

Package ‘rly’

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Type Package

Title Tools to Create Formal Language Parser

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Description R implementation of the common parsing tools 'lex' and 'yacc'.

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URL <https://github.com/systemincloud/rly>

BugReports <https://github.com/systemincloud/rly/issues>

Suggests testthat, knitr, rmarkdown

Encoding UTF-8

Depends R (>= 3.3.0)

Imports R6, futile.logger

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VignetteBuilder knitr

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lex	<i>Build a lexer</i>
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Description

Build all of the regular expression rules from definitions in the supplied module

Usage

```
lex(module = NA, args = list(), debug = FALSE, debuglog = NA,
    errorlog = NA)
```

Arguments

- module R6 class containing lex rules
- args list of arguments that should be passed to constructor
- debug on and off debug mode
- debuglog custom logger for debug messages
- errorlog custom logger for error messages

Value

Lexer ready to use

Examples

```
TOKENS = c('NAME', 'NUMBER')
LITERALS = c('=', '+', '-', '*', '/', '(', ')')

Lexer <- R6::R6Class("Lexer",
  public = list(
    tokens = TOKENS,
    literals = LITERALS,
    t_NAME = '[a-zA-Z_][a-zA-Z0-9_]*',
    t_NUMBER = function(re='\\d+', t) {
      t$value <- strtoi(t$value)
      return(t)
    },
    t_ignore = " \t",
    t_newline = function(re='\\n+', t) {
      t$lexer$lineno <- t$lexer$lineno + nchar(t$value)
```

```

        return(NULL)
    },
    t_error = function(t) {
        cat(sprintf("Illegal character '%s'", t$value[1]))
        t$lexer$skip(1)
        return(t)
    }
)
)

lexer <- rly::lex(Lexer)
lexer$input("5 + 3")
print(lexer$token())$value
# [1] 5
print(lexer$token())$value
# [1] "+"
print(lexer$token())$value
# [1] 3

```

Lexer

Lexing Engine

Description

The following Lexer class implements the lexer runtime. There are only a few public methods and attributes:

- `input()` - Store a new string in the lexer
- `token()` - Get the next token
- `clone()` - Clone the lexer
- `lineno` - Current line number
- `lexpos` - Current position in the input string

Usage

Lexer

Format

An [R6Class](#) generator object

LexToken

Lex Token

Description

Token class. This class is used to represent the tokens produced

Usage

LexToken

Format

An [R6Class](#) generator object

LRParser

The LR Parsing engine

Description

The LR Parsing engine

Usage

LRParser

Format

An [R6Class](#) generator object

NullLogger

Null logger is used when no output should be generated.

Description

Does nothing.

Usage

NullLogger

Format

A [R6Class](#) object

Examples

```
debuglog <- NullLogger$new()
debuglog$info('This will not print')
```

RlyLogger

Print log message to file or console.

Description

This object is a stand-in for a logging object created by the logging module. RLY will use this by default to create things such as the parser.out file. If a user wants more detailed information, they can create their own logging object and pass it into RLY. '

Usage

RlyLogger

Format

A [R6Class](#) object

Examples

```
debuglog <- rly::RlyLogger$new(".", "file.out")
debuglog$info('This is info message')

file.remove("file.out")
```

yacc

Build a parser

Description

This function is entry point to the library

Usage

```
yacc(module = NA, args = list(), method = "LALR", debug = FALSE,
      start = NA, check_recursion = TRUE, debugfile = "parser.out",
      outputdir = NA, debuglog = NA, errorlog = NA)
```

Arguments

module	R6 class containing rules
args	list of arguments that should be passed to constructor
method	type of algorithm
debug	on and off debug mode
start	provide custom start method
check_recursion	should yacc look for recursions in rules
debugfile	the name of the custom debug output logs
outputdir	the directory of custom debug logs
debuglog	custom logger for debug messages
errorlog	custom logger for error messages

Value

Parser ready to use

Examples

```
TOKENS = c('NAME', 'NUMBER')
LITERALS = c('=', '+', '-', '*', '/', '(', ')')

Parser <- R6::R6Class("Parser",
  public = list(
    tokens = TOKENS,
    literals = LITERALS,
    # Parsing rules
    precedence = list(c('left', '+', '-'),
                      c('left', '*', '/'),
                      c('right', 'UMINUS')),
    # dictionary of names
    names = new.env(hash=TRUE),
    p_statement_assign = function(doc='statement : NAME "=" expression', p) {
      self$names[[as.character(p$get(2))]] <- p$get(4)
    },
    p_statement_expr = function(doc='statement : expression', p) {
      cat(p$get(2))
      cat('\n')
    },
    p_expression_binop = function(doc="expression : expression '+' expression
                                   | expression '-' expression
                                   | expression '*' expression
                                   | expression '/' expression", p) {
      if(p$get(3) == '+') p$set(1, p$get(2) + p$get(4))
      else if(p$get(3) == '-') p$set(1, p$get(2) - p$get(4))
      else if(p$get(3) == '*') p$set(1, p$get(2) * p$get(4))
      else if(p$get(3) == '/') p$set(1, p$get(2) / p$get(4))
    },
```

```

    p_expression_uminus = function(doc="expression : '-' expression %prec UMINUS", p) {
      p$set(1, -p$get(3))
    },
    p_expression_group = function(doc="expression : '(' expression ')'", p) {
      p$set(1, p$get(3))
    },
    p_expression_number = function(doc='expression : NUMBER', p) {
      p$set(1, p$get(2))
    },
    p_expression_name = function(doc='expression : NAME', p) {
      p$set(1, self$names[[as.character(p$get(2))]])
    },
    p_error = function(p) {
      if(is.null(p)) cat("Syntax error at EOF")
      else          cat(sprintf("Syntax error at '%s'", p$value))
    }
  )
)

parser <- rly::yacc(Parser)

```

YaccProduction

Object sent to grammar rule

Description

This class is a wrapper around the objects actually passed to each grammar rule. Index lookup and assignment actually assign the `.value` attribute of the underlying `YaccSymbol` object. The `lineno()` method returns the line number of a given item (or 0 if not defined). The `linespan()` method returns a tuple of (startline,endline) representing the range of lines for a symbol. The `lexspan()` method returns a tuple (lexpos,endlexpos) representing the range of positional information for a symbol.

Usage

```
YaccProduction
```

Format

An [R6Class](#) generator object

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