

The luatexbase-attr package

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Abstract

In addition to the registers existing in \TeX and $\epsilon\text{-}\text{\TeX}$, Lua \TeX introduces a new concept: attributes. This package takes care of attribute allocation just like Plain \TeX and LaTeX do for other registers, and also provides a Lua interface.

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1 Documentation

1.1 \TeX interface

The main macro defined here is `\newluatexattribute`. It behaves in the same way as `\newcount`. There are also two helper macros: `\setluatexattribute` sets an attribute's value (locally, but you can use `\global` in front of it). `\unsetluatexattribute` unsets an attribute by giving it a special value, depending on Lua \TeX 's version; you should always use this macro in order to be sure the correct special value for your version of Lua \TeX is used.

Due to the intended use of attributes, it makes no sense to locally allocate an attribute the way you can locally allocate a counter using `etex.sty`'s `\loccount`, so no corresponding macro is defined.

1.2 Lua interface

The various Lua functions for manipulating attributes use a number to designate the attribute. Hence, package writers need a way to know the number of the attribute associated to `\fooattr` assuming it was defined using `\newluatexattribute\fooattr`, something that LuaTeX currently doesn't support (you can get the current value of the associated attribute as `tex.attribute.fooattr`, but not the attribute number).

There are several ways to work around this. For example, it is possible to extract the number at any time from the `\meaning` of `\foobar`. Alternatively, one could look at `\the\allocationnumber` just after the definition of `\fooattr` and remember it in a Lua variable. For your convenience, this is automatically done by `\newluatexattribute`: the number is remembered in a dedicated Lua table so that you can get it as `luatexbase.attributes.fooattr` (mind the absence of backslash here) at any time.

Also, two Lua functions are provided that are analogous to the above TeX macros (actually, the macros are wrappers around the functions): `luatexbase.new_attributes(<name>)` allocates a new attribute, without defining a corresponding TeX control sequence (only an entry in `luatexbase.attributes` is created. It usually returns the number of the allocated attribute. If room is missing, it raises an error, unless the second argument (optional) is not false, in which case it returns -1.

`luatexbase.unset_attribute(<name>)` unsets an existing attribute.

2 Implementation

2.1 TeX package

```
1 (*texpackage)
```

2.1.1 Preliminaries

Reload protection, especially for Plain TeX.

```
2           \csname lltxb@attr@loaded\endcsname
3 \expandafter\let\csname lltxb@attr@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@attr@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-attr}[2010/05/27 v0.2a Attributes 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 PackageWarningNoLine\endcsname\relax
53 \def\x#1#2{\begingroup\newlinechar10
54 \immediate\write16{Package #1 warning: #2}\endgroup}
55 \else
56 \let\x\PackageWarningNoLine
57 \fi
58 \expandafter\endgroup
59 \x{luatexbase-attr}{LuaTeX is required for this package. Aborting.}
60 \lltxb@attr@AtEnd
61 \expandafter\endinput
62 \fi

```

2.1.2 Primitives needed

Load `luatexbase-compat`.

```
63 \begingroup\expandafter\expandafter\expandafter\endgroup
64 \expandafter\ifx\csname RequirePackage\endcsname\relax
65   \input luatexbase-compat.sty
66 \else
67   \RequirePackage{luatexbase-compat}
68 \fi
```

Make sure the primitives we need are available.

```
69 \luatexbase@ensure@primitive{luaescapestring}
70 \luatexbase@ensure@primitive{attributedef}
71 \luatexbase@ensure@primitive{attribute}
```

2.1.3 Load supporting Lua module

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

```
72 \begingroup\expandafter\expandafter\expandafter\endgroup
73 \expandafter\ifx\csname RequirePackage\endcsname\relax
74   \input luatexbase-loader.sty
75 \else
76   \RequirePackage{luatexbase-loader}
77 \fi
78 \luatexbase@directlua{require('luatexbase.attr')}
```

2.2 User macros

The allocation macro is merely a wrapper around the Lua function, but handles error and logging in `TEX`, for consistency with other allocation macros.

```
79 \def\newluatexattribute#1{%
80   \begingroup\escapechar\m@ne \expandafter\expandafter\expandafter
81   \endgroup \expandafter\expandafter\expandafter
82   \allocationnumber \luatexbase@directlua{tex.write(
83     luatexbase.new_attribute("\luatexluaescapestring{\string#1}", true))}%
84   \ifnum\allocationnumber>\m@ne
85     \global\luatexattributedef#1=\allocationnumber
86     \wlog{\string#1=\string\luatexattribute\the\allocationnumber}%
87   \else
88     \errmessage{No room for a new \string\attribute}%
89   \fi}
```

Helper macro `\unsetluatexattribute`: wrapper around the Lua function.

```
90 \def\unsetluatexattribute#1{%
91   \begingroup\escapechar\m@ne
92   \luatexbase@directlua{%
93     luatexbase.unset_attribute("\luatexluaescapestring{\string#1}")}%
94   \endgroup}
```

And now the trivial helper macro.

```
95 \def\setluatexattribute#1#2{%  
96   #1=\numexpr#2\relax}
```

That's all folks!

```
97 \lletxb@attr@AtEnd  
98 \</texpackage>
```

2.3 Lua module

```
99 \<luamodule>  
100 module('luatexbase', package.seeall)
```

This table holds the values of the allocated attributes, indexed by name.

```
101 attributes = {}
```

The allocation function. Unlike other registers, allocate starting from 1. Some code (eg, font handling coming from ConT_EXt) behaves strangely with `\attribute0` and since there is plenty of room here, it doesn't seem bad to "loose" one item in order to avoid this problem.

```
102 local last_alloc = 0  
103 function new_attribute(name, silent)  
104   if last_alloc >= 65535 then  
105     if silent then  
106       return -1  
107     else  
108       error("No room for a new \\attribute", 1)  
109     end  
110   end  
111   last_alloc = last_alloc + 1  
112   attributes[name] = last_alloc  
113   unset_attribute(name)  
114   if not silent then  
115     texio.write_nl('log', string.format(  
116       'luatexbase.attributes[%q] = %d', name, last_alloc))  
117   end  
118   return last_alloc  
119 end
```

Unset an attribute the correct way depending on LuaT_EX's version.

```
120 local unset_value = (luatexbase.luatexversion < 37) and -1 or -2147483647  
121 function unset_attribute(name)  
122   tex.setattribute(attributes[name], unset_value)  
123 end  
124 \</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 and Plain TeX. We also check that the attribute's number is remembered well, independently of the current value of `\escapechar`.

```

125 <testplain>\input luatexbase-attr.sty
126 <testlatex>\RequirePackage{luatexbase-attr}
127 <*testplain,testlatex>
128 \newluatexattribute\testattr
129 \setluatexattribute\testattr{1}
130 \unsetluatexattribute\testattr
131 \catcode64 11
132 \luatexbase@directlua{assert(luatexbase.attributes.testattr)}
133 \luatexbase@directlua{luatexbase.new_attribute('luatestattr')}
134 \luatexbase@directlua{assert(luatexbase.attributes.luatestattr)}
135 \begingroup
136 \escapechar64
137 \newluatexattribute\anotherattr
138 \endgroup
139 \setluatexattribute\anotherattr{1}
140 \luatexbase@directlua{assert(luatexbase.attributes.anotherattr)}
141 </testplain,testlatex>
142 <testplain>\bye
143 <testlatex>\stop

```