aliquam arcu lorem, inceptos hymenaeos. Vivamus rhoncus tincidunt augue.
The main purpose of this library is to support creation of single page posters with \tcolorbox\es. A \texttt{tcbposter}^{P.426} is a \texttt{tikzpicture} where \texttt{tcolorbox}es can be placed in a column oriented manner using \texttt{\posterbox}\textsuperscript{P.431} commands. This base concept is more or less copied from the great \texttt{baposter} package.

The \texttt{LIB raster} library, see Section 16 on page 298, can produce similar looking results and may be more appropriate depending on the actual project.

- The \texttt{LIB raster} library has a flow oriented concept, just like a conventional text flow. The text flow (box flow) is a merely endless ribbon which gets broken into lines (and paragraphs) and the lines are broken into pages. \texttt{LIB raster} shapes the boxes to convenient sizes to fill lines and pages in a pleasant way.

- The \texttt{LIB tcbposter} library supports a quite free placement of boxes inside a page. Basically, boxes are placed like \texttt{nodes} are placed inside a \texttt{tikzpicture}. In contrast to \texttt{LIB raster}, this is a \textit{single} page and not a flow of pages. The poster is divided into columns and rows. There is a more or less gentle force to use the columns (or spans of columns) for positioning and sizing while the row placement is completely optional.

The creation of this library was motivated by Ignasi.

\noindent
\begin{tcblisting}
! Inside a \texttt{tikzpicture} there should be no embedded \texttt{tikzpicture}s. This rule is violated by the \texttt{LIB poster} library. Be aware that there may be some unwanted interactions between the main \texttt{tikzpicture} and the embedded ones inside the \texttt{tcolorbox}es.
\end{tcblisting}

The library is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary\{poster\}
\end{verbatim}

This also loads the libraries \texttt{skins}, see Section 10 on page 156, \texttt{breakable}, see Section 19 on page 388, \texttt{magazine}, see Section 20 on page 415, and \texttt{fitting}, see Section 22 on page 439.

\section{Overview}

\begin{tcblisting}
\textbf{Click me to see the tutorial}

You get the best overview of the \texttt{LIB poster} library and its facilities, if you look at the \texttt{Poster Tutorial} which is part of the \texttt{tcolorbox} documentation:
\texttt{tcolorbox-tutorial-poster.pdf}
\end{tcblisting}
21.2 Main Poster Environment

This creates a `tikzpicture` environment with suitable additional settings defined by the given \`(options\). Basically, `\posterbox` and `\posterboxenv` are used to place `tcolorboxes` as nodes into the environment, but additional TikZ code can also be used. As \`(options\) all `/tcb/posterset/` keys may be applied, namely:

- `/tcb/posterset/poster` : poster settings like columns, rows, sizes...
- `/tcb/posterset/coverage` and `/tcb/posterset/no coverage` : settings for a surrounding `tcolorbox` for background and margins.
- `/tcb/posterset/boxes` : style of the `tcolorboxes` used for the poster.
- `/tcb/posterset/fontsize` : scaling of used fonts.

\begin{tcbposter}
  \poster{\begin{tcbparam}{poster}
    \showframe,\height=10cm,\spacing=2mm,\end{tcbparam},
  \boxes{\begin{tcbparam}{boxes}
    \beamer,\colframe=blue!50!black,\colback=blue!50,\colupper=yellow!50,\end{tcbparam},
  \end{tcbparam}}

  \posterbox{\name=A,\column=3,\row=2}\{My first box\}
  \posterbox[\adjustedtitle=Second box]{\name=B,\column=2,\span=2,\below=A}\{My second box\}
  \posterbox[\adjustedtitle=Third box]{\name=C,\column=2,\between=B\and\bottom}\{My third box\}
\end{tcbposter}
Inside \tcbposter\p.426, there are several predefined Ti\kZ nodes. These nodes share a common /tcb/poster/prefix\p.428 which is TCBPOSTER\@ by default. This prefix is used to discriminate the poster nodes from local nodes of any embedded \tikzpicture environment. You will never need this prefix using \posterbox\p.431 and its placement options, but if you want to refer to a predefined node using pure Ti\kZ code. The predefined nodes (shown without prefix) are:

- \textbf{poster}: defines the bounding box of the poster (without the coverage).
- \textbf{top}: top position plus row spacing
- \textbf{bottom}: bottom position minus row spacing
- \textbf{middle}: vertical middle position
- \textbf{col}\textsubscript{1}, \textbf{col}\textsubscript{2}, \ldots: bounding box of column 1, column 2, \ldots
- \textbf{row}\textsubscript{1}, \textbf{row}\textsubscript{2}, \ldots: bounding box of row 1, row 2, \ldots

Further nodes are defined using the /tcb/posterloc/name\p.432 option.

Never use a \tcbposter\p.426 inside a \tcbposter\p.426. But, if you do anyway, use a different /tcb/poster/prefix\p.428 for the embedded poster or you surely get a total mess.

There are several properties inside a \tcbposter\p.426 which may be useful for advanced code (skip the following on first reading):

- \textbf{\tcbposterwidth}: Width of the poster (without margins).
- \textbf{\tcbposterheight}: Height of the poster (without margins).
- \textbf{\tcbpostercolspacing}: Column distance.
- \textbf{\tcbposterrowspacing}: Row distance.
- \textbf{\tcbpostercolwidth}: Width of a column.
- \textbf{\tcbposterrowheight}: Height of a row.

\begin{verbatim}
\tcbposterset\{\langle options\rangle\}
\end{verbatim}

Sets options for every following \tcbposter\p.426 inside the current \TeX group. For example, the numbers for rows and columns may be defined for the whole document by this:

\begin{verbatim}
\tcbposterset\{poster={columns=2,rows=3}\}
\end{verbatim}

See \tcbposter\p.426 for all feasible options.
21.3 Poster Settings

This option can be applied inside \texttt{tcbposter}^{P.426} and \texttt{tcbposterset}^{P.427} to set the given poster \texttt{(option list)}, e.g.

\begin{tcbposter}
    \texttt{poster={width=20cm,height=15cm}}
\end{tcbposter}

For the \texttt{(option list)}, see the following keys.

\begin{itemize}
    \item \texttt{columns} = \texttt{(number)} \hspace{1cm} (no default, initially 3)
        Sets the \texttt{(number)} of columns for a \texttt{tcbposter}.
    \item \texttt{rows} = \texttt{(number)} \hspace{1cm} (no default, initially 4)
        Sets the \texttt{(number)} of rows for a \texttt{tcbposter}.
    \item \texttt{colspacing} = \texttt{(length)} \hspace{1cm} (no default, initially 4mm)
        Sets \texttt{(length)} as distance between columns.
    \item \texttt{rowspacing} = \texttt{(length)} \hspace{1cm} (no default, initially 4mm)
        Sets \texttt{(length)} as distance between rows.
    \item \texttt{spacing} = \texttt{(length)} \hspace{1cm} (style, no default, initially 4mm)
        Sets \texttt{(length)} as distance between columns and rows.
    \item \texttt{showframe} = \texttt{true}|\texttt{false} \hspace{1cm} (default \texttt{true}, initially \texttt{false})
        Displays a red auxiliary mesh as optical support during poster creation. Also, every \texttt{/tcb/posterloc/name}^{P.432} is displayed.
    \item \texttt{width} = \texttt{(length)} \hspace{1cm} (no default, initially \texttt{\linewidth})
        Sets \texttt{(length)} as width of the poster. For a typical poster, this has not to be set manually. Especially, if \texttt{/tcb/posterset/coverage}^{P.429} is present, use \texttt{coverage={width=(length)}} instead to change the overall width.
    \item \texttt{height} = \texttt{(length)} \hspace{1cm} (no default, initially unset)
        Sets \texttt{(length)} as height of the poster. For a typical poster, this has not to be set manually, but is set automatically to an appropriate value. If \texttt{/tcb/posterset/coverage}^{P.429} is present, use only one if any option \texttt{coverage={height=(length)}} or \texttt{poster={height=(length)}}.
    \item \texttt{prefix} = \texttt{name} \hspace{1cm} (no default, initially TCBPOSTER@)
        \texttt{name} is set as prefix for any \texttt{TikZ} node which is generated automatically by the \texttt{poster} library. This encompasses predefined nodes like \texttt{top}, \texttt{bottom}, \ldots, and nodes defined by using \texttt{/tcb/posterloc/name}^{P.432}. Also, see Section 21.2 on page 426. For a typical poster, this value can stay as it is.
\end{itemize}
21.4 Coverage

/tcb/posterset/coverage={⟨option list⟩}  (style, no default)

This option can be applied inside \tcbposter \textsuperscript{P.426} and \tcbposterset \textsuperscript{P.427} and it adds an optional coverage for the poster which is a surrounding \tcolorbox with the given ⟨option list⟩. Here, margins and background settings for the poster can be given. The coverage has several default \tcolorbox settings suitable for the purpose:

\begin{Verbatim}
enhanced, frame hidden, sharp corners, boxsep=0pt, boxrule=0pt,
top=4mm, bottom=4mm, left=4mm, right=4mm,
toptitle=2mm, bottomtitle=2mm, colback=white
\end{Verbatim}

The ⟨option list⟩ can contain any \tcolorbox option.

\begin{Verbatim}\begin{tcbposter}[
poster = {showframe, spacing=1mm},
coverage = {height=5cm,
interior style={top color=yellow, bottom color=yellow!50!red},
watermark text={My Poster}, watermark color=white},
],\end{tcbposter}\end{Verbatim}

\begin{tabular}{ccc}
\hline
\textbf{col1} & \textbf{col2} & \textbf{col3} \\
\hline
row1 & & \\
row2 & & \\
row3 & & \\
row4 & & \\
\hline
\end{tabular}

\begin{enumerate}
\item For a typical poster, the option /tcb/spread \textsuperscript{P.94} will use the whole page for the poster coverage.
\item Poster margins can be adapted by /tcb/left \textsuperscript{P.39} /tcb/right \textsuperscript{P.40} /tcb/top \textsuperscript{P.42}, /tcb/bottom \textsuperscript{P.43}.
\item Poster background can be changed by /tcb/colback \textsuperscript{P.27}, /tcb/interior style \textsuperscript{P.157}, /tcb/interior style image \textsuperscript{P.158}, etc.
\item Do not use /tcb/poster/width \textsuperscript{P.428} and /tcb/poster/height \textsuperscript{P.428} in combination with a coverage. Note that you may use /tcb/width \textsuperscript{P.34} and /tcb/height \textsuperscript{P.53} inside the coverage ⟨option list⟩. Note that this also is not necessary when /tcb/spread \textsuperscript{P.94} is applied.
\end{enumerate}

\begin{Verbatim}/tcb/posterset/no coverage\end{Verbatim}  (style, no value, initially set)

Removes the surrounding \tcolorbox completely.
21.5 Common Box Settings

This option can be applied inside \texttt{tcbposter}\textsuperscript{P.426} and \texttt{tcbposterset}\textsuperscript{P.427} and it is used to set up the style of the \texttt{tcolorbox}es inside the poster. The \langle option list \rangle can contain any \texttt{tcolorbox} option, but box size options are not assumed to be useful here, because the size will be determined by the placement options.

\begin{verbatim}
\begin{tcbposter}
  \texttt{poster = \{spacing=2mm, columns=3, rows=2\},}
  \texttt{coverage = \{height=5cm,}
    \texttt{  \{top color=yellow, bottom color=yellow!50!red\},}
  \texttt{\},}
  \texttt{boxes = \{sharp corners=downhill, arc=3mm, boxrule=1mm,}
    \texttt{  colback=white, colframe=cyan,}
    \texttt{  title style=\{left color=black, right color=cyan\},}
    \texttt{  fonttitle=bfseries\}}
\end{tcbposter}

\begin{verbatim}
First
\begin{verbatim}
\texttt{First box}
\end{verbatim}
Second
\begin{verbatim}
\texttt{Second box}
\end{verbatim}
\end{verbatim}
\end{verbatim}
\end{verbatim}

21.6 Font Scaling

This option can be applied inside \texttt{tcbposter}\textsuperscript{P.426} and \texttt{tcbposterset}\textsuperscript{P.427}. It uses \texttt{/tcb/fit basedim}\textsuperscript{P.443} and \texttt{/tcb/fit fontsize macros}\textsuperscript{P.444} to redefine \texttt{\normalsize} to \langle length \rangle and all other standard font size macros like \texttt{\small} and \texttt{\large} accordingly. This needs a freely scalable font family like \texttt{lmodern} to work. If \texttt{/tcb/posterset/fontsize} is not applied, there standard font size macros are not changed in any way.

\begin{verbatim}
\begin{tcbposter}
  \texttt{poster = \{spacing=2mm, columns=3, rows=2\},}
  \texttt{coverage = \{height=5cm,}
    \texttt{  \{top color=yellow, bottom color=yellow!50!red\},}
    \texttt{\},}
  \texttt{boxes = \{sharp corners=downhill, arc=3mm, boxrule=1mm,}
    \texttt{  colback=white, colframe=cyan,}
    \texttt{  title style=\{left color=black, right color=cyan\},}
    \texttt{  fontsize=15pt, \% \texttt{\normalsize} is now 15pt}
\end{tcbposter}

\begin{verbatim}
\texttt{...}
\end{verbatim}
\end{verbatim}
21.7 Box Placement

Inside a \texttt{tcbposter} environment, this places a \texttt{tcolorbox} with additional \texttt{tcolorbox} (\textit{options}) and the given (\textit{box content}) at a place determined by (\textit{placement}). All (\textit{placement}) options are described in the following. Note that (\textit{box content}) cannot contain \texttt{verbatim} material, see \texttt{posterboxenv}.

\begin{Verbatim}
\begin{tcbposter}
poster = {showframe,height=4cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbposter}
\begin{posterbox}[title=My title]{name=A,column=2,row=2}{My first box}
\end{posterbox}
\end{Verbatim}

This is the environment version of \texttt{posterbox}, i.e. inside a \texttt{tcbposter} environment, this places a \texttt{tcolorbox} with additional \texttt{tcolorbox} (\textit{options}) and the given (\textit{environment content}) at a place determined by (\textit{placement}). In contrast to \texttt{posterbox}, the (\textit{environment content}) is allowed to contain \texttt{verbatim} material. Note that the implementation of \texttt{posterbox} is more efficient than the implementation of \texttt{posterboxenv}.

\begin{Verbatim}
\begin{tcbposter}
poster = {showframe,height=4cm,spacing=2mm,rows=2},
boxes = {size=small,beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbposter}
\begin{posterboxenv}[title=My title]{name=A,column=2,between=top and bottom}
My first box.
\begin{tcblisting}[size=small,colback=yellow!10]
My \textbf{first} poster listing.
\end{tcblisting}
\end{posterboxenv}
\end{tcbposter}
\end{Verbatim}
Sets *(name)* as reference for the current \(\texttt{posterbox}\) or \(\texttt{posterboxenv}\). A TikZ shape name is constructed automatically as combination of \(\texttt{/tcb/poster/prefix}\) and *(name)*.

\begin{tcbposter}
\begin{quote}
\begin{verbatim}
poster = {showframe,height=2.5cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{verbatim}
\end{quote}
\end{tcbposter}

\begin{tcbposter}
\begin{quote}
\begin{verbatim}
posterbox(name=A,column=2,row=2){My first box}
\node[below right=4mm,fill=yellow] (X) at (TCBPOSTER@poster.north west) {Example A};
\draw[blue,very thick,->] (X) |- (TCBPOSTER@A);
\end{verbatim}
\end{quote}
\end{tcbposter}

\begin{tcbposter}
\begin{quote}
\begin{verbatim}
poster = {showframe,height=2.5cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{verbatim}
\end{quote}
\end{tcbposter}

\begin{tcbposter}
\begin{quote}
\begin{verbatim}
posterbox(name=A, column=2, row=2){My first box}
\node[below right=4mm, fill=yellow] (X) at (TCBPOSTER@poster.north west) {Example A};
\draw[blue, very thick, ->] (X) |- (TCBPOSTER@A);
\end{verbatim}
\end{quote}
\end{tcbposter}

\begin{tcbposter}
\begin{quote}
\begin{verbatim}
posterbox(row=1, column=2, span=2){First box}
posterbox(row=2, column=2, span=0.8){Second box}
\end{verbatim}
\end{quote}
\end{tcbposter}

\begin{tcbposter}
\begin{quote}
\begin{verbatim}
poster = {showframe,height=2.5cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{verbatim}
\end{quote}
\end{tcbposter}

\begin{tcbposter}
\begin{quote}
\begin{verbatim}
posterbox(row=1, column=2, span=2){First box}
posterbox(row=2, column=2, span=0.8){Second box}
\end{verbatim}
\end{quote}
\end{tcbposter}

\begin{tcbposter}
\begin{quote}
\begin{verbatim}
poster = {showframe,height=2.5cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{verbatim}
\end{quote}
\end{tcbposter}

\begin{tcbposter}
\begin{quote}
\begin{verbatim}
posterbox(row=1, column=2, span=2){First box}
posterbox(row=2, column=2, span=0.8){Second box}
\end{verbatim}
\end{quote}
\end{tcbposter}

\begin{tcbposter}
\begin{quote}
\begin{verbatim}
poster = {showframe,height=2.5cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{verbatim}
\end{quote}
\end{tcbposter}

432
/tcb/posterloc/span=(number)  
(no default, initially 1)  
Sets the width of the current box to span (number) columns. (number) is also allowed to be a real number like 0.5 or 1.7. See /tcb/posterloc/column → P.432 and /tcb/posterloc/column* → P.432 for examples.

/tcb/posterloc/row=(number)  
(no default, initially unset)  
If this option is applied, the box is placed at the row denoted by (number). Also, the height is set as fixed according to /tcb/posterloc/rowspan.

\begin{tcbposter}
    \[ poster = {showframe,height=2.5cm,spacing=2mm,rows=2}, 
    \]
    \posterbox{row=1,column=1}{First box}
    \posterbox{row=1,column=2,rowspan=2}{Second box}
    \posterbox[natural height]{row=1,column=3}{Third box}
\end{tcbposter}

/tcb/posterloc/rowspan=(number)  
(no default, initially 1)  
Sets the height of the current box to span (number) rows. (number) is also allowed to be a real number like 0.5 or 1.7.

\begin{tcbposter}
    \[ poster = {showframe,height=2.5cm,spacing=2mm,rows=2}, 
    \]
    \posterbox{row=1,column=1,rowspan=0.9}{First box}
    \posterbox{row=1,column=2,rowspan=1.5}{Second box}
    \posterbox{row=1,column=3,rowspan=2}{Third box}
\end{tcbposter}

/tcb/posterloc/fixed height  
(no value, initially 0pt)  
Sets the height of the current box span rows as denoted by /tcb/posterloc/rowspan. This can be used, if not /tcb/posterloc/row, but another height placement option is applied.
The box is placed below another box with the given \((name)\). Also, \((name)\) can be a predefined node, see Section 21.2 on page 426.

\begin{tcbposter}
poster = {showframe,height=3cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbposter}

\begin{tcbposter}
poster = {showframe,height=3cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbposter}

\begin{tcbposter}
poster = {showframe,height=3cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbposter}

\begin{tcbposter}
poster = {showframe,height=3cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbposter}
The box is placed at the position with the given (name). This is quite likely a predefined node, see Section 21.2 on page 426.

\begin{tcbposter}
poster = {showframe, height=3cm, spacing=2mm, rows=2},
boxes = {beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50},
\end{tcbposter}

\begin{tcbposter}
posterbox{name=A, column=1, at=middle}{First box}
posterbox{name=B, column=2, at=row1}{Second box}
\end{tcbposter}

The box is placed below a box (name1) and above another box (name2). Also, (name1) and (name2) can be predefined nodes, see Section 21.2 on page 426.

\begin{tcbposter}
poster = {showframe, height=3cm, spacing=2mm, rows=2},
boxes = {beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50},
\end{tcbposter}

\begin{tcbposter}
posterbox{name=A, column=1, below=top}{First box}
posterbox{name=B, column=1, between=A and bottom}{Second box}
posterbox{name=C, column=2, above=bottom}{Third box}
posterbox{name=D, column=2, between=top and C, span=2}{Fourth box}
posterbox{name=E, column=3, between=D and bottom}{Fifth box}
\end{tcbposter}
The box is broken into partial boxes. These partial boxes are placed following the given \langle sequence \rangle of placements. The feasible syntax for the \langle sequence \rangle is:

\langle column a \rangle \text{ between } \langle name a1 \rangle \text{ and } \langle name a2 \rangle \text{ then} \\
\langle column b \rangle \text{ between } \langle name b1 \rangle \text{ and } \langle name b2 \rangle \text{ then} \\
\langle column c \rangle \text{ between } \langle name c1 \rangle \text{ and } \langle name c2 \rangle \text{ then}...

Obviously, this places the first part box at \langle column a \rangle between \langle name a2 \rangle and \langle name a2 \rangle. The second box part is placed at \langle column b \rangle between \langle name b2 \rangle and \langle name b2 \rangle, and so on.
If the box content of a `/tcb/posterloc/sequence` is too short to fill all reserved box parts, the empty boxes are drawn with the `/tcb/placem` style. This style can be redefined, e.g. to `/tcb/blankest`, if nothing should be drawn for empty boxes.

\begin{tcbposter}
\[\text{poster} = \{\text{showframe},\text{height}=2.5\text{cm},\text{spacing}=2\text{mm},\text{rows}=2\}, \]
\[\text{boxes} = \{\text{beamer},\text{colframe}=\text{blue!50!black},\text{colback}=\text{blue!50},\text{colupper}=\text{yellow!50}\}, \]
\]
\posterbox \{name=A,\text{column}=1,\text{below}=\text{top},\text{span}=2\}\{\text{First box}\}
\posterbox \{colframe=\text{red!50!black},\text{colback}=\text{red!50}\}
\{\text{name}=B,\text{sequence}=1\text{ between }A\text{ and bottom then} \}
\{\text{2 between }A\text{ and bottom then} \}
\{\text{3 between top and bottom} \}
\{\text{Second box followed by placeholder boxes} \}
\end{tcbposter}

\begin{tcbposter}
\[\text{poster} = \{\text{showframe},\text{height}=3\text{cm},\text{spacing}=2\text{mm},\text{rows}=2\}, \]
\[\text{boxes} = \{\text{beamer},\text{colframe}=\text{blue!50!black},\text{colback}=\text{blue!50},\text{colupper}=\text{yellow!50}\}, \]
\]
\posterbox \{name=A,\text{column}=1,\text{row}=1,\text{xshift}=6\text{mm}\}\{\text{First box}\}
\posterbox \{name=B,\text{column}=2,\text{row}=2,\text{xshift}=-6\text{mm}\}\{\text{Second box}\}
\end{tcbposter}

\text{Horizontal shift of a box by \langle length\rangle.}
Vertical shift of a box by \(\langle \text{length} \rangle\).

\begin{tcbposter}
    \poster = \{\text{showframe, height=3cm, spacing=2mm, rows=2},
    \text{boxes} = \{\text{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50}\},
    \}
    \posterbox\{name=A, column=1, row=1, yshift=-4mm\}{First box}
    \posterbox\{name=B, column=2, row=2, yshift=4mm\}{Second box}
\end{tcbposter}
The library is loaded by a package option or inside the preamble by:

\texttt{\tcbuselibrary{fitting}}

### 22.1 Macros of the Library

\texttt{\tcboxfit[(options)]{box content}}

Creates a colored box where the given \texttt{box content} is fitted to the width and height of the box. A \texttt{tcboxfit} has to have a fixed height. If no fixed height is given, a square box is constructed. In principle, most \texttt{(options)} for \texttt{tcolorbox'' P.12} can be used for \texttt{\tcboxfit} with some restrictions. A \texttt{\tcboxfit} cannot have a lower part and cannot be broken.
\newtcboxfit{\langle init options \rangle}{\langle name \rangle}{\langle number \rangle}{\langle default \rangle}{\langle options \rangle}

Creates a new macro \(\langle name \rangle\) based on \texttt{tcboxfit} \textsuperscript{-}P.439. Basically, \texttt{\newtcboxfit} operates like \texttt{\newcommand}. The new macro \(\langle name \rangle\) optionally takes \(\langle number \rangle\)+1 arguments, where \(\langle default \rangle\) is the default value for the optional first argument. The \langle options \rangle are given to the underlying \texttt{tcboxfit}. The \langle init options \rangle allow setting up automatic numbering, see Section 5 from page 114.

\begin{verbatim}
\newtcboxfit{mybox}{colback=red!5!white, colframe=red!75!black,width=4cm, height=1.5cm,halign=center}
\mybox{This is my own box.}\par
\mybox{This is my own box with more text to be written.}
\end{verbatim}

\begin{verbatim}
\% \usepackage{lipsum}
\newtcboxfit{\mybox}[2]{colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries, boxsep=1mm,left=0mm,right=0mm,top=0mm, bottom=0mm,halign=center, valign=center, nobeforeafter,width=#1,height=#2}
\mybox[2.5cm]{1cm}{First box}\%
\mybox[2.5cm]{1cm}{Second box with more text}\
\mybox[5cm]{2cm}{Third box with text}\
\mybox[5cm]{3cm}{\lipsum[1]}
\end{verbatim}

\begin{verbatim}
\% \usepackage{lipsum}
\renewtcboxfit{\mybox}{\langle init options \rangle}{\langle name \rangle}{\langle number \rangle}{\langle default \rangle}{\langle options \rangle}
\renewtcboxfit{\mybox}[2]{colback=red!5!white, colframe=red!75!black, width=2cm,height=2cm/3*2,#1}
\mybox[colback=yellow]{5cm}{\lipsum[2]}
\end{verbatim}

\renewtcboxfit{\langle init options \rangle}{\langle name \rangle}{\langle number \rangle}{\langle default \rangle}{\langle options \rangle}

Operates like \texttt{\newtcboxfit}, but based on \texttt{\renewcommand} instead of \texttt{\newcommand}. An existing macro is redefined.
This is a \LaTeX length adapted automatically by most variants of \texttt{/tcb/fit algorithm}\textsuperscript{\texttt{P.448}}. Therefore, it never is to be changed by the user, but may be applied read-only. The \texttt{\textbackslash tcbfitdim} corresponds to the font size and may also be used to calculate box margins or other distances in dependency. The initial and maximum value for \texttt{\textbackslash tcbfitdim} is set by \texttt{/tcb/fit basedim}\textsuperscript{\texttt{P.443}}.

\texttt{\textbackslash tcbfontsize\{\langle factor\rangle\}}

Selects a font size inside a \texttt{tcolorbox} which is scaled with the given \texttt{\langle factor\rangle} relative to \texttt{\textbackslash tcbfitdim}. Also see \texttt{/tcb/fit fontsize macros}\textsuperscript{\texttt{P.444}}.

\begin{tcolorbox}[fit basedim=10pt]
\begin{tabular}{l}
\texttt{\textbackslash tcbfontsize\{0.25\} Very tiny,} \\
\texttt{\textbackslash tcbfontsize\{0.5\} Small,} \\
\texttt{\textbackslash tcbfontsize\{1\} Normal,} \\
\texttt{\textbackslash tcbfontsize\{2\} Large,} \\
\texttt{\textbackslash tcbfontsize\{4\} Huge.}
\end{tabular}
\end{tcolorbox}

\begin{tcolorbox}[fit basedim=10pt, fit to height=2cm]
\begin{tabular}{l}
\texttt{\textbackslash tcbfontsize\{0.25\} Very tiny,} \\
\texttt{\textbackslash tcbfontsize\{0.5\} Small,} \\
\texttt{\textbackslash tcbfontsize\{1\} Normal,} \\
\texttt{\textbackslash tcbfontsize\{2\} Large,} \\
\texttt{\textbackslash tcbfontsize\{4\} Huge.}
\end{tabular}
\end{tcolorbox}
22.2 Option Keys of the Library

The font size for the content of a box with fixed width and fixed height can be adjusted automatically. This is called the \textit{fitbox capture mode}. Note that the fit control algorithm constructs a series of versions for the box and selects the “best”. Therefore, the compilation time is quite longer than for a normal box. The \texttt{tcboxfit} macro uses this algorithm by default.

\begin{itemize}
  \item The fit control keys are only applicable to unbreakable boxes without a lower part. The box content should not change counters.
\end{itemize}

\texttt{/tcb/fit} \hfill (style, initially unset)

Sets the \texttt{/tcb/capture} mode to \texttt{fitbox}, i.e. enables the font size adjustment algorithm. Thereby, a \texttt{tcolorbox} acts like \texttt{tcboxfit} where the given box content is fitted to the width and height of the box. Therefore, the box has to have a fixed height. If no fixed height is given, a square box is constructed. The font dimension \texttt{tcbfitdim} can also be used to adjust the margins of the box since a box with a tiny font may not need large margins. The number of constructed boxes is saved to the macro \texttt{tcbfitsteps} for analysis.

\begin{verbatim}
% \usepackage{lipsum}
% \tcbsuselibrary{skins}
\newtcolorbox{fitting}[2][]{fit,height=#2,boxsep=1pt,valign=center,opacityupper=0.5,,
top=0.4\tcbfitdim,bottom=0.4\tcbfitdim,left=0.75\tcbfitdim,right=0.75\tcbfitdim,
enhanced,watermark text={\tcbfitsteps},colframe=blue!75!black,colback=white,#1}
\begin{fitting}{4cm}
\lipsum[1]
\end{fitting}
\begin{fitting}{2cm}
\lipsum[2]
\end{fitting}
\begin{fitting}{1cm}
\lipsum[3]
\end{fitting}
\end{verbatim}


/tcb/fit to (width) and (height) (style, initially unset)
Shortcut for using /tcb/fit \[442\] and setting the (width) and (height) values separately.

\begin{tcolorbox}[fit to=3cm and 2cm]
This box content is fitted to the given dimensions.
\end{tcolorbox}

/tcb/fit to height (height) (style, initially unset)
Shortcut for using /tcb/fit \[442\] and setting the (height) value separately.

\begin{tcolorbox}[fit to height=2cm]
This box content is fitted to the given height.
\end{tcolorbox}

/tcb/fit basedim=(length) (no default, initially 10pt)
Sets the starting font dimension for the font size adjustment algorithm to (length). The algorithm never enlarges this dimension. Therefore, the final \texttt{\tcbfitdim} \[441\] is identical to or smaller than (length).

\begin{tcolorbox}[fit to=4cm and 2cm, fit basedim=50pt]
Enough words for the box.
\end{tcolorbox}

/tcb/fit skip=(real value) (no default, initially 1.2)
Sets the skip value of the selected font to (real value) times \texttt{\tcbfitdim} \[441\].

\begin{tcolorbox}[fit to=5cm and 4cm, fit skip=1.0 ]
\lipsum[1]
\end{tcolorbox}
Redefines the standard \LaTeX\ font size macros \texttt{\tiny}, \texttt{\scriptsize}, \texttt{\footnotesize}, \texttt{\small}, \texttt{\normalsize}, \texttt{\large}, \texttt{\Large}, \texttt{\Huge}, and \texttt{\Huge}, to set font sizes relative to the current \texttt{\tcbfitdim} \cite{P.441}. Note that the display skip values for mathematical formulas are respected by the redefined macros. Also see \texttt{\tcbfontsize} \cite{P.441}.

% \usepackage{lipsum}
\begin{tcolorbox}
\[fit to height=4cm\]
{\Large\bfseries This text is not adapted:}\par
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}
[fit to height=4cm, \texttt{fit fontsize macros}]
{\Large\bfseries This text is adapted:}\par
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}
{\Huge\bfseries This text is not adapted:}\par
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}
{\realHuge\bfseries This text is adapted:}\par
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}
{\Huge\bfseries The relative relative font size macros are also usable without the \texttt{fit} algorithm.}\par
{\Huge\bfseries Adapted Huge} \texttt{---} \texttt{\realHuge\bfseries Original Huge}
\end{tcolorbox}

\begin{tcolorbox}
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}
{\Huge\bfseries Adapted title}\par
\lipsum[2]
\end{tcolorbox}
/tcb/fit height plus=(dimension)  (no default, initially 0pt)

The box is allowed to enlarge the fixed height up to the given (dimension), before a font size fit is applied. An optional /tcb/fit width plus is tried after the height adaption.

\begin{tcolorbox}[fit]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit,fit height plus=1cm]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit,fit height plus=1cm]
\lipsum[2]
\end{tcolorbox}

/tcb/fit width plus=(dimension)  (no default, initially 0pt)

The box is allowed to enlarge the fixed width up to the given (dimension), before a font size fit is applied. An optional /tcb/fit height plus is tried before the width adaption.

\begin{tcolorbox}[fit]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit,fit width plus=1cm]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit,fit width plus=1cm]
\lipsum[2]
\end{tcolorbox}
Typically but not necessarily, the optional title of a \texttt{tcolorbox} is not part of the fit operation. If a \texttt{/tcb/fit width plus} is applied, the title is also adapted to the new width. If counters are increased inside the title text, they may be increased more than one time. To avoid this, you are encouraged to use \texttt{/tcb/phantom} or \texttt{/tcb/step and label} to set counters or use automatic numbering, see Subsection 5.1 from page 114.

\texttt{/tcb/fit width from=\langle min \rangle to \langle max \rangle} \quad \text{(style, no default)}

Sets the box width to \langle min \rangle and allows the width to grow up to \langle max \rangle.

\begin{verbatim}
\% \usepackage{lipsum}
\tcbset{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,bottom=1mm,
right=1mm,boxsep=0mm,height=4cm}

\begin{tcolorbox}[fit,width=\linewidth/2]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}
\begin{tcolorbox}[fit width from=\linewidth/2 to \linewidth]
\lipsum[2]
\end{tcolorbox}
\end{tcolorbox}
\end{verbatim}


Sets the box height to \textit{(min)} and allows the height to grow up to \textit{(max)}.

\begin{Verbatim}
% \usepackage{lipsum}
\newtcolorbox{mybox}{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm, bottom=1mm,right=1mm,boxsep=0mm,width=4cm,nobeforeafter, fit height from=1cm to 8cm}
\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}
This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.
\end{mybox}
\begin{mybox}
\lipsum[2]
\end{mybox}
\end{Verbatim}
Sets the algorithm for the fitting process after optionally width and height are adapted. In the following, adapting the font size means adapting $\texttt{\textbackslash tcbbfitdim}$ \textsuperscript{441}. Feasible values for $\langle \text{name} \rangle$ are:

- **fontsize** (initial): The algorithm is a bisection method that adapts the font size until certain stop conditions are fulfilled. This is the most time-consuming method but it is robust and gives pleasant results.

  ! The used font has to be freely scalable for this method! Other content than text is not scaled down. The aspect ratio is fully guaranteed.

- **fontsize\***: First, the **fontsize** algorithm is applied. If the font was scaled down and the resulting height is too small, the box is squeezed to fit the area.

  ! The used font has to be freely scalable for this method! Other content than text may be slightly rescaled. The aspect ratio cannot be fully guaranteed.

- **aresize**: The algorithm calculates the area size for the text without scaling the font. The text box is shaped for the needed aspect ratio in one or two steps. Finally, it is scaled down with a standard $\texttt{\textbackslash resizebox}$ macro.

  ! The used font has not to be scalable. Every box content is scaled down. The aspect ratio cannot be fully guaranteed.

- **aresize\***: The **aresize** algorithm is applied, but if the content was scaled down and the resulting height is too small, the box is squeezed to fit the area.

  ! The used font has not to be scalable. Every box content is scaled down. The aspect ratio cannot be fully guaranteed.

- **hybrid**: First, this algorithm estimates the needed font size in one or two steps. Then an **aresize** fitting as above is a applied.

  ! The used font has to be freely scalable for this method! Other content than text may be slightly rescaled. The aspect ratio cannot be fully guaranteed.

- **hybrid\***: First, this algorithm estimates the needed font size in one or two steps. Then an **aresize\*** fitting as above is a applied.

  ! The used font has to be freely scalable for this method! Other content than text may be slightly rescaled. The aspect ratio cannot be fully guaranteed.

- **squeeze**: The text box is brutally scaled down to fit.

  ! The aspect ratio is very likely to be horrible. You should not use this method for final documents.
Quality dotfill versus dotfill Speed

Quality dots versus dots Speed
The following options set control parameters for the fit algorithm. Mainly, they apply
to the \texttt{fontsize} variant, see \texttt{/tcb/fit algorithm} \texttt{P.448}. The options should be seen as
experimental and are likely to change in future versions, if necessary.

\texttt{/tcb/fit maxstep=⟨number⟩}  \hspace{1cm} (no default, initially 20)

Sets the maximal step size for the font size adjustment algorithm. In normal situations,
the algorithm stops before reaching the initial value of 20 steps. If the box content does not
shrink, this value prevents an endless loop.

\texttt{/tcb/fit maxfontdiff=⟨dimension⟩}  \hspace{1cm} (no default, initially 0.1pt)

The algorithm stops, if the font size is determined within a deviation of ⟨dimension⟩.

\texttt{/tcb/fit maxfontdiffgap=⟨dimension⟩}  \hspace{1cm} (no default, initially 1pt)

The algorithm stops, if the number of lines is determined and the font size is determined
within a deviation of ⟨dimension⟩.

\texttt{/tcb/fit maxwidthdiff=⟨dimension⟩}  \hspace{1cm} (no default, initially 1pt)

The algorithm stops, if the (optionally) flexible box width is determined within a deviation
of ⟨dimension⟩.

\texttt{/tcb/fit maxwidthdiffgap=⟨dimension⟩}  \hspace{1cm} (no default, initially 10pt)

The algorithm stops, if the number of lines is determined and the (optionally) flexible box
width is determined within a deviation of ⟨dimension⟩.

\texttt{/tcb/fit warning=⟨value⟩}  \hspace{1cm} (no default, initially off)

Typically, the fit control algorithm constructs several auxiliary boxes to determine the
optimal one. If not switched off, the construction of the auxiliary boxes may produce many
\texttt{hbox} warnings. This option key changes the \texttt{\hbadness} value.

- \texttt{off}: Most of ‘Underfull \texttt{hbox}’ and ‘Overfull \texttt{hbox}’ warnings are switched off
  (including the ones for the finally used box).
- \texttt{on}: All warnings for all auxiliary boxes are displayed.
- \texttt{final}: Only warnings for the finally used box are displayed. Note that an additional
  box has to be contructed for theses messages.
23 Library \texttt{hooks}

The library is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{hooks}
\end{verbatim}

For the skin related options, the library \texttt{skins} has to be loaded separately.

23.1 Concept of Hooks

A hook is a placeholder in some \LaTeX code where additional code can be added. For example, the \LaTeX macro \texttt{\textbackslash AtBeginDocument} adds code to a hook which is placed at the beginning of every document.

Several option keys of \texttt{tcolorbox} allow providing some code which is added to specific places of a colored box. For example, \texttt{/tcb/before upper} \textsuperscript{\textit{P.65}} places code before the content of the upper part. A following usage of this key overwrites any prior settings.

The library \texttt{hooks} extends \texttt{/tcb/before upper} \textsuperscript{\textit{P.65}} and several more existing keys to “hookable” versions, e.g. \texttt{/tcb/before upper app} \textsuperscript{\textit{P.452}} and \texttt{/tcb/before upper pre} \textsuperscript{\textit{P.452}}. The “hookable” keys don’t overwrite prior settings but either append or prepend the newly given code to the existing code.

The general naming convention (with some small exceptions) is:

- \texttt{(option key) app}: works like \texttt{(option key)} but appends its code to the existing code.
- \texttt{(option key) pre}: works like \texttt{(option key)} but prepends its code to the existing code.

If the original \texttt{(option key)} is used (again), all code will be overwritten. Therefore, the order of the option key usage is crucial.

\begin{verbatim}
% \usepackage{array,tabularx}
\newcolumntype{Y}{>{\raggedleft\arraybackslash}X}% see tabularx
\tcset{enhanced,fonttitle=\bfseries\large,fontupper=\normalsize\sffamily,
    colback=yellow!10!white,colframe=red!50!black,colbacktitle=Salmon!30!white,
    coltitle=black,center title,
    tabularx={|X||Y|Y|Y|Y|Y},% this sets `before upper' and `after upper'
    before upper app={Group & One & Two & Three & Four & Sum\hline\hline} }
\begin{tcolorbox}[title=My table]
\begin{tabular}{|Y|Y|Y|Y|Y|Y|}
\hline
\textbf{Group} & \textbf{One} & \textbf{Two} & \textbf{Three} & \textbf{Four} & \textbf{Sum} \\
\hline
Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
\hline
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
\hline
Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\hline
Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\hline
\end{tabular}
\end{tcolorbox}
\end{verbatim}

My table

<table>
<thead>
<tr>
<th>Group</th>
<th>One</th>
<th>Two</th>
<th>Three</th>
<th>Four</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>1000.00</td>
<td>2000.00</td>
<td>3000.00</td>
<td>4000.00</td>
<td>10000.00</td>
</tr>
<tr>
<td>Green</td>
<td>2000.00</td>
<td>3000.00</td>
<td>4000.00</td>
<td>5000.00</td>
<td>14000.00</td>
</tr>
<tr>
<td>Blue</td>
<td>3000.00</td>
<td>4000.00</td>
<td>5000.00</td>
<td>6000.00</td>
<td>18000.00</td>
</tr>
<tr>
<td>Sum</td>
<td>6000.00</td>
<td>9000.00</td>
<td>12000.00</td>
<td>15000.00</td>
<td>42000.00</td>
</tr>
</tbody>
</table>
23.2 Box Content Additions

The following option keys extend the options given in Subsection 4.11 from page 64.

/tcb/before title app={code} \hspace{1cm} (no default)

Appends the given \textit{code} to /tcb/before title^\text{P.64} after the color and font settings and \textit{before} the content of the title.

/tcb/before title pre={code} \hspace{1cm} (no default)

Prepends the given \textit{code} to /tcb/before title^\text{P.64} after the color and font settings and \textit{before} the content of the title.

/tcb/after title app={code} \hspace{1cm} (no default)

Appends the given \textit{code} to /tcb/after title^\text{P.64} after the content of the title.

/tcb/after title pre={code} \hspace{1cm} (no default)

Prepends the given \textit{code} to /tcb/after title^\text{P.64} after the content of the title.

/tcb/before upper app={code} \hspace{1cm} (no default)

Appends the given \textit{code} to /tcb/before upper^\text{P.65} or /tcb/before upper*^\text{P.65} after the color and font settings and \textit{before} the content of the upper part.

/tcb/before upper pre={code} \hspace{1cm} (no default)

Prepends the given \textit{code} to /tcb/before upper^\text{P.65} or /tcb/before upper*^\text{P.65} after the color and font settings and \textit{before} the content of the upper part.

/tcb/after upper app={code} \hspace{1cm} (no default)

Appends the given \textit{code} to /tcb/after upper^\text{P.66} or /tcb/after upper*^\text{P.66} after the content of the upper part.

/tcb/after upper pre={code} \hspace{1cm} (no default)

Prepends the given \textit{code} to /tcb/after upper^\text{P.66} or /tcb/after upper*^\text{P.66} after the content of the upper part.

% \tcbuselibrary{theorems}
\begin{tcolorbox}[
ams align,% this sets `before upper*' and `after upper*' \colback=yellow!10!white,\colframe=red!50!black, before upper app={\frac{2}{\sqrt{2}}&=\sqrt{2}.\}, after upper pre={\int x^2 ~\text{d}x &= \frac13 x^3 + c.\}} \end{tcolorbox}

\textbf{22.} \frac{2}{\sqrt{2}} = \sqrt{2}.
\textbf{23.} \sum_{n=1}^{\infty} \frac{1}{n} = \infty.
\textbf{24.} \int x^2 ~\text{d}x = \frac13 x^3 + c.
\textbf{25.} \sin\left(\frac{\pi}{2}\right) = 1.
/tcb/before lower app=⟨code⟩ (no default)
Appends the given ⟨code⟩ to /tcb/before lower→P.67 or /tcb/before lower*→P.67 after the color and font settings and before the content of the lower part.

/tcb/before lower pre=⟨code⟩ (no default)
Prepends the given ⟨code⟩ to /tcb/before lower→P.67 or /tcb/before lower*→P.67 after the color and font settings and before the content of the lower part.

/tcb/after lower app=⟨code⟩ (no default)
Appends the given ⟨code⟩ to /tcb/after lower→P.68 or /tcb/after lower*→P.68 after the content of the lower part.

/tcb/after lower pre=⟨code⟩ (no default)
Prepends the given ⟨code⟩ to /tcb/after lower→P.68 or /tcb/after lower*→P.68 after the content of the lower part.

23.3 Embedding into the Surroundings
The following option keys extend the options given in Subsection 4.14 from page 81.

The “hookable” versions are usable inside the document. In the preamble, they can only be used after explicit setting of /tcb/before→P.81 and /tcb/after→P.81 or by e.g. /tcb/parskip→P.85.

/tcb/before app=⟨code⟩ (no default)
Appends the given ⟨code⟩ to /tcb/before→P.81 before the colored box.

/tcb/before pre=⟨code⟩ (no default)
Prepends the given ⟨code⟩ to /tcb/before→P.81 before the colored box.

/tcb/after app=⟨code⟩ (no default)
Appends the given ⟨code⟩ to /tcb/after→P.81 after the colored box.

/tcb/after pre=⟨code⟩ (no default)
Prepends the given ⟨code⟩ to /tcb/after→P.81 after the colored box.

\tcbset{colback=red!15!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title,before app={The box follows:\[4pt]}, after app={This is the end.}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

The box follows:

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is the end.
23.4 Overlays

The following option keys extend the options given in Subsection 4.12 from page 74.

\( /tcb/overlay\ app=(\text{graphical code}) \)  
(no default)

Appends the given \( \langle \text{graphical code} \rangle \) to \( /tcb/overlay \)~\textsuperscript{P.74}.

\( /tcb/overlay\ pre=(\text{graphical code}) \)  
(no default)

Prepends the given \( \langle \text{graphical code} \rangle \) to \( /tcb/overlay \)~\textsuperscript{P.74}.

\( /tcb/overlay\ unbroken\ app=(\text{graphical code}) \)  
(no default)

Appends the given \( \langle \text{graphical code} \rangle \) to \( /tcb/overlay\ unbroken \)\textsuperscript{P.75}.

\( /tcb/overlay\ unbroken\ pre=(\text{graphical code}) \)  
(no default)

Prepends the given \( \langle \text{graphical code} \rangle \) to \( /tcb/overlay\ unbroken \)\textsuperscript{P.75}.

\( /tcb/overlay\ first\ app=(\text{graphical code}) \)  
(no default)

Appends the given \( \langle \text{graphical code} \rangle \) to \( /tcb/overlay\ first \)\textsuperscript{P.75}.

\( /tcb/overlay\ first\ pre=(\text{graphical code}) \)  
(no default)

Prepends the given \( \langle \text{graphical code} \rangle \) to \( /tcb/overlay\ first \)\textsuperscript{P.75}.
/tcb/overlay middle app=(graphical code)  
Appends the given ⟨graphical code⟩ to /tcb/overlay middle \rightarrow P.75.

/tcb/overlay middle pre=(graphical code)  
Prepends the given ⟨graphical code⟩ to /tcb/overlay middle \rightarrow P.75.

/tcb/overlay last app=(graphical code)  
Appends the given ⟨graphical code⟩ to /tcb/overlay last \rightarrow P.75.

/tcb/overlay last pre=(graphical code)  
Prepends the given ⟨graphical code⟩ to /tcb/overlay last \rightarrow P.75.

/tcb/overlay broken app=(graphical code)  
Appends the given ⟨graphical code⟩ to /tcb/overlay broken \rightarrow P.75.

/tcb/overlay broken pre=(graphical code)  
Prepends the given ⟨graphical code⟩ to /tcb/overlay broken \rightarrow P.75.

/tcb/overlay unbroken and first app=(graphical code)  
Appends the given ⟨graphical code⟩ to /tcb/overlay unbroken and first \rightarrow P.75.

/tcb/overlay unbroken and first pre=(graphical code)  
Prepends the given ⟨graphical code⟩ to /tcb/overlay unbroken and first \rightarrow P.75.

/tcb/overlay middle and last app=(graphical code)  
Appends the given ⟨graphical code⟩ to /tcb/overlay middle and last \rightarrow P.75.

/tcb/overlay middle and last pre=(graphical code)  
Prepends the given ⟨graphical code⟩ to /tcb/overlay middle and last \rightarrow P.75.

/tcb/overlay unbroken and last app=(graphical code)  
Appends the given ⟨graphical code⟩ to /tcb/overlay unbroken and last \rightarrow P.75.

/tcb/overlay unbroken and last pre=(graphical code)  
Prepends the given ⟨graphical code⟩ to /tcb/overlay unbroken and last \rightarrow P.75.

/tcb/overlay first and middle app=(graphical code)  
Appends the given ⟨graphical code⟩ to /tcb/overlay first and middle \rightarrow P.75.

/tcb/overlay first and middle pre=(graphical code)  
Prepends the given ⟨graphical code⟩ to /tcb/overlay first and middle \rightarrow P.75.
23.5 Watermarks

The following option keys extend the options given in Subsection 10.3 from page 174.

Watermarks are special overlays. The \texttt{\colorbox} library allows the combination of several watermarks and overlays.

\[\texttt{/tcb/watermark text app=(text)}\]  
(no default)

Appends a \texttt{/tcb/watermark text $^{\cdot \cdot \cdot 174}$} to the colored box.

\[\texttt{/tcb/watermark text pre=(text)}\]  
(no default)

Prepends a \texttt{/tcb/watermark text $^{\cdot \cdot \cdot 174}$} to the colored box.

\[\texttt{/tcb/watermark text app on=(part) is (text)}\]  
(no default)

Appends a \texttt{/tcb/watermark text on $^{\cdot \cdot \cdot 174}$} the named \texttt{(part)} of a break sequence.

\[\texttt{/tcb/watermark text pre on=(part) is (text)}\]  
(no default)

Prepends a \texttt{/tcb/watermark text on $^{\cdot \cdot \cdot 174}$} the named \texttt{(part)} of a break sequence.
/tcb/watermark graphics app=⟨file name⟩ (no default)
Appends a /tcb/watermark graphics→P.175 referenced by ⟨file name⟩ to the colored box.

/tcb/watermark graphics pre=⟨file name⟩ (no default)
Prepends a /tcb/watermark graphics→P.175 referenced by ⟨file name⟩ to the colored box.

/tcb/watermark graphics app on=⟨part⟩ is ⟨file name⟩ (no default)
Appends a /tcb/watermark graphics on→P.175 the named ⟨part⟩ of a break sequence. The picture is referenced by ⟨file name⟩.

/tcb/watermark graphics pre on=⟨part⟩ is ⟨file name⟩ (no default)
Prepends a /tcb/watermark graphics on→P.175 the named ⟨part⟩ of a break sequence. The picture is referenced by ⟨file name⟩.

/tcb/watermark tikz app=⟨graphical code⟩ (no default)
Appends a /tcb/watermark tikz→P.176 with the given tikz ⟨graphical code⟩ to the colored box.

/tcb/watermark tikz pre=⟨graphical code⟩ (no default)
Prepends a /tcb/watermark tikz→P.176 with the given tikz ⟨graphical code⟩ to the colored box.

% \usepackage{tikz}
\tcbset{colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries, 
        watermark color=Navy, watermark opacity=0.25, 
        smiley/.style={watermark tikz pre={
            \path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm); 
            \fill[red] (45:5mm) circle (1mm); 
            \fill[red] (135:5mm) circle (1mm); 
            \draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);}}}
\begin{tcolorbox}
[enhanced,title=My title, watermark text=Watermark, 
         smiley]
\lipsum[1-2]
\end{tcolorbox}

/tcb/watermark tikz app on=⟨part⟩ is ⟨graphical code⟩ (no default)
Appends a /tcb/watermark tikz on→P.176 the named ⟨part⟩ of a break sequence.

/tcb/watermark tikz pre on=⟨part⟩ is ⟨graphical code⟩ (no default)
Prepends a /tcb/watermark tikz on→P.176 the named ⟨part⟩ of a break sequence.
23.6 Underlays

The following option keys extend the options given in Section 10.8 on page 204. There are no app type keys since underlays are stackable by default.

/tcb/underlay pre\{graphical code\} (no default)

Prepends the given \{graphical code\} to /tcb/underlay \(\rightarrow\) P.204.

/tcb/underlay unbroken pre\{graphical code\} (no default)

Prepends the given \{graphical code\} to /tcb/underlay unbroken \(\rightarrow\) P.205.

/tcb/underlay first pre\{graphical code\} (no default)

Prepends the given \{graphical code\} to /tcb/underlay first \(\rightarrow\) P.205.

/tcb/underlay middle pre\{graphical code\} (no default)

Prepends the given \{graphical code\} to /tcb/underlay middle \(\rightarrow\) P.205.

/tcb/underlay last pre\{graphical code\} (no default)

Prepends the given \{graphical code\} to /tcb/underlay last \(\rightarrow\) P.205.

/tcb/underlay boxed title pre\{graphical code\} (no default)

Prepends the given \{graphical code\} to /tcb/underlay boxed title \(\rightarrow\) P.205.

/tcb/underlay broken pre\{graphical code\} (no default)

Prepends the given \{graphical code\} to /tcb/underlay broken \(\rightarrow\) P.205.

/tcb/underlay unbroken and first pre\{graphical code\} (no default)

Prepends the given \{graphical code\} to /tcb/underlay unbroken and first \(\rightarrow\) P.205.

/tcb/underlay middle and last pre\{graphical code\} (no default)

Prepends the given \{graphical code\} to /tcb/underlay middle and last \(\rightarrow\) P.205.

/tcb/underlay unbroken and last pre\{graphical code\} (no default)

Prepends the given \{graphical code\} to /tcb/underlay unbroken and last \(\rightarrow\) P.205.

/tcb/underlay first and middle pre\{graphical code\} (no default)

Prepends the given \{graphical code\} to /tcb/underlay first and middle \(\rightarrow\) P.205.
23.7 Finishes

The following option keys extend the options given in Section 10.9 on page 206. There are no app type keys since finishes are stackable by default.

/\texttt{tcb/finish\ pre}\:\texttt{=(graphical\ code)}\quad \text{(no\ default)}

\begin{itemize}
\item Prepends the given \texttt{\<graphical\ code\>} to /\texttt{tcb/finish} \rightarrow \texttt{P.206}.
\end{itemize}

/\texttt{tcb/finish\ unbroken\ pre}\:\texttt{=(graphical\ code)}\quad \text{(no\ default)}

\begin{itemize}
\item Prepends the given \texttt{\<graphical\ code\>} to /\texttt{tcb/finish\ unbroken} \rightarrow \texttt{P.207}.
\end{itemize}

/\texttt{tcb/finish\ first\ pre}\:\texttt{=(graphical\ code)}\quad \text{(no\ default)}

\begin{itemize}
\item Prepends the given \texttt{\<graphical\ code\>} to /\texttt{tcb/finish\ first} \rightarrow \texttt{P.207}.
\end{itemize}

/\texttt{tcb/finish\ middle\ pre}\:\texttt{=(graphical\ code)}\quad \text{(no\ default)}

\begin{itemize}
\item Prepends the given \texttt{\<graphical\ code\>} to /\texttt{tcb/finish\ middle} \rightarrow \texttt{P.207}.
\end{itemize}

/\texttt{tcb/finish\ last\ pre}\:\texttt{=(graphical\ code)}\quad \text{(no\ default)}

\begin{itemize}
\item Prepends the given \texttt{\<graphical\ code\>} to /\texttt{tcb/finish\ last} \rightarrow \texttt{P.207}.
\end{itemize}

/\texttt{tcb/finish\ broken\ pre}\:\texttt{=(graphical\ code)}\quad \text{(no\ default)}

\begin{itemize}
\item Prepends the given \texttt{\<graphical\ code\>} to /\texttt{tcb/finish\ broken} \rightarrow \texttt{P.207}.
\end{itemize}

/\texttt{tcb/finish\ unbroken\ and\ first\ pre}\:\texttt{=(graphical\ code)}\quad \text{(no\ default)}

\begin{itemize}
\item Prepends the given \texttt{\<graphical\ code\>} to /\texttt{tcb/finish\ unbroken\ and\ first} \rightarrow \texttt{P.207}.
\end{itemize}

/\texttt{tcb/finish\ middle\ and\ last\ pre}\:\texttt{=(graphical\ code)}\quad \text{(no\ default)}

\begin{itemize}
\item Prepends the given \texttt{\<graphical\ code\>} to /\texttt{tcb/finish\ middle\ and\ last} \rightarrow \texttt{P.207}.
\end{itemize}

/\texttt{tcb/finish\ unbroken\ and\ last\ pre}\:\texttt{=(graphical\ code)}\quad \text{(no\ default)}

\begin{itemize}
\item Prepends the given \texttt{\<graphical\ code\>} to /\texttt{tcb/finish\ unbroken\ and\ last} \rightarrow \texttt{P.207}.
\end{itemize}

/\texttt{tcb/finish\ first\ and\ middle\ pre}\:\texttt{=(graphical\ code)}\quad \text{(no\ default)}

\begin{itemize}
\item Prepends the given \texttt{\<graphical\ code\>} to /\texttt{tcb/finish\ first\ and\ middle} \rightarrow \texttt{P.207}.
\end{itemize}

23.8 Skin Code

The following option keys extend the options given in Subsection 9.2 from page 145.

/\texttt{tcb/frame\ code\ app}\:\texttt{=(graphical\ code)}\quad \text{(no\ default)}

\begin{itemize}
\item Appends the given \texttt{\<graphical\ code\>} to /\texttt{tcb/frame\ code} \rightarrow \texttt{P.145}.
\end{itemize}

/\texttt{tcb/frame\ code\ pre}\:\texttt{=(graphical\ code)}\quad \text{(no\ default)}

\begin{itemize}
\item Prepends the given \texttt{\<graphical\ code\>} to /\texttt{tcb/frame\ code} \rightarrow \texttt{P.145}.
\end{itemize}

/\texttt{tcb/interior\ titled\ code\ app}\:\texttt{=(graphical\ code)}\quad \text{(no\ default)}

\begin{itemize}
\item Appends the given \texttt{\<graphical\ code\>} to /\texttt{tcb/interior\ titled\ code} \rightarrow \texttt{P.145}.
\end{itemize}

\begin{tcolorbox}[title=My title,enhanced,colframe=Navy, frame code app={\draw[yellow, line width=1cm] (frame.south west)--(frame.north east);} , interior titled code app={\draw[red, line width=1cm] (frame.north west)--(frame.south east);}, ] \lipsum[1] \end{tcolorbox}
23.9 Extras

The following option keys extend the options given in Section 19.5 on page 397. There are no app type keys since extras are stackable by default.

- **/tcb/extras pre**\[\{(options)\}\] (no default)
  Prepends the given \{(options)\} to /tcb/extras → P.397.

- **/tcb/extras unbroken pre**\[\{(options)\}\] (no default)
  Prepends the given \{(options)\} to /tcb/extras unbroken → P.397.

- **/tcb/extras first pre**\[\{(options)\}\] (no default)
  Prepends the given \{(options)\} to /tcb/extras first → P.397.

- **/tcb/extras middle pre**\[\{(options)\}\] (no default)
  Prepends the given \{(options)\} to /tcb/extras middle → P.397.

- **/tcb/extras last pre**\[\{(options)\}\] (no default)
  Prepends the given \{(options)\} to /tcb/extras last → P.397.

- **/tcb/extras broken pre**\[\{(options)\}\] (no default)
  Prepends the given \{(options)\} to /tcb/extras broken → P.397.

- **/tcb/extras unbroken and first pre**\[\{(options)\}\] (no default)
  Prepends the given \{(options)\} to /tcb/extras unbroken and first → P.397.

- **/tcb/extras middle and last pre**\[\{(options)\}\] (no default)
  Prepends the given \{(options)\} to /tcb/extras middle and last → P.397.

- **/tcb/extras unbroken and last pre**\[\{(options)\}\] (no default)
  Prepends the given \{(options)\} to /tcb/extras unbroken and last → P.397.

- **/tcb/extras first and middle pre**\[\{(options)\}\] (no default)
  Prepends the given \{(options)\} to /tcb/extras first and middle → P.398.

23.10 Listings

The following option keys extend the options given in Section 17 from page 320.

- **/tcb/listing options app**\[\{(options)\}\] (no default)
  Appends the given \{(options)\} to /tcb/listing options → P.327.

- **/tcb/listing options pre**\[\{(options)\}\] (no default)
  Prepends the given \{(options)\} to /tcb/listing options → P.327.

- **/tcb/minted options app**\[\{(options)\}\] (no default)
  Appends the given \{(options)\} to /tcb/minted options → P.330.

- **/tcb/minted options pre**\[\{(options)\}\] (no default)
  Prepends the given \{(options)\} to /tcb/minted options → P.330.
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{xparse}

This also loads the package \texttt{xparse} \cite{13}.

The purpose of this library is to give comfortable access to the powerful document command production with \texttt{xparse} for \texttt{tcolorbox}. See the \texttt{xparse} package documentation \cite{13} for details about the argument (\textit{specification}) used in this section.

### 24.1 Option Keys

\texttt{/tcb/verbatim} \hspace{1cm} (style, no value)

Sets options for a \textit{verbatim} style \texttt{tcb} \cite{P.14}. Since the indented boxes may contain only very few words, the dimensions are made smaller and \texttt{/tcb/nobeforeafter} \cite{P.81} and \texttt{/tcb/tcbox raise base} \cite{P.102} are set.

\begin{verbatim}
\DeclareTotalTCBox{\myverb}{ v }{verbatim,
   colframe=red!75!black,colupper=blue}{#1}
\myverb{\textbf} is a \myverb{\LaTeX} command.
\end{verbatim}

\begin{verbatim}
\begin{myverb}
This is a tcolorbox.
\end{myverb}
\end{verbatim}

\begin{verbatim}
\begin{myverb}[goldshade.png]
This is a tcolorbox.
\end{myverb}
\end{verbatim}

\texttt{/tcb/IfNoValueTF}={}⟨\textit{argument}⟩\{⟨true options⟩\}⟨false options⟩\} \hspace{1cm} (no default)

\texttt{/tcb/IfNoValueT}={}⟨\textit{argument}⟩\{⟨true options⟩\} \hspace{1cm} (no default)

\texttt{/tcb/IfNoValueF}={}⟨\textit{argument}⟩\{⟨false options⟩\} \hspace{1cm} (no default)

Wraps the \texttt{\IfNoValue(TF)} command(s) of \texttt{xparse} for option setting. If the \textit{⟨argument⟩} has no value, the \textit{⟨true options⟩} are set. Otherwise, the \textit{⟨false options⟩} are set.

\begin{verbatim}
\DeclareTColorBox{mybox}{ o }{colframe=red!75!black,
   IfNoValueTF=#{1}[colback=red!5!white]{enhanced,interior style image=#1}}
\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}[goldshade.png]
This is a tcolorbox.
\end{mybox}
\end{verbatim}
\texttt{/tcb/IfValueTF={(argument)\{\{true options\}\{\{false options\}\}}}} \quad (\text{no default})
\texttt{/tcb/IfValueT={(argument)\{\{true options\}\}}} \quad (\text{no default})
\texttt{/tcb/IfValueF={(argument)\{\{false options\}\}}} \quad (\text{no default})

Wraps the \texttt{IfValue(TF)} command(s) of \texttt{xparse} for option setting. If the \texttt{\langle argument \rangle} has a value, the \texttt{\langle true options \rangle} are set. Otherwise, the \texttt{\langle false options \rangle} are set.

\texttt{\begin{mybox}}\texttt{This is a tcolorbox.}\texttt{\end{mybox}}
\texttt{\begin{mybox}[My title]}\texttt{This is a tcolorbox.}\texttt{\end{mybox}}

\texttt{\DeclareTColorBox{mybox}{ o }{colframe=red!75!black,colback=red!5!white,}
\texttt{IfValueT={#1}{title={\textbar#1\textbar},fonttitle=\textbf}}}
\texttt{\begin{mybox}}\texttt{This is a tcolorbox.}\texttt{\end{mybox}}

\texttt{\DeclareTColorBox{mybox}{ s }{colframe=red!75!black,}
\texttt{IfBooleanTF={#1}{colback=yellow!50!red}{colback=red!5!white}}}
\texttt{\begin{mybox}}\texttt{This is a tcolorbox.}\texttt{\end{mybox}}
\texttt{\begin{mybox}*[My title]}\texttt{This is a tcolorbox.}\texttt{\end{mybox}}

\texttt{\begin{mybox}}\texttt{This is a tcolorbox.}\texttt{\end{mybox}}
\texttt{\begin{mybox}}\texttt{This is a tcolorbox.}\texttt{\end{mybox}}
24.2 Producing \texttt{tcolorbox} Environments and Commands

\begin{tcolorbox}[init options]{name}{specification}{options}
\end{tcolorbox}

Creates a new environment \texttt{name} based on \texttt{tcolorbox}. Basically, \texttt{\textbackslash DeclareTColorBox} operates like \texttt{\textbackslash DeclareDocumentEnvironment}. This means, the new environment \texttt{name} is constructed with the given argument \texttt{specification}. The \texttt{options} are given to the underlying \texttt{tcolorbox}. Note that /tcb/savedelimiter\footnote{P.26} is set to the given \texttt{name} automatically.

The \texttt{init options} allow setting up automatic numbering, see Section 5 from page 114. The new environment is always created, irrespective of an already existing environment with the same name.

% counter from previous example
\begin{tcolorbox}[use counter from=pabox]{mybox}{ O{red} m d" " !O{} }
{enhanced, colframe=#1!75!black, colback=#1!15!white,
 fonttitle=\texttt{bfseries},title={\texttt{thetcbcounter}-#2},
 IfValueT={#3}{watermark text={#3}},#4}
\begin{mybox}{My title}
This is a \texttt{tcolorbox}.
\end{mybox}
\begin{mybox}{blue}{My title}
This is a \texttt{tcolorbox}.
\end{mybox}
\begin{mybox}{green}{My title}"My Watermark"
This is a \texttt{tcolorbox}.
\end{mybox}
\begin{mybox}{yellow}{My title}[colbacktitle=yellow!50!white,coltitle=black]
This is a \texttt{tcolorbox}.
\end{mybox}
\begin{mybox}{purple}{My title}"All together"[coltitle=yellow]
This is a \texttt{tcolorbox}.
\end{mybox}
\NewTColorBox\{\textit{init options}\}\{(\textit{name})\}\{(\textit{specification})\}\{(\textit{options})\}  

Operates like \DeclareTColorBox\^{P.464}, but based on \NewDocumentEnvironment instead of \DeclareDocumentEnvironment. An error is issued if \textit{name} has already been defined.

\RenewTColorBox\{(\textit{init options})\}\{(\textit{name})\}\{(\textit{specification})\}\{(\textit{options})\}  

Operates like \DeclareTColorBox\^{P.464}, but based on \RenewDocumentEnvironment instead of \DeclareDocumentEnvironment. An existing environment is redefined.

\ProvideTColorBox\{\textit{init options}\}\{(\textit{name})\}\{(\textit{specification})\}\{(\textit{options})\}  

Operates like \DeclareTColorBox\^{P.464}, but based on \ProvideDocumentEnvironment instead of \DeclareDocumentEnvironment. The environment \textit{name} is only created if it is not already defined.
\DeclareTotalTColorBox[(init options)]{⟨name⟩}{⟨specification⟩}{⟨options⟩}{⟨content⟩}

Creates a new command \langle name\rangle based on tcolorbox\textsuperscript{P.12}. In contrast to \DeclareTColorBox\textsuperscript{P.464}, also the \langle content\rangle of the tcolorbox is specified. Basically, \DeclareTotalTColorBox operates like \DeclareDocumentCommand. This means, the new command \langle name\rangle is constructed with the given argument \langle specification\rangle. The \langle options\rangle are given to the underlying tcolorbox\textsuperscript{P.12} which is filled with the specified \langle content\rangle.

Note that /tcb/savedelimiter\textsuperscript{P.26} is set to the given \langle name\rangle automatically. The \langle init options\rangle allow setting up automatic numbering, see Section 5 from page 114. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
\DeclareTotalTColorBox{\diabox}{ O{} v m }
  { bicolor,nobeforeafter,equal height group=diabox,width=5.7cm,
    fonttitle=\bfseries\ttfamily,adjusted title={#2},center title,
    colframe=blue!20!black,leftupper=0mm,rightupper=0mm,colback=black!75!white,#1}
  { \tikz\path[fill zoom image={#2}](0,0)rectangle(\linewidth,4cm);%
    \tcblower#3}
\end{verbatim}

\begin{itemize}
  \item \diabox{blueshade.png}{Created with GIMP. http://www.gimp.org}
  \item \diabox{goldshade.png}{Created with GIMP. http://www.gimp.org}
\end{itemize}

\NewTotalTColorBox[(init options)]{⟨name⟩}{⟨specification⟩}{⟨options⟩}{⟨content⟩}

Operates like \DeclareTotalTColorBox, but based on \NewDocumentCommand instead of \DeclareDocumentCommand. An error is issued if \langle name\rangle has already been defined.

\RenewTotalTColorBox[(init options)]{⟨name⟩}{⟨specification⟩}{⟨options⟩}{⟨content⟩}

Operates like \DeclareTotalTColorBox, but based on \RenewDocumentCommand instead of \DeclareDocumentCommand. An existing command is redefined.

\ProvideTotalTColorBox[(init options)]{⟨name⟩}{⟨specification⟩}{⟨options⟩}{⟨content⟩}

Operates like \DeclareTotalTColorBox, but based on \ProvideDocumentCommand instead of \DeclareDocumentCommand. The command \langle name\rangle is only created if it is not already defined.
24.3 Producing tcbox Commands

\DeclareTCBox[\langle init options \rangle]{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}

Creates a new command \langle name \rangle based on \tcbox \textsuperscript{P.14}. Basically, \DeclareTCBox operates like \DeclareDocumentCommand. This means, the new command \langle name \rangle is constructed with the given argument \langle specification \rangle. The \langle options \rangle are given to the underlying \tcbox \textsuperscript{P.14}.

Note that /tcb/savedelimiter \textsuperscript{P.26} is set to the given \langle name \rangle automatically. The \langle init options \rangle allow setting up automatic numbering, see Section 5 from page 114. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
% counter from previous example
\DeclareTCBox[use counter from=pabox]{mybox}{s m s}
{nobeforeafter, colback=red!5!white, colframe=red!75!black,
title={\#2 (Box \thetcbcounter)}, fonttitle=bfseries,
IfBooleanT={#1}{enhanced, drop shadow},
IfBooleanT={#3}{colbacktitle=red!50!white}}

\mybox{Bird}{This is my first box.}
\hfill
\mybox*{Tree}{This is my second box.}
\par\bigskip
\mybox{Bike}*{This is my third box.}
\hfill
\mybox*{City}*{This is my fourth box.}
\end{verbatim}

\NewTCBox[\langle init options \rangle]{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}

Operates like \DeclareTCBox, but based on \NewDocumentCommand instead of \DeclareDocumentCommand. An error is issued if \langle name \rangle has already been defined.

\RenewTCBox[\langle init options \rangle]{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}

Operates like \DeclareTCBox, but based on \RenewDocumentCommand instead of \DeclareDocumentCommand. An existing command is redefined.

\ProvideTCBox[\langle init options \rangle]{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}

Operates like \DeclareTCBox, but based on \ProvideDocumentCommand instead of \DeclareDocumentCommand. The command \langle name \rangle is only created if it is not already defined.
\DeclareTotalTCBox\((init \ options)\)\{(name)\}\{(specification)\}\{(options)\}\{(content)\}

Creates a new command \(\langle name\rangle\) based on \tcbox\rightarrow P.14. In contrast to \DeclareTCBox\rightarrow P.467, also the \(\langle content\rangle\) of the \tcbox\ is specified. Basically, \DeclareTotalTCBox\ operates like \DeclareDocumentCommand. This means, the new command \(\langle name\rangle\) is constructed with the given argument \(\langle specification\rangle\). The \(\langle options\rangle\) are given to the underlying \tcbox\rightarrow P.14 which is filled with the specified \(\langle content\rangle\).

Note that /tcb/savedelimiter\rightarrow P.26 is set to the given \(\langle name\rangle\) automatically. The \(\langle init \ options\rangle\) allow setting up automatic numbering, see Section 5 from page 114. The new command is always created, irrespective of an already existing command with the same name.

\[\begin{align*}
\text{\texttt{\LaTeX}} & \text{\texttt{\LaTeX}}\texttt{\texttt{\LaTeX}}
\end{align*}\]

To set a word \textbf{bold} in \myverb{\LaTeX}, use \myverb[green]{\textbf{bold}}. Alternatively, write \myverb[blue]{\textbf{bold}}. In \myverb[blue]{\LaTeX}{\texttt{\LaTeX}}{\LaTeX}{{\LaTeX}}{\LaTeX}, other font settings are done in the same way, e.g. \myverb{\textit}, \myverb{\itshape}\ or \myverb[brown]{\texttt}, \myverb[ttfamily]{\ttfamily}.

The next example uses \listinline\ from the \listings package to typeset the verbatim content.

\[\begin{align*}
\% \usepackage{listings} \text{or} \tcbuselibrary{listings}
\text{\texttt{\LaTeX}} & \text{\texttt{\LaTeX}}\texttt{\LaTeX}\texttt{\LaTeX}
\end{align*}\]

\[\begin{align*}
\textsf{\LaTeX} & \textsf{\LaTeX}\textsf{\LaTeX}\textsf{\LaTeX}
\end{align*}\]

\[\begin{align*}
\texttt{\LaTeX} & \texttt{\LaTeX}\texttt{\LaTeX}\texttt{\LaTeX}
\end{align*}\]

\[\begin{align*}
\texttt{\LaTeX} & \texttt{\LaTeX}\texttt{\LaTeX}\texttt{\LaTeX}
\end{align*}\]

\[\begin{align*}
\texttt{\LaTeX} & \texttt{\LaTeX}\texttt{\LaTeX}\texttt{\LaTeX}
\end{align*}\]
\NewTotalTCBox{(init options)}{(name)}{(specification)}{(options)}{(content)}

Operates like \DeclareTotalTCBox\textsuperscript{P.468}, but based on \NewDocumentCommand instead of \DeclareDocumentCommand. An error is issued if \textbackslash (name) has already been defined.

\RenewTotalTCBox{(init options)}{(name)}{(specification)}{(options)}{(content)}

Operates like \DeclareTotalTCBox\textsuperscript{P.468}, but based on \RenewDocumentCommand instead of \DeclareDocumentCommand. An existing command is redefined.

\ProvideTotalTCBox{(init options)}{(name)}{(specification)}{(options)}{(content)}

Operates like \DeclareTotalTCBox\textsuperscript{P.468}, but based on \ProvideDocumentCommand instead of \DeclareDocumentCommand. The command \textbackslash (name) is only created if it is not already defined.

\tcboxverb{(options)}{(verbatim box content)}

Creates a colored box based on \tcbox\textsuperscript{P.14} which is fitted to the width of the given \textit{(verbatim box content)}. The underlying \tcbox\textsuperscript{P.14} is styled with /tcb/verbatim\textsuperscript{P.462} plus the given \textit{(options)}. The difference to \tcbox\textsuperscript{P.14} is that the \textit{(verbatim box content)} is interpreted verbatim. Therefore, \tcboxverb acts similar to \verb.

\tcboxverb{\LaTeX}, \tcboxverb[colback=blue!10!white,colupper=blue]{\LaTeX}, \tcboxverb[blank,fuzzy halo]{\LaTeX}, \tcboxverb[beamer]{\LaTeX}, \tcboxverb[enhanced,skin=enhancedmiddle_jigsaw,colframe=red]{\LaTeX}.
24.4 Producing \texttt{tcblisting} Environments

Besides \texttt{xpars}, the following commands also need the \texttt{listings} library to be included.

\texttt{\textbackslash DeclareTCBListing}[(\textit{init options})]{\textit{name}}{\textit{specification}}{\textit{options}}

Creates a new environment \textit{name} based on \texttt{tcblisting} \textsuperscript{P.321}. Basically, \texttt{\textbackslash DeclareTCBListing} operates like \texttt{\textbackslash DeclareDocumentEnvironment}. This means, the new environment \textit{name} is constructed with the given argument \textit{specification}. The \textit{options} are given to the underlying \texttt{tcblisting} \textsuperscript{P.321}. Note that \texttt{/tcb/savedelimiter} \textsuperscript{P.26} is set to the given \textit{name} automatically.

The \textit{init options} allow setting up automatic numbering, see Section 5 from page 114.

The new environment is always created, irrespective of an already existing environment with the same name.

\texttt{\textbackslash DeclareTCBListing}\{mybox\}{ s O{} m }{%
  colback=red!5!white,
  colframe=red!75!black,
  fonttitle=\bfseries,
  IfBooleanTF={#1}
  \{listing side text\
  \text{title=\{#3\},#2\
  \bigskip

\begin{mybox}\{Listing Box\}
This is my \texttt{LaTeX} box.
\end{mybox}
\begin{mybox}*\{Listing Box\}
This is my \texttt{LaTeX} box.
\end{mybox}
\begin{mybox}\{colback=yellow\}
\{Listing Box\}
This is my \texttt{LaTeX} box.
\end{mybox}

\texttt{\textbackslash NewTCBListing}[(\textit{init options})]{\textit{name}}{\textit{specification}}{\textit{options}}

Operates like \texttt{\textbackslash DeclareTCBListing}, but based on \texttt{\textbackslash NewDocumentEnvironment} instead of \texttt{\textbackslash DeclareDocumentEnvironment}. An error is issued if \textit{name} has already been defined.

\texttt{\textbackslash RenewTCBListing}[(\textit{init options})]{\textit{name}}{\textit{specification}}{\textit{options}}

Operates like \texttt{\textbackslash DeclareTCBListing}, but based on \texttt{\textbackslash RenewDocumentEnvironment} instead of \texttt{\textbackslash DeclareDocumentEnvironment}. An existing environment is redefined.

\texttt{\textbackslash ProvideTCBListing}[(\textit{init options})]{\textit{name}}{\textit{specification}}{\textit{options}}

Operates like \texttt{\textbackslash DeclareTCBListing}, but based on \texttt{\textbackslash ProvideDocumentEnvironment} instead of \texttt{\textbackslash DeclareDocumentEnvironment}. The environment \textit{name} is only created if it is not already defined.
With date of 2018-05-12, the \texttt{xparse} package changed the argument collection process. Now, spaces are ignored which leads to a serious change for listing environments ending with an optional argument like \texttt{O{}}. The former behavior of respecting spaces can be preserved by adding a «!». Note that the following code uses \texttt{!O{}} now.

- For older \texttt{xparse} versions, the following code is correct when using \texttt{O{}}.
- For \texttt{xparse} of 2018-05-12, only the first two examples of the following code using \texttt{O{}} are really "good" – all others do not work.
- For \texttt{xparse} of 2018-05-12 and later, the following code is correct when using \texttt{!O{}}.

### Caveats of using an environment ending with an optional argument

\begin{verbatim}
\DeclareTCLListing{mybox}{!O{} }{listing only,#1}
\begin{mybox}[colframe=red]
good
\end{mybox}

\begin{mybox}[colframe=red]\good\end{mybox}

\begin{mybox}
good\end{mybox}

\begin{mybox} \good\end{mybox}

\begin{mybox}\bad!\end{mybox}

\begin{mybox}\[good\end{mybox}

\begin{mybox}\[\good\end{mybox}

\begin{mybox}\[\bad!\end{mybox}
\end{verbatim}
24.5 Producing \texttt{tcbinputlisting} Commands

The following commands need the \texttt{listings} library to be included.

\begin{verbatim}
\DeclareTCBInputListing[(init options)]{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}
Creates a new command \langle name\rangle based on \texttt{tcbinputlisting}. Basically, \texttt{\DeclareTCBInputListing} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \langle name\rangle is constructed with the given argument \langle specification\rangle. The \langle options\rangle are given to the underlying \texttt{tcbinputlisting}.

The \langle init options\rangle allow setting up automatic numbering, see Section 5 from page 114. The new command is always created, irrespective of an already existing command with the same name.

% counter from previous example
\DeclareTCBInputListing[use counter from=pabox]{\mylisting}{0\{0\{red\} m }{%
listing file={#3},title=Listing-\texttt{\thetcbcounter},
colback=#2!5!white,colframe=#2!50!black,colbacktitle=#2!75!black,
fonttitle=\textbf,listing only,#1}
\mylisting[before upper=\textit{This is the included file content:}]%
[blue]{\jobname.tcbtemp}
\end{verbatim}

\begin{verbatim}
\NewTCBInputListing[(init options)]{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}
Operates like \texttt{\DeclareTCBInputListing}, but based on \texttt{\NewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An error is issued if \langle name\rangle has already been defined.

\RenewTCBInputListing[(init options)]{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}
Operates like \texttt{\DeclareTCBInputListing}, but based on \texttt{\RenewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An existing command is redefined.

\ProvideTCBInputListing[(init options)]{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}
Operates like \texttt{\DeclareTCBInputListing}, but based on \texttt{\ProvideDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. The command \langle name\rangle is only created if it is not already defined.

\end{verbatim}
24.6 Producing `tboxfit` Commands

The following commands need the `fitting` library to be included.

```
\DeclareTCBoxFit{\langle init options \rangle}{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}
```

Creates a new command `\langle name \rangle` based on `\tcboboxfit \textsuperscript{P.439}`. Basically, `\DeclareTCBoxFit` operates like `\DeclareDocumentCommand`. This means, the new command `\langle name \rangle` is constructed with the given argument `\langle specification \rangle`. The `\langle options \rangle` are given to the underlying `\tcboboxfit \textsuperscript{P.439}`.

Note that `/tcb/savedelimiter` \textsuperscript{P.26} is set to the given `\langle name \rangle` automatically.

The `\langle init options \rangle` allow setting up automatic numbering, see Section 5 from page 114. The new command is always created, irrespective of an already existing command with the same name.

```
% \usepackage{lipsum}
\DeclareTCBoxFit{\mybox}{ O{} m !o }
{colback=red!5!white,
 colframe=red!75!black,
 width=#2,height=#2/3*2,
 IfValueT={#3}{height=#3},
 #1}
\mybox[colback=yellow]{5cm}
% {\lipsum[2]}
\mybox[colback=yellow]{5cm}{4cm}{\lipsum[2]}
```

```
\NewTCBoxFit{\langle init options \rangle}{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}
```

Operates like `\DeclareTCBoxFit`, but based on `\NewDocumentCommand` instead of `\DeclareDocumentCommand`. An error is issued if `\langle name \rangle` has already been defined.

```
\RenewTCBoxFit{\langle init options \rangle}{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}
```

Operates like `\DeclareTCBoxFit`, but based on `\RenewDocumentCommand` instead of `\DeclareDocumentCommand`. An existing command is redefined.

```
\ProvideTCBoxFit{\langle init options \rangle}{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}
```

Operates like `\DeclareTCBoxFit`, but based on `\ProvideDocumentCommand` instead of `\DeclareDocumentCommand`. The command `\langle name \rangle` is only created if it is not already defined.
\DeclareTotalTCBoxFit[(\textit{init options})]{(\textit{name})}{(\textit{specification})}{(\textit{options})}{(\textit{content})}

Creates a new command \textit{name} based on \textit{tcboxfit} \textsuperscript{P.439}. In contrast to \texttt{\DeclareTCBoxFit} \textsuperscript{P.473}, also the (\textit{content}) of the \textit{tcboxfit} is specified. Basically, \texttt{\DeclareTotalTCBoxFit} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \textit{name} is constructed with the given argument (\textit{specification}). The (\textit{options}) are given to the underlying \texttt{\tcboxfit} \textsuperscript{P.439} which is filled with the specified (\textit{content}).

Note that \texttt{/tcb/savedelimiter} \textsuperscript{P.26} is set to the given (\textit{name}) automatically. The (\textit{init options}) allow setting up automatic numbering, see Section 5 from page 114. The new command is always created, irrespective of an already existing command with the same name.

\texttt{\% \usetheme{lipsum}}
\begin{verbatim}
\DeclareTotalTCBoxFit{\multibox}{ 0\{ 0\{10\} m }{\{\textit{nobeeforeafter, colback=red!5!white, colframe=red!75!black, width=\#2, height=\#2/3*2, valign=center, #1\} }{ \foeach \textit{\textbackslash {n} in \{1,...,#3\} \{ #4 \} }}
\multibox{5cm}{\{I shall not repeat.\}}
\multibox{colframe=blue!75!white}{5cm}[20]{\{I shall not repeat.\}}
\multibox{colback=yellow,height=5cm}{14cm}[100]{\{I shall not repeat.\}}
\end{verbatim}

\texttt{\% \usetheme{lipsum}}
\begin{verbatim}
\NewTotalTCBoxFit[(\textit{init options})]{(\textit{name})}{(\textit{specification})}{(\textit{options})}{(\textit{content})}

Operates like \texttt{\DeclareTotalTCBoxFit}, but based on \texttt{\NewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An error is issued if \textit{name} has already been defined.
\end{verbatim}

\begin{verbatim}
\RenewTotalTCBoxFit[(\textit{init options})]{(\textit{name})}{(\textit{specification})}{(\textit{options})}{(\textit{content})}

Operates like \texttt{\DeclareTotalTCBoxFit}, but based on \texttt{\RenewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An existing command is redefined.
\end{verbatim}

\begin{verbatim}
\ProvideTotalTCBoxFit[(\textit{init options})]{(\textit{name})}{(\textit{specification})}{(\textit{options})}{(\textit{content})}

Operates like \texttt{\DeclareTotalTCBoxFit}, but based on \texttt{\ProvideDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. The command \textit{name} is only created if it is not already defined.
\end{verbatim}

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The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{external}

The purpose of this library is to support externalization of document snippets like graphics or boxes which can be compiled stand-alone. These snippets are written to external files, compiled and the resulting pdf files are included to the main document as images. The whole procedure saves compilation time, if such a snippet is costly to compile but needs to compile just once or very seldom.

There are very good alternatives to this library. One should consider the standalone package or the TikZ externalization library instead. The \external{} library is something in between and can be seen as poor man variant of the TikZ externalization library.

The main differences between TikZ externalization and \external{} are:

- TikZ external compiles the whole original document in a sophisticated way while \external{} uses only the preamble or a part of the preamble of the original document.

- TikZ external can automatically externalize all \tikzpicture{} environments while \external{} externalizes marked snippets only.

- Code snippets to be externalized by \external{} are not restricted to \tikzpicture{} environments. But these snippets have to be stand-alone without dependencies to the rest of the document.

Why should somebody use \external{} instead of the more powerful TikZ external? One reason could be compilation speed, but the main reason for creating the library at all was that TikZ external tends to choke on complicated documents where the sophisticated mechanism stumbles. Since \external{} does not use the original document body for compilation, this cannot happen.

Source snippets are compiled, if their md5 checksum has changed. They are not compiled automatically, if option settings are changed or anything outside the snippet is changed. Use /tcb/external/force remake \textsuperscript{P.476} to force compilation in this case or simply delete the externalized pdf oder md5 files.

To use the externalization options, the compiler has to be called with the \texttt{-shell-escape} permission to authorize potentially dangerous system calls. Be warned that this is a security risk.
25.1 Preparation of a Document for Externalization

The preamble of the main document has to contain the \texttt{tcbEXTERNALIZE} command. Without this command, no externalization operation will be executed.

\texttt{tcbEXTERNALIZE}

It is mandatory for externalization that this command is used once in the preamble of the main document. Every setting before \texttt{tcbEXTERNALIZE} will also be used for compiling an external snippet. Every setting after \texttt{tcbEXTERNALIZE} will be ignored for compiling an external snippet. Place this command right before \texttt{\begin{document}}, if you are not absolutely sure about another place.

The main document has to look like the following:

\begin{verbatim}
documentclass[\texttt{a4paper}]{book}\% for example
\usepackage{...}\% anything
% ...
% Typically, all or the very most settings for the document.
\tcbEXTERNALIZE\% Typically, just before \texttt{\begin{document}}
% Additional settings which are ABSOLUTELY irrelevant for the
% stand-alone snippets.
% \begin{document}
% \% The document.
% \% This also contains the marked snippets for externalization.
\end{document}
\end{verbatim}

During compilation, a /tcb/external/runner file is dynamically created (several times). This is the actual main file for compiling an externalized snippet.

\texttt{/tcb/external/runner=(file name)} \hspace{1cm} (no default, initially \texttt{\jobname_run.tex})

Sets the (file name) for dynamically created \texttt{runner} file. This is the actual main file for a document snippet. Typically, the initial setting is not needed to be changed.

\texttt{\tcbset\{external/runner=myrunner.tex\}}

\texttt{/tcb/external/prefix=(text)} \hspace{1cm} (no default, initially \texttt{external/})

The (text) is prefixed to any /tcb/external/name→P.478 for an externalization snippet. The initial setting implies saving all snippets into an external/ subdirectory. Depending on the operation system, the subdirectory may have to be created manually once.

\begin{verbatim}
% Use a 'real' prefix instead of writing into a subdirectory:
\tcbset\{external/prefix=ext_\}
\end{verbatim}

\texttt{/tcb/external/externalize=true|false} \hspace{1cm} (default true, initially true)

If set to true, the marked snippets are compiled if necessary. If set to false, the marked snippets are not compiled but included as text. /tcb/external/externalize can only be used after \texttt{tcbEXTERNALIZE}.

\texttt{/tcb/external/force remake=true|false} \hspace{1cm} (default true, initially false)

If set to true, the marked snippets are always compiled. If set to true, the marked snippets are compiled only if necessary. The necessity is given, if a compiled pdf file is missing or the md5 checksum of the source snippet has changed.

\texttt{/tcb/external/!} \hspace{1cm} (style)

Shortcut for setting /tcb/external/force remake to true.

\texttt{/tcb/external/-} \hspace{1cm} (style)

Shortcut for setting /tcb/external/externalize to false.
25.2 Marking Externalization Snippets

\begin{tcbexternal}{\langle name \rangle}
\langle environment content \rangle
\end{tcbexternal}

Marks the environment content as a snippet for externalization. Typically, the content is a \texttt{tikzpicture} or something similar. It is important to note that the snippet should not have any dependencies with the rest of the document, e.g. referencing counters or setting counters is not possible. The \langle name \rangle is automatically prefixed with \texttt{/tcb/external/prefix} \textsuperscript{P.476}. In combination, this has to be a unique file name. It is advised to not use spaces or umlauts for the name. The \langle options \rangle are keys from the /tcb/external/ key tree.

\begin{tcbexternal}{example_tikzpicture}
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
\end{tcbexternal}

If a \texttt{tcolorbox} \textsuperscript{P.12} is externalized, one should use \texttt{/tcb/nobeforeafter} \textsuperscript{P.81} for the box. Indention and distances to the text before and after have to be given separately outside the \texttt{tcbexternal} environment.

\begin{tcbexternal}{\langle name \rangle}
\begin{tcbbox}{\langle options \rangle}
\begin{tcolorbox}{\langle options \rangle,\langle options \rangle,\langle options \rangle}
This complete tcolorbox is externalized. One cannot use numbered boxes here. Note the \texttt{minipage} option which tells the current line width to the external snippet.
\end{tcolorbox}
\end{tcbbox}
\end{tcbexternal}

\begin{tcbexternal}{\langle name \rangle}
\begin{tcbbox}{\langle options \rangle}
\begin{tcolorbox}{\langle options \rangle,\langle options \rangle,\langle options \rangle}
This complete tcolorbox is externalized. One cannot use numbered boxes here. Note the \texttt{minipage} option which tells the current line width to the external snippet.
\end{tcolorbox}
\end{tcbbox}
\end{tcbexternal}
The interior of the tcolorbox is externalized. One can use numbered boxes without problems. Note that the text color has to be set for the text manually since it is converted into an image.

\begin{tcbexternal}[minipage]{example_tabularx}
\newcolumntype{Y}{>{\raggedleft\arraybackslash}X}
\begin{tabularx}{\linewidth}{|l||Y|Y|Y|Y||Y|}
\hline
Group & One & Two & Three & Four & Sum \\
\hline
Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
\hline
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
\hline
Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\hline
Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\hline
\end{tabularx}
\end{tcbexternal}

\begin{tcolorbox}[nobeforeafter, enhanced, 
  fonttitle = \bfseries, 
  title = Externalized Box, 
  colframe = blue!50!black, 
  interior style = {fill overzoom image = blueshade.png}]
\begin{tcbexternal}[minipage]{example_tcolorbox2}
\color{white} \%
The interior of the tcolorbox is externalized.
One can use numbered boxes without problems.
Note that the text color has to be set for the text manually since it is converted into an image.
\end{tcbexternal}
\end{tcolorbox}

The \langle name \rangle is automatically prefixed with /tcb/external/prefix \textsuperscript{P.476}. In combination, this has to be a unique file name for externalization. Typically, this key is not used directly but is set indirectly as mandatory parameter, see \texttt{tcbexternal} \textsuperscript{P.477}.
This is an externalized version of \texttt{tcolorbox} created using \texttt{\newtcbexternalizetcolorbox}:

\begin{extcolorbox}
\begin{minipage}{example_extcolorbox}
\begin{tcolorbox}
Inner box.
\end{tcolorbox}
\end{minipage}
\end{extcolorbox}

\begin{tcolorbox}[colframe=blue,colback=blue!5,before skip=6pt]
Inner box.
\end{tcolorbox}

\begin{extcolorbox}
My external box
\end{extcolorbox}

\begin{itemize}
\item \textbf{Never} externalize numbered boxes.
\item \textbf{Never} externalize boxes which contain references to other things, e.g. using \texttt{\ref} or \texttt{\cite}.
\item \textbf{Never} externalize breakable boxes.
\end{itemize}
\begin{extikzpicture}[(options)]\begin{tikzpicture}⟨environment content⟩\end{tikzpicture}\end{extikzpicture}

This is an externalized version of \texttt{tikzpicture} created using \texttt{newtcbexternalizeenvironment} → P.484:

\begin{center}
\begin{extikzpicture}
preamble={\usepackage{pgfplots}}, % add package for external graph
input source on error=false, % do not load source on error
\}{example_pgfplots}
\pgfplotsset{width=12cm}
\begin{axis}
[3d box=background,grid=major, xlabel=$x$, ylabel=$y$, zlabel=$z$, view/h=40, mesh/interior colormap name=hot, colormap/blackwhite, z buffer=sort, domain=0:90, y domain=0:60, zmin=0, zmax=2, z post scale=1.2,
]
\addplot3[surf,mesh/interior colormap name=blackwhite, colormap/hot,] ( {cos(x)},{sin(x)},{2*sin(y)} );
\addplot3[surf] ( {2*cos(x)*cos(y)},{2*sin(x)*cos(y)},{2*sin(y)} );
\end{axis}
\end{extikzpicture}
\end{center}

\newtcbexternalizeenvironment{extikzpicture}{tikzpicture}{[]}{}{}
The text content of a `tcblisting`\textsuperscript{P.321} is externalized with the given \texttt{(name)}. Note that the listing part is not externalized.

\begin{tcblisting}{externalize listing=example_listing, bicolour, colback=yellow!10, colframe=yellow!50!black, colbacklower=white, center lower}
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
 {\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
\end{tcblisting}

\begin{dispExample*}{sidebyside, externalize example=example_example}
\tikz\path[shading=ball, ball color=red] circle (7mm);
\end{dispExample*}

Combination of `/tcb/externalize listing` and `/tcb/external/force remake`\textsuperscript{P.476}.

Combination of `/tcb/externalize example` and `/tcb/external/force remake`\textsuperscript{P.476}.
25.3 Customization

/\texttt{tcb/external/safety}=\langle length \rangle  
(no default, initially 2mm)

The snippet box is surrounded with a safety border with a thickness of \langle length \rangle. This border is automatically trimmed during picture inclusion. The reason for this mechanism is to catch box content which extrudes over the bounding box. For example, shadows of a tcolorbox are painted outside the bounding box and would be lost otherwise.

/\texttt{tcb/external/environment}=\langle env \rangle  
(no default, initially unset)

Surrounds the exported snippet text with an environment \langle env \rangle without parameters. Note that this option is ignored for /\texttt{tcb/externalize listing} → P.481.

/\texttt{tcb/external/environment with percent}=true|false  
(default true, initially true)

If set to true, the \texttt{begin} and \texttt{end} code of /\texttt{tcb/external/environment} is appended with a percent sign. For verbatim environments, this option typically has to be set to false.

/\texttt{tcb/external/minipage}=\langle length \rangle  
(default \texttt{\linewidth}, initially unset)

Surrounds the exported snippet text with a minipage. The optional \langle length \rangle parameter sets the width of the minipage. Note that the default width is the current line width of the main document. See tcbexternal → P.477 for examples. Note that this option is ignored for /\texttt{tcb/externalize listing} → P.481.

/\texttt{tcb/external/plain}  
(no value, initially set)

Removes any text which was set to surround the snippet. This removes the setting of /\texttt{tcb/external/minipage}, but is independent of /\texttt{tcb/external/safety}.

/\texttt{tcb/external/compiler}=\langle text \rangle  
(no default, initially \texttt{pdflatex})

Sets the name of the compiler for the snippets. Note that this compiler has to support the \texttt{pdfmdividesum} primitive e.g. using the \texttt{pdftexcmds} package. This should work for \texttt{xelatex} and \texttt{lualatex}.

/\texttt{tcb/external/runs}=\langle number \rangle  
(no default, initially 1)

Sets the number of compiler runs for the snippet.

\begin{tcbexternal}[minipage,runs=2]{example_raster}
\begin{tcbitemize}[raster equal height,
  size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem \texttt\Huge Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}
\end{tcbexternal}

/\texttt{tcb/external/input source on error}=true|false  
(default true, initially true)

If set to true, the source code of the snippet is loaded instead of the failed pdf picture. Typically, this will lead to an error stop at the faulty place of the source and such helps detecting the cause. If the source input compiles without error, the document setup may be incorrect, see Section 25.1 on page 476. Maybe, the external/ subdirectory has to be created manually in this case, see /\texttt{tcb/external/prefix}\textsuperscript{P.476}. If the option is set to false, the compilation stops immediately on an error. The log file of the external snippet has to be consulted for error messages in this case.

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The given \texttt{code} is added before the snippet document. Typically, this means before \texttt{documentclass}. This is not used for compilation of the main document.

The given \texttt{options} are passed to the given \texttt{package} for the snippet document. This is a shortcut for using \texttt{/tcb/external/preclass} with \texttt{PassOptionsToPackage}. This not used for compilation of the main document.

The given \texttt{options} are passed to the given \texttt{class} for the snippet document. This is a shortcut for using \texttt{/tcb/external/preclass} with \texttt{PassOptionsToClass}. This not used for compilation of the main document.

Removes all additional \texttt{/tcb/external/preclass} settings.

The given \texttt{code} is added to the preamble of the snippet document. This is not used for compilation of the main document.

The given \texttt{options} are added as parameter for \texttt{tcbset\textsuperscript{P.13}} to the preamble of the snippet document. This are not used for compilation of the main document.

Removes all additional \texttt{/tcb/external/preamble} settings.

Expands to \texttt{true}, if executed during snippet compilation, and to \texttt{false}, if executed during main document compilation. This can be used before \texttt{tcbEXTERNALIZE\textsuperscript{P.476}} to give different setting to snippet and main document.

\begin{verbatim}
\tcbifexternal{
  \usepackage{onlyforexternal}
}
\tcbifexternal{
  \usepackage{onlyformain}
}
\end{verbatim}
\newtcbexternalizeenvironment\{⟨newenv⟩\}{⟨env⟩}\{⟨options⟩\}\{⟨begin⟩\}{⟨end⟩}

Creates a new environment ⟨newenv⟩ which is based on tcbexternal\textsuperscript{−P.477}. This environment takes at least one optional parameter and one mandatory parameter. These two parameters are passed to tcbexternal\textsuperscript{−P.477}. Further, the given ⟨options⟩ are always added to the option list of tcbexternal\textsuperscript{−P.477}.

The environment content is externalized and the external snippet is surrounded by an environment ⟨env⟩. All further parameters of ⟨newenv⟩ are given to ⟨env⟩ as parameters. The included image is prepended by ⟨begin⟩ and appended by ⟨end⟩.

\texttt{extikzpicture} \textsuperscript{−P.480} is an example application for \newtcbexternalizeenvironment.

\begin{extabular}{example_tabular}{|l|p{6cm}|r|}
\hline
A & B & C \\
\hline
a & This table is externalized as snippet. Obviously, this only makes sense for highly complex tables. & b \\
\hline
\end{extabular}

\renewtcbexternalizeenvironment\{⟨newenv⟩\}{⟨env⟩}\{⟨options⟩\}\{⟨begin end options⟩\}

Identical to \newtcbexternalizeenvironment, but the environment ⟨newenv⟩ is created by \renewenvironment instead of \newenvironment.

\newtcbexternalizetcolorbox\{⟨newenv⟩\}{⟨env⟩}\{⟨options⟩\}\{⟨begin end options⟩\}

Creates a new environment ⟨newenv⟩ which is based on tcbexternal\textsuperscript{−P.477}. This environment takes at least one optional parameter and one mandatory parameter. These two parameters are passed to tcbexternal\textsuperscript{−P.477}. Further, the given ⟨options⟩ are always added to the option list of tcbexternal\textsuperscript{−P.477}.

The environment content is externalized and the external snippet is surrounded by an environment ⟨env⟩. All further parameters of ⟨newenv⟩ are given to ⟨env⟩ as parameters. In contrast to \newtcbexternalizeenvironment, the environment ⟨env⟩ is intended to be based on \texttt{tcolorbox} \textsuperscript{−P.12} or \texttt{tcblisting} \textsuperscript{−P.321}.

The ⟨begin end options⟩ are options for settings the space before and after the included image using \texttt{/tcb/before} \textsuperscript{−P.81}, \texttt{/tcb/before skip} \textsuperscript{−P.83}, \texttt{/tcb/after} \textsuperscript{−P.81}, or \texttt{/tcb/after skip} \textsuperscript{−P.83}.

Use the exact identical values for \texttt{/tcb/before} \textsuperscript{−P.81} and \texttt{/tcb/after} \textsuperscript{−P.81} inside ⟨begin end options⟩ as they where used for definition of ⟨env⟩! Otherwise, externalized and non-externalized version will have different spacings.

\texttt{extcolorbox} \textsuperscript{−P.479} is an example application for \newtcbexternalizetcolorbox.
Definition in the preamble:
\newtcblisting{myownlisting}[2][]{
  enhanced,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  colbacktitle=red!50!yellow,before skip=6pt,after skip=6pt,
  title={#2},#1}
\newtcbexternalizetcolorbox{exmyownlisting}{myownlisting}%
  {minipage,environment with percent=false}%
  {before skip=6pt,after skip=6pt}% same values as for mylisting

\begin{exmyownlisting}{example_mylisting}% <- name for the external file
  {My externalized example box}
  This is my \LaTeX\ box.
\end{exmyownlisting}

\renewtcbexternalizetcolorbox{⟨newenv⟩}{⟨env⟩}{⟨options⟩}{⟨begin end options⟩}

Identical to \renewtcbexternalizetcolorbox \textsuperscript{P.484}, but the environment ⟨newenv⟩ is created by \renewenvironment instead of \newenvironment.

\tcbbiffileprocess{⟨condition⟩}{⟨source⟩}{⟨md5-file⟩}{⟨target⟩}{⟨true⟩}{⟨false⟩}

This is a low-level macro which is internally used. The MD5 digest of a ⟨source⟩ file is compared with a stored MD5 digest from an auxiliary ⟨md5-file⟩. If they are not equal, the auxiliary ⟨md5-file⟩ is updated to store the current MD5 digest. Further,
• if ⟨condition⟩ equals 0, ⟨true⟩ is executed.
• if ⟨condition⟩ equals 1:
  • If the current and stored MD5 digests were different, ⟨true⟩ is executed.
  Otherwise, if the ⟨target⟩ file is not existing, ⟨true⟩ is executed.
  Otherwise, if the ⟨target⟩ file is older than the ⟨md5-file⟩, ⟨true⟩ is executed.
  Otherwise, ⟨false⟩ is executed.
• if ⟨condition⟩ equals 2, ⟨false⟩ is executed.

The intended processing purpose of the ⟨true⟩ code is to produce a ⟨target⟩ file from the given ⟨source⟩ file.
25.4 Troubleshooting and FAQ

- I use the default settings, but the external subdirectory is not created.
  Depending on operating system and compiler, an external subdirectory is automatically
  created or not. If not, create such a directory manually or add the following to your
  document:\footnote{The \texttt{shellesc} package is loaded automatically by the library.}:

  \ShellEscape{mkdir external}

  or

  \ShellEscape{mkdir -p external}

  If the combination of /tcb/external/prefix\footnote{P.476} and chosen snippet name points to
  another subdirectory than external, this has to be adapted.

- I use the \texttt{minted} package and I get a cache directory for every externalized
  snippet.
  To avoid this problem, there are several ways.

  - If you do not need \texttt{minted} inside the snippet code, you may use
    \texttt{\usepackage{minted}} after \texttt{\tcbEXTERNALIZE}\footnote{P.476} or use \texttt{\tcbifexternal}\footnote{P.483} to switch \texttt{minted} off for the external code. If \texttt{minted} is already included by another
    package, add the following to your preamble:

      \texttt{\tcbset{external/PassOptionsToPackage={draft}{minted}}}

  - If \texttt{minted} is needed for the snippet code, caching can be switched off by adding the
    following to your preamble:

      \texttt{\tcbset{external/PassOptionsToPackage={cache=false}{minted}}}

    Alternatively, the \texttt{cachedir} option of \texttt{minted} may be used to redirect the cache.
This library has the single purpose to support \LaTeX\ package documentations like this one. Actually, the visual nature follows the approach from Till Tantau’s \texttt{pgf} \cite{pgf} documentation. Typically, this library is assumed to be used in conjunction with the class \texttt{ltxdoc} or alike. Denis Bitouzé, Muzimuzhi, and many others provided very valuable input for this library.

The library is loaded by a package option or inside the preamble by:

\begin{quote}
\texttt{\usepackage[documentation]{tcolorbox}}
\end{quote}

This also loads the library \texttt{skins}, see Section 10 on page 156, the library \texttt{raster}, see Section 16 on page 298, the library \texttt{listings}, see Section 17 on page 320, the library \texttt{xparse}, see Section 24 on page 462, and a bunch of packages, namely \texttt{makeidx}, \texttt{marginnote}, \texttt{refcount}, and \texttt{hyperref}. The packages \texttt{pifont} and \texttt{marvosym} should be installed for some symbols, but need not to be loaded.

\begin{itemize}
\item The package \texttt{makeidx} is loaded only, if \texttt{\printindex} is not already defined. Therefore, one can include an alternative to \texttt{makeidx} like \texttt{imakeidx} before the library \texttt{documentation} is used.
\item The package \texttt{marginnote} is loaded only, if \texttt{\marginnote} is not already defined.
\item In contrast to other \texttt{tcolorbox} options, the option settings for \texttt{documentation} are typically not getting reset by \texttt{/tcb/reset}, i.e. they keep their values for embedded boxes.
\item In combination with DocStrip, \texttt{/tcb/verbatim ignore percent} may be helpful.
\end{itemize}

For UTF-8 support load (ignore this when using Xe\LaTeX):  

\begin{quote}
\texttt{\usepackage[listingsutf8]{tcolorbox}}
\end{quote}

For \texttt{minted} support, load:

\begin{quote}
\texttt{\usepackage{tcolorbox,minted}}
\texttt{\tcbset{listing engine=minted}}
\end{quote}

26.1 Macros of the Library

\begin{docCommand}{\langle options\rangle}{\langle name\rangle}{\langle parameters\rangle}
\langle command description\rangle
\end{docCommand}

Documents a \LaTeX\ macro with given \texttt{(name)} where \texttt{(name)} is written without backslash. The given \texttt{(options)} are set with \texttt{\tcbset}. This macro takes mandatory or optional \texttt{(parameters)}. It is automatically indexed and can be referenced with \texttt{\refCom}{\langle name\rangle}.
\begin{docCommand}{foonakedocSubKey}{\marg{name}\marg{key path}}
  Creates a new environment \texttt{\meta{name}} based on \texttt{\refEnv{docKey}} for the documentation of keys with the given \texttt{\meta{key path}}.
\end{docCommand}

\foonakedocSubKey\{⟨name⟩\}{⟨key path⟩}

Creates a new environment \texttt{⟨name⟩} based on \texttt{docKey \rarr; P. 491} for the documentation of keys with the given \texttt{⟨key path⟩}.

\begin{docCommand}{foonakedocSubKey*}{\marg{name}\marg{key path}}
  Creates a new environment \texttt{⟨name⟩} based on \texttt{docKey \rarr; P. 491} for the documentation of keys with the given \texttt{⟨key path⟩}.
\end{docCommand}

\foonakedocSubKey*\{⟨name⟩\}{⟨key path⟩}

Identical to \texttt{docCommand \rarr; P.487}, but without index entry.

Documents several (similar) \LaTeX{} macro variants simultaneously. The given \texttt{⟨options⟩} are set with \texttt{\tcbset \rarr; P.13} and are valid for all variants and the documentation text. Every variant is described by an option set \texttt{(variant1)}, \texttt{(variant2)}, and so on. The most crucial options are \texttt{/tcb/doc name \rarr; P.501} and \texttt{/tcb/doc parameter \rarr; P.501}.

\begin{docCommands}{⟨options⟩}{⟨name⟩}{⟨parameters⟩}
\end{docCommands}

\begin{docCommands}\{⟨variant1⟩\},⟨variant2⟩,…\}
\end{docCommands}

\begin{docCommands}{\doc no index, \% no index entries for this example
  \doc name = newtheorem, \doc parameter = \marg{envname},
  \}
  \{ ),
  \{ \doc parameter = \marg{envname}\oarg{numbered within} \},
  \{ \doc parameter = \oarg{numbered like}\marg{envname} \},
  \{ \doc name = newtheorem* \},
  \}
\end{docCommands}

\newtheorem{⟨envname⟩}
\newtheorem{⟨envname⟩}{⟨numbered within⟩}
\newtheorem[⟨numbered like⟩]{⟨envname⟩}
\newtheorem*[⟨envname⟩] example
Documents a \LaTeX\ environment with given \name{⟨name⟩}. The given \options{⟨options⟩} are set with \tcbset{⟨options⟩}. This environment takes mandatory or optional \parameters{⟨parameters⟩}. It is automatically indexed and can be referenced with \refEnv{⟨name⟩}.

\begin{docEnvironment}
\name{foocolorbox}
\parameters{\oarg{⟨options⟩}}
This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.
\end{docEnvironment}

\begin{foocolorbox}
⟨⟨options⟩⟩
⟨environment description⟩
\end{foocolorbox}
This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.

\begin{docEnvironment}%
[doclang/environment content=My content text]%
{foocolorbox}*
\parameters{\oarg{⟨options⟩}}
This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.
\end{docEnvironment}

\begin{foocolorbox*}{⟨options⟩}
⟨My content text⟩
\end{foocolorbox*}
This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.

\begin{docEnvironment*}{⟨options⟩}{⟨name⟩}{⟨parameters⟩}
⟨environment description⟩
\end{docEnvironment*}
Identical to \docEnvironment, but without index entry.
Documents several (similar) \LaTeX{} environment variants simultaneously. The given \texttt{⟨options⟩} are set with \texttt{\tcbset} and are valid for all variants and the documentation text. Every variant is described by an option set \texttt{⟨variant1⟩}, \texttt{⟨variant2⟩}, and so on. The most crucial options are \texttt{/tcb/doc name} and \texttt{/tcb/doc parameter}.

\begin{docEnvironments}
\begin{var}
doc no index, \% no index entries for this example
\begin{var}
doc parameter = \texttt{\oarg\marg\langle title\rangle},
\end{var}
doclang/environment content = box content,
\end{var}
\begin{var}
doc name = redbox,
doc description = a red colored box,
\end{var}
\begin{var}
doc name = greenbox,
doc description = a green colored box,
\end{var}
\begin{var}
doc name = bluebox,
doc description = a blue colored box,
\end{var}
\begin{var}
doc name = custombox,
doc parameter = \texttt{\oarg\marg\langle color\rangle\marg\langle title\rangle},
doc description = a colored box,
\end{var}
\end{var}
example
\end{docEnvironments}

\begin{redbox}\texttt{\langle options\rangle\langle title\rangle}\end{redbox} (a red colored box)
\begin{greenbox}\texttt{\langle options\rangle\langle title\rangle}\end{greenbox} (a green colored box)
\begin{bluebox}\texttt{\langle options\rangle\langle title\rangle}\end{bluebox} (a blue colored box)
\begin{custombox}\texttt{\langle options\rangle\langle color\rangle\langle title\rangle}\end{custombox} (a colored box)
\begin{docKey}[(key path)] [(options)]{(name)}{(parameters)}{(description)}
\end{docKey}

Documents a key with given \textit{name} and an optional \textit{key path}. The given \textit{options} are set with \cbset. This key takes mandatory or optional \textit{parameters} as value with a short \textit{description}. It is automatically indexed and can be referenced with \refKey. 

\begin{docKey}[foo]{footitle}{=\meta{text}}{no default, initially empty}
\end{docKey}

Creates a heading line with \meta{text} as content.

\begin{docKey}
/foo/footitle=\text{(no default, initially empty)}
\end{docKey}

Creates a heading line with \text as content.

\begin{docKeys}
\begin{docKey}[
\text{doc no index, } \% \text{ no index entries for this example}
\text{doc keypath = mykeyroot,}
\text{doc parameter = {=\meta{length}},}
\end{docKey}

\begin{docKey}
{\text{doc name = width,}
\text{doc description = initially \texttt{10cm},}
},
\begin{docKey}
{\text{doc name = height,}
\text{doc description = initially \texttt{7cm},}
},
\end{docKey}
\end{docKey}
\end{docKeys}

\begin{docKeys}
/mykeyroot/width=\text{\texttt{length}} \text{(initially 10cm)}
/mykeyroot/height=\text{\texttt{length}} \text{(initially 7cm)}
\end{docKeys}

Identical to docKey, but without index entry.

Documents several (similar) key variants simultaneously. The given \textit{options} are set with \cbset and are valid for all variants and the documentation text. Every variant is described by an option set \texttt{\{variant1\}}, \texttt{\{variant2\}}, and so on. The most crucial options are /tcb/doc keypath \textsuperscript{P.501}, /tcb/doc name \textsuperscript{P.501}, /tcb/doc parameter \textsuperscript{P.501}, and /tcb/doc description \textsuperscript{P.502}.

\begin{docKeys}
\begin{docKey}
{\text{doc no index, } \% \text{ no index entries for this example}
\text{doc keypath = mykeyroot,}
\text{doc parameter = {=\meta{length}},}
\end{docKey}

\begin{docKey}
{\text{doc name = width,}
\text{doc description = initially \texttt{10cm},}
},
\begin{docKey}
{\text{doc name = height,}
\text{doc description = initially \texttt{7cm},}
},
\end{docKey}
\end{docKey}
\end{docKeys}

\begin{docKeys}
/mykeyroot/width=\text{\texttt{length}} \text{(initially 10cm)}
/mykeyroot/height=\text{\texttt{length}} \text{(initially 7cm)}
\end{docKeys}
\begin{docPathOperation}{(options)}{(name)}{(parameters)}
\{operation description\}
\end{docPathOperation}

Documents a TikZ path operation with given \textit{name}. The given \textit{options} are set with \texttt{\textbackslash tcbset} \texttt{\rightarrow} \texttt{P.13}. This TikZ path operation takes mandatory or optional \textit{parameters}. It is automatically indexed and can be referenced with \texttt{\refPathOperation} \texttt{\rightarrow} \texttt{P.499}\{\textit{name}\}.

\begin{docPathOperation}{\{opt\}}{(\textit{name})}{\texttt{\textbackslash colOpt\{at(\texttt{\meta\{coord\}})\}}}
\{\texttt{Imaginary path operation for illustration.}\}
\end{docPathOperation}

\begin{docPathOperations}{(options)}{(name)}{(parameters)}
\{command description\}
\end{docPathOperations}

Identical to \texttt{docPathOperation}, but without index entry.

\begin{docPathOperations}{(options)}{\{variant1\}, \{variant2\}, \ldots}
\{command description\}
\end{docPathOperations}

Documents several (similar) TikZ path operation variants simultaneously. The given \textit{options} are set with \texttt{\textbackslash tcbset} \texttt{\rightarrow} \texttt{P.13} and are valid for all variants and the documentation text. Every variant is described by an option set \textit{variant1}, \textit{variant2}, and so on. The most crucial options are \texttt{/tcb/doc name} \texttt{\rightarrow} \texttt{P.501} and \texttt{/tcb/doc parameter} \texttt{\rightarrow} \texttt{P.501}.

\begin{docPathOperations}{
  \{doc no index, \% no index entries for this example\}
  {
    {
      doc name = rectangle, 
      doc parameter = \texttt{\meta\{corner or cycle\}},
    },
    {
      doc name = circle, 
      doc parameter = \texttt{\oarg\{options\}},
    },
    {
      doc name = ellipse, 
      doc parameter = \texttt{\oarg\{options\}},
    },
  }
}{example}
\end{docPathOperations}

\texttt{\path\ldots\texttt{rectangle(\textit{corner or cycle})\ldots};}\texttt{\path\ldots\texttt{circle[(options)]\ldots};}\texttt{\path\ldots\texttt{ellipse[(options)]\ldots};}\texttt{\example}
\docValue\langle\textit{options}\rangle\{\langle\textit{name}\rangle\}
\docValue*\langle\textit{options}\rangle\{\langle\textit{name}\rangle\}

Documents a value with given \langle\textit{name}\rangle. Typically, this is a value for a key. The given \langle\textit{options}\rangle are set with \texttt{\tcbset}\rightarrow\texttt{P.13}. This value is automatically indexed for \docValue and has no index entry for \docValue*.

A feasible value for \texttt{\refKey/foo/footitle} is \docValue*\{foovalue\}.

A feasible value for \texttt{/foo/footitle} \rightarrow\texttt{P.491} is \texttt{foovalue}.

\docAuxCommand\langle\textit{options}\rangle\{\langle\textit{name}\rangle\}
\docAuxCommand*\langle\textit{options}\rangle\{\langle\textit{name}\rangle\}

Documents an auxiliary or minor \LaTeX macro with given \langle\textit{name}\rangle where \langle\textit{name}\rangle is written without backslash. The given \langle\textit{options}\rangle are set with \texttt{\tcbset}\rightarrow\texttt{P.13}. This macro is automatically indexed for \docAuxCommand and has no index entry for \docAuxCommand*.

The macro \docAuxCommand\{fooaux\} holds some interesting data.

The macro \texttt{fooaux} holds some interesting data.

\docAuxEnvironment\langle\textit{options}\rangle\{\langle\textit{name}\rangle\}
\docAuxEnvironment*\langle\textit{options}\rangle\{\langle\textit{name}\rangle\}

Documents an auxiliary or minor \LaTeX environment with given \langle\textit{name}\rangle. The given \langle\textit{options}\rangle are set with \texttt{\tcbset}\rightarrow\texttt{P.13}. This macro is automatically indexed indexed for \docAuxEnvironment and has no index entry for \docAuxEnvironment*.

The environment \docAuxEnvironment\{fooauxenv\} holds some interesting data.

The environment \texttt{fooauxenv} holds some interesting data.

\docAuxKey\langle\textit{key path}\rangle\langle\textit{options}\rangle\{\langle\textit{name}\rangle\}
\docAuxKey*\langle\textit{key path}\rangle\langle\textit{options}\rangle\{\langle\textit{name}\rangle\}

Documents an auxiliary key with given \langle\textit{name}\rangle and an optional \langle\textit{key path}\rangle. The given \langle\textit{options}\rangle are set with \texttt{\tcbset}\rightarrow\texttt{P.13}. It is automatically indexed for \docAuxKey and has no index entry for \docAuxKey*.

The key \docAuxKey[foo]\{fooaux\} holds some interesting data.

The key \texttt{/foo/fooaux} holds some interesting data.

\docCounter\langle\textit{options}\rangle\{\langle\textit{name}\rangle\}
\docCounter*\langle\textit{options}\rangle\{\langle\textit{name}\rangle\}

Documents a counter with given \langle\textit{name}\rangle. The given \langle\textit{options}\rangle are set with \texttt{\tcbset}\rightarrow\texttt{P.13}. The counter is automatically indexed for \docCounter and has no index entry for \docCounter*.

The counter \docCounter\{foocounter\} can be used for computation.

The counter \texttt{foocounter} can be used for computation.
Documents a length with given \textit{name}. The given \textit{options} are set with \texttt{tcbset}\textsuperscript{P.13}. The length is automatically indexed for \texttt{docLength} and has no index entry for \texttt{docLength*}.

\begin{itemize}
  \item The length \texttt{docLength}\{\texttt{foolength}\} can be used for computation.
  \item The length \texttt{foolength} can be used for computation.
\end{itemize}

Documents a color with given \textit{name}. The given \textit{options} are set with \texttt{tcbset}\textsuperscript{P.13}. The color is automatically indexed for \texttt{docColor} and has no index entry for \texttt{docColor*}.

\begin{itemize}
  \item The color \texttt{docColor}\{\texttt{foocolor}\} is available.
  \item The color \texttt{foocolor} is available.
\end{itemize}

\texttt{\textbackslash cs\{\textit{name}\}}

Macro from \texttt{ltxdoc}[3] to typeset a command word \textit{name} where the backslash is prefixed. The library overwrites the original macro.

\begin{itemize}
  \item This is a \texttt{cs}\{\texttt{foocommand}\}.
  \item This is a \texttt{foocommand}.
\end{itemize}

\texttt{\textbackslash meta\{\textit{text}\}}

Macro from \texttt{doc}[8] to typeset a \textit{text}. The library overwrites the original macro.

\begin{itemize}
  \item This is a \texttt{meta}\{\textit{text}\}.
  \item This is a \{\textit{text}\}.
\end{itemize}

\texttt{\textbackslash marg\{\textit{text}\}}

Macro from \texttt{ltxdoc}[3] to typeset a \{\textit{text}\} with curly brackets as a mandatory argument. The library overwrites the original macro.

\begin{itemize}
  \item This is a mandatory \texttt{marg}\{\textit{argument}\}.
  \item This is a mandatory \{\textit{argument}\}.
\end{itemize}

\texttt{\textbackslash oarg\{\textit{text}\}}

Macro from \texttt{ltxdoc}[3] to typeset a \{\textit{text}\} with square brackets as an optional argument. The library overwrites the original macro.

\begin{itemize}
  \item This is an optional \texttt{oarg}\{\textit{argument}\}.
  \item This is an optional \{\textit{argument}\}.
\end{itemize}
\textbf{\texttt{\textbackslash brackets\{\textit{text}\}}} \\
Sets the given \textit{text} with curly brackets.

\begin{example}
Here we use \texttt{\textbackslash brackets\{some text\}}.
\end{example}

Here we use \{some text\}.

\texttt{\textbackslash begin\{dispExample\}} \\
\{\textit{environment content}\} \\
\texttt{\textbackslash end\{dispExample\}}

Creates a colored box based on a \texttt{tcolorbox} \textsuperscript{P.12}. It displays the environment content as source code in the upper part and as compiled text in the lower part of the box. The appearance is controlled by \texttt{/tcb/documentation listing style} \textsuperscript{P.509} and the style \texttt{/tcb/docexample} \textsuperscript{P.509}. It may be changed by redefining this style.

\begin{example}
This is a \LaTeX\ example.
\end{example}

This is a \LaTeX\ example.

This is a \LaTeX\ example.

\begin{example*}{sidebyside}
This is a \LaTeX\ example.
\end{example*}

This is a \LaTeX\ example.  \\
This is a \LaTeX\ example.
\begin{dispListing}
  \{environment content\}
\end{dispListing}

Creates a colored box based on \texttt{tcolorbox} \textsuperscript{P.12}. It displays the environment content as source code. The appearance is controlled by \texttt{/tcb/documentation listing style} \textsuperscript{P.509} and the style \texttt{/tcb/docexample} \textsuperscript{P.509}. It may be changed by redefining this style.

\begin{dispListing}
This is a \LaTeX\ example.
\end{dispListing}

\begin{dispListing*}{(options)}
  \{environment content\}
\end{dispListing*}

The starred version of \texttt{dispListing} takes \texttt{tcolorbox} \textsuperscript{P.12} \texttt{(options)} as parameter. These \texttt{(options)} are executed after \texttt{/tcb/docexample} \textsuperscript{P.509}.

\begin{dispListing*}{title=My listing}
This is a \LaTeX\ example.
\end{dispListing*}

\begin{absquote}
\{environment content\}
\end{absquote}

Used to typeset an abstract as quoted and small text.

\begin{absquote}
|tcolorbox| provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part.
\end{absquote}

tcolorbox provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part.
\texttt{tcbmakedocSubKey}\{\langle name\rangle\}\{\langle key\ path\rangle\}

Creates a new environment \langle name\rangle based on docKey→P.491 for the documentation of keys with the given \langle key\ path\rangle as root. The new environment \langle name\rangle takes the same parameters as docKey→P.491 itself. A second starred environment \langle name\rangle is also created, which is identical to \langle name\rangle but without index entry.

\begin{verbatim}
\begin{docFooKey}{foodummy}{=\meta{nothing}}{no default, initially empty}
Some key.
\end{docFooKey}
\begin{docFooKey*}{foo another dummy}{=\meta{nothing}}{no default, initially empty}
Some key (not indexed).
\end{docFooKey*}
\end{verbatim}

\begin{verbatim}
/foo/foodummy=(nothing) (no default, initially empty)
Some key.
/foo/foo another dummy=(nothing) (no default, initially empty)
Some key (not indexed).
\end{verbatim}

**N 2020-04-22** \texttt{tcbmakedocSubKeys}\{\langle name\rangle\}\{\langle key\ path\rangle\}

Creates a new environment \langle name\rangle based on docKeys→P.491 for the documentation of keys with the given \langle key\ path\rangle as root. The new environment \langle name\rangle takes the same parameters as docKeys→P.491 itself.

\begin{verbatim}
\begin{docFooKeys}
\[
\text{doc parameter } = \{=\meta{nothing}\},
\text{doc description } = \{\text{no default, initially empty}\},
\]
\{
\text{doc name } = \text{foodummy 2},
\},
\text{doc name } = \text{foo another dummy 2},
\text{doc no index},
\}
\text{Some description.}
\end{docFooKeys}
\end{verbatim}

\begin{verbatim}
/foo/foodummy 2=(nothing) (no default, initially empty)
/bar/foodummy another dummy 2=(nothing) (no default, initially empty)
\text{Some description.}
\end{verbatim}
\refCom\{\langle name \rangle\}
References a documented \LaTeX\ macro with given \langle name \rangle where \langle name \rangle is written without backslash. The page reference is suppressed if it links to the same page.

We have created \refCom\{foomakedocSubKey\} as an example.

We have created \foomakedocSubKey \textsuperscript{P. 488} as an example.

\refCom\{\langle name \rangle\}
References a documented \LaTeX\ macro with given \langle name \rangle where \langle name \rangle is written without backslash. There is no page reference.

We have created \refCom\{foomakedocSubKey\} as an example.

We have created \foomakedocSubKey as an example.

\refEnv\{\langle name \rangle\}
References a documented \LaTeX\ environment with given \langle name \rangle. The page reference is suppressed if it links to the same page.

We have created \refEnv\{foocolorbox\} as an example.

We have created foocolorbox \textsuperscript{P. 489} as an example.

\refEnv\{\langle name \rangle\}
References a documented \LaTeX\ environment with given \langle name \rangle. There is no page reference.

We have created \refEnv\{foocolorbox\} as an example.

We have created foocolorbox as an example.

\refKey\{\langle name \rangle\}
References a documented key with given \langle name \rangle where \langle name \rangle is the full path name of the key. The page reference is suppressed if it links to the same page.

We have created \refKey\{/foo/footitle\} as an example.

We have created /foo/footitle \textsuperscript{P. 491} as an example.

\refKey\{\langle name \rangle\}
References a documented key with given \langle name \rangle where \langle name \rangle is the full path name of the key. There is no page reference.

We have created \refKey\{/foo/footitle\} as an example.

We have created /foo/footitle as an example.
\texttt{\refPathOperation\{<name>\}}

References a documented TikZ path operation with given <name>. The page reference is suppressed if it links to the same page.

We have created \refPathOperation{fooop} as an example.

We have created fooop \textsuperscript{P. 492} as an example.

\texttt{\refPathOperation{*\{<name>\}}}

References a documented TikZ path operation with given <name>. There is no page reference.

We have created \refPathOperation{*{fooop}} as an example.

\texttt{\refAux\{<name>\}}

References some auxiliary environment, key, value, or color. The <name> is colored according to \texttt{/tcb/color hyperlink}\textsuperscript{P. 511}, if \texttt{hyperref} colorlinks are set, but there is no real link.

Some pages back, one can see \refAux{/foo/footitle} as an example.

Some pages back, one can see /foo/footitle as an example.

\texttt{\refAuxcs\{<name>\}}

References some auxiliary macro <name> where <name> is written without backslash. The <name> is colored according to \texttt{/tcb/color hyperlink}\textsuperscript{P. 511}, if \texttt{hyperref} colorlinks are set, but there is no real link.

Some pages back, one can see \refAuxcs{fooaux} as an example.

Some pages back, one can see fooaux as an example.

\texttt{\colDef\{<text>\}}

Sets <text> with the command color, see \texttt{/tcb/color command}\textsuperscript{P. 511}.

This is my \colDef{text}.

This is my text.

\texttt{\colOpt\{<text>\}}

Sets <text> with the option color, see \texttt{/tcb/color option}\textsuperscript{P. 511}.

This is my \colOpt{text}.

This is my text.
\colFade{\text}

Sets \text with the fade color, see /tcb/color fade $^\text{P.\ref{ref:color-fade}}$.

This is my \colFade{text}.

This is my text.

\tcbdocmarginnote{\text}{\text}

Creates a tcolorbox note with the given \text inside the margin using the marginnote package. The style of the tcolorbox is predefined and can be altered by /tcb/doc marginnote $^\text{P.\ref{ref:marginnote}}$ and the given \text.}

Some text \tcbdocmarginnote{Note A}
which is commented by a note inside the margin. Alternatively to \tcbdocmarginnote, you can always use \margintnote with a tcolorbox directly.\par
This is further text\%
\tcbdocmarginnote[colframe=blue!50!white, colback=blue!5!white]{Note B}
with another note.

Some text which is commented by a note inside the margin. Alternatively to \tcbdocmarginnote, you can always use \margintnote with a tcolorbox directly.\par
This is further text with another note.

\tcbdocnew{\text}

Auxiliary macro which typesets the /tcb/doclang/new $^\text{P.\ref{ref:new}}$ text with the given \text. It may be redefined for customization.

\tcbdocnew{1981-10-29}.\par

% Next one is displayed in the margin:
\tcbdocmarginnote{\tcbdocnew{1978-02-09}}

\tcbdocupdated{\text}

Auxiliary macro which typesets the /tcb/doclang/updated $^\text{P.\ref{ref:updated}}$ text with the given \text. It may be redefined for customization.

\tcbdocupdated{2014-09-19}.\par
26.2 Entry Content Option Keys

\texttt{/tcb/doc name=⟨name⟩}

(No default, initially empty)

Sets the \langle name\rangle of the entry to document, i.e. the \langle name\rangle of the command, environment, key, etc. For \texttt{docCommand} \(\rightarrow\) P.487, \texttt{docEnvironment} \(\rightarrow\) P.489, etc. the \langle name\rangle is set by a mandatory parameter, but can also be set by \texttt{/tcb/doc name}. \texttt{/tcb/doc name} also sets \langle name\rangle to \texttt{/tcb/doc label} \(\rightarrow\) P.502, \texttt{/tcb/doc index} \(\rightarrow\) P.502, and \texttt{/tcb/doc sort index} \(\rightarrow\) P.502.

\begin{docCommands}
\begin{verbatim}
doc no index, \% no index entries for this example
   doc name = \bfseries,
\end{verbatim}
\end{docCommands}

\begin{verbatim}
\bfseries
Font setting to bold face.
\end{verbatim}

\texttt{/tcb/doc parameter=⟨parameters⟩}

(No default, initially empty)

Sets the \langle parameters\rangle of the entry to document, i.e. the \langle parameters\rangle of the command, environment, key, etc. For \texttt{docCommand} \(\rightarrow\) P.487, \texttt{docEnvironment} \(\rightarrow\) P.489, etc. the \langle parameters\rangle is set by a mandatory option, but can also be set by \texttt{/tcb/doc parameter}.

\begin{docCommands}
\begin{verbatim}
doc no index, \% no index entries for this example
   doc name = textbf,
   doc parameter = \marg{text},
\end{verbatim}
\end{docCommands}

\begin{verbatim}
\textbf{⟨text⟩}
Sets \langle text\rangle in bold face.
\end{verbatim}

\texttt{/tcb/doc keypath=⟨key path⟩}

(No default, initially empty)

Sets the \langle key path\rangle of the key to document. For \texttt{docKey} \(\rightarrow\) P.491 and \texttt{docKey*} \(\rightarrow\) P.491 the \langle key path\rangle is set by a specialized option, but can also be set by \texttt{/tcb/doc keypath}.

\begin{docKeys}
\begin{verbatim}
doc no index, \% no index entries for this example
   doc keypath = tikz,
   doc name = fill,
   doc parameter = \colOpt{=\meta{color}},
\end{verbatim}
\end{docKeys}

\begin{verbatim}
/tikz/fill=⟨color⟩
This option causes the path to be filled.
\end{verbatim}
Sets a (short!) additional \textit{description} for \texttt{docCommand} \textsuperscript{P.487}, \texttt{docEnvironment} \textsuperscript{P.489}, or \texttt{docPathOperation} \textsuperscript{P.492}. Such a description is mandatory for \texttt{docKey} \textsuperscript{P.491}.

\begin{docCommand*}[doc description=my description]{myCommandF}{\marg{argument}}
This is the documentation of \texttt{\refCom{myCommandF}} which takes one \texttt{\meta{argument}}. \texttt{\refCom{myCommandF}} does some funny things with its \texttt{\meta{argument}}.
\end{docCommand*}

\texttt{myCommandF}{\langle argument \rangle}(my description)
This is the documentation of \texttt{myCommandF} which takes one \texttt{\langle argument \rangle}. \texttt{myCommandF} does some funny things with its \texttt{\langle argument \rangle}.

Note that the description \textit{text} may overlap with the text on the left hand side if too long. Linebreaks can be used inside the \textit{text}.

If used inside the option list of \texttt{docCommand} \textsuperscript{P.487}, \texttt{docEnvironment} \textsuperscript{P.489}, \texttt{docKey} \textsuperscript{P.491}, etc, then \textit{text} is used for labeling instead of the name of the definition.

\begin{docPathOperation*}[doc label=pathline]{-{}-}{\meta{coordinate or cycle}}
This is the documentation of \texttt{\refPathOperation{pathline}}.
\end{docPathOperation*}

\texttt{-|}{\langle coordinate or cycle \rangle}...;
This is the documentation of \texttt{-|}.

If used inside the option list of \texttt{docCommand} \textsuperscript{P.487}, \texttt{docEnvironment} \textsuperscript{P.489}, \texttt{docKey} \textsuperscript{P.491}, etc, then \textit{text} is used for as sort key for the index instead of the name of the definition.

\begin{docCommands}
\begin{docCommands}
\texttt{doc name = l_tcobox_example_tl, doc sort index = example_tl, \% sorted unter e like example}
\end{docCommands}
\end{docCommands}

502
/tcb/doc into index=true|false
(default true, initially true)

If set to false, no index entries are written for the main documentation environments. The same effect is achieved by using e.g. docCommand*→P.488 instead of docCommand*→P.487.

/tcb/doc no index
(style, initially unset)

If set, no index entries are written for the main documentation environments. This is a shortcut for using /tcb/doc into index=false.

/tcb/doc marginnote=⟨options⟩
(no default, initially empty)

Sets style ⟨options⟩ for the displayed box of the \tcbdocmarginnote→P.500 command.

\tcbset{doc marginnote={colframe=blue!50!white,colback=blue!5!white}}%
This is some text\tcbdocmarginnote{Note A}
which is commented by a note inside the margin.

This is some text which is commented by a note inside the margin.

/tcb/doc new=⟨date⟩
(style, no default)

Adds a marginnote with a “New: ⟨date⟩” message at the beginning of the upper box part. The intended use is inside the option list of docCommand*→P.487, docEnvironment*→P.489, etc.

\begin{docCommand}[doc new=2000-01-01]{foosomething}{\marg{text}}
Some command for something.
\end{docCommand}

\foosomething{⟨text⟩}
Some command for something.

/tcb/doc updated=⟨date⟩
(style, no default)

Adds a marginnote with a “Updated: ⟨date⟩” message at the beginning of the upper box part.

/tcb/doc new and updated=⟨new date⟩{⟨update date⟩}
(style, no default)

Adds a marginnote with “New: ⟨new date⟩” and “Updated: ⟨update date⟩” messages at the beginning of the upper box part. See /tcb/doc new.
26.3 Entry Customization Option Keys

\begin{docCommand*}[doc left=2cm,doc left indent=-2cm]{myCommandA}{⟨argument⟩}
This is the documentation of \refCom{myCommandA} which takes one \meta{argument}. \myCommandA does some funny things with its \meta{argument}.
\end{docCommand*}

\myCommandA{⟨argument⟩}
This is the documentation of \myCommandA which takes one ⟨argument⟩. \myCommandA does some funny things with its ⟨argument⟩.

\begin{docCommand*}[doc right=2cm]{myCommandB}{⟨argument⟩}
This is the documentation of \refCom{myCommandB} which takes one \meta{argument}. \myCommandB does some funny things with its \meta{argument}.
\end{docCommand*}

\myCommandB{⟨argument⟩}
This is the documentation of \myCommandB which takes one ⟨argument⟩. \myCommandB does some funny things with its ⟨argument⟩.

\begin{docCommand*}[doc left indent=2cm]{myCommandC}{⟨argument⟩}
This is the documentation of \refCom{myCommandC} which takes one \meta{argument}. \myCommandC does some funny things with its \meta{argument}.
\end{docCommand*}

\myCommandC{⟨argument⟩}
This is the documentation of \myCommandC which takes one ⟨argument⟩. \myCommandC does some funny things with its ⟨argument⟩.

\begin{docCommand*}[doc right indent=-10mm,doc right=10mm,doc description=test value]{myCommandD}{⟨argument⟩}
This is the documentation of \refCom{myCommandD} which takes one \meta{argument}. \myCommandD does some funny things with its \meta{argument}.
\end{docCommand*}

\myCommandD{⟨argument⟩}(test value)
This is the documentation of \myCommandD which takes one ⟨argument⟩. \myCommandD does some funny things with its ⟨argument⟩.
The head lines of the main documentation environments `docCommand`\(^{\text{P.487}}\), `docEnvironment`\(^{\text{P.489}}\), `docKey`\(^{\text{P.491}}\), etc, are `tcolorboxes` inside a `tcbraster`\(^{\text{P.300}}\). Options to the surrounding `tcbrasters` and the embedded `tcolorboxes` can be given using the following keys.

\[\texttt{/tcb/doc raster command=\langle options\rangle}\]
(no default, initially empty)

Sets \langle options \rangle for the surrounding `tcbraster`\(^{\text{P.300}}\) of `docCommand`\(^{\text{P.487}}\), `docCommand*`\(^{\text{P.488}}\), and `docCommands`\(^{\text{P.488}}\).

\[
\begin{docCommand*}{myCommandI}\{}\marg{\text{argument}}\}
\text{This is the documentation of } \refCom{\text{myCommandI}} \text{ which takes one } \meta{\text{argument}}. \refCom{\text{myCommandI}} \text{ does some funny things with its } \meta{\text{argument}}. \\
\end{docCommand*}
\]

\[\texttt{/tcb/doc raster environment=\langle options\rangle}\]
(no default, initially empty)

Sets \langle options \rangle for the surrounding `tcbraster`\(^{\text{P.300}}\) of `docEnvironment`\(^{\text{P.489}}\), `docEnvironment*`\(^{\text{P.489}}\), and `docEnvironments`\(^{\text{P.490}}\).

\[\texttt{/tcb/doc raster key=\langle options\rangle}\]
(no default, initially empty)

Sets \langle options \rangle for the surrounding `tcbraster`\(^{\text{P.300}}\) of `docKey`\(^{\text{P.491}}\), `docKey*`\(^{\text{P.491}}\), and `docKeys`\(^{\text{P.491}}\).

\[\texttt{/tcb/doc raster path=\langle options\rangle}\]
(no default, initially empty)

Sets \langle options \rangle for the surrounding `tcbraster`\(^{\text{P.300}}\) of `docPathOperation`\(^{\text{P.492}}\), `docPathOperation*`\(^{\text{P.492}}\), and `docPathOperations`\(^{\text{P.492}}\).

\[\texttt{/tcb/doc raster}=\langle options\rangle\]
(no default, initially empty)

Shortcut for setting the same \langle options \rangle for `/tcb/doc raster command`, `/tcb/doc raster environment`, `/tcb/doc raster key`, and `/tcb/doc raster path`.

\[\texttt{/tcb/doc head command=\langle options\rangle}\]
(no default, initially empty)

Sets \langle options \rangle for the head line of `docCommand`\(^{\text{P.487}}\), `docCommand*`\(^{\text{P.488}}\), and `docCommands`\(^{\text{P.488}}\).

\[
\begin{docCommand*}{myCommandE}\{}\marg{\text{argument}}\}
\text{This is the documentation of } \refCom{\text{myCommandE}} \text{ which takes one } \meta{\text{argument}}. \refCom{\text{myCommandE}} \text{ does some funny things with its } \meta{\text{argument}}. \\
\end{docCommand*}
\]
/tcb/doc head environment=(options) (no default, initially empty)
Sets (options) for the head line of docEnvironment → P.489, docEnvironment* → P.489, and docEnvironments → P.490.

\tcbset{doc head environment={beamer,boxsep=2pt,arc=2pt,colback=green!20!white}}
\begin{docEnvironment*}{myEnvironment}{⟨argument⟩}
This is the documentation of \refEnv{myEnvironment} which takes one ⟨meta⟩ argument.
\end{docEnvironment*}

This is the documentation of myEnvironment which takes one ⟨argument⟩.

/tcb/doc head key=(options) (no default, initially empty)
Sets (options) for the head line of docKey → P.491, docKey* → P.491, and docKeys → P.491.

\tcbset{doc head key={boxsep=4pt,arc=4pt,boxrule=0.6pt,}
frame style=fill,interior style=fill,colframe=green!50!black}}
\begin{docKey}{/foo/myKey}{}{no value}
This is the documentation of \refKey{/foo/myKey}.
\end{docKey}

/foo/myKey (no value)
This is the documentation of /foo/myKey.

/tcb/doc head path=(options) (no default, initially empty)
Sets (options) for the head line of docPathOperation → P.492, docPathOperation* → P.492, and docPathOperations → P.492.

\tcbset{doc head command={interior style={fill,left color=red!7!white,
right color=blue!7!white}}}\begin{docPathOperation*}{-{}-}{⟨coordinate or cycle⟩}
This is the documentation of \refPathOperation{-{}-}.
\end{docPathOperation*}

\path ... --⟨coordinate or cycle⟩ ...;
This is the documentation of --.

/tcb/doc head=(options) (no default, initially empty)
Shortcut for setting the same (options) for /tcb/doc head command → P.505, /tcb/doc head environment, /tcb/doc head key, and /tcb/doc head path.
The description texts of the main documentation environments `docCommand` \textsuperscript{P.487}, `docEnvironment` \textsuperscript{P.489}, `docKey` \textsuperscript{P.491}, etc, are set in a compact form without indentation and `parskip=0pt`. This settings can overruled by using the following keys to insert code before (or after) the description texts.

\begin{Verbatim}[commandchars=\!\%][nofloat]
/tcb/before doc body command=(code) (no default, initially empty)
\end{Verbatim}

Executes \texttt{(code)} before the description texts of `docCommand` \textsuperscript{P.487} and `docCommand*` \textsuperscript{P.488}.

\begin{Verbatim}[commandchars=\!\%][nofloat]
\tcbset{before doc body command=#{\
% \\
\setlength{\parindent}{2.5em}\
\setlength{\parskip}{1ex plus 0.75ex minus 0.25ex}\
}}
\begin{docCommand*}{myCommandG}{\marg{argument}}
This is the documentation of \texttt{\refCom{myCommandG}} which takes one \texttt{\meta{argument}}. \texttt{\refCom{myCommandG}} does some funny things with its \texttt{\meta{argument}}.
\end{docCommand*}
\myCommandG{\langle argument \rangle}

This is the documentation of \texttt{myCommandG} which takes one \texttt{\langle argument \rangle}. \texttt{myCommandG} does some funny things with its \texttt{\langle argument \rangle}.

\begin{Verbatim}[commandchars=\!\%][nofloat]
/tcb/after doc body command=(code) (no default, initially empty)
\end{Verbatim}

Executes \texttt{(code)} after the description texts of `docCommand` \textsuperscript{P.487} and `docCommand*` \textsuperscript{P.488}.

\begin{Verbatim}[commandchars=\!\%][nofloat]
\tcbset{after doc body command=#{\
% \\
\hfill\noindent[1]\hspace*{\fill}\textcolor{red}{$\diamondsuit$}\
}}
\begin{docCommand*}{myCommandH}{\marg{argument}}
This is the documentation of \texttt{\refCom{myCommandH}} which takes one \texttt{\meta{argument}}. \texttt{\refCom{myCommandH}} does some funny things with its \texttt{\meta{argument}}.
\end{docCommand*}
\myCommandH{\langle argument \rangle}

This is the documentation of \texttt{myCommandH} which takes one \texttt{\langle argument \rangle}. \texttt{myCommandH} does some funny things with its \texttt{\langle argument \rangle}. ♢

\begin{Verbatim}[commandchars=\!\%][nofloat]
/tcb/before doc body environment=(code) (no default, initially empty)
\end{Verbatim}

Executes \texttt{(code)} before the description texts of `docEnvironment` \textsuperscript{P.489} and `docEnvironment*` \textsuperscript{P.489}.

\begin{Verbatim}[commandchars=\!\%][nofloat]
/tcb/after doc body environment=(code) (no default, initially empty)
\end{Verbatim}

Executes \texttt{(code)} after the description texts of `docEnvironment` \textsuperscript{P.489} and `docEnvironment*` \textsuperscript{P.489}.

\begin{Verbatim}[commandchars=\!\%][nofloat]
/tcb/before doc body key=(code) (no default, initially empty)
\end{Verbatim}

Executes \texttt{(code)} before the description texts of `docKey` \textsuperscript{P.491} and `docKey*` \textsuperscript{P.491}.

\begin{Verbatim}[commandchars=\!\%][nofloat]
/tcb/after doc body key=(code) (no default, initially empty)
\end{Verbatim}

Executes \texttt{(code)} after the description texts of `docKey` \textsuperscript{P.491} and `docKey*` \textsuperscript{P.491}. 507
Executes \texttt{(code)} before the description texts of \texttt{docPathOperation} \textsuperscript{P.492} and \texttt{docPathOperation*} \textsuperscript{P.492}.

Executes \texttt{(code)} after the description texts of \texttt{docPathOperation} \textsuperscript{P.492} and \texttt{docPathOperation*} \textsuperscript{P.492}.

Shortcut for setting the same \texttt{(options)} for \texttt{/tcb/before doc body} command \textsuperscript{P.507}, \texttt{/tcb/before doc body environment} \textsuperscript{P.507}, \texttt{/tcb/before doc body key} \textsuperscript{P.507}, and \texttt{/tcb/before doc body path}.

Shortcut for setting the same \texttt{(options)} for \texttt{/tcb/after doc body} command \textsuperscript{P.507}, \texttt{/tcb/after doc body environment} \textsuperscript{P.507}, \texttt{/tcb/after doc body key} \textsuperscript{P.507}, and \texttt{/tcb/after doc body path}.
26.4 General Customization Option Keys

/tcb/docexample (style, no value)

Sets the style for dispExample \( \rightarrow \) P.495 and dispListing \( \rightarrow \) P.496 with the colors ExampleBack and ExampleFrame. To change the appearance of the examples, this style can be redefined.

% Predefined style:
\begin{verbatim}
\tcbsset{
  docexample/.style={colframe=ExampleFrame,colback=ExampleBack,
    before skip=\medskipamount,after skip=\medskipamount,
    fontlower=\footnotesize}
\end{verbatim}

/tcb/documentation listing options=(key list) (no default, initially style=tcbdocumentation)

Sets the options from the package listings [6]. They are used inside dispExample \( \rightarrow \) P.495 and dispListing \( \rightarrow \) P.496 to typeset the listings. Note that this is not identical to the key /tcb/listing options \( \rightarrow \) P.327 which is used for “normal” listings.

Used for /tcb/listing engine \( \rightarrow \) P.332=listings only.

/tcb/documentation listing style=(listing style) (no default, initially tcbdocumentation)

Abbreviation for documentation listing options={style=...}. This key sets a \textit{(style)} for the listings package, see [6]. Note that this is not identical to the key /tcb/listing style \( \rightarrow \) P.327 which is used for “normal” listings.

Used for /tcb/listing engine \( \rightarrow \) P.332=listings only.

/tcb/documentation minted options=(key list) (no default, initially tabsize=2,fontsize=\small)

Sets the options from the package minted [12] which are used during typesetting of the listing, if used. Note that this is not identical to the key /tcb/minted options \( \rightarrow \) P.330 which is used for “normal” listings.

Used for /tcb/listing engine \( \rightarrow \) P.332=minted only.

/tcb/documentation minted style=(key list) (no default, initially unset)

Sets a \textit{(style)} known to Pygments [14] for the package minted [12], if used. Note that this is not identical to the key /tcb/minted style \( \rightarrow \) P.331 which is used for “normal” listings.

Used for /tcb/listing engine \( \rightarrow \) P.332=minted only.

/tcb/documentation minted language=(programming language) (no default, initially latex)

Sets a \textit{(programming language)} known to Pygments [14] for the package minted [12], if used. Note that this is not identical to the key /tcb/minted language \( \rightarrow \) P.330 which is used for “normal” listings.

Used for /tcb/listing engine \( \rightarrow \) P.332=minted only.

The following two keys are deprecated and without function (v3.50 and above). Use /tcb/before \( \rightarrow \) P.81 and /tcb/after \( \rightarrow \) P.81 with appropriate values instead. Also see /tcb/docexample.

/tcb/before example=(macros) (no default, initially empty)

Sets the \textit{(macros)} which are executed before dispExample \( \rightarrow \) P.495 and dispListing \( \rightarrow \) P.496 additional to /tcb/before \( \rightarrow \) P.81.

/tcb/after example=(macros) (no default, initially empty)

Sets the \textit{(macros)} which are executed after dispExample \( \rightarrow \) P.495 and dispListing \( \rightarrow \) P.496 additional to /tcb/after \( \rightarrow \) P.81.
/tcb/keywords bold=true|false  (default true, initially true)

Keyword used in docEnvironment→P.489, docCommand→P.487, etc. are printed boldface (or not). Since the typewriter font is used, the effect may be invisible with Computer Modern fonts or similar which do not have a bold variant. Note that references to keywords are not printed boldface at all.

\LARGE
\docAuxCommand{fooaux}, \refCom{tcbset}
fooaux, tcbset→P.13
\docAuxCommand{fooaux}, \refCom{tcbset}

/tcb/index command=(macro)  (no default, initially \index)

Replaces the internally used \index macro by the given ⟨macro⟩. The ⟨macro⟩ has to take one mandatory argument like \index. This option is mutually exclusive with /tcb/index command name.

\tcbset{index command=\myindexcommand}

/tcb/index command name=(name)  (no default, initially unset)

Replaces the internally used \index macro by \index[(name)], i.e. \index[... is replaced by \index[(name)]{...}. This option is intended to be used with imakeidx and is mutually exclusive with /tcb/index command.

\tcbset{index command name=mydoc}

/tcb/index format=(format)  (no default, initially pgf)

Determines the basic ⟨format⟩ of the generated index. Feasible values are:
- pgfsection: The index is formatted like in the pgf documentation (as a section).
- pgfchapter: The index is formatted like in the pgf documentation (as a chapter).
- pgf: Alias for pgfsection.
- doc: The index is assumed to be formatted by doc or ltxdoc. The usage of makeindex with -s gind.ist is assumed. The package hypdoc has to be loaded before tcolorbox. Only a limited set of customizations will work! This option cannot be unset when used!
- off: The index is not formatted by tcolorbox. Use this, if the index is formatted by other package like imakeidx.

/tcb/index actual=(character)  (no default, initially @)

Sets the character for “actual” in automatic indexing.

/tcb/index quote=(character)  (no default, initially ”)

Sets the character for “quote” in automatic indexing.

/tcb/index level=(character)  (no default, initially !)

Sets the character for “level” in automatic indexing.

/tcb/index default settings  (style, no value)

Sets the makeindex default values for /tcb/index actual, /tcb/index quote, and /tcb/index level.

/tcb/index german settings  (style, no value)

Sets the makeindex values recommended for German language texts. This is identical to setting the following:

\tcbset{index actual={=}, index quote={"}, index level={>}}
/tcb/index annotate=true|false (default true, initially true)

If set to true, the index entries are annotated with short descriptions given by
/tcb/doclang/environment→P.512, /tcb/doclang/key→P.512, and others.

/tcb/index colorize=true|false (default true, initially false)

If set to true, the index entries colorized according to the color settings given by /tcb/color
environment, /tcb/color key, and others.

/tcb/color command=(color) (no default, initially Definition)

Sets the highlight color used by macro definitions.

/tcb/color environment=(color) (no default, initially Definition)

Sets the highlight color used by environment definitions.

/tcb/color key=(color) (no default, initially Definition)

Sets the highlight color used by key definitions.

/tcb/color path=(color) (no default, initially Definition)

Sets the highlight color used by TikZ path operation definitions.

/tcb/color value=(color) (no default, initially Definition)

Sets the highlight color used by value definitions.

/tcb/color counter=(color) (no default, initially Definition)

Sets the highlight color used by counter definitions.

/tcb/color length=(color) (no default, initially Definition)

Sets the highlight color used by length definitions.

/tcb/color color=(color) (no default, initially Definition)

Sets the highlight color used by color definitions.

/tcb/color definition=(color) (no default, initially Definition)

Sets the highlight color for /tcb/color command, /tcb/color environment, /tcb/color
key, /tcb/color path, /tcb/color value, /tcb/color counter, /tcb/color length, and /tcb/color color.

/tcb/color option=(color) (no default, initially Option)

Sets the color used for optional arguments.

/tcb/color fade=(color) (no default, initially Fade)

Sets the color used for faded text like \path in docPathOperation→P.492.

/tcb/color hyperlink=(color) (no default, initially Hyperlink)

Sets the color for all hyper-links, i.e. all internal and external links.
26.5 Language Option Keys

The following keys are provided for language specific settings. The English language is pre-defined.

/tcb/english language (style, no value)

Sets all language specific settings to English.

/tcb/doclang/color=(text) (no default, initially color)

Text used in the index for colors.

/tcb/doclang/colors=(text) (no default, initially Colors)

Heading text in the index for colors.

/tcb/doclang/counter=(text) (no default, initially counter)

Text used in the index for counters.

/tcb/doclang/counters=(text) (no default, initially Counters)

Heading text in the index for counters.

/tcb/doclang/environment=(text) (no default, initially environment)

Text used in the index for environments.

/tcb/doclang/environments=(text) (no default, initially Environments)

Heading text in the index for environments.

/tcb/doclang/environment content=(text) (no default, initially environment content)

Text used in docEnvironment→P.489.

/tcb/doclang/index=(text) (no default, initially Index)

Heading text for the index.

/tcb/doclang/key=(text) (no default, initially key)

Text used in the index for keys.

/tcb/doclang/keys=(text) (no default, initially Keys)

Heading text used in the index for keys.

/tcb/doclang/length=(text) (no default, initially length)

Text used in the index for lengths.

/tcb/doclang/lengths=(text) (no default, initially Lengths)

Heading text in the index for lengths.

/tcb/doclang/new=(text) (no default, initially New)

Announcement text for new content.

/tcb/doclang/path=(text) (no default, initially path operation)

Text used in the index for path operations.

/tcb/doclang/paths=(text) (no default, initially Path operations)

Heading text in the index for path operations.

/tcb/doclang/pageshort=(text) (no default, initially P.)

Short text for page references.

/tcb/doclang/updated=(text) (no default, initially Updated)

Announcement text for updated content.

/tcb/doclang/value=(text) (no default, initially value)

Text used in the index for values.

/tcb/doclang/values=(text) (no default, initially Values)

Heading text in the index for values.
26.6 Predefined Colors of the Library

The following colors are predefined. They are used as default colors in some library commands.

Option, Definition, ExampleFrame, ExampleBack, Hyperlink, Fade.
A Picture Credits

The following pictures were used inside this documentation.

- Basilica_5.png
  - http://commons.wikimedia.org/wiki/File:Basilica_5.png
  - Photograph taken by Thomas F. Sturm.

- lichtspiel.jpg
  - Photograph taken by Thomas F. Sturm.

- crinklepaper.png
  - Created with GIMP.
  - http://www.gimp.org

- pink_marble.png
  - Created with GIMP.
  - http://www.gimp.org

- blueshade.png
  - Created with GIMP.
  - http://www.gimp.org

- goldshade.png
  - Created with GIMP.
  - http://www.gimp.org
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https://www.unibw.de/bw/professuren/thomas-sturm.


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