The magicnum package

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Abstract

This packages allows to access magic numbers by a hierarchical name system.

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*Please report any issues at https://github.com/ho-tex/oberdiek/issues

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1 Documentation

1.1 Introduction

Especially since ε-TEX there are many integer values with special meanings, such as catcodes, group types, ...Package etex, enabled by options, defines macros in the user namespace for these values.

This package goes another approach for storing the names and values.

- If LuaTEX is available, they are stored in Lua tables.
- Without LuaTEX they are remembered using internal macros.

1.2 User interface

The integer values and names are organized in a hierarchical scheme of categories with the property names as leaves. Example: ε-TEX's `\currentgrouplevel` reports 2 for a group caused by `\hbox`. This package has choosen to organize the group types in a main category `etex` and its subcategory `grouptype`:

`etex.grouptype.hbox` = 2

The property name `hbox` in category `etex.grouptype` has value 2. Dots are used to separate components.

If you want to have the value, the access key is constructed by the category with all its components and the property name. For the opposite the value is used instead of the property name.

Values are always integers (including negative numbers).

1.2.1 \magicnum

`\magicnum {`⟨*access key*⟩`}`

Macro `\magicnum` expects an access key as argument and expands to the requested data. The macro is always expandable. In case of errors the expansion result is empty.

The same macro is also used for getting a property name. In this case the property name part in the access key is replaced by the value.

The catcodes of the resulting numbers and strings follow TEX's tradition of `\string`, `\meaning`, ...: The space has catcode 10 (`tex.catcode.space`) and the other characters have catcode 12 (`tex.catcode.other`).

Examples:

`\magicnum{etex.grouptype.hbox}` ⇒ 2
`\magicnum{tex.catcode.14}` ⇒ comment
`\magicnum{tex.catcode.undefined}` ⇒ ∅

1.2.2 Properties

- The components of a category are either subcategories or key value pairs, but not both.
- The full specified property names are unique and thus has one integer value exactly.
- Also the values inside a category are unique. This condition is a prerequisite for the reverse mapping of `\magicnum`.
- All names start with a letter. Only letters or digits may follow.

1.3 Data

1.3.1 Category tex.catcode

tex.catcode.escape	0
tex.catcode.begingroup	1
tex.catcode.endgroup	2
tex.catcode.math	3
tex.catcode.align	4
tex.catcode.eol	5
tex.catcode.parameter	6
tex.catcode.superscript	7
tex.catcode.subscript	8
tex.catcode.ignore	9
tex.catcode.space	10
tex.catcode.letter	11
tex.catcode.other	12
tex.catcode.active	13
tex.catcode.comment	14
tex.catcode.invalid	15

1.3.2 Category etex.grouptype

etex.grouptype.bottomlevel	0
etex.grouptype.simple	1
etex.grouptype.hbox	2
etex.grouptype.adjustedhbox	3
etex.grouptype.vbox	4
etex.grouptype.align	5
etex.grouptype.noalign	6
etex.grouptype.output	8
etex.grouptype.math	9
etex.grouptype.disc	10
etex.grouptype.insert	11
etex.grouptype.vcenter	12
etex.grouptype.mathchoice	13
etex.grouptype.semisimple	14
etex.grouptype.mathshift	15
etex.grouptype.mathleft	16

1.3.3 Category etex.iftype

etex.iftype.none	0
etex.iftype.char	1
etex.iftype.cat	2
etex.iftype.num	3
etex.iftype.dim	4
etex.iftype.odd	5
etex.iftype.vmode	6
etex.iftype.hmode	7
etex.iftype.mmode	8
etex.iftype.inner	9
etex.iftype.void	10
etex.iftype.hbox	11
etex.iftype.vbox	12
etex.iftype.x	13
etex.iftype.eof	14
etex.iftype.true	15
etex.iftype.false	16
etex.iftype.case	17
etex.iftype.defined	18
etex.iftype.csname	19
etex.iftype.fontchar	20

1.3.4 Category etex.nodetype

etex.nodetype.none	-1
etex.nodetype.char	0
etex.nodetype.hlist	1
etex.nodetype.vlist	2
etex.nodetype.rule	3
etex.nodetype.ins	4
etex.nodetype.mark	5
etex.nodetype.adjust	6
etex.nodetype.ligature	7
etex.nodetype.disc	8
etex.nodetype.whatsit	9
etex.nodetype.math	10
etex.nodetype.glue	11
etex.nodetype.kern	12
etex.nodetype.penalty	13
etex.nodetype.unset	14
etex.nodetype.maths	15

1.3.5 Category etex.interactionmode

etex.interactionmode.batch	0
etex.interactionmode.nonstop	1
etex.interactionmode.scroll	2
etex.interactionmode.errorstop	3

1.3.6 Category luatex.pdfliteral.mode

luatex.pdfliteral.mode.setorigin	0
luatex.pdfliteral.mode.page	1
luatex.pdfliteral.mode.direct	2

2 Implementation

```
⟨*package⟩
```

2.1 Reload check and package identification

Reload check, especially if the package is not used with LaTeX.

```
\begingroup\catcode61\catcode48\catcode32=10\relax%
  \catcode13=5 % ^^M
  \endlinechar=13 %
  \catcode35=6 % #
  \catcode39=12 % '
  \catcode44=12 % ,
  \catcode45=12 % -
  \catcode46=12 % .
  \catcode58=12 % :
  \catcode64=11 % @
  \catcode123=1 % {
  \catcode125=2 % }
  \expandafter\let\expandafter\x\csname ver@magicnum.sty\endcsname
  \ifx\x\relax % plain-TeX, first loading
  \else
    \def\empty{}%
    \ifx\x\empty % LaTeX, first loading,
      % variable is initialized, but \ProvidesPackage not yet seen
    \else
      \expandafter\ifx\csname PackageInfo\endcsname\relax
        \def\x#1#2{%
          \immediate\write-1{Package #1 Info: #2.}%
        }%
      \else
        \def\x#1#2{\PackageInfo{#1}{#2, stopped}}%
      \fi
      \x{magicnum}{The package is already loaded}%
      \aftergroup\endinput
    \fi
  \fi
\endgroup%
```

Package identification:

```
\begingroup\catcode61\catcode48\catcode32=10\relax%
  \catcode13=5 % ^^M
  \endlinechar=13 %
  \catcode35=6 % #
  \catcode39=12 % '
  \catcode40=12 % (
  \catcode41=12 % )
  \catcode44=12 % ,
  \catcode45=12 % -
  \catcode46=12 % .
  \catcode47=12 % /
  \catcode58=12 % :
  \catcode64=11 % @
  \catcode91=12 % [
  \catcode93=12 % ]
  \catcode123=1 % {
  \catcode125=2 % }
  \expandafter\ifx\csname ProvidesPackage\endcsname\relax
    \def\x#1#2#3[#4]{\endgroup
      \immediate\write-1{Package: #3 #4}%
      \xdef#1{#4}%
    }%
  \else
    \def\x#1#2[#3]{\endgroup
      #2[{#3}]%
```

```
    \ifx#1\@undefined
      \xdef#1{#3}%
    \fi
    \ifx#1\relax
      \xdef#1{#3}%
    \fi
  }%
 \fi
\expandafter\x\csname ver@magicnum.sty\endcsname
\ProvidesPackage{magicnum}%
  [2016/05/16 v1.5 Magic numbers (HO)]%
```

2.2 Catcodes

```
\begingroup\catcode61\catcode48\catcode32=10\relax%
 \catcode13=5 % ^^M
 \endlinechar=13 %
 \catcode123=1 % {
 \catcode125=2 % }
 \catcode64=11 % @
 \def\x{\endgroup
   \expandafter\edef\csname magicnum@AtEnd\endcsname{%
     \endlinechar=\the\endlinechar\relax
     \catcode13=\the\catcode13\relax
     \catcode32=\the\catcode32\relax
     \catcode35=\the\catcode35\relax
     \catcode61=\the\catcode61\relax
     \catcode64=\the\catcode64\relax
     \catcode123=\the\catcode123\relax
     \catcode125=\the\catcode125\relax
   }%
 }%
\x\catcode61\catcode48\catcode32=10\relax%
\catcode13=5 % ^^M
\endlinechar=13 %
\catcode35=6 % #
\catcode64=11 % @
\catcode123=1 % {
\catcode125=2 % }
\def\TMP@EnsureCode#1#2{%
 \edef\magicnum@AtEnd{%
   \magicnum@AtEnd
   \catcode#1=\the\catcode#1\relax
 }%
 \catcode#1=#2\relax
}
\TMP@EnsureCode{34}{12}% "
\TMP@EnsureCode{39}{12}% '
\TMP@EnsureCode{40}{12}% (
\TMP@EnsureCode{41}{12}% )
\TMP@EnsureCode{42}{12}% *
\TMP@EnsureCode{44}{12}% ,
\TMP@EnsureCode{45}{12}% -
\TMP@EnsureCode{46}{12}% .
\TMP@EnsureCode{47}{12}% /
\TMP@EnsureCode{58}{12}% :
\TMP@EnsureCode{60}{12}% <
\TMP@EnsureCode{62}{12}% >
\TMP@EnsureCode{91}{12}% [
\TMP@EnsureCode{93}{12}% ]
\edef\magicnum@AtEnd{\magicnum@AtEnd\noexpand\endinput}
```

2.3 Check for previous definition

```
\begingroup\expandafter\expandafter\expandafter\endgroup
\expandafter\ifx\csname newcommand\endcsname\relax
  \expandafter\ifx\csname magicnum\endcsname\relax
  \else
    \input infwarerr.sty\relax
    \@PackageError{magicnum}{%
      \string\magicnum\space is already defined%
    }\@ehc
  \fi
\else
  \newcommand*{\magicnum}{}%
\fi
```

2.4 Without LuaTEX

```
\begingroup\expandafter\expandafter\expandafter\endgroup
\expandafter\ifx\csname directlua\endcsname\relax
```

\magicnum

```
  \begingroup\expandafter\expandafter\expandafter\endgroup
  \expandafter\ifx\csname ifcsname\endcsname\relax
    \def\magicnum#1{%
      \expandafter\ifx\csname MG@#1\endcsname\relax
      \else
        \csname MG@#1\endcsname
      \fi
    }%
  \else
    \begingroup
      \edef\x{\endgroup
        \def\noexpand\magicnum##1{%
          \expandafter\noexpand\csname
          ifcsname\endcsname MG@##1\noexpand\endcsname
            \noexpand\csname MG@##1%
                \noexpand\expandafter\noexpand\endcsname
          \expandafter\noexpand\csname fi\endcsname
        }%
      }%
    \x
  \fi

\else
```

2.5 With LuaTEX

```
  \begingroup\expandafter\expandafter\expandafter\endgroup
  \expandafter\ifx\csname RequirePackage\endcsname\relax
    \input ifluatex.sty\relax
    \input infwarerr.sty\relax
  \else
    \RequirePackage{ifluatex}[2010/03/01]%
    \RequirePackage{infwarerr}[2010/04/08]%
  \fi
```

\magicnum@directlua

```
  \ifnum\luatexversion<36 %
    \def\magicnum@directlua{\directlua0 }%
  \else
    \let\magicnum@directlua\directlua
  \fi

  \magicnum@directlua{%
    require("oberdiek.magicnum")%
```

```
  }%
  \begingroup
    \def\x{2016/05/16 v1.5}%
    \def\StripPrefix#1>{}%
    \edef\x{\expandafter\StripPrefix\meaning\x}%
    \edef\y{%
      \magicnum@directlua{%
        if oberdiek.magicnum.getversion then %
          oberdiek.magicnum.getversion()%
        end%
      }%
    }%
    \ifx\x\y
    \else
      \@PackageError{magicnum}{%
        Wrong version of lua module.\MessageBreak
        Package version: \x\MessageBreak
        Lua module: \y
      }\@ehc
    \fi
  \endgroup
```

\luaescapestring

```
  \begingroup
    \expandafter\ifx\csname luaescapestring\endcsname\relax
      \directlua{%
        if tex.enableprimitives then %
          tex.enableprimitives('magicnum@', {'luaescapestring'})%
        end%
      }%
      \global\let\luaescapestring\magicnum@luaescapestring
    \fi
    \expandafter\ifx\csname luaescapestring\endcsname\relax
      \escapechar=92 %
      \@PackageError{magicnum}{%
        Missing \string\luaescapestring
      }\@ehc
    \fi
  \endgroup
```

\magicnum

```
  \def\magicnum#1{%
    \magicnum@directlua{%
      oberdiek.magicnum.get("\luaescapestring{#1}")%
    }%
  }%

  \expandafter\magicnum@AtEnd
\fi%
⟨/package⟩
```

2.6 Data

2.6.1 Plain data

```
⟨*data⟩
tex.catcode
  escape = 0
  begingroup = 1
  endgroup = 2
  math = 3
  align = 4
  eol = 5
```

```
  parameter = 6
  superscript = 7
  subscript = 8
  ignore = 9
  space = 10
  letter = 11
  other = 12
  active = 13
  comment = 14
  invalid = 15
etex.grouptype
  bottomlevel = 0
  simple = 1
  hbox = 2
  adjustedhbox = 3
  vbox = 4
  align = 5
  noalign = 6
  output = 8
  math = 9
  disc = 10
  insert = 11
  vcenter = 12
  mathchoice = 13
  semisimple = 14
  mathshift = 15
  mathleft = 16
etex.iftype
  none = 0
  char = 1
  cat = 2
  num = 3
  dim = 4
  odd = 5
  vmode = 6
  hmode = 7
  mmode = 8
  inner = 9
  void = 10
  hbox = 11
  vbox = 12
  x = 13
  eof = 14
  true = 15
  false = 16
  case = 17
  defined = 18
  csname = 19
  fontchar = 20
etex.nodetype
  none = -1
  char = 0
  hlist = 1
  vlist = 2
  rule = 3
  ins = 4
  mark = 5
  adjust = 6
  ligature = 7
  disc = 8
  whatsit = 9
  math = 10
```

```
  glue = 11
  kern = 12
  penalty = 13
  unset = 14
  maths = 15
etex.interactionmode
  batch = 0
  nonstop = 1
  scroll = 2
  errorstop = 3
luatex.pdfliteral.mode
  setorigin = 0
  page = 1
  direct = 2
⟨/data⟩
```

2.6.2 Data for TEX

```
⟨*package⟩
```

\magicnum@add

```
\begingroup\expandafter\expandafter\expandafter\endgroup
\expandafter\ifx\csname detokenize\endcsname\relax
  \def\magicnum@add#1#2#3{%
    \expandafter\magicnum@@add
       \csname MG@#1.#2\expandafter\endcsname
       \csname MG@#1.#3\endcsname
      {#3}{#2}%
  }%
  \def\magicnum@@add#1#2#3#4{%
    \def#1{#3}%
    \def#2{#4}%
    \edef#1{%
      \expandafter\strip@prefix\meaning#1%
    }%
    \edef#2{%
      \expandafter\strip@prefix\meaning#2%
    }%
  }%
  \expandafter\ifx\csname strip@prefix\endcsname\relax
    \def\strip@prefix#1->{}%
  \fi
\else
  \def\magicnum@add#1#2#3{%
    \expandafter\edef\csname MG@#1.#2\endcsname{%
      \detokenize{#3}%
    }%
    \expandafter\edef\csname MG@#1.#3\endcsname{%
      \detokenize{#2}%
    }%
  }%
\fi

\magicnum@add{tex.catcode}{escape}{0}
\magicnum@add{tex.catcode}{begingroup}{1}
\magicnum@add{tex.catcode}{endgroup}{2}
\magicnum@add{tex.catcode}{math}{3}
\magicnum@add{tex.catcode}{align}{4}
\magicnum@add{tex.catcode}{eol}{5}
\magicnum@add{tex.catcode}{parameter}{6}
\magicnum@add{tex.catcode}{superscript}{7}
\magicnum@add{tex.catcode}{subscript}{8}
\magicnum@add{tex.catcode}{ignore}{9}
\magicnum@add{tex.catcode}{space}{10}
```

```
\magicnum@add{tex.catcode}{letter}{11}
\magicnum@add{tex.catcode}{other}{12}
\magicnum@add{tex.catcode}{active}{13}
\magicnum@add{tex.catcode}{comment}{14}
\magicnum@add{tex.catcode}{invalid}{15}
\magicnum@add{etex.grouptype}{bottomlevel}{0}
\magicnum@add{etex.grouptype}{simple}{1}
\magicnum@add{etex.grouptype}{hbox}{2}
\magicnum@add{etex.grouptype}{adjustedhbox}{3}
\magicnum@add{etex.grouptype}{vbox}{4}
\magicnum@add{etex.grouptype}{align}{5}
\magicnum@add{etex.grouptype}{noalign}{6}
\magicnum@add{etex.grouptype}{output}{8}
\magicnum@add{etex.grouptype}{math}{9}
\magicnum@add{etex.grouptype}{disc}{10}
\magicnum@add{etex.grouptype}{insert}{11}
\magicnum@add{etex.grouptype}{vcenter}{12}
\magicnum@add{etex.grouptype}{mathchoice}{13}
\magicnum@add{etex.grouptype}{semisimple}{14}
\magicnum@add{etex.grouptype}{mathshift}{15}
\magicnum@add{etex.grouptype}{mathleft}{16}
\magicnum@add{etex.iftype}{none}{0}
\magicnum@add{etex.iftype}{char}{1}
\magicnum@add{etex.iftype}{cat}{2}
\magicnum@add{etex.iftype}{num}{3}
\magicnum@add{etex.iftype}{dim}{4}
\magicnum@add{etex.iftype}{odd}{5}
\magicnum@add{etex.iftype}{vmode}{6}
\magicnum@add{etex.iftype}{hmode}{7}
\magicnum@add{etex.iftype}{mmode}{8}
\magicnum@add{etex.iftype}{inner}{9}
\magicnum@add{etex.iftype}{void}{10}
\magicnum@add{etex.iftype}{hbox}{11}
\magicnum@add{etex.iftype}{vbox}{12}
\magicnum@add{etex.iftype}{x}{13}
\magicnum@add{etex.iftype}{eof}{14}
\magicnum@add{etex.iftype}{true}{15}
\magicnum@add{etex.iftype}{false}{16}
\magicnum@add{etex.iftype}{case}{17}
\magicnum@add{etex.iftype}{defined}{18}
\magicnum@add{etex.iftype}{csname}{19}
\magicnum@add{etex.iftype}{fontchar}{20}
\magicnum@add{etex.nodetype}{none}{-1}
\magicnum@add{etex.nodetype}{char}{0}
\magicnum@add{etex.nodetype}{hlist}{1}
\magicnum@add{etex.nodetype}{vlist}{2}
\magicnum@add{etex.nodetype}{rule}{3}
\magicnum@add{etex.nodetype}{ins}{4}
\magicnum@add{etex.nodetype}{mark}{5}
\magicnum@add{etex.nodetype}{adjust}{6}
\magicnum@add{etex.nodetype}{ligature}{7}
\magicnum@add{etex.nodetype}{disc}{8}
\magicnum@add{etex.nodetype}{whatsit}{9}
\magicnum@add{etex.nodetype}{math}{10}
\magicnum@add{etex.nodetype}{glue}{11}
\magicnum@add{etex.nodetype}{kern}{12}
\magicnum@add{etex.nodetype}{penalty}{13}
\magicnum@add{etex.nodetype}{unset}{14}
\magicnum@add{etex.nodetype}{maths}{15}
\magicnum@add{etex.interactionmode}{batch}{0}
\magicnum@add{etex.interactionmode}{nonstop}{1}
\magicnum@add{etex.interactionmode}{scroll}{2}
```

```
\magicnum@add{etex.interactionmode}{errorstop}{3}
\magicnum@add{luatex.pdfliteral.mode}{setorigin}{0}
\magicnum@add{luatex.pdfliteral.mode}{page}{1}
\magicnum@add{luatex.pdfliteral.mode}{direct}{2}

\magicnum@AtEnd%
⟨/package⟩
```

2.6.3 Lua module

```
⟨*lua⟩

module("oberdiek.magicnum", package.seeall)

function getversion()
  tex.write("2016/05/16 v1.5")
end

local data = {
  ["tex.catcode"] = {
    [0] = "escape",
    [1] = "begingroup",
    [2] = "endgroup",
    [3] = "math",
    [4] = "align",
    [5] = "eol",
    [6] = "parameter",
    [7] = "superscript",
    [8] = "subscript",
    [9] = "ignore",
    [10] = "space",
    [11] = "letter",
    [12] = "other",
    [13] = "active",
    [14] = "comment",
    [15] = "invalid",
    ["active"] = 13,
    ["align"] = 4,
    ["begingroup"] = 1,
    ["comment"] = 14,
    ["endgroup"] = 2,
    ["eol"] = 5,
    ["escape"] = 0,
    ["ignore"] = 9,
    ["invalid"] = 15,
    ["letter"] = 11,
    ["math"] = 3,
    ["other"] = 12,
    ["parameter"] = 6,
    ["space"] = 10,
    ["subscript"] = 8,
    ["superscript"] = 7
  },
  ["etex.grouptype"] = {
    [0] = "bottomlevel",
    [1] = "simple",
    [2] = "hbox",
    [3] = "adjustedhbox",
    [4] = "vbox",
    [5] = "align",
    [6] = "noalign",
    [8] = "output",
    [9] = "math",
    [10] = "disc",
    [11] = "insert",
```

```
    [12] = "vcenter",
    [13] = "mathchoice",
    [14] = "semisimple",
    [15] = "mathshift",
    [16] = "mathleft",
    ["adjustedhbox"] = 3,
    ["align"] = 5,
    ["bottomlevel"] = 0,
    ["disc"] = 10,
    ["hbox"] = 2,
    ["insert"] = 11,
    ["math"] = 9,
    ["mathchoice"] = 13,
    ["mathleft"] = 16,
    ["mathshift"] = 15,
    ["noalign"] = 6,
    ["output"] = 8,
    ["semisimple"] = 14,
    ["simple"] = 1,
    ["vbox"] = 4,
    ["vcenter"] = 12
  },
  ["etex.iftype"] = {
    [0] = "none",
    [1] = "char",
    [2] = "cat",
    [3] = "num",
    [4] = "dim",
    [5] = "odd",
    [6] = "vmode",
    [7] = "hmode",
    [8] = "mmode",
    [9] = "inner",
    [10] = "void",
    [11] = "hbox",
    [12] = "vbox",
    [13] = "x",
    [14] = "eof",
    [15] = "true",
    [16] = "false",
    [17] = "case",
    [18] = "defined",
    [19] = "csname",
    [20] = "fontchar",
    ["case"] = 17,
    ["cat"] = 2,
    ["char"] = 1,
    ["csname"] = 19,
    ["defined"] = 18,
    ["dim"] = 4,
    ["eof"] = 14,
    ["false"] = 16,
    ["fontchar"] = 20,
    ["hbox"] = 11,
    ["hmode"] = 7,
    ["inner"] = 9,
    ["mmode"] = 8,
    ["none"] = 0,
    ["num"] = 3,
    ["odd"] = 5,
    ["true"] = 15,
    ["vbox"] = 12,
```

```
    ["vmode"] = 6,
    ["void"] = 10,
    ["x"] = 13
  },
  ["etex.nodetype"] = {
    [-1] = "none",
    [0] = "char",
    [1] = "hlist",
    [2] = "vlist",
    [3] = "rule",
    [4] = "ins",
    [5] = "mark",
    [6] = "adjust",
    [7] = "ligature",
    [8] = "disc",
    [9] = "whatsit",
    [10] = "math",
    [11] = "glue",
    [12] = "kern",
    [13] = "penalty",
    [14] = "unset",
    [15] = "maths",
    ["adjust"] = 6,
    ["char"] = 0,
    ["disc"] = 8,
    ["glue"] = 11,
    ["hlist"] = 1,
    ["ins"] = 4,
    ["kern"] = 12,
    ["ligature"] = 7,
    ["mark"] = 5,
    ["math"] = 10,
    ["maths"] = 15,
    ["none"] = -1,
    ["penalty"] = 13,
    ["rule"] = 3,
    ["unset"] = 14,
    ["vlist"] = 2,
    ["whatsit"] = 9
  },
  ["etex.interactionmode"] = {
    [0] = "batch",
    [1] = "nonstop",
    [2] = "scroll",
    [3] = "errorstop",
    ["batch"] = 0,
    ["errorstop"] = 3,
    ["nonstop"] = 1,
    ["scroll"] = 2
  },
  ["luatex.pdfliteral.mode"] = {
    [0] = "setorigin",
    [1] = "page",
    [2] = "direct",
    ["direct"] = 2,
    ["page"] = 1,
    ["setorigin"] = 0
  }
}
function get(name)
  local startpos, endpos, category, entry =
      string.find(name, "^(%a[%a%d%.]*)%.(-?[%a%d]+)$")
```

```
  if not entry then
    return
  end
  local node = data[category]
  if not node then
    return
  end
  local num = tonumber(entry)
  local value
  if num then
    value = node[num]
    if not value then
      return
    end
  else
    value = node[entry]
    if not value then
      return
    end
    value = "" .. value
  end
  tex.write(value)
end
```

⟨/lua⟩

3 Test

3.1 Catcode checks for loading

⟨*test1⟩

```
\catcode`\{=1 %
\catcode`\}=2 %
\catcode`\#=6 %
\catcode`\@=11 %
\expandafter\ifx\csname count@\endcsname\relax
  \countdef\count@=255 %
\fi
\expandafter\ifx\csname @gobble\endcsname\relax
  \long\def\@gobble#1{}%
\fi
\expandafter\ifx\csname @firstofone\endcsname\relax
  \long\def\@firstofone#1{#1}%
\fi
\expandafter\ifx\csname loop\endcsname\relax
  \expandafter\@firstofone
\else
  \expandafter\@gobble
\fi
{%
  \def\loop#1\repeat{%
    \def\body{#1}%
    \iterate
  }%
  \def\iterate{%
    \body
      \let\next\iterate
    \else
      \let\next\relax
    \fi
    \next
  }%
  \let\repeat=\fi
```

```
}%
\def\RestoreCatcodes{}
\count@=0 %
\loop
  \edef\RestoreCatcodes{%
    \RestoreCatcodes
    \catcode\the\count@=\the\catcode\count@\relax
  }%
\ifnum\count@<255 %
  \advance\count@ 1 %
\repeat

\def\RangeCatcodeInvalid#1#2{%
  \count@=#1\relax
  \loop
    \catcode\count@=15 %
  \ifnum\count@<#2\relax
    \advance\count@ 1 %
  \repeat
}
\def\RangeCatcodeCheck#1#2#3{%
  \count@=#1\relax
  \loop
    \ifnum#3=\catcode\count@
    \else
      \errmessage{%
        Character \the\count@\space
        with wrong catcode \the\catcode\count@\space
        instead of \number#3%
      }%
    \fi
  \ifnum\count@<#2\relax
    \advance\count@ 1 %
  \repeat
}
\def\space{ }
\expandafter\ifx\csname LoadCommand\endcsname\relax
  \def\LoadCommand{\input magicnum.sty\relax}%
\fi
\def\Test{%
  \RangeCatcodeInvalid{0}{47}%
  \RangeCatcodeInvalid{58}{64}%
  \RangeCatcodeInvalid{91}{96}%
  \RangeCatcodeInvalid{123}{255}%
  \catcode`\@=12 %
  \catcode`\\=0 %
  \catcode`\%=14 %
  \LoadCommand
  \RangeCatcodeCheck{0}{36}{15}%
  \RangeCatcodeCheck{37}{37}{14}%
  \RangeCatcodeCheck{38}{47}{15}%
  \RangeCatcodeCheck{48}{57}{12}%
  \RangeCatcodeCheck{58}{63}{15}%
  \RangeCatcodeCheck{64}{64}{12}%
  \RangeCatcodeCheck{65}{90}{11}%
  \RangeCatcodeCheck{91}{91}{15}%
  \RangeCatcodeCheck{92}{92}{0}%
  \RangeCatcodeCheck{93}{96}{15}%
  \RangeCatcodeCheck{97}{122}{11}%
  \RangeCatcodeCheck{123}{255}{15}%
  \RestoreCatcodes
}
```

```
\Test
\csname @@end\endcsname
\end
```
⟨/test1⟩

3.2 Test data

⟨*testplain⟩
```
\input magicnum.sty\relax
\def\Test#1#2{%
  \edef\result{\magicnum{#1}}%
  \edef\expect{#2}%
  \edef\expect{\expandafter\stripprefix\meaning\expect}%
  \ifx\result\expect
  \else
    \errmessage{%
      Failed: [#1] % hash-ok
      returns [\result] instead of [\expect]%
    }%
  \fi
}
\def\stripprefix#1->{}
```
⟨/testplain⟩

⟨*testlatex⟩
```
\NeedsTeXFormat{LaTeX2e}
\documentclass{minimal}
\usepackage{magicnum}[2016/05/16]
\usepackage{qstest}
\IncludeTests{*}
\LogTests{log}{*}{*}
\newcommand*{\Test}[2]{%
  \Expect*{\magicnum{#1}}{#2}%
}
\begin{qstest}{magicnum}{magicnum}
```
⟨/testlatex⟩

⟨*testdata⟩
```
\Test{tex.catcode.escape}{0}
\Test{tex.catcode.invalid}{15}
\Test{tex.catcode.unknown}{}
\Test{tex.catcode.0}{escape}
\Test{tex.catcode.15}{invalid}
\Test{etex.iftype.true}{15}
\Test{etex.iftype.false}{16}
\Test{etex.iftype.15}{true}
\Test{etex.iftype.16}{false}
\Test{etex.nodetype.none}{-1}
\Test{etex.nodetype.-1}{none}
\Test{luatex.pdfliteral.mode.direct}{2}
\Test{luatex.pdfliteral.mode.1}{page}
\Test{}{}
\Test{unknown}{}
\Test{unknown.foo.bar}{}
\Test{unknown.foo.4}{}
```
⟨/testdata⟩

⟨*testplain⟩
```
\csname @@end\endcsname
\end
```
⟨/testplain⟩
⟨*testlatex⟩
```
\end{qstest}
\csname @@end\endcsname
```
⟨/testlatex⟩

3.3 Small test for iniTEX

```
762 ⟨*test4⟩
763 \catcode`\{=1
764 \catcode`\}=2
765 \catcode`\#=6
766 \input magicnum.sty\relax
767 \edef\x{\magicnum{tex.catcode.15}}
768 \edef\y{invalid}
769 \def\Strip#1>{}
770 \edef\y{\expandafter\Strip\meaning\y}
771 \ifx\x\y
772   \immediate\write16{Ok}%
773 \else
774   \errmessage{\x<>\y}%
775 \fi
776 \csname @@end\endcsname\end
777 ⟨/test4⟩
```

4 Installation

4.1 Download

Package. This package is available on CTAN[1]:

CTAN:macros/latex/contrib/oberdiek/magicnum.dtx The source file.

CTAN:macros/latex/contrib/oberdiek/magicnum.pdf Documentation.

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.

4.2 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/
```

4.3 Package installation

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

```
tex magicnum.dtx
```

[1] http://ctan.org/pkg/magicnum

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

magicnum.sty	→ tex/generic/oberdiek/magicnum.sty
magicnum.lua	→ scripts/oberdiek/magicnum.lua
oberdiek.magicnum.lua	→ scripts/oberdiek/oberdiek.magicnum.lua
magicnum.pdf	→ doc/latex/oberdiek/magicnum.pdf
magicnum.txt	→ doc/latex/oberdiek/magicnum.txt
test/magicnum-test1.tex	→ doc/latex/oberdiek/test/magicnum-test1.tex
test/magicnum-test2.tex	→ doc/latex/oberdiek/test/magicnum-test2.tex
test/magicnum-test3.tex	→ doc/latex/oberdiek/test/magicnum-test3.tex
test/magicnum-test4.tex	→ doc/latex/oberdiek/test/magicnum-test4.tex
magicnum.dtx	→ source/latex/oberdiek/magicnum.dtx

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.

4.4 Refresh file name databases

If your TEX distribution (teTEX, mikTEX, ...) relies on file name databases, you must refresh these. For example, teTEX users run texhash or mktexlsr.

4.5 Some details for the interested

Unpacking with LATEX. The .dtx chooses its action depending on the format:

plain TEX: Run docstrip and extract the files.

LATEX: Generate the documentation.

If you insist on using LATEX for docstrip (really, docstrip does not need LATEX), then inform the autodetect routine about your intention:

```
latex \let\install=y\input{magicnum.dtx}
```

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

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

```
\PassOptionsToClass{a4paper}{article}
```

An example follows how to generate the documentation with pdfLATEX:

```
pdflatex magicnum.dtx
makeindex -s gind.ist magicnum.idx
pdflatex magicnum.dtx
makeindex -s gind.ist magicnum.idx
pdflatex magicnum.dtx
```

5 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 magicnum.xml.

```
⟨*catalogue⟩
<?xml version='1.0' encoding='us-ascii'?>
<!DOCTYPE entry SYSTEM 'catalogue.dtd'>
```

```
<entry datestamp='$Date$' modifier='$Author$' id='magicnum'>
  <name>magicnum</name>
  <caption>Access TeX systems' "magic numbers".</caption>
  <authorref id='auth:oberdiek'/>
  <copyright owner='Heiko Oberdiek' year='2007,2009-2011'/>
  <license type='lppl1.3'/>
  <version number='1.5'/>
  <description>
    This package allows access to the various parameter values in
    TeX (catcode values), e-TeX (group, if and node types, and
    interaction mode), and LuaTeX (pdfliteral mode) by a hierarchical
    name system.
    <p/>
    The package is part of the <xref refid='oberdiek'>oberdiek</xref> bundle.
  </description>
  <documentation details='Package documentation'
      href='ctan:/macros/latex/contrib/oberdiek/magicnum.pdf'/>
  <ctan file='true' path='/macros/latex/contrib/oberdiek/magicnum.dtx'/>
  <miktex location='oberdiek'/>
  <texlive location='oberdiek'/>
  <install path='/macros/latex/contrib/oberdiek/oberdiek.tds.zip'/>
</entry>
⟨/catalogue⟩
```

6 History

[2007/12/12 v1.0]

- First public version.

[2009/04/10 v1.1]

- Adaptation to LuaTeX 0.40.

[2010/03/09 v1.2]

- Adaptation to package luatex 0.4.

[2011/03/24 v1.3]

- Catcode fixes.

[2011/04/10 v1.4]

- Compatibility for iniTeX.
- Dependency from package luatex removed.
- Version check for lua module.

[2016/05/16 v1.5]

- Documentation updates.

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