Package 'qol'

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Title Powerful 'SAS' Inspired Concepts for more Efficient Bigger Outputs

Version 1.3.6

Description The main goal is to make descriptive evaluations easier to create bigger and more complex outputs in less time with less code. Introducing format containers with multilabels <https://documentation.sas.com/doc/en/pgmsascdc/v_067/proc/p06ciqes4eaqo6n0zyqtz9p21nfb.htm>, a more powerful summarise which is capable to output every possible combination of the provided grouping variables in one go <https://documentation.sas.com/doc/en/pgmsascdc/v_067/proc/p0jvbbqkt0gs2cn1lo4zndbqs1pe.htm>, tabulation functions which can create any table in different styles <https://documentation.sas.com/doc/en/pgmsascdc/v_067/proc/n1ql5xnu0k3kdtn11gwa5hc7u435.htm> and other more readable functions. The code is optimized to work fast even with datasets of over a million observations.

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`add_extension` *Add Extensions to Variable Names*

Description

Renames variables in a data frame by adding the desired extensions to the original names. This can be useful if you want to use pre summarised data with `any_table()`, which needs the value variables to have the statistic extensions.

Usage

```
add_extension(data_frame, from, extensions, reuse = "none")
```

Arguments

`data_frame`	The data frame in which variables should gain extensions to their name.
`from`	The position of the variable inside the data frame at which to start the renaming.
`extensions`	The extensions to add.
`reuse`	"none" by default, meaning only the provided extensions will be set. E.g. if there are two extensions provided, two variables will be renamed. If "last", the last provided extension will be used for every following variable until the end of the data frame. If "repeat", the provided extensions will be repeated from the first one for every following variable until the end of the data frame.

Value

Returns a data frame with extended variable names.

Examples

```
# Example data frame
my_data <- dummy_data(10)

# Add extensions to variable names
new_names1 <- my_data |> add_extension(5, c("sum", "pct"))
new_names2 <- my_data |> add_extension(5, c("sum", "pct"), reuse = "last")
new_names3 <- my_data |> add_extension(5, c("sum", "pct"), reuse = "alternate")
```

---

add_variable_range *Add Empty Variables In A Given Range*

Description

Add empty variables to a data frame in the provided range. Basically does in a data frame, what paste0("age", 1:10) does for a vector.

Usage

```
add_variable_range(data_frame, var_range)
```

Arguments

data_frame	A data frame to add variables to.
var_range	A range of variables to add, provided in the form: var_name1:var_name10 or var_name1-var_name10.

Value

Returns a data frame with added variables.

Examples

```
# Example data frames
my_data <- dummy_data(100)

# Add variable range
my_data <- my_data |> add_variable_range(status1:status12)

# The range can also be provided with a hyphen
my_data <- my_data |> add_variable_range(status13-status24)
```

any_table *Compute Any Possible Table*

Description

any_table() produces any possible descriptive table in 'Excel' format. Any number of variables can be nested and crossed. The output is an individually styled 'Excel' table, which also receives named ranges, making it easier to read the data back in.

Usage

```
any_table(
  data_frame,
  rows,
  columns = "",
  values,
  statistics = NULL,
  pct_group = c(),
  pct_value = list(),
  pct_block = c(),
  compute = list(),
  formats = list(),
  by = c(),
  weight = NULL,
  full_precision = FALSE,
  order_by = "stats",
  titles = .qol_options[["titles"]],
  footnotes = .qol_options[["footnotes"]],
  var_labels = .qol_options[["var_labels"]],
  stat_labels = .qol_options[["stat_labels"]],
  box = "",
  workbook = NULL,
  style = .qol_options[["excel_style"]],
  output = .qol_options[["output"]],
  na.rm = .qol_options[["na.rm"]],
  print_miss = .qol_options[["print_miss"]],
  print = .qol_options[["print"]],
  monitor = .qol_options[["monitor"]]
)
```

Arguments

data_frame	A data frame in which are the variables to tabulate.
rows	A vector that provides single variables or variable combinations that should appear in the table rows. To nest variables use the form: "var1 + var2 + var3 + ...".

`columns` A vector that provides single variables or variable combinations that should appear in the table rows. To nest variables use the form: "var1 + var2 + var3 + ...".

`values` A vector containing all variables that should be summarised. Macro variables can be used.

`statistics` Available functions:

- "sum" -> Weighted and unweighted sum
- "sum_wgt" -> Sum of all weights
- "freq" -> Unweighted frequency
- "freq_g0" -> Unweighted frequency of all values greater than zero
- "pct_group" -> Weighted and unweighted percentages within the respective group
- "pct_value" -> Weighted and unweighted percentages between value variables or of a variable expression
- "pct_total" -> Weighted and unweighted percentages compared to the grand total
- "mean" -> Weighted and unweighted mean
- "median" -> Weighted and unweighted median
- "mode" -> Weighted and unweighted mode
- "min" -> Minimum
- "max" -> Maximum
- "sd" -> Weighted and unweighted standard deviation
- "variance" -> Weighted and unweighted standard variance
- "first" -> First value
- "last" -> Last value
- "pn" -> Weighted and unweighted percentiles (any p1, p2, p3, ... possible) Uses the SAS default way of calculating percentiles, which is Type 2 described in `quantile()`.
- "missing" -> Missings generated by the value variables

`pct_group` This option is used to determine which variable of the row and column variables should add up to 100 %. Multiple variables can be specified in a vector to generate multiple group percentages. You can also use the keywords "row_pct" or "col_pct" to calculate total percentages for rows and columns regardless of the respective other dimension. Macro variables can be used.

`pct_value` You can pass a list here, which contains the information for a new variable name and between which of the value variables percentages should be computed. Macro variables can be used.

`pct_block` Can be "rows" or "columns". Calculates percentages for the last group of variables inside the individual row or column combinations. To make these work use the writing style: sex + education + (last, combined, group). Additionally these formats need to be used with multilabels which carry a total category per variable in the last combined variable group. If you don't want to display these total categories in the results, use the "!" in front of the format expression like "!Total".

compute	A list in which individual calculations are handled. For the writing style see the compute.() function.
formats	A list in which is specified which formats should be applied to which variables. Macro variables can be used in the variable names and format names.
by	Compute tables stratified by the expressions of the provided variables. Macro variables can be used.
weight	Put in a weight variable to compute weighted results.
full_precision	FALSE by default. If TRUE, the rounding of the values according to the number formats in the style parameter is skipped and all values are output with all their decimal places.
order_by	Determine how the columns will be ordered. "values" orders the results by the order you provide the variables in values. "stats" orders them by the order under statistics. "values_stats" is a combination of both. "columns" keeps the order as given in columns, "interleaved" alternates the stats and "blocks" groups the columns by their root name, so that columns of expanded combinations like "age + (sex, education)" stay together.
titles	Specify one or more table titles. If you want to add hyperlinks you can do so by adding "link:" followed by the hyperlink to the main text. To link to a file use "file:" and pass the full file path afterwards. Linking to another cell works with "cell:". When linking to a cell you can use to following keywords to automatically link to specific parts of the output: first_title, last_title, first_footnote, last_footnote, table_start, table_end, table_header.
footnotes	Specify one or more table footnotes. If you want to add hyperlinks you can do so by adding "link:" followed by the hyperlink to the main text. To link to a file use "file:" and pass the full file path afterwards. Linking to another cell works with "cell:". When linking to a cell you can use to following keywords to automatically link to specific parts of the output: first_title, last_title, first_footnote, last_footnote, table_start, table_end, table_header.
var_labels	A list in which is specified which label should be printed for which variable instead of the variable name.
stat_labels	A list in which is specified which label should be printed for which statistic instead of the statistic name.
box	Provide a text for the upper left box of the table. Macro variables can be used.
workbook	Insert a previously created workbook to expand the sheets instead of creating a new file.
style	A list of options can be passed to control the appearance of 'Excel' outputs. Styles can be created with excel_output_style().
output	The following output formats are available: excel, excel_nostyle, html, excel_html and no.
na.rm	FALSE by default. If TRUE removes all NA values from the variables.
print_miss	FALSE by default. If TRUE outputs all possible categories of the grouping variables based on the provided formats, even if there are no observations for a combination.

print	TRUE by default. If TRUE prints the output, if FALSE doesn't print anything. Can be used if one only wants to catch the output data frame and workbook with meta information.
monitor	FALSE by default. If TRUE, outputs two charts to visualize the functions time consumption.

Details

any_table() is based on the 'SAS' procedure Proc Tabulate, which provides efficient and readable ways to perform complex tabulations.

With this function you can combine any number of variables in any possible way, all at once. You just define which variables or variable combinations should end up in the table rows and columns with a simple syntax. Listing variables in a vector like c("var1", "var2", "var3",...) means to put variables below (in case of the row variables) or besides (in case of the column variables) each other. Nesting variables is as easy as putting a plus sign between them, e.g. c("var1 + var2", "var2" + "var3" + "var4", etc.). And of course you can combine both versions.

The real highlight is, that this function not only creates all the desired variable combinations and exports them to an 'Excel' file, it prints a fully custom styled table to a workbook. Setting up a custom, reusable style is as easy as setting up options like: provide a color for the table header, set the font size for the row header, should borders be drawn for the table cells yes/no, and so on. Merging doubled header texts, happens automatically.

With this function you basically can fully concentrate on designing a table, instead of thinking hard about how to calculate where to put a border or to even manually prepare a designed workbook.

If a used variable has value labels attached (e.g. through the 'haven' or 'labelled' packages) these labels are used for the tabulation. If a format is applied to a labelled variable the format wins and the labels are ignored. Otherwise the labels are turned into an internal format, so the labelled values are shown.

Value

Returns a list with the data table containing the results for the table, the formatted 'Excel' workbook and the meta information needed for styling the final table.

See Also

Creating a custom table style: excel_output_style(), modify_output_style(), number_format_style(), modify_number_formats().

Global style options: set_style_options(), set_labels().

Other global options: set_titles(), set_footnotes(), set_print(), set_monitor(), set_na.rm(), set_print(), set_print_miss(), set_output().

Combine Excel workbooks: combine_into_workbook().

Standalone table of contents: create_table_of_contents().

Creating formats: discrete_format() and interval_format().

Functions that can handle formats and styles: frequencies(), crosstabs().

Additional functions that can handle styles: export_with_style()

Additional functions that can handle formats: summarise_plus(), recode.(), recode_multi(), transpose_plus(), sort_plus()

Examples

```
# NOTE: Some of the examples use the parameter 'output = "excel_nostyle"' to
#       make them run faster so that more examples can be provided. Take out
#       the parameter to get the fully styled excel table.
#       The global option for printing the output is also set to FALSE for
#       the same reason. When running the examples manually, don't run this
#       option here.
#       Background color is also removed to make the code run faster.
set_print(FALSE)
set_style_options(background_color = "")

# Example data frame
my_data <- dummy_data(1000)
my_data[["person"]] <- 1

# Formats
age. <- discrete_format(
    "Total"          = 0:100,
    "under 18"       = 0:17,
    "18 to under 25" = 18:24,
    "25 to under 55" = 25:54,
    "55 to under 65" = 55:64,
    "65 and older"   = 65:100)

sex. <- discrete_format(
    "Total"  = 1:2,
    "Male"   = 1,
    "Female" = 2)

# NOTE: "!" in front of an expression makes the expression available for
#       calculations but prevents it from beeing printed out. This notation
#       is especially needed when using pct_block.
education. <- discrete_format(
    "!Total"           = c("low", "middle", "high"),
    "low education"    = "low",
    "middle education" = "middle",
    "high education"   = "high")

state. <- discrete_format(
    "Germany"                     = 1:16,
    "Schleswig-Holstein"          = 1,
    "Hamburg"                     = 2,
    "Lower Saxony"                = 3,
    "Bremen"                      = 4,
    "North Rhine-Westphalia"      = 5,
    "Hesse"                       = 6,
    "Rhineland-Palatinate"        = 7,
    "Baden-Württemberg"           = 8,
    "Bavaria"                     = 9,
```

```
    "Saarland"                      = 10,
    "West"                          = 1:10,
    "Berlin"                        = 11,
    "Brandenburg"                   = 12,
    "Mecklenburg-Western Pomerania" = 13,
    "Saxony"                        = 14,
    "Saxony-Anhalt"                 = 15,
    "Thuringia"                     = 16,
    "East"                          = 11:16)

# Define style
set_style_options(column_widths = c(2, 15, 15, 15, 9))

# Define titles and footnotes. If you want to add hyperlinks you can do so by
# adding "link:" followed by the hyperlink to the main text. Linking to another
# cell works with "cell:". To link to a file use "file:" and pass the full file
# path afterwards. When linking to a cell you can use to following keywords to
# automatically link to specific parts of the output: first_title, last_title,
# first_footnote, last_footnote, table_start, table_end, table_header.
set_titles("This is title number 1",
           "This is title number 2 link: https://cran.r-project.org/",
           "This is title number 3 cell: W22",
           "This is title number 4 file: C:/MyFolder/MyFile.txt")

set_footnotes("This is footnote number 1",
              "This is footnote number 2 file: C:/MyFolder/MyFile.txt",
              "This is footnote number 3 cell: W22",
              "This is footnote number 4 link: https://cran.r-project.org/")

# Output complex tables with different percentages
my_data |> any_table(rows      = c("sex + age", "sex", "age"),
                     columns   = c("year", "education + year"),
                     values    = weight,
                     pct_group = c("row_pct", "col_pct"),
                     formats   = list(sex = sex., age = age.,
                                      education = education.),
                     output    = "excel_nostyle",
                     na.rm     = TRUE)

# If you want to get a clearer vision of what the result table looks like, in terms
# of the row and column categories, you can write the code like this, to make out
# the variable crossings and see the order.
# my_data |> any_table(columns   = c(            "year", "education + year"),
#                      rows      = c("sex + age",
#                                    "sex",
#                                    "age"),
#                      values    = weight,
#                      pct_group = c("sex", "age"),
#                      formats   = list(sex = sex., age = age.,
#                                       education = education.),
#                      output    = "excel_nostyle",
#                      na.rm     = TRUE)
```

```
# Percentages based on value variables instead of categories
my_data |> any_table(rows       = c("age + year"),
                     columns    = "sex",
                     values     = c(probability, person),
                     statistics = c("pct_value", "sum", "freq"),
                     pct_value  = list(rate = "probability / person"),
                     weight     = weight,
                     formats    = list(sex = sex., age = age.),
                     output    = "excel_nostyle",
                     na.rm      = TRUE)

# Percentages based on a formatted variable expression
my_data |> any_table(rows       = c("age + year"),
                     columns    = "sex",
                     values     = c(probability, person),
                     pct_value  = list(sex = "Total", age = "Total"),
                     weight     = weight,
                     formats    = list(sex = sex., age = age.),
                     output    = "excel_nostyle",
                     na.rm      = TRUE)

# Percentages based on variable combination blocks
# NOTE: age + (year, education) becomes "age + year" and "age + education"
#       and will be sorted together. Also works in columns. You can also
#       do something like this: age + (year, sex + education, education).
# NOTE: pct_block needs this notation to work properly. Additionally it needs
#       the use of multilabel formats since it picks the maximum of each variable
#       within the brackets as total. To calculate this total but suppress it
#       in the final table use "!" in front of a format expression. See format
#       creation at the top.
my_data |> any_table(rows       = c("sex + (age, education)"),
                     columns    = "year",
                     values     = weight,
                     pct_block  = c("rows", "columns"),
                     formats    = list(sex = sex., age = age.,
                                       education = education.),
                     output     = "excel_nostyle",
                     na.rm      = TRUE)

# Individual calculations
my_data |> any_table(rows       = c("age + year"),
                     columns    = "sex",
                     values     = "probability",
                     statistics = c("sum", "sum_wgt"),
                     compute    = list(percent_pct = probability_sum * 100 / sum_wgt,
                                       square_pct  = percent_pct ^ 2),
                     weight     = weight,
                     formats    = list(sex = sex., age = age.),
                     output     = "excel_nostyle",
                     na.rm      = TRUE)

# Customize the visual appearance by adding variable and statistic labels. Both
# can also be set as a global option, if labels should be reused over multiple
```

```
# tables.
# Note: You don't have to describe every element. Sometimes a table can be more
# readable with less text. To completely remove a variable label just put in an
# empty text "" as label.#'
set_titles("This is title number 1",
           "This is title number 2",
           "This is title number 3")

set_footnotes("This is footnote number 1",
              "This is footnote number 2",
              "This is footnote number 3")

my_data |> any_table(rows        = c("age + year"),
                     columns     = "sex",
                     values      = weight,
                     statistics  = c("sum", "pct_group"),
                     order_by    = "interleaved",
                     formats     = list(sex = sex., age = age.),
                     var_labels  = list(age = "Age categories",
                                        sex = "", weight = ""),
                     stat_labels = list(pct = "%"),
                     output      = "excel_nostyle",
                     na.rm       = TRUE)

# Individual styling can also be passed directly
my_style <- excel_output_style(header_back_color = "0077B6",
                               font              = "Times New Roman")

# my_data |> any_table(rows       = c("age + year"),
#                      columns    = "sex",
#                      values     = c(probability, person),
#                      statistics = c("pct_value", "sum", "freq"),
#                      pct_value  = list(rate = "probability / person"),
#                      weight     = weight,
#                      formats    = list(sex = sex., age = age.),
#                      style      = my_style,
#                      na.rm      = TRUE)

# Select specific statistics for specific variables
my_data |> any_table(rows       = "sex",
                     columns    = "year",
                     statistics = list("sum"       = c(weight, income),
                                       "pct_group" = balance),
                     formats    = list(sex = sex.),
                     output     = "excel_nostyle",
                     na.rm      = TRUE)

# Pass on workbook to create more sheets in the same file
my_style <- my_style |> modify_output_style(sheet_name = "age_sex")

result_list <- my_data |>
           any_table(rows       = "age",
                     columns    = "sex",
```

```
                      values     = weight,
                      statistics = "sum",
                      formats    = list(sex = sex., age = age.),
                      style      = my_style,
                      output     = "excel_nostyle",
                      na.rm      = TRUE,
                      print      = FALSE)

my_style <- my_style |> modify_output_style(sheet_name = "edu_year")

my_data |> any_table(workbook   = result_list[["workbook"]],
                      rows       = "education",
                      columns    = "year",
                      values     = weight,
                      statistics = "pct_group",
                      formats    = list(education = education.),
                      style      = my_style,
                      output     = "excel_nostyle",
                      na.rm      = TRUE)

# In case you have a good amount of tables, you want to combine in a single workbook,
# you can also catch the outputs and combine them afterwards in one go.
# NOTE: This section is commented out to just show the principle. Otherwise the
#       example code would run for too long.
# set_style_options(sheet_name = "sheet1")
# tab1 <- my_data |> any_table(..., print = FALSE, output = "excel_nostyle")
#
# set_style_options(sheet_name = "sheet2")
# tab2 <- my_data |> any_table(..., print = FALSE, output = "excel_nostyle")
#
# set_style_options(sheet_name = "sheet3")
# tab3 <- my_data |> any_table(..., print = FALSE, output = "excel_nostyle")
#
# ...
#
# Every of the above tabs is a list, which contains the data table, an unstyled
# workbook and the meta information needed for the individual styling. These tabs
# can be input into the following function, which reads the meta information, styles
# each table individually and combines them as separate sheets into a single workbook.
# combine_into_workbook(tab1, tab2, tab3 file = "C:/My_folder/My_workbook.xlsx")

# The result list from above also carries the transformed data frame if
# needed for further usage
any_table_df <- result_list[["table"]]

# Output multiple complex tables by expressions of another variable.
# If you specify the sheet name as "by" in the output style, the sheet
# names are named by the variable expressions of the by-variable. Otherwise
# the given sheet named gets a running number.
my_style <- my_style |> modify_output_style(sheet_name = "by")

my_data |> any_table(rows       = c("sex", "age"),
                      columns    = "education",
```

```
                      values     = weight,
                      by         = state,
                      statistics = c("sum", "pct_group"),
                      pct_group  = "education",
                      formats    = list(sex = sex., age = age., state = state.,
                                        education = education.),
                      output     = "excel_nostyle",
                      na.rm      = TRUE)

# To save a table as xlsx file you have to set the path and filename in the
# style element
# Example files paths
table_file <- tempfile(fileext = ".xlsx")

# Note: Normally you would directly input the path ("C:/MyPath/") and name ("MyFile.xlsx").
set_style_options(save_path  = dirname(table_file),
                  file       = basename(table_file),
                  sheet_name = "MyTable")

my_data |> any_table(rows    = "sex",
                     columns = "year",
                     values  = weight,
                     formats = list(sex = sex.),
                     output  = "excel_nostyle")

# Manual cleanup for example
unlink(table_file)

# Global options are permanently active until the current R session is closed.
# There are also functions to reset the values manually.
reset_qol_options()
```

`build_master` *Build a Master Script From Folder*

Description

`build_master()` reads a given folder structure, which contains scripts, and builds a master file. The file which gets written depends on the selected layout.

Usage

```
build_master(dir, master_name = "Master", author = "", layout = "compact")
```

Arguments

`dir`	The folder structure which contains the scripts to build upon.
`master_name`	The file name which should be written.

author	Authors name to be put in the header.
layout	The layout which should be written to the master file. Available are: • "compact": The header and rebuilt master section followed by one script block which runs all scripts. (default) • "full": The whole folder structure with an overview, a section which runs all scripts and single blocks for every folder and script.

Details

The function works with folder structures that look like this:

root/

```
 subfolder1/

     script1.R

     script2.R

     ....R

 subfolder2/

     script3.R

     script4.R

     ....R

 .../

     ....R
```

Value

Returns the script as character vector and saves it as master file.

See Also

RStudio helper functions: `run_script()`, `run_folder()`, `run_project()`, `run_project_parallel()`

Examples

```
# Example export file paths
# NOTE: These tempfiles are only for the examples. In reality you just call the
# main function and put in your desired path and name directly.
temp_file <- tempfile(fileext = ".Rmd")

# Example master
build_master(dir         = dirname(temp_file),
```

```
              master_name = basename(temp_file))

# Example full master
build_master(dir         = dirname(temp_file),
             master_name = basename(temp_file),
             layout      = "full")

# Manual cleanup for example
unlink(temp_file)
```

---

build_rstheme *Build a Theme From Scratch*

Description

Build your own theme by just setting up the colors for the different parts of RStudio. A theme file will be exported which can be added by going to:

Tools -> Global Options -> Appearance -> Add

Usage

```
build_rstheme(
  file_path,
  theme_name = "qol_green",
  dark_theme = TRUE,
  editor_background = "#062625",
  editor_headline = "#3B3B3B",
  editor_font = "#C3B79D",
  toolbar = "#2E2E2E",
  tab = "#3B3B3B",
  selected_tab = "#062625",
  line_number = "#C3B79D",
  print_margin = "#3B3B3B",
  cursor = "#CCCCCC",
  selection = "#1B436E",
  smart_highlight = "#3686dc",
  bracket_highlight = "#595959",
  active_line = "#202324",
  whitespace = "#CCCCCC",
  debug_line = "#F18889",
  scrollbar = "#3B3B3B",
  scrollbar_hover = "#595959",
  scrollbar_active = "#BFBFBF",
  class_name = "#BEDD1A",
  keyword = "#FFC90E",
  language_constant = "#FFC90E",
  function_name = "#C3B79D",
```

```
  numeric = "#C93F3F",
  string = "#63C2C9",
  regex = "#E8E6E3",
  variable = "#E8E6E3",
  comment = "#32CD32",
  symbol = "#C3B79D",
  console_code = "#C3B79D",
  markdown_code = "#083332"
)
```

Arguments

file_path	The path to which the theme file should be saved.
theme_name	The themes name.
dark_theme	Handles some elements not covered with the other parameters.
editor_background	Base background color in the editor.
editor_headline	Mostly used for the headlines of the environment panel.
editor_font	Base font color of the editor.
toolbar	Base toolbar and frame color.
tab	Color of inactive tabs.
selected_tab	Color of active tabs.
line_number	The color of the line numbers on the left.
print_margin	Color of the vertical line showing the print margin.
cursor	Cursor color.
selection	The background color of the current selection.
smart_highlight	Background color of smart highlighted words.
bracket_highlight	Background color of highlighted bracket pairs.
active_line	Color for the active line the cursor is in.
whitespace	Color for whitespace characters.
debug_line	Color of the current debug line.
scrollbar	Color of the scrollbars.
scrollbar_hover	Highlight color when hovering over a scrollbar.
scrollbar_active	Highlight color when clicking on a scrollbar.
class_name	Code color for class names (like package names).
keyword	Code color for fixed keywords (like function, if, else).
language_constant	Code color for language constants (like the @ keywords).

function_name	Code color for base and package functions.
numeric	Code color for numeric values.
string	Code color for string values.
regex	Code color for regex expressions.
variable	Code color for variables, parameters and arguments.
comment	Code color for comments.
symbol	Code Color of symbols (like <-, brackets).
console_code	Color of executed Code in the Console.
markdown_code	Background color of code passages in a markdown file.

Details

In the 'SAS Enterprise Guide' the user is able to not only choose a given theme, but to also pick the colors for the different parts of the editor by themselves. Everyone has a different taste of what colors look pleasing to the eyes, so you should be able to choose them by yourself.

Value

Saves a complete theme file.

Examples

```
# Example export file paths
# NOTE: These tempfiles are only for the examples. In reality you just call the
# main function and put in your desired path and name directly.
temp_file <- tempfile(fileext = ".rstheme")
file_name <- basename(tools::file_path_sans_ext(temp_file))

# Example theme
build_rstheme(file_path         = dirname(temp_file),
              theme_name        = file_name,
              editor_background = "#417291",
              editor_headline   = "#602BCA",
              editor_font       = "#C75C48")

# Manual cleanup for example
unlink(temp_file)
```

---

check_required_package

Check If Required Package Is Installed

Description

Check whether a certain package is required for a task. This includes the packages listed under suggestions in the description file. The user will be asked whether a package should be installed or not.

Usage

```
check_required_package(package)
```

Arguments

package	The name of the required package.

Value

Returns TRUE or FALSE.

---

code_statistics *Analyze R Scripts And Print Out Statistics*

Description

code_statistics() reads in a folder or entire folder structure, grabs all 'R' script files and scans the contents for different patterns. It then outputs a small report which shows of which parts the code consists.

Usage

```
code_statistics(paths, recursive = FALSE, output_per = "overall")
```

Arguments

paths	A full folder path in which there are 'R' scripts to be analyzed. Can be a single path or a vector of paths.
recursive	FALSE by default. If TRUE scans the provided paths recursive for sub folders and the 'R' scripts within them.
output_per	"overall" by default. Determines how detailed the results are printed. Valid options are "overall", "folder" or "file".

Value

Returns the results as a data frame.

Examples

```
# Run this function on a directory, actually containing R script files
# to see some results.
code_statistics(tempdir())
```

combine_into_workbook *Combine Multiple Tables Into One Workbook*

Description

Combines any number of tables created with any_table(), crosstabs(), frequencies() or export_with_style() into one workbook and styles them according to their meta information.

Usage

```
combine_into_workbook(
  ...,
  output = "excel",
  style = .qol_options[["excel_style"]],
  table_of_contents = FALSE,
  toc_header = "Table of Contents",
  toc_sheet_name = "Contents",
  subheaders = list(),
  subheader_colors = c(),
  subheader_underline = FALSE,
  colored_tabs = FALSE,
  print = .qol_options[["print"]],
  monitor = .qol_options[["monitor"]]
)
```

Arguments

...	Provide any number of result lists output by any_table(), crosstabs(), frequencies() or export_with_style().
output	The following output formats are available: excel and excel_nostyle.
style	A list of options can be passed to control the appearance of the table of contents. Styles can be created with excel_output_style().
table_of_contents	Whether to create a table of contents.
toc_header	The main header.
toc_sheet_name	The table of contents sheet name.
subheaders	A list of custom subheaders. The entry names are the actual subheaders to be displayed, while the values are the sheet names at which the subheaders start.
subheader_colors	Subheader background colors. These colors will also be used to color the tabs, if the option is activated.
subheader_underline	FALSE by default. If TRUE underlines the subheaders.
colored_tabs	FALSE by default. If TRUE colors the tabs according to the subheader colors.

print	TRUE by default. If TRUE prints the output, if FALSE doesn't print anything. Can be used if one only wants to catch the combined workbook.
monitor	FALSE by default. If TRUE outputs two charts to visualize the functions time consumption.

Value

A fully styled workbook containing the provided tables.

See Also

Creating a custom table style: excel_output_style(), modify_output_style(), number_format_style(), modify_number_formats().

Global style options: set_style_options(), set_labels().

Other global options: set_titles(), set_footnotes(), set_print(), set_monitor(), set_na.rm(), set_print(), set_print_miss(), set_output().

Standalone table of contents: create_table_of_contents().

Creating formats: discrete_format() and interval_format().

Functions that can handle formats and styles: frequencies(), crosstabs().

Additional functions that can handle styles: export_with_style()

Additional functions that can handle formats: summarise_plus(), recode.(), recode_multi(), transpose_plus(), sort_plus()

Examples

```
# Example data frame
my_data <- dummy_data(1000)
my_data[["person"]] <- 1

# Formats
age. <- discrete_format(
    "Total"          = 0:100,
    "under 18"       = 0:17,
    "18 to under 25" = 18:24,
    "25 to under 55" = 25:54,
    "55 to under 65" = 55:64,
    "65 and older"   = 65:100)

sex. <- discrete_format(
    "Total"  = 1:2,
    "Male"   = 1,
    "Female" = 2)

education. <- discrete_format(
    "Total"            = c("low", "middle", "high"),
    "low education"    = "low",
    "middle education" = "middle",
    "high education"   = "high")
```

```
# Define style
set_style_options(column_widths = c(2, 15, 15, 15, 9))

# Define titles and footnotes. If you want to add hyperlinks you can do so by
# adding "link:" followed by the hyperlink to the main text.
set_titles("This is title number 1",
           "This is title number 2 link: https://cran.r-project.org/",
           "This is title number 3 file: C:/MyFolder/MyFile.docx",
           "This is title number 4 cell: W22")
set_footnotes("This is footnote number 1 cell: W22",
              "This is footnote number 2 file: C:/MyFolder/MyFile.docx",
              "This is footnote number 3 link: https://cran.r-project.org/",
              "This is footnote number 4")

# Catch the output and additionally use the options:
# print = FALSE and output = "no".
# This skips the styling and output part, so that the function runs faster.
set_print(FALSE)
set_output("excel_nostyle")
set_style_options(sheet_name = "big_table")

tab1 <- my_data |> any_table(rows       = c("sex + age", "sex", "age"),
                             columns    = c("year", "education + year"),
                             values     = weight,
                             statistics = c("sum", "pct_group"),
                             pct_group  = c("sex", "age", "education", "year"),
                             formats    = list(sex = sex., age = age.,
                                               education = education.),
                             na.rm      = TRUE,
                             print      = FALSE)

set_style_options(sheet_name = "age_sex")

tab2 <- my_data |> any_table(rows       = "age",
                             columns    = "sex",
                             values     = weight,
                             statistics = "sum",
                             formats    = list(sex = sex., age = age.),
                             na.rm      = TRUE,
                             print      = FALSE)

set_style_options(sheet_name = "data")

tab3 <- my_data |> export_with_style(print = FALSE)

# Every of the above tabs is a list, which contains the data table, an unstyled
# workbook and the meta information needed for the individual styling. These
# tabs can be input into the following function, which reads the meta information,
# styles each table individually and combines them as separate sheets into a single workbook.
combine_into_workbook(tab1, tab2, tab3)

# Add an automatically generated table of contents with custom styling
set_titles("This is title number 1",
```

```
            "Back to Contents cell: Contents!A1")

combine_into_workbook(tab1, tab2, tab3,
                      table_of_contents = TRUE,
                      subheaders        = list("First Subheader"  = "big_table",
                                               "Second Subheader" = "data"),
                      subheader_colors  = c("FF0000", "00FF00", "0000FF"),
                      colored_tabs      = TRUE,
                     style            = excel_output_style(toc_header_font_size    = 20,
                                                           toc_subheader_font_size = 16))

# To save a table as xlsx file you have to set the path and filename in the
# style element
# Example files paths
workbook_file <- tempfile(fileext = ".xlsx")

set_style_options(save_path = dirname(workbook_file),
                  file      = basename(workbook_file))

combine_into_workbook(tab1, tab2, tab3)

# Manual cleanup for example
unlink(workbook_file)

# Reset the global options afterwards
set_print(TRUE)
set_output("excel")
```

`compute.` *Compute New Variables*

Description

Compute new variables without having to write the name of the data frame multiple times. It can handle all kinds of operations like simple value assignment or calculations, but also can make use of other functions.

In addition it can be used in a conditional `do_if()` block.

Usage

```
compute.(data_frame, ..., monitor = .qol_options[["monitor"]])
```

Arguments

`data_frame`	A data frame in which to compute new variables.
`...`	The calculations that should be executed.
`monitor`	FALSE by default. If TRUE, outputs two charts to visualize the functions time consumption.

Details

The loop you can use within `compute.()` is based on the 'SAS' do-over-loop. This type of loop iterates over every vector that appears in the loop in parallel. Means that in the first iteration all the first vector elements are used, in the second iteration all second elements of every vector, and so on. With this loop you don't have the need to construct an outer loop, but can directly pass in different vectors and let the function handle the loop inside.

Value

Returns a data frame with newly computed variables.

See Also

The following functions can make use of the `do_if()` conditions:

Conditions: `if.()`, `else_if.()`, `else.()`

Filter Data Frame: `where.()`

Create new Variables: `compute.()`

Examples

```
# Example data frame
my_data <- dummy_data(1000)

# Simple assignment
assign_df <- my_data |> compute.(new_var1 = 1,
                                 new_var2 = "Hello")

# Simple calculation
sum_df <- my_data |> compute.(new_sum = age + sex)

# Using functions
mean_df <- my_data |> compute.(new_mean = collapse::fmean(age))

# Using qol functions
qol_df <- my_data |> compute.(row_sum = row_calculation("sum", state, age, sex))

# Use compute.() as a do-over-loop. In this kind of loop all vectors will be
# advanced one iteration at a time in parallel.
new_vars <- c("var1", "var2", "var3")
money    <- c("income", "expenses", "balance")
multi    <- c(1, 2, 3)

do_over_df <- my_data |> compute.(new_vars = money * multi)

# You can also do all at once
all_df <- my_data |> compute.(new_var1 = 1,
                              new_var2 = "Hello",
                              new_sum  = age + sex,
                              new_mean = mean(age),
                              row_sum  = row_calculation("sum", state, age, sex),
```

```
                              new_vars = multi * money)

# compute.() can be used in a do_if() situation and is aware of overarching
# conditions.
age_west. <- discrete_format("under 18"     = 0:17,
                             "18 and older" = 18:100)

age_east. <- discrete_format("under 65"     = 0:64,
                             "65 and older" = 65:100)

do_if_df <- my_data |>
    do_if(state < 11) |>
        compute.(region    = "West",
                 age_group = recode.(age = age_west.)) |>
    else_do() |>
        compute.(region    = "East",
                 age_group = recode.(age = age_east.)) |>
    end_do()
```

`concat` *Concatenate Multiple Variables With Padding*

Description

Concatenate multiple variables inside a data frame into a new variable. An automatic or individual padding can be applied. The padding character can be chosen freely.

The function can also be used to give a single variable a padding.

Usage

```
concat(
  data_frame,
  ...,
  separator = NULL,
  padding_char = NULL,
  padding_length = NULL,
  padding_right = FALSE
)
```

Arguments

`data_frame`	A data frame which contains the the variables to concatenate.
`...`	The names of the variables to concatenate.
`separator`	Characters to put in between variables when binding them together.
`padding_char`	A single character which will be used to fill up the empty places.
`padding_length`	A numeric vector containing the individual padding length per variable.
`padding_right`	FALSE by default. If TRUE insert padding characters on the right side instead of the left side.

Value

Returns a character vector.

See Also

Other character manipulating functions: sub_string(), remove_blanks()

Examples

```
# Example data frame
my_data <- dummy_data(100)

# Concatenate variables as provided
my_data[["id1"]] <- my_data |> concat(household_id, state, age)

# Concatenate variables with leading zeros. Each variable will
# receive an individual padding length according to their
# longest value.
my_data[["id2"]] <- my_data |> concat(household_id, state, age,
                                      padding_char = "0")

# Concatenate variables with individual character and lengths.
my_data[["id2"]] <- my_data |> concat(household_id, state, age,
                                      padding_char   = "_",
                                      padding_length = c(5, 3, 4))

# Padding a single variable in place
my_data[["state"]] <- my_data |> concat(state, padding_char = "0")
```

---

content_report *Get Detailed Summary About A Data Frame*

Description

Prints a summary of a data frames contents, including details such as variable names, types, unique values, missings and min/max values. It also tells you the number of observations and variables present in the data frame, memory usage and the number of duplicate observations.

Usage

```
content_report(data_frame, output = "console", monitor = FALSE)
```

Arguments

data_frame	The data frame to get the content information from.
output	The following output formats are available: console (default) or text.
monitor	FALSE by default. If TRUE, outputs two charts to visualize the functions time consumption.

Details

content_report() is based on the 'SAS' procedure Proc Contents, which provides a summary of global information one one hand like number of observations and variables among many others and on the other hand shows per variable information like type and length.

'R' doesn't store the same information in a data frame like 'SAS', but there are many useful information to get a quick overview of a data frame. With this function you don't need to look at each variable individually. You can simply run it over a data frame and get values for: number of unique values, missing values (absolute and relative), min and max value as well as the top value.

Value

Returns a list containing the global information as well as a data table containing the per variable information.

Examples

```
# Example data frame
my_data <- dummy_data(100)

content_report(my_data)
```

---

convert_arguments *Convert Function Arguments to Character Vector*

Description

args_to_char(): Converts any argument passed as a single character or symbol as well as character vectors or vector of symbols back as character vector.

dots_to_char(): When you define a function and want the user to be able to pass variable names without the need to have them stored in a vector c() or list() beforehand and without putting the names into quotation marks, you can convert this variable list passed as ... into a character vector.

Note: If the user passes a list of characters it is returned as given.

get_origin_as_char() is a wrapper that allows to retrieve the original contents of the provided variable, whether called directly or nested in multiple function calls, as a character vector.

Usage

```
args_to_char(argument)

dots_to_char(...)

get_origin_as_char(original, substituted)
```

Arguments

argument	Function argument to convert.
...	Used for variable names listed in ... without the need to put them in c() or list().
original	The data frame which contains the columns to be checked.
substituted	The grouping variables which potentially form unique combinations.

Value

Returns a character vector.

Examples

```
# Example function with function parameter
print_vnames <- function(parameter){
    var_names <- args_to_char(substitute(parameter))
    print(var_names)
}

print_vnames(age)
print_vnames("age")
print_vnames(c(age, sex, income, weight))
print_vnames(c("age", "sex", "income", "weight"))

# You can also pass in a character vector, if you have stored variable names elsewhere
var_names <- c("age", "sex", "income", "weight")
print_vnames(var_names)

# If you plan to use the function within other functions, better use get_origin_as_char()
print_vnames <- function(parameter){
    var_names <- get_origin_as_char(parameter, substitute(parameter))
    print(var_names)
}

another_function <- function(parameter){
    print_vnames(parameter)
}

another_function("age")
another_function(c("age", "sex", "income", "weight"))

# Example function with ellipsis
print_vnames <- function(...){
    var_names <- dots_to_char(...)
    print(var_names)
}

print_vnames(age)
print_vnames("age")
print_vnames(age, sex, income, weight)
print_vnames("age", "sex", "income", "weight")
```

```
# You can also pass in a character vector, if you have stored variable names elsewhere
var_names <- c("age", "sex", "income", "weight")
print_vnames(var_names)
```

---

convert_variables *Convert Variables*

Description

convert_numeric() converts all given variables to numeric if possible. If a variable contains none numerical values (not including NAs), the variable will not be converted.

convert_factor() converts all given variables to factor.

Usage

```
convert_numeric(data_frame, variables)

convert_factor(data_frame, variables)
```

Arguments

data_frame	A data frame containing variables to convert.
variables	Variables from the data frame which should be converted.

Value

convert_numeric() returns the same data frame with converted variables where possible.

convert_factor() returns the same data frame with converted variables.

Examples

```
# Convert variables in a data frame to numeric where possible
test_df <- data.frame(var_a = c(1, 2, 3, NA, 4, 5),
                      var_b = c(1, 2, "Hello", NA, 4, 5))

convert_df <- test_df |> convert_numeric(c("var_a", "var_b"))

# Convert variables in a data frame to factor
test_df <- data.frame(var_a = c(1, 2, 3, 4, 5),
                      var_b = c("e", "c", "a", "d", "b"))

convert_df <- test_df |> convert_factor("var_b")
```

`create_table_of_contents` *Create Table Of Contents For 'Excel' Workbooks*

Description

Creates a table of contents sheet with custom style based on the provided 'Excel' workbook.

Usage

```
create_table_of_contents(
  wb,
  style = .qol_options[["excel_style"]],
  toc_header = "Table of Contents",
  toc_sheet_name = "Contents",
  titles = c(),
  subheaders = list(),
  subheader_colors = c(),
  subheader_underline = FALSE,
  colored_tabs = FALSE,
  print = .qol_options[["print"]]
)
```

Arguments

`wb`	Workbook which receives the table of contents sheet.
`style`	A list of options can be passed to control the appearance of the table of contents. Styles can be created with `excel_output_style()`.
`toc_header`	The main header.
`toc_sheet_name`	The table of contents sheet name.
`titles`	Input a vector of custom titles displayed along the sheet names.
`subheaders`	A list of custom subheaders. The entry names are the actual subheaders to be displayed, while the values are the sheet names at which the subheaders start.
`subheader_colors`	Subheader background colors. These colors will also be used to color the tabs, if the option is activated.
`subheader_underline`	FALSE by default. If TRUE underlines the subheaders.
`colored_tabs`	FALSE by default. If TRUE colors the tabs according to the subheader colors.
`print`	TRUE by default. If TRUE prints the output, if FALSE doesn't print anything. Can be used if one only wants to catch the combined workbook.

Value

Returns a modified 'Excel' workbook with table of contents sheet.

See Also

Creating a custom table style: excel_output_style(), modify_output_style(), number_format_style(), modify_number_formats().

Global style options: set_style_options(), set_labels().

Other global options: set_titles(), set_footnotes(), set_print(), set_monitor(), set_na.rm(), set_print(), set_print_miss(), set_output().

Combine Excel workbooks: combine_into_workbook().

Creating formats: discrete_format() and interval_format().

Functions that can handle formats and styles: frequencies(), crosstabs().

Additional functions that can handle styles: export_with_style()

Additional functions that can handle formats: summarise_plus(), recode.(), recode_multi(), transpose_plus(), sort_plus()

Examples

```
# Example data frame
my_data <- dummy_data(10)

# First we create a workbook to play around with
# print = FALSE and output = "excel_nostyle".
# This skips the styling and output part, so that the function runs faster.
set_print(FALSE)
set_output("excel_nostyle")

set_style_options(sheet_name = "sheet1")
tab1 <- my_data |> export_with_style()

set_style_options(sheet_name = "sheet2")
tab2 <- my_data |> export_with_style()

set_style_options(sheet_name = "sheet3")
tab3 <- my_data |> export_with_style()

set_style_options(sheet_name = "sheet4")
tab4 <- my_data |> export_with_style()

set_style_options(sheet_name = "sheet5")
tab5 <- my_data |> export_with_style()

set_style_options(sheet_name = "sheet6")
tab6 <- my_data |> export_with_style()

wb <- combine_into_workbook(tab1, tab2, tab3, tab4, tab5, tab6)

# Now add a custom styled table of contents sheet
create_table_of_contents(wb,
                         toc_header     = "My Custom Header",
                         toc_sheet_name = "TOC",
                         titles         = c("A title for sheet number 1",
```

```
                                        "A second title, this one goes to number two",
                                          "And a third one",
                                         "By the way: If you don't input titles here",
                                        "The title column will be empty. See below."),
                          subheaders      = list("This is a subheadline" = "sheet1",
                                                 "Another one"           = "sheet3",
                                                 "And another one"       = "sheet5"),
                          subheader_underline = TRUE,
                          colored_tabs        = TRUE,
                        style             = excel_output_style(toc_header_font_size = 20,
                                                               toc_other_font_size = 14))

# To save a table as xlsx file you have to set the path and filename in the
# style element
# Example files paths
workbook_file <- tempfile(fileext = ".xlsx")

set_style_options(save_path = dirname(workbook_file),
                  file      = basename(workbook_file))

create_table_of_contents(wb)

# Manual cleanup for example
unlink(workbook_file)

# Reset the global options afterwards
set_print(TRUE)
set_output("excel")
```

`crosstabs` *Display Cross Table of Two Variables*

Description

`crosstabs()` produces a cross table of two variables. Statistics can be weighted sums, unweighted frequencies or different percentages.

Usage

```
crosstabs(
  data_frame,
  rows,
  columns,
  show_total = TRUE,
  statistics = "sum",
  formats = c(),
  by = c(),
  weight = NULL,
```

```
  full_precision = FALSE,
  titles = .qol_options[["titles"]],
  footnotes = .qol_options[["footnotes"]],
  style = .qol_options[["excel_style"]],
  output = .qol_options[["output"]],
  na.rm = .qol_options[["na.rm"]],
  print_miss = .qol_options[["print_miss"]],
  print = .qol_options[["print"]],
  monitor = .qol_options[["monitor"]]
)
```

Arguments

data_frame	A data frame in which are the variables to tabulate.
rows	The variable that appears in the table rows.
columns	The variable that appears in the table columns.
show_total	TRUE by default. Whether to print row and column totals or not.
statistics	The user requested statistics.Available functions: • "sum" -> Weighted and unweighted sum • "freq" -> Unweighted frequency • "pct_row" -> Weighted and unweighted row percentages • "pct_column" -> Weighted and unweighted column percentages • "pct_total" -> Weighted and unweighted percentages compared to the grand total
formats	A list in which is specified which formats should be applied to which variables. Macro variables can be used in the variable names and format names.
by	Compute tables stratified by the expressions of the provided variables.
weight	Put in a weight variable to compute weighted results.
full_precision	FALSE by default. If TRUE, the rounding of the values according to the number formats in the style parameter is skipped and all values are output with all their decimal places.
titles	Specify one or more table titles. If you want to add hyperlinks you can do so by adding "link:" followed by the hyperlink to the main text. To link to a file use "file:" and pass the full file path afterwards. Linking to another cell works with "cell:". When linking to a cell you can use to following keywords to automatically link to specific parts of the output: first_title, last_title, first_footnote, last_footnote, table_start, table_end, table_header.
footnotes	Specify one or more table footnotes. If you want to add hyperlinks you can do so by adding "link:" followed by the hyperlink to the main text. To link to a file use "file:" and pass the full file path afterwards. Linking to another cell works with "cell:". When linking to a cell you can use to following keywords to automatically link to specific parts of the output: first_title, last_title, first_footnote, last_footnote, table_start, table_end, table_header.
style	A list of options can be passed to control the appearance of 'Excel' outputs. Styles can be created with excel_output_style().

output	The following output formats are available: console (default), text, excel, excel_nostyle and no.
na.rm	FALSE by default. If TRUE removes all NA values from the variables.
print_miss	FALSE by default. If TRUE outputs all possible categories of the grouping variables based on the provided formats, even if there are no observations for a combination.
print	TRUE by default. If TRUE prints the output, if FALSE doesn't print anything. Can be used if one only wants to catch the output data frame.
monitor	FALSE by default. If TRUE, outputs two charts to visualize the functions time consumption.

Details

crosstabs() is based on the 'SAS' procedure Proc Freq, which provides efficient and readable ways to perform cross tabulations.

To create a cross table you only need to provide a variable for the rows and columns. Nothing special about this. The real power comes into play, when you output your tables as a fully styled 'Excel' workbook. Setting up a custom, reusable style is as easy as setting up options like: provide a color for the table header, set the font size for the row header, should borders be drawn for the table cells yes/no, and so on.

You can not only output sums and frequencies, but also different percentages, all set up in separate, evenly designed tables. For just a quick overview, rather than fully designed tables, you can also just output the tables in ASCII style format.

If a used variable has value labels attached (e.g. through the 'haven' or 'labelled' packages) these labels are used for the tabulation. If a format is applied to a labelled variable the format wins and the labels are ignored. Otherwise the labels are turned into an internal format, so the labelled values are shown.

Value

Returns a data tables containing the results for the cross table.

See Also

Creating a custom table style: excel_output_style(), modify_output_style(), number_format_style(), modify_number_formats().

Global style options: set_style_options(), set_labels().

Other global options: set_titles(), set_footnotes(), set_print(), set_monitor(), set_na.rm(), set_print(), set_print_miss(), set_output().

Combine Excel workbooks: combine_into_workbook().

Standalone table of contents: create_table_of_contents().

Creating formats: discrete_format() and interval_format().

Functions that can handle formats and styles: frequencies(), any_table().

Additional functions that can handle styles: export_with_style()

Additional functions that can handle formats: summarise_plus(), recode.(), recode_multi(), transpose_plus(), sort_plus()

Examples

```
# NOTE: The global option for printing the output is set to FALSE to save time
#       on running the examples. When running the examples manually, don't run
#       this option here.
#       Background color is also removed to make the code run faster.
set_print(FALSE)
set_style_options(background_color = "")

# Example data frame
my_data <- dummy_data(1000)

# Define titles and footnotes.
set_titles("This is title number 1",
           "This is title number 2",
           "This is title number 3")

set_footnotes("This is footnote number 1",
              "This is footnote number 2",
              "This is footnote number 3")

# Output cross tables
my_data |> crosstabs(state, sex)
my_data |> crosstabs(state, sex,
                     weight = "weight")

# Also works with characters
my_data |> crosstabs("state", "sex")
my_data |> crosstabs("state", "sex",
                     weight = "weight")

# Applying formats
age. <- discrete_format(
    "Total"          = 0:100,
    "under 18"       = 0:17,
    "18 to under 25" = 18:24,
    "25 to under 55" = 25:54,
    "55 to under 65" = 55:64,
    "65 and older"   = 65:100)

sex. <- discrete_format(
    "Total"  = 1:2,
    "Male"   = 1,
    "Female" = 2)

my_data |> crosstabs(age, sex,
                     formats = list(age = age., sex = sex.))

# Split cross table by expressions of another variable
my_data |> crosstabs(state, sex, by = education)

# Compute different stats
my_data |> crosstabs(state, sex,
```

```
                    statistics = c("sum", "freq", "pct_row", "pct_column", "pct_total"))

# Get a list with two data tables for further usage
result_list <- my_data |> crosstabs(age, sex,
                                    formats = list(age = age., sex = sex.))

# Output in text file
my_data |> crosstabs(state, sex, output = "text")

# Output to Excel
my_data |> crosstabs(state, sex, output = "excel")

# If you want to add hyperlinksto titles and footnotes you can do so by
# adding "link:" followed by the hyperlink to the main text. Linking to another
# cell works with "cell:". To link to a file use "file:" and pass the full file
# path afterwards. When linking to a cell you can use to following keywords to
# automatically link to specific parts of the output: first_title, last_title,
# first_footnote, last_footnote, table_start, table_end, table_header.
set_titles("This is title number 1",
           "This is title number 2 link: https://cran.r-project.org/",
           "This is title number 3 cell: W22",
           "This is title number 4 file: C:/MyFolder/MyFile.txt")

set_footnotes("This is footnote number 1",
              "This is footnote number 2 file: C:/MyFolder/MyFile.txt",
              "This is footnote number 3 cell: W22",
              "This is footnote number 4 link: https://cran.r-project.org/")

# Individual styling can also be passed directly
my_style <- excel_output_style(header_back_color = "0077B6",
                               font              = "Times New Roman")

my_data |> crosstabs(age, sex, output = "excel", style = my_style,
                     formats = list(age = age., sex = sex.))

# To save a table as xlsx file you have to set the path and filename in the
# style element
# Example files paths
table_file <- tempfile(fileext = ".xlsx")

# Note: Normally you would directly input the path ("C:/MyPath/") and name ("MyFile.xlsx").
#       With the set_style_options you can also set a table style globally.
set_style_options(save_path  = dirname(table_file),
                  file       = basename(table_file),
                  sheet_name = "MyTable")

my_data |> crosstabs(state, sex, output = "excel")

# Manual cleanup for example
unlink(table_file)

# Global options are permanently active until the current R session is closed.
# There are also functions to reset the values manually.
```

```
reset_qol_options()
```

`do_if` *Lock In A Condition*

Description

Locks in a condition and stores it as a hidden attribute of the data frame. This condition can be accessed by `if.()`, `else_if.()`, `else.()`, `where.()` and `compute.()`, enabling these functions to work with an overarching condition. This function can also be used to nest multiple overarching conditions.

`else_do()`: Checks for existing do_if() conditions and reverses the condition of the last one.

`end_do()`: Drops the last stored condition.

`end_all_do()`: Drops all stored conditions.

Usage

```
do_if(data_frame, condition)

else_do(data_frame)

end_do(data_frame)

end_all_do(data_frame)
```

Arguments

`data_frame`	A data frame on which to apply filters.
`condition`	The condition lock in.

Value

Returns a data frame with the condition stored as an attribute.

See Also

The following functions can make use of the `do_if()` conditions:

Conditions: `if.()`, `else_if.()`, `else.()`

Filter Data Frame: `where.()`

Create new Variables: `compute.()`

Examples

```
# Example data frame
my_data <- dummy_data(1000)

# Create a simple do-if-block
do_if_df <- my_data |>
    do_if(state < 11) |>
          if.(age < 18, new_var = 1) |>
        else.(          new_var = 2) |>
    else_do() |>
          if.(age < 18, new_var = 3) |>
        else.(          new_var = 4) |>
    end_do()

# do_if() can also be nested
do_if_df <- my_data |>
    do_if(state < 11) |>
        do_if(sex == 1) |>
              if.(age < 18, new_var = 1) |>
            else.(          new_var = 2) |>
        else_do() |>
              if.(age < 18, new_var = 3) |>
            else.(          new_var = 4) |>
        end_do() |>
    else_do() |>
        do_if(sex == 1) |>
              if.(age < 18, new_var = 5) |>
            else.(          new_var = 6) |>
        else_do() |>
              if.(age < 18, new_var = 7) |>
            else.(          new_var = 8) |>
        end_do() |>
    end_do()

# NOTE: Close the do-if-blocks with end_do() to remove the stored conditions
#       again.
```

`drop_type_vars` *Drop automatically generated Variables*

Description

If `summarise_plus()` is used with the nested options "all" or "single", three hierarchical metadata variables are automatically generated: TYPE, TYPE_NR and DEPTH. With this functions these variables are dropped.

- `TYPE` (character): The active grouping combination for the row (e.g., `"year+sex"`), or `"total"` for the grand total.

- TYPE_NR (integer): A unique sequential identifier assigned to each distinct grouping combination (TYPE).
- DEPTH (integer): The number of active grouping variables in the row's combination (e.g., 0 for "total", 1 for single variables, etc.).

Usage

```
drop_type_vars(data_frame)
```

Arguments

data_frame	The data frame with automatically generated variables.

Value

Returns a data frame without the variables TYPE, TYPE_NR and DEPTH.

Examples

```
# Example format
sex. <- discrete_format(
    "Total"  = 1:2,
    "Male"   = 1,
    "Female" = 2)

# Example data frame
my_data <- dummy_data(1000)

# Call function
all_possible <- my_data |>
    summarise_plus(class      = c(year, sex),
                   values     = c(income, probability),
                   statistics = c("sum", "mean", "freq"),
                   formats    = list(sex = "sex."),
                   weight     = weight,
                   nesting    = "all",
                   na.rm      = TRUE) |>
    drop_type_vars()

# The function also works when data frames are stored inside a list. It then
# drops the variables from every data frame inside the list.
type_df   <- my_data |> summarise_plus()
type_list <- list(type_df, type_df, type_df) |> drop_type_vars()
```

dummy_data *Dummy Data*

Description

The dummy data frame contains a few randomly generated variables like year, sex, age, income and weight to test out functionalities. It can be generated with the desired number of observations.

Usage

```
dummy_data(
  no_obs = 25000,
  insert_na = TRUE,
  wide = FALSE,
  monitor = .qol_options[["monitor"]]
)
```

Arguments

no_obs	Number of observations.
insert_na	TRUE by default. Inserts random NA values into variables.
wide	FALSE by default. If TRUE returns the data in wide format where each row represents one household and person-level variables are suffixed with the person number (e.g. sex1, sex2, age1, age2).
monitor	FALSE by default. If TRUE outputs two charts to visualize the functions time consumption.

Value

Returns a dummy data table.

Examples

```
# Long format dataset
my_data <- dummy_data(1000)

# Wide format dataset
# NOTE: Here 1000 is not the number of households (rows in the data frame),
#       but the number of persons in the data frame.
my_data_wide <- dummy_data(1000, wide = TRUE)
```

duplicates *Check For Duplicate Variable Names*

Description

Checks for duplicate variable names in a data frame, e.g. AGE, age and Age.

Counts the number of duplicated variables in a data frame. If a variable appears three times, e.g. AGE, age and Age, the variable count will be one.

Usage

```
get_duplicate_var_names(data_frame)

get_duplicate_var_count(data_frame)
```

Arguments

data_frame	The data frame which variable names to check for duplicates.

Value

get_duplicate_var_names(): Returns a vector of duplicate variable names.

get_duplicate_var_count(): Returns the count of duplicated variables as a numeric value.

Examples

```
# Example data frame
my_data <- data.frame(age    = 1,
                      AGE    = 2,
                      Age    = 3,
                      sex    = 1)

dup_var_names <- my_data |> get_duplicate_var_names()

dup_var_count <- my_data |> get_duplicate_var_count()
```

error_handling *Error Handling*

Description

resolve_intersection(): Compares if two vectors have intersecting values. If TRUE, removes the intersection values from the base vector

part_of_df(): Check if variable names are part of a data frame. If not, remove them from the given vector.

remove_doubled_values(): Remove values from a vector that appear more than once.

check_weight(): Check if a weight variable was provided. If TRUE, check whether it can be used else add a temporary weight variable.

Usage

```
resolve_intersection(base, vector_to_check, check_only = FALSE)

part_of_df(data_frame, var_names, check_only = FALSE)

remove_doubled_values(var_names)

check_weight(data_frame, var_names)
```

Arguments

base	The base vector from which to remove any intersecting values.
vector_to_check	The vector for which intersections should be checked.
check_only	Returns a list of invalid entries instead of a vector. Additionally it doesn't throw a warning.
data_frame	A data frame in which to look up variable names.
var_names	A character vector of variable names.

Value

Returns a vector or list.

Examples

```
# Resolve intersection between two vectors
vec1 <- c("a", "b", "c", "d")
vec2 <- c("e", "f", "a", "g")

vec1 <- resolve_intersection(vec1, vec2)

# Check if variables are part of a data frame
my_data   <- dummy_data(100)
var_names <- c("year", "state", "age", "test")

var_names <- my_data |> part_of_df(var_names)

# Remove doubled values
```

```
var_names <- c("year", "state", "state", "age")

var_names <- remove_doubled_values(var_names)

# Check the provided weight variable
var_names <- my_data |> check_weight("weight")
```

`excel_output_style` *Style for 'Excel' Table Outputs*

Description

Set different options which define the visual output of 'Excel' tables produced by `frequencies()`, `crosstabs()` and `any_table()`.

Usage

```
excel_output_style(
  save_path = NULL,
  file = NULL,
  sheet_name = "Table",
  font = "Arial",
  column_widths = "auto",
  row_heights = "auto",
  title_heights = NULL,
  header_heights = NULL,
  subheader_heights = NULL,
  table_heights = NULL,
  footnote_heights = NULL,
  start_row = 2,
  start_column = 2,
  freeze_col_header = FALSE,
  freeze_row_header = FALSE,
  filters = TRUE,
  grid_lines = TRUE,
  by_as_subheaders = FALSE,
  background_color = "FFFFFF",
  header_back_color = "FFFFFF",
  header_font_color = "000000",
  header_font_size = 10,
  header_font_bold = TRUE,
  header_alignment = "center",
  header_stat_merging = "block",
  header_wrap = "1",
  header_indent = 0,
  header_borders = TRUE,
```

```
header_border_color = "000000",
subheader_back_color = "FFFFFF",
subheader_font_color = "000000",
subheader_font_size = 10,
subheader_font_bold = TRUE,
subheader_alignment = "center",
subheader_wrap = "1",
subheader_indent = 0,
subheader_borders = TRUE,
subheader_border_color = "000000",
cat_col_back_color = "FFFFFF",
cat_col_font_color = "000000",
cat_col_font_size = 10,
cat_col_font_bold = FALSE,
cat_col_alignment = "left",
cat_col_wrap = "1",
cat_col_indent = 1,
cat_col_borders = TRUE,
cat_col_border_color = "000000",
table_back_color = "FFFFFF",
table_font_color = "000000",
table_font_size = 10,
table_font_bold = FALSE,
table_alignment = "right",
table_indent = 1,
table_borders = FALSE,
table_border_color = "000000",
block_borders = FALSE,
block_border_color = "000000",
as_heatmap = FALSE,
heatmap_low_color = "F8696B",
heatmap_middle_color = "FFFFFF",
heatmap_high_color = "63BE7B",
box_back_color = "FFFFFF",
box_font_color = "000000",
box_font_size = 10,
box_font_bold = TRUE,
box_alignment = "center",
box_wrap = "1",
box_indent = 0,
box_borders = TRUE,
box_border_color = "000000",
number_formats = number_format_style(),
title_font_color = "000000",
title_font_size = 10,
title_font_bold = TRUE,
title_alignment = "left",
footnote_font_color = "000000",
```

```
  footnote_font_size = 8,
  footnote_font_bold = FALSE,
  footnote_alignment = "left",
  na_symbol = ".",
  toc_background_color = "FFFFFF",
  toc_inner_back_color = "FFFFFF",
  toc_border_color = "000000",
  toc_header_font_color = "000000",
  toc_header_font_size = 10,
  toc_header_font_bold = TRUE,
  toc_header_alignment = "left",
  toc_subheader_font_color = "000000",
  toc_subheader_font_size = 10,
  toc_subheader_font_bold = TRUE,
  toc_subheader_alignment = "left",
  toc_other_font_color = "000000",
  toc_other_font_size = 10,
  toc_other_font_bold = FALSE,
  toc_other_alignment = "left",
  toc_link_alignment = "left"
)
```

Arguments

save_path	If NULL, opens the output as temporary file. Otherwise specify an output path.
file	If NULL, opens the output as temporary file. Otherwise specify a filename with extension.
sheet_name	Name of the sheet inside the workbook to which the output shall be written. If multiple outputs are produced in one go, the sheet name additionally receives a running number.
font	Set the font to be used for the entire output.
column_widths	Specify whether column widths should be set automatically and individually or if a numeric vector is passed each column width can be specified manually. If a table has more columns than column widths are provided, the last given column width will be repeated until the end of the table.
row_heights	Specify whether row heights should be set automatically and individually or if a numeric vector is passed each row height can be specified manually. If a table has more rows than row heights are provided, the last given row height will be repeated until the end of the table.
title_heights	Set individual row heights for the titles only.
header_heights	Set individual row heights for the table header only.
subheader_heights	Set individual row heights for the table subheader only.
table_heights	Set individual row heights for the table body only.
footnote_heights	Set individual row heights for the footnotes only.

`start_row` The row in which the table starts.

`start_column` The column in which the table starts.

`freeze_col_header`
Whether to freeze the column header so that it is always visible while scrolling down the document.

`freeze_row_header`
Whether to freeze the row header so that it is always visible while scrolling sideways in the document.

`filters` Whether to set filters in the column header, when exporting a data frame.

`grid_lines` Whether to show grid lines or not.

`by_as_subheaders`
Whether to format by variables as subheaders in one table instead of single tables on multiple sheets.

`background_color`
Background cell color for any cell which isn't covered by the other background color options. Use "" for no color.

`header_back_color`
Background cell color of the table header.

`header_font_color`
Font color of the table header.

`header_font_size`
Font size of the table header.

`header_font_bold`
Whether to print the table header in bold letters.

`header_alignment`
Set the text alignment of the table header.

`header_stat_merging`
Set how far the statistics row is merged. Allowed are "all", "block" (default), "none".

`header_wrap` Whether to wrap the texts in the table header.

`header_indent` Indentation level of the table header.

`header_borders` Whether to draw borders around the table header cells.

`header_border_color`
Borders colors of the table header cells.

`subheader_back_color`
Background cell color of the table subheader.

`subheader_font_color`
Font color of the table subheader.

`subheader_font_size`
Font size of the table subheader.

`subheader_font_bold`
Whether to print the table subheader in bold letters.

`subheader_alignment`
Set the text alignment of the table subheader.

`subheader_wrap` Whether to wrap the texts in the table subheader.

`subheader_indent`
Indentation level of the table subheader.

`subheader_borders`
Whether to draw borders around the table subheader cells.

`subheader_border_color`
Borders colors of the table subheader cells.

`cat_col_back_color`
Background cell color of the category columns inside the table.

`cat_col_font_color`
Font color of the category columns inside the table.

`cat_col_font_size`
Font size of the category columns inside the table.

`cat_col_font_bold`
Whether to print the category columns inside the table in bold letters.

`cat_col_alignment`
Set the text alignment of the category columns inside the table.

`cat_col_wrap` Whether to wrap the texts in the category columns inside the table.

`cat_col_indent` Indentation level of the category columns inside the table.

`cat_col_borders`
Whether to draw borders around the category columns inside the table.

`cat_col_border_color`
Borders colors of the category columns inside the table.

`table_back_color`
Background color of the inner table cells.

`table_font_color`
Font color of the inner table cells.

`table_font_size`
Font size of the inner table cells.

`table_font_bold`
Whether to print the inner table cells in bold numbers

`table_alignment`
Set the text alignment of the inner table cells.

`table_indent` Indentation level of the inner table cells.

`table_borders` Whether to draw borders around the inner table cells.

`table_border_color`
Borders colors of the inner table cells.

`block_borders` Whether to draw a vertical line on the side of each statistic block.

`block_border_color`
Border color of the statistic block borders.

`as_heatmap` Whether to lay a conditional formatting over the values.

`heatmap_low_color`
The color for lower values in the conditional formatting.

heatmap_middle_color
: The color for middle values in the conditional formatting.

heatmap_high_color
: The color for high values in the conditional formatting.

box_back_color
: Background color of the left box in table header.

box_font_color
: Font color of the left box in table header.

box_font_size
: Font size of the left box in table header.

box_font_bold
: Whether to print the left box in table header in bold letters.

box_alignment
: Set the text alignment of the left box in table header.

box_wrap
: Whether to wrap the texts in the left box in table header.

box_indent
: Indentation level of the left box in table header.

box_borders
: Whether to draw borders around the left box in table header.

box_border_color
: Borders colors of the left box in table header.

number_formats
: Put in a list of number formats which should be assigned to the different stats. Number formats can be created with number_format_style().

title_font_color
: Font color of the titles.

title_font_size
: Font size of the tables titles.

title_font_bold
: Whether to print the tables titles in bold letters.

title_alignment
: Set the text alignment of the titles.

footnote_font_color
: Font color of the footnotes

footnote_font_size
: Font size of the tables footnotes

footnote_font_bold
: Whether to print the tables footnotes in bold letters.

footnote_alignment
: Set the text alignment of the footnotes.

na_symbol
: Define the symbol that should be used for NA values.

toc_background_color
: Table of contents background cell color for any cell which isn't covered by the inner background color. Use "" for no color.

toc_inner_back_color
: Table of contents inner background color. Use "" for no color.

toc_border_color
: Table of contents color for all borders.

toc_header_font_color
: Table of contents font color of the main header.

toc_header_font_size
: Table of contents font size of the main header.

`toc_header_font_bold`
: Whether to print the table of contents main header in bold letters.

`toc_header_alignment`
: Set the text alignment of the table of contents main header.

`toc_subheader_font_color`
: Table of contents font color of the subheader.

`toc_subheader_font_size`
: Table of contents font size of the subheader.

`toc_subheader_font_bold`
: Whether to print the table of contents

`toc_subheader_alignment`
: Set the text alignment of the table of contents

`toc_other_font_color`
: Table of contents font color of all other texts.

`toc_other_font_size`
: Table of contents font size of all other texts.

`toc_other_font_bold`
: Whether to print the table of contents

`toc_other_alignment`
: Set the text alignment of all other table of contents texts.

`toc_link_alignment`
: Set the text alignment of the table of contents shet links.

Details

`excel_output_style()` is based on the Output Delivery System (ODS) in 'SAS', which provides efficient and readable ways to set up different table styles.

With the output style you have full control over the table design. There is no need to think about calculating the right place to input a background color or a border of a certain type and how to do this in a loop for multiple cells. Just input colors, borders, font styles, etc. for the different table parts and everything else is handled by the functions capable of using styles.

The concept basically is: design over complex calculations.

Value

Returns a list of named style options.

See Also

Creating a custom table style: `modify_output_style()`, `number_format_style()`, `modify_number_formats()`.

Global style options: `set_style_options()`, `set_labels()`.

Functions that can handle styles: `frequencies()`, `crosstabs()`, `any_table()`, `export_with_style()`

Examples

```
# For default values
excel_style <- excel_output_style()

# Set specific options, the rest will be set to default values
excel_style <- excel_output_style(font       = "Calibri",
                                  sheet_name = "My_Output")

# For cells with no background color pass an empty string
excel_style <- excel_output_style(table_back_color = "")
```

`expand_formats` *Expand A List Of Formats To Generate All Possible Combinations*

Description

Generates a data frame which contains all nested combinations of the provided format labels.

Usage

```
expand_formats(..., names = NULL)
```

Arguments

`...`	A list containing format data frames.
`names`	Custom variable names for the newly generated data frame.

Value

Returns a data frames with all format label combinations.

Examples

```
# Example formats
sex. <- discrete_format(
    "Total"  = 1:2,
    "Male"   = 1,
    "Female" = 2)

age. <- discrete_format(
    "Total"          = 0:100,
    "under 18"       = 0:17,
    "18 to under 25" = 18:24,
    "25 to under 55" = 25:54,
    "55 to under 65" = 55:64,
    "65 and older"   = 65:100)

# Expand formats
```

```
expand_df <- expand_formats(sex., age.,
                            names = c("sex", "age"))
```

`export_with_style` *Export Data Frame With Style*

Description

`export_with_style()` prints a data frame as an individually styled 'Excel' table. Titles, footnotes and labels for variable names can optionally be added.

Usage

```
export_with_style(
  data_frame,
  titles = .qol_options[["titles"]],
  footnotes = .qol_options[["footnotes"]],
  var_labels = .qol_options[["var_labels"]],
  workbook = NULL,
  style = .qol_options[["excel_style"]],
  column_align = NULL,
  output = .qol_options[["output"]],
  print = .qol_options[["print"]],
  monitor = .qol_options[["monitor"]]
)
```

Arguments

`data_frame`	A data frame to print.
`titles`	Specify one or more table titles. If you want to add hyperlinks you can do so by adding "link:" followed by the hyperlink to the main text. To link to a file use "file:" and pass the full file path afterwards. Linking to another cell works with "cell:". When linking to a cell you can use to following keywords to automatically link to specific parts of the output: first_title, last_title, first_footnote, last_footnote, table_start, table_end, table_header.
`footnotes`	Specify one or more table footnotes. If you want to add hyperlinks you can do so by adding "link:" followed by the hyperlink to the main text. To link to a file use "file:" and pass the full file path afterwards. Linking to another cell works with "cell:". When linking to a cell you can use to following keywords to automatically link to specific parts of the output: first_title, last_title, first_footnote, last_footnote, table_start, table_end, table_header.
`var_labels`	A list in which is specified which label should be printed for which variable instead of the variable name.
`workbook`	Insert a previously created workbook to expand the sheets instead of creating a new file.

style	A list of options can be passed to control the appearance of 'Excel' outputs. Styles can be created with excel_output_style().
column_align	Individually align the data frame columns in the final 'Excel' output.
output	The following output formats are available: excel, excel_nostyle and no.
print	TRUE by default. If TRUE prints the output, if FALSE doesn't print anything. Can be used if one only wants to catch the output workbook.
monitor	FALSE by default. If TRUE outputs two charts to visualize the functions time consumption.

Details

export_with_style() is based on the 'SAS' procedure Proc Print, which outputs the data frame as is into a styled table.

Value

Returns a list with the data table containing the results for the table, the formatted 'Excel' workbook and the meta information needed for styling the final table.

See Also

Creating a custom table style: excel_output_style(), modify_output_style(), number_format_style(), modify_number_formats().

Global style options: set_style_options(), set_labels().

Other global options: set_titles(), set_footnotes(), set_print(), set_monitor(), set_na.rm(), set_print(), set_print_miss(), set_output().

Combine Excel workbooks: combine_into_workbook().

Functions that can handle styles: frequencies(), crosstabs(), any_table().

Examples

```
# Example data frame
my_data <- dummy_data(100)
set_style_options(background_color = "")

# Define style
set_style_options(column_widths = c(2, 15, 15, 15, 9))

# Define titles and footnotes. If you want to add hyperlinks you can do so by
# adding "link:" followed by the hyperlink to the main text. Linking to another
# cell works with "cell:". To link to a file use "file:" and pass the full file
# path afterwards. When linking to a cell you can use to following keywords to
# automatically link to specific parts of the output: first_title, last_title,
# first_footnote, last_footnote, table_start, table_end, table_header.
set_titles("This is title number 1",
           "This is title number 2 link: https://cran.r-project.org/",
           "This is title number 3 cell: W22",
           "This is title number 4 file: C:/MyFolder/MyFile.txt")
```

```
set_footnotes("This is footnote number 1",
              "This is footnote number 2 file: C:/MyFolder/MyFile.txt",
              "This is footnote number 3 cell: W22",
              "This is footnote number 4 link: https://cran.r-project.org/")

# Print styled data frame
my_data |> export_with_style()

# Retrieve formatted workbook, original table and meta information for further usage
export_list <- my_data |> export_with_style()

# To save a table as xlsx file you have to set the path and filename in the
# style element
# Example files paths
table_file <- tempfile(fileext = ".xlsx")

# Note: Normally you would directly input the path ("C:/MyPath/") and
#       name ("MyFile.xlsx").
#       With the set_style_options you can also set a table style globally.
set_style_options(save_path  = dirname(table_file),
                  file       = basename(table_file),
                  sheet_name = "MyTable")

my_data |> export_with_style()

# In case you have a good amount of tables, you want to combine in a single
# workbook, you can also catch the outputs and combine them afterwards in one go.
set_style_options(sheet_name = "sheet1")
tab1 <- my_data |> export_with_style(print = FALSE)

set_titles(NULL)
set_style_options(sheet_name = "sheet2")
tab2 <- my_data |> export_with_style(print = FALSE)

set_footnotes(NULL)
set_style_options(sheet_name = "sheet3")
tab3 <- my_data |> export_with_style(print = FALSE, output = "excel_nostyle")

# Every of the above tabs is a list, which contains the data table, an unstyled
# workbook and the meta information needed for the individual styling. These tabs
# can be input into the following function, which reads the meta information,
# styles each table individually and combines them as separate sheets into a
# single workbook.
combine_into_workbook(tab1, tab2, tab3)
combine_into_workbook(tab1, tab2, tab3, file = table_file)

# Manual cleanup for example
unlink(table_file)

# Global options are permanently active until the current R session is closed.
# There are also functions to reset the values manually.
reset_qol_options()
```

first_row_as_names *Set First Data Frame Row As Variable Names*

Description

Sets the first row of a data frame as variable names and deletes it. In case of NA or empty characters in the first row, the old names are kept.

Usage

```
first_row_as_names(data_frame)
```

Arguments

data_frame	A data frame for which to set new variable names.

Value

Returns a data frame with renamed variables.

Examples

```
# Example data frame
my_data <- data.frame(
              var1 = c("id", 1, 2, 3),
              var2 = c(NA, "a", "b", "c"),
              var3 = c("value", 1, 2, 3),
              var4 = c("", "a", "b", "c"),
              var5 = c(1, 2, 3, 4))

my_data <- my_data |> first_row_as_names()
```

free_memory *Remove Objects From Memory By Name And Type*

Description

Remove objects by name or type to free up memory. Uses the base `rm()` function but provides more flexible ways to remove objects.

Usage

```
free_memory(names = NULL, types = NULL, envir = .GlobalEnv)
```

Arguments

names	Object names to be removed.
types	Object types to be removed.
envir	The environment to remove the objects from.

Details

free_memory() is based on the 'SAS' function Proc Datasets. Among other things this procedure is able to remove datasets from memory. But not only by writing out the full file name, it is capable of looking for datasets starting with, ending with or containing a certain text. Additionally certain object types can be removed.

Value

Returns removed objects.

Examples

```
# Example data frames
my_data1 <- dummy_data(10)
my_data2 <- dummy_data(10)
data     <- dummy_data(10)
file     <- dummy_data(10)

# Free memory by name
free_memory("my_:")
free_memory(c("data", "file"))

# Free by type
my_data1 <- dummy_data(10)
my_data2 <- dummy_data(10)
data     <- dummy_data(10)
file     <- dummy_data(10)

free_memory(type = "data.frame")
```

---

frequencies *Display Frequency Tables of Single Variables*

Description

frequencies() produces two kinds of tables for a quick overview of single variables. The first table is for a broader overview and contains mean, sd, min, max, freq and missings. The second table is the actual frequency table which shows the weighted sums, percentages and unweighted frequencies per expression.

Usage

```
frequencies(
  data_frame,
  ...,
  formats = c(),
  by = c(),
  weight = NULL,
  means = FALSE,
  full_precision = FALSE,
  titles = .qol_options[["titles"]],
  footnotes = .qol_options[["footnotes"]],
  style = .qol_options[["excel_style"]],
  output = .qol_options[["output"]],
  na.rm = .qol_options[["na.rm"]],
  print_miss = .qol_options[["print_miss"]],
  print = .qol_options[["print"]],
  monitor = .qol_options[["monitor"]]
)
```

Arguments

data_frame	A data frame in which are the variables to tabulate.
...	The single variables to create frequency tables for. Just list them separated by commas.
formats	A list in which is specified which formats should be applied to which variables. Macro variables can be used in the variable names and format names.
by	Compute tables stratified by the expressions of the provided variables.
weight	Put in a weight variable to compute weighted results.
means	FALSE by default. If TRUE prints a small summarising table which contains mean, sd, min, max, total freq and missing values.
full_precision	FALSE by default. If TRUE, the rounding of the values according to the number formats in the style parameter is skipped and all values are output with all their decimal places.
titles	Specify one or more table titles. If you want to add hyperlinks you can do so by adding "link:" followed by the hyperlink to the main text. To link to a file use "file:" and pass the full file path afterwards. Linking to another cell works with "cell:". When linking to a cell you can use to following keywords to automatically link to specific parts of the output: first_title, last_title, first_footnote, last_footnote, table_start, table_end, table_header.
footnotes	Specify one or more table footnotes. If you want to add hyperlinks you can do so by adding "link:" followed by the hyperlink to the main text. To link to a file use "file:" and pass the full file path afterwards. Linking to another cell works with "cell:". When linking to a cell you can use to following keywords to automatically link to specific parts of the output: first_title, last_title, first_footnote, last_footnote, table_start, table_end, table_header.

style	A list of options can be passed to control the appearance of 'Excel' outputs. Styles can be created with excel_output_style().
output	The following output formats are available: console (default), text, excel, excel_nostyle and no.
na.rm	FALSE by default. If TRUE removes all NA values from the variables.
print_miss	FALSE by default. If TRUE outputs all possible categories of the grouping variables based on the provided formats, even if there are no observations for a combination.
print	TRUE by default. If TRUE prints the output, if FALSE doesn't print anything. Can be used if one only wants to catch the output data frame.
monitor	FALSE by default. If TRUE, outputs two charts to visualize the functions time consumption.

Details

frequencies() is based on the 'SAS' procedure Proc Freq, which provides efficient and readable ways to output frequency tables.

To create a frequency table you only need to provide a single variable. Nothing special about this. The real power comes into play, when you output your tables as a fully styled 'Excel' workbook. Setting up a custom, reusable style is as easy as setting up options like: provide a color for the table header, set the font size for the row header, should borders be drawn for the table cells yes/no, and so on.

You also can provide multiple single variables to generate multiple, evenly designed tables, all at once. For just a quick overview, rather than fully designed tables, you can also just output the tables in ASCII style format.

If a used variable has value labels attached (e.g. through the 'haven' or 'labelled' packages) these labels are used for the tabulation. If a format is applied to a labelled variable the format wins and the labels are ignored. Otherwise the labels are turned into an internal format, so the labelled values are shown.

Value

Returns a list of two data tables containing the results for the frequency tables.

See Also

Creating a custom table style: excel_output_style(), modify_output_style(), number_format_style(), modify_number_formats().

Global style options: set_style_options(), set_labels().

Other global options: set_titles(), set_footnotes(), set_print(), set_monitor(), set_na.rm(), set_print(), set_print_miss(), set_output().

Combine Excel workbooks: combine_into_workbook().

Standalone table of contents: create_table_of_contents().

Creating formats: discrete_format() and interval_format().

Functions that can handle formats and styles: crosstabs(), any_table().

Additional functions that can handle styles: export_with_style()

Additional functions that can handle formats: summarise_plus(), recode.(), recode_multi(), transpose_plus(), sort_plus()

Examples

```
# NOTE: The global option for printing the output is set to FALSE to save time
#       on running the examples. When running the examples manually, don't run
#       this option here.
#       Background color is also removed to make the code run faster.
set_print(FALSE)
set_style_options(background_color = "")

# Example data frame
my_data <- dummy_data(1000)

# Define titles and footnotes.
set_titles("This is title number 1",
           "This is title number 2",
           "This is title number 3")

set_footnotes("This is footnote number 1",
              "This is footnote number 2",
              "This is footnote number 3")

# Output frequencies tables
my_data |> frequencies(sex)
my_data |> frequencies(age, education,
                       weight = weight)

# Also works with characters
my_data |> frequencies("sex")
my_data |> frequencies("age", "education",
                       weight = "weight")

# Applying
sex. <- discrete_format(
    "Total"  = 1:2,
    "Male"   = 1,
    "Female" = 2)

my_data |> frequencies(sex, formats = list(sex = sex.))

# Split frequencies by expressions of another variable
my_data |> frequencies(sex, by = education)

# Get a list with two data tables for further usage
result_list <- my_data |> frequencies(sex, formats = list(sex = sex.))

# Output in text file
my_data |> frequencies(sex, output = "text")
```

```
# Output to Excel
my_data |> frequencies(sex, output = "excel")

# If you want to add hyperlinksto titles and footnotes you can do so by
# adding "link:" followed by the hyperlink to the main text. Linking to another
# cell works with "cell:". To link to a file use "file:" and pass the full file
# path afterwards. When linking to a cell you can use to following keywords to
# automatically link to specific parts of the output: first_title, last_title,
# first_footnote, last_footnote, table_start, table_end, table_header.
set_titles("This is title number 1",
           "This is title number 2 link: https://cran.r-project.org/",
           "This is title number 3 cell: W22",
           "This is title number 4 file: C:/MyFolder/MyFile.txt")

set_footnotes("This is footnote number 1",
              "This is footnote number 2 file: C:/MyFolder/MyFile.txt",
              "This is footnote number 3 cell: W22",
              "This is footnote number 4 link: https://cran.r-project.org/")

# Individual styling can also be passed directly
my_style <- excel_output_style(header_back_color = "0077B6",
                               font              = "Times New Roman")

my_data |> frequencies(sex, output = "excel", style = my_style)

# To save a table as xlsx file you have to set the path and filename in the
# style element
# Example files paths
table_file <- tempfile(fileext = ".xlsx")

# Note: Normally you would directly input the path ("C:/MyPath/") and name ("MyFile.xlsx").
#       With the set_style_options you can also set a table style globally.
set_style_options(save_path  = dirname(table_file),
                  file       = basename(table_file),
                  sheet_name = "MyTable")

my_data |> frequencies(sex, output = "excel")

# Manual cleanup for example
unlink(table_file)

# Global options are permanently active until the current R session is closed.
# There are also functions to reset the values manually.
reset_qol_options()
```

---

fuse_variables *Fuse Multiple Variables*

Description

When you have a situation where you have multiple variables with different NA values that happen to be in different places (where one variable has a value the other is NA and vice versa) you can fuse these together to a single variable.

Usage

```
fuse_variables(
  data_frame,
  new_variable_name,
  variables_to_fuse,
  drop_original_vars = TRUE
)
```

Arguments

data_frame	A data frame with variables to fuse.
new_variable_name	The name of the new fused variable.
variables_to_fuse	A vector with the variables that should be fused together.
drop_original_vars	Whether to drop or keep the original values. TRUE by default.

Value

Returns a data frame without the variables TYPE, TYPE_NR and DEPTH.

Examples

```
# Example format
sex. <- discrete_format(
    "Total"  = 1:2,
    "Male"   = 1,
    "Female" = 2)

# Example data frame
my_data <- dummy_data(1000)

# Call function
all_possible <- my_data |>
    summarise_plus(class      = c(year, sex),
                   values     = c(income, probability),
                   statistics = c("sum", "mean", "freq"),
                   formats    = list(sex = "sex."),
                   weight     = weight,
                   nesting    = "all",
                   na.rm      = TRUE)

all_possible <- all_possible[DEPTH <= 1] |>
```

```
    fuse_variables("fusion", c("year", "sex"))

# NOTE: You can generally use this function to fuse variables. What is done in
#       multiple steps above can be achieved by just using nested = "single" in
#       summarise_plus.
single <- my_data |>
    summarise_plus(class      = c(year, sex),
                   values     = c(income, probability),
                   statistics = c("sum", "mean", "freq"),
                   formats    = list(sex = "sex."),
                   weight     = weight,
                   nesting    = "single",
                   na.rm      = TRUE)
```

`get_excel_range` *Converts Numbers into 'Excel' Ranges*

Description

Converts a column number into the according letter to form a cell reference like it is used in 'Excel' (e.g "A1"). Also can compute a range from cell to cell (e.g. "A1:BY22").

Usage

```
get_excel_range(
  row = NULL,
  column = NULL,
  from_row = NULL,
  from_column = NULL,
  to_row = NULL,
  to_column = NULL
)
```

Arguments

`row`	Single row number.
`column`	Single column number.
`from_row`	Range start row.
`from_column`	Range start column.
`to_row`	Range end row.
`to_column`	Range end column.

Value

Returns a character with an 'Excel' range.

Examples

```
single_cell <- get_excel_range(row = 1, column = 6)
range       <- get_excel_range(from_row = 1, from_column = 6,
                               to_row = 5,   to_column = 35)
```

---

hex_ansi *Convert Color Codes*

Description

hex_to_256(): Generate a 256-color 6x6x6 color cube.

hex_to_ansi(): Applies hex color and font weight to a text as ansi codes.

Usage

```
hex_to_256(hex_color)

hex_to_ansi(text, hex_color = NULL, bold = FALSE)
```

Arguments

hex_color	The hex color code to convert.
text	The text which contains hex color codes to be convert into ansi style formatting.
bold	FALSE by default. If TRUE inserts ansi code for bold printing

Value

hex_to_256(): Returns 6x6x6 color cube.

hex_to_ansi(): Returns formatted text.

Examples

```
color_cube <- hex_to_ansi("#32CD32")

formatted_text <- hex_to_ansi("This is a text to test the coloring",
                              hex_color = "#32CD32", bold = TRUE)
```

`ifelse_multi` *Do Multiple ifelse At Once*

Description

`ifelse_multi()` handles multiple conditions and value assignments at once by nesting multiple ifelse statements. It is special in the case that it takes the conditions as unevaluated characters to be able to parse them before evaluation. This enables a SAS like writing style of the conditions.

Usage

```
ifelse_multi(data_frame, ..., else. = NA, do_if = NULL, na.rm = TRUE)
```

Arguments

`data_frame`	A data frame on which to apply multiple ifelse statements.
`...`	The conditions as character and the assignments in the form: "condition" = value, "condition" = value, ...
`else.`	The default value which is applied when no condition results in an assignment.
`do_if`	Define an overarching condition that will be used on all other conditions.
`na.rm`	TRUE by default. Sets the default value even though a condition results in NA. If FALSE leaves NA as missing value.

Details

The function takes in conditions as characters to be able to parse the conditions. The parsing allows to write conditions in a SAS like way. For example the condition

"age >= 15 & age < 65" can be written as "15 <= age < 65"

Additionally and/or (case insensitive) are recognized keywords which will be translated into &/|.

"age >= 15 and age < 65 or sex == 1" becomes "age >= 15 & age < 65 | sex == 1"

And `macro()` variables are allowed in any spot, e.g.:

YEAR <- 2025\ "year == &YEAR" translates to "year == 2025".

Single = get translated to ==, the SAS not ^= is translated to !=.

In SAS you can write "age in (1 4 7 15 21)" or "age not in (2, 4, 37, 82)" which gets translated into "age %in% (1, 4, 7, 15, 21)" and "!(age %in% (2, 4, 37, 82))".

When using == or != operators you can check if character expressions start with (text:), end with (:text) or contain a certain text (:text:). These also get translated.

Value

Returns a vector with a conditionally computed variable.

See Also

Conditions: if.(), else_if.(), else.()

Filter Data Frame: where.()

Create new Variables: compute.()

Resolve macro variables: macro(), apply_macro()

Examples

```
# Example data frame
my_data <- dummy_data(100)

# Simple ifelse statement
my_data[["under18"]]    <- my_data |> ifelse_multi(" age < 18 " = 1,       else. = 0)
my_data[["middle_age"]] <- my_data |> ifelse_multi(" 15 <= age < 65 " = 1, else. = 0)

my_data[["age_gr"]] <- my_data |>
    ifelse_multi(" age < 18 "       = "under 18",
                 " 18 <= age < 25 " = "18 to under 25",
                 " 25 <= age < 50 " = "25 to under 50",
                 " 50 <= age < 65 " = "50 to under 65",
                 " 65 <= age      " = "65 and more")

# With overarching do_if condition
my_data[["age_gr_edu"]] <- my_data |>
    ifelse_multi(do_if = " education in ('middle' 'high') ",
                      " age < 18 "       = "under 18",
                      " 18 <= age < 25 " = "18 to under 25",
                      " 25 <= age < 50 " = "25 to under 50",
                      " 50 <= age < 65 " = "50 to under 65",
                      " 65 <= age      " = "65 and more")

# And/or translation
my_data[["and"]] <- my_data |> ifelse_multi(" age > 65 and sex = 1 " = 1,
                                            " age > 65 and sex = 2 " = 2,
                                            else. = 0)

my_data[["or"]] <- my_data |> ifelse_multi(" age > 65 or sex = 1 " = 1,
                                           " age > 65 or sex = 2 " = 2,
                                           else. = 0)

# "in" translation
my_data[["in"]] <- my_data |> ifelse_multi(" age in (1 10 25 65 90) " = 1, else. = 0)

# Colon translation: start/ends with and contains
my_data[["start"]]    <- my_data |> ifelse_multi(" education == 'lo:' "  = 1, else. = 0)
my_data[["end"]]      <- my_data |> ifelse_multi(" education == ':le' "  = 1, else. = 0)
my_data[["contains"]] <- my_data |> ifelse_multi(" education == ':ig:' " = 1, else. = 0)

# Macro variables can be integrated in any place
variable     <- "age"
age_to_check <- 18
```

```
value_to_set <- "under 18"

my_data[["macro"]] <- my_data |>
    ifelse_multi(" &variable < &age_to_check " = "&value_to_set",
                 else.                         = "other")

# NA translation
my_data[["NA"]]    <- my_data |> ifelse_multi(" age == .       " = 1, else. = 0)
my_data[["notNA"]] <- my_data |> ifelse_multi(" education != . " = 1, else. = 0)

# Pass in existing variable values
my_data[["income_mix"]] <- my_data |>
    ifelse_multi(" age < 50 " = income, else. = expenses)
```

`import_export` *High Level Import From And Export To CSV And XLSX*

Description

`import_data()`: A wrapper for `data.table::fread()` and `openxlsx2::wb_to_df()`, providing basic import functionality with minimal code. Uses "Latin-1" encoding.

`import_multi()`: Runs multiple imports on all provided files. Is able to import all sheets from xlsx files.

`export_data()`: A wrapper for `data.table::fwrite()` and `openxlsx2::wb_save()`, providing basic export functionality with minimal code.

`export_multi()`: Runs multiple exports on a list of data frames. Is able to export to a single xlsx file with multiple sheets.

Usage

```
import_data(
  infile,
  sheet = 1,
  region = NULL,
  separator = "auto",
  decimal = "auto",
  var_names = TRUE
)

import_multi(
  file_list,
  sheet = "all",
  region = NULL,
  separator = "auto",
  decimal = "auto",
  var_names = TRUE,
```

```
  stack_files = FALSE
)

export_data(
  data_frame,
  outfile,
  separator = ";",
  decimal = ",",
  var_names = TRUE
)

export_multi(
  file_list,
  out_path,
  into_sheets = TRUE,
  separator = NULL,
  decimal = ",",
  var_names = TRUE
)
```

Arguments

infile	Full file path with extension to a csv, txt or xlsx file to be imported.
sheet	Only used in xlsx import. Which sheet of the workbook to import.
region	Only used in xlsx import. Can either be an 'Excel' range like 'A1:BY27' or the name of a named region.
separator	Only used in CSV/TXT-export. Defines the single character value separator.
decimal	Only used in CSV/TXT-export. Defines the single character decimal character.
var_names	TRUE by default. Whether to export variable names or not.
file_list	import_multi(): A character vector containing full file paths. export_multi(): A list of data frames.#'
stack_files	FALSE by default. If TRUE, stacks data frames after importing them. If FALSE, returns all data frames in a list.
data_frame	A data frame to export.
outfile	Full file path with extension. Allowed extensions are ".csv", ".txt" and ".xlsx".
out_path	The file path where to save the exported files.
into_sheets	TRUE by default. Whether to export all data frames into multiple sheets of a single xlsx file or into separate xlsx files.

Details

import_data() and export_data() are based on the 'SAS' procedures Proc Import and Proc Export, which provide a very straight forward syntax. While 'SAS' can import many different formats with these procedures, these 'R' versions concentrate on importing CSV, TXT and XLSX files.

The main goal here is to just provide as few as possible parameters to tackle most of the imports and exports. These error handling also tries to let an import and export happen, even though a parameter wasn't provided in the correct way.

Value

Returns a data frame.

Multi functions: Returns a list of data frames or a stacked data frame.

See Also

Functions that can export with style: `frequencies()`, `crosstabs()`, `any_table()`, `export_with_style()`.

Creating a custom table style: `excel_output_style()`, `modify_output_style()`, `number_format_style()`, `modify_number_formats()`.

Global style options: `set_style_options()`, `set_labels()`.

Examples

```
# Example files
csv_file  <- system.file("extdata", "qol_example_data_csv.csv",   package = "qol")
txt_file  <- system.file("extdata", "qol_example_data_txt.txt",   package = "qol")
xlsx_file <- system.file("extdata", "qol_example_data_xlsx.xlsx", package = "qol")

# Import: Provide full file path
my_csv  <- import_data(csv_file)
my_csv  <- import_data(txt_file)
my_xlsx <- import_data(xlsx_file)

# Import specific regions
range_import <- import_data(xlsx_file, region = "B4:H32")
name_import  <- import_data(xlsx_file, region = "test_region")

# Import from another sheet
sheet_import <- import_data(xlsx_file, sheet = "Sheet 2")

# Import multiple files at once
all_files <- import_multi(c(csv_file, txt_file, xlsx_file))

# Example data frame
my_data <- dummy_data(100)

# Example export file paths
export_csv  <- tempfile(fileext = ".csv")
export_txt  <- tempfile(fileext = ".txt")
export_xlsx <- tempfile(fileext = ".xlsx")

# Export: Provide full file path
my_data |> export_data(export_csv)
my_data |> export_data(export_txt)
my_data |> export_data(export_xlsx)
```

```
# Example data frame list
my_list <- list(first      = dummy_data(10),
                second.txt = dummy_data(10))

# Export multiple data frames into one xlsx file
# with multiple sheets
export_multi(my_list, tempdir())

# Export multiple data frames into multiple xlsx files
export_multi(my_list, tempdir(), into_sheets = FALSE)

# Export multiple data frames into multiple csv/txt files
export_multi(my_list, tempdir(), separator = ";")

# Manual cleanup for example
file1 <- file.path(tempdir(), "my_list.xlsx")
file2 <- file.path(tempdir(), "first.xlsx")
file3 <- file.path(tempdir(), "second.xlsx")
file4 <- file.path(tempdir(), "first.csv")
file5 <- file.path(tempdir(), "second.txt")

unlink(c(export_csv, export_xlsx,
         file1, file2, file3, file4, file5))
```

`inverse` *Get Variable Names Which Are Not Part Of The Given Vector*

Description

If you have stored variable names inside a character vector, this function gives you the inverse variable name vector.

Usage

```
inverse(data_frame, var_names)
```

Arguments

`data_frame`	The data frame from which to take the variable names.
`var_names`	A character vector of variable names.

Value

Returns the inverse vector of variable names compared to the given vector.

Examples

```
# Example data frame
my_data <- dummy_data(1000)

# Get variable names
var_names <- c("year", "age", "sex")
other_names <- my_data |> inverse(var_names)

# Can also be used to just get all variable names
all_names <- my_data |> inverse()
```

---

libname *Check If Path Exists And Retrieve Files*

Description

libname() checks if a given path exists and writes a message in the console accordingly. Optional all files from the given path can be retrieved as a named character vector.

Usage

```
libname(path, get_files = FALSE, extensions = NULL, recursive = FALSE)
```

Arguments

path	A folder path.
get_files	FALSE by default. If TRUE returns a named character vector containing file paths.
extensions	Specify file extensions to be kept in the list when retrieving files.
recursive	FALSE by default. If TRUE scans the provided folder for additional files inside sub folders. Only work in combination with get_files = TRUE.

Value

Returns the given file path or a named character vector containing file paths.

Examples

```
my_path   <- libname("C:/My_Path/")
file_list <- libname("C:/My_Path/", get_files = TRUE)
```

`macro` *Resolve Macro Variables In A Text*

Description

Variables written with a leading "&" inside a text will be resolved into the character or numeric expression the corresponding object is holding.

Usage

```
macro(text)

apply_macro(character_vector)
```

Arguments

`text`	A text containing macro variables to resolve.
`character_vector`	A vector containing multiple character expressions in which to resolve macro variables.

Details

Macro variables in 'SAS' can be set up with %Let and can act as global accessible variables. This in itself is nothing special to 'R' because basically every object created outside a function is a global variable.

To use these global objects within a text one has to use e.g. paste0("The current year is: ", year). With the macro function one can write it like this: macro("The current year is &year").

So where is the benefit? If implemented within a function, a parameter like "title" or "footnote" in the tabulation functions, can resolve these variables without the need of another function. You can just pass the character expression "The current year is &year" and the implementation inside the function resolves the macro variable directly in place.

Value

`macro()`: Returns a character.

`apply_macro()`: Returns a character vector.

See Also

Functions that can make use of macro variables: `any_table()`, `frequencies()`, `crosstabs()`, `export_with_style()`, `summarise_plus()`

Within the tabulation functions titles, footnotes, var_labels and stat_labels can resolve macros. Additionally they can be used in the `any_table()` rows, columns, values, by, pct_group, pct_value, pct_block and box parameter and in the `summarise_plus()` class, values and types parameter.

Macros can also be used inside the formats parameter of all functions that accept it. Both the variable names and the format names can be built with macros, e.g. list("&variable_name" = "&format_name").

Examples

```
# Resolving macro variable in single character
year <- 2026

text <- macro("The current year is &year")

# You can also combine multiple macro variables
some_variable <- "current"
current2026   <- "The current year is"

text_combi <- macro("&&some_variable&year &year")

# Resolving macro variable in character vector
char_vector <- c("The current year is &year",
                 "The &some_variable year is &year",
                 "&&some_variable&year &year")

text_vector <- apply_macro(char_vector)
```

`messages` *Print Styled Messages*

Description

Printing styled messages for different occasions. There are notifications, warnings, errors, function call headlines, progress and function closing messages. Or just a neutral one.

Usage

```
print_message(
  type,
  text,
  ...,
  always_print = FALSE,
  utf8 = .qol_messages[["format"]][["utf8"]],
  no_color = .qol_messages[["no_color"]]
)

print_headline(
  text,
  ...,
  line_char = "=",
  max_width = getOption("width"),
```

```
  always_print = FALSE,
  utf8 = .qol_messages[["format"]][["utf8"]],
  no_color = .qol_messages[["no_color"]]
)

print_start_message(
  current_time = Sys.time(),
  caller_color = "#63C2C9",
  always_print = FALSE,
  suppress = FALSE,
  utf8 = .qol_messages[["format"]][["utf8"]],
  no_color = .qol_messages[["no_color"]]
)

print_closing(
  time_threshold = 2,
  start_time = .qol_messages[["start_time"]],
  caller_color = "#63C2C9",
  always_print = FALSE,
  suppress = FALSE,
  utf8 = .qol_messages[["format"]][["utf8"]],
  no_color = .qol_messages[["no_color"]]
)

print_step(
  type,
  text,
  ...,
  in_place = FALSE,
  always_print = FALSE,
  utf8 = .qol_messages[["format"]][["utf8"]],
  no_color = .qol_messages[["no_color"]]
)

set_up_custom_message(
  type = "UNICORN",
  color = "#FF00FF",
  ansi_icon = NULL,
  text_icon = "^",
  ansi_wait_icon = NULL,
  text_wait_icon = "?",
  indent = 1,
  text_bold = FALSE,
  text_italic = FALSE,
  text_underline = FALSE,
  text_color = NULL,
  time_color = "#6B6B6B"
)
```

Arguments

type	If displayed as a normal note, then this is the text displayed in front of the message. This also appears as type in the message stack.
text	The message text to display.
...	Additional information to display like variable names. To use these write [NAME YOU PUT IN] in the text.
always_print	FALSE by default. If TRUE, prints headlines even in deeper nested situations.
utf8	Whether to display complex characters or just plain text.
no_color	Whether to display color codes or suppress them.
line_char	The character that that forms the line.
max_width	The maximum number of characters drawn, which determines the line length of the headline.
current_time	The current time to create a time stamp.
caller_color	Hex color code for the displayed caller function.
suppress	FALSE by default. If TRUE triggers all the message procedures to create a message stack but doesn't print the message to the console.
time_threshold	The total time spent is displayed in different colors from green over yellow to red, depending on the threshold specified (in seconds).
start_time	The time at which the function call started to calculate the time difference and output the total time spent.
in_place	Prints the step message on the same line as before, instead of in the next line. This can e.g. be used inside loops.
color	The color of the message type.
ansi_icon	The icon used when message is displayed in utf8 mode.
text_icon	The icon used when message is displayed in text only mode.
ansi_wait_icon	The icon used when a timed message is waiting for the end of execution displayed in utf8 mode.
text_wait_icon	The icon used when a timed message is waiting for the end of execution displayed in text only mode.
indent	How many spaces to indent the message.
text_bold	FALSE by default. If TRUE prints the message text in bold letters.
text_italic	FALSE by default. If TRUE prints the message text in italic letters.
text_underline	FALSE by default. If TRUE prints the message text underlined.
text_color	The color of the actual message text.
time_color	The color used for the time stamps.

Details

The message types in which you can enter custom texts, are capable of using different styling operators. These are:

- Insert list of elements: [vector_name]
- Adding conditional words, if list of elements has more than one element: [?word]
- Adding conditional singular/plural, depending on list of element length: [?singular/plural]
- Bold, italic and underline: [b]some text[/b], [i]some text[/i], [u]some text[/u]
- Coloring parts of the message: [#FF00FF some text]

Value

Return text without styling or total running time.

`set_up_custom_message()`: Returns the global list of custom messages.

See Also

Also have a look at the small helpers: `get_message_stack()`, `set_no_print()`, `set_no_color()`, `print_stack_as_messages()`, `convert_square_brackets()`

Examples

```
# Example messages
print_message("NOTE", c("Just a quick note that you can also insert e.g.[? a / ]variable",
                        "name[?s] like this: [listing].",
                      "Depending on the number of variables you can also alter the text."),
              listing = c("age", "state", "NUTS3"))

print_message("WARNING", "Just a quick [#FF00FF colored warning]!")

print_message("ERROR", "Or a [b]bold[/b], [i]italic[/i] and [u]underlined[/u] error.")

print_message("NEUTRAL", c("You can also just output [u]plain text[/u] if you like and use",
                       "[#FFFF00 [b]all the different[/b] [i]formatting options.[/i]]"))

# Different headlines
print_headline("This is a headline")

print_headline("[#00FFFF This is a different headline] with some color",
               line_char = "-")

print_headline("[b]This is a very small[/b] and bold headline",
               line_char = ".",
               max_width = 60)

# Messages with time stamps
test_func <- function(){
    print_start_message()
    print_step("GREY", "Probably not so important")
    print_step("MAJOR", "This is a major step...")
```

```
    print_step("MINOR", "Sub step1")
    print_step("MINOR", "Sub step2")
    print_step("MINOR", "Sub step3")
    print_step("MAJOR", "[b]Finishing... [/b][#00FFFF with some color again!]")
    print_closing()
}

test_func()

# See what is going on in the message stack
message_stack <- get_message_stack()

# Print messages on the same line instead of below each other
in_place_steps <- function(){
    print_start_message()

    print_step("MAJOR", "Let's get started...")

    for (i in seq_len(10)){
        print_step("Minor", "This is in place step [i] of 10", i = i, in_place = TRUE)
        Sys.sleep(0.25)
    }

    print_step("MAJOR", "Loop has ended")

    print_closing()
}

in_place_steps()

# Set up a custom message
set_up_custom_message(type           = "HOTDOG",
                      color          = "#B27A01",
                      ansi_icon      = "\U0001f32d",
                      text_icon      = "IOI",
                      ansi_wait_icon = "\U00023f1",
                      text_wait_icon = "/",
                      indent         = 1)

hotdog_print <- function(){
    print_start_message()
    print_message("HOTDOG", c("This is the first hotdog message! Hurray!",
                              "And it is also multiline in this version."))
    print_step("HOTDOG", "Or use as single line message with time stamps.")
    Sys.sleep(0.5)
    print_step("HOTDOG", "Or use as single line message with time stamps.")
    Sys.sleep(0.5)
    print_step("HOTDOG", "Or use as single line message with time stamps.")
    Sys.sleep(0.5)
    print_closing()
}

hotdog_print()
```

```
# See new message in the message stack
hotdog_stack <- get_message_stack()
```

`message_helpers` *Message Helper Functions*

Description

`get_message_stack()`: Retrieves the current message stack as list or data frame.

`set_no_print()`: FALSE by default. If set to TRUE the messages will be formatted and returned but not printed to the console. Can e.g. be used in unit test situations.

`set_no_color()`: TRUE by default. Suppresses the color codes so that messages can be printed clean.

`print_stack_as_messages()`: Prints the message stack as actual messages (only not suppressed messages). Can be used to trigger expect_message, expect_warning or expect_error in unit tests.

`convert_square_brackets()`: Convert different curly bracket patterns into ansi formatting or passes the context of vectors into the text.

Usage

```
get_message_stack(as_data_frame = FALSE)

set_no_print(value = FALSE)

set_no_color(value = TRUE)

print_stack_as_messages(type = NULL)

convert_square_brackets(text, ...)
```

Arguments

`as_data_frame`	FALSE by default. If TRUE returns message stack information as data frame.
`value`	Can be TRUE or FALSE.
`type`	The message type to filter.
`text`	The text in which to replace the curly brackets.
`...`	The actual replacement vectors.

Details

The message types in which you can enter custom texts, are capable of using different styling operators. These are:

- Insert list of elements: [vector_name]
- Adding conditional words, if list of elements has more than one element: [?word]
- Adding conditional singular/plural, depending on list of element length: [?singular/plural]
- Bold, italic and underline: [b]some text[/b], [i]some text[/i], [u]some text[/u]
- Coloring parts of the message: [#FF00FF some text]

Value

`get_message_stack()`: Returns a list of messages or a data frame.

`set_no_print()`: Returns the global no_print option.

`set_no_color()`: Returns the global no_color option.

`print_stack_as_messages()`: Returns NULL.

`convert_square_brackets()`: Returns formatted text.

See Also

Main printing functions: `print_message()`, `print_headline()`, `print_start_message()`, `print_closing()`, `print_step()`, `set_up_custom_message()`

`modify_number_formats` *Modify Number Formats Used by* `any_table()`

Description

Modify previously created number formats with `number_format_style()`.

Usage

```
modify_number_formats(formats_to_modify, ...)
```

Arguments

`formats_to_modify`	Pre created number formats where only certain elements should be modified while the rest is kept as is.
`...`	Pass in names and corresponding new values for existing number formats.

Details

modify_number_formats() is based on 'SAS' number formats and the Output Delivery System (ODS), which provides efficient and readable ways to set up different table styles.

With the number format style you have full control over formatting numbers according to the different statistics. There is no need to think about calculating the right place to input the number formats and how to do this in a loop for multiple cells. Just input the different number formats and decimals for the different statistics and everything else is handled by the functions capable of using number styles.

The concept basically is: design over complex calculations.

Value

Returns a modified list of number format options.

See Also

Creating a custom table style: excel_output_style(), modify_output_style(), number_format_style().

Global style options: set_style_options(), set_labels().

Functions that can handle styles: frequencies(), crosstabs(), any_table(), export_with_style().

Examples

```
# For default values
format_list <- number_format_style(pct_excel    = "0.00000000",
                                   pct_decimals = 8)

# Set specific options, the rest will be kept as is
format_list <- format_list |> modify_number_formats(sum_excel = "#,###,##0.000")

# IMPORTANT: Don't forget to add individual formats to an excel style, otherwise
# they won't come into affect.
excel_style <- excel_output_style(number_formats = format_list)
```

---

modify_output_style *Modify Style for 'Excel' Table Outputs*

Description

Modify a previously created style with excel_output_style().

Usage

```
modify_output_style(style_to_modify, ...)
```

Arguments

style_to_modify
: A pre created style where only certain elements should be modified while the rest is kept as is.

...
: Pass in names and corresponding new values for existing style elements.

Details

modify_output_style() is based on the Output Delivery System (ODS) in 'SAS', which provides efficient and readable ways to set up different table styles.

With the output style you have full control over the table design. There is no need to think about calculating the right place to input a background color or a border of a certain type and how to do this in a loop for multiple cells. Just input colors, borders, font styles, etc. for the different table parts and everything else is handled by the functions capable of using styles.

The concept basically is: design over complex calculations.

Value

Returns a modified list of named style options.

See Also

Creating a custom table style: excel_output_style(), number_format_style(), modify_number_formats().

Global style options: set_style_options(), set_labels().

Functions that can handle styles: frequencies(), crosstabs(), any_table(), export_with_style()

Examples

```
# For default values
excel_style <- excel_output_style()

# Set specific options, the rest will be kept as is
excel_style <- excel_style |> modify_output_style(sheet_name      = "Sheet",
                                                  title_font_bold = FALSE)

# For cells with no background color pass an empty string
excel_style <- excel_style |> modify_output_style(table_back_color = "")
```

---

multi_join *Join Multiple Data Frames In One Go*

Description

Join two or more data frames together in one operation. multi_join() can handle multiple different join methods and can join on differently named variables.

Usage

```
multi_join(
  data_frames,
  on,
  how = "left",
  keep_indicators = FALSE,
  monitor = .qol_options[["monitor"]]
)
```

Arguments

data_frames	A list of data frames to join together. The second and all following data frames will be joined on the first one.
on	The key variables on which the data frames should be joined. If a character vector is provided, the function assumes all the variables are in every data frame. To join on different variable names a named list of character vectors has to be provided, with one list entry per data frame. If the first data frame should be joined on different variables with each following data frame, its list entry can be a list of character vectors with one vector per join. If fewer combinations are provided than there are remaining data frames, the last combination is repeated.
how	A character vector containing the join method names. Available methods are: left, right, inner, full, outer, left_inner and right_inner.
keep_indicators	FALSE by default. If TRUE, a variable for each data frame is created, which indicates whether a data frame provides values.
monitor	FALSE by default. If TRUE, outputs two charts to visualize the functions time consumption.

Details

multi_join() is based on the 'SAS' Data-Step function Merge. Merge is capable of joining multiple data sets together at once, with a very basic syntax.

Provide the dataset names, the variables, on which they should be joined and after a full join is complete, the user can decide which parts of the joins should remain in the final dataset.

multi_join() tries to keep the simplicity, while giving the user the power, to do more joins at the same time. Additionally to what Merge can do, this function also makes use of the Proc SQL possibility to join datasets on different variable names.

All data frames are joined on the first one. The first data frame can therefore be joined on different variables with each following data frame, similar to a SQL statement with multiple JOIN clauses.

Value

Returns a single data frame with joined variables from all given data frames.

Examples

```
# Example data frames
df1 <- data.frame(key = c(1, 1, 1, 2, 2, 2),
                  a   = c("a", "a", "a", "a", "a", "a"))

df2 <- data.frame(key = c(2, 3),
                  b   = c("b", "b"))

# See all different joins in action
join_methods <- c("left", "right", "inner", "full", "outer", "left_inner", "right_inner")
joined_data  <- list()

for (method in seq_along(join_methods)){
    joined_data[[method]] <- multi_join(list(df1, df2),
                                        on  = "key",
                                        how = join_methods[[method]])
}

# Left join on more than one key
df1b <- data.frame(key1 = c(1, 1, 1, 2, 2, 2),
                   key2 = c("a", "a", "a", "a", "a", "a"),
                   a    = c("a", "a", "a", "a", "a", "a"))

df2b <- data.frame(key1 = c(2, 3),
                   key2 = c("a", "a"),
                   b    = c("b", "b"))

left_joined <- multi_join(list(df1b, df2b), on = c("key1", "key2"))

# Join more than two data frames
df3 <- data.frame(key = c(1, 2),
                  c   = c("c", "c"))

multiple_joined <- multi_join(list(df1, df2, df3), on = "key")

# You can also use different methods for each join
multiple_joined2 <- multi_join(list(df1, df3, df2),
                               on  = "key",
                               how = c("left", "right"))

# Joining on different variable names
df1c <- data.frame(key1 = c(1, 1, 1, 2, 2, 2),
                   key2 = c("a", "a", "a", "a", "a", "a"),
                   a    = c("a", "a", "a", "a", "a", "a"))

df2c <- data.frame(var1 = c(2, 3),
                   var2 = c("a", "a"),
                   b    = c("b", "b"))

df3c <- data.frame(any  = c(1, 2),
                   name = c("a", "a"),
                   c    = c("c", "c"))
```

```
multiple_joined3 <- multi_join(list(df1c, df2c, df3c),
                               on = list(df1c = c("key1", "key2"),
                                         df2c = c("var1", "var2"),
                                         df3c = c("any", "name")))

# Joining the first data frame on different variables with each following data frame
df1d <- data.frame(key1 = c(1, 1, 2),
                   key2 = c("a", "a", "b"),
                   key3 = c(10, 20, 20),
                   a    = "a")

df2d <- data.frame(var1 = c(1, 2),
                   var2 = c("a", "b"),
                   b    = "b")

df3d <- data.frame(any  = c("a", "a", "b"),
                   name = c(10, 20, 20),
                   c    = "c")

multiple_joined4 <- multi_join(list(df1d, df2d, df3d),
                           on = list(df1d = list(c("key1", "key2"), c("key3", "key2")),
                                     df2d = c("var1", "var2"),
                                     df3d = c("name", "any")))
```

---

number_format_style *Number Formats Used by* any_table()

Description

Set individual number formats for the different statistics in tables produced with any_table().

Usage

```
number_format_style(
  pct_excel = "0.0",
  freq_excel = "#,###,##0",
  freq.g0_excel = "#,###,##0",
  sum_excel = "#,###,##0",
  sum.wgt_excel = "#,###,##0",
  mean_excel = "#,###,##0",
  median_excel = "#,###,##0",
  mode_excel = "#,###,##0",
  min_excel = "#,###,##0",
  max_excel = "#,###,##0",
  sd_excel = "#,###,##0.000",
  variance_excel = "#,###,##0.000",
  first_excel = "#,###,##0",
```

```
  last_excel = "#,###,##0",
  p_excel = "#,###,##0",
  missing_excel = "#,###,##0",
  pct_decimals = 1,
  freq_decimals = 0,
  freq.g0_decimals = 0,
  sum_decimals = 3,
  sum.wgt_decimals = 3,
  mean_decimals = 2,
  median_decimals = 2,
  mode_decimals = 2,
  min_decimals = 2,
  max_decimals = 2,
  sd_decimals = 3,
  variance_decimals = 3,
  first_decimals = 0,
  last_decimals = 0,
  p_decimals = 2,
  missing_decimals = 0
)
```

Arguments

pct_excel	Number format for percentage applied in Excel workbook.
freq_excel	Number format for frequency applied in Excel workbook.
freq.g0_excel	Number format for frequency greater zero applied in Excel workbook.
sum_excel	Number format for sum applied in Excel workbook.
sum.wgt_excel	Number format for sum of weights applied in Excel workbook.
mean_excel	Number format for mean applied in Excel workbook.
median_excel	Number format for median applied in Excel workbook.
mode_excel	Number format for mode applied in Excel workbook.
min_excel	Number format for min applied in Excel workbook.
max_excel	Number format for max applied in Excel workbook.
sd_excel	Number format for sd applied in Excel workbook.
variance_excel	Number format for variance applied in Excel workbook.
first_excel	Number format for first applied in Excel workbook.
last_excel	Number format for last applied in Excel workbook.
p_excel	Number format for percentile applied in Excel workbook.
missing_excel	Number format for missing applied in Excel workbook.
pct_decimals	Number of decimals for percentage.
freq_decimals	Number of decimals for frequency.
freq.g0_decimals	Number of decimals for frequency greater zero.

`sum_decimals` Number of decimals for sum.

`sum.wgt_decimals` Number of decimals for sum of weights.

`mean_decimals` Number of decimals for mean.

`median_decimals` Number of decimals for median.

`mode_decimals` Number of decimals for mode.

`min_decimals` Number of decimals for min.

`max_decimals` Number of decimals for max.

`sd_decimals` Number of decimals for sd.

`variance_decimals` Number of decimals for variance.

`first_decimals` Number of decimals for first.

`last_decimals` Number of decimals for last.

`p_decimals` Number of decimals for percentile.

`missing_decimals` Number of decimals for missing.

Details

`number_format_style()` is based on 'SAS' number formats and the Output Delivery System (ODS), which provides efficient and readable ways to set up different table styles.

With the number format style you have full control over formatting numbers according to the different statistics. There is no need to think about calculating the right place to input the number formats and how to do this in a loop for multiple cells. Just input the different number formats and decimals for the different statistics and everything else is handled by the functions capable of using number styles.

The concept basically is: design over complex calculations.

Value

Returns a list of named number format options.

See Also

Creating a custom table style: `excel_output_style()`, `modify_output_style()`, `modify_number_formats()`.

Global style options: `set_style_options()`, `set_labels()`.

Functions that can handle styles: `frequencies()`, `crosstabs()`, `any_table()`, `export_with_style()`

Examples

```
# For default values
format_list <- number_format_style()

# Set specific options, the rest will be set to default values
format_list <- number_format_style(pct_excel    = "0.00000000",
```

```
                                    pct_decimals = 8)

# IMPORTANT: Don't forget to add individual formats to an excel style, otherwise
# they won't come into affect.
excel_style <- excel_output_style(number_formats = format_list)
```

---

qol_chat *Go To GitHub NEWS Page*

Description

Opens browser and goes to the DeepWiki page

Usage

```
qol_chat()
```

Value

URL.

---

qol_news *Go To GitHub NEWS Page*

Description

Opens browser and goes to the Github NEWS page

Usage

```
qol_news()
```

Value

URL.

qol_options *Set Global Print Option*

Description

set_print(): Set the print option globally for the tabulation and export to Excel functions.

get_print(): Get the globally stored print option.

set_monitor(): Set the monitor option globally for the heavier functions which are able to show how they work internally.

get_monitor(): Get the globally stored monitor option.

set_na.rm(): Set the na.rm option globally for each function which can remove NA values.

get_na.rm(): Get the globally stored na.rm option.

set_print_miss(): Set the print_miss option globally for each function which can display missing categories.

get_print_miss(): Get the globally stored print_miss option.

set_output(): Set the output option globally for each function that can output results to "console", "text", "excel", "excel_nostyle", "html", "excel_html" or "no".

get_output(): Get the globally stored output option.

set_titles(): Set the titles globally for each function that can print titles above the output table.

get_titles(): Get the globally stored titles.

set_footnotes(): Set the footnotes globally for each function that can print footnotes above the output table.

get_footnotes(): Get the globally stored footnotes.

set_threads(): Globally sets the number of used threads for the save and load file functions.

get_threads(): Get the globally stored number of used threads.

Usage

```
set_print(...)

get_print()

set_monitor(...)

get_monitor()

set_na.rm(...)

get_na.rm()

set_print_miss(...)
```

```
get_print_miss()

set_output(...)

get_output()

set_titles(...)

get_titles()

set_footnotes(...)

get_footnotes()

set_threads(...)

get_threads()
```

Arguments

...	set_threads(): Put in the number of threads to use or NULL to reset.

Value

set_print(): Changed global print option.

get_print(): TRUE or FALSE.

set_monitor(): Changed global monitor option.

get_monitor(): TRUE or FALSE.

set_na.rm(): Changed global na.rm option.

get_na.rm(): TRUE or FALSE.

set_print_miss(): Changed global print_miss option.

get_print_miss(): TRUE or FALSE.

set_output(): Changed global output option.

get_output(): Current output option as character.

set_titles(): Changed global titles.

get_titles(): Current titles as character.

set_footnotes(): Changed global footnotes.

get_footnotes(): Current footnotes as character.

set_threads(): Changed global number of used threads.

get_threads(): Current number of used threads.

Examples

```
# Set and get the global print option
set_print(FALSE)
set_print(TRUE)

get_print()

# Set and get the global monitor option
set_monitor(TRUE)
set_monitor(FALSE)

get_monitor()

# Set and get the global NA removal option
set_na.rm(TRUE)
set_na.rm(FALSE)

get_na.rm()

# Set and get the global print missing option
set_print_miss(TRUE)
set_print_miss(FALSE)

get_print_miss()

# Set and get the global output option
set_output("excel")

get_output()

# Set and get table titles globally
set_titles("This is title number 1 link: https://cran.r-project.org/",
           "This is title number 2 cell: W22",
           "This is title number 3 file: C:/MyFolder/MyFile.docx",
           "This is title number 4")

# To reset titles do
set_titles(NULL)

get_titles()

# Set and get table footnotes globally
set_footnotes("This is footnote number 1 link: https://cran.r-project.org/",
              "This is footnote number 2 cell: W22",
              "This is footnote number 3 file: C:/MyFolder/MyFile.docx",
              "This is footnote number 4")

# To reset footnotes do
set_footnotes(NULL)

get_footnotes()
```

```
# Set and get used threads globally
set_threads(8)

get_threads()
```

---

recode *Recode New Variables With Formats*

Description

Instead of writing multiple if-clauses to recode values into a new variable, you can use formats to recode a variable into a new one.

Usage

```
recode.(data_frame, ...)

recode_multi(data_frame, ..., convert = TRUE)
```

Arguments

data_frame	A data frame which contains the the original variables to recode.
...	recode.() Pass in the original variable name that should be recoded along with the corresponding format container in the form: variable = format. In recode_multi() multiple variables can be recoded in one go and multilabels can be applied. This overwrites the original variables and duplicates rows if multilabels are applied. In occasions were you want to use format containers to afterwards perform operations with other packages, you can make use of this principle with this function.
convert	TRUE by default. Converts recoded variables to numeric or character depending on the input format instead of leaving them as factors.

Details

recode.() is based on the 'SAS' function put(), which provides an efficient and readable way, to generate new variables with the help of formats.

When creating a format you can basically write code like you think: This new category consists of these original values. And after that you just apply these new categories to the original values to create a new variable. No need for multiple if_else statements.

Value

recode.(): If one variable is provided, returns a vector with recoded values. If multiple variables are provided, returns a list of recoded vectors which can be assigned to multiple new variables at once.

recode_multi(): Returns a data frame with the newly recoded variable.

See Also

Creating formats: discrete_format() and interval_format().

Functions that also make use of formats: frequencies(), crosstabs(), any_table(), summarise_plus(), transpose_plus(), sort_plus()

Examples

```
# Example formats
age. <- discrete_format(
    "under 18"       = 0:17,
    "18 to under 25" = 18:24,
    "25 to under 55" = 25:54,
    "55 to under 65" = 55:64,
    "65 and older"   = 65:100)

# Example data frame
my_data <- dummy_data(1000)

# Call function
my_data[["age_group1"]] <- my_data |> recode.(age = age.)

# Formats can also be passed as characters
my_data[["age_group2"]] <- my_data |> recode.(age = "age.")

# Multiple variables can be recoded at once into multiple new variables
income. <- interval_format(
    "below 500"          =    0:500,
    "500 to under 1000"  =  500:1000,
    "1000 to under 2000" = 1000:2000,
    "2000 and more"      = 2000:100000)

my_data[, c("age_group", "income_group")] <- my_data |>
    recode.(age = age., income = income.)

# Multilabel recode
sex. <- discrete_format(
    "Total"  = 1:2,
    "Male"   = 1,
    "Female" = 2)

income_multi. <- interval_format(
    "Total"              =    0:100000,
    "below 500"          =    0:500,
    "500 to under 1000"  =  500:1000,
    "1000 to under 2000" = 1000:2000,
    "2000 and more"      = 2000:100000)

# recode_multi() can not only apply multiple recodings, but it can also
# apply multilabels.
# NOTE: Recoding will always be in place. When applying multilabels the
#       result data frame will have more observations than before.
multi_data <- my_data |> recode_multi(sex = sex., income = income_multi.)
```

`remove_blanks` *Remove Blanks*

Description

Removes leading and trailing blanks or both. Can also remove all blanks from a character or normalize multiple blanks to single ones.

Usage

```
remove_blanks(data_frame, variable, which = "all")
```

Arguments

`data_frame`	A data frame which contains the character variables from which blanks should be removed.
`variable`	Variable name of the one from which to remove blanks.
`which`	"all" by default. Can be "leading", "trailing", "trim", "normalize" or "all". Determines which blanks should be removed

Value

Returns a character vector with removed blanks.

See Also

Other character manipulating functions: `concat()`, `sub_string()`

Examples

```
# Example data frame
my_data <- dummy_data(100)
my_data[["blanks"]] <- " This  is  a  test "

# Remove blanks
my_data[["leading"]]   <- my_data |> remove_blanks(blanks, which = "leading")
my_data[["trailing"]]  <- my_data |> remove_blanks(blanks, which = "trailing")
my_data[["trim"]]      <- my_data |> remove_blanks(blanks, which = "trim")
my_data[["all"]]       <- my_data |> remove_blanks(blanks, which = "all")
my_data[["normalize"]] <- my_data |> remove_blanks(blanks, which = "normalize")
```

remove_stat_extension *Replace Statistic From Variable Names*

Description

Remove the statistic name from variable names, so that they get back their old names without extension.

Usage

```
remove_stat_extension(data_frame, statistics)
```

Arguments

data_frame	The data frame in which there are variables to be renamed.
statistics	Statistic extensions that should be removed from the variable names.

Value

Returns a data frame with renamed variables.

Examples

```
# Example data frame
my_data <- dummy_data(1000)

# Summarise data
all_nested <- my_data |>
    summarise_plus(class      = c(year, sex),
                   values     = c(weight, income),
                   statistics = c("sum", "pct_group", "pct_total", "sum_wgt", "freq"),
                   weight     = weight,
                   nesting    = "deepest",
                   na.rm      = TRUE)

# Remove statistic extension
new_names <- all_nested |> remove_stat_extension("sum")
```

rename_multi *Rename One Or More Variables*

Description

Can rename one or more existing variable names into the corresponding new variable names in one go.

Usage

```
rename_multi(data_frame, ...)
```

Arguments

data_frame	The data frame which contains the variable names to be renamed.
...	Pass in variables to be renamed in the form: "old_var" = "new_var".

Value

Returns a data_frame with renamed variables.

Examples

```
# Example data frame
my_data <- dummy_data(10)

# Rename multiple variables at once
new_names_df <- my_data |> rename_multi(sex   = var1,
                                        age   = var2,
                                        state = var3)

# Also works with variable names in quotation marks
new_names_df <- my_data |> rename_multi("sex"   = "var1",
                                        "age"   = "var2",
                                        "state" = "var3")

# It is also possible to rename variables stored in vectors
old_names <- c("sex", "age", "state")
new_names <- c("var1", "var2", "var3")

new_names_df <- my_data |> rename_multi(old_names = new_names)

# Single variables and vectors can be mixed in one call
old_names <- c("income", "balance")
new_names <- c("var1", "var2")

new_names_df <- my_data |> rename_multi(sex       = var3,
                                        old_names = new_names)
```

---

rename_pattern *Replace Patterns Inside Variable Names*

Description

Replace a certain pattern inside a variable name with a new one. This can be used if there are multiple different variable names which have a pattern in common (e.g. all end in "_sum" but start different), so that there don't have to be multiple rename variable calls.

Usage

```
rename_pattern(data_frame, old_pattern, new_pattern)
```

Arguments

data_frame	The data frame in which there are variables to be renamed.
old_pattern	The pattern which should be replaced in the variable names.
new_pattern	The pattern which should be set in place for the old one.

Value

Returns a data frame with renamed variables.

Examples

```
# Example data frame
my_data <- dummy_data(1000)

# Summarise data
all_nested <- my_data |>
    summarise_plus(class      = c(year, sex),
                   values     = c(weight, income),
                   statistics = c("sum", "pct_group", "pct_total", "sum_wgt", "freq"),
                   weight     = weight,
                   nesting    = "deepest",
                   na.rm      = TRUE)

# Rename variables by repacing patterns
new_names <- all_nested |>
    rename_pattern("pct", "percent") |>
    rename_pattern("_sum", "")
```

---

replace_except *Replace Patterns While Protecting Exceptions*

Description

Replaces a provided pattern with another, while protecting exceptions. Exceptions can contain the given pattern, but won't be changed during replacement.

Usage

```
replace_except(vector, pattern, replacement, exceptions = NULL)
```

Arguments

vector	A vector containing the texts, where a pattern should be replaced.
pattern	The pattern that should be replaced.
replacement	The new pattern, which replaces the old one.
exceptions	A character vector containing exceptions, which should not be altered.

Value

Returns a vector with replaced pattern.

Examples

```
# Vector, where underscores should be replaced
underscores <- c("my_variable", "var_with_underscores", "var_sum", "var_pct_total")

# Extensions, where underscores shouldn't be replaced
extensions <- c("_sum", "_pct_group", "_pct_total", "_pct_value", "_pct", "_freq_g0",
                "_freq", "_mean", "_median", "_mode", "_min", "_max", "_first",
                "_last", "_p1", "_p2", "_p3", "_p4", "_p5", "_p6", "_p7", "_p8", "_p9",
                "sum_wgt", "_sd", "_variance", "_missing")

# Replace
new_vector <- underscores |> replace_except("_", ".", extensions)
```

---

reporter *Print Styled Tinytest Results*

Description

Styles the results of tinytest to get a better visual overview.

`test_package()`: Runs all set up unit tests with tinytest and outputs the results with the custom reporter.

`test_single_file()`: Runs a single unit test file with tinytest.

Usage

```
report_test_results(tiny_results, utf8 = .qol_messages[["format"]][["utf8"]])

test_package(package_name, multithread = FALSE)

test_single_file(file_name)
```

Arguments

tiny_results	The results produced by tinytest.
utf8	Whether to display complex characters or just plain text.
package_name	Name of the package to test.
multithread	FALSE by default. Whether to run tests multithreaded. NOTE: To make this work you have to manually run devtools::install() first.
file_name	Name of the file to test.

Value

Returns the results.

Examples

```
# Example results
result_file <- system.file("extdata", "qol_tinytest_results.fst", package = "qol")
results     <- load_file(dirname(result_file), basename(result_file))

# Display results
results |> report_test_results()

# Normally you would do this:
# tinytest::test_all("PATH TO PACKAGE") |> report_test_results()
# or
# tinytest::test_package("PACKAGE NAME", testdir = "inst/tinytest") |> report_test_results()

# To test the whole package with the custom reporter use:
# test_package("qol")
```

---

round_values *Round Values With Half Rounded Up And Multiples Of X*

Description

This function rounds values according to DIN 1333 (round half up) or as an alternative in multiples of a given value.

round_multi(): Rounds multiple variables at once inside a data frame.

Usage

```
round_values(values, digits = 0, multiple = NULL)

round_multi(
  data_frame,
  variables,
```

```
  new_names = NULL,
  digits = 0,
  multiple = NULL
)
```

Arguments

values	Numeric values to round.
digits	The number of decimal places the values should be rounded to.
multiple	The multiple to round the values to.
data_frame	The data frame in which the variables to be rounded are found.
variables	The variable names of which to round the values.
new_names	The new names of the rounded variables. If provided adds variables, if not overwrites the existing variables with rounded values.

Value

round_values(): Returns rounded values.

round_multi(): Returns a data frame with rounded values.

Examples

```
# With vectors
round_numbers1 <- round_values(c(-0.5, -0.4, 0.1, 0.49, 0.5, 1.5, 2.5, 3.2))
round_numbers2 <- round_values(c(-0.5, -0.49, 0.17, 0.499, 0.51, 1.549, 2.51, 3.25),
                               digits = 1)
round_numbers3 <- round_values(c(-0.3, -0.24, 1.17, 2.749, 0.25, 1.549, 2.75, 3.25),
                               multiple = 0.5)

# With a data frame
my_data <- dummy_data(100)

my_data[["income_round1"]] <- my_data[["income"]] |> round_values()
my_data[["income_round2"]] <- my_data[["income"]] |> round_values(multiple = 100)


# Round multiple variables in a data frame
my_data <- my_data |> round_multi(variables = c(income,  expenses,  balance),
                                  new_names = c(incomeR, expensesR, balanceR),
                                  digits = 1)
```

row_calculation *Perform Row Wise Calculations*

Description

Perform row wise calculations on numeric variables.

Usage

```
row_calculation(data_frame, statistics, ..., round_digits = NULL)
```

Arguments

data_frame	A data frame in which are the values to be calculated.
statistics	Available functions: "sum", "freq", "mean", "median", "mode", "min", "max".
...	Variable names of the value variables.
round_digits	The number of decimal places the values should be rounded to.

Value

Returns a numeric vector.

Examples

```
# Example data frame
my_data <- data.frame(var1 = 1:5,
                      var2 = c(6, 7, 8, NA, 10),
                      var3 = 11:15)

# Calculate new variables
my_data[["sum"]]  <- my_data |> row_calculation("sum",  var1, var2, var3)
my_data[["mean"]] <- my_data |> row_calculation("mean", var1:var3)
```

run_scripts *Run 'R' Scripts Via File Dialog*

Description

Opens an RStudio file selection dialog to pick a single script/folder or a whole folder structure and runs it after confirmation. The dialog starts in the folder of the currently opened script in RStudio.

Single files and entire folders can be silenced (code will not be executed) by adding a "_" to the end of the file or folder name.

`run_script()`: Runs the selected script.

`run_folder()`: Runs all scripts in the selected folder.

run_project(): Runs all scripts found in a folder structure, including all scripts within subfolders, in sequential order.

run_project_parallel(): Runs all scripts found in a folder structure, including all scripts within subfolders. Folders, which are marked with an "!" at the end of their folder name, are run as background jobs in parallel, all other folders are run sequentially.

Usage

```
run_script(path = NULL)

run_folder(path = NULL)

run_project(path = NULL)

run_project_parallel(path = NULL)
```

Arguments

path	The folder in which the file selection dialog should start. If left out, the folder of the currently opened script in RStudio is used.

Details

Example structure for a larger project

Project folder

- Subfolder1
  - Script1.R
  - Script2.R
  - ...
- Subfolder2
  - ...
- ...
- Master.Rmd

If you open "Master.Rmd" in such a structure (the file can be completely empty) and simply run one of the commands in the console, a selection window opens which directly shows the path where the "Master.Rmd" file is located. Depending on the command, you can then select and run either a single script, all scripts in a folder, or all scripts in all folders of the project at once.

Note: If the master file has the extension "*.R", it is also picked up when running the project folder with run_project(). If it also contains code which runs files in the subfolders, things will be executed twice. Therefore it is better to use a different file type or to not add any code in it.

Value

Returns TRUE or FALSE.

See Also

Build master file: build_master()

---

save_load *Save And Load FST And RDS Files*

Description

save_file(): Saves fst and rds files. Offers variable selection and observation subsetting. By default the function has a write protection, which has to be explicitly turned off to be able to overwrite files.

save_file_multi(): Saves multiple files.

load_file(): Loads fst and rds files. Provided variables to keep are read in case insensitive and are returned in provided order. Additionally a subset can be defined directly.

load_file_multi(): Loads multiple files and stores them into a list or directly stacks the files into one data frame.

Usage

```
save_file(
  data_frame,
  path,
  file,
  keep = NULL,
  where = NULL,
  compress = 100,
  protect = TRUE,
  ...
)

save_file_multi(
  data_frame_list,
  file_list,
  keep_list = NULL,
  compress = 100,
  protect = TRUE
)

load_file(
  path,
  file,
  keep = NULL,
  where = NULL,
  keep_var_order = FALSE,
  by_reference = FALSE,
  ...
```

```
)

load_file_multi(
  file_list,
  keep_list = NULL,
  stack_files = TRUE,
  keep_var_order = FALSE,
  by_reference = FALSE
)
```

Arguments

data_frame	The data fame to be saved.
path	The file path to save to/load from.
file	The file name including the file extension.
keep	The variables to keep in the file.
where	A condition on which to subset the observations.
compress	The amount of compression to use from 0 to 100. The lower the value, the larger the file size and faster the saving speed. Uses maximum compression by default.
protect	TRUE by default. Throws an error if a file already exists. If FALSE, overwrites existing files.
...	Used internally to suppress messages, when using the multi save/load version.
data_frame_list	A list of data frames.
file_list	A character vector containing full file paths.
keep_list	Can be a single variable name, a vector or a list of vectors containing the variables to keep per file. If there are fewer list entries than files to load, the last list element will be used repeatedly.
keep_var_order	FALSE by default. If TRUE, keeps the variables in order of appearance and ignores the order provided in the keep parameter. If FALSE orders the variables in the keep order.
by_reference	Don't load the complete file into memory, instead just load a reference and only load what is needed on demand from disc. Only works with fst files.
stack_files	TRUE by default. Stacks data frames after loading them. If FALSE, returns all data frames in a list.

Value

Returns a data frame. `load_file_multi()` can also return a list of data frame.

Examples

```
# Example data frame
my_data <- dummy_data(100)
```

```
# Save files
# NOTE: Normally you would pass in the path and file as character. For the
#       examples this is handled differently to provide runnable examples.
my_data |> save_file(path = tempdir(),
                     file = "testfile.fst")
my_data |> save_file(path = tempdir(),
                     file = "testfile.rds")

# Save file and only keep specific variables
# NOTE: Since the temporary file already exists now if you run the above code,
#       all the following save operations would throw errors because by default
#       the function write protects existing files. So for the following examples
#       the write protection is turned off.
my_data |> save_file(path    = tempdir(),
                     file    = "testfile.fst",
                     keep    = c(sex, age, state),
                     protect = FALSE)

# Save file and subset observations
my_data |> save_file(path    = tempdir(),
                     file    = "testfile.fst",
                     where   = sex == 1 & age > 65,
                     protect = FALSE)

# Example lists
my_df_list <- list(dummy_data(10),
                   dummy_data(10))

file1 <- file.path(tempdir(), "first.fst")
file2 <- file.path(tempdir(), "second.rds")
my_file_list <- list(file1, file2)

# Save multiple files at once
save_file_multi(data_frame_list = my_df_list,
                file_list       = my_file_list,
                protect         = FALSE)

# Save multiple files and only keep specific variables
save_file_multi(data_frame_list = my_df_list,
                file_list       = my_file_list,
                keep_list       = c(sex, age, state),
                protect         = FALSE)

# Save multiple files and keep different variables per data frame
save_file_multi(data_frame_list = my_df_list,
                file_list       = my_file_list,
                keep_list       = list(c(person_id, first_person),
                                       c(NUTS3, income, weight)),
                protect         = FALSE)

unlink(c(file1, file2,
         file.path(tempdir(), "testfile.fst"),
         file.path(tempdir(), "testfile.rds")))
```

```
# Example files
fst_file <- system.file("extdata", "qol_example_data_fst.fst", package = "qol")
rds_file <- system.file("extdata", "qol_example_data_rds.rds", package = "qol")

# Load file
my_fst <- load_file(path = dirname(fst_file),
                    file = basename(fst_file))
my_rds <- load_file(path = dirname(rds_file),
                    file = basename(rds_file))

# Load file and only keep specific variables
# NOTE: Variable names can be written case insensitive. Meaning if a variable
#       is stored as "age" and you write "AGE" in keep, the function will find
#       the variable and rename it to "AGE".
my_fst_keep <- load_file(path = dirname(fst_file),
                         file = basename(fst_file),
                         keep = c(AGE, INCOME_class, State, weight))

# Load file and subset observations
my_fst_where <- load_file(path  = dirname(fst_file),
                          file  = basename(fst_file),
                          where = sex == 1 & age > 65)

# Load file and directly rename variables
my_fst_rename <- load_file(path = dirname(fst_file),
                           file = basename(fst_file),
                           keep = list(AGE          = SingleAges,
                                       INCOME_class = NetIncome,
                                       State        = GermanState,
                                       weight       = ExtraFactor))

# Load multiple files and stack them
stack_files <- load_file_multi(c(fst_file, rds_file))

# Load multiple files and output them in a list
list_files <- load_file_multi(file_list   = c(fst_file, rds_file),
                              stack_files = FALSE)

# Load multiple files and only keep specific variables
all_files_keep <- load_file_multi(file_list = c(fst_file, rds_file),
                                  keep_list = c(Sex, AGE, stAte))

# Load multiple files and keep different variables per data frame
all_files_diff <- load_file_multi(file_list = c(fst_file, rds_file),
                                  keep_list = list(c(Person_ID, First_Person),
                                                   c(nuts3, Income, WEIGHT)))
```

`setcolorder_by_pattern`

Order Columns by Variable Name Patterns

Description

Order variables in a data frame based on a pattern rather than whole variable names. E.g. grab every variable that contains "sum" in it's name and order them together so that they appear next to each other.

Usage

```
setcolorder_by_pattern(data_frame, pattern)
```

Arguments

`data_frame`	The data frame to be ordered.
`pattern`	The pattern which is used for ordering the data frame columns.

Value

Returns a reordered data frame with the ordered variables at the end.

Examples

```
# Example data frame
my_data <- dummy_data(1000)

# Summarise data
all_nested <- my_data |>
    summarise_plus(class      = c(year, sex),
                   values     = c(weight, income),
                   statistics = c("sum", "pct_group", "pct_total", "sum_wgt", "freq"),
                   weight     = weight,
                   nesting    = "deepest",
                   na.rm      = TRUE)

# Set a different column order
new_order <- all_nested |> setcolorder_by_pattern(c("pct", "freq", "sum"))
```

sort_plus *Sort Data Frame Rows With Some Additions*

Description

Sort data frame rows by the provided variables. sort_plus() is also able to preserve the current order of certain variables and only sort other variables within this order. As another option one can sort a variable with the help of formats, which can be used to e.g. sort a character variable in another than alphabetical order without creating a temporary variable just for sorting.

Usage

```
sort_plus(
  data_frame,
  by,
  preserve = NULL,
  order = "ascending",
  formats = list(),
  na.last = TRUE
)
```

Arguments

data_frame	A data frame to summarise.
by	A variable vector which contains the variables to sort by.
preserve	A vector containing all variables which current order should be preserved.
order	A vector containing the sorting order for each variable. 'ascending'/'a' or 'descending'/'d' can be used. If there are less orders given than by variables provided, the last given sorting order will be used for the additional by variables.
formats	A list in which is specified which formats should be used to sort certain variables. Macro variables can be used in the variable names and format names.
na.last	TRUE by default. Specifies whether NA values should come last or first.

Details

sort_plus() is just very loosely based on the 'SAS' procedure Proc Sort. It tries to keep the simplicity, but with some added features.

Value

Returns a sorted data table.

See Also

Creating formats: discrete_format() and interval_format().

Functions that also make use of formats: frequencies(), crosstabs(), any_table(), recode.(), recode_multi(), transpose_plus().

Examples

```
# Example formats
education. <- discrete_format(
    "1" = "low",
    "2" = "middle",
    "3" = "high")

# Example data frame
my_data <- dummy_data(1000)

# Simple sorting
sort_df1 <- my_data |> sort_plus(by = c(state, sex, age))
sort_df2 <- my_data |> sort_plus(by    = c(state, sex, age),
                                 order = c("ascending", "descending"))

# Character variables will normally be sorted alphabetically. With the help
# of a format this variable can be sorted in a completely different way.
sort_df3 <- my_data |> sort_plus(by      = education,
                                 formats = list(education = education.))

# Preserve the order of the character variable, otherwise it couldn't stay in
# it's current order.
sort_df4 <- sort_df3 |> sort_plus(by       = age,
                                  preserve = education)

# Or do all at once
sort_df5 <- my_data |> sort_plus(by       = c(sex, education),
                                 preserve = state,
                                 formats = list(education = education.))
```

---

split_by *Split Data Frame By Variable Expressions Or Condition*

Description

Split up a data frame based on variable expressions or on conditions to receive multiple smaller data frames. Both possibilities can be used at the same time.

Usage

```
split_by(
  data_frame,
  ...,
  formats = list(),
  inverse = FALSE,
  monitor = .qol_options[["monitor"]]
)
```

Arguments

data_frame	A data frame which should be split up into multiple data frames.
...	Pass in one or multiple variables and/or conditions on which the provided data frame should be splitted.
formats	A list in which is specified which formats should be applied to which variables. Macro variables can be used in the variable names and format names.
inverse	Uses the inverse conditions to split up the data frame.
monitor	FALSE by default. If TRUE, outputs two charts to visualize the functions time consumption.

Details

split_by() is based on the explicit Output from 'SAS'. With the Output function one can - among other things - explicitly tell 'SAS' which observation to output into which data set. Which enables the user to output one observation into one or multiple data sets.

Instead of subsetting the same data frame multiple times manually, you can subset it multiple times at once with this function.

The function can take in conditions as characters to be able to parse the conditions. The parsing allows to write conditions in a SAS like way. For example the condition

"age >= 15 & age < 65" can be written as "15 <= age < 65"

Additionally and/or (case insensitive) are recognized keywords which will be translated into &/|.

"age >= 15 and age < 65 or sex == 1" becomes "age >= 15 & age < 65 | sex == 1"

And macro() variables are allowed in any spot, e.g.:

YEAR <- 2025\ "year == &YEAR" translates to "year == 2025".

Single = get translated to ==, the SAS not ^= is translated to !=.

In SAS you can write "age in (1 4 7 15 21)" or "age not in (2, 4, 37, 82)" which gets translated into "age %in% (1, 4, 7, 15, 21)" and "!(age %in% (2, 4, 37, 82))".

When using == or != operators you can check if character expressions start with (text:), end with (:text) or contain a certain text (:text:). These also get translated.

Value

Returns a list of data frames split by variable expressions and/or conditions. The lists names are the variable expressions or conditions.

Examples

```
# Example data frame
my_data <- dummy_data(1000)

# Split by variable expressions
split_var_df <- my_data |> split_by(sex)

# Split by conditions
split_cond_df <- my_data |> split_by(sex == 1 & age <  18,
```

```
                                    sex == 2 & age >= 18)

# Split by character conditions with 'SAS' like syntax
split_cond_df <- my_data |> split_by(" 15 <= age < 65 ",
                                    " education in ('low' 'middle') ")

# Split by condition with inverse group
split_inv_df <- my_data |> split_by(sex == 1, inverse = TRUE)

# Split by variables and conditions
split_combi_df <- my_data |> split_by(state, education,
                                      sex == 1, age < 18)

# Split by variable expressions using formats
state. <- discrete_format(
    "Germany"                       = 1:16,
    "Schleswig-Holstein"            = 1,
    "Hamburg"                       = 2,
    "Lower Saxony"                  = 3,
    "Bremen"                        = 4,
    "North Rhine-Westphalia"        = 5,
    "Hesse"                         = 6,
    "Rhineland-Palatinate"          = 7,
    "Baden-Württemberg"             = 8,
    "Bavaria"                       = 9,
    "Saarland"                      = 10,
    "West"                          = 1:10,
    "Berlin"                        = 11,
    "Brandenburg"                   = 12,
    "Mecklenburg-Western Pomerania" = 13,
    "Saxony"                        = 14,
    "Saxony-Anhalt"                 = 15,
    "Thuringia"                     = 16,
    "East"                          = 11:16)

split_format_df <- my_data |> split_by(state,
                                       formats = list(state = state.))
```

---

stack_data *Stack Multiple Data Frames*

Description

Stacks multiple data frames and matches column names.

Usage

```
stack_data(..., id = FALSE, compress = NULL, guessing_rows = 100)
```

Arguments

...	Put in multiple data frames to stack them in the provided order.
id	Adds an ID column to indicate the different data frames.
compress	No compression by default. If compression receives any value, stack_data() will convert character variables to numeric or integer where possible. If set to "factor" all non numeric character variables will be converted to factors.
guessing_rows	100 by default. stack_data() takes a sample of rows to determine of which type variables are.

Value

Returns a stacked data frame.

Examples

```
# Example data frames
my_data1 <- dummy_data(100)
my_data2 <- dummy_data(100)
my_data3 <- dummy_data(100)
my_data4 <- dummy_data(100)
my_data5 <- dummy_data(100)

# Stack data frames
stacked_df <- stack_data(my_data1,
                         my_data2,
                         my_data3,
                         my_data4,
                         my_data5)
```

---

style_options *Set Global Styling Options For Excel Workbooks*

Description

Modify Styling options for Excel workbooks. Available parameters can be seen in excel_output_style() or number_format_style().

set_style_options() sets the styling options for Excel workbooks globally.These options are used by all tabulation and output functions, which are capable of exporting styled outputs.

get_style_options() Prints out the currently set global styling options.

reset_style_options() Resets global style options to the default parameters. This includes all options set with set_style_options(), set_labels(), set_titles() and set_footnotes().

close_file() is a simple, more readable wrapper for setting file parameter to NULL.

set_labels(): Can set variable and statistic labels globally so that they don't have to be provided in every output function separately.

`get_labels()`: Get the globally stored variable and statistic labels as a list and print the contents to the console.

`reset_qol_options()` Resets global options to the default parameters.

Usage

```
set_style_options(..., save_file = NULL)

get_style_options(from_file = NULL)

reset_style_options()

close_file()

set_labels(...)

get_labels()

reset_qol_options()
```

Arguments

`...`	`set_labels()`: Put in the variable names and their respective labels.
`save_file`	A full file path to an RDS file in which global style options should be stored.
`from_file`	A full file path to an RDS file in which global style options are stored.

Value

`set_style_options()`: Returns modified global styling options.

`get_style_options()`: List of global styling options.

`reset_style_options()`: Returns default global styling options.

`close_file()`: List of global styling options with file = NULL.

`set_labels()`: List of variable and statistic labels.

`get_labels()`: List of variable and statistic labels.

`reset_qol_options()`: Returns default global options.

See Also

Functions that use global styling options: `any_table()`, `frequencies()`, `crosstabs()`, `export_with_style()`.

Functions that use global variable and statistic labels: `any_table()`, `frequencies()`, `crosstabs()`.

Functions that also use global variable labels: `export_with_style()`.

Examples

```
# This function can process any parameter from excel_output_style() or
# number_format_style() and sets the option globally.
set_style_options(save_path    = "C:/My Projects/",
                  sum_decimals = 8)

get_style_options()

# Reset all the style options including variable and statistic labels as well
# as titles and footnotes.
reset_style_options()

# Reset the file parameter
close_file()

# Set variable and statistic labels globally, retrieve and reset them
set_labels(age_gr = "Group of ages",
           status = "Current status",
           pct    = "%")

# To reset labels do this
set_labels(NULL)

get_labels()

# Reset all globally set options
reset_qol_options()
```

---

sub_string *Retrieve A Substring From A Character*

Description

sub_string() can extract parts of a character from the left side, right side or from the middle. It is also able to start or end at specific letter sequences instead of positions.

Usage

```
sub_string(data_frame, variable, from = NULL, to = NULL, case_sensitive = TRUE)
```

Arguments

data_frame	A data frame which contains the variables to concatenate.
variable	A character variable to extract parts from.
from	The names of the variables to concatenate.
to	A single character which will be used to fill up the empty places.

case_sensitive TRUE by default. When a character expression is passed as from or to it makes a difference whether a letter is written in upper or lower case. Pass FALSE to handle upper and lower case equally.

Value

Returns parts of a character vector.

See Also

Other character manipulating functions: concat(), remove_blanks()

Examples

```
# Example data frame
my_data <- dummy_data(100)

# Extract text from the left
my_data[["left"]] <- my_data |> sub_string(education, to = 2)

# Extract text from the right
my_data[["right"]] <- my_data |> sub_string(education, from = 2)

# Extract text from the middle
my_data[["middle"]] <- my_data |> sub_string(education, from = 2, to = 3)

# Find text and extract from the left
my_data[["left2"]] <- my_data |> sub_string(education, to = "l")

# Find text and extract from the right
my_data[["right2"]] <- my_data |> sub_string(education, from = "l")

# Find text and extract from the middle
my_data[["middle2"]] <- my_data |> sub_string(education, from = "i", to = "l")
```

---

summarise_plus *Fast And Powerful Yet Simple To Use Summarise*

Description

summarise_plus() creates a new aggregated data table with the desired grouping. It can output only the deepest nested combination of the grouping variables (default) or you can also output every possible combination of the grouping variables at once, with just one small change. Besides the normal summary functions like sum, mean or median, you can also calculate their respective weighted version by just setting a weight variable.

Usage

```
summarise_plus(
  data_frame,
  class = NULL,
  values,
  statistics = c("sum", "freq"),
  formats = list(),
  types = "",
  weight = NULL,
  nesting = "deepest",
  merge_back = FALSE,
  convert = TRUE,
  na.rm = .qol_options[["na.rm"]],
  print_miss = .qol_options[["print_miss"]],
  monitor = .qol_options[["monitor"]],
  notes = TRUE
)
```

Arguments

data_frame	A data frame to summarise.
class	A vector containing all grouping variables. Macro variables can be used.
values	A vector containing all variables that should be summarised. Macro variables can be used.
statistics	Available functions: • "sum" -> Weighted and unweighted sum • "sum_wgt" -> Sum of all weights • "freq" -> Unweighted frequency • "freq_g0" -> Unweighted frequency of all values greater than zero • "pct_group" -> Weighted and unweighted percentages within the respective group • "pct_total" -> Weighted and unweighted percentages compared to the grand total • "mean" -> Weighted and unweighted mean • "median" -> Weighted and unweighted median • "mode" -> Weighted and unweighted mode • "min" -> Minimum • "max" -> Maximum • "sd" -> Weighted and unweighted standard deviation • "variance" -> Weighted and unweighted standard variance • "first" -> First value • "last" -> Last value • "pn" -> Weighted and unweighted percentiles (any p1, p2, p3, ... possible) Uses the SAS default way of calculating percentiles, which is Type 2 described in quantile().

- "missing" -> Missings generated by the value variables

`formats` A list in which is specified which formats should be applied to which class variables. Macro variables can be used in the variable names and format names.

`types` A character vector specifying the different combinations of group variables which should be computed when using nesting = "all". If left empty all possible combinations will be computed.

`weight` Put in a weight variable to compute weighted results.

`nesting` The predefined value is "deepest" meaning that only the fully nested version of all class variables will be computed. If set to "all", all possible combinations will be computed in one data table. The option "single" only outputs the ungrouped summary of all class variables in one data table.

`merge_back` Newly summarised variables can be merged back to the original data frame if TRUE. Only works if nested = "deepest" and no formats are defined.

`convert` TRUE by default. Converts all class variables back to their original type after summarisation. If FALSE, returns variables as factors.

`na.rm` FALSE by default. If TRUE removes all NA values from the class variables.

`print_miss` FALSE by default. If TRUE outputs all possible categories of the grouping variables based on the provided formats, even if there are no observations for a combination.

`monitor` FALSE by default. If TRUE, outputs two charts to visualize the functions time consumption.

`notes` TRUE by default. Prints notifications about NA values produced by class variables during summarise.

Details

`summarise_plus()` is based on the 'SAS' procedure Proc Summary, which provides efficient and readable ways to perform complex aggregations.

Normally you would compute new categorical variables beforehand - probably even in different forms, if you wanted to have different categorizations - and bloat up the data set. After all this recoding footwork you could finally use multiple summaries to compute all the stats you need to then put them back together. With this function this is no more necessary.

In `summarise_plus()` you put in the original data frame and let the recoding happen via format containers. This is very efficient, since new variables and categories are only created just before the summarise happens.

Additionally you can specify whether you only want to produce the all nested version of all group variables or whether you want to produce every possible combination in one go. All with a single option.

The function is optimized to always take the fastest route, depending on the options specified.

Value

Returns a summarised `data.table`.

If `nesting` is set to `"all"` or `"single"`, the returned table automatically includes three hierarchical metadata variables:

- TYPE (character): The active grouping combination for the row (e.g., "year+sex"), or "total" for the grand total.
- TYPE_NR (integer): A unique sequential identifier assigned to each distinct grouping combination (TYPE).
- DEPTH (integer): The number of active grouping variables in the row's combination (e.g., 0 for "total", 1 for single variables, etc.).

See Also

Creating formats: discrete_format() and interval_format().

Functions that also make use of formats: frequencies(), crosstabs(), any_table(), recode.(), recode_multi(), transpose_plus(), sort_plus().

Examples

```
# NOTE: The used threads are set here to prevent a NOTE from the CRAN checks,
#       otherwise this is not necessary.
old_threads <- data.table::getDTthreads()
data.table::setDTthreads(1)

# Example formats
age. <- discrete_format(
    "Total"          = 0:100,
    "under 18"       = 0:17,
    "18 to under 25" = 18:24,
    "25 to under 55" = 25:54,
    "55 to under 65" = 55:64,
    "65 and older"   = 65:100)

sex. <- discrete_format(
    "Total"  = 1:2,
    "Male"   = 1,
    "Female" = 2)

income. <- interval_format(
    "Total"              =    0:100000,
    "below 500"          =    0:500,
    "500 to under 1000"  =  500:1000,
    "1000 to under 2000" = 1000:2000,
    "2000 and more"      = 2000:100000)

# Example data frame
my_data <- dummy_data(1000)

# Summarise the data  with all class variables nested
all_nested <- my_data |>
    summarise_plus(class      = c(year, sex, age),
                   values     = income,
                   statistics = c("sum", "pct_group", "pct_total", "sum_wgt", "freq"),
                   formats    = list(sex = sex., age = age.),
                   weight     = weight,
```

```
                  nesting    = "deepest",
                  na.rm      = TRUE)

# Output all possible combinations of the provided class variables. Meaning:
# Total, combinations of 2, combinations of 3, ...
all_possible <- my_data |>
    summarise_plus(class      = c(year, sex, age, income),
                  values     = c(probability),
                  statistics = c("sum", "p1", "p99", "min", "max", "freq", "freq_g0"),
                  formats    = list(sex    = sex.,
                                    age    = age.,
                                    income = income.),
                  weight     = weight,
                  nesting    = "all",
                  na.rm      = TRUE)

# Formats can also be passed as characters
single <- my_data |>
    summarise_plus(class      = c(year, age, sex),
                  values     = weight,
                  statistics = c("sum", "mean"),
                  formats    = list(sex = "sex.", age = "age."),
                  nesting    = "single")

# Summarise and merge results back to the original data frame
merge_back <- my_data |>
    summarise_plus(class      = c(year, age, sex),
                  values     = weight,
                  statistics = c("sum", "mean"),
                  nesting    = "deepest",
                  merge_back = TRUE)

# Select only certain variable combinations of all the possible combinations
certain_types <- my_data |>
    summarise_plus(class      = c(year, sex, age),
                  values     = c(probability),
                  statistics = c("sum", "mean", "freq"),
                  formats    = list(sex = sex.,
                                    age = age.),
                  types      = c("year", "year + age", "age + sex"),
                  weight     = weight,
                  nesting    = "all",
                  na.rm      = TRUE)

# You can also select repeating combinations faster like this
combi_types <- my_data |>
    summarise_plus(class      = c(year, sex, age, education),
                  values     = weight,
                  statistics = "sum",
                  formats    = list(sex = sex.,
                                    age = age.),
                  types      = "year + sex + (age, age + education, education)",
                  nesting    = "all",
```

```
                  na.rm      = TRUE)

# Select specific statistics for specific variables
specific_stats <- my_data |>
    summarise_plus(class      = c(year, sex),
                   statistics = list("sum"       = c(weight, income),
                                     "mean"      = expenses,
                                     "pct_group" = balance),
                   formats    = list(sex = sex.),
                   na.rm      = TRUE)

# Works without grouping
no_group <- my_data |> summarise_plus(values = income)

# And also without values
no_values  <- my_data |> summarise_plus(class = c(year, sex, age))
no_nothing <- my_data |> summarise_plus()

# NOTE: The used threads are set here to prevent a NOTE from the CRAN checks,
#       otherwise this is not necessary.
data.table::setDTthreads(old_threads)
```

`transpose_plus` *Fast And Powerful Yet Simple To Use Transpose*

Description

`transpose_plus()` is able to reshape a data frame from long to wide and from wide to long. In the long to wide transposition variables can be nested or placed side by side. With the wide to long transposition it is also possible to transpose multiple variables at once.

Additionally `transpose_plus()` is able to weight results before transposing them from long to wide.

The function also makes use of formats, which means you don't need to create variables storing the new variable names before transposition. You can just use formats to name the new variables and with multilabels you can even generate new variable expressions at the same time.

Usage

```
transpose_plus(
  data_frame,
  preserve = NULL,
  pivot = NULL,
  values = NULL,
  stack = FALSE,
  statistics = "sum",
  formats = c(),
  weight = NULL,
```

```
  na.rm = .qol_options[["na.rm"]],
  summarise = TRUE,
  monitor = .qol_options[["monitor"]]
)
```

Arguments

data_frame	A data frame to transpose
preserve	Variables to keep and preserve in their current form.
pivot	A vector that provides the expressions of single variables or variable combinations that should be transposed. To nest variables use the form: "var1 + var2 + var3 + ...".
values	A vector containing all value variables that should be transposed. In a wide to long transposition it can also be a named list with a single entry. The list name then determines the name of the id variable and the vector provides custom value expressions for the id variable. The length of these custom expressions has to match the number of expressions that every pivot list entry transposes.
stack	FALSE by default. If TRUE the variables are stacked below each other in a wide to long transposition. Otherwise the variables are put beside each other.
statistics	Available functions (only long to wider transposition): • "sum" -> Weighted and unweighted sum • "sum_wgt" -> Sum of all weights • "freq" -> Unweighted frequency • "freq_g0" -> Unweighted frequency of all values greater than zero • "pct_group" -> Weighted and unweighted percentages within the respective group • "pct_total" -> Weighted and unweighted percentages compared to the grand total • "mean" -> Weighted and unweighted mean • "median" -> Weighted and unweighted median • "mode" -> Weighted and unweighted mode • "min" -> Minimum • "max" -> Maximum • "sd" -> Weighted and unweighted standard deviation • "variance" -> Weighted and unweighted standard variance • "first" -> First value • "last" -> Last value • "pn" -> Weighted and unweighted percentiles (any p1, p2, p3, ... possible) Uses the SAS default way of calculating percentiles, which is Type 2 described in quantile(). • "missing" -> Missings generated by the value variables
formats	A list in which is specified which formats should be applied to which variables. Macro variables can be used in the variable names and format names.
weight	Put in a weight variable to compute weighted results.

na.rm	FALSE by default. If TRUE removes all NA values from the preserve and pivot variables.
summarise	If TRUE the data will be summarised before the long to wide transposition. Set to FALSE to skip the summarisation step.
monitor	FALSE by default. If TRUE, outputs two charts to visualize the functions time consumption.

Details

transpose_plus() is just very loosely based on the 'SAS' procedure Proc Transpose, and the possibilities of a Data-Step transposition using loops.

The transposition methods 'SAS' has to offer are actually fairly weak. Which is weird because all tools are there to have another powerful function. So transpose_plus() tries to create the function 'SAS' should have.

The function is able to interpret which transposition direction the user wants by just looking at what the user provided with the function parameters. For a long to wide transposition it is natural to just provide variables to transpose. While it is also just natural to provide new variable names when transposing from wide to long. That alone reduces the number of parameters the user has to enter to perform a simple transposition.

The real magic happens when formats come into play. With their help you can not only name new variables or their expressions, but you can also generate completely new expressions with no effort, just with the help of multilabels.

Value

Returns a transposed data table.

See Also

Creating formats: discrete_format() and interval_format().

Functions that also make use of formats: frequencies(), crosstabs(), any_table(), recode.(), recode_multi(), sort_plus().

Examples

```
# Example formats
age. <- discrete_format(
    "Total"          = 0:100,
    "under 18"       = 0:17,
    "18 to under 25" = 18:24,
    "25 to under 55" = 25:54,
    "55 to under 65" = 55:64,
    "65 and older"   = 65:100)

sex. <- discrete_format(
    "Total"  = 1:2,
    "Male"   = 1,
    "Female" = 2)
```

```
sex2. <- discrete_format(
    "Total"  = c("Male", "Female"),
    "Male"   = "Male",
    "Female" = "Female")

income. <- interval_format(
    "Total"              =    0:100000,
    "below 500"          =    0:500,
    "500 to under 1000"  =  500:1000,
    "1000 to under 2000" = 1000:2000,
    "2000 and more"      = 2000:100000)

# Example data frame
my_data <- dummy_data(1000)

# Transpose from long to wide and use a multilabel to generate additional categories
long_to_wide <- my_data |>
    transpose_plus(preserve = c(year, age),
                   pivot    = c("sex", "education"),
                   values   = income,
                   formats  = list(sex = sex., age = age.),
                   weight   = weight,
                   na.rm    = TRUE)

# Transpose back from wide to long and put results below each other by setting
# stack to TRUE.
wide_to_long <- long_to_wide |>
    transpose_plus(preserve = c(year, age),
                   pivot    = list(sex       = c("Total", "Male", "Female"),
                                   education = c("low", "middle", "high")),
                   stack    = TRUE)

# Transpose from long to wide and use a multilabel to generate additional categories
long_to_wide <- my_data |>
    transpose_plus(preserve = c(year, age),
                   pivot    = "sex",
                   values   = c(income, weight),
                   formats  = list(sex = sex., age = age.),
                   weight   = weight,
                   na.rm    = TRUE) |>
    rename_multi("income_Total"  = "Total",
                 "income_Male"   = "Male",
                 "income_Female" = "Female")

# Transpose back from wide to long but this time put results side by side.
# To do that every list entry has to have the same name. The values parameter
# is then used to give the new value variables a name. For the expressions of
# the new categorical variable the variable names from the first pivot list
# entry are used.
wide_to_long <- long_to_wide |>
    transpose_plus(preserve = c(year, age),
                   values   = c(income, weight),
                   pivot    = list(sex = c("Total", "Male", "Female"),
```

```
                                sex = c("weight_Total", "weight_Male", "weight_Female")))

# Nesting variables in long to wide transposition
nested <- my_data |>
    transpose_plus(preserve = c(year, age),
                   pivot    = "sex + education",
                   values   = income,
                   formats  = list(sex = sex., age = age.),
                   weight   = weight,
                   na.rm    = TRUE)

# Select the statistics which should be computed for all value variables
with_stats <- my_data |>
    transpose_plus(preserve   = state,
                   pivot      = "sex",
                   values     = weight,
                   statistics = c("sum", "pct_group"),
                   formats    = list(sex = sex.),
                   na.rm      = TRUE)

# Select specific statistics for specific variables. The value variables are
# taken from the statistics list, so the values parameter can be skipped.
specific_stats <- my_data |>
    transpose_plus(preserve   = age,
                   pivot      = "sex",
                   statistics = list("sum"       = c(weight, income),
                                     "pct_group" = balance,
                                     "max"       = expenses),
                   formats   = list(sex = sex., age = age.),
                   na.rm     = TRUE)

# Or both, nested and un-nested, at the same time
both <- my_data |>
    transpose_plus(preserve = c(year, age),
                   pivot    = c("sex + education", "sex", "education"),
                   values   = income,
                   formats  = list(sex = sex., age = age.),
                   weight   = weight,
                   na.rm    = TRUE)

# Transpose a data frame from wide to long and use the values parameter as a
# named list with a single entry to give the new categorical variable a custom
# name and custom value expressions. The pivot list names then become the new
# value variables.
my_data <- dummy_data(1000, wide = TRUE)

wide_df <- my_data |>
    transpose_plus(preserve = c(year, state, household_id),
                   values   = list(person_id = paste0("person_", 1:7)),
                   pivot    = list(sex       = paste0("sex_",    1:7),
                                   age       = paste0("age_",    1:7)))
```

vars_between *Get All Variable Names Between Two Variables*

Description

Get all the variable names inside a data frame between two variables (including the provided ones) as a character vector

Usage

```
vars_between(data_frame, from, to)
```

Arguments

data_frame	The data frame from which to take the variable names.
from	Starting variable of variable range.
to	Ending variable of variable range.

Value

Returns a character vector of variable names.

Examples

```
# Example data frame
my_data <- dummy_data(1000)

# Get variable names
var_names <- my_data |> vars_between(state, income)

# Get variable names in reverse order
vars_reverse <- my_data |> vars_between(income, state)

# If you only provide "from" or "to" you get all variable names from a point to
# the end or from the beginning to a given point.
vars_from <- my_data |> vars_between(state)
vars_to   <- my_data |> vars_between(to = state)

# Or just get all variable names
vars_all <- my_data |> vars_between()
```

`where.` *Filter Data Frame With Direct View*

Description

Filter observations and variables and directly view the result on screen.

Usage

```
where.(data_frame, condition = NULL, keep = NULL)
```

Arguments

`data_frame`	A data frame on which to apply filters.
`condition`	The condition on which to filter observations.
`keep`	The Variables to keep in the result data frame.

Value

Returns a filtered data frame.

See Also

`ifelse()` with multiple conditions and 'SAS' writing style: `ifelse_multi()`

The following functions can make use of the `do_if()` conditions:

Conditions: `if.()`, `else_if.()`, `else.()`

Filter Data Frame: `where.()`

Create new Variables: `compute.()`

Examples

```
# Example data frame
my_data <- dummy_data(1000)

# Get a quick filtered view
my_data |> where.(sex == 1 & age < 25,
                  c(sex, age, household_id, education))
```

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