

# The `lparse` package

Josef Friedrich

[josef@friedrich.rocks](mailto:josef@friedrich.rocks)

[github.com/Josef-Friedrich/lparse](https://github.com/Josef-Friedrich/lparse)

0.2.0 from 2025/06/19

```
\def\test{\par\directlua{
  local oarg, star, marg = lparse.scan('o s m')
  tex.print('o: ' .. tostring(oarg))
  tex.print('s: ' .. tostring(star))
  tex.print('m: ' .. tostring(marg))
}}

\test{marg} % o: nil s: false m: marg
\test[oarg]{marg} % o: oarg s: false m: marg
\test[oarg]*{marg} % o: oarg s: true m: marg
```

# Contents

<b>1</b>	<b>Introduction</b>	<b>3</b>
<b>2</b>	<b>The Lua API of <code>lparse</code></b>	<b>3</b>
2.1	Description of the argument specification . . . . .	3
2.2	Function: <code>scan</code> . . . . .	4
2.3	Class: <code>Scanner</code> . . . . .	4
2.3.1	Method: <code>Scanner:scan()</code> . . . . .	4
2.3.2	Method: <code>Scanner:export()</code> . . . . .	4
2.3.3	Method: <code>Scanner:assert()</code> . . . . .	4
2.3.4	Method: <code>Scanner:debug()</code> . . . . .	4
2.4	Auxiliary functions . . . . .	4
<b>3</b>	<b>Implementation</b>	<b>6</b>
3.1	<code>lparse.lua</code> . . . . .	6
3.2	<code>lparse.tex</code> . . . . .	16
3.3	<code>lparse.sty</code> . . . . .	17

# 1 Introduction

The name `lparse` is derived from `xparse`. The `x` has been replaced by `l` because this package only works with Lua $\TeX$ . `l` stands for *Lua*. Just as with `xparse`, it is possible to use a special syntax consisting of single letters to express the arguments of a macro. However, `lparse` is able to read arguments regardless of the macro system used - whether L $\TeX$  or Con $\TeX$ t or even plain  $\TeX$ . Of course, Lua $\TeX$  must always be used as the engine.

## Similar projects

For Con $\TeX$ t there is a similar argument scanner (see Con $\TeX$ t Lua Document `cld-mkiv`). This scanner is implemented in the following files: `toks-scn.lua` `toks-aux.lua` `toks-ini.lua` Con $\TeX$ t scanner apparently uses the token library of the Lua $\TeX$  successor project luameta $\TeX$ : `lmtokenlib.c`

## 2 The Lua API of `lparse`

### 2.1 Description of the argument specification

The following lists describing the argument types are taken from the manuals `usrguide` and `xparse`. The descriptive texts of the individual argument types have only been slightly adjusted. The argument types that are not yet supported are bracketed.

- m A standard mandatory argument, which can either be a single token alone or multiple tokens surrounded by curly braces `{}`. Regardless of the input, the argument will be passed to the internal code without the outer braces. This is the `lparse` type specifier for a normal  $\TeX$  argument.
- r Given as `r<token1><token2>`, this denotes a “required” delimited argument, where the delimiters are `<token1>` and `<token2>`. If the opening delimiter `<token1>` is missing, `nil` will be returned after a suitable error.
- R Given as `R<token1><token2>{<default>}`, this is a “required” delimited argument as for `r`, but it has a user-definable recovery `<default>` instead of `nil`.
- v Reads an argument “verbatim”, between the following character and its next occurrence.
- (b) Not implemented! Only suitable in the argument specification of an environment, it denotes the body of the environment, between `\begin{<environment>}` and `\end{<environment>}`.

The types which define optional arguments are:

- o A standard L $\TeX$  optional argument, surrounded with square brackets, which will supply `nil` if not given (as described later).
- d Given as `d<token1><token2>`, an optional argument which is delimited by `<token1>` and `<token2>`. As with `o`, if no value is given `nil` is returned.
- O Given as `O{<default>}`, is like `o`, but returns `<default>` if no value is given.

- D Given as `D⟨token1⟩⟨token2⟩{⟨default⟩}`, it is as for `d`, but returns `⟨default⟩` if no value is given. Internally, the `o`, `d` and `O` types are short-cuts to an appropriated-constructed `D` type argument.
- s An optional star, which will result in a value `true` if a star is present and `false` otherwise (as described later).
- t An optional `⟨token⟩`, which will result in a value `true` if `⟨token⟩` is present and `false` otherwise. Given as `t⟨token⟩`.
- (e) Not implemented! Given as `e{⟨tokens⟩}`, a set of optional *embellishments*, each of which requires a *value*. If an embellishment is not present, `-NoValue-` is returned. Each embellishment gives one argument, ordered as for the list of `⟨tokens⟩` in the argument specification. All `⟨tokens⟩` must be distinct. *This is an experimental type.*
- (E) Not implemented! As for `e` but returns one or more `⟨defaults⟩` if values are not given: `E{⟨tokens⟩}{⟨defaults⟩}`.

## 2.2 Function: scan

```

\input lparse.tex

\def\test{\par\directlua{
  local oarg, star, marg = lparse.scan('o s m')
  tex.print('o: ' .. tostring(oarg))
  tex.print('s: ' .. tostring(star))
  tex.print('m: ' .. tostring(marg))
}% Important: after \directlua no characters to expand
}

\test{marg} % o: nil s: false m: marg
\test[oarg]{marg} % o: oarg s: false m: marg
\test[oarg]*{marg} % o: oarg s: true m: marg

\bye

```

## 2.3 Class: Scanner

### 2.3.1 Method: Scanner:scan()

### 2.3.2 Method: Scanner:export()

### 2.3.3 Method: Scanner:assert()

### 2.3.4 Method: Scanner:debug()

## 2.4 Auxiliary functions

Some auxiliary functions are exported in the `utils` table:

```

local lparse = require('lparse')

local parse_spec = lparse.utils.parse_spec
local scan_oarg = lparse.utils.scan_oarg

```

**Function: `utils.scan_oarg(init_delim, end_delim)`**

Plain TeX does not know optional arguments [*oarg*]. The function `scan_oarg` allows to search for optional arguments not only in L<sup>A</sup>TeX but also in Plain TeX. The function uses the token library built into LuaTeX. The two parameters `init_delim` and `end_delim` can be omitted. Then square brackets are assumed to be delimiters. `utils.scan_oarg('(', ')')` searches for an optional argument in round brackets, for example. The function returns the string between the delimiters or `nil` if no delimiters could be found. The delimiters themselves are not included in the result. After the `\directlua{}`, the macro using `scan_oarg` must not expand to any characters.

```
\input lparse.tex

\def\test{\par\directlua{
  local oarg = lparse.utils.scan_oarg()
  tex.print('oarg: ' .. tostring(oarg))
}}

\test[oarg] % oarg: oarg
\test % oarg: nil

\bye
```

## 3 Implementation

### 3.1 lparse.lua

```
1  -- lparse.lua
2  -- Copyright 2023-2025 Josef Friedrich
3  --
4  -- This work may be distributed and/or modified under the
5  -- conditions of the LaTeX Project Public License, either version 1.3c
6  -- of this license or (at your option) any later version.
7  -- The latest version of this license is in
8  -- http://www.latex-project.org/lppl.txt
9  -- and version 1.3c or later is part of all distributions of LaTeX
10 -- version 2008/05/04 or later.
11 --
12 -- This work has the LPPL maintenance status `maintained'.
13 --
14 -- The Current Maintainer of this work is Josef Friedrich.
15 --
16 -- This work consists of the files lparse.lua, lparse.tex,
17 -- and lparse.sty.
18 ---
19 if lpeg == nil then
20     lpeg = require('lpeg')
21 end
22
23 ---
24 ---@param spec string An argument specifier, for example `o m`
25 ---
26 ---Required arguments:
27 ---
28 ---* `m`: A standard mandatory argument, which can either be a single
29 --- token alone or multiple tokens surrounded by curly braces `{}`.
30 --- Regardless of the input, the argument will be passed to the
31 --- internal code without the outer braces. This is the `lparse`
32 --- type specifier for a normal TeX argument.
33 ---* `r`: Given as `r` `token1` `token2`, this denotes a
34 --- required delimited argument, where the delimiters are
35 --- `token1` and `token2`. If the opening delimiter
36 --- `token1` is missing, `nil` will be
37 --- returned after a suitable error.
38 ---* `R` Given as `R` `token1` `token2` `default`,
39 --- this is a required delimited argument as for `r`,
40 --- but it has a user-definable recovery `default` instead of
41 --- `nil`.
42 ---* `v`: Reads an argument `verbatim`, between the following
43 --- character and its next occurrence.
44 ---
45 ---Optional arguments:
46 ---
47 ---* `o`: A standard LaTeX optional argument, surrounded with square
48 --- brackets, which will supply
49 --- `nil` if not given (as described later).
50 ---* `d`: Given as `d` `token1` `token2`, an optional
51 --- argument which is delimited by `token1` and `token1`.
52 --- As with `o`, if no
53 --- value is given `nil` is returned.
54 ---* `D`: Given as `D{default}`, is like `o`, but
55 --- returns `default` if no value is given.
56 ---* `D`: Given as `D` `token1` `token2` `{default}`,
57 --- it is as for `d`, but returns `default` if no value is given.
58 --- Internally, the `o`, `d` and `D` types are
59 --- short-cuts to an appropriated-constructed `D` type argument.
60 ---* `s`: An optional star, which will result in a value
```

```

61 --- `true` if a star is present and `false`
62 --- otherwise (as described later).
63 ---* `t`: An optional `token`, which will result in a value
64 --- `true` if `token` is present and `false`
65 --- otherwise. Given as `t` `token`.
66 ---
67 ---@return Argument[]
68 local function parse_spec(spec)
69     local V = lpeg.V
70     local P = lpeg.P
71     local Set = lpeg.S
72     local Range = lpeg.R
73     local CaptureFolding = lpeg.Cf
74     local CaptureTable = lpeg.Ct
75     local Cc = lpeg.Cc
76     local CaptureSimple = lpeg.C
77
78     local function add_result(result, value)
79         if not result then
80             result = {}
81         end
82         table.insert(result, value)
83         return result
84     end
85
86     local function collect_delims(a, b)
87         return { init_delim = a, end_delim = b }
88     end
89
90     local function collect_token(a)
91         return { token = a }
92     end
93
94     local function set_default(a)
95         return { default = a }
96     end
97
98     local function combine(...)
99         local args = { ... }
100
101         local output = {}
102
103         for _, arg in ipairs(args) do
104             if type(arg) ~= 'table' then
105                 arg = {}
106             end
107
108             for key, value in pairs(arg) do
109                 output[key] = value
110             end
111
112             end
113
114         return output
115     end
116
117     local function ArgumentType(letter)
118         local function get_type(l)
119             return { argument_type = l }
120         end
121         return CaptureSimple(P(letter)) / get_type
122     end
123
124     local T = ArgumentType

```

```

125
126 local pattern = P({
127   'init',
128   init = V('whitespace') ^ 0 *
129     CaptureFolding(CaptureTable('') * V('list'), add_result),
130
131   list = (V('arg') * V('whitespace') ^ 1) ^ 0 * V('arg') ^ -1,
132
133   arg = V('m') + V('r') + V('R') + V('v') + V('o') + V('d') + V('O') +
134     V('D') + V('s') + V('t'),
135
136   m = T('m') / combine,
137
138   r = T('r') * V('delimiters') / combine,
139
140   R = T('R') * V('delimiters') * V('default') / combine,
141
142   v = T('v') * Cc({ verbatim = true }) / combine,
143
144   o = T('o') * Cc({ optional = true }) / combine,
145
146   d = T('d') * V('delimiters') * Cc({ optional = true }) / combine,
147
148   O = T('O') * V('default') * Cc({ optional = true }) / combine,
149
150   D = T('D') * V('delimiters') * V('default') *
151     Cc({ optional = true }) / combine,
152
153   s = T('s') * Cc({ star = true }) / combine,
154
155   t = T('t') * V('token') / combine,
156
157   token = V('delimiter') / collect_token,
158
159   delimiter = CaptureSimple(Range('!~')),
160
161   delimiters = V('delimiter') * V('delimiter') / collect_delims,
162
163   whitespace = Set(' \t\n\r'),
164
165   default = P('{') * CaptureSimple((1 - P('}')) ^ 0) * P('}') /
166     set_default,
167 })
168
169 return pattern:match(spec)
170
171 end
172
173 ---
174 ---@param t Token
175 local function debug_token(t)
176   print(t)
177   print('command', t.command)
178   print('cmdname', t.cmdname)
179   print('csname', t.csname)
180   print('id', t.id)
181   print('tok', t.tok)
182   print('active', t.active)
183   print('expandable', t.expandable)
184   print('protected', t.protected)
185   print('mode', t.mode)
186   print('index', t.index)
187 end
188

```



```

189 ---
190 ---Scan for an optional delimited argument.
191 ---
192 ---@param init_delim? string # The character that marks the beginning of an optional
↳ argument (by default '[').
193 ---@param end_delim? string # The character that marks the end of an optional
↳ argument (by default ']').
194 ---
195 ---@return string/nil # The string that was enclosed by the delimiters. The
↳ delimiters themselves are not returned.
196 local function scan_oarg(init_delim, end_delim)
197     if init_delim == nil then
198         init_delim = '['
199     end
200     if end_delim == nil then
201         end_delim = ']'
202     end
203
204 ---
205 ---@param t Token
206 ---
207 ---@return string
208 local function convert_token_to_string(t)
209     if t.index ~= nil then
210         return utf8.char(t.index)
211     else
212         return '\\' .. t.csname
213     end
214 end
215
216 local delimiter_stack = 0
217
218 local function get_next_char()
219     local t = token.get_next()
220     local char = convert_token_to_string(t)
221     if char == init_delim then
222         delimiter_stack = delimiter_stack + 1
223     end
224
225     if char == end_delim then
226         delimiter_stack = delimiter_stack - 1
227     end
228     return char, t
229 end
230
231 local char, t = get_next_char()
232
233 if t.cmdname == 'spacer' then
234     char, t = get_next_char()
235 end
236
237 if char == init_delim then
238     local output = {}
239
240     char, t = get_next_char()
241
242     -- "while" better than "repeat ... until": The end_delimiter is
243     -- included in the result output.
244     while not (char == end_delim and delimiter_stack == 0) do
245         table.insert(output, char)
246         char, t = get_next_char()
247     end
248     return table.concat(output, '')
249 else

```

```

250     token.put_next(t)
251     end
252 end
253
254 ---
255 ---Represents an argument of a command.
256 ---
257 ---The basic form of the argument specifier is a list of letters, where
258 ---each letter defines a `Argument`.
259 ---
260 ---## `m`:
261 ---
262 ---```lua
263 ---{ argument_type = 'm' }
264 ---```
265 ---
266 ---## `r`:
267 ---
268 ---```lua
269 ---{ argument_type = 'r', end_delim = '>', init_delim = '<' }
270 ---```
271 ---
272 ---## `R`:
273 ---
274 ---(`R<>{default}`)
275 ---
276 ---```lua
277 ---{
278 ---  argument_type = 'R',
279 ---  end_delim = '>',
280 ---  init_delim = '<',
281 ---  default = 'default',
282 ---}
283 ---```
284 ---
285 ---## `v`:
286 ---
287 ---```lua
288 ---{
289 ---  argument_type = 'v',
290 ---  verbatim = true,
291 ---}
292 ---```
293 ---
294 ---## `o`:
295 ---
296 ---```lua
297 ---{ argument_type = 'o', optional = true }
298 ---```
299 ---
300 ---## `d`:
301 ---
302 ---(`d<>`)
303 ---
304 ---```lua
305 ---{
306 ---  argument_type = 'd',
307 ---  optional = true,
308 ---  end_delim = '>',
309 ---  init_delim = '<',
310 ---}
311 ---```
312 ---
313 ---## `D`:

```

```

314 ---
315 ---(`O{default}`)
316 ---
317 ---``lua
318 ---{ argument_type = 'O', optional = true, default = 'default' }
319 ---``
320 ---
321 ---## `D`:
322 ---
323 ---(`D<>{default}`)
324 ---
325 ---``lua
326 ---{
327 ---  argument_type = 'D',
328 ---  optional = true,
329 ---  default = ' default ',
330 ---  end_delim = '>',
331 ---  init_delim = '<',
332 ---}
333 ---``
334 ---
335 ---
336 ---## `s`:
337 ---
338 ---``lua
339 ---{ argument_type = 's', star = true }
340 ---``
341 ---
342 ---
343 ---## `t`:
344 ---
345 ---``lua
346 ---{ argument_type = 't', token = '+' }
347 ---``
348 ---
349 ---@class Argument
350 ---@field argument_type? 'm' | 'r' | 'R' | 'v' | 'o' | 'd' | 'O' | 'D' | 's' | 't' A
↪  single letter representing the argument type in the list of letters.
351 ---@field optional? boolean Indicates whether the argument is optional.
352 ---@field init_delim? string The character that marks the beginning of an argument.
353 ---@field end_delim? string The character that marks the end of an argument.
354 ---@field star? boolean `true` if it is a star argument type (`s`).
355 ---@field default? string The default value if no value is given.
356 ---@field verbatim? boolean `true` if it is a verbatim argument type (`v`).
357 ---@field token? string The optional token for the argument type `t`.
358 ---
359 ---A parser that parses the argument specification (list of letters).
360 ---@class Scanner
361 ---@field spec string An argument specifier
362 ---@field args Argument[]
363 ---@field result any[]
364 local Scanner = {}
365 ---@private
366 Scanner.__index = Scanner
367 ---
368 ---
369 ---@param spec string An argument specifier, for example `o m`
370 ---
371 ---Required arguments:
372 ---
373 ---* `m`: A standard mandatory argument, which can either be a single
374 ---  token alone or multiple tokens surrounded by curly braces `{}`.
375 ---  Regardless of the input, the argument will be passed to the
376 ---  internal code without the outer braces. This is the `lparse`

```

```

377 --- type specifier for a normal TeX argument.
378 ---* `r`: Given as `r` `token1` `token2`, this denotes a
379 --- required delimited argument, where the delimiters are
380 --- `token1` and `token2`. If the opening delimiter
381 --- `token1` is missing, `nil` will be
382 --- returned after a suitable error.
383 ---* `R` Given as `R` `token1` `token2` `default`,
384 --- this is a required delimited argument as for `r`,
385 --- but it has a user-definable recovery `default` instead of
386 --- `nil`.
387 ---* `v`: Reads an argument `verbatim`, between the following
388 --- character and its next occurrence.
389 ---
390 ---Optional arguments:
391 ---
392 ---* `o`: A standard LaTeX optional argument, surrounded with square
393 --- brackets, which will supply
394 --- `nil` if not given (as described later).
395 ---* `d`: Given as `d` `token1` `token2`, an optional
396 --- argument which is delimited by `token1` and `token1`.
397 --- As with `o`, if no
398 --- value is given `nil` is returned.
399 ---* `O`: Given as `O{default}`, is like `o`, but
400 --- returns `default` if no value is given.
401 ---* `D`: Given as `D` `token1` `token2` `{default}`,
402 --- it is as for `d`, but returns `default` if no value is given.
403 --- Internally, the `o`, `d` and `O` types are
404 --- short-cuts to an appropriated-constructed `D` type argument.
405 ---* `s`: An optional star, which will result in a value
406 --- `true` if a star is present and `false`
407 --- otherwise (as described later).
408 ---* `t`: An optional `token`, which will result in a value
409 --- `true` if `token` is present and `false`
410 --- otherwise. Given as `t` `token`.
411 function Scanner:new(spec)
412     local parser = {}
413     setmetatable(parser, Scanner)
414     parser.spec = spec
415     parser.args = parse_spec(spec)
416     parser.result = parser:scan()
417     return parser
418 end
419
420 ---
421 ---Scan for arguments in the token input stream.
422 ---
423 ---@return any[]
424 function Scanner:scan()
425     local result = {}
426     local index = 1
427     for _, arg in pairs(self.args) do
428         if arg.star then
429             -- s
430             result[index] = token.scan_keyword('s')
431         elseif arg.token then
432             -- t
433             result[index] = token.scan_keyword(arg.token)
434         elseif arg.optional then
435             -- o d O D
436             local oarg = scan_oarg(arg.init_delim, arg.end_delim)
437             if arg.default and oarg == nil then
438                 oarg = arg.default
439             end
440             result[index] = oarg

```

```

441     elseif arg.init_delim and arg.end_delim then
442         -- r R
443         local oarg = scan_oarg(arg.init_delim, arg.end_delim)
444         if arg.default and oarg == nil then
445             oarg = arg.default
446         end
447         if oarg == nil then
448             tex.error('Missing required argument')
449         end
450         result[index] = oarg
451     else
452         -- m v
453         local marg = token.scan_argument(arg.verbatim ~= true)
454         if marg == nil then
455             tex.error('Missing required argument')
456         end
457         result[index] = marg
458     end
459     index = index + 1
460 end
461 return result
462 end
463
464 ---@private
465 function Scanner:set_result(...)
466     self.result = { ... }
467 end
468
469 ---
470 ---@return string/boolean/nil ...
471 function Scanner:export()
472     -- #self.arg: to get all elements of the result table, also elements
473     -- with nil values.
474     return table.unpack(self.result, 1, #self.args)
475 end
476
477 function Scanner:assert(...)
478     local arguments = { ... }
479     for index, arg in ipairs(arguments) do
480         assert(self.result[index] == arg, string.format(
481             'Argument at index %d doesn't match: "%s" != "%s"',
482             index, self.result[index], arg))
483     end
484 end
485
486 function Scanner:debug()
487     for index = 1, #self.args do
488         print(index, self.result[index])
489     end
490 end
491
492 ---
493 ---@param spec string An argument specifier, for example `o m`
494 ---
495 ---Required arguments:
496 ---
497 ---* `m`: A standard mandatory argument, which can either be a single
498 --- token alone or multiple tokens surrounded by curly braces `{}`.
499 --- Regardless of the input, the argument will be passed to the
500 --- internal code without the outer braces. This is the `lparse`
501 --- type specifier for a normal TeX argument.
502 ---* `r`: Given as `r` `token1` `token2`, this denotes a
503 --- required delimited argument, where the delimiters are
504 --- `token1` and `token2`. If the opening delimiter

```

```

505 --- `token1` is missing, `nil` will be
506 --- returned after a suitable error.
507 ---* `R` Given as `R` `token1` `token2` `default`,
508 --- this is a required delimited argument as for `r`,
509 --- but it has a user-definable recovery `default` instead of
510 --- `nil`.
511 ---* `v`: Reads an argument `verbatim`, between the following
512 --- character and its next occurrence.
513 ---
514 ---Optional arguments:
515 ---
516 ---* `o`: A standard LaTeX optional argument, surrounded with square
517 --- brackets, which will supply
518 --- `nil` if not given (as described later).
519 ---* `d`: Given as `d` `token1` `token2`, an optional
520 --- argument which is delimited by `token1` and `token1`.
521 --- As with `o`, if no
522 --- value is given `nil` is returned.
523 ---* `O`: Given as `O{default}`, is like `o`, but
524 --- returns `default` if no value is given.
525 ---* `D`: Given as `D` `token1` `token2` `{default}`,
526 --- it is as for `d`, but returns `default` if no value is given.
527 --- Internally, the `o`, `d` and `O` types are
528 --- short-cuts to an appropriated-constructed `D` type argument.
529 ---* `s`: An optional star, which will result in a value
530 --- `true` if a star is present and `false`
531 --- otherwise (as described later).
532 ---* `t`: An optional `token`, which will result in a value
533 --- `true` if `token` is present and `false`
534 --- otherwise. Given as `t` `token`.
535 ---
536 ---@return Scanner
537 local function create_scanner(spec)
538   return Scanner:new(spec)
539 end
540
541 ---
542 ---Scan for arguments in the token input stream.
543 ---
544 ---@param spec string An argument specifier, for example `o m`
545 ---
546 ---Required arguments:
547 ---
548 ---* `m`: A standard mandatory argument, which can either be a single
549 --- token alone or multiple tokens surrounded by curly braces `{}`.
550 --- Regardless of the input, the argument will be passed to the
551 --- internal code without the outer braces. This is the `lparse`
552 --- type specifier for a normal TeX argument.
553 ---* `r`: Given as `r` `token1` `token2`, this denotes a
554 --- required delimited argument, where the delimiters are
555 --- `token1` and `token2`. If the opening delimiter
556 --- `token1` is missing, `nil` will be
557 --- returned after a suitable error.
558 ---* `R` Given as `R` `token1` `token2` `default`,
559 --- this is a required delimited argument as for `r`,
560 --- but it has a user-definable recovery `default` instead of
561 --- `nil`.
562 ---* `v`: Reads an argument `verbatim`, between the following
563 --- character and its next occurrence.
564 ---
565 ---Optional arguments:
566 ---
567 ---* `o`: A standard LaTeX optional argument, surrounded with square
568 --- brackets, which will supply

```

```

569 --- `nil` if not given (as described later).
570 ---* `d`: Given as `d` `token1` `token2`, an optional
571 --- argument which is delimited by `token1` and `token1`.
572 --- As with `o`, if no
573 --- value is given `nil` is returned.
574 ---* `D`: Given as `D{default}`, is like `o`, but
575 --- returns `default` if no value is given.
576 ---* `D`: Given as `D` `token1` `token2` `{default}`,
577 --- it is as for `d`, but returns `default` if no value is given.
578 --- Internally, the `o`, `d` and `D` types are
579 --- short-cuts to an appropriated-constructed `D` type argument.
580 ---* `s`: An optional star, which will result in a value
581 --- `true` if a star is present and `false`
582 --- otherwise (as described later).
583 ---* `t`: An optional `token`, which will result in a value
584 --- `true` if `token` is present and `false`
585 --- otherwise. Given as `t` `token`.
586 ---
587 ---@return boolean/string/nil ...
588 local function scan(spec)
589     local scanner = create_scanner(spec)
590     return scanner:export()
591 end
592
593 return {
594     scan = scan,
595     Scanner = create_scanner,
596     utils = { parse_spec = parse_spec, scan_oarg = scan_oarg },
597 }

```

## 3.2 lparse.tex

```
1  %% lparse.tex
2  %% Copyright 2023-2025 Josef Friedrich
3  %
4  % This work may be distributed and/or modified under the
5  % conditions of the LaTeX Project Public License, either version 1.3c
6  % of this license or (at your option) any later version.
7  % The latest version of this license is in
8  % http://www.latex-project.org/lppl.txt
9  % and version 1.3c or later is part of all distributions of LaTeX
10 % version 2008/05/04 or later.
11 %
12 % This work has the LPPL maintenance status `maintained'.
13 %
14 % The Current Maintainer of this work is Josef Friedrich.
15 %
16 % This work consists of the files lparse.lua, lparse.tex,
17 % and lparse.sty.
18
19 \directlua
20 {
21   lparse = require('lparse')
22 }
```



### 3.3 lparse.sty

```
1 %% lparse.sty
2 %% Copyright 2023-2025 Josef Friedrich
3 %
4 % This work may be distributed and/or modified under the
5 % conditions of the LaTeX Project Public License, either version 1.3c
6 % of this license or (at your option) any later version.
7 % The latest version of this license is in
8 % http://www.latex-project.org/lppl.txt
9 % and version 1.3c or later is part of all distributions of LaTeX
10 % version 2008/05/04 or later.
11 %
12 % This work has the LPPL maintenance status `maintained'.
13 %
14 % The Current Maintainer of this work is Josef Friedrich.
15 %
16 % This work consists of the files lparse.lua, lparse.tex,
17 % and lparse.sty.
18
19 \NeedsTeXFormat{LaTeX2e}
20 \ProvidesPackage{lparse}[2025/06/19 v0.2.0 Parse and scan macro arguments in Lua on
   ⇨ LuaTeX using a xparse like argument specification]
21
22 \input lparse.tex
```