

# Package ‘wrapr’

May 8, 2026

**Type** Package

**Title** Wrap R Tools for Debugging and Parametric Programming

**Version** 2.1.0

**Date** 2023-08-19

**URL** <https://github.com/WinVector/wrapr>,  
<https://winvector.github.io/wrapr/>

**Maintainer** John Mount <jmount@win-vector.com>

**BugReports** <https://github.com/WinVector/wrapr/issues>

**Description** Tools for writing and debugging R code. Provides:  
'%.>%' dot-pipe (an 'S3' configurable pipe), unpack/to (R style multiple assignment/return),  
'build\_frame()'/draw\_frame()' ('data.frame' example tools),  
'qc()' (quoting concatenate),  
':= ' (named map builder), 'let()' (converts non-  
standard evaluation interfaces to parametric standard  
evaluation interfaces, inspired by 'gtools::strmacro()' and 'base::bquote()'), and more.

**License** GPL-2 | GPL-3

**Encoding** UTF-8

**RoxygenNote** 7.2.3

**Depends** R (>= 3.3.0)

**Imports** utils, methods, stats

**Suggests** parallel, knitr, graphics, rmarkdown, R.rsp, tinytest

**VignetteBuilder** knitr, R.rsp

**ByteCompile** true

**NeedsCompilation** no

**Author** John Mount [aut, cre],  
Nina Zumel [aut],  
Win-Vector LLC [cph]

**Repository** CRAN

**Date/Publication** 2023-08-19 18:00:02 UTC

## Contents

wrapr-package . . . . .	3
add_name_column . . . . .	4
apply_left . . . . .	5
apply_left.default . . . . .	6
apply_left_default . . . . .	7
apply_right . . . . .	8
apply_right.default . . . . .	10
apply_right_S4 . . . . .	11
as_named_list . . . . .	12
bc . . . . .	13
bquote_call_args . . . . .	14
bquote_function . . . . .	15
buildNameCallback . . . . .	16
build_frame . . . . .	17
checkColsFormUniqueKeys . . . . .	18
check_equiv_frames . . . . .	19
clean_fit_glm . . . . .	19
clean_fit_lm . . . . .	21
coalesce . . . . .	22
DebugFn . . . . .	23
DebugFnE . . . . .	24
DebugFnW . . . . .	25
DebugFnWE . . . . .	26
DebugPrintFn . . . . .	27
DebugPrintFnE . . . . .	28
defineLambda . . . . .	29
dot_arrow . . . . .	30
draw_frame . . . . .	31
draw_framec . . . . .	32
evalb . . . . .	33
execute_parallel . . . . .	34
f . . . . .	35
grepdf . . . . .	36
grepv . . . . .	37
has_no_dup_rows . . . . .	38
invert_perm . . . . .	38
lambda . . . . .	39
lapplym . . . . .	40
let . . . . .	40
makeFunction_se . . . . .	42
mapsyms . . . . .	43
map_to_char . . . . .	44
map_upper . . . . .	45
match_order . . . . .	45
mk_formula . . . . .	46
mk_tmp_name_source . . . . .	48

named_map_builder . . . . .	49
orderv . . . . .	50
pack . . . . .	51
parLapplyLBm . . . . .	52
partition_tables . . . . .	53
pipe_impl . . . . .	54
psagg . . . . .	55
qae . . . . .	56
qc . . . . .	57
qchar_frame . . . . .	59
qe . . . . .	60
qs . . . . .	61
reduceexpand . . . . .	61
restrictToNameAssignments . . . . .	62
seqi . . . . .	63
si . . . . .	64
sinterp . . . . .	65
sortv . . . . .	66
split_at_brace_pairs . . . . .	67
stop_if_dot_args . . . . .	68
strsplit_capture . . . . .	69
sx . . . . .	70
to . . . . .	71
uniques . . . . .	72
unpack . . . . .	73
vapplym . . . . .	74
VectorizeM . . . . .	75
view . . . . .	76
[.Unpacker . . . . .	77
[<-.Unpacker . . . . .	77
%in_block% . . . . .	79
%<s% . . . . .	80
%s>% . . . . .	81
%c% . . . . .	81
%dot% . . . . .	82
%p% . . . . .	83
%qc% . . . . .	83

**Index****85**

## Description

wrapr: Wrap R Functions for Debugging and Parametric Programming

Provides `DebugFnW()` to capture function context on error for debugging, and `let()` which converts non-standard evaluation interfaces to parametric standard evaluation interfaces. `DebugFnW()` captures the calling function and arguments prior to the call causing the exception, while the classic `options(error=dump.frames)` form captures at the moment of the exception itself (thus function arguments may not be at their starting values). `let()` rebinds (possibly unbound) names to names.

For more information:

- `vignette('DebugFnW', package='wrapr')`
- `vignette('let', package='wrapr')`
- `vignette(package='wrapr')`
- Website: <https://github.com/WinVector/wrapr>
- let video: [https://youtu.be/iKLGxzzm9Hk?list=PLAKBwakacHbQp\\_Z66asDnjin-0qttT0-o9](https://youtu.be/iKLGxzzm9Hk?list=PLAKBwakacHbQp_Z66asDnjin-0qttT0-o9)
- Debug wrapper video: <https://youtu.be/zFEC9-1XSN8?list=PLAKBwakacHbQT51nPHex1on3YNCCmggZA>.

## Author(s)

**Maintainer:** John Mount <jmount@win-vector.com>

Authors:

- Nina Zumel <nzumel@win-vector.com>

Other contributors:

- Win-Vector LLC [copyright holder]

## See Also

Useful links:

- <https://github.com/WinVector/wrapr>
- <https://winvector.github.io/wrapr/>
- Report bugs at <https://github.com/WinVector/wrapr/issues>

---

add\_name\_column

*Add list name as a column to a list of data.frames.*

---

## Description

Add list name as a column to a list of data.frames.

## Usage

```
add_name_column(dlist, destinationColumn)
```

**Arguments**

dlist                    named list of data.frames  
 destinationColumn      character, name of new column to add

**Value**

list of data frames, each of which as the new destinationColumn.

**Examples**

```
dlist <- list(a = data.frame(x = 1), b = data.frame(x = 2))
add_name_column(dlist, 'name')
```

---

apply\_left

*S3 dispatch on class of pipe\_left\_arg.*

---

**Description**

For formal documentation please see [https://github.com/WinVector/wrapr/blob/master/extras/wrapr\\_pipe.pdf](https://github.com/WinVector/wrapr/blob/master/extras/wrapr_pipe.pdf).

**Usage**

```
apply_left(
  pipe_left_arg,
  pipe_right_arg,
  pipe_environment,
  left_arg_name,
  pipe_string,
  right_arg_name
)
```

**Arguments**

pipe\_left\_arg    left argument.  
 pipe\_right\_arg substitute(pipe\_right\_arg) argument.  
 pipe\_environment  
                   environment to evaluate in.  
 left\_arg\_name   name, if not NULL name of left argument.  
 pipe\_string     character, name of pipe operator.  
 right\_arg\_name name, if not NULL name of right argument.

**Value**

result

**See Also**[apply\\_left.default](#)**Examples**

```

apply_left.character <- function(pipe_left_arg,
                                pipe_right_arg,
                                pipe_environment,
                                left_arg_name,
                                pipe_string,
                                right_arg_name) {
  if(is.language(pipe_right_arg)) {
    wrapr::apply_left_default(pipe_left_arg,
                              pipe_right_arg,
                              pipe_environment,
                              left_arg_name,
                              pipe_string,
                              right_arg_name)
  } else {
    paste(pipe_left_arg, pipe_right_arg)
  }
}
setMethod(
  wrapr::apply_right_S4,
  signature = c(pipe_left_arg = "character", pipe_right_arg = "character"),
  function(pipe_left_arg,
            pipe_right_arg,
            pipe_environment,
            left_arg_name,
            pipe_string,
            right_arg_name) {
    paste(pipe_left_arg, pipe_right_arg)
  })

"a" %>% 5 %>% 7

"a" %>% toupper(.)

q <- "z"
"a" %>% q

```

---

apply\_left.default      *S3 dispatch on class of pipe\_left\_arg.*

---

**Description**

Place evaluation of left argument in `.` and then evaluate right argument.

**Usage**

```
## Default S3 method:
apply_left(
  pipe_left_arg,
  pipe_right_arg,
  pipe_environment,
  left_arg_name,
  pipe_string,
  right_arg_name
)
```

**Arguments**

pipe\_left\_arg left argument

pipe\_right\_arg substitute(pipe\_right\_arg) argument

pipe\_environment  
environment to evaluate in

left\_arg\_name name, if not NULL name of left argument.

pipe\_string character, name of pipe operator.

right\_arg\_name name, if not NULL name of right argument.

**Value**

result

**See Also**

[apply\\_left](#)

**Examples**

```
5 %.>% sin(.)
```

---

apply\_left\_default *S3 dispatch on class of pipe\_left\_arg.*

---

**Description**

Place evaluation of left argument in . and then evaluate right argument.

**Usage**

```
apply_left_default(  
  pipe_left_arg,  
  pipe_right_arg,  
  pipe_environment,  
  left_arg_name,  
  pipe_string,  
  right_arg_name  
)
```

**Arguments**

pipe\_left\_arg left argument

pipe\_right\_arg substitute(pipe\_right\_arg) argument

pipe\_environment  
environment to evaluate in

left\_arg\_name name, if not NULL name of left argument.

pipe\_string character, name of pipe operator.

right\_arg\_name name, if not NULL name of right argument.

**Value**

result

**See Also**

[apply\\_left](#)

**Examples**

```
5 %.>% sin(.)
```

---

apply\_right

*S3 dispatch on class of pipe\_right\_argument.*

---

**Description**

Triggered if right hand side of pipe stage was a name that does not resolve to a function. For formal documentation please see [https://github.com/WinVector/wrapr/blob/master/extras/wrapr\\_pipe.pdf](https://github.com/WinVector/wrapr/blob/master/extras/wrapr_pipe.pdf).

**Usage**

```
apply_right(  
  pipe_left_arg,  
  pipe_right_arg,  
  pipe_environment,  
  left_arg_name,  
  pipe_string,  
  right_arg_name  
)
```

**Arguments**

`pipe_left_arg` left argument

`pipe_right_arg` right argument

`pipe_environment`  
environment to evaluate in

`left_arg_name` name, if not NULL name of left argument.

`pipe_string` character, name of pipe operator.

`right_arg_name` name, if not NULL name of right argument.

**Value**

result

**See Also**

[apply\\_left](#), [apply\\_right\\_S4](#)

**Examples**

```
# simulate a function pointer  
apply_right.list <- function(pipe_left_arg,  
                             pipe_right_arg,  
                             pipe_environment,  
                             left_arg_name,  
                             pipe_string,  
                             right_arg_name) {  
  pipe_right_arg$f(pipe_left_arg)  
}  
  
f <- list(f=sin)  
2 %>% f  
f$f <- cos  
2 %>% f
```

---

apply\_right.default    *Default apply\_right implementation.*

---

### Description

Default apply\_right implementation: S4 dispatch to apply\_right\_S4.

### Usage

```
## Default S3 method:
apply_right(
  pipe_left_arg,
  pipe_right_arg,
  pipe_environment,
  left_arg_name,
  pipe_string,
  right_arg_name
)
```

### Arguments

pipe\_left\_arg    left argument  
pipe\_right\_arg   pipe\_right\_arg argument  
pipe\_environment  
                  environment to evaluate in  
left\_arg\_name    name, if not NULL name of left argument.  
pipe\_string      character, name of pipe operator.  
right\_arg\_name   name, if not NULL name of right argument.

### Value

result

### See Also

[apply\\_left](#), [apply\\_right](#), [apply\\_right\\_S4](#)

### Examples

```
# simulate a function pointer
apply_right.list <- function(pipe_left_arg,
                             pipe_right_arg,
                             pipe_environment,
                             left_arg_name,
                             pipe_string,
                             right_arg_name) {
  pipe_right_arg$f(pipe_left_arg)
```

```
}  
  
f <- list(f=sin)  
2 %.>% f  
f$f <- cos  
2 %.>% f
```

---

apply\_right\_S4

*S4 dispatch method for apply\_right.*

---

## Description

Intended to be generic on first two arguments.

## Usage

```
apply_right_S4(  
  pipe_left_arg,  
  pipe_right_arg,  
  pipe_environment,  
  left_arg_name,  
  pipe_string,  
  right_arg_name  
)
```

## Arguments

pipe\_left\_arg left argument  
pipe\_right\_arg pipe\_right\_arg argument  
pipe\_environment environment to evaluate in  
left\_arg\_name name, if not NULL name of left argument.  
pipe\_string character, name of pipe operator.  
right\_arg\_name name, if not NULL name of right argument.

## Value

result

## See Also

[apply\\_left](#), [apply\\_right](#)

**Examples**

```

a <- data.frame(x = 1)
b <- data.frame(x = 2)

# a %.>% b # will (intentionally) throw

setMethod(
  "apply_right_S4",
  signature("data.frame", "data.frame"),
  function(pipe_left_arg,
           pipe_right_arg,
           pipe_environment,
           left_arg_name,
           pipe_string,
           right_arg_name) {
    rbind(pipe_left_arg, pipe_right_arg)
  })

a %.>% b # should equal data.frame(x = c(1, 2))

```

---

as\_named\_list

*Capture named objects as a named list.*


---

**Description**

Build a named list from a sequence of named arguments of the form NAME, or NAME = VALUE. This is intended to shorten forms such as `list(a = a, b = b)` to `as_named_list(a, b)`.

**Usage**

```
as_named_list(...)
```

**Arguments**

... argument names (must be names, not strings or values) plus possible assigned values.

**Value**

a named list mapping argument names to argument values

**Examples**

```

a <- data.frame(x = 1)
b <- 2

str(as_named_list(a, b))

```

```

as_named_list(a, x = b, c = 1 + 1)

# an example application for this function is managing saving and
# loading values into the workspace.
if(FALSE) {
  # remotes::install_github("WinVector/wrapr")
  library(wrapr)

  a <- 5
  b <- 7
  do_not_want <- 13

  # save the elements of our workspace we want
  saveRDS(as_named_list(a, b), 'example_data.RDS')

  # clear values out of our workspace for the example
  rm(list = ls())
  ls()
  # notice workspace environemnt now empty

  # read back while documenting what we expect to
  # read in
  unpack[a, b] <- readRDS('example_data.RDS')

  # confirm what we have, the extra unpack is a side
  # effect of the []<- notation. To avoid this instead
  # use one of:
  #   unpack(readRDS('example_data.RDS'), a, b)
  #   readRDS('example_data.RDS') %.>% unpack(., a, b)
  #   readRDS('example_data.RDS') %.>% unpack[a, b]
  ls()
  # notice do_not_want is not present

  print(a)

  print(b)
}

```

---

bc

*Blank Concatenate. Parse argument as a vector of values allowing "blank separators".*

---

### Description

Separates string data on whitespace and separating symbols into an array.

### Usage

```
bc(s, ..., sep_symbols = ",|", strict = TRUE, convert = TRUE)
```

**Arguments**

s	string to parse
...	force later arguments to be set by name
sep_symbols	characters to consider separators
strict	logical, if TRUE throw exception on confusing input
convert	logical, if TRUE try to convert from string type to other types

**Details**

Can throw exception on lack of explicit value separators, example: `bc('"a"b"')` and non-matching portions. Whitespace is normalized to spaces. Attempts to split on obvious number format boundaries. Suggested by Emil Erik Pula Bellamy Begtrup-Bright <https://github.com/WinVector/wrapr/issues/12>.

**Value**

vector of values

**See Also**

[qc](#), [qe](#), [qae](#), [bquote](#), [sx](#)

**Examples**

```
bc('1 2 "c", d') # returns c("1", "2", "c", "d")
bc('1 2 3') # returns c(1, 2, 3)
bc('1 2 "3"') # returns c("1", "2", "3")
bc('1,2|3.4') # returns c(1, 2, 3.4)
bc('01 02', convert=FALSE) # returns c("01", "02")
```

---

bquote\_call\_args

*Treat ... argument as bquoted-values.*

---

**Description**

bquote\_call\_args is a helper to allow the user to write functions with bquote-enabled argument substitution. Uses convention that `:=` is considered an alias for `=`. Re-writes call args to evaluate `expr` with bquote `.` (`()`) substitution. Including `.` (`-x`) promoting `x`'s value from character to a name, which is called "quote negation" (hence the minus-sign).

**Usage**

```
bquote_call_args(call, env = parent.frame())
```

**Arguments**

call            result of match.call()  
 env            environment to perform lookups in.

**Value**

name list of values

**See Also**

[bquote\\_function](#)

**Examples**

```
f <- function(q, ...) {
  env = parent.frame()
  # match.call() best called in function context.
  captured_call <- match.call()
  captured_args <- bquote_call_args(captured_call, env)
  captured_args
}

z <- "x"
y <- 5
qv <- 3

# equivalent to f(3, x = 5)
f(.(qv), .(z) := .(y))

# equivalent to f(q = 7)
qname <- 'q'
f(.(qname) := 7)
```

---

bquote\_function            *Adapt a function to use bquote on its arguments.*

---

**Description**

bquote\_function is for adapting a function defined elsewhere for bquote-enabled argument substitution. Re-write call to evaluate expr with bquote .() substitution. Uses convention that := is considered a alias for =. Including .(-x) promoting x's value from character to a name, which is called "quote negation" (hence the minus-sign).

**Usage**

```
bquote_function(fn)
```

**Arguments**

fn                    function to adapt, must have non-empty formals().

**Value**

new function.

**See Also**

[bquote\\_call\\_args](#)

**Examples**

```
if(requireNamespace('graphics', quietly = TRUE)) {
  angle = 1:10
  variable <- as.name("angle")
  plotb <- bquote_function(graphics::plot)
  plotb(x = .(variable), y = sin(.(variable)))
}
```

```
f1 <- function(x) { substitute(x) }
f2 <- bquote_function(f1)
arg <- "USER_ARG"
f2(arg)     # returns arg
f2.(arg)   # returns "USER_ARG" (character)
f2.(-arg)  # returns USER_ARG (name)
```

---

buildNameCallback	<i>Build a custom writeback function that writes state into a user named variable.</i>
-------------------	--

---

**Description**

Build a custom writeback function that writes state into a user named variable.

**Usage**

```
buildNameCallback(varName)
```

**Arguments**

varName                character where to write captured state

**Value**

writback function for use with functions such as [DebugFnW](#)

**Examples**

```
# user function
f <- function(i) { (1:10)[[i]] }
# capture last error in variable called "lastError"
writeBack <- buildNameCallback('lastError')
# wrap function with writeBack
df <- DebugFnW(writeBack,f)
# capture error (Note: tryCatch not needed for user code!)
tryCatch(
  df(12),
  error = function(e) { print(e) })
# examine error
str(lastError)
# redo call, perhaps debugging
tryCatch(
  do.call(lastError$fn_name, lastError$args),
  error = function(e) { print(e) })
```

---

build\_frame

*Build a data.frame from the user's description.*

---

**Description**

A convenient way to build a data.frame in legible transposed form. Position of first "|" (or other infix operator) determines number of columns (all other infix operators are aliases for "|"). Names are de-referenced.

**Usage**

```
build_frame(..., cf_eval_environment = parent.frame())
```

**Arguments**

... cell names, first infix operator denotes end of header row of column names.  
 cf\_eval\_environment environment to evaluate names in.

**Value**

character data.frame

**See Also**

[draw\\_frame](#), [qchar\\_frame](#)

**Examples**

```

tc_name <- "training"
x <- build_frame(
  "measure",          tc_name, "validation" |
  "minus binary cross entropy", 5, -7      |
  "accuracy",          0.8, 0.6          )
print(x)
str(x)
cat(draw_frame(x))

build_frame(
  "x" |
  -1 |
  2  )

```

---

checkColsFormUniqueKeys

*Check that a set of columns form unique keys.*

---

**Description**

For local data.frame only.

**Usage**

```
checkColsFormUniqueKeys(data, keyColNames)
```

**Arguments**

data            data.frame to work with.  
keyColNames    character array of column names to check.

**Value**

logical TRUE if the rows of data are unique addressable by the columns named in keyColNames.

**Examples**

```

d <- data.frame(key = c('a','a', 'b'), k2 = c(1 ,2, 2))
checkColsFormUniqueKeys(d, 'key') # should be FALSE
checkColsFormUniqueKeys(d, c('key', 'k2')) # should be TRUE

```

---

check_equiv_frames	<i>Check two data.frames are equivalent after sorting columns and rows.</i>
--------------------	---

---

**Description**

Confirm two dataframes are equivalent after reordering columns and rows.

**Usage**

```
check_equiv_frames(d1, d2, ..., tolerance = sqrt(.Machine$double.eps))
```

**Arguments**

d1	data.frame 1
d2	data.frame 2
...	force later arguments to bind by name
tolerance	numeric comparison tolerance

**Value**

logical TRUE if equivalent

---

clean_fit_glm	<i>Fit a stats::glm without carrying back large structures.</i>
---------------	---

---

**Description**

Please see <https://win-vector.com/2014/05/30/trimming-the-fat-from-glm-models-in-r/> for discussion.

**Usage**

```
clean_fit_glm(
  outcome,
  variables,
  data,
  ...,
  family,
  intercept = TRUE,
  outcome_target = NULL,
  outcome_comparator = "==",
  weights = NULL,
  env = baseenv()
)
```

**Arguments**

outcome	character, name of outcome column.
variables	character, names of variable columns.
data	data.frame, training data.
...	not used, force later arguments to be used by name
family	passed to stats::glm()
intercept	logical, if TRUE allow an intercept term.
outcome_target	scalar, if not NULL write outcome==outcome_target in formula.
outcome_comparator	one of "=", "!=", ">=", "<=", ">", "<", only use of outcome_target is not NULL.
weights	passed to stats::glm()
env	environment to work in.

**Value**

list(model=model, summary=summary)

**Examples**

```
mk_data_example <- function(k) {
  data.frame(
    x1 = rep(c("a", "a", "b", "b"), k),
    x2 = rep(c(0, 0, 0, 1), k),
    y = rep(1:4, k),
    yC = rep(c(FALSE, TRUE, TRUE, TRUE), k),
    stringsAsFactors = FALSE)
}

res_glm <- clean_fit_glm("yC", c("x1", "x2"),
  mk_data_example(1),
  family = binomial)
length(serialize(res_glm$model, NULL))

res_glm <- clean_fit_glm("yC", c("x1", "x2"),
  mk_data_example(10000),
  family = binomial)
length(serialize(res_glm$model, NULL))

predict(res_glm$model,
  newdata = mk_data_example(1),
  type = "response")
```

---

clean_fit_lm	<i>Fit a stats::lm without carrying back large structures.</i>
--------------	--

---

## Description

Please see <https://win-vector.com/2014/05/30/trimming-the-fat-from-glm-models-in-r/> for discussion.

## Usage

```
clean_fit_lm(  
  outcome,  
  variables,  
  data,  
  ...,  
  intercept = TRUE,  
  weights = NULL,  
  env = baseenv()  
)
```

## Arguments

outcome	character, name of outcome column.
variables	character, names of variable columns.
data	data.frame, training data.
...	not used, force later arguments to be used by name
intercept	logical, if TRUE allow an intercept term.
weights	passed to stats::glm()
env	environment to work in.

## Value

list(model=model, summary=summary)

## Examples

```
mk_data_example <- function(k) {  
  data.frame(  
    x1 = rep(c("a", "a", "b", "b"), k),  
    x2 = rep(c(0, 0, 0, 1), k),  
    y = rep(1:4, k),  
    yC = rep(c(FALSE, TRUE, TRUE, TRUE), k),  
    stringsAsFactors = FALSE)  
}  
  
res_lm <- clean_fit_lm("y", c("x1", "x2"),
```

```

                                mk_data_example(1))
length(serialize(res_lm$model, NULL))

res_lm <- clean_fit_lm("y", c("x1", "x2"),
                      mk_data_example(10000))
length(serialize(res_lm$model, NULL))

predict(res_lm$model,
        newdata = mk_data_example(1))

```

---

coalesce

*Coalesce values (NULL/NA on left replaced by values on the right).*


---

### Description

This is a simple "try to take values on the left, but fall back to the right if they are not available" operator. It is inspired by SQL coalesce and the notation is designed to evoke the idea of testing and the C# ?? null coalescing operator. NA and NULL are treated roughly equally: both are replaced regardless of available replacement value (with some exceptions). The exceptions are: if the left hand side is a non-zero length vector we preserve the vector type of the left-hand side and do not assign any values that vectors can not hold (NULLs and complex structures) and do not replace with a right argument list.

### Usage

```

coalesce(coalesce_left_arg, coalesce_right_arg)

coalesce_left_arg %?? coalesce_right_arg

```

### Arguments

```

coalesce_left_arg
    vector or list.
coalesce_right_arg
    vector or list.

```

### Details

This operator represents a compromise between the desire to replace length zero structures and NULL/NA values and the desire to preserve the first argument's structure (vector versus list). The order of operations has been chosen to be safe, convenient, and useful. Length zero lists are not treated as NULL (which is consistent with R in general). Note for non-vector operations on conditions we recommend looking into `isTRUE`, which solves some problems even faster than coalesce style operators.

When `length(coalesce_left_arg) <= 0` then return `coalesce_right_arg` if `length(coalesce_right_arg) > 0`, otherwise return `coalesce_left_arg`. When `length(coalesce_left_arg) > 0`: assume `coalesce_left_arg`

is a list or vector and `coalesce_right_arg` is a list or vector that is either the same length as `coalesce_left_arg` or length 1. In this case replace NA/NULL elements of `coalesce_left_arg` with corresponding elements of `coalesce_right_arg` (re-cycling `coalesce_right_arg` when it is length 1).

### Value

`coalesce_left_arg` with NA elements replaced.

### Functions

- `coalesce_left_arg` %?% `coalesce_right_arg`: coalesce operator

### Examples

```
c(NA, NA, NA) %?% 5           # returns c(5, 5, 5)
c(1, NA, NA) %?% list(5)      # returns c(1, 5, 5)
c(1, NA, NA) %?% list(list(5)) # returns c(1, NA, NA)
c(1, NA, NA) %?% c(NA, 20, NA) # returns c(1, 20, NA)
NULL %?% list()              # returns NULL
NULL %?% c(1, NA)            # returns c(1, NA)
list(1, NULL, NULL) %?% c(3, 4, NA) # returns list(1, 4, NA_real_)
list(1, NULL, NULL, NA, NA) %?% list(2, NULL, NA, NULL, NA) # returns list(1, NULL, NA, NULL, NA)
c(1, NA, NA) %?% list(1, 2, list(3)) # returns c(1, 2, NA)
c(1, NA) %?% list(1, NULL)          # returns c(1, NA)
c() %?% list(1, NA, NULL)           # returns list(1, NA, NULL)
c() %?% c(1, NA, 2)                 # returns c(1, NA, 2)
```

---

DebugFn	<i>Capture arguments of exception throwing function call for later debugging.</i>
---------	---

---

### Description

Run fn, save arguments on failure. Please see: `vignette("DebugFnW", package="wrapr")`.

### Usage

```
DebugFn(saveDest, fn, ...)
```

### Arguments

<code>saveDest</code>	where to write captured state (determined by type): NULL random temp file, character temp file, name <code>globalenv()</code> variable, and function triggers callback.
<code>fn</code>	function to call
<code>...</code>	arguments for <code>fn</code>

**Value**

fn(...) normally, but if fn(...) throws an exception save to saveDest RDS of list r such that do.call(r\$fn,r\$args) repeats the call to fn with args.

**See Also**

[dump.frames](#), [DebugFn](#), [DebugFnW](#), [DebugFnWE](#), [DebugPrintFn](#), [DebugFnE](#), [DebugPrintFnE](#)

**Examples**

```
saveDest <- paste0(tempfile('debug'), '.RDS')
f <- function(i) { (1:10)[[i]] }
# correct run
DebugFn(saveDest, f, 5)
# now re-run
# capture error on incorrect run
tryCatch(
  DebugFn(saveDest, f, 12),
  error = function(e) { print(e) })
# examine details
situation <- readRDS(saveDest)
str(situation)
# fix and re-run
situation$args[[1]] <- 6
do.call(situation$fn_name, situation$args)
# clean up
file.remove(saveDest)
```

---

DebugFnE

*Capture arguments and environment of exception throwing function call for later debugging.*

---

**Description**

Run fn, save arguments, and environment on failure. Please see: `vignette("DebugFnW", package="wrapp")`.

**Usage**

```
DebugFnE(saveDest, fn, ...)
```

**Arguments**

saveDest	where to write captured state (determined by type): NULL random temp file, character temp file, name globalenv() variable, and function triggers callback.
fn	function to call
...	arguments for fn

**Value**

fn(...) normally, but if fn(...) throws an exception save to saveDest RDS of list r such that do.call(r\$fn,r\$args) repeats the call to fn with args.

**See Also**

[dump.frames](#), [DebugFn](#), [DebugFnW](#), [DebugFnWE](#), [DebugPrintFn](#), [DebugFnE](#), [DebugPrintFnE](#)

**Examples**

```
saveDest <- paste0(tempfile('debug'), '.RDS')
f <- function(i) { (1:10)[[i]] }
# correct run
DebugFnE(saveDest, f, 5)
# now re-run
# capture error on incorrect run
tryCatch(
  DebugFnE(saveDest, f, 12),
  error = function(e) { print(e) })
# examine details
situation <- readRDS(saveDest)
str(situation)
# fix and re-run
situation$args[[1]] <- 6
do.call(situation$fn, situation$args, envir=situation$env)
# clean up
file.remove(saveDest)
```

---

DebugFnW

*Wrap a function for debugging.*

---

**Description**

Wrap fn, so it will save arguments on failure.

**Usage**

```
DebugFnW(saveDest, fn)
```

**Arguments**

saveDest	where to write captured state (determined by type): NULL random temp file, character temp file, name globalenv() variable, and function triggers callback.
fn	function to call

**Value**

wrapped function that saves state on error.

**See Also**

`dump.frames`, `DebugFn`, `DebugFnW`, `DebugFnWE`, `DebugPrintFn`, `DebugFnE`, `DebugPrintFnE` Operator idea from: <https://gist.github.com/nassimhaddad/c9c327d10a91dcf9a3370d30dff8ac3d>. Please see: `vignette("DebugFnW", package="wrapr")`.

**Examples**

```
saveDest <- paste0(tempfile('debug'), '.RDS')
f <- function(i) { (1:10)[[i]] }
df <- DebugFnW(saveDest, f)
# correct run
df(5)
# now re-run
# capture error on incorrect run
tryCatch(
  df(12),
  error = function(e) { print(e) })
# examine details
situation <- readRDS(saveDest)
str(situation)
# fix and re-run
situation$args[[1]] <- 6
do.call(situation$fn, situation$args)
# clean up
file.remove(saveDest)

f <- function(i) { (1:10)[[i]] }
curEnv <- environment()
writeBack <- function(sit) {
  assign('lastError', sit, envir=curEnv)
}
attr(writeBack, 'name') <- 'writeBack'
df <- DebugFnW(writeBack, f)
tryCatch(
  df(12),
  error = function(e) { print(e) })
str(lastError)
```

---

DebugFnWE

*Wrap function to capture arguments and environment of exception throwing function call for later debugging.*

---

**Description**

Wrap fn, so it will save arguments and environment on failure. Please see: `vignette("DebugFnW", package="wrapr")`.

**Usage**

```
DebugFnWE(saveDest, fn, ...)
```

**Arguments**

saveDest	where to write captured state (determined by type): NULL random temp file, character temp file, name globalenv() variable, and function triggers callback.
fn	function to call
...	arguments for fn

**Value**

wrapped function that captures state on error.

**See Also**

[dump.frames](#), [DebugFn](#), [DebugFnW](#), [DebugFnWE](#), [DebugPrintFn](#), [DebugFnE](#), [DebugPrintFnE](#)

Idea from: <https://gist.github.com/nassimhaddad/c9c327d10a91dcf9a3370d30dff8ac3d>

**Examples**

```
saveDest <- paste0(tempfile('debug'), '.RDS')
f <- function(i) { (1:10)[[i]] }
df <- DebugFnWE(saveDest, f)
# correct run
df(5)
# now re-run
# capture error on incorrect run
tryCatch(
  df(12),
  error = function(e) { print(e) })
# examine details
situation <- readRDS(saveDest)
str(situation)
# fix and re-run
situation$args[[1]] <- 6
do.call(situation$fn, situation$args, envir=situation$env)
# clean up
file.remove(saveDest)
```

---

DebugPrintFn

*Capture arguments of exception throwing function call for later debugging.*

---

**Description**

Run fn and print result, save arguments on failure. Use on systems like ggplot() where some calculation is delayed until print(). Please see: vignette("DebugFnW", package="wrapr").

**Usage**

```
DebugPrintFn(saveDest, fn, ...)
```

**Arguments**

saveDest	where to write captured state (determined by type): NULL random temp file, character temp file, name globalenv() variable, and function triggers callback.
fn	function to call
...	arguments for fn

**Value**

fn(...) normally, but if fn(...) throws an exception save to saveDest RDS of list r such that do.call(r\$fn,r\$args) repeats the call to fn with args.

**See Also**

[dump.frames](#), [DebugFn](#), [DebugFnW](#), [DebugFnWE](#), [DebugPrintFn](#), [DebugFnE](#), [DebugPrintFnE](#)

**Examples**

```
saveDest <- paste0(tempfile('debug'), '.RDS')
f <- function(i) { (1:10)[[i]] }
# correct run
DebugPrintFn(saveDest, f, 5)
# now re-run
# capture error on incorrect run
tryCatch(
  DebugPrintFn(saveDest, f, 12),
  error = function(e) { print(e) })
# examine details
situation <- readRDS(saveDest)
str(situation)
# fix and re-run
situation$args[[1]] <- 6
do.call(situation$fn,situation$args)
# clean up
file.remove(saveDest)
```

---

DebugPrintFnE

*Capture arguments and environment of exception throwing function call for later debugging.*

---

**Description**

Run fn and print result, save arguments and environment on failure. Use on systems like ggplot() where some calculation is delayed until print(). Please see: vignette("DebugFnW", package="rwrap").

**Usage**

```
DebugPrintFnE(saveDest, fn, ...)
```

**Arguments**

saveDest	where to write captured state (determined by type): NULL random temp file, character temp file, name globalenv() variable, and function triggers callback.
fn	function to call
...	arguments for fn

**Value**

fn(...) normally, but if fn(...) throws an exception save to saveDest RDS of list r such that do.call(r\$fn,r\$args) repeats the call to fn with args.

**See Also**

[dump.frames](#), [DebugFn](#), [DebugFnW](#), [DebugFnWE](#), [DebugPrintFn](#), [DebugFnE](#), [DebugPrintFnE](#)

**Examples**

```
saveDest <- paste0(tempfile('debug'), '.RDS')
f <- function(i) { (1:10)[[i]] }
# correct run
DebugPrintFnE(saveDest, f, 5)
# now re-run
# capture error on incorrect run
tryCatch(
  DebugPrintFnE(saveDest, f, 12),
  error = function(e) { print(e) })
# examine details
situation <- readRDS(saveDest)
str(situation)
# fix and re-run
situation$args[[1]] <- 6
do.call(situation$fn, situation$args, envir=situation$env)
# clean up
file.remove(saveDest)
```

---

defineLambda

*Define lambda function building function.*


---

**Description**

Use this to place a copy of the lambda-symbol function builder in your workspace.

**Usage**

```
defineLambda(envir = parent.frame(), name = NULL)
```

**Arguments**

```
envir      environment to work in.
name       character, name to assign to (defaults to Greek lambda).
```

**See Also**

[lambda](#), [makeFunction\\_se](#), [named\\_map\\_builder](#)

**Examples**

```
defineLambda()
# ls()
```

---

dot_arrow	<i>Pipe operator ("dot arrow", "dot pipe" or "dot arrow pipe").</i>
-----------	---

---

**Description**

Defined as roughly : `a %>.% b ~ { . <- a; b }`; (with visible `.`-side effects).

**Usage**

```
pipe_left_arg %>% pipe_right_arg
```

```
pipe_left_arg %>.% pipe_right_arg
```

```
pipe_left_arg %.% pipe_right_arg
```

**Arguments**

```
pipe_left_arg  left argument expression (substituted into .)
```

```
pipe_right_arg right argument expression (presumably including .)
```

**Details**

The pipe operator has a couple of special cases. First: if the right hand side is a name, then we try to de-reference it and apply it as a function or surrogate function.

The pipe operator checks for and throws an exception for a number of "piped into nothing cases" such as `5 %>% sin()`, many of these checks can be turned off by adding braces.

For some discussion, please see <https://win-vector.com/2017/07/07/in-praise-of-syntactic-sugar/>.

For some more examples, please see the package README <https://github.com/WinVector/>

`wrapr`. For formal documentation please see [https://github.com/WinVector/wrapr/blob/master/extras/wrapr\\_pipe.pdf](https://github.com/WinVector/wrapr/blob/master/extras/wrapr_pipe.pdf). For a base-R step-debuggable pipe please try the Bizarro Pipe <https://win-vector.com/2017/01/29/using-the-bizarro-pipe-to-debug-magrittr-pipelines-in-r/>. `%>.%` and `%.>%` are synonyms.

The dot arrow pipe has S3/S4 dispatch (please see <https://journal.r-project.org/archive/2018/RJ-2018-042/index.html>). However as the right-hand side of the pipe is normally held unevaluated, we don't know the type except in special cases (such as the right-hand side being referred to by a name or variable). To force the evaluation of a pipe term, simply wrap it in `.()`.

## Value

```
eval({ . <- pipe_left_arg; pipe_right_arg });)
```

## Functions

- `pipe_left_arg %.>% pipe_right_arg`: dot arrow
- `pipe_left_arg %>.% pipe_right_arg`: alias for dot arrow
- `pipe_left_arg %.% pipe_right_arg`: alias for dot arrow

## Examples

```
# both should be equal:
cos(exp(sin(4)))
4 %.>% sin(.) %.>% exp(.) %.>% cos(.)

f <- function() { sin }
# returns f() ignoring dot, not what we want
5 %.>% f()
# evaluates f() early then evaluates result with .-substitution rules
5 %.>% .(f())
```

---

draw\_frame

*Render a simple data.frame in build\_frame format.*

---

## Description

Render a simple data.frame in build\_frame format.

## Usage

```
draw_frame(
  x,
  ...,
  time_format = "%Y-%m-%d %H:%M:%S",
  formatC_options = list(),
  adjust_for_auto_indent = 2
)
```

**Arguments**

**x** data.frame (with atomic types).  
**...** not used for values, forces later arguments to bind by name.  
**time\_format** character, format for "POSIXt" classes.  
**formatC\_options** named list, options for formatC()- used on numerics.  
**adjust\_for\_auto\_indent** integer additional after first row padding

**Value**

character

**See Also**

[build\\_frame](#), [qchar\\_frame](#)

**Examples**

```

tc_name <- "training"
x <- build_frame(
  "measure"           , tc_name, "validation", "idx" |
  "minus binary cross entropy", 5      , 7      , 1L   |
  "accuracy"          , 0.8    , 0.6    , 2L   )
print(x)
cat(draw_frame(x))

```

---

draw\_framec

*Render a simple data.frame in qchar\_frame format.*

---

**Description**

Render a simple data.frame in qchar\_frame format.

**Usage**

```
draw_framec(x, ..., unquote_cols = character(0), adjust_for_auto_indent = 2)
```

**Arguments**

**x** data.frame (with character types).  
**...** not used for values, forces later arguments to bind by name.  
**unquote\_cols** character, columns to elide quotes from.  
**adjust\_for\_auto\_indent** integer additional after first row padding.

**Value**

character

**See Also**

[build\\_frame](#), [qchar\\_frame](#)

**Examples**

```
controlTable <- wrapr::qchar_frame(
  "flower_part", "Length"      , "Width"      |
  "Petal"       , Petal.Length , Petal.Width |
  "Sepal"       , Sepal.Length , Sepal.Width )
cat(draw_framec(controlTable, unquote_cols = qc(Length, Width)))
```

---

evalb

*Near eval(bquote(expr)) shortcut.*

---

**Description**

Evaluate `expr` with `bquote .()` substitution. Including `.-x` promoting `x`'s value from character to a name, which is called "quote negation" (hence the minus-sign).

**Usage**

```
evalb(expr, where = parent.frame())
```

**Arguments**

`expr`                    expression to evaluate.  
`where`                   environment to work in.

**Value**

evaluated substituted expression.

**Examples**

```
if(requireNamespace('graphics', quietly = TRUE)) {
  angle = 1:10
  variable <- as.name("angle")
  fn_name <- 'sin'
  evalb( plot(x = .(variable), y = .(-fn_name).(variable)) )
}
```

---

execute\_parallel      *Execute f in parallel partitioned by partition\_column.*

---

### Description

Execute `f` in parallel partitioned by `partition_column`, see [partition\\_tables](#) for details.

### Usage

```
execute_parallel(
  tables,
  f,
  partition_column,
  ...,
  cl = NULL,
  debug = FALSE,
  env = parent.frame()
)
```

### Arguments

<code>tables</code>	named map of tables to use.
<code>f</code>	function to apply to each tableset signature is function takes a single argument that is a named list of data.frames.
<code>partition_column</code>	character name of column to partition on
<code>...</code>	force later arguments to bind by name.
<code>cl</code>	parallel cluster.
<code>debug</code>	logical if TRUE use <code>lapply</code> instead of <code>parallel::clusterApplyLB</code> .
<code>env</code>	environment to look for values in.

### Value

list of `f` evaluations.

### See Also

[partition\\_tables](#)

### Examples

```
if(requireNamespace("parallel", quietly = TRUE)) {
  cl <- parallel::makeCluster(2)

  d <- data.frame(x = 1:5, g = c(1, 1, 2, 2, 2))
  f <- function(d1) {
```

```

    d <- d$d
    d$s <- sqrt(d$x)
    d
  }
  r <- execute_parallel(list(d = d), f,
                        partition_column = "g",
                        cl = cl) %.>%
    do.call(rbind, .) %.>%
    print(.)

  parallel::stopCluster(cl)
}

```

---

f. *Build an anonymous function of dot.*

---

### Description

Build an anonymous function of dot.

### Usage

```
f.(body, env = parent.frame())
```

### Arguments

body	function body
env	environment to work in.

### Value

user defined function.

### See Also

[lambda](#), [defineLambda](#), [named\\_map\\_builder](#), [makeFunction\\_se](#)

### Examples

```

f <- f.(sin(.) %.>% cos(.))
7 %.>% f

```

---

`grepdf`*Grep for column names from a data.frame*

---

**Description**

Grep for column names from a data.frame

**Usage**

```
grepdf(  
  pattern,  
  x,  
  ...,  
  ignore.case = FALSE,  
  perl = FALSE,  
  value = FALSE,  
  fixed = FALSE,  
  useBytes = FALSE,  
  invert = FALSE  
)
```

**Arguments**

<code>pattern</code>	passed to <a href="#">grep</a>
<code>x</code>	data.frame to work with
<code>...</code>	force later arguments to be passed by name
<code>ignore.case</code>	passed to <a href="#">grep</a>
<code>perl</code>	passed to <a href="#">grep</a>
<code>value</code>	passed to <a href="#">grep</a>
<code>fixed</code>	passed to <a href="#">grep</a>
<code>useBytes</code>	passed to <a href="#">grep</a>
<code>invert</code>	passed to <a href="#">grep</a>

**Value**

column names of x matching grep condition.

**See Also**

[grep](#), [grepv](#)

## Examples

```
d <- data.frame(xa=1, yb=2)

# starts with
grepdf('^x', d)

# ends with
grepdf('b$', d)
```

---

grepv	<i>Return a vector of matches.</i>
-------	------------------------------------

---

## Description

Return a vector of matches.

## Usage

```
grepv(
  pattern,
  x,
  ...,
  ignore.case = FALSE,
  perl = FALSE,
  fixed = FALSE,
  useBytes = FALSE,
  invert = FALSE
)
```

## Arguments

pattern	character scalar, pattern to match, passed to <a href="#">grep</a> .
x	character vector to match to, passed to <a href="#">grep</a> .
...	not used, forced later arguments to bind by name.
ignore.case	logical, passed to <a href="#">grep</a> .
perl	logical, passed to <a href="#">grep</a> .
fixed	logical, passed to <a href="#">grep</a> .
useBytes	logical, passed <a href="#">grep</a> .
invert	passed to <a href="#">grep</a> .

## Value

vector of matching values.

**See Also**

[grep](#), [grepdf](#)

**Examples**

```
grepv("x$", c("sox", "xor"))
```

---

has_no_dup_rows	<i>Check for duplicate rows.</i>
-----------------	----------------------------------

---

**Description**

Check a simple data.frame (no list or exotic rows) for duplicate rows.

**Usage**

```
has_no_dup_rows(data)
```

**Arguments**

data            data.frame

**Value**

TRUE if there are no duplicate rows, else FALSE.

---

invert_perm	<i>Invert a permutation.</i>
-------------	------------------------------

---

**Description**

For a permutation  $p$  build  $q$  such that  $p[q] == q[p] == \text{seq\_len}(\text{length}(p))$ . Please see <https://win-vector.com/2017/05/18/on-indexing-operators-and-composition/> and <https://win-vector.com/2017/09/02/permutation-theory-in-action/>.

**Usage**

```
invert_perm(p)
```

**Arguments**

$p$             vector of length  $n$  containing each of  $\text{seq\_len}(n)$  exactly once.

**Value**

vector  $q$  such that  $p[q] == q[p] == \text{seq\_len}(\text{length}(p))$

**Examples**

```
p <- c(4, 5, 7, 8, 9, 6, 1, 3, 2, 10)
q <- invert_perm(p)
p[q]
all.equal(p[q], seq_len(length(p)))
q[p]
all.equal(q[p], seq_len(length(p)))
```

---

lambda	<i>Build an anonymous function.</i>
--------	-------------------------------------

---

**Description**

Mostly just a place-holder so lambda-symbol form has somewhere safe to hang its help entry.

**Usage**

```
lambda(..., env = parent.frame())
```

**Arguments**

...	formal parameters of function, unbound names, followed by function body (code/language).
env	environment to work in

**Value**

user defined function.

**See Also**

[defineLambda](#), [makeFunction\\_se](#), [named\\_map\\_builder](#)

**Examples**

```
#lambda-syntax: lambda(arg [, arg]*, body [, env=env])
# also works with lambda character as function name
# print(intToUtf8(0x03BB))

# example: square numbers
sapply(1:4, lambda(x, x^2))

# example more than one argument
f <- lambda(x, y, x+y)
f(2,4)
```

---

lapplym *Memoizing wrapper for lapply.*

---

**Description**

Memoizing wrapper for lapply.

**Usage**

```
lapplym(X, FUN, ...)
```

**Arguments**

X	list or vector of inputs
FUN	function to apply
...	additional arguments passed to lapply

**Value**

list of results.

**See Also**

[VectorizeM](#), [vapplym](#), [parLapplyLBm](#)

**Examples**

```
fs <- function(x) { x <- x[[1]]; print(paste("see", x)); sin(x) }  
# should only print "see" twice, not 6 times  
lapplym(c(0, 1, 1, 0, 0, 1), fs)
```

---

let *Execute expr with name substitutions specified in alias.*

---

**Description**

let implements a mapping from desired names (names used directly in the expr code) to names used in the data. Mnemonic: "expr code symbols are on the left, external data and function argument names are on the right."

**Usage**

```
let(
  alias,
  expr,
  ...,
  envir = parent.frame(),
  subsMethod = "langsubs",
  strict = TRUE,
  eval = TRUE,
  debugPrint = FALSE
)
```

**Arguments**

alias	mapping from free names in expr to target names to use (mapping have both unique names and unique values).
expr	block to prepare for execution.
...	force later arguments to be bound by name.
envir	environment to work in.
subsMethod	character substitution method, one of 'langsubs' (preferred), 'subsubs', or 'stringsubs'.
strict	logical if TRUE names and values must be valid un-quoted names, and not dot.
eval	logical if TRUE execute the re-mapped expression (else return it).
debugPrint	logical if TRUE print debugging information when in stringsubs mode.

**Details**

Please see the `wrpr` vignette for some discussion of `let` and crossing function call boundaries: `vignette('wrpr', 'wrpr')`. For formal documentation please see [https://github.com/WinVector/wrpr/blob/master/extras/wrpr\\_let.pdf](https://github.com/WinVector/wrpr/blob/master/extras/wrpr_let.pdf). Transformation is performed by substitution, so please be wary of unintended name collisions or aliasing.

Something like `let` is only useful to get control of a function that is parameterized (in the sense it take column names) but non-standard (in that it takes column names from non-standard evaluation argument name capture, and not as simple variables or parameters). So `wrpr::let` is not useful for non-parameterized functions (functions that work only over values such as `base::sum`), and not useful for functions take parameters in straightforward way (such as `base::merge`'s "by" argument). `dplyr::mutate` is an example where we can use a `let` helper. `dplyr::mutate` is parameterized (in the sense it can work over user supplied columns and expressions), but column names are captured through non-standard evaluation (and it rapidly becomes unwieldy to use complex formulas with the standard evaluation equivalent `dplyr::mutate_`). `alias` can not include the symbol ".".

The intent from is from the user perspective to have (if `a <- 1`; `b <- 2`): `let(c(z = 'a'), z+b)` to behave a lot like `eval(substitute(z+b, c(z=quote(a))))`.

`let` deliberately checks that it is mapping only to legal R names; this is to discourage the use of `let` to make names to arbitrary values, as that is the more properly left to R's environment systems. `let` is intended to transform "tame" variable and column names to "tame" variable and column names.

Substitution outcomes that are not valid simple R variable names (produced with out use of back-ticks) are forbidden. It is suggested that substitution targets be written ALL\_CAPS style to make them stand out.

let was inspired by `gtools::strmacro()`. Please see <https://github.com/WinVector/wrapr/blob/master/extras/MacrosInR.md> for a discussion of macro tools in R.

### Value

result of expr executed in calling environment (or expression if `eval==FALSE`).

### See Also

[bquote](#), [do.call](#)

### Examples

```
d <- data.frame(
  Sepal_Length=c(5.8,5.7),
  Sepal_Width=c(4.0,4.4),
  Species='setosa')

mapping <- qc(
  AREA_COL = Sepal_area,
  LENGTH_COL = Sepal_Length,
  WIDTH_COL = Sepal_Width
)

# let-block notation
let(
  mapping,
  d %>%
  transform(., AREA_COL = LENGTH_COL * WIDTH_COL)
)

# Note: in packages can make assignment such as:
#   AREA_COL <- LENGTH_COL <- WIDTH_COL <- NULL
# prior to code so targets don't look like unbound names.
```

---

makeFunction\_se

*Build an anonymous function.*

---

### Description

Build an anonymous function.

**Usage**

```
makeFunction_se(params, body, env = parent.frame())
```

**Arguments**

params            formal parameters of function, unbound names.  
 body             substituted body of function to map arguments into.  
 env               environment to work in.

**Value**

user defined function.

**See Also**

[lambda](#), [defineLambda](#), [named\\_map\\_builder](#)

**Examples**

```
f <- makeFunction_se(as.name('x'), substitute({x*x}))
f(7)
```

```
g <- makeFunction_se(c(as.name('x'), as.name('y')), substitute({ x + 3*y }))
g(1,100)
```

---

mapsyms	<i>Map symbol names to referenced values if those values are string scalars (else throw).</i>
---------	---

---

**Description**

Map symbol names to referenced values if those values are string scalars (else throw).

**Usage**

```
mapsyms(...)
```

**Arguments**

...               symbol names mapping to string scalars

**Value**

map from original symbol names to new names (names found in the current environment)

**See Also**[let](#)**Examples**

```
x <- 'a'
y <- 'b'
print(mapsyms(x, y))
d <- data.frame(a = 1, b = 2)
let(mapsyms(x, y), d$x + d$y)
```

---

`map_to_char`*format a map.*

---

**Description**

format a map.

**Usage**

```
map_to_char(mp, ..., sep = " ", assignment = "=", quote_fn = base::shQuote)
```

**Arguments**

<code>mp</code>	named vector or list
<code>...</code>	not used, force later arguments to bind by name.
<code>sep</code>	separator suffix, what to put after commas
<code>assignment</code>	assignment string
<code>quote_fn</code>	string quoting function

**Value**

character formatted representation

**See Also**[dput](#), [capture.output](#)**Examples**

```
cat(map_to_char(c('a' = 'b', 'c' = 'd')))
cat(map_to_char(c('a' = 'b', 'd', 'e' = 'f')))
cat(map_to_char(c('a' = 'b', 'd' = NA, 'e' = 'f')))
cat(map_to_char(c(1, NA, 2)))
```

---

map_upper	<i>Map up-cased symbol names to referenced values if those values are string scalars (else throw).</i>
-----------	--

---

**Description**

Map up-cased symbol names to referenced values if those values are string scalars (else throw).

**Usage**

```
map_upper(...)
```

**Arguments**

...                    symbol names mapping to string scalars

**Value**

map from original symbol names to new names (names found in the current environment)

**See Also**

[let](#)

**Examples**

```
x <- 'a'  
print(map_upper(x))  
d <- data.frame(a = "a_val")  
let(map_upper(x), paste(d$X, x))
```

---

match_order	<i>Match one order to another.</i>
-------------	------------------------------------

---

**Description**

Build a permutation  $p$  such that  $ids1[p] == ids2$ . See <https://win-vector.com/2017/09/02/permutation-theory-in-action/>.

**Usage**

```
match_order(ids1, ids2)
```

**Arguments**

ids1            unique vector of ids.  
 ids2            unique vector of ids with `sort(ids1)==sort(ids2)`.

**Value**

p integers such that `ids1[p] == ids2`

**Examples**

```
ids1 <- c(4, 5, 7, 8, 9, 6, 1, 3, 2, 10)
ids2 <- c(3, 6, 4, 8, 5, 7, 1, 9, 10, 2)
p <- match_order(ids1, ids2)
ids1[p]
all.equal(ids1[p], ids2)
# note base::match(ids2, ids1) also solves this problem
```

---

mk\_formula

*Construct a formula.*


---

**Description**

Safely construct a simple Wilkinson notation formula from the outcome (dependent variable) name and vector of input (independent variable) names.

**Usage**

```
mk_formula(
  outcome,
  variables,
  ...,
  intercept = TRUE,
  outcome_target = NULL,
  outcome_comparator = "==",
  env = baseenv(),
  extra_values = NULL,
  as_character = FALSE
)
```

**Arguments**

outcome        character scalar, name of outcome or dependent variable.  
 variables     character vector, names of input or independent variables.  
 ...            not used, force later arguments to bind by name.  
 intercept    logical, if TRUE allow an intercept term.

**outcome\_target** scalar, if not NULL write `outcome==outcome_target` in formula.  
**outcome\_comparator** one of "=", "!=", ">=", "<=", ">", "<", only use of `outcome_target` is not NULL.  
**env** environment to use in formula (unless `extra_values` is non empty, then this is a parent environment).  
**extra\_values** if not empty extra values to be added to a new formula environment containing `env`.  
**as\_character** if TRUE return formula as a character string.

### Details

Note: `outcome` and `variables` are each intended to be simple variable names or column names (or `.`). They are not intended to specify interactions, I()-terms, transforms, general expressions or other complex formula terms. Essentially the same effect as [reformulate](#), but trying to avoid the paste currently in [reformulate](#) by calling [update.formula](#) (which appears to work over terms). Another reasonable way to do this is just `paste(outcome, paste(variables, collapse = " + "), sep = " ~ ")`.

Care must be taken with later arguments to functions like `lm()` whose help states: "All of weights, subset and offset are evaluated in the same way as variables in formula, that is first in data and then in the environment of formula." Also note `env` defaults to `baseenv()` to try and minimize reference leaks produced by the environment captured by the formula ending up stored in the resulting model for `lm()` and `glm()`. For behavior closer to `as.formula()` please set the `env` argument to `parent.frame()`.

### Value

a formula object

### See Also

[reformulate](#), [update.formula](#)

### Examples

```

f <- mk_formula("mpg", c("cyl", "disp"))
print(f)
(model <- lm(f, mtcars))
format(model$terms)

f <- mk_formula("cyl", c("wt", "gear"), outcome_target = 8, outcome_comparator = ">=")
print(f)
(model <- glm(f, mtcars, family = binomial))
format(model$terms)
  
```

---

mk\_tmp\_name\_source      *Produce a temp name generator with a given prefix.*

---

### Description

Returns a function `f` where: `f()` returns a new temporary name, `f(remove=vector)` removes names in vector and returns what was removed, `f(dumpList=TRUE)` returns the list of names generated and clears the list, `f(peek=TRUE)` returns the list without altering anything.

### Usage

```
mk_tmp_name_source(  
  prefix = "tmpnam",  
  ...,  
  alphabet = as.character(0:9),  
  size = 20,  
  sep = "_"  
)
```

### Arguments

<code>prefix</code>	character, string to prefix temp names with.
<code>...</code>	force later argument to be bound by name.
<code>alphabet</code>	character, characters to choose from in building ids.
<code>size</code>	character, number of characters to build id portion of names from.
<code>sep</code>	character, separator between temp name fields.

### Value

name generator function.

### Examples

```
f <- mk_tmp_name_source('ex')  
print(f())  
nm2 <- f()  
print(nm2)  
f(remove=nm2)  
print(f(dumpList=TRUE))
```

---

named_map_builder	<i>Named map builder.</i>
-------------------	---------------------------

---

## Description

Set names of right-argument to be left-argument, and return right argument. Called from := operator.

## Usage

```
named_map_builder(targets, values)
```

```
`:=`(targets, values)
```

```
targets %:=% values
```

## Arguments

targets	names to set.
values	values to assign to names (and return).

## Value

values with names set.

## See Also

[lambda](#), [defineLambda](#), [makeFunction\\_se](#)

## Examples

```
c('a' := '4', 'b' := '5')  
# equivalent to: c(a = '4', b = '5')
```

```
c('a', 'b') := c('1', '2')  
# equivalent to: c(a = '1', b = '2')
```

```
# the important example  
name <- 'a'  
name := '5'  
# equivalent to: c('a' = '5')
```

---

orderv	<i>Order by a list of vectors.</i>
--------	------------------------------------

---

**Description**

Produce an ordering permutation from a list of vectors. Essentially a non-... interface to [order](#).

**Usage**

```
orderv(
  columns,
  ...,
  na.last = TRUE,
  decreasing = FALSE,
  method = c("auto", "shell", "radix")
)
```

**Arguments**

columns	list of atomic columns to order on, can be a <code>data.frame</code> .
...	not used, force later arguments to bind by name.
na.last	(passed to <a href="#">order</a> ) for controlling the treatment of NAs. If TRUE, missing values in the data are put last; if FALSE, they are put first; if NA, they are removed.
decreasing	(passed to <a href="#">order</a> ) logical. Should the sort order be increasing or decreasing? For the "radix" method, this can be a vector of length equal to the number of arguments in ... For the other methods, it must be length one.
method	(passed to <a href="#">order</a> ) the method to be used: partial matches are allowed. The default ("auto") implies "radix" for short numeric vectors, integer vectors, logical vectors and factors. Otherwise, it implies "shell". For details of methods "shell", "quick", and "radix", see the help for <a href="#">sort</a> .

**Value**

ordering permutation

**See Also**

[order](#), [sortv](#)

**Examples**

```
d <- data.frame(x = c(2, 2, 3, 3, 1, 1), y = 6:1)
d[order(d$x, d$y), , drop = FALSE]
d[orderv(d), , drop = FALSE]
```

---

pack	<i>Pack values into a named list.</i>
------	---------------------------------------

---

### Description

This function packs values given by name into a named list.

### Usage

```
pack(..., .wrapr_private_var_env = parent.frame())
```

### Arguments

... values to pack, these should be specified by name (not as constants).  
.wrapr\_private\_var\_env environment to evaluate in

### Value

named list of values

### See Also

[unpack](#)

### Examples

```
x <- 1
y <- 2
pack(x, y) # list(x = 1, y = 2)

pack(a = x, y) # list(a = 1, y = 2)

pack(a = 5, y) # list(a = 5, y = 2)

pack(1, 2) # list('1' = 1, '2' = 2)

v <- pack(x = 8, y = 9) # list(x = 8, y = 9)
v -> unpack[x, y]
print(x) # 8
print(y) # 9
```

---

parLapplyLBm	<i>Memoizing wrapper for parLapplyLB</i>
--------------	--

---

**Description**

Memoizing wrapper for parLapplyLB

**Usage**

```
parLapplyLBm(cl = NULL, X, fun, ..., chunk.size = NULL)
```

**Arguments**

cl	cluster object
X	list or vector of inputs
fun	function to apply
...	additional arguments passed to lapply
chunk.size	passed to parallel::parLapplyLB

**Value**

list of results.

**See Also**

[parLapplyLB](#), [lapplym](#), [VectorizeM](#), [vapplym](#)

**Examples**

```
if(requireNamespace("parallel", quietly = TRUE)) {  
  cl <- parallel::makeCluster(2)  
  fs <- function(x) { x <- x[[1]]; Sys.sleep(1); sin(x) }  
  # without memoization should take 1000 seconds  
  lst <- parLapplyLBm(cl, c(rep(0, 1000), rep(1, 1000)), fs)  
  parallel::stopCluster(cl)  
}
```

---

partition_tables	<i>Partition as set of tables into a list.</i>
------------------	--

---

**Description**

Partition a set of tables into a list of sets of tables. Note: removes rownames.

**Usage**

```
partition_tables(  
  tables_used,  
  partition_column,  
  ...,  
  source_usage = NULL,  
  source_limit = NULL,  
  tables = NULL,  
  env = NULL  
)
```

**Arguments**

tables_used	character, names of tables to look for.
partition_column	character, name of column to partition by (tables should not have NAs in this column).
...	force later arguments to bind by name.
source_usage	optional named map from tables_used names to sets of columns used.
source_limit	optional numeric scalar limit on rows wanted every source.
tables	named map from tables_used names to data.frames.
env	environment to also look for tables named by tables_used

**Value**

list of names maps of data.frames partitioned by partition\_column.

**See Also**

[execute\\_parallel](#)

**Examples**

```
d1 <- data.frame(a = 1:5, g = c(1, 1, 2, 2, 2))  
d2 <- data.frame(x = 1:3, g = 1:3)  
d3 <- data.frame(y = 1)  
partition_tables(c("d1", "d2", "d3"), "g", tables = list(d1 = d1, d2 = d2, d3 = d3))
```

---

pipe_impl	<i>Pipe dispatch implementation.</i>
-----------	--------------------------------------

---

**Description**

This is a helper for implementing additional pipes.

**Usage**

```
pipe_impl(pipe_left_arg, pipe_right_arg, pipe_environment, pipe_string = NULL)
```

**Arguments**

pipe\_left\_arg possibly unevaluated left argument.  
 pipe\_right\_arg possibly unevaluated right argument.  
 pipe\_environment environment to evaluate in.  
 pipe\_string character, name of pipe operator.

**Value**

result

**Examples**

```
# Example: how wrapr pipe is implemented

print(`%.>%`)

# Example: create a value that causes pipelines to record steps.

# inject raw values into wrapped/annotated world
unit_recording <- function(x, recording = paste(as.expression(substitute(x)), collapse = '\n')) {
  res <- list(value = x, recording = recording)
  class(res) <- "recording_value"
  res
}

# similar to bind or >>=
# (takes U, f:U -> V to M(f(U)), instead of
#      U, f:U -> M(V) to M(f(U)))
# so similar to a functor taking
# f:U -> V to f':M(U) -> M(V)
# followed by application.
apply_left.recording_value <- function(
```

```

    pipe_left_arg,
    pipe_right_arg,
    pipe_environment,
    left_arg_name,
    pipe_string,
    right_arg_name) {
  force(pipe_environment)
  tmp <- wrapr::pipe_impl(
    pipe_left_arg = pipe_left_arg$value,
    pipe_right_arg = pipe_right_arg,
    pipe_environment = pipe_environment,
    pipe_string = pipe_string)
  unit_recording(
    tmp,
    paste0(pipe_left_arg$recording,
           ' %.>% ',
           paste(as.expression(pipe_right_arg), collapse = '\n')))
}

# make available on standard S3 search path
assign('apply_left.recording_value',
      apply_left.recording_value,
      envir = .GlobalEnv)

unpack[value, recording] := 3 %.>%
  unit_recording(.) %.>%
  sin(.) %.>%
  cos(.)

print(value)
print(recording)

# clean up
rm(envir = .GlobalEnv, list = 'apply_left.recording_value')

```

---

 psagg

*Pseudo aggregator.*


---

## Description

Take a vector or list and return the first element (pseudo-aggregation or projection). If the argument length is zero or there are different items throw in an error.

## Usage

```
psagg(x, ..., strict = TRUE)
```

**Arguments**

x                    should be a vector or list of items.  
 ...                 force later arguments to be passed by name  
 strict              logical, should we check value uniqueness.

**Details**

This function is useful in some split by column situations as a safe and legible way to convert vectors to scalars.

**Value**

x[[1]] (or throw if not all items are equal or this is an empty vector).

**Examples**

```
d <- data.frame(
  group = c("a", "a", "b"),
  stringsAsFactors = FALSE)
dl <- lapply(
  split(d, d$group),
  function(di) {
    data.frame(
      # note: di$group is a possibly length>1 vector!
      # pseudo aggregate it to the value that is
      # constant for each group, confirming it is constant.
      group_label = psagg(di$group),
      group_count = nrow(di),
      stringsAsFactors = FALSE
    )
  })
do.call(rbind, dl)
```

---

qae                    *Quote assignment expressions (name = expr, name := expr, name  
 %:=% expr).*

---

**Description**

Accepts arbitrary un-parsed expressions as assignments to allow forms such as "Sepal\_Long := Sepal.Length >= 2 \* Sepal.Width". (without the quotes). Terms are expressions of the form "lhs := rhs", "lhs = rhs", "lhs %:=% rhs".

**Usage**

```
qae(...)
```

**Arguments**

... assignment expressions.

**Details**

qae() uses bquote() .() quasiquotation escaping notation, and .(-) "string quotes, string to name" notation.

**Value**

array of quoted assignment expressions.

**See Also**

[qc](#), [qe](#)

**Examples**

```
ratio <- 2

exprs <- qae(Sepal_Long := Sepal.Length >= ratio * Sepal.Width,
            Petal_Short = Petal.Length <= 3.5)
print(exprs)

exprs <- qae(Sepal_Long := Sepal.Length >= .(ratio) * Sepal.Width,
            Petal_Short = Petal.Length <= 3.5)
print(exprs)

# library("rdatatable")
# datasets::iris %.>%
# extend_se(., exprs) %.>%
# summary(.)
```

---

qc

*Quoting version of c() array concatenate.*

---

**Description**

The qc() function is intended to help quote user inputs.

**Usage**

```
qc(..., .wrapr_private_var_env = parent.frame())
```

**Arguments**

... items to place into an array  
 .wrapr\_private\_var\_env  
 environment to evaluate in

## Details

qc() a convenience function allowing the user to elide excess quotation marks. It quotes its arguments instead of evaluating them, except in the case of a nested call to qc() or c(). Please see the examples for typical uses both for named and un-named character vectors.

qc() uses bquote() .() quasiquotation escaping notation. Also take care: arguments are parsed by R before being passed to qc(). This means 01 is interpreted as 1 and a string such as 0z1 is a syntax error. Some notes on this can be found here: <https://github.com/WinVector/wrapr/issues/15#issuecomment-962092462>

## Value

quoted array of character items

## See Also

[qe](#), [qae](#), [bquote](#), [bc](#), [sx](#)

## Examples

```
a <- "x"

qc(a) # returns the string "a" (not "x")

qc(.a) # returns the string "x" (not "a")

qc(.a) := a # returns c("x" = "a")

qc("a") # return the string "a" (not "\"a\"")

qc(sin(x)) # returns the string "sin(x)"

qc(a, qc(b, c)) # returns c("a", "b", "c")

qc(a, c("b", "c")) # returns c("a", "b", "c")

qc(x=a, qc(y=b, z=c)) # returns c(x="a", y="b", z="c")

qc('x'='a', wrapr::qc('y'='b', 'z'='c')) # returns c(x="a", y="b", z="c")

c(a = c(a="1", b="2")) # returns c(a.a = "1", a.b = "2")
qc(a = c(a=1, b=2)) # returns c(a.a = "1", a.b = "2")
qc(a := c(a=1, b=2)) # returns c(a.a = "1", a.b = "2")
```

---

`qchar_frame`*Build a quoted data.frame.*

---

### Description

A convenient way to build a character data.frame in legible transposed form. Position of first "|" (or other infix operator) determines number of columns (all other infix operators are aliases for "|"). Names are treated as character types.

### Usage

```
qchar_frame(...)
```

### Arguments

... cell names, first infix operator denotes end of header row of column names.

### Details

`qchar_frame()` uses `bquote()` `.``()` quasiquotation escaping notation. Because of this using dot as a name in some places may fail if the dot looks like a function call.

### Value

character data.frame

### See Also

[draw\\_frame](#), [build\\_frame](#)

### Examples

```
loss_name <- "loss"
x <- qchar_frame(
  measure,                training,    validation |
  "minus binary cross entropy", .(loss_name), val_loss  |
  accuracy,               acc,          val_acc   )
print(x)
str(x)
cat(draw_frame(x))

qchar_frame(
  x |
  1 |
  2 ) %>% str(.)
```

---

qe *Quote expressions.*

---

### Description

Accepts arbitrary un-parsed expressions as to allow forms such as "Sepal.Length >= 2 \* Sepal.Width". (without the quotes).

### Usage

```
qe(...)
```

### Arguments

... assignment expressions.

### Details

qe() uses bquote() .() quasiquotation escaping notation, and .(-) "string quotes, string to name" notation.

### Value

array of quoted assignment expressions.

### See Also

[qc](#), [qae](#)

### Examples

```
ratio <- 2

exprs <- qe(Sepal.Length >= ratio * Sepal.Width,
            Petal.Length <= 3.5)
print(exprs)

exprs <- qe(Sepal.Length >= .(ratio) * Sepal.Width,
            Petal.Length <= 3.5)
print(exprs)
```

---

qs	<i>Quote argument as a string.</i>
----	------------------------------------

---

**Description**

qs() uses bquote() .() quasiquotation escaping notation.

**Usage**

```
qs(s)
```

**Arguments**

s                      expression to be quoted as a string.

**Value**

character

**Examples**

```
x <- 7
qs(a == x)
qs(a == .(x))
```

---

reduceexpand	<i>Use function to reduce or expand arguments.</i>
--------------	--

---

**Description**

x %|. % f stands for f(x[[1]], x[[2]], ..., x[[length(x)]]). v %|. % x also stands for f(x[[1]], x[[2]], ..., x[[length(x)]]). The two operators are the same, the variation just allowing the user to choose the order they write things. The mnemonic is: "data goes on the dot-side of the operator."

**Usage**

```
f %|. % args
args %|. % f
```

**Arguments**

f                    function.  
 args                argument list or vector, entries expanded as function arguments.

**Details**

Note: the reduce operation is implemented by `do.call()`, so has standard R named argument semantics.

**Value**

`f(args)` where `args` elements become individual arguments of `f`.

**Functions**

- `f %|. % args`: `f` reduce `args`
- `args %|. % f`: `args` expand `f`

**See Also**

[do.call](#), [list](#), [c](#)

**Examples**

```
args <- list('prefix_', c(1:3), '_suffix')
args %|. % paste0
# prefix_1_suffix" "prefix_2_suffix" "prefix_3_suffix"
paste0 %|. % args
# prefix_1_suffix" "prefix_2_suffix" "prefix_3_suffix"
```

---

restrictToNameAssignments

*Restrict an alias mapping list to things that look like name assignments*

---

**Description**

Restrict an alias mapping list to things that look like name assignments

**Usage**

```
restrictToNameAssignments(alias, restrictToAllCaps = FALSE)
```

**Arguments**

alias                mapping list  
 restrictToAllCaps   logical, if true only use all-capitalized keys

**Value**

string to string mapping

**Examples**

```
alias <- list(region= 'east', str= "'seven'")
aliasR <- restrictToNameAssignments(alias)
print(aliasR)
```

---

seqi

*Increasing whole-number sequence.*

---

**Description**

Return an in increasing whole-number sequence from a to b inclusive (return integer(0) if none such).  
Allows for safe iteration.

**Usage**

```
seqi(a, b)
```

**Arguments**

a	scalar lower bound
b	scalar upper bound

**Value**

whole number sequence

**Examples**

```
# print 3, 4, and then 5
for(i in seqi(3, 5)) {
  print(i)
}

# empty
for(i in seqi(5, 2)) {
  print(i)
}
```

---

si *Dot substitution string interpolation.*

---

## Description

String interpolation using bquote-style `.`(`)` notation. Pure R, no C/C++ code called. `sinterp` and `si` are synonyms.

## Usage

```
si(
  str,
  ...,
  envir = parent.frame(),
  enclos = parent.frame(),
  match_pattern = "\\\\.\\(((\\^[^()]+)|((\\^[^()]*\\)))\\))+\\)",
  removal_patterns = c("^\\.\\.\\(", "\\)$")
)
```

## Arguments

<code>str</code>	character string to be substituted into
<code>...</code>	force later arguments to bind by name
<code>envir</code>	environment to look for values
<code>enclos</code>	enclosing evaluation environment
<code>match_pattern</code>	regexp to find substitution targets.
<code>removal_patterns</code>	regexps to remove markers from substitution targets.

## Details

See also <https://CRAN.R-project.org/package=R.utils>, <https://CRAN.R-project.org/package=rprintf>, and <https://CRAN.R-project.org/package=glue>.

## Value

modified strings

## See Also

[strsplit\\_capture](#), [sinterp](#)

**Examples**

```
x <- 7
si("x is .(x), x+1 is .(x+1)\n.(x) is odd is .(x%%2 == 1)")

# Because matching is done by a regular expression we
# can not use arbitrary depths of nested parenthesis inside
# the interpolation region. The default regexp allows
# one level of nesting (and one can use {} in place
# of parens in many places).
si("sin(x*(x+1)) is .(sin(x*{x+1}))")

# We can also change the delimiters,
# in this case to !! through the first whitespace.
si(c("x is !!x , x+1 is !!x+1 \n!!x is odd is !!x%%2==1"),
  match_pattern = '!![^[[:space:]]+[[[:space:]]?]',
  removal_patterns = c("^!!", "[[:space:]]?$"))
```

---

sinterp

*Dot substitution string interpolation.*


---

**Description**

String interpolation using bquote-style `.`(`.`) notation. Pure R, no C/C++ code called.

**Usage**

```
sinterp(
  str,
  ...,
  envir = parent.frame(),
  enclos = parent.frame(),
  match_pattern = "\\.\.\\(((\\^[^()]+)|((\\^[^()]*\\)))\\))+\\.",
  removal_patterns = c("^\\.\\.\\.", "\\.$")
)
```

**Arguments**

<code>str</code>	charater string(s) to be substituted into
<code>...</code>	force later arguments to bind by name
<code>envir</code>	environemnt to look for values
<code>enclos</code>	enclosing evaluation environment
<code>match_pattern</code>	regexp to find substitution targets.
<code>removal_patterns</code>	regexps to remove markers from substitution targets.

**Details**

See also <https://CRAN.R-project.org/package=R.utils>, <https://CRAN.R-project.org/package=rprintf>, and <https://CRAN.R-project.org/package=glue>.

**Value**

modified strings

**See Also**

[strsplit\\_capture](#), [si](#)

**Examples**

```
x <- 7
sinterp("x is .(x), x+1 is .(x+1)\n.(x) is odd is .(x%%2 == 1)")

# Because matching is done by a regular expression we
# can not use arbitrary depths of nested parenthesis inside
# the interpolation region. The default regexp allows
# one level of nesting (and one can use {} in place
# of parens in many places).
sinterp("sin(x*(x+1)) is .(sin(x*{x+1}))")

# We can also change the delimiters,
# in this case to !! through the first whitespace.
sinterp(c("x is !!x , x+1 is !!x+1 \n!!x is odd is !!x%%2==1"),
        match_pattern = '!![^[[:space:]]+[[[:space:]]?]',
        removal_patterns = c("^!!", "[[:space:]]?*$"))
```

---

sortv

*Sort a data.frame.*

---

**Description**

Sort a data.frame by a set of columns.

**Usage**

```
sortv(
  data,
  colnames,
  ...,
  na.last = TRUE,
  decreasing = FALSE,
  method = c("auto", "shell", "radix")
)
```

**Arguments**

data	data.frame to sort.
colnames	column names to sort on.
...	not used, force later arguments to bind by name.
na.last	(passed to <a href="#">order</a> ) for controlling the treatment of NAs. If TRUE, missing values in the data are put last; if FALSE, they are put first; if NA, they are removed.
decreasing	(passed to <a href="#">order</a> ) logical. Should the sort order be increasing or decreasing? For the "radix" method, this can be a vector of length equal to the number of arguments in . . . . For the other methods, it must be length one.
method	(passed to <a href="#">order</a> ) the method to be used: partial matches are allowed. The default ("auto") implies "radix" for short numeric vectors, integer vectors, logical vectors and factors. Otherwise, it implies "shell". For details of methods "shell", "quick", and "radix", see the help for <a href="#">sort</a> .

**Value**

ordering permutation

**See Also**

[orderv](#)

**Examples**

```
d <- data.frame(x = c(2, 2, 3, 3, 1, 1), y = 6:1)
sortv(d, c("x", "y"))
```

---

split\_at\_brace\_pairs *Split strings at -pairs.*

---

**Description**

Split strings at -pairs.

**Usage**

```
split_at_brace_pairs(s, open_symbol = "{", close_symbol = "}")
```

**Arguments**

s	string or list of strings to split.
open_symbol	symbol to start marking.
close_symbol	symbol to end marking.

**Value**

array or list of split strings.

**Examples**

```
split_at_brace_pairs("{x} + y + {z}")
```

---

stop_if_dot_args	<i>Stop with message if dot_args is a non-trivial list.</i>
------------------	---

---

**Description**

Generate a stop with a good error message if the dots argument was a non-trivial list. Useful in writing functions that force named arguments.

**Usage**

```
stop_if_dot_args(dot_args, msg = "")
```

**Arguments**

dot_args	substitute(list(...)) from another function.
msg	character, optional message to prepend.

**Value**

NULL or stop()

**Examples**

```
f <- function(x, ..., inc = 1) {
  stop_if_dot_args(substitute(list(...)), "f")
  x + inc
}
f(7)
f(7, inc = 2)
tryCatch(
  f(7, 2),
  error = function(e) { print(e) }
)
```

---

strsplit\_capture      *Split a string, keeping separator regions*

---

### Description

Split a string, keeping separator regions

### Usage

```
strsplit_capture(  
  x,  
  split,  
  ...,  
  ignore.case = FALSE,  
  fixed = FALSE,  
  perl = FALSE,  
  useBytes = FALSE  
)
```

### Arguments

x	character string to split (length 1 vector)
split	split pattern
...	force later arguments to bind by name
ignore.case	passed to gregexpr
fixed	passed to gregexpr
perl	passed to gregexpr
useBytes	passed to gregexpr

### Value

list of string segments annotated with is\_sep.

### See Also

[sinterp](#), [si](#)

### Examples

```
strsplit_capture("x is .(x) and x+1 is .(x+1)", "\\.[^()]+\\")
```

---

sx	<i>String eXplode. Parse argument as a vector of string allowing "blank separators".</i>
----	--

---

## Description

Separates string data on whitespace and separating symbols into an array.

## Usage

```
sx(s, ..., sep_symbols = ",|", strict = TRUE)
```

## Arguments

s	string to parse
...	force later arguments to be set by name
sep_symbols	characters to consider separators
strict	logical, if TRUE throw exception on confusing input

## Details

Can throw exception on lack of explicit value separators, example: `bc(' "a" "b"')` and non-matching portions. Whitespace is normalized to spaces. Suggested by Emil Erik Pula Bellamy Begtrup-Bright <https://github.com/WinVector/wrapr/issues/15>.

## Value

vector of values

## See Also

[qc](#), [qe](#), [qae](#), [bquote](#), [bc](#)

## Examples

```
sx('1 2 "c", d') # returns c("1", "2", "c", "d")
sx('1 2 3') # returns c("1", "2", "3")
sx('1 2 "3"') # returns c("1", "2", "3")
sx('1,2|3.4') # returns c("1", "2", "3.4")
sx('01 02') # returns c("01", "02")
```

---

to	<i>Unpack or bind values by names into the calling environment, eager eval (no-dot) variation.</i>
----	--

---

### Description

Unpacks or binds values into the calling environment, eager eval (no-dot) variation. Uses bquote escaping. NULL is a special case that is unpacked to all targets. NA targets are skipped. All non-NA target names must be unique.

### Usage

```
to(...)
```

### Arguments

...                    argument names to write to

### Details

Note: when using []<- notation, a reference to the unpacker object is written into the unpacking environment as a side-effect of the implied array assignment. := assignment does not have this side-effect. Array-assign form can not use the names: ., wrapr\_private\_self, value, or to. function form can not use the names: . or wrapr\_private\_value. For more details please see here <https://win-vector.com/2020/01/20/unpack-your-values-in-r/>.

Related work includes Python tuple unpacking, zeallot's arrow, and vadr::bind.

### Value

a UnpackTarget

### Examples

```
# named unpacking
# looks like assignment: DESTINATION = NAME_VALUE_USING
d <- data.frame(x = 1:2,
               g=c('test', 'train'),
               stringsAsFactors = FALSE)
to[train_set = train, test_set = test] := split(d, d$g)
# train_set and test_set now correctly split
print(train_set)
print(test_set)
rm(list = c('train_set', 'test_set'))

# named unpacking NEWNAME = OLDNAME implicit form
# values are matched by name, not index
to[train, test] := split(d, d$g)
print(train)
print(test)
```

```

rm(list = c('train', 'test'))

# pipe version (notice no dot)
split(d, d$g) %>% to(train, test)
print(train)
print(test)
rm(list = c('train', 'test'))
# Note: above is wrapr dot-pipe, piping does not currently work with
# magrittr pipe due to magrittr's introduction of temporary
# intermediate environments during evaluation.

# bquote example
train_col_name <- 'train'
test_col_name <- 'test'
to[train = .(train_col_name), test = .(test_col_name)] := split(d, d$g)
print(train)
print(test)
rm(list = c('train', 'test'))

```

---

uniques

*Strict version of unique (without ...).*


---

### Description

Check that ... is empty and if so call `base::unique(x, incomparables = incomparables, MARGIN = MARGIN, fromLast = fromLast)` (else throw an error)

### Usage

```
uniques(x, ..., incomparables = FALSE, MARGIN = 1, fromLast = FALSE)
```

### Arguments

<code>x</code>	items to be compared.
<code>...</code>	not used, checked to be empty to prevent errors.
<code>incomparables</code>	passed to <code>base::unique</code> .
<code>MARGIN</code>	passed to <code>base::unique</code> .
<code>fromLast</code>	passed to <code>base::unique</code> .

### Value

`base::unique(x, incomparables = incomparables, MARGIN = MARGIN, fromLast = fromLast)`

**Examples**

```
x = c("a", "b")
y = c("b", "c")

# task: get unique items in x plus y
unique(c(x, y)) # correct answer
unique(x, y)    # oops forgot to wrap arguments, quietly get wrong answer
tryCatch(
  uniques(x, y), # uniques catches the error
  error = function(e) { e })
uniques(c(x, y)) # uniques works like base::unique in most case
```

---

unpack	<i>Unpack or bind values by names into the calling environment.</i>
--------	---

---

**Description**

Unpacks or binds values into the calling environment. Uses bquote escaping. NULL is a special case that is unpacked to all targets. NA targets are skipped. All non-NA target names must be unique.

**Usage**

```
unpack(wrapr_private_value, ...)
```

**Arguments**

```
wrapr_private_value      list of values to copy
...                       argument names to write to
```

**Details**

Note: when using `[]<-` notation, a reference to the unpacker object is written into the unpacking environment as a side-effect of the implied array assignment. `:=` assignment does not have this side-effect. Array-assign form can not use the names: `.`, `wrapr_private_self`, `value`, or `unpack`. Function form can not use the names: `.` or `wrapr_private_value`. For more details please see here <https://win-vector.com/2020/01/20/unpack-your-values-in-r/>.

Related work includes Python tuple unpacking, zeallot's arrow, and `vadr::bind`.

**Value**

value passed in (invisible)

**See Also**

[pack](#)

**Examples**

```

# named unpacking
# looks like assignment: DESTINATION = NAME_VALUE_USING
d <- data.frame(x = 1:2,
                g=c('test', 'train'),
                stringsAsFactors = FALSE)
unpack[train_set = train, test_set = test] := split(d, d$g)
# train_set and test_set now correctly split
print(train_set)
print(test_set)
rm(list = c('train_set', 'test_set'))

# named unpacking NEWNAME = OLDNAME implicit form
# values are matched by name, not index
unpack[train, test] := split(d, d$g)
print(train)
print(test)
rm(list = c('train', 'test'))

# function version
unpack(split(d, d$g), train, test)
print(train)
print(test)
rm(list = c('train', 'test'))

# pipe version
split(d, d$g) %>% unpack(., train, test)
print(train)
print(test)
rm(list = c('train', 'test'))
# Note: above is wrapr dot-pipe, piping does not currently work with
# magrittr pipe due to magrittr's introduction of temporary
# intermediate environments during evaluation.

# bquote example
train_col_name <- 'train'
test_col_name <- 'test'
unpack(split(d, d$g), train = .(train_col_name), test = .(test_col_name))
print(train)
print(test)
rm(list = c('train', 'test'))

```

---

vapplym

*Memoizing wrapper for vapply.*


---

**Description**

Memoizing wrapper for vapply.

**Usage**

```
vapplym(X, FUN, FUN.VALUE, ..., USE.NAMES = TRUE)
```

**Arguments**

X	list or vector of inputs
FUN	function to apply
FUN.VALUE	type of vector to return
...	additional arguments passed to lapply
USE.NAMES	passed to vapply

**Value**

vector of results.

**See Also**

[VectorizeM](#), [lapplym](#)

**Examples**

```
fs <- function(x) { x <- x[[1]]; print(paste("see", x)); sin(x) }
# should only print "see" twice, not 6 times
vapplym(c(0, 1, 1, 0, 0, 1), fs, numeric(1))
```

---

VectorizeM

*Memoizing wrapper to base::Vectorize()*

---

**Description**

Build a wrapped function that applies to each unique argument in a vector of arguments once.

**Usage**

```
VectorizeM(
  FUN,
  vectorize.args = arg.names,
  SIMPLIFY = TRUE,
  USE.NAMES = TRUE,
  UNLIST = FALSE
)
```

**Arguments**

<code>FUN</code>	function to apply
<code>vectorize.args</code>	a character vector of arguments which should be vectorized. Defaults to first argument of <code>FUN</code> . If set must be length 1.
<code>SIMPLIFY</code>	logical or character string; attempt to reduce the result to a vector, matrix or higher dimensional array; see the <code>simplify</code> argument of <code>sapply</code> .
<code>USE.NAMES</code>	logical; use names if the first ... argument has names, or if it is a character vector, use that character vector as the names.
<code>UNLIST</code>	logical; if <code>TRUE</code> try to unlist the result.

**Details**

Only sensible for pure side-effect free deterministic functions.

**Value**

adapted function (vectorized with one call per different value).

**See Also**

[Vectorize](#), [vapply](#), [lapply](#)

**Examples**

```
fs <- function(x) { x <- x[[1]]; print(paste("see", x)); sin(x) }
fv <- VectorizeM(fs)
# should only print "see" twice, not 6 times
fv(c(0, 1, 1, 0, 0, 1))
```

---

view

*Invoke a spreadsheet like viewer when appropriate.*

---

**Description**

Invoke a spreadsheet like viewer when appropriate.

**Usage**

```
view(x, ..., title = wrapr_deparse(substitute(x)), n = 200)
```

**Arguments**

<code>x</code>	R object to view
<code>...</code>	force later arguments to bind by name.
<code>title</code>	title for viewer
<code>n</code>	number of rows to show

**Value**

invoke view or format object

**Examples**

```
view(mtcars)
```

---

[.Unpacker                      *Prepare for unpack or bind values into the calling environment.*

---

**Description**

Prepare for unpack or bind values into the calling environment. This makes pipe to behavior very close to assign to behavior for the Unpacker class.

**Usage**

```
## S3 method for class 'Unpacker'
wrapr_private_self[...]
```

**Arguments**

```
wrapr_private_self            object implementing the feature, wrapr::unpack
...                            names of to unpack to (can be escaped with bquote .() notation).
```

**Value**

prepared unpacking object

---

[<- .Unpacker                      *Unpack or bind values into the calling environment.*

---

**Description**

Unpacks or binds values into the calling environment. Uses bquote escaping. NULL is a special case that is unpacked to all targets. NA targets are skipped. All non-NA target names must be unique.

**Usage**

```
## S3 replacement method for class 'Unpacker'
wrapr_private_self[... ] <- value
```

**Arguments**

wrapr\_private\_self  
 object implementing the feature, wrapr::unpack

...  
 names of to unpack to (can be escaped with bquote .() notation).

value  
 list to unpack into values, must have a number of entries equal to number of ... arguments

**Details**

Note: when using []<- notation, a reference to the unpacker object is written into the unpacking environment as a side-effect of the implied array assignment. := assignment does not have this side-effect. Array-assign form can not use the names: ., wrapr\_private\_self, value, or the name of the unpacker itself. For more details please see here <https://win-vector.com/2020/01/20/unpack-your-values-in-r/>.

Related work includes Python tuple unpacking, zeallot's arrow, and vadr::bind.

**Value**

wrapr\_private\_self

**Examples**

```
# named unpacking
# looks like assignment: DESTINATION = NAME_VALUE_USING
d <- data.frame(x = 1:2,
                g=c('test', 'train'),
                stringsAsFactors = FALSE)
to[train_set = train, test_set = test] := split(d, d$g)
# train_set and test_set now correctly split
print(train_set)
print(test_set)
rm(list = c('train_set', 'test_set'))

# named unpacking NEWNAME = OLDNAME implicit form
# values are matched by name, not index
to[train, test] := split(d, d$g)
print(train)
print(test)
rm(list = c('train', 'test'))

# bquote example
train_col_name <- 'train'
test_col_name <- 'test'
to[train = .(train_col_name), test = .(test_col_name)] := split(d, d$g)
print(train)
print(test)
rm(list = c('train', 'test'))
```

---

%in\_block%                    *Inline let-block notation.*

---

### Description

Inline version of let-block.

### Usage

```
a %in_block% b
```

### Arguments

- a                    (left argument) named character vector with target names as names, and replacement names as values.
- b                    (right argument) expression or block to evaluate under let substitution rules.

### Value

evaluated block.

### See Also

[let](#)

### Examples

```
d <- data.frame(
  Sepal_Length=c(5.8,5.7),
  Sepal_Width=c(4.0,4.4),
  Species='setosa')

# let-block notation
let(
  qc(
    AREA_COL = Sepal_area,
    LENGTH_COL = Sepal_Length,
    WIDTH_COL = Sepal_Width
  ),
  d %>%
  transform(., AREA_COL = LENGTH_COL * WIDTH_COL)
)

# %in_block% notation
qc(
  AREA_COL = Sepal_area,
  LENGTH_COL = Sepal_Length,
  WIDTH_COL = Sepal_Width
) %in_block% {
```

```
d %.>%
  transform(., AREA_COL = LENGTH_COL * WIDTH_COL)
}

# Note: in packages can make assignment such as:
# AREA_COL <- LENGTH_COL <- WIDTH_COL <- NULL
# prior to code so targets don't look like unbound names.
```

---

%<s%

*Dot substitution string interpolation.*

---

## Description

String interpolation using bquote-style `.`(`.`) notation. Pure R, no C/C++ code called.

## Usage

```
str %<s% envir
```

## Arguments

<code>str</code>	character string to be substituted into
<code>envir</code>	environment to look for values

## Details

See also <https://CRAN.R-project.org/package=R.utils>, <https://CRAN.R-project.org/package=rprintf>, and <https://CRAN.R-project.org/package=glue>.

## Value

modified strings

## See Also

[strsplit\\_capture](#), [si](#)

## Examples

```
"x is .(x)" %<s% list(x = 7)
```

---

%s>% *Dot substitution string interpolation.*

---

### Description

String interpolation using bquote-style .() notation. Pure R, no C/C++ code called.

### Usage

```
envir %s>% str
```

### Arguments

envir	environemnt to look for values
str	charater string to be substituted into

### Details

See also <https://CRAN.R-project.org/package=R.utils>, <https://CRAN.R-project.org/package=rprintf>, and <https://CRAN.R-project.org/package=glue>.

### Value

modified strings

### See Also

[strsplit\\_capture](#), [si](#)

### Examples

```
list(x = 7) %s>% "x is .(x)"
```

---

%c% *Inline list/array concatenate.*

---

### Description

Inline list/array concatenate.

### Usage

```
e1 %c% e2
```

**Arguments**

e1 first, or left argument.  
e2 second, or right argument.

**Value**

`c(e1, c2)`

**Examples**

```
1:2 %c% 5:6
```

```
c("a", "b") %c% "d"
```

---

`%dot%`*Inline dot product.*

---

**Description**

Inline dot product.

**Usage**

```
e1 %dot% e2
```

**Arguments**

e1 first, or left argument.  
e2 second, or right argument.

**Value**

`c(e1, c2)`

**Examples**

```
c(1,2) %dot% c(3, 5)
```

---

%p% *Inline character paste0.*

---

**Description**

Inline character paste0.

**Usage**

e1 %p% e2

**Arguments**

e1 first, or left argument.  
e2 second, or right argument.

**Value**

c(e1, c2)

**Examples**

```
"a" %p% "b"  
c("a", "b") %p% "_d"
```

---

%qc% *Inline quoting list/array concatenate.*

---

**Description**

Inline quoting list/array concatenate.

**Usage**

e1 %qc% e2

**Arguments**

e1 first, or left argument.  
e2 second, or right argument.

**Value**

qc(e1, c2)

**Examples**

```
1:2 %qc% 5:6
```

```
c("a", "b") %qc% d
```

```
a %qc% b %qc% c
```

# Index

- `:=` (named\_map\_builder), 49
- `[.Unpacker`, 77
- `[<-.Unpacker`, 77
- `%.>%` (dot\_arrow), 30
- `%.% (dot_arrow)`, 30
- `%:=%` (named\_map\_builder), 49
- `%>.%` (dot\_arrow), 30
- `%?%` (coalesce), 22
- `%<s%`, 80
- `%c%`, 81
- `%dot%`, 82
- `%in_block%`, 79
- `%p%`, 83
- `%qc%`, 83
- `%s>%`, 81
  
- `add_name_column`, 4
- `apply_left`, 5, 7–11
- `apply_left.default`, 6, 6
- `apply_left_default`, 7
- `apply_right`, 8, 10, 11
- `apply_right.default`, 10
- `apply_right_S4`, 9, 10, 11
- `as_named_list`, 12
  
- `bc`, 13, 58, 70
- `bquote`, 14, 42, 58, 70
- `bquote_call_args`, 14, 16
- `bquote_function`, 15, 15
- `build_frame`, 17, 32, 33, 59
- `buildNameCallback`, 16
  
- `c`, 62
- `capture.output`, 44
- `check_equiv_frames`, 19
- `checkColsFormUniqueKeys`, 18
- `clean_fit_glm`, 19
- `clean_fit_lm`, 21
- `coalesce`, 22
  
- `DebugFn`, 23, 24–29
- `DebugFnE`, 24, 24, 25–29
- `DebugFnW`, 17, 24, 25, 25, 26–29
- `DebugFnWE`, 24–26, 26, 27–29
- `DebugPrintFn`, 24–27, 27, 28, 29
- `DebugPrintFnE`, 24–28, 28, 29
- `defineLambda`, 29, 35, 39, 43, 49
- `do.call`, 42, 62
- `dot_arrow`, 30
- `dput`, 44
- `draw_frame`, 17, 31, 59
- `draw_framec`, 32
- `dump.frames`, 24–29
  
- `evalb`, 33
- `execute_parallel`, 34, 53
  
- `f.`, 35
  
- `grep`, 36–38
- `grepdf`, 36, 38
- `grepv`, 36, 37
  
- `has_no_dup_rows`, 38
  
- `invert_perm`, 38
- `isTRUE`, 22
  
- `lambda`, 30, 35, 39, 43, 49
- `lapplym`, 40, 52, 75, 76
- `let`, 40, 44, 45, 79
- `list`, 62
  
- `makeFunction_se`, 30, 35, 39, 42, 49
- `map_to_char`, 44
- `map_upper`, 45
- `mapsyms`, 43
- `match_order`, 45
- `mk_formula`, 46
- `mk_tmp_name_source`, 48
  
- `named_map_builder`, 30, 35, 39, 43, 49

order, [50](#), [67](#)  
orderv, [50](#), [67](#)

pack, [51](#), [73](#)  
parLapplyLB, [52](#)  
parLapplyLBm, [40](#), [52](#)  
partition\_tables, [34](#), [53](#)  
pipe\_impl, [54](#)  
psagg, [55](#)

qae, [14](#), [56](#), [58](#), [60](#), [70](#)  
qc, [14](#), [57](#), [57](#), [60](#), [70](#)  
qchar\_frame, [17](#), [32](#), [33](#), [59](#)  
qe, [14](#), [57](#), [58](#), [60](#), [70](#)  
qs, [61](#)

reduceexpand, [61](#)  
reformulate, [47](#)  
restrictToNameAssignments, [62](#)

seqi, [63](#)  
si, [64](#), [66](#), [69](#), [80](#), [81](#)  
sinterp, [64](#), [65](#), [69](#)  
sort, [50](#), [67](#)  
sortv, [50](#), [66](#)  
split\_at\_brace\_pairs, [67](#)  
stop\_if\_dot\_args, [68](#)  
strsplit\_capture, [64](#), [66](#), [69](#), [80](#), [81](#)  
sx, [14](#), [58](#), [70](#)

to, [71](#)

uniques, [72](#)  
unpack, [51](#), [73](#)  
update\_formula, [47](#)

vapplym, [40](#), [52](#), [74](#), [76](#)  
Vectorize, [76](#)  
VectorizeM, [40](#), [52](#), [75](#), [75](#)  
view, [76](#)

wrapr (wrapr-package), [3](#)  
wrapr-package, [3](#)