

The luatexbase-cctb package

Manuel Pégourié-Gonnard & Élie Roux

Support: lualatex-dev@tug.org

v0.3 2010-05-27

Abstract

In addition to the registers existing in \TeX and $\varepsilon\text{-}\TeX$, Lua \TeX introduces a new concept: catcode tables. This package takes care of catcode table allocation just like Plain \TeX and LaTeX do for other registers.

Contents

1	Documentation	1
2	Implementation	2
2.1	\TeX package	2
2.1.1	Preliminaries	2
2.1.2	Load supporting Lua module	4
2.1.3	Primitives needed	4
2.1.4	User macros	4
2.1.5	Predefined tables	5
2.2	Lua module	6
3	Test files	7

1 Documentation

The main macro defined here is `\newluatexcatcodetable`. It behaves the same as `\newbox`. Additionally, the newly allocated catcode table is initialised to the catcodes of `IniTeX`. In order to help you define the catcode tables (once they are allocated), two helper macros are available.

```
\setcatcoderange{<from>}{<to>}{<value>}
```

Set all characters code in the range `<from>`–`<to>` to the given catcode `<value>`.

```
\setluatexcatcodetable{<table>}{<catcode statements>}
```

Set a previously allocated `<table>` to the catcodes given by executing `<catcode statements>`. Note that `<table>` must not be the current active catcode table. You may, however, load another catcode table in your `<catcode statements>`.

For your convenience, a few catcode tables are predefined:

- `\CatcodeTableIniTeX`: Ini \TeX catcodes.
- `\CatcodeTableString`: the catcode regime used by `\string` and `\meaning`: everything has catcode 12, except space (U+0020) that has catcode 10.
- `\CatcodeTableOther`: everything (included space) has catcode 12.
- `\CatcodeTableLaTeX`: basic L \TeX 2 ϵ catcodes.
- `\CatcodeTableLaTeXAtLetter`: same as above, but `@` is a letter.
- `\CatcodeTableExpl`: catcodes used by L \TeX 3 with `\ExplSyntaxOn`. Be aware that this does not provide the exact same environment as `\ExplSyntaxOn`: most noticeably, some booleans are not set, and `\endlinechar` is not adjusted (it should be 32).

Various Lua function accept a catcode table number as argument. In order to use them, the package writer needs to know the number of an allocated catcode table. Since `\chardef` is used for the definition of the control sequence, this is rather easy to do. However, for extra ease of use, the numbers are also directly accessible from Lua as the value of the table `luatexbase.catcodetables`, whose keys is the name of the control sequence (without any leading backslash). Moreover, nickames are available for the predefined catcode tables:

- `CatcodeTableIniTeX = ini`,
- `CatcodeTableString = string`,
- `CatcodeTableOther = other`,
- `CatcodeTableLaTeX = latex`,
- `CatcodeTableLaTeXAtLetter = latex-atletter = latex-package`,
- `CatcodeTableExpl = expl = expl3`,

2 Implementation

2.1 \TeX package

```
1 (*texpackage)
```

2.1.1 Preliminaries

Reload protection, especially for Plain \TeX .

```
2           \csname lltxb@cctb@loaded\endcsname
3 \expandafter\let\csname lltxb@cctb@loaded\endcsname\endinput

   Catcode defenses.

4 \begingroup
5   \catcode123 1 % {
6   \catcode125 2 % }
7   \catcode 35 6 % #
8   \toks0{}%
9   \def\x{}%
10  \def\y#1 #2 {%
11    \toks0\expandafter{\the\toks0 \catcode#1 \the\catcode#1}%

```

```

12   \edef\x{\x \catcode#1 #2}}%
13   \y 123 1 % {
14   \y 125 2 % }
15   \y 35 6 % #
16   \y 10 12 % ^^J
17   \y 34 12 % "
18   \y 36 3 % $ $
19   \y 39 12 % '
20   \y 40 12 % (
21   \y 41 12 % )
22   \y 42 12 % *
23   \y 43 12 % +
24   \y 44 12 % ,
25   \y 45 12 % -
26   \y 46 12 % .
27   \y 47 12 % /
28   \y 60 12 % <
29   \y 61 12 % =
30   \y 64 11 % @ (letter)
31   \y 62 12 % >
32   \y 95 12 % _ (other)
33   \y 96 12 % `
34   \edef\y#1{\endgroup\edef#1{\the\toks0\relax}\x}%
35 \expandafter\y\csname lltxb@cctb@AtEnd\endcsname

Package declaration.

36 \begingroup
37 \expandafter\ifx\csname ProvidesPackage\endcsname\relax
38   \def\x#1[#2]{\immediate\write16{Package: #1 #2}}
39 \else
40   \let\x\ProvidesPackage
41 \fi
42 \expandafter\endgroup
43 \x{luatexbase-cctb}[2010/10/10 v0.3 Catcodetable allocation for LuaTeX]

Make sure LuaTeX is used.

44 \begingroup\expandafter\expandafter\expandafter\endgroup
45 \expandafter\ifx\csname RequirePackage\endcsname\relax
46   \input ifluatex.sty
47 \else
48   \RequirePackage{ifluatex}
49 \fi
50 \ifluatex\else
51   \begingroup
52     \expandafter\ifx\csname PackageError\endcsname\relax
53       \def\x#1#2#3{\begingroup \newlinechar10
54         \errhelp{#3}\errmessage{Package #1 error: #2}\endgroup}
55     \else
56       \let\x\PackageError
57     \fi
58   \expandafter\endgroup
59 \x{luatexbase-attr}{LuaTeX is required for this package. Aborting.}{%
60   This package can only be used with the LuaTeX engine^^J%
61   (command 'lualatex' or 'luatex').^^J%

```

```

62   Package loading has been stopped to prevent additional errors.}
63   \lltxb@cctb@AtEnd
64   \expandafter\endinput
65 \fi

```

2.1.2 Load supporting Lua module

First load luatexbase-loader (hence luatexbase-compat), then the supporting Lua module.

```

66 \begingroup\expandafter\expandafter\expandafter\endgroup
67 \expandafter\ifx\csname RequirePackage\endcsname\relax
68   \input luatexbase-loader.sty
69 \else
70   \RequirePackage{luatexbase-loader}
71 \fi
72 \luatexbase@directlua{require('luatexbase.cctb')}

```

2.1.3 Primitives needed

luatexbase-compat is already loaded; just make sure the primitives we need are available.

```

73 \luatexbase@ensure@primitive{luaescapestring}
74 \luatexbase@ensure@primitive{catcodetable}
75 \luatexbase@ensure@primitive{initcatcodetable}
76 \luatexbase@ensure@primitive{savecatcodetable}

```

2.1.4 User macros

The allocation macro. Allocate tables starting with 1, since table 0 is the default table. Allocate only odd numbers to allow using even numbers as a stack.

```

77 \newcount\lltxb@catcodetable@alloc
78 \lltxb@catcodetable@alloc@m@ne
79 \def\newluatexcatcodetable#1{%
80   \ifnum\lltxb@catcodetable@alloc<65535\relax
81     \global\advance\lltxb@catcodetable@alloc\tw@
82     \allocationnumber\lltxb@catcodetable@alloc
83     \global\chardef#1\allocationnumber
84     \luatexinitcatcodetable\allocationnumber
85     \begingroup\escapechar@m@ne
86     \luatexbase@directlua{luatexbase.catcodetabledef_from_tex(
87       '\luatexluaescapestring{\string#1}', '\number\allocationnumber')}%
88     \endgroup
89     \wlog{\string#1=\string\luatexcatcodetable\the\allocationnumber}%
90   \else
91     \errmessage{No room for a new \string\luatexcatcodetable}%
92   \fi}

```

A small patch to get two new counters in Plain too.

```

93 \expandafter\ifx\csname @tempcnta\endcsname\relax
94   \csname newcount\endcsname\@tempcnta
95 \fi
96 \expandafter\ifx\csname @tempcntb\endcsname\relax
97   \csname newcount\endcsname\@tempcntb
98 \fi

```

Set the catcodes for a range of characters.

```
99 \def\setcatcoderange#1#2#3{%
100 \edef\luaSCR@temp{%
101   \noexpand\@tempcnta=\the\@tempcnta
102   \noexpand\@tempcntb=\the\@tempcntb
103   \noexpand\count@=\the\count@
104   \relax}%
105 \@tempcnta=#1\relax
106 \@tempcntb=#2\relax
107 \count@=#3\relax
108 \loop\unless\ifnum\@tempcnta>\@tempcntb
109   \catcode\@tempcnta=\count@
110   \advance\@tempcnta\@ne
111 \repeat
112 \luaSCR@temp}
```

Set a catcode table.

```
113 \def\setluatexcatcodetable#1#2{%
114 \begingroup
115 #2%
116 \luatexsavecatcodetable#1%
117 \endgroup}
```

2.1.5 Predefined tables

The `IniTeX` catcode table needs no extra initialisation.

```
118 \newluatexcatcodetable\CatcodeTableIniTeX
```

The `String` and `Other` catcode tables.

```
119 \newluatexcatcodetable\CatcodeTableString
120 \setluatexcatcodetable\CatcodeTableString{%
121 \luatexcatcodetable\CatcodeTableIniTeX
122 \catcode0 12 % nul
123 \catcode13 12 % carriage return
124 \catcode37 12 % percent
125 \setcatcoderange{65}{90}{12}% A-Z
126 \setcatcoderange{97}{122}{12}% a-z
127 \catcode92 12 % backslash
128 \catcode127 12 }
```

```
129 \newluatexcatcodetable\CatcodeTableOther
130 \setluatexcatcodetable\CatcodeTableOther{%
131 \luatexcatcodetable\CatcodeTableString
132 \catcode32 12 }
```

Tables for `LATEX 2ε`.

```
133 \newluatexcatcodetable\CatcodeTableLaTeX
134 \setluatexcatcodetable\CatcodeTableLaTeX{%
135 \luatexcatcodetable\CatcodeTableIniTeX
136 \setcatcoderange{0}{31}{15}%
137 \catcode9 10 % tab
138 \catcode12 13 % form feed
139 \catcode13 5 % carriage return
```

```

140 \catcode35 6 % hash
141 \catcode36 3 % dollar
142 \catcode38 4 % ampersand
143 \catcode94 7 % circumflex
144 \catcode95 8 % underscore
145 \catcode123 1 % brace left
146 \catcode125 2 % brace right
147 \catcode126 13 % tilde
148 \catcode127 15 }

149 \newluatexcatcodetable\CatcodeTableLaTeXAtLetter
150 \setluatexcatcodetable\CatcodeTableLaTeXAtLetter{%
151 \luatexcatcodetable\CatcodeTableLaTeX
152 \catcode64=11 }

```

A table for expl3.

```

153 \newluatexcatcodetable\CatcodeTableExpl
154 \setluatexcatcodetable\CatcodeTableExpl{%
155 \luatexcatcodetable\CatcodeTableLaTeX
156 \catcode126 10 % tilde is a space char
157 \catcode32 9 % space is ignored
158 \catcode9 9 % tab also ignored
159 \catcode95 11 % underscore letter
160 \catcode58 11 % colon letter
161 }

```

Finally do the shortcuts.

```

162 \luatexbase@directlua{luatexbase.catcodetable_do_shortcuts()}

```

That's all, folks!

```

163 \lltxb@cctb@AtEnd
164 </texpackage>

```

2.2 Lua module

```

165 (*luamodule)
166 module('luatexbase', package.seeall)

```

The number associated to a CS name is remembered in the `catcodetables` table.

```

167 catcodetables = {}
168 function catcodetabledef_from_tex(name, number)
169     catcodetables[name] = tonumber(number)
170 end

```

The next function creates some shortcuts for better readability in lua code. This makes `luatexbase.catcodetables.latex` equivalent to `luatexbase.catcodetables.CatcodeTableLaTeX`.

```

171 function catcodetable_do_shortcuts()
172     local cat = catcodetables
173     cat['latex'] = cat.CatcodeTableLaTeX
174     cat['latex-package'] = cat.CatcodeTableLaTeXAtLetter
175     cat['latex-atletter'] = cat.CatcodeTableLaTeXAtLetter
176     cat['ini'] = cat.CatcodeTableIniTeX
177     cat['expl3'] = cat.CatcodeTableExpl
178     cat['expl'] = cat.CatcodeTableExpl
179     cat['string'] = cat.CatcodeTableString

```

```

180   cat['other']           = cat.CatcodeTableOther
181 end
182 </luamodule>

```

3 Test files

The tests done are very basic: we just make sure that the package loads correctly and the macros don't generate any error, under both LaTeX en Plain TeX.

```

183 <testplain,testlatex>\catcode00 15
184 <testplain>\input luatexbase-cctb.sty
185 <testlatex>\RequirePackage{luatexbase-cctb}
186 <*testplain,testlatex>
187 \begingroup \catcode64 11 \global\let\lua\luatexbase@directlua \endgroup

```

Also check that the catcodetable's number is remembered well, independently of the current value of `\escapechar`.

```

188 \newluatexcatcodetable\testcctb
189 \lua{assert(luatexbase.catcodetables.testcctb)}
190 \begingroup
191 \escapechar64
192 \newluatexcatcodetable\anothercctb
193 \endgroup
194 \lua{assert(luatexbase.catcodetables.anothercctb)}

```

Now, play a little bit with predefined tables. Be careful to change catcodes only inside a group to avoid chaos.

```

195 \def\test#1#2#3{%
196   \begingroup
197   \ifcsname CatcodeTable#1\endcsname \else \INTERR \fi
198   \luatexcatcodetable\csname CatcodeTable#1\endcsname
199   \ifnum\catcode#2=#3 \else \ERROR \fi
200   \endgroup}
201 \test {IniTeX}      {00} {09}
202 \test {IniTeX}      {92} {00}
203 \test {IniTeX}      {64} {12}
204 \test {IniTeX}      {65} {11}
205 \test {String}     {92} {12}
206 \test {String}     {65} {12}
207 \test {String}     {32} {10}
208 \test {Other}      {92} {12}
209 \test {Other}      {65} {12}
210 \test {Other}      {32} {12}
211 \test {LaTeXAtLetter} {64} {11}
212 \test {LaTeX}      {64} {12}
213 \test {Expl}       {32} {09}
214 <testlatex>\documentclass{minimal}
215 \lua{%
216   tex.sprint('\string\setbox0=\string\hbox{')
217   tex.sprint(luatexbase.catcodetables.string, "\string\undef # _^&")
218   tex.sprint('}')
219 }

```

```
220 </testplain, testlatex>  
221 <testplain>\bye  
222 <testlatex>\stop
```