Package ‘dipsaus’

October 22, 2022

Type Package
Title A Dipping Sauce for Data Analysis and Visualizations
Version 0.2.5
Description Works as an "add-on" to packages like 'shiny', 'future', as well as 'rlang', and provides utility functions. Just like dipping sauce adding flavors to potato chips or pita bread, 'dipsaus' for data analysis and visualizations adds handy functions and enhancements to popular packages. The goal is to provide simple solutions that are frequently asked for online, such as how to synchronize 'shiny' inputs without freezing the app, or how to get memory size on 'Linux' or 'MacOS' system. The enhancements roughly fall into these four categories: 1. 'shiny' input widgets; 2. high-performance computing using the 'future' package; 3. modify R calls and convert among numbers, strings, and other objects. 4. utility functions to get system information such like CPU chip-set, memory limit, etc.

URL https://github.com/dipterix/dipsaus
BugReports https://github.com/dipterix/dipsaus/issues
License GPL-3
Encoding UTF-8
Language en-US
Depends R (>= 3.5.0)
Imports utils, stats, graphics, grDevices, parallel, Rcpp, R6, shiny, cli, stringr, jsonlite (>= 1.6), future, future.apply, progressr, fastmap (>= 1.1.0), base64url, base64enc, digest, rlang (>= 0.4.0), startup, rstudioapi (>= 0.11)
Suggests knitr, rmarkdown, testthat, microbenchmark, magrittr, yaml, future.callr, remotes, glue
RoxygenNote 7.2.1
LinkingTo Rcpp
VignetteBuilder knitr
NeedsCompilation yes
Author  Zhengjia Wang [aut, cre],
        John Magnotti [ctb] (Contributed to `rutabaga.R`),
        Xiang Zhang [ctb] (Contributed to `rutabaga.R`)
Maintainer  Zhengjia Wang <dipterix.wang@gmail.com>
Repository  CRAN
Date/Publication  2022-10-22 07:05:06 UTC

R topics documented:

AbstractMap .......................................................... 4
AbstractQueue .......................................................... 4
actionButtonStyled ..................................................... 6
add_to_session ........................................................... 8
ask_or_default ........................................................... 9
ask_yesno ............................................................... 10
async ................................................................. 11
async_expr ............................................................. 11
async_flapply .......................................................... 12
async_works ............................................................ 13
as_pipe ................................................................. 15
attached_packages ..................................................... 16
base64_to_image ......................................................... 17
base64_to_string ......................................................... 17
baseline_array .......................................................... 18
capture_expr ............................................................ 21
cat2 ................................................................. 21
capture_installed_packages ........................................... 23
clear_env ............................................................... 23
col2hexStr ............................................................... 24
collapse ................................................................. 25
compoundInput2 ........................................................ 26
decorate_function ......................................................... 28
deparse_svec ............................................................. 30
dipsaus-rstudio-shortcuts ............................................. 31
do_aggregate ............................................................. 33
do_nothing ............................................................... 34
drop_nulls ............................................................... 34
eval_dirty ............................................................... 35
fastcov2 ............................................................... 36
fastmap2 ............................................................... 37
fastquantile ............................................................ 39
fastqueue2 .............................................................. 40
flex_div ................................................................. 41
forelse ................................................................. 42
getInputBinding ........................................................ 44
get_cpu ................................................................. 45
get_credential .......................................................... 45
R topics documented:

get_dots .......................................................... 47
get_ip ............................................................. 48
get_os ............................................................. 49
get_ram ............................................................. 50
graphic-devices ................................................... 50
handler_dipsaus_progress ..................................... 52
html_asis ......................................................... 53
html_class .......................................................... 54
iapply ............................................................. 55
lapply_async2 .................................................... 56
lapply_callr ....................................................... 57
list_to_fastmap2 .................................................. 59
list_to_fastqueue2 ................................................ 59
lock ............................................................... 60
make_forked_clusters ............................................. 61
map ............................................................... 63
mask_function2 .................................................... 65
match_calls ........................................................ 66
mean_se ............................................................ 67
mem_limit2 ........................................................ 68
new_function2 ..................................................... 68
no_op ............................................................. 70
package_installed ................................................. 71
parse_svec ........................................................ 72
PersistContainer .................................................. 73
prepare_install .................................................... 74
print_directory_tree .............................................. 75
progress2 ........................................................ 76
registerInputBinding ............................................. 78
restart_session ..................................................... 79
rs_active_project ............................................... 79
rs_avail .......................................................... 79
rs_edit_file ........................................................ 80
rs_exec ........................................................... 81
rs_focus_console .................................................. 82
rs_save_all ........................................................ 83
rs_select_path ..................................................... 83
rs_set_repos ....................................................... 84
rs_viewer ........................................................... 84
screenshot .......................................................... 85
session_uuid ........................................................ 85
set_shiny_input ..................................................... 86
sepx_type2 .......................................................... 88
shared_finalizer .................................................... 89
shift_array .......................................................... 92
shiny_alert2 ......................................................... 93
shiny_is_running ..................................................... 95
ste_mean ........................................................... 95
AbstractQueue

Abstract Queue to store key-value pairs

Description

This class is inspired by https://cran.r-project.org/package=txtq. The difference is AbstractQueue introduce an abstract class that can be extended and can queue not only text messages, but also arbitrary R objects, including expressions and environments. All the queue types in this package inherit this class.

Abstract Public Methods

Methods start with @... are not thread-safe. Most of them are not used directly by users. However, you might want to override them if you inherit this abstract class. Methods marked as "(override)" are not implemented, meaning you are supposed to implement the details. Methods marked as "(optional)" usually have default alternatives.

initialize(...) (override) The constructor. Usually three things to do during the process: 1. set get_locker free_locker if you don’t want to use the default lockers. 2. set lock file (if using default lockers). 3. call self$connect(...)
AbstractQueue

get_locker(), free_locker() (optional) Default is NULL for each methods, and queue uses an internal private$default_get_locker and private$default_free_locker. These two methods are for customized locker, please implement these two methods as functions during self$initialization get_locker obtains and lock access (exclusive), and free_locker frees the locker. Once implemented, privateexclusive will take care the rest. Type: function; parameters: none; return: none

@get_head(), @set_head(v) (override) Get head so that we know where we are in the queue self$@get_head() should return a integer indicating where we are at the queue self$@set_head(v) stores that integer. Parameter v is always non-negative, this is guaranteed. Users are not supposed to call these methods directly, use self$head and self$head<- instead. However, if you inherit this class, you are supposed to override the methods.

@get_total(), @set_total(v) (override) Similar to @get_head and @set_head, defines the total items ever stored in the queue. total-head equals current items in the queue.

@inc_total(n=1) (optional) Increase total, usually this doesn’t need to be override, unless you are using files to store total and want to decrease number of file connections

@append_header(msg, ...) (override) msg will be vector of strings, separated by "\", containing encoded headers: ‘time’, ‘key’, ‘hash’, and ‘message’. to decode what’s inside, you can use self$print_items(stringr::str_split_fixed(msg, \"\", 4)). Make sure to return a number, indicating number of items stored. Unless handled elsewhere, usually return(length(msg)).

@store_value(value, key) (override) Defines how to store value. ‘key’ is unique identifier generated from time, queue ID, and value. Usually I use it as file name or key ID in database. value is an arbitrary R object to store. you need to store value somewhere and return a string that will be passed as ‘hash’ in self$restore_value.

restore_value(hash, key, preserve = FALSE) (override) Method to restore value from given combination of ‘hash’ and ‘key’. ‘hash’ is the string returned by @store_value, and ‘key’ is the same as key in @store_value. preserve is a indicator of whether to preserve the value for future use. If set to FALSE, then you are supposed to free up the resource related to the value. (such as free memory or disk space)

@log(n = -1, all = FALSE) (override) get n items from what you saved to during @append_header. n less equal than 0 means listing all possible items. If all=TRUE, return all items (number of rows should equals to self$total), including popped items. If all=FALSE, only return items in the queue (number of rows is self$count). The returned value should be a n x 4 matrix. Usually I use stringr::str_split_fixed(..., \"\", 4). Please see all other types implemented for example.

@reset(...) (override) Reset queue, remove all items and reset head, total to be 0.

@clean() (override) Clean the queue, remove all the popped items.

@validate() (override) Validate the queue. Stop if the queue is broken.

@connect(con, ...) (override) Set up connection. Usually should be called at the end of self$initialization to connect to a database, a folder, or an existing queue you should do checks whether the connection is new or it’s an existing queue.

connect(con, ...) (optional) Thread-safe version. sometimes you need to override this function instead of @connect, because privateexclusive requires lockfile to exist and to be locked. If you don’t have lockers ready, or need to set lockers during the connection, override this one.

destroy() (optional) Destroy a queue, free up space and call delayedAssign(.lockfile', {stop(...)}, assign.env=private) to raise error if a destroyed queue is called again later.
Public Methods

Usually don’t need to override unless you know what you are doing.

push(value, message='', ...) Function to push an arbitrary R object to queue. message is a string giving notes to the pushed item. Usually message is stored with header, separated from values. The goal is to describe the value. ... is passed to @append_header.

pop(n = 1, preserve = FALSE) Pop n items from the queue. preserve indicates whether not to free up the resources, though not always guaranteed.

print_item(item), print_items(items) To decode matrix returned by log(), returning named list or data frame with four heads: ‘time’, ‘key’, ‘hash’, and ‘message’.

list(n=-1) List items in the queue, decoded. If n is less equal than 0, then list all results. The result is equivalent to self$print_items(self$log(n))

log(n=-1, all=FALSE) List items in the queue, encoded. This is used with self$print_items. When all=TRUE, result will list the records ever pushed to the queue since the last time queue is cleaned. When all=FALSE, results will be items in the queue. n is the number of items.

Public Active Bindings

id  Read-only property. Returns unique ID of current queue.
lockfile  The lock file.
head  Integer, total number of items popped, i.e. inactive items.
total  Total number of items ever pushed to the queue since last cleaned, integer.
count  Integer, read-only, equals to total - head, number of active items in the queue

Private Methods or properties

.id  Don’t use directly. Used to store queue ID.
.lockfile  Location of lock file.
lock  Preserve the file lock.
exclusive(expr,...) Function to make sure the methods are thread-safe

default_get_locker() Default method to lock a queue
default_free_locker  Default method to free a queue

Description

Action Button but with customized styles
**Usage**

```r
actionButtonStyled(
    inputId,
    label,
    icon = NULL,
    width = NULL,
    type = "primary",
    btn_type = "button",
    class = "",
    ...
)
```

**Arguments**

- `inputId`, `label`, `icon`, `width`, ...
  passed to `shiny::actionButton`
- `type` button type, choices are `default`, `primary`, `info`, `success`, `warning`, and `danger`
- `btn_type` HTML tag type, either "button" or "a"
- `class` additional classes to be added to the button

**Value**

'HTML' tags

**See Also**

`updateActionButtonStyled` for how to update the button.

**Examples**

```r
# demo('example-actionButtonStyled', package='dipsaus')

library(shiny)
library(dipsaus)

ui <- fluidPage(
    actionButtonStyled('btn', label = 'Click me', type = 'default'),
    actionButtonStyled('btn2', label = 'Click me2', type = 'primary')
)

server <- function(input, output, session) {
    btn_types = c('default', 'primary', 'info', 'success', 'warning', 'danger')
    observeEvent(input$btn, {
        btype = btn_types[((input$btn-1) %% (length(btn_types)-1)) + 1]
        updateActionButtonStyled(session, 'btn2', type = btype)
    })
    observeEvent(input$btn2, {
```
add_to_session

updateActionButtonStyled(session, 'btn',
    disabled = c(FALSE,TRUE)[(input$btn2 %% 2) + 1])
}

if( interactive() ){
    shinyApp(ui, server, options = list(launch.browser=TRUE))
}

<table>
<thead>
<tr>
<th>add_to_session</th>
<th>Store/Get key-value pairs in 'shiny' session</th>
</tr>
</thead>
</table>

Description

If key is missing, it’ll be created, otherwise ignored or overwritten.

Usage

```r
add_to_session(
    session,
    key = "rave_id",
    val = paste(sample(c(letters, LETTERS, 0:9), 20), collapse = ""),
    override = FALSE
)
```

Arguments

- **session**: ‘Shiny’ session
- **key**: character, key to store
- **val**: value to store
- **override**: if key exists, whether to overwrite its value

Value

If session is shiny session, returns current value stored in session, otherwise returns NULL.
**ask_or_default**

**Description**

Ask a question and read from the terminal in interactive scenario

**Usage**

```r
ask_or_default(..., default = "", end = "", level = "INFO")
```

**Arguments**

..., end, level passed to `cat2`

default default value to return in case of blank input

**Details**

The prompt string will ask a question, providing defaults. Users need to enter the answer. If the answer is blank (no space), then returns the default, otherwise returns the user input.

This can only be used in an **interactive** session.

**Value**

A character from the user’s input, or the default value. See details.

**See Also**

`cat2`, `readline`, `ask_yesno`

**Examples**

```r
if(interactive()){
  ask_or_default('What is the best programming language?',
                 default = 'PHP')
}
```
ask_yesno  
Ask and Return True or False from the Terminal

Description

Ask a question and read from the terminal in interactive scenario

Usage

```r
ask_yesno(
  ..., end = "", level = "INFO",
  error_if_canceled = TRUE,
  use_rs = TRUE,
  ok = "Yes",
  cancel = "No",
  rs_title = "Yes or No:"
)
```

Arguments

- `...`: `end, level` passed to `cat2`
- `error_if_canceled`: raise error if canceled
- `use_rs`: whether to use `rstudioapi` if possible
- `ok`: button label for yes
- `cancel`: button label for no
- `rs_title`: message title if 'RStudio' question box pops up.

Details

The prompt string will ask for an yes or no question. Users need to enter "y", "yes" for yes, "n", "no" or no, and "c" for cancel (case-insensitive).

This can only be used in an interactive session.

Value

- logical or NULL or raise an error. If "yes" is entered, returns TRUE; if "no" is entered, returns FALSE; if "c" is entered, `error_if_canceled=TRUE` will result in an error, otherwise return NULL

See Also

- `cat2`, `readline`, `ask_or_default`
Examples
if(interactive()){
  ask_yesno('Do you know how hard it is to submit an R package and ',',
  'pass the CRAN checks?')
  ask_yesno('Can I pass the CRAN check this time?')
}

async (Evaluate expression in async_expr)

Description
Evaluate expression in async_expr

Usage
async(expr)

Arguments
expr R expression

See Also
async_expr

async_expr (Apply R expressions in a parallel way)

Description
Apply R expressions in a parallel way

Usage
async_expr(.
  .X,
  .expr,
  .varname = "x",
  envir = parent.frame(),
  .pre_run = NULL,
  .ncore = future::availableCores(),
  ...
)
async_flapply

Arguments

- `.X` a vector or a list to apply evaluation on
- `.expr` R expression, unquoted
- `.varname` variable name representing element of each `.X`
- `envir` environment to evaluate expressions
- `.pre_run` expressions to be evaluated before looping.
- `.ncore` number of CPU cores
- ... passed to `future::future`

Details

async_expr uses `lapply` and `future::future` internally. Within each loop, an item in ".X" will be assigned to variable "x" (defined by ".varname") and enter the evaluation. During the evaluation, function async is provided. Expressions within async will be evaluated in another session, otherwise will be evaluated in current session. Below is the workflow:

- Run `.pre_run`
- For `i` in `seq_along(.X)`:
  - 1. Assign `x` with `.X[[i]]`, variable name `x` is defined by `.varname`
  - 2. Evaluate `expr` in current session.
     * a. If async is not called, return evaluated `expr`
     * b. If `async(async_expr)` is called, evaluate `async_expr` in another session, and return the evaluation results if `async_expr`

Value

a list whose length equals to `.X`. The value of each item returned depends on whether async is called. See details for workflow.

async_flapply  Wraper for `future.apply::future_lapply`

Description

Wrapper for `future.apply::future_lapply`

Usage

`async_flapply(X, FUN, ...)`

Arguments

- `X`, `FUN`, `...` passing to `future.apply::future_lapply`

See Also

`future_lapply`
async_works

**Run jobs in other R sessions without waiting**

**Description**

This function has been deprecated. Please use `lapply_callr` instead.

**Usage**

```r
async_works(
  X,
  FUN,
  ..., .globals = NULL, .name = "Untitled", .rs = FALSE, .wait = TRUE, .chunk_size = Inf, .nworkers = future::availableCores(), .simplify = FALSE, .quiet = FALSE, .log
)
```

**Arguments**

- `X` vector or list to be applied
- `FUN` function with the first argument to be each element of `X`
- `...` further arguments to be passed to `FUN`
- `.globals` global variables to be evaluated in `FUN`
- `.name` job names, used if backed by `rstudioapi` jobs
- `.rs` whether to use `rstudioapi` jobs
- `.wait` whether to wait for the results
- `.chunk_size` used only when `.wait=FALSE`, chunk size for each workers at a time. Only useful for printing progress messages, but might slow down the process when `.chunk_size` is too small
- `.nworkers` number of workers at a time
- `.simplify` whether to simplify the results, i.e. merge list of results to vectors or arrays
- `.quiet` whether to suppress the printing messages
- `.log` internally used
async_works

Details

Unlike future package, where the global variables can be automatically detected, async_works require users to specify global variables explicitly via .globals

async_works is almost surely slower than future.apply packages. However, it provides a functionality that future.apply can hardly achieve: being non-block. When setting .wait=FALSE, the process will run in the background, and one may run as many of these tasks as they want. This is especially useful when large data generating process occurs (such as read in from a file, process, generate summarizing reports).

Value

If .wait=TRUE, returns the applied results of FUN on each of X. The result types depend on .simplify (compare the difference between lapply and sapply). If .wait=FALSE, then returns a function that can check the result. The function takes timeout argument that blocks the session at most timeout seconds waiting for the results. See examples.

Examples

## Not run:
# requires a sub-process to run the code

# Basic usage
a <- 1
async_works(1:10, function(ii){
  ii + a # sub-process don't know a, hence must pass a as globals
}, .globals = list(a = a))

# non-blocking case
system.time{
  check <- async_works(1:10, function(ii){
    # simulating process, run run run
    Sys.sleep(ii)
    Sys.getpid()
  }, .wait = FALSE)
}

# check the results
res <- check(timeout = 0.1)
attr(res, 'resolved') # whether it's resolved

# block the session waiting for the results
res <- check(timeout = Inf)
attr(res, 'resolved')

## End(Not run)
as_pipe

Convert functions to pipe-friendly functions

Description
Convert functions to pipe-friendly functions

Usage
as_pipe(
  x,
  ...,
  call,
  arg_name,
  .name = arg_name,
  .env = parent.frame(),
  .quoted = FALSE
)

Arguments
x  R object as input
... default arguments explicitly display in the returned function
call a function call, or the function itself
arg_name argument name to be varied. This argument will be the first argument in the new
function so it’s pipe-friendly.
.name new argument name; default is the same as arg_name
.env executing environment
quoted whether call has been quoted

Value
If x is missing, returns a function that takes one argument, otherwise run the function with given x

Examples

# modify a function call
vary_title <- as_pipe(call = plot(1:10, 1:10),
  pch = 16,
  arg_name = 'main',
  .name = 'title')

vary_title

# vary_title is pipe-friendly with 'pch' default 16
vary_title(title = 'My Title')
# 'pch' is explicit

```r
vary_title(title = 'My Title', pch = 1)
```

# other variables are implicit

```r
vary_title(title = 'My Title', type = 'l')
```

# modify a function

```r
f <- function(b = 1, x) { b + x }
f_pipable <- as_pipe(call = f, arg_name = 'x')
f_pipable
```

f_pipable(2)

# Advanced use

# Set option dipsaus.debug.as_pipe=TRUE to debug

```r
options("dipsaus.debug.as_pipe" = TRUE)
```

# Both `.z` and `z` work

```r
image2 <- as_pipe(call = image(
  x = seq(0, 1, length.out = nrow(z)),
  y = 1:ncol(z),
  z = matrix(1:16, 4),
  xlab = "Time", ylab = "Freq",
  main = "Debug"
), arg_name = 'z')
```

# main can be overwritten

```r
image2(matrix(1:50, 5), main = "Production")
```

# reset debug option

```r
options("dipsaus.debug.as_pipe" = FALSE)
```

---

### attached_packages

Get attached package names in current session (Internally used)

**Description**

Get attached package names in current session (Internally used)

**Usage**

```r
attached_packages(include_base = FALSE)
```
**base64_to_image**

**Arguments**

- **include_base**  whether to include base packages

**Value**

characters, package names that are attached in current session

---

**base64_to_image**  *Save "Base64" Data to Images*

**Description**

Save "Base64" Data to Images

**Usage**

base64_to_image(data, path)

**Arguments**

- **data**  characters, encoded "Base64" data for images
- **path**  file path to save to

**Value**

Absolute path of the saved file

---

**base64_to_string**  *Convert "Base64" Data to String*

**Description**

Decode "Base64" data to its generating characters

**Usage**

base64_to_string(what)

**Arguments**

- **what**  characters, encoded "Base64" data

**Value**

String
Examples

```r
input <- "The quick brown fox jumps over the lazy dog"

# Base64 encode
what <- base64enc::base64encode(what = charToRaw(input))

# Base64 decode
base64_to_string(what)
```

---

**baseline_array**

*Calculate Contrasts of Arrays in Different Methods*

**Description**

Provides five methods to baseline an array and calculate contrast.

**Usage**

```r
baseline_array(
  x,
  along_dim,
  baseline_indexpoints,
  unit_dims = seq_along(dim(x))[[-along_dim]],
  method = c("percentage", "sqrt_percentage", "decibel", "zscore", "sqrt_zscore",
             "subtract_mean")
)
```

**Arguments**

- `x` array (tensor) to calculate contrast
- `along_dim` integer range from 1 to the maximum dimension of `x`. baseline along this dimension, this is usually the time dimension.
- `baseline_indexpoints` integer vector, which index points are counted into baseline window? Each index ranges from 1 to `dim(x)[[along_dim]]`. See Details.
- `unit_dims` integer vector, baseline unit: see Details.
- `method` character, baseline method options are: "percentage", "sqrt_percentage", "decibel", "zscore", and "sqrt_zscore"
**Details**

Consider a scenario where we want to baseline a bunch of signals recorded from different locations. For each location, we record \( n \) sessions. For each session, the signal is further decomposed into frequency-time domain. In this case, we have the input \( x \) in the following form:

\[
\text{session \times frequency \times time \times location}
\]

Now we want to calibrate signals for each session, frequency and location using the first 100 time points as baseline points, then the code will be

\[
\text{baseline_array}(x, \text{along_dim} = 3, 1:100, \text{unit_dims} = c(1, 2, 4))
\]

*along_dim* is dimension of time, in this case, it’s the third dimension of \( x \). *baseline_indexpoints*=1:100, meaning the first 100 time points are used to calculate baseline. *unit_dims* defines the unit signal. Its value \( c(1, 2, 4) \) means the unit signal is per session (first dimension), per frequency (second) and per location (fourth).

In some other cases, we might want to calculate baseline across frequencies then the unit signal is *frequency*time, i.e. signals that share the same session and location also share the same baseline. In this case, we assign *unit_dims*=c(1, 4).

There are five baseline methods. They fit for different types of data. Denote \( z \) is an unit signal, \( z_0 \) is its baseline slice. Then these baseline methods are:

- **"percentage"**
  \[
  \frac{z - \bar{z}_0}{\bar{z}_0} \times 100\%
  \]
- **"sqrt_percentage"**
  \[
  \frac{\sqrt{z} - \sqrt{\bar{z}_0}}{\sqrt{\bar{z}_0}} \times 100\%
  \]
- **"decibel"**
  \[
  10 \times (\log_{10}(z) - \log_{10}(\bar{z}_0))
  \]
- **"zscore"**
  \[
  \frac{z - \bar{z}_0}{sd(\bar{z}_0)}
  \]
- **"sqrt_zscore"**
  \[
  \frac{\sqrt{z} - \sqrt{\bar{z}_0}}{sd(\sqrt{\bar{z}_0})}
  \]

**Value**

Contrast array with the same dimension as \( x \).
library(dipsaus)
set.seed(1)

# Generate sample data
dims = c(10,20,30,2)
x = array(rnorm(prod(dims))^2, dims)

# Set baseline window to be arbitrary 10 timepoints
baseline_window = sample(30, 10)

# ----- baseline percentage change -------

# Using base functions
re1 <- aperm(apply(x, c(1,2,4), function(y){
  m <- mean(y[baseline_window])
  (y/m - 1) * 100
}), c(2,3,1,4))

# Using dipsaus
re2 <- baseline_array(x, 3, baseline_window, c(1,2,4),
  method = 'percentage')

# Check different, should be very tiny (double precisions)
range(re2 - re1)

# Check speed for large dataset
if(interactive()){
dims = c(200,20,300,2)
x = array(rnorm(prod(dims))^2, dims)
# Set baseline window to be arbitrary 10 timepoints
baseline_window = seq_len(100)
f1 <- function(){
  aperm(apply(x, c(1,2,4), function(y){
    m <- mean(y[baseline_window])
    (y/m - 1) * 100
  }), c(2,3,1,4))
}
f2 <- function(){
  # equivalent as bl = x[,,baseline_window, ]
  #
  baseline_array(x, along_dim = 3,
    baseline_indexpoints = baseline_window,
    unit_dims = c(1,2,4), method = 'sqrt_percentage')
}
microbenchmark::microbenchmark(f1(), f2(), times = 3L)
}
**capture_expr**

*Captures Evaluation Output of Expressions as One Single String*

**Description**
Evaluate expression and captures output as characters, then concatenate as one single string.

**Usage**
capture_expr(expr, collapse = "\n", type = c("output", "message"), ...)

**Arguments**
- expr: R expression
- collapse: character to concatenate outputs
- type, ...: passed to `capture.output`

**Value**
Character of length 1: output captured by `capture.output`

**Examples**
```r
x <- data.frame(a=1:10)
x_str <- capture_expr({
  print(x)
})
x_str

cat(x_str)
```

---

**cat2**

*Color Output*

**Description**
Color Output
Usage

cat2(
  ...,  
  level = "DEBUG",   
  print_level = FALSE,   
  file = "",   
  sep = " ",   
  fill = FALSE,   
  labels = NULL,   
  append = FALSE,   
  end = "\n",   
  pal = listDEBUG = "grey60", INFO = "#1d9f34", WARNING = "#ec942c", ERROR = "#f02c2c",   
  FATAL = "#763053", DEFAULT = "grey60"),   
  use_cli = TRUE,   
  bullet = "auto"
)

Arguments

... to be printed
level 'DEBUG', 'INFO', 'WARNING', 'ERROR', or 'FATAL' (total 5 levels)
print_level if true, prepend levels before messages
file, sep, fill, labels, append pass to base::cat
end character to append to the string
pal a named list defining colors see details
use_cli logical, whether to use package 'cli'
bullet character, if use 'cli', which symbol to show. see symbol

Details

There are five levels of colors by default: 'DEBUG', 'INFO', 'WARNING', 'ERROR', or FATAL. Default colors are: 'DEBUG' (grey60), 'INFO' (#1d9f34), 'WARNING' (#ec942c), 'ERROR' (#f02c2c), 'FATAL' (#763053) and 'DEFAULT' (#000000, black). If level is not in preset five levels, the color will be "default"-black color.

Value

none.
check_installed_packages

Check If Packages Are Installed, Returns Missing Packages

Description

Check If Packages Are Installed, Returns Missing Packages

Usage

check_installed_packages(
  pkgs,
  libs = base::.libPaths(),
  auto_install = FALSE,
  ...
)

Arguments

pkgs vector of packages to install
libs paths of libraries
auto_install automatically install packages if missing
... other parameters for install.packages

Value

package names that are not installed

clear_env

Function to clear all elements within environment

Description

Function to clear all elements within environment

Usage

clear_env(env, ...)

Arguments

env environment to clean, can be an R environment, or a fastmap2 instance
... ignored
Examples

```r
env = new.env()
env$a = 1
print(as.list(env))

clear_env(env)
print(as.list(env))
```

col2hexStr

**Convert color to Hex string**

**Description**

Convert color to Hex string

**Usage**

```r
col2hexStr(col, alpha = NULL, prefix = "#", ...)
```

**Arguments**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>col</code></td>
<td>character or integer indicating color</td>
</tr>
<tr>
<td><code>alpha</code></td>
<td>NULL or numeric, transparency. See <code>grDevices::rgb</code></td>
</tr>
<tr>
<td><code>prefix</code></td>
<td>character, default is &quot;#&quot;</td>
</tr>
<tr>
<td><code>...</code></td>
<td>passing to <code>adjustcolor</code></td>
</tr>
</tbody>
</table>

**Details**

col2hexStr converts colors such as 1, 2, 3, "red", "blue", ... into hex strings that can be easily recognized by ‘HTML’, ‘CSS’ and ‘JavaScript’. Internally this function uses `adjustcolor` with two differences:

1. the returned hex string does not contain alpha value if `alpha` is NULL;
2. the leading prefix "#" can be customized

**Value**

characters containing the hex value of each color. See details

**See Also**

`adjustcolor`
Examples

col2hexStr(1, prefix = '0x')  # "0x000000"
col2hexStr('blue')  # "#0000FF"

# Change default palette, see "grDevices::colors()"
grDevices::palette(c('orange3', 'skyblue1'))
col2hexStr(1)  # Instead of #000000, #CD8500

collapse  

Collapse Sensors And Calculate Summations/Mean

Description

Collapse Sensors And Calculate Summations/Mean

Usage

collapse(x, keep, average = FALSE)

Arguments

x  
A numeric multi-mode tensor (array), without NA

keep  
Which dimension to keep

average  
collapse to sum or mean

Value

a collapsed array with values to be mean or summation along collapsing dimensions

Examples

# Example 1
x = matrix(1:16, 4)

# Keep the first dimension and calculate sums along the rest
collapse(x, keep = 1)
rowSums(x)  # Should yield the same result

# Example 2
x = array(1:120, dim = c(2,3,4,5))
result = collapse(x, keep = c(3,2))
compare = apply(x, c(3,2), sum)
sum(abs(result - compare))  # The same, yield 0 or very small number (1e-10)

# Example 3 (performance)
# Small data, no big difference, even slower
x = array(rnorm(240), dim = c(4,5,6,2))
microbenchmark::microbenchmark(
  result = collapse(x, keep = c(3,2)),
  compare = apply(x, c(3,2), sum),
  times = 1L, check = function(v){
    max(abs(range(do.call("-", v)))) < 1e-10
  }
)

# large data big difference
x = array(rnorm(prod(300,200,105)), c(300,200,105,1))
microbenchmark::microbenchmark(
  result = collapse(x, keep = c(3,2)),
  compare = apply(x, c(3,2), sum),
  times = 1L, check = function(v){
    max(abs(range(do.call("-", v)))) < 1e-10
  }
)

### compoundInput2

**Compound input that combines and extends shiny inputs**

**Description**

Compound input that combines and extends shiny inputs

**Usage**

```r
compoundInput2(
  inputId,
  label = "Group",
  components = shiny::tagList(),
  initial_ncomp = 1,
  min_ncomp = 0,
  max_ncomp = 10,
  value = NULL,
  label_color = NA,
  max_height = NULL,
  ...
)
```

**Arguments**

- `inputId` character, shiny input ID
- `label` character, will show on each groups
- `components` ‘HTML’ tags that defines and combines HTML components within groups
- `initial_ncomp` numeric initial number of groups to show, non-negative
compoundInput2

min_ncomp  minimum number of groups, default is 0, non-negative
max_ncomp  maximum number of groups, default is 10, greater or equal than min_ncomp
value      list of lists, initial values of each inputs, see examples.
label_color integer or characters, length of 1 or max_ncomp, assigning colors to each group
              labels; default is NA, and try to get color from foreground par("fg")
max_height maximum height of the widget
...         will be ignored

Value

‘HTML’ tags

See Also

updateCompoundInput2 for how to update inputs

Examples

library(shiny); library(dipsaus)
compoundInput2(
  'input_id', 'Group',
  div(
    textInput('text', 'Text Label'),
    sliderInput('sli', 'Slider Selector', value = 0, min = 1, max = 1)
  ),
  label_color = 1:10,
  value = list(
    list(text = '1'), # Set text first group to be "1"
    list(),            # no settings for second group
    list(sli = 0.2)    # sli = 0.2 for the third group
  )
)

# Source - system.file('demo/example-compountInput2.R', package='dipsaus')

# demo('example-compountInput2', package='dipsaus')

library(shiny)
library(dipsaus)
ui <- fluidPage(
  fluidRow(
    column(
      width = 4,
      compoundInput2(
        'compound', 'Group Label', label_color = c(NA,1:9),
        components = div(
          textInput('txt', 'Text'),
          selectInput('sel', 'Select', choices = 1:10, multiple = TRUE),
          sliderInput('sli', 'Slider', max=1, min=0, val=0.5)
        ),
        value = list(

```
server <- function(input, output, session) {
  observe({
    print(input$compound)
  })
  observe({
    # Getting specific input at group 1
    print(input$compound_txt_1)
  })
  observeEvent(input$action, {
    updateCompoundInput2(
      session, 'compound',
      # Update values for each components
      value = lapply(1:5, function(ii){
        list(
          txt = sample(LETTERS, 1),
          sel = sample(1:10, 3),
          sli = runif(1)
        )
      }), ncomp = NULL, txt = list(label = as.character(Sys.time()))
    )
  })

  if( interactive() ){
    shinyApp(ui, server, options = list(launch.browser = TRUE))
  }
}

---

decorate_function  
Python-style decorator

**Description**

Python-style decorator

**Usage**

decorate_function(orig, decor, ...)

lhs %D% rhs
Arguments

orig, lhs  any function

decor, rhs  decorator function that takes orig as its first argument

...  passed to decor

Examples

# Example 1: basic usage
# Decorator that prints summary of results and return results itself
verbose_summary <- function(...){
    summary_args <- list(...)
    function(f){
        function(...){
            results <- f(...)

            print(do.call(
                summary,
                c(list(results), summary_args)
            ))
            results
        }
    }
}

# runs as.list, but through verbose_summary
as_list2 <- decorate_function(as.list, verbose_summary)

# run test
res <- as_list2(1:3)  # will verbose summary
identical(res, as.list(1:3))

# Example 2
x <- 1:20
y <- x + rnorm(20)

# decorator, add a line with slope 1 with given intercept
abline_xy <- function(b){
    function(f){
        function(...){
            f(...)
            intercept <- get_dots('intercept', 0, ...)
            abline(a = intercept, b = b)
        }
    }
}
# orig, plot whatever x vs jittered+intercept
plot_xy <- function(x, intercept = rnorm(1)){
  plot(x, jitter(x, amount = 3) + intercept)
}

# new function that decorate plot_xy with abline_xy, and
# returns the intercept
plot_xy2 <- decorate_function(plot_xy, abline_xy, b = 1)

# alternatively, you might also want to try
plot_xy2 <- plot_xy %D% abline_xy(b = 1)

plot_xy2(x = 1:20)

---

deparse_svec  
Convert Integer Vectors To String

Description

Convert Integer Vectors To String

Usage

deparse_svec(
  nums,
  connect = "-",
  concatenate = TRUE,
  collapse = ",",
  max_lag = 1
)

Arguments

nums integer vector
connect character used to connect consecutive numbers
concatenate connect strings if there are multiples
collapse if concatenate, character used to connect strings
max_lag defines "consecutive", min = 1

Value

strings representing the input vector. For example, c(1, 2, 3) returns "1-3".

See Also

parse_svec


Examples

deparse_svec(c(1:10, 15:18))

dipsaus-rstudio-shortcuts

Register customized R code to ’RStudio’ shortcuts

Description

’RStudio’ keyboard shortcuts is handy, however, it is non-trivial to set shortcuts that run customized code. The proposing functions allow 10 customized R expressions to be registered. The first five (1 to 5) are interactive shortcuts, the rest five (6 to 10) are non-interactive.

Usage

rs_add_insertion_shortcut(which, txt, force = FALSE)
rs_add_shortcut(which, expr, force = FALSE, quoted = FALSE)
rs_remove_shortcut(which)
rs_show_shortcut(which)
rs_quick_debug(env = globalenv())

Arguments

which integer from 1 to 10, which keyboard shortcut to edit
txt an insertion/replacement shortcut to add
force whether to remove existing shortcut if the hot-key has been registered
expr expression to run if shortcut is pressed
quoted whether expr is quoted, default is false
env environment to debug code; default is global environment

Details

There are two steps to register an ’RStudio’ keyboard shortcut.
1. Please enable the shortcuts by opening ’Tools’ > ’Modify Keyboard Shortcuts’ in ’RStudio’ menu bar; search and locate add-in items starting with ’Dipsaus’; register hot-keys of your choices, and then save. It is recommended that these keys are ’Alt’ + 1 to ’Alt’ + 0. On Apple, ’Alt’ is equivalent to ’option’ key.
2. run rs_add_insertion_shortcut or rs_add_shortcut to customize the behaviors of each shortcuts; see Examples.

Function rs_quick_debug provides quick way to debug a script or function without messing up the code. The script only works in ’RStudio’. When executing the quick-debug function, the
Cursor context will be automatically resolved and nearest debugging code blocks will be searched and executed. To enable this feature, add a line with "# DIPSAUS: DEBUG START" in your code, followed by debugging code blocks in comments. The script will figure it out. Since the 'RStudio' context will be obtained when executing the function, it is recommended to add this function to your shortcuts. By default, if the shortcut-1 is unset, this function will be executed.

Examples

```r
## Not run:
# Need to run in RStudio
# Please read the Section 'Details' carefully

# --------------------------------------------
# I assume the shortcuts are Alt+1,2,...,9,0,
# corresponding to shortcuts 1 - 10
# Adds an insertion to Alt+9
rs_add_insertion_shortcut(9, " %?<-% ", force = TRUE)
# restart RStudio and try 'Alt+9'

# Adds an expression to Alt+2
rs_add_shortcut(2, {
  expr <- sprintf("system.time({
%s
})
", rstudioapi::selectionGet()$value)
  cat(expr)
  eval(parse(text = expr))
}, force = TRUE)
# Select any valid R code and press Alt+1

# --------------------------------------------
# run this to set your shortcut (one-time setup)
rs_add_shortcut(1, { dipsaus::rs_quick_debug() })
# Add debug feature: insert the following comment anywhere in your code
# You may open a new script in the RStudio
# DIPSAUS: DEBUG START
# message("Debugging...")
# a <- 1
# print(a)
# message("Finished")

# Place your cursor here, press the shortcut key
```
do_aggregate

## End(Not run)

### do_aggregate

**Make aggregate pipe-friendly**

#### Description

A pipe-friendly wrapper of `aggregate` when using formula as input.

#### Usage

```r
do_aggregate(x, ...)
```

#### Arguments

- `x` an R object
- `...` other parameters passed to `aggregate`

#### Value

Results from `aggregate`

#### See Also

`aggregate`

#### Examples

```r
library(magrittr)
data(ToothGrowth)

ToothGrowth %>%
do_aggregate(len ~ ., mean)
```
do_nothing  

A dummy function that literally does nothing

Usage

```
do_nothing(...)```

Arguments

```
...      ignored
```

Value

Nothing

---

drop_nulls  

Drop NULL values from list or vectors

Usage

```
drop_nulls(x, .invalids = list("is.null"))```

Arguments

```
x              list to check
.invalids      a list of functions, or function name. Default is 'is.null'.
```

Value

list or vector containing no invalid values

Examples

```
x <- list(NULL,NULL,1,2)
drop_nulls(x)  # length of 2
```
**Description**
Evaluate expressions

**Usage**
eval_dirty(expr, env = parent.frame(), data = NULL, quoted = TRUE)

**Arguments**
- `expr` R expression or `rlang` quo
- `env` environment to evaluate
- `data` dataframe or list
- `quoted` Is the expression quoted? By default, this is TRUE. This is useful when you don’t want to use an expression that is stored in a variable; see examples

**Details**
eval_dirty uses base::eval() function to evaluate expressions. Compare to rlang::eval_tidy, which won’t affect original environment, eval_dirty causes changes to the environment. Therefore if `expr` contains assignment, environment will be changed in this case.

**Value**
the executed results of `expr` evaluated with side effects.

**Examples**

```r
env = new.env(); env$a = 1
rlang::eval_tidy(quote({a <- 111}), env = env)
print(env$a) # Will be 1. This is because eval_tidy has no side effect

 eval_dirty(quote({a <- 111}), env)
print(env$a) # 111, a is changed

# Unquoted case
 eval_dirty({a <- 222}, env, quoted = FALSE)
print(env$a)
```
fastcov2  
*Calculate Covariance Matrix in Parallel*

**Description**

Speed up covariance calculation for large matrices. The default behavior is similar to `cov`. Please remove any NA prior to calculation.

**Usage**

`fastcov2(x, y = NULL, col1, col2, df)`

**Arguments**

- `x`: a numeric vector, matrix or data frame; a matrix is highly recommended to maximize the performance
- `y`: NULL (default) or a vector, matrix or data frame with compatible dimensions to `x`; the default is equivalent to `y = x`
- `col1`: integers indicating the subset (columns) of `x` to calculate the covariance; default is all the columns
- `col2`: integers indicating the subset (columns) of `y` to calculate the covariance; default is all the columns
- `df`: a scalar indicating the degrees of freedom; default is `nrow(x) - 1`

**Value**

A covariance matrix of `x` and `y`. Note that there is no NA handling. Any missing values will lead to NA in the resulting covariance matrices.

**Examples**

```r
x <- matrix(rnorm(400), nrow = 100)

# Call 'cov(x)' to compare
fastcov2(x)

# Calculate covariance of subsets
fastcov2(x, col1 = 1, col2 = 1:2)

# Speed comparison
x <- matrix(rnorm(100000), nrow = 1000)
microbenchmark::microbenchmark(
  fastcov2 = {
    fastcov2(x, col1 = 1:50, col2 = 51:100)
  },
  cov = {
    cov(x[,1:50], x[,51:100])
  })
```
Description

*fastmap* provides a key-value store where the keys are strings and the values are any R objects. It differs from normal environment that *fastmap* avoids memory leak. *fastmap2* is a wrapper for *fastmap*, which provides several generic functions such that it has similar behaviors to lists or environments.

Usage

```r
fastmap2(missing.default = NULL)
```

## S3 method for class 'fastmap2'
```r
x[[name]]
```

## S3 method for class 'fastmap2'
```r
x$name
```

## S3 replacement method for class 'fastmap2'
```r
x[[name]] <- value
```

## S3 replacement method for class 'fastmap2'
```r
x$name <- value
```

## S3 method for class 'fastmap2'
```r
x[i, j = NULL, ...]
```

## S3 replacement method for class 'fastmap2'
```r
x[i, j = NULL, ...] <- value
```

## S3 method for class 'fastmap2'
```r
names(x)
```

## S3 method for class 'fastmap2'
```r
print(x, ...)
```

## S3 method for class 'fastmap2'
```r
length(x)
```

## S3 method for class 'fastmap2'
```r
as.list(x, recursive = FALSE, sorted = FALSE, ...)
```
Arguments

missing_default  passed to fastmap::fastmap
x              a 'fastmap2' object
name           name, or key of the value
value          any R object
i, j            vector of names
...           passed to other methods
recursive      whether to recursively apply `as.list`
sorted         whether to sort names; default is false

Value

A list of 'fastmap2' instance

Examples

```r
## --------------------------- Basic Usage --------------------------
map <- fastmap2()
map$a = 1
map$b = 2
print(map)

map[c('a', 'b')]
# Alternative way
map['a', 'b']

map[c('c', 'd')] <- 3:4
# or
map['e', 'f'] <- 5:6

# The order is not guaranteed, unless sort=TRUE
as.list(map)
as.list(map, sort=TRUE)

names(map)
length(map)

## ----------------------- NULL value handles -----------------------
map$b <- NULL
names(map)  # 'b' still exists!
as.list(map)  # 'b' is NULL, but still there

# to remove 'b', you have to use '@remove' method
map$@remove('b')

## ---------------- Native fastmap::fastmap methods ----------------
```

# whether map has 'a'
map$@has('a')

# Remove a name from list
map$@remove('a')

# remove all from list
map$@reset()
print(map)

---

**fastquantile**

*Calculate single quantile for numerical values*

---

**Description**

Slightly faster than `quantile` with `na.rm=TRUE`. The internal implementation uses the 'C++' function `std::nth_element`, which is significantly faster than base R implementation when the length of input `x` is less than 1e7.

**Usage**

`fastquantile(x, q)`

**Arguments**

- `x` : numerical vector (integers or double)
- `q` : number from 0 to 1

**Value**

Identical to `quantile(x, q, na.rm=TRUE)`

**Examples**

```r
# create input x with NAs
x <- rnorm(10000)
x[sample(10000, 10)] <- NA

# compute median
res <- fastquantile(x, 0.5)
res

# base method
res == quantile(x, 0.5, na.rm = TRUE)
res == median(x, na.rm = TRUE)

# Comparison
```
```r
microbenchmark::microbenchmark(
  {
    fastquantile(x, 0.5)
  },
  {
    quantile(x, 0.5, na.rm = TRUE)
  },
  {
    median(x, na.rm = TRUE)
  }
)
```

---

**fastqueue2**  
A Wrapper for `fastmap::fastqueue`

### Description
A Wrapper for `fastmap::fastqueue`

### Usage

```r
fastqueue2(init = 20L, missing_default = NULL)
```

#### S3 method for class 'fastqueue2'

```r
x[[i]]
```

#### S3 method for class 'fastqueue2'

```r
x[i, j = NULL, ...]
```

#### S3 method for class 'fastqueue2'

```r
print(x, ...)
```

#### S3 method for class 'fastqueue2'

```r
length(x)
```

#### S3 method for class 'fastqueue2'

```r
as.list(x, ...)
```

### Arguments

- `init, missing_default`  
  passed to `fastmap::fastqueue`

- `x`  
  a `'fastqueue2'` object

- `i, j`  
  integer index

- `...`  
  integer indices or passed to other methods

### Value

A list of `'fastqueue2'` instance
 Examples

```r
x <- fastqueue2()
# add elements
x$madd(1, "b", function(){ "c" }, 4, "5")
# print information
print(x)
# get the second element without changing the queue
x[[2]]
# remove and get the first element
x$remove()
# the second item
x[[2]]
# first two items in a list
x[c(1,2)]
print(x)
as.list(x)
```

---

**flex_div**  
Generate Shiny element with arrangement automatically

**Description**

Generate Shiny element with arrangement automatically

**Usage**

```r
flex_div(..., ncols = "auto")
```

**Arguments**

<table>
<thead>
<tr>
<th>...</th>
<th>shiny UI elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>ncols</td>
<td>number of columns, either &quot;auto&quot; or vector of positive integers</td>
</tr>
</tbody>
</table>

**Details**

If multiple numbers of columns are specified, `flex_div` will guess the best size that will be applied. For button UI, `flex_div` automatically add "20px" on the top margin.

**Value**

HTML objects
Examples

```r
ui <- flex_div(
  shiny::selectInput('sel', label = 'Select input',
                     choices = '', width = '100%'),
  shiny::textInput('id2', label = html_asis(' '),
                  width = '100%',
                  value = 'Heights aligned'),
  actionButtonStyled('ok2', 'Button', width = '100%'),
  shiny::sliderInput('sl', 'Item 4', min = 1, max = 2,
                     value = 1.5, width = '100%'),
  shiny::fileInput('aa', 'item 5', width = '100%'),
  ncols = c(2,3) # Try to assign 2 or 3 items per column
)
if(interactive()){
  shiny::shinyApp(ui = shiny::fluidPage(shiny::fluidRow(ui)),
                  server = function(input, output, session){})
}
```

---

forelse

Python-style "for-else" function

**Description**

Provide Python-style "for-else" that works as follows: for each element, execute "for" block, if there is break while executing "for" block, then just stop and ignore the "else" statement, otherwise run "else" block.

**Usage**

```r
forelse(x, FUN, ALT_FUN = NULL)
```

**Arguments**

- **x**: iterative R objects such as list, vector, etc.
- **FUN**: function that applies to each x
- **ALT_FUN**: function that takes no argument or other types of R object

**Value**

If any FUN returns anything other than NULL, then the function returns the first none NULL object. If all x fed to FUN return NULL, then this function returns ALT_FUN (if ALT_FUN is not a function) or the result of ALT_FUN().
Examples

# --------------------------- Basic Usage ------------------------------

# 1. ALT_FUN get executed because FUN returns NULL for all items in x
forelse(
  1:10,
  function(x){
    cat('The input is ', x, end = '\n')
    if( x > 10) return(x) else return(NULL)
  },
  function(){
    cat('ALT_FUN is executed!\n')
    'wow'
  }
)

# 2. FUN returns non-NULL object
forelse(  
  1:10,
  function(x){
    cat('The input is ', x, end = '\n')
    if( x %% 2 == 0 ) return(x) else return(NULL)
  },
  'wow'
)

# --------------------------- Performance ------------------------------
FUN <- function(x){
  Sys.sleep(0.01)
  if( x %% 2 == 0 ) return(x) else return(NULL)
}

microbenchmark::microbenchmark({
  forelse(1:10, FUN, 'wow')
  }, {
    y <- unlist(lapply(1:10, FUN))
    if(length(y)){
      y <- y[[1]]
    }else{
      y <- 'wow'
    }
  }, {
    y <- NULL
    for(x in 1:10){ y <- FUN(x) }
    if(is.null(y)){ y <- 'wow' }
  }, times = 3)
**getInputBinding**

*Obtain registered input bindings*

**Description**

Obtain registered input bindings

**Usage**

```r
getInputBinding(fname, pkg = NULL, envir = parent.frame())
```

**Arguments**

- `fname`: input function name, character or quoted expression such as `'shiny::textInput'` or `numericInput`.
- `pkg`: (optional), name of package
- `envir`: environment to evaluate `fname` if `pkg` is not provided

**Value**

a list containing: 1. ‘JavaScript’ input binding name; 2. ‘R’ updating function name

**Examples**

```r
library(dipsaus)

# Most recommended usage
getInputBinding('compoundInput2', pkg = 'dipsaus')

# Other usages
getInputBinding('shiny::textInput')

getInputBinding(shiny::textInput)

getInputBinding(compoundInput2, pkg = 'dipsaus')

# Bad usage, raise errors in some cases
## Not run:
## You need to library(shiny), or set envir=asNamespace('shiny'), or pkg='shiny'
getInputBinding('textInput')
getInputBinding(textInput) # also fails

## Always fails
getInputBinding('dipsaus::compoundInput2', pkg = 'dipsaus')

## End(Not run)
```
get_cpu

Description
Defunct Functions in Package dipsaus The functions or variables listed here are no longer part of the package.

Usage
get_cpu()

generateCredential

Generate a random password

Description
Please note that this function is not meant to be used in production. It is not meant to be used for highly secured cryptographic purposes.

Usage
generateCredential(
  master_password,
  method = c("get_or_create", "replace", "query"),
  service = NULL,
  special_chr = "~\! @#$%^&*()_-+=[{]}|;\'<.?/",
  tokenfile = NULL,
  verbose = FALSE
)

Arguments

  master_password  a master password that only you know, should have at least 8 characters
  method           whether to query token map, or to create the password, choices are 'get_or_create' (default), 'replace', 'query'; see 'Details'
  service          service name, must only contains letters, digits, equal sign, underscore, comma, dot, dash
  special_chr      special characters allowed in the password
  tokenfile        a file containing all the tokens. Warning: if you lose the token book, it is hard (not impossible, but impractical) to restore the passwords
  verbose          whether to print out service names; default is false
get_credential

Details

Please note that this function is not meant to be used in production or anything that requires high security level. This is most likely for my personal use since I am tired of storing the passwords on the cloud or having to buy the services.

The encryption adopts 'sha256' algorithm provided by digest function. To restore a password, you will need two components: master_password, a token book (tokenfile). If any of them is missing, then the password is lost. Please store the token book properly (for example, in 'Dropbox' vault).

The token book could be shared. Anyone who do not have master password will be unlikely to restore the service password. Do not share the master password with anyone other than yourself.

By default, method='get_or_create' will try to retrieve existing tokens to generate password. If the token is missing, then a new token will be generated. The method='replace' will ignore existing tokens and directly create a new one.

Value

If method is 'query', returns token map; otherwise returns the password itself

See Also

digest

Examples

tokenfile <- tempfile()

# ------------ Create a password and store the tokens to token book -------------
pass1 <- get_credential(
  master_password = "my password",
  service = "google.com:my_username",
  special_chr = "@#$%^&*",
  tokenfile = tokenfile
)
print(pass1)

# ---------- Query existing tokens ----------
token_params <- get_credential(
  method = "query",
  tokenfile = tokenfile,
  verbose = TRUE
)

print(token_params)

# ---------- retrieve stored password -------------
pass2 <- get_credential(
  master_password = "my password",
  service = "google.com",
  tokenfile = tokenfile
)
identical(pass1, pass2)

# Using wrong master password
pass3 <- get_credential(
  master_password = "wrong password",
  service = "google.com",
  tokenfile = tokenfile
)
identical(pass1, pass3)

# ---------- Replace token ----------
# Existing token will be replaced with a new token
pass4 <- get_credential(
  master_password = "my password",
  method = "replace",
  service = "google.com",
  special_chr = "@#$%^&*",
  tokenfile = tokenfile
)
print(pass4)
identical(pass1, pass4)

---

**get_dots**

*Get or check elements from dots ’...’*

**Description**

Get information from ’...’ without evaluating the arguments.

**Usage**

```r
get_dots(.name, ..default = NULL, ...)
missing_dots(envir = parent.frame())
```

**Arguments**

- `.name` character name of the argument
- `.default` R object to return if argument not found
- `...` dots that contains argument
- `envir` R environment

**Value**

`missing_dots` returns logical vector with lengths matching with dot lengths. `get_dots` returns value corresponding to the name.
Examples

```r
# ------------------------ Basic Usage ---------------------------
# missing_dots(environment()) is a fixed usage

my_function <- function(...){
  missing_dots(environment())
}
my_function(,)

# get_dots
plot2 <- function(...){
  title = get_dots('main', 'There is no title', ...)
  plot(...)
  title
}

plot2(1:10)
plot2(1:10, main = 'Scatter Plot of 1:10')

# ------------------------ Comparisons ----------------------------
f1 <- function(...){ get_dots('x', ...) }
f2 <- function(...){ list(...)[['x']] }
delayedAssign('y', { cat('y is evaluated!') })

# y will not evaluate
f1(x = 1, y = y)

# y gets evaluated
f2(x = 1, y = y)

# ------------------------ Decorator example --------------------------
ret_range <- function(which_range = 'y'){
  function(f){
    function(...){
      f(...)
      y_range <- range(get_dots(which_range, 0, ...))
      y_range
    }
  }
}

plot_ret_yrange <- plot %D% ret_range('y')
plot_ret_yrange(x = 1:10, y = rnorm(10))
```

---

*get_ip*  
*Get IP address*
get_os

Description
Get 'IP' address

Usage
get_ip(get_public = NA)

Arguments
get_public whether to get public 'IP'

Value
a list of 'IP' addresses

get_os
Detect the type of operating system

Description
Detect the type of operating system

Usage
get_os()

Value
The type of current operating system: 'windows', 'darwin', 'linux', 'solaris', or otherwise 'unknown'.

Examples
get_os()
### get_ram

**Get Memory Size**

**Description**

Get Memory Size

**Usage**

get_ram()

**Details**

The function `get_ram` only supports 'MacOS', 'Windows', and 'Linux'. 'Solaris' or other platforms will return NA. Here are the system commands used to detect memory limits:

- **'Windows'** Uses command `/wmic.exe` in the 'Windows' system folder. Notice this command-line tool might not exist on all 'Windows' machines. `get_ram` will return NA if it cannot locate the command-line tool.
- **'MacOS'** Uses command `/sysctl` located at `/usr/sbin/` or `/sbin/`. Alternatively, you can edit the environment variable 'PATH' to include the command-line tools if `/sysctl` is missing. `get_ram` will return NA if it cannot locate `/sysctl`.
- **'Linux'** Uses the file `/proc/meminfo`, possibly the first entry 'MemTotal'. If the file is missing or entry 'MemTotal' cannot be located, `get_ram` will return NA.

**Value**

System RAM in bytes, or NA if not supported.

**Examples**

get_ram()
Arguments

... named expressions to launch devices
env environment to evaluate expressions
attributes named list; names correspond to device names and values are attributes to set to the devices
which which attribute to obtain
dev which device to search for attributes
ifnotfound value to return if attribute is not found

Value

A list of functions to query, control, and switch between devices

Examples

## Not run: ## Unix-specific example

# Create multiple named devices, setting attributes to the second graph
devs <- dev_create(
  line = X11(), points = x11(),
  attributes = list(points = list(pch = 16))
)

# switch to device named "points"

devs$dev_which('points')

# Plot points, with pch given as preset
plot(1:10, pch = get_dev_attr(which = 'pch', ifnotfound = 1))

# switch to "line" device
devs$dev_switch('line')
plot(1:100, type='l')

# Create another group with conflict name
dev_another <- dev_create(line = X11())

# Query device name with 'line'
dev_another$dev_which('line')  # 4
devs$dev_which('line')  # 2, doesn't conflict with the new groups

dev.list()
# close one or more device
dev_another$dev_off('line')
dev.list()

# close all devices
devs$dev_off()
dev.list()
### End(Not run)

---

**handler_dipsaus_progress**

*Progress-bar Handler*

**Description**

Handler for `progress2` to support `progressr::handlers`. See examples for detailed use case.

**Usage**

```r
handler_dipsaus_progress(
  title = getOption("dipsaus.progressr.title", "Progress"),
  intrusiveness = getOption("progressr.intrusiveness.gui", 1),
  target = if (is.null(shiny::getDefaultReactiveDomain())) "terminal" else "gui",
  enable = interactive() || shiny_is_running(),
  ...)
```

**Arguments**

- `title` default title of `progress2`
- `intrusiveness` A non-negative scalar on how intrusive (disruptive) the reporter to the user
- `target` where progression updates are rendered
- `enable` whether the progress should be reported
- `...` passed to `make_progression_handler`

**Examples**

```r
library(progressr)
library(shiny)
library(future)

## ------------------------------ Setup! -------------------------------
handlers(handler_dipsaus_progress())

# ------------------------------ A simple usage ------------------------
xs <- 1:5
handlers(handler_dipsaus_progress())
with_progress({
  p <- progressor(along = xs)
  y <- lapply(xs, function(x) {
    p(sprintf("x=%g", x))
    Sys.sleep(0.1)
  })
}
```
sqrt(x)
})
})

# ------------------------ A future.apply case ------------------------
plan(sequential)
# test it yourself with plan(multisession)

handlers(handler_dipsaus_progress())
with_progress({
  p <- progressor(along = xs)
y <- future.apply::future_lapply(xs, function(x) {
  p(sprintf("x=%g", x))
  Sys.sleep(0.1)
sqrt(x)
})
})

# ------------------------ A shiny case --------------------------------

ui <- fluidPage(
  actionButton("ok", 'Run Demo')
)

server <- function(input, output, session) {
  handlers(handler_dipsaus_progress())
  make_forked_clusters()

  observeEvent(input$ok, {
    with_progress({
      p <- progressor(along = 1:100)
y <- future.apply::future_lapply(1:100, function(x) {
        p(sprintf("Input %d|Result %d", x, x+1))
        Sys.sleep(1)
x+1
      })
    })
  })
}

if(interactive()){
  shinyApp(ui, server)
}
**html_class**

### Description

Escape HTML strings so that they will be displayed ‘as-is’ in websites.

### Usage

```r
desc_str <- html_asis('Desc', space = FALSE)
```

### Arguments

- `s` characters
- `space` whether to also escape white space, default is true.

### Value

An R string

### Examples

```r
ui <- flex_div(
  shiny::textInput('id', width = '100%', value = 'Height not aligned'),
  actionButtonStyled('ok', 'Button1', width = '100%'),
  shiny::textInput('id2', html_asis(' '), width = '100%', value = 'Heights aligned'),
  actionButtonStyled('ok2', 'Button2', width = '100%'),
  ncols = 2
)
if(interactive()){
  shiny::shinyApp(ui = shiny::fluidPage(shiny::fluidRow(ui)),
    server = function(input, output, session){})
}
```

**html_class**

Combine, add, or remove ‘HTML’ classes

### Description

Combine ‘HTML’ classes to produce nice, clean ‘HTML’ class string via `combine_html_class`, or to remove a class via `remove_html_class`

### Usage

```r
combine_html_class(...)  
remove_html_class(target, class)
```
**Arguments**

... one or more characters, classes to combine; duplicated classes will be removed  
**target** characters, class list  
**class** one or more characters, classes to be removed from target  

**Value**

A character string of new 'HTML' class  

**Examples**

```r
define_classes() 

combine_html_class("a b c d e")
# Combine classes "a b c d e"

remove_html_class("a b c e", c("b", "c "))
# Remove class
```

---

**iapply**  
Apply each elements with index as second input  

**Description**

Apply function with an index variable as the second input.  

**Usage**

```r
iapply(X, FUN, ..., .method = c("sapply", "lapply", "vapply"))
```

**Arguments**

- **X** a vector (atomic or list)  
- **FUN** the function to be applied to each element of X: see ‘Details’.  
- **...** passed to apply methods  
- **.method** method to use, default is **sapply**  

**Details**

**FUN** will be further passed to the apply methods. Unlike **lapply**, **FUN** is expected to have at least two arguments. The first argument is each element of **X**, the second argument is the index number of the element.  

**Value**

a list or matrix depends on **.method**. See **lapply**
Description
Apply, but in parallel

Usage

```r
lapply_async2(
  x,
  FUN,
  FUN.args = list(),
  callback = NULL,
  plan = TRUE,
  future.chunk.size = NULL,
  future.seed = sample.int(1, n = 1e+05 - 1),
  ...
)
```

Arguments

- `x`: vector, list
- `FUN`: function to apply on each element of `x`
- `FUN.args`: more arguments to feed into `FUN`
- `callback`: function to run after each iteration
- `plan`: logical, or character or future plan; see Details.
- `future.chunk.size`, `future.seed`: see also `future_lapply`. If you want the callbacks to be called immediately after each loop, then set it to `1`, which is not optimal but the only way right now.
- `...`: passed to `plan`

Details

When `plan` is logical, `FALSE` means use current plan. If `plan=TRUE`, then it equals to `plan='multicore'`. For characters, `plan` can be `multicore`, `'callr'`, `'sequential'`, `'multisession'`, `'multiprocess'`, etc. Alternatively, you could pass future `plan` objects.

Value

same as with(FUN.args, lapply(x, function(el){eval(body(FUN))))))

See Also

`make_forked_clusters`
Examples

```r
library(future)
plan(sequential)

# Use sequential plan
# 1. Change `plan` to `multicore`, `multisession`, or TRUE to enable
# multi-core, but still with progress information
# 2. Change plan=FALSE will use current future plan
res <- lapply_async2(100:200, function(x){
  return(x+1)
}, callback = function(e){
  sprintf('Input=%d', e)
}, plan = 'sequential')

# Disable callback message, then the function reduce to
# normal `future.apply::future_lapply`
res <- lapply_async2(100:200, function(x){
  return(x+1)
}, callback = NULL, plan = FALSE)

if(interactive()) {
  # PID are different, meaning executing in different sessions
  lapply_async2(1:4, function(x){
    Sys.getpid()
  })
}
```

---

**lapply_callr**  
Apply function with `rs_exec`

**Description**

Apply function with `rs_exec`

**Usage**

```r
lapply_callr(
  x,
  fun,
  ..., 
  .callback = NULL,
  .globals = list(),
  .ncores = future::availableCores(),
  .packages = attached_packages(),
  .focus_on_console = TRUE,
  .rs = FALSE,
)```
Arguments

- `x` vector or list
- `fun` function
- `...` passed to function, see `lapply`
- `.callback` a function takes zero, one, or two arguments and should return a string to show in the progress
- `.globals` a named list that `fun` relies on
- `.ncores` number of cores to use; only used when `.wait=TRUE`
- `.packages` packages to load
- `.focus_on_console` whether to focus on console once finished; is only used when `.rs` is true
- `.rs` whether to create 'RStudio' jobs; default is false
- `.quiet` whether to suppress progress message
- `.name` the name of progress and jobs
- `.wait` whether to wait for the results; default is true, which blocks the main session waiting for results.

Value

When `.wait=TRUE`, returns a list that should be, in most of the cases, identical to `lapply`; when `.wait=FALSE`, returns a function that collects results.

See Also

- `rs_exec`

Examples

```r
if(interactive()){
  lapply_callr(1:3, function(x, a){
    c(Sys.getpid(), a, x)
  }, a = 1)

  lapply_callr(1:30, function(x)
  {
    Sys.sleep(0.1)
    sprintf("a + x = %d", a + x)
  }, .globals = list(a = 1),
  .callback = I, .name = "Test")
}
list_to_fastmap2

Description
Copy elements to fastmap2

Usage
list_to_fastmap2(li, map = NULL)

Arguments
li      a list or an environment
map     NULL or a fastmap2 instance

Value
If map is not NULL, elements will be added to map and return map, otherwise create a new instance.

list_to_fastqueue2

Description
Copy elements to fastqueue2

Usage
list_to_fastqueue2(li, queue = NULL)

Arguments
li      a list or an environment
queue   NULL or a fastqueue2 instance

Value
If map is not NULL, elements will be added to map and return map, otherwise create a new instance.
Create or Unlock a Lock

Description
A wrapper for 'synchronicity' package, but user can interrupt the lock procedure anytime, and don't have to worry about whether the lock exists or not.

Usage

```r
dipsaus_lock(name, timeout = 10, exclusive = TRUE)
dipsaus_unlock(name, timeout = 10, exclusive = TRUE)
dipsaus_resetlocks(name)
```

Arguments

- `name`: character, the locker's name, must be only letters and digits
- `timeout`: numeric, seconds to wait for the locker to lock or unlock
- `exclusive`: ignored

Value
Logical, whether the operation succeed.

Examples

```r
# Clear existing locks
dipsaus::dipsaus_resetlocks()

# unlock to prepare for the example
dipsaus_unlock('testlocker', timeout = 0.01)

# Create a locker, return TRUE
lock_success = dipsaus_lock('testlocker')
if(lock_success){
  cat2('testlocker has been locked')
}

# test whether locker has been locked
lock_success = dipsaus_lock('testlocker', timeout = 0.01)
if(!lock_success){
  cat2('attempt to lock testlocker failed')
}

# unlock
dipsaus_unlock('testlocker', timeout = 0.01)
```
# clean up
dipsaus::dipsaus_resetlocks()

---

**Description**

Creates forked clusters. If fails, then switch to alternative plan (default is "multisession").

**Usage**

```r
make_forked_clusters(
  workers = future::availableCores(),
  on_failure = getOption("dipsaus.cluster.backup", "sequential"),
  clean = FALSE,
  ...
)
```

**Arguments**

- **workers**: positive integer, number of cores to use
- **on_failure**: alternative plan to use if failed. This is useful when forked process is not supported (like 'windows'); default is options("dipsaus.cluster.backup") or 'sequential'
- **clean**: whether to reverse the plan on exit. This is useful when use `make_forked_clusters` inside of a function. See details and examples.
- **...**: passing to `future::plan`

**Details**

This was originally designed as a wrapper for `future::plan(future::multicore, ...)`. Forked clusters are discouraged when running in 'RStudio' because some pointers in 'RStudio' might be incorrectly handled, causing fork-bombs. However, forked process also has big advantages over other parallel methods: there is no data transfer needed, hence its speed is very fast. Many external pointers can also be shared using forked process. Since version 1.14.0, unfortunately, forked 'multicore' is banned by `future` package by default, and you usually need to enable it manually. This function provides a simple way of enable it and plan the future at the same time.

On windows, forked process is not supported, under this situation, the plan fall back to sequential, which might not be what you want. In such case, this function provides an alternative strategy that allows you to plan. You could also always enable the alternative strategy by setting `dipsaus.no.fork` option to true.
The parameter clean allows you to automatically clean the plan. This function allows you to reverse back to previous plan automatically once your function exits. For example, users might have already set up their own plans, clean=TRUE allows you to set the plan back to those original plans once function exit. To use this feature, please make sure this function is called within another function, and you must collect results before exiting the outer function.

Value

Current future plan

See Also

lapply_async2

Examples

```r
if(interactive()){
  # ------ Basic example
  library(future)
  library(dipsaus)

  # sequential
  plan("sequential")

  make_forked_clusters()
  plan() # multicore, or multisession (on windows)

  Sys.getpid() # current main session PID
  value(future(Sys.getpid())) # sub-process PID, evaluated as multicore

  # ------ When fork is not supported

  # reset to default single core strategy
  plan("sequential")

  # Disable forked process
  options("dipsaus.no.fork" = TRUE)
  options("dipsaus.cluster.backup" = "multisession")

  # Not fall back to multisession
  make_forked_clusters()
  plan()

  # ------ Auto-clean

  # reset plan
  plan("sequential")
  options("dipsaus.no.fork" = FALSE)
options("dipsaus.cluster.backup" = "multisession")

# simple case:
my_func <- function()
  make_forked_clusters(clean = TRUE)

  fs <- lapply(1:4, function(i){
    future({Sys.getpid()})
  })

  unlist(value(fs))
}

my_func()  # The PIDs are different, meaning they ran in other sessions
plan()     # The plan is sequential, auto reversed strategy

# ------ Auto-clean with lapply_async2
my_plan <- plan()

# lapply_async2 version of the previous task
lapply_async2(1:4, function(i){
  Sys.getpid()
})

identical(plan(), my_plan)

---

map Create R object map.

Description
Provides five types of map that fit in different use cases.

Usage

```
session_map(map = fastmap::fastmap())
```

```
rds_map(path = tempfile())
```

```
text_map(path = tempfile())
```

Arguments

<table>
<thead>
<tr>
<th>map</th>
<th>a fastmap::fastmap() list</th>
</tr>
</thead>
<tbody>
<tr>
<td>path</td>
<td>directory path where map data should be stored</td>
</tr>
</tbody>
</table>
Details

There are five types of map implemented. They all inherit class `AbstractMap`. There are several differences in use case scenarios and they backend implementations.

- **session_map**: A session map takes a `fastmap` object. All objects are stored in current R session. This means you cannot access the map from other process nor parent process. The goal of this map is to share the data across different environments and to store global variables, as long as they share the same map object. If you are looking for maps that can be shared by different processes, check the rest map types. The closest map type is `rds_map`.

- **rds_map**: An 'RDS' map uses file system to store values. The values are stored separately in '.rds' files. Compared to session maps, 'RDS' map can be shared across different R process. It’s recommended to store large files in `rds_map`. If the value is not large in RAM, `text_map` is recommended.

- **text_map**: A 'text' map uses file system to store values. Similar to `rds_map`, it can be stored across multiple processes as long as the maps share the same file directory. However, unlike `rds_map`, `text_map` can only store basic data values, namely atom data types. The supported types are: numeric, character, vector, list, matrix. It’s highly recommended to convert factors to characters. Do NOT use if the values are functions or environments. The recommended use case scenario is when the speed is not the major concern, and you want to preserve data with backward compatibility. Otherwise it’s highly recommended to use `rds_map`.

Value

An R6 instance that inherits `AbstractMap`

Examples

# ----------------------Basic Usage ----------------------

# Define a path to your map.
path = tempfile()
map <- rds_map(path)

# Reset
map$reset()

# Check if the map is corrupted.
map$validate()

# You have not set any key-value pairs yet.
# Let's say two parallel processes (A and B) are sharing this map.
# Process A set values
map$keys()

# Start push
# set a normal message
map$set(key = 'a', value = 1)

# set a large object
map$set(key = 'b', value = rnorm(100000))

# set an object with hash of another object
map$set(key = 'c', value = 2, signature = list(
  parameter1 = 123,
  parameter2 = 124
))

# Check what's in the map from process B
mapB <- rds_map(path)
mapB$keys()
mapB$keys(include_signatures = TRUE)

# Number of key-values pairs in the map.
mapB$size()

# Check if key exists
mapB$has(c('1', 'a', 'c'))

# Check if key exists and signature also matches
mapB$has('c', signature = list(
  parameter1 = 123,
  parameter2 = 124
))

# Signature changed, then return FALSE. This is especially useful when
# value is really large and reading the value takes tons of time
mapB$has('c', signature = list(
  parameter1 = 1244444,
  parameter2 = 124
))

# Destroy the map's files altogether.
mapB$destroy()

## Not run:
  # Once destroyed, validate will raise error
  mapB$validate()

## End(Not run)

---

**mask_function2**  
*Mask a function with given variables*

**Description**

Modifies the default behavior of the function by adding one environment layer on top of input function. The masked variables are assigned directly to the environment.
Usage

mask_function2(f, ..., .list = list())

Arguments

f  any function
..., .list  name-value pairs to mask the function

Value

a masked function

Examples

a <- 123
f1 <- function(){
  a + 1
}
f1()  # 124

f2 <- mask_function2(f1, a = 1)
f2()  # a is masked with value 1, return 2

environment(f1)  # global env
environment(f2)  # masked env

env <- environment(f2)
identical(parent.env(env), environment(f1))  # true
env$a  # masked variables: a=1

match_calls

Recursively match calls and modify arguments

Description

Recursively match calls and modify arguments

Usage

match_calls(
call,
recursive = TRUE,
replace_args = list(),
quoted = FALSE,
envir = parent.frame(),
...)


mean_se

Arguments

- **call**: an R expression
- **recursive**: logical, recursively match calls, default is true
- **replace_args**: named list of functions, see examples
- **quoted**: logical, is call quoted
- **envir**: which environment should call be evaluated
- **...**: other parameters passing to match.call

Value

A nested call with all arguments matched

Examples

```r
library(dipsaus); library(shiny)

# In shiny modules, we might want to add ns() to inputIds
# In this example, textInput(id) will become textInput(ns(id))
match_calls(lapply(1:20, function(i){
  textInput(paste("id", i), paste("Label", i))
}), replace_args = list(
  inputId = function(arg, call){ as.call(list(quote(ns), arg)) }
))
```

---

**mean_se**  
*Calculates mean and standard error of mean*

Description

Calculates mean and standard error of mean

Usage

```r
mean_se(x, na.rm = FALSE, se_na_as_zero = na.rm)
```

Arguments

- **x**: R numerical object
- **na.rm**: whether to remove NA; default is false
- **se_na_as_zero**: see na_as_zero in ste_mean

Value

A named vector containing the mean and standard error of mean (ste_mean).
See Also

ste_mean

Examples

# Mean should be near 0 (mean of standard normal)
# standard error of mean should be near 0.01
mean_se(rnorm(10000))

---

mem_limit2

Get max RAM size This is an experimental function that is designed for non-windows systems

Description

Get max RAM size This is an experimental function that is designed for non-windows systems

Usage

mem_limit2()

Value

a list of total free memory.

---

new_function2

Create new function that supports 'quasi-quosure' syntax

Description

Create new function that supports 'quasi-quosure' syntax

Usage

new_function2(
    args = alist(),
    body = {
    },
    env = parent.frame(),
    quote_type = c("unquoted", "quote", "quo"),
    quasi_env = parent.frame()
)
new_function2

Arguments

- **args**: named list of function formals
- **body**: function body expression, supports 'quasi-quo' syntax
- **env**: declare environment of the function
- **quote_type**: character, whether body is unquoted, quoted, or a 'quo' object (from 'rlang' package)
- **quasi_env**: where the 'quasi-quo' should be evaluated, default is parent environment

Details

An unquoted body expression will be quoted, all the expressions with 'quasi-quo' like `!!var` will be evaluated and substituted with the value of `var`. For a 'quo', `quo_squash` will be applied. A quoted expression will not be substitute, but will be expanded if any 'quasi-quo' detected.

**args** must be a list object, see **formals**. For arguments with no default values, or quoted defaults, use **alist**. An arg=alist(a=) will result in a function like function(a){...}. See examples for more details.

Value

a function

See Also

- **new_function**

Examples

```r
# standard usage
x <- 1:10
f1 <- new_function2(alist(a=), { print(a + x) }, env = environment())
f1(0)

x <- 20:23
f1(0) # result changed as x changed

# 'quasi-quo' syntax
x <- 1:10
f2 <- new_function2(alist(a=), { print(a + !!x) })
print(f2)

f2(0)

x <- 20:23
f2(0) # result doesn't change as f2 doesn't depend on x anymore

# argument settings
```
```
default <- 123

# default with values pre-specified
new_function2(list(a = default)) # function (a = 123)

# default with values unevaluated
new_function2(list(a = quote(default))) # function (a = default)
nnew_function2(alist(a = default))

# missing default
new_function2(alist(a = )) # function (a)
```

---

**no_op**

Pipe-friendly no-operation function

**Description**

returns the first input with side effects

**Usage**

```r
no_op(.x, .expr, ..., .check_fun = TRUE)
```

**Arguments**

- `.x`  
  any R object
- `.expr`  
  R expression that produces side effects
- `...`, `.check_fun`  
  see ‘details’

**Details**

`no_op` is a pipe-friendly function that takes any values in, evaluate expressions but still returns input. This is very useful when you have the same input across multiple functions and you want to use pipes.

`.expr` is evaluated with a special object `.`, you can use `.` to represent `.x` in `.expr`. For example, if `.x=1:100`, then `plot(x=seq(0,1,length.out = 100), y=.)` is equivalent to `plot(x=seq(0,1,length.out = 100), y=1:100).

`.check_fun` checks whether `.expr` returns a function, if yes, then the function is called with argument `.x` and ...

**Value**

The value of `.x`
Examples

library(magrittr)

### 1. Basic usage

# Will print('a') and return 'a'
no_op('a', print)

# Will do nothing and return 'a' because .check_fun is false
no_op('a', print, .check_fun = FALSE)

# Will print('a') and return 'a'
no_op('a', print(.), .check_fun = FALSE)

### 2. Toy example

library(graphics)

par(mfrow = c(2,2))
x <- rnorm(100)

# hist and plot share the same input `rnorm(100)`

x %>%
  # .expr is a function, all ... are passed as other arguments
  no_op( hist, nclass = 10 ) %>%
  no_op( plot, x = seq(0,1,length.out = 100) ) %>%

# Repeat the previous two plots, but with different syntax
no_op({ hist(., nclass = 10) }) %>%
no_op({ plot(x = seq(0,1,length.out = 100), y = .) }) %>%

# The return statement is ignored

no_op({ return(x + 1)}) ->

y

# x is returned at the end

identical(x, y)  # TRUE

---

package_installed  Check if a package is installed

Description

Check if a package is installed
package_installed(pkgs, all = FALSE)

Arguments

pkgs vector of package names
all only returns TRUE if all packages are installed. Default is FALSE.

Value

logical, if packages are installed or not. If all=TRUE, return a logical value of whether all packages are installed.

Examples

# Check if package base and dipsaus are installed
package_installed(c('base', 'dipsaus'))

# Check if all required packages are installed
package_installed(c('base', 'dipsaus'), all = TRUE)

parse_svec

Parse Text Into Numeric Vectors

Usage

parse_svec(text, sep = ',', connect = '-:|', sort = FALSE, unique = TRUE)

Arguments

text string with chunks, e.g. "1-10, 14, 16-20, 18-30" has 4 chunks
sep default is ",", character used to separate chunks
connect characters defining connection links for example "1:10" is the same as "1-10"
sort sort the result
unique extract unique elements

Value

a numeric vector. For example, "1-3" returns c(1, 2, 3)
PersistContainer

**See Also**

deparse_svec

**Examples**

```
parse_svec('1-10, 13:15,14-20')
```

---

**PersistContainer**  
*Wrapper to cache key-value pairs and persist across sessions*

**Description**

This class is designed to persist arbitrary R objects locally and share across different sessions. The container consists two-level caches. The first one is session-based, meaning it's only valid under current R session and will be cleared once the session is shut down. The second is the persist-level map, which will persist to hard drive and shared across sessions. See `cache` method in 'details'.

**Public Methods**

- `initialize(..., backend = rds_map)` The constructor. `backend` must inherit `AbstractMap`, ... will be passed to `backend$new(...)`. To check available back-ends and their use cases, see `map`.

- `reset(all = FALSE)` Reset container. If `all` is set to be true, then reset session-based and hard-drive-based, otherwise only reset session-based container.

- `destroy(all = FALSE)` destroy the container. Only use it when you want to finalize the container in `reg.finalizer`.

- `has(key, signature = NULL)` returns a list of true/false (logical) vectors indicating whether keys exist in the container, if signature is used when caching the key-value pairs, then it also checks whether signature matches. This is very important as even if the keys match but signature is wrong, the results will be false.

- `remove(keys, all = TRUE)` Remove keys in the container. Default is to remove the keys in both levels. If `all=FALSE`, then only remove the key in current session

- `cache(key, value, signature = NULL, replace = FALSE, persist = FALSE)` key and signature together form the unique identifier for the value. By default `signature` is none, but it's very useful when value if large, or key is not a string. `replace` indicates whether to force replace the key-value pairs even if the entry exists. If `persist` is true, then the value is stored in hard-disks, otherwise the value will be deleted once the session is closed.

**See Also**

`map`
Examples

```r
container = PersistContainer$new(tempfile())

# Reset the container so that values are cleared
container$reset(all = TRUE)

# Store '1' to 'a' with signature 111 to a non-persist map
# returns 1
container$cache(key = 'a', value = 1, signature = 111, persist = FALSE)

# Replace 'a' with 3
# returns 3
container$cache(key = 'a', value = 3, signature = 111, persist = TRUE, replace = TRUE)

# check if 'a' exists with signature 111
container$has('a', signature = 111)  # TRUE
# When you only have 'a' but no signature
container$has('a')  # TRUE
# check if 'a' exists with wrong signature 222
container$has('a', signature = 222)  # FALSE

# Store 'a' with 2 with same signature
# will fail and ignore the value (value will not be evaluated if signed)
# Return 2 (Important! use cached values)
container$cache(key = 'a', value = {
  print(123)
  return(2)
}, signature = 111, replace = FALSE)

# When no signature is present
# If the key exists (no signature provided), return stored value
# returns 3
container$cache(key = 'a', value = 4)

# replace is TRUE (no signature provided), signature will be some default value
container$cache(key = 'a', value = 2, replace = TRUE)

# destroy the container to free disk space
container$destroy()
```

---

**prepare_install**

*Install Packages at Next Startup*

**Description**

Register temporary code that will install packages at next session. The code will be automatically removed once executed.
Usage

prepare_install2(packages, restart = FALSE, repos = getOption("repos"), ...)

Arguments

packages characters, vector of package names installation; default is false
restart whether to restart session automatically
repos repositories to search for packages
... internal arguments

Details

prepare_install is soft-deprecated, use prepare_install2 instead.

Installing packages in R session could require restarts if a package to be updated has been loaded. Normally restarting R fixes the problem. However, under some circumstances, such as with a startup code in profile, restarting R might still fail the installation. prepare_install2 starts a new session with clean environments for installation.

Value

None

print_directory_tree

Print Directory Tree

Description

Print Directory Tree

Usage

print_directory_tree(
  target,
  root = "~",
  child,
  dir_only = FALSE,
  collapse = NULL,
  ...
)
progress2

Arguments

- **target**: target directory path, relative to root
- **root**: root directory, default is `~`
- **child**: child files in target; if missing, then list all files
- **dir_only**: whether to display directory children only
- **collapse**: whether to concatenate results as one single string
- ... pass to `list.files` when list all files

Value

Characters, print-friendly directory tree.

Description

'Shiny' progress bar, but can run without reactive context

Usage

```r
progress2(
  title,
  max = 1,
  ...,
  quiet = FALSE,
  session = shiny::getDefaultReactiveDomain(),
  shiny_auto_close = FALSE,
  log = NULL
)
```

Arguments

- **title**: character, task description
- **max**: maximum number of items in the queue
- ... passed to `shiny::Progress$new(...)`
- **quiet**: suppress console output, ignored in shiny context.
- **session**: 'shiny' session, default is current reactive domain
- **shiny_auto_close**: logical, automatically close 'shiny' progress bar once current observer is over. Default is FALSE. If setting to TRUE, then it's equivalent to `p <- progress2(...); on.exit({p$close()}, add = TRUE)`.
- **log**: function when running locally, default is NULL, which redirects to `cat2`
progress2

Value

A list of functions:

\texttt{inc(detail, message = NULL, amount = 1, \ldots)} Increase progress bar by amount (default is 1).
\texttt{close()} Close the progress
\texttt{reset(detail = '', message = '', value = 0)} Reset the progress to value (default is 0), and reset information
\texttt{get\_value()} Get current progress value
\texttt{is\_closed()} Returns logical value if the progress is closed or not.

Examples

\begin{verbatim}
progress <- progress2('Task A', max = 2)
progress$inc('Detail 1')
progress$inc('Detail 2')
progress$close()

# Check if progress is closed
progress$is_closed()

# ------------------------------ Shiny Example ------------------------------
library(shiny)
library(dipsaus)

ui <- fluidPage(
    actionButtonStyled('do', 'Click Here', type = 'primary')
)

server <- function(input, output, session) {
    observeEvent(input$do, {
        updateActionButtonStyled(session, 'do', disabled = TRUE)
        progress <- progress2('Task A', max = 10, shiny_auto_close = TRUE)
        lapply(1:10, function(ii){
            progress$inc(sprintf('Detail %d', ii))
            Sys.sleep(0.2)
        })
        updateActionButtonStyled(session, 'do', disabled = FALSE)
    })
}

if(interactive()){
    shinyApp(ui, server)
}
\end{verbatim}
registerInputBinding  
Register customized input to enable support by compound input

Description

Register customized input to enable support by compound input

Usage

```r
registerInputBinding(  
  fname,
  pkg,
  shiny_binding,
  update_function = NULL,
  quiet = FALSE
)
```

Arguments

- `fname` : character, function name, such as "textInput"
- `pkg` : character, package name, like "shiny"
- `shiny_binding` : character, 'JavaScript' binding name. See examples
- `update_function` : character, update function such as "shiny::textInput"
- `quiet` : logical, whether to suppress warnings

Value

a list of binding functions, one is 'JavaScript' object key in Shiny.inputBindings, the other is 'shiny' update function in R end.

Examples

```r
# register shiny textInput
registerInputBinding('textInput', 'shiny',
  'shiny.textInput', 'shiny::updateTextInput')

# Register shiny actionLink
# In "Shiny.inputbindings", the binding name is "shiny.actionButtonInput",
# Shiny update function is "shiny::updateActionButton"
registerInputBinding('actionLink', 'shiny',
  'shiny.actionButtonInput', 'shiny::updateActionButton')
```
**restart_session**

*Restart R Session*

**Description**
Utilize 'RStudio' functions to restart, if running without 'RStudio', use startup restart instead.

**Usage**
restart_session()

---

**rs_active_project**

*Get 'RStudio' active project*

**Description**
Get 'RStudio' active project

**Usage**
rs_active_project(...)

**Arguments**
... passed to rs_avail

**Value**
If 'RStudio' is running and current project is not none, return project name, otherwise return `NA`

---

**rs_avail**

*Verify 'RStudio' version*

**Description**
Verify 'RStudio' version

**Usage**
rs_avail(version_needed = "1.3", child_ok = FALSE, shiny_ok = FALSE)
Arguments

- **version_needed**: minimum version required
- **child_ok**: check if the current R process is a child process of the main RStudio session.
- **shiny_ok**: if set false, then check if ‘Shiny’ is running, return false if shiny reactive domain is not NULL

Value

whether ‘RStudio’ is running and its version is above the required

See Also

**isAvailable**

---

**rs_edit_file**  
*Use ‘RStudio’ to open and edit files*

Description

Use ‘RStudio’ to open and edit files

Usage

```r
rs_edit_file(path, create = TRUE)
```

Arguments

- **path**: path to file
- **create**: whether to create if path is not found; default is true

Value

Opens the file pointing to path to edit, and returns the path
Description

Utilizes ‘RStudio’ job scheduler if correct environment is detected, otherwise call system command via Rscript

Usage

rs_exec(
  expr,
  name = "Untitled",
  quoted = FALSE,
  rs = TRUE,
  wait = FALSE,
  packages = NULL,
  focus_on_console = FALSE,
...,
  nested_ok = FALSE
)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>expr</td>
<td>R expression</td>
</tr>
<tr>
<td>name</td>
<td>used by ‘RStudio’ as name of the job</td>
</tr>
<tr>
<td>quoted</td>
<td>is expr quoted</td>
</tr>
<tr>
<td>rs</td>
<td>whether to use ‘RStudio’ by default</td>
</tr>
<tr>
<td>wait</td>
<td>whether to wait for the result.</td>
</tr>
<tr>
<td>packages</td>
<td>packages to load in the sub-sessions</td>
</tr>
<tr>
<td>focus_on_console</td>
<td>whether to return back to console after creating jobs; useful when users want to focus on writing code; default is false. This feature works with ‘RStudio’ (&gt;=1.4)</td>
</tr>
</tbody>
</table>

Details

‘RStudio’ provides interfaces jobRunScript to schedule background jobs. However, this functionality only applies using ‘RStudio’ IDE. When launching R from other places such as terminals, the job scheduler usually result in errors. In this case, the alternative is to call system command via Rscript.
The expression `expr` will run a clean environment. Therefore R objects created outside of the context will be inaccessible from within the child environment, and packages except for base packages will not be loaded.

There is a small difference when running within and without 'RStudio'. When running via `Rscript`, the environment will run under `vanilla` argument, which means no load, no start-up code. If you have start-up code stored at `~/.Rprofile`, the start-up code will be ignored. When running within 'RStudio', the start-up code will be executed. As of `rstudioapi` version 0.11, there is no 'vanilla' option. This feature is subject to change in the future.

**Value**

If `wait=TRUE`, returns evaluation results of `expr`, otherwise a function that can track the state of job.

**Examples**

```r
if(interactive()){
  h <- rs_exec(
    { Sys.sleep(2) print(Sys.getpid()) },
    wait = FALSE, name = 'Test',
    focus_on_console = TRUE
  )
  code <- h()
  print(code)

  # wait 3 seconds
  Sys.sleep(3)
  code <- h()
  attributes(code)
}
```

---

**Description**

Focus on coding; works with 'RStudio' (>=1.4)

**Usage**

`rs_focus_console(wait = 0.5)`

**Arguments**

- `wait`  
  wait in seconds before sending command; if too soon, then 'RStudio' might not be able to react.
**rs_save_all**

**Value**

None

**Description**

Perform "safe" save-all action with backward compatibility: check whether 'RStudio' is running and whether rstudioapi has function documentSaveAll.

**Usage**

rs_save_all()

---

**rs_select_path**

**Use 'RStudio' to Select a Path on the Server**

**Description**

Use 'RStudio' to Select a Path on the Server

**Usage**

rs_select_path(is_directory = TRUE)

**Arguments**

* is_directory whether the path should be a directory

**Value**

Raise error if rs_avail fails, otherwise returns the selected path
rs_set_repos  
*Add secondary 'CRAN'-like repository to the 'RStudio' settings*

**Description**

Add self-hosted repository, such as 'drat', 'r-universe' to 'RStudio' preference. Please restart 'RStudio' to take changes into effect.

**Usage**

```r
rs_set_repos(name, url, add = TRUE)
```

**Arguments**

- `name`: repository name, must be unique and readable
- `url`: the website address of the repository, starting with schemes such as 'https'.
- `add`: whether to add to existing repository; default is true

**Details**

'RStudio' allows to add secondary 'CRAN'-like repository to its preference, such that users can add on-going self-hosted developing repositories (such as package 'drat', or 'r-universe'). These repositories will be set automatically when running `install.packages`.

**Value**

a list of settings.

rs_viewer  
*Get 'RStudio' Viewer, or Return Default*

**Description**

Get 'RStudio' Viewer, or Return Default

**Usage**

```r
rs_viewer(
  ..,
  default = TRUE,
  version_needed = "1.3",
  child_ok = FALSE,
  shiny_ok = FALSE
)
```
screenshot

Arguments

... passed to viewer
default if rs_avail fails, the value to return. Default is TRUE
version_needed, child_ok, shiny_ok passed to rs_avail

Value

If viewer can be called and 'RStudio' is running, then launch 'RStudio' internal viewer. Otherwise if default is a function such as browseURL, then call the function with given arguments. If default is not a function, return default.

Description

Take a screenshot of the whole page and save encoded DataURI that can be accessed via input[[inputId]].

Usage

screenshot(inputId, session = shiny::getDefaultReactiveDomain())

Arguments

inputId the input id where the screenshot should be
session shiny session

Value

None. However, the screenshot results can be accessed from shiny input

Examples

library(shiny)
library(dipsaus)
ui <- fluidPage(
  tagList(
    shiny::singleton(shiny::tags/head( 
      shiny::tags$link(rel="stylesheet", type="text/css", href="dipsaus/dipsaus.css"), 
      shiny::tags$script(src="dipsaus/dipsaus-dipterix-llb.js") 
    )))
  ),
  actionButtonStyled('do', 'Take Screenshot'),
  compoundInput2('group', label = 'Group', components = list( 
    TextInput('txt', 'Enter something here') 
  ))
)
server <- function(input, output, session) {
  observeEvent(input$do, {
    screenshot('screenshot_result')
  })
  observeEvent(input$screenshot_result, {
    showModal(modalDialog(
      tags$img(src = input$screenshot_result, width = '100%')
    )
  )
  })

  if(interactive()){
    shinyApp(ui, server)
  }
}

---

**session_uuid**  
*Provides Unique Session ID According to Current R Session*

**Description**

Provides Unique Session ID According to Current R Session

**Usage**

```r
session_uuid(pid = Sys.getpid(), attributes = FALSE)
```

**Arguments**

- `pid`  
  R session process ID, default is `Sys.getpid()`
- `attributes`  
  whether to append data used to calculate ID as attributes, default is false

**Value**

Character string

---

**set_shiny_input**  
*Set Shiny Input*

**Description**

Shiny `input` object is read-only reactive list. When try to assign values to input, errors usually occur. This method provides several work-around to set values to input. Please use along with `use_shiny_dipsaus`.
set_shiny_input

Usage

```r
set_shiny_input(
  session = shiny::getDefaultReactiveDomain(),
  inputId,
  value,
  priority = c("event", "deferred", "immediate"),
  method = c("proxy", "serialize", "value", "expression"),
  quoted = TRUE
)
```

Arguments

- **session**: shiny session, see shiny domains
- **inputId**: character, input ID
- **value**: the value to assign
- **priority**: characters, options are "event", "deferred", and "immediate". "event" and "immediate" are similar, they always fire changes. "deferred" fire signals to other reactive/observers only when the input value has been changed
- **method**: characters, options are "proxy", "serialize", "value", "expression". "proxy" is recommended, other methods are experimental.
- **quoted**: is value quoted? Only used when method is "expression"

Examples

```r
library(shiny)
library(dipsaus)
ui <- fluidPage(
  # Register widgets
  use_shiny_dipsaus(),
  actionButton('run', 'Set Input'),
  verbatimTextOutput('input_value')
)

server <- function(input, output, session) {
  start = Sys.time()

  output$input_value <- renderPrint({
    now <- input$key
    now %<-% start
    cat('This app has been opened for ',
        difftime(now, start, units = 'sec'), ' seconds')
  })

  observeEvent(input$run, {
    # setting input$key to Sys.time()
    set_shiny_input(session, 'key', Sys.time())
  })
}
```
sexp_type2

Get Internal Storage Type

Description
Get internal (C) data types; See https://cran.r-project.org/doc/manuals/r-release/R-ints.pdf Page 1 for more different SEXPTYPES.

Usage
sexp_type2(x)

## S3 method for class 'sexp_type2'
as.character(x, ...)

## S3 method for class 'sexp_type2'
print(x, ...)

Arguments

x any R object

... ignored

Value
An integer of class "sexp_type2"

See Also
storage.mode

Examples

# 1 vs 1L

# Integer case
sexp_type2(1L)

# double
sexp_type2(1)
shared_finalizer

Create Shared Finalization to Avoid Over Garbage Collection

Description
Generates a function to be passed to `reg.finalizer`

Usage

```r
shared_finalizer(x, key, fin, onexit = FALSE, ...)
```

## Default S3 method:
```
shared_finalizer(x, key, fin, onexit = FALSE, ...)
```

## S3 method for class 'R6'
```
shared_finalizer(x, key, fin, onexit = TRUE, ...)
```

## S3 method for class 'fastmap'
```
shared_finalizer(x, key, fin, onexit = FALSE, ...)
```

Arguments

- **x**  
  object to finalize

- **key**  
  characters that should be identical if finalization method is to be shared

- **fin**  
  Shared finalization: function to call on finalization; see `reg.finalizer`. See details.

- **onexit**  
  logical: should the finalization be run if the object is still uncollected at the end of the R session? See `reg.finalizer`

- **...**  
  passed to other methods
Details

The main purpose of this function is to allow multiple objects that point to a same source (say a temporary file) to perform clean up when all the objects are garbage collected.

Base function `reg.finalizer` provides finalization to to garbage collect single R environment. However, when multiple environments share the same file, finalizing one single environment will result in removing the file so that all the other environment lose the reference. (See example "Native `reg.finalizer` fails example")

The argument of `fin` varies according to different types of `x`. For environments, `fin` contains and only contains one parameter, which is the environment itself. This is the same as `reg.finalizer`.

For R6 classes, `fin` is ignored if class has "shared_finalize" method defined. For `fastmap` or `fastmap2` instances, `fin` accepts no argument.

Examples

```r
# ------------ Environment example ------------
file_exists <- TRUE
clear_files <- function(e){
  print('Clean some shared files')
  # do something to remove files
  file_exists <<- FALSE
}

# e1, e2 both require file existence
e1 <- new.env()
e1$valid <- function(){ file_exists }
e2 <- new.env()
e2$valid <- function(){ file_exists }

# we don't want to remove files when either e1,e2 gets
# garbage collected, however, we want to run `clear_files`
# when system garbage collecting *both* e1 and e2

# Make sure `key's are identical
shared_finalizer(e1, 'cleanXXXfiles', clear_files)
shared_finalizer(e2, 'cleanXXXfiles', clear_files)

# Now remove e1, files are not cleaned, and e2 is still valid
rm(e1); invisible(gc(verbose = FALSE))
e2$valid() # TRUE
file_exists # TRUE

# remove both e1 and e2, and file gets removed
rm(e2); invisible(gc(verbose = FALSE))
file_exists # FALSE

# ------------ R6 example ------------

cls <- R6::R6Class(
```
classname = '...demo...',
cloneable = TRUE,
public = list(
    file_path = character(0),
    shared_finalize = function(){
        cat('Finalize shared resource - ', self$file_path, '\n')
    },
    finalize = function(){
        cat('Finalize private resource\n')
    },
    initialize = function(file_path){
        self$file_path = file_path
        shared_finalizer(self, key = self$file_path)
    }
)
)
e1 <- cls$new('file1')
rm(e1); invisible(gc(verb = FALSE))
e1 <- cls$new('file2')
# A copy of e1
e2 <- e1$clone()
# unfortunately, we have to manually register
shared_finalizer(e2, key = e2$file_path)
# Remove e1, gc only free private resource
rm(e1); invisible(gc(verb = FALSE))
# remove e1 and e2, run shared finalize
rm(e2); invisible(gc(verb = FALSE))

# ------------ fastmap/fastmap2 example -----------

# No formals needed for fastmap/fastmap2
fin <- function(){
    cat('Finalizer is called\n')
}
# single reference case
e1 <- dipsaus::fastmap2()
shared_finalizer(e1, 'fin-fastmap2', fin = fin)
invisible(gc(verb = FALSE)) # Not triggered
rm(e1); invisible(gc(verb = FALSE)) # triggered

# multiple reference case
e1 <- dipsaus::fastmap2()
e2 <- dipsaus::fastmap2()
shared_finalizer(e1, 'fin-fastmap2', fin = fin)
shared_finalizer(e2, 'fin-fastmap2', fin = fin)
rm(e1); invisible(gc(verb = FALSE)) # Not triggered
rm(e2); invisible(gc(verb = FALSE)) # triggered
# ------------ Native reg.finalizer fails example ------------

# This example shows a failure case using base::reg.finalizer

file_exists <- TRUE
clear_files <- function(e){
  print('Clean some shared files')
  # do something to remove files
  file_exists <<- FALSE
}

# e1, e2 both require file existence
e1 <- new.env()
e1$valid <- function(){ file_exists }
e2 <- new.env()
e2$valid <- function(){ file_exists }

reg.finalizer(e1, clear_files)
reg.finalizer(e2, clear_files)
gc()
file_exists

# removing e1 will invalidate e2
rm(e1); gc()
e2$valid() # FALSE

# Clean-ups
rm(e2); gc()

---

shift_array  Shift Array by Index

Description
  Re-arrange arrays in parallel

Usage
  shift_array(x, shift_idx, shift_by, shift_amount)

Arguments
  x array, must have at least matrix
  shift_idx which index is to be shifted
  shift_by which dimension decides shift_amount
  shift_amount shift amount along shift_idx
Details

A simple use-case for this function is to think of a matrix where each row is a signal and columns stand for time. The objective is to align (time-lock) each signal according to certain events. For each signal, we want to shift the time points by certain amount.

In this case, the shift amount is defined by `shift_amount`, whose length equals to number of signals. `shift_idx`=2 as we want to shift time points (column, the second dimension) for each signal. `shift_by`=1 because the shift amount is depend on the signal number.

Examples

```r
x <- matrix(1:10, nrow = 2, byrow = TRUE)
z <- shift_array(x, 2, 1, c(1,2))

y <- NA * x
y[1,1:4] = x[1,2:5]
y[2,1:3] = x[2,3:5]

# Check if z ang y are the same
z - y

# array case
# x is Trial x Frequency x Time
x <- array(1:27, c(3,3,3))

# Shift time for each trial, amount is 1, -1, 0
shift_amount <- c(1,-1,0)
z <- shift_array(x, 3, 1, shift_amount)

if(interactive()){  
  par(mfrow = c(3, 2))
  for(ii in 1:3){
    image(t(x[ii,,]), ylab = 'Frequency', xlab = 'Time',
         main = paste('Trial', ii))
    image(t(z[ii,,]), ylab = 'Frequency', xlab = 'Time',
         main = paste('Shifted amount:', shift_amount[ii]))
  }
}
```

shiny_alert2

**Simple shiny alert that uses 'JavaScript' promises**

Description

Simple shiny alert that uses 'JavaScript' promises
Usage

shiny_alert2(
  title = "Alert",
  text = "",
  icon = c("info", "warning", "success", "error"),
  danger_mode = FALSE,
  auto_close = TRUE,
  buttons = NULL,
  on_close = NULL,
  session = shiny::getDefaultReactiveDomain()
)

close_alert2()

Arguments

- **title**: title of the alert
- **text**: alert body text (pure text)
- **icon**: which icon to display, choices are 'info', 'success', 'warning', and 'error'
- **danger_mode**: true or false; if true, then the confirm button turns red and the default focus is set on the cancel button instead. To enable danger mode, buttons must be TRUE as well
- **auto_close**: whether to close automatically when clicking outside of the alert
- **buttons**: logical value or a named list, or characters. If logical, it indicates whether buttons should be displayed or not; for named list, the names will be the button text, see example; for characters, the characters will be the button text and value
- **on_close**: NULL or a function that takes in one argument. If function is passed in, then it will be executed when users close the alert
- **session**: shiny session, see domains

Value

a temporary input ID, currently not useful

Examples

```r
library(shiny)
library(dipsaus)
ui <- fluidPage(
  use_shiny_dipsaus(),
  actionButtonStyled('btn', 'btn')
)

server <- function(input, output, session) {
  observeEvent(input$btn, {
    shiny_alert2(
```

```r
```
on_close = function(value) {
  cat("Modal closed!\n")
  print(value)
}

if(interactive()){
  shinyApp(ui, server, options = list(launch.browser = TRUE))
}

shiny_is_running

Detect whether 'Shiny' is running

Description

Detect whether 'Shiny' is running

Usage

shiny_is_running()

Value

logical, true if current shiny context is active

ste_mean

Standard error of mean

Description

Ported from 'rutabaga' package, calculates standard error of mean. The sample size is determined by number of none-NA numbers by default

Usage

ste_mean(x, na.rm = FALSE, na_as_zero = na.rm, ...)

## Default S3 method:
ste_mean(x, na.rm = FALSE, na_as_zero = na.rm, ...)
**Arguments**

- `x` : R object
- `na.rm` : whether to remove NA; default is false
- `na_as_zero` : whether convert NA to zero
- ... : passed to other methods

**Value**

A numerical number that is the standard error of the mean

**See Also**

`mean_se`

**Examples**

```r
x <- rnorm(100)
ste_mean(x)
# internal implementation
identical(ste_mean(x), sd(x) / sqrt(100))
```

---

**sumsquared**

*Fast Calculation of Sum-squared for Large Matrices/Vectors*

**Description**

Calculate $\sum(x^2)$, but faster when the number of elements exceeds 1000.

**Arguments**

- `x` : double, integer, or logical vector/matrix

**Value**

A numerical scalar
Examples

```r
x <- rnorm(10000)
sumsquared(x)

# Compare speed
microbenchmark::microbenchmark(
  cpp = {sumsquared(x)},
  r = {sum(x^2)}
)
```

**Description**

Synchronize Shiny Inputs

**Usage**

```r
sync_shiny_inputs(
  input, session, inputIds, uniform = rep("I", length(inputIds)),
  updates, snap = 250, ignoreNULL = TRUE, ignoreInit = FALSE
)
```

**Arguments**

- `input`, `session` shiny reactive objects
- `inputIds` input ids to be synchronized
- `uniform` functions, equaling to length of `inputIds`, converting inputs to a uniform values
- `updates` functions, equaling to length of `inputIds`, updating input values
- `snap` numeric, milliseconds to defer the changes
- `ignoreNULL, ignoreInit` passed to `bindEvent`

**Value**

none.
Examples

library(shiny)

ui <- fluidPage(
  textInput('a', 'a', value = 'a'),
  sliderInput('b', 'b', value = 1, min = 0, max = 1000)
)

server <- function(input, output, session) {
  sync_shiny_inputs(input, session, inputIds = c('a', 'b'), uniform = list(
    function(a){as.numeric(a)},
    'I'
  ), updates = list(
    function(a){updateTextInput(session, 'a', value = a)},
    function(b){updateSliderInput(session, 'b', value = b)}
  ))
}

if(interactive()){
  shinyApp(ui, server)
}

test_farg

Test whether function has certain arguments

Usage

test_farg(fun, arg, dots = TRUE)

Arguments

fun      function
arg      characters of function arguments
dots     whether fun's dots (...) counts

Examples

a <- function(n = 1){}

# Test whether 'a' has argument called 'b'
test_farg(a, 'b')

# Test whether 'a' has argument called 'b' and 'n'
test_farg(a, c('b', 'n'))

# 'a' now has dots
a <- function(n = 1, ...){}

# 'b' could goes to dots and a(b=...) is still valid
test_farg(a, 'b')

# strict match, dots doesn't count
a <- function(n = 1, ...){}
test_farg(a, 'b', dots = FALSE)

---

**time_delta**

*Calculate time difference and return a number*

**Description**

Calculate time difference and return a number

**Usage**

```r
time_delta(t1, t2, units = "secs")
```

**Arguments**

- **t1**: time start
- **t2**: time end
- **units**: character, choices are 'secs', 'mins', 'hours', and 'days'

**Value**

numeric difference of time in units specified

**Examples**

```r
a = Sys.time()
Sys.sleep(0.3)
b = Sys.time()

time_delta(a, b) # In seconds, around 0.3
time_delta(a, b, "mins") # in minutes, around 0.005
```
to_datauri  
Convert file to 'base64' format

Description
Convert file to 'base64' format

Usage

to_datauri(file, mime = "")

Arguments

- file: file path
- mime: 'mime' type, default is blank

Value

'a base64' data string looks like 'data:;base64,AEF6986...' 

to_ram_size  
Convert bytes to KB, MB, GB,...

Description
Convert bytes to KB, MB, GB,...

Usage

to_ram_size(s, kb_to_b = 1000)

Arguments

- s: size
- kb_to_b: how many bytes counts one KB, 1000 by default

Value

numeric equaling to s but formatted
updateActionButtonStyled

Update styled action button

Description
Update styled action button

Usage
```
updateActionButtonStyled(
  session,
  inputId,
  label = NULL,
  icon = NULL,
  type = NULL,
  disabled = NULL,
  ...
)
```

Arguments

```
session, inputId, label, icon
  passed to shiny::updateActionButton
type   button type to update
disabled whether to disable the button
...
  ignored
```

Value

none

See Also

`actionButtonStyled` for how to define the button.

updateCompoundInput2

Update compound inputs

Description

Update compound inputs
Usage

updateCompoundInput2(
  session,
  inputId,
  value = NULL,
  ncomp = NULL,
  initialization = NULL,
  ...
)

Arguments

  session  shiny session or session proxy
  inputId  character see compoundInput2
  value    list of lists, see compoundInput2 or examples
  ncomp    integer, non-negative number of groups to update, NULL to remain unchanged
  initialization, ... named list of other updates

Value

  none

See Also

  compoundInput2 for how to define components.

Examples

  ## Not run:
  library(shiny); library(dipsaus)

  ## UI side
  compoundInput2(  
    'input_id', 'Group',
    div(      
      textInput('text', 'Text Label'),
      sliderInput('sli', 'Slider Selector', value = 0, min = 1, max = 1)
    ),
    label_color = 1:10,
    value = list(     
      list(text = '1'), # Set text first group to be "1"
      # no settings for second group
      list(sli = 0.2)   # sli = 0.2 for the third group
    )
  )

  ## server side:
  updateCompoundInput2(session, 'inputid',

# Change the first 3 groups
value = lapply(1:3, function(ii){
    list(sli = runif(1))
}),
# Change text label for all groups
initialization = list(
    text = list(label = as.character(Sys.time())))

## End(Not run)

update_fastmap2

Migrate a fastmap2 object to a new one

Description

Migrate a fastmap2 object to a new one

Usage

update_fastmap2(from, to, override = TRUE)

Arguments

from, to fastmap2 object
override whether to override keys in to if they exist

Value

Map to

See Also

fastmap2

use_shiny_dipsaus

Set up shiny plugins

Description

This function must be called from a Shiny app’s UI in order for some widgets to work.

Usage

use_shiny_dipsaus(x)
Arguments

x 'HTML’ tags

%OF%

Get an element with condition that it must be from a list or vector

Description

Get an element with condition that it must be from a list or vector

Usage

lhs %OF% rhs

Arguments

lhs the element of candidate
rhs the constraint

Value

Returns an element of length one that will be from rhs

Examples

# C is from LETTERS, therefore returns 'C'
"C" %OF% LETTERS

# 'lhs' is not from 'rhs', hence return the first element of LETTERS '9' %OF% LETTERS
NULL %OF% LETTERS

# When there are multiple elements from 'lhs', select the first that
# matches the constraint
c('9', "D", "V") %OF% LETTERS
A JavaScript style of creating functions

Description

A JavaScript style of creating functions

Usage

args %=>% expr

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>args</td>
<td>function arguments: see <em>formals</em></td>
</tr>
<tr>
<td>expr</td>
<td>R expression that forms the body of functions: see <em>body</em></td>
</tr>
</tbody>
</table>

Value

A function that takes *args* as parameters and *expr* as the function body

Examples

```r
# Formal arguments
c(a) %=>% {
  print(a)
}

# Informal arguments
list(a=) %=>% {
  print(a)
}

# Multiple inputs
c(a, b = 2, ...) %=>% {
  print(c(a, b, ...))
}

# ------ JavaScript style of forEach ------
# #### Equivalent JavaScript Code:
# LETTERS.forEach((el, ii) => {
#   console.log('The index of letter ' + el + ' in "x" is: ' + ii);
# });
iapply(LETTERS, c(el, ii) %=>% {
  cat2('The index of letter ', el, ' in ', sQuote('x'), ' is: ', ii)
}) -> results
```
%?<-%

Left-hand side checked assignment Provides a way to assign default values to variables. If the statement 'lhs' is invalid or NULL, this function will try to assign value, otherwise nothing happens.

Description

Left-hand side checked assignment Provides a way to assign default values to variables. If the statement ‘lhs’ is invalid or NULL, this function will try to assign value, otherwise nothing happens.

Usage

lhs %?<-% value

Arguments

lhs an object to check or assign
value value to be assigned if lhs is NULL

Value

Assign value on the right-hand side to the left-hand side if lhs does not exist or is NULL

Examples

# Prepare, remove aaa if exists
if(exists("aaa", envir = globalenv(), inherits = FALSE)){
  rm(aaa, envir = globalenv())
}

# Assign
aaa %?<-% 1; print(aaa)

# However, if assigned, nothing happens
aaa = 1;
aaa %?<-% 2;
print(aaa)

# in a list
a = list()
a$e %?<-% 1; print(a$e)
a$e %?<-% 2; print(a$e)
%+-%  

**Plus-minus operator**

**Description**

Plus-minus operator

**Usage**

```r
a %+-% b
```

**Arguments**

- `a`: numeric vectors, matrices or arrays
- `b`: numeric vectors, matrices or arrays

**Value**

```r
a +/- b
```

The dimension depends on `a+b`. If `a+b` is a scalar, returns a vector of two; in the case of vector, returns a matrix; all other cases will return an array with the last dimension equal to 2.

**Examples**

```r
# scalar
1 %+-% 2 # -1, 3

# vector input
c(1,2,3) %+-% 2 # matrix

# matrix input
matrix(1:9, 3) %+-% 2 # 3x3x2 array
```

%<-??%  

**Right-hand side checked assignment**

Provides a way to avoid assignment to the left-hand side. If the statement `value` is invalid or NULL, this function will not assign values and nothing happens.

**Description**

Right-hand side checked assignment Provides a way to avoid assignment to the left-hand side. If the statement `value` is invalid or NULL, this function will not assign values and nothing happens.

**Usage**

```r
lhs %<-??% value
```
Arguments

lhs  an object to be assigned to
value value to be checked

Value

Assign value on the right-hand side to the left-hand side if value does exists and is not NULL

Examples

# Prepare, remove aaa if exists
if(exists('aaa', envir = globalenv(), inherits = FALSE)){
  rm(aaa, envir = globalenv())
}

# aaa will not be assigned. run `print(aaa)` will raise error
aaa %<-?% NULL

# Assign
aaa %<-?% 1
print(aaa)

# in a list
a = list()
a$e %<-?% bbb; print(a$e)
a$e %<-?% 2; print(a$e)
Index

[.fastmap2 (fastmap2), 37
[.fastqueue2 (fastqueue2), 40
[<-.fastmap2 (fastmap2), 37
[[.fastmap2 (fastmap2), 37
[[.fastqueue2 (fastqueue2), 40
[[-.fastmap2 (fastmap2), 37
$.fastmap2 (fastmap2), 37
$.<-.fastmap2 (fastmap2), 37
$.%D% (decorate_function), 28
%+-%, 107
%<-%, 107
%->%, 105
%?<-%, 106
%OF%, 104

AbstractMap, 4, 64
AbstractQueue, 4
actionButtonStyled, 6, 101
add_to_session, 8
adjustcolor, 24
aggregate, 33
alist, 69
as.character.sexp_type2 (sexp_type2), 88
as.list, 38
as.list.fastmap2 (fastmap2), 37
as.list.fastqueue2 (fastqueue2), 40
as_pipe, 15
ask_or_default, 9, 10
ask.yesno, 9, 10
async, 11
async_expr, 11, 11
async_flapply, 12
async_works, 13
attached_packages, 16

base64_to_image, 17
base64_to_string, 17
baseline_array, 18
bindEvent, 97
body, 105

browseURL, 85
capture.output, 21
capture_expr, 21
cat2, 9, 10, 21, 76
check_installed_packages, 23
clear_env, 23
close_alert2 (shiny_alert2), 93
col2hexStr, 24
collapse, 25
combine_html_class (html_class), 54
compoundInput2, 26, 102
cov, 36
decorate_function, 28
deparse_svec, 30, 73
dev_create (graphic-devices), 50
digest, 46
dipsaus-defunct (get_cpu), 45
dipsaus-rstudio-shortcuts, 31
dipsaus_lock (lock), 60
dipsaus_resetlocks (lock), 60
dipsaus_unlock (lock), 60
do_aggregate, 33
do_nothing, 34
domains, 87, 94
drop_nulls, 34
eval_dirty, 35
fastcov2, 36
fastmap, 37, 64, 90
fastmap2, 23, 37, 90, 103
fastquantile, 39
fastqueue2, 40
flex_div, 41
forelse, 42
formals, 69, 105
future_lapply, 12
get_cpu, 45
INDEX

get_credential, 45
get_dev_attr (graphic-devices), 50
get_dots, 47
get_ip, 48
get_os, 49
get_ram, 50
getInputBinding, 44
graphic-devices, 50

handler_dipsaus_progress, 52
html_asis, 53
html_class, 54

iapply, 55
install.packages, 84
interactive, 9, 10
isAvailable, 80

jobRunScript, 81

lapply, 14, 55, 58
lapply_async2, 56, 62
lapply_callr, 13, 57
length.fastmap2 (fastmap2), 37
length.fastqueue2 (fastqueue2), 40
list.files, 76
list_to_fastmap2, 59
list_to_fastqueue2, 59
lock, 60

make_forked_clusters, 56, 61
make_progression_handler, 52
map, 63, 73
mask_function2, 65
match_calls, 66
mean, 67
mean_se, 67, 96
mem_limit2, 68
missing_dots (get_dots), 47

names.fastmap2 (fastmap2), 37
new_function, 69
new_function2, 68
no_op, 70

package_installed, 71
parse_svec, 30, 72
PersistContainer, 73
plan, 56
prepare_install, 74
prepare_install2 (prepare_install), 74
print.fastmap2 (fastmap2), 37
print.fastqueue2 (fastqueue2), 40
print.sexp_type2 (sexp_type2), 88
print_directory_tree, 75
progress2, 52, 76
quantile, 39
quo_squash, 69

rds_map, 64
rds_map (map), 63
readline, 9, 10
reg.finalizer, 73, 89, 90
registerInputBinding, 78
remove_html_class (html_class), 54
restart_session, 79
rs_active_project, 79
rs_add_insertion_shortcut
dipsaus-rstudio-shortcuts, 31
rs_add_shortcut
dipsaus-rstudio-shortcuts, 31
rs_avail, 79, 79, 83, 85
rs_edit_file, 80
rs_exec, 58, 81
rs_focus_console, 82
rs_quick_debug
dipsaus-rstudio-shortcuts, 31
rs_remove_shortcut
dipsaus-rstudio-shortcuts, 31
rs_save_all, 83
rs_select_path, 83
rs_set_repos, 84
rs_show_shortcut
dipsaus-rstudio-shortcuts, 31
rs_viewer, 84

sapply, 14, 55
screenshot, 85
session_map, 64
session_map (map), 63
session_uuid, 86
set_shiny_input, 86
sexp_type2, 88
shared_finalizer, 89
ste_mean, 67, 68, 95
storage.mode, 88
sumsquared, 96
symbol, 22
sync_shiny_inputs, 97
test_farg, 98
text_map, 64
text_map(map), 63
time_delta, 99
to_datauri, 100
to_ram_size, 100
update_fastmap2, 103
updateActionButtonStyled, 7, 101
updateCompoundInput2, 27, 101
use_shiny_dipsaus, 86, 103
viewer, 85