

# Package ‘hutils’

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**Type** Package

**Title** Miscellaneous R Functions and Aliases

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**Description** Provides utility functions for, and drawing on, the 'data.table' package. The package also collates useful miscellaneous functions extending base R not available elsewhere. The name is a portmanteau of 'utils' and the author.

**BugReports** <https://github.com/hughparsonage/hutils/issues>

**URL** <https://github.com/hughparsonage/hutils>,  
<https://hughparsonage.github.io/hutils/>

**License** GPL-3

**Depends** R (>= 3.3.0)

**Imports** data.table, magrittr, stats, utils, fastmatch, grDevices

**Suggests** testthat (>= 2.1.0), datasets, desc, dplyr, digest, fst, Hmisc, hutilscpp, microbenchmark, knitr, rmarkdown, nycflights13, geosphere, ggplot2, readr, rcheology, rstudioapi, survey, tibble, tidyr, withr (>= 2.0.0)

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hutils-package	<i>hutils package</i>
----------------	-----------------------

---

**Description**

Provides utility functions for, and drawing on, the 'data.table' package. The package also collates useful miscellaneous functions extending base R not available elsewhere. The name is a portman-teau of 'utils' and the author.

**Details**

The package attempts to provide lightweight, fast, and stable functions for common operations.

By **lightweight**, I mean in terms of dependencies: we import `package:data.table` and `package:fastmatch` which do require compilation, but in C. Otherwise, all dependencies do not require compilation.

By **fast**, I mean essentially as fast as possible without using compilation.

By **stable**, I mean that unit tests *should not change* unless the major version also changes. To make this completely transparent, tests include the version of their introduction and are guaranteed to not be modified (not even in the sense of adding extra, independent tests) while the major version is 1. Tests that do not include the version in their filename may be modified from version to version (though this will be avoided).

---

ahull	<i>Maximum area given x and y coordinates</i>
-------	---

---

**Description**

Present since `hutils 1.2.0`.

**Usage**

```
ahull(
  DT,
  x = DT$x,
  y = DT$y,
  minH = 0,
  minW = 0,
  maximize = "area",
  incl_negative = FALSE
)
```

**Arguments**

DT, x, y	Coordinates of a curve containing a rectangle. Either as a list, DT, containing columns x and y.
minH	The minimum height of the rectangles.
minW	The minimum width of the rectangles.
maximize	How the rectangle should be selected. Currently, only "area" supported.
incl_negative	Should areas below the x-axis be considered?

**Value**

A data.table: The coordinates of a rectangle, from (0, 0), (1, 0), (1, 1), (0, 1), south-west clockwise, that is contained within the area of the chart for positive values only.

**Examples**

```
ahull(, c(0, 1, 2, 3, 4), c(0, 1, 2, 0, 0))
```

---

 aliases

*Aliases*


---

**Description**

These simple aliases can be useful to avoid operator precedence ambiguity, or to make use of indents from commas within your text editor. The all-caps versions accept single-length (capable of 'short-circuits') logical conditions only.

Neithers and nors are identical except have slightly different short-circuits. NOR uses negation once so may be quicker if the first argument is very, very prompt.

**Usage**

AND(x, y)

OR(x, y)

nor(x, y)

neither(x, y)

NOR(x, y)

NEITHER(x, y)

pow()

XOR(x, y)

**Arguments**

x, y                    Logical conditions.

---

*all\_same\_sign*                    *Determine whether a vector is all of the same sign*

---

**Description**

Present since hutils 1.2.0.

**Usage**

`all_same_sign(x)`

**Arguments**

x                        A numeric vector.

**Value**

TRUE if all elements of x have the same sign. Zero is a separate sign from positive and negative. All vectors of length-1 or length-0 return TRUE, even if x = NA, (since although the value is unknown, it must have a unique sign), and non-numeric x.

**Examples**

```

all_same_sign(1:10)
all_same_sign(1:10 - 1)
all_same_sign(0)
all_same_sign(NA)
all_same_sign(c(NA, 1))
all_same_sign("surprise?")
all_same_sign(c(0, 0.1 + 0.2 - 0.3))

if (requireNamespace("microbenchmark", quietly = TRUE)) {
  library(microbenchmark)
  microbenchmark(base = length(unique(sign(1:1e5), nmax = 3)) == 1L,
                 all_same_sign(1:1e5))
}
# Unit: microseconds
#           expr   min    lq  mean  median    uq   max  neval  cld
#           base 2012 2040 2322   2047 2063 9324   100   b
# all_same_sign(1:1e+05)  86   86   94    89   93  290   100   a

```

---

**any\_grepl***Does the pattern appear anywhere?*

---

**Description**

Shortcut for `any(grepl(...))`, mostly for consistency.

**Usage**

```

any_grepl(
  x,
  pattern,
  perl = TRUE,
  ignore.case = FALSE,
  fixed = FALSE,
  quiet = FALSE
)

```

**Arguments**

`x` A character vector.

`pattern`, `perl`, `ignore.case`, `fixed` As in [grep](#).

`quiet` (logical, default: FALSE) If TRUE, silences any messages.

**Details**

From version v 1.4.0, `any_grepl(a, bb)` will be internally reversed to `any_grepl(bb, a)` if `length(bb) > 1` and `length(a) == 1`.

## Examples

```
any_grepl(c("A_D_E", "K0j"), "[a-z]")
```

---

auc

*AUC*

---

## Description

Returns the area under the curve ("AUC") of a receiver-operating characteristic curve for the given predicted and actual values.

## Usage

```
auc(actual, pred)
```

## Arguments

actual	Logical vector: TRUE for positive class. If not a logical vector, the result is interpreted as one if safe to do so, <i>viz.</i> if <code>actual</code> contains precisely two unique values and is either a numeric vector, an ordered factor, or the unique values are FALSE and TRUE (case-insensitively). Anything else is an error.
pred	Numeric (double) vector the same length as <code>actual</code> giving the predicted probability of TRUE. Must be a numeric vector the same length as <code>actual</code> .

## Author(s)

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**Source**

Source code based on `Metrics::auc` from Ben Hamner and Michael Frasco and Erin LeDell from the `Metrics` package.

---

average_bearing	<i>Average of bearings</i>
-----------------	----------------------------

---

**Description**

Average of bearings

**Usage**

```
average_bearing(theta1, theta2, average_of_opposite = NULL)
```

```
average_bearing_n(thetas)
```

**Arguments**

theta1, theta2 Bearings, expressed in degrees.

average\_of\_opposite

The average of opposing bearings (e.g. average of north and south) is not well-defined. If `NULL`, the result for opposing vectors is undefined; if `"right"`, returns  $\theta_1 + 90$ ; if `"left"` then  $\theta_2 + 90$ . Can also be a single numeric to provide a specific value when the vectors point in opposite directions.

thetas A vector of bearings.

**Value**

For `'average_bearing'`, the bearing bisecting the two bearings.

For `'average_bearing_n'`, the average bearing of the bearing.

**Examples**

```
average_bearing(0, 90)
average_bearing(0, 270)
average_bearing(90, 180)
```

```
average_bearing(0, 180)
average_bearing(0, 180, average_of_opposite = 3)
average_bearing(0, 180, average_of_opposite = "left")
```

```
average_bearing_n(1:179)
```

---

bearing	<i>Bearing calculations</i>
---------	-----------------------------

---

**Description**

Bearing calculations

**Usage**

```
bearing(lat_orig, lon_orig, lat_dest, lon_dest)
```

```
compass2bearing(compass)
```

```
easterly_component(compass)
```

```
northerly_component(compass)
```

**Arguments**

lat\_orig, lon\_orig, lat\_dest, lon\_dest  
Latitude and longitude of origin and destination.

compass A character vector of compass rose points, such as c("NW", "E", "SSW").

**Value**

bearing An approximate bearing from \_orig and \_dest.

compass2bearing The bearing encoded by the compass input.

easterly\_component The easterly component of a unit vector pointing in the direction provided.

**Examples**

```
bearing(0, 0, 90, 0)  
bearing(-35, 151, 51, 0)
```

```
compass2bearing("NW")  
easterly_component("E")  
easterly_component("NW")
```

---

`coalesce`*Find first non-missing element*

---

**Description**

Lightweight version of `dplyr::coalesce`, with all the vices and virtues that come from such an approach. Very similar logic (and timings to `dplyr::coalesce`), though no ability to use quosures etc. One exception is that if `x` does not contain any missing values, it is returned immediately, and ignores `...`. For example, `dplyr::coalesce(1:2, 1:3)` is an error, but `hutils::coalesce(1:2, 1:3)` is not.

**Usage**

```
coalesce(x, ...)
```

**Arguments**

<code>x</code>	A vector
<code>...</code>	Successive vectors whose values will replace the corresponding values in <code>x</code> if the value is (still) missing.

**Value**

`x` with missing values replaced by the first non-missing corresponding elements in `...`. That is, if `... = A, B, C` and `x[i]` is missing, then `x[i]` is replaced by `A[i]`. If `x[i]` is still missing (i.e. `A[i]` was itself `NA`), then it is replaced by `B[i]`, `C[i]` until it is no longer missing or the list has been exhausted.

**Source**

Original source code but obviously inspired by `dplyr::coalesce`.

**Examples**

```
coalesce(c(1, NA, NA, 4), c(1, 2, NA, NA), c(3, 4, 5, NA))
```

---

`dev_copy2a4`*Copy device to an A4 PDF*

---

**Description**

Simply a wrapper around `dev.copy2pdf`, but without the need to remember that an A4 sheet of paper is 8.27 in by 11.69 in.

**Usage**

```
dev_copy2a4(filename, ...)
```

**Arguments**

filename	A string giving the name of the PDF file to write to, must end in .pdf.
...	Other parameters passed to <a href="#">pdf</a> .

**Value**

As in [dev2](#).

---

 dir2

*List many files*


---

**Description**

(Windows only) Same as [list.files](#) but much faster.

Present since v1.4.0.

**Usage**

```
dir2(
  path = ".",
  file_ext = NULL,
  full.names = TRUE,
  recursive = TRUE,
  pattern = NULL,
  fixed = FALSE,
  perl = TRUE && missing(fixed) && !fixed,
  ignore.case = FALSE,
  invert = FALSE,
  .dont_use = FALSE
)
```

**Arguments**

path	A string representing the trunk path to search within.
file_ext	A string like '*.txt' or '.csv' to limit the result to files with that extension.
full.names	TRUE by default.
recursive	TRUE by default.
pattern, perl, ignore.case, fixed, invert	As in <a href="#">grep</a> but with different defaults. Used to filter files with extension <code>file_ext</code> .
.dont_use	Only used for tests to simulate non-Windows systems.

**Value**

The same as `list.files`, a character vector of files sought.

---

drop_col	<i>Drop column or columns</i>
----------	-------------------------------

---

**Description**

Drop column or columns

**Usage**

```
drop_col(DT, var, checkDT = TRUE)
```

```
drop_cols(DT, vars, checkDT = TRUE)
```

**Arguments**

DT	A data.table.
var	Quoted column to drop.
checkDT	Should the function check DT is a data.table?
vars	Character vector of columns to drop. Only the intersection is dropped; if any vars are not in names(DT), no warning is emitted.

**Value**

DT with specified columns removed.

**Examples**

```
if (requireNamespace("data.table", quietly = TRUE)) {  
  library(data.table)  
  DT <- data.table(x = 1, y = 2, z = 3)  
  
  drop_col(DT, "x")  
}
```

---

drop_colr	<i>Drop columns whose names match a pattern</i>
-----------	---

---

**Description**

drop\_colr present since hutils 1.0.0.

drop\_grep is identical but only present since hutils 1.2.0.

**Usage**

```
drop_colr(DT, pattern, ..., checkDT = TRUE)
```

**Arguments**

DT	A data.table.
pattern	A regular expression as in grep1.
...	Arguments passed to grep1.
checkDT	If TRUE (the default), will error if DT is not a data.table.

**Examples**

```
library(data.table)
dt <- data.table(x1 = 1, x2 = 2, y = 3)
drop_grep(dt, "x")
```

---

drop_constant_cols	<i>Drop constant columns</i>
--------------------	------------------------------

---

**Description**

Drops columns that have only one value in a data.table.

**Usage**

```
drop_constant_cols(DT, copy = FALSE)
```

**Arguments**

DT	A data.table.
copy	(logical, default: FALSE) Whether the data.table should be copied before any columns are dropped. If FALSE, the default, columns are dropped from DT by reference.

**Details**

If DT is a data.frame that is not a data.table, constant columns are still dropped, but since DT will be copied, copy should be set to TRUE to avoid a warning. If DT is a data.frame and all but one of the columns are constant, a data.frame will still be returned, as opposed to the values of the sole remaining column, which is the default behaviour of base data.frame.

If all columns are constant, drop\_constant\_cols returns a Null data table if DT is a data.table, but a data frame with 0 columns and nrow(DT) otherwise.

**Examples**

```
library(data.table)
X <- data.table(x = c(1, 1), y = c(1, 2))
drop_constant_cols(X)
```

---

drop_empty_cols	<i>Drop empty columns</i>
-----------------	---------------------------

---

**Description**

Removes columns from a data.table where all the values are missing.

**Usage**

```
drop_empty_cols(DT, copy = FALSE)
```

**Arguments**

DT	A data.table.
copy	Copies the data.table so the original can be retained. Not applicable if DT is not a data.table. If FALSE, the default, DT itself will be modified.

---

duplicated_rows	<i>Return duplicated rows of data.table</i>
-----------------	---

---

**Description**

This function differs from duplicated in that it returns both the duplicate row and the row which has been duplicated. This may prove useful in combination with the by argument for determining whether two observations are identical across more than just the specified columns.

**Usage**

```
duplicated_rows(
  DT,
  by = names(DT),
  na.rm = FALSE,
  order = TRUE,
  copyDT = TRUE,
  na.last = FALSE
)
```

**Arguments**

DT	A <code>data.table</code> .
by	Character vector of columns to evaluate duplicates over.
na.rm	(logical) Should NAs in <code>by</code> be removed before returning duplicates? (Default FALSE.)
order	(logical) Should the result be ordered so that duplicate rows are adjacent? (Default TRUE.)
copyDT	(logical) Should DT be copied prior to detecting duplicates. If FALSE, the ordering of DT will be changed by reference.
na.last	(logical) If <code>order</code> is TRUE, should NAs be ordered first or last?. Passed to <code>data.table::setorderv</code> .

**Value**

Duplicate rows of DT by `by`. For interactive use.

**Examples**

```
if (requireNamespace("data.table", quietly = TRUE)) {
  library(data.table)

  DT <- data.table(x = rep(1:4, 3),
                  y = rep(1:2, 6),
                  z = rep(1:3, 4))

  # No duplicates
  duplicated_rows(DT)

  # x and y have duplicates
  duplicated_rows(DT, by = c("x", "y"), order = FALSE)

  # By default, the duplicate rows are presented adjacent to each other.
  duplicated_rows(DT, by = c("x", "y"))
}
```

---

find_pattern_in	<i>Find string pattern in (text) file</i>
-----------------	---

---

### Description

goto\_pattern\_in present from 1.6.0

### Usage

```
find_pattern_in(
  file_contents,
  basedir = ".",
  dir_recursive = TRUE,
  reader = readLines,
  include.comments = FALSE,
  comment.char = NULL,
  use.OS = FALSE,
  file_pattern = "\\.(R|r)(nw|md)?$",
  file_contents_perl = TRUE,
  file_contents_fixed = FALSE,
  file_contents_ignore_case = FALSE,
  file.ext = NULL,
  which_lines = c("first", "all")
)

goto_pattern_in(file_contents, ...)
```

### Arguments

file_contents	A perl-regular expression as a search query.
basedir	The root of the directory tree in which files will be searched recursively.
dir_recursive	(logical, default: TRUE) Search within subdirectories of basedir?
reader	A function, akin to base::readLines, the default, that accepts a filename and returns a character vector.
include.comments	If FALSE, the default, comments (i.e. anything after a \#) are not searched.
comment.char	If include.comments is FALSE, what character marks a comment character? By default, NULL, which sets the correct comment symbol for R and TeX files.
use.OS	Use the operating system to determine file list. Only available on Windows. If it fails, a fall-back option (using dir) is used.
file_pattern	A regular expression passed to list.files(pattern = file.ext). By default, "\.(R r)(nw md)?\$", i.e. all R and Sweave files. (Does not have to be a file extension.)
file_contents_perl	(logical, default: TRUE) Should file_contents be interpreted as a perl regex?

file_contents_fixed	(logical, default: FALSE) Should file_contents be interpreted as a fixed regex?
file_contents_ignore_case	(logical, default: FALSE) As in <a href="#">grep</a> .
file.ext	A file extension passed to the operating system if use.OS is used.
which_lines	One of "first" and "all". If "first" only the first match in any file is returned in the result; if "all", all matches are.
...	Arguments passed to find_pattern_in.

**Details**

For convenience, if file\_contents appears to be a directory and basedir does not, the arguments are swapped, but with a warning.

**Value**

A data.table, showing the matches per file.

goto\_pattern\_in additionally prompts for a row of the returned results. Using the rstudioapi, if available, RStudio will jump to the file and line number.

---

fst\_columns

*Utilities for 'fst' files*


---

**Description**

Utilities for 'fst' files

**Usage**

```
fst_columns(file.fst)
```

```
fst_nrow(file.fst)
```

**Arguments**

file.fst Path to file.

**Value**

Various outputs:

fst\_columns Returns the names of the columns in file.fst.

fst\_nrow Returns the number of rows in file.fst.

---

`generate_LaTeX_manual` *Generate LaTeX manual of installed package*

---

**Description**

Generate LaTeX manual of installed package

**Usage**

```
generate_LaTeX_manual(pkg, launch = TRUE)
```

**Arguments**

<code>pkg</code>	Quoted package name (must be installed).
<code>launch</code>	Should the PDF created be launched using the viewer (TRUE by default)?

**Value**

See [system](#). Called for its side-effect: creates a PDF in the current working directory. Requires a TeX distribution.

**Source**

<https://stackoverflow.com/a/30608000/1664978>

---

`haversine_distance` *Distance between two points on the Earth*

---

**Description**

Distance between two points on the Earth

**Usage**

```
haversine_distance(lat1, lon1, lat2, lon2)
```

**Arguments**

<code>lat1, lon1, lat2, lon2</code>	That latitudes and longitudes of the two points.
-------------------------------------	--

**Details**

This is reasonably accurate for distances in the order of 1 to 1000 km.

**Value**

The distance in kilometres between the two points.

**Examples**

```
# Distance from YMEL to YSSY
haversine_distance(-37 - 40/60, 144 + 50/60, -33 - 56/60, 151 + 10/60)
```

---

if_else	<i>Vectorized if</i>
---------	----------------------

---

**Description**

Lightweight `dplyr::if_else` with the virtues and vices that come from such an approach. Attempts to replicate `dplyr::if_else` but written in base R for faster compile time. originally `hutils::if_else` was faster than `dplyr::if_else` but since `dplyr v 1.2.0` this is no longer the case, nor will `hutils::if_else` work on lists or on factors. Additional attributes may be dropped.

**Usage**

```
if_else(condition, true, false, missing = NULL)
```

**Arguments**

<code>condition</code>	Logical vector.
<code>true, false</code>	Where <code>condition</code> is TRUE/FALSE, use the corresponding <code>true/no</code> value. They must have the same <code>typeof</code> as each other and be the same length as <code>condition</code> or <code>length-one</code> .
<code>missing</code>	If <code>condition</code> is NA, use the corresponding <code>na</code> value. Like <code>true</code> and <code>false</code> , must be of the same type and have the same length as <code>condition</code> , unless it has length one.

**Details**

If the result is expected to be a factor then the conditions for type safety are strict and may be made stricter in future.

**Value**

Where `condition` is TRUE, the corresponding value in `true`; where `condition` is FALSE, the corresponding value in `false`. Where `condition` is NA, then the corresponding value in `na` – unless `na` is NULL (the default) in which case the value will be NA (with the same type as `true`.)

**Source**

Original code but obviously heavily inspired by <https://CRAN.R-project.org/package=dplyr>.

---

```
implies          #' Logical implies
```

---

### Description

Returns the result of  $x \implies y$ .

### Usage

```
implies(x, y)

x %implies% y
```

### Arguments

`x, y`                    Logical vectors of the same length.

### Value

Logical implies: TRUE unless `x` is TRUE and `y` is FALSE.

NA in either `x` or `y` results in NA if and only if the result is unknown. In particular NA %implies% TRUE is TRUE and FALSE %implies% NA is TRUE.

If `x` or `y` are length-one, the function proceeds as if the length-one vector were recycled to the length of the other.

### Examples

```
library(data.table)
CJ(x = c(TRUE,
          FALSE),
   y = c(TRUE,
          FALSE))[, `x => y` := x %implies% y][]

#>      x     y  x => y
#> 1: FALSE FALSE   TRUE
#> 2: FALSE  TRUE   TRUE
#> 3:  TRUE FALSE  FALSE
#> 4:  TRUE  TRUE   TRUE

# NA results:
#> 5:   NA   NA     NA
#> 6:   NA FALSE    NA
#> 7:   NA  TRUE   TRUE
#> 8: FALSE  NA     TRUE
#> 9:  TRUE  NA     NA
```

---

isAttached	<i>Is a package attached?</i>
------------	-------------------------------

---

**Description**

Is a package attached?

**Usage**

isAttached(pkg)

**Arguments**

pkg            Either character or unquoted.

**Value**

TRUE if pkg is attached.

---

isTrueFalse	<i>Logical assertions</i>
-------------	---------------------------

---

**Description**

Logical assertions

**Usage**

isTrueFalse(x)

**Arguments**

x            An object whose values are to be checked.

**Value**

For isTrueFalse, TRUE if and only if x is TRUE or FALSE identically (perhaps with attributes).

---

longest\_affix                      *Longest common prefix/suffix*

---

## Description

Longest common prefix/suffix

## Usage

```
trim_common_affixes(
  x,
  .x = NULL,
  na.rm = TRUE,
  prefixes = TRUE,
  suffixes = TRUE,
  warn_if_no_prefix = TRUE,
  warn_if_no_suffix = TRUE
)
```

```
longest_suffix(x, .x = NULL, na.rm = TRUE, warn_if_no_suffix = TRUE)
```

```
longest_prefix(x, .x = NULL, na.rm = TRUE, warn_if_no_prefix = TRUE)
```

## Arguments

<code>x</code>	A character vector.
<code>.x</code>	If NULL, the default, ignored. May be used if <code>x</code> is known to be free of NAs.
<code>na.rm</code>	(logical, default: TRUE) If FALSE, an NA in <code>x</code> means "" is the only common affix. If NA, the longest prefix/suffix is <code>NA_character_</code> (provided <code>anyNA(x)</code> ). If <code>anyNA(x) == FALSE</code> <code>na.rm</code> has no effect.
<code>prefixes</code>	(logical, default: TRUE) If TRUE, trim prefixes.
<code>suffixes</code>	(logical, default: TRUE) If TRUE, trim suffixes.
<code>warn_if_no_prefix, warn_if_no_suffix</code>	(logical, default: TRUE) If FALSE, if <code>x</code> has no common affixes the warning is suppressed. (If no common prefix/suffix then the common affix returned will be "" (the empty string).)

## Value

The longest common substring in `x` either at the start or end of each string. For `trim_common_affixes` `x` with common prefix and common suffix removed.

## Examples

```
longest_prefix(c("totalx", "totaly", "totalz"))
longest_suffix(c("ztotal", "ytotal", "xtotal"))
```

---

mean_na	<i>Proportion of values that are NA.</i>
---------	--

---

**Description**

Proportion of values that are NA.

**Usage**

```
mean_na(v)
```

**Arguments**

v                    A vector.

**Value**

A double, `mean(is.na(v))`.

---

Mode	<i>Statistical mode</i>
------	-------------------------

---

**Description**

Present since `hutils 1.4.0`. The most common element.

**Usage**

```
Mode(x)
```

**Arguments**

x                    A vector for which the mode is desired.

**Value**

The most common element of x.

If the mode is not unique, only one of these values is returned, for simplicity.

If x has length zero, `Mode(x) = x`.

---

mutate\_ntile

Add a column of ntiles to a data table

---

### Description

Add a column of ntiles to a data table

### Usage

```
mutate_ntile(
  DT,
  col,
  n,
  weights = NULL,
  by = NULL,
  keyby = NULL,
  new.col = NULL,
  character.only = FALSE,
  overwrite = TRUE,
  check.na = FALSE
)
```

### Arguments

DT	A <code>data.table</code> .
col	The column name (quoted or unquoted) for which quantiles are desired.
n	A positive integer, the number of groups to split col.
weights	If NULL, the default, use unweighted quantiles. Otherwise, a string designating the column that is passed to <code>weighted_ntile</code> .
by, keyby	Produce a grouped quantile column, as in <code>data.table</code> . keyby will set a key on the result ( <i>i.e.</i> order by keyby).
new.col	If not NULL, the name of the column to be added. If NULL (the default) a name will be inferred from n. (For example, n = 100 will be <col>Percentile).
character.only	(logical, default: FALSE) Do not contemplate col to be an unquoted column name.
overwrite	(logical, default: TRUE) If TRUE and new.col already exists in DT, the column will be overwritten. If FALSE, attempting to overwrite an existing column is an error.
check.na	(logical, default: FALSE) If TRUE, NAs in DT[[col]] will throw an error. If NA's are present, the corresponding n-tile may take any value.

### Value

DT with a new integer column new.col containing the quantiles. If DT is not a `data.table` its class may be preserved unless keyby is used, where it will always be a `data.table`.

**Examples**

```

library(data.table)
DT <- data.table(x = 1:20, y = 2:1)
mutate_ntile(DT, "x", n = 10)
mutate_ntile(DT, "x", n = 5)
mutate_ntile(DT, "x", n = 10, by = "y")
mutate_ntile(DT, "x", n = 10, keyby = "y")

y <- "x"
DT <- data.table(x = 1:20, y = 2:1)
mutate_ntile(DT, y, n = 5) # Use DT$y
mutate_ntile(DT, y, n = 5, character.only = TRUE) # Use DT$x

```

---

mutate_other	<i>Group infrequent entries into 'Other category'</i>
--------------	---

---

**Description**

Useful when you want to constrain the number of unique values in a column by keeping only the most common values.

**Usage**

```

mutate_other(
  .data,
  var,
  n = 5,
  count,
  by = NULL,
  var.weight = NULL,
  mass = NULL,
  copy = TRUE,
  other.category = "Other"
)

```

**Arguments**

.data	Data containing variable.
var	Variable containing infrequent entries, to be collapsed into "Other".
n	Threshold for total number of categories above "Other".
count	Threshold for total count of observations before "Other".
by	Extra variables to group by when calculating n or count.
var.weight	Variable to act as a weight: var's where the sum of this variable exceeds mass will be kept, others set to other .category.

mass	Threshold for sum of var .weight: any var where the aggregated sum of var .weight exceeds mass will be kept and other var will be set to other .category. By default (mass = NULL), the value of mass is $-\infty$ , with a warning. You may set it explicitly to $-\text{Inf}$ if you really want to avoid a warning that this function will have no effect.
copy	Should .data be copied? Currently only TRUE is supported.
other .category	Value that infrequent entries are to be collapsed into. Defaults to "Other".

**Value**

.data but with var changed so that infrequent values have the same value (other .category).

**Examples**

```
library(data.table)
library(magrittr)

DT <- data.table(City = c("A", "A", "B", "B", "C", "D"),
                 value = c(1, 9, 4, 4, 5, 11))

DT %>%
  mutate_other("City", var.weight = "value", mass = 10) %>%
  .[]
```

---

ngrep

*Anti-grep*


---

**Description**

It is not simple to negate a regular expression. This obviates the need takes the long way round: negating the corresponding `grep1` call.

**Usage**

```
ngrep(pattern, x, value = FALSE, ...)
```

**Arguments**

x, value, pattern  
As in [grep](#).

... Arguments passed to `grep1`.

**Value**

If value is FALSE (the default), indices of x which do not match the pattern; if TRUE, the values of x themselves.

**Examples**

```

grep("[a-h]", letters)
ngrep("[a-h]", letters)

txt <- c("The", "licenses", "for", "most", "software", "are",
"designed", "to", "take", "away", "your", "freedom",
"to", "share", "and", "change", "it.",
"", "By", "contrast", "the", "GNU", "General", "Public", "License",
"is", "intended", "to", "guarantee", "your", "freedom", "to",
"share", "and", "change", "free", "software", "--",
"to", "make", "sure", "the", "software", "is",
"free", "for", "all", "its", "users")

grep("[gu]", txt, value = TRUE)
ngrep("[gu]", txt, value = TRUE)

```

---

prohibit\_unequal\_length\_vectors

*Prohibit unequal length vectors*


---

**Description**

Tests whether all vectors have the same length.

**Usage**

```
prohibit_unequal_length_vectors(...)
```

**Arguments**

...            Vectors to test.

**Value**

An error message unless all of ... have the same length in which case NULL, invisibly.

---

prohibit\_vector\_recycling

*Prohibit vector recycling*


---

**Description**

Tests (harshly) whether the vectors can be recycled safely.

**Usage**

```
prohibit_vector_recycling(...)

prohibit_vector_recycling.MAXLENGTH(...)
```

**Arguments**

```
...          A list of vectors
```

**Value**

An error message if the vectors are of different length (unless the alternative length is 1). The functions differ in their return values on success: `prohibit_vector_recycling.MAXLENGTH` returns the maximum of the lengths whereas `prohibit_vector_recycling` returns NULL. (Both functions return their values invisibly.)

**Examples**

```
## Not run:
# Returns nothing because they are of the same length
prohibit_vector_recycling(c(2, 2), c(2, 2))
# Returns nothing also, because the only different length is 1
prohibit_vector_recycling(c(2, 2), 1)
# Returns an error:
prohibit_vector_recycling(c(2, 2), 1, c(3, 3, 3))

## End(Not run)
```

---

provide.dir

*Provide directory*

---

**Description**

Provide directory. Create directory only if it does not exist.

**Usage**

```
provide.dir(path, ...)
```

**Arguments**

```
path          Path to create.
...          Passed to dir.create.
```

**Value**

path on success, the empty string character(1) on failure.

---

provide.file	<i>Provide a file</i>
--------------	-----------------------

---

**Description**

Present since hutils v1.5.0.

**Usage**

```
provide.file(path, on_failure = "")
```

**Arguments**

path	A string. The path to a filename that requires existence.
on_failure	The return value on failure. By default, an empty string.

**Value**

path for success. Or on\_failure if the path cannot be provided.

---

replace_pattern_in	<i>Replace string pattern in text file</i>
--------------------	--

---

**Description**

Replace string pattern in text file

**Usage**

```
replace_pattern_in(  
  file_contents,  
  replace,  
  basedir = ".",  
  dir_recursive = TRUE,  
  reader = readLines,  
  file_pattern = "\\.(R|r)(nw|md)?$",  
  file_contents_perl = TRUE,  
  file_contents_fixed = FALSE,  
  file_contents_ignore_case = FALSE,  
  writer = writeLines  
)
```

**Arguments**

file_contents	Character string containing a regular expression to be matched in the given character vector. Passed to pattern in <a href="#">gsub</a> .
replace	The replacement, passed to replacement in <a href="#">gsub</a> .
basedir	The root of the directory tree in which files will be searched recursively.
dir_recursive	(logical, default: TRUE) Search within subdirectories of basedir?
reader	A function, akin to <code>base::readLines</code> , the default, that accepts a filename and returns a character vector.
file_pattern	A regular expression passed to <code>list.files(pattern = file.ext)</code> . By default, <code>"\\.(R r)(nw md)?\$"</code> , i.e. all R and Sweave files. (Does not have to be a file extension.)
file_contents_perl	(logical, default: TRUE) Should file_contents be interpreted as a perl regex?
file_contents_fixed	(logical, default: FALSE) Should file_contents be interpreted as a fixed regex?
file_contents_ignore_case	(logical, default: FALSE) As in <a href="#">grep</a> .
writer	A function that will rewrite the file from the character vector read in.

---

report_error	<i>Report errors and warnings</i>
--------------	-----------------------------------

---

**Description**

Provides a consistent style for errors and warnings.

**Usage**

```
report_error(
  faulty_input,
  error_condition,
  requirement,
  context = NULL,
  advice,
  hint = NULL,
  halt = TRUE
)
```

**Arguments**

faulty_input	Unquoted function argument that is the cause of the error condition.
error_condition	A sentence explaining the condition that invoked the error.
requirement	A sentence that explains what is required.
context	(Optional) A sentence that contextualizes the error
advice	Advice for the user to avoid the error.
hint	If the input can be guessed,
halt	(logical, default: TRUE) Should the function signal an error and halt?

---

RQ

*Shorthand for requireNamespace*


---

**Description**

Present since `hutils v1.2.0`. Alias for `if (!requireNamespace(pkg, quietly = TRUE)) yes else no`. Typical use-case would be `RQ(pkg, install.packages("pkg"))]`.

Default values for `yes` and `no` from `hutils v1.5.0`.

This function is not recommended for use in scripts as it is a bit cryptic; its use-case is for bash scripts and the like where calls like this would otherwise be frequent and cloud the message.

**Usage**

```
RQ(pkg, yes = NULL, no = NULL)
```

**Arguments**

pkg	Package to test whether the package is not yet installed.
yes	Response if pkg is <b>not</b> installed.
no	(optional) Response if pkg is installed.

**Examples**

```
## Not run:
RQ("dplyr", "dplyr needs installing")

## End(Not run)
```

---

samp *Safer sampler*

---

### Description

Present since hutils v1.4.0. Same as [sample](#), but avoiding the behaviour when `length(x) == 1L`.

### Usage

```
samp(x, size = length(x), replace = size > length(x), loud = TRUE, prob = NULL)
```

### Arguments

x	A vector.
size	A non-negative integer, the number of items to return.
replace	Should the sampling be done with replacement? Defaults to TRUE if <code>size &gt; length(x)</code> , with a message.
loud	If TRUE, the default, any behaviour known to be different from <a href="#">sample</a> is flagged with a message.
prob	As in <a href="#">sample</a> .

### Examples

```
samp(1:5)
sample(1:5)

samp(1:5, size = 10) # no error
tryCatch(sample(1:5, size = 10),
  error = function(e) print(e$message))

samp(5, size = 3)
sample(5, size = 3)
```

---

selector *Fast selection of data.table columns*

---

### Description

Present since hutils 1.2.0.

### Usage

```
selector(DT, ..., cols = NULL, preserve.key = TRUE, shallow = FALSE)
```

**Arguments**

DT	A data.table.
...	Unquoted column names.
cols	Character vector of column names.
preserve.key	(logical, default: TRUE) Reapply the key (if DT has one)?
shallow	(logical, default: FALSE) Should the result be a shallow <a href="#">copy</a> of DT's columns or should the columns be assigned by reference? If TRUE, any modification to the result also modifies the selected columns in DT.

**Value**

DT with the selected columns.

**Examples**

```
RQ("nycflights13", no = {
  library(nycflights13)
  library(data.table)
  fs <- as.data.table(flights)
  fs1 <- selector(fs, year, month, day, arr_delay)
  fs1[, arr_delay := NA]
})
```

---

select\_grep

*Select names matching a pattern*

---

**Description**

Select names matching a pattern

**Usage**

```
select_grep(
  DT,
  patterns,
  .and = NULL,
  .but.not = NULL,
  ignore.case = FALSE,
  perl = TRUE,
  fixed = FALSE,
  useBytes = FALSE,
  invert = FALSE,
  .warn.fixed.mismatch = TRUE
)
```

**Arguments**

DT	A data.frame.
patterns	Regular expressions to be matched against the names of DT. If length(patterns) > 1 the patterns are concatenated using alternation.
.and	Character or integer positions of names to select, regardless of whether or not they are matched by patterns.
.but.not	Character or integer positions of names to drop, regardless of whether or not they are matched by patterns or whether they are explicitly added by .and.
ignore.case, perl, fixed, useBytes, invert	Arguments passed to <code>grep</code> . Note that <code>perl = TRUE</code> by default (unlike <code>grep</code> ) unless <code>fixed = TRUE</code> (and <code>perl</code> is missing).
.warn.fixed.mismatch	(logical, default: TRUE) If TRUE, the default, selecting <code>fixed = TRUE</code> with <code>perl = TRUE</code> or <code>ignore.case = TRUE</code> results in <code>perl</code> and <code>ignore.case</code> being reset to FALSE with a warning (as in <code>grep</code> ), even if it makes no difference to the columns eventually selected. If FALSE unambiguous results are allowed; if <code>ignore.case = TRUE</code> and <code>fixed = TRUE</code> , the result is <b>unambiguous</b> if <code>select_grep(DT, tolower(patterns), fixed = TRUE)</code> and <code>select_grep(DT, toupper(patterns), fixed = TRUE)</code> are identical.

**Value**

DT with the selected names.

integer vector of positions

**Examples**

```
library(data.table)
dt <- data.table(x1 = 1, x2 = 2, y = 0)
select_grep(dt, "x")
select_grep(dt, "x", .and = "y")
select_grep(dt, "x", .and = "y", .but.not = "x2")
```

---

select\_which

*Select columns satisfying a condition*

---

**Description**

Select columns satisfying a condition

**Usage**

```
select_which(DT, Which, .and.dots = NULL, checkDT = TRUE, .and.grep = NULL)
```

**Arguments**

DT	A <code>data.table</code> .
Which	A function that takes a vector and returns TRUE or FALSE. TRUE columns are selected.
.and.dots	Optional extra columns to include. May be a character vector of names(DT) or numeric (positions) or logical. If provided, the columns so added (if they do not satisfy Which) will be after all the columns Which do so satisfy.
checkDT	If TRUE (the default), an informative error message is provided if DT is not a <code>data.table</code> .
.and.grep	A character vector of regular expressions to match to the names of DT. The corresponding columns will be included in the result.

**Value**

DT with the selected variables.

**Examples**

```
library(data.table)
DT <- data.table(x = 1:5,
                 y = letters[1:5],
                 AB = c(NA, TRUE, FALSE))
select_which(DT, anyNA, .and.dots = "y")
```

---

seq\_nrow

*Generate sequence of row numbers*

---

**Description**

Generate sequence of row numbers

**Usage**

```
seq_nrow(x)
```

**Arguments**

x                    An object that admits an `nrow`.

**Value**

Equivalent to `seq_len(nrow(x))`

---

set_cols_first	<i>Put columns first or last</i>
----------------	----------------------------------

---

### Description

Reorder columns of a `data.table` (via `setcolorder`) so that particular columns appear first (or last), or in a particular order.

### Usage

```
set_cols_first(DT, cols, intersection = TRUE)
set_cols_last(DT, cols, intersection = TRUE)
set_colsuborder(DT, cols, intersection = TRUE)
```

### Arguments

DT	A <code>data.table</code> .
cols	Character vector of columns to put before (after) all others or, in the case of <code>set_colsuborder</code> , a vector of columns in the order requested.
intersection	Use the intersection of the names of DT and cols. If FALSE any cols are not the names of DT, the function may error on behalf of <code>data.table</code> . Not available for <code>set_colsuborder</code> .

### Details

In the case of `set_colsuborder` the group of columns cols occupy the same positions in DT but in a different order. See examples.

### Examples

```
library(data.table)

DT <- data.table(y = 1:5, z = 11:15, x = letters[1:5])
set_cols_first(DT, "x")[]
set_cols_last(DT, "x")[]
set_colsuborder(DT, c("x", "y"))[]
```

---

`swap`*Swap assignment*

---

**Description**

Swap values simultaneously. Present since `hutils 1.4.0`.

**Usage**

```
x %<->% value
```

**Arguments**

`x`, `value`      Objects whose values are to be reassigned by swapping.

**Value**

NULL invisibly. Called for its side-effect: the values of `x` and `value` are swapped. So

```
x %<->% value
```

is equivalent to

```
temp <- x
x <- value
value <- temp
rm(temp)
```

**Examples**

```
a <- 1
b <- 2
a %<->% b
a
b
```

---

Switch	<i>Vectorized switch</i>
--------	--------------------------

---

### Description

Present since `utils 1.2.0`. Vectorized version of `switch`. Used to avoid or make clearer the result of `if_else(Expr == , ..1, if_else(Expr == , ..2, ...))`

### Usage

```
Switch(Expr, ..., DEFAULT, IF_NA = NULL, MUST_MATCH = FALSE)
```

### Arguments

Expr	A character vector.
...	As in <code>switch</code> , a list of named alternatives. Unlike <code>switch</code> , unnamed vectors are taken to match <code>""</code> . Likewise, NA values in Expr must be assigned via <code>IF_NA</code> .
DEFAULT	A mandatory default value should any name of ... be left unmatched.
IF_NA	Optional value to replace missing ( <code>NA_character_</code> ) values in Expr.
MUST_MATCH	(logical, default: FALSE) Must every value in Expr be matched by a conversion in ...? If TRUE any output equal to the value of DEFAULT is an error.

### Value

For every element of ... whose name matches an element of Expr, that element's value.

### Examples

```
Switch(c("a", "b", "c", "a"),
  "a" = 1,
  "b" = 2,
  "c" = 3,
  "4" = 4,
  DEFAULT = 0)
```

---

unique-keys	<i>Unique keys</i>
-------------	--------------------

---

### Description

A data.table's key need not be unique, but there are frequently circumstances where non-unique keys can wreak havoc. `has_unique_key` reports the existence of a unique key, and `set_unique_key` both sets and ensures the uniqueness of keys.

**Usage**

```
has_unique_key(DT)

set_unique_key(DT, ...)
```

**Arguments**

DT	A data.table
...	keys to set

**Value**

has\_unique\_key returns TRUE if DT has a unique key, FALSE otherwise. set\_unique\_key runs setkey(DT, ...) then checks whether the key is unique, returning the keyed data.table if the key is unique, or an error message otherwise.

---

weight2rows	<i>Expand a weighted data frame to an equivalent unweighted</i>
-------------	---

---

**Description**

Present since v1.0.0. Argument rows.out available since v1.3.0; rows.out < 1 supported since v 1.4.0. Argument discard\_weight.var available since v1.3.0.

**Usage**

```
weight2rows(DT, weight.var, rows.out = NULL, discard_weight.var = FALSE)
```

**Arguments**

DT	A data.table. Will be converted to one if possible.
weight.var	Variable in DT to be used as weights.
rows.out	If not NULL (the default) specifies the number of rows in the result; otherwise the number of rows will be sum(DT[[weight.var]]). (Due to rounding, this figures are inexact.) Since v1.4.0, if 0 < rows.out < 1 then taken to be a sample of the unweighted table. (So rows.out = 0.1 would give a 10% sample.)
discard_weight.var	If FALSE, the default, weight.var in DT will be 1 for each row in the result or a new weight if rows.out is given. Otherwise, TRUE drops the column entirely.

**Value**

DT but with the number of rows expanded to sum(DT[[weight.var]]) to reflect the weighting.

**Examples**

```
library(data.table)
DT <- data.table(x = 1:5, y = c(1, 1, 1, 1, 2))
weight2rows(DT, "y")
weight2rows(DT, "y", rows.out = 5)
```

---

weighted_ntile	<i>Weighted (ranked) quantiles</i>
----------------	------------------------------------

---

**Description**

Weighted (ranked) quantiles

**Usage**

```
weighted_ntile(vector, weights = rep(1, times = length(vector)), n)
```

**Arguments**

vector	The vector for which quantiles are desired.
weights	The weights associated with the vector. None should be NA or zero.
n	The number of quantiles desired.

**Details**

With a short-length vector, or with weights of a high variance, the results may be unexpected.

**Value**

A vector of integers corresponding to the ntiles. (As in `dplyr::ntile`.)

**Examples**

```
weighted_ntile(1:10, n = 5)
weighted_ntile(1:10, weights = c(rep(4, 5), rep(1, 5)), n = 5)
```

---

weighted_quantile	<i>Weighted quantile</i>
-------------------	--------------------------

---

**Description**

quantile when the values are weighted

**Usage**

```
weighted_quantile(v, w = NULL, p = (0:4)/4, v_is_sorted = FALSE)
```

**Arguments**

v	A vector from which sample quantiles are desired.
w	Weights corresponding to each v.
p	Numeric vector of probabilities. Missing values or values outside [0, 1] raise an error.
v_is_sorted	(logical, default: FALSE) If TRUE, ordering v is assumed to be sorted. Only set to TRUE when it is certain that v is sorted (as within groups of tables).

**Value**

A vector the same length as p, the quantiles corresponding to each element of p.

---

<code>%in%</code>	<i>Exists and (not) in</i>
-------------------	----------------------------

---

**Description**

A common blunder in R programming is to mistype one of a set of filters without realizing. This function will error if any member of the values to be matched against is not present.

**Usage**

```
lhs %in% rhs
```

```
lhs %notin% rhs
```

**Arguments**

lhs	Values to be matched
rhs	Values to be matched against.

**Value**

Same as %in% and %notin%, unless an element of rhs is not present in lhs, in which case, an error.

**Examples**

```
# Incorrectly assumed to include two Species
iris[iris$Species %in% c("setosa", "versicolour"), ]
## Not run:
# Error:
iris[iris$Species %ein% c("setosa", "versicolour"), ]

## End(Not run)
```

---

%notchin%	<i>Negation of in (character)</i>
-----------	-----------------------------------

---

**Description**

Negation of in (character)

**Usage**

```
x %notchin% y
```

**Arguments**

x	Values to be matched.
y	Values to be matched against.

**Details**

If y is NULL, then x is TRUE for consistency with %in%. If x and y are not both character, the function simply falls back to %in% rather than erroring.

---

%notin%	<i>Negation of in</i>
---------	-----------------------

---

**Description**

Negation of in

**Usage**

```
x %notin% y
```

**Arguments**

<code>x</code>	Values to be matched
<code>y</code>	Values to be matched against.

**Details**

If `y` is `NULL`, then `x` is `TRUE` for consistency with `%in%`. Note that the function uses `fmatch` internally for performance on large `y`. Accordingly, `y` will be modified by adding a `.match.hash` attribute and thus must not be used in packages where `y` is a constant, or for things like names of `data.table`.

---

<code>%pin%</code>	<i>Partial in</i>
--------------------	-------------------

---

**Description**

Analogue of `%in%` but indicating partial match of the left operand.

**Usage**

```
x %pin% Y
```

**Arguments**

<code>x</code>	The values to be matched. Same as <code>%in%</code> .
<code>Y</code>	A vector of values (perl regular expressions) to be matched against.

**Value**

`TRUE` for every `x` for which any `grepl` is `TRUE`.

**Examples**

```
x <- c("Sydney Airport", "Melbourne Airport")
x %pin% c("Syd", "Melb")
```

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