The picture package

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Abstract

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

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*Please report any issues at https://github.com/hy-tex/oberdiek/issues
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 \texttt{dimexpr}, if \texttt{e-\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 \texttt{dimexpr} is available and uses then option \etex as default. If \texttt{e-\TeX} also could not be found, then plain is used.

1.3 Example

\begin{verbatim}
\documentclass{article}
\usepackage[calc]{picture}
\begin{document}
\setlength{\unitlength}{1pt}
\begin{picture}(\textwidth, 10mm)
  \put(0, 0){\makebox(0,0)[lb]{Hello World}}\%
  \put(0, \heightof{Hello World} + \fboxsep){\%
    \line(1, 0){\widthof{Hello World}}\%
  }\%
  \put(\widthof{Hello World}, 10mm){\%
    \line(0, -1){10mm}\%
  }\%
\end{picture}
\end{document}
\end{verbatim}

1.4 Supported packages

Packages \texttt{pspicture} and \texttt{pic2e} are supported, but they must be loaded before package picture.

New macros can be supported by \texttt{\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):

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

2.1 Identification

\NeedsTeXFormat{LaTeX2e}
\ProvidesPackage{picture} [2016/05/16 v1.4 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.

\if@iffacelayoutloaded{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
}\%
\DeclareOption{etex}{%
  \begingroup\expandafter\expandafter\expandafter\endgroup
  \expandafter\ifx\csname dimexpr\endcsname\relax
    \PackageError{picture}{\PackageError{picture}{e-TeX is not available}\@ehc
  \else
    \let\Pc@method\Pc@etexname
  \fi
}\%
\DeclareOption{calc}{%
  \let\Pc@method\Pc@calcname
}\%
\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@toks@length#1{%
    \begingroup
    \let\calc@error\Pc@calc@error
    \setlength\dimen\#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 
}{\% 
\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 
\aftergroup\afterassignment
\aftergroup\Pc@next 
\dimen@\=\dimexpr#1\unitlength\Pc@nil{#1}\%
\}%
\fi

2.3.3 Method plain
\ifx\Pc@method\Pc@plannename 
\def\Pc@tokslength#1{\% 
\begingroup 
\afterassignment\Pc@next 
\dimen@\=\dimexpr#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 
\fi
\expandafter\endgroup
\end{document}
\Pc@addtoks \Pc@nil must not have the meaning of \relax because of \dimexpr.
\let\Pc@nil\message
\Pc@addtoks
\def\Pc@addtoks#1{%\toks@=%\expandafter{\the\toks@#1}%;}
\Pc@init
\def\Pc@init#1{%\begingroup\toks@={#1}%;}
\Pc@finish
\def\Pc@finish#1{%\expandafter\endgroup\expandafter#1\the\toks@;}

2.4 Redefinitions
\picture@redefine #1: command name
#2: parameter text, length parameter with & instead of #
\def\picture@redefine#1#2{%\begingroup\edef\reserved@a{%\noexpand\noexpand\expandafter\noexpand\csname PcOrg@\expandafter\@gobble\string#1\endcsname}%;\toks0={#1}%;\Pc@first#2&0%;}
\Pc@first
\def\Pc@first#1&{%\toks1={#1}%;\toks2={\Pc@init{#1}}%;\Pc@scanlength}
\Pc@scanlength #1: number of length parameter or zero
\def\Pc@scanlength#1{%\ifcase#1 \expandafter\Pc@last\else\toks1=%\expandafter{\the\toks1 ###1}%;\toks2=%\expandafter\Pc@tokslength{###1}%;\expandafter\Pc@scannext\fi}
\Pc@scannext #1: parameter text
\def\Pc@scannext#1&{%\toks1=%\expandafter{\the\toks1 \the\toks2 \Pc@tokslength{###1}%;}\expandafter\Pc@last\Pc@scannext}
\Pc@last
\def\Pc@last{%\ifcase\toks1 \else\toks1=%\expandafter{\the\toks1 \the\toks2 \Pc@tokslength{###1}%;}\expandafter\Pc@scannext\fi}
\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)}

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\@oval{(&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 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 texmf in their name are usually organized this way.

3.2 Bundle installation

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

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 pdfatfi.pl that should be installed in such a way that it can be called as pdfatfi. Example (linux):

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

3.3 Package installation

Unpacking. The .dtx file is a self-extracting docstrip archive. The files are extracted by running the .dtx through plain TeX:

tex picture.dtx

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

<table>
<thead>
<tr>
<th>File</th>
<th>Directory</th>
</tr>
</thead>
<tbody>
<tr>
<td>picture.sty</td>
<td>tex/latex/oberdiek/picture.sty</td>
</tr>
<tr>
<td>picture.pdf</td>
<td>doc/latex/oberdiek/picture.pdf</td>
</tr>
<tr>
<td>picture-example.tex</td>
<td>doc/latex/oberdiek/picture-example.tex</td>
</tr>
<tr>
<td>picture.dtx</td>
<td>source/latex/oberdiek/picture.dtx</td>
</tr>
</tbody>
</table>

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

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\(^1\)http://ctan.org/pkg/picture
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

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

\begin{itemize}
\item \textbf{plain TeX:} Run docstrip and extract the files.
\item \textbf{\LaTeX:} Generate the documentation.
\end{itemize}

If you insist on using \LaTeX for docstrip (really, 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.

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{ltxtoc.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 caption and 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}
223 (<catalogue>)
224 <?xml version='1.0' encoding='us-ascii'?>
225 <!DOCTYPE entry SYSTEM 'catalogue.dtd'>
226 <entry datestamp='$Date$' modifier='$Author$' id='picture'>
227 <name>picture</name>
228 <caption>Dimens for picture macros.</caption>
229 <authorref id='auth:oberdiek'/>
230 <copyright owner='Heiko Oberdiek' year='2006-2009'/>
231 <license type='lppl1.3'/>
232 <version number='1.4'/>
233 <description>
234 There are macro and environment arguments that expect numbers
235 that will internally be multiplied by \texttt{\unitlength}.
236 This package extends the syntax of these arguments, so that
237 dimensions with calculation support may be used for these arguments.
238 <p/>
239 The package is part of the \texttt{xref:oberdiek} bundle.
240 </description>
241 <documentation details='Package documentation'
242 href='ctan:/macros/latex/contrib/oberdiek/picture.pdf'/>
243 <ctan file='true' path='/macros/latex/contrib/oberdiek/picture.dtx'/>
244 <miktex location='oberdiek'/>
\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.

[2016/05/16 v1.4]
- Documentation updates.

6 Index

Numbers written in italic refer to the page where the corresponding entry is described; 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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