The \texttt{picture} package

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Abstract

There are macro and environment arguments that expect numbers that will internally be multiplicated with \texttt{\unitlength}. This package extends the syntax of these arguments that dimens with calculation support can be added for these arguments.

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1 User interface

1.1 Introduction

The environment picture and macros such as \put, \line, \vector and other macros have arguments that expect numbers that are used as factor for \unitlength. This package redefines such macros and adds code that detects whether such an argument is given as number or as length. In the latter case, the length is used directly without multiplying with \unitlength.

1.2 Options

Depending on the available features, also length expressions can be given. Option calc loads package calc. Then expressions of these package may be used. Otherwise etex wraps the length argument inside \dimexpr…\relax, if \varepsilon-TEX is available. Otherwise option plain uses plain assignments without calculation support.

The default is calc if package calc is loaded before package picture. If you specify option calc the loading of calc is ensured. Otherwise package picture looks whether \dimexpr is available and uses then option etex as default. If \varepsilon-TEX also could not be found, then plain is used.

1.3 Example

1 \langle*𭖾𭗑𭖺𭗆𭗉𭗅𭖾⟩
2 \documentclass{article}
3 \usepackage[calc]{picture}
4 \begin{document}
5 \setlength{\unitlength}{1pt}
6 \begin{picture}(\widthof{Hello World}, 10mm)
7 \put(0, 0){\makebox(0,0)[lb]{Hello World}}%
8 \put(0, \heightof{Hello World} + \fboxsep){%
9 \line(1, 0){\widthof{Hello World}}%
10 \put(\widthof{Hello World}, 10mm){%
11 \line(0, -1){10mm}%
12 \end{picture}
13 \end{document}
14 ⟨/𭖾𭗑𭖺𭗆𭗉𭗅𭖾⟩

1.4 Supported packages

Packages psppicture and pict2e are supported, but they must be loaded before package picture.

New macros can be supported by \picture@redefine. The first argument is the macro which contains the arguments in its parameter text that you want to support by package picture. The second argument contains the parameter text. Change # to & for the arguments in question. Examples (already used by package picture):

\picture@redefine\put{(&1,&2)}
\picture@redefine\line{(#1,#2)&3}
2 Implementation

2.1 Identification

\NeedsTeXFormat{LaTeX2e}
\ProvidesPackage{picture}[]
[2009/10/11 v1.3 Dimens for picture macros (HO)]

2.2 Options

\def\Pc@calcname{calc}
\def\Pc@etexname{etex}
\def\Pc@plainname{plain}

\Pc@method Macro \Pc@method stores the method to use for calculations. Check which features are available and set the default for \Pc@method.

\ifpackageloaded{calc}\{%
 \let\Pc@method\Pc@calcname
 \begingroup\expandafter\expandafter\expandafter\endgroup
 \expandafter\ifx\csname dimexpr\endcsname\relax
 \let\Pc@method\Pc@plainname
 \else
 \let\Pc@method\Pc@etexname
 \fi
 \fi

\DeclareOption{plain}\{%
 \let\Pc@method\Pc@plainname
 \fi
\}

\DeclareOption{etex}\{%
 \begingroup\expandafter\expandafter\expandafter\endgroup
 \expandafter\ifx\csname dimexpr\endcsname\relax
 \PackageError{picture}{e-\TeX is not available}\@ehc
 \else
 \let\Pc@method\Pc@etexname
 \fi
 \fi

\DeclareOption{calc}\{%
 \let\Pc@method\Pc@calcname
 \fi
\}

\ProcessOptions*
\begingroup
 \let\on@line\@empty
 \PackageInfo{picture}{Calculation method: \Pc@method}\%
\endgroup

2.3 Calculation method

\ifx\Pc@method\Pc@calcname\%
 \RequirePackage{calc}\%
 \fi

2.3.1 Method calc

\ifx\Pc@method\Pc@calcname\%
 \def\Pc@tokslength#1\{%
 \begingroup
 \let\calc@error\Pc@calc@error
 \netlength\dimen0\#1\unitlength\Pc@next\Pc@nil\#1\%
 \}\%
 \let\PcOrg@calc@error\calc@error
\fi
\@ifpackagelater{calc}{2007/08/22}{% v4.3
\def\Pc@calc@error#1{%
  \expandafter\ifx\expandafter\unitlength\noexpand#1\relax
  \def\calc@next##1!{%
    \endgroup
    \aftergroup\afterassignment
    \aftergroup\Pc@next
  }%
  \expandafter\@firstoftwo
  \else
  \expandafter\@secondoftwo
  \fi
  \calc@next{#1}%
}{%
  \PcOrg@calc@error{#1}%
}%
}\def\Pc@calc@error#1{%
  \expandafter\ifx\expandafter\unitlength\noexpand#1\relax
  \def\calc@next##1!{%
    \endgroup
    \aftergroup\afterassignment
    \aftergroup\Pc@next
  }%
  \expandafter\@gobble
  \else
  \expandafter\@firstofone
  \fi
  \PcOrg@calc@error{#1}%
}%
\fi

2.3.2 Method etex
\ifx\Pc@method\Pc@etexname
\def\Pc@tokslength#1{%
  \begingroup
  \afterassignment\Pc@next
  \dimen@=#1\unitlength\Pc@nil{#1}%
}\fi

2.3.3 Method plain
\ifx\Pc@method\Pc@plainname
\def\Pc@tokslength#1{%
  \begingroup
  \afterassignment\Pc@next
  \dimen@=#1\unitlength\Pc@nil{#1}%
}\fi

2.3.4 Help macros
\def\Pc@next#1\Pc@nil#2{%
  \ifx\#1\%
    \endgroup
    \Pc@addtoks{{#2}}%
  \else
    \expandafter\endgroup
    \Pc@addtoks{{#2}}%
  }\fi
\expandafter\endgroup
\Pc@nil must not have the meaning of \relax because of \dimexpr.

\Pc@nil \Pc@nil

2.4 Redefinitions

\picture@redefine #1: command name
#2: parameter text, length parameter with & instead of #

\Pc@first

\Pc@scanlength #1: number of length parameter or zero

\Pc@scannext
\ifx\#1\%
\else
\toks1=\expandafter{\the	oks1 #1}\
\toks2=\expandafter{\the	oks2 \Pc@addtoks{#1}}\
\fi
\Pc@scanlength
\}
\Pc@last
\def\Pc@last{%
\edef\x{%
\endgroup
\let\reserved@a\the	oks0 %
\def\the\toks0 \the\toks1 {%
\the\toks2 %
\noexpand\Pc@finish\reserved@a
}%
}%
\x
}

2.4.1 L\TeX{} base macros
\picture@redefine\@picture{(&1,&2)(&3,&4)}
\picture@redefine\put{(&1,&2)}
\picture@redefine\multiput{(&1,&2)}
\picture@redefine\@multiput{(&1,&2)}
\picture@redefine\line{(#1,#2)&3}
\picture@redefine\vector{(#1,#2)&3}
\picture@redefine\dashbox{&1(&2,&3)}
\picture@redefine\@circle{&1}
\picture@redefine\@dot{&1}
\picture@redefine\@bezier{#1(&2,&3)(&4,&5)(&6,&7)}
\picture@redefine\@imakepicbox{(&1,&2)}

2.4.2 Package pspicture
Package pspicture changes the signature of \@oval by adding an optional argument.
\ifpackageloaded{pspicture}\
\picture@redefine\@oval{[&1](&2,\&3)}
\picture@redefine\Line{(&1,&2)}
\picture@redefine\Curve{(&1,&2)}
\picture@redefine\Vector{(&1,&2)}
\}
\picture@redefine\@bezier{1&(2,\&3)(4,\&5)(6,\&7)}
\picture@redefine\@imakepicbox{(&1,&2)}

2.5 Check package loading order
\Pc@checkpackage
\def\Pc@checkpackage#1{%
\ifpackageloaded{#1}\
\AtBeginDocument{%
\ifpackageloaded{#1}\
\PackageWarningNoLine{picture}{Package `#1' is loaded after `picture'.\MessageBreak Load package `picture' afterwards to get full support\MessageBreak of its additional syntax with length specifications}\)
\)
\}


3 Installation

3.1 Download

Package. This package is available on CTAN:\(^1\):


Bundle. All the packages of the bundle ‘oberdiek’ are also available in a TDS compliant ZIP archive. There the packages are already unpacked and the documentation files are generated. The files and directories obey the TDS standard.

CTAN:install/macros/latex/contrib/oberdiek.tds.zip

TDS refers to the standard “A Directory Structure for \TeX\ Files” (CTAN:tds/tds.pdf). Directories with \texttt{texmf} in their name are usually organized this way.

3.2 Bundle installation

Unpacking. Unpack the \texttt{oberdiek.tds.zip} in the TDS tree (also known as \texttt{texmf} tree) of your choice. Example (linux):

```bash
unzip oberdiek.tds.zip -d ~/texmf
```

Script installation. Check the directory TDS:scripts/oberdiek/ for scripts that need further installation steps. Package attachfile2 comes with the Perl script \texttt{pdfatfi.pl} that should be installed in such a way that it can be called as \texttt{pdfatfi}. Example (linux):

```bash
chmod +x scripts/oberdiek/pdfatfi.pl
cp scripts/oberdiek/pdfatfi.pl /usr/local/bin/
```

3.3 Package installation

Unpacking. The \texttt{.dtx} file is a self-extracting \texttt{docstrip} archive. The files are extracted by running the \texttt{.dtx} through \texttt{plain} \TeX:\n
```bash
tex picture.dtx
```

TDS. Now the different files must be moved into the different directories in your installation TDS tree (also known as \texttt{texmf} tree):

- picture.sty → tex/latex/oberdiek/picture.sty
- picture.pdf → doc/latex/oberdiek/picture.pdf
- picture-example.tex → doc/latex/oberdiek/picture-example.tex
- picture.dtx → source/latex/oberdiek/picture.dtx

If you have a \texttt{docstrip.cfg} that configures and enables \texttt{docstrip}'s TDS installing feature, then some files can already be in the right place, see the documentation of \texttt{docstrip}.

\(^1\)ftp://ftp.ctan.org/tex-archive/
3.4 Refresh file name databases

If your \TeX{} distribution (\tex, \miktex, ...) relies on file name databases, you
must refresh these. For example, \tex users run \texttt{texhash} or \texttt{mktexlsr}.

3.5 Some details for the interested

\textbf{Attached source.} The PDF documentation on CTAN also includes the \texttt{.dtx}
source file. It can be extracted by AcrobatReader 6 or higher. Another option is \texttt{pdftk}, e.g. unpack the file into the current directory:

\begin{verbatim}
  pdftk picture.pdf unpack_files output .
\end{verbatim}

\textbf{Unpacking with \LaTeX{}.} The \texttt{.dtx} chooses its action depending on the format:

\textbf{plain \TeX{}}: Run \texttt{docstrip} and extract the files.

\textbf{\LaTeX{}}: Generate the documentation.

If you insist on using \LaTeX{} for \texttt{docstrip} (really, \texttt{docstrip} does not need \LaTeX{}),
then inform the autodetect routine about your intention:

\begin{verbatim}
  latex \let\install=y\input{picture.dtx}
\end{verbatim}

Do not forget to quote the argument according to the demands of your shell.

\textbf{Generating the documentation.} You can use both the \texttt{.dtx} or the \texttt{.drv}
to generate the documentation. The process can be configured by the configuration
file \texttt{ltxdoc.cfg}. For instance, put this line into this file, if you want to have A4
as paper format:

\begin{verbatim}
  \PassOptionsToClass{a4paper}{article}
\end{verbatim}

An example follows how to generate the documentation with pdf\LaTeX{}:

\begin{verbatim}
  pdflatex picture.dtx
  makeindex -s gind.ist picture.idx
  pdflatex picture.dtx
  makeindex -s gind.ist picture.idx
  pdflatex picture.dtx
\end{verbatim}

4 Catalogue

The following XML file can be used as source for the \TeX{} Catalogue. The elements\texttt{caption} and \texttt{description} are imported from the original XML file from the
Catalogue. The name of the XML file in the Catalogue is \texttt{picture.xml}.

\begin{verbatim}
<entry datestamp='$Date$' modifier='$Author$' id='picture'>
  <name>picture</name>
  <caption>Dimens for picture macros.</caption>
  <authorref id='auth:oberdiek'/>
  <copyright owner='Heiko Oberdiek' year='2006-2009'/>
  <license type='lppl1.3'/>
  <version number='1.3'/>
  <description>
    There are macro and environment arguments that expect numbers
    that will internally be multiplied by \texttt{\unitlength}.
    This package extends the syntax of these arguments, so that
    dimensions with calculation support may be used for these arguments.
  </description>
</entry>
\end{verbatim}
5 History

[2006/08/26 v1.0]
- First released version. (First start of the project was June/July 2002.)

[2007/04/11 v1.1]
- Line ends sanitized.

[2008/11/26 v1.2]
- Package pict2e added to documentation section “Supported packages”.
- Package order of supported packages is checked.

[2009/10/11 v1.3]
- Fix because of new version v4.3 of package calc.

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Numbers written in italic refer to the page where the corresponding entry is de-
scribed; numbers underlined refer to the code line of the definition; plain numbers
refer to the code lines where the entry is used.

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