

# Package ‘dipsaus’

December 17, 2024

**Type** Package

**Title** A Dipping Sauce for Data Analysis and Visualizations

**Version** 0.3.0

**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>, <https://dipterix.org/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), base64enc, digest, rlang (>= 0.4.0), rstudioapi (>= 0.11)

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AbstractMap	<i>Abstract Map to store key-value pairs</i>
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**Description**

Abstract Map to store key-value pairs

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AbstractQueue	<i>Defines abstract queue class</i>
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---

**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$connect(...)`
- `get_locker()`, `free_locker()` (**optional**) Default is NULL for each methods, and queue uses an internal `private$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, `private$exclusive` will take care the rest. Type: function; parameters: none; return: none
- `@get_head()`, `@set_head(v)` (**override**) Get head so that we know where we are in the queue `self$@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 `private$exclusive` 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

---

actionButtonStyled     *Action Button but with customized styles*

---

## Description

Action Button but with customized styles

## Usage

```
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

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

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

```

---

add\_to\_session

*Store/Get key-value pairs in 'shiny' session*


---

### Description

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

### Usage

```

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	<i>Read a Line from the Terminal, but with Default Values</i>
----------------	---

---

## Description

Ask a question and read from the terminal in interactive scenario

## Usage

```
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

```
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

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

### Arguments

<code>..., end, level</code>	passed to <code>cat2</code>
<code>error_if_canceled</code>	raise error if canceled
<code>use_rs</code>	whether to use <code>rstudioapi</code> if possible
<code>ok</code>	button label for yes
<code>cancel</code>	button label for no
<code>rs_title</code>	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(),
  ...
)
```

**Arguments**

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

**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.

---

<code>async_flapply</code>	<i>Wrapper for <code>future.apply::future_lapply</code></i>
----------------------------	---

---

**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

```

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

## 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**

<code>x</code>	R object as input
<code>...</code>	default arguments explicitly display in the returned function
<code>call</code>	a function call, or the function itself
<code>arg_name</code>	argument name to be varied. This argument will be the first argument in the new function so it's pipe-friendly.
<code>.name</code>	new argument name; default is the same as <code>arg_name</code>
<code>.env</code>	executing environment
<code>.quoted</code>	whether <code>call</code> 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
vary_title(title = 'My Title', pch = 1)

# other variables are implicit
vary_title(title = 'My Title', type = 'l')

# modify a function

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

# Both `.(z)` and `z` work

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

# reset debug option
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

```
attached_packages(include_base = FALSE)
```



**Arguments**

include\_base    whether to include base packages

**Value**

characters, package names that are attached in current session

---

base64-url	<i>Encode or decode 'base64'</i>
------------	----------------------------------

---

**Description**

Compatible with results from package 'base64url', but implemented with package 'base64enc'. I simply do not like it when I have to depend on two packages that can achieve the same goal. This implementation is slower. If you have 'base64url' installed, please use that version.

**Usage**

```
base64_urlencode(x)
```

```
base64_urldecode(x)
```

**Arguments**

x                    character vector to encode or decode

**Value**

character vector of the same length as x

**Examples**

```
x = "plain text"
encoded = base64_urlencode(x)
decoded = base64_urldecode(encoded)
print(encoded)
print(decoded)
```

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**

```
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

```
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

<code>x</code>	array (tensor) to calculate contrast
<code>along_dim</code>	integer range from 1 to the maximum dimension of <code>x</code> . baseline along this dimension, this is usually the time dimension.
<code>baseline_indexpoints</code>	integer vector, which index points are counted into baseline window? Each index ranges from 1 to <code>dim(x)[[along_dim]]</code> . See Details.
<code>unit_dims</code>	integer vector, baseline unit: see Details.
<code>method</code>	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:

$$session \times frequency \times time \times location$$

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

```
baseline_array(x, along_dim = 3, 1 : 100, unit_dims = c(1, 2, 4))
```

`along_dim=3` 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"

$$\frac{z - \bar{z}_0}{sd(z_0)}$$

"sqrt\_zscore"

$$\frac{\sqrt{z} - \sqrt{\bar{z}_0}}{sd(\sqrt{z_0})}$$

## Value

Contrast array with the same dimension as  $x$ .

## Examples

```
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 <a href="#">capture.output</a>

### Value

Character of length 1: output captured by [capture.output](#)

**Examples**

```
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 = list(DEBUG = "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 <a href="#">symbol</a>

**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	<i>Function to clear all elements within environment</i>
-----------	--

---

**Description**

Function to clear all elements within environment

**Usage**

```
clear_env(env, ...)
```

**Arguments**

env	environment to clean, can be an R environment, or a <a href="#">fastmap2</a> instance
...	ignored

**Examples**

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

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

---

col2hexStr	<i>Convert color to Hex string</i>
------------	------------------------------------

---

**Description**

Convert color to Hex string

**Usage**

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

**Arguments**

col	character or integer indicating color
alpha	NULL or numeric, transparency. See <code>grDevices::rgb</code>
prefix	character, default is "#"
...	passing to <a href="#">adjustcolor</a>



**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**

```

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
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(
          list(txt = '1'), # Set text first group to be "1"
          '',             # no settings for second group
          list(sli = 0.2) # sli = 0.2 for the third group
        )
      ),
      hr(),
      actionButton('action', 'Update compound input')
    )
  )
)

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))
```

---

digest2

*Digest R object with source reference removed*

---

**Description**

Digest R object with source reference removed

**Usage**

```
digest2(object, ..., keep_source = FALSE)
```

**Arguments**

object, ...	passed to <a href="#">digest</a>
keep_source	whether to keep the code that generates the object; default is false

**See Also**

[removeSource](#)

---

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

```
## 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({\n%s\n})\n",
                 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

# DIPS AUS: DEBUG START
# message("Debugging...")
# a <- 1
# print(a)
# message("Finished")

# Place your cursor here, press the shortcut key

## End(Not run)
```

---

do_aggregate	<i>Make aggregate pipe-friendly</i>
--------------	-------------------------------------

---

**Description**

A pipe-friendly wrapper of [aggregate](#) when using formula as input.

**Usage**

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

**Arguments**

x	an R object
...	other parameters passed to <a href="#">aggregate</a>

**Value**

Results from [aggregate](#)

**See Also**

[aggregate](#)

**Examples**

```
data(ToothGrowth)

ToothGrowth |>
  do_aggregate(len ~ ., mean)
```

---

do_nothing	<i>A dummy function that literally does nothing</i>
------------	---

---

**Description**

A dummy function that literally does nothing

**Usage**

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

**Arguments**

...	ignored
-----	---------

**Value**

Nothing

---

drop_nulls	<i>Drop NULL values from list or vectors</i>
------------	--

---

**Description**

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
```

---

eval_dirty	<i>Evaluate expressions</i>
------------	-----------------------------

---

**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**

```
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)
```

---

fancyFileInput

*Shiny drag-and-drop file input*


---

**Description**

Fancy drag and drop file upload for shiny apps.

**Usage**

```
fancyFileInput(
  inputId,
  label,
  width = NULL,
  after_content = "Drag & drop, or button",
  size = c("s", "m", "l", "xl"),
  ...
)
```

**Arguments**

<code>inputId</code>	the input slot that will be used to access the value
<code>label</code>	display label for the control, or <code>NULL</code> for no label.
<code>width</code>	the width of the input
<code>after_content</code>	tiny content that is to be displayed below the input box
<code>size</code>	height of the widget, choices are 's', 'm', 'l', and 'xl'
<code>...</code>	passed to <code>fileInput</code>

**Value**

See [fileInput](#)

**Examples**

```
library(shiny)
library(dipsaus)

ui <- basicPage(
  fancyFileInput('file_input', "Please upload")
)

if(interactive()) {
  shinyApp(
    ui, server = function(input, output, session){},
    options = list(launch.browser = TRUE)
  )
}
```

---

fastcov2

*Calculate Covariance Matrix in Parallel*

---

**Description**

Speed up covariance calculation for large matrices. The default behavior is similar [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**

```
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])
  },
  unit = 'ms', times = 10
)
```

---

fastmap2

*A Wrapper for fastmap::fastmap*


---

**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**

```
fastmap2(missing_default = NULL)

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

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

```

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

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

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

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

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

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

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

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

```

### Arguments

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

### Value

A list of 'fastmap2' instance

### Examples

```

## ----- 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**

```
# 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
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**

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

## S3 method for class 'fastqueue2'
x[[i]]
```

```
## S3 method for class 'fastqueue2'
x[i, j = NULL, ...]

## S3 method for class 'fastqueue2'
print(x, ...)

## S3 method for class 'fastqueue2'
length(x)

## S3 method for class 'fastqueue2'
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

```
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

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

## Arguments

<code>...</code>	shiny UI elements
<code>ncols</code>	number of columns, either "auto" or vector of positive integers

## 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

```
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	<i>Python-style "for-else" function</i>
---------	---

---

### 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

```
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 non 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	<i>Obtain registered input bindings</i>
-----------------	---

---

## Description

Obtain registered input bindings

## Usage

```
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**

```

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	<i>Defunct Functions in Package <b>dipsaus</b> The functions or variables listed here are no longer part of the package.</i>
---------	--

---

**Description**

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

**Usage**

```
get_cpu()
```

---

get_credential	<i>Generate a random password</i>
----------------	-----------------------------------

---

**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**

```

get_credential(
    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

**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 twp 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	<i>Get or check elements from dots '...'</i>
----------	--

---

### Description

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

### Usage

```
get_dots(..name, ..default = NULL, ...)
```

```
missing_dots(envir = parent.frame())
```

### Arguments

<code>..name</code>	character name of the argument
<code>..default</code>	R object to return if argument not found
<code>...</code>	dots that contains argument
<code>envir</code>	R environment

### Value

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

### Examples

```
# ----- 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*


---

### 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	<i>Detect the type of operating system</i>
--------	--

---

**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	<i>Get Memory Size</i>
---------	------------------------

---

**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()
```

---

graphic-devices	<i>Create a group of named graphic devices</i>
-----------------	--

---

**Description**

Create a group of named graphic devices

**Usage**

```
dev_create(..., env = parent.frame(), attributes = list())
```

```
get_dev_attr(which, dev = grDevices::dev.cur(), ifnotfound = NULL)
```

**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

```

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

```
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\_asis

*Escape HTML strings*

---

## Description

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

## Usage

```
html_asis(s, space = TRUE)
```

## Arguments

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

## Value

An R string

## Examples

```
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

```
combine_html_class(...)

remove_html_class(target, class)
```

### Arguments

<code>...</code>	one or more characters, classes to combine; duplicated classes will be removed
<code>target</code>	characters, class list
<code>class</code>	one or more characters, classes to be removed from <code>target</code>

### Value

A character string of new 'HTML' class

### Examples

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

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



---

iapply	<i>Apply each elements with index as second input</i>
--------	---

---

**Description**

Apply function with an index variable as the second input.

**Usage**

```
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 <a href="#">sapply</a>

**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](#)

---

is_from_namespace	<i>Check whether a function, environment comes from a namespace</i>
-------------------	---

---

**Description**

A coarse way to find if a function comes from a package.

**Usage**

```
is_from_namespace(x, recursive = TRUE)
```

**Arguments**

x	function, environment, language (with environment attached)
recursive	whether to recursively search parent environments

**Value**

logical true if `x` or its environment is defined in a namespace; returns false if the object is atomic, or defined in/from global environment, or an empty environment.

**Examples**

```
is_from_namespace(baseenv())      # TRUE
is_from_namespace(utils::read.csv) # TRUE

x <- function(){}
is_from_namespace(NULL)          # FALSE
is_from_namespace(x)             # FALSE
is_from_namespace(emptyenv())    # FALSE

# Let environment of `x` be base environment
# (exception case)
environment(x) <- baseenv()
is_from_namespace(x)             # TRUE
```

---

lapply\_async2

*Apply, but in parallel*


---

**Description**

Apply, but in parallel

**Usage**

```
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**

<code>x</code>	vector, list
<code>FUN</code>	function to apply on each element of <code>x</code>
<code>FUN.args</code>	more arguments to feed into <code>FUN</code>

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(e1){eval(body(FUN))}))`

### See Also

[make\\_forked\\_clusters](#)

### Examples

```

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**

```
lapply_callr(  
  x,  
  fun,  
  ...,  
  .callback = NULL,  
  .globals = list(),  
  .ncores = future::availableCores(),  
  .packages = attached_packages(),  
  .focus_on_console = TRUE,  
  .rs = FALSE,  
  .quiet = FALSE,  
  .name = "",  
  .wait = TRUE  
)
```

**Arguments**

<code>x</code>	vector or list
<code>fun</code>	function
<code>...</code>	passed to function, see <a href="#">lapply</a>
<code>.callback</code>	a function takes zero, one, or two arguments and should return a string to show in the progress
<code>.globals</code>	a named list that <code>fun</code> relies on
<code>.ncores</code>	number of cores to use; only used when <code>.wait=TRUE</code>
<code>.packages</code>	packages to load
<code>.focus_on_console</code>	whether to focus on console once finished; is only used when <code>.rs</code> is true
<code>.rs</code>	whether to create 'RStudio' jobs; default is false
<code>.quiet</code>	whether to suppress progress message
<code>.name</code>	the name of progress and jobs
<code>.wait</code>	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**

```
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	<i>Copy elements to fastmap2</i>
------------------	----------------------------------

---

**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`      *Copy elements to fastqueue2*

---

**Description**

Copy elements to fastqueue2

**Usage**

```
list_to_fastqueue2(li, queue = NULL)
```

**Arguments**

<code>li</code>	a list or an environment
<code>queue</code>	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.

---

`lock`      *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**

```
dipsaus_lock(name, timeout = 10, exclusive = TRUE)
```

```
dipsaus_unlock(name, timeout = 10, exclusive = TRUE)
```

```
dipsaus_resetlocks(name)
```

**Arguments**

<code>name</code>	character, the locker's name, must be only letters and digits
<code>timeout</code>	numeric, seconds to wait for the locker to lock or unlock
<code>exclusive</code>	ignored

**Value**

Logical, whether the operation succeed.

**Examples**

```

# 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()

```

---

make\_forked\_clusters *Create forked clusters, but more than that*

---

**Description**

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

**Usage**

```

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 <code>make_forked_clusters</code> inside of a function. See details and examples.
...	passing to <code>future::plan</code>

### Details

This was original 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

```
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)
}
```

**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**

map	a <code>fastmap::fastmap()</code> list
path	directory path where map data should be stored

**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` the `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	<i>Mask a function with given variables</i>
----------------	---

---

### 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(),  
  ...  
)
```

**Arguments**

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

**Value**

A nested call with all arguments matched

**Examples**

```
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	<i>Calculates mean and standard error of mean</i>
---------	---

---

**Description**

Calculates mean and standard error of mean

**Usage**

```
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 <a href="#">ste_mean</a>

**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	<i>Get max RAM size This is an experimental function that is designed for non-windows systems</i>
------------	---

---

**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()  
)
```

### Arguments

args	named list of function formals
body	function body expression, supports 'quasi-quosure' 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-quosure' should be evaluated, default is parent environment

### Details

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

```

# ----- 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-quosure' 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){}
new_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**

```
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

```
## 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)`

y <- 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)})  
# 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

### Usage

```
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	<i>Parse Text Into Numeric Vectors</i>
------------	--

---

**Description**

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)

**See Also**

[deparse\\_svec](#)

**Examples**

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

---

PersistContainer	<i>Wrapper to cache key-value pairs and persist across sessions</i>
------------------	---

---

**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 is 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**

```
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()

```

---

```
print_directory_tree Print Directory Tree
```

---

## Description

Print Directory Tree

## Usage

```

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

```

## Arguments

target	target directory path, relative to root
root	root directory, default is '~'
child	child files in target; is missing, then list all files
dir_only	whether to display directory children only
collapse	whether to concatenate results as one single string
...	pass to <a href="#">list.files</a> when list all files

## Value

Characters, print-friendly directory tree.

---

 progress2

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


---

### Description

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

### Usage

```
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 <code>shiny::Progress\$new(...)</code>
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 <code>p &lt;- progress2(...); on.exit({p\$close()}, add = TRUE)</code> .
log	function when running locally, default is NULL, which redirects to <a href="#">cat2</a>

### Value

A list of functions:

`inc(detail, message = NULL, amount = 1, ...)` Increase progress bar by amount (default is 1).

`close()` Close the progress

`reset(detail = "", message = "", value = 0)` Reset the progress to value (default is 0), and reset information

`get_value()` Get current progress value

`is_closed()` Returns logical value if the progress is closed or not.

**Examples**

```

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)
}

```

---

registerInputBinding *Register customized input to enable support by compound input*

---

**Description**

Register customized input to enable support by compound input

**Usage**

```

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**

```
# 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	<i>Restart R Session</i>
-----------------	--------------------------

---

**Description**

Utilize 'RStudio' functions to restart, if running without 'RStudio', use package startup (not included in this library) instead.

**Usage**

```
restart_session()
```



---

rs_active_project	<i>Get 'RStudio' active project</i>
-------------------	-------------------------------------

---

**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	<i>Verify 'RStudio' version</i>
----------	---------------------------------

---

**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	<i>Use 'RStudio' to open and edit files</i>
--------------	---

---

**Description**

Use 'RStudio' to open and edit files

**Usage**

```
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

---

rs_exec	<i>Schedule a Background Job</i>
---------	----------------------------------

---

**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,  
  as_promise = FALSE,  
  wait = FALSE,  
  packages = NULL,  
  focus_on_console = FALSE,  
  ...,  
  nested_ok = FALSE  
)
```

**Arguments**

<code>expr</code>	R expression
<code>name</code>	used by 'RStudio' as name of the job
<code>quoted</code>	is <code>expr</code> quoted
<code>rs</code>	whether to use 'RStudio' by default
<code>as_promise</code>	whether to return as a <a href="#">promise</a> object; default is no
<code>wait</code>	whether to wait for the result.
<code>packages</code>	packages to load in the sub-sessions
<code>focus_on_console</code>	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' (>=1.4)
<code>...</code>	internally used
<code>nested_ok</code>	whether nested <code>rs_exec</code> is allowed; default is false; Set to true to allow nested parallel code, but use at your own risk.

**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**

```
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)
}
```

---

rs\_focus\_console      *Focus on 'RStudio' Console*

---

### 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.

### Value

None

---

rs\_save\_all              *Save all documents in 'RStudio'*

---

### 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	<i>Use 'RStudio' to Select a Path on the Server</i>
----------------	---

---

**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	<i>Add secondary 'CRAN'-like repository to the 'RStudio' settings</i>
--------------	---

---

**Description**

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

**Usage**

```
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	<i>Get 'RStudio' Viewer, or Return Default</i>
-----------	--

---

**Description**

Get 'RStudio' Viewer, or Return Default

**Usage**

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

**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

---

screenshot	<i>Take a screenshot in shiny apps</i>
------------	--

---

**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-lib.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**

```
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	<i>Set Shiny Input</i>
-----------------	------------------------

---

**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](#).

**Usage**

```
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 <a href="#">domains</a>
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**

```

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())
  })
}

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

```

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 <b>R</b> 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)

# Built-in function
sexp_type2(`+`)

# normal functions
sexp_type2(sexp_type2)

# symbols (quoted names)
sexp_type2(quote(`+`))

# Calls (quoted expressions)
sexp_type2(quote({`+`}))
```

---

shared\_finalizer

*Create Shared Finalization to Avoid Over Garbage Collection*

---

**Description**

Generates a function to be passed to [reg.finalizer](#)

**Usage**

```
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, ...)

## S3 method for class 'fastmap2'
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 <a href="#">reg.finalizer</a> . See details.
onexit	logical: should the finalization be run if the object is still uncollected at the end of the R session? See <a href="#">reg.finalizer</a>
...	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**

```
# ----- 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 }

e1$valid(); e2$valid()

# 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(verbose = 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(verbose = FALSE))

# remove e1 and e2, run shared finalize
rm(e2); invisible(gc(verbose = 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(verbose = FALSE)) # Not triggered
rm(e1); invisible(gc(verbose = 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(verbose = FALSE)) # Not triggered
rm(e2); invisible(gc(verbose = 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

```
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 and 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 <a href="#">domains</a>

**Value**

a temporary input ID, currently not useful

**Examples**

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

server <- function(input, output, session) {
  observeEvent(input$btn, {
    shiny_alert2(
      on_close = function(value) {
        cat("Modal closed!\n")
        print(value)
      },
      title = "Title",
      text = "message",
      icon = "success",
      auto_close = FALSE,
      buttons = list("cancel" = TRUE,
                    "YES!" = list(value = 1))
    )
  })
}

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	<i>Standard error of mean</i>
----------	-------------------------------

---

**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**

```
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  $\text{sum}(x^2)$ , but faster when the number of elements exceeds 1000.

**Arguments**

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

**Value**

A numerical scalar

**Examples**

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

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

---

`sync_shiny_inputs`*Synchronize Shiny Inputs*

---

**Description**

Synchronize Shiny Inputs

**Usage**

```
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*

---

**Description**

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
test_farg(a, 'b', dots = FALSE)
```

---

time\_delta

*Calculate time difference and return a number*


---

**Description**

Calculate time difference and return a number

**Usage**

```
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**

```

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	<i>Convert file to 'base64' format</i>
------------	--

---

**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	<i>Convert bytes to KB, MB, GB,...</i>
-------------	--

---

**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**

args            function arguments: see [formals](#)  
 expr            R expression that forms the body of functions: see [body](#)

**Value**

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

**Examples**

```
# 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$a %?<-% 1; print(a$a)
a$a %?<-% 2; print(a$a)
```

---

*%+-%**Plus-minus operator*

---

**Description**

Plus-minus operator

**Usage**

a %+-% b

**Arguments**

a, b                    numeric vectors, matrices or arrays

**Value**

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**

```
# 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**

```
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
```

`%<-?%`

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```
a = list()
a$a %<-?% bbb; print(a$a)
a$a %<-?% 2; print(a$a)
```

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