The makebase \LaTeX \text{2}\varepsilon package\footnote{This document corresponds to makebase v. 0.2\alpha, dated 2016/05/10.}

Typeset counters in a different base

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Summary

This package typesets a \LaTeX \ counter such as page in an arbitrary base (default 16). It does not change font or typeface.

The package extends the functionality of the existing hex \LaTeX \text{2.09} package and provides documentation. However, the author is not a mathematician, and suggestions for rewriting the code are welcomed.

Warning: this is alpha software and may contain bugs. Please report problems to the author.
1 Description

This package was developed for an application which typeset smoke proofs of font characters from the Private Use areas of Unicode, where the codepoint is a very large number usually expressed in hexadecimal, and this was required for the page numbers.

The package contains two macros:

1. \Sil@MB@maxdiv finds the highest power of the selected base which is smaller than the value of the counter and makes it the primary divisor;

2. \makebase divides the counter repeatedly by the divisor found in \Sil@MB@maxdiv, reducing it by one power each time, and outputting the quotient as a digit.

This has only been tested in page numbering so far (see the accompanying file makebase-test.tex, for example:

\begin{verbatim}
\setcounter{page}{57635}
\makebase{page}
\end{verbatim}

will produce 0xE123 (the default base is 16). Using

\begin{verbatim}
\makebase[8]{page}
\end{verbatim}

produces 0160443.

Warning: this is alpha software and may contain bugs. Please report problems to the author.
2 Implementation

2.1 Packages required for the package itself

calc
Required for calculations involving lengths or counters, such as changes to widths for margin adjustment.

\RequirePackage{calc}

2.2 Counters

\Sil@MB@prenum
The value of the counter before calculations start.

\newcounter{Sil@MB@prenum}

\Sil@MB@postnum
The value of the counter after calculations.

\newcounter{Sil@MB@postnum}

\Sil@MB@quot
The quotient (number of times the computed divisor goes into the current value of the counter \Sil@MB@postnum.

\newcounter{Sil@MB@quot}

\Sil@MB@rem
The remainder after division.

\newcounter{Sil@MB@rem}

\Sil@MB@div
The divisor (initially the base).

\newcounter{Sil@MB@div}

2.3 Macros

Two macros are defined: one internal for calculating the largest divisor needed to start with, and one public, for implementing the conversion.

\Sil@MB@maxdiv
This is the internal (private) macro.

\newcommand{\Sil@MB@maxdiv}{[2][16]}{%
Record the counter value and the base (default 16)

\setcounter{Sil@MB@div}{#1}%
\setcounter{Sil@MB@prenum}{#2}%
\% \message{Testing \theSil@MB@prenum\space for divisibility by powers of \theSil@MB@div}%

It repeatedly divides the counter by the base using \TeX\'s \texttt{\divide} primitive and then re-multiplies it using \texttt{\multiply} to see if the result is zero yet, and if not, increases the base by a power and tries again.

\loop \% \message{...dividing \theSil@MB@prenum\space by \theSil@MB@div}%
\divide\c@Sil@MB@prenum by\c@Sil@MB@div
\multiply\c@Sil@MB@prenum by\c@Sil@MB@div
\multiply\c@Sil@MB@div by#1
\ifnum\c@Sil@MB@prenum>0
\repeat

Because the repeating condition above cannot include anything other than the \texttt{\repeat} command, it is necessary to compute the increase of the power \textit{before} the condition.

We therefore need to decrease it on exit to compensate, before decreasing it yet again to the previous successful level, which is the one we want to use in the actual computation as the initial divisor.

\divide\c@Sil@MB@div by#1
\divide\c@Sil@MB@div by#1
\% \message{Need to start at \theSil@MB@div.}%
\}

\texttt{\makebase} This is the user-level macro which performs the conversion. It too defaults to base 16.

\newcommand{\makebase}[2][16]{%
The first action is to call the internal macro \texttt{Sil@MB@maxdiv} to compute the initial divisor as above.
\Sil@MB@maxdiv[#1]{#2}%

The prefix \texttt{0x} is output if the base is 16; for base 8 the prefix is \texttt{0}. These should probably be developed for other bases with an option to use \TeX\'s
double-quote and single-quote prefixes.

25 \ifnum#1=16 0x\else\ifnum#1=8 0\fi\fi

Set the initial values for before-and-after calculation.

26 \setcounter{Sil@MB@prenum}{#2}\
27 \setcounter{Sil@MB@postnum}{#2}\
28 \message{Formatting \theSil@MB@prenum space in base#1 starting at \theSil@MB@div}\

Loop through the calculations. If the current divisor is bigger than the counter, output a zero and decrement the power.

30 \loop
31 \ifnum\c@Sil@MB@div>\c@Sil@MB@prenum
32 0\divide\c@Sil@MB@div by#1
33 \message{skipped a power, divisor now \theSil@MB@div}\
34 \fi

Perform the division and record the quotient, then re-multiply the value so the remainder can be computed.

35 \message{Dividing \theSil@MB@postnum space by \theSil@MB@div}\
36 \divide\c@Sil@MB@postnum by\c@Sil@MB@div\
37 \message{...got \theSil@MB@postnum}\
38 \setcounter{Sil@MB@quot}{\value{Sil@MB@postnum}}\
39 \message{Multiplying \theSil@MB@postnum space by \theSil@MB@div}\
40 \multiply\c@Sil@MB@postnum by\c@Sil@MB@div\
41 \message{...got \theSil@MB@postnum, setting remainder}\
42 \setcounter{Sil@MB@rem}{\value{Sil@MB@prenum}-\value{Sil@MB@postnum}}\
43 \message{...got \theSil@MB@rem}\

Output the quotient, allowing for alphabetic hexadecimal digits.

44 \par\dots divided \theSil@MB@prenum by \theSil@MB@div\
45 \theSil@MB@quot times (\theSil@MB@postnum) leaving \theSil@MB@rem:\
46 \ifcase\c@Sil@MB@quot 0\or 1\or 2\or 3\or 4\or 5\or 6\or 7\or 8\or 9\or A\or B\or C\or D\or E\or F\else !Z\fi

As in the internal macro, make the resetting of the next values for the next loop before testing the loop condition. If the remainder is zero, exit.

48 \setcounter{Sil@MB@prenum}{\value{Sil@MB@rem}}\
49 \setcounter{Sil@MB@postnum}{\value{Sil@MB@rem}}\
50 \divide\c@Sil@MB@div by#1
\ifnum\c@Sil@MB@rem>0
\repeat
}
A  Test of package

\documentclass{article}
\usepackage{makebase}
\setcounter{page}{"E123}
\renewcommand{\thepage}{\ttfamily\makebase[16]{\value{page}}}
\begin{document}
This is page number \arabic{page}.
\end{document}
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%%% Copyright 2005 M. Y. Name
%%
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%% of this license or (at your option) any later version.
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%% http://www.latex-project.org/lppl.txt
%% and version 1.3 or later is part of all distributions of \LaTeX
%% version 2005/12/01 or later.
%%
%% This work has the LPPL maintenance status ‘maintained’.
%%
%% The Current Maintainer of this work is M. Y. Name.
%%
%% This work consists of the files pig.dtx and pig.ins
%% and the derived file pig.sty.
```

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```
%% This work consists of all files listed in manifest.txt.
```

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Change History

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v0.2
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