## Manual for version 3.73

(2015/10/16)

Thomas F. Sturm

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<table>
<thead>
<tr>
<th>tcolorbox</th>
<th>tcolorbox</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual for version 3.73</td>
<td>(2015/10/16)</td>
</tr>
<tr>
<td>Thomas F. Sturm</td>
<td></td>
</tr>
</tbody>
</table>
\begin{tcbbraster}[raster columns=4,title=tcolorbox \version,fonttitle=\small\bfseries,raster width=50cm]
\foreach \b in {1,...,28} \begin{tcolorbox}[enhanced,watermark text=\thetcbrasternum,colframe=boxcol!30!white,colback=boxcol!25!white!30!white,colbacktitle=boxcol!!+!50!black!30!white,colupper=black!30!white]\lipsum[2]\end{tcolorbox}
\end{tcbbraster}

\begin{tcbitemize}[title=tcolorbox \version,fonttitle=\small\bfseries,enhanced jigsaw,opacityback=0.5,opacitybacktitle=0.75,halign=center,valign=center,arc=5mm,raster width=16cm,raster column skip=8mm,raster halign=center,raster force size=false,raster row 1/.style={height=6cm},raster row 2/.style={width=6cm,height=4cm},raster column 1/.style={flushright title,frame style={left color=yellow!50!black,right color=green!50!black},title style={left color=yellow!50!blue,right color=blue!50!green!50!black},interior style={left color=yellow!70,right color=green!70},underlay={\draw[line width=6mm,line cap=round,black!160]([shift={(0.4,-0.15)}]frame.north east)--([shift={(0.4,0.15)}]frame.south east);}},raster column 2/.style={frame style={left color=green!50!black,right color=yellow!50!black},title style={left color=blue!50!green!50!black,right color=yellow!50!blue},interior style={left color=green!70,right color=yellow!70}}\end{tcbitemize}

\begin{tcbitemize}[fontupper=\Huge\bfseries,sharp corners=west,underlay={\draw[line width=6mm,line cap=round,black!160]([shift={(0.4,0.30)}]frame.north east) -- coordinate(A) +(0,0.2);\draw[line width=1mm,line cap=round,black!160](A) -- +(30:1.5cm);\draw[line width=1mm,line cap=round,black!160](A) -- +(150:1.5cm);}]tcolorbox\end{tcbitemize}

Manual for \version\version\version\datum

\begin{tcbitemize}[sharp corners=northeast]Thomas F.~Sturm\end{tcbitemize}

};\end{tikzpicture}\end{inctext}
The \texttt{tcolorbox} package

Manual for version 3.73 (2015/10/16)

Thomas F. Sturm\textsuperscript{1}

Abstract

\texttt{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 \texttt{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.

Contents

1 Introduction 7
1.1 Installation 7
1.2 Loading the Package 7
1.3 Libraries 8

2 Quick Reference 10

3 Macros for Box Creation 11

4 Option Keys 17
4.1 Title 17
4.2 Subtitle 20
4.3 Upper Part 21
4.4 Lower Part 23
4.5 Colors and Fonts 26
4.6 Text Alignment 29
4.7 Geometry 33
4.7.1 Width 33
4.7.2 Rules 34
4.7.3 Arcs 35
4.7.4 Spacing 37
4.7.5 Size Shortcuts 42
4.8 Corners 46
4.9 Transparency 49
4.10 Height Control 51
4.11 Box Content Additions 58
4.12 Overlays 64
4.13 Floating Objects 69
4.14 Side by Side 71
4.15 Embedding into the Surroundings 76
4.16 Bounding Box 80

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1 Introduction

The package originates from the first edition of my book «\textit{\LaTeX – Einführung in das Textsatzsystem}» [19] 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 [16–18] as well. With this package, you are invited to apply these boxes for similar projects.

Starting with version 2.00, for all internal calculations $\varepsilon$-\TeX\ [2] expressions are used in replacement of the package \texttt{calc}. The breaking news for version 2.00 is the support for breakable boxes. This new 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 texmf tree.

1.2 Loading the Package

The base package \texttt{tcolorbox} loads the packages \texttt{pgf} [20], \texttt{verbatim} [15], \texttt{etoolbox} [7], and \texttt{environ} [14]. \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. 8 (see there). For example, the key to typeset listings is:

\begin{verbatim}
\usepackage[listing]{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 \texttt{/tcb/library/}.

/tcb/library/skins

Loads the package \texttt{tikz} \cite{tikz} and provides additional styles (skins) for the appearance of the colored boxes; see Section 9 from page 124.

/tcb/library/raster

Provides additional macros and options for typesetting multiple boxes arranged in a kind of raster; see Section 12 from page 231.

/tcb/library/listings

Loads the package \texttt{listings} \cite{listings} and provides additional macros for typesetting listings which are described in Section 13 from page 242.

/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 13 from page 242.

/tcb/library/minted

Loads the package \texttt{minted} \cite{minted} to typeset listings with the \texttt{Pygments} \cite{pygments} tool, also see Section 13 on page 242.

/tcb/library/theorems

Provides additional macros for typesetting theorems which are described in Section 14 from page 282.

/tcb/library/breakable

Provides support for automatic box breaking from one page to another; see Section 15 on page 305.

/tcb/library/magazine

Provides support for storing broken box parts to be used later or in interchanged order, Section 16 on page 327.

/tcb/library/fitting

Provides support for font size adaption of the box content to the box dimensions; see Section 17 from page 335.

/tcb/library/hooks

Extends several option keys to 'hookable' keys; see Section 18 from page 346.

/tcb/library/xparse

Provides document command production with \texttt{xparse} for \texttt{tcolorbox}; see Section 19 from page 357.
/tcb/library/external

Provides externalization support for stand-alone document snippets, see Section 20 on page 370.

/tcb/library/documentation

Provides additional macros for typesetting \LaTeXX documentations which are described in Section 21 from page 381.

/tcb/library/many

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

/tcb/library/most

Loads all libraries except \texttt{LIB minted} and \texttt{LIB 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{LIB documentation} library.

/tcb/library/all

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

\begin{tcolorbox}[(options)]
(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{\textbf{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:

This is another \textbf{tcolorbox}.

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 17 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{\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{\tcbliner}.
\tcbset{⟨options⟩}
Sets options for every following \texttt{tcolorbox}\textsuperscript{P.11} inside the current \TeX\ group. By default, this does not apply to nested boxes, see Section 4.17 on page 86. For example, the colors of the boxes may be defined for the whole document by this:

\begin{tcolorbox}
\begin{tcolorbox}
\end{tcolorbox}
\end{tcolorbox}

\tcbsetforeverylayer{⟨options⟩}
Sets options for every following \texttt{tcolorbox}\textsuperscript{P.11} inside the current \TeX\ group. In contrast to \texttt{\tcbset}, this does also apply to nested boxes, see Section 4.17 on page 86. Technically, the \texttt{⟨options⟩} are appended to the default values for every \texttt{tcolorbox} which are applied by \texttt{/tcb/reset}\textsuperscript{P.95}.

You should not use this macro, if you are not completely sure that you want to have the \texttt{⟨options⟩} also for boxes in boxes (in boxes in boxes …).

\begin{tcolorbox}
\begin{tcolorbox}
\end{tcolorbox}
\end{tcolorbox}

All options for this box
This is a tcolorbox.

Nested box
Note that this nested box has a red frame but no green background.

Options given with \texttt{\tcbsetforeverylayer} survive a \texttt{\reset}.
\texttt{\texttt{tclbox}}\{\texttt{\texttt{(options)}}\}\{\texttt{\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.11} can be used for \texttt{tclbox} with some restrictions. A \texttt{tclbox} cannot have a lower part and cannot be broken.

\begin{verbatim}
\tcbox[tcbset={colframe=blue!50!black, colback=white, colupper=red!50!black, fonttitle=\bfseries, nobeforeafter, center title}]{Hello World}\hfill
\% \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}}% \hfill
\% \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}

Hello World

<table>
<thead>
<tr>
<th>My table</th>
<th>One</th>
<th>Two</th>
<th>Three</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>Mice</td>
<td>Lions</td>
<td></td>
</tr>
<tr>
<td>Upper</td>
<td>Middle</td>
<td>Lower</td>
<td></td>
</tr>
</tbody>
</table>

\begin{verbatim}
% \usepackage{tikz}
\tcset{colframe=blue!50!black, colback=white, colupper=red!50!black, fonttitle=\bfseries, 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{tikzname} node)
\tcbox[tikznode]{Hello\World{}}
\end{verbatim}

Hello World!

HelloWorld!

Hello World!
See Section 19.2 on page 359 and Section 19.3 on page 362 for more elaborate methods to create new environments and commands.

\begin{newtcolorbox}[init options]{(name)}{(number)}{(default)}{(options)}
  Creates a new environment \textit{(name)} based on \texttt{tcolorbox} \textsuperscript{P.11}. Basically, \texttt{\textbackslash newtcolorbox} operates like \texttt{\textbackslash newenvironment}. This means, the new environment \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{tcolorbox}. Note that /tcb/savedelimiter \textsuperscript{P.25} is set to the given \textit{(name)} automatically. The \textit{(init options)} allow setting up automatic numbering, see Section 5 from page 97.

\begin{itemize}
  \item \begin{newtcolorbox}[mybox]{colback=red!5!white, \newline colframe=red!75!black} \begin{mybox} This is my own box. \end{mybox} \end{newtcolorbox}
  \item \begin{newtcolorbox}[mybox][1]{colback=red!5!white, \newline colframe=red!75!black,fonttitle=\textbf, title=#1} \begin{mybox}{Hello there} This is my own box with a mandatory title. \end{mybox} \end{newtcolorbox}
  \item \begin{newtcolorbox}[mybox][2][]{colback=red!5!white, \newline colframe=red!75!black,fonttitle=\textbf, colbacktitle=red!85!black,enhanced, attach boxed title to top center={yshift=-2mm}, title=#2,#1} \begin{mybox}[colback=yellow]{Hello there} This is my own box with a mandatory title and options. \end{mybox} \end{newtcolorbox}
\end{itemize}

\textbf{Definition in the preamble:}

\begin{itemize}
  \item \begin{newtcolorbox}[auto counter,number within=section]{pabox}[2][]{\% \newline colback=red!5!white,colframe=red!75!black,fonttitle=\textbf, title=Examp.-\texttt{thetcbcounter}: #2,#1} \begin{pabox}{Hello there} This is my own box with a mandatory numbered title and options. \end{pabox} \end{newtcolorbox}
\end{itemize}

\begin{itemize}
  \item \begin{newtcolorbox}[init options]{(name)}{(number)}{(default)}{(options)} \newtcolorbox
  \item \begin{newtcolorbox}[init options]{(name)}{(number)}{(default)}{(options)} \newtcolorbox
  \end{itemize}

\begin{itemize}
  \item \texttt{\textbackslash renewtcolorbox}\{(init options)\}\{(name)\}\{(number)\}\{(default)\}\{(options)\}
  Operates like \texttt{\textbackslash newtcolorbox}, but based on \texttt{\textbackslash renewenvironment} instead of \texttt{\textbackslash newenvironment}. An existing environment is redefined.
newtcbox\{(init options)\}{\langle(name)\rangle}{\langle(number)\rangle}{\langle(default)\rangle}{\langle(options)\rangle}

Creates a new macro \langle(name)\rangle based on \tcbox P.13. Basically, newtcbox operates like \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 \tcbox. The \langle(init options)\rangle allow setting up automatic numbering, see Section 5 from page 97.

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

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

\newtcbox[2]{\mybox}[colback=yellow]{Hello there}
\mybox[colback=yellow]{Hello there}{This is my own box.}

Definition in the preamble:

\newtcbox[use counter from=pabox]{\pbbox}[2]{\langle\textbf{\thetcbcounter}\rangle #2,#1}
\pbbox[colback=yellow]{Hello there}
\pbbox[colback=yellow]{Hello there}{This is my own box.}

\newtcbox[red]{on line, arc=0pt, outer arc=0pt, colback=\#1!10!white, colframe=\#1!50!black, boxsep=0pt, left=1pt, right=1pt, top=2pt, bottom=2pt, boxrule=0pt, bottomrule=1pt, toprule=1pt}
\newtcbox[1]{\xmybox}{on line, arc=7pt, colback=\#1!10!white, colframe=\#1!50!black, before upper={\rule[-3pt]{0pt}{10pt}}, boxrule=1pt, boxsep=0pt, left=6pt, right=6pt, top=2pt, bottom=2pt}

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

\renewtcbox\{(init options)\}{\langle(name)\rangle}{\langle(number)\rangle}{\langle(default)\rangle}{\langle(options)\rangle}

Operates like newtcbox, but based on \renewcommand instead of \newcommand. An existing macro is redefined.
An existing environment \texttt{⟨name⟩} is redefined to be boxed inside a \texttt{tcolorbox} with the given \texttt{⟨options⟩}.

\begin{verbatim}
% tcbuselibrary{skins}
\newenvironment{myitemize}{\begin{itemize}}{\end{itemize}}
\tcolorboxenvironment{myitemize}{blanker, 
    before skip=6pt,after skip=6pt, 
    borderline west={3mm}{0pt}{red}}

Some text. \begin{myitemize} \item Alpha \item Beta \item Gamma \end{myitemize} More text.
\end{verbatim}

See further examples in Section 14.4 on page 304.
4 Option Keys

For the \texttt{\{options\}} in \texttt{tcolorbox}\textsuperscript{\textsuperscript{P.11}} respectively \texttt{\tcbset}\textsuperscript{\textsuperscript{P.12}} the following \texttt{pgf} keys can be applied. The key tree path \texttt{/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 [19, 20] or the examples starting from page 269.

4.1 Title

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

Creates a heading line with \langle text\rangle as content.

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

My heading line
This is a \textbf{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 \langle text\rangle as content. The minimal height of this line is adjusted to fit the text given by \texttt{/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.

\begin{tcolorbox}[colback=White,arc=0mm,width=(\linewidth-4pt)/4,
equal height group=AT,before=,after=\hfill,fonttitle=\bfseries]
\begin{tcolorbox}[title=xxx,colframe=red!75!black]
Some content.
\end{tcolorbox}
\begin{tcolorbox}[title=ggg,colframe=red!75!black]
Some content.
\end{tcolorbox}
\begin{tcolorbox}[title=AAA,colframe=red!75!black]
Some content.
\end{tcolorbox}
\begin{tcolorbox}[title=Ägypten,colframe=red!75!black]
Some content.
\end{tcolorbox}
\end{tcolorbox}

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

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

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

This sets the reference text for \texttt{/tcb/adjusted title}. If your texts never exceed 'Äpgjy' in depth and height you don't need to care about this option.
/tcb/squeezed title = \langle text \rangle  
(style, no default, initially unset)

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

% \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 too long for this application}]
  Third box
\end{tcbitemize}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|}
\hline
\textbf{Short title} & \textbf{This is a very very long title} & \textbf{This title is clearly too long for this application} \\
First box & Second box & Third box \\
\hline
\end{tabular}
\end{table}

/tcb/squeezed title* = \langle text \rangle  
(style, no default, initially unset)

This is a combination of /tcb/adjusted title\textsuperscript{*} P.17 and /tcb/squeezed title.

% \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 too long for this application}]
  Third box
\end{tcbitemize}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|}
\hline
\textbf{Short title} & \textbf{This is a very very long title} & \textbf{This title is clearly too long for this application} \\
First box & Second box & Third box \\
\hline
\end{tabular}
\end{table}
**/tcb/detach title**

Detaches the title from its normal position. The text of the title is stored into \tcbtitletext and the formatted title is available by \tcbtitle. The main application is to move the title from its usual place to another one.

\newtcolorbox{mybox}[2][]{colbacktitle=red!10!white, colback=blue!10!white,coltitle=red!70!black, title={#2},fonttitle=\bfseries,#1}

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

\begin{mybox}[detach title,before upper={\tcbtitle\quad}]{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}

**/tcb/attach title**

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

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

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

More title options are documented in Section 4.11 on page 58 and Section 9.2 on page 131.
Inside the box content, one or more subtitles can be added. In general, a subtitle is a further \texttt{tcolorbox} which inherits some color and geometry options from the enclosing box. It may be customized just like any other \texttt{tcolorbox}.

\begin{tcolorbox}[title=My title, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries]
This is a \textbf{tcolorbox}.
\tcbsubtitle[before skip=\baselineskip]%
\{My subtitle\}
Further text.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
My subtitle
Further text.

\begin{tcolorbox}[title=My title, colback=red!5!white, colframe=red!75!black, colbacktitle=yellow!50!red, coltitle=red!25!black, fonttitle=\bfseries]
This is a \textbf{tcolorbox}.
\tcbsubtitle[before skip=\baselineskip]%
\{My subtitle\}
Further text.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
My subtitle
Further text.

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

My title
This is a \textbf{tcolorbox}.
My subtitle
Further text.
Second subtitle
Further text.

\begin{tcolorbox}[title=My title, colback=red!5!white, colframe=red!75!black, colbacktitle=yellow!50!red, coltitle=red!25!black, fonttitle=\bfseries, subtitle style={boxrule=0.4pt, colback=yellow!50!red!25!white}]
This is a \textbf{tcolorbox}.
\tcbsubtitle{My subtitle}
Further text.
\tcbsubtitle{Second subtitle}
Further text.
\end{tcolorbox}
4.3 Upper Part

The text content of a \texttt{tcolorbox}\(^{P.11}\) may be parted into a mandatory \textit{upper part} and an optional \textit{lower part}. These parts are separated by \texttt{tcblower}\(^{P.11}\). If there is no \texttt{tcblower}\(^{P.11}\) present, there is no \textit{lower part} and the \textit{upper part} forms the complete text content.

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

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

This is the lower part.

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

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

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

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

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

21
/tcb/saveto\{file name\}

Saves the content of the box into a file for an optional later usage. This is the counterpart of /tcb/savelowerto\(^{\text{P.23}}\), 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}\(^{\text{P.11}}\).

This option cannot be combined with /tcb/savelowerto\(^{\text{P.23}}\).

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

This is the lower part.
4.4 Lower Part

/\texttt{tcb/lowerbox}=\langle mode \rangle \quad \text{(no default, initially visible)}

Controls the treatment of the lower part of the box. Feasible values for \langle mode \rangle are:

- \textsf{visible}: usual type setting of the lower part,
- \textsf{invisible}: empty space instead of the lower part contents,
- \textsf{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}.
\tcblower
This is the lower part (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[lowerbox=ignored,colback=white]
This is a \textbf{tcolorbox}.
\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}.
\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:
\input{\jobname_bspsave.tex}

\begin{tcolorbox}[lowerbox=invisible,savelowerto=\jobname_bspsave.tex,colback=white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[lowerbox=invisible,savelowerto=\jobname_bspsave.tex,colback=white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/\texttt{tcb/savelowerto}=\langle file name \rangle \quad \text{(no default, initially empty)}

Saves the content of the lower part into a file for an optional later usage.

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

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

\begin{tcolorbox}[lowerbox=invisible,savelowerto=\jobname_bspsave.tex,colback=white]
This is the lower part which may be quite complex: \[ f(x) = \frac{1+x^2}{1-x^2}. \]
\end{tcolorbox}
/tcb/lower separated=true|false (default true, initially true)

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/savedelim=er\texttt{name} \ (\text{no default, initially tcolorbox})

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

\begin{verbatim}
\newenvironment{mybox}{%\tcolorbox[\texttt{\texttt{ savedelim=mybox, savelowerto=jobname_bspsave2.tex,lowerbox=\texttt{\texttt{ ignored, colback=red!5!white,colframe=red!75!black,fonttitle=\texttt{\texttt{ bfseries, title=#1}}})%}
}{\end{tcolorbox}}
\begin{mybox}{My Example}
Upper part.
\end{mybox}
\begin{tcolorbox}[colback=green!5]
\input{jobname_bspsave2.tex}
\end{tcolorbox}
\end{verbatim}

The \texttt{savelim} is used implicitly with \texttt{\newtcolorbox} \texttt{\texttt{P.14}} which allows a more convenient usage:

\begin{verbatim}
\newtcolorbox{mybox}[1]{%\tcolorbox[\texttt{\texttt{ savedelim=mybox, savelowerto=jobname_bspsave2.tex,lowerbox=\texttt{\texttt{ ignored, colback=red!5!white,colframe=red!75!black,fonttitle=\texttt{\texttt{ bfseries, title=#1}}})%}
}{\end{tcolorbox}}
\begin{mybox}{My Example}
Upper part.
\end{mybox}
\begin{tcolorbox}[colback=green!5]
\input{jobname_bspsave2.tex}
\end{tcolorbox}
\end{verbatim}
4.5 Colors and Fonts

/tcb/colframe=⟨color⟩
(no default, initially black!75!white)
Sets the frame ⟨color⟩ of the box.

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

/tcb/colback=⟨color⟩
(no default, initially black!5!white)
Sets the background ⟨color⟩ of the box.

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

/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.49, and /tcb/title style P.127, and /tcb/title code P.118.

\begin{tcolorbox}[title=My title,title filled]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
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=⟨color⟩
(no default, initially black!50!white)
Sets the background ⟨color⟩ 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}.  

26
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/tcb/colupper=⟨color⟩</code></td>
<td>Sets the text ⟨color⟩ of the upper part.</td>
</tr>
<tr>
<td></td>
<td>\begin{tcolorbox}[colupper=red!75!black]</td>
</tr>
<tr>
<td></td>
<td>This is a \textbf{tcolorbox}.</td>
</tr>
<tr>
<td></td>
<td>\tcblower</td>
</tr>
<tr>
<td></td>
<td>This is the lower part.</td>
</tr>
<tr>
<td></td>
<td>\end{tcolorbox}</td>
</tr>
<tr>
<td><code>/tcb/collower=⟨color⟩</code></td>
<td>Sets the text ⟨color⟩ of the lower part.</td>
</tr>
<tr>
<td></td>
<td>\begin{tcolorbox}[collower=red!75!black]</td>
</tr>
<tr>
<td></td>
<td>This is a \textbf{tcolorbox}.</td>
</tr>
<tr>
<td></td>
<td>\tcblower</td>
</tr>
<tr>
<td></td>
<td>This is the lower part.</td>
</tr>
<tr>
<td></td>
<td>\end{tcolorbox}</td>
</tr>
<tr>
<td><code>/tcb/coltext=⟨color⟩</code></td>
<td>Sets the text ⟨color⟩ of the box. This is an abbreviation for setting</td>
</tr>
<tr>
<td></td>
<td>colupper and collower to the same value.</td>
</tr>
<tr>
<td></td>
<td>\begin{tcolorbox}[coltext=red!75!black]</td>
</tr>
<tr>
<td></td>
<td>This is a \textbf{tcolorbox}.</td>
</tr>
<tr>
<td></td>
<td>\tcblower</td>
</tr>
<tr>
<td></td>
<td>This is the lower part.</td>
</tr>
<tr>
<td></td>
<td>\end{tcolorbox}</td>
</tr>
<tr>
<td><code>/tcb/colttitle=⟨color⟩</code></td>
<td>Sets the title text ⟨color⟩ of the box.</td>
</tr>
<tr>
<td></td>
<td>\begin{tcolorbox}[coltitle=red!75!black, colbacktitle=black!10!white, title=Test]</td>
</tr>
<tr>
<td></td>
<td>This is a \textbf{tcolorbox}.</td>
</tr>
<tr>
<td></td>
<td>\end{tcolorbox}</td>
</tr>
</tbody>
</table>
Sets \texttt{\textbf{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}.

Sets \texttt{\textbf{text}} before the content of the lower part (e.g. font settings).

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

This is a \textbf{tcolorbox}.

This is the lower part.

Sets \texttt{\textbf{text}} before the content of the title text (e.g. font settings).

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

Hello

This is a \textbf{tcolorbox}.

More color options are provided by using skins documented in Section 9 from page 124.
4.6 Text Alignment

/tcb/halign=(alignment)  
(no default, initially justify)

If there is no lower part, halign determines the horizontal (alignment) of the text content. Otherwise, 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 /tikz/align settings, even if the implementation differs.

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

The differences between the flush and non-flush version are explained in detail in the TikZ manual [20]. 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}
```

Flush center  
This is a demonstration text for showing how line breaking works.

Flush left  
This is a demonstration text for showing how line breaking works.

Flush right  
This is a demonstration text for showing how line breaking works.

Center  
This is a demonstration text for showing how line breaking works.

Left  
This is a demonstration text for showing how line breaking works.

Right  
This is a demonstration text for showing how line breaking works.

/tcb/halign upper=(alignment)  
(no default, initially justify)

Alias for /tcb/halign.
\texttt{halign lower} determines the horizontal \texttt{(alignment)} of the lower part of the box. The feasible values for \texttt{(alignment)} are the same as for \texttt{/tcb/halign}.\footnote{P. 29}
\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.

\textbf{/tcb/halign title}=(alignment) (no default, initially justify)
\textbf{halign lower} determines the horizontal (alignment) of the title of the box. The feasible values for (alignment) are the same as for /tcb/halign\textsuperscript{P.29}.

\textbf{/tcb/flushleft upper} (style, no value)
Shortcut for setting /tcb/halign\textsuperscript{P.29} to flush left.

\textbf{/tcb/center upper} (style, no value)
Shortcut for setting /tcb/halign\textsuperscript{P.29} to flush center.

\textbf{/tcb/flushright upper} (style, no value)
Shortcut for setting /tcb/halign\textsuperscript{P.29} to flush right.

\textbf{/tcb/flushleft lower} (style, no value)
Shortcut for setting /tcb/halign lower\textsuperscript{P.30} to flush left.

\textbf{/tcb/center lower} (style, no value)
Shortcut for setting /tcb/halign lower\textsuperscript{P.30} to flush center.

\textbf{/tcb/flushright lower} (style, no value)
Shortcut for setting /tcb/halign lower\textsuperscript{P.30} to flush right.

\textbf{/tcb/flushleft title} (style, no value)
Shortcut for setting /tcb/halign title to flush left.

\textbf{/tcb/center title} (style, no value)
Shortcut for setting /tcb/halign title to flush center.

\textbf{/tcb/flushright title} (style, no value)
Shortcut for setting /tcb/halign title 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 51.

/tcb/valign=⟨alignment⟩

(no default, initially top)

If the height of a \textbf{tcolorbox} is not the natural height, \texttt{valign} determines the vertical ⟨alignment⟩ 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 17 on page 335 alternatively.
- **scale*: Like \texttt{scale}, but scaling is bounded by \texttt{/tcb/valign scale limit}.

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

\begin{verbatim}
\set{width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm}
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{verbatim}

\begin{tcolorbox}[width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm]
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm]
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm]
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm]
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm]
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm]
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm]
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm]
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm]
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm]
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm]
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm]
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm]
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm]
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm]
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{tcolorbox}

/tcb/valign upper=⟨alignment⟩

(no default, initially top)

Alias for \texttt{/tcb/valign}.

/tcb/valign lower=⟨alignment⟩

(no default, initially top)

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

/tcb/valign scale limit=⟨real number⟩

(no default, initially 1.1)

Sets an upper scale limit for the \texttt{scale*} setting in \texttt{/tcb/valign} and \texttt{/tcb/valign lower}. Note that this value is not reset by \texttt{/tcb/reset} P.95. So, changes also apply to embedded boxes.

Also see \texttt{/tcb/sidebyside align} P.71 for alignment settings when upper part and lower part are set side-by-side.
4.7 Geometry

4.7.1 Width

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

Sets the total width of the colored box to \textit{\texttt{\textit{length}}}. See also \texttt{/tcb/height} \textsuperscript{P.51}.

\begin{verbatim}
\tcbset{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 \texttt{tcolorbox}.

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

Sets the text width of the upper part to \textit{\texttt{\textit{length}}}. See also \texttt{/tcb/text height} \textsuperscript{P.52}.

\begin{verbatim}
\tcbset{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 \texttt{tcolorbox} where the text has a width of 4cm.

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

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

\begin{verbatim}
\tcbset{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 \texttt{tcolorbox}.

This is a \texttt{tcolorbox}.

See Section 4.10 on page 51 for setting fixed height values.
4.7.2 Rules

\texttt{/tcb/toprule}(\textit{length}) \hspace{2cm} (no default, initially \textit{0.5mm})

Sets the line width of the top rule to \textit{\langle length\rangle}.

\texttt{\textbackslash tcbset\{colback=red!5!white,colframe=red!75!black\}}

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

\texttt{This is a tcolorbox.}

\texttt{/tcb/bottomrule}(\textit{length}) \hspace{2cm} (no default, initially \textit{0.5mm})

Sets the line width of the bottom rule to \textit{\langle length\rangle}.

\texttt{\textbackslash tcbset\{colback=red!5!white,colframe=red!75!black\}}

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

\texttt{This is a tcolorbox.}

\texttt{/tcb/leftrule}(\textit{length}) \hspace{2cm} (no default, initially \textit{0.5mm})

Sets the line width of the left rule to \textit{\langle length\rangle}.

\texttt{\textbackslash tcbset\{colback=red!5!white,colframe=red!75!black\}}

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

\texttt{This is a tcolorbox.}

\texttt{/tcb/rightrule}(\textit{length}) \hspace{2cm} (no default, initially \textit{0.5mm})

Sets the line width of the right rule to \textit{\langle length\rangle}.

\texttt{\textbackslash tcbset\{colback=red!5!white,colframe=red!75!black\}}

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

\texttt{This is a tcolorbox.}
/tcb/titlerule=(length)  (no default, initially 0.5mm)
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}

/tcb/boxrule=(length)  (style, no default, initially 0.5mm)
Sets all rules of the frame to \langle length \rangle, i.e. \texttt{/tcb/toprule} \textsuperscript{P.34}, \texttt{/tcb/bottomrule} \textsuperscript{P.34}, \texttt{/tcb/lefrule} \textsuperscript{P.34}, \texttt{/tcb/rightrule} \textsuperscript{P.34}, and \texttt{/tcb/titlerule}.

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

More options for drawing a \texttt{/tcb/borderline} \textsuperscript{P.151} are provided by using skins documented in Section 9 from page 124.

4.7.3 Arcs

/tcb/arc=(length)  (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}
\begin{tcolorbox}[arc=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
Sets `/tcb/circular arc` \(^{P.35}\) to match the half of the inner width of the colored box. If width and height of the box are identical, this gives a circle.

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 is a \textbf{tcolorbox}.

Sets `/tcb/bean arc` \(^{P.35}\) to match the smaller value of the half of the inner width and of the inner height of the colored box.

This only works for a fixed `/tcb/height` \(^{P.51}\). Also, `/tcb/bean arc` must be used after width and height are set by option keys.

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

Box A

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

Box B

Sets `/tcb/octogon arc` \(^{P.35}\) 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}

STOP

STOP

36
/tcb/arc is angular (no value, initially unset)

Using this options 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 \texttt{TikZ} code. This change may break with future updates of \texttt{TikZ}.

\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 \texttt{/tcb/arc is angular}. The original \texttt{TikZ} code is activated.

/tcb/outer arc=(\texttt{length}) (no default, initially unset)

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

\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 \texttt{/tcb/arc}.

4.7.4 Spacing

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

Sets a common padding of \langle \texttt{length} \rangle 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{tcolorbox}[boxsep=5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[boxsep=5mm,draft]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
/tcb/left=⟨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 lefttitle, leftupper, and leftlower to the same value.

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

This is a tcolorbox.

/tcb/lefttitle=⟨length⟩ (no default, initially 4mm)
Sets the left space between title text and frame (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[lefttitle=3cm,title=My Title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My Title

This is a tcolorbox.

/tcb/leftupper=⟨length⟩ (no default, initially 4mm)
Sets the left space between upper text and frame (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[leftupper=3cm,title=My Title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My Title

This is a tcolorbox.

/tcb/leftlower=⟨length⟩ (no default, initially 4mm)
Sets the left space between lower text and frame (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[leftlower=3cm]
\tcblower
This is the lower part.
\end{tcolorbox}

This is a 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 righttitle, rightupper, and rightlower to the same value.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[width=5cm,right=2cm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a tcolorbox.

/tcb/righttitle=(length) (no default, initially 4mm)
Sets the right space between title text and frame (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[width=5cm,righttitle=2cm,title=My very long title text]
This is a \textbf{tcolorbox} with standard upper box dimensions.
\end{tcolorbox}

My very long title text
This is a tcolorbox with standard upper box dimensions.

/tcb/rightupper=(length) (no default, initially 4mm)
Sets the right space between upper text and frame (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[width=5cm,rightupper=2cm,title=My very long title text]
This is a \textbf{tcolorbox} with compressed upper box dimensions.
\end{tcolorbox}

My very long title text
This is a tcolorbox with compressed upper box dimensions.
**/tcb/rightlower=(length)**  
(no default, initially 4mm)  
Sets the right space between lower text and frame (additional to `boxsep`).

This is a `tcolorbox` with standard upper box dimensions.  
\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`).

This is a `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`).

My title  
\begin{tcolorbox}[toptitle=3mm,title=My title]  
This is a `tcolorbox`.  
\end{tcolorbox}
/tcb/bottom={length}  
(no default, initially 2mm)  
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 tcolorbox.

This is the lower part.

/tcb/bottomtitle={length}  
(no default, initially 0mm)  
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 tcolorbox.

/tcb/middle={length}  
(no default, initially 2mm)  
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 tcolorbox.

This is the lower part.
4.7.5 Size Shortcuts

/tcb/size=(name) \(\text{(no default, initially normal)}\)

Sets all geometry keys with exception of /tcb/width in \text{P.33} to predefined length values. For (name), the following values are feasible:

- **normal**: normal sized boxes e.g. of width \texttt{\linewidth}.
- **title**: title line sized boxes.
- **small**: small boxes e.g. for keyword highlighting.
- **fbox**: identical to the standard \texttt{\fbox}.
- **tight**: no padding space at all.
- **minimal**: no padding space, no box rules.

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

\text{Predefined values}

<table>
<thead>
<tr>
<th>boxrule</th>
<th>normal</th>
<th>title</th>
<th>small</th>
<th>fbox</th>
<th>tight</th>
<th>minimal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.5mm</td>
<td>0.4mm</td>
<td>0.3mm</td>
<td>0.4pt</td>
<td>0.4pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>boxsep</td>
<td>1.0mm</td>
<td>1.0mm</td>
<td>1.0mm</td>
<td>3.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>left</td>
<td>4.0mm</td>
<td>2.0mm</td>
<td>1.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>right</td>
<td>4.0mm</td>
<td>2.0mm</td>
<td>1.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>top</td>
<td>2.0mm</td>
<td>0.25mm</td>
<td>0.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>bottom</td>
<td>2.0mm</td>
<td>0.25mm</td>
<td>0.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>toptitle</td>
<td>0.0mm</td>
<td>0.0mm</td>
<td>0.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>bottomtitle</td>
<td>0.0mm</td>
<td>0.0mm</td>
<td>0.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>middle</td>
<td>2.0mm</td>
<td>0.75mm</td>
<td>0.5mm</td>
<td>1.0pt</td>
<td>0.2pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>arc</td>
<td>1.0mm</td>
<td>0.75mm</td>
<td>0.5mm</td>
<td>1.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>outer arc</td>
<td>auto</td>
<td>auto</td>
<td>auto</td>
<td>auto</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
</tbody>
</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 /tcb/width by \textit{P.33} /tcb/enlarge left by \textit{P.81}, and /tcb/enlarge right by \textit{P.81} appropriately. The resulting box is overlapping into the left and right margin of the page. Note that this style option has to be given after all other geometry keys!

\begin{tcolorbox}
\textit{Normal text for comparison:}\\ \\
\lipsum[2]
\end{tcolorbox}

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

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

Normal text for comparison:

Oversized box

Normal box
According to the \(\text{toggle preset}\), 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 and spaces are switched.
- \texttt{evenpage}: if the page is an even page, the values of the left and right rules and spaces are switched. It is recommended that you use this setting in conjunction with \texttt{/tcb/check odd page} \(^\text{P.94}\).

Horizontal bounding box enlargements are not toggled by this option. They can be toggled independently by \texttt{/tcb/toggle enlargement} \(^\text{P.83}\). For example, \texttt{/tcb/oversize} \(^\text{P.43}\) changes the bounding box.

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 tcolorbox can be set individually as /tcb/sharp corners or as /tcb/rounded corners \textsuperscript{p.47}. These settings are also reflected in the behavior of /tcb/borderline \textsuperscript{p.151} and /tcb/shadow \textsuperscript{p.162} as one would expect.

By default, all four corners are rounded. So, only the /tcb/sharp corners option will be necessary for most use cases. The /tcb/rounded corners \textsuperscript{p.47} option can be used to revert a /tcb/sharp corners setting.

/tcb/sharp corners\{position\}  
(default all, initially unset)

The \{position\} denotes one or more of the four box corners to be set as sharp 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}\colorback=red!5!white,  
colframe=red!75!black,  
sharp corners=northwest \}  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

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

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 \cite{P.46} 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:\footnote{The graphical examples assume that the boxes where set to have sharp corners before.}

- 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}

/tcb/sharpish corners  
(style, no value)

Shortcut for setting /tcb/arc \cite{P.35} and /tcb/outer arc \cite{P.37} to 0pt. With this setting, rounded corners will appear als quasi-sharp, but e.g. the shadow will be somewhat rounder than the shadow of really sharp corners.

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

Corners are still of type rounded with this option, but appear sharp. To switch back to rounded corners, one has to adapt /tcb/arc \cite{P.35} and /tcb/outer arc \cite{P.37}.
The following examples will show the differences between \texttt{/tcb/rounded corners} \cite{p.47}, \texttt{/tcb/sharpish corners} \cite{p.47}, and \texttt{/tcb/sharp corners} \cite{p.46}. The later two give the same core box, but \texttt{/tcb/borderline} \cite{p.151} and \texttt{/tcb/shadow} \cite{p.162} settings are slightly different. The following examples use \texttt{/tcb/drop fuzzy shadow} \cite{p.156}.

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

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

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

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

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

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

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

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

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

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

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

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

Transparency effects are likely to be used in conjunction with *jigsaw* skin variants, see Section 9.10 on page 173.

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

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

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

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

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

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

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

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

\begin{tcolorbox}[enhanced,opacityupper=0.5,
  interior style={pattern=checkerboard light 
  (gray)}]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

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

\begin{tcolorbox}[enhanced,opacitylower=0.5,
  interior style={pattern=checkerboard light 
  /RightTorque
  /LeftTorquegray}]
  This is a \textbf{tcolorbox}.
  \tcblower
  This is the lower part.
\end{tcolorbox}

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

\begin{tcolorbox}[enhanced,opacitytext=0.5,
  interior style={pattern=checkerboard light 
  /RightTorque
  /LeftTorquegray}]
  This is a \textbf{tcolorbox}.
  \tcblower
  This is the lower part.
\end{tcolorbox}

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

\begin{tcolorbox}[enhanced,opacitytitle=0.7,
  coltitle=black,
  fonttitle=\bfseries,title=This is a title,
  title style={pattern=checkerboard light 
  (gray)}]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/opacityframe={\textit{fraction}},opacityback={\textit{fraction}},opacitybacktitle={\textit{fraction}},opacitytext={\textit{fraction}},colback={\textit{color}},colframe={\textit{color}},colbacktitle={\textit{color}}
Sets the text opacity of the box frame, background, and title to the given \(\text{\textit{fraction}}\) and colors.

\begin{tcolorbox}[enhanced jigsaw,fonttitle=\bfseries,title=This is a title,
  opacityframe=0.5,opacityback=0.25,opacitybacktitle=0.25,opacitytext=0.8,
  colback=red!5!white,colframe=red!75!black,colbacktitle=yellow!20!red]
  This is a \textbf{tcolorbox}.
\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.

The height control keys are only applicable to unbreakable boxes. If a box is set to be \texttt{/tcb/breakable} \textsuperscript{P.307}, the height is always computed according to the \textit{natural height}.

\texttt{/tcb/natural height} \hspace{1cm} (no value, initially set)

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

\texttt{/tcb/height=\langle length\rangle} \hspace{1cm} (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{\tcbset {width=(\linewidth-2mm)/3,before=-,after=\hfill,}\newline
colframe=blue!75!black,colback=white}\newline
\begin{tcolorbox}\[height=1cm,valign=center\]\newline
This box has a height of 1cm.\newline
\end{tcolorbox}\newline
\begin{tcolorbox}\[height=2cm,valign=center\]\newline
This box has a height of 2cm.\newline
\end{tcolorbox}\newline
\begin{tcolorbox}\[height=3cm,split=0.5,valign=center,valign lower=center\]\newline
This box has a height of 3cm.\newline
\tcblower\newline
Lower part.\newline
\end{tcolorbox}\newline

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

\texttt{/tcb/height plus=\langle length\rangle} \hspace{1cm} (no default, initially 0pt)

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

\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/text height=(length)  
Sets the text height to (length). This is the length from the top of the upper part to the bottom of the optional lower part. See also /tcb/text width.  

\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=(length)
(style, no default)

Adds \textit{(length)} to the current height of the colored box. /tcb/height \textsuperscript{P.51} has to be set before this key is used!

\begin{tcolorbox}
\texttt{\small/tcbset\{height=1cm,}
\texttt{\hspace{1em}valign=center,}
\texttt{\hspace{1em}width=(\linewidth-2mm)/2,}
\texttt{\hspace{1em}before=\text{	extbackslash hfill,}
\texttt{\hspace{1em}colframe=blue!75!black,}
\texttt{\hspace{1em}colback=white\}}

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

/tcb/height fill=true|false|maximunm
(default \textit{true}, initially \textit{false})

If set to \textit{true}, the height of the \texttt{tcolorbox} is set to the rest of the available vertical space of the current page. If set to \textit{maximum}, the page is compressed as much as possible. Note that the \texttt{tcolorbox} is always set as its own paragraph using this option. Also see /tcb/text fill \textsuperscript{P.60}.

\begin{tcolorbox}
\texttt{\small/tcbset\{height fill,}
\texttt{\hspace{1em}colback=red!5!white,}
\texttt{\hspace{1em}colframe=red!75!black,}
\texttt{\hspace{1em}fonttitle=\textbf{series,}
\texttt{\hspace{1em}title=Box which fills the rest of the page\}}
\begin{tcolorbox}
\lipsum[1]
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}
\begin{verbatim}
% \usepackage{lipsum}
% \tcbuselibrary{breakable}
\begin{tcolorbox}[height fill,}
\texttt{\hspace{1em}colback=red!5!white,}
\texttt{\hspace{1em}colframe=red!75!black,}
\texttt{\hspace{1em}fonttitle=\textbf{series,}
\texttt{\hspace{1em}title=Box which fills the rest of the page}\}
\lipsum[1]
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

\textbf{Box which fills the rest of the page}

Sets `/tcb/height` \(^{51}\) 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 \textit{tcolorbox}.

If the height of a \texttt{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.

\begin{tcodebox}
\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}}
\end{tcodebox}

\texttt{/tcb/space to upper} \hspace{1em} (style)  
This is an abbreviation for \texttt{space=1}, i.e. all extra space is added to the upper part.

\texttt{/tcb/space to lower} \hspace{1em} (style, initially set)  
This is an abbreviation for \texttt{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.

\tcbspace{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}\[
\myspace
\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.

/tcb/split=(fraction)

If the height of a \texttt{tcolorbox} is not the natural height, the \texttt{(fraction)} with a value between 0 and 1 determines the positioning of the segmentation between the upper and the lower part. Here, 0 stands for top and 1 for bottom. Note that the box is split regardless of the actual dimensions of the text parts!

\tcbspace{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}}

This is the upper part.
This is the lower part with a lot of text in several lines.
This is the upper part.
This is the lower part with a lot of text in several lines.
This is the upper part.
This is the lower part with a lot of text in several lines.
This is the upper part.
This is the lower part with a lot of text in several lines.
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.
\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 12 on page 231 for more equal height options.
Plants a \textit{\langle length \rangle} into the equal height group with the given \textit{\langle id \rangle}. This ensures that the height will not drop below \textit{\langle length \rangle}. Note that you cannot reduce a computed height value by using this key with a small value. The difference to applying \textit{/tcbr/height} 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. This is the lower part.
\end{tcolorbox}

\begin{tcblisting}
\textbf{Mixed}
\end{tcblisting}

\begin{tcolorbox}[title={Fourth box}]
My final box.
\end{tcolorbox}
4.11 Box Content Additions

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

/\texttt{tcb/before title}=\(\text{(code)}\) (no default, initially unset)

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

```
\tcbset{before title=\{\textcolor{yellow}{\large Important:}\--},
        colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

- \textbf{Important: My title}

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

/\texttt{tcb/after title}=\(\text{(code)}\) (no default, initially unset)

The given \(\text{(code)}\) is placed after the content of the title.

```
\tcbset{after title={\hfill\colorbox{Navy}{approved}},
        colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

- \textbf{My title approved}

/\texttt{tcb/before upper}=\(\text{(code)}\) (no default, initially unset)

The given \(\text{(code)}\) is placed after the color and font settings and before the content of the upper part.

```
\tcbset{before upper=\{\textit{The story:}\par},
        colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

- \textit{The story:}

```
This is a \textbf{tcolorbox}.
```
The given \textit{code} is placed after the content of the upper part.

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

The given \textit{code} is placed after the color and font settings and before the content of the lower part.

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

The given \textit{code} is placed after the content of the lower part.

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part. \textit{This is the end.}
\end{tcolorbox}
If `/tcb/text fill` is used, one cannot have a lower part and the box is unbreakable.

**/tcb/text fill**  
(style, no value)

This style sets `/tcb/before upper`\(^*\)P.58 and `/tcb/after upper`\(^*\)P.59 to embedd the upper part with a minipage. If a fixed height was applied e.g. by `/tcb/height`\(^*\)P.51 or `/tcb/height fill`\(^*\)P.53, 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=\bfseries,  
height=8cm,text fill,  
title=My filled box]  
This is a \textbf{tcolorbox}.  
\par\vfill  
\begin{center}  
My middle text.  
\end{center}  
\par\vfill  
This is the end of my box.  
\end{tcolorbox}

My filled box  

This is a \textcolor{red}{tcolorbox}.

My middle text.

This is the end of my box.
If \texttt{tcb/tabularx} or \texttt{tcb/tabularx*} are used, one cannot have a lower part.

\texttt{tcb/tabularx}=(\texttt{preamble})

This style sets \texttt{tcb/before upper}^\textsuperscript{P.58} and \texttt{tcb/after upper}^\textsuperscript{P.59} and several geometry keys to support a \texttt{tabularx} with the given \texttt{(preamble)}. The packages \texttt{tabularx} [4], \texttt{array}, and \texttt{colortbl} have to be loaded separately.

\begin{tcolorbox}
\begin{tabularx}{X|X|X|X|X|X}
\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 \\
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{tabularx}
\end{tcolorbox}

\texttt{tcb/tabularx*}=(\texttt{code}){\texttt{(preamble)}}

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

\begin{tcolorbox}
\begin{tabularx}{X|X|X}
\hline
\textbf{One} & \textbf{Two} & \textbf{Three} \\
\hline
1000.00 & 2000.00 & 3000.00 \\
2000.00 & 3000.00 & 4000.00 \\
\end{tabularx}
\end{tcolorbox}
This style adds a centered \tikzpicture environment to the start and end of the upper part. The \langle\textit{options}\rangle 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}

This style adds a centered \tikzpicture environment to the start and end of the lower part. The \langle\textit{options}\rangle may be given as TikZ picture options.

\begin{tcblisting}{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}
/tcb/tikznodelower=(options) (style)
This style places the lower part content into a centered TiKZ node. The (options) may be given as TiKZ node options.

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

/tcb/tikznodestyle=(options) (style)
Shortcut for setting /tcb/tikznodelower and /tcb/tikznodeupper the same time.

/tcb/varwidthupper=(length) (style, default /tcb/width=P.33)
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 (length). This option is only senseful for a \tcbox P.13.

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

With an overlay, arbitrary (graphical code) can be added to a tcolorbox. This code is executed after the frame and interior are drawn and before the text content is drawn. Therefore, you can decorate the \tcolorbox with your own extensions. Common special cases are watermarks which are implemented using overlays. See Subsection 9.3 from page 139 if you want to add 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 /tcb/enhanced \textsuperscript{\texttt{P.178}} mode from the library skins is recommended which allows \texttt{tikz} code and gives access to /tcb/geometry nodes \textsuperscript{\texttt{P.115}} 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}
\begin{scope}
\path[draw=green!65!black,fill=green!10,line width=1mm] (0,0) arc (0:180:5mm);
\path[fill=black] (-0.2,0) arc (0:180:1mm);
\end{scope}
\begin{scope}
\draw[thick,red] (-1,0) -- (1,0);
\end{scope}
\end{tcolorbox}

% \tcbset{frogbox/.style={enhanced,colback=green!10,colframe=green!65!black, enlarge top by=5.5mm, overlay={\foreach \x in {2cm,3.5cm} {
 \begin{scope}[shift={([xshift=\x]frame.north west)}]
 \path[draw=green!65!black,fill=green!10,line width=1mm] (0,0) arc (0:180:5mm);
 \path[fill=black] (-0.2,0) arc (0:180:1mm);
 \end{scope}}}}}

\begin{tcolorbox}[frogbox,title=My title]
This is a \textbf{tcolorbox}.
\tcblobject{This is the lower part.}
\end{tcolorbox}

% \usetikzlibrary{patterns} % preamble
% \tcbset{frogbox/.style={enhanced,colback=green!10,colframe=green!65!black, enlarge top by=5.5mm, overlay={\foreach \x in {2cm,3.5cm} {
 \begin{scope}[shift={([xshift=\x]frame.north west)}]
 \path[draw=green!65!black,fill=green!10,line width=1mm] (0,0) arc (0:180:5mm);
 \path[fill=black] (-0.2,0) arc (0:180:1mm);
 \end{scope}}}}}

\begin{tcolorbox}[frogbox,title=My title]
This is a \textbf{tcolorbox}.
\tcblobject{This is the lower part.}
\end{tcolorbox}
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}
\colorlet{colexam}{red!75!black}
\newtcolorbox[use counter=example]{myexample}%
Example 1

Example 2


Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero. Fusce sagittis erat erat tristique mollis. Maecenas sapien libero, molestie et, lobortis in,


4.13 Floating Objects

/tcb/floatplacement={⟨values⟩}  
(no default, initially htb)  
Sets ⟨values⟩ as default values for the usage of /tcb/float and /tcb/float*. Feasible are the usual parameters for floating objects.

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

/tcb/float={⟨values⟩}  
(default from floatplacement)  
Turns the box to a floating object where ⟨values⟩ are the usual parameters for such floating objects. If they are not used, the placement uses the default values given by floatplacement.

\begin{tcolorbox}[float,  
    title=Floating box from |float|,  
    enhanced,watermark text={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}

/tcb/float*=⟨values⟩  
(default from floatplacement)  
Identical to /tcb/float, but for wide boxes spanning the whole page width of two column documents or in conjunction with the packages multicol or paracol. Note that you have to set width=\textwidth additionally, if the box should span the whole page width in these cases!

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

/tcb/nofloat  
(style, initially set)  
Turns the floating behavior off.

/tcb/every float={⟨code⟩}  
(no default, initially empty)
For floating objects, the `/tcb/before` and `/tcb/after` settings are ignored. Instead, the given (code) is inserted before a floating box. If the box is `/tcb/breakable`, 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 Side by Side

Further side by side options for code examples are \texttt{/tcb/listing side text \textsuperscript{a}P.259}, \texttt{/tcb/text side listing \textsuperscript{a}P.259}, \texttt{/tcb/listing outside text \textsuperscript{a}P.259}, and \texttt{/tcb/text outside listing \textsuperscript{a}P.259}.

\texttt{/tcb/sidebyside=true|false} \hspace{1cm} (default \texttt{true}, initially \texttt{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 \texttt{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{tcolorbox}[title=My title,sidebyside]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}

\texttt{\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}}
\begin{tcolorbox}[adjusted title=center,sidebyside align=center]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=top,sidebyside align=top]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=bottom,sidebyside align=bottom]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}

\texttt{\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,nobeforeafter,}
left=2mm,right=2mm,sidebyside,sideby\ldots{one line.}
This is a
short text.
bottom
This is a
text which
is too long
for one line.
This is a
short text.

\texttt{\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,}
left=2mm,right=2mm,sidebyside,sideby\ldots{one line.}
This is a
short text.
center, top, and bottom are identical to the known corresponding minipage options. For example, top aligns the top lines of the lefthand and righthand side according to their baselines. 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 center seam, top seam, and bottom seam. For example, top seam aligns the very top seam of the lefthand and righthand side.

\begin{tcolorbox}[adjusted title=center seam,sidebyside align=center seam]
This is my description text for the pictures displayed on the righthand side.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=top seam,sidebyside align=top seam]
This is my description text for the pictures displayed on the righthand side.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=bottom seam,sidebyside align=bottom seam]
This is my description text for the pictures displayed on the righthand side.
\end{tcolorbox}
Sets the horizontal distance between the left-handed and right-handed part to \(\textlangle \text{length} \rangle\).

Sets the width of the left-handed part to the given \(\textlangle \text{length} \rangle\).

Sets the width of the right-handed part to the given \(\textlangle \text{length} \rangle\).
/tcb/lefthand ratio=$(fraction)$  (no default, initially 0.5)
Sets the width of the left-handed part to the given $(fraction)$ of the available space.
$(fraction)$ is a value between 0 and 1.

\begin{tcolorbox}[title=My title,sidebyside,lefthand ratio=0.25]
This is the upper (left-handed) part.
\tcblower
This is the lower (right-handed) part.
\end{tcolorbox}

/tcb/righthand ratio=$(fraction)$  (no default, initially 0.5)
Sets the width of the right-handed part to the given $(fraction)$ of the available space.
$(fraction)$ is a value between 0 and 1.

\begin{tcolorbox}[title=My title,sidebyside,righthand ratio=0.25]
This is the upper (left-handed) part.
\tcblower
This is the lower (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.

\begin{tikzpicture}
\path[fill=red!20,draw=red!50!black]
(0,0) node[below]{A} -- (3,1) node[above]{B} -- (1,4) node[above]{C} -- cycle;
\end{tikzpicture}

4.15 Embedding into the Surroundings

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

/tcb/before=⟨code⟩  
Sets the ⟨code⟩ 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 /tcb/ignore nobreak is set to false.

/tcb/after=⟨code⟩  
Sets the ⟨code⟩ which is executed after the colored box. It is not used for floating boxes.

/tcb/parskip  
Sets the keys before and after to values which are recommended, if the package parskip is used and there is no better idea for before and after.

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

/tcb/noparskip  
Sets the keys before and after to values which are recommended, if the package parskip is not used and there is no better idea for before and after.

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

/tcb/autoparskip  
Tries to detect the usage of the package parskip and sets the keys before and after accordingly. Actually, the following is done:

- If the length of \parskip is greater than 0 pt at the beginning of the document, \tcb/parskip is executed. Here, the usage of package parskip is assumed.
- Otherwise, if the length of \parskip is not greater than 0 pt at the beginning of the document, \tcb/noparskip is executed. Here, the absence of package parskip is assumed.

autoparskip is the default for the package tcolorbox, if before or after are not changed otherwise.

/tcb/nobeforeafter  
Abbreviation for clearing the keys before and after. The colored box is not put into a paragraph and there is no space before or after the box.

\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}

/tcb/forces nobeforeafter  
Forces the setting of /tcb/nobeforeafter even if /tcb/before and /tcb/after are set to other values later. Do not use this option globally unless you really know what you do. Note that embedded boxes do not inherit this forced clearance.
/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 \dotfill
\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}
Some text \dotfill
\begin{tcolorbox}[box align=top]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=top]
First line.\ \Second line.
\end{tcolorbox}

\textcolor{red}{N 2014-10-10} /tcb/box align=⟨alignment⟩
(style, no default, initially bottom)
Used to set the /tcb/baseline value of the resulting \tcolorbox. Feasible values for ⟨alignment⟩ are:
- \texttt{bottom}: alignment with the box bottom,
- \texttt{top}: alignment with the box top,
- \texttt{center}: alignment with the box center,
- \texttt{base}: alignment with the box content base. This option is not applicable for a \tcolorbox \textsuperscript{P.11} but for a \tcbox \textsuperscript{P.13} only. It is an alias for /tcb/tcbox raise base \textsuperscript{P.91}.

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

77
\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
\begin{tcolorbox}
One line.
\end{tcolorbox}
\begin{tcolorbox}
First line. Second line.
\end{tcolorbox}

\tcbset{colframe=red!50!white,nobeforeafter}
\begin{tcolorbox}[box align=base]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=base,size=fbox]
Another line
\end{tcolorbox}

\tcbset{beforeafter skip=0pt, colframe=red!50!white}
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}
Second box.
\end{tcolorbox}
<table>
<thead>
<tr>
<th>Command</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>\tcb[left skip]</td>
<td></td>
<td>Inserts some horizontal space of the given \textit{length} before the colored box. This style sets \tcb/grow to left by \textsuperscript{P.82} with the negated \textit{length}, i.e. the bounding box and box width are changed.</td>
</tr>
<tr>
<td>\begin{tcolorbox}</td>
<td></td>
<td>\textbf{tcolorbox}.</td>
</tr>
<tr>
<td>\end{tcolorbox}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>\tcb[right skip]</td>
<td></td>
<td>Inserts some horizontal space of the given \textit{length} after the colored box. This style sets \tcb/grow to right by \textsuperscript{P.82} with the negated \textit{length}, i.e. the bounding box and box width are changed.</td>
</tr>
<tr>
<td>\begin{tcolorbox}</td>
<td></td>
<td>\textbf{tcolorbox}.</td>
</tr>
<tr>
<td>\end{tcolorbox}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>\tcb[leftright skip]</td>
<td></td>
<td>Inserts some horizontal space of the given \textit{length} before and after the colored box. This style changes the bounding box and the box width.</td>
</tr>
<tr>
<td>\begin{tcolorbox}</td>
<td></td>
<td>\textbf{tcolorbox}.</td>
</tr>
<tr>
<td>\end{tcolorbox}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>\tcb/ignore nobreak</td>
<td>true</td>
<td>After a heading, \LaTeX{} tries to avoid a break by setting a \texttt{nobreak} boolean value. Starting from version 3.33, the \tcb/before \textsuperscript{P.76} respectively \tcb/before skip \textsuperscript{P.78} settings are not used after a heading if \tcb/ignore nobreak is set to false. For an unbreakable box, \tcb/before nobreak is used instead. Further, a \tcb/breakable \textsuperscript{P.307} box will also try to avoid a break between a heading and a directly following first part of a break sequence. Set \tcb/ignore nobreak to true, if \texttt{nobreak} should be ignored as prior to version 3.33. Also, such a setting may be used locally to enforce the \tcb/before \textsuperscript{P.76} setting.</td>
</tr>
<tr>
<td>\begin{tcolorbox}</td>
<td></td>
<td>\textbf{tcolorbox}.</td>
</tr>
<tr>
<td>\end{tcolorbox}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>\tcb/before nobreak</td>
<td></td>
<td>Sets the \texttt{code} which is executed before the colored box if it is unbreakable, if \tcb/ignore nobreak is not set, and if the box follows a heading.</td>
</tr>
<tr>
<td>\begin{tcolorbox}</td>
<td></td>
<td>\textbf{tcolorbox}.</td>
</tr>
<tr>
<td>\end{tcolorbox}</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.16 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.153} to display the actual bounding box. For this, the library \texttt{skins} has to be included and \texttt{/tcb/enhanced} \textsuperscript{P.178} has to be set.

\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}

\begin{tcolorbox}[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}

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

Enlarges the bounding box distance to the top of the box by \langle length\rangle. If the box is \textit{breakable}, only the first box of the break sequence gets enlarged. \texttt{/tcb/enlarge top by} \textsuperscript{P.81} overwrites this key.

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

Enlarges the bounding box distance to the bottom of the box by \langle length\rangle. If the box is \textit{breakable}, only the last box of the break sequence gets enlarged. \texttt{/tcb/enlarge bottom by} \textsuperscript{P.81} overwrites this key.
/tcb/enlarge top at break by=(length)  
(no default, initially 0mm)
Enlarges the bounding box distance to the top of the box by \( (length) \), if the box is /tcb/breakable \(^{+P.307} \). In this case, it is applied to middle and last parts in a break sequence. /tcb/enlarge top by 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 \( (length) \), if the box is /tcb/breakable \(^{+P.307} \). In this case, it is applied to first and middle parts in a break sequence. /tcb/enlarge bottom by overwrites this key.

/tcb/enlarge top by=(length)  
(no default, initially 0mm)
Enlarges the bounding box distance to the top of the box by \( (length) \). /tcb/enlarge top initially by \(^{-P.80} \) and /tcb/enlarge top at break by are set to \( (length) \).

/tcb/enlarge bottom by=(length)  
(no default, initially 0mm)
Enlarges the bounding box distance to the bottom of the box by \( (length) \). /tcb/enlarge bottom finally by \(^{-P.80} \) and /tcb/enlarge bottom at break by are set to \( (length) \).

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

\textbf{This is a tcolorbox.}

\textbf{This is a tcolorbox.}

\textbf{This is a tcolorbox.}

This is a \textbf{tcolorbox}.

This is a \textbf{tcolorbox}.
\texttt{/tcb/enlarge by=(\textit{length})} \hspace{2cm} \text{(no default, initially 0mm)}

Enlarges the bounding box distance to all sides of the box by \textit{\langle length\rangle}.

\begin{verbatim}
\tcbset{colframe=blue!75!black, colback=white, width=5cm, nobeforeafter}

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

\begin{tcolorbox}[enlarge by=5mm, enhanced, show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\end{verbatim}

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

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

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

\texttt{/tcb/grow to left by=(\textit{length})} \hspace{2cm} \text{(no default, initially 0mm)}

Enlarges the current box width by \textit{\langle length\rangle} and enlarges (shrinks) the bounding box distance to the left side of the box by \textit{\langle length\rangle}. Also see \texttt{/tcb/left skip} \textsuperscript{P.79}.

\begin{verbatim}
\tcbset{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{verbatim}

\begin{tcolorbox}
This is a \textbf{tcolorbox} with a width of 7cm.
\end{tcolorbox}

\texttt{/tcb/grow to right by=(\textit{length})} \hspace{2cm} \text{(no default, initially 0mm)}

Enlarges the current box width by \textit{\langle length\rangle} and enlarges (shrinks) the bounding box distance to the right side of the box by \textit{\langle length\rangle}. Also see \texttt{/tcb/right skip} \textsuperscript{P.79}.

\begin{verbatim}
\tcbset{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}

\bigskip

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

\end{verbatim}

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

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}
This page is an odd page. Therefore, the left and right enlargements are not toggled (with some luck; otherwise use \texttt{forced}). 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.

\textbf{/tcb/toggle enlargement=\textit{\texttt{toggle preset}}} \quad \text {(default \texttt{evenpage}, initially \texttt{none})}

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

- \texttt{none}: no switching.
- \texttt{forced}: the values of the left and right enlargement are switched.
- \texttt{evenpage}: if the page is an even page, the values of the left and right enlargement are switched. It is recommended that you use this setting in conjunction with \texttt{/tcb/check odd page}-P.94.

See \texttt{/tcb/toggle left and right}-P.44 to toggle geometry settings.
The following keys should not be used with breakable boxes or boxes with a lower part.

/tcb/shrink tight (style, no value, initially unset)
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 tcolorbox.
Lorem ipsum dolor sit amet, consectetuer adipiscing elit.

/tcb/extrude left by=(length) (style, no default, initially unset)
The (upper part of the) colored box is extruded by the given \textit{(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 ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \textit{\tcbox[extrude left by=1cm]{Curabitur} dictum gravida mauris.} Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.


/tcb/extrude right by=(length) (style, no default, initially unset)
The (upper part of the) colored box is extruded by the given \textit{(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 ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \textit{\tcbox[extrude right by=1cm]{Curabitur} dictum gravida mauris.} Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

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

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

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \texttt{\textbackslash tcb[extrude top by=1cm]\{Curabitur\} dictum gravida mauris.}

Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

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

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

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \texttt{\textbackslash tcb[extrude bottom by=1cm]\{Curabitur\} dictum gravida mauris.}

Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

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

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

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

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \texttt{\textbackslash tcb\{Curabitur\} dictum gravida mauris. \texttt{\textcolor{vulputate}{Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. \textbackslash tcb[Mauris ut leo.]}\}
4.17 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{tcblayer}. 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}. If needed, the number of managed layers can be increased by setting \texttt{\tcbsetmanagedlayer} 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} by default. You can change this, but be prepared for surprises if you do.

If the defaults are 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{\tcbset} 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} or \texttt{/tcb/every box on higher layers} 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{\tcbset} survive.
   - For layer 2 and above (nested boxes), a \texttt{/tcb/reset} followed by \texttt{/tcb/every box} option list is applied. Every resettable options given by a preceding \texttt{\tcbset} and by the surrounding box(es) are reset.
4. The \texttt{(options)} given to the \texttt{tcolorbox} are applied. Or, if the box was generated by \texttt{\newtcolorbox} or friends, the \texttt{(options)} given there are applied.
5. If the box was generated by \texttt{\newtcolorbox} or friends, some automated options are applied.

\texttt{/tcb/every box} \hspace{1cm} (style)

By default, this style is empty.

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

It may be changed by redefining this style.

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

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

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

Here, \(n\) 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}

\section*{/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}

\section*{\texttt{\tcbsetmanagedlayer\{\langle number\}\}}}

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

\begin{verbatim}
\% \usepackage{lipsum}
\% \tcbuselibrary{skins,breakable}
\tcbset{colframe=red!75!black,fonttitle=\bfseries,
  colback=red!5!white,
  every box/.style={enhanced,watermark text=\thetcblayer,
  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\textsuperscript{a}. Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, nisi. Morbi auctor lorem non justo. Nam laacus 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
\end{tcolorbox}
\begin{tcolorbox}[title=Layer 2 Box]
abc\footnote{The footnote of abc}
\end{tcolorbox}
\begin{tcolorbox}[title=Another Box,ams equation]
\tcbhighmath{\sum\limits_{n=1}^{\infty} \frac{1}{n}} = \infty.
\end{tcolorbox}
\begin{tcolorbox}[title=Another Box]
Some text\textsuperscript{a}.\footnote{A lipsum text}. \lipsum[3]
\end{tcolorbox}
\begin{tcolorbox}[title=Layer 4,colframe=blue,colback=white]
Layer 4\footnote{Layer 4 footnote}
\end{tcolorbox}
\begin{tcolorbox}
The End\footnote{Last footnote}.
\end{tcolorbox}
\end{tcolorbox}
\begin{tcolorbox}
\lipsum[2]
\begin{tcolorbox}[title=Layer 2 Box]
abc\footnote{The footnote of abc}
\end{tcolorbox}
\begin{tcolorbox}[title=Another Box,ams equation]
\tcbhighmath{\sum\limits_{n=1}^{\infty} \frac{1}{n}} = \infty.
\end{tcolorbox}
\begin{tcolorbox}[title=Yet Another Box]
\tcbboxfit[height=2cm]{\lipsum[1]}
My text.
\begin{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{tcolorbox}
\end{verbatim}

Layer 2 Box

<table>
<thead>
<tr>
<th>abc(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(^a)The footnote of abc</td>
</tr>
</tbody>
</table>

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

Footnote from layer 1 box

Footnote from some text
4.18 Capture Mode

\texttt{\textbackslash tcb/capture=\langle \textit{mode} \rangle} \quad \text{(no default, initially minipage)}

The capture $\langle \textit{mode} \rangle$ defines how the box content is processed.
Feasible values for $\langle \textit{mode} \rangle$ are:

- **minipage**: This is the default $\langle \textit{mode} \rangle$ for \tcolorbox \textsuperscript{P.11}. The content may have an upper and a lower part. Optionally, the box can be \texttt{\textbackslash tcb/breakable} \textsuperscript{P.307}. The box content is put into a minipage or into something similar to a minipage.

- **hbox**: This is the default $\langle \textit{mode} \rangle$ for \tcbox \textsuperscript{P.13}. 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{\textbackslash tcb/hbox}.

- **fitbox**: \text{(needs the \\texttt{fitting} library)} This is the default $\langle \textit{mode} \rangle$ for \tcboxfit \textsuperscript{P.335}. 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{\textbackslash tcb/fit} \textsuperscript{P.337}.

\begin{tcolorbox}
\texttt{\textbackslash 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{tcolorbox}

\texttt{\textbackslash tcb/hbox} \quad \text{(style, no default)}

Shortcut for capture=hbox.

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

\texttt{\textbackslash tcb/minipage} \quad \text{(style, no default)}

Shortcut for capture=minipage.

89
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{tcolorbox}
\textbf{parbox=true (normal)}

\end{tcolorbox}

\begin{tcolorbox}
\textbf{parbox=false}

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

```
\begin{tcolorbox}
Rechnungsadjunktentochter.\par
Statthaltbereikonzipist.
\end{tcolorbox}
```

\begin{tcolorbox}[\hyphenationfix]  
Rechnungsadjunktentochter.\par
Statthaltbereikonzipist.  
\end{tcolorbox}

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

4.20 Files

\texttt{/tcb/tempfile=⟨file name⟩} \hspace{1em} (no default, initially \texttt{\jobname.tcbtemp})

Sets ⟨file name⟩ as name for the temporary file which is used inside \texttt{tcbwritetemp} \textsuperscript{P.105} and \texttt{\tcbusetemp} \textsuperscript{P.105} implicitly.

4.21 \texttt{tcbox} Specials

The following options are applicable for \texttt{\tcbox} \textsuperscript{P.13} and \texttt{\tcboxmath} \textsuperscript{P.284} only.

\texttt{/tcb/tcbox raise=⟨length⟩} \hspace{1em} (no default, initially \texttt{0pt})

Raises the \texttt{tcbox} \textsuperscript{P.13} by the given ⟨length⟩.

```
\begin{tcolorbox}
\texttt{dotfill}
\tcbox[tcbox raise base]{Hello World 1}\texttt{dotfill}
\tcbox{Hello World 2}\texttt{dotfill}
\tcbox[tcbox raise=5mm]{Hello World 3}
\end{tcolorbox}
```

\textbf{/tcb/tcbox raise base} \hspace{1em} (style, no value, initially unset)

Raises the \texttt{tcbox} \textsuperscript{P.13} such that the base of its content matches the base of the environmental line; see example above.

\textbf{/tcb/on line} \hspace{1em} (style, no value, initially unset)

Combines \texttt{/tcb/tcbox raise base} with \texttt{/tcb/nobeforeafter} \textsuperscript{P.76}. The resulting box behaves analogue to \texttt{fbox}.  

91
Controls how \texttt{tcb/width} respects a \texttt{tcb/width} setting. Feasible values for \texttt{(mode)} are:

- \textbf{auto} (initial setting): ignore \texttt{tcb/width} and set box width according to its content.
- \textbf{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.
- \textbf{forced center}: Set box width according to \texttt{tcb/width}. The content is centered and may overlap the box borders.
- \textbf{forced left}: Set box width according to \texttt{tcb/width}. The content is left aligned and may overlap the box borders.
- \textbf{forced right}: Set box width according to \texttt{tcb/width}. The content is right aligned and may overlap the box borders.
- \textbf{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}.
- \textbf{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}.
- \textbf{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}.
4.22 Counters, Labels, and References

\texttt{/tcb/phantom=\langle\text{code}\rangle} \hspace{1em} \text{(no default, initially unset)}

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

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

- The \langle\text{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\text{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\text{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 13.9 from page 276, e.g. Example 13.1 on page 277.

\texttt{/tcb/nophantom} \hspace{1em} \text{(no value, initially set)}

Removes the phantom code if set before.

\texttt{/tcb/label=\langle\text{marker}\rangle} \hspace{1em} \text{(no default, initially unset)}

The \langle\text{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 97, e.g. \texttt{/tcb/new/auto counter P.97.}

\texttt{/tcb/phantomlabel=\langle\text{marker}\rangle} \hspace{1em} \text{(no default, initially unset)}

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

\texttt{/tcb/label type=\langle\text{type}\rangle} \hspace{1em} \text{(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\text{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 14.3.5 on page 301.

\texttt{/tcb/no label type} \hspace{1em} \text{(no value, initially set)}

Removes a \texttt{/tcb/label type}, if set before.

\texttt{/tcb/step=\langle\text{counter}\rangle} \hspace{1em} \text{(no default, initially unset)}

Shortcut for \texttt{phantom=\{\refstepcounter{#1}\}}. The given \langle\text{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 97.

\texttt{/tcb/step and label=\langle\text{counter}\rangle\{\langle\text{marker}\rangle\}} \hspace{1em} \text{(no default, initially unset)}

Shortcut for using \texttt{/tcb/step} and \texttt{/tcb/label}. This option is not needed when using the convenient automated numbering introduced with version 2.40, see Subsection 5.1 from page 97.
If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 104 is used, this key describes the ⟨text⟩ for an entry into the generated list, e.g.

\begin{tcolorbox}[enhanced, check odd page, watermark text={\ifoddpage Odd\else Even\fi\ page!}]
\lipsum[1]
\end{tcolorbox}


\begin{tcolorbox}
\begin{verbatim}
\usepackage{changepage}
\strictpagecheck

% \usepackage{changepage}
\tcbset{colframe=blue!75!black, colback=white}
\begin{tcolorbox}[enhanced, check odd page, 
watermark text={\ifoddpage Odd\else Even\fi\ page!}]
\lipsum[1]
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

\begin{tcolorbox}
\begin{verbatim}
\makeatletter
\newcommand{\checkoddpage}{\ifoddpage{\checkoddpagetrue}\else\checkoddpagefalse\fi}
\makeatother

\usepackage{changepage}
\checkoddpagefalse
\tcbset{colframe=blue!75!black, colback=white}
\begin{tcolorbox}[enhanced, check odd page, 
watermark text={\checkoddpage Odd\else Even\fi\ page!}]
\lipsum[1]
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

3If changepage is not included, a compilation error will arise.
4.23 Externalization

See Section 20 on page 370 for the \texttt{[external]} library of \texttt{tcolorbox}.

If the \texttt{externalization} library of the \texttt{tikz} package is used and \texttt{/tcb/graphical environment} is set to \texttt{tikzpicture}, a \texttt{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 \texttt{tcolorbox} is used. If you typically use the pattern \texttt{\tikzexternalenable some picture \tikzexternaldisable}, there is nothing to care about.

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

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

\texttt{/tcb/shield externalize=true|false} (default true, initially false)

If set to \texttt{true}, the drawing part of the \texttt{tcolorbox} is not being externalized which is a good thing at the current state of art. Nevertheless, if the \texttt{tcolorbox} contains a \texttt{tikzpicture}, this picture is still externalized. Pictures drawn with help of \texttt{/tcb/tikzupper} or alike are not externalized.

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

\texttt{/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 \texttt{tcolorbox} to set the externalization \texttt{⟨file name⟩} for the first \texttt{tikzpicture} which is discovered \texttt{inside} the box content. The package \texttt{tikz} or the library \texttt{skins} has to be loaded to use this option. Additionally, \texttt{\usetikzlibrary{external}} has to be used.

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

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

4.24 Miscellaneous

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

Sets (nearly) all \texttt{tcolorbox} settings (including loaded libraries) back to their default values plus any settings given by \texttt{\tcbsetforeverylayer}. \texttt{/tcb/savedelimiter} and \texttt{/tcb/capture} keep their values. Also, all raster values (see Section 12 on page 231) 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 4.17 from page 86.
/tcb/only=<⟨overlay specification⟩>(⟨options⟩)  (style, no default, initially unset)
Sets the given tcolorbox ⟨options⟩ in dependency of a beamer ⟨overlay specification⟩. Note that this needs the beamer class. The ⟨options⟩ will only be used on the specified beamer frames.

\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}
\tcblower
\begin{equation*}
\int\limits_{1}^{x} \frac{1}{t}~dt = \ln(x).
\end{equation*}
\end{tcolorbox}
\end{frame}
\end{document}

/tcb/code=(code)  (no default, initially unset)
The given ⟨code⟩ is executed immediately. This option is useful to place some arbitrary code into an option list.

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

Useless at this spot but functional.

My \textit{working} title

This is a tcolorbox.
5 Initialization Option Keys

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

- `\newtcolorbox`\textsuperscript{P.14},
- `\newtcbx`\textsuperscript{P.15},
- `\newtcblisting`\textsuperscript{P.246},
- `\newtcbinputlisting`\textsuperscript{P.248},
- `\newtcbtheorem`\textsuperscript{P.282}, and
- `\newtcbxfit`\textsuperscript{P.336}.

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.

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 `\thetcbcounter`, e.g. inside the title of the box. The real counter name is stored inside `\tcbcounter`.

`\tcb/new/auto counter` (no value, initially unset)

Creates a new counter automatically. With `\tcb/new/number format`\textsuperscript{P.99} and `\tcb/new/number within`\textsuperscript{P.99}, the appearance and behavior of the counter can be changed. The counter value is referenced by `\thetcbcounter`.

Definition in the preamble:

```
\newtcolorbox[auto counter,number within=section]{pabox}{%
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  title=Examp.-\thetcbcounter: #2,#1}
```

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

Examp. 5.1: Title with number

This box is automatically numbered with 5.1 on page 97. 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 \\
/tcb/new/number format\textsuperscript{P.99} and /tcb/new/number within\textsuperscript{P.99} are inherited and cannot be changed. The counter value is referenced by \texttt{\thetcbcounter}.

\begin{tcolorbox}[use counter from=pabox]{mybox}\[2\][%
colback=blue!5!white,colframe=blue!75!black,fonttitle=\bfseries,
title=Some Box \ \thetcbcounter\ #: #2,#1]
\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}

\begin{tcolorbox}[use counter=\texttt{myexample},number format=\texttt{Alph}]{mybox}\[2\][%
colback=green!5!white,colframe=green!55!black,fonttitle=\bfseries,
title=Some Box \ \thetcbcounter\ #: #2,#1]
\begin{mybox}[label={myusecounter}]{Title with \LaTeX\ number}
This box is automatically numbered with \ref{myusecounter} on page \pageref{myusecounter}. Inside the box, the \texttt{\thetcbcounter} can also be referenced by |\texttt{\thetcbcounter}|.
The real counter name is \texttt{\tcbcounter}.
\end{mybox}

\begin{tcolorbox}[use counter*=\texttt{myexample}]{mybox}\[2\][% \newcounter{myexample}\% preamble
\colback=green!5!white,colframe=green!55!black,fonttitle=\bfseries,
title=Some Box \ \thetcbcounter\ #: #2,#1]
\begin{mybox}[label={myusecounter}]{Title with continued number}
This box is automatically numbered with 5.2 on page 98. Inside the box, the 5.2 can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{tcb@cnt@pabox}.
\end{mybox}

\begin{tcolorbox}[use counter=\texttt{myexample},number format=\texttt{Alph}]{mybox}\[2\][% \newcounter{myexample}\% preamble
\colback=green!5!white,colframe=green!55!black,fonttitle=\bfseries,
title=Some Box \ \thetcbcounter\ #: #2,#1]
\begin{mybox}[label={myusecounter}]{Title with \LaTeX\ number}
This box is automatically numbered with A on page 98. Inside the box, the A can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{myexample}.
\end{mybox}

\begin{tcolorbox}[use counter=\texttt{myexample}]{mybox}\[2\][% \newcounter{myexample}\% preamble
\colback=green!5!white,colframe=green!55!black,fonttitle=\bfseries,
title=Some Box \ \thetcbcounter\ #: #2,#1]
\begin{mybox}[label={myusecounter}]{Title with \LaTeX\ number}
This box is automatically numbered with A on page 98. Inside the box, the A can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{myexample}.
\end{mybox}

\begin{tcolorbox}[use counter=\texttt{myexample}]{mybox}\[2\][% \newcounter{myexample}\% preamble
\colback=green!5!white,colframe=green!55!black,fonttitle=\bfseries,
title=Some Box \ \thetcbcounter\ #: #2,#1]
\begin{mybox}[label={myusecounter}]{Title with \LaTeX\ number}
This box is automatically numbered with A on page 98. Inside the box, the A can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{myexample}.
\end{mybox}

/\texttt{tcb/new/no counter}\% (no value, initially set)
The created boxes are not numbered. This is the default. The option may be used to overrule a previous option.
The automatic counter is set to zero, if $\langle\text{counter}\rangle$ is increased. Additionally, during output, the value of $\langle\text{counter}\rangle$ 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:

```
number within=chapter
```

See `/tcb/new/use counter` for a complete example.

Declares the format of the automatic counter. The $\langle\text{format macro}\rangle$ can be any valid \LaTeX number formatting macro like `\arabic`, `\roman`, etc.

To display the counter value in large roman numbers, use:

```
number format=\Roman
```

See `/tcb/new/auto counter` for a complete example.

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

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

```
\newtcolorbox [auto counter,number within=section, number freestyle={(Q/\noexpand\thesection/\noexpand\Alph{\tcbcounter})}, ]{phbox}[2]{%
colback=yellow!15!white,colframe=blue!75!black,fonttitle=\bfseries, title=\textit{Question~-\thetcbcounter}: #2,#1}
\begin{phbox}[label={myfreestyle}]{Title with freestyle number}
This box is automatically numbered with `\ref{myfreestyle}` on page `\pageref{myfreestyle}`. Inside the box, the `\thetcbcounter` can also be referenced by `\thetcbcounter`. The real counter name is `\texttt{tcb@cnt@phbox}`.
\end{phbox}
```

```
\begin{phbox}[label={myfreestyle}]{Title with freestyle number}
This box is automatically numbered with `(Q/5/A)` on page 99. Inside the box, the `(Q/5/A)` can also be referenced by `\thetcbcounter`. The real counter name is `tcb@cnt@phbox`.
\end{phbox}
```
The following options /tcb/new/crefname and /tcb/new/Crefname need to be set inside the preamble.

\tcb/new/crefname=\{\textit{singular}\}\{\textit{plural}\} \hspace{1cm} (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. It creates a cross-reference type for the new \texttt{tcolorbox}'es, where the lowercase \texttt{(singular)} and \texttt{(plural)} forms of the cross-reference are given. This type is the environment or macro name and /tcb/label type \textsuperscript{P.93} is set automatically. See /tcb/label type \textsuperscript{P.93} and [5] for more information.

\tcb/new/Crefname=\{\textit{singular}\}\{\textit{plural}\} \hspace{1cm} (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. It creates a cross-reference type for the new \texttt{tcolorbox}'es, where the uppercase \texttt{(singular)} and \texttt{(plural)} forms of the cross-reference are given. This type is the environment or macro name and /tcb/label type \textsuperscript{P.93} is set automatically. See /tcb/label type \textsuperscript{P.93} and [5] for more information.

\begin{tcbitemize}
\item Definition in the preamble:
\begin{verbatim}
% \usepackage{cleveref}
\newtcolorbox[auto counter,number within=section, crename={bluebox}{blueboxes}]% {mybluebox}[2]\[colback=blue!5!white, colframe=blue!75!black, fonttitle=\bfseries, title=Bluebox \thetcbcounter: #2,#1]
\end{verbatim}
\end{tcbitemize}

\begin{tcbitemize}
\item \begin{verbatim}
% \usepackage{varioref}
% \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}.
With \texttt{varioref}:
\Vref{myreference}, \vref{myreference}.
\Vref*{myreference}, \vref*{myreference}.
\end{verbatim}
\end{tcbitemize}

Bluebox 5.1: My title

This is an example.

Bluebox 5.1, bluebox 5.1.
Page 100, page 100.
Bluebox, bluebox.
5.1, 100.
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.17 is used instead of the standard \caption and /tcb/list text*P.94 can be used instead of the optional parameter of the standard \caption.

Feasible values for \langle name \rangle are:

- **figures**: blend into the standard figure environment.
- **tables**: blend into the standard table environment.
- **listings**: blend into the standard lstlistings 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}
/tcb/blend before title=⟨value⟩ (no default, initially colon)

This option formats the title output of /tcb/new/blend into P.101. Note that this is a common tcolorbox option which should be set globally or in the normal option part of \newtcolorbox P.14.

Feasible values for ⟨value⟩ are:
- colon: use name/number plus colon.
- dash: use name/number plus dash.
- colon hang: use name/number plus colon with hanging indent.
- dash hang: use name/number plus dash with hanging indent.

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

\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 \texttt{/tcb/new/blend} into \texttt{P.101}. The \texttt{(code)} takes one parameter, the name/number. Use this, if \texttt{/tcb/blend before title} \texttt{P.102} is not flexible enough.

\begin{myfigure}{A tcolorbox figure}
\includegraphics[height=6cm]{lichtspiel.jpg}
\end{myfigure}

\begin{figure}
\centering
\begin{tcolorbox}
\[blend before title code={\fbox{##1}\ },title={#2},every float=\centering,#1]
\end{tcolorbox}
\caption{A tcolorbox figure}
\end{figure}
5.2 Lists of \tcolorbox es

For figures and tables, \LaTeX{} provides the \texttt{\listoffigures} and \texttt{\listoftables} commands to create lists of these numbered entities. Also, a \tcolorbox{} can be part of such a kind of list.

1. Assign a list \langle name \rangle by the \texttt{initialization} option \texttt{/tcb/new/list inside}.

2. Optionally, a new \langle type \rangle for list entries may be assigned by the \texttt{initialization} option \texttt{/tcb/new/list type}.

3. List entries a generated automatically within each new \tcolorbox{} using the above initialization.
   - If \texttt{/tcb/list entry}^\textsuperscript{P.94} is set, the entry is generated with it.
   - Otherwise, if \texttt{/tcb/title}^\textsuperscript{P.17} 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}.

\texttt{/tcb/new/list inside=\langle name \rangle} \hspace{1cm} \text{(no default, initially unset)}

Assigns a list or contents file to the generated \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}. For example:

\begin{verbatim}
list inside=exam
\end{verbatim}

See Section 13.9 from page 276 for a complete example.

\texttt{/tcb/new/list type=\langle type \rangle} \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@\textcolorbox}{\@dottedtocline{1}{1.5em}{2.3em}}
\end{verbatim}

This is identical to the \texttt{\l@section} setting of \LaTeX{}. \texttt{\l@\textcolorbox} can be redefined or a new \langle type \rangle can be assigned.

\texttt{\tcblistof[\langle macro \rangle]{\langle name \rangle}{\langle title text \rangle}}

Displays the generated list of \tcolorbox{}es with the given \langle name \rangle. The heading is generated by \langle macro \rangle\langle title text \rangle where \texttt{section} is the default setting for \langle macro \rangle.

To display the list inside a subsection, use for example:

\begin{verbatim}
\tcblistof[\texttt{subsection}]{exam}{List of Exercises}
\end{verbatim}

The result of the example is found as Subsection 13.10 on page 279.

\begin{itemize}
\item The core of the list is generated by \texttt{\@starttoc{\langle name \rangle}} which can be wrapped into an own macro.
\end{itemize}
6 Saving and Loading of Verbatim Texts

The following macros are slightly modified versions of the original macros from the known packages \texttt{moreverb} and \texttt{verbatim}. They are used implicitly inside of a \texttt{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}

Now, we are using the file:
\input{\jobname\_verbexp.tex}

This environment may be used inside an own environment. Note, that inside the environment definition \texttt{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}

Now, we are using the file:
\input{\jobname\_myverb.tex}

\begin{tcbwritetemp}
⟨environment content⟩
\end{tcbwritetemp}

Has the same function as \texttt{tcbverbatimwrite}, but uses the key value of \texttt{tempfile} for the file name.

\begin{tcbwritetemp}
This text is saved \textit{as is}.
\end{tcbwritetemp}

Now, we are using the file:
\texttt{tcbusetemp}

\texttt{tcbusetemp}

Loads the current temporary file which was saved by \texttt{tcbwritetemp}.

105
7 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 7.3 on the next page where information about example solutions is recorded and read again in Section 7.4 on page 110.

7.1 Makros

\begin{itemize}
\item \texttt{\textbackslash tcbstartrecording[(file name)]}
\begin{itemize}
\item Opens a file denoted by \texttt{(file name)} for writing the records. The default file name is \texttt{\jobname.records}. See Section 7.3 on the next page for an example application.
\end{itemize}
\end{itemize}

\begin{itemize}
\item \texttt{\textbackslash tcbrecord\{⟨content⟩\}}
\begin{itemize}
\item Records any \texttt{⟨content⟩} to the record file. \texttt{\textbackslash tcbrecord} is implemented as \texttt{\textbackslash immediate\textbackslash write}. \texttt{\textbackslash tcbstartrecording} has to be called before; otherwise, \texttt{\textbackslash tcbrecord} is silently ignored.
\end{itemize}
\end{itemize}

\begin{itemize}
\item \texttt{\textbackslash tcbstoprecording}
\begin{itemize}
\item Closes the current record file which was opened by \texttt{\textbackslash tcbstartrecording} before.
\end{itemize}
\end{itemize}

\begin{itemize}
\item \texttt{\textbackslash tcbinputrecords[(file name)]}
\begin{itemize}
\item 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.
\end{itemize}
\end{itemize}

7.2 Options

\begin{itemize}
\item \texttt{/tcb/record=⟨content⟩} \hspace*{0.5cm} (style, no default)
\begin{itemize}
\item Records any \texttt{⟨content⟩} to the record file, see \texttt{\textbackslash tcbrecord}. This key can be used several times to write several lines.
\end{itemize}
\end{itemize}

\begin{itemize}
\item \texttt{/tcb/no recording}
\begin{itemize}
\item Disables \texttt{\textbackslash tcbrecord} and \texttt{/tcb/record} inside the current group.
\end{itemize}
\end{itemize}
7.3 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. 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 7.4.

\begin{definition}{preamble}
\begin{verbatim}
\NewTColorBox{auto counter, number within=section}{exercise}{+O{}}{
  \begin{tcbclipinterior}
    \shade[inner color=green!80!yellow,outer color=yellow!10!white]
    (interior.north west) circle (2cm);
    \draw[help lines,step=5mm,yellow!80!black,shift={(interior.north west)}]
    (interior.south west) grid (interior.north east);
  \end{tcbclipinterior},
  title={Exercise~\thetcbcounter:},
  label={exercise@\thetcbcounter},
  attach title to upper=\quad,
  after upper={
    \textcolor{green!40!black}{\itshape Solution on page~\pageref{solution@\thetcbcounter}}},
  lowerbox=ignored,
  savelowerto=solutions/exercise-\thetcbcounter.tex,
  record={\string\solution{\thetcbcounter}{solutions/exercise-\thetcbcounter.tex}},
  %
  #1
}
\NewTotalTColorBox{solution}{mm}{
  \begin{tcbclipinterior}
    \shade[inner color=red!50!yellow,outer color=yellow!10!white]
    (interior.north west) circle (2cm);
    \draw[help lines,step=5mm,yellow!80!black,shift={(interior.north west)}]
    (interior.south west) grid (interior.north east);
  \end{tcbclipinterior},
  title={Solution of Exercise~\ref{exercise@#1} on page~\pageref{exercise@#1}:},
  phantomlabel={solution@#1},
  attach title to upper=\par,
  \input{#2}
}
\tcbset{no solution/.style={no recording,after upper=}}
\tcbstartrecording
\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
  f(x)=\sin((\sin x)^2)
\end{equation*}
\tcblower
The derivative is:
\begin{align*}
  f'(x) &= \left( \sin((\sin x)^2) \right)' \\
  &= \cos((\sin x)^2) 2\sin x \cos x.
\end{align*}
\end{exercise}
\end{verbatim}
\end{definition}

107
\begin{exercise}[no solution]
It holds:
\begin{equation*}
\frac{d}{dx}\left(\ln|x|\right) = \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*}
\begin{align*}
f'(x) &= \left( (\sin(\sin x))^2 \right)'
= 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*}
\begin{align*}
f'(x) &= \left( \sqrt{x^3-6x^2+2x} \right)'
= \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*}
\begin{align*}
f'(x) &= \left( \left(\frac{2+3x}{1-2x}\right)^3 \right)'
= 3 \left(\frac{2+3x}{1-2x}\right)^2 \left( (1-2x)3-(2+3x)(-2) \right) \left( \frac{1}{(1-2x)^2} \right)
= \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*}
\begin{align*}
f'(x) &= \left( \frac{\cos x}{(\tan 2x)^2} \right)'
\end{align*}
\end{exercise}
\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x)=\cos((2x^2+3)^3)
\end{equation*}
\end{exercise}

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*}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x)=(x^2+1)\sqrt{x^4+1}
\end{equation*}
\end{exercise}

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 7.1: Compute the derivative of the following function:
\[ f(x) = \sin((\sin x)^2) \]
Solution on page 110

Exercise 7.2: It holds:
\[ \frac{d}{dx}(\ln x) = \frac{1}{x} \]

Exercise 7.3: Compute the derivative of the following function:
\[ f(x) = (\sin(sin x))^2 \]
Solution on page 110

Exercise 7.4: Compute the derivative of the following function:
\[ f(x) = \sqrt{x^3 - 6x^2 + 2x} \]
Solution on page 110
### Exercise 7.5: Compute the derivative of the following function:

\[ f(x) = \left( \frac{2 + 3x}{1 - 2x} \right)^3 \]

Solution on page 111

### Exercise 7.6: Compute the derivative of the following function:

\[ f(x) = \frac{\cos x}{(\tan 2x)^2} \]

Solution on page 111

### Exercise 7.7: Compute the derivative of the following function:

\[ f(x) = \cos((2x^2 + 3)^3) \]

Solution on page 111

### Exercise 7.8: Compute the derivative of the following function:

\[ f(x) = (x^2 + 1)\sqrt{x^4 + 1} \]

Solution on page 111

### 7.4 Example: Solutions

This concludes the example given in Section 7.3 on page 107. Now, the saved and recorded solutions are included.

\[ \texttt{tcbinputrecords} \]

### Solution of Exercise 7.1 on page 109:
The derivative is:

\[ f'(x) = \left( \sin((\sin x)^2) \right)' = \cos((\sin x)^2)2\sin x \cos x. \]

### Solution of Exercise 7.3 on page 109:
The derivative is:

\[ f'(x) = \left( (\sin(\sin x))^2 \right)' = 2\sin(\sin x) \cos(\sin x) \cos x. \]

### Solution of Exercise 7.4 on page 109:
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 7.5 on page 110:
The derivative is:
\[ f'(x) = \left( \frac{2 + 3x}{1 - 2x} \right)^3 = 3 \left( \frac{2 + 3x}{1 - 2x} \right)^2 \frac{(1 - 2x)3 - (2 + 3x)(+2)}{(1 - 2x)^2} = \frac{21(2 + 3x)^2}{(1 - 2x)^4}. \]

Solution of Exercise 7.6 on page 110:
The derivative is:
\[ f''(x) = \frac{\cos x}{(\tan 2x)^2} = \frac{\cos x (\cos 2x)^2}{(\sin 2x)^2} \]
\[ = \frac{(\sin 2x)^2[-\sin x)(\cos 2x)^2 + (\cos x)4 \cos 2x(-\sin 2x)] - \cos x(\cos 2x)^2 4 \sin 2x \cos 2x}{(\sin 2x)^4} \]
\[ = -\frac{\cos(2x)[\sin x \sin 2x \cos 2x + 4 \cos x(\sin 2x)^2 + 4 \cos x(\cos 2x)^2]}{(\sin 2x)^3} \]
\[ = -\frac{\cos(2x)[\sin x \sin 2x \cos 2x + 4 \cos x]}{(\sin 2x)^3}. \]

Solution of Exercise 7.7 on page 110:
The derivative is:
\[ f'(x) = \left( \cos((2x^2 + 3)^3) \right) = -\sin((2x^2 + 3)^3)(2x^2 + 3)^2 2 \cdot 2x \]
\[ = -12x(2x^2 + 3)^2 \sin((2x^2 + 3)^3). \]

Solution of Exercise 7.8 on page 110:
The derivative is:
\[ f'(x) = \left( (x^2 + 1)\sqrt{x^4 + 1} \right)' = 2x \sqrt{x^4 + 1} + \frac{2x^3(x^2 + 1)}{\sqrt{x^4 + 1}}. \]
8 Technical Overview and Customization

This section provides a technical overview of the skin concept of \texttt{tcolorbox}. For most applications of \texttt{tcolorbox}, one will not need to know the bells and whistles described herein. You may proceed to Section 9 on page 124 where the customization options for most users are documented.

The following explanations also cover options and settings from the \texttt{skins} library, see Section 9 on page 124.

8.1 Skins and Drawing Engines

From a technical point of view, a \textit{skin} is a style definition for the appearance of a \texttt{tcolorbox}. The core package provides some additional option keys for skins but only two skins called \texttt{standard} \footnote{P.176} and \texttt{standard jigsaw} \footnote{P.177}. The \texttt{skins} library adds several more skins. To change to a skin, only one option from the core package has to be set.

\begin{verbatim}
/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.
\end{verbatim}

\begin{verbatim}
\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}[skin=beamer,adjusted title=My title]
This is my content.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
/tcb/skin first=⟨name⟩ (style, no default, initially standard)
If the box is set to be \texttt{/tcb/breakable} \footnote{P.307} and is broken actually, then the skin for the \textit{first} part of the break sequence is set to ⟨name⟩, see Subsection 15.7 on page 318. Typically, this key is set by a \texttt{/tcb/skin}.
\end{verbatim}

\begin{verbatim}
/tcb/skin middle=⟨name⟩ (style, no default, initially standard)
If the box is set to be \texttt{/tcb/breakable} \footnote{P.307} and is broken actually, then the skin for the \textit{middle} parts (if any) of the break sequence is set to ⟨name⟩, see Subsection 15.7 on page 318. Typically, this key is set by a \texttt{/tcb/skin}.
\end{verbatim}

\begin{verbatim}
/tcb/skin last=⟨name⟩ (style, no default, initially standard)
If the box is set to be \texttt{/tcb/breakable} \footnote{P.307} and is broken actually, then the skin for the \textit{last} part of the break sequence is set to ⟨name⟩, see Subsection 15.7 on page 318. Typically, this key is set by a \texttt{/tcb/skin}.
\end{verbatim}

\begin{verbatim}
/tcb/graphical environment=⟨name⟩ (no default, initially \texttt{pgfpicture})
Sets the graphical environment for the \texttt{tcolorbox} to ⟨name⟩. 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} and may seldom be used directly.
\end{verbatim}
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.114} 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.114}.
4. The \textit{title area} of the box, if there is a title and \texttt{/tcb/title filled} \textsuperscript{P.26} is set to \texttt{true}; drawn by \texttt{/tcb/title engine} \textsuperscript{P.114}.

\texttt{/tcb/frame engine=\{name\}} \textsuperscript{(no default, initially \texttt{standard})}

Sets the \textit{frame} drawing engine for a box to \texttt{\{name\}}. Typically, this key is set by a \texttt{/tcb/skin} \textsuperscript{P.112}. Feasible values for \texttt{\{name\}} 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.124},
- \texttt{pathjigaw}: a \texttt{tikz} path which is controlled by \texttt{/tcb/frame style} \textsuperscript{P.124},
- \texttt{pathfirst}: a \texttt{tikz} path which is controlled by \texttt{/tcb/frame style} \textsuperscript{P.124},
- \texttt{pathfirstjigaw}: a \texttt{tikz} path which is controlled by \texttt{/tcb/frame style} \textsuperscript{P.124},
- \texttt{pathmiddle}: a \texttt{tikz} path which is controlled by \texttt{/tcb/frame style} \textsuperscript{P.124},
- \texttt{pathmiddlejigaw}: a \texttt{tikz} path which is controlled by \texttt{/tcb/frame style} \textsuperscript{P.124},
- \texttt{pathlast}: a \texttt{tikz} path which is controlled by \texttt{/tcb/frame style} \textsuperscript{P.124},
- \texttt{pathlastjigaw}: a \texttt{tikz} path which is controlled by \texttt{/tcb/frame style} \textsuperscript{P.124},
- \texttt{freelance}: deprecated.
- \texttt{spartan}: a quite spartan code.
- \texttt{empty}: draw nothing.

\texttt{/tcb/interior titled engine=\{name\}} \textsuperscript{(no default, initially \texttt{standard})}

Sets the \textit{interior} drawing engine for a titled box to \texttt{\{name\}}. Typically, this key is set by a \texttt{/tcb/skin} \textsuperscript{P.112}. Feasible values for \texttt{\{name\}} 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.125},
- \texttt{pathfirst}: a \texttt{tikz} path which is controlled by \texttt{/tcb/interior style} \textsuperscript{P.125},
- \texttt{pathmiddle}: a \texttt{tikz} path which is controlled by \texttt{/tcb/interior style} \textsuperscript{P.125},
- \texttt{pathlast}: a \texttt{tikz} path which is controlled by \texttt{/tcb/interior style} \textsuperscript{P.125},
- \texttt{freelance}: deprecated.
- \texttt{spartan}: a quite spartan code.
- \texttt{empty}: draw nothing.
Sets the interior drawing engine for an untitled box to ⟨name⟩. Typically, this key is set by a /tcb/skin. Feasible values for ⟨name⟩ are:

- **standard**: the original code from the core package,
- **path**: a tikz path which is controlled by /tcb/interior style,
- **pathmiddle**: a tikz path which is controlled by /tcb/interior style,
- **pathlast**: a tikz path which is controlled by /tcb/interior style,
- **freelance**: deprecated.
- **spartan**: a quite spartan code.
- **empty**: draw nothing.

Sets the segmentation (line) drawing engine for a box to ⟨name⟩. Typically, this key is set by a /tcb/skin. Feasible values for ⟨name⟩ are:

- **standard**: the original code from the core package,
- **path**: a tikz path which is controlled by /tcb/segmentation style,
- **freelance**: deprecated.
- **spartan**: a quite spartan code.
- **empty**: draw nothing.

Sets the title area drawing engine for a titled box to ⟨name⟩. Typically, this key is set by a /tcb/skin. Feasible values for ⟨name⟩ are:

- **standard**: the original code from the core package,
- **path**: a tikz path which is controlled by /tcb/title style,
- **pathmiddle**: a tikz path which is controlled by /tcb/title style,
- **pathlast**: a tikz path which is controlled by /tcb/title style,
- **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 8.2 on page 116.
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 TikZ. Typically, this key is set automatically by a `/tcb/skin`.

\begin{tcolorbox}[adjusted title=The title]
\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}
\end{tcolorbox}
8.2 Code Option Keys

The following code options are applicable for all skins. The used \textit{(graphical code)} can be any \textit{pgf} code. For all skins with exception of \textit{standard}\textsuperscript{\textsuperscript{\textsuperscript{-P.176}}} and \textit{standard jigsaw}\textsuperscript{\textsuperscript{\textsuperscript{-P.177}}}, the \textit{(graphical code)} can also be any \textit{TikZ} code.

\texttt{/tcb/frame code=\{graphical code\}} (code, default from \textit{standard})

The given \textit{(graphical code)} is used for drawing the \textit{frame} of the box.

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

\texttt{/tcb/frame empty} (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{\textsuperscript{-P.125}}.

\texttt{/tcb/interior titled code=\{graphical code\}} (code, default from \textit{standard})

The given \textit{(graphical code)} is used for drawing the \textit{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 \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

\texttt{/tcb/interior titled empty} (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{\textsuperscript{-P.126}}.
\texttt{/tcb/interior code=\{graphical code\}} (code, default from \texttt{standard})

The given \{graphical code\} is used for drawing the \textit{interior} of the box, if the box is without a title.

\begin{tcolorbox}[enhanced,interior 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}

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

\texttt{/tcb/interior empty} (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} \texttt{\textsuperscript{P.126}}.

\texttt{/tcb/segmentation code=\{graphical code\}} (code, default from \texttt{standard})

The given \{graphical code\} is used for drawing the \textit{segmentation} area of the box.

\begin{tcolorbox}[enhanced,title=My title,segmentation code={
\path)[top color=red!5!white,bottom color=red!5!white,middle color=blue]
(segmentation.south west) rectangle (segmentation.north east);\}]
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.

\texttt{/tcb/segmentation empty} (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} \texttt{\textsuperscript{P.127}}.
/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\textsuperscript{128}. 
8.3 Subskins

A subskin is a new /tcb/skin based on an existing skin which is extended or changed.

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 beamer and the style /tcb/beamer as pattern.

\tcbsubskin\{⟨name⟩\}(⟨base skin⟩)(⟨options⟩)

Creates a new skin ⟨name⟩ which inherits all properties of an existing ⟨base skin⟩ plus the given ⟨options⟩. The new skin ⟨name⟩ can be used as value for the keys /tcb/skin, /tcb/skin first, /tcb/skin middle, and /tcb/skin last. As ⟨base skin⟩, one can take standard, empty, enhanced, or any skin from the skins library, see Section 9 on page 124.

\% \tcbuselibrary{skins}
\tcbsubskin{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=empty, skin middle=empty, skin last=empty }
\begin{tcolorbox}[skin=empty]  
This is my content.
\end{tcolorbox}

/tcb/skin first is subskin of={⟨base skin⟩}(⟨options⟩) (no default, initially unset)

Creates a new unnamed skin which inherits all properties of an existing ⟨base skin⟩ plus the given ⟨options⟩. This skin is set as /tcb/skin first.

See a detailed example on page 210.

/tcb/skin middle is subskin of={⟨base skin⟩}(⟨options⟩) (no default, initially unset)

Creates a new unnamed skin which inherits all properties of an existing ⟨base skin⟩ plus the given ⟨options⟩. This skin is set as /tcb/skin middle.

See a detailed example on page 210.

/tcb/skin last is subskin of={⟨base skin⟩}(⟨options⟩) (no default, initially unset)

Creates a new unnamed skin which inherits all properties of an existing ⟨base skin⟩ plus the given ⟨options⟩. This skin is set as /tcb/skin last.

See a detailed example on page 210.
8.4 Drawing Scheme

Depending on the complexity of a \texttt{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:

\begin{verbatim}
\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[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[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}
\end{verbatim}

For this definition, we get the maximal number of drawing steps:

1. shadow

- Section 9.6 on page 156.

2. frame

- /tcb/colframe \textsuperscript{P.26}, /tcb/opacityframe \textsuperscript{P.49}
- /tcb/frame code \textsuperscript{P.116}
- /tcb/frame style \textsuperscript{P.124}
Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. 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.


Lower part

- Section 9.9 on page 171
9 Library skins

The library is loaded by a package option or inside the preamble by:

\tcbusetlibrary{skins}

This also loads the package tikz [20]. Typically but not necessarily, the following skins use tikz instead of pgf.

9.1 Style Option Keys

The following style options are applicable for all skins which use engines of type path, pathfirst, pathmiddle, or pathlast. Especially, the skin enhanced supports all of them and standard none.

/tcb/frame style=(tikz keys) (style, no default)

The (tikz keys) are used inside the tikz path command for drawing the frame of the box. This option is available if the /tcb/frame engine is set to path, pathfirst, pathmiddle, or pathlast. It is not available for standard.

/tcb/frame style image=⟨file name⟩ (no default, initially unset)

Fills the frame with an external image referenced by ⟨file name⟩. For advanced features like blending of a picture with the background, use /tcb/frame style together with /tikz/fill stretch image.
/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 ⟨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/frame style P.124 together with /tikz/fill tile image P.227.

\begin{tcolorbox}
[enhanced,title=My title, frame style tile={width=1cm}{pink_marble.png}]
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/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.116.

\begin{tcolorbox}
[enhanced,title=My title, frame hidden]
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/interior style={⟨tikz keys⟩} (style, no default)
The ⟨tikz keys⟩ are used inside the 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.113 or /tcb/interior engine P.114 is set to path, pathfirst, pathmiddle, or pathlast. It is not available for standard.

\begin{tcolorbox}
[enhanced,title=My title, interior style={left color=red!20!white, right color=yellow!50!white}]
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/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 together with /tikz/fill stretch image.

\begin{tcolorbox}
\tcbset{colframe=red!75!black,fonttitle=\bfseries}
\begin{tcbox}[enhanced,title=My title,
interior style image=goldshade.png]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcbox}
\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 together with /tikz/fill tile image.

\begin{tcolorbox}
\tcbset{colframe=red!75!black,fonttitle=\bfseries}
\begin{tcbox}[enhanced,title=My title,
interior style tile={width=2cm}{crinklepaper.png}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcbox}
\end{tcolorbox}

/tcb/interior hidden (style, no value)
This is a shortcut for interior style={draw=none,fill=none}. Depending on the skin, this option switches off the drawing of the interior. Alternatively, use /tcb/interior empty and/or /tcb/interior titled empty.

\begin{tcolorbox}
\tcbset{frame style={top color=red!20!white,
bottom color=red!20!white!75!black},
fonttitle=\bfseries,coltitle=black}
\begin{tcbox}[enhanced,title=My title,
interior hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcbox}
\end{tcolorbox}
\texttt{/tcb/segmentation style=\{tikz keys\}} (style, no default)
The \{tikz keys\} are used inside the \texttt{tikz} path command for drawing the segmentation line of the box.
This option is available if the \texttt{/tcb/segmentation engine}\textsuperscript{\ref{P.114}} is set to \texttt{path}. It is not available for \texttt{standard}.

\begin{tcolorbox}
\begin{tcset}
\cbset{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 \texttt{tcolorbox}.
\tcbbelow
This is the lower part.
\end{tcolorbox}
\end{tcset}
\end{tcolorbox}

\texttt{/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 \texttt{/tcb/lower separated}\textsuperscript{\ref{P.24}} which has the same effect for most skins. Alternatively, use \texttt{/tcb/segmentation empty}\textsuperscript{\ref{P.117}}.

\begin{tcolorbox}
\begin{tcset}
\cbset{colback=red!5!white,colframe=red!75!black,fonttitle=bfseries}
\begin{tcolorbox}[title=My title,segmentation hidden=
\begin{tcset}
\cbset{colback=red!5!white,colframe=red!75!black,fonttitle=bfseries}
\begin{tcolorbox}[enhanced,title=My title,title style=\{left color=blue!15!yellow,right color=red!85!black\}]
This is a \texttt{tcolorbox}.
\tcbbelow
This is the lower part.
\end{tcolorbox}
\end{tcset}
\end{tcolorbox}
\end{tcset}
\end{tcolorbox}

\texttt{/tcb/title style=\{tikz keys\}} (style, no default)
The \{tikz keys\} are used inside the \texttt{tikz} path command for drawing the title area of the box.
This option is available if the \texttt{/tcb/title engine}\textsuperscript{\ref{P.114}} is set to \texttt{path}, \texttt{pathfirst}, \texttt{pathmiddle}, or \texttt{pathlast}. It is not available for \texttt{standard}.

\begin{tcolorbox}
\begin{tcset}
\cbset{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 \texttt{tcolorbox}.
\tcbbelow
This is the lower part.
\end{tcolorbox}
\end{tcset}
\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\textsuperscript{P.127} together with /tikz/fill stretch image\textsuperscript{P.223}.

```
\tcbset{colback=blue!5!white,colframe=blue!75!black,
        fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,
            title style image=blueshade.png]
\textbf{This is a tcolorbox.}
\tcblower
This is the lower part.
\end{tcolorbox}
```

My title
This is a tcolorbox.
This is the lower part.

```
\begin{tcolorbox}[enhanced,title=My title,
            title style image=pink_marble.png]
\textbf{This is a tcolorbox.}
\tcblower
This is the lower part.
\end{tcolorbox}
```

My title
This is a tcolorbox.
This is the lower part.

```
\tcbset{colback=blue!5!white,colframe=blue!75!black,
        fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,\textbf{title hidden}]
\textbf{This is a tcolorbox.}
\tcblower
This is the lower part.
\end{tcolorbox}
```

My title
This is a tcolorbox.
This is the lower part.

/tcb/title style tile={(graphics options)\{\langle\text{name}\rangle\}} (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\textsuperscript{P.127} together with /tikz/fill tile image\textsuperscript{P.227}.

```
\tcbset{colback=red!5!white,colframe=red!75!black,\bfseries
        coltitle=blue!50!black,fonttitle=\bfseries}
\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}
```

My title
This is a tcolorbox.
This is the lower part.

/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\textsuperscript{P.26} for a similar effect. Alternatively, use /tcb/title empty\textsuperscript{P.118}.

```
\tcbset{colback=red!5!white,colframe=red!75!black,\bfseries
        fonttitle=\bfseries}
\begin{tcolorbox}[title=My title,\textbf{title hidden}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

My title
This is a tcolorbox.
This is the lower part.
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\textsuperscript{P.35}. 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\textsuperscript{P.169}. Thus, it is not available for standard\textsuperscript{P.176} and standard jigsaw\textsuperscript{P.177}, but for all other skins, e.g. enhanced\textsuperscript{P.178}. As an underlay, this option can be used multiple times and is removed by /tcb/no underlay\textsuperscript{P.169}.

\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, frame hidden, title=My title, boxrule=0pt,titlerule=1mm, titlerule style=red!50!black ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

%\usetikzlibrary{arrows.meta}
\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 TikZ style applied to frame, interior, and title background can be used by authors in customizing code.

\tikz/tcb fill frame (style, no value)  
This is a TikZ style which is finally applied to the frame of the box.

\tikz/tcb fill interior (style, no value)  
This is a TikZ style which is finally applied to the interior of the box.

\tikz/tcb fill title (style, no value)  
This is a TikZ style which is finally applied to the title area of the box.
9.2 Boxed Title Option Keys

The following options place the title text into an own \texttt{tcbox}. This boxed title can be customized independently from the main box using /\texttt{tcb} /boxed title style. The placement can be influenced by \texttt{boxtitle options}.

\texttt{/tcb/attach boxed title to top left=\langle boxtitle options \rangle} (style, default empty)
The title is boxed with a \texttt{tcbox} 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 \texttt{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/attach boxed title to top center=\langle boxtitle options \rangle} (style, default empty)
The title is boxed with a \texttt{tcbox} and attached to the top of the main box.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top center] This is a \texttt{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/attach boxed title to top right=\langle boxtitle options \rangle} (style, default empty)
The title is boxed with a \texttt{tcbox} 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 \texttt{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/attach boxed title to bottom left=\langle boxtitle options \rangle} (style, default empty)
The title is boxed with a \texttt{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 \texttt{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/attach boxed title to bottom center=\langle boxtitle options \rangle} (style, default empty)
The title is boxed with a \texttt{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 \texttt{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/attach boxed title to bottom right=\langle boxtitle options \rangle} (style, default empty)
The title is boxed with a \texttt{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 \texttt{tcolorbox}.
\end{tcolorbox}
The \textit{boxtitle options} 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 \textit{boxtitle options}:

\begin{itemize}
  \item \texttt{/tcb/boxtitle/xshift=(length)} (no default, initially 0pt)
    The boxed title is shifted by \texttt{(length)} in the horizontal direction.

  \begin{tcolorbox}[enhanced,title=My title, attach boxed title to top left={xshift=-2mm}, boxed title style={size=small,colback=blue}]
    This is a \texttt{tcolorbox}.
  \end{tcolorbox}

  \begin{tcolorbox}[enhanced,title=My title, attach boxed title to top center={yshift=-\tcboxedtitleheight/2}, boxed title style={size=small,colback=blue}]
    This is a \texttt{tcolorbox}.
  \end{tcolorbox}

  \begin{tcolorbox}[enhanced,title=My title, attach boxed title to top center={yshift*=-3mm}, boxed title style={size=small,colback=blue}, show bounding box]
    This is a \texttt{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 \texttt{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 \texttt{tcolorbox}.
  \end{tcolorbox}

  \begin{tcolorbox}[enhanced,title=My title, attach boxed title to top center={yshift*=-3mm}, boxed title style={size=small,colback=blue}]
    This is a \texttt{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 \texttt{tcolorbox}.
  \end{tcolorbox}

  \begin{tcolorbox}[enhanced,title=My title, attach boxed title to top center={yshift*=-3mm}, boxed title style={size=small,colback=blue}, show bounding box]
    This is a \texttt{tcolorbox}.
  \end{tcolorbox}
\end{itemize}
The boxed title options are implemented as an underlay, see Section 9.8 on page 169. Therefore, a boxed title is not drawn, if a skin does not support underlays like standard\textsuperscript{P.176}. Still, the room for the boxed titles gets reserved in these cases.

A Ti\kZ node title is produced by a boxed title which can be used inside /tcb/frame code\textsuperscript{P.116}, /tcb/interior code\textsuperscript{P.117}, underlays, overlays, and finishes.

A boxed title is almost always the first underlay. The only exceptions are underlays defined by /tcb/underlay boxed title\textsuperscript{P.170} which are drawn before. Additionally, underlays defined by /tcb/underlay boxed title\textsuperscript{P.170} are only drawn, if a boxed title is actually set. They are ignored, if there is no boxed title.

\begin{tcolorbox}[enhanced,title=My title, fonttitle=\bfseries,coltitle=green!25!black, attach boxed title to top center=\{yshift=-2mm,yshifttext=-1mm\}, boxed title style=\{colframe=green!75!black, colback=yellow!50!green\}] This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title, colframe=red!50!black,colback=red!10!white, arc=1mm,colbacktitle=red!10!white, fonttitle=\bfseries,coltitle=red!50!black, attach boxed title to top left=\{xshift=3.2mm,yshift=-0.50mm\}, boxed title style=\{enhanced, skin=enhancedfirst_jigsaw, size=small,arc=1mm,bottom=-1mm, interior style=\{fill=none, top color=red!30!white, bottom color=red!20!white\}\}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
The title text content is captured with a horizontal box. Especially, there are no linebreak possible.

\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\bigskip
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}

The title text content is captured with a minipage with a width of \emph{(length)}. By default, the resulting boxed title is somewhat smaller than the main box.

\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\bigskip
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}

The title text content is captured with a minipage with a width of main box width plus \emph{(length)}. By default, the resulting boxed title is somewhat smaller than the main box.

\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\bigskip
\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 \texttt{(options)}. The text is centered by default.

\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 \texttt{(length)}. This style needs the \texttt{varwidth} package \cite{varwidth} to be loaded manually. By default, the resulting boxed title is somewhat smaller than the main box.

\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 \texttt{(length)}. This style needs the \texttt{varwidth} package \cite{varwidth} to be loaded manually. By default, the resulting boxed title is somewhat smaller than the main box.

\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}
9.3 Watermark Option Keys

The following watermark options are applicable for all skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment} \textsuperscript{P.112}. Therefore, the skin \texttt{standard} \textsuperscript{P.176} does not support these watermarks, but all other skins, e.g. \texttt{enhanced} \textsuperscript{P.178}.

The watermark options rely on the more general overlay options described in Section 4.12 from page 64. Therefore, \texttt{watermarks} and \texttt{overlays} cannot be used mixed. But a mixture is possible with the \texttt{\_\_\_hooks} library, see Section 18.

\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}
[enhanced,title=My title,watermark text=My Watermark]
\lipsum[1]
\tcblower
\lipsum[2]
\end{tcolorbox}
\end{verbatim}

\textbf{My title}


\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}
[enhanced,title=My title,watermark text on=\texttt{part} is \texttt{text}]
\lipsum[1]
\tcblower
\lipsum[2]
\end{tcolorbox}
\end{verbatim}

\textbf{My title}


Feasible values for \texttt{\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,
- \texttt{first and middle}: first and middle parts of a break sequence.
/tcb/watermark graphics = (file name) (no default, initially unset)
Draws an external picture referenced by (file name) in the center of the interior region of a \tcolorbox. The picture is drawn \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 /tcb/watermark zoom \textsuperscript{P.142} or /tcb/watermark stretch \textsuperscript{P.144}.

\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 on=}(part) is (file name) (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 \textsuperscript{P.307}.

Feasible values for (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.
/tcb/watermark tikz={⟨graphical code⟩} (no default, initially unset)

Draws the given tikz ⟨graphical code⟩ in the center of the interior region of a tcolorbox. The code is executed after the frame and interior are drawn and before the text content is drawn. The result is zoomed or stretched according the values of /tcb/watermark zoom P.142 or /tcb/watermark stretch P.144.

```latex
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\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]\\tcb当地人
\lipsum[2]\\end{tcolorbox}
```

My title


/tcb/watermark tikz on=⟨part⟩ is ⟨graphical code⟩ (no default, initially unset)

This option draws the given tikz ⟨graphical code⟩ in the center of the interior region of a tcolorbox as described for /tcb/watermark tikz. But this is done only for boxes named ⟨part⟩ of a break sequence, see /tcb/breakableP.307.

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.

/tcb/no watermark (style, no default, initially set)

Removes the watermark if set before. This is an alias for /tcb/no overlayP.65.
\texttt{/tcb/watermark opacity=\langle fraction \rangle}
(no default, initially 1.00)

Sets the opacity value $\in [0,1]$ for a watermark.

\begin{tcolorbox}[title=Opacity 1.00,watermark opacity=1.00]
\lipsum[2]
\end{tcolorbox}
\hspace{1cm}
\begin{tcolorbox}[title=Opacity 0.50,watermark opacity=0.50]
\lipsum[2]
\end{tcolorbox}

\textbf{Opacity 1.00}
Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor
torem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tel-
lus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vi-
tae 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.

\textbf{Opacity 0.50}
Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor
torem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tel-
lus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vi-
tae 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.

\texttt{/tcb/watermark zoom=\langle fraction \rangle}
(no default, initially 0.75)

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.

\begin{tcolorbox}[title=Zoom 1.0,watermark zoom=1.0]
\lipsum[2]
\end{tcolorbox}
\hspace{1cm}
\begin{tcolorbox}[title=Zoom 0.5,watermark zoom=0.5]
\lipsum[2]
\end{tcolorbox}

\textbf{Zoom 1.0}
Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor
torem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tel-
lus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vi-
tae 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.

\textbf{Zoom 0.5}
Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor
torem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tel-
lus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vi-
tae 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/watermark shrink=(fraction)  
(no default, initially unset)

Identically to /tcb/watermark zoom \xrightarrow{P.142}, but the watermark never gets enlarged. Thus, the watermark keeps its original size or is shrunk.

/tcb/watermark overzoom=(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}
\texttt{\begin{minipage}{0.45\textwidth}
tcbset{enhanced, colback=white, colframe=blue!50!black, fonttitle=\bfseries, watermark opacity=0.5, watermark graphics=lichtspiel.jpg, nobeforeafter, width=(\linewidth-2mm)/2}
\end{minipage}}
\begin{minipage}{0.45\textwidth}
\begin{verbatim}
\tcbset{enhanced, colback=white, colframe=blue!50!black, fonttitle=\bfseries, watermark opacity=0.5, watermark graphics=lichtspiel.jpg, nobeforeafter, width=(\linewidth-2mm)/2}
\end{verbatim}
\end{minipage}\end{tcolorbox}

If a /tcb/watermark overzoom value of 1.0 is used in connection with invisible top and bottom rules which still have a thickness greater than 0pt, the space of these invisible rules may not be covered by the watermark. For example, this situation may occur during the breaking of /tcb/enhanced \xrightarrow{P.178} boxes. To avoid this optical glitch, just set /tcb/pad at break \xrightarrow{P.311} 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.

\begin{tcolorbox}
[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}
\begin{tcolorbox} [title=Stretch 0.50, watermark stretch=0.50]
\lipsum[2]
\end{tcolorbox}
\end{tcolorbox}

/tcb/watermark color=(color) (no default, initially mixed background and frame color)
Sets the color for the watermark.

\begin{tcolorbox}
[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}
\end{tcolorbox}
Sets the watermark to be clipped to the interior area.

\[\texttt{\texttt{\textbackslash tcbset\{enhanced, colback=white, colframe=blue!50!white, fonttitle=\textbf{\texttt{bfseries}}, watermark opacity=0.5, watermark stretch=1.00, arc=3mm, watermark graphics=lichtspiel.jpg\}}}

\begin{tcolorbox}
\begin{Verbatim}
\texttt{\texttt{\textbackslash lipsum[1]}}
\end{Verbatim}
\end{tcolorbox}

\begin{tcolorbox}
\begin{Verbatim}
\texttt{\texttt{\textbackslash lipsum[1]}}
\end{Verbatim}
\end{tcolorbox}

\begin{tcolorbox}
\begin{Verbatim}
\texttt{\texttt{\textbackslash lipsum[1]}}
\end{Verbatim}
\end{tcolorbox}

\begin{tcolorbox}
\begin{Verbatim}
\texttt{\texttt{\textbackslash lipsum[1]}}
\end{Verbatim}
\end{tcolorbox}

\begin{tcolorbox}
\begin{Verbatim}
\texttt{\texttt{\textbackslash lipsum[1]}}
\end{Verbatim}
\end{tcolorbox}

Clip (default)


No clip

9.4 Clip Environments

The following clip environments are applicable for all skins which use engines of type \texttt{path}, \texttt{pathfirst}, \texttt{pathmiddle}, or \texttt{pathlast}. Especially, the skin \texttt{enhanced} \textsuperscript{P.178} supports all of them and \texttt{standard} \textsuperscript{P.176} none. The typical area of application is inside overlay code, see Section 4.12 from page 64.

\begin{tcbclipframe}
\begin{environment content}
\end{tcbclipframe}

Defines a \LaTeX\ scope which clips to the frame area path.

\begin{picturebox}[title=My Picture Box]{lichtspiel.jpg}
\lipsum[1]
\end{picturebox}

My Picture Box

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, faucibus, nisl. Donec vel ante, fringilla vel, aliquet ac, tortor. Integer ac tortor vitae turpis euismod ac, elementum, elit. Donec euismod pharetra magna.

\texttt{\begin{verbatim}
\makeatletter
\newtcolorbox{picturebox}[2][]{
  enhanced,frame hidden,interior hidden,fonttitle=\bfseries,
  overlay={\begin{tcbclipframe}\node at (frame)
  \begin{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}
\end{verbatim}}
\begin{tcbinvclipframe}
\textit{environment content}
\end{tcbinvclipframe}

Defines a Tikz scope which clips to the \textit{outside} of the frame area path.

\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}

\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{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}
\end{tcbclipinterior}

Defines a Tikz scope which clips to the interior area path.

\begin{tcbliptitle}
\begin{tcolorbox}[enhanced,title=My Title,colframe=blue,colback=yellow!10!white,
overlay={\begin{tcbliptitle}\node at (title)\{\includegraphics[width=\linewidth]{lichtspiel.jpg}\};\end{tcbliptitle}}]
\lipsum[1]
\end{tcolorbox}
\end{tcbliptitle}

Defines a Tikz scope which clips to the title area path.
\verb|/tcb/clip title|=true|false

Sets the title to be clipped to the title area.

\begin{tcolorbox}[title=This is a title which is unbreakable and far too long]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=This is a title which is unbreakable and far too long, clip title]
This is a tcolorbox.
\end{tcolorbox}

\verb|/tcb/clip upper|=true|false

Sets the upper part to be clipped to the interior area.

\newcommand{\mygraphics}[2][]{{% 
  \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}}
  {\includegraphics[width=\the\dimexpr(\linewidth-4mm)/2\relax}{#2}}}

\mygraphics[lichtspiel.jpg]\hspace{1em}
\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.

\[\text{\begin{tcblisting}{clip lower}\end{tcblisting}}\]

Sets the lower part to be clipped to the interior area.
9.5 Border Line Option Keys

The following borderline options are applicable for most skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment P.112}. Therefore, the skin \texttt{standard P.176} does not support these border lines, but most other skins, e.g. \texttt{enhanced P.178}.

The borderlines are independent from the normal \texttt{tcolorbox} rules. They may be used with or without the \texttt{/tcb/segmentation engine P.114}.

The borderlines are stackable, i.e. several different border lines can be used on the same \texttt{tcolorbox}. They are drawn \textit{after} the box frame and box interior and \textit{before} overlays or watermarks.

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

Technically, the normal \texttt{tcolorbox} rules result from a Ti\textsc{k}Z \textit{filling} process. The border lines are created by a Ti\textsc{k}Z \textit{drawing} process. This can be used to apply different effects.

\texttt{/tcb/borderline=\{(width)\}{(offset)\}{(options)\}} (no default, initially unset)

Adds a new borderline to the stack of border lines. This border line is drawn with the given \texttt{(width)} and gets an \texttt{(offset)} computed from the frame outline. A positive \texttt{(offset)} value moves the borderline inside the \texttt{tcolorbox} and a negative \texttt{(offset)} value moves it outside without changing the bounding box.

The border line is drawn along a Ti\textsc{k}Z path with the given Ti\textsc{k}Z \texttt{(options)}. Note that the Ti\textsc{k}Z \texttt{line width} option should not be used here.

The border lines adapt to the rounded corners of the \texttt{tcolorbox}. An inside borderline will switch to sharp corners if necessary, an outside borderline will always be rounded except for \texttt{/tcb/sharp corners P.46}.

\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} ]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

\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} ]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}


My title


/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.
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 \langle\text{offset}\rangle, they ignore skin settings but adapt to breakable boxes.

N 2014-10-20 \texttt{/tcb/borderline north={⟨width⟩}{⟨offset⟩}{⟨options⟩}} (no default, initially unset)

Adds a new borderline with the given \langle width\rangle to the north of the \texttt{tcolorbox}. A positive \langle offset\rangle value moves the borderline inside the \texttt{tcolorbox} and a negative \langle offset\rangle value moves it outside without changing the bounding box.

\begin{tcolorbox}[enhanced,  
borderline north={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

N 2014-10-20 \texttt{/tcb/borderline south={⟨width⟩}{⟨offset⟩}{⟨options⟩}} (no default, initially unset)

Adds a new borderline with the given \langle width\rangle to the south of the \texttt{tcolorbox}. A positive \langle offset\rangle value moves the borderline inside the \texttt{tcolorbox} and a negative \langle offset\rangle value moves it outside without changing the bounding box.

\begin{tcolorbox}[enhanced,  
borderline south={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

N 2014-10-20 \texttt{/tcb/borderline east={⟨width⟩}{⟨offset⟩}{⟨options⟩}} (no default, initially unset)

Adds a new borderline with the given \langle width\rangle to the east of the \texttt{tcolorbox}. A positive \langle offset\rangle value moves the borderline inside the \texttt{tcolorbox} and a negative \langle offset\rangle value moves it outside without changing the bounding box.

\begin{tcolorbox}[enhanced,  
borderline east={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

N 2014-10-20 \texttt{/tcb/borderline west={⟨width⟩}{⟨offset⟩}{⟨options⟩}} (no default, initially unset)

Adds a new borderline with the given \langle width\rangle to the west of the \texttt{tcolorbox}. A positive \langle offset\rangle value moves the borderline inside the \texttt{tcolorbox} and a negative \langle offset\rangle value moves it outside without changing the bounding box.

\begin{tcolorbox}[enhanced,  
borderline west={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{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 \textbf{tcolorbox}. A positive ⟨offset⟩ value moves the borderlines inside the \textbf{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 \textbf{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 \textbf{tcolorbox}. A positive ⟨offset⟩ value moves the borderlines inside the \textbf{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}.
My second line.
\end{tcolorbox}
This is a \textbf{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}

9.6 Shadow Option Keys

The following shadow options are applicable for most skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical~environment}. Therefore, the skin \texttt{standard} does not support these shadows, but most other skins, e.g. \texttt{enhanced}.

The shadows are stackable, i.e. several different shadows can be used on the same \texttt{tcolorbox}. They are drawn \texttt{before} the box frame is drawn.

\texttt{/tcb/no~shadow} \hspace{1cm} (no default)

Removes all shadows if set before.

9.6.1 Common Shadows and Halos

\texttt{/tcb/drop~shadow} \hspace{1cm} \texttt{\textcolor{color}{\texttt{(color)}}} \hspace{1cm} (style, default \texttt{black\!50\!white})

Adds a new shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{(color)} for the shadow can be changed.

\begin{tcolorbox}\[drop shadow\]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Another shadow, drop shadow=blue]
This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/drop~fuzzy~shadow} \hspace{1cm} \texttt{\textcolor{color}{\texttt{(color)}}} \hspace{1cm} (style, default \texttt{black\!50\!white})

Adds a new fuzzy shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{(color)} for the shadow can be changed.

\begin{tcolorbox}\[drop fuzzy shadow\]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Another shadow, drop fuzzy shadow=blue]
This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/drop~midday~shadow} \hspace{1cm} \texttt{\textcolor{color}{\texttt{(color)}}} \hspace{1cm} (style, default \texttt{black\!50\!white})

Adds a new shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{(color)} for the shadow can be changed.

\begin{tcolorbox}\[drop midday shadow\]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Another shadow, drop midday shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
/tcb/drop fuzzy midday shadow=\langle\textit{color}\rangle\quad\text{(style, default black!50!white)}

Adds a new fuzzy shadow with standard dimensions to the stack of shadows. Optionally, the \langle\textit{color}\rangle for the shadow can be changed.

\begin{tcolorbox}[drop fuzzy midday shadow]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Another shadow, drop fuzzy midday shadow=blue]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=My own halo, halo=2mm with green]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Another halo, fuzzy halo=2mm with green]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[blank, enhanced jigsaw, boxsep=2pt, arc=2pt, fuzzy halo=2mm with red!50!white, fuzzy halo=1mm with white]
\lipsum[1]
\end{tcolorbox}


/tcb/halo=\langle\textit{size}\rangle\text{ \textit{with} }\langle\textit{color}\rangle\quad\text{(style, default 0.9mm with yellow)}

Adds a new halo shadow with the given \langle\textit{color}\rangle which overlaps the colorbox all sides by \langle\textit{size}\rangle.

\begin{tcolorbox}[title=My own halo, halo=2mm with green]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Another halo, fuzzy halo=2mm with green]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Another halo]
This is a tcolorbox.
\end{tcolorbox}

/tcb/fuzzy halo=\langle\textit{size}\rangle\text{ \textit{with} }\langle\textit{color}\rangle\quad\text{(style, default 0.9mm with yellow)}

Adds a new fuzzy halo shadow with the given \langle\textit{color}\rangle which overlaps the colorbox all sides by \langle\textit{size}\rangle plus 0.48mm.

\begin{tcolorbox}[title=My own halo, fuzzy halo=2mm with green]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Another halo, fuzzy halo=2mm with green]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Another halo]
This is a tcolorbox.
\end{tcolorbox}
For all following shadows, the optionally given \texttt{⟨color⟩} for the shadow can be changed equivalent to the preceding examples.

\begin{tcolorbox}[drop shadow southeast, enhanced,colback=red!5!white,colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}

\texttt{\color{black!50!white} ≡ P.156}

\begin{tcolorbox}[drop shadow southwest, enhanced,colback=red!5!white,colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}

\texttt{\color{black!50!white} ≡ P.156}

\begin{tcolorbox}[drop shadow west, enhanced,colback=red!5!white,colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}

\texttt{\color{black!50!white} ≡ P.156}

\begin{tcolorbox}[drop shadow northwest, enhanced,colback=red!5!white,colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}

\texttt{\color{black!50!white} ≡ P.156}

\begin{tcolorbox}[drop shadow north, enhanced,colback=red!5!white,colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}

\texttt{\color{black!50!white} ≡ P.156}
/tcb/drop shadow northeast=(color)  (style, default black!50!white)
Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\begin{drop shadow northeast, 
  enhanced, colback=red!5!white, colframe=red!75!black
\end{drop shadow northeast}
This is a tcolorbox.
\end{tcolorbox}
This is a tcolorbox.

/tcb/drop shadow east=(color)  (style, default black!50!white)
Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\begin{drop shadow east, 
  enhanced, colback=red!5!white, colframe=red!75!black
\end{drop shadow east}
This is a tcolorbox.
\end{tcolorbox}
This is a tcolorbox.

/tcb/drop fuzzy shadow southeast=(color)  (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

\begin{tcolorbox}
\begin{drop fuzzy shadow southeast, 
  enhanced, colback=red!5!white, colframe=red!75!black
\end{drop fuzzy shadow southeast}
This is a tcolorbox.
\end{tcolorbox}
This is a tcolorbox.

/tcb/drop fuzzy shadow south=(color)  (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

\begin{tcolorbox}
\begin{drop fuzzy shadow south, 
  enhanced, colback=red!5!white, colframe=red!75!black
\end{drop fuzzy shadow south}
This is a tcolorbox.
\end{tcolorbox}
This is a tcolorbox.

/tcb/drop fuzzy shadow southwest=(color)  (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\begin{drop fuzzy shadow southwest, 
  enhanced, colback=red!5!white, colframe=red!75!black
\end{drop fuzzy shadow southwest}
This is a tcolorbox.
\end{tcolorbox}
This is a tcolorbox.

/tcb/drop fuzzy shadow west=(color)  (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\begin{drop fuzzy shadow west, 
  enhanced, colback=red!5!white, colframe=red!75!black
\end{drop fuzzy shadow west}
This is a tcolorbox.
\end{tcolorbox}
This is a tcolorbox.
/tcb/drop fuzzy shadow northwest=(color)  (style, default black!50!white)
 Adds 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)
 Adds 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)
 Adds 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)
 Adds 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}
9.6.2 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.

\tcbox{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.

\tcbox{enhanced, colback=red!5!white, boxrule=0.4pt, sharp corners, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[drop small lifted shadow, size=fbox] {This is a tcolorbox.} \end{tcolorbox}
\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.

\tcbox{enhanced, colback=red!5!white, boxrule=0.4pt, sharp corners, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[drop large lifted shadow] This is a tcolorbox. \end{tcolorbox}
\begin{tcolorbox}[title=Another shadow, drop large lifted shadow=blue] This is a tcolorbox. \end{tcolorbox}
9.6.3 Generic Shadows

\rightarrow{\text{	exttt{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 \texttt{TikZ} path with the given \texttt{TikZ} \langle options \rangle.

The shadows adapt to the rounded corners of the \texttt{tcolorbox}. An shrinked shadow will switch to sharp corners if necessary, an enlarged shadow may become more rounded depending on several factors. But \texttt{/tcb/sharp corners} \textsuperscript{\textsuperscript{P.46}} 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}]
This is a tcolorbox.
\end{tcolorbox}
/tcb/fuzzy shadow={⟨xshift⟩}{⟨yshift⟩}{⟨offset⟩}{⟨step⟩}{⟨options⟩} (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 \texttt{⟨xshift⟩} and \texttt{⟨yshift⟩}. The \texttt{⟨offset⟩} value is a
distance value from the frame outline. A positive \texttt{⟨offset⟩} value shrinks the shadow and a
negative \texttt{⟨offset⟩} value enlarges the shadow. The \texttt{⟨⟨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 \texttt{(⟨options⟩)} but any \texttt{opacity} value will be ignored.

\begin{tcolorbox}[title=My own shadow,]
\fuzzy shadow={2mm}{-1mm}{0mm}{0.1mm}{\textcolor{black!50!white}}
\end{tcolorbox}
This is a \texttt{tcolorbox}.

\begin{tcolorbox}[title=Another shadow,]
\fuzzy shadow={-1mm}{-2mm}{0mm}{0.2mm}{\textcolor{fill=blue}}
\end{tcolorbox}
This is a \texttt{tcolorbox}.

\begin{tcolorbox}[title=Double shadow,]
\fuzzy shadow={-1.5mm}{-1.5mm}{0mm}{0.1mm}{\textcolor{blue}},
\fuzzy shadow={1.5mm}{-1.5mm}{0mm}{0.1mm}{\textcolor{red}}
\end{tcolorbox}
This is a \texttt{tcolorbox}.

\begin{tcolorbox}[title=Far shadow,]
\fuzzy shadow={5.5mm}{-3.5mm}{0mm}{0.3mm}{\textcolor{black}}
\end{tcolorbox}
This is a \texttt{tcolorbox}.

\begin{tcolorbox}[title=Glow shadow,]
\fuzzy shadow={0mm}{0mm}{-1.5mm}{0.15mm}{\textcolor{yellow!75!red}}
\end{tcolorbox}
This is a \texttt{tcolorbox}.

\newtcolorbox{mybox}{[1]}{\texttt{\{}enhanced,\texttt{\}}
fuzzy shadow={1.0mm}{-1.0mm}{0.12mm}{0mm}{\textcolor{blue!50!white}},
fuzzy shadow={-1.0mm}{-1.0mm}{0.12mm}{0mm}{\textcolor{red!50!white}},
fuzzy shadow={-1.0mm}{1.0mm}{0.12mm}{0mm}{\textcolor{green!50!white}},
fuzzy shadow={1.0mm}{1.0mm}{0.12mm}{0mm}{\textcolor{yellow!50!white}},#1}
\begin{mybox}[title=A multi shadow box]
This is a \texttt{tcolorbox}.
\end{mybox}
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.

```
\set{enhanced,nobeforeafter,colback=red!5!white,
     colframe=red!75!black,width=3cm,square,halign=center,valign=center}
\begin{tcolorbox}[drop shadow]
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}
```

```
\set{enhanced,colback=red!5!white,
     boxrule=0.1pt,
     colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My own shadow,
                 lifted shadow={1mm}{-2mm}{3mm}{0.1mm}]
This is a tcolorbox.
\end{tcolorbox}
```

`tcb/lifted shadow` 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 `tcolorbox` but is shifted by \langle xshift \rangle and \langle yshift \rangle on the lower left corner and by \langle xshift \rangle and \langle yshift \rangle on the lower right corner. Additionally, there is a \langle bend \rangle in the middle. The \langle step \rangle value describes a shrink offset used for the combination of the partial shadows. The shadow is filled along a Ti\LaTeX\ path with the given Ti\LaTeX\ \langle options \rangle but any opacity value will be ignored.

```
\begin{tcolorbox}[title=My own shadow,
                 lifted shadow={1mm}{-2mm}{3mm}{0.1mm}]
This is a tcolorbox.
\end{tcolorbox}
```
9.6.4 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 `/tcb/frame style`.

```latex
\usetikzlibrary{shadows}
\tcolorbox[enhanced, colback=red!5!white, colframe=red!75!black, frame style={drop shadow}]
{This is a tcolorbox.}
```

```latex
\usetikzlibrary{shadows}
\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.}
```

```latex
\usetikzlibrary{shadows}
\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}}]
{This is a tcolorbox.}
```
9.7 TikZ Picture Option Keys

The following general options are applicable for skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment}. Therefore, the skin \texttt{standard} does not support these options, but most other skins, e.g. \texttt{enhanced}.

\texttt{/tcb/tikz=(tikz option list)} (no default, initially empty)

Adds the given \langle tikz option list \rangle to the main \texttt{tikzpicture} environment used to draw the color box, see [20]. If this option is applied a second time, the new \langle tikz option list \rangle is appended to the current option list.

\begin{tcolorbox}
\texttt{\tcbset{enhanced,colback=red!5!white,}
\texttt{colframe=red!75!black,fonttitle=\bfseries}}
\begin{tcolorbox}[title=Transparent box, tikz={opacity=0.5,transparency group}]
This is a tcolorbox.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}
\texttt{\tcbset{enhanced,colback=red!5!white,}
\texttt{colframe=red!75!black,fonttitle=\bfseries,}
\texttt{fontupper=\bfseries\Huge,}
\texttt{halign title=center,halign=center}}
\begin{tcolorbox}[title=Rotated box, tikz={rotate=30}]
Sold!
\end{tcolorbox}
\end{tcolorbox}

\texttt{/tcb/tikz reset} (initially set)

Removes all options given by \texttt{/tcb/tikz}.

\texttt{/tcb/at begin tikz=(tikz code)} (no default, initially empty)

The given \langle tikz code \rangle 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 \langle tikz code \rangle is appended to the current code.

\texttt{/tcb/at begin tikz reset} (initially set)

Removes all code given by \texttt{/tcb/at begin tikz}.

\texttt{/tcb/at end tikz=(tikz code)} (no default, initially empty)

The given \langle tikz code \rangle 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 \langle tikz code \rangle is appended to the current code.

\texttt{/tcb/at end tikz reset} (initially set)

Removes all code given by \texttt{/tcb/at end tikz}.
\[\text{/tcb/rotate} = \langle \text{angle} \rangle\] (no default, initially unset)
Rotates the tcolorbox by the given \( \langle \text{angle} \rangle \). Note that this is a TikZ 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}

\[\text{/tcb/scale} = \langle \text{fraction} \rangle\] (no default, initially unset)
Scales the tcolorbox by the given \( \langle \text{fraction} \rangle \). Note that this is a TikZ 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}

\[\text{/tcb/remember}\] (style, initially unset)
Shortcut for \texttt{tikz={remember picture}}. This allows one to reference nodes in other TikZ pictures.

\begin{tcolorbox}[enhanced,remember,colback=red!5!white,colframe=red!75!black,fonttitle=\textbf]{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 \langle name\rangle to be referenced in other \TeX pictures.

\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}

\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}

9.8 Underlay Option Keys

Underlays are quite similar to overlays described in Section 4.12 on page 64. Underlays are drawn after the frame and interior are drawn and before overlays and the text content is drawn; see Section 8.4 on page 120 for the general drawing scheme.

The differences between underlays and overlays are:

- Underlays are not applicable for the skins standard[^P.176] and standard jigsaw[^P.177], whereas overlays are applicable also for these skins. The skin spartan[^P.214] supports underlays but no overlays.

! If an underlay is used with the standard[^P.176] skin, it is silently ignored.

- Underlays are stackable, i.e. several different underlays can be used on the same \texttt{tcolorbox}. Overlays are not stackable by default (but with some help of the library \texttt{hooks}).

- Boxed titles are implemented with underlays (Section 9.2 on page 131), watermarks are implemented with overlays (Section 9.3 on page 139).

\texttt{/tcb/underlay=⟨graphical code⟩} \hspace{1em} (no default, initially unset)\n
Adds \texttt{(graphical code)} to the box drawing process. This \texttt{(graphical code)} is drawn after the frame and interior and before the text content.

\begin{tcolorbox}[\texttt{mybox}][1]\[1\][]{\texttt{enhanced},\texttt{colback=red!5!white},\texttt{colbacktitle=red!85!black!50!white},\texttt{colframe=red!75!black},\texttt{fonttitle=\texttt{bfseries}},\texttt{watermark color=yellow!50!white},\texttt{underlay=⟨\begin{tcbclipinterior}\texttt{draw[red!40!white, line width=1cm]} \texttt{(interior.south west)}\texttt{--(interior.north east)};\texttt{\end{tcbclipinterior}}\rangle},\texttt{attach boxed title to top center=⟨yshift=-2mm⟩,#1}\}

\texttt{\begin{mybox}[\texttt{title=My box},\texttt{watermark text=My Watermark}]\texttt{\lipsum[2]}\end{mybox}}

\texttt{/tcb/no underlay} \hspace{1em} (style, no default, initially set)\n
Removes the underlay if set before.

[^P.176]: Page 176
[^P.177]: Page 177
[^P.214]: Page 214
If the box is set to be `/tcb/breakable` and is broken actually, then the (graphical code) is added to the box drawing process. `/tcb/underlay` overwrites this key.

If the box is set to be `/tcb/unbreakable` but is not broken actually or if the box is set to be `/tcb/unbreakable` and is not broken actually, then the (graphical code) is added to the box drawing process. `/tcb/underlay` overwrites this key.

Removes the unbroken underlay if set before.

Removes the first underlay if set before.

Removes the middle underlay if set before.

Removes the last underlay if set before.

Removes the boxed title underlay if set before.

This is an abbreviation for setting `/tcb/underlay unbroken` and `/tcb/underlay first` together. `/tcb/underlay` overwrites this key.

This is an abbreviation for setting `/tcb/underlay middle` and `/tcb/underlay last` together. `/tcb/underlay` overwrites this key.

This is an abbreviation for setting `/tcb/underlay unbroken` and `/tcb/underlay last` together. `/tcb/underlay` overwrites this key.

This is an abbreviation for setting `/tcb/underlay first` and `/tcb/underlay middle` together. `/tcb/underlay` overwrites this key.
9.9 Finish Option Keys

Finishes are quite similar to underlays described in Section 9.8 on page 169 and overlays described in Section 4.12 on page 64. Finishes are drawn after the text content is drawn; see Section 8.4 on page 120 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.178}, empty\textsuperscript{P.205}, freelance\textsuperscript{P.217}, bicolor\textsuperscript{P.191}, beamer\textsuperscript{P.196}, and widget\textsuperscript{P.201}.

  If a finish is used with the standard\textsuperscript{P.176} skin, it is silently ignored.

- Finishes are stackable, i.e. several different finishes can be used on the same \tcolorbox.

\tcbfinish(\textit{graphical code})(no default, initially unset)

Adds \textit{graphical code} to the box drawing process. This \textit{graphical code} is drawn after the text content.

```
\newtcolorbox{mybox}[1\'][2\'][2\']{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}
```

My box


```
\newtcolorbox{mybox}[1\'][2\'][2\']{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}
```

My box

/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.307} and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process. /tcb/finish  \textsuperscript{P.171} overwrites this key.

/tcb/finish unbroken=⟨graphical code⟩  
(no default, initially unset)  
If the box is set to be /tcb/breakable  \textsuperscript{P.307} but is \textit{not} broken actually or if the box is set to be /tcb/unbreakable  \textsuperscript{P.308}, then the ⟨graphical code⟩ is added to the box drawing process. /tcb/finish  \textsuperscript{P.171} 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.307} and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process for the \textit{first} part of the break sequence. /tcb/finish  \textsuperscript{P.171} 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.307} and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process for the \textit{middle} parts (if any) of the break sequence. /tcb/finish  \textsuperscript{P.171} 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.307} and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process for the \textit{last} part of the break sequence. /tcb/finish  \textsuperscript{P.171} 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.171} 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.171} 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.171} 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.171} overwrites this key.
9.10 Jigsaw Skin Variants

As described in Section 8.1 on page 112, 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} $^\text{P.176}$ and \texttt{enhanced} $^\text{P.178}$, there are variants called \texttt{standard jigsaw} $^\text{P.177}$ and \texttt{enhanced jigsaw} $^\text{P.185}$.

\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}

\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}
A normal box with hidden interior and title
This is a tcolorbox.

A jigsaw box with hidden interior and title
This is a tcolorbox.

\newtcolorbox{mybox}{skin=enhancedmiddle 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}

9.11 Draft Mode

To reduce the compilation time while drafting a document, the draft mode can be applied. Basically, it changes all skins to spartan \cite{P.214} and sets the /tcb/fit algorithm \cite{P.343} to squeeze. Especially, when fuzzy shadows are used, the speedup will be considerable high.

It is strongly recommended that the draft mode is not used for the final document. Use spartan \cite{P.214} directly, if you want to stay with it. The draft mode implementation may change in future.

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, /tcb/remember as \cite{P.168} will not have any effect. You may exclude critical code with \verb|\tcbinterruptdraftmode| / \verb|\tcbcontinuedraftmode| from converting to draft mode.

\verb|\tcbstartdraftmode|

Any following \texttt{tcolorbox} code is put into draft mode. All skin settings are overruled with spartan \cite{P.214}. Overlays, watermarks, shadows, borderlines, and rounded corners are deactivated for all \texttt{tcolorbox} layers.

\verb|\tcbstopdraftmode|

The draft mode is deactivated for the following code.

\verb|\tcbinterruptdraftmode|

If the compilation is in draft mode, the draft mode is deactivated until a following \verb|\tcbcontinuedraftmode| is detected.

If the compilation is not in draft mode, nothing happens and a following \verb|\tcbcontinuedraftmode| will not start the draft mode.

The pair \verb|\tcbinterruptdraftmode| and \verb|\tcbcontinuedraftmode| cannot be used nested.

\verb|\tcbcontinuedraftmode|

Continues the draft mode which was suspended by a preceding \verb|\tcbinterruptdraftmode|. Nothing happens, if there was no draft mode before \verb|\tcbinterruptdraftmode|.

Code, which is place between \verb|\tcbinterruptdraftmode| and \verb|\tcbcontinuedraftmode| is shielded from draft mode.

\verb|/tcb/draftmode=true|false| (default true, initially false)

If set to true, the draft mode is started. If set to false, the draft mode is stopped.

\begin{verbatim}
\newtcolorbox{mybeamer}[2][]{beamer,colback=Salmon!50!white,
ocframe=FireBrick!75!black,adjusted title={#2},#1}
\begin{mybeamer}{Beamer box}
This box looks like a box provided by the \texttt{beamer} class.
\end{mybeamer}
\begin{mybeamer}[draftmode]{Beamer box}
This box looks like a box provided by the \texttt{beamer} class.
\end{mybeamer}
\end{verbatim}
9.12 Skin Family 'standard'

Note that the option keys /tcb/frame style, /tcb/interior style, /tcb/segmentation style, and /tcb/title style are not be applicable to the standard skin. Also, watermarks (see Subsection 9.3) are not usable with the standard skin.

/tcb/skin=standard

This is the standard skin from the core package. All drawing engines are set to type standard. The drawing is based on pgf commands and does not need the tikz package.

Environment and engines for the skin 'standard'

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>pgfpicture</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>standard</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>standard</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>standard</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>standard</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>standard</td>
</tr>
</tbody>
</table>

/tcb/standard

This is an abbreviation for setting skin=standard.

\begin{tcbraster}[standard,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is 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}
\end{tcbraster}

This is my content. This is my content. My title This is my content. My title
This is the standard jigsaw skin from the core package. It differs from the skin \texttt{standard} \cite{P.176} by its frame engine, see Section 9.10 on page 173.

**Environment and engines for the skin 'standard jigsaw'**

\begin{tcbraster}
\[standard jigsaw,raster equal height,raster columns=4,\]
\[colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen,\]
\[opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5,\]
\[left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm\]
\begin{tcolorbox}
\begin{tcbraster}
\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]
This is my content. \\
\tcblower More content. \\
\end{tcolorbox}
\end{tcbraster}
\end{tcolorbox}

This is an abbreviation for setting \texttt{skin=standard jigsaw}.

\begin{tcbraster}
\begin{tcolorbox}
This is my content. \\
\end{tcolorbox}
\begin{tcolorbox}
This is 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}
\end{tcbraster}
9.13 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}\hspace{1cm}P.176 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}\hspace{1cm}P.124, \texttt{/tcb/interior style}\hspace{1cm}P.125, \texttt{/tcb/segmentation style}\hspace{1cm}P.127, and \texttt{/tcb/title style}\hspace{1cm}P.127.

Environment and engines for the skin 'enhanced'

\texttt{/tcb/graphical environment}\hspace{1cm}P.112: \texttt{tikzpicture}
\texttt{/tcb/frame engine}\hspace{1cm}P.113: \texttt{path}
\texttt{/tcb/interior titled engine}\hspace{1cm}P.113: \texttt{path}
\texttt{/tcb/interior engine}\hspace{1cm}P.114: \texttt{path}
\texttt{/tcb/segmentation engine}\hspace{1cm}P.114: \texttt{path}
\texttt{/tcb/title engine}\hspace{1cm}P.114: \texttt{path}

\texttt{/tcb/enhanced}\hspace{1cm}(style, no value)

This is an abbreviation for setting \texttt{skin=enhanced}.

```latex
\begin{tcbbraster}
[enhanced,raster equal height,raster columns=4,
colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is 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]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbbraster}
```

This is my content.

This is my content.

More content.

My title

This is my content.

My title

This is my content.

More content.

178
With the 'enhanced' skin, it is quite easy to produce fancy looking effects.

Note that this is still a `tcolorbox`.

Of course, skins can be used for listings also.

\begin{equation}
\int_1^2 \frac{1}{x} \, dx = \ln(2).
\end{equation}

\begin{equation}
\int_1^2 \frac{1}{x} \, dx = \ln(2).
\end{equation}
For unbreakable boxes, this is identical to using \texttt{/tcb/enhanced}. But, for breakable boxes, the \textit{break sequence} is identical to the \texttt{standard} skin, see Section 15.7 from page 318.

This style relies on the skin \texttt{enhanced}. All drawing operations are hidden and all margins are set to 0pt. See \texttt{/tcb/blanker} 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 \texttt{\textbackslash tcb\textunderscore lower} you separate the box content into two functional units. \texttt{\textbackslash tcb\textunderscore line} draws only a line which looks like the segmentation line between upper and lower part. Furthermore, you can use \texttt{\textbackslash tcb\textunderscore line} more than just once. \texttt{\textbackslash tcb\textunderscore line} always uses the \texttt{path} drawing engine. Therefore, the \texttt{/tcb/segmentation style} can be applied.

\begin{tcolorbox}
\begin{Verbatim}
\texttt{\textbackslash tcb\set\{enhanced, colframe=blue!50!black, colback=white\}}
\texttt{\begin{tcolorbox}\begin{Verbatim}
\texttt{\textbackslash lipsun[1]}\texttt{\textbackslash tcb\textunderscore line} \texttt{\textbackslash lipsun[2]}\texttt{\textbackslash tcb\textunderscore blow}er \texttt{\textbackslash lipsun[3]}\texttt{\textbackslash tcb\textunderscore line} \texttt{\textbackslash lipsun[4]} \end{Verbatim}\end{tcolorbox}}
\end{Verbatim}
\end{tcolorbox}


\texttt{\textbackslash tcb\textunderscore line}\* 

Equivalent to \texttt{\textbackslash tcb\textunderscore line}, but in a breakable box, \texttt{\textbackslash tcb\textunderscore line}\* 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'

- /tcb/graphical environment: \texttt{tikzpicture}
- /tcb/frame engine: \texttt{pathfirst}
- /tcb/interior titled engine: \texttt{pathfirst}
- /tcb/interior engine: \texttt{pathfirst}
- /tcb/segmentation engine: \texttt{path}
- /tcb/title engine: \texttt{pathfirst}

\begin{tcbraster}
\[\text{This is my content.}\]
\[\text{This is my content.}\]
\[\text{More content.}\]
\[\text{My title}\]
\[\text{My title}\]
\\end{tcbraster}
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.

Environment and engines for the skin 'enhancedmiddle' :

/\texttt{tcb/graphical\ environment}^{P.112}: \texttt{tikzpicture}
/\texttt{tcb/frame\ engine}^{P.113}: \texttt{pathmiddle}
/\texttt{tcb/interior\ titled\ engine}^{P.113}: \texttt{pathmiddle}
/\texttt{tcb/interior\ engine}^{P.114}: \texttt{pathmiddle}
/\texttt{tcb/segmentation\ engine}^{P.114}: \texttt{path}
/\texttt{tcb/title\ engine}^{P.114}: \texttt{pathmiddle}
This is a flavor of enhanced \textsuperscript{p.178} which is used as a last part in a break sequence for enhanced \textsuperscript{p.178}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin ‘enhancedlast’

\begin{tcbraster}[skin=enhancedlast,raster equal height,raster columns=4,
colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is 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}
\end{tcbraster}
This is the jigsaw variant of skin \texttt{enhanced}^{P.178}. It differs by its frame engine, see Section 9.10 on page 173.

\begin{tcbraster}
\begin{tcolorbox}
\begin{tikzpicture}
\end{tikzpicture}
\end{tcolorbox}
\begin{tcolorbox}
\begin{tikzpicture}
\end{tikzpicture}
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
\begin{tikzpicture}
\end{tikzpicture}
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
\begin{tikzpicture}
\end{tikzpicture}
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}

Environment and engines for the skin `\texttt{enhanced jigsaw}'

\begin{tcbraster}
\begin{tcolorbox}
\begin{tikzpicture}
\end{tikzpicture}
\end{tcolorbox}
\begin{tcolorbox}
\begin{tikzpicture}
\end{tikzpicture}
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
\begin{tikzpicture}
\end{tikzpicture}
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
\begin{tikzpicture}
\end{tikzpicture}
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}

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

This is an abbreviation for setting \texttt{skin=enhanced jigsaw}.
This is the jigsaw variant of skin \texttt{enhancedfirst} \cite[p.182]{jigsaw}. It differs by its frame engine, see Section 9.10 on page 173.

### Environment and engines for the skin 'enhancedfirst jigsaw'

- `/tcb/graphical environment` \cite[p.112]{jigsaw}: \texttt{tikzpicture}
- `/tcb/frame engine` \cite[p.113]{jigsaw}: \texttt{pathfirstjigsaw}
- `/tcb/interior titled engine` \cite[p.113]{jigsaw}: \texttt{pathfirst}
- `/tcb/interior engine` \cite[p.114]{jigsaw}: \texttt{pathfirstjigsaw}
- `/tcb/segmentation engine` \cite[p.114]{jigsaw}: \texttt{path}
- `/tcb/title engine` \cite[p.114]{jigsaw}: \texttt{pathfirst}

\begin{tcbraster}[skin=enhancedfirst jigsaw,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is 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}
\end{tcbraster}
This is the jigsaw variant of skin enhancedmiddle. It differs by its frame engine, see Section 9.10 on page 173.

Environment and engines for the skin 'enhancedmiddle jigsaw'

- graphical environment: tikzpicture
- frame engine: pathmiddlejigsaw
- interior titled engine: pathmiddlejigsaw
- interior engine: pathmiddle
- segmentation engine: path
- title engine: pathmiddle

This styles relies on the skin enhancedmiddle jigsaw. It is intended to be used as an optical marker like a highlighter pen.
This example demonstrates the creation of several text marker environments based on enhancedmiddle\textsuperscript{P.183}.

\begin{tcolorbox}[textmarker/.style={%
  skin=enhancedmiddle jigsaw,breakable,parbox=false,
  boxrule=0mm,lefrule=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}}
\end{tcolorbox}

\lipsum[1-3]
\lipsum[4]
\lipsum[5]
\lipsum[6]
\lipsum[7]
\lipsum[8]


Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique,


This is the jigsaw variant of skin `enhancedlast`\textsuperscript{P.184}. It differs by its frame engine, see Section 9.10 on page 173.

### Environment and engines for the skin `enhancedlast`

- `/tcb/graphical environment`\textsuperscript{P.112}: `tikzpicture`
- `/tcb/frame engine`\textsuperscript{P.113}: `pathlastjigsaw`
- `/tcb/interior titled engine`\textsuperscript{P.113}: `pathlast`
- `/tcb/interior engine`\textsuperscript{P.114}: `pathlast`
- `/tcb/segmentation engine`\textsuperscript{P.114}: `path`
- `/tcb/title engine`\textsuperscript{P.114}: `pathlast`

\begin{tcbraster}[skina=enhancedlast jigsaw,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is 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}
\end{tcbraster}
9.14 Skin Family 'bicolor'

This skin is quite similar to the standard and enhanced 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.

Environment and engines for the skin 'bicolor'

- The most basic usage of this skin is to set the background color of the lower part by colbacklower and all other options like for the standard skin.

\begin{tcolorbox}[skin=bicolor,title=The title, colframe=FireBrick!75!black,colback=Salmon!50!white,colbacklower=Salmon]
The upper part.
\tcblower
The lower part.
\end{tcolorbox}

- The more advanced usage of this skin is to apply the frame style and the interior style like for the enhanced skin. Also, the segmentation style can be used, but it is applied to the whole lower part.

\begin{tcolorbox}[skin=bicolor,title=The title, frame style={top color=FireBrick,bottom color=FireBrick!15!white,draw=black}, interior style={left color=Salmon,right color=Salmon!50!white}, segmentation style={right color=Salmon,left color=Salmon!50!white}]
The upper part.
\tcblower
The lower part.
\end{tcolorbox}

\[\text{tcb/bicolor}\] (style, no value)

This is an abbreviation for setting skin=bicolor.
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.

My title

This is my content.

More content.

This is my content.

This is my content.

More content.

\begin{tcblisting}{title={Snapshot of the staging area},
gitexample={The option `-a` automatically stages all tracked and modified files before the commit.\par
This can be combined with the message option `-m` as seen in the third line.}}

\begin{Verbatim}
git commit

git commit -a

git commit -am 'changes to my example'
\end{Verbatim}

\end{tcblisting}

Snapshot of the staging area

git commit

git commit -a

git commit -am 'changes to my example'

The option `-a` automatically stages all tracked and modified files before the commit. This can be combined with the message option `-m` as seen in the third line.
This is a flavor of \texttt{bicolor} which is used as a \textit{first} part in a break sequence for \texttt{bicolor}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin 'bicolorfirst'

<table>
<thead>
<tr>
<th>Engine</th>
<th>Engine Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>\texttt{tikzpicture}</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>\texttt{pathfirst}</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>\texttt{pathfirst}</td>
</tr>
</tbody>
</table>

```latex
\begin{tcbraster}[skin=bicolorfirst,raster equal height,raster columns=4,
colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,
colbacktitle=LimeGreen!75!DarkGreen,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is 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}
\end{tcbraster}
```

This is my content.
This is my content.
More content.
My title
This is my content.
My title
This is my content.
More content.
This is a flavor of *bicolor* which is used as a *middle* part in a break sequence for *bicolor*. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin ‘bicolormiddle’

<table>
<thead>
<tr>
<th>Environment/Engine</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td><em>tikzpicture</em></td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td><em>pathmiddle</em></td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td><em>special</em></td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td><em>special</em></td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td><em>special</em></td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td><em>pathmiddle</em></td>
</tr>
</tbody>
</table>

```latex
\begin{tcbraster}
  \begin{tcolorbox}[
    skin=bicolormiddle,
    raster equal height,
    raster columns=4,
    colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,
    colbacktitle=LimeGreen!75!DarkGreen,
    left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
  This is my content.
  \end{tcolorbox}
  \begin{tcolorbox}
  This is 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}
\end{tcbraster}
```
This is a flavor of \texttt{bicolor} \footnote{P.191} which is used as a \textit{last} part in a break sequence for \texttt{bicolor} \footnote{P.191}. Nevertheless, this skin can be applied independently.

**Environment and engines for the skin \texttt{bicolorlast}**

- `/tcb/graphical environment`: \texttt{tikzpicture}
- `/tcb/frame engine`: \texttt{pathlast}
- `/tcb/interior titled engine`: \texttt{special}
- `/tcb/interior engine`: \texttt{special}
- `/tcb/segregation engine`: \texttt{special}
- `/tcb/title engine`: \texttt{pathlast}

\begin{tcbraster} [skin=bicolorlast,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen, colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is 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}
\end{tcbraster}
9.15 Skin Family 'beamer'

/tcb/skin=beamer (skin)
This skin resembles boxes known from the beamer class and therefore is called 'beamer'. It uses the normal colors from the core package but shades them a little bit. To use this skin, the tikz library shadings has to be included in the preamble by:

\usetikzlibrary{shadings}

The appearance of the skin can be controlled by /tcb/frame style P.124 and /tcb/interior style P.125, if needed. Here, the segmentation cannot be controlled by a style.

Environment and engines for the skin 'beamer'

/tcb/graphical environment P.112: tikzpicture
/tcb/frame engine P.113: path
/tcb/interior titled engine P.113: special
/tcb/interior engine P.114: special
/tcb/segmentation engine P.114: special
/tcb/title engine P.114: path

/tcb/beamer (style, no value)
This is an abbreviation for setting skin=beamer.

It also changes the geometry and some style options.

\begin{tcbraster}[beamer,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
  \begin{tcolorbox}
    This is my content.
  \end{tcolorbox}
  \begin{tcolorbox}
    This is my content.
  \end{tcolorbox}
  \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.
  \end{tcolorbox}
  \begin{tcolorbox}[adjusted title=My title]
    This is my content.
  \end{tcolorbox}
  \tcblower
  More content.
\end{tcbraster}

This is my content. This is my content. My title This is my content. My title
A colored box with the 'beamer' skin

This box looks like a box provided by the \texttt{beamer} class.

Beamer Box with background picture


Beamerish block: myblock

This is a flavor of `beamer` which is used as a first part in a break sequence for `beamer`. Nevertheless, this skin can be applied independently.

Environment and engines for the skin `beamerfirst`

- `/tcb/graphical environment`: `tikzpicture`
- `/tcb/frame engine`: `pathfirst`
- `/tcb/interior titled engine`: `special`
- `/tcb/interior engine`: `special`
- `/tcb/segmentation engine`: `special`
- `/tcb/title engine`: `pathfirst`

```latex
\begin{tcbraster}[beamer,skin=beamerfirst,raster equal height,raster columns=4,
colback=LightGreen,colframe=DarkGreen,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
  \begin{tcolorbox}
    This is my content.
  \end{tcolorbox}
  \begin{tcolorbox}
    This is 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}
\end{tcbraster}
```
This is a flavor of `beamer` which is used as a *middle* part in a break sequence for `beamer`. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin `beamermiddle`

<table>
<thead>
<tr>
<th>Environment/Engine</th>
<th>P. Page</th>
<th>Engine</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>112</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>113</td>
<td>pathmiddle</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>113</td>
<td><em>special</em></td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>114</td>
<td><em>special</em></td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>114</td>
<td><em>special</em></td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>114</td>
<td>pathmiddle</td>
</tr>
</tbody>
</table>

```latex
\begin{tcbraster}
[beamer,skin=beamermiddle,raster equal height,raster columns=4,
colback=LightGreen,colframe=DarkGreen,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is 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}
\end{tcbraster}
```
This is a flavor of \texttt{beamer} which is used as a \textit{last} part in a break sequence for \texttt{beamer}. Nevertheless, this skin can be applied independently.

\begin{tcbraster}[beamer,skin=beamerlast,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is 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}
\end{tcbraster}

\begin{verbatim}
\begin{tcbraster}{beamer,skin=beamerlast,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my 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.
\end{tcolorbox}
\end{tcbraster}
\end{verbatim}
9.16 Skin Family ‘widget’

\tcb/skin=widget

This skin uses the normal colors from the core package but shades them a little bit. To use this skin, the \texttt{tikz} library \texttt{shadings} has to be included in the preamble by:

\begin{verbatim}
\usetikzlibrary{shadings}
\end{verbatim}

The appearance of the skin can be controlled by \texttt{/tcb/frame style}, \texttt{/tcb/interior style}, and \texttt{/tcb/segmentation style}, if needed.

\begin{align*}
\text{Environment and engines for the skin ‘widget’} \\
\text{\texttt{/tcb/graphical environment}}: \begin{cases} \text{\texttt{tikzpicture}} \\ \text{\texttt{path}} \end{cases} \\
\text{\texttt{/tcb/frame engine}}: \begin{cases} \text{\texttt{path}} \end{cases} \\
\text{\texttt{/tcb/interior titled engine}}: \begin{cases} \text{\texttt{path}} \end{cases} \\
\text{\texttt{/tcb/interior engine}}: \begin{cases} \text{\texttt{special}} \end{cases} \\
\text{\texttt{/tcb/segmentation engine}}: \begin{cases} \text{\texttt{special}} \end{cases} \\
\text{\texttt{/tcb/title engine}}: \begin{cases} \text{\texttt{special}} \end{cases} \\
\text{\texttt{/tcb/widget}} \quad \text{(style, no value)}
\end{align*}

This is an abbreviation for setting \texttt{skin=widget}.

\begin{verbatim}
\begin{tcbraster}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my 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.
\end{tcolorbox}
\end{tcbraster}
\end{verbatim}

It also changes the geometry and some style options.
This is a flavor of \textit{widget} \textsuperscript{P.201} which is used as a \textit{first} part in a break sequence for \textit{widget} \textsuperscript{P.201}. Nevertheless, this skin can be applied independently.

\textbf{Environment and engines for the skin 'widgetfirst':}

- /tcb/graphical environment \textsuperscript{P.112}: \texttt{tikzpicture}
- /tcb/frame engine \textsuperscript{P.113}: \texttt{pathfirst}
- /tcb/interior titled engine \textsuperscript{P.113}: \texttt{pathfirst}
- /tcb/interior engine \textsuperscript{P.114}: \texttt{pathfirst}
- /tcb/segmentation engine \textsuperscript{P.114}: \texttt{special}
- /tcb/title engine \textsuperscript{P.114}: \texttt{special}
This is a flavor of widget\(^{P.201}\) which is used as a *middle* part in a break sequence for widget\(^{P.201}\). Nevertheless, this skin can be applied independently.

Environment and engines for the skin ‘widgetmiddle’

```
\begin{tcbraster} [widget,skin=widgetmiddle,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is 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}
\end{tcbraster}
```
This is a flavor of `widget` which is used as a last part in a break sequence for `widget`. Nevertheless, this skin can be applied independently.

**Environment and engines for the skin 'widgetlast'**

- `/tcb/graphical environment`:
  - `tikzpicture`
- `/tcb/frame engine`:
  - `pathlast`
- `/tcb/interior titled engine`:
  - `pathlast`
- `/tcb/interior engine`:
  - `pathlast`
- `/tcb/segmentation engine`:
  - `special`
- `/tcb/title engine`:
  - `special`

```latex
\begin{tcbraster}[widget,skin=widgetlast,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\begin{tcolorbox}
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.
\begin{tcolorbox}
More content.
\end{tcolorbox}
\end{tcbraster}
```
9.17 Skin Family 'empty'

\texttt{/tcb/skin=empty}

This skin sets all engines to empty, i.e. nothing is drawn at all. Therefore, this skin is a good starting point to create a complete new style by yourself.

<table>
<thead>
<tr>
<th>Environment and engines for the skin 'empty'</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{/tcb/graphical environment} P.112: tikzpicture</td>
</tr>
<tr>
<td>\texttt{/tcb/frame engine} P.113: empty</td>
</tr>
<tr>
<td>\texttt{/tcb/interior titled engine} P.113: empty</td>
</tr>
<tr>
<td>\texttt{/tcb/interior engine} P.114: empty</td>
</tr>
<tr>
<td>\texttt{/tcb/segmentation engine} P.114: empty</td>
</tr>
<tr>
<td>\texttt{/tcb/title engine} P.114: empty</td>
</tr>
</tbody>
</table>

\texttt{/tcb/empty}

This is an abbreviation for setting skin=empty.

\begin{tcbraster}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is 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}
\end{tcbraster}
This style relies on the skin `empty`\textsuperscript{P.205}. All engines are set to empty and all margins are set to 0pt. In contrast to `/tcb/blank`\textsuperscript{P.180}, the graphical paths are not constructed with exception of the geometry nodes.

\begin{tcolorbox}[blanker,watermark text=A blank box]
\lipsum[1]
\end{tcolorbox}


% \tcblibrary{fitting}
\newtcboxfit{\mybox}{blanker,width=4cm,height=7cm,top=0pt,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}

A

B

C


This is a flavor of \texttt{empty}`\textsuperscript{P.\,205} which is used as a \textit{first} part in a break sequence for \texttt{empty}`\textsuperscript{P.\,205}. Nevertheless, this skin can be applied independently.

\begin{tcbarray}[empty,skin=emptyfirst,raster equal height,raster columns=4,
    coltitle=Navy,borderline={2pt}{0pt}{black!10!white},
    left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is 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}
\end{tcbarray}
This is a flavor of empty\footnote{P.205} which is used as a middle part in a break sequence for empty\footnote{P.205}. Nevertheless, this skin can be applied independently.

**Environment and engines for the skin 'emptymiddle'**

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Empty Middle Engine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphical Environment</td>
<td>\texttt{tikzpicture}</td>
</tr>
<tr>
<td>Frame Engine</td>
<td>\texttt{empty}</td>
</tr>
<tr>
<td>Interior Titled Engine</td>
<td>\texttt{empty}</td>
</tr>
<tr>
<td>Interior Engine</td>
<td>\texttt{empty}</td>
</tr>
<tr>
<td>Segmentation Engine</td>
<td>\texttt{empty}</td>
</tr>
<tr>
<td>Title Engine</td>
<td>\texttt{empty}</td>
</tr>
</tbody>
</table>

\begin{tcbraster}[empty,skin=emptymiddle,raster equal height,raster columns=4,\]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is 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}
\end{tcbraster}
This is a flavor of empty\textsuperscript{P.205} which is used as a last part in a break sequence for empty\textsuperscript{P.205}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin ‘emptylast’

- \texttt{/tcb/graphical environment}\textsuperscript{P.112}: \texttt{tikzpicture}
- \texttt{/tcb/frame engine}\textsuperscript{P.113}: empty
- \texttt{/tcb/interior titled engine}\textsuperscript{P.113}: empty
- \texttt{/tcb/interior engine}\textsuperscript{P.114}: empty
- \texttt{/tcb/segmentation engine}\textsuperscript{P.114}: empty
- \texttt{/tcb/title engine}\textsuperscript{P.114}: empty
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 \texttt{/tcb/frame code} and \texttt{/tcb/interior code}. The second application of \texttt{freebox} is broken into several parts which are drawn by the codes given by \texttt{/tcb/skin first is subskin of}, \texttt{/tcb/skin middle is subskin of}, and \texttt{/tcb/skin last is subskin of}.

\begin{verbatim}
\% Preamble:
\usepackage{tikz,lipsum}
\tcbuselibrary{skins,breakable}
\tikzset{coltria/.style={fill=red!15!white}}
\newtcolorbox{freebox}[1][]{{empty,breakable,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, 
frame code={
\path[\tcb fill frame] (frame.south west)--(frame.north west) 
--([xshift=-5mm]frame.north east)--([yshift=-5mm]frame.north east) 
--([yshift=-5mm]frame.south east)--([xshift=-5mm]frame.south east) --cycle; }, 
interior code={
\path[\tcb fill interior] (interior.south west)--(interior.north west)--(interior.south east)--(interior.north east)--cycle; },
},
\end{verbatim}

\begin{verbatim}
% code for unbroken boxes:
frame code={\path[\tcb fill frame] (frame.south west)--(frame.north west) 
--([xshift=-5mm]frame.north east)--([yshift=-5mm]frame.north east) 
--([yshift=-5mm]frame.south east)--([xshift=-5mm]frame.south east)--cycle; },
interior code={\path[\tcb fill interior] (interior.south west)--(interior.north west)--(interior.south east)--(interior.north east)--cycle; },
},
\end{verbatim}

% code for the first part of a break sequence:
skin first is subskin of={emptyfirst}{{
frame code={\path[\tcb fill frame] (frame.south west)--(frame.north west) 
--([xshift=-5mm]frame.north east)--([yshift=-5mm]frame.north east) 
--([yshift=-5mm]frame.south east)--([xshift=-5mm]frame.south east)--cycle; }, 
\path[coltria] ([xshift=2.5mm,yshift=1mm]frame.south west) -- +(120:2mm) 
-- +(60:2mm) -- cycle; },
interior code={\path[\tcb fill interior] (interior.south west)--(interior.north west)--(interior.south east)--(interior.north east)--cycle; },
},
\end{verbatim}

% code for the middle part of a break sequence:
skin middle is subskin of={emptymiddle}{{
frame code={\path[\tcb fill frame] (frame.south west)--(frame.north west) 
--(frame.north east)--(frame.south east)--cycle; }, 
\path[coltria] ([xshift=2.5mm,yshift=-1mm]frame.north west) -- +(240:2mm) 
-- +(300:2mm) -- cycle; },
\path[coltria] ([xshift=2.5mm,yshift=1mm]frame.south west) -- +(120:2mm) 
-- +(60:2mm) -- cycle; },
interior code={\path[\tcb fill interior] (interior.south west)--(interior.north west)--(interior.south east)--(interior.north east)--cycle; },
},
\end{verbatim}

% code for the last part of a break sequence:
skin last is subskin of={emptylast}{{
frame code={\path[\tcb fill frame] (frame.south west)--(frame.north west) 
--(frame.north east)--([yshift=5mm]frame.south east) 
--([xshift=-5mm]frame.south east)--cycle; }, 
\path[coltria] ([xshift=2.5mm,yshift=-1mm]frame.north west) -- +(240:2mm) 
-- +(300:2mm) -- cycle; },
interior code={\path[\tcb fill interior] (interior.south west)--(interior.north west)--(interior.south east)--(interior.north east)--cycle; }
},
\end{verbatim}


9.18 Skin 'spartan'

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 9.11 on page 175. Nevertheless, it can be used as a normal skin.

Environment and engines for the skin 'spartan'

\begin{tcbraster}[spartan,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is 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}
\end{tcbraster}

This is my content.
This is my content.
My title
My title
More content.
This is my content.
This is my content.
More content.
9.19 Skin ‘draft’

This skin is intended to be used while drafting new geometric settings for a \texttt{tcolorbox}.

\begin{center}
\begin{tabular}{|c|c|}
\hline
\texttt{/tcb/graphical environment} & \texttt{tikzpicture} \\
\hline
\texttt{/tcb/frame engine} & \texttt{special} \\
\hline
\texttt{/tcb/interior titled engine} & \texttt{special} \\
\hline
\texttt{/tcb/interior engine} & \texttt{special} \\
\hline
\texttt{/tcb/segmentation engine} & \texttt{path} \\
\hline
\texttt{/tcb/title engine} & \texttt{path} \\
\hline
\end{tabular}
\end{center}

This is an abbreviation for setting \texttt{skin=draft}.

\begin{tcbraster}
\begin{tcolorbox}[draft, raster equal height, raster columns=4, colback=LightGreen, colframe=DarkGreen, colbacktitle=LimeGreen!75!DarkGreen, left=1mm, right=1mm, top=1mm, bottom=1mm, middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is 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}
\end{tcbraster}


This skin family 'freelance' is deprecated with tcolorbox 3.00. It is not longer needed, because /tcb/frame code \textsuperscript{P.116}, /tcb/interior code \textsuperscript{P.117}, /tcb/interior titled code \textsuperscript{P.116}, and /tcb/title code \textsuperscript{P.118} can be applied to every skin now. In this sense, everything has become 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.205} or /tcb/enhanced \textsuperscript{P.178} where you would have used /tcb/freelance before.

/tcb/skin=freelance \textsuperscript{(skin)}
This skin gives full freedom for the appearance of the tcolorbox. All drawing engines are set to type freelance; they use the tikz package and compute the /tcb/geometry nodes \textsuperscript{P.115}.

Environment and engines for the skin ’freelance’

/tcb/graphical environment \textsuperscript{P.112}: tikzpicture
/tcb/frame engine \textsuperscript{P.113}: freelance
/tcb/interior titled engine \textsuperscript{P.113}: freelance
/tcb/interior engine \textsuperscript{P.114}: freelance
/tcb/segmentation engine \textsuperscript{P.114}: freelance
/tcb/title engine \textsuperscript{P.114}: freelance

/tcb/freelance \textsuperscript{(style, no value)}
This is an abbreviation for setting skin=freelance.

/tcb/skin=freelancefirst \textsuperscript{(skin)}
This skin equals freelance with exception of the break sequence, see Section 15.7 on page 318.

/tcb/skin=freelancemiddle \textsuperscript{(skin)}
This skin equals freelance with exception of the break sequence, see Section 15.7 on page 318.

/tcb/skin=freelancelast \textsuperscript{(skin)}
This skin equals freelance with exception of the break sequence, see Section 15.7 on page 318.

/tcb/extend freelance=(options) \textsuperscript{(no default, initially empty)}
The \textit{(options)} are added to the skin definition of freelance.

/tcb/extend freelancefirst=(options) \textsuperscript{(no default, initially empty)}
The \textit{(options)} are added to the skin definition of freelancefirst which is used as first part of the break sequence of freelance. See /tcb/skin first is subskin of \textsuperscript{P.119} for a substitute of this key.

/tcb/extend freelancemiddle=(options) \textsuperscript{(no default, initially empty)}
The \textit{(options)} are added to the skin definition of freelancemiddle which is used as middle part of the break sequence of freelance. See /tcb/skin middle is subskin of \textsuperscript{P.119} for a substitute of this key.

/tcb/extend freelancelast=(options) \textsuperscript{(no default, initially empty)}
The \textit{(options)} are added to the skin definition of freelancelast which is used as last part of the break sequence of freelance. See /tcb/skin last is subskin of \textsuperscript{P.119} for a substitute of this key.
10 Inclusion of Boxed Image Files

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:

```
\tcbuselibrary{skins}
```

See Section 9 on page 124 for the documentation of all other options of the \texttt{skins} library.

10.1 Macros

\texttt{\tcbincludegraphics[\{options\}]{\{file name\}}}

In principle, this macro includes an image file denoted by \texttt{\{file name\}} using the standard \texttt{\includegraphics} and puts it into a \texttt{tcolorbox} \cite{P.11}. The \{options\} are \texttt{tcolorbox} keys to set up the colored box. Use /tcb/\texttt{graphics options} \cite{P.221} to specify options for the underlying \texttt{\includegraphics}. Some \texttt{tcolorbox} option keys are automatically set, namely /tcb/\texttt{enhanced} \cite{P.178} and options to center the image inside the box.

The sizing of the included image is done depending on the following:

- If a /tcb/\texttt{width} \cite{P.33} is specified, but no fixed /tcb/\texttt{height} \cite{P.51}, the image is sized to fill the inner width of the box. The height of the box adapts to the image.
- If a fixed /tcb/\texttt{height} \cite{P.51} is specified, the image is sized to fill the fixed inner area of the box.
- If the /tcb/\texttt{capture} \cite{P.89} mode /tcb/\texttt{hbox} \cite{P.89} is specified, the image is sized according to given \texttt{\includegraphics} options only. The box adapts to the image.

```
% \tcbuselibrary{raster}
\begin{tcbraster}[raster columns=3,raster force size=false,size=fbox,  colframe=red!50!black,colback=red!20!black,  fonttitle=\bfseries,center title,drop fuzzy shadow]
\tcbincludegraphics[title=Normal]{goldshade.png}
\tcbincludegraphics[title=Fixed height,height=3cm]{goldshade.png}
\tcbincludegraphics[title=hbox mode,hbox,graphics options={width=3cm}]{goldshade.png}
\end{tcbraster}
```
The auxiliary macro `\texttt{\textbackslash imagename}` may be used inside `\texttt{\textbackslash tcbincludegraphics}` 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.

% \texttt{\textbackslash tcbuse\texttt{library(raster)}}
\begin{tcbraster}
  \[size=fbox,
  \texttt{colframe}=red!50!black,\texttt{colback}=red!20!black,
  \texttt{fonttitle}=\texttt{\texttt{\textbackslash bfseries}\texttt{\textbackslash ttfamily}},\texttt{center title},\texttt{drop fuzzy shadow}]
  \texttt{\textbackslash tcbincludegraphics[title=\texttt{\textbackslash imagename}\{goldshade.png\}}
  \texttt{\textbackslash tcbincludegraphics[finish={
    \texttt{node}[\texttt{fill=white,fill opacity=0.5,text opacity=1}]
    \texttt{at (frame.center) \texttt{\texttt{\textbackslash bfseries\texttt{\textbackslash ttfamily\texttt{\textbackslash imagename}}}];}\}]\{blueshade.png\}
  \end{tcbraster}

\begin{minipage}{0.5\textwidth}
\centering
\texttt{goldshade.png}
\end{minipage} \hspace{0.05\textwidth} \begin{minipage}{0.5\textwidth}
\centering
\texttt{blueshade.png}
\end{minipage}
\texttt{\texttt{\textbackslash tcbincludepdf\[(options)\]{\textit{file name}}} \\
This is a generalized version of \texttt{\texttt{\textbackslash tcolorbox}} \textsuperscript{\textsuperscript{P.11}} which allows to include a complete PDF file denoted by \texttt{(file name)}. Every page is boxed into an own \texttt{\texttt{\textbackslash tcolorbox}} \textsuperscript{\textsuperscript{P.11}} customized by the given \texttt{(options)}. It is reasonable to put such a series of boxes inside a \texttt{\texttt{\textbackslash tcbbraster}} \textsuperscript{\textsuperscript{P.233}} for alignment. \\
Use \texttt{\texttt{\textbackslash tcb\textbackslash graphics\ pages}} \textsuperscript{\textsuperscript{P.221}} to use a selection of pages instead of using the whole file. The auxiliary macro \texttt{\texttt{\textbackslash imagepage}} may be used inside \texttt{\texttt{\textbackslash tcbincludepdf}} to display the current page number. \\
\begin{verbatim}
% \tcbuselibrary{raster}
\begin{tcbbraster}[raster columns=3,colframe=blue,colback=white, colbacktitle=blue!50!white,fonttitle=\small\textbf{ttfamily}, left=0pt,right=0pt,top=0pt,bottom=0pt,boxsep=0pt,boxrule=0.6pt, toptitle=1mm,bottomtitle=1mm,drop lifted shadow,center title, graphics pages={1,...,6},title={\textit{\texttt{\textbackslash imagename\ [\texttt{\textbackslash imagepage}]}},
\tcbincludepdf{tcolorbox-example.pdf}
\end{tcbbraster}
\end{verbatim}

\texttt{tcolorbox-example.pdf [1]} \hspace{2cm} \texttt{tcolorbox-example.pdf [2]} \hspace{2cm} \texttt{tcolorbox-example.pdf [3]} \\
\hspace{2cm} \texttt{tcolorbox-example.pdf [4]} \hspace{2cm} \texttt{tcolorbox-example.pdf [5]} \hspace{2cm} \texttt{tcolorbox-example.pdf [6]}
10.2 Option Keys

\texttt{/tcb/graphics options=⟨options⟩} \hspace{1cm} (no default, initially empty)

Used for \texttt{\textbackslash tcbincludegraphics \textsuperscript{P.218}} and \texttt{\textbackslash tcbincludepdf \textsuperscript{P.220}} to specify \texttt{\textbackslash includegraphics ⟨options⟩}.

```
\begin{tcbarray}[raster columns=3,size=fbox,raster equal height,colframe=red!50!black,colback=red!20!black,drop fuzzy shadow]
\tcbincludegraphics{goldshade.png}
\tcbincludegraphics[graphics options={angle=20}]{goldshade.png}
\tcbincludegraphics[graphics options={viewport=0cm 0cm 8cm 4cm,clip}]{goldshade.png}
\end{tcbarray}
```

\texttt{/tcb/graphics directory=⟨directory⟩} \hspace{1cm} (no default, initially empty)

Used for \texttt{\textbackslash tcbincludegraphics \textsuperscript{P.218}} and \texttt{\textbackslash tcbincludepdf \textsuperscript{P.220}} to specify a file system \texttt{⟨directory⟩} where the image files are located.

```
\tcbset{
  graphics directory={.},
  graphics directory={examples},
  graphics directory={../../pictures},
}
```

\textbf{!} The \texttt{\textbackslash graphicspath} macro from the \texttt{graphics} package is superior to this option. \texttt{/tcb/graphics directory} may be used especially for \texttt{\textbackslash tcbincludepdf \textsuperscript{P.220}}.

\texttt{/tcb/graphics pages=⟨selection⟩} \hspace{1cm} (no default, initially \texttt{1,...,\texttt{\textbackslash pdfpages}})

Used for \texttt{\textbackslash tcbincludepdf \textsuperscript{P.220}} to specify a \texttt{⟨selection⟩} of pages to be included. The largest page number is accessible by \texttt{\textbackslash pdfpages}. The \texttt{⟨selection⟩} has to be given using the \texttt{\textbackslash foreach} syntax of TikZ.

```
\tcbset{
  graphics pages={1,3,7},
  graphics pages={1,...,10},
  graphics pages={1,3,...,18},
  graphics pages={100,...,\texttt{\textbackslash pdfpages}},
}
```
11 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 [20]. 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 9 on page 124 for the documentation of all other options of the \texttt{skins} library.

11.1 Fill Plain

\begin{itemize}
  \item \texttt{/tikz/fill plain image}=⟨file name⟩ (no default, initially unset)
    Fills the current path with an external image referenced by ⟨file name⟩. 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=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

  \item \texttt{/tikz/fill plain image*}=⟨file name⟩ (no default, initially unset)
    Fills the current path with an external image referenced by ⟨file name⟩. The image is put in the center of the path, but it is not resized to fit into the path area. The ⟨graphics options⟩ are given to the underlying \texttt{\usepackage{graphicx}} command.

\begin{tikzpicture}
\path[draw,fill plain image*={width=2.5cm}{goldshade.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

  \item \texttt{/tikz/fill plain picture}=⟨graphical code⟩ (no default, initially unset)
    Fills the current path with the given ⟨graphical code⟩. 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 \texttt{path picture} option.

\begin{tikzpicture}
\path[draw,fill plain 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}
\end{itemize}
11.2 Fill Stretch

\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}

\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}

\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}
11.3 Fill Overzoom

/tikz/fill overzoom image=(file name)  \hspace{1cm} (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⟩)  \hspace{1cm} (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⟩  \hspace{1cm} (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}
11.4 Fill Zoom

/tikz/fill zoom 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 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 ⟨file name⟩. The ⟨graphics
options⟩ are given to the underlying \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 ⟨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}
11.5 Fill Shrink

/tikz/fill shrink 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 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}

/tikz/fill shrink image*= (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 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}

/tikz/fill shrink picture={graphical code} (no default, initially unset)
Fills the current path with the given (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}
11.6 Fill Tile

\texttt{/tikz/fill tile image=⟨file name⟩} \hspace{1cm} (no default, initially unset)
Fills the current path with a tile pattern using an external image referenced by \texttt{⟨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}

\texttt{/tikz/fill tile image*=⟨(graphics options)⟩{⟨file name⟩}} \hspace{1cm} (no default, initially unset)
Fills the current path with a tile pattern using an external image referenced by \texttt{⟨file name⟩}.
The \texttt{⟨graphics options⟩} are given to the underlying \texttt{\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}

\texttt{/tikz/fill tile picture=⟨graphical code⟩} \hspace{1cm} (no default, initially unset)
Fills the current path with a tile pattern using the given \texttt{⟨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}

\texttt{/tikz/fill tile picture*=⟨(fraction)⟩{⟨graphical code⟩}} \hspace{1cm} (no default, initially unset)
Fills the current path with a tile pattern using the given \texttt{⟨graphical code⟩}. The graphic is resized by \texttt{⟨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}
11.7 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 \langle fraction \rangle.

\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 \langle fraction \rangle 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 \langle graphics options \rangle are given to the underlying \texttt{\usepackage{graphicx} \includegraphics} command for the image fill options. This can be just together with \texttt{/tikz/fill stretch image} \textsuperscript{P.223}, \texttt{/tikz/fill overzoom image} \textsuperscript{P.224}, \texttt{/tikz/fill zoom image} \textsuperscript{P.225}, and \texttt{/tikz/fill tile image} \textsuperscript{P.227}.

\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}
11.8 Straightening of the Arcs

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

\texttt{\textbackslash tcbpatcharcangular}

The Ti\kZ package provides a nice \texttt{rounded corners} option to replace all corners by little arcs. \texttt{\textbackslash tcbpatcharcangular} 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);
\end{tikzpicture}

\texttt{\textbackslash tcbpatcharcround}

This macro reverts \texttt{\textbackslash tcbpatcharcangular}, i.e., the patch from \texttt{\textbackslash tcbpatcharcangular} is replaced by the original code.
11.9 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 TikZ 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};
\tcbsetmacrotowidthofnode\mywidth{A}
\tcbsetmacrotoheightofnode\myheight{A}
\path[fill=blue!25!white] % rectangle without border
  ([xshift=2mm]A.south east) rectangle node{Copy} +(+\mywidth,\myheight);
\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};
\end{tikzpicture}
12  Library \texttt{raster}

The library is loaded by a package option or inside the preamble by:

\texttt{\usepackage{raster}}

12.1 Concept of Rasters

A \textit{raster} is used to align several colored boxes in a regular way. It can be seen as a far related counterpart to the \texttt{matrix} construct of \textsc{Ti\kern-0.1667em\kern-0.125emkZ}, but it differs in many aspects. In principle, \texttt{tcolorbox}es 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 \textit{raster} is not restricted to a single page but may break into an arbitrary series of pages.

```latex
\begin{tcb}{width=0.4\textwidth, before skip=\baselinestretch\baselineskip, height=0.3\textwidth, after skip=\baselinestretch\baselineskip}
\end{tcb}
```

```latex
\begin{tcb}{width=0.4\textwidth, before skip=\baselinestretch\baselineskip, height=0.3\textwidth, after skip=\baselinestretch\baselineskip}
\end{tcb}
```


Nine Boxes.
12.2 Macros of the Library

\begin{tcbraster}[(\texttt{options})]
\input{tcbrasterlib}
\end{tcbraster}

A raster arranges enclosed boxes in a regular way, mainly into rows and columns. The \texttt{(options)} are used to control the raster parameters and to set the properties for the enclosed boxes.

- The \texttt{raster} is only allowed to contain a series of \texttt{tcolorbox}\textsuperscript{P.11} environments or derived constructs. With some small restrictions, boxes created with \texttt{tcboxfit}\textsuperscript{P.335} can also be added. Boxes created with \texttt{tcbox}\textsuperscript{P.13} 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 \texttt{\textbackslash \textbackslash} or \texttt{\textbackslash par} to end a row; row breaks are done automatically.
- The boxes inside a raster are numbered automatically. \texttt{\textbackslash thetcbrasternum} may be used inside a box to access this number.

\begin{tcbraster}
\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}
\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}
This is a special case of a \texttt{tcbraster}\textsuperscript{P.233} with the given \texttt{(options)}.

- Here, the enclosed boxes are created using \texttt{tcbitem}.
- There has to be at least one \texttt{tcbitem}.
- One cannot use anything else than \texttt{tcbitem} to add something to the \textit{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 \# 1\tetcbrasternum}]
\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{tabular}{|p{2cm}|p{2cm}|}
\hline
Box \# 1 & Box \# 2 \\
First box & Second box \\
\hline
Box \# 3 & Box \# 4 \\
This is a box with a second line & Another box \\
\hline
Box \# 5 & \\
A box again & \\
\hline
\end{tabular}

\texttt{tcbitemize} has more restrictions than \texttt{tcbraster}\textsuperscript{P.233}. Especially, the \texttt{/tcb/capture}\textsuperscript{P.89} mode has to be \texttt{minipage}. For example, \texttt{/tcb/fit}\textsuperscript{P.337} cannot be used safely. If \texttt{/tcb/fit}\textsuperscript{P.337} should be used, turn over to \texttt{tcbraster}\textsuperscript{P.233}.

\begin{tcbitemize}\texttt{(options)}
\end{tcbitemize}

\begin{tcbitemize}[\texttt{(options)}]
\end{tcbitemize}

Used inside \texttt{tcbitemize} to create a new \texttt{tcolorbox}\textsuperscript{P.11} with the given \texttt{(options)}.
12.3 Option Keys of the Library

N 2014-11-10 \texttt{/tcb/raster columns}=(\textit{number}) \hspace{1cm} \text{(no default, initially 2)}
Sets the \textit{\textit{number}} of columns for a \textit{raster}.

\begin{tcbitemize}[raster columns=3, size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}
\begin{tcbitemize}[raster columns=4, size=small,colframe=blue!50!black,colback=blue!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

N 2014-11-10 \texttt{/tcb/raster rows}=(\textit{number}) \hspace{1cm} \text{(no default, initially 2)}
Sets the \textit{\textit{number}} of rows for a \textit{raster}. Note that this is only relevant in connection with setting \texttt{/tcb/raster height} to a value greater than 0pt. Then, it defines the number of rows per given height.

N 2014-11-10 \texttt{/tcb/raster width}=(\textit{length}) \hspace{1cm} \text{(no default, initially \texttt{\linewidth})}
Sets the total raster width to the given \textit{\textit{length}}. \texttt{/tcb/raster left skip} and \texttt{/tcb/raster right skip} are part of the total width.

\begin{tcbitemize}[raster width=\texttt{\linewidth}/2, size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}
Sets the raster height per /tcb/raster rows to the given \langle length \rangle. 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 \langle length \rangle 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]
\item One
\item Two
\item[enhanced, finish={\draw[blue,very thick,<->] (frame.south) -- node[right,pos=.75]{4cm} +(0,4); }]
Three
\item Four
\item Five
\end{tcbitemize}

Space of the given \langle glue \rangle is inserted vertically before the raster. This space is discardable.

\begin{tcbitemize}[raster equal skip=4mm, size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

Space of the given \langle glue \rangle is inserted vertically after the raster. This space is discardable.

Shortcut to set /tcb/raster before skip, /tcb/raster after skip, /tcb/raster column skip, and /tcb/raster row skip to the same \langle length \rangle value.

\begin{tcbitemize}[raster equal skip=4mm, size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item Three
\item 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]
  \tcitem One
  \tcitem Two
  \tcitem Three
  \tcitem 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]
  \tcitem One
  \tcitem Two
  \tcitem Three
  \tcitem 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]
  \tcitem One
  \tcitem Two
  \tcitem Three
  \tcitem 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]
  \tcitem One
  \tcitem Two
  \tcitem Three
  \tcitem Four
\end{tcbitemize}
/tcb/raster halign=(alignment) (no default, initially left)
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}

/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\textsuperscript{P. 77} 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.56. The ⟨id⟩ of the equal height group is chosen automatically, but it may be set manually by /tcb/raster equal height group.  
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}

One

\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}

\begin{tcbitemize}[raster equal height,raster equal height group=raster-manual-id]
  \tcbitem One  
  \tcbitem Huge Two
\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.

/tcbset(size=small,colframe=red!50!black,colback=red!10!white)  
\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

One

Two
/tcb/raster force size=true|false

Enforces the raster size computations onto the enclosed boxes. If set to false, individual settings can be used (for the better or worse).

\begin{tcbitemize}[raster force size=false, raster halign=center,
  size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem Two
  \tcbitem[add to width=-3cm] Three
  \tcbitem[add to width=-3cm] Four
  \tcbitem[add to width=-3cm] Five
  \tcbitem[add to width=3cm] Six
\end{tcbitemize}

/tcb/raster reset

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.

12.4 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{tcbitemize}[size=small,colframe=red!50!black,colback=red!10!white,
  raster odd column/.style={colframe=blue!50!black,colback=blue!10!white}]
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}

/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.

\begin{tcbitemize}[size=small,colframe=red!50!black,colback=red!10!white, raster row 2/.style={colframe=blue!50!black,colback=blue!10!white}]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

This style is used for every box with an odd number.

This style is used for every box with an even number.

\begin{tcbitemize}[size=small,colframe=red!50!black,colback=red!10!white, raster even number/.style={colframe=blue!50!black,colback=blue!10!white}]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\tcbitem Five
\tcbitem Six
\end{tcbitemize}

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.

\begin{tcbitemize}[size=small,colframe=red!50!black,colback=red!10!white, raster number 4/.style={colframe=blue!50!black,colback=blue!10!white}]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}
13 Libraries \texttt{listings}, \texttt{listingsutf8}, and \texttt{minted}

13.1 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, you should take \texttt{listingsutf8}.

The order in which the libraries are included influences the default settings and the \texttt{/tcb/reset} \footnote{P. 95} behavior. The settings of a later loaded library overwrite the settings of a previous loaded library. A library is never loaded twice.

13.1.1 Loading \texttt{listings}

This library uses the package \texttt{listings} \footnote{P. 6} to typeset listings. It is loaded by a package option or inside the preamble by:

\begin{verbatim}
\include{listings}
\end{verbatim}

This also loads the package \texttt{listings} \footnote{P. 6}.

The \texttt{/tcb/listing engine} \footnote{P. 254} is set to \texttt{listings} by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{verbatim}
\tcbset{listing engine=listings}
\end{verbatim}

13.1.2 Loading \texttt{listingsutf8}

To extend \texttt{listings} for UTF-8 encoded sources, you can use the support from the package \texttt{listingsutf8} \footnote{P. 10} by loading the library variant \texttt{listingsutf8}.

\begin{verbatim}
\tcbuselibrary{listingsutf8}
\tcbset{listing utf8=latin1} \% optional; 'latin1' is the default.
\end{verbatim}

This also loads the library \texttt{listings} and the packages \texttt{listings} \footnote{P. 6} and \texttt{listingsutf8} \footnote{P. 10}.

The \texttt{/tcb/listing engine} \footnote{P. 254} is set to \texttt{listings} by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{verbatim}
\tcbset{listing engine=listings}
\end{verbatim}
13.1.3 Loading \texttt{minted}

This library uses the package \texttt{minted} \cite{11} to typeset listings. It is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{minted}
\end{verbatim}

This also loads the package \texttt{minted} \cite{11}.

The \texttt{minted} package uses the external tool \texttt{Pygments} \cite{13} to apply syntax highlighting. It has to be installed and set up, before the library can be used, see \cite{11} and \cite{13}. The \texttt{tcolorbox} library \texttt{minted} does not work, if the package \texttt{minted} \cite{11} does not work.

The \texttt{/tcb/listing engine} \texttt{\texttt{\texttt{\texttt{P.254}}} is set to \texttt{minted}} by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{verbatim}
\tcbset{listing engine=minted}
\end{verbatim}

13.2 Common Macros of the Libraries

\begin{verbatim}
\begin{tcblisting}{⟨options⟩}
⟨environment content⟩
\end{tcblisting}
\end{verbatim}

Creates a colored box based on a \texttt{tcolorbox} \texttt{\texttt{\texttt{P.11}}.} 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{verbatim}
\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}
\end{verbatim}

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.
<?xml version="1.0"?>
<project name="Package tcolorbox" default="documentation" basedir=".">
  <description>
    Apache Ant build file (http://ant.apache.org/)
  </description>
</project>

\begin{tikzpicture}
  \fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
\begin{tcboutputlisting}
(environment content)
\end{tcboutputlisting}

Saves the environment content to a file which is named by the key value of 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{/options})

Creates a colored boxed based on a \texttt{tcolorbox}. The text content is read from a file named by the key value of listing file. Apart from that, the function is equal to that of \texttt{tcblisting} \textsuperscript{P.243}.

\begin{tcbinputlisting}[colback=red!5!white,colframe=red!75!black,text only]
\end{tcbinputlisting}

\begin{tcbinputlisting}[colback=green!5,colframe=green!75!black,listing only]
\end{tcbinputlisting}

\texttt{\begin{tikzpicture}}
\texttt{\fill[red] (0,0) rectangle (1,1);}
\texttt{\end{tikzpicture}}

\texttt{\tcbuselistingtext}

Loads text from a file named by the key value of listing file.

\begin{tcbuselistingtext}
\end{tcbuselistingtext}

\texttt{\tcbuselistinglisting}

Typesets text as listing from a file named by the key value of listing file.

\begin{tcbuselistinglisting}
\end{tcbuselistinglisting}

\texttt{\begin{tikzpicture}}
\texttt{\fill[red] (0,0) rectangle (1,1);}
\texttt{\end{tikzpicture}}

\texttt{\tcbusetemplisting}

Typesets text as listing from a temporary file which was written by \texttt{tcbwritetemp} \textsuperscript{P.105}.  

245
See Section 19.4 on page 365 and Section 19.5 on page 367 for more elaborate methods to create new environments and commands.

If a new sort of `tcblisting` environments should be created with one optional argument only, one is highly recommended to use `\DeclareTcBListing` or `\NewTcBListing` instead of `\newtcblisting` to avoid content scanning problems.

\texttt{\newtcblisting\{\langle init options\rangle\}\{\langle name\rangle\}\{\langle number\rangle\}\{\langle default\rangle\}\{\langle options\rangle\}}

Creates a new environment \langle name\rangle based on `tcblisting`. Basically, `\newtcblisting` operates like `\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 `tcblisting`. Note that `/tcb/savedelimiter` is set to the given \langle name\rangle automatically. The \langle init options\rangle allow setting up automatic numbering, see Section 5 from page 97.

\begin{verbatim}
\newtcblisting{mybox}\{
  colback=red!5!white, 
  colframe=red!75!black}
\begin{mybox}
This is my \LaTeX\ box.
\end{mybox}
\end{verbatim}

This is my \LaTeX\ box.

This is my \LaTeX\ box.

\begin{verbatim}
\newtcblisting{mybox}[1]\{
  colback=red!5!white, 
  colframe=red!75!black, 
  fonttitle=\bfseries, 
  title=#1}
\begin{mybox}{Listing Box}
This is my \LaTeX\ box.
\end{mybox}
\end{verbatim}

\texttt{Listing Box}

This is my \LaTeX\ box.

This is my \LaTeX\ box.

\begin{verbatim}
\newtcblisting{mybox}[2]\{
  colback=red!5!white, 
  colframe=red!75!black, 
  fonttitle=\bfseries, 
  title=#2,#1}
\begin{mybox}[listing only]
  \{Listing Box\}
This is my \LaTeX\ box.
\end{mybox}
\end{verbatim}

\texttt{Listing Box}

This is my \LaTeX\ box.

\texttt{Listing Box}

This is my \LaTeX\ box.

\begin{verbatim}
\newtcblisting{mybox}[2]\{
  colback=red!5!white, 
  colframe=red!75!black, 
  fonttitle=\bfseries, 
  title=#2,#1}
\begin{mybox}[listing side text]
  \{Listing Box\}
This is my \LaTeX\ box.
\end{mybox}
\end{verbatim}

\texttt{Listing 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 \textit{P. 246}, but based on \renewenvironment instead of \newenvironment. An existing environment is redefined.

\texttt{Listing 1: Listing Box}

\begin{mycbox}{Listing Box}
This is my \LaTeX\ box.
\end{mycbox}

\begin{mycbox}{Listing Box}
This is my \LaTeX\ box.
\end{mycbox}
\newtcbinputlisting[(init options)]{(name)}{(number)}{(default)}{(options)}

Creates a new macro \(\langle \text{name} \rangle\) based on \verb|\tcbinputlisting|. Basically, \verb|\newtcbinputlisting| operates like \verb|\newcommand|. The new macro \(\langle \text{name} \rangle\) optionally takes \(\langle \text{number} \rangle\) arguments, where \(\langle \text{default} \rangle\) is the default value for the optional first argument. The \(\langle \text{options} \rangle\) are given to the underlying \verb|\tcbinputlisting|. The \(\langle \text{init options} \rangle\) allow setting up automatic numbering, see Section 5 from page 97.

\begin{verbatim}
\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][]{%
listing file={#2},
title=Listing (\thetcbcounter) of \texttt{#2},
colback=red!5!white,colframe=red!75!black,fonttitle=bfseries,
listing only,breakable,#1}
\mylisting[before upper=\textit{This is the included file content:}]
{\jobname.tcbtemp}
\end{verbatim}

### Listing (2) of \texttt{tcolorbox.tcbtemp}

This is the included file content:

\begin{verbatim}
\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][]{%
listing file={#2},
title=Listing (\thetcbcounter) of \texttt{#2},
colback=red!5!white,colframe=red!75!black,fonttitle=bfseries,
listing only,breakable,#1}
\mylisting[before upper=\textit{This is the included file content:}]
{\jobname.tcbtemp}
\end{verbatim}

\begin{verbatim}
\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][]{%
listing engine=minted,minted language=latex,minted style=colorful,
listing file={#2},
title=Listing (\thetcbcounter) of \texttt{#2},
colback=red!5!white,colframe=red!75!black,fonttitle=bfseries,
listing only,breakable,#1}
\mylisting[before upper=\textit{This is the included file content:}]
{\jobname.tcbtemp}
\end{verbatim}

### Listing (3) of \texttt{tcolorbox.tcbtemp}

This is the included file content:

\begin{verbatim}
\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][]{%
listing engine=minted,minted language=latex,minted style=colorful,
listing file={#2},
title=Listing (\thetcbcounter) of \texttt{#2},
colback=red!5!white,colframe=red!75!black,fonttitle=bfseries,
listing only,breakable,#1}
\mylisting[before upper=\textit{This is the included file content:}]
{\jobname.tcbtemp}
\end{verbatim}

\renewtcbinputlisting[(init options)]{(name)}{(number)}{(default)}{(options)}

Operates like \verb|\newtcbinputlisting|, but based on \verb|\renewcommand| instead of \verb|\newcommand|. An existing macro is redefined.
13.3 Option Keys of the \texttt{listings} Library

\texttt{/tcb/listing\ options\ as\ (key\ list)} \texttt{(no\ default,\ initially\ style=tcblatex)}

Sets the options from the package \texttt{listings} [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!75!black,
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{tcblisting}{no listing\ options}

All \texttt{listings} options removed.
\end{tcblisting}

\begin{tcblisting}{colback=red!5!white,colframe=red!25,left=6mm,
listing\ options={style=tcblatex}}

Here, we use the predefined style.
\end{tcblisting}

\section*{Notes}

Abbreviation for \texttt{listing\ options={}}. 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 \texttt{listings} options removed.
\end{tcblisting}

\begin{tcblisting}{colback=red!5!white,colframe=red!25,left=6mm,
listing\ style=tcblatex}

Here, we use the predefined style.
\end{tcblisting}
/tcb/listing inputencoding=(encoding)  (no default, initially \inputencodingname)
Sets the input encoding value for the predefined listing style tcblatex and
tcbdocumentation from the library \document. 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 verti-
cal space. If set to false, the listings package code is kept unchanged. Note that listings
outside tclisting \textsuperscript{\textasciitilde}P.243 and \tcbinputlisting \textsuperscript{\textasciitilde}P.245 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 \textit{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}

\begin{commandshell}
  \textcolor{red}{\small\ttfamily\bfseries root \$>} \textcolor{red}{\small\ttfamily\bfseries ls -al}
  \textcolor{red}{\small\ttfamily\bfseries root \$>} \textcolor{red}{\small\ttfamily\bfseries cd /usr/lib}
\end{commandshell}

/tcb/every listing line*=(text)  (no default, initially unset/empty)
Identical to /tcb/every listing line plus additional enlargement of /tcb/rightupper \textsuperscript{\textasciitilde}P.39
by the width of \textit{text}. Therefore, this option has to be used after the geometry settings
are done. This option is intended to be used in conjunction with /tcb/hbox \textsuperscript{\textasciitilde}P.89.

\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}

\begin{commandshell}
  \textcolor{red}{\small\ttfamily\bfseries root \$>} \textcolor{red}{\small\ttfamily\bfseries ls -al}
  \textcolor{red}{\small\ttfamily\bfseries root \$>} \textcolor{red}{\small\ttfamily\bfseries cd /usr/lib}
\end{commandshell}

See further options in Section 13.6 on page 254.

\begin{itemize}
  \item For an combined example of using \lstinline inside a tcolorbox, see
    \DeclareTotalTCBox \textsuperscript{\textasciitilde}P.363.
\end{itemize}

250
13.4 Option Keys of the \texttt{listingsutf8} Library

The \texttt{listingsutf8} library is an extension of the \texttt{listings} library, so all options from Section 13.3 on page 249 are applicable.

\begin{verbatim}
/tcb/listing utf8=/one-byte-encoding/ (style, no default, initially latin1)
Abbreviation for using \texttt{/tcb/listing inputencoding} P. 250 together with UTF-8 support from the package \texttt{listingsutf8} [10]. This option is available only for the library variant \texttt{listingsutf8}. The \texttt{(one-byte-encoding)} is one of the applicable encodings from [10], e.g. latin1.
\end{verbatim}

See further options in Section 13.6 on page 254.
13.5 Option Keys of the \texttt{minted} Library

\texttt{/tcb/minted language=(programming language)} (no default, initially \texttt{latex})

Sets a \texttt{(programming language)} known to Pygments [13].

\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}

\texttt{/tcb/minted options=(key list)} (no default, initially \texttt{tabsize=2,fontsize=\small})

Sets the options from the package \texttt{minted} [11] which are used during typesetting of the listing.

% \tcbuselibrary{skins}
\newtcblisting{myjava}{listing engine=minted,minted style=colorful,
minted language=java,minted options={fontsize=\small,linenos,\textup{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}

\begin{Verbatim}
\public class HelloWorld {
  // A 'Hello World' in Java
  \public static \void main(String[] args) {
    System.out.println("Hello World!");
  }
}\end{Verbatim}

\newtcblisting{myjava}{listing engine=minted,minted style=colorful,
minted language=java,minted options={fontsize=\small,linenos,\textup{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}

\begin{Verbatim}
\public class HelloWorld {
  // A 'Hello World' in Java
  \public static \void main(String[] args) {
    System.out.println("Hello World!");
  }
}\end{Verbatim}

252
\texttt{/tcb/minted style=(style)} \hspace{1cm} \text{(no default, initially unset)}

Sets a \textit{(style)} known to \texttt{Pygments} \cite{13}. This is independent from \textit{/tcb/minted options} \cite{1252}. Note that styles are always applied globally; all following examples will be set in the given \textit{(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 \textit{/tcb/minted language} \cite{1252} and \textit{/tcb/minted options} \cite{1252}.

See further options in Section 13.6 on the following page.
13.6 Common Option Keys of all Libraries

For the \texttt{⟨options⟩} in \texttt{tcblisting} \cite{P.243} respectively \texttt{tcbinputlisting} \cite{P.245} the following \texttt{pgf} keys can be applied. The key tree path \texttt{/tcb/} is not to be used inside these macros.

\texttt{/tcb/listing engine=⟨engine⟩} (no default)
Sets the \texttt{⟨engine⟩} 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.

\texttt{/tcb/listing file=⟨file name⟩} (no default, initially \texttt{/jobname.listing})
Sets the \texttt{⟨file name⟩} of the file which is used to save listings.

\texttt{/tcb/listing and text} (no value, initially set)
Typesets the environment content as listing in the upper part and as compiled text in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and text}
This is a \LaTeX\ example.
\end{tcblisting}

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing only}
This is a \LaTeX\ example.
\end{tcblisting}

\texttt{/tcb/text and listing} (no value)
Typesets the environment content as compiled text in the upper part and as listing in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text and listing}
This is a \LaTeX\ example.
\end{tcblisting}

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listings}
This is a \LaTeX\ example.
\end{tcblisting}

\texttt{/tcb/listing only} (no value)
Typesets the environment content as listing.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing only}
This is a \LaTeX\ example.
\end{tcblisting}
/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={text}

Records a comment with \texttt{text} as content. The comment is displayed e.g. in conjunction with /tcb/listing and comment \textsuperscript{P.258} and /tcb/comment and listing \textsuperscript{P.258}.

\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 \tcolorbox.

N 2014-11-17 /tcb/comment only

Typesets only 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={(options)}{filename}

Uses an image denoted by \texttt{filename} as \texttt{comment} for the listing. The image is included by the standard \texttt{includegraphics} macro with given \texttt{options}.

\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.
/tcb/tcbimage comment={filename} (style, no default, initially unset)
Uses an image denoted by \( \langle \text{filename} \rangle \) as comment for the listing. The image is included by the \( \texttt{tcbincludegraphics} \)\(^{\text{P.218}} \) macro. The inclusion can be customized by \( /\text{tcb/comment style} \)\(^{\text{P.258}} \).

\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}

\% \texttt{/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}

/tcb/pdf comment={filename} (style, default listing file, initially unset)
Uses a PDF file denoted by \( \langle \text{filename} \rangle \) as comment for the listing. The image is included by \( \texttt{tcbincludepdf} \)\(^{\text{P.220}} \) inside a \texttt{tcbraster}\(^{\text{P.233}} \). The inclusion can be customized by \( /\text{tcb/comment style} \)\(^{\text{P.258}} \).

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment, righthand width=3cm,lower separated=false, tcbincludecomment={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}

The library \texttt{skins} is needed to apply this option.

The libraries \texttt{skins} and \texttt{raster} are needed to apply this option.
This is a \LaTeX\ example.
/tcb/pdf extension=⟨extension⟩

Sets the PDF file name extension for /tcb/pdf comment • P. 256 to ⟨extension⟩. Note that ⟨extension⟩ always overwrites any actual extension given inside /tcb/pdf comment • P. 256.

/tcb/comment style=⟨options⟩

Sets the ⟨options⟩ for /tcb/tcbimage comment • P. 256 and /tcb/pdf comment • P. 256. These are tcolorbox options to customize the colored box drawn around the image(s), also image options encapsulated by /tcb/graphics options • P. 221, and tcbraster • P. 233 options for /tcb/pdf comment • P. 256.

/tcb/listing and comment

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\flqq\ignorespaces\tcbuselistingtext\unskip\frqq}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
This is my comment. It may contain line breaks.
It can even use the environment content «This is a \LaTeX\ example.»

/tcb/comment and listing

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.
Typesets the environment content side by side as listing in the left (upper) part and as compiled text in the right (lower) part.

\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.

Typesets the environment content side by side as compiled text in the left (upper) part and as listing in the right (lower) part.

\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.

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 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 4.14, see page 71.

\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 \texttt{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 \texttt{tcolorbox} and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 4.14, see page 71.

\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. This is a \LaTeX\ example.
/tcb/listing side comment

Typesets the environment content side by side as listing in the left (upper) part and a given comment in the right (lower) part.

\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.

/tcb/comment side listing

Typesets the environment content side by side with a given comment in the left (upper) part and as listing in the right (lower) part.

\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

Typesets the environment content side by side as listing in a 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 tcolorbox and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 4.14, see page 71.

\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}

This is a \LaTeX\ example.

/tcb/comment outside listing

Typesets the environment content side by side as listing in a 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 tcolorbox and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 4.14, see page 71.

\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}

This is a \LaTeX\ example.
/tcb/listing above text
Typesets the environment content as listing in a tcolorbox and as compiled text 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 text is controlled by /tcb/middle. 

\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/listing above* text
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 /tcb/after.

\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
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.

\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.
Typesets the environment content as listing in a \texttt{tcolorbox} and a given comment outside and below 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 /tcb/middle\textsuperscript{.P.41}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above comment, center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

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 /tcb/middle\textsuperscript{.P.41}.

\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}

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 /tcb/before\textsuperscript{.P.76}.

\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}
13.7 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}. 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=Opt,rightlower=Opt,middle=Opt,
  colframe=red!50!black,colback=yellow!10!white,
  listing and comment,
  listing file={tcolorbox-example},
  listing options=
  \{style=tcblatex,txcscstyle=\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}},
}
```

```latex
\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]
Upper part of my box.
\end{tcolorbox}
```

263
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} ]
This box uses a \textit{boxed title}. The box of the title can be formatted independently from the main box.
\end{tcolorbox}

...
1 Colored boxes

<table>
<thead>
<tr>
<th>My box</th>
<th>My box with my title</th>
</tr>
</thead>
<tbody>
<tr>
<td>My box.</td>
<td>My title</td>
</tr>
<tr>
<td>My box with my title.</td>
<td>My title</td>
</tr>
<tr>
<td>My title.</td>
<td>My box</td>
</tr>
<tr>
<td>My box</td>
<td>My title</td>
</tr>
</tbody>
</table>

2 3D-Boxes

This is a 3D-box.

This is a 3D-box.

This is a 3D-box.

3 Theorems

**Theorem 3.1: Summation of Numbers**

For all natural number $n$ it holds:

$$\sum_{i=1}^{n} i = \frac{n(n+1)}{2}$$

4 Watermarks

**Breakable box**


**Box inside box**

My box inside box.

5 Boxes in boxes

**Box inside box**

My box inside box.

6 Breakable Boxes


**Box inside box**

My box inside box.

**Box inside box**

My box inside box.

**Box inside box**

My box inside box.
/tcb/no process  (no default)

Removes all processing commands if set before.

/tcb/process code=⟨code⟩  (no default, initially empty)

Adds ⟨code⟩ which is executed during \tcbinputlisting\(^\text{P.245}\) and \tcblisting\(^\text{P.243}\). At the time of executing the given ⟨code⟩, the listing is already written to /tcb/listing file\(^\text{P.254}\), 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 \tcb/comment\(^\text{P.255}\). Several /tcb/process code options can be given which are processed in the given order.

To use the further options, the compiler has to be called with the -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 ⟨system command⟩, if the document is compiled with the -shell-escape permission. The current listing file can be accessed as \filename@area\filename@base\filename@ext.

/tcb/compilable listing (style, no default)

Sets /tcb/listing file\(^\text{P.254}\) to \jobname-listing-⟨counter⟩.

The default /tcb/listing file\(^\text{P.254}\) setting cannot be used to compile a listing, since the base name equals the \jobname and the included PDF files should be unique. Therefore, to use /tcb/run pdflatex etc., the /tcb/listing file\(^\text{P.254}\) has to be set to a unique value. One may use /tcb/compilable listing for this purpose.

/tcb/run pdflatex=⟨arguments⟩  (style, no default, initially unset)

Issues a pdflatex compilation of the listing with the given ⟨arguments⟩.

• The main document has to be compiled with the -shell-escape permission.
• The /tcb/listing file\(^\text{P.254}\) has to be unique for the listing.
• If the listing has to be compiled twice, add run pdflatex two times to the option list.
\documentclass{beamer}
\usetheme{Warsaw}
\begin{document}
\begin{frame}{Beamer example}
\begin{block}{Hello World}
\begin{itemize}[<+->]
\item One
\item Two
\end{itemize}
\end{block}
\begin{alertblock}{Integral}
\begin{equation}
\visible<3->{\int\limits_1^x \frac{1}{t}~dt}
\visible<4->{ = \ln(x).}
\end{equation}
\end{alertblock}
\end{frame}
\end{document}
\begin{tcblisting}{enhanced jigsaw, title={PSTricks with pdflatex},fonttitle=\bfseries, colframe=red!50!black,colback=yellow!10!white, listing options={style=tcblatex, texcsstyle=\color{red!70!black}}, lower separated=false,middle=0pt, listing side comment,righthand width=4.5cm, compilable listing, run latex,run dvips,run ps2pdf, pdf comment, comment style={raster columns=1,graphics options={viewport=0in 8in 4in 11.5in,clip}},}
\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}
\end{tcblisting}
13.8 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.

\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 13.1: First example with a title line}
Here, we use Example \ref{firstExample} with a title line.
\end{example}
This is a \LaTeX\ example which displays the text as source code and in compiled form.

\begin{texexp}{text and listing}
This is a \LaTeX\ example which displays the text as source code and in compiled form.
\end{texexp}

This is a \LaTeX\ example which displays the text as source code and in compiled form.

\begin{texexp}{listing only}
This is a \LaTeX\ example which displays the text as source code only.
\end{texexp}

This is a \LaTeX\ example which displays the text as source code only.

\begin{texexp}{text only}
This is a \LaTeX\ example which displays the text in compiled form only.
\end{texexp}

This is a \LaTeX\ example which displays the text in compiled form only.

\begin{texexpxtitled}{An Example with a Heading}{heading1}
This is a \LaTeX\ example with a numbered heading line which can be referred to.
\end{texexpxtitled}

Here, we see Example \ref{heading1}.

Example 13.2: An Example with a Heading

This is a \LaTeX\ example with a numbered heading line which can be referred to.

This is a \LaTeX\ example with a numbered heading line which can be referred to.

Here, we see Example 13.2.
The keys can be used in combination. Here, an example with a heading line and source code only is given.

Here, we see Example \ref{heading2}.

Example 13.3: 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 13.3.

Example 13.4: 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 following series of examples demonstrate the application of \texttt{tcolorbox}'s options for diversification.
Example 13.6: 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 13.7: 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 13.8: How to use options (3): 
Here, the \texttt{tikzpicture} is totally hidden. The \texttt{bicolor} skin highlights the output.

\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 13.9: How to use options (4): 
The \texttt{bicolor} skin also works with side by side mode

\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 13.10: 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 13.11: 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 13.12: 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}
13.9 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 7 on page 106.

- Before the first exercise is given, `\tcbstartrecording` has to be called to start recording.

- The solution is given as content of a `tcboutputlisting` environment. Note, that you can use this content also inside the exercise with `\tcbuselistingtext` in compiled form.

- After the last exercise is given (and before using the solutions), `\tcbstoprecording` has to be called to stop recording.

- The solutions are loaded by `\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 `\tcbwritetemp` and used in compiled form by `\tcbusetemp` or as source code by `\tcbusetemplisting`.

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.

```latex
\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\sffamily\bfseries, fontupper=\small, fontlower=\small, listing options={style=tcblatex,texcsstyle=\color{red!40!black}},}}
```

With these preparations, the kernel environment `\texercise` for our exercises is created quickly:

```latex
\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 \textcolor{red!40!black}{\texttt{#2}} Solution on page \pageref{sol:#2}}, list text={Exercise with solution on page \pageref{sol:#2}},#1}
```

Definition in the preamble:
The following examples demonstrate the application.

Exercise 13.1
Solution on page 280

Create the following table:

<table>
<thead>
<tr>
<th>Antike</th>
<th>Mittelalter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Republik</td>
<td>Kaiserreich</td>
</tr>
</tbody>
</table>

Das alte Italien

<table>
<thead>
<tr>
<th>Republik</th>
<th>Kaiserreich</th>
<th>Franken</th>
<th>Teilstaaten</th>
</tr>
</thead>
</table>
Create a new macro `\headingline` which produces the following output:

```
\headingline{Very important heading}
```

Exercise 13.2

Solution on page 280

Create a new macro `\headingline` which produces the following output:

```
\headingline{Very important heading}
```

My heading

In this tiny tabular, there is only a heading and some text below which has a width of ten centimeters.
Exercise 13.4

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.
\begin{tcbwritetemp}
\synop{Neil Armstrong}
\verb+That\'s one small step for a man, one giant leap for mankind.++
\verb+Das ist ein kleiner Schritt für einen Mann, ein riesiger Sprung für die Menschheit.++
\end{tcbwritetemp}
\tcbusetemplisting

\begin{tabular}{@{}p{\linewidth/2}|p{\linewidth/2} @{}}
\hline
\textit{English} & \textit{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{tcbwritetemp}
\subsection*{List of Exercises}
\end{tcbwritetemp}

\label{listofexercises}

13.10 List of Exercises

13.1 Exercise with solution on page 280 ........................................ 277
13.2 Exercise with solution on page 280 ........................................ 278
13.3 Exercise with solution on page 280 ........................................ 278
13.4 Exercise with solution on page 281 ........................................ 279
13.11 Solutions for the given \LaTeX{} Exercises

For all solutions, a macro \texttt{\processsol} was written to the file \texttt{\jobname.records}. Now, we need a definition for this macro to use the solutions.

\begin{verbatim}
% \usepackage{hyperref} % for phantomlabel
\newtcbinputlisting{\processsol}{2}{%
texercesystyle, listing only, listing file={#1}, phantomblabel={sol:#2}, % title={Solution for Exercise \ref{exe:#2} on page \pageref{exe:#2}}, }
\end{verbatim}

The loading of all solutions is done by:

\texttt{\tcbinputrecords}

With this, we get:

\textbf{Solution for Exercise 13.1 on page 277}

\begin{verbatim}
\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 Antike} & \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 r"{o}mischen Republik standen dem Staat jeweils zwei Konsuln vor, deren Machtbefugnisse identisch waren. & Das r"{o}mische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser, regiert. & In der V"{o}lkerwanderungszeit "{u}bernahmen die Goten und sp"{a}ter die Franken die Vorherrschaft. & Im sp"{a}teren Mittelalter regierten F"{u}rsten einen Fleckenteppich von Einzelstaaten.\\
% \end{tabular}
\end{verbatim}

\textbf{Solution for Exercise 13.2 on page 278}

\begin{verbatim}
\newcommand{\headingline}[1]{% \begin{center}\Large\bfseries #1\end{center}}
\end{verbatim}

\textbf{Solution for Exercise 13.3 on page 278}

\begin{verbatim}
\newcommand{\minitable}[2]{% \begin{center}\begin{tabular}{p{10cm}}\hline
\multicolumn{1}{c}{\bfseries#1}\\
\hline
#2\\
\hline
\end{tabular}\end{center}}
\end{verbatim}
\newcommand{\synop}[3]{% 
\begin{tabular}{@{}p{\linewidth-\tabcolsep*2-\arrayrulewidth}/2| % 
p{\linewidth-\tabcolsep*2-\arrayrulewidth}/2}@{}}\hline 
\multicolumn{2}{c}{\bfseries #1}\\\hline 
\multicolumn{1}{c|}{\itshape English} & 
\multicolumn{1}{c}{\itshape German}\\\hline 
#2 & #3 
\end{tabular}}
14 Library \textit{theorems}

The library is loaded by a package option or inside the preamble by:

\texttt{tcbuselibrary\{theorems\}}

This also loads the package \texttt{amsmath}.

14.1 Macros of the Library

\texttt{\newtcbtheorem\{init options\}\{name\}\{display name\}\{options\}\{prefix\}}

Creates new environments \texttt{\{name\}} and \texttt{\{name\}^*} based on \texttt{tcolorbox} to frame a (mathematical) theorem. The \texttt{\{display name\}} is used in the title line with a number, e.g. «Theorem 5.1». The \texttt{\{options\}} are given to the underlying \texttt{tcolorbox} to control the appearance. The \texttt{\{init options\}} allow setting up automatic numbering, see Section 5 on page 97.

The new environment \texttt{\{name\}} 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 the second mandatory parameter is a \texttt{\{marker\}}. The theorem is automatically labeled with \texttt{\{prefix\}:(\{marker\})}.

The new environment \texttt{\{name\}^*} takes one optional and one mandatory parameter and represents an unnumbered variant of the environment \texttt{\{name\}}. This variant is not labeled and not listed in lists of theorems.

\begin{verbatim}
\newtcbtheorem[number within=section]{mytheo}{My Theorem}{colback=green!5,colframe=green!35!black,fonttitle=\bfseries}{th}
\end{verbatim}

\begin{verbatim}
\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 \texttt{\ref{th:theoexample}} and is given on page \texttt{\pageref{th:theoexample}}.
\end{mytheo}
\end{verbatim}

My Theorem 14.1: This is my title

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 14.1 and is given on page 282.

\begin{verbatim}
\begin{mytheo}[label=myownlabel]{This is my title}{}
The label parameter can be left empty without \texttt{LaTeX} error. Or you may use an own label to reference Theorem \texttt{\ref{myownlabel}}.
\end{mytheo}
\end{verbatim}

My Theorem 14.2: This is my title

The label parameter can be left empty without \texttt{FPeX} error. Or you may use an own label to reference Theorem 14.2.
\begin{mytheo}{Unnumbered Theorem}
This theorem is not numbered.
\end{mytheo}

My Theorem: Unnumbered Theorem
This theorem is not numbered.

\begin{mytheo*}{}
This theorem has no number and no title.
\end{mytheo*}

My Theorem
This theorem has no number and no title.

\renewtcbtheorem\[\langle\text{init options}\rangle\]\{\langle\text{name}\rangle\}\{\langle\text{display name}\rangle\}\{\langle\text{options}\rangle\}\{\langle\text{prefix}\rangle\}\}

Operates like \newtcbtheorem\[P.282\], but based on \renewenvironment instead of \newenvironment. An existing environment is redefined.

\tcbmaketheorem\{\langle\text{name}\rangle\}\{\langle\text{display name}\rangle\}\{\langle\text{options}\rangle\}\{\langle\text{counter}\rangle\}\{\langle\text{prefix}\rangle\}\}

\bf{\newtcbtheorem\[P.282\]} supersedes this macro.

Creates a new environment \langle\text{name}\rangle based on tcolorbox to frame a (mathematical) theorem. The \langle\text{display name}\rangle is used in the title line with a number, e.g. «Theorem 5.1». The \langle\text{options}\rangle are given to the underlying tcolorbox to control the appearance. The \langle\text{counter}\rangle is used for automatic numbering. The new environment \langle\text{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 the second mandatory parameter is a \langle\text{marker}\rangle. The theorem is automatically labeled with \langle\text{prefix}\rangle: \langle\text{marker}\rangle.
\texttt{tcolorbox\{(options)\}\{(mathematical box content)\}}

Creates a \texttt{tcolorbox} \(^{P.11}\) which is fitted to the width of the given \texttt{(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}
\text{\texttt{tcbset}}\{\text{fonttitle=\scriptsize}\}
\text{\texttt{tcbmath}}\texttt{[colback=LightBlue!25!white,colframe=blue]}\{ a^2 = 16 \} \quad \Rightarrow \quad \text{\texttt{tcbmath}}\texttt{[colback=Salmon!25!white,colframe=red,title=Implication]}\%
\{ a = 4 ~\vee~ a=-4. \}
\end{equation}

\( a^2 = 16 \quad \Rightarrow \quad a = 4 \lor a=-4. \)  \(3\)

\texttt{tcbhighmath\{(options)\}\{(mathematical box content)\}}

This is a special case of the \texttt{tcbmath} macro which uses the style \texttt{/tcb/highlight math} \(^{P.291}\). It is intended to provide context sensitive highlighting of formula parts. The color settings via \texttt{/tcb/highlight math style} \(^{P.291}\) may be different inside theorems or other colored areas and outside.

\begin{align}
\text{\texttt{tcbhighmath}}\{\sum_{n=1}^{\infty} \frac{1}{n}\} &= \infty. \\
\int x^2 \text{~d}x &= \frac{1}{3} x^3 + c.
\end{align}

\( \sum_{n=1}^{\infty} \frac{1}{n} = \infty. \)  \(4\)

\( \int x^2 \text{~d}x = \frac{1}{3} x^3 + c. \)  \(5\)

\begin{align}
\text{\texttt{tcbhighmath}}\{\sum_{n=1}^{\infty} \frac{1}{n}\} &= \infty. \\
\int x^2 \text{~d}x &= \frac{1}{3} x^3 + c.
\end{align}

\( \sum_{n=1}^{\infty} \frac{1}{n} = \infty. \)  \(6\)

\( \int x^2 \text{~d}x = \frac{1}{3} x^3 + c. \)  \(7\)
\texttt{\textbackslash tcbhighmath} \textsuperscript{P.284} 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{tcbset}{highlight math style = {enhanced, colframe = red!60!black, colback = yellow!50!white, arc = 4pt, boxrule = 1pt, drop fuzzy shadow}}
\begin{empheq}[box = \tcbhighmath]{align}
  a &= \sin(z) \\
  E &= mc^2 + \int_a^b x \, dx
\end{empheq}
\end{tcbset}

Besides \texttt{\textbackslash tcbhighmath} \textsuperscript{P.284}, one can easily define an independent new box based on \texttt{\textbackslash tcbox} \textsuperscript{P.13} which acts like \texttt{\textbackslash tcbhighmath} \textsuperscript{P.284}:

\begin{empheq}[box = \otherbox]{align}
  a &= \sin(z) \\
  E &= mc^2 + \int_a^b x \, dx
\end{empheq}

\begin{equation}
  \texttt{\textbackslash tcbhighmath}\{E\} = \texttt{\textbackslash otherbox}\{mc^2\}
\end{equation}
### 14.2 Option Keys of the Library

<table>
<thead>
<tr>
<th>Option Key</th>
<th>Description</th>
<th>Code Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{/tcb/separator sign} $\langle sign \rangle$</td>
<td>(no default, initially : ) The given \texttt{$\langle sign \rangle$} 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.</td>
<td>\begin{verbatim} % \usepackage{amssymb} \newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}% {colback=white,colframe=red!50!black,fonttitle=\bfseries, separator sign={\ $\blacktriangleright$}}{theo} \begin{sometheorem}{My example}{My example}{% My theorem text. \end{sometheorem} \end{verbatim}</td>
</tr>
<tr>
<td>\texttt{/tcb/separator sign colon}</td>
<td>(style, no value, initially set) Sets \texttt{/tcb/separator sign} to the default colon : sign.</td>
<td>\begin{verbatim} \newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}% {colback=white,colframe=red!50!black,fonttitle=\bfseries, separator sign dash}{theo} \begin{sometheorem}{My example}{My example}{% My theorem text. \end{sometheorem} \end{verbatim}</td>
</tr>
<tr>
<td>\texttt{/tcb/separator sign dash}</td>
<td>(style, no value) Sets \texttt{/tcb/separator sign} to an en-dash sign.</td>
<td>\begin{verbatim} \newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}% {colback=white,colframe=red!50!black,fonttitle=\bfseries, separator sign none}{theo} \begin{sometheorem}{My example}{My example}{% My theorem text. \end{sometheorem} \end{verbatim}</td>
</tr>
<tr>
<td>\texttt{/tcb/separator sign none}</td>
<td>(style, no value) Sets \texttt{/tcb/separator sign} to empty.</td>
<td>\begin{verbatim} \newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}% {colback=white,colframe=red!50!black,fonttitle=\bfseries, separator sign none}{theo} \begin{sometheorem}{My example}{My example}{% My theorem text. \end{sometheorem} \end{verbatim}</td>
</tr>
</tbody>
</table>
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 14.7: «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 14.8: (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 14.9: 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. The ⟨text⟩ is removed, if description font is used without value.

\newtcbtheorem{use counter from=mytheo}{sometheorem}{Theorem} %
{colback=white,colframe=red!50!black,fonttitle=\bfseries, description delimiters={\glqq}{\grqq}, description font=\mdseries\itshape}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 14.10: "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, /tcb/description color, 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.

\newtcbox{formbox}{enhanced,frame empty,size=minimal,boxsep=2pt,arc=1pt, on line,interior style image=goldshade.png}
\newtcbtheorem{use counter from=mytheo}{sometheorem}{Theorem} %
{colback=white,colframe=red!50!black,fonttitle=\bfseries, description formatter=\formbox}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 14.11: 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.

\newtcbtheorem{use counter from=mytheo}{sometheorem}{Theorem} %
{colback=white,colframe=red!50!black,fonttitle=\bfseries, terminator sign=\.{}}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 14.12: My example.
My theorem text.
Theorem 14.13 – My example:
My theorem text.

Theorem 14.14: My example –
My theorem text.

Theorem 14.15: 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}

14.16 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}  
{colback=white,colframe=red!50!black,fonttitle=\bfseries,  
 theorem name,enhanced,watermark text={\thetcbcounter}}{theo}  
\begin{sometheorem}{My example}{}  
My theorem text.  
\end{sometheorem}

Theorem: My example 14.17
My theorem text.

/tcb/theorem={⟨display name⟩}{⟨counter⟩}{⟨title⟩}{⟨marker⟩} (no default)

This key is internally used by \tcbmaketheorem^P.283, but can be used directly in a \tcolorbox for a more flexible approach. The ⟨display name⟩ is used together with the increased ⟨counter⟩ value and the ⟨title⟩ for the title line of the box. Additionally, a \label with the given ⟨marker⟩ is created.

% \newcounter{texercise}% preamble  
\begin{tcolorbox}[colback=green!10,colframe=green!50!black,arc=4mm,  
 theorem={Test}{texercise}{Direct usage}{myMarker}]  
Here, we see the test \ref{myMarker}.  
\end{tcolorbox}

Test 1: Direct usage
Here, we see the test 1.

For a common appearance inside the document, the key theorem should not be used directly as in the example above, but as part of a new environment created by hand or using \tcbmaketheorem^P.283 or using its successor \newtcbtheorem^P.282.
// tcb/highlight math
Predefined style which is used for \tcbhighmath \textsuperscript{P.284}. It can be changed comfortable with \tcb/highlight math style.

// tcb/highlight math style=(style definition)
Changes the definition for \tcb/highlight math to the given (style definition). See \tcbhighmath \textsuperscript{P.284} for another example.

% \tcbuselibrary{skins}
\tcbset{highlight math style={enhanced,%\textless-- needed for the \textquote{remember} options
colframe=red,colback=red!10!white,boxsep=0pt}}
\begin{align*}
\tcbhighmath[remember as=fx]{f(x)}&= \int\limits_{1}^{x} \frac{1}{t^2}~dt
= \left[-\frac{1}{t}\right]_{1}^{x}\n&= -\frac{1}{x} + \frac{1}{1}
&= 1 - \frac{1}{x}.
\end{align*}

// tcb/math upper
Sets the upper part to mathematical mode with font \texttt{\displaystyle}.

// tcb/math lower
Sets the lower part to mathematical mode with font \texttt{\displaystyle}.

// tcb/math
Sets the upper part and lower part to mathematical mode with font \texttt{\displaystyle}.

\begin{tcolorbox}[math,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}
The following styles are only tested to work with the original \texttt{amsmath} environments. If e.g. the \texttt{equation} environment is redefined as \texttt{gather}, then \texttt{/tcb/ams equation} should \texttt{/tcb/ams gather} could not be used. Obviously, you are encouraged to use \texttt{/tcb/ams gather} in this case.

\begin{tcolorbox}
[\texttt{ams equation},colback=yellow!10!white,colframe=red!50!black]
\int \sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}

\begin{tcolorbox}
[\texttt{ams equation*},colback=yellow!10!white,colframe=red!50!black]
\int \sum\limits_{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\limits_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{tcolorbox}

\begin{tcolorbox}[ams align*,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{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\limits_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{tcolorbox}
/tcb/ams gather upper
   (style, no value)
   Adds an amsmath gather environment to the start and end of the upper part.

/tcb/ams gather lower
   (style, no value)
   Adds an amsmath gather environment to the start and end of the lower part.

/tcb/ams gather
   (style, no value)
   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_{n=1}^{\infty} \frac{1}{n} = \infty.\quad (18)
\int x^2 \text{d}x = \frac{1}{3} x^3 + c.\quad (19)
\end{tcolorbox}

/tcb/ams gather* upper
   (style, no value)
   Adds an amsmath gather* environment to the start and end of the upper part.

/tcb/ams gather* lower
   (style, no value)
   Adds an amsmath gather* environment to the start and end of the lower part.

/tcb/ams gather*
   (style, no value)
   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_{n=1}^{\infty} \frac{1}{n} = \infty.
\int x^2 \text{d}x = \frac{1}{3} x^3 + c.
\end{tcolorbox}
Neutralizes the \abovedisplayskip of a following align or gather environment for the upper part. Note that the text content has to start with such a formula.

Neutralizes the \abovedisplayskip of a following align or gather environment for the lower part. Note that the text content has to start with such a formula.

Neutralizes the \abovedisplayskip of a following align or 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. \\
\int x^2 \; dx &= \frac{1}{3} x^3 + c.
\end{align}
\end{tcolorbox}

And now for something completely different.

New colored mathematical environments are easily created using \newtcolorbox:\

\begin{tcolorbox}[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{tcolorbox}

All described options like /tcb/ams gather upper, /tcb/ams gather lower, /tcb/ams gather are (partially) setting (overwriting) the keys /tcb/before upper, /tcb/after upper, /tcb/before lower, /tcb/after lower. Therefore, e.g. \tcbset{ams gather,before upper=\text{Pythagoras:}} produces an invalid result. For this case, you are invited to use \tcbset{ams gather,before upper app=\text{Pythagoras:}}, see /tcb/before upper app.
/tcb/theorem style=⟨name⟩ (no default, initially standard)
Applies a predefined style ⟨name⟩ to the theorem environment. Some of the feasible ⟨name⟩ values resemble style names from the packages theorem and ntheorem to give convenient access to known patterns.

The styles alter /tcb/separatort sign \textsuperscript{P.286}, /tcb/description delimiters \textsuperscript{P.287}, /tcb/terminator sign \textsuperscript{P.288}, and more. Therefore, one should apply such keys after a theorem style.

For the following examples, we use:

\begin{tcbtheorem}[use counter from=mytheo]{theorem}{Theorem}{
% fonttitle=\bfseries\upshape,fontupper=\itshape,
colframe=green!50!black,colback=green!10!white,
colbacktitle=green!20!white,coltitle=blue!75!black}{theo}

The predefined styles are:

- standard: This is the initial value.

\begin{tcbtheorem}{standard}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{tcbtheorem}

\textbf{Theorem 14.18: standard}
This is my theorem. \[ a^2 + b^2 = c^2. \]

- change standard

\begin{tcbtheorem}{change standard}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{tcbtheorem}

\textbf{14.19 Theorem: change standard}
This is my theorem. \[ a^2 + b^2 = c^2. \]

- plain

\begin{tcbtheorem}{plain}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{tcbtheorem}

\textbf{Theorem 14.20 (plain): This is my theorem.}
\[ a^2 + b^2 = c^2. \]
• break

\begin{theorem}[theorem style=break]{break}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}\end{theorem}

Theorem 14.21 (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 14.22 (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}

14.23 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}

14.24 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}

14.25 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}

14.26 Theorem (margin): This is my theorem.
\[ a^2 + b^2 = c^2. \]

14.27 Theorem (margin): This is my theorem.
\[ a^2 + b^2 = c^2. \]

• 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}

14.28 Theorem (margin break): This is my theorem.
\[ a^2 + b^2 = c^2. \]

14.29 Theorem (margin break): This is my theorem.
\[ a^2 + b^2 = c^2. \]

• 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}

14.30 Theorem (margin apart)
This is my theorem.
\[ a^2 + b^2 = c^2. \]

14.31 Theorem (margin apart)
This is my theorem.
\[ a^2 + b^2 = c^2. \]
14.3 Examples for Definitions and Theorems

In the following, the application of \texttt{tcbmaketheorem} \textsuperscript{P.283} 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.

**Definition in the preamble:**

\begin{verbatim}
\usepackage{cleveref}
tcset{
defstyle/.style={fonttitle=\bfseries, fontupper=\slshape, arc=0mm, colback=blue!5!white, colframe=blue!75!black},
\theostyle/.style={fonttitle=\bfseries, fontupper=\slshape, colback=red!10!white, colframe=red!75!black},}
\newtcbtheorem[number within=subsection,crefname={definition}{definitions}]{def}{}
\newtcbtheorem[use counter from=Definition,crefname={theorem}{theorems}]{theo}{}
\newtcbtheorem[use counter from=Definition,crefname={corollary}{corollaries}]{cor}{}
\end{verbatim}

By \texttt{newtcbtheorem} \textsuperscript{P.282}, 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}
\text{Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung zu Testzwecken ungewöhnlich lang ist} \texttt{diffbarstetig}
\end{Theorem}

The following theorem is numbered as Theorem 14.3.1 and referenced with the marker \texttt{theo:diffbarstetig}.

**Theorem 14.3.1:** Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung zu Testzwecken ungewöhnlich lang ist

\begin{verbatim}
\begin{Theorem}
\text{Eine Funktion } f : I \to \mathbb{R} \text{ ist in } x_0 \in I \text{ stetig, wenn } f \text{ in } x_0 \text{ differenzierbar ist.}
\end{Theorem}
\end{verbatim}
The following definition is numbered as \Cref{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*}
\begin{aligned}
f'(x_0) & \quad \text{oder} \quad \frac{df}{dx}(x_0).
\end{aligned}
\end{equation*}
\end{Definition}

The following definition is numbered as Definition 14.3.2 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*}
\begin{aligned}
f'(x_0) & \quad \text{oder} \quad \frac{df}{dx}(x_0).
\end{aligned}
\end{equation*}
\end{Definition}

The following corollary is numbered as \Cref{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}

The following corollary is numbered as Corollary 14.3.3 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}
Theorem 14.3.4: Hinreichende Bedingung für Wendepunkte

\[ f \text{ sei eine auf einem Intervall } [a,b] \text{ dreimal stetig differenzierbare Funktion. Ist } f''(x_0) = 0 \text{ in } x_0 \in (a,b) \text{ und } f'''(x_0) \neq 0, \text{ so ist } (x_0,f(x_0)) \text{ ein Wendepunkt von } f. \]

Theorem 14.3.5 (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 \( \xi \in [x_0, x] \), so dass gilt

\[
f(x) - f(x_0) = \langle \text{grad } f(\xi), x - x_0 \rangle\]

Here, \texttt{cleveref} support is used to reference \texttt{Theorem 14.3.5} on Page 301. This theorem can also be referenced by \texttt{Vref} resulting in \texttt{Theorem 14.3.5}.

Note that \texttt{/tcb/label type \textsuperscript{\textbullet}{} P.93} was used in the example above to feed \texttt{cleveref} [5] with the needed name information.
Here, using `\Vref` resulting in \Vref{theo:meanvaluetheorem} is more interesting...

Here, using `\Vref` resulting in Theorem 14.3.5 on page 301 is more interesting...

\begin{YetAnotherTheorem}{Mittelwertsatz für $n$ 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}

\begin{Theorem}{Mittelwertsatz für $n$ 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{Theorem}

Theorem 14.3.7: 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
\begin{equation*}
f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top (x - x_0)
\end{equation*}
You need more attention for your theorems? Here, you are...

\begin{Theorem} [enhanced, fuzzy halo=3mm with yellow, fuzzy halo=2mm with red, fuzzy halo=1mm with yellow, watermark color=red!35!white, watermark text={Overacting\Fundamental Theorem}]
\lipsum[1-2]
\end{Theorem}

Overacting
Fundamental Theorem

Theorem 14.3.8: Fundamental Theorem of Theorems


Let’s try a more conservative approach:

\begin{YetAnotherTheorem}{Mittelwertsatz f"{u}r $n$ Variable}{mittelwertsatz_n4}
Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f : D \to \mathbb{R}$ eine differenzierbare Funktion. 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) \cdot (x - x_0)
\end{equation*}
\end{YetAnotherTheorem}

Theorem 14.3.9 (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
\[f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top (x - x_0)\]
14.4 Using other theorem environments with \texttt{tcolorbox}

Instead of creating theorem environments with the methods described before, environments from other packages can be boxed with a \texttt{tcolorbox}.

Environments may be created e.g. by methods from the \texttt{theorem} package or the \texttt{amsthm} package. \texttt{\tcolorboxenvironment} can be used to put a box around these environments.

\begin{tcolorbox}[enhanced jigsaw,colframe=cyan,interior hidden,breakable,before skip=10pt,after skip=10pt]
\begin{lem}
\lipsum[2]
\end{lem}
\lipsum[3]
\begin{proof}
\lipsum*[4]
\end{proof}
\end{tcolorbox}


15 Library \texttt{breakable}

The library is loaded by a package option or inside the preamble by:

\begin{tcbuselibrary}{breakable}

15.1 Technical Overview

The library \texttt{breakable} supports the automatic breaking of a \texttt{tcolorbox}. This feature is enabled by \texttt{/tcb/breakable} \textsuperscript{P.307} and disabled by \texttt{/tcb/unbreakable} \textsuperscript{P.308}.

If a \texttt{tcolorbox} is set to be \texttt{/tcb/breakable} \textsuperscript{P.307}, 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.
3. Otherwise, it is checked if at least \texttt{/tcb/lines before break} \textsuperscript{P.308} 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.
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.
7. The remaining part is named \textit{last part} of the \textit{break sequence} and shipped out. The algorithm stops.

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{P.308}.
In principle, all boxes of the \textit{break sequence} share the same geometric parameters. The differences are:

- The given \texttt{/tcb/before} and \texttt{/tcb/after} 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 \texttt{/tcb/toprule at break}, \texttt{/tcb/bottomrule at break}, \texttt{/tcb/enlarge top at break}, and \texttt{/tcb/enlarge bottom at break}.

- The \texttt{/tcb/skin} decides how the first, middle, and last part look like. Actually, every part type has its own skin given by the options \texttt{/tcb/skin first}, \texttt{/tcb/skin middle}, and \texttt{/tcb/skin last}. Typically, these options are set automatically by the main skin, see Subsection 15.7 from page 318.

15.2 Limitations and Known Bugs

- The maximal total height of the upper and of the lower part of normal breakable \texttt{tcolorbox}es is about 65536pt (ca. 2300 cm) 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 \texttt{unlimited} value for \texttt{/tcb/breakable}. 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 \texttt{unlimited} for critical large boxes only.

- You can nest an unbreakable \texttt{tcolorbox} inside another \texttt{tcolorbox}, even inside a breakable one. But you cannot not nest a breakable box inside a breakable box. The \texttt{/tcb/breakable} key for a nested box is ignored automatically\textsuperscript{4}, 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 \texttt{/tcb/enforce breakable} for the nested box\textsuperscript{5}. But, a breakable box inside a breakable box will usually give a mess.

- If your text content contains some text color changing commands, your color will not survive the break to the next box. But, with the \texttt{fontspec} package and \texttt{xelatex} or \texttt{lualatex}, you can use \texttt{\addfontfeatures{Color=mycolor}} to add a font color which survives the break.

- The \texttt{perpage} option of the \texttt{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).

\footnote{Until \texttt{tcolorbox} 3.04, the \texttt{/tcb/breakable} key was not ignored for nested boxes.}

\footnote{\texttt{/tcb/enforce breakable} acts like \texttt{/tcb/breakable} until \texttt{tcolorbox} 3.04.}

N 2014-10-30
15.3 Main Option Keys

/\texttt{tcb/breakable=\texttt{true}\mid \texttt{false}\mid \texttt{unlimited}} \hfill (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 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} \cite{p.178} for breaking a box. The parts of the 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}


/tcb/unbreakable

Sets the tcolorbox to be unbreakable.

/tcb/enforce breakable

A tcolorbox inside a tcolorbox is automatically set to be unbreakable. Using /tcb/breakable\^P.307 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.307 had until package version 3.04 and exists for backward compatibility.

/tcb/title after break=(text)

The /tcb/title\^P.17 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.

/tcb/notitle after break

Removes the title line or following parts in a break sequence if set before.

/tcb/adjusted title after break=(text)

Works like /tcb/adjusted title\^P.17 but applied to /tcb/title after break.

/tcb/lines before break=(number)

Assures that the given (number) of lines of the upper box part or the lower box part are placed before a break happens.
\texttt{/tcb/break at=(length)/(length)/.../(length)}  \hspace{1em}  \text{(no default, initially 0pt)}

Defines break points at the given \langle length \rangle values. The first \langle length \rangle defines the (maximal) height of the first partial box, the second \langle length \rangle defines the (maximal) height of the second partial box, and so on. The last \langle length \rangle value is applied to all following partial boxes if any. Setting a length to 0pt means that the naturally available space is used for breaking.

\begin{verbatim}
% \usepackage{multicol,lipsum}
\begin{multicols}{3}\footnotesize
Breakable boxes inside a \texttt{multicols} environment need special attendance. They are broken by default at $\texttt{\LaTeX}$ height. The \texttt{break at} option can be used to insert better break points by hand.
\begin{tcolorbox}[enhanced jigsaw,size=small,vfill before first,
colframe=red,colback=yellow!10!white,before title=\raggedright,
title={Broken box inside a \texttt{multicols} environment},fonttitle=\bfseries,enforce breakable,\% use only breakable in the real world!
pad at break=1mm,break at=3cm/6.3cm ]
\lipsum[1]
\end{tcolorbox}
\refKey{/tcb/height fixed for} may also be considered for \texttt{multicols} environments. \end{multicols}
\end{verbatim}

Breakable boxes inside a \texttt{multicols} environment need special attendance. They are broken by default at \texttt{\LaTeX} height. The \texttt{break at} option can be used to insert better break points by hand.

\begin{tcolorbox}[breakable,enlargepage=0mm/\baselineskip/2\baselineskip/0mm,...

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.

\texttt{/tcb/enlargepage=(length)/(length)/.../(length)}  \hspace{1em}  \text{(no default, initially 0pt)}

Inserts a \texttt{\enlargethispage{(length)}} to the pages of the break sequence, i.e. allows one to enlarge (or shrink) partial boxes. The first \langle length \rangle is applied to the first partial box, the second \langle length \rangle is applied to the second partial box, and so on. The last \langle length \rangle value is applied to all following partial boxes if any. Note that floating boxes will not be enlarged.

\begin{verbatim}
\begin{tcolorbox}[breakable,\enlargepage=0mm/\baselineskip/2\baselineskip/0mm,...

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.

If an automated page break occurs before the first partial box, the page enlargement is applied to the page before the first partial box \textit{and} again to the page of the first partial box. Insert a manual break to prevent this.

In general, \texttt{enlargepage} should be used at the final stage of a document for fine-tuning only.
/tcb/enlargepage flexible=(length)  
(no default, initially 0pt)
This allows an automated page enlargement for up to (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 /tcb/enlargepage·P.309. But /tcb/enlargepage flexible overwrites settings of /tcb/pad before break*·P.311 or /tcb/pad at break*·P.311.

% The following setting hinders orphan lines for the last partial box
\tcbset{enlargepage flexible=\baselineskip}

/tcb/compress page=(option)  
(default all, initially baselineskip)
This option controls the space management on the page which contains the unbroken box or the first part of a break sequence. Feasible (option) values are:
• 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.
• baselineskip (initial value): Shrinkable glue up to one \baselineskip on the page is potentially used for the unbroken box or the first part of a break sequence.
• 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.

/tcb/shrink break goal=(length)  
(no default, initially 0pt)
This is an emergency parameter if the break algorithm produces unpleasant breaks. It shrinks the goal height of the current box part by (length) which may result in smaller boxes. Never use negative values. Usually, this option will never be needed at all.
15.4 Option Keys for the Break Appearance

\tcb/toprule at break=⟨length⟩ (no default, initially 0.5mm)
Sets the line width of the top rule to ⟨length⟩ if the box is /tcb/breakable. In this case, it is applied to middle and last parts in a break sequence. Note that /tcb/toprule \( \text{^P.34} \) overwrites this value if used afterwards.

\tcb/bottomrule at break=⟨length⟩ (no default, initially 0.5mm)
Sets the line width of the bottom rule to ⟨length⟩ if the box is /tcb/breakable. In this case, it is applied to first and middle parts in a break sequence. Note that /tcb/bottomrule \( \text{^P.34} \) overwrites this value if used afterwards.

\tcb/topsep at break=⟨length⟩ (no default, initially 0mm)
Additional vertical space of ⟨length⟩ 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.

\tcb/bottomsep at break=⟨length⟩ (no default, initially 0mm)
Additional vertical space of ⟨length⟩ 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.

\tcb/pad before break=⟨length⟩ (style, no default, initially 3.5mm)
Sets the total amount of vertical space after the text content and before the break point to ⟨length⟩. This style sets /tcb/toprule at break to 0pt and changes /tcb/topsep at break as required. In general, it is not advisable to change this value if the middle and last parts in a break sequence start with a rule or a title.

\tcb/pad before break*=⟨length⟩ (style, no default)
Sets /tcb/pad before break to ⟨length⟩ and /tcb/enlargepage flexible \( \text{^P.310} \) to an appropriate value such that empty closing frames are avoided.

\tcb/pad after break=⟨length⟩ (style, no default, initially 3.5mm)
Sets the total amount of vertical space after the break point and before the text content to ⟨length⟩. This style sets /tcb/bottomrule at break to 0pt and changes /tcb/bottomsep at break as required. In general, it is not advisable to change this value if the first and middle parts in a break sequence end with a rule.

\tcb/pad at break=⟨length⟩ (style, no default, initially 3.5mm)
Abbreviation for setting ⟨length⟩ to /tcb/pad before break and /tcb/pad after break.

\tcb/pad at break*=langle(length⟩ (style, no default)
Sets /tcb/pad at break to ⟨length⟩ and /tcb/enlargepage flexible \( \text{^P.310} \) to an appropriate value such that empty closing frames are avoided.

% \usepackage{lipsum} % preamble
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\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


/tcb/pad at break\p.311 or /tcb/pad at break*\p.311 should be used as very last option in an option list, because they adapt other settings.

Also see \tcb/enlarge top at break by\p.81 and \tcb/enlarge bottom at break by\p.81.

/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 \textcolorbox 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\p.51 for setting a fixed height for unbroken boxes. See \tcb/height fill\p.53 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.
15.5 Extra Options for Partial Boxes

\texttt{/tcb/extras}={}⟨\texttt{options}\rangle\}

(no default, initially unset)

Adds \texttt{tcolorbox} ⟨\texttt{options}⟩ to every box of a \texttt{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.

\texttt{/tcb/no extras}

(style, no default, initially set)

Removes all extras if set before.

\texttt{/tcb/extras broken}={}⟨\texttt{options}\rangle\}

(no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \texttt{P.307} and \textit{is} broken actually, then the ⟨\texttt{options}⟩ are added to every box of the \texttt{break sequence}. \texttt{/tcb/extras} overwrites this key.

\texttt{/tcb/extras unbroken}={}⟨\texttt{options}\rangle\}

(no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \texttt{P.307} but \textit{is not} broken actually or if the box is set to be \texttt{/tcb/unbreakable} \texttt{P.308}, then the ⟨\texttt{options}⟩ are added to the box. \texttt{/tcb/extras} overwrites this key.

\texttt{/tcb/no extras unbroken}

(style, no default, initially set)

Removes the unbroken extras if set before.

\texttt{/tcb/extras first}={}⟨\texttt{options}\rangle\}

(no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \texttt{P.307} and \textit{is} broken actually, then the ⟨\texttt{options}⟩ are added to the \textit{first} box of the break sequence. \texttt{/tcb/extras} overwrites this key.

\texttt{/tcb/no extras first}

(style, no default, initially set)

Removes the first extras if set before.

\texttt{/tcb/extras middle}={}⟨\texttt{options}\rangle\}

(no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \texttt{P.307} and \textit{is} broken actually, then the ⟨\texttt{options}⟩ are added to every \textit{middle} box (if any) of the break sequence. \texttt{/tcb/extras} overwrites this key.

\texttt{/tcb/no extras middle}

(style, no default, initially set)

Removes the middle extras if set before.

\texttt{/tcb/extras last}={}⟨\texttt{options}\rangle\}

(no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \texttt{P.307} and \textit{is} broken actually, then the ⟨\texttt{options}⟩ are added to the \textit{last} box of the break sequence. \texttt{/tcb/extras} overwrites this key.

\texttt{/tcb/no extras last}

(style, no default, initially set)

Removes the last extras if set before.

\texttt{/tcb/extras unbroken and first}={}⟨\texttt{options}\rangle\}

(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.

\texttt{/tcb/extras middle and last}={}⟨\texttt{options}\rangle\}

(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.

\texttt{/tcb/extras unbroken and last}={}⟨\texttt{options}\rangle\}

(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.

\texttt{/tcb/extras first and middle}={}⟨\texttt{options}\rangle\}

(no default, initially unset)

This is an abbreviation for setting \texttt{/tcb/extras first} and \texttt{/tcb/extras middle} together. \texttt{/tcb/extras} overwrites this key.

15.6 Breakable boxes and the multicol package

Unbreakable tcolorboxes can be used without special care inside a multicols environment from the multicol package [9]. Since version 3.10, a breakable tcolorbox detects, if it is used inside a multicols environment. But choosing break points for a breakable box cannot be done by the balancing routine of multicols. By default, boxes will break at \textwidth. To get pleasant results, use the /tcb/break at \textwidth and /tcb/height fixed for \textwidth options.

% \usepackage{lipsum,multicol} % preamble
\small
\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=7.5cm/Opt ]
\lipsum[2-4]
\end{tcolorbox}
\lipsum[4]
\end{multicols}


My breakable box


Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis.

This example is already set inside a \texttt{multicols} environment. This time, a \texttt{middle} part has full \texttt{\textwidth}. /\texttt{tcb/height fixed for=P.312} 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=8.2cm/0pt, height fixed for=middle ] \lipsum[2-7] \end{tcolorbox}

\lipsum[8]


My breakable box


quis dolor. Donec pellentesque, erat ac sagittis semper, nunc dui lobortis purus, quis congue purus metus ultricies tellus. Praesent 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 \texttt{tcolorbox} which fills the \texttt{multicol} environment completely. Here, \texttt{/tcb/height fixed for=P.312} is used to give all three columns the full height. Note that the appropriate \texttt{/tcb/break at=P.309} value is not computed automatically but set manually.

\begin{multicols}{3}
\begin{tcolorbox}
\lipsum[1-3]
\end{tcolorbox}
\end{multicols}
15.7 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</td>
<td>skin=enhancedfirst</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=enhancedfirst</td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=enhancedmiddle</td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=enhancedlast</td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>skin=enhanced jigsaw</td>
<td>skin=enhanced first jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhanced middle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhanced last jigsaw</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>skin=enhanced first jigsaw</td>
<td>skin=enhanced first jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhanced middle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhanced middle jigsaw</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>skin=enhanced middle jigsaw</td>
<td>skin=enhanced middle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhanced middle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhanced last jigsaw</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>skin=enhanced last jigsaw</td>
<td>skin=enhanced middle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhanced middle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhanced last jigsaw</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Skin = bicolor</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Broken Boxes</td>
<td>Skin = bicolorfirst</td>
</tr>
<tr>
<td></td>
<td>Skin = bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>Skin = bicolorlast</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Skin = bicolorfirst</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broken Boxes</td>
<td>Skin = bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>Skin = bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>Skin = bicolormiddle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Skin = bicolormiddle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broken Boxes</td>
<td>Skin = bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>Skin = bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>Skin = bicolormiddle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Skin = bicolorlast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broken Boxes</td>
<td>Skin = bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>Skin = bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>Skin = bicolorlast</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>skin=beamer</td>
<td>skin=beamerfirst</td>
</tr>
<tr>
<td></td>
<td>skin=beamermiddle</td>
</tr>
<tr>
<td></td>
<td>skin=beamermiddle</td>
</tr>
<tr>
<td></td>
<td>skin=beamerlast</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=beamerfirst</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=beamermiddle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=beamerlast</td>
</tr>
</tbody>
</table>

323
<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=freelance</td>
<td>skin=freelancefirst</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancelast</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=freelancefirst</td>
<td>skin=freelancefirst</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
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</tr>
</thead>
<tbody>
<tr>
<td>skin=freelancemiddle</td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=freelancelast</td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancelast</td>
</tr>
</tbody>
</table>
15.8 Break by Hand (Faked Break)

See Section 15.6 on page 315 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}[title=My broken box,skin=enhancedfirst]
This is a box which breaks from one column to another
\end{tcolorbox}
\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}
\begin{tcolorbox}[skin=enhancedlast]
own purposes.
\end{tcolorbox}
The main purpose of this library is to store a tcolorbox into an array of box registers for later usage.

If the 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 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 magazine in the sense of storage, but also in the sense of a journal where an article often is 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:

```
\tcbuselibrary{magazine}
```

This also loads the library \breakable, see Section 15 on page 305.

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.

### 16.1 Creation and Resetting of Box Arrays

\newboxarray\{\textlangle name\textrangle\}

This creates a new box array called \langle name\rangle. There already is a box array available with name default which can be used directly. Note that the creation is a global operation.

```
\newboxarray{myarray}
```

\boxarrayreset\{\langle name\rangle\}

Resets the size counter of a box array \langle name\rangle to zero. If \langle name\rangle is not provided, default is used as name. Use this or /tcb/reset box array before you apply /tcb/store to box array.\footnote{P.328} Otherwise, all boxes would be appended to the already existing boxes. This command does not clear box registers.

```
\boxarrayreset % resets ‘default’
\boxarrayreset{myarray} % resets ‘myarray’
```

\tcb/reset box array=\langle name\rangle\ (default default, initially unset)

Resets the size counter of a box array \langle name\rangle to zero. Use this or \boxarrayreset (which does the same) before you apply /tcb/store to box array.\footnote{P.328}.

```
\tcbset{
  reset box array, % resets ‘default’
  reset box array=myarray, % resets ‘myarray’
}
```
Works like \texttt{\textbackslash boxarrayreset} to reset the size counter of a box array \texttt{(name)} 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 \texttt{\consumeboxarray} or \texttt{\consumetcboxarray} was used to apply the stored boxes, there is no advantage in using \texttt{\boxarrayclear}.

\begin{verbatim}
\boxarrayclear \% clears 'default'
\boxarrayclear{myarray} \% clears 'myarray'
\end{verbatim}

16.2 Storing Content

\texttt{\tcb/store to box array\texttt{=(name)}} (default default, initially unset)

Stores a \texttt{tcolorbox} or all parts of a break sequence of a \texttt{tcolorbox} into a box array \texttt{(name)}. If no \texttt{(name)} is given, the already existing \texttt{default} box array is used. Otherwise, the box array has to be created beforehand with \texttt{\newboxarray}. Note that the box has to be \texttt{/tcb/breakable}, if the box shall break into several parts. Typically, manual break points are additionally defined by \texttt{/tcb/break at}. Otherwise, the box parts will have a length of about \texttt{\textheight}. For most use cases, a \texttt{\tcb/reset box array} should be applied to reset the box array counter.

\begin{verbatim}
\usepackage{lipsum}
\begin{tcolorbox}[
\begin{tcolorbox}[
\begin{tcolorbox}[
\begin{tcolorbox}[
\begin{tcolorbox}[
\end{verbatim}
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.309. You may want to have some additional distance to the preceding text.

```latex
% \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}
\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}

lorem non justo. Nam lac-

```
\begin{boxarraystore}{⟨name⟩}
⟨environment content⟩
\end{boxarraystore}

Stores the environment content into a box array \(⟨name⟩\). This corresponds to the standard \LaTeX\ environment \texttt{lrbox}, but the storage operation is global. As long as \texttt{boxarrayreset} on page 327 is not used, every new \texttt{boxarraystore} adds a further box to the array.

\begin{verbatim}
\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}
\end{verbatim}

Lamb | Little | a | Had | Mary

16.3 Retrieving Content

\texttt{boxarraygetsize}[⟨name⟩]{⟨macro⟩}

Stores the current size of a box array \(⟨name⟩\) into a given \(⟨macro⟩\). If no \(⟨name⟩\) is given, the already existing \texttt{default} box array is used.

\begin{verbatim}
\boxarraygetsize{\mysize}
\foreach \n in {1,...,\mysize} { \useboxarray{\n} }
\end{verbatim}

Mary | Had | a | Little | Lamb

\texttt{useboxarray}[⟨name⟩]{⟨index⟩}

Typesets the box with the given \(⟨index⟩\) number from the box array \(⟨name⟩\). If no \(⟨name⟩\) is given, the already existing \texttt{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 \texttt{useboxarray} corresponds to the standard \texttt{usebox} macro, respectively, \texttt{copy}.
\usetctboxarray\{(name)\}\{(index)\}\{(options)\}

Typesets the box with the given \{index\} number from the box array \{name\} using \useboxarray as content of a \tcbox. 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. The \tcbox can be customized by tcolorbox \{options\}.

\begin{Verbatim}
\boxarraygetsize\{\mysize\}
\foreach \n in \{1,...,\mysize\} \{ \usetctboxarray\{\n\}\{on line,colframe=yellow,colback=yellow!10\} \}
\end{Verbatim}

\begin{Verbatim}
\boxarraygetsize\{\mysize\}
\foreach \n in \{1,...,\mysize\} \{ \consumetctboxarray\{\n\} \}
\par
\end{Verbatim}

\begin{Verbatim}
First run: \foreach \n in \{1,...,\mysize\} \{ \consumetctboxarray\{\n\} \}
Second run: \\par
First run: Mary Had \underline{\text{n}} Little Lamb
Second run: Mary Had \underline{\text{n}} Little Lamb
\end{Verbatim}

\begin{Verbatim}
\boxarraygetsize\{\mysize\}
\foreach \n in \{1,...,\mysize\} \{ \consumetctboxarray\{\n\} \}
\end{Verbatim}

\begin{Verbatim}
First run: \foreach \n in \{1,...,\mysize\} \{ \consumetctboxarray\{\n\} \}
Second run: \\par
\end{Verbatim}

\begin{Verbatim}
First run: Mary Had \underline{\text{n}} Little Lamb
Second run: Mary Had \underline{\text{n}} Little Lamb
\end{Verbatim}

\begin{Verbatim}
— continued from page 330 —
the appropriate places you see. The linking texts like continued on page x are created by /tcb/finish commands for the embedding \tcbox. To label the box parts, /tcb/phantomlabel is used. These quite small partial boxes are
— continued on page 334 —
\end{Verbatim}
16.4 Box Dimensions

\texttt{\textbackslash boxarraygetwidth\{\textit{name}\}\{\textit{macro}\}\{\textit{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 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.

\texttt{\textbackslash tcbox\[size=small,colframe=blue!20,colback=yellow!5,on line,\reset and store to box array\]{Test}}

\begin{tabular}{ll}
\useboxarray\{1\} & width of box 1: \texttt{\boxarraygetwidth\{\mylen\}{1}} \mylen \\
\useboxarray\{2\} & width of box 2: \texttt{\boxarraygetwidth\{\mylen\}{2}} \mylen
\end{tabular}

Test width of box 1: 30.35799pt
width of box 2: 0pt

\texttt{\textbackslash boxarraygetheight\{\textit{name}\}\{\textit{macro}\}\{\textit{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 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.

\texttt{\textbackslash tcbox\[size=small,colframe=blue!20,colback=yellow!5,on line,\reset and store to box array\]{Test}}

\begin{tabular}{ll}
\useboxarray\{1\} & height of box 1: \texttt{\boxarraygetheight\{\mylen\}{1}} \mylen \\
\useboxarray\{2\} & height of box 2: \texttt{\boxarraygetheight\{\mylen\}{2}} \mylen
\end{tabular}

Test height of box 1: 9.89883pt
height of box 2: 0pt

\texttt{\textbackslash boxarraygetdepth\{\textit{name}\}\{\textit{macro}\}\{\textit{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 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.

\texttt{\textbackslash tcbox\[size=small,colframe=blue!20,colback=yellow!5,on line,\reset and store to box array\]{Test}}

\begin{tabular}{ll}
\useboxarray\{1\} & depth of box 1: \texttt{\boxarraygetdepth\{\mylen\}{1}} \mylen \\
\useboxarray\{2\} & depth of box 2: \texttt{\boxarraygetdepth\{\mylen\}{2}} \mylen
\end{tabular}

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 \textit{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
The library is loaded by a package option or inside the preamble by:
\tcbuselibrary\{fitting\}

17.1 Macros of the Library
\tcboxfit\{(options)\}\{\spaceboxcontent\}\}

Creates a colored box where the given \spaceboxcontent is fitted to the width and height of the box. A tcolorbox has to have a fixed height. If no fixed height is given, a square box is constructed. In principle, most \spaceboxoptions for a tcolorbox can be used for \tcboxfit with some restrictions. A \tcboxfit cannot have a lower part and cannot be broken.

\begin{tcbraster}[colback=green!10!white,boxsep=1mm]
\end{tcbraster}


% \usepackage\{lipsum\} \tcbuselibrary\{raster\}
\tcset\{colframe=blue!50!black, colback=red!10!white, boxsep=Opt, top=1mm, bottom=1mm, left=1mm, right=1mm, fit algorithm=hybrid*, raster equal skip=1mm\}
\begin{tcbraster}[raster columns=3, raster valign=bottom]
\end{tcbraster}


\begin{tcbraster}[colback=green!10!white, boxsep=1mm]
\end{tcbraster}
See Section 19.6 on page 368 for more elaborate methods to create new commands.

\newtcbboxfit\{\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 \tcboxfit\footnote{P.335}. Basically, \newtcbboxfit operates like \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 \tcboxfit. The \langle init options \rangle allow setting up automatic numbering, see Section 5 from page 97.

\newtcbboxfit\{\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.\}

This is my own box.
This is my own box with more text to be written.

% \usepackage{lipsum}
\newtcbboxfit\{\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]}%

First box
Second box with more text
Third box with text

\newtcbboxfit\{\mybox\}[2]\{colback=red!5!white, 
colframe=red!75!black, width=#2,height=#1/3*2,#1\}
\mybox[5cm]{\lipsum[2]}%

Very tiny,
Small,
Normal,
Large,
Huge.

\renewtcbboxfit\{(init options)\}\{(name)\}\{(number)\}\{(default)\}\{(options)\}

 Operates like \newtcbboxfit, but based on \renewcommand instead of \newcommand. An existing macro is redefined.

\tcbfontsize\{\langle factor \rangle\}

Selects a font size inside a \tcolorbox which is scaled with the given \langle factor \rangle relative to \tcbfitdim.

% \usepackage{lipsum}
\renewtcbboxfit\{\mybox\}[2]\{colback=red!5!white, 
colframe=red!75!black, 
width=#2,height=#2/3*2,#1\}
\mybox[5cm]{\lipsum[2]} %

\tcbfontsize\{0.25\} Very tiny,\%
\tcbfontsize\{0.5\} Small,\%
\tcbfontsize\{1\} Normal,\%
\tcbfontsize\{2\} Large,\%
\tcbfontsize\{4\} Huge.\%

Very tiny
Small, Normal, Large, Huge.
17.2 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 *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 algorithm will fail, if a different selected font size does not change the overall size of the box content. The \(\texttt{tcboxfit}^ {\textsuperscript{335}}\) macro uses this algorithm by default.

The fit control keys are only applicable to unbreakable boxes without a lower part. The box content should not change counters.

\texttt{/tcb/fit} \hspace{2cm} (style, initially unset)

Sets the \(\texttt{/tcb/capture}^ {\textsuperscript{89}}\) mode to fitbox, i.e. enables the font size adjustment algorithm. Thereby, a \texttt{tcolorbox} \(\textsuperscript{11}\) acts like \(\texttt{tcboxfit}^ {\textsuperscript{335}}\) 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.

\[
\text{\% \usepackage{lipsum}}
\text{\% \tcbuselibrary{skins}}
\newtcolorbox{fitting}[2][]{fit,height=#2,boxsep=1pt,valign=center,opacityupper=0.5,top=0.4\texttt{tcbfitdim},bottom=0.4\texttt{tcbfitdim},left=0.75\texttt{tcbfitdim},right=0.75\texttt{tcbfitdim},enhanced,watermark text={\texttt{tcbfitsteps}},colframe=blue!75!black,colback=white,#1}
\begin{fitting}{4cm}
\lipsum[1]
\end{fitting}
\begin{fitting}{2cm}
\lipsum[2]
\end{fitting}
\begin{fitting}{1cm}
\lipsum[3]
\end{fitting}
\]


Shortcut for using `/tcb/fit` 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}

Shortcut for using `/tcb/fit` and setting the \(<height>\) value separately.

\begin{tcolorbox}[fit to height=2cm]
This box content is fitted to the given height.
\end{tcolorbox}

Sets the starting font dimension for the font size adjustment algorithm to \(<length>\). The algorithm never enlarges this dimension.

\begin{tcolorbox}[fit to=4cm and 2cm, fit basedim=50pt]
Enough words for the box.
\end{tcolorbox}

Sets the skip value of the selected font to \(<real value>\) times \texttt{\tcbfitdim}.

\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{\LARGE}, and \texttt{\huge}, to set font sizes relative to the current \texttt{\tcbbfindim}. Note that the display skip values for mathematical formulas are respected by the redefined macros.

% \usepackage{lipsum}
\tcbsset{colback=red!5!white, 
colframe=red!75!black,left=1mm, 
right=1mm,boxsep=0mm}

\begin{tcolorbox}[fit to height=4cm] 
{\Large\textbf{This text is not adapted:}}\par
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit to height=4cm, fit fontsize macros] 
{\Large\textbf{This text is adapted:}}\par
\lipsum[2]
\end{tcolorbox}

The relative relative font size macros are also usable without the \texttt{\fit} algorithm.

The relative relative font size macros are also usable without the \texttt{\fit} algorithm.

\begin{tcolorbox}[height=5cm, fit fontsize macros, fonttitle=\normalsize\textbf{series}, title=Adapted title] 
{\lipsum[2]}
\end{tcolorbox}

% \tcbsset{size=fbox,colback=red!5!white, 
colframe=red!75!black}
\tcboxfit[height=5cm, fit fontsize macros, fonttitle=\normalsize\textbf{series}, title=Adapted title] 
{\lipsum[2]}

\let\realHuge=\Huge

\begin{tcolorbox}[fit basedim=7pt, 
fontupper=\normalsize, 
fit fontsize macros] 
The relative relative font size macros are also usable without the \texttt{\fit} algorithm.\par
{\Huge Adapted Huge} --- 
{\realHuge Original Huge}
\end{tcolorbox}
The box is allowed to enlarge the fixed height up to the given \texttt{(dimension)}, before a font size fit is applied. An optional \texttt{/tcb/fi
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} \textsuperscript{93} or \texttt{/tcb/step and label} \textsuperscript{93} to set counters or use automatic numbering, see Subsection 5.1 from page 97.

\texttt{/tcb/fit width from\langle min\rangle to \langle max\rangle} \hspace{1cm} \text{(style, no default)}

Sets the box width to \langle \text{min} \rangle and allows the width to grow up to \langle \text{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}[fit width from=\linewidth/2 to \linewidth]
\lipsum[2]
\end{tcolorbox}
\end{verbatim}

Sets the box height to \langle min \rangle and allows the height to grow up to \langle max \rangle.

\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}

/tcb/fit algorithm bureaucrats (no default, initially fontsize)

Sets the algorithm for the fitting process after optionally width and height are adapted. Feasible values for (name) 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.

  ![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.

  ![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.]

- **areasize**: 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 resizebox macro.

  > The used font has not to be scalable. Every box content is scaled down. The aspect ratio cannot be fully guaranteed.

  ![The used font has not to be scalable. Every box content is scaled down. The aspect ratio cannot be fully guaranteed.]

- **areasize**: The areasize 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.

  ![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 areasize fitting as above is 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.

  ![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 areasize* fitting as above is 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.

  ![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.
The following options set control parameters for the fit algorithm. Mainly, they apply to the \texttt{fontsize} variant, see \texttt{/tcb/fit algorithm} \textsuperscript{P.343}. The options should be seen as experimental and are likely to change in future versions, if necessary.

\texttt{/tcb/fit maxstep}=(\texttt{number}) \hfill (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}=(\texttt{dimension}) \hfill (no default, initially 0.1pt)

The algorithm stops, if the font size is determined within a deviation of \texttt{(dimension)}.

\texttt{/tcb/fit maxfontdiffgap}=(\texttt{dimension}) \hfill (no default, initially 1pt)

The algorithm stops, if the number of lines is determined and the font size is determined within a deviation of \texttt{(dimension)}.

\texttt{/tcb/fit maxwidthdiff}=(\texttt{dimension}) \hfill (no default, initially 1pt)

The algorithm stops, if the (optionally) flexible box width is determined within a deviation of \texttt{(dimension)}.

\texttt{/tcb/fit maxwidthdiffgap}=(\texttt{dimension}) \hfill (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 \texttt{(dimension)}.

\texttt{/tcb/fit warning}=(\texttt{value}) \hfill (no default, initially \texttt{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 \texttt{'Underfull \hbox'} and \texttt{'Overfull \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 constructed for theses messages.
18 Library \textbf{hooks}

The library is loaded by a package option or inside the preamble by:

\texttt{\usepackage{\textbackslash tcbuselibrary}{hooks}}

For the skin related options, the library \textbf{skins} has to be loaded separately.

18.1 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, /tcb/before upper places code before the content of the upper part. A following usage of this key overwrites any prior settings.

The library \textbf{hooks} extends /tcb/before upper and several more existing keys to 'hookable' versions, e.g. /tcb/before upper app and /tcb/before upper pre. 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:

- (option key) \texttt{app}: works like (option key) but appends its code to the existing code.
- (option key) \texttt{pre}: works like (option key) but prepends its code to the existing code.

If the original (option key) is used (again), all code will be overwritten. Therefore, the order of the option key usage is crucial.
18.2 Box Content Additions

The following option keys extend the options given in Subsection 4.11 from page 58.

/\texttt{tcb/before title app}=(code) (no default)
  Appends the given \texttt{(code)} to \texttt{/tcb/before title} after the color and font settings and before the content of the title.

/\texttt{tcb/before title pre}=(code) (no default)
  Prepends the given \texttt{(code)} to \texttt{/tcb/before title} after the color and font settings and before the content of the title.

/\texttt{tcb/after title app}=(code) (no default)
  Appends the given \texttt{(code)} to \texttt{/tcb/after title} after the content of the title.

/\texttt{tcb/after title pre}=(code) (no default)
  Prepends the given \texttt{(code)} to \texttt{/tcb/after title} after the content of the title.

/\texttt{tcb/before upper app}=(code) (no default)
  Appends the given \texttt{(code)} to \texttt{/tcb/before upper} after the color and font settings and before the content of the upper part.

/\texttt{tcb/before upper pre}=(code) (no default)
  Prepends the given \texttt{(code)} to \texttt{/tcb/before upper} after the color and font settings and before the content of the upper part.

/\texttt{tcb/after upper app}=(code) (no default)
  Appends the given \texttt{(code)} to \texttt{/tcb/after upper} after the content of the upper part.

/\texttt{tcb/after upper pre}=(code) (no default)
  Prepends the given \texttt{(code)} to \texttt{/tcb/after upper} after the content of the upper part.

\begin{tcolorbox}
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty. \quad (23)
\int x^2 ~\text{d}x = \frac{1}{3} x^3 + c. \quad (24)
\sin\left(\frac{\pi}{2}\right) = 1. \quad (25)
\end{tcolorbox}
Appends the given \(\langle \text{code} \rangle\) to \(\text{/tcb/before lower}\) after the color and font settings and before the content of the lower part.

Prepends the given \(\langle \text{code} \rangle\) to \(\text{/tcb/before lower}\) after the color and font settings and before the content of the lower part.

Appends the given \(\langle \text{code} \rangle\) to \(\text{/tcb/after lower}\) after the content of the lower part.

Prepends the given \(\langle \text{code} \rangle\) to \(\text{/tcb/after lower}\) after the content of the lower part.

### 18.3 Embedding into the Surroundings

The following option keys extend the options given in Subsection 4.15 from page 76.

The 'hookable' versions are usable inside the document. In the preamble, they can only be used after explicit setting of \(\text{/tcb/before}\) and \(\text{/tcb/after}\) or by e.g. \(\text{/tcb/parskip}\).

Appends the given \(\langle \text{code} \rangle\) to \(\text{/tcb/before}\) before the colored box.

Prepends the given \(\langle \text{code} \rangle\) to \(\text{/tcb/before}\) before the colored box.

Appends the given \(\langle \text{code} \rangle\) to \(\text{/tcb/after}\) after the colored box.

Prepends the given \(\langle \text{code} \rangle\) to \(\text{/tcb/after}\) after the colored box.

```latex
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title,before app={The box follows:\n[4pt]},
    after app={This is the end.}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

The box follows:

<table>
<thead>
<tr>
<th>My title</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is a \textbf{tcolorbox}.</td>
</tr>
</tbody>
</table>

This is the end.
18.4 Overlays

The following option keys extend the options given in Subsection 4.12 from page 64.

/tcb/overlay app=⟨graphical code⟩  (no default)

Appends the given ⟨graphical code⟩ to /tcb/overlay."P.64.

/tcb/overlay pre=⟨graphical code⟩  (no default)

Prepends the given ⟨graphical code⟩ to /tcb/overlay."P.64.

/tcb/overlay unbroken app=⟨graphical code⟩  (no default)

Appends the given ⟨graphical code⟩ to /tcb/overlay unbroken."P.65.

/tcb/overlay unbroken pre=⟨graphical code⟩  (no default)

Prepends the given ⟨graphical code⟩ to /tcb/overlay unbroken."P.65.

/tcb/overlay first app=⟨graphical code⟩  (no default)

Appends the given ⟨graphical code⟩ to /tcb/overlay first."P.65.

/tcb/overlay first pre=⟨graphical code⟩  (no default)

Prepends the given ⟨graphical code⟩ to /tcb/overlay first."P.65.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/tcb/overlay middle app=⟨graphical code⟩</code></td>
<td>Appends the given ⟨graphical code⟩ to <code>/tcb/overlay middle</code> P.65.</td>
</tr>
<tr>
<td><code>/tcb/overlay middle pre=⟨graphical code⟩</code></td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/overlay middle</code> P.65.</td>
</tr>
<tr>
<td><code>/tcb/overlay last app=⟨graphical code⟩</code></td>
<td>Appends the given ⟨graphical code⟩ to <code>/tcb/overlay last</code> P.65.</td>
</tr>
<tr>
<td><code>/tcb/overlay last pre=⟨graphical code⟩</code></td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/overlay last</code> P.65.</td>
</tr>
<tr>
<td><code>/tcb/overlay broken app=⟨graphical code⟩</code></td>
<td>Appends the given ⟨graphical code⟩ to <code>/tcb/overlay broken</code> P.65.</td>
</tr>
<tr>
<td><code>/tcb/overlay broken pre=⟨graphical code⟩</code></td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/overlay broken</code> P.65.</td>
</tr>
<tr>
<td><code>/tcb/overlay unbroken and first app=⟨graphical code⟩</code></td>
<td>Appends the given ⟨graphical code⟩ to <code>/tcb/overlay unbroken and first</code> P.65.</td>
</tr>
<tr>
<td><code>/tcb/overlay unbroken and first pre=⟨graphical code⟩</code></td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/overlay unbroken and first</code> P.65.</td>
</tr>
<tr>
<td><code>/tcb/overlay middle and last app=⟨graphical code⟩</code></td>
<td>Appends the given ⟨graphical code⟩ to <code>/tcb/overlay middle and last</code> P.65.</td>
</tr>
<tr>
<td><code>/tcb/overlay middle and last pre=⟨graphical code⟩</code></td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/overlay middle and last</code> P.65.</td>
</tr>
<tr>
<td><code>/tcb/overlay unbroken and last app=⟨graphical code⟩</code></td>
<td>Appends the given ⟨graphical code⟩ to <code>/tcb/overlay unbroken and last</code> P.65.</td>
</tr>
<tr>
<td><code>/tcb/overlay unbroken and last pre=⟨graphical code⟩</code></td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/overlay unbroken and last</code> P.65.</td>
</tr>
<tr>
<td><code>/tcb/overlay first and middle app=⟨graphical code⟩</code></td>
<td>Appends the given ⟨graphical code⟩ to <code>/tcb/overlay first and middle</code> P.65.</td>
</tr>
<tr>
<td><code>/tcb/overlay first and middle pre=⟨graphical code⟩</code></td>
<td>Prepends the given ⟨graphical code⟩ to <code>/tcb/overlay first and middle</code> P.65.</td>
</tr>
</tbody>
</table>
18.5 Watermarks

Watermarks are special overlays. The \texttt{\textcopyright\textregistered\texttrademark} library allows the combination of several watermarks and overlays.

\begin{itemize}
\item \texttt{/tcb/watermark\ \textit{text app}=\langle text \rangle} \quad (no default)
\end{itemize}

Appends a \texttt{/tcb/watermark text} \textsuperscript{P.139} to the colored box.

\begin{tcolorbox}
\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,watermark graphics=Basilica_5.png, watermark opacity=0.25, watermark text app=Basilica,watermark color=Navy ]
\lipsum[1-2]
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

This example uses a public domain picture from\url{http://commons.wikimedia.org/wiki/File:Basilica_5.png}

\begin{itemize}
\item \texttt{/tcb/watermark\ \textit{text pre}=\langle text \rangle} \quad (no default)
\end{itemize}

Prepends a \texttt{/tcb/watermark text} \textsuperscript{P.139} to the colored box.

\begin{tcolorbox}
\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,watermark graphics=Basilica_5.png, watermark opacity=0.25, watermark text app=Basilica,watermark color=Navy ]
\lipsum[1-2]
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

This example uses a public domain picture from\url{http://commons.wikimedia.org/wiki/File:Basilica_5.png}

\begin{itemize}
\item \texttt{/tcb/watermark\ \textit{text app on}=\langle part \rangle is \langle text \rangle} \quad (no default)
\end{itemize}

Appends a \texttt{/tcb/watermark text} \textsuperscript{P.139} the named \langle part \rangle of a break sequence.

\begin{itemize}
\item \texttt{/tcb/watermark\ \textit{text pre on}=\langle part \rangle is \langle text \rangle} \quad (no default)
\end{itemize}

Prepends a \texttt{/tcb/watermark text} \textsuperscript{P.139} the named \langle part \rangle of a break sequence.
/tcb/watermark graphics app=⟨file name⟩  (no default)
Appends a /tcb/watermark graphics \(^{P.140}\) referenced by ⟨file name⟩ to the colored box.

/tcb/watermark graphics pre=⟨file name⟩  (no default)
Prepends a /tcb/watermark graphics \(^{P.140}\) 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 \(^{P.140}\) 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 \(^{P.140}\) 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 \(^{P.141}\) with the given tikz ⟨graphical code⟩ to the colored box.

/tcb/watermark tikz pre=⟨graphical code⟩  (no default)
Prepends a /tcb/watermark tikz \(^{P.141}\) 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}

My title

18.6 Underlays

The following option keys extend the options given in Section 9.8 on page 169. 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 \textsuperscript{P.169}.

/tcb/underlay unbroken pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/underlay unbroken \textsuperscript{P.170}.

/tcb/underlay first pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/underlay first \textsuperscript{P.170}.

/tcb/underlay middle pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/underlay middle \textsuperscript{P.170}.

/tcb/underlay last pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/underlay last \textsuperscript{P.170}.

/tcb/underlay boxed title pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/underlay boxed title \textsuperscript{P.170}.

/tcb/underlay broken pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/underlay broken \textsuperscript{P.170}.

/tcb/underlay unbroken and first pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/underlay unbroken and first \textsuperscript{P.170}.

/tcb/underlay middle and last pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/underlay middle and last \textsuperscript{P.170}.

/tcb/underlay unbroken and last pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/underlay unbroken and last \textsuperscript{P.170}.

/tcb/underlay first and middle pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/underlay first and middle \textsuperscript{P.170}.
18.7 Finishes

The following option keys extend the options given in Section 9.9 on page 171. There are no app type keys since finishes are stackable by default.

\[
\begin{align*}
/\text{tcb/finish} & \text{ pre}=\langle \text{graphical code} \rangle \quad \text{(no default)} \\
& \quad \text{Prepends the given } \langle \text{graphical code} \rangle \text{ to } /\text{tcb/finish} \quad \text{P.171}. \\
/\text{tcb/finish unbroken} & \text{ pre}=\langle \text{graphical code} \rangle \quad \text{(no default)} \\
& \quad \text{Prepends the given } \langle \text{graphical code} \rangle \text{ to } /\text{tcb/finish unbroken} \quad \text{P.172}. \\
/\text{tcb/finish first} & \text{ pre}=\langle \text{graphical code} \rangle \quad \text{(no default)} \\
& \quad \text{Prepends the given } \langle \text{graphical code} \rangle \text{ to } /\text{tcb/finish first} \quad \text{P.172}. \\
/\text{tcb/finish middle} & \text{ pre}=\langle \text{graphical code} \rangle \quad \text{(no default)} \\
& \quad \text{Prepends the given } \langle \text{graphical code} \rangle \text{ to } /\text{tcb/finish middle} \quad \text{P.172}. \\
/\text{tcb/finish last} & \text{ pre}=\langle \text{graphical code} \rangle \quad \text{(no default)} \\
& \quad \text{Prepends the given } \langle \text{graphical code} \rangle \text{ to } /\text{tcb/finish last} \quad \text{P.172}. \\
/\text{tcb/finish broken} & \text{ pre}=\langle \text{graphical code} \rangle \quad \text{(no default)} \\
& \quad \text{Prepends the given } \langle \text{graphical code} \rangle \text{ to } /\text{tcb/finish broken} \quad \text{P.172}. \\
/\text{tcb/finish unbroken and first} & \text{ pre}=\langle \text{graphical code} \rangle \quad \text{(no default)} \\
& \quad \text{Prepends the given } \langle \text{graphical code} \rangle \text{ to } /\text{tcb/finish unbroken and first} \quad \text{P.172}. \\
/\text{tcb/finish middle and last} & \text{ pre}=\langle \text{graphical code} \rangle \quad \text{(no default)} \\
& \quad \text{Prepends the given } \langle \text{graphical code} \rangle \text{ to } /\text{tcb/finish middle and last} \quad \text{P.172}. \\
/\text{tcb/finish unbroken and last} & \text{ pre}=\langle \text{graphical code} \rangle \quad \text{(no default)} \\
& \quad \text{Prepends the given } \langle \text{graphical code} \rangle \text{ to } /\text{tcb/finish unbroken and last} \quad \text{P.172}. \\
/\text{tcb/finish first and middle} & \text{ pre}=\langle \text{graphical code} \rangle \quad \text{(no default)} \\
& \quad \text{Prepends the given } \langle \text{graphical code} \rangle \text{ to } /\text{tcb/finish first and middle} \quad \text{P.172}.
\end{align*}
\]

18.8 Skin Code

The following option keys extend the options given in Subsection 8.2 from page 116.

\[
\begin{align*}
/\text{tcb/frame code} & \text{ app}=\langle \text{graphical code} \rangle \quad \text{(no default)} \\
& \quad \text{Appends the given } \langle \text{graphical code} \rangle \text{ to } /\text{tcb/frame code} \quad \text{P.116}. \\
/\text{tcb/frame code} & \text{ pre}=\langle \text{graphical code} \rangle \quad \text{(no default)} \\
& \quad \text{Prepends the given } \langle \text{graphical code} \rangle \text{ to } /\text{tcb/frame code} \quad \text{P.116}. \\
/\text{tcb/interior titled code} & \text{ app}=\langle \text{graphical code} \rangle \quad \text{(no default)} \\
& \quad \text{Appends the given } \langle \text{graphical code} \rangle \text{ to } /\text{tcb/interior titled code} \quad \text{P.116}.
\end{align*}
\]
### 18.9 Extras

The following option keys extend the options given in Section 15.5 on page 313. There are no `app` type keys since extras are stackable by default.

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{/tcb/extras pre={\textit{options}}}</td>
<td>Prepends the given <code>\{\textit{options}\}</code> to <code>/tcb/extras</code></td>
<td>(no default)</td>
</tr>
<tr>
<td>\texttt{/tcb/extras unbroken pre={\textit{options}}}</td>
<td>Prepends the given <code>\{\textit{options}\}</code> to <code>/tcb/extras unbroken</code></td>
<td>(no default)</td>
</tr>
<tr>
<td>\texttt{/tcb/extras first pre={\textit{options}}}</td>
<td>Prepends the given <code>\{\textit{options}\}</code> to <code>/tcb/extras first</code></td>
<td>(no default)</td>
</tr>
<tr>
<td>\texttt{/tcb/extras middle pre={\textit{options}}}</td>
<td>Prepends the given <code>\{\textit{options}\}</code> to <code>/tcb/extras middle</code></td>
<td>(no default)</td>
</tr>
<tr>
<td>\texttt{/tcb/extras last pre={\textit{options}}}</td>
<td>Prepends the given <code>\{\textit{options}\}</code> to <code>/tcb/extras last</code></td>
<td>(no default)</td>
</tr>
<tr>
<td>\texttt{/tcb/extras broken pre={\textit{options}}}</td>
<td>Prepends the given <code>\{\textit{options}\}</code> to <code>/tcb/extras broken</code></td>
<td>(no default)</td>
</tr>
<tr>
<td>\texttt{/tcb/extras unbroken and first pre={\textit{options}}}</td>
<td>Prepends the given <code>\{\textit{options}\}</code> to <code>/tcb/extras unbroken and first</code></td>
<td>(no default)</td>
</tr>
<tr>
<td>\texttt{/tcb/extras middle and last pre={\textit{options}}}</td>
<td>Prepends the given <code>\{\textit{options}\}</code> to <code>/tcb/extras middle and last</code></td>
<td>(no default)</td>
</tr>
<tr>
<td>\texttt{/tcb/extras unbroken and last pre={\textit{options}}}</td>
<td>Prepends the given <code>\{\textit{options}\}</code> to <code>/tcb/extras unbroken and last</code></td>
<td>(no default)</td>
</tr>
<tr>
<td>\texttt{/tcb/extras first and middle pre={\textit{options}}}</td>
<td>Prepends the given <code>\{\textit{options}\}</code> to <code>/tcb/extras first and middle</code></td>
<td>(no default)</td>
</tr>
</tbody>
</table>
19 Library \texttt{xparse}

The library is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{xparse}
\end{verbatim}

This also loads the package \texttt{xparse} [12].

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 [12] for details about the argument (\textit{specification}) used in this section.

19.1 Option Keys

\texttt{/tcb/verbatim} \hspace{1em} (style, no value)

Sets options for a \texttt{verbatim} style \texttt{tcolorbox} \textsuperscript{P.13}. Since the indented boxes may contain only very few words, the dimensions are made smaller and \texttt{/tcb/nobeforeafter} \textsuperscript{P.76} and \texttt{/tcb/tcbox raise base} \textsuperscript{P.91} 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}
\textbf is a \LaTeX command.
\end{verbatim}

\texttt{/tcb/IfNoValueTF} \hspace{1em} (no default)

Wraps the \texttt{IfNoValueTF} command 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}

This is a tcolorbox.

This is a tcolorbox.

357
/tcb/IfValueTF={⟨argument⟩}{⟨true options⟩}{⟨false options⟩}  
(no default)
Wraps the \IfValueTF command of xparse for option setting. If the ⟨argument⟩ has a value, the ⟨true options⟩ are set. Otherwise, the ⟨false options⟩ are set.

\DeclareTColorBox{mybox}{ o }{colframe=red!75!black,colback=red!5!white,  
IfValueTF={#1}{title={\texttt{#1}},fonttitle=\bfseries}{}}

\begin{mybox}
\end{mybox}

\begin{mybox}[My title]
\end{mybox}

/tcb/IfBooleanTF={⟨argument⟩}{⟨true options⟩}{⟨false options⟩}  
(no default)
Wraps the \IfBooleanTF command of xparse for option setting. If the ⟨argument⟩ is \BooleanTrue, the ⟨true options⟩ are set. If the ⟨argument⟩ is \BooleanFalse, the ⟨false options⟩ are set.

\DeclareTColorBox{mybox}{ s }{colframe=red!75!black,  
IfBooleanTF={#1}{colback=yellow!50!red}{colback=red!5!white}}

\begin{mybox}
\end{mybox}

\begin{mybox}*
\end{mybox}
19.2 Producing \texttt{tcolorbox} Environments and Commands

\texttt{\textbackslash DeclareTColorBox\{\texttt{\langle init options\rangle}\}\{\texttt{\langle name\rangle}\}\{\texttt{\langle specification\rangle}\}\{\texttt{\langle options\rangle}\}}

Creates a new environment \texttt{\langle name\rangle} based on \texttt{tcolorbox}.\textsuperscript{P.11} Basically, \texttt{\textbackslash DeclareTColorBox} operates like \texttt{\textbackslash DeclareDocumentEnvironment}. This means, the new environment \texttt{\langle name\rangle} is constructed with the given argument \texttt{\langle specification\rangle}. The \texttt{\langle options\rangle} are given to the underlying \texttt{tcolorbox}.\textsuperscript{P.11} Note that \texttt{/tcb/savedelimiter}\textsuperscript{P.25} is set to the given \texttt{\langle name\rangle} automatically. The \texttt{\langle init options\rangle} allow setting up automatic numbering, see Section 5 from page 97. The new environment is always created, irrespective of an already existing environment with the same name.

\begin{verbatim}
% counter from previous example
\texttt{\textbackslash DeclareTColorBox\{\texttt{\langle init options\rangle}\}\{\texttt{\langle name\rangle}\}\{\texttt{\langle specification\rangle}\}\{\texttt{\langle options\rangle}\}}
\texttt{\textbackslash \textbackslash begin\{mybox\}\{My title\}
This is a tcolorbox.
\texttt{\textbackslash \textbackslash end\{mybox\}}}
\texttt{\textbackslash \textbackslash begin\{mybox\}\{blue\}\{My title\}
This is a tcolorbox.
\texttt{\textbackslash \textbackslash end\{mybox\}}}
\texttt{\textbackslash \textbackslash begin\{mybox\}\{green\}\{My title\}"My Watermark"
This is a tcolorbox.
\texttt{\textbackslash \textbackslash end\{mybox\}}}
\texttt{\textbackslash \textbackslash begin\{mybox\}\{yellow\}\{My title\}\{colbacktitle=yellow!50!white,coltitle=black\}
This is a tcolorbox.
\texttt{\textbackslash \textbackslash end\{mybox\}}}
\texttt{\textbackslash \textbackslash begin\{mybox\}\{purple\}\{My title\}"All together"[coltitle=yellow]}
This is a tcolorbox.
\texttt{\textbackslash \textbackslash end\{mybox\}}}
\end{verbatim}
\NewTColorBox\{(init options)\}\{(name)\}\{(specification)\}\{(options)\}

Operates like \DeclareTColorBox\P.359, but based on \NewDocumentEnvironment instead of \DeclareDocumentEnvironment. An error is issued if \textit{name} has already been defined.

\RenewTColorBox\{(init options)\}\{(name)\}\{(specification)\}\{(options)\}

Operates like \DeclareTColorBox\P.359, but based on \RenewDocumentEnvironment instead of \DeclareDocumentEnvironment. An existing environment is redefined.

\ProvideTColorBox\{(init options)\}\{(name)\}\{(specification)\}\{(options)\}

Operates like \DeclareTColorBox\P.359, but based on \ProvideDocumentEnvironment instead of \DeclareDocumentEnvironment. The environment \textit{name} is only created if it is not already defined.
\DeclareTotalTColorBox[(init options)]\{\langle name \rangle\}\{\langle specification \rangle\}\{\langle options \rangle\}\{\langle content \rangle\}

Creates a new command \langle name \rangle based on \texttt{tcolorbox} \textsuperscript{P.11}. In contrast to \texttt{\DeclareTColorBox} \textsuperscript{P.359}, also the \langle content \rangle of the \texttt{tcolorbox} is specified.

Basically, \texttt{\DeclareTotalTColorBox} 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{tcolorbox} \textsuperscript{P.11} which is filled with the specified \langle content \rangle.

Note that /tcb/savedelimiter \textsuperscript{P.25} is set to the given \langle name \rangle automatically. The \langle init options \rangle allow setting up automatic numbering, see Section 5 from page 97.

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=\texttt{bfseries\ttfamily}, adjusted title=\langle#2\rangle, center title, 
    colframe=blue!20!black, leftupper=0mm, rightupper=0mm, colback=black!75!white, #1\}
    \{ \texttt{tikz\path\fill zoom image=\langle#2\rangle\} (0,0) \texttt{rectangle} \langle \texttt{linewidth},4cm\rangle; 
\\texttt{\tcblower} #3\}
\end{Verbatim}

\begin{Verbatim}
\diabox{blueshade.png}\{\text{Created with \texttt{GIMP}. \url{http://www.gimp.org}}\}
\diabox{goldshade.png}\{\text{Created with \texttt{GIMP}. \url{http://www.gimp.org}}\}
\end{Verbatim}

\NewTotalTColorBox[(init options)]\{\langle name \rangle\}\{\langle specification \rangle\}\{\langle options \rangle\}\{\langle content \rangle\}

Operates like \texttt{\DeclareTotalTColorBox}, but based on \texttt{\NewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An error is issued if \langle name \rangle has already been defined.

\RenewTotalTColorBox[(init options)]\{\langle name \rangle\}\{\langle specification \rangle\}\{\langle options \rangle\}\{\langle content \rangle\}

Operates like \texttt{\DeclareTotalTColorBox}, but based on \texttt{\RenewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An existing command is redefined.

\ProvideTotalTColorBox[(init options)]\{\langle name \rangle\}\{\langle specification \rangle\}\{\langle options \rangle\}\{\langle content \rangle\}

Operates like \texttt{\DeclareTotalTColorBox}, but based on \texttt{\ProvideDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. The command \langle name \rangle is only created if it is not already defined.

361
19.3 Producing \texttt{tcbox} \texttt{Commands}

\texttt{\textbackslash DeclareTCBox[⟨init options⟩]{⟨name⟩}{⟨specification⟩}{⟨options⟩}}

Creates a new command \texttt{⟨name⟩} based on \texttt{tcbox} \textsuperscript{P.13}. Basically, \texttt{\textbackslash DeclareTCBox} operates like \texttt{\textbackslash DeclareDocumentCommand}. This means, the new command \texttt{⟨name⟩} is constructed with the given argument \texttt{⟨specification⟩}. The \texttt{⟨options⟩} are given to the underlying \texttt{tcbox} \textsuperscript{P.13}.

Note that \texttt{/tcb/savedelimiter} \textsuperscript{P.25} is set to the given \texttt{⟨name⟩} automatically. The \texttt{⟨init options⟩} allow setting up automatic numbering, see Section 5 from page 97. 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,
  IfBooleanTF={#1}{enhanced, drop shadow}{},
  IfBooleanTF={#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}

\begin{itemize}
  \item \texttt{\textbackslash NewTCBox[⟨init options⟩]{⟨name⟩}{⟨specification⟩}{⟨options⟩}}
  \texttt{\textbackslash NewTCBox} operates like \texttt{\textbackslash DeclareTCBox}, but based on \texttt{\textbackslash NewDocumentCommand} instead of \texttt{\textbackslash DeclareDocumentCommand}. An error is issued if \texttt{⟨name⟩} has already been defined.
  \item \texttt{\textbackslash RenewTCBox[⟨init options⟩]{⟨name⟩}{⟨specification⟩}{⟨options⟩}}
  \texttt{\textbackslash RenewTCBox} operates like \texttt{\textbackslash DeclareTCBox}, but based on \texttt{\textbackslash RenewDocumentCommand} instead of \texttt{\textbackslash DeclareDocumentCommand}. An existing command is redefined.
  \item \texttt{\textbackslash ProvideTCBox[⟨init options⟩]{⟨name⟩}{⟨specification⟩}{⟨options⟩}}
  \texttt{\textbackslash ProvideTCBox} operates like \texttt{\textbackslash DeclareTCBox}, but based on \texttt{\textbackslash ProvideDocumentCommand} instead of \texttt{\textbackslash DeclareDocumentCommand}. The command \texttt{⟨name⟩} is only created if it is not already defined.
\end{itemize}
\DeclareTotalTCBox\{\init options\}\{\name\}\{\specification\}\{\options\}\{\content\}

Creates a new command \name based on \tcbox P.13. In contrast to \DeclareTCBox\{\name\} P.362, also the \content of the \tcbox is specified.

Basically, \DeclareTotalTCBox operates like \DeclareDocumentCommand. This means, the new command \name is constructed with the given argument \specification. The \options are given to the underlying \tcbox\{\name\} P.13 which is filled with the specified \content.

Note that /tcb/savedelimiter P.25 is set to the given \name automatically. The \init options allow setting up automatic numbering, see Section 5 from page 97.

The new command is always created, irrespective of an already existing command with the same name.

\begin{Verbatim}
\\texttt{\myverb{O\\{red\\}} v O{}}

\begin{quote}
\begin{verbatim}
\{ \fontupper=\ttfamily,nobeforeafter,tcbox raise base,arc=0pt,outer arc=0pt, top=0pt,bottom=0pt,left=0mm,right=0mm, leftrule=0pt, rightrule=0pt,toprule=0.3mm,bottomrule=0.3mm,boxsep=0.5mm, colback=\#1!10!white,colframe=\#1!50!black,\#3\}\{#2\}
\end{verbatim}
\end{quote}
\end{Verbatim}

To set a word \textbf{bold} in \myverb{\LaTeX}, use \myverb[green]{\textbf{bold}}. Alternatively, write \myverb[yellow]{\textbf{bold}}. In \myverb[blue]{\LaTeX}[enhanced, fuzzy halo], other font settings are done in the same way, e.g. \myverb[\textit]{}, \myverb[\itshape] or \myverb[\texttt]{}, \myverb[\ttfamily].

The next example uses \lstinline from the listings package to typeset the verbatim content.

\begin{Verbatim}
% \usepackage{listings} or \tcbuselibrary{listings}
\DeclareTCBox\{commandbox\}\{s v\}
{\verbatim,colupper=white,colback=black!75!white,colframe=black}
{\IfBooleanTF{#1}{\textcolor{red}{\ttfamily\bfseries > }}{}}
{\lstinline[language=command.com,keywordstyle=\color{blue!35!white}\bfseries]\^#2^}
\end{Verbatim}

\begin{Verbatim}
\commandbox*{cd "My Documents"} changes to directory \commandbox{My Documents}.
\end{Verbatim}

\begin{Verbatim}
\commandbox*{dir /A} lists the directory content.
\end{Verbatim}

\begin{Verbatim}
\commandbox*{copy example.txt d:\target} copies \commandbox{example.txt} to \commandbox{d:\target}.
\end{Verbatim}

\begin{itemize}
\item \texttt{cd "My Documents"} changes to directory \texttt{My Documents}.
\item \texttt{dir /A} lists the directory content.
\item \texttt{copy example.txt d:\target} copies \texttt{example.txt} to \texttt{d:\target}.
\end{itemize}

363
\NewTotalTCBox\{\init\ \\options\}\{\name\}\{\specification\}\{\options\}\{\content\}
Operates like \DeclareTotalTCBox\ P.363, but based on \NewDocumentCommand instead of \DeclareDocumentCommand. An error is issued if \name\ has already been defined.

\RenewTotalTCBox\{\init\ \\options\}\{\name\}\{\specification\}\{\options\}\{\content\}
Operates like \DeclareTotalTCBox\ P.363, but based on \RenewDocumentCommand instead of \DeclareDocumentCommand. An existing command is redefined.

\ProvideTotalTCBox\{\init\ \\options\}\{\name\}\{\specification\}\{\options\}\{\content\}
Operates like \DeclareTotalTCBox\ P.363, but based on \ProvideDocumentCommand instead of \DeclareDocumentCommand. The command \name\ is only created if it is not already defined.

\tcboxverb\{\options\}\{\verbatim\ content\}
Creates a colored box based on \tcbox\ P.13 which is fitted to the width of the given \verbatim\ content. The underlying \tcbox\ P.13 is styled with /tcb/verbatim P.357 plus the given \options. The difference to \tcbox\ P.13 is that the \verbatim\ 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.

\LaTeX, \LaTeX, \LaTeX, \LaTeX, \LaTeX, \LaTeX.
19.4 Producing \texttt{tcblisting} Environments

The following commands need the \texttt{listings} library to be included.

\begin{itemize}
\item \texttt{\textbackslash DeclareTCBListing} \texttt{[(init options)]} \texttt{\{}\texttt{name}\texttt{\}} \texttt{\{}\texttt{specification}\texttt{\}} \texttt{\{}\texttt{options}\texttt{\}}
\end{itemize}

Creates a new environment \texttt{\{}\texttt{name}\texttt{\}} based on \texttt{tcblisting} \textsuperscript{P.243}.

Basically, \texttt{\textbackslash DeclareTCBListing} operates like \texttt{\textbackslash DeclareDocumentEnvironment}. This means, the new environment \texttt{\{}\texttt{name}\texttt{\}} is constructed with the given argument \texttt{\{}\texttt{specification}\texttt{\}}.

The \texttt{\{}\texttt{options}\texttt{\}} are given to the underlying \texttt{tcblisting} \textsuperscript{P.243}.

Note that \texttt{/tcb/savedelimiter} \textsuperscript{P.25} is set to the given \texttt{\{}\texttt{name}\texttt{\}} automatically.

The new environment is always created, irrespective of an already existing environment with the same name.

\begin{itemize}
\item \texttt{\textbackslash NewTCBListing} \texttt{[(init options)]} \texttt{\{}\texttt{name}\texttt{\}} \texttt{\{}\texttt{specification}\texttt{\}} \texttt{\{}\texttt{options}\texttt{\}}
\end{itemize}

Operates like \texttt{\textbackslash DeclareTCBListing}, but based on \texttt{\textbackslash NewDocumentEnvironment} instead of \texttt{\textbackslash DeclareDocumentEnvironment}. An error is issued if \texttt{\{}\texttt{name}\texttt{\}} has already been defined.

\begin{itemize}
\item \texttt{\textbackslash RenewTCBListing} \texttt{[(init options)]} \texttt{\{}\texttt{name}\texttt{\}} \texttt{\{}\texttt{specification}\texttt{\}} \texttt{\{}\texttt{options}\texttt{\}}
\end{itemize}

Operates like \texttt{\textbackslash DeclareTCBListing}, but based on \texttt{\textbackslash RenewDocumentEnvironment} instead of \texttt{\textbackslash DeclareDocumentEnvironment}. An existing environment is redefined.

\begin{itemize}
\item \texttt{\textbackslash ProvideTCBListing} \texttt{[(init options)]} \texttt{\{}\texttt{name}\texttt{\}} \texttt{\{}\texttt{specification}\texttt{\}} \texttt{\{}\texttt{options}\texttt{\}}
\end{itemize}

Operates like \texttt{\textbackslash DeclareTCBListing}, but based on \texttt{\textbackslash ProvideDocumentEnvironment} instead of \texttt{\textbackslash DeclareDocumentEnvironment}. The environment \texttt{\{}\texttt{name}\texttt{\}} is only created if it is not already defined.
Caveats of using an environment ending with an optional argument

\DeclareTCBListing{mybox}{ 0{} }{listing only,#1}
\begin{mybox}[colframe=red]
good
\end{mybox}
\begin{mybox}[colframe=red]\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}
19.5 Producing \texttt{tcbinputlisting} Commands

The following commands need the \texttt{listings} library to be included.

\begin{quote}
\texttt{\textbackslash DeclareTCBInputListing[\{init options\}]\{\langle name\rangle\}\{\langle specification\rangle\}\{\langle options\rangle\}}
\end{quote}

Creates a new command \texttt{\langle name\rangle} based on \texttt{tcbinputlisting} \textsuperscript{p.245}. Basically, \texttt{\textbackslash DeclareTCBInputListing} operates like \texttt{\textbackslash DeclareDocumentCommand}. This means, the new command \texttt{\langle name\rangle} is constructed with the given argument \texttt{\langle specification\rangle}. The \texttt{\langle options\rangle} are given to the underlying \texttt{tcbinputlisting} \textsuperscript{p.245}.

The \texttt{\langle init options\rangle} allow setting up automatic numbering, see Section 5 from page 97. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
% counter from previous example
\DeclareTCBInputListing[use counter from=pabox]{\mylisting}{O{}O{red}m}{
  listing file={#3},title=Listing-\thetcbcounter,
  colback=#2!5!white,colframe=#2!50!black,colbacktitle=#2!75!black,
  fonttitle=\bfseries,listing only,#1}
\mylisting[before upper=\textit{This is the included file content:}]
 [blue]{\jobname.tcbtemp}
\end{verbatim}

\begin{quote}
\texttt{\textbackslash NewTCBInputListing[\{init options\}]\{\langle name\rangle\}\{\langle specification\rangle\}\{\langle options\rangle\}}
\end{quote}

Operates like \texttt{\textbackslash DeclareTCBInputListing}, but based on \texttt{\textbackslash NewDocumentCommand} instead of \texttt{\textbackslash DeclareDocumentCommand}. An error is issued if \texttt{\langle name\rangle} has already been defined.

\begin{quote}
\texttt{\textbackslash RenewTCBInputListing[\{init options\}]\{\langle name\rangle\}\{\langle specification\rangle\}\{\langle options\rangle\}}
\end{quote}

Operates like \texttt{\textbackslash DeclareTCBInputListing}, but based on \texttt{\textbackslash RenewDocumentCommand} instead of \texttt{\textbackslash DeclareDocumentCommand}. An existing command is redefined.

\begin{quote}
\texttt{\textbackslash ProvideTCBInputListing[\{init options\}]\{\langle name\rangle\}\{\langle specification\rangle\}\{\langle options\rangle\}}
\end{quote}

Operates like \texttt{\textbackslash DeclareTCBInputListing}, but based on \texttt{\textbackslash ProvideDocumentCommand} instead of \texttt{\textbackslash DeclareDocumentCommand}. The command \texttt{\langle name\rangle} is only created if it is not already defined.
19.6 Producing \texttt{tboxfit} Commands

The following commands need the \texttt{fitting} library to be included.

\begin{verbatim}
\DeclareTCBoxFit[\{init options\}]\{\{name\}\}{\{specification\}}{\{options\}}
\end{verbatim}

Creates a new command \texttt{\{name\}} based on \texttt{tboxfit} \texttt{P.335}. Basically, \texttt{\DeclareTCBoxFit} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \texttt{\{name\}} is constructed with the given argument \texttt{\{specification\}}. The \texttt{\{options\}} are given to the underlying \texttt{tboxfit} \texttt{P.335}.

Note that /\texttt{tcb/savedelimiter} \texttt{P.25} is set to the given \texttt{\{name\}} automatically. The \texttt{\{init options\}} allow setting up automatic numbering, see Section 5 from page 97. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
% \usepackage{lipsum}
\DeclareTCBoxFit{\mybox}{0}{m o}
\{colback=red!5!white,
colframe=red!75!black,
width=\#2,height=\#2/3*2,
IfValueTF={\#3}{height=\#3}{}\}
\mybox[\texttt{colback=yellow}]{5cm} %
\{\texttt{lipsum}[2]\}
\mybox[\texttt{colback=yellow}]{5cm}[4cm]\{\texttt{lipsum}[2]\}
\end{verbatim}

\begin{verbatim}
\NewTCBoxFit[\{init options\}]\{\{name\}\}{\{specification\}}{\{options\}}
\end{verbatim}

Operates like \texttt{\DeclareTCBoxFit}, but based on \texttt{\NewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An error is issued if \texttt{\{name\}} has already been defined.

\begin{verbatim}
\RenewTCBoxFit[\{init options\}]\{\{name\}\}{\{specification\}}{\{options\}}
\end{verbatim}

Operates like \texttt{\DeclareTCBoxFit}, but based on \texttt{\RenewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An existing command is redefined.

\begin{verbatim}
\ProvideTCBoxFit[\{init options\}]\{\{name\}\}{\{specification\}}{\{options\}}
\end{verbatim}

Operates like \texttt{\DeclareTCBoxFit}, but based on \texttt{\ProvideDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. The command \texttt{\{name\}} is only created if it is not already defined.
\DeclareTotalTCBoxFit{⟨init options⟩}{⟨name⟩}{⟨specification⟩}{⟨options⟩}{⟨content⟩}

Creates a new command \(⟨name⟩\) based on \tcboxfit\P.335. In contrast to \DeclareTCBoxFit\P.368, also the \(⟨content⟩\) of the \tcboxfit\ is specified.

Basically, \DeclareTotalTCBoxFit\ operates like \DeclareDocumentCommand. This means, the new command \(⟨name⟩\) is constructed with the given argument \(⟨specification⟩\). The \(⟨options⟩\) are given to the underlying \tcboxfit\P.335 which is filled with the specified \(⟨content⟩\).

Note that /tcb/savedelimiter\P.25 is set to the given \(⟨name⟩\) automatically.

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 \texttt{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 \texttt{external} are:

- TikZ \texttt{external} compiles the whole original document in a sophisticated way while \texttt{external} uses only the preamble or a part of the preamble of the original document.
- TikZ \texttt{external} can automatically externalize all \texttt{tikzpicture} environments while \texttt{external} externalizes marked snippets only.
- Code snippets to be externalized by \texttt{external} are not restricted to \texttt{tikzpicture} environments. But these snippets have to be stand-alone without dependencies to the rest of the document.

Why should somebody use \texttt{external} instead of the more powerful TikZ \texttt{external}? One reason could be compilation speed, but the main reason for creating the library at all was that TikZ \texttt{external} tends to choke on complicated documents where the sophisticated mechanism stumbles. Since \texttt{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 \texttt{/tcb/external/force remake} \textsuperscript{P.371} to force compilation in this case or simply delete the externalized snippets.

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.
20.1 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[a4paper]{book} \% for example
\usepackage\ldots{} \% anything
\%
\% Typically, all or the very most settings for the document.
% \\
\texttt{\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 \texttt{/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 \texttt{(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 \texttt{(text)} is prefixed to any \texttt{/tcb/external/name} for an externalization snippet. The initial setting implies saving all snippets into an \texttt{external/} subdirectory. Depending on the operation system, the subdirectory may have to be created manually once.

\texttt{\tcbset{external/prefix=ext_}}

\texttt{\tcb/external/externalize=true|false} \hspace{1cm} (default \texttt{true}, initially \texttt{true})

If set to \texttt{true}, the marked snippets are compiled if necessary. If set to \texttt{false}, the marked snippets are not compiled but included as text. \texttt{/tcb/external/externalize} can only be used after \texttt{\tcbEXTERNALIZE}.

\texttt{\tcbset{external/externalize=false}}

\texttt{\tcb/external/force remake=true|false} \hspace{1cm} (default \texttt{true}, initially \texttt{false})

If set to \texttt{true}, the marked snippets are always compiled. If set to \texttt{true}, the marked snippets are compiled only if necessary. The necessity is given, if a compiled pdf file is missing or the \texttt{md5} checksum of the source snippet has changed.

\texttt{\tcbset{external/force remake=false}}

\texttt{/tcb/external/!} \hspace{1cm} (style)

Shortcut for setting \texttt{/tcb/external/force remake} to \texttt{true}.

\texttt{\tcbset{external/force remake=true}}

\texttt{/tcb/external/-} \hspace{1cm} (style)

Shortcut for setting \texttt{/tcb/external/externalize} to \texttt{false}.
20.2 Marking Externalization Snippets

\begin{tcbexternal}{⟨options⟩}{⟨name⟩}
\begin{⟨environment content⟩}
\end{⟨environment content⟩}
\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 \textit{⟨name⟩} is automatically prefixed with /tcb/external/prefix\textsuperscript{P.371}. In combination, this has to be a unique file name. It is advised to not use spaces or umlauts for the name. The \textit{⟨options⟩} 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.11} is externalized, one should use /tcb/nobeforeafter\textsuperscript{P.76} for the box. Indention and distances to the text before and after have to be given separately outside the \texttt{tcbexternal} environment.

\begin{tcbexternal}[minipage]{example_tcolorbox}
\begin{tcolorbox}[nobeforeafter,enhanced,
\texttt{fonttitle=\bfseries,title=Externalized Box,}
\texttt{colframe=red!50!black,drop fuzzy shadow,}
\texttt{interior style={fill overzoom image=goldshade.png}}]
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{tcbexternal}

\textbf{Externalized Box}

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.
Externalized Box

The interior of the tcolorbox is externalized. One can use numbered boxes without problem. Note that the text color has to be set for the text manually since it is converted into an image.

Group | One | Two | Three | Four | Sum
--- | --- | --- | --- | --- | ---
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
Sum   | 6000.00 | 9000.00 | 12000.00 | 15000.00 | 42000.00

\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 problem.
Note that the text color has to be set for the text manually since it is converted into an image.
\end{tcbexternal}
\end{tcolorbox}
This is an externalized version of \texttt{tcolorbox} \textsuperscript{P.11} created using \texttt{\newtcbexternalizetcolorbox} \textsuperscript{P.379}:

\begin{extcolorbox}\[options\]{}\[tcolorbox options\] \[environment content\] \end{extcolorbox}

\texttt{\newtcbexternalizetcolorbox}\texttt{extcolorbox}{\texttt{tcolorbox}}{}{}\[options\] and \[name\] are given to the underlying \texttt{tcbexternal} \textsuperscript{P.372} environment, while \[tcolorbox options\] are given to \texttt{tcolorbox} \textsuperscript{P.11}.

Note that you should not redefine \texttt{/tcb/like before} \textsuperscript{P.76} and \texttt{/tcb/like after} \textsuperscript{P.76} inside the \[tcolorbox options\], since the externalized version would not be identical to the non-externalized otherwise.

\begin{extcolorbox}[minipage]{example_extcolorbox} \[ enhanced,colframe=red!50!black,colback=yellow!10, fonttitle=\bfseries,drop fuzzy shadow, title=My external box ]\end{extcolorbox}

This box is completely externalized.

\begin{tcolorbox}[colframe=blue,colback=blue!5,before skip=6pt] Inner box. \end{tcolorbox}

\begin{extcolorbox} \end{extcolorbox}

\textbf{My external box}

This box is completely externalized.

\begin{tcolorbox} Inner box. \end{tcolorbox}

\begin{extcolorbox} \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}
This is an externalized version of \texttt{tikzpicture} created using \texttt{newtcbexternalizeenvironment} \cite{P.379}:

\begin{center}
\begin{extikzpicture}
\begin{tikzpicture}
\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{tikzpicture}
\end{extikzpicture}
\end{center}
The text content of a `tcblisting`\textsuperscript{P.243} is externalized with the given \langle name \rangle. Note that the listing part is not externalized.

\begin{tcblisting}{externalize listing=example_listing,\
obreak
colorback=yellow!10,colorframe=yellow!50!black,\
noindent
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,\
bball color=red] circle (7mm);
\end{dispExample*}

\begin{tcblisting}{externalize listing=example_listing,\nobreak\langle name \rangle}
\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{tcblisting}{externalize listing=example_listing,\nobreak\langle name \rangle}
\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}

The text content of a `dispExample*`\textsuperscript{P.386} is externalized with the given \langle name \rangle. Note that the listing part is not externalized.

\begin{dispExample*}{sidebyside,externalize example=example_example}
\tikz\path[shading=ball,\
bball color=red] circle (7mm);
\end{dispExample*}

\begin{tcblisting}{externalize listing=example_listing,\langle name \rangle}
\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,\
bball color=red] circle (7mm);
\end{dispExample*}

\begin{tcblisting}{externalize listing=example_listing,\langle name \rangle}
\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,\
bball color=red] circle (7mm);
\end{dispExample*}

\begin{tcblisting}{externalize listing=example_listing,\langle name \rangle}
\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,\
bball color=red] circle (7mm);
\end{dispExample*}

\begin{tcblisting}{externalize listing=example_listing,\langle name \rangle}
\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,\
bball color=red] circle (7mm);
\end{dispExample*}

\begin{tcblisting}{externalize listing=example_listing,\langle name \rangle}
\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,\
bball color=red] circle (7mm);
\end{dispExample*}
20.3 Customization

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 \texttt{tcolorbox} are painted outside the bounding box and would be lost otherwise.

Surrounds the exported snippet text with an environment \langle env \rangle without parameters. Note that this option is ignored for /tcb/externalize listing \textsuperscript{P.376}.

If set to true, the \texttt{begin} and \texttt{end} code of /tcb/external/environment is appended with a percent sign. For verbatim environments, this option typically has to be set to false.

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 \textsuperscript{P.372} for examples. Note that this option is ignored for /tcb/externalize listing \textsuperscript{P.376}.

Removes any text which was set to surround the snippet. This removes the setting of /tcb/external/minipage, but is independent of /tcb/external/safety.

Sets the name of the compiler for the snippets. Note that this compiler has to support the \texttt{pdfmdfivesum} primitive e.g. using the \texttt{pdftexcmds} package. This should work for \texttt{xelatex} and \texttt{lualatex}.

Sets the number of compiler runs for the snippet.

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 20.1 on page 371. Maybe, the \texttt{external/} subdirectory has to be created manually in this case, see /tcb/external/prefix \textsuperscript{P.371}.

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.
The given \langle code \rangle is added before the snippet document. Typically, this means before \documentclass. This is not used for compilation of the main document.

The given \langle options \rangle are passed to the given \langle package \rangle for the snippet document. This is a shortcut for using /tcb/external/preclass with \PassOptionsToPackage. This not used for compilation of the main document.

The given \langle options \rangle are passed to the given \langle class \rangle for the snippet document. This is a shortcut for using /tcb/external/preclass with \PassOptionsToClass. This not used for compilation of the main document.

The given \langle code \rangle is added to the preamble of the snippet document. This is not used for compilation of the main document.

The given \langle options \rangle are added as parameter for \tcbset^P.12 to the preamble of the snippet document. This are not used for compilation of the main document.

Removes all additional /tcb/external/preamble settings.

Expands to \langle true \rangle, if executed during snippet compilation, and to \langle false \rangle, if executed during main document compilation. This can be used before \tcbEXTERNALIZE^P.371 to give different setting to snippet and main document.
\newtcbexternalizeenvironment{\langle newenv \rangle}{\langle env \rangle}{\langle options \rangle}{\langle begin \rangle}{\langle end \rangle}

Creates a new environment \langle newenv \rangle which is based on \texttt{tcbexternal}±P.372. This environment takes at least one optional parameter and one mandatory parameter. These two parameters are passed to \texttt{tcbexternal}±P.372. Further, the given \langle options \rangle are always added to the option list of \texttt{tcbexternal}±P.372.

The environment content is externalized and the external snippet is surrounded by an environment \langle env \rangle. All further parameters of \langle newenv \rangle are given to \langle env \rangle as parameters. The included image is prepended by \langle begin \rangle and appended by \langle end \rangle.

\texttt{extikzpicture}±P.375 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}

\newtcbexternalizeenvironment{\langle newenv \rangle}{\langle env \rangle}{\langle options \rangle}{\langle begin end options \rangle}

Identical to \newtcbexternalizeenvironment, but the environment \langle newenv \rangle is created by \texttt{renewenvironment} instead of \texttt{newenvironment}.

\newtcbexternalizetcolorbox{\langle newenv \rangle}{\langle env \rangle}{\langle options \rangle}{\langle begin end options \rangle}

Creates a new environment \langle newenv \rangle which is based on \texttt{tcbexternal}±P.372. This environment takes at least one optional parameter and one mandatory parameter. These two parameters are passed to \texttt{tcbexternal}±P.372. Further, the given \langle options \rangle are always added to the option list of \texttt{tcbexternal}±P.372.

The environment content is externalized and the external snippet is surrounded by an environment \langle env \rangle. All further parameters of \langle newenv \rangle are given to \langle env \rangle as parameters. \textbf{In contrast to \newtcbexternalizeenvironment, the environment \langle env \rangle is intended to be based on \texttt{tcolorbox}±P.11 or \texttt{tcblisting}±P.243.}

The \langle begin end options \rangle are options for settings the space before and after the included image using \texttt{/tcb/before}±P.76, \texttt{/tcb/before skip}±P.78, \texttt{/tcb/after}±P.76, or \texttt{/tcb/after skip}±P.78.

Use the exact identical values for \texttt{/tcb/before}±P.76 and \texttt{/tcb/after}±P.76 inside \langle begin end options \rangle as they where used for definition of \langle env \rangle! Otherwise, externalized and non-externalized version will have different spacings.

\texttt{extcolorbox}±P.374 is an example application for \newtcbexternalizetcolorbox.

\begin{verbatim}
\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}%
  (before skip=6pt,after skip=6pt)% same values as for mylisting
\end{verbatim}
20.4 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:

  \begin{verbatim}
  \immediate\write18{mkdir external}
  \end{verbatim}

  or

  \begin{verbatim}
  \immediate\write18{mkdir -p external}
  \end{verbatim}

  If the combination of `/tcb/external/prefix` and chosen snippet name points to another subdirectory than `external`, this has to be adapted.

- **I use the 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 `minted` inside the snippet code, you may use \texttt{\usepackage[minted]} \texttt{after} \texttt{tcbEXTERNALIZE} or use \texttt{tcbifexternal} to switch `minted` off for the external code. If `minted` is already included by another package, add the following to your preamble:

    \begin{verbatim}
    \tcbset{external/PassOptionsToPackage={draft}{minted}}
    \end{verbatim}

  - If `minted` is needed for the snippet code, caching can be switched off by adding the following to your preamble:

    \begin{verbatim}
    \tcbset{external/PassOptionsToPackage={cache=false}{minted}}
    \end{verbatim}

    Alternatively, the `cachedir` option of `minted` may be used to redirect the cache.
21 Library \texttt{documentation}

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.

The library is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{documentation}
\end{verbatim}

This also loads the library \texttt{listings}, see Section 13 on page 242, the library \texttt{skins}, see Section 9 on page 124, the library \texttt{xparse}, see Section 19 on page 357, and a bunch of packages, namely \texttt{pifont}, \texttt{marvosym}, \texttt{makeidx}, \texttt{marginnote}, \texttt{refcount}, and \texttt{hyperref}.

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.

The package \texttt{marginnote} is loaded only, if \texttt{marginnote} is not already defined.

For UTF-8 support, load:

\begin{verbatim}
\tcbuselibrary{listingsutf8,documentation}
\end{verbatim}

For \texttt{minted} \cite{minted} support, load:

\begin{verbatim}
\tcbuselibrary{documentation,minted}
\tcbset{listing engine=minted}
\end{verbatim}

21.1 Macros of the Library

\begin{verbatim}
\begin{docCommand}{⟨options⟩}{⟨name⟩}{⟨parameters⟩}
⟨command description⟩
\end{docCommand}
\end{verbatim}

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} \cite{refCom} \texttt{⟨name⟩}.

\begin{verbatim}
\begin{docCommand}{foomakedocSubKey}{⟨name⟩}{⟨key path⟩}
\marg{name}\marg{key path}
\end{docCommand}
\end{verbatim}

Creates a new environment \texttt{meta⟨name⟩} based on \texttt{refEnv⟨docKey⟩} for the documentation of keys with the given \texttt{meta⟨key path⟩}.

\begin{verbatim}
\foomakedocSubKey{⟨name⟩}{⟨key path⟩}
\end{verbatim}

Creates a new environment \texttt{⟨name⟩} based on \texttt{docKey} \cite{docKey} for the documentation of keys with the given \texttt{⟨key path⟩}. 

381
\begin{docCommand}{foomakedocSubKey*}{\marg(name)\marg(key path)}
 Creates a new environment \meta{name} based on \refEnv{docKey} for the documentation of keys with the given \meta{key path}.
\end{docCommand}

\begin{foomakedocSubKey*}{\langle name \rangle}{\langle key path \rangle}
 Creates a new environment \langle name \rangle based on \texttt{docKey} for the documentation of keys with the given \langle key path \rangle.
\end{foomakedocSubKey*}

\begin{docCommand*}{\langle options \rangle}{\langle name \rangle}{\langle parameters \rangle}
 (command description)
\end{docCommand*}

Identical to \texttt{docCommand} \texttt{\textbackslash P.381}, but without index entry.

\begin{docEnvironment}{\langle name \rangle}{\langle parameters \rangle}
 (environment description)
\end{docEnvironment}

Documents a \LaTeX{} environment with given \langle name \rangle. The given \langle options \rangle are set with \texttt{\textbackslash tcbset} \texttt{\textbackslash P.12}. This environment takes mandatory or optional \langle parameters \rangle. It is automatically indexed and can be referenced with \texttt{\refEnv{\textbackslash P.388}{\langle name \rangle}}.

\begin{docEnvironment}{foocolorbox}{\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}{\langle options \rangle}
 (environment content)
\end{foocolorbox}

This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.

\begin{docEnvironment*}{\langle options \rangle}{\langle name \rangle}{\langle parameters \rangle}
 (environment description)
\end{docEnvironment*}

Identical to \texttt{docEnvironment}, but without index entry.
\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 \texttt{\textbackslash tcbset} \cite{P.12}. This key takes mandatory or optional \textit{(parameters)} as value with a short \textit{(description)}. It is automatically indexed and can be referenced with \texttt{\textbackslash refKey} \cite{P.389}\{(name)\}.

\begin{docKey}[foo]{footitle}{=}\texttt{\textbackslash meta}\{text\}{no default, initially empty}
\end{docKey}
Creates a heading line with \texttt{\textbackslash meta}\{text\} as content.

\begin{docKey*}[foo]{footitle}{=}\texttt{\textbackslash meta}\{text\}{no default, initially empty}
\end{docKey*}
Identical to \texttt{docKey}, but without index entry.

\begin{docValue}{(name)}
\end{docValue}
Documents a value with given \textit{(name)}. Typically, this is a value for a key. This value is automatically indexed.

A feasible value for \texttt{\textbackslash refKey}/foo/footitle is \texttt{docValue}foovalue.

\begin{docValue*}{(name)}
\end{docValue*}
Identical to \texttt{docValue}, but without index entry.

\begin{docAuxCommand}{(name)}
\end{docAuxCommand}
Documents an auxiliary or minor \LaTeX{} macro with given \textit{(name)} where \textit{(name)} is written without backslash. This macro is automatically indexed.

The macro \texttt{\textbackslash docAuxCommand}fooaux holds some interesting data.

The macro \texttt{\textbackslash fooaux} holds some interesting data.

\begin{docAuxCommand*}{(name)}
\end{docAuxCommand*}
Identical to \texttt{docAuxCommand}, but without index entry.

\begin{docAuxEnvironment}{(name)}
\end{docAuxEnvironment}
Documents an auxiliary or minor \LaTeX{} environment with given \textit{(name)}. This macro is automatically indexed.

The environment \texttt{\textbackslash docAuxEnvironment}fooauxenv holds some interesting data.

The environment \texttt{\textbackslash fooauxenv} holds some interesting data.

\begin{docAuxEnvironment*}{[(key path)]}{(name)}
\end{docAuxEnvironment*}
Identical to \texttt{docAuxEnvironment}, but without index entry.
\texttt{\textbackslash docAuxKey[\langle key\ path\ \rangle][\langle name\ \rangle]}

Documents an auxiliary key with given \langle name\ \rangle and an optional \langle key\ path\ \rangle. It is automatically indexed.

The key \texttt{\textbackslash docAuxKey[foo]{fooaux}} holds some interesting data.

The key \texttt{/foo/fooaux} holds some interesting data.

\texttt{\textbackslash docAuxKey*[\langle key\ path\ \rangle][\langle name\ \rangle]}

Identical to \texttt{\textbackslash docAuxKey}, but without index entry.

\texttt{\textbackslash docCounter[\langle name\ \rangle]}

Documents a counter with given \langle name\ \rangle. The counter is automatically indexed.

The counter \texttt{\textbackslash docCounter{foocounter}} can be used for computation.

The counter \texttt{foocounter} can be used for computation.

\texttt{\textbackslash docCounter*[\langle name\ \rangle]}

Identical to \texttt{\textbackslash docCounter}, but without index entry.

\texttt{\textbackslash docLength[\langle name\ \rangle]}

Documents a counter with given \langle name\ \rangle. The counter is automatically indexed.

The length \texttt{\textbackslash docLength{foolength}} can be used for computation.

The length \texttt{foolength} can be used for computation.

\texttt{\textbackslash docLength*[\langle name\ \rangle]}

Identical to \texttt{\textbackslash docLength}, but without index entry.

\texttt{\textbackslash docColor[\langle name\ \rangle]}

Documents a color with given \langle name\ \rangle. The color is automatically indexed.

The color \texttt{\textbackslash docColor{foocolor}} is available.

The color \texttt{foocolor} is available.

\texttt{\textbackslash docColor*[\langle name\ \rangle]}

Identical to \texttt{\textbackslash docColor}, but without index entry.
\texttt{\textbackslash cs\{name\}}

Macro from \texttt{ltxdoc} [3] to typeset a command word \texttt{(name)} where the backslash is prefixed. The library overwrites the original macro.

| This is a \texttt{\cs\{foocommand\}}. |
| This is a \texttt{\foocommand}. |

\texttt{\textbackslash meta\{text\}}

Macro from \texttt{doc} [8] to typeset a meta \texttt{(text)}. The library overwrites the original macro.

| This is a \texttt{\meta\{text\}}. |
| This is a \texttt{(text)}. |

\texttt{\textbackslash marg\{text\}}

Macro from \texttt{ltxdoc} [3] to typeset a \texttt{(text)} with curly brackets as a mandatory argument. The library overwrites the original macro.

| This is a mandatory \texttt{\marg\{argument\}}. |
| This is a mandatory \texttt{(argument)}. |

\texttt{\textbackslash oarg\{text\}}

Macro from \texttt{ltxdoc} [3] to typeset a \texttt{(text)} with square brackets as an optional argument. The library overwrites the original macro.

| This is an optional \texttt{\oarg\{argument\}}. |
| This is an optional \texttt{([argument])}. |

\texttt{\textbackslash brackets\{text\}}

Sets the given \texttt{(text)} with curly brackets.

| Here we use \texttt{\brackets\{some text\}}. |
| Here we use \texttt{\{some text\}}. |
\begin{dispExample}
(environment content)
\end{dispExample}

Creates a colored box based on a \texttt{tcolorbox} \textsuperscript{P.11}. 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.391} and the style \texttt{/tcb/docexample} \textsuperscript{P.391}. It may be changed by redefining this style.

\begin{dispExample*}{sidebyside}
\begin{LaTeX}
This is a \LaTeX example.
\end{LaTeX}
\end{dispExample*}

\begin{dispExample}
This is a \LaTeX example.
\end{dispExample}
\begin{dispListing}
(environment content)
\end{dispListing}

Creates a colored box based on a tcolorbox \textsuperscript{11}. It displays the environment content as source code. The appearance is controlled by \texttt{/tcb/documentation listing style}\textsuperscript{391} and the style \texttt{/tcb/docexample}\textsuperscript{391}. It may be changed by redefining this style.

\begin{dispListing}
This is a \LaTeX\ example.
\end{dispListing}

This is a \LaTeX\ example.

\begin{dispListing*}{title=My listing}
(environment content)
\end{dispListing*}

The starred version of \texttt{dispListing} takes tcolorbox \textsuperscript{11} \langle\texttt{options}\rangle as parameter. These \langle\texttt{options}\rangle are executed after \texttt{/tcb/docexample}\textsuperscript{391}.

\begin{dispListing*}{title=My listing}
This is a \LaTeX\ example.
\end{dispListing*}

My listing

This is a \LaTeX\ example.

\begin{absquote}
\texttt{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}

\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}

used to typeset an abstract as quoted and small text.
\texttt{tcbmakedocSubKey\{⟨name⟩\}\{⟨key path⟩\}}

Creates a new environment ⟨name⟩ based on \texttt{docKey} \(^{P.383}\) for the documentation of keys with the given ⟨key path⟩ as default. The new environment ⟨name⟩ takes the same parameters as \texttt{docKey} \(^{P.383}\) itself. A second starred environment ⟨name⟩ is also created, which is identical to ⟨name⟩ but without index entry.

\begin{Verbatim}
\texttt{tcbmakedocSubKey\{docFooKey\}\{foo\}}
\end{Verbatim}

\begin{verbatim}
\begin{docFooKey}{foodummy}{=\meta{nothing}}{no default, initially empty}
Some key.
\end{docFooKey}
\end{verbatim}

\begin{verbatim}
\begin{docFooKey*}{foo another dummy}{=\meta{nothing}}{no default, initially empty}
Some key (not indexed).
\end{docFooKey*}
\end{verbatim}

\texttt{/foo/foodummy=⟨nothing⟩}
Some key.
\texttt{/foo/foo another dummy=⟨nothing⟩}
Some key (not indexed).

\texttt{\refCom\{⟨name⟩\}}

References a documented \LaTeX{} macro with given ⟨name⟩ where ⟨name⟩ is written without backslash. The page reference is suppressed if it links to the same page.

\begin{Verbatim}
\texttt{\refCom\{foomakedocSubKey\} as an example.}
\end{Verbatim}

\texttt{\refCom\{foomakedocSubKey\} \(^{P.381}\) as an example.}

\texttt{\refCom*\{⟨name⟩\}}

References a documented \LaTeX{} macro with given ⟨name⟩ where ⟨name⟩ is written without backslash. There is no page reference.

\begin{Verbatim}
\texttt{\refCom*\{foomakedocSubKey\} as an example.}
\end{Verbatim}

\texttt{\refCom*\{foomakedocSubKey\} as an example.}

\texttt{\refEnv\{⟨name⟩\}}

References a documented \LaTeX{} environment with given ⟨name⟩. The page reference is suppressed if it links to the same page.

\begin{Verbatim}
\texttt{\refEnv\{foocolorbox\} as an example.}
\end{Verbatim}

\texttt{\refEnv\{foocolorbox\} \(^{P.382}\) as an example.}

\texttt{\refEnv*\{⟨name⟩\}}

References a documented \LaTeX{} environment with given ⟨name⟩. There is no page reference.

\begin{Verbatim}
\texttt{\refEnv*\{foocolorbox\} as an example.}
\end{Verbatim}

\texttt{\refEnv*\{foocolorbox\} as an example.}

388
\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.383} 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.

\refAux\{\langle name\rangle\} 
References some auxiliary environment, key, value, or color. The hyperlink color is used, 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.

\refAuxcs\{\langle name\rangle\} 
References some auxiliary macro \langle name\rangle where \langle name\rangle is written without backslash. The hyperlink color is used, 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.

\colDef\{\langle text\rangle\} 
Sets \langle text\rangle with the command color, see \texttt{/tcb/color command} \textsuperscript{P.393}.

This is my \colDef{text}.
This is my text.

\colOpt\{\langle text\rangle\} 
Sets \langle text\rangle with the option color, see \texttt{/tcb/color option} \textsuperscript{P.393}.

This is my \colOpt{text}.
This is my text.
\tcbdocmarginnote{⟨options⟩}{⟨text⟩}

Creates a tcolorbox note with the given ⟨text⟩ inside the margin using the \texttt{marginnote} package. The style of the tcolorbox is predefined and can be altered by /\texttt{tcb/doc marginnote} P.398 and the given ⟨options⟩.

Some text\tcbdocmarginnote{Note A}
which is commented by a note inside the margin. Alternatively to \texttt{\tcbdocmarginnote}, you can always use \texttt{\marginnote} with a \texttt{tcolorbox} directly.\par
This is further text\x
\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 \texttt{\tcbdocmarginnote}, you can always use \texttt{\marginnote} with a \texttt{tcolorbox} directly.
This is further text with another note.

\tcbdocnew{⟨date⟩}

Auxiliary macro which typesets the /\texttt{tcb/doclang/new} P.394 text with the given ⟨date⟩. It may be redefined for customization.

\tcbdocupdated{⟨date⟩}

Auxiliary macro which typesets the /\texttt{tcb/doclang/updated} P.394 text with the given ⟨date⟩. It may be redefined for customization.
21.2 Option Keys of the Library

/tcb/docexample (style, no value)

Sets the style for \texttt{dispExample} \textsuperscript{P.386} and \texttt{dispListing} \textsuperscript{P.387} with the colors \texttt{ExampleBack} and \texttt{ExampleFrame}. To change the appearance of the examples, this style can be redefined.

% Predefined style:
\begin{verbatim}
\tcbset{
  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 \texttt{listings} \textsuperscript{[6]}. They are used inside \texttt{dispExample} \textsuperscript{P.386} and \texttt{dispListing} \textsuperscript{P.387} to typeset the listings. Note that this is not identical to the key /tcb/listing options \textsuperscript{P.249} which is used for 'normal' listings.

Used for /tcb/listing engine \textsuperscript{P.254}=listings only.

/tcb/documentation listing style=(listing style) (no default, initially tcbdocumentation)

Abbreviation for \texttt{documentation listing options}=(style=...). This key sets a \texttt{style} for the \texttt{listings} package, see \textsuperscript{[6]}. Note that this is not identical to the key /tcb/listing style \textsuperscript{P.249} which is used for 'normal' listings.

Used for /tcb/listing engine \textsuperscript{P.254}=listings only.

/tcb/documentation minted style=(key list) (no default, initially unset)

Sets a \texttt{style} known to \texttt{Pygments} \textsuperscript{[13]} for the package \texttt{minted} \textsuperscript{[11]}, if used. Note that this is not identical to the key /tcb/minted style \textsuperscript{P.253} which is used for 'normal' listings.

Used for /tcb/listing engine \textsuperscript{P.254}=minted only.

/tcb/documentation minted options=(minted style) (no default, initially tabsize=2,fontsize=\small)

Sets the options from the package \texttt{minted} \textsuperscript{[11]} which are used during typesetting of the listing, if used. Note that this is not identical to the key /tcb/minted options \textsuperscript{P.252} which is used for 'normal' listings.

Used for /tcb/listing engine \textsuperscript{P.254}=minted only.

The following two keys are deprecated and without function (v3.50 and above). Use /tcb/before \textsuperscript{P.76} and /tcb/after \textsuperscript{P.76} with appropriate values instead. Also see /tcb/docexample.

/tcb/before example=(macros) (no default, initially empty)

Sets the \texttt{macros} which are executed before \texttt{dispExample} \textsuperscript{P.386} and \texttt{dispListing} \textsuperscript{P.387} additional to /tcb/before \textsuperscript{P.76}.

/tcb/after example=(macros) (no default, initially empty)

Sets the \texttt{macros} which are executed after \texttt{dispExample} \textsuperscript{P.386} and \texttt{dispListing} \textsuperscript{P.387} additional to /tcb/after \textsuperscript{P.76}.

391
/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 \texttt{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:

- \texttt{pgfsection}: The index is formatted like in the \texttt{pgf} documentation (as a section).
- \texttt{pgfchapter}: The index is formatted like in the \texttt{pgf} documentation (as a chapter).
- \texttt{pgf}: Alias for \texttt{pgfsection}.
- \texttt{doc}: The index is assumed to be formatted by \texttt{doc} or \texttt{ltxdoc}. The usage of \texttt{makeindex} with \texttt{-s gind.ist} is assumed. The package \texttt{hypdoc} has to be loaded before \texttt{tcolorbox}.
- \texttt{off}: The index is not formatted by \texttt{tcolorbox}. Use this, if the index is formatted by other package like \texttt{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 \texttt{makeindex} default values for /tcb/index actual, /tcb/index quote, and /tcb/index level.

/tcb/index german settings (style, no value)

Sets the \texttt{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.394, /tcb/doclang/key ^P.394, 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 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 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 hyperlink=(color) (no default, initially Hyperlink)
Sets the color for all hyper-links, i.e. all internal and external links.
The following keys are provided for language specific settings. The English language is predefined.

- `/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` at page 382.

- `/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/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.
Sets the left hand offset of the documentation texts from `docCommand` on P.381, `docEnvironment` on P.382, `docKey` on P.383, etc, to \( \langle \text{length} \rangle \).

\begin{docCommand*}[doc left=2cm,doc left indent=-2cm]{myCommandA}{⟨argument⟩}
This is the documentation of \refCom{myCommandA} which takes one \meta{argument}.
\refCom{myCommandA} does some funny things with its \meta{argument}.
\end{docCommand*}

\myCommandA{⟨argument⟩}
This is the documentation of \myCommandA which takes one \langle argument \rangle. \myCommandA does some funny things with its \langle argument \rangle.

Sets the right hand offset of the documentation texts from `docCommand` on P.381, `docEnvironment` on P.382, `docKey` on P.383, etc, to \( \langle \text{length} \rangle \).

\begin{docCommand*}[doc right=2cm]{myCommandB}{⟨argument⟩}
This is the documentation of \refCom{myCommandB} which takes one \meta{argument}.
\refCom{myCommandB} does some funny things with its \meta{argument}.
\end{docCommand*}

\myCommandB{⟨argument⟩}
This is the documentation of \myCommandB which takes one \langle argument \rangle. \myCommandB does some funny things with its \langle argument \rangle.

Sets the left hand indent of documentation heads from `docCommand` on P.381, `docEnvironment` on P.382, `docKey` on P.383, etc, to \( \langle \text{length} \rangle \).

\begin{docCommand*}[doc left indent=2cm]{myCommandC}{⟨argument⟩}
This is the documentation of \refCom{myCommandC} which takes one \meta{argument}.
\refCom{myCommandC} does some funny things with its \meta{argument}.
\end{docCommand*}

\myCommandC{⟨argument⟩}
This is the documentation of \myCommandC which takes one \langle argument \rangle. \myCommandC does some funny things with its \langle argument \rangle.

Sets the right hand indent of documentation heads from `docCommand` on P.381, `docEnvironment` on P.382, `docKey` on P.383, etc, to \( \langle \text{length} \rangle \).

\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}.
\refCom{myCommandD} does some funny things with its \meta{argument}.
\end{docCommand*}

\myCommandD{⟨argument⟩}
(test value)
This is the documentation of \myCommandD which takes one \langle argument \rangle. \myCommandD does some funny things with its \langle argument \rangle.
The head lines of the main documentation environments \texttt{docCommand} \cite{P.381}, \texttt{docEnvironment} \cite{P.382}, \texttt{docKey} \cite{P.383}, etc, are set inside \texttt{tcolorbox}es. Options to these \texttt{tcolorbox}es can be given using the following keys.

\begin{itemize}
\item \texttt{/tcb/doc head command=(\textit{options})} \hspace{1cm} (no default, initially empty)
Sets \textit{\texttt{\textit{options}}} for the head line of \texttt{docCommand} \cite{P.381} and \texttt{docCommand*} \cite{P.382}.

\begin{verbatim}
\tcbset{doc head command={interior style={fill,left color=red!20!white, right color=blue!20!white}}}
\begin{docCommand*}{myCommandE}{\marg{argment}}
This is the documentation of \refCom{myCommandE} which takes one \meta{argument}. \refCom{myCommandE} does some funny things with its \meta{argument}.
\end{docCommand*}
\end{verbatim}

\item \texttt{/tcb/doc head environment=(\textit{options})} \hspace{1cm} (no default, initially empty)
Sets \textit{\texttt{\textit{options}}} for the head line of \texttt{docEnvironment} \cite{P.382} and \texttt{docEnvironment*} \cite{P.382}.

\begin{verbatim}
\tcbset{doc head environment={beamer,boxsep=2pt,arc=2pt,colback=green!20!white, after=[par\smallskip]}}
\begin{docEnvironment*}{myEnvironment}{\marg{argment}}
This is the documentation of \refEnv{myEnvironment} which takes one \meta{argument}. \refEnv{myEnvironment} does some funny things with its \meta{argument}.
\end{docEnvironment*}
\end{verbatim}

\item \texttt{/tcb/doc head key=(\textit{options})} \hspace{1cm} (no default, initially empty)
Sets \textit{\texttt{\textit{options}}} for the head line of \texttt{docKey} \cite{P.383} and \texttt{docKey*} \cite{P.383}.

\begin{verbatim}
\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*}
\end{verbatim}

\item \texttt{/tcb/doc head=(\textit{options})} \hspace{1cm} (no default, initially empty)
Shortcut for setting the same \textit{\texttt{\textit{options}}} for \texttt{/tcb/doc head command}, \texttt{/tcb/doc head environment}, and \texttt{/tcb/doc head key}.

\end{itemize}
The description texts of the main documentation environments \texttt{docCommand* P.381}, \texttt{docEnvironment* P.382}, \texttt{docKey* P.383}, etc, are set in a compact form without indentation and \texttt{parskip=0pt}. This settings can overruled by using the following keys to insert code before (or after) the description texts.

\begin{docCommand*}\{myCommandG\}\{\marg{argment}\}
This is the documentation of \texttt{\refCom{myCommandG}} which takes one \texttt{\meta{argment}}. \texttt{\refCom{myCommandG}} does some funny things with its \texttt{\meta{argment}}.
\end{docCommand*}

\begin{docCommand*}\{myCommandH\}\{\marg{argment}\}
This is the documentation of \texttt{\refCom{myCommandH}} which takes one \texttt{\meta{argment}}. \texttt{\refCom{myCommandH}} does some funny things with its \texttt{\meta{argment}}.
\end{docCommand*}

\begin{docEnvironment*}\{myCommandG\}\{\marg{argment}\}
This is the documentation of \texttt{\refCom{myCommandG}} which takes one \texttt{\meta{argment}}. \texttt{\refCom{myCommandG}} does some funny things with its \texttt{\meta{argment}}.
\end{docEnvironment*}

\begin{docEnvironment*}\{myCommandH\}\{\marg{argment}\}
This is the documentation of \texttt{\refCom{myCommandH}} which takes one \texttt{\meta{argment}}. \texttt{\refCom{myCommandH}} does some funny things with its \texttt{\meta{argment}}.
\end{docEnvironment*}

\begin{docKey*}\{myCommandG\}\{\marg{argment}\}
This is the documentation of \texttt{\refCom{myCommandG}} which takes one \texttt{\meta{argment}}. \texttt{\refCom{myCommandG}} does some funny things with its \texttt{\meta{argment}}.
\end{docKey*}

\begin{docKey*}\{myCommandH\}\{\marg{argment}\}
This is the documentation of \texttt{\refCom{myCommandH}} which takes one \texttt{\meta{argment}}. \texttt{\refCom{myCommandH}} does some funny things with its \texttt{\meta{argment}}.
\end{docKey*}

\begin{docBody}\{\meta{options}\}
Shortcut for setting the same \texttt{\meta{options}} for /\texttt{tcb/before doc body command}, /\texttt{tcb/before doc body environment}, and /\texttt{tcb/before doc body key}.
\end{docBody}

\begin{docBody}\{\meta{options}\}
Shortcut for setting the same \texttt{\meta{options}} for /\texttt{tcb/after doc body command}, /\texttt{tcb/after doc body environment}, and /\texttt{tcb/after doc body key}.
\end{docBody}
Sets a (short!) additional description \langle text \rangle for \texttt{docCommand} \textsuperscript{P.381} or \texttt{docEnvironment} \textsuperscript{P.382}. Such a description is mandatory for \texttt{docKey} \textsuperscript{P.383}.

\begin{docCommand*}\{doc description=my description\}{myCommandF}\{\text{\texttt{\textbackslash marg}}\{\text{argument}\}\}
This is the documentation of \texttt{\textbackslash myCommandF} which takes one \texttt{\textbackslash meta}\{\text{argument}\}. \texttt{\textbackslash refCom}\{\text{myCommandF}\} does some funny things with its \texttt{\textbackslash meta}\{\text{argument}\}.
\end{docCommand*}

\begin{docCommand}\{\text{myCommandF}\}\{\langle argument \rangle\}\}
This is the documentation of \texttt{myCommandF} which takes one \langle argument \rangle. \texttt{myCommandF} does some funny things with its \langle argument \rangle.
\end{docCommand}

Note that the description \langle text \rangle may overlap with the text on the left hand side if too long. Linebreaks can be used inside the \langle text \rangle.

\texttt{\textbackslash tcb/doc into index=true|false}
(default \texttt{true}, initially \texttt{true})
If set to \texttt{false}, no index entries are written for the main documentation environments. The same effect is achieved by using e.g. \texttt{docCommand*} \textsuperscript{P.382} instead of \texttt{docCommand} \textsuperscript{P.381}.

\texttt{\textbackslash tcb/doc marginnote=\{options\}
(no default, initially empty)
Sets style \langle options \rangle for the displayed box of the \texttt{\textbackslash tcbdocmarginnote} \textsuperscript{P.390} command.

\texttt{\textbackslash tcbset\{doc marginnote=\{colframe=blue!50!white, colback=blue!5!white\}\}\%}
This is some text \texttt{\textbackslash 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.

\texttt{\textbackslash tcb/doc new=(date)
(style, no default)
Adds a a marginnote with a ’New: \langle data \rangle’ message at the beginning of the upper box part. The intended use is inside the option list of \texttt{docCommand} \textsuperscript{P.381}, \texttt{docEnvironment} \textsuperscript{P.382}, etc.

\begin{docCommand}\{doc new=2000-01-01\}{foosomething}\{\text{\texttt{\textbackslash marg}}\{text\}\}
Some command for something.
\end{docCommand}

\texttt{\textbackslash foosomething}\{\langle text \rangle\}
Some command for something.

\texttt{\textbackslash tcb/doc updated=(date)
(style, no default)
Adds a marginnote with a ’Updated: \langle data \rangle’ message at the beginning of the upper box part. See \texttt{/tcb/doc new}.

\texttt{\textbackslash tcb/doc new and updated=\{\langle new date \rangle\}\{\langle update date \rangle\}
(style, no default)
Adds a marginnote with ’New: \langle new date \rangle’ and ’Updated: \langle update data \rangle’ messages at the beginning of the upper box part. See \texttt{/tcb/doc new}.

\subsection*{21.3 Predefined Colors of the Library}

The following colors are predefined. They are used as default colors in some library commands.

\begin{verbatim}
Option □, Definition □, ExampleFrame □, ExampleBack □, Hyperlink □.
\end{verbatim}
# Picture Credits

The following pictures were used inside this documentation.

<table>
<thead>
<tr>
<th>Picture</th>
<th>Source</th>
</tr>
</thead>
<tbody>
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<td><a href="http://commons.wikimedia.org/wiki/File:Basilica_5.png">http://commons.wikimedia.org/wiki/File:Basilica_5.png</a></td>
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</tr>
<tr>
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<tr>
<td>blueshade.png</td>
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<tr>
<td>goldshade.png</td>
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</tr>
</tbody>
</table>
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Index

- key, 371
! key, 371

absquote environment, 387
add to height key, 53
add to list key, 94
add to width key, 33
adjust text key, 17
adjusted title key, 17
adjusted title after break key, 308
after key, 76
after app key, 348
after doc body key, 397
after doc body command key, 397
after doc body environment key, 397
after doc body key key, 397
after example key, 391
after lower key, 59
after lower app key, 348
after lower pre key, 348
after pre key, 348
after skip key, 78
after title key, 58
after title app key, 347
after title pre key, 347
after upper key, 59
after upper app key, 347
after upper pre key, 347
all key, 9
all value, 46, 47, 239, 310, 312
ams align key, 293
ams align lower key, 293
ams align upper key, 293
ams align* key, 293
ams align* lower key, 293
ams align* upper key, 293
ams equation key, 292
ams equation lower key, 292
ams equation upper key, 292
ams equation* key, 292
ams equation* lower key, 292
ams equation* upper key, 292
ams gather key, 294
ams gather lower key, 294
ams gather upper key, 294
ams gather* key, 294
ams gather* lower key, 294
ams gather* upper key, 294
ams nodisplayskip key, 295
ams nodisplayskip lower key, 295
ams nodisplayskip upper key, 295
arc key, 35
arc is angular key, 37
arc is curved key, 37
areasize value, 343
areasize* value, 343
at begin tikz key, 166
at begin tikz reset key, 166
at end tikz key, 166
at end tikz reset key, 166
attach boxed title to bottom center key, 131
attach boxed title to bottom left key, 131
attach boxed title to bottom right key, 131
attach boxed title to top center key, 131
attach boxed title to top left key, 131
attach boxed title to top right key, 131
attach title key, 19
attach title to upper key, 19
auto value, 92
auto counter key, 97
auto limited value, 92
auto outer arc key, 37
autoparsskip key, 76
base value, 77
baseline key, 77
baselineskip value, 310
beamer key, 196
beamer Skin, 196
beamerfirst Skin, 198
beamerlast Skin, 200
beamermiddle Skin, 199
bean arc key, 36
before key, 76
before app key, 348
before doc body key, 397
before doc body command key, 397
before doc body environment key, 397
before doc body key key, 397
before example key, 391
before lower key, 59
before lower app key, 348
before lower pre key, 348
before nobreak key, 79
before pre key, 348
before skip key, 78
before title key, 58
before title app key, 347
before title pre key, 347
before upper key, 58
before upper app key, 347
before upper pre key, 347
beforeafter skip key, 78
bicolor key, 191
bicolor Skin, 191
bicolorfirst Skin, 193
bicolorlast Skin, 195
bicolormiddle Skin, 194
blank key, 180
blanker key, 206
blend before title key, 102
blend before title code key, 103
blend into key, 101
borderline key, 151
borderline east key, 154
borderline horizontal key, 155
borderline north key, 154
borderline south key, 154
borderline vertical key, 155
borderline west key, 154
bottom key, 41
bottom value, 32, 71, 72, 77, 238
bottom seam value, 71, 72
bottomrule key, 34
bottomrule at break key, 311
bottomsep at break key, 311
bottomtitle key, 41
box align key, 77
\boxarrayclear, 328
\boxarraygetbox, 332
\boxarraygetdepth, 333
\boxarraygetheight, 333
\boxarraygetsize, 330
\boxarraygettotalheight, 334
\boxarraygetwidth, 333
\boxarrayreset, 327
boxarraysstore environment, 330
boxed title style key, 133
boxrule key, 35
boxsep key, 37
\brackets, 385
break value, 297
break at key, 309
breakable key, 8, 307
broken value, 139–141
capture key, 89
center value, 29, 32, 71, 72, 77, 238
center lower key, 31
center seam value, 71, 72
center title key, 31
center upper key, 31
change value, 297
change apart value, 297
change break value, 297
change standard value, 296
check odd page key, 94
circular arc key, 36
clear preamble key, 378
clear preclass key, 378
clip lower key, 150
clip title key, 149
clip upper key, 149
clip watermark key, 145
code key, 96
colback key, 26
colbacklower key, 192
colbacktitle key, 26
\colDef, 389
colframe key, 26
colower key, 27
colon value, 102
colon hang value, 102
\colOpt, 389
color key, 394
color color key, 393
color command key, 393
color counter key, 393
color definition key, 393
color environment key, 393
color hyperlink key, 393
color key key, 393
color length key, 393
color option key, 393
color value key, 393
Colors
\Definition, 398
ExampleBack, 398
ExampleFrame, 398
foocolor, 384
Hyperlink, 398
Option, 398
colors key, 394
coltext key, 27
coltitle key, 27
colupper key, 27
comment key, 255
comment above listing key, 262
comment above* listing key, 262
comment and listing key, 258
comment only key, 255
comment outside listing key, 260
comment side listing key, 260
comment style key, 258
compilable listing key, 266
compiler key, 377
compress page key, 310
\consumeboxarray, 331
\consumetcboxarray, 331
counter key, 394
Counters
foocounter, 384
counters key, 394
Crefname key, 100
crefname key, 100
\cs, 385
dash value, 102
dash hang value, 102
\DeclareTCBInputListing, 367
\DeclareTCBListing, 365
\DeclareTCBox, 362
\DeclareTCBoxFit, 368
\DeclareTColorBox, 359
\DeclareTotalTCBox, 363
\DeclareTotalTCBoxFit, 369
\DeclareTotalTColorBox, 361
Definition color, 398
description color key, 287
description delimiters key, 287
index command name key, 392
index default settings key, 392
index format key, 392
index german settings key, 392
index level key, 392
index quote key, 392
input source on error key, 377
interior code key, 117
interior code app key, 355
interior code pre key, 355
interior empty key, 117
interior engine key, 114
interior hidden key, 126
interior style key, 125
interior style image key, 126
interior style tile key, 126
interior titled code key, 116
interior titled code app key, 354
interior titled code pre key, 355
interior titled empty key, 116
interior titled engine key, 113
invisible key, 21
invisible value, 21, 23
justify value, 29
key key, 394
Keys
/foo/
   fooaux, 384
   foodummy, 388
   footitle, 383
/tcb/
   add to height, 53
   add to list, 94
   add to width, 33
   adjust text, 17
   adjusted title, 17
   adjusted title after break, 308
   after, 76
   after app, 348
   after doc body, 397
   after doc body command, 397
   after doc body environment, 397
   after doc body key, 397
   after example, 391
   after lower, 59
   after lower app, 348
   after lower pre, 348
   after pre, 348
   after skip, 78
   after title, 58
   after title app, 347
   after title pre, 347
   after upper, 59
   after upper app, 347
   after upper pre, 347
   ams align, 293
   ams align lower, 293
   ams align upper, 293
ams align*, 293
ams align* lower, 293
ams align* upper, 293
ams equation, 292
ams equation lower, 292
ams equation upper, 292
ams equation*, 292
ams equation* lower, 292
ams equation* upper, 292
ams gather, 294
ams gather lower, 294
ams gather upper, 294
ams gather*, 294
ams gather* lower, 294
ams gather* upper, 294
ams nodisplayskip, 295
ams nodisplayskip lower, 295
ams nodisplayskip upper, 295
arc, 35
arc is angular, 37
arc is curved, 37
at begin tikz, 166
at begin tikz reset, 166
at end tikz, 166
at end tikz reset, 166
attach boxed title to bottom center, 131
attach boxed title to bottom left, 131
attach boxed title to bottom right, 131
attach boxed title to top center, 131
attach boxed title to top left, 131
attach boxed title to top right, 131
attach title, 19
attach title to upper, 19
auto outer arc, 37
autoparskip, 76
baseline, 77
beamer, 196
bean arc, 36
before, 76
before app, 348
before doc body, 397
before doc body command, 397
before doc body environment, 397
before doc body key, 397
before example, 391
before lower, 59
before lower app, 348
before lower pre, 348
before nobreak, 79
before pre, 348
before skip, 78
before title, 58
before title app, 347
before title pre, 347
before upper, 58
before upper app, 347
before upper pre, 347
beforeafter skip, 78
bicolor, 191
blank, 180
blanker, 206
blend before title, 102
blend before title code, 103
borderline, 151
borderline east, 154
borderline horizontal, 155
borderline north, 154
borderline south, 154
borderline vertical, 155
borderline west, 154
bottom, 41
bottomrule, 34
bottomrule at break, 311
bottomsep at break, 311
bottomtitle, 41
box align, 77
boxed title style, 133
boxrule, 35
boxsep, 37
break at, 309
breakable, 307
capture, 89
center lower, 31
center title, 31
center upper, 31
check odd page, 94
circular arc, 36
clip lower, 150
clip title, 149
clip upper, 149
clip watermark, 145
code, 96
colback, 26
colbacklower, 192
colbacktitle, 26
colframe, 26
coller, 27
color color, 393
color command, 393
color counter, 393
color definition, 393
color environment, 393
color hyperlink, 393
color key, 393
color length, 393
color option, 393
color value, 393
coltext, 27
coltitle, 27
colupper, 27
comment, 255
comment and listing, 258
comment only, 255
comment outside listing, 260
comment side listing, 260
comment style, 258
 compilable listing, 266
compress page, 310
description color, 287
description delimiters, 287
description delimiters none, 287
description delimiters parenthesis, 287
description font, 288
description formatter, 288
detach title, 19
do not store to box array, 330
doc description, 398
doc head, 396
doc head command, 396
doc head environment, 396
doc head key, 396
doc into index, 398
doc left, 395
doc left indent, 395
doc margindent, 398
doc new, 398
doc new and updated, 398
doc right, 395
doc right indent, 395
doc updated, 398
docexample, 391
documentation listing options, 391
documentation listing style, 391
documentation minted options, 391
documentation minted style, 391
draft, 215
draftmode, 175
drop fuzzy midday shadow, 157
drop fuzzy shadow, 156
drop fuzzy shadow east, 160
drop fuzzy shadow north, 160
drop fuzzy shadow northeast, 160
drop fuzzy shadow northwest, 160
drop fuzzy shadow south, 159
drop fuzzy shadow southeast, 159
drop fuzzy shadow southwest, 159
drop fuzzy shadow west, 159
drop large lifted shadow, 161
drop lifted shadow, 161
drop midday shadow, 156
drop shadow, 156
drop shadow east, 159
drop shadow north, 158
drop shadow northeast, 159
drop shadow northwest, 158
drop shadow south, 158
drop shadow southeast, 158
drop shadow southwest, 158
drop shadow west, 158
drop small lifted shadow, 161
empty, 205
enforce breakable, 308
english language, 394
enhanced, 178
enhanced jigsaw, 185
enhanced standard, 180
enlarge bottom at break by, 81
enlarge bottom by, 81
enlarge bottom finally by, 80
enlarge by, 82
enlarge left by, 81
enlarge right by, 81
enlarge top at break by, 81
enlarge top by, 81
enlarge top initially by, 80
enlargepage, 309
enlargepage flexible, 310
equal height group, 56
every box, 86
every box on higher layers, 87
every box on layer n, 87
every float, 69
every listing line, 250
every listing line*, 250
extend freelance, 217
extend freelancenext, 217
extend freelancepre, 217
extend freelancemiddle, 217
external, 95
externalize example, 376
externalize example!, 376
externalize listing, 376
externalize listing!, 376
extras, 313
extras broken, 313
extras broken pre, 356
extras first, 313
extras first and middle, 313
extras first and middle pre, 356
extras first pre, 356
extras last, 313
extras last pre, 356
extras middle, 313
extras middle and last, 313
extras middle and last pre, 356
extras middle pre, 356
extras pre, 356
extras unbroken, 313
extras unbroken and first, 313
extras unbroken and first pre, 356
extras unbroken and last, 313
extras unbroken and last pre, 356
extras unbroken pre, 356
extrude bottom by, 85
extrude by, 85
extrude left by, 84
extrude right by, 84
extrude top by, 85
finish, 171
finish broken, 172
finish broken pre, 354
finish first, 172
finish first and middle, 172
finish first and middle pre, 354
finish first pre, 354
finish last, 172
finish last pre, 354
finish middle, 172
finish middle and last, 172
finish middle and last pre, 354
finish middle pre, 354
finish pre, 354
finish unbroken, 172
finish unbroken and first, 172
finish unbroken and first pre, 354
finish unbroken and last, 172
finish unbroken and last pre, 354
finish unbroken pre, 354
fit, 337
fit algorithm, 343
fit basedim, 338
fit fontsize macros, 339
fit height from, 342
fit height plus, 340
fit maxfontdiff, 345
fit maxfontdiffgap, 345
fit maxstep, 345
fit maxwidthdiff, 345
fit maxwidthdiffgap, 345
fit skip, 338
fit to, 338
fit to height, 338
fit warning, 345
fit width from, 341
fit width plus, 340
float, 69
float*, 69
floatplacement, 69
flushleft lower, 31
flushleft title, 31
flushleft upper, 31
flushright lower, 31
flushright title, 31
flushright upper, 31
fontlower, 28
fonttitle, 28
fontupper, 28
forces nobeforeafter, 76
frame code, 116
frame code app, 354
frame code pre, 354
frame empty, 116
frame engine, 113
frame hidden, 125
frame style, 124
frame style image, 124
frame style tile, 125
no recording, 106
no shadow, 156
no underlay, 169
no underlay boxed title, 170
no underlay first, 170
no underlay last, 170
no underlay middle, 170
no underlay unbroken, 170
no watermark, 141
nobeforeafter, 76
nofloat, 69
noparskip, 76
noparam, 93
notitle, 17
notitle after break, 308
octagon arc, 36
on line, 91
only, 96
opacityback, 49
opacitybacktitle, 49
opacityfill, 49
opacityframe, 49
opacitylower, 50
opacitytext, 50
opacitytitle, 50
opacityupper, 50
outer arc, 37
overlay, 64
overlay app, 349
overlay broken, 65
overlay broken app, 350
overlay broken pre, 350
overlay first, 65
overlay first and middle, 65
overlay first and middle app, 350
overlay first and middle pre, 350
overlay first app, 349
overlay first pre, 349
overlay last, 65
overlay last app, 350
overlay last pre, 350
overlay middle, 65
overlay middle and last, 65
overlay middle and last app, 350
overlay middle and last pre, 350
overlay middle app, 350
overlay middle pre, 350
overlay pre, 349
overlay unbroken, 65
overlay unbroken and first, 65
overlay unbroken and first app, 350
overlay unbroken and first pre, 350
overlay unbroken and last, 65
overlay unbroken and last app, 350
overlay unbroken and last pre, 350
overlay unbroken app, 349
overlay unbroken pre, 349
oversize, 43
pad after break, 311
pad at break, 311
pad at break*, 311
pad before break, 311
pad before break*, 311
parbox, 90
parskip, 76
pdf comment, 256
pdf extension, 258
phantom, 93
phantomlabel, 93
process code, 266
raster after skip, 236
raster before skip, 236
raster column n, 240
raster column skip, 237
raster columns, 235
raster equal height, 239
raster equal height group, 239
raster equal skip, 236
raster even column, 240
raster even number, 241
raster even row, 241
raster every box, 240
raster force size, 240
raster halign, 238
raster height, 236
raster left skip, 237
raster number n, 241
raster odd column, 240
raster odd number, 241
raster odd row, 240
raster reset, 240
raster right skip, 237
raster row m, 241
raster row m column n, 241
raster row skip, 237
raster rows, 235
raster valign, 238
raster width, 235
record, 106
remake, 95
remember, 167
remember as, 168
reset, 95
reset and store to box array, 330
reset box array, 327
right, 39
right skip, 79
righthand ratio, 74
righthand width, 73
rightlower, 40
rightrule, 34
righttitle, 39
rightrule, 39
rotate, 167
rounded corners, 47
run arara, 268
run biber, 268
run bibtex, 268
run dvips, 268
run latex, 268
run lualatex, 268
run makeindex, 268
run pdflatex, 266
run ps2pdf, 268
run system command, 266
run xelatex, 268
savedelimiter, 25
saveto, 22
scale, 167
segmentation code, 117
segmentation code app, 355
segmentation code pre, 355
segmentation empty, 117
segmentation engine, 114
segmentation hidden, 127
segmentation style, 127
separator sign, 286
separator sign colon, 286
separator sign dash, 286
separator sign none, 286
shadow, 162
sharp corners, 46
sharpish corners, 47
shield externalize, 95
show bounding box, 153
shrink break goal, 310
shrink tight, 84
sidebyside, 71
sidebyside align, 71
sidebyside gap, 73
size, 42
skin, 112
skin first, 112
skin first is subskin of, 119
skin last, 112
skin last is subskin of, 119
skin middle, 112
skin middle is subskin of, 119
smart shadow arc, 164
space, 54
space to both, 55
space to lower, 54
space to upper, 54
spartan, 214
split, 55
square, 54
squeezed title, 18
squeezed title*, 18
standard, 176
standard jigsaw, 177
step, 93
step and label, 93
store to box array, 328
subtitle style, 20
tabularx, 61
tabularx*, 61
tcbimage comment, 256
tcbox raise, 91
tcbox raise base, 91
tcbox width, 92
tempfile, 91
terminator sign, 288
terminator sign colon, 289
terminator sign dash, 289
terminator sign none, 289
text above listing, 261
text above* listing, 261
text and listing, 254
text fill, 60
text height, 52
text only, 255
text outside listing, 259
text side listing, 259
text width, 33
theorem, 290
theorem name, 290
theorem name and number, 289
theorem number and name, 290
theorem style, 296
tikz, 166
tikz lower, 62
tikz reset, 166
tikz upper, 62
tikznode, 63
tikznode boxed title, 138
tikznode lower, 63
tikznode upper, 63
title, 17
title after break, 308
title code, 118
title code app, 355
title code pre, 355
title empty, 118
title engine, 114
title filled, 26
title hidden, 128
title style, 127
title style image, 128
title style tile, 128
titlerule, 35
titlerule style, 129
toggle enlargement, 83
toggle left and right, 44
top, 40
toprule, 34
toprule at break, 311
topsep at break, 311
toptitle, 40
unbreakable, 308
underlay, 169
underlay boxed title, 170
underlay boxed title pre, 353
underlay broken, 170
underlay broken pre, 353
underlay first, 170
underlay first and middle, 170
underlay first and middle pre, 353
underlay first pre, 353
underlay last, 170
underlay last pre, 353
underlay middle, 170
underlay middle and last, 170
underlay middle and last pre, 353
underlay middle pre, 353
underlay unbroken, 170
underlay unbroken and first, 170
underlay unbroken and first pre, 353
underlay unbroken and last, 170
underlay unbroken and last pre, 353
underlay unbroken pre, 353
upperbox, 21
valign, 32
valign lower, 32
valign scale limit, 32
valign upper, 32
varwidth boxed title, 138
varwidth boxed title*, 138
varwidth upper, 63
verbatim, 357
vfill before first, 312
visible, 21
watermark color, 144
watermark graphics, 140
watermark graphics app, 352
watermark graphics app on, 352
watermark graphics on, 140
watermark graphics pre, 352
watermark graphics pre on, 352
watermark opacity, 142
watermark overzoom, 143
watermark shrink, 143
watermark stretch, 144
watermark text, 139
watermark text app, 351
watermark text app on, 351
watermark text on, 139
watermark text pre, 351
watermark text pre on, 351
watermark tikz, 141
watermark tikz app, 352
watermark tikz app on, 352
watermark tikz on, 141
watermark tikz pre, 352
watermark tikz pre on, 352
watermark zoom, 142
widget, 201
width, 33
-watermark tikz pre on, 352
-watermark tikz on, 141
-watermark tikz app on, 352
-watermark tikz app, 352
-watermark tikz, 141
-watermark text pre on, 351
-watermark text pre, 351
-watermark text on, 139
-watermark text app on, 351
-watermark text app, 351
-watermark text, 139
-watermark stretch, 144
-watermark shrink, 143
-watermark scale limit, 32
-watermark lower, 32
-watermark, 32
visible, 21
verbatim, 357
vfill before first, 312
watermark text pre on, 351
watermark text pre, 351
watermark text on, 139
watermark text app on, 351
watermark text app, 351
watermark text, 139
watermark stretch, 144
watermark shrink, 143
watermark scale limit, 32
watermark lower, 32
watermark, 32
width, 33
auto counter, 97
blend into, 101
Crefname, 100
crefname, 100
list inside, 104
list type, 104
no counter, 98
number format, 99
number freestyle, 99
number within, 99
use counter, 98
use counter from, 98
use counter*, 98

/tikz/
fill image opacity, 228
fill image options, 228
fill image scale, 228
fill overzoom image, 224
fill overzoom image*, 224
fill overzoom picture, 224
fill plain image, 222
fill plain image*, 222
fill plain picture, 222
fill shrink image, 226
fill shrink image*, 226
fill shrink picture, 226
fill stretch image, 223
fill stretch image*, 223
fill stretch picture, 223
fill tile image, 227
fill tile image*, 227
fill tile picture, 227
fill tile picture*, 227
fill zoom image, 225
fill zoom image*, 225
fill zoom picture, 225
tcb fill frame, 130
tcb fill interior, 130
tcb fill title, 130

keys key, 394

label key, 93
label type key, 93
last value, 139–141, 312
left key, 38
left value, 29, 238
left skip key, 79
lefthand ratio key, 74
lefthand width key, 73
leftlower key, 38
leftrule skip key, 79
lefterule key, 34
lefttitle key, 38
leftupper key, 38
length key, 394
Lengths
\foolength, 384
lengths key, 394
lifted shadow key, 164
lines before break key, 308

list entry key, 94
list inside key, 104
list text key, 94
list type key, 104
listing above comment key, 262
listing above text key, 261
listing above* comment key, 262
listing above* text key, 261
listing and comment key, 258
listing and text key, 254
listing engine key, 254
listing file key, 254
listing inputencoding key, 250
listing only key, 254
listing options key, 249
listing outside comment key, 260
listing outside text key, 259
listing remove caption key, 250
listing side comment key, 260
listing side text key, 259
listing style key, 249
listing utf8 key, 251
listings key, 8
listings value, 101, 254
listingsutf8 key, 8
lower separated key, 24
lowerbox key, 23

magazine key, 8
many key, 9
\margin, 385
margin value, 298
margin apart value, 298
margin break value, 298
marker key, 187
math key, 291
math lower key, 291
math upper key, 291
maximum value, 53
\meta, 385
middle key, 41
middle value, 139–141, 312
middle and last value, 139–141, 312
minimal value, 42
minimum center value, 92
minimum for equal height group key, 57
minimum left value, 92
minimum right value, 92
minipage key, 89, 377
minipage value, 89, 234
minipage boxed title key, 137
minipage boxed title* key, 137
minted key, 8
minted value, 254
minted language key, 252
minted options key, 252
minted style key, 253
most key, 9

name key, 373

413
natural height key, 51
new key, 394
\newboxarray, 327
\newtcbexternalizeenvironment, 379
\newtcbexternalizetcolorbox, 379
\NewTCBInputListing, 367
\newtcbinputlisting, 248
\NewTCBListing, 365
\newtcblisting, 246
\NewTCBox, 15
\NewTCBoxFit, 368
\newtcboxfit, 336
\newtcbtheorem, 282
\NewTColorBox, 360
\newtcolorbox, 14
\NewTotalTCBox, 364
\NewTotalTCBoxFit, 369
\NewTotalTColorBox, 361
no borderline key, 153
no counter key, 98
no extras key, 313
no extras first key, 313
no extras last key, 313
no extras middle key, 313
no extras unbroken key, 313
no finish key, 172
no finish first key, 172
no finish last key, 172
no finish middle key, 172
no finish unbroken key, 172
no label type key, 93
no listing options key, 249
no overlay key, 65
no process key, 266
no recording key, 106
no shadow key, 156
no underlay key, 169
no underlay boxed title key, 170
no underlay first key, 170
no underlay last key, 170
no underlay middle key, 170
no underlay unbroken key, 170
no watermark key, 141
nobeforeafter key, 76
nofloat key, 69
none value, 44, 83, 239, 310, 312
noparbox key, 90
noparbox key, 93
normal value, 42
north value, 46, 47
northeast value, 46, 47
northwest value, 46, 47
notitle key, 17
notitle after break key, 308
number format key, 99
number freestyle key, 99
number within key, 99
\oarg, 385
octagon arc key, 36
off value, 345, 392
on value, 345
on line key, 91
only key, 96
opacityback key, 49
opacitybacktitle key, 49
opacityfill key, 49
opacityframe key, 49
opacitylower key, 50
opacitytext key, 50
opacitytitle key, 50
opacityupper key, 50
Option color, 398
outer arc key, 37
overlay key, 64
overlay app key, 349
overlay broken key, 65
overlay broken app key, 350
overlay broken pre key, 350
overlay first key, 65
overlay first and middle key, 65
overlay first and middle app key, 350
overlay first and middle pre key, 350
overlay first app key, 349
overlay first pre key, 349
overlay last key, 65
overlay last app key, 350
overlay last pre key, 350
overlay middle key, 65
overlay middle and last key, 65
overlay middle and last app key, 350
overlay middle and last pre key, 350
overlay middle app key, 350
overlay middle pre key, 350
overlay pre key, 349
overlay unbroken key, 65
overlay unbroken and first key, 65
overlay unbroken and first app key, 350
overlay unbroken and first pre key, 350
overlay unbroken and last key, 65
overlay unbroken and last app key, 350
overlay unbroken and last pre key, 350
overlay unbroken app key, 349
overlay unbroken pre key, 349
oversize key, 43
pad after break key, 311
pad at break key, 311
pad at break* key, 311
pad before break key, 311
pad before break* key, 311
pageshort key, 394
parbox key, 90
parskip key, 76
PassOptionsToClass key, 378
PassOptionsToPackage key, 378
path value, 113, 114
pathfirst value, 113, 114
pathfirstjigsaw value, 113