

# penlightplus

## Additions to the Penlight Lua Libraries

Kale Ewasiuk (kalekje@gmail.com)

2024-03-14

This package first loads the `[import]penlight` package.

The `pl` option may be passed to this package to create an alias for `penlight`.

`globals` option may be used to make several of the functions global (as discussed below).

### texlua usage

If you want to use `penlightplus.lua` with the `texlua` interpreter (no document is made, but useful for testing your Lua code), you can access it by setting `__SKIP_TEX__ = true` before loading. For example:

```
package.path = package.path .. ';'..'path/to/texmf/tex/lualatex/penlightplus/?.lua'
package.path = package.path .. ';'..'path/to/texmf/tex/lualatex/penlight/?.lua'
penlight = require'penlight'

__SKIP_TEX__ = true --only required if you want to use
                    --penlightplus without a LaTeX run
__PL_GLOBALS__ = true -- optional, include global definitions

require'penlightplus'
```

The following global Lua variables are defined:

`__SKIP_TEX__` If using the `penlightplus` package with `texlua` (good for troubleshooting), set this global before loading `penlight`

The global flags below are taken care of in the package options:

`__PL_GLOBALS__` If using package with `texlua` and you don't want to set some globals (described in next sections), set this global before to `true` loading `penlight`

`__PL_NO_HYPERREF__` a flag used to change the behaviour of a function, depending on if you don't use the hyperref package

`__PDFmetadata__` a table used to store PDF meta-data

### global extras

If the package option `globals` is used, many additional globals are set for easier scripting. `pl.hasval`, `pl.COMP`, `pl.utils.kpairs`, `pl.utils.npairs` become globals. `pl.tablex` is aliased as `pl.tbx` and `tbx` (which also includes all native Lua table functions), and `pl.array2d` is aliased as `pl.a2d` and `a2d`.

If you want global `pl.tex` funcs and vars, call `pl.make_tex_global()`

### penlight additions

Some functionality is added to penlight and Lua.

`pl.hasval(x)` Python-like boolean testing

`COMP'xyz'()` Python-like comprehensions:

<https://lunarmodules.github.io/Penlight/libraries/pl.comprehension.html>

`clone_function(f)` returns a cloned function

`operator.strgt(a,b)` compares strings a greater than b (useful for sorting)

`operator.strlt(a,b)` compares strings a less than b (useful for sorting)

`math.mod(n,d)`, `math.mod2(n)` math modulus

`string.upfirst(s)` uppercase first letter

`string.delspace(s)` delete all spaces

`string.trimfl(s)` remove first and last chars

`string.appif(s, append, bool, alternate)`

`string.gfirst(s, t)` return first matched patten from an array of patterns t

`string.gextract(s)` extract a pattern from a string (returns capture and new string with capture removed)

`string.totable(s)` string a table of characters

`string.tolist(s)` string a table of characters

`string.containsany(s,t)` checks if any of the array of strings t are in s using `string.find`

`string.containsanycase(s,t)` case-insensitive version

`string.delspace(s)` clear spaces from string

`string.subpar(s, c)` replaces `\\par` with a character of your choice default is space

`string.fmt(s, t, fmt)` format a string like `format_operator`, but with a few improvements.

`t` can be an array (reference items like `\$1` in the string), and `fmt` can be a table of formats (keys correspond to those in `t`), or a string that is processed by `luakeys`.  
`string.parsekv(s, opts)` parse a string using `penlight.luakeys`. A string or table can be used for `opts`.

`tablex.fmt(t, f)` format a table with table or key-value string `f`  
`tablex.strinds(t)` convert integer indexes to string indices (1 -> '1')  
`tablex.filterstr(t,e,case)` keep only values in table `t` that contain expression `e`, case insensitive by default.  
`tablex.mapslice(f,t,i1,i2)` map a function to elements between `i1` and `i2`  
`tablex.listcontains(t,v)` checks if a value is in a array-style list

`pl.char(n)` return letter corresponding to 1=a, 2=b, etc.  
`pl.Char(n)` return letter corresponding to 1=A, 2=B, etc.

`pl.utils.filterfiles(dir,filt,rec)` Get files from `dir` and apply glob-like filters. Set `rec` to `true` to include sub directories

### **A pl.tex. module is added**

`add_bkt_cnt(n)`, `close_bkt_cnt(n)`, `reset_bkt_cnt` functions to keep track of adding curly brackets as strings. `add` will return `n` (default 1) `{`'s and increment a counter. `close` will return `n` `}`'s (default will close all brackets) and decrement.

`_NumBkts` internal integer for tracking the number of brackets  
`opencmd(cs)` prints `\cs {` and adds to the bracket counters.

`xNoValue,xTrue,xFalse`: xparse equivalents for commands

`prt(x)`, `prtn(x)` print without or with a newline at end. Tries to help with special characters or numbers printing.

`prt1(l)`, `prtt(t)` print a literal string, or table

`wrt(x)`, `wrtn(x)` write to log

`wrh(s1, s2)` pretty-print something to console. `S2` is a flag to help you find., alias is `help_wrt`, also in `pl.wrth`

`prt_array2d(tt)` pretty print a 2d array

`pkgwarn(pkg, msg1, msg2)` throw a package warning

`pkgerror(pkg, msg1, msg2, stop)` throw a package error. If `stop` is true, immediately ceases compile.

`defcmd(cs, val)` like `\gdef`, but note that no special chars allowed in `cs`(eg. `@`)

`defmacro(cs, val)` like `\gdef`, allows special characters, but any tokens in `val` must be pre-defined (this uses `token.set_macro` internally)

`newcmd(cs, val)` like `\newcommand`

`renewcmd(cs, val)` like `\renewcommand`

`prvcmd(cs, val)` like `\providecommand`

`deccmd(cs, dft, overwrite)` declare a command. If `dft` (default) is `nil`, `cs` is set to a package warning saying '`cs`' was declared and used in document, but never set. If `overwrite` is true, it will overwrite an existing command (using `defcmd`), otherwise, it will throw error like `newcmd`.

`get_ref_info(1)` accesses the `\r @label` and returns a table

## Recording latex input

`penlight.tex.startrecording()` start recording input buffer without printing to latex

`penlight.tex.stoprecording()` stop recording input buffer

`penlight.tex.readbuf()` internal-use function that interprets the buffer. This will ignore an environment ending (eg. `end{envir}`)

`penlight.tex.recordedbuf` the string variable where the recorded buffer is stored

## Macro helpers

`\MakeluastringCommands [def]{spec}` will let `\pllustring (A|B|C..)` be `\luastring (N|O|T|F)` based on the letters that `spec` is set to (or `def` if nothing is provided) This is useful if you want to write a command with flexibility on argument expansion. The user can specify `n`, `o`, `t`, and `f` (case insensitive) if they want no, once, twice, or full expansion. For example, we can control the expansion of args 2 and 3 with arg 1:

```
\NewDocumentCommand{\splittocomma}{ 0{nn} m m }{%
  \MakeluastringCommands [nn]{#1}%
  \luadirect{penlight.tex.split2comma(\pllustringA{#2},\pllustringB{#3})}%
}
```

## Lua boolean expressions for LaTeX conditionals

`\ifluax {<Lua expr>}{<do if true>}[<do if false>]` and

`\ifluax {<Lua expr>}{<do if true>}[<do if false>]` for truthy (uses `penlight.hasval`)

<pre> 1 \ifluax{3^3 == 27}{3*3*3 is 27}[WRONG]\\ 2 \ifluax{abc123 == nil}{Var is nil}[WRONG]\\ 3 \ifluax{not true}{tRuE}[fAlSe]\\ 4 \ifluax{''}{TRUE}[FALSE]\\ 5 \ifluaxv{''}{true}[false]\\ </pre>	<pre> 3*3*3 is 27 Var is nil fAlSe TRUE false </pre>
---	--

## Creating and using Lua tables in LaTeX

penlightplus provides a Lua-table interface. Tables are stored in the `penlight.tbls` table.

```

\tblnew {t} declares a new table with name t
\tblchg {t} changes the 'recent' table
\tblfrkv {t}{key-val string}[luakeys opts] new table from key-val using luakeys
\tblfrkvN {t}{key-val string}[luakeys opts] does not expand key-val string luakeys
\tblfrkvCD {t}{key-val string}[luakeys opts] define tbl from key-val, check if
any were not defined as defaults (see below), and then push all to definitions
\tblkvundefcheck will throw an error if you use define a table from key-values and
use a key that was not specified in the luakeys parse options via opts.defaults or
opts.defs. \tblfrcsv {t}{csv} a shorthand \tblfrkv {t}{csv}[naked_as_value=true,opts],
a good way to convert a comma-separated list to an array
\tblfrcsvN {t}{csv} same as above, but the csv is not expanded. \tblset {i}{v}
sets a value of the table/index i to v
\tblget {i} gets the value and tex.sprint()s it
\tbladd {i}{v} add a new value to a table using index method
\tbladdN {i}{v} above, but don't expand the value argument
\tblcon {t}{csv} concatenate an array-style csv
\tblapp {t}{v} append a value (integer-wise) to a table
\tbldef {i}{d} pushes the value to macro d
\tbldefall {t}{d} define all item in table t (use recent if blank) with format d<key>
where d is your prefix. If d is blank, keys will be defined as \dtbl <t><k> \tblgdef
{i}{d} pushes the defined value to a global
\tbldefxy {i}{d} splits the value of item by spaces creates two definitions \dx and
\dy . Useful for pasing tikz coordinates like xy=0 5
For defining tables, if d is blank, commands are defined as dtbl<t><k>
\iftbl {i}{tr}[fa] runs code ta if the item is true else fr
\iftblv {i}{tr}[fa] runs code ta if the item is truthy else fr

```

```

\tblprt {t} print the table in console

```

There are 3 ways to use the index (placeholder `{i}` above). `t.key` where `t` is the table name and `key` is a string key, `t/int` where `int` is an integer index (ie. uses `t[int]`,

note that negative indexes are allowed where -1 is the last element), or simply use `ind` without the table name, where the assumed table is the last one that was created or changed to, (passing a number will be used as an integer index).

```

1 \tblfrkv{my}{a,b,c,first=john,last=smith}%
2   [defaults={x=0,i=one,n=false,y=yes}]
3 \tblget{my.a}\
4 \tblset{a}{tRuE!!}
5 \tblget{a}\
6 \tblget{my.x}\
7 \tblget{.x}\
8 \tbladd{my.newkey}{val}\tblget{newkey}\
9 \tbladd{nk}{VAL}\tblget{nk}\
10 \tblif{n}{tr}[fa]\
11 \tblifv{n}{TR}[FA]\
12 \tblif{my.y}{Tr}[Fa]\
13 \tblifv{y}{tR}[fA]\
14 %% \kvtblundefcheck % would throw error
15 \tbldef{my.first}{mydef} \mydef\
16 \tbldef{first}{}\dtblmyfirst\
17 {\tbldef{last}{mydef} \mydef} \mydef\
18 {\tblgdef{last}{mydef}} \mydef\
19
20 \tbldefall{}{}\dtblmyfirst\
21 \tbldefall{my}{DEF}\DEFfirst
22
23 \tblset{my.a}{12 36}
24 \tbldefxy{my.a}{coord} (\coordx,\coordy)
25 \tbldefxy{my.a}{} (\dtblmyax,\dtblmyay)
26 \tbldefxy{a}{} (\dtblmyax,\dtblmyay)
27
28 \tblfrcsv{me}{a,b,"c,see",d,e}
29 \tblget{me/1},\tblget{2}\
30 \tblget{3}\
31 \tblset{me/4}{D}\tblget{me/4}\tblget{/4}\
32 \tblset{5}{E}\tblget{5}\
33 \tblget{-2},\tblget{me/-1}\
34 \tblget{/ -3}\
35 %% \tblget{k} % would throw error
36
37 \tblfrkvCD{M}{a=A,b=B,d=D}[defaults={a,b,c,d}]
38 \dtblMa \dtblMb \dtblMc \dtblMd

```

true  
tRuE!!  
0  
0  
val  
VAL  
fa  
FA  
Tr  
tR  
john  
john  
smith john  
smith  
  
john  
john  
(12,36) (12,36) (12,36)  
a,b  
c,see  
DD  
E  
D,E  
c,see  
  
ABtrueD

Note: for this versions: all latex tbl commands are now prefixed with `tbl`, eg., `tblget`, `tblset`. Old-style commands eg. `gettbl` will be kept as aliases for a few more releases then removed.

## A practical tbl example



<pre> 1 \begin{itemize} 2   \splittoitems{kale\and john}{\and} 3   \splittoitems{kale -john -someone else} 4   \splittoitems{1,2,3,4}{,} 5 \end{itemize} </pre>	<ul style="list-style-type: none"> <li>• kale</li> <li>• john</li> <li>• kale</li> <li>• john</li> <li>• someone else</li> <li>• 1</li> <li>• 2</li> <li>• 3</li> <li>• 4</li> </ul>
---	--

**PDF meta data (for pdfx package)**

`\writePDFmetadatak` *\*{m}* Take a key-value string (eg. `title=whatever, author=me`) and writes to the `jobname.xmpdata` file, to be used by pdfx. *\** will first clear the data `\writePDFmetadata` runs the lua function `penlight.tex.writePDFmetadata()`, which pushes the lua variable `__PDFmetadata__` (a table) to the xmpdata file.