Package 'R.utils'

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Title Various programming utilities

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Description This package provides utility classes and methods useful when programming in R and developing R packages.

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`R.utils-package` *Package R.utils*

Description

This package provides utility classes and methods useful when programming in R and developing R packages.

Warning: The Application Programming Interface (API) of the classes and methods in this package may change. Classes and methods are considered either to be stable, or to be in beta or alpha (pre-beta) stage. See list below for details.

The main reason for publishing this package on CRAN although it lacks a stable API, is that its methods and classes are used internally by other packages on CRAN that the author has published.

For package history, see `showHistory(R.utils)`.

Requirements

This package requires the **R.oo** package [1].

Installation and updates

To install this package do:

```
install.packages("R.utils")
```

To get started

- Arguments[alpha] Methods for common argument processing.
- Assert[alpha] Methods for assertion of values and states.
- GString[alpha] A character string class with methods for simple substitution.
- Java[beta] Reads and writes Java streams.
- Options[alpha] Tree-structured options queried in a file-system like manner.
- Settings[alpha] An Options class for reading and writing package settings.
- ProgressBar[beta] Text-based progress bar.
- FileProgressBar[beta] A ProgressBar that reports progess as file size.
- System[alpha] Methods for access to system.

- Verbose[alpha] A class for verbose and log output. Utilized by the VComments and LComments classes.
- SmartComments, VComments, LComments[alpha] Methods for preprocessing source code comments of certain formats into R code.

In addition to the above, there is a large set of function for file handling such as support for reading/following Windows Shortcut links, but also other standalone utility functions. See package index for a list of these. These should also be considered to be in alpha or beta stage.

How to cite this package

Whenever using this package, please cite [1] as

```
@INPROCEEDINGS{BengtssonH_2003,
 author       = {Henrik Bengtsson},
 title        = {The {R.oo} package - Object-Oriented Programming
                 with References Using Standard {R} Code},
 booktitle    = {Proceedings of the 3rd International Workshop on
                 Distributed Statistical Computing (DSC 2003)},
 year         = {2003},
 editor       = {Kurt Hornik and Friedrich Leisch and Achim Zeileis},
 address      = {Vienna, Austria},
 month        = {March},
 issn         = {1609-395X},
 howpublished = {http://www.ci.tuwien.ac.at/Conferences/DSC-2003/},
}
```

Wishlist

Here is a list of features that would be useful, but which I have too little time to add myself. Contributions are appreciated.

- Write a TclTkProgressBar class.
- Improve/stabilize the GString class.
- Mature the SmartComments classes. Also add AComments and PComments for assertion and progress/status comments.

If you consider implement some of the above, make sure it is not already implemented by downloading the latest "devel" version!

License

References

1 H. Bengtsson, *The R.oo package - Object-Oriented Programming with References Using Standard R Code*, In Kurt Hornik, Friedrich Leisch and Achim Zeileis, editors, Proceedings of the 3rd International Workshop on Distributed Statistical Computing (DSC 2003), March 20-22, Vienna, Austria. http://www.ci.tuwien.ac.at/Conferences/DSC-2003/Proceedings/

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

---

addFinalizerToLast *Modifies .Last() to call 'finalizeSession()*

Description

Modifies .Last() to call 'finalizeSession() *before* calling the default `.Last()` function.

Note that `.Last()` is *not* guaranteed to be called when the R session finished. For instance, the user may quit R by calling `quit(runLast=FALSE)` or run R in batch mode.

Note that this function is called when the R.utils package is loaded.

Usage

```
## Default S3 method:
addFinalizerToLast(...)
```

Arguments

`...`	Not used.

Value

Returns (invisibly) `TRUE` if `.Last()` was modified, otherwise `FALSE`.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

`onSessionExit()`.

`Arguments` *Static class to validate and process arguments*

Description

Package: R.utils
Class Arguments

```
Object
~~|
~~+--Arguments
```

Directly known subclasses:

public static class **Arguments**
extends Object

Fields and Methods

Methods:

`getCharacter`	-
`getCharacters`	Coerces to a character vector and validates.
`getDirectory`	-
`getDouble`	-
`getDoubles`	Coerces to a double vector and validates.
`getEnvironment`	Gets an existing environment.
`getIndex`	-
`getIndices`	Coerces to a integer vector and validates.
`getInstanceOf`	Gets an instance of the object that is of a particular class.
`getInteger`	-
`getIntegers`	Coerces to a integer vector and validates.
`getLogical`	-
`getLogicals`	Coerces to a logical vector and validates.
`getNumeric`	-
`getNumerics`	Coerces to a numeric vector and validates.
`getReadablePath`	-
`getReadablePathname`	Gets a readable pathname.
`getReadablePathnames`	Gets a readable pathname.
`getRegularExpression`	Gets a valid regular expression pattern.
`getVector`	Validates a vector.
`getVerbose`	Coerces to Verbose object.
`getWritablePath`	-

getWritablePathname Gets a writable pathname.

Methods inherited from Object:
$, $<-, [[, [[<-, as.character, attach, attachLocally, clearCache, clone, detach, equals, extend, finalize, gc, getEnvironment, getFields, getInstantiationTime, getStaticInstance, hasField, hashCode, ll, load, objectSize, print, registerFinalizer, save

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

---

arrayIndex *Converts vector indices to array indices*

Description

Converts vector indices to array indices assuming last array dimension to "move fastest", e.g. matrices are stored column by column.

Usage

```
## Default S3 method:
arrayIndex(i, dim, ...)
```

Arguments

i	A vector of vector indices to be converted to array indices.
dim	A non-empty numeric vector specifying the dimension of the array.
...	Not used.

Value

Returns an integer matrix of length(i) rows and length(dim) columns.

References

[1] H. Bengtsson, *Bayesian Networks - a self-contained introduction with implementation remarks*, Master's Thesis in Computer Science, Mathematical Statistics, Lund Institute of Technology, 1999.

See Also

From R v2.11.0 there is arrayInd(), which does the same thing as this method. which() with argument arr.ind=TRUE.

Examples

```
# Single index
print(arrayIndex(21, dim=c(4,3,3)))

# Multiple indices
print(arrayIndex(20:23, dim=c(4,3,3)))

# Whole array
x <- array(1:30, dim=c(5,6))
print(arrayIndex(1:length(x), dim=dim(x)))

# Find (row,column) of maximum value
m <- diag(4-abs(-4:4))
print(arrayIndex(which.max(m), dim=dim(m)))
```

---

as.character.binmode

Converts a binary/octal/hexadecimal number into a string

Description

Converts a binary/octal/hexadecimal number into a string.

Usage

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

Arguments

x	Object to be converted.
...	Not used.

Value

Returns a character.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

as.character.octmode(), cf. octmode. intToBin() (incl. intToOct() and intToHex()).

`Assert` *The Assert class*

Description

Package: R.utils
Class Assert

```
Object
~~|
~~+--Assert
```

Directly known subclasses:

public static class **Assert**
extends Object

Usage

```
Assert(...)
```

Arguments

`...`	Not used.

Fields and Methods

Methods:

`check`	Static method asserting that a generic condition is true.
`inherits`	Static method asserting that an object inherits from of a certain class.
`isMatrix`	Static method asserting thatan object is a matrix.
`isScalar`	Static method asserting thatan object is a single value.
`isVector`	Static method asserting thatan object is a vector.

Methods inherited from Object:
$, $<-, [[, [[<-, as.character, attach, attachLocally, clearCache, clone, detach, equals, extend, finalize, gc, getEnvironment, getFields, getInstantiationTime, getStaticInstance, hasField, hashCode, ll, load, objectSize, print, registerFinalizer, save

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

`attachLocally.list` *Assigns an objects elements locally*

Description

Assigns an objects elements locally.

Usage

```
## S3 method for class 'list'
attachLocally(object, fields=NULL, excludeFields=NULL, overwrite=TRUE, envir=parent
```

Arguments

`object`	An object with named elements such as an `environment`, a `list`, or a `data.frame`.
`fields`	A `character vector` specifying elements to be copied. If `NULL`, all elements are considered.
`excludeFields`	A `character vector` specifying elements not to be copied. This has higher priority than `fields`.
`overwrite`	If `FALSE`, fields that already exists will not be copied.
`envir`	The `environment` where elements are copied to.
`...`	Not used.

Value

Returns (invisibly) a `character vector` of the fields copied.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

`attachLocally()` of class Object. `attach`().

Examples

```
foo <- function(object) {
  cat("Local objects in foo():\n")
  print(ls())

  attachLocally(object)

  cat("\nLocal objects in foo():\n")
  print(ls())

  for (name in ls()) {
    cat("\nObject '", name, "':\n", sep="")
    print(get(name, inherits=FALSE))
  }
}

a <- "A string"
l <- list(a=1:10, msg="Hello world", df=data.frame(a=NA, b=2))
foo(l)
print(a)
```

`bunzip2` *Bunzip a file*

Description

Bunzip a file.

Usage

```
## Default S3 method:
bunzip2(filename, destname=gsub("[.]bz2$", "", filename), overwrite=FALSE, remove=T
```

Arguments

`filename`	Pathname of (bzip2'ed) input file to be bunzip2'ed.
`destname`	Pathname of output file.
`overwrite`	If the output file already exists, then if `overwrite` is `TRUE` the file is silently overwritting, otherwise an exception is thrown.
`remove`	If `TRUE`, the input file is removed afterward, otherwise not.
`BFR.SIZE`	The number of bytes read in each chunk.
`...`	Not used.

Details

Internally `bzfile()` (see `connections`) is used to read chunks of the bzip2'ed file, which are then written to the output file.

Value

Returns the number of (input/compressed) bytes read.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

`callHooks` *Call hook functions by hook name*

Description

Call hook functions by hook name.

Usage

```
## Default S3 method:
callHooks(hookName, ..., removeCalledHooks=FALSE)
```

Arguments

`hookName`	A `character` string of the hook name.
`...`	Argument passed to each hook function.
`removeCalledHooks`	If `TRUE`, called hook functions are removed, otherwise not.

Value

Returns (invisibly) whatever `callHooks.list()` returns.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

Internally, after retriving hook functions, `callHooks.list()` is called.

Examples

```
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Example 1
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# First, clean up if called more than once
setHook("myFunction.onEnter", NULL, action="replace")
setHook("myFunction.onExit", NULL, action="replace")

runConference <- function(...) {
```

```
  callHooks("myFunction.onEnter")
  cat("Speaker A: Hello there...\n")
  callHooks("myFunction.onExit")
}

setHook("myFunction.onEnter", function(...) {
  cat("Chair: Welcome to our conference.\n")
})

setHook("myFunction.onEnter", function(...) {
  cat("Chair: Please welcome Speaker A!\n")
})

setHook("myFunction.onExit", function(...) {
  cat("Chair: Please thanks Speaker A!\n")
})

runConference()


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Example 2
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
setHook("randomNumber", NULL, action="replace")
setHook("randomNumber", rnorm)      # By function
setHook("randomNumber", "rexp")     # By name
setHook("randomNumber", "runiff")   # Non-existing name
setHook("randomNumber", .GlobalEnv) # Not a function

res <- callHooks("randomNumber", n=1)
str(res)
cat("Number of hooks: ", length(res), "\n");
isErroneous <- unlist(lapply(res, FUN=function(x) !is.null(x$exception)));
cat("Erroneous hooks: ", sum(isErroneous), "\n");
```

`callHooks.function` *Call hook functions*

Description

Call hook functions.

Usage

```
## S3 method for class 'function'
callHooks(hooks, ...)
```

Arguments

hooks	A function or a list of hook functions or names of such.
...	Argument passed to each hook function.

Value

Returns (invisibly) a list that is named with hook names, if possible. Each element in the list is in turn a list with three element: fcn is the hook function called, result is its return value, and exception is the exception caught or NULL.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

See callHooks() to call hook function by name.

---

capitalize *Capitalizes/decapitalizes each character string in a vector*

Description

Capitalizes/decapitalized (making the first letter upper/lower case) of each character string in a vector.

Usage

```
  ## Default S3 method:
capitalize(str, ...)
  ## Default S3 method:
decapitalize(str, ...)
```

Arguments

str	A vector of character strings to be capitalized.
...	Not used.

Value

Returns a vector of character strings of the same length as the input vector.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

toCamelCase.

Examples

```
words <- strsplit("Hello wOrld", " ")[[1]];
cat(paste(toupper(words), collapse=" "), "\n")       # "HELLO WORLD"
cat(paste(tolower(words), collapse=" "), "\n")       # "hello world"
cat(paste(capitalize(words), collapse=" "), "\n")    # "Hello WOrld"
cat(paste(decapitalize(words), collapse=" "), "\n") # "hello wOrld"
```

---

colClasses *Creates a vector of column classes used for tabular reading*

Description

Creates a vector of column classes used for tabular reading based on a compact format string.

Usage

```
## Default S3 method:
colClasses(fmt, ...)
```

Arguments

fmt	A character string specifying the column-class format. This string is first translated by sprintf().
...	Optional arguments for the sprintf() translation.

Value

Returns a vector of character strings.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

read.table.

Examples

```
# All predefined types
print(colClasses("-?cdfilnrzDP"))
## [1] "NULL"      "NA"        "character" "double"
## [5] "factor"    "integer"   "logical"   "numeric"
## [9] "raw"       "complex"   "Date"      "POSIXct"

# A string in column 1, integers in column 4 and 5, rest skipped
print(colClasses("c--ii----"))
## [1] "character" "NULL"      "NULL"      "integer"
## [5] "integer"   "NULL"      "NULL"      "NULL"
## [9] "NULL"

# Repeats and custom column classes
c1 <- colClasses("3c{MyClass}3{foo}")
print(c1)
## [1] "character" "character" "character" "MyClass"
## [5] "foo"       "foo"       "foo"

# Passing repeats and class names using sprintf() syntax
c2 <- colClasses("%dc{%s}%d{foo}", 3, "MyClass", 3)
stopifnot(identical(c1, c2))

# Repeats of a vector of column classes
c3 <- colClasses("3{MyClass,c}")
print(c3)
## [1] "MyClass"   "character" "MyClass"   "character"
## [4] "MyClass"   "character"

# Large number repeats
c4 <- colClasses("321{MyClass,c,i,d}")
c5 <- rep(c("MyClass", "character", "integer", "double"), times=321)
stopifnot(identical(c4, c5))
```

`commandArgs` *Extract Command Line Arguments*

Description

Provides access to a copy of the command line arguments supplied when this R session was invoked. This function is backward compatible with `commandArgs`() of the **base** package, but adds more features.

Usage

```
commandArgs(asValues=FALSE, excludeReserved=FALSE, excludeEnvVars=FALSE, os=NULL, .
```

Arguments

asValues	If TRUE, a named list is returned, where command line arguments of type --foo will be returned as TRUE with name foo, and arguments of type -foo=value will be returned as character string value with name foo. In addition, if -foo value is given, this is interpreted as -foo=value, as long as value does not start with a double dash (--).
excludeReserved	If TRUE, arguments reserved by R are excluded, otherwise not. Which the reserved arguments are depends on operating system. For details, see Appendix B on "Invoking R" in *An Introduction to R*.
excludeEnvVars	If TRUE, arguments that assigns environment variable are excluded, otherwise not. As described in R --help, these are arguments of format <key>=<value>.
os	A vector of character strings specifying which set of reserved arguments to be used. Possible values are "unix", "mac", "windows", "ANY" or "current". If "current", the current platform is used. If "ANY" or NULL, all three OSs are assumed for total cross-platform compatibility.
...	Passed to commandArgs() of the **base** package.

Details

This function should be fully backward compatible with the same function in the base package.

Value

Returns a character vector containing the names of the executable and the user-supplied command line arguments, or a list if asValue is TRUE.

The first element is the name of the executable by which R was invoked. As far as I am aware, the exact form of this element is platform dependent. It may be the fully qualified name, or simply the last component (or basename) of the application. The attribute isReserved is a logical vector specifying if the corresponding command line argument is a reserved R argument or not.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

commandArgs(), Platform()

Examples

```
# Get all arguments
commandArgs()

## Spawn a copy of this application as it was invoked.
## system(paste(commandArgs(), collapse=" "))
```

```
# Get only "private" arguments and not the name of the R executable.
commandArgs(excludeReserved=TRUE)[-1]

# If R is started as
#   R DATAPATH=../data --args --root="do da" --foo bar --details --a=2
# then commandArgs(asValue=TRUE) returns a list like
#   list(R=NA, DATAPATH="../data" args=TRUE, root="do da", foo="bar", details=TRUE, a="2")
```

`copyDirectory` *Copies a directory*

Description

Copies a directory.

Usage

```
## Default S3 method:
copyDirectory(from, to=".", ..., private=TRUE, recursive=TRUE)
```

Arguments

`from`	The pathname of the source directory to be copied.
`to`	The pathname of the destination directory.
`...`	Additional arguments passed to `file.copy`(), e.g. `overwrite`.
`private`	If `TRUE`, files (and directories) starting with a period is also copied, otherwise not.
`recursive`	If `TRUE`, subdirectories are copied too, otherwise not.

Value

Returns (invisibly) a `character vector` of pathnames copied.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

`countLines` *Counts the number of lines in a text file*

Description

Counts the number of lines in a text file by counting the number of occurances of platform-independent newlines (CR, LF, and CR+LF [1]), including a last line with neither. An empty file has zero lines.

Usage

```
## Default S3 method:
countLines(file, chunkSize=5e+07, ...)
```

Arguments

`file`	A `connection` or a pathname.
`chunkSize`	The number of bytes read in each chunk.
`...`	Not used.

Value

Returns an non-negative `integer`.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

References

[1] Page *Newline*, Wikipedia, July 2008. `http://en.wikipedia.org/wiki/Newline`

Examples

```
pathname <- system.file("NEWS", package="R.utils");
n <- countLines(pathname);
n2 <- length(readLines(pathname));
stopifnot(n == n2);
```

createFileAtomically
Creates a file atomically

Description

Creates a file atomically by first creating and writing to a temporary file which is then renamed.

Usage

```
## Default S3 method:
createFileAtomically(filename, path=NULL, FUN, ..., skip=FALSE, overwrite=FALSE, ba
```

Arguments

filename	The filename of the file to create.
path	The path to the file.
FUN	A function that creates and writes to the pathname that is passed as the first argument. This pathname is guaranteed to be a non-existing temporary pathname.
...	Additional argumentes passed to pushTemporaryFile() and popTemporaryFile().
skip	If TRUE and a file with the same pathname already exists, nothing is done/written.
overwrite	If TRUE and a file with the same pathname already exists, the existing file is overwritten. This is also done atomically such that if the new file was not successfully created, the already original file is restored. If restoration also failed, the original file remains as the pathname with suffix ".bak" appended.
backup	If TRUE and a file with the same pathname already exists, then it is backed up while creating the new file. If the new file was not successfully created, the original file is restored from the backup copy.
verbose	A logical or Verbose.

Value

Returns (invisibly) the pathname.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

Internally, pushTemporaryFile() and popTemporaryFile() are used for working toward a temporary file, and pushBackupFile() and popBackupFile() are used for backing up and restoring already existing file.

Examples

```
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Create a file atomically
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
n <- 10;
createFileAtomically("foobar.txt", FUN=function(pathname) {
  cat(file=pathname, "This file was created atomically.\n");
  cat(file=pathname, "Timestamp: ", as.character(Sys.time()), "\n", sep="");
  for (kk in 1:n) {
    cat(file=pathname, kk, "\n", append=TRUE);
    Sys.sleep(0.1);
  }
  cat(file=pathname, "END OF FILE\n", append=TRUE);
}, overwrite=TRUE)

bfr <- readLines("foobar.txt");
cat(bfr, sep="\n");


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Overwrite the file atomically (emulate write failure)
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
tryCatch({
  createFileAtomically("foobar.txt", FUN=function(pathname) {
    cat(file=pathname, "Trying to create a new file.\n");
    cat(file=pathname, "Writing a bit, but then an error...\n", append=TRUE);
    # Emulate write error
    stop("An error occured while writing to the new file.");
    cat(file=pathname, "END OF FILE\n", append=TRUE);
  }, overwrite=TRUE)
}, error = function(ex) {
  print(ex$message);
})

# The original file was never overwritten
bfr2 <- readLines("foobar.txt");
cat(bfr2, sep="\n");
stopifnot(identical(bfr2, bfr));

# The partially temporary file remains
stopifnot(isFile("foobar.txt.tmp"));
bfr3 <- readLines("foobar.txt.tmp");
cat(bfr3, sep="\n");

file.remove("foobar.txt.tmp");
```

`createLink` *Creates a link to a file or a directory*

Description

Creates a link to a file or a directory. First it tries to create a (Unix-like) symbolic link and if that was not successful it tries to create a Windows Shortcut link. If neither works, an exception is thrown.

Usage

```
## Default S3 method:
createLink(link=".", target, overwrite=FALSE, methods=c("unix-symlink", "windows-nt
```

Arguments

`link`	The path or pathname of the link to be created. If `"."` (or `NULL`), it is inferred from the `target` argument.
`target`	The target file or directory to which the shortcut should point to.
`overwrite`	If `TRUE`, an existing link file is overwritten, otherwise not.
`methods`	A `character vector` specifying what methods (and in what order) should be tried for creating links.
`...`	Not used.

Value

Returns (invisibly) the path or pathname to the destination.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

See Also

`createWindowsShortcut()` and `file.symlink()`

`createWindowsShortcut`
Creates a Microsoft Windows Shortcut (.lnk file)

Description

Creates a Microsoft Windows Shortcut (.lnk file).

Usage

```
## Default S3 method:
createWindowsShortcut(pathname, target, overwrite=FALSE, ...)
```

Arguments

pathname	The pathname (with file extension *.lnk) of the link file to be created.
target	The target file or directory to which the shortcut should point to.
overwrite	If TRUE, an existing link file is overwritten, otherwise not.
...	Not used.

Value

Returns (invisibly) the pathname.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

References

[1] Create a windows shortcut (.LNK file), SS64.com, http://ss64.com/nt/shortcut.html

See Also

readWindowsShortcut()

Examples

```
# Create Windows Shortcut links to a directory and a file
targets <- list(
  system.file(package="R.utils"),
  system.file("DESCRIPTION", package="R.utils")
)

for (kk in seq(along=targets)) {
  cat("Link #", kk, "\n", sep="");

  target <- targets[[kk]];
  cat("Target: ", target, "\n", sep="");

  # Name of *.lnk file
  pathname <- sprintf("%s.LNK", tempfile())

  tryCatch({
    # Will only work on Windows systems with support for VB scripting
    createWindowsShortcut(pathname, target=target)
  }, error = function(ex) {})

  # Was it created?
  if (isFile(pathname)) {
    cat("Created link file: ", pathname, "\n", sep="");

    # Validate that it points to the correct target
```

```
    dest <- filePath(pathname, expandLinks="any")
    cat("Available target: ", dest, "\n", sep="");

    file.remove(pathname)
    stopifnot(tolower(dest) == tolower(target))
  }
}
```

`dataFrame` *Allocates a data frame with given column classes*

Description

Allocates a data frame with given column classes.

Usage

```
## Default S3 method:
dataFrame(colClasses, nrow=1, ...)
```

Arguments

`colClasses`	A `character vector` of column classes, cf. `read.table`.
`nrow`	An `integer` specifying the number of rows of the allocated data frame.
`...`	Not used.

Value

Returns an NxK `data.frame` where N equals `nrow` and K equals `length(colClasses)`.

See Also

`data.frame`.

Examples

```
df <- dataFrame(colClasses=c(a="integer", b="double"), nrow=10)
df[,1] <- sample(1:nrow(df))
df[,2] <- rnorm(nrow(df))
print(df)
```

detachPackage *Detaches a packages by name*

Description

Detaches a packages by name, if loaded.

Usage

```
## Default S3 method:
detachPackage(pkgname, ...)
```

Arguments

pkgname	A character string of the package name to be detached.
...	Not used.

Value

Returns (invisibly) TRUE if package was detached, otherwise FALSE.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

detach().

devDone *Closes an on-screen (interactive) device*

Description

Closes an on-screen (interactive) device.

Usage

```
devDone(which=dev.cur(), ...)
```

Arguments

which	An index (numeric) or a label (character).
...	Not used.

Value

Returns nothing.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

devOff(). dev.interactive.

---

devEval *Opens a new device, evaluate (graphing) code, and closes device*

Description

Opens a new device, evaluate (graphing) code, and closes device.

Usage

```
devEval(type=getOption("device"), expr, envir=parent.frame(), name="Rplot", tags=NU
```

Arguments

type	Specifies the type of device to be used by devNew.
expr	The expression of graphing commands to be evaluated.
envir	The environment where expr should be evaluated.
name, tags	The fullname name of the image is specified as the name with optional comma-separated tags appended.
ext	The filename extension of the image file generated, if any. By default, it is inferred from argument type.
...	Additional arguments passed to devNew.
filename	The filename of the image saved, if any. See also below.
path	The directory where then image should be saved, if any.
force	If TRUE, and the image file already exists, then it is overwritten, otherwise not.

Value

Returns a named list with items specifying for instance the pathname, the fullname etc of the generated image. *Note that the return value may be changed in future releases.*

Generated image file

If created, the generated image file is saved in the directory specfied by argument path with a filename consisting of the name followed by optional comma-separated tags and a filename extension given by argument ext.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

devNew().

`devGetLabel` *Gets the label of a device*

Description

Gets the label of a device.

Usage

```
devGetLabel(which=dev.cur(), ...)
```

Arguments

`which`	An index (`numeric`) or a label (`character`).
`...`	Not used.

Value

Returns a `character` string.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

devSetLabel() and devList().

devIsOpen *Checks if a device is open or not*

Description

Checks if a device is open or not.

Usage

```
devIsOpen(which=dev.cur(), ...)
```

Arguments

which	An index (numeric) or a label (character).
...	Not used.

Value

Returns TRUE if the device is open, otherwise FALSE.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

Examples

```
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Use devices for conditional processing of code.
# Close devices to rerun code.
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
cat("Currently opened device:\n")
print(devList())

# Alt A: Use device index counter (starting with the 16:th)
fig <- 15
if (!devIsOpen(fig <- fig + 1)) {
  devSet(fig)
  cat("Figure", fig, "\n")
  plot(1:10)
}
cat("Currently opened device:\n")
print(devList())

if (!devIsOpen(fig <- fig + 1)) {
  devSet(fig)
  cat("Figure", fig, "\n")
  plot(1:10)
}
cat("Currently opened device:\n")
```

```
print(devList())

# Alt B: Use device labels
if (!devIsOpen(label <- "part 1")) {
  devSet(label)
  cat("Part 1\n")
  plot(1:10)
}
cat("Currently opened device:\n")
print(devList())


if (!devIsOpen(label <- "part 2")) {
  devSet(label)
  cat("Part 2\n")
  plot(1:10)
}
cat("Currently opened device:\n")
print(devList())
```

`devList` *Lists the indices of the open devices named by their labels*

Description

Lists the indices of the open devices named by their labels.

Usage

```
devList(...)
```

Arguments

`...`	Not used.

Value

Returns a named `integer` `vector`.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

`dev.list()`.

devNew *Opens a new device*

Description

Opens a new device.

Usage

```
devNew(type=getOption("device"), ..., aspectRatio=NULL, par=NULL, label=NULL)
```

Arguments

type	A character string specifying the type of device to be opened. This string should match the name of an existing device function.
...	Additional arguments passed to the device function, e.g. width and height.
aspectRatio	A numeric ratio specifying the aspect ratio of the image. See below.
par	An optional named list of graphical settings applied, that is, passed to par, immediately after opening the device.
label	An optional character string specifying the label of the opened device.

Value

Returns what the device function returns.

Aspect ratio

The aspect ratio of an image is the height relative to the width. If argument height is not given (or NULL), it is calculated as aspectRatio*width as long as they are given. Likewise, if argument width is not given (or NULL), it is calculated as width/aspectRatio as long as they are given. If neither width nor height is given, or if both are given, then aspectRatio is ignored.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

devDone() and devOff(). For simplified generation of image files, see devEval().

devOff *Closes a device*

Description

Closes a device.

Usage

```
devOff(which=dev.cur(), ...)
```

Arguments

which	An index (numeric) or a label (character).
...	Not used.

Value

Returns what dev.off() returns.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

devDone(). Internally, dev.off() is used.

devSet *Activates a device*

Description

Activates a device.

Usage

```
devSet(which=dev.next(), ...)
```

Arguments

which	An index (numeric) or a label (character). If neither, then a label corresponding to the checksum of which as generated by digest is used.
...	Not used.

Value

Returns what dev.set() returns.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

devOff() and devDone(). Internally, dev.set() is used.

---

devSetLabel *Sets the label of a device*

Description

Sets the label of a device.

Usage

```
devSetLabel(which=dev.cur(), label, ...)
```

Arguments

which	An index (numeric) or a label (character).
label	A character string.
...	Not used.

Value

Returns nothing.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

devGetLabel() and devList().

dimNA< - *Sets the dimension of an object with the option to infer one dimension autmatically*

Description

Sets the dimension of an object with the option to infer one dimension autmatically. If one of the elements in the dimension vector is NA, then its value is inferred from the length of the object and the other elements in the dimension vector. If the inferred dimension is not an integer, an error is thrown.

Usage

```
## Default S3 replacement method:
dimNA(x) <- value
```

Arguments

x	An R object.
value	NULL of a positive numeric vector with one optional NA.

Value

Returns (invisibly) what dim<-() returns (see dim() for more details).

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

dim().

Examples

```
x <- 1:12
dimNA(x) <- c(2,NA,3)
stopifnot(dim(x) == as.integer(c(2,2,3)))
```

displayCode *Displays the contents of a text file with line numbers and more*

Description

Displays the contents of a text file with line numbers and more.

Usage

```
## Default S3 method:
displayCode(con=NULL, code=NULL, numerate=TRUE, lines=-1, wrap=79, highlight=NULL,
```

Arguments

con	A connection or a character string filename. If code is specified, this argument is ignored.
code	A character vector of code lines to be displayed.
numerate	If TRUE, line are numbers, otherwise not.
lines	If a single numeric, the maximum number of lines to show. If -1, all lines are shown. If a vector of numeric, the lines numbers to display.
wrap	The (output) column numeric where to wrap lines.
highlight	A vector of line number to be highlighted.
pager	If "none", code is not displayed in a pager, but only returned. For other options, see file.show().
...	Additional arguments passed to file.show(), which is used to display the formatted code.

Value

Returns (invisibly) the formatted code as a character string.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

file.show().

Examples

```
file <- system.file("DESCRIPTION", package="R.utils")
cat("Displaying: ", file, ":\n", sep="")
displayCode(file)

file <- system.file("NEWS", package="R.utils")
cat("Displaying: ", file, ":\n", sep="")
displayCode(file, numerate=FALSE, lines=100:110, wrap=65)

file <- system.file("NEWS", package="R.utils")
cat("Displaying: ", file, ":\n", sep="")
displayCode(file, lines=100:110, wrap=65, highlight=c(101,104:108))
```

---

doCall *Executes a function call with option to ignore unused arguments*

Description

Executes a function call with option to ignore unused arguments.

Usage

```
## Default S3 method:
doCall(.fcn, ..., args=NULL, alwaysArgs=NULL, .functions=.fcn, .ignoreUnusedArgs=TR
```

Arguments

`.fcn`	A `character` string naming the function to be called.
`...`	Named arguments to be passed to the function.
`args`	A `list` of additional named arguments that will be appended to the above arguments.
`alwaysArgs`	A `list` of additional named arguments that will be appended to the above arguments and that will *never* be ignore. This is useful if you want to pass arguments to a function that accepts arguments via `...`.
`.functions`	A `character vector` of function names whos arguments should be kept. This is useful when one function passes `...` to another, e.g. `loess`.
`.ignoreUnusedArgs`	If `TRUE`, arguments that are not accepted by the function, will not be passed to it. Otherwise, all arguments are passed.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/).

See Also

`do.call`().

Examples

```
doCall("plot", x=1:10, y=sin(1:10), col="red", dummyArg=54,
       alwaysArgs=list(xlab="x", ylab="y"),
       .functions=c("plot", "plot.xy"))
```

---

downloadFile.character

Downloads a file

Description

Downloads a file.

Usage

```
## S3 method for class 'character'
downloadFile(url, filename=basename(url), path=NULL, skip=TRUE, overwrite=!skip, ..
```

Arguments

`url`	A `character` string specifying the URL to be downloaded.
`filename, path`	(optional) `character` strings specifying the local filename and the path of the downloaded file.
`skip`	If `TRUE`, an already downloaded file is skipped.
`overwrite`	If `TRUE`, an already downloaded file is overwritten, otherwise an error is thrown.
`...`	Additional arguments passed to `download.file`.
`username, password`	`character` strings specifying the username and password for authenticated downloads. The alternative is to specify these via the URL.
`binary`	If `TRUE`, the file is downloaded exactly "as is", that is, byte by byte (recommended). which means it willand the downloaded file is empty, the file
`dropEmpty`	If `TRUE` and the downloaded file is empty, the file is ignored and `NULL` is returned.
`verbose`	A `logical`, `integer`, or a `Verbose` object.

Details

Currently arguments `username` and `password` are only used for downloads via URL protocol 'https'. The 'https' protocol requires that 'wget' is available on the system.

Value

Returns the local pathname to the downloaded filename, or `NULL` if no file was downloaded.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

Internally download.file is used. That function may generate an empty file if the URL is not available.

Examples

```
## Not run:
 pathname <- downloadFile("http://www.r-project.org/index.html", path="www.r-project.org/")
 print(pathname)

## End(Not run)
```

---

eps *EPS graphics device*

Description

Device driver for Encapsulated Postscript. This driver is the same as the postscript driver where some arguments have different default values.

Usage

```
eps(file="Rplot%03d.eps", horizontal=FALSE, paper="special", ...)
```

Arguments

file	Default file name (pattern).
horizontal	If FALSE, an horizontal EPS file is created, otherwise a portrait file is created.
paper	A character string specifying the paper type. Overrides the default of postscript().
...	Other arguments accepted by postscript().

Value

A plot device is opened; nothing is returned.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

postscript.

Examples

```
## Not run:
   eps("foo.eps")

   # is identical to

   postscript("foo.eps", onefile=TRUE, horizontal=FALSE)

   # and

   dev.print(eps, "foo.eps")

   # is identical to

   dev.print(postscript, "foo.eps", onefile=TRUE, horizontal=FALSE, paper="special")

## End(Not run)
```

---

evalWithTimeout *Evaluate an R expression and interrupts it if it takes too long*

Description

Evaluate an R expression and interrupts it if it takes too long.

Usage

```
evalWithTimeout(..., envir=parent.frame(), timeout, cpu=timeout, elapsed=timeout, o
```

Arguments

`...`	The R expression to be evaluated as passed to `eval`().
`envir`	The `environment` in which the expression should be evaluated.
`timeout, cpu, elapsed`	A `numeric` specifying the maximum number of seconds the expression is allowed to run before being interrupted by the timeout. The `cpu` and `elapsed` arguments can be used to specify whether time should be measured in CPU time or in wall time.
`onTimeout`	A `character` specifying what action to take if a timeout event occurs.

Value

Returns the results of the expression evaluated, or `NULL` if `onTimeout="warning"` and a timeout event occured.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

References

[1] R help thread 'Time out for a R Function' on 2010-12-06. http://www.mail-archive.com/r-help@r-project.org/msg119344.html

See Also

setTimeLimit()

Examples

```
# - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Function that takes "a long" time to run
# - - - - - - - - - - - - - - - - - - - - - - - - - - - -
foo <- function() {
  print("Tic");
  for (kk in 1:100) {
    print(kk);
    Sys.sleep(0.1);
  }
  print("Tac");
}


# - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Evaluate code, if it takes too long, generate
# a timeout by throwing a TimeoutException.
# - - - - - - - - - - - - - - - - - - - - - - - - - - - -
res <- NULL;
tryCatch({
  res <- evalWithTimeout({
    foo();
  }, timeout=1.08);
}, TimeoutException=function(ex) {
  cat("Timeout. Skipping.\n");
})


# - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Evaluate code, if it takes too long, generate
# a timeout returning NULL and generate a warning.
# - - - - - - - - - - - - - - - - - - - - - - - - - - - -
res <- evalWithTimeout({
  foo();
}, timeout=1.08, onTimeout="warning");
```

`extract.array` *Extract a subset of an array, matrix or a vector with unknown dimensions*

Description

Extract a subset of an array, matrix or a vector with unknown dimensions.

This method is useful when you do not know the number of dimensions of the object your wish to extract values from, cf. example.

Usage

```
## S3 method for class 'array'
extract(x, ..., drop=FALSE, indices=list(...))
```

Arguments

x	An array or a matrix.
...	These arguments are by default put into the indices list.
indices	A list of index vectors to be extracted. The names (coerced to integers) of the list elements are the dimension indices for each of the index vectors.
drop	If TRUE, dimensions of length one are dropped, otherwise not.

Value

Returns an array.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

slice.index()

Examples

```
cat("\nCreate an array 'x' with a random number of dimensions:\n")
maxdim <- 4
dim <- sample(3:maxdim, size=sample(2:maxdim, size=1), replace=TRUE)
ndim <- length(dim)
dimnames <- list()
for (kk in 1:ndim)
  dimnames[[kk]] <- sprintf("%s%d", letters[kk], 1:dim[kk])
x <- 1:prod(dim)
x <- array(x, dim=dim, dimnames=dimnames)

cat("\nArray 'x':\n")
print(x)


cat("\nExtract 'x[2:3,...]':\n")
print(extract(x, "1"=2:3))
```

```
cat("\nExtract 'x[3,2:3,...]':\n")
print(extract(x, "1"=3,"2"=2:3))

cat("\nExtract 'x[...,2:3]':\n")
indices <- list(2:3)
names(indices) <- length(dim(x))
print(extract(x, indices=indices))
```

`fileAccess` *Checks the permission of a file or a directory*

Description

Checks the permission of a file or a directory.

Usage

```
## Default S3 method:
fileAccess(pathname, mode=0, safe=TRUE, ...)
```

Arguments

`pathname`	A `character` string of the file or the directory to be checked.
`mode`	An `integer` (0,1,2,4), cf. `file.access`().
`safe`	If `TRUE`, the permissions are tested more carefully, otherwise `file.access`() is used.
`...`	Not used.

Details

In R there is `file.access`() for checking whether the permission of a file. Unfortunately, that function cannot be 100% trusted depending on platform used and file system queried, cf. [1].

Value

Returns an `integer`; 0 if the permission exists, -1 if not.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

References

[1] R-devel thread *file.access() on network (mounted) drive on Windows Vista?* on Nov 26, 2008.
[2] Filesystem permissions, Wikipedia, 2010. `http://en.wikipedia.org/wiki/Filesystem_permissions`

See Also

file.access()

Examples

```
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Current directory
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
path <- "."

# Test for existence
print(fileAccess(path, mode=0))
# Test for execute permission
print(fileAccess(path, mode=1))
# Test for write permission
print(fileAccess(path, mode=2))
# Test for read permission
print(fileAccess(path, mode=4))


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# A temporary file
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
pathname <- tempfile()
cat(file=pathname, "Hello world!")

# Test for existence
print(fileAccess(pathname, mode=0))
# Test for execute permission
print(fileAccess(pathname, mode=1))
# Test for write permission
print(fileAccess(pathname, mode=2))
# Test for read permission
print(fileAccess(pathname, mode=4))

file.remove(pathname)


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# The 'base' package directory
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
path <- system.file(package="base")

# Test for existence
print(fileAccess(path, mode=0))
# Test for execute permission
print(fileAccess(path, mode=1))
# Test for write permission
print(fileAccess(path, mode=2))
# Test for read permission
print(fileAccess(path, mode=4))
```

```
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# The 'base' package DESCRIPTION file
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
pathname <- system.file("DESCRIPTION", package="base")

# Test for existence
print(fileAccess(pathname, mode=0))
# Test for execute permission
print(fileAccess(pathname, mode=1))
# Test for write permission
print(fileAccess(pathname, mode=2))
# Test for read permission
print(fileAccess(pathname, mode=4))
```

`filePath` *Construct the path to a file from components and expands Windows Shortcuts along the pathname from root to leaf*

Description

Construct the path to a file from components and expands Windows Shortcuts along the pathname from root to leaf. This function is backward compatible with `file.path`() when argument `removeUps=FALSE` and `expandLinks="none"`, except that a (character) `NA` is return if any argument is NA.

This function exists on all platforms, not only Windows systems.

Usage

```
## Default S3 method:
filePath(..., fsep=.Platform$file.sep, removeUps=TRUE, expandLinks=c("none", "any",
```

Arguments

`...`	Arguments to be pasted together to a file path and then be parsed from the root to the leaf where Windows shortcut files are recognized and expanded according to argument `which` in each step.
`fsep`	the path separator to use.
`removeUps`	If `TRUE`, relative paths, for instance "foo/bar/../" are shortend into "foo/", but also "./" are removed from the final pathname, if possible.
`expandLinks`	A `character` string. If `"none"`, Windows Shortcut files are ignored. If `"local"`, the absolute target on the local file system is used. If `"relative"`, the relative target is used. If `"network"`, the network target is used. If `"any"`, the first the local, then the relative and finally the network target is searched for.
`mustExist`	If `TRUE` and if the target does not exist, the original pathname, that is, argument `pathname` is returned. In all other cases the target is returned.
`verbose`	If `TRUE`, extra information is written while reading.

Details

If `expandLinks==TRUE`, each component, call it *parent*, in the absolute path is processed from the left to the right as follows: 1. If a "real" directory of name *parent* exists, it is followed. 2. Otherwise, if Microsoft Windows Shortcut file with name *parent.lnk* exists, it is read. If its local target exists, that is followed, otherwise its network target is followed. 3. If no valid existing directory was found in (1) or (2), the expanded this far followed by the rest of the pathname is returned quietly. 4. If all of the absolute path was expanded successfully the expanded absolute path is returned.

Value

Returns a `character` string.

On speed

Internal `file.exists()` is call while expanding the pathname. This is used to check if there exists a Windows shortcut file named 'foo.lnk' in 'path/foo/bar'. If it does, 'foo.lnk' has to be followed, and in other cases 'foo' is ordinary directory. The `file.exists()` is unfortunately a bit slow, which is why this function appears slow if called many times.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

See Also

`readWindowsShortcut`(). `file.path`().

Examples

```
# Default
print(file.path("foo", "bar", "..", "name")) # "foo/bar/../name"

# Shorten pathname, if possible
print(filePath("foo", "bar", "..", "name"))  # "foo/name"
print(filePath("foo/bar/../name"))           # "foo/name"

# Recognize Windows Shortcut files along the path, cf. Unix soft links
filename <- system.file("data-ex/HISTORY.LNK", package="R.utils")
print(filename)
filename <- filePath(filename, expandLinks="relative")
print(filename)
```

FileProgressBar *A progress bar that sets the size of a file accordingly*

Description

Package: R.utils
Class FileProgressBar

```
Object
~~|
~~+--ProgressBar
~~~~~~~|
~~~~~~~+--FileProgressBar
```

Directly known subclasses:

public static class **FileProgressBar**
extends ProgressBar

Usage

```
FileProgressBar(pathname=NULL, ...)
```

Arguments

pathname	The pathname of the output file.
...	Other arguments accepted by the ProgressBar constructor.

Details

A progress bar that sets the size of a file accordingly. This class useful to check the progress of a batch job by just querying the size of a file, for instance, via ftp.

Fields and Methods

Methods:

remove	Removes the progress file for a file progress bar.
update	Updates file progress bar.

Methods inherited from ProgressBar:
as.character, getBarString, increase, isDone, reset, setMaxValue, setProgress, setStepLength, setTicks,

setValue, update

Methods inherited from Object:
$, $<-, [[, [[<-, as.character, attach, attachLocally, clearCache, clone, detach, equals, extend, finalize, gc, getEnvironment, getFields, getInstantiationTime, getStaticInstance, hasField, hashCode, ll, load, objectSize, print, registerFinalizer, save

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

Examples

```
  ## Not run:

# Creates a progress bar (of length 100) that displays it self as a file.
pb <- FileProgressBar("~/progress.simulation")
reset(pb)
while (!isDone(pb)) {
  x <- rnorm(3e4)
  increase(pb)
  Sys.sleep(0.01)
}


## End(Not run)
```

---

finalizeSession *Function to call for finalizing the R session*

Description

Function to call for finalizing the R session. When called, all registered "onSessionExit" hooks (functions) are called. To define such hooks, use the onSessionExit() function.

This method should not be used by the user.

Usage

```
## Default S3 method:
finalizeSession(...)
```

Arguments

...	Not used.

Value

Returns (invisibly) the hooks successfully called.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

onSessionExit().

`findSourceTraceback` *Finds all 'srcfile' objects generated by source() in all call frames*

Description

Finds all 'srcfile' objects generated by source() in all call frames. This makes it possible to find out which files are currently scripted by source().

Usage

```
## Default S3 method:
findSourceTraceback(...)
```

Arguments

`...`	Not used.

Value

Returns a named list of objects of class 'srcfile'. The names of the list entries corresponds to the 'filename' value of each corresponding 'srcfile' object. The returned list is empty if source() was not called.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

Examples

```
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Create two R script files where one source():s the other
# and both lists the traceback of filenames source():d.
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
path <- tempdir();
pathnameA <- Arguments$getWritablePathname("foo.R", path=path);
pathnameB <- Arguments$getWritablePathname("bar.R", path=path);

code <- 'cat("BEGIN foo.R\n")';
code <- c(code, 'print(findSourceTraceback());');
code <- c(code, sprintf('source("%s");', pathnameB));
```

```
code <- c(code, 'cat("END foo.R\n")');
code <- paste(code, collapse="\n");
cat(file=pathnameA, code);

code <- 'cat("BEGIN bar.R\n")';
code <- c(code, 'print(findSourceTraceback());');
code <- c(code, 'cat("END bar.R\n")');
code <- paste(code, collapse="\n");
cat(file=pathnameB, code);


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Source the first file
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
source(pathnameA, echo=TRUE);
```

`getAbsolutePath` *Gets the absolute pathname string*

Description

Gets the absolute pathname string.

Usage

```
## Default S3 method:
getAbsolutePath(pathname, workDirectory=getwd(), expandTilde=FALSE, ...)
```

Arguments

`pathname`	A `character` string of the pathname to be converted into an absolute pathname.
`workDirectory`	A `character` string of the current working directory.
`expandTilde`	If `TRUE`, tilde (~) is expanded to the corresponding directory, otherwise not.
`...`	Not used.

Details

This method will replace replicated slashes ('/') with a single one, except for the double forward slashes prefixing a Microsoft Windows UNC (Universal Naming Convention) pathname.

Value

Returns a `character` string of the absolute pathname.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

See Also

isAbsolutePath().

---

getParent *Gets the string of the parent specified by this pathname*

Description

Gets the string of the parent specified by this pathname. This is basically, by default the string before the last path separator of the absolute pathname.

Usage

```
## Default S3 method:
getParent(pathname, depth=1, fsep=.Platform$file.sep, ...)
```

Arguments

pathname	A character string of the pathname to be checked.
depth	An integer specifying how many generations up the path should go.
fsep	A character string of the file separator.
...	Not used.

Value

Returns a character string if the parent exists, otherwise NULL.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

---

getRelativePath *Gets the relative pathname relative to a directory*

Description

Gets the relative pathname relative to a directory.

Usage

```
## Default S3 method:
getRelativePath(pathname, relativeTo=getwd(), caseSensitive=NULL, ...)
```

Arguments

pathname	A character string of the pathname to be converted into an relative pathname.
relativeTo	A character string of the reference pathname.
caseSensitive	If TRUE, the comparison is case sensitive, otherwise not. If NULL, it is decided from the relative path.
...	Not used.

Details

In case the two paths are on different file systems, for instance, C:/foo/bar/ and D:/foo/, the method returns pathname as is.

Value

Returns a character string of the relative pathname.

Non-case sensitive comparison

If caseSensitive == NULL, the relative path is used to decide if the comparison should be done in a case-sensitive mode or not. The current check is if it is a Windows path or not, that is, if the relative path starts with a device letter, then the comparison is non-case sensitive.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

getAbsolutePath(). isAbsolutePath().

Examples

```
getRelativePath("foo", "foo")                       # "."
getRelativePath("foo/bar", "foo")                   # "bar"
getRelativePath("foo/bar", "foo/bar/yah")           # ".."
getRelativePath("foo/bar/cool", "foo/bar/yah/sub/") # "../../cool"
getRelativePath.default("/foo/bar/", "/bar/foo/")   # "../../foo/bar"

# Windows
getRelativePath("C:/foo/bar/", "C:/bar/")           # "../foo/bar"
getRelativePath("C:/foo/bar/", "D:/bar/")           # "C:/foo/bar"
```

GString *Character string with advanced substitutions*

Description

Package: R.utils
Class GString

```
character
~~|
~~+--GString
```

Directly known subclasses:

public static class **GString**
extends character

Usage

```
GString(..., sep="")
```

Arguments

`...`	one or more objects, to be coerced to `character` vectors.
`sep`	A `character` string to separate the terms.

Fields and Methods

Methods:

`as.character`	Gets the processed character string.
`getBuiltinDate`	Gets the current date.
`getBuiltinDatetime`	Gets the current date and time.
`getBuiltinHostname`	Gets the hostname of the system running R.
`getBuiltinOs`	Gets the operating system of the running machine.
`getBuiltinPid`	Gets the process id of the current R session.
`getBuiltinRhome`	Gets the path where R is installed.
`getBuiltinRversion`	Gets the current R version.
`getBuiltinTime`	Gets the current time.
`getBuiltinUsername`	Gets the username of the user running R.
`getRaw`	Gets the unprocessed GString.
`getVariableValue`	Gets a variable value given a name and attributes.
`parse`	Parses a GString.
`print`	Prints the processed GString.

Methods inherited from character:
all.equal, as.data.frame, as.Date, as.POSIXlt, as.raster, downloadFile, formula, getDLLRegisteredRoutines, isOpen, toAsciiRegExprPattern, toFileListTree, uses

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

Examples

```
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# First example
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
who <- "world"

# Compare this...
cat(as.character(GString("Hello ${who}\n")))

# ...to this.
cat(GString("Hello ${who}\n"))

# Escaping
cat(as.character(GString("Hello \${who}\n")))


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Looping over vectors
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
x <- 1:5
y <- c("hello", "world")
cat(as.character(GString("(x,y)=(${x},${y})")), sep=", ")
cat("\n")

cat(as.character(GString("(x,y)=(${x},$[capitalize]{y})")), sep=", ")
cat("\n")


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Predefined ("builtin") variables
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
cat(as.character(GString("Hello ${username} on host ${hostname} running R v${rversion} in pr


# Other built-in variables/functions...
cat(as.character(GString("Current date: ${date}\n")))
cat(as.character(GString("Current date: $[format='%d/%m/%y']{date}\n")))
cat(as.character(GString("Current time: ${time}\n")))


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Evaluating inline R code
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

```
cat(as.character(GString("Simple calculation: 1+1=${`1+1`}\n")))
cat(as.character(GString("Alternative current date: ${`date()`}\n")))


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Function values
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Call function rnorm with arguments n=1, i.e. rnorm(n=1)
cat(as.character(GString("Random normal number: $[n=1]{rnorm}\n")))


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Global search-replace feature
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Replace all '-' with '.'
cat(as.character(GString("Current date: ${date/-/.}\n")))
# Another example
cat(as.character(GString("Escaped string: 12*12=${`12*12`/1/}\n")))


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Defining new "builtin" function values
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Define your own builtin variables (functions)
setMethodS3("getBuiltinAletter", "GString", function(object, ...) {
  base::letters[runif(1, min=1, max=length(base::letters))]
})

cat(as.character(GString("A letter: ${aletter}\n")))
cat(as.character(GString("Another letter: ${aletter}\n")))


# Another example
setMethodS3("getBuiltinGstring", "GString", function(object, ...) {
  # Return another GString.
  GString("${date} ${time}")
})

cat(as.character(GString("Advanced example: ${gstring}\n")))


# Advanced example
setMethodS3("getBuiltinRunif", "GString", function(object, n=1, min=0, max=1, ...) {
  formatC(runif(n=n, min=min, max=max), ...)
})

cat(as.character(GString("A random number: ${runif}\n")))
n <- 5
cat(as.character(GString("${n} random numbers: ")))
cat(as.character(GString("$[n=n, format='f']{runif}")))
cat("\n")
```

```
# Advanced options.
# Options are parsed as if they are elements in a list, e.g.
#   list(n=runif(n=1,min=1,max=5), format='f')
cat(as.character(GString("$Random number of numbers: ")))
cat(as.character(GString("$[n=runif(n=1,min=1,max=5), format='f']{runif}")))
cat("\n")
```

`gzip` *Gzip/Gunzip a file*

Description

Gzip/Gunzip a file.

Usage

```
## Default S3 method:
gzip(filename, destname=sprintf("%s.gz", filename), overwrite=FALSE, remove=TRUE, B
```

Arguments

`filename`	Pathname of input file.
`destname`	Pathname of output file.
`overwrite`	If the output file already exists, then if `overwrite` is `TRUE` the file is silently overwritting, otherwise an exception is thrown.
`remove`	If `TRUE`, the input file is removed afterward, otherwise not.
`BFR.SIZE`	The number of bytes read in each chunk.
`...`	Not used.

Details

Internally `gzfile()` (see `connections`) is used to read (write) chunks to (from) the gzip file. If the process is interrupted before completed, the partially written output file is automatically removed.

Value

Returns the number of (input) bytes read.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

Examples

```
cat(file="foo.txt", "Hello world!")
gzip("foo.txt")
print(file.info("foo.txt.gz"))
gunzip("foo.txt.gz")
print(file.info("foo.txt"))
file.remove("foo.txt")
```

---

hasUrlProtocol *Checks if one or several pathnames has a URL protocol*

Description

Checks if one or several pathnames has a URL protocol.

Usage

```
## Default S3 method:
hasUrlProtocol(pathname, ...)
```

Arguments

pathname	A character vector.
...	Not used.

Value

Returns a logical vector.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

---

inAnyInterval.numeric *Checks if a set of values are inside one or more intervals*

Description

Checks if a set of values are inside one or more intervals.

Usage

```
## S3 method for class 'numeric'
inAnyInterval(...)
```

Arguments

...	Arguments passed to *mapToIntervals().

Value

Returns a logical vector.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

mapToIntervals().

---

insert *Insert values to a vector at certain positions*

Description

Insert values to a vector at certain positions.

Usage

```
## Default S3 method:
insert(x, ats, values=NA, useNames=TRUE, ...)
```

Arguments

x	The vector of data values.
ats	The indices of x where the values should be inserted.
values	A list or a vector of the values to be inserted.
useNames	If FALSE, the names attribute is dropped/ignored, otherwise not. Only applied if argument x is named.
...	Not used.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

Examples

```
# Insert at first position
y <- c(a=1, b=2, c=3)
print(y)
x <- insert(y, ats=1, values=rep(NA,2))
Ex <- c(NA,NA,y)
print(x)
stopifnot(identical(x,Ex))

x <- insert(y, ats=1, values=rep(NA,2), useNames=FALSE)
print(x)

# Insert at last position (names of 'values' are ignored
# because input vector has not names)
x <- insert(1:3, ats=4, values=c(d=2, e=1))
Ex <- c(1:3,2,1)
print(x)
stopifnot(identical(x,Ex))


# Insert in the middle of a vector
x <- insert(c(1,3,2,1), ats=2, values=2)
print(x)
stopifnot(identical(as.double(x),as.double(Ex)))


# Insert multiple vectors at multiple indices at once
x0 <- c(1:4, 8:11, 13:15)

x <- insert(x0, at=c(5,9), values=list(5:7,12))
print(x)
Ex <- 1:max(x)
stopifnot(identical(as.double(x),as.double(Ex)))

x <- insert(x0, at=c(5,9,12), values=list(5:7,12,16:18))
print(x)
Ex <- 1:max(x)
stopifnot(identical(as.double(x),as.double(Ex)))


# Insert missing indices
Ex <- 1:20
missing <- setdiff(Ex, x0)
x <- x0
for (m in missing)
  x <- insert(x, ats=m, values=m)
print(x)
stopifnot(identical(as.double(x),as.double(Ex)))
```

intervalsToSeq.matrix *Generates a vector of indices from a matrix of intervals*

Description

Generates a vector of indices from a matrix of intervals.

Usage

```
## S3 method for class 'matrix'
intervalsToSeq(fromTo, sort=FALSE, unique=FALSE, ...)
```

Arguments

fromTo	An Nx2 integer matrix.
sort	If TRUE, the returned indices are ordered.
unique	If TRUE, the returned indices are unique.
...	Not used.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

seqToIntervals().

Examples

```
## Not run: See example(seqToIntervals)
```

intToBin *Converts an integer to a binary/octal/hexadecimal number*

Description

Converts an integer to a binary/octal/hexadecimal number.

Usage

```
intToBin(x)
intToOct(x)
intToHex(x)
```

Arguments

x	An integer to be converted.

Value

Returns a character.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

---

isAbsolutePath *Checks if this pathname is absolute*

Description

Checks if this pathname is absolute.

Usage

```
## Default S3 method:
isAbsolutePath(pathname, ...)
```

Arguments

pathname	A character string of the pathname to be checked.
...	Not used.

Value

Returns a TRUE if the pathname is absolute, otherwise FALSE.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

isDirectory — *Checks if the file specification is a directory*

Description

Checks if the file specification is a directory.

Usage

```
## Default S3 method:
isDirectory(pathname, ...)
```

Arguments

pathname	A character string of the pathname to be checked.
...	Not used.

Value

Returns TRUE if the file specification is a directory, otherwise FALSE is returned.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

To check if it is a file see isFile(). Internally file.info() is used.

isEof.connection — *Checks if the current file position for a connection is at the 'End of File'*

Description

Checks if the current file position for a connection is at the 'End of File'.

Usage

```
## S3 method for class 'connection'
isEof(con, ...)
```

Arguments

con	A connection.
...	Not used.

Value

Returns a logical.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

For more information see connection.

---

isFile *Checks if the file specification is a file*

Description

Checks if the file specification is a file.

Usage

```
## Default S3 method:
isFile(pathname, ...)
```

Arguments

pathname	A character string of the pathname to be checked.
...	Not used.

Value

Returns TRUE if the file specification is a file, otherwise FALSE is returned.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

To check if it is a directory see isDirectory(). Internally file.info() is used.

isOpen.character *Checks if there is an open connection to a file*

Description

Checks if there is an open connection to a file.

Usage

```
## S3 method for class 'character'
isOpen(pathname, rw=c("read", "write"), ...)
```

Arguments

pathname	An character string.
rw	A character vector. If "read", a file is considered to be open if there exist an open connection that can read from that file. If "write", a file is considered to be open if there exist an open connection that can write to that file. Both these values may be specified.
...	Not used.

Value

Returns TRUE if there exists a file connection that is open, otherwise FALSE.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

See isOpen() in connections. showConnections().

isPackageInstalled *Checks if a package is installed or not*

Description

Checks if a package is installed or not.

Usage

```
## Default S3 method:
isPackageInstalled(package, ...)
```

Arguments

package	The name of the package.
...	Not used.

Value

Returns a logical.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

isPackageLoaded().

---

isPackageLoaded *Checks if a package is loaded or not*

Description

Checks if a package is loaded or not. Note that, contrary to require(), this function does not load the package if not loaded.

Usage

```
## Default S3 method:
isPackageLoaded(package, version=NULL, ...)
```

Arguments

package	The name of the package.
version	A character string specifying the version to test for. If NULL, any version is tested for.
...	Not used.

Value

Returns a logical.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

To check if a package is installed or not, see isPackageInstalled().

isUrl *Checks if one or several pathnames is URLs*

Description

Checks if one or several pathnames is URLs.

Usage

```
## Default S3 method:
isUrl(pathname, ...)
```

Arguments

pathname	A character vector.
...	Not used.

Value

Returns a logical vector.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

isZero *Checks if a value is (close to) zero or not*

Description

Checks if a value (or a vector of values) is (close to) zero or not where "close" means if the absolute value is less than neps*eps. *Note that* x == 0 *will not work in all cases.*

By default eps is the smallest possible floating point value that can be represented by the running machine, i.e. .Machine$double.eps and neps is one. By changing neps it is easy to adjust how close to zero "close" means without having to know the machine precision (or remembering how to get it).

Usage

```
## Default S3 method:
isZero(x, neps=1, eps=.Machine$double.eps, ...)
```

Arguments

x	A vector of values.
eps	The smallest possible floating point.
neps	A scale factor of eps specifying how close to zero "close" means. If eps is the smallest value such that 1 + eps != 1, i.e. .Machine$double.eps, neps must be greater or equal to one.
...	Not used.

Value

Returns a logical vector indicating if the elments are zero or not.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

all.equal(). Comparison. .Machine.

Examples

```
x <- 0
print(x == 0)       # TRUE
print(isZero(x))    # TRUE

x <- 1
print(x == 0)       # FALSE
print(isZero(x))    # FALSE

x <- .Machine$double.eps
print(x == 0)       # FALSE
print(isZero(x))    # FALSE

x <- 0.9*.Machine$double.eps
print(x == 0)       # FALSE
print(isZero(x))    # TRUE

# From help(Comparisions)
x1 <- 0.5 - 0.3
x2 <- 0.3 - 0.1
print(x1 - x2)
print(x1 == x2)                             # FALSE on most machines
print(identical(all.equal(x1, x2), TRUE)) # TRUE everywhere
print(isZero(x1-x2))                        # TRUE everywhere
```

`Java` *Static class for Java related methods*

Description

Package: R.utils
Class Java

```
Object
~~|
~~+--Java
```

Directly known subclasses:

public static class **Java**
extends Object

Static class that provides methods for reading and writing Java data types. Currently the following data types are supported: byte, short and int. R character strings can be written as UTF-8 formatted strings, which can be read by Java. Currently on Java String's that contain ASCII characters can be imported into R. The reason for this is that other characters are translated into non-eight bits data, e.g. 16- and 24-bits, which the readChar() method currently does not support.

Furthermore, the Java class defines some static constants describing the minimum and maximum value of some of the common Java data types: `BYTE.MIN`, `BYTE.MAX` `SHORT.MIN`, `SHORT.MAX` `INT.MIN`, `INT.MAX` `LONG.MIN`, and `LONG.MAX`.

Usage

```
Java()
```

Fields and Methods

Methods:

`asByte`	Converts a numeric to a Java byte.
`asInt`	Converts an numeric to a Java integer.
`asLong`	Converts a numeric to a Java long.
`asShort`	Converts a numeric to a Java short.
`readByte`	Reads a Java formatted byte (8 bits) from a connection.
`readInt`	Reads a Java formatted int (32 bits) from a connection.
`readShort`	Reads a Java formatted short (16 bits) from a connection.
`readUTF`	Reads a Java (UTF-8) formatted string from a connection.
`writeByte`	Writes a byte (8 bits) to a connection in Java format.

writeInt	Writes a integer (32 bits) to a connection in Java format.
writeShort	Writes a short (16 bits) to a connection in Java format.
writeUTF	Writes a string to a connection in Java format (UTF-8).

Methods inherited from Object:
$, $<-, [[, [[<-, as.character, attach, attachLocally, clearCache, clone, detach, equals, extend, finalize, gc, getEnvironment, getFields, getInstantiationTime, getStaticInstance, hasField, hashCode, ll, load, objectSize, print, registerFinalizer, save

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

Examples

```
pathname <- tempfile()

# Open the temporary file for writing
out <- file(pathname, open="wb")
b <- -128:127
Java$writeByte(out, b)
s <- -32768:32767
Java$writeShort(out, s)
i <- c(-2147483648, -2147483647, -1, 0, +1, 2147483646, 2147483647);
Java$writeInt(out, i)
str <- "This R string was written (using the UTF-8 format) using\nthe static methods of the
Java$writeUTF(out, str)
close(out)

# Open the temporary file for reading
inn <- file(pathname, open="rb")

bfr <- Java$readByte(inn, n=length(b))
cat("Read ", length(bfr), " bytes.\n", sep="")
if (!identical(bfr, b))
  throw("Failed to read the same data that was written.")

bfr <- Java$readShort(inn, n=length(s))
cat("Read ", length(bfr), " shorts.\n", sep="")
if (!identical(bfr, s))
  throw("Failed to read the same data that was written.")

bfr <- Java$readInt(inn, n=length(i))
cat("Read ", length(bfr), " ints.\n", sep="")
if (!identical(bfr, i))
  throw("Failed to read the same data that was written.")

bfr <- Java$readUTF(inn)
cat("Read ", nchar(bfr), " UTF characters:\n", "'", bfr, "'\n", sep="")
```

```
close(inn)

file.remove(pathname)
```

`jpeg2` *A JPEG device for Bitmap Files via GhostScript*

Description

A JPEG device for Bitmap Files via GhostScript.

Usage

```
## Default S3 method:
jpeg2(filename, width=480, height=480, res=144, type="jpeg", ...)
```

Arguments

`filename`	The name of the file to be produced.
`width, height`	The width and height (in pixels) of the result image.
`res`	The resolution of the image.
`type`	The output type. See `dev2bitmap` for details.
`...`	Additional arguments passed to `bitmap()`.

Value

Returns nothing.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

`lastModified` *Gets the time when the file was last modified*

Description

Gets the time when the file was last modified. The time is returned as a `POSIXct` object.

Usage

```
## Default S3 method:
lastModified(pathname, ...)
```

Arguments

pathname	A character string of the pathname to be checked.
...	Not used.

Value

Returns POSIXct object specifying when the file was last modified. If the file does not exist or it is a directory, 0 is returned.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

Internally file.info() is used.

LComments *The LComments class*

Description

Package: R.utils
Class LComments

```
Object
~~|
~~+--SmartComments
~~~~~~~|
~~~~~~~+--VComments
~~~~~~~~~~~~|
~~~~~~~~~~~~+--LComments
```

Directly known subclasses:

public static class **LComments**
extends VComments

The LComments class.

This class, is almost identical to the super class, except that the constructor has different defaults.

Usage

```
LComments(letter="L", verboseName="log", ...)
```

Arguments

letter	The smart letter.
verboseName	The name of the verbose object.
...	Not used.

Fields and Methods

Methods:
No methods defined.

Methods inherited from VComments:
convertComment, reset, validate

Methods inherited from SmartComments:
compile, convertComment, parse, reset, validate

Methods inherited from Object:
$, $<-, [[, [[<-, as.character, attach, attachLocally, clearCache, clone, detach, equals, extend, finalize, gc, getEnvironment, getFields, getInstantiationTime, getStaticInstance, hasField, hashCode, ll, load, objectSize, print, registerFinalizer, save

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

---

listDirectory *Gets the file names in the directory*

Description

Gets the file names in the directory.

Contrary to `list.files()`, this method guarantees to work recursively. Moreover, when subdirectories are processed recursively, directory names are also returned.

Usage

```
## Default S3 method:
listDirectory(pathname, pattern=NULL, recursive=FALSE, allNames=FALSE, fullNames=FA
```

Arguments

pathname	A pathname to be listed.
pattern	A character string of the filename pattern passed. See list.files() for more details.
recursive	If TRUE, subdirectories are recursively processed, otherwise not.
allNames	If TRUE, also files starting with a period are returned.
fullNames	If TRUE, the full path names are returned.
...	Not used.

Value

Returns a vector of file names.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

Internally list.files() is used.

---

loadObject *Method to load object from a file or a connection*

Description

Method to load object from a file or a connection, which previously have been saved using saveObject().

Usage

```
## Default S3 method:
loadObject(file, path=NULL, ...)
```

Arguments

file	A filename or connection to read the object from.
path	The path where the file exists.
...	Not used.

Details

The main difference from this method and load() in the **base** package, is that this one returns the object read rather than storing it in the global environment by its default name. This makes it possible to load objects back using any variable name.

Value

Returns the save object.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

saveObject() to save an object to file. Internally load() is used. See also loadToEnv().

mapToIntervals.numeric
Maps values to intervals

Description

Maps values to intervals by returning an index vector specifying the (first) interval that each value maps to, if any.

Usage

```
## S3 method for class 'numeric'
mapToIntervals(x, intervals, includeLower=TRUE, includeUpper=TRUE, ...)
```

Arguments

x	A numeric vector of K values to be matched.
intervals	The N intervals to be matched against. If an Nx2 numeric matrix, the first column should be the lower bounds and the second column the upper bounds of each interval. If a numeric vector of length 2N, each consecutive pair should be the lower and upper bounds of an interval.
includeLower, includeUpper	If TRUE, the lower (upper) bound of *each* interval is included in the test, otherwise not.
...	Not used.

Value

Returns an integer vector of length K. Values that do not map to any interval have return value NA.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

inAnyInterval(). match(). findInterval(). cut().

`mergeIntervals.numeric` *Merges intervals*

Description

Merges intervals by returning an index `vector` specifying the (first) interval that each value maps to, if any.

Usage

```
## S3 method for class 'numeric'
mergeIntervals(intervals, ...)
```

Arguments

`intervals`	The N intervals to be merged. If an Nx2 `numeric matrix`, the first column should be the lower bounds and the second column the upper bounds of each interval. If a `numeric vector` of length 2N, each consecutive pair should be the lower and upper bounds of an interval.
`...`	Not used.

Details

The upper and lower bounds are considered to be inclusive, that is, all intervals are interpreted to be of form [a,b]. There is currently no way to specify intervals with open bounds, e.g. (a,b].

Furthermore, the bounds are currently treated as real values. For instance, merging [0,1] and [2,3] will return the same intervals. Note, if integer intervals were treated specially, we would merge these intervals to integer interval [0,3] == {0,1,2,3}.

Value

Returns a `matrix` (or a `vector`) of M intervals, where M <= N. The intervals are ordered by their lower bounds. The @mode of the returned intervals is the same as the mode of the input intervals.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

See Also

`inAnyInterval`(). `match`().

mkdirs — *Creates a directory including any necessary but nonexistent parent directories*

Description

Creates a directory including any necessary but nonexistent parent directories.

Usage

```
## Default S3 method:
mkdirs(pathname, ...)
```

Arguments

pathname	A character string of the pathname to be checked.
...	Not used.

Value

Returns TRUE if the directory was succesfully created, otherwise FALSE. Note that if the directory already exists, FALSE is returned.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

Internally dir.create() is used.

NullVerbose — *A Verbose class ignoring everything*

Description

Package: R.utils
Class NullVerbose

```
Object
~~|
~~+--Verbose
~~~~~~~|
~~~~~~~+--NullVerbose
```

Directly known subclasses:

public static class **NullVerbose**
extends Verbose

A Verbose class ignoring everything.

Usage

```
NullVerbose(...)
```

Arguments

`...`	Ignored.

Fields and Methods

Methods:

`cat`	-
`enter`	-
`evaluate`	-
`exit`	-
`header`	-
`isOn`	Checks if the output is on.
`isVisible`	Checks if a certain verbose level will be shown or not.
`newline`	-
`print`	-
`printf`	-
`ruler`	-
`str`	-
`summary`	-
`writeRaw`	All output methods.

Methods inherited from Verbose:
as.character, as.double, as.logical, capture, cat, enter, equals, evaluate, exit, getThreshold, getTimestampFormat, header, isOn, isVisible, less, more, newline, off, on, popState, print, printf, pushState, ruler, setDefaultLevel, setThreshold, setTimestampFormat, str, summary, timestamp, timestampOff, timestampOn, warnings, writeRaw

Methods inherited from Object:
$, $<-, [[, [[<-, as.character, attach, attachLocally, clearCache, clone, detach, equals, extend, finalize, gc, getEnvironment, getFields, getInstantiationTime, getStaticInstance, hasField, hashCode, ll, load, objectSize, print, registerFinalizer, save

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

Examples

```
verbose <- Verbose()
cat(verbose, "A verbose messages")

verbose <- NullVerbose()
cat(verbose, "A verbose messages")   # Ignored
```

---

onGarbageCollect *Registers a function to be called when the R garbage collector is (detected to be) running*

Description

Registers a function to be called when the R garbage collector is (detected to be) running.

Usage

```
## Default S3 method:
onGarbageCollect(fcn, action=c("prepend", "append", "replace"), ...)
```

Arguments

fcn	A function to be called without argument.
action	A character string specifying how the hook function is added to list of hooks.
...	Not used.

Value

Returns (invisibly) the hooks successfully called.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

Examples

```
## Not run:
  onGarbageCollect(function(...) {
    cat("The R garbage collector is running!\n");
  })

## End(Not run)
```

`onSessionExit` *Registers a function to be called when the R session finishes*

Description

Registers a function to be called when the R session finishes.

Usage

```
## Default S3 method:
onSessionExit(fcn, action=c("prepend", "append", "replace"), ...)
```

Arguments

`fcn`	A `function` to be called without argument.
`action`	A `character` string specifying how the hook function is added to list of hooks.
`...`	Not used.

Details

Functions registered this way are called when `finalizeSession`() is called. Moreover, when this package is loaded, the `.Last()` function is modified such that `finalizeSession()` is called. However, note that `.Last()` is *not* guaranteed to be called when the R session finished. For instance, the user may quit R by calling `quit(callLast=FALSE)`. Moreover, when R is run in batch mode, `.Last()` is never called.

Value

Returns (invisibly) the hooks successfully called.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

`.Last`(). `finalizeSession`().

Examples

```
## Not run:
  onSessionExit(function(...) {
    cat("Bye bye world!\n");
  })

  quit()

## End(Not run)
```

`Options` *The Options class*

Description

Package: R.utils
Class Options

```
Object
~~|
~~+--Options
```

Directly known subclasses:
Settings

public static class **Options**
extends Object

A class to set and get either options stored in a `list` tree structure.

Each option has a pathname. The format of a pathname is similar to a (Unix) filesystem pathname, e.g. "graphics/cex". See examples for more details.

Usage

```
Options(options=list(), ...)
```

Arguments

`options`	A tree `list` structure of options.
`...`	Not used.

Details

Note, this class and its methods do *not* operate on the global options structure defined in R (options).

Value

The constructor returns an Options object.

Fields and Methods

Methods:

`as.character`	Returns a character string version of this object.
`as.list`	Gets a list representation of the options.

equals	Checks if this object is equal to another Options object.
getLeaves	Gets all (non-list) options in a flat list.
getOption	Gets an option.
hasOption	Checks if an option exists.
names	Gets the full pathname of all (non-list) options.
nbrOfOptions	Gets the number of options set.
setOption	Sets an option.
str	Prints the structure of the options.

Methods inherited from Object:
$, $<-, [[, [[<-, as.character, attach, attachLocally, clearCache, clone, detach, equals, extend, finalize, gc, getEnvironment, getFields, getInstantiationTime, getStaticInstance, hasField, hashCode, ll, load, objectSize, print, registerFinalizer, save

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

Examples

```
local <- Options()

# Query a missing option
cex <- getOption(local, "graphics/cex")
cat("graphics/cex =", cex, "\n")  # Returns NULL

# Query a missing option with default value
cex <- getOption(local, "graphics/cex", defaultValue=1)
cat("graphics/cex =", cex, "\n")  # Returns NULL

# Set option and get previous value
oldCex <- setOption(local, "graphics/cex", 2)
cat("previous graphics/cex =", oldCex, "\n")  # Returns NULL

# Set option again and get previous value
oldCex <- setOption(local, "graphics/cex", 3)
cat("previous graphics/cex =", oldCex, "\n")  # Returns 2

# Query a missing option with default value, which is ignored
cex <- getOption(local, "graphics/cex", defaultValue=1)
cat("graphics/cex =", cex, "\n")  # Returns 3

# Query multiple options with multiple default values
multi <- getOption(local, c("graphics/cex", "graphics/pch"), c(1,2))
print(multi);

# Check existance of multiple options
has <- hasOption(local, c("graphics/cex", "graphics/pch"))
print(has);
```

```
# Get a subtree of options
graphics <- getOption(local, "graphics")
print(graphics)

# Get the complete tree of options
all <- getOption(local)
print(all)
```

---

patchCode *Patches installed and loaded packages and more*

Description

Patches installed and loaded packages and more.

Usage

```
## Default S3 method:
patchCode(paths=NULL, recursive=TRUE, suppressWarnings=TRUE, knownExtensions=c("R",
```

Arguments

paths	The path to the directory (and subdirectories) which contains source code that will patch loaded packages. If NULL, the patch path is given by the option R_PATCHES, If the latter is not set, the system environment with the same name is used. If neither is given, then ~/R-patches/ is used.
recursive	If TRUE, source code in subdirectories will also get loaded.
suppressWarnings	If TRUE, warnings will be suppressed, otherwise not.
knownExtensions	A character vector of filename extensions used to identify source code files. All other files are ignored.
verbose	If TRUE, extra information is printed while patching, otherwise not.
...	Not used.

Details

The method will look for source code files (recursively or not) that match known filename extensions. Each found source code file is then source()d.

If the search is recursive, subdirectories are entered if and only if either (1) the name of the subdirectory is the same as a *loaded* (and installed) package, or (2) if there is no installed package with that name. The latter allows common code to be organized in directories although it is still not assigned to packages.

Each of the directories given by argument `paths` will be processed one by one. This makes it possible to have more than one file tree containing patches.

To set an options, see `options`(). To set a system environment, see `Sys.setenv`(). The character `;` is interpreted as a separator. Due to incompatibility with Windows pathnames, `:` is *not* a valid separator.

Value

Returns (invisibly) the number of files sourced.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

`source`(). `library`(). `relibrary`().

Examples

```
## Not run:
   # Patch all source code files in the current directory
   patchCode(".")

   # Patch all source code files in R_PATCHES
   options("R_PATCHES"="~/R-patches/")
   # alternatively, Sys.setenv("R_PATCHES"="~/R-patches/")
   patchCode()

## End(Not run)
```

---

png2 *A PNG device for Bitmap Files via GhostScript*

Description

A PNG device for Bitmap Files via GhostScript.

Usage

```
## Default S3 method:
png2(filename, width=480, height=480, res=144, type="png256", ...)
```

Arguments

filename	The name of the file to be produced.
width, height	The width and height (in pixels) of the result image.
res	The resolution of the image.
type	The output type. See dev2bitmap for details.
...	Additional arguments passed to bitmap().

Value

Returns nothing.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

---

popBackupFile *Drops a backup suffix from the backup pathname*

Description

Drops a backup suffix from the backup pathname and, by default, restores an existing backup file accordingly by renaming it.

Usage

```
## Default S3 method:
popBackupFile(filename, path=NULL, suffix=".bak", isFile=TRUE, onMissing=c("ignore"
```

Arguments

filename	The filename of the backup file.
path	The path of the file.
suffix	The suffix of the filename to be dropped.
isFile	If TRUE, the backup file must exist and will be renamed. If FALSE, it is only the pathname string that will be modified. For details, see below.
onMissing	A character string specifying what to do if the backup file does not exist.
drop	If TRUE, the backup file will be dropped in case the original file already exists or was successfully restored.
...	Not used.
verbose	A logical or Verbose.

Value

Returns the pathname with the backup suffix dropped.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

See pushBackupFile() for more details and an example.

---

popTemporaryFile *Drops a temporary suffix from the temporary pathname*

Description

Drops a temporary suffix from the temporary pathname and, by default, renames an existing temporary file accordingly.

Usage

```
## Default S3 method:
popTemporaryFile(filename, path=NULL, suffix=".tmp", isFile=TRUE, ..., verbose=FALS
```

Arguments

filename	The filename of the temporary file.
path	The path of the temporary file.
suffix	The suffix of the temporary filename to be dropped.
isFile	If TRUE, the temporary file must exist and will be renamed. If FALSE, it is only the pathname string that will be modified. For details, see below.
...	Not used.
verbose	A logical or Verbose.

Details

If isFile is FALSE, the pathname where the suffix of the temporary pathname has been dropped is returned. If isFile is TRUE, the temporary file is renamed. Then, if the temporary file does not exists or it was not successfully renamed, an exception is thrown.

Value

Returns the pathname with the temporary suffix dropped.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

See pushTemporaryFile() for more details and an example.

printf *C-style formatted output*

Description

C-style formatted output.

Usage

```
## Default S3 method:
printf(fmt, ..., sep="", file="")
```

Arguments

fmt	A character vector of format strings. See same argument for sprintf().
...	Additional arguments sprintf().
sep	A character vector of strings to append after each element.
file	A connection, or a character of a file to print to. See same argument for cat().

Value

Returns nothing.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

For C-style formatting of character strings, see sprintf().

Examples

```
cat("Hello world\n")
printf("Hello world\n")

x <- 1.23
cat(sprintf("x=%.2f\n", x))
printf("x=%.2f\n", x)

y <- 4.56
cat(sprintf(c("x=%.2f\n", "y=%.2f\n"), c(x,y)), sep="")
printf(c("x=%.2f\n", "y=%.2f\n"), c(x,y))
```

`ProgressBar` *Provides text based counting progress bar*

Description

Package: R.utils
Class ProgressBar

```
Object
~~|
~~+--ProgressBar
```

Directly known subclasses:
FileProgressBar

public static class **ProgressBar**
extends Object

Usage

```
ProgressBar(max=100, ticks=10, stepLength=1, newlineWhenDone=TRUE)
```

Arguments

`max`	The maximum number of steps.
`ticks`	Put visual "ticks" every `ticks` step.
`stepLength`	The default length for each increase.
`newlineWhenDone`	If `TRUE`, a newline is outputted when bar is updated, when done, otherwise not.

Fields and Methods

Methods:

`as.character`	Gets a string description of the progress bar.
`getBarString`	Gets the progress bar string to be displayed.
`increase`	Increases (steps) progress bar.
`isDone`	Checks if progress bar is completed.
`reset`	Reset progress bar.
`setMaxValue`	Sets maximum value.
`setProgress`	Sets current progress.
`setStepLength`	Sets default step length.
`setTicks`	Sets values for which ticks should be visible.
`setValue`	Sets current value.

update Updates progress bar.

Methods inherited from Object:
$, $<-, [[, [[<-, as.character, attach, attachLocally, clearCache, clone, detach, equals, extend, finalize, gc, getEnvironment, getFields, getInstantiationTime, getStaticInstance, hasField, hashCode, ll, load, objectSize, print, registerFinalizer, save

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

Examples

```
# A progress bar with default step length one.
pb <- ProgressBar(max=42)
reset(pb)
while (!isDone(pb)) {
  x <- rnorm(3e4)
  increase(pb)
  Sys.sleep(0.02)
}
cat("\n")

# A "faster" progress bar with default step length 1.4.
pb <- ProgressBar(max=42, stepLength=1.4)
reset(pb)
while (!isDone(pb)) {
  x <- rnorm(3e4)
  increase(pb)
  Sys.sleep(0.02)
}

cat("\n")
```

---

pushBackupFile *Appends a backup suffix to the pathname*

Description

Appends a backup suffix to the pathname and, optionally, renames an existing file accordingly.

In combination with popBackupFile(), this method is useful for creating a backup of a file and restoring it.

Usage

```
## Default S3 method:
pushBackupFile(filename, path=NULL, suffix=".bak", isFile=TRUE, onMissing=c("ignore
```

Arguments

filename	The filename of the file to backup.
path	The path of the file.
suffix	The suffix to be appended.
isFile	If TRUE, the file must exist and will be renamed on the file system. If FALSE, it is only the pathname string that will be modified. For details, see below.
onMissing	A character string specifying what to do if the file does not exist.
copy	If TRUE, an existing original file remains after creating the backup copy, otherwise it is dropped.
overwrite	If TRUE, any existing backup files are overwritten, otherwise an exception is thrown.
...	Not used.
verbose	A logical or Verbose.

Value

Returns the pathname with the suffix appended.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

popBackupFile().

Examples

```
# Create a file
pathname <- "foobar.txt";
cat(file=pathname, "File v1\n");


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# (a) Backup and restore a file
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Turn it into a backup file
pathnameB <- pushBackupFile(pathname, verbose=TRUE);
print(pathnameB);

# Restore main file from backup
pathnameR <- popBackupFile(pathnameB, verbose=TRUE);
print(pathnameR);


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# (b) Backup, create a new file and frop backup file
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

```
# Turn it into a backup file
pathnameB <- pushBackupFile(pathname, verbose=TRUE);
print(pathnameB);

# Create a new file
cat(file=pathname, "File v2\n");

# Drop backup because a new main file was successfully created
pathnameR <- popBackupFile(pathnameB, verbose=TRUE);
print(pathnameR);
```

`pushTemporaryFile` *Appends a temporary suffix to the pathname*

Description

Appends a temporary suffix to the pathname and, optionally, renames an existing file accordingly.

In combination with `popTemporaryFile`(), this method is useful for creating a file/writing data to file *atomically*, by first writing to a temporary file which is the renamed. If for some reason the generation of the file was interrupted, for instance by a user interrupt or a power failure, then it is only the temporary file that is incomplete.

Usage

```
## Default S3 method:
pushTemporaryFile(filename, path=NULL, suffix=".tmp", isFile=FALSE, ..., verbose=FA
```

Arguments

`filename`	The filename of the file.
`path`	The path of the file.
`suffix`	The suffix to be appended.
`isFile`	If `TRUE`, the file must exist and will be renamed on the file system. If `FALSE`, it is only the pathname string that will be modified. For details, see below.
`...`	Not used.
`verbose`	A `logical` or `Verbose`.

Details

If `isFile` is `FALSE`, the pathname where the suffix of the temporary pathname has been added is returned. If `isFile` is `TRUE`, the file is also renamed. Then, if the file does not exists or it was not successfully renamed, an exception is thrown.

Value

Returns the pathname with the suffix appended.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

popTemporaryFile().

Examples

```
createAtomically <- function(pathname, ...) {
  cat("Pathname: ", pathname, "\n", sep="");

  # Generate a file atomically, i.e. the file will either be
  # complete or not created at all.  If interrupted while
  # writing, only a temporary file will exist/remain.
  pathnameT <- pushTemporaryFile(pathname);
  cat("Temporary pathname: ", pathnameT, "\n", sep="");

  cat(file=pathnameT, "This file was created atomically:\n");
  for (kk in 1:10) {
    cat(file=pathnameT, kk, "\n", append=TRUE);
    Sys.sleep(0.1);
  }
  cat(file=pathnameT, "END OF FILE\n", append=TRUE);

  # Rename the temporary file
  pathname <- popTemporaryFile(pathnameT);

  pathname;
} # createAtomically()


pathname <- tempfile();

tryCatch({
  # Try to interrupt the process while writing...
  pathname <- createAtomically(pathname);
}, interrupt=function(intr) {
  str(intr);
})

# ...and this will throw an exception
bfr <- readLines(pathname);
cat(bfr, sep="\n");
```

readBinFragments *Reads binary data from disjoint sections of a connection or a file*

Description

Reads binary data from disjoint sections of a connection or a file.

Usage

```
## Default S3 method:
readBinFragments(con, what, idxs=1, origin=c("current", "start"), size=NA, ..., ver
```

Arguments

con	A connection or the pathname of an existing file.
what	A character string or an object specifying the the data type (mode()) to be read.
idxs	A vector of (non-duplicated) indices or a Nx2 matrix of N from-to index intervals specifying the elements to be read. Positions are either relative to the start or the current location of the file/connection as given by argument origin.
origin	A character string specify whether the indices in argument idxs are relative to the "start" or the "current" position of the file/connection.
size	The size of the data type to be read. If NA, the natural size of the data type is used.
...	Additional arguments passed to readBin().
verbose	A logical or a Verbose object.

Value

Returns a vector of the requested mode().

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

writeBinFragments().

Examples

```
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Create a data file
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
data <- 1:255
size <- 2
```

```
pathname <- tempfile("exampleReadBinFragments")
writeBin(con=pathname, data, size=size)


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Read and write using index vectors
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
cat("Read file...\n")
# Read every 16:th byte in the file
idxs <- seq(from=1, to=255, by=16)
x <- readBinFragments(pathname, what="integer", size=size, signed=FALSE, idxs=idxs)
stopifnot(identical(x, data[idxs]))
print(x)
# Read every 16:th byte in a connection starting with the 6th.
idxs <- idxs + 5L;
x <- readBinFragments(pathname, what="integer", size=size, signed=FALSE, idxs=idxs)
stopifnot(identical(x, data[idxs]))
print(x)
cat("Read file...done\n")

cat("Write file...\n")
# Update every 16:th byte in the file
idxs <- seq(from=1, to=255, by=16)
x0 <- data[idxs]
writeBinFragments(pathname, idxs=idxs, rev(x0), size=size)
x <- readBinFragments(pathname, what="integer", size=size, signed=FALSE, idxs=idxs)
print(x)
stopifnot(identical(rev(x0), x))

# Update every 16:th byte in the file
idxs <- seq(from=1, to=255, by=16)
writeBinFragments(pathname, idxs=idxs, rev(x), size=size)
x <- readBinFragments(pathname, what="integer", size=size, signed=FALSE, idxs=idxs)
print(x)
stopifnot(identical(x0, x))

# Assert everything is as expected
# Read the complete file
x <- readBin(pathname, what="integer", size=size, signed=FALSE, n=length(data))
stopifnot(identical(x, data))
cat("Write file...done\n")


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Ditto but via a connection
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
cat("Read connection...\n")
# Read every 16:th byte in a connection
con <- file(pathname, open="rb")
idxs <- seq(from=1, to=255, by=16)
x <- readBinFragments(con, what="integer", size=size, signed=FALSE, idxs=idxs)
stopifnot(identical(x, data[idxs]))
print(x)
```

```
# Read every 16:th byte in a connection starting with the 6th.
idxs <- idxs + 5L;
x <- readBinFragments(con, what="integer", size=size, signed=FALSE, idxs=idxs, origin="start
stopifnot(identical(x, data[idxs]))
print(x)
close(con)
cat("Read connection...done\n")


# Update every 16:th byte in a connection
cat("Write connection...\n")
con <- file(pathname, open="r+b")
idxs <- seq(from=1, to=255, by=16)
x0 <- data[idxs]
writeBinFragments(pathname, idxs=idxs, rev(x0), size=size)
x <- readBinFragments(pathname, what="integer", size=size, signed=FALSE, idxs=idxs)
print(x)
stopifnot(identical(rev(x0), x))

# Update every 16:th byte in the file
idxs <- seq(from=1, to=255, by=16)
writeBinFragments(pathname, idxs=idxs, rev(x), size=size)
x <- readBinFragments(pathname, what="integer", size=size, signed=FALSE, idxs=idxs, origin="
print(x)
stopifnot(identical(x0, x))

close(con)

# Assert everything is as expected
# Read the complete file
x <- readBin(pathname, what="integer", size=size, signed=FALSE, n=length(data))
stopifnot(identical(x, data))
cat("Write connection...done\n")


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Clean up
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
file.remove(pathname)
```

`readRdHelp` *Reads one or more Rd help files in a certain format*

Description

Reads one or more Rd help files in a certain format.

Usage

```
## Default S3 method:
readRdHelp(..., format=c("text", "html", "latex", "rd"), drop=TRUE)
```

Arguments

`...`	Arguments passed to `help`.
`format`	A `character` string specifying the return type.
`drop`	If `FALSE` or more than one help entry is found, the result is returned as a `list`.

Value

Returns a `list` of `character` strings or a single `character` string.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

`readTable` *Reads a file in table format*

Description

Reads a file in table format and creates a data frame from it, with cases corresponding to lines and variables to fields in the file.

WARNING: This method is very much in an alpha stage. Expect it to change.

This method is an extension to the default `read.table` function in R. It is possible to specify a column name to column class map such that the column classes are automatically assigned from the column header in the file.

In addition, it is possible to read any subset of rows. The method is optimized such that only columns and rows that are of interest are parsed and read into R's memory. This minimizes memory usage at the same time as it speeds up the reading.

Usage

```
## Default S3 method:
readTable(file, colClasses=NULL, isPatterns=FALSE, defColClass=NA, header=FALSE, sk
```

Arguments

`file`	A `connection` or a filename. If a filename, the path specified by `path` is added to the front of the filename. Unopened files are opened and closed at the end.

colClasses	Either a named or an unnamed character vector. If unnamed, it specified the column classes just as used by read.table. If it is a named vector, names(colClasses) are used to match the column names read (this requires that header=TRUE) and the column classes are set to the corresponding values.
isPatterns	If TRUE, the matching of names(colClasses) to the read column names is done by regular expressions matching.
defColClass	If the column class map specified by a named colClasses argument does not match some of the read column names, the column class is by default set to this class. The default is to read the columns in an "as is" way.
header	If TRUE, column names are read from the file.
skip	The number of lines (commented or non-commented) to skip before trying to read the header or alternatively the data table.
nrows	The number of rows to read of the data table. Ignored if rows is specified.
rows	An row index vector specifying which rows of the table to read, e.g. row one is the row following the header. Non-existing rows are ignored. Note that rows are returned in the same order they are requested and duplicated rows are also returned.
col.names	Same as in read.table().
check.names	Same as in read.table(), but default value is FALSE here.
path	If file is a filename, this path is added to it, otherwise ignored.
...	Arguments passed to read.table used internally.
stripQuotes	If TRUE, quotes are stripped from values before being parse. This argument is only effective when method=="readLines".
method	If "readLines", (readLines()) is used internally to first only read rows of interest, which is then passed to read.table(). If "intervals", contigous intervals are first identified in the rows of interest. These intervals are the read one by one using read.table(). The latter methods is faster and especially more memory efficient if the intervals are not too many, where as the former is prefered if many "scattered" rows are to be read.
verbose	A logical or a Verbose object.

Value

Returns a data.frame.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

readTableIndex(). read.table. colClasses().

readTableIndex *Reads a single column from file in table format*

Description

Reads a single column from file in table format, which can then be used as a index-to-row (look-up) map for fast access to a subset of rows using readTable().

Usage

```
## Default S3 method:
readTableIndex(..., indexColumn=1, colClass="character", verbose=FALSE)
```

Arguments

indexColumn	An single integer of the index column.
colClass	A single character specifying the class of the index column.
...	Arguments passed to readTable() used internally.
verbose	A logical or a Verbose object.

Value

Returns a vector.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

readTable().

Examples

```
## Not run:
    # File containing data table to be access many times
    filename <- "somefile.txt"

    # Create a look-up index
    index <- readTableIndex(filename)

    # Keys of interest
    keys <- c("foo", "bar", "wah")

    # Read only those keys and do it fast
    df <- readTable(filename, rows=match(keys, index))

## End(Not run)
```

readWindowsShortcut *Reads a Microsoft Windows Shortcut (.lnk file)*

Description

Reads a Microsoft Windows Shortcut (.lnk file).

Usage

```
## Default S3 method:
readWindowsShortcut(con, verbose=FALSE, ...)
```

Arguments

con	A connection or a character string (filename).
verbose	If TRUE, extra information is written while reading.
...	Not used.

Details

The MIME type for a Windows Shortcut file is application/x-ms-shortcut.

Value

Returns a list structure.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

References

[1] Wotsit's Format, http://www.wotsit.org/, 2005.
[2] Hager J, *The Windows Shortcut File Format* (as reverse-engineered by), version 1.0.
[3] Microsoft Developer Network, *IShellLink Interface*, 2008. http://msdn2.microsoft.com/en-us/library/bb774950.aspx
[4] Andrews D, *Parsing Windows Shortcuts (lnk) files in java*, comp.lang.java.help, Aug 1999. http://groups.google.com/group/comp.lang.java.help/browse_thread/thread/a2e147b07d5480a2/
[5] Multiple authors, *Windows shell links* (in Tcl), Tcler's Wiki, April 2008. http://wiki.tcl.tk/1844
[6] Daniel S. Bensen, *Shortcut File Format (.lnk)*, Stdlib.com, April 24, 2009. http://www.stdlib.com/art6-Shortcut-File-Format-lnk.html [7] [MS-SHLLINK]: Shell Link (.LNK) Binary File Format, Microsoft Inc., September 25, 2009.

See Also

createWindowsShortcut() filePath

Examples

```
filename <- system.file("data-ex/HISTORY.LNK", package="R.utils")
lnk <- readWindowsShortcut(filename)

# Print all information
print(lnk)

# Get the relative path to the target file
history <- file.path(dirname(filename), lnk$relativePath)

# Alternatively, everything in one call
history <- filePath(filename, expandLinks="relative")

file.show(history)
```

---

relibrary *Reloads a package*

Description

Reloads a package. This function works exactly the same as library, *except* that it is reloads the package if it already loaded. This is useful for developers. For more information see library.

Usage

```
relibrary(package, character.only=FALSE, warn.conflicts=FALSE, ...)
```

Arguments

package	Name or character string giving the name of a package.
character.only	A logical indicating whether package can be assumed to be character strings.
warn.conflicts	If TRUE, warnings are printed about conflicts from reattaching of the package, unless that package contains an object .conflicts.OK.
...	Any other arguments that library() takes.

Details

While relibrary is reloading a package the option relibrary will be set to name of the package currently reloaded. This can be useful if the package to be reloaded would like save away data until it is loaded again.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

See library().

---

removeDirectory *Removes a directory*

Description

Removes a directory, and if requested, also its contents.

Usage

```
## Default S3 method:
removeDirectory(path, recursive=FALSE, mustExist=TRUE, ...)
```

Arguments

path	A character string specifying the directory to be removed.
recursive	If TRUE, subdirectories and files are also removed. If FALSE, and directory is non-empty, an exception is thrown.
mustExist	If TRUE, and the directory does not exist, an exception is thrown.
...	Not used.

Value

Returns (invisibly) TRUE, the directory was successfully removed, otherwise FALSE, unless an exception is thrown.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

Internally unlink() is used.

`resample` *Sample values from a set of elements*

Description

Sample values from a set of elements. Contrary to `sample`(), this function also works as expected when there is only one element in the set to be sampled, cf. [1]. This function originates from the example code of `sample`() as of R v2.12.0.

Usage

```
## Default S3 method:
resample(x, ...)
```

Arguments

`x`	A `vector` of any length and data type.
`...`	Additional arguments passed to `sample.int`().

Value

Returns a sampled `vector` of the same data types as argument `x`.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

References

[1] Henrik Bengtsson, *Using sample() to sample one value from a single value?*, R-devel mailing list, 2010-11-03.

See Also

Internally `sample`() is used.

resetWarnings *Resets recorded warnings*

Description

Resets recorded warnings.

Usage

```
## Default S3 method:
resetWarnings(...)
```

Arguments

`...`	Not used.

Value

Returns (invisibly) the number of warnings removed.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

warnings()

saveObject *Saves an object to a file or a connection*

Description

Saves an object to a file or a connection.

Usage

```
## Default S3 method:
saveObject(object, file=NULL, path=NULL, compress=TRUE, ..., safe=TRUE)
```

Arguments

object	The object to be saved.
file	A filename or connection where the object should be saved. If NULL, the filename will be the hash code of the object plus ".xdr".
path	Optional path, if file is a filename.
compress	If TRUE, the file is compressed to, otherwise not.
...	Other arguments accepted by save() in the base package.
safe	If TRUE and file is a file, then, in order to lower the risk for incomplete files, the object is first written to a temporary file, which is then renamed to the final name.

Value

Returns (invisibly) the pathname or the connection.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

loadObject() to load an object from file. digest for how hash codes are calculated from an object.

---

seqToHumanReadable *Gets a short human readable string representation of an vector of indices*

Description

Gets a short human readable string representation of an vector of indices.

Usage

```
## Default S3 method:
seqToHumanReadable(idx, delimiter="-", collapse=", ", ...)
```

Arguments

idx	A vector of integer indices.
delimiter	A character string delimiter.
collapse	A character string used to collapse subsequences.
...	Not used.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

seqToIntervals().

Examples

```
print(seqToHumanReadable(1:10))  # "1-10"
print(seqToHumanReadable(c(1:10, 15:18, 20)))  # "1-10, 15-18, 20"
```

---

seqToIntervals *Gets all contigous intervals of a vector of indices*

Description

Gets all contigous intervals of a vector of indices.

Usage

```
## Default S3 method:
seqToIntervals(idx, ...)
```

Arguments

idx	A vector of integer indices.
...	Not used.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

*intervalsToSeq(). To identify sequences of *equal* values, see rle().

Examples

```
x <- 1:10
y <- seqToIntervals(x)
print(y)  # [1 10]

x <- c(1:10, 15:18, 20)
y <- seqToIntervals(x)
print(y)  # [1 10; 15 18; 20 20]

z <- intervalsToSeq(y)
print(z)
stopifnot(all.equal(x,z))
```

`Settings` *Class for applicational settings*

Description

Package: R.utils
Class Settings

```
Object
~~|
~~+--Options
~~~~~~~|
~~~~~~~+--Settings
```

Directly known subclasses:

public static class **Settings**
extends Options

Class for applicational settings.

Usage

```
Settings(basename=NULL, ...)
```

Arguments

`basename`	A `character` string of the basename of the settings file.
`...`	Arguments passed to constructor of superclass Options.

Fields and Methods

Methods:

`findSettings`	Searches for the settings file in one or several directories.
`getLoadedPathname`	Gets the pathname of the settings file loaded.
`isModified`	Checks if settings has been modified compared to whats on file.
`loadAnywhere`	Loads settings from file.
`promptAndSave`	Prompt user to save modified settings.
`saveAnywhere`	Saves settings to file.

Methods inherited from Options:

as.character, as.list, equals, getLeaves, getOption, hasOption, names, nbrOfOptions, setOption, str

Methods inherited from Object:
$, $<-, [[, [[<-, as.character, attach, attachLocally, clearCache, clone, detach, equals, extend, finalize, gc, getEnvironment, getFields, getInstantiationTime, getStaticInstance, hasField, hashCode, ll, load, objectSize, print, registerFinalizer, save

Load settings with package and save on exit

Here is a generic `.First.lib()` function for loading settings with package. It also (almost) assures that the package is detached when R finishes. See `onSessionExit`() why it is not guaranteed!

The almost generic `.Last.lib()` function, which will prompt user to save settings, is called when a package is detached.

It is custom to put these functions in a file named `zzz.R`.

.First.lib():

```
.First.lib <- function(libname, pkgname) {
  # Write a welcome message when package is loaded
  pkg <- Package(pkgname);
  assign(pkgname, pkg, pos=getPosition(pkg));

  # Read settings file ".<pkgname>Settings" and store it in package
  # variable '<pkgname>Settings'.
  varname <- paste(pkgname, "Settings");
  basename <- paste(".", varname, sep="");
  settings <- Settings$loadAnywhere(basename, verbose=TRUE);
  if (is.null(settings))
    settings <- Settings(basename);
  assign(varname, settings, pos=getPosition(pkg));

  # Detach package when R finishes, which will save package settings too.
  onSessionExit(function(...) detachPackage(pkgname));

  packageStartupMessage(getName(pkg), " v", getVersion(pkg),
      " (", getDate(pkg), ") successfully loaded. See ?", pkgname,
      " for help.\n", sep="");
} # .First.lib()
```

.Last.lib():

```
.Last.lib <- function(libpath) {
  pkgname <- "<package name>";

  # Prompt and save package settings when package is detached.
  varname <- paste(pkgname, "Settings", sep="");
  if (exists(varname)) {
    settings <- get(varname);
```

```
    if (inherits(settings, "Settings"))
      promptAndSave(settings);
  }
} # .Last.lib()
```

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

Examples

```
# Load settings from file, or create default settings
basename <- "some.settings"
settings <- Settings$loadAnywhere(basename)
if (is.null(settings))
  settings <- Settings(basename)

# Set default options, if missing.
setOption(settings, "graphics/verbose", TRUE, overwrite=FALSE)
setOption(settings, "io/verbose", Verbose(threshold=-1), overwrite=FALSE)

# Save and reload settings
path <- tempdir()
saveAnywhere(settings, path=path)
settings2 <- Settings$loadAnywhere(basename, paths=path)

# Clean up
file.remove(getLoadedPathname(settings2))

# Assert correctness
stopifnot(equals(settings, settings2))
```

`SmartComments` *Abstract class SmartComments*

Description

Package: R.utils
Class SmartComments

```
Object
~~|
~~+--SmartComments
```

Directly known subclasses:
LComments, VComments

public abstract static class **SmartComments**
extends Object

Abstract class SmartComments.

Usage

```
SmartComments(letter=NA, ...)
```

Arguments

`letter`	A single `character`.
`...`	Not used.

Details

A "smart" source-code comment is an R comment, which start with a '\#', but is followed by a single letter, then a single symbol and a second '\#' and then an option character string, and there must not be any code before the comment on the same line. In summary, a smart comment line has format: `<white spaces>#<letter><symbol># <some text>`.

Example code with two smart comments (VComments):

```
x <- 2
#V1# threshold=-1
#Vc# A v-comment log message
cat("Hello world")
```

which after compilation becomes

```
x <- 2
verbose <- Verbose(threshold=-1)
if (verbose) { cat(verbose, "A v-comment log message"); }
cat("Hello world")
```

Fields and Methods

Methods:

`compile`	Preprocess a vector of code lines.
`convertComment`	Converts a single smart comment to R code.
`parse`	Parses one single smart comment.
`reset`	Resets a SmartComments compiler.
`validate`	Validates the compiled lines.

Methods inherited from Object:
$, $<-, [[, [[<-, as.character, attach, attachLocally, clearCache, clone, detach, equals, extend, finalize, gc, getEnvironment, getFields, getInstantiationTime, getStaticInstance, hasField, hashCode, ll, load, objectSize, print, registerFinalizer, save

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

VComments.

---

sourceDirectory *Sources files recursively to either local or global environment*

Description

Sources files recursively to either local or global environment.

Usage

```
## Default S3 method:
sourceDirectory(path, pattern=".*[.](r|R|s|S|q)([.](lnk|LNK))*$", recursive=TRUE, e
```

Arguments

path	A path to a directory to be sourced.
pattern	A regular expression file name pattern to identify source code files.
recursive	If TRUE, subdirectories are recursively sourced first, otherwise not.
envir	An environment in which the code should be evaluated.
onError	If an error occures, the error may stop the job, give a warning, or silently be skipped.
verbose	A logical or a Verbose object.
...	Additional arguments passed to sourceTo().

Value

Returns a vector of the full pathnames of the files sourced.

Details

Subdirectories and files in each (sub-)directory are sourced in lexicographic order.

Hooks

This method does not provide hooks, but the internally used sourceTo() does.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

sourceTo() and compare to source().

---

sourceTo *Parses and evaluates code from a file or a connection*

Description

Parses and evaluates code from a file or a connection. This has the same effect as if `source(..., local=TRUE)` would have been called from within the given environment. This is useful when setting up a new local working environment.

Usage

```
## Default S3 method:
sourceTo(file, chdir=FALSE, ..., local=TRUE, envir=parent.frame(), modifiedOnly=FAI
```

Arguments

`file`	A connection or a character string giving the pathname of the file or URL to read from.
`chdir`	If TRUE and `file` is a pathname, the R working directory is temporarily changed to the directory containing `file` for evaluating.
`...`	Arguments to source(). If argument `file` is not explicitly given, the first argument is assumed to be the `file` argument. This argument is converted into a string by `as.character()`.
`local`	If FALSE, evaluation is done in the global environment, otherwise in the calling environment.
`envir`	An environment in which source() should be called. If NULL, the global environment is used.
`modifiedOnly`	If TRUE, the file is sourced only if modified since the last time it was sourced, otherwise regardless.

Value

Return the result of source().

Hooks

This methods recognizes the hook `sourceTo/onPreprocess`, which is called after the lines in file has been read, but before they have been parsed by the R parser, cf. `parse()`. An `onPreprocess` hook function should take a `character vector` of code lines and return a `character vector` of code lines. This can for instance be used to pre-process R source code with special directives such as `VComments`.

Note that only one hook function can be used for this function, otherwise an error is generated.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

See Also

`sourceDirectory()`. `sys.source()` and `source()`.

Examples

```
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Example 1
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
cat("=== Example 1 ================================================\n")

foo <- function(file, ...) {
  cat("Local objects before calling sourceTo():\n")
  print(ls())

  res <- sourceTo(file, ...)

  cat("Local objects after calling sourceTo():\n")
  print(ls())
}

cat("Global objects before calling foo():\n")
lsBefore <- NA
lsBefore <- ls()
foo(file=textConnection(c('a <- 1', 'b <- 2')))

cat("Global objects after calling foo():\n")
stopifnot(length(setdiff(ls(), lsBefore)) == 0)


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Example 2 - with VComments preprocessor
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
cat("=== Example 2 ================================================\n")

preprocessor <- function(lines, ...) {
  cat("---------------------------------------\n")
  cat("Source code before preprocessing:\n")
  displayCode(code=lines, pager="console")
```

```
  cat("----------------------------------------\n")
  cat("Source code after preprocessing:\n")
  lines <- VComments$compile(lines)
  displayCode(code=lines, pager="console")
  cat("----------------------------------------\n")
  lines
}

oldHooks <- getHook("sourceTo/onPreprocess")
setHook("sourceTo/onPreprocess", preprocessor, action="replace")
code <- c(
 'x <- 2',
 '#V1# threshold=-1',
 '#Vc# A v-comment log message',
 'print("Hello world")'
)
fh <- textConnection(code)
sourceTo(fh)
setHook("sourceTo/onPreprocess", oldHooks, action="replace")
```

`splitByPattern` *Splits a single character string by pattern*

Description

Splits a single character string by pattern. The main difference compared to `strsplit`() is that this method also returns the part of the string that matched the pattern. Also, it only takes a single character string.

Usage

```
## Default S3 method:
splitByPattern(str, pattern, ...)
```

Arguments

`str`	A single `character` string to be split.
`pattern`	A regular expression `character` string.
`...`	Not used.

Value

Returns a named `character vector` with names equal to `"TRUE"` if element is a pattern part and `"FALSE"` otherwise.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

See Also

Compare to strsplit().

Examples

```
rspCode <- "<body>Hello <%=\"world\"%></body>"
rspParts <- splitByPattern(rspCode, pattern="<%.*%>")
cat(rspCode, "\n")
print(rspParts)
```

---

stext *Writes text in the margin along the sides of a plot*

Description

Writes text in the margin along the sides of a plot.

Usage

```
## Default S3 method:
stext(text, side=1, line=0, pos=0.5, margin=c(0.2, 0.2), charDim=c(strwidth("M", ce
```

Arguments

text	The text to be written. See mtext for details.
side	An integer specifying which side to write the text on. See mtext for details.
line	A numeric specifying on which line to write on.
pos	A numeric, often in [0,1], specifying the position of the text relative to the left and right edges.
margin	A numeric vector length two specifying the text margin.
charDim	A numeric vector length two specifying the size of a typical symbol.
cex	A numeric specifying the character expansion factor.
...	Additional arguments passed to mtext.

Value

Returns what mtext returns.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

Internally mtext is used.

`subplots` *Creates a grid of subplots*

Description

Creates a grid of subplots in the current figure. If arguments `nrow` and `ncol` are given a `nrow`-by-`ncol` grid of subplots are created. If only argument `n` is given then a r-by-s grid is created where |r-s| <= 1, i.e. a square or almost a square of subplots is created. If `n` and `nrow` is given then a grid with `nrow` rows and at least `n` subplots are created. Similar if `n` and `ncol` is given. The argument `byrow` specifies if the order of the subplots should be rowwise (`byrow=TRUE`) or columnwise.

Usage

```
## Default S3 method:
subplots(n=1, nrow=NULL, ncol=NULL, byrow=TRUE, ...)
```

Arguments

`n`	If given, the minimum number of subplots.
`nrow`	If given, the number of rows the grid of subplots should contain.
`ncol`	If given, the number of columns the grid of subplots should contain.
`byrow`	If `TRUE`, the panels are ordered row by row in the grid, otherwise column by column.
`...`	Not used.

Value

Returns the `matrix` containing the order of plots.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

See Also

`layout` and `layout.show()`.

Examples

```
subplots(nrow=2, ncol=3)  # 2-by-3 grid of subplots
subplots(n=6, nrow=2)     # 2-by-3 grid of subplots
subplots(n=5, ncol=2)     # 3-by-2 grid of subplots
subplots(1)               # (Reset) to a 1-by-1 grid of subplots
subplots(2)               # 1-by-2 grid of subplots
subplots(3)               # 2-by-2 grid of subplots
l <- subplots(8)          # 3-by-3 grid of subplots
layout.show(length(l))
```

System *Static class to query information about the system*

Description

Package: R.utils
Class System

```
Object
~~|
~~+--System
```

Directly known subclasses:

public static class **System**
extends Object

The System class contains several useful class fields and methods. It cannot be instantiated.

Fields and Methods

Methods:

currentTimeMillis	Get the current time in milliseconds.
findGhostscript	Searches for the ghostview binary on the current system.
findGraphicsDevice	Searches for a working PNG device.
getHostname	Retrieves the computer name of the current host.
getMappedDrivesOnWindows	-
getUsername	Retrieves the name of the user running R.
mapDriveOnWindows	-
openBrowser	Opens an HTML document using the OS default HTML browser.
parseDebian	Parses a string, file or connection for Debian formatted parameters.
unmapDriveOnWindows	-

Methods inherited from Object:
$, $<-, [[, [[<-, as.character, attach, attachLocally, clearCache, clone, detach, equals, extend, finalize, gc, getEnvironment, getFields, getInstantiationTime, getStaticInstance, hasField, hashCode, ll, load, objectSize, print, registerFinalizer, save

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

`TextStatusBar` *A status bar at the R prompt that can be updated*

Description

Package: R.utils
Class TextStatusBar

```
Object
~~|
~~+--TextStatusBar
```

Directly known subclasses:

public static class **TextStatusBar**
extends Object

A status bar at the R prompt that can be updated.

Usage

```
TextStatusBar(fmt=paste("%-", getOption("width") - 1, "s", sep = ""), ...)
```

Arguments

`fmt`	A `character` format string to be used by `sprintf`(). Default is a left-aligned string of full width.
`...`	Named arguments to be passed to `sprintf`() together with the format string.

Details

A label with name `hfill` can be used for automatic horizontal filling. It must be `numeric` and be immediate before a string label such that a `hfill` label and the following string label together specifies an sprintf format such as `"%*-s"`. The value of `hfill` will be set such that the resulting status bar has width equal to `getOption("width")-1` (the reason for the -1 is to prevent the text status bar from writing into the next line). If more than one `hfill` label is used their widths will be uniformly distributed. Left over spaces will be distributed between `hfill` labels with initial values of one.

Fields and Methods

Methods:

`flush`	Flushes the output.

getLabel	Gets the current value of a label.
newline	Writes a newline.
popMessage	Adds a message above the status bar.
setLabel	Sets the value of a label.
setLabels	Sets new values of given labels.
update	Updates the status bar (visually).
updateLabels	Sets the new values of given labels and updates the status bar.

Methods inherited from Object:
$, $<-, [[, [[<-, as.character, attach, attachLocally, clearCache, clone, detach, equals, extend, finalize, gc, getEnvironment, getFields, getInstantiationTime, getStaticInstance, hasField, hashCode, ll, load, objectSize, print, registerFinalizer, save

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

Examples

```
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Read all HTML files in the base package
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
path <- system.file("html", package="base");
files <- list.files(path, full.names=TRUE)
nfiles <- length(files)

cat(sprintf("Reading %d files in %s:\n", nfiles, path))

# Create a status bar with four labels
sb <- TextStatusBar("File: %-*s [%3.0f%% %6.0f lines %-8s]",
                hfill=1, file="", progress=0, nlines=0, time="")

nlines <- 0
for (kk in seq(length=nfiles)) {
  file <- files[kk]

  # Update the status bar
  if (sb) {
    setLabel(sb, "progress", 100*kk/nfiles)
    if (kk %% 10 == 1 || kk == nfiles)
      setLabel(sb, "file", substr(basename(file), 1, 44))

    size <- file.info(file)$size/1024;
    # popMessage() calls update() too
    popMessage(sb, sprintf("Processing %s (%.2fkB)",
                                      basename(file), size))
    flush(sb)
  }

  # Read the file
```

```
  lines <- readLines(file)
  nlines <- nlines + length(lines)

  # Emulate slow process
  if (interactive()) {
    Sys.sleep(rexp(1, rate=40))
  }

  # Update the status bar
  if (sb) {
    setLabel(sb, "nlines", nlines)
    setLabel(sb, "time", format(Sys.time(), "%H:%M:%S"))
    update(sb)
  }
}
cat("\n")
```

`TimeoutException` *TimeoutException represents timeout errors*

Description

Package: R.utils
Class TimeoutException

```
Object
~~|
~~+--try-error
~~~~~~~|
~~~~~~~+--condition
~~~~~~~~~~~~|
~~~~~~~~~~~~+--error
~~~~~~~~~~~~~~~~~|
~~~~~~~~~~~~~~~~~+--simpleError
~~~~~~~~~~~~~~~~~~~~~~|
~~~~~~~~~~~~~~~~~~~~~~+--Exception
~~~~~~~~~~~~~~~~~~~~~~~~~~|
~~~~~~~~~~~~~~~~~~~~~~~~~~+--TimeoutException
```

Directly known subclasses:

public static class **TimeoutException**
extends Exception

TimeoutException represents timeout errors occuring when a set of R expressions executed did not finish in time.

Usage

```
TimeoutException(..., cpu=NA, elapsed=NA)
```

Arguments

`...`	Any arguments accepted by `Exception`.
`cpu, elapsed`	The maximum time the R expressions were allowed to be running before the timeout occured as measured in CPU time and (physically) elapsed time.

Fields and Methods

Methods:

`getMessage`	Gets the message of the exception.

Methods inherited from Exception:
as.character, getCall, getLastException, getMessage, getStackTrace, getWhen, print, printStackTrace, throw

Methods inherited from error:
as.character, throw

Methods inherited from condition:
as.character, conditionCall, conditionMessage, print

Methods inherited from Object:
$, $<-, [[, [[<-, as.character, attach, attachLocally, clearCache, clone, detach, equals, extend, finalize, gc, getEnvironment, getFields, getInstantiationTime, getStaticInstance, hasField, hashCode, ll, load, objectSize, print, registerFinalizer, save

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

For detailed information about exceptions see `Exception`.

---

touchFile *Updates the timestamp of a file*

Description

Updates the timestamp of a file. Currently, it is only possible to change the timestamp specifying when the file was last modified, and time can only be set to the current time.

Usage

```
## Default S3 method:
touchFile(pathname, ...)
```

Arguments

pathname	A character specifying the file to be updated.
...	Not used.

Value

Returns (invisibly) the old timestamp.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

References

[1] R-devel mailing list thread *Unix-like touch to update modification timestamp of file?*, started on 2008-02-26. http://tolstoy.newcastle.edu.au/R/e4/devel/08/02/0654.html

See Also

file.info().

Examples

```
# 1. Create a file
pathname <- tempfile()
cat(file=pathname, "Hello world!")
md5a <- digest::digest(pathname, file=TRUE)

# 2. Current time stamp
ta <- file.info(pathname)$mtime
print(ta)

# 3. Update time stamp
Sys.sleep(1.2)
touchFile(pathname)
tb <- file.info(pathname)$mtime
print(tb)

# 4. Verify that the timestamp got updated
stopifnot(tb > ta)

# 5. Verify that the contents did not change
md5b <- digest::digest(pathname, file=TRUE)
stopifnot(identical(md5a, md5b))
```

toUrl *Converts a pathname into a URL*

Description

Converts a pathname into a URL starting with `file://`.

Usage

```
## Default S3 method:
toUrl(pathname, safe=TRUE, ...)
```

Arguments

`pathname`	A `character` string of the pathname to be made into a URL.
`safe`	If `TRUE`, certain "unsafe" characters are escaped.
`...`	Not used.

Value

Returns a `character` string.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

See Also

`URLencode`.

unwrap.array *Unwrap an array, matrix or a vector to an array of more dimensions*

Description

Unwrap an array, matrix or a vector to an array of more dimensions. This is done by splitting up each dimension into several dimension based on the names of that dimension.

Usage

```
## S3 method for class 'array'
unwrap(x, split=rep("[.]", length(dim(x))), drop=FALSE, ...)
```

Arguments

x	An array or a matrix.
split	A list or a character vector. If a list, it should contain functions that takes a character vector as the first argument and optional ... arguments. Each function should split the vector into a list of same length and where all elements contains the same number of parts. If a character vector, each element split[i] is replaced by a function call function(names, ...) strsplit(names, split=split[i]).
drop	If TRUE, dimensions of of length one are dropped, otherwise not.
...	Arguments passed to the split functions.

Details

Although not tested thoroughly, unwrap() should be the inverse of wrap() such that identical(unwrap(wrap(x)) x) holds.

Value

Returns an array.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

*wrap().

Examples

```
## Not run: See ?wrap.array for an example
```

VComments *The VComments class*

Description

Package: R.utils
Class VComments

```
Object
~~|
~~+--SmartComments
~~~~~~~|
~~~~~~~+--VComments
```

Directly known subclasses:
LComments

public static class **VComments**
extends *SmartComments*

The VComments class.

Usage

```
VComments(letter="V", verboseName="verbose", ...)
```

Arguments

`letter`	The smart letter.
`verboseName`	The name of the verbose object.
`...`	Not used.

Details

The 'v' in VComments stands for 'verbose', because of its relationship to the `Verbose` class.

Here is a list of VComments and the R code that replaces each of them by the compiler:

Constructors

- \#V0\#[<args>] - NullVerbose(<args>)
- \#V1\#[<args>] - Verbose(<args>)

Controls

- \#V=\#[<variable>] - Sets the name of the <verbose> object. Default is 'verbose'.
- \#V\^\#<threshold> - setThreshold(<verbose>, <threshold>)
- \#V?\#<expression> - if (isVisible(<verbose>)) { <expression> }
- \#V@\#<level> - setDefaultLevel(<verbose>, <level>)
- \#Vm\#<method> <args> - <method>(<verbose>, <args>)

Enters and exits

- \#V+\#[<message>] - enter(<verbose>, <message>)
- \#V-\#[<message>] - exit(<verbose>, <message>)
- \#V!\#[<message>] - pushState(<verbose>)
  on.exit(popState(<verbose>))
  If <message>, enter(<verbose>, <message>)

Simple output

- \#Vn\#<ignored> - newline(<verbose>)
- \#Vr\#<ignored> - ruler(<verbose>)
- \#Vt\#<ignored> - timestamp(<verbose>)
- \#Vw\#[<title>] - warnings(<verbose>, <title>)

Output messages

- \#Vc\#[<message>] - cat(<verbose>, <message>)
- \#Ve\#<expression> - eval(<verbose>, <expression>)
- \#Vh\#<message> - header(<verbose>, <message>)
- \#Vp\#<object> - print(<verbose>, <object>)
- \#Vs\#<object> - summary(<verbose>, <object>)
- \#Vz\#<object> - str(<verbose>, <object>)

Fields and Methods

Methods:

convertComment	Converts a verbose comment to R code.
reset	Resets a VComments compiler.
validate	Validates the compiled lines.

Methods inherited from SmartComments:
compile, convertComment, parse, reset, validate

Methods inherited from Object:
$, $<-, [[, [[<-, as.character, attach, attachLocally, clearCache, clone, detach, equals, extend, finalize, gc, getEnvironment, getFields, getInstantiationTime, getStaticInstance, hasField, hashCode, ll, load, objectSize, print, registerFinalizer, save

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

Examples

```
filename <- system.file("data-ex/exampleVComments.R", package="R.utils")
lines <- readLines(filename)

cat("Code before preprocessing:\n")
displayCode(code=lines, pager="console")

lines <- VComments$compile(lines)

cat("Code after preprocessing:\n")
displayCode(code=lines, pager="console")
```

`Verbose` *Class to writing verbose messages to a connection or file*

Description

Package: R.utils
Class Verbose

```
Object
~~|
~~+--Verbose
```

Directly known subclasses:
MultiVerbose, NullVerbose

public static class **Verbose**
extends Object

Class to writing verbose messages to a connection or file.

Usage

```
Verbose(con=stderr(), on=TRUE, threshold=0, asGString=TRUE, timestamp=FALSE, remove
```

Arguments

`con`	A `connection` or a `character` string filename.
`on`	A `logical` indicating if the writer is on or off.
`threshold`	A `numeric` threshold that the `level` argument of any write method has to be equal to or larger than in order to the message being written. Thus, the lower the threshold is the more and more details will be outputted.
`timestamp`	If `TRUE`, each output is preceded with a timestamp.
`removeFile`	If `TRUE` and `con` is a filename, the file is first deleted, if it exists.
`asGString`	If `TRUE`, all messages are interpreted as `GString` before being output, otherwise not.
`core`	Internal use only.
`...`	Not used.

Fields and Methods

Methods:

`as.character`	Returns a character string version of this object.

as.double	Gets a numeric value of this object.
as.logical	Gets a logical value of this object.
capture	Captures output of a function.
cat	Concatenates and prints objects if above threshold.
enter	Writes a message and indents the following output.
equals	Checks if this object is equal to another.
evaluate	Evaluates a function and prints its results if above threshold.
exit	Writes a message and unindents the following output.
getThreshold	Gets current verbose threshold.
getTimestampFormat	Gets the default timestamp format.
header	Writes a header.
isOn	Checks if the output is on.
isVisible	Checks if a certain verbose level will be shown or not.
less	Creates a cloned instance with a higher threshold.
more	Creates a cloned instance with a lower threshold.
newline	Writes one or several empty lines.
off	Turn off the output.
on	Turn on the output.
popState	-
print	Prints objects if above threshold.
printf	Formats and prints object if above threshold.
pushState	Pushes the current indentation state of the Verbose object.
ruler	Writes a ruler.
setDefaultLevel	Sets the current default verbose level.
setThreshold	Sets verbose threshold.
setTimestampFormat	Sets the default timestamp format.
str	Prints the structure of an object if above threshold.
summary	Generates a summary of an object if above threshold.
timestamp	Writes a timestamp.
timestampOff	-
timestampOn	Turns automatic timestamping on and off.
warnings	Outputs any warnings recorded.
writeRaw	Writes objects if above threshold.

Methods inherited from Object:
$, $<-, [[, [[<-, as.character, attach, attachLocally, clearCache, clone, detach, equals, extend, finalize, gc, getEnvironment, getFields, getInstantiationTime, getStaticInstance, hasField, hashCode, ll, load, objectSize, print, registerFinalizer, save

Output levels

As a guideline, use the following levels when outputting verbose/debug message using the Verbose class. For a message to be shown, the output level must be greater than (not equal to) current threshold. Thus, the lower the threshold is set, the more messages will be seen.

- <= -100Only for debug messages, i.e. messages containing all necessary information for debugging purposes and to find bugs in the code. Normally these messages are so detailed so

they will be a pain for the regular user, but very useful for bug reporting and bug tracking by the developer.

- -99 – -11Detailed verbose messages. These will typically be useful for the user to understand what is going on and do some simple debugging fixing problems typically due to themselves and not due to bugs in the code.
- -10 – -1Verbose messages. For example, these will typically report the name of the file to be read, the current step in a sequence of analysis steps and so on. These message are not very useful for debugging.
- 0Default level in all output methods and default threshold. Thus, by default, messages at level 0 are not shown.
- >= +1Message that are always outputted (if threshold is kept at 0). We recommend not to output message at this level, because methods should be quiet by default (at the default threshold 0).

A compatibility trick and a speed-up trick

If you want to include calls to Verbose in a package of yours in order to debug code, but not use it otherwise, you might not want to load R.utils all the time, but only for debugging. To achieve this, the value of a reference variable to a Verbose class is always set to `TRUE`, cf. typically an Object reference has value `NA`. This makes it possible to use the reference variable as a first test before calling Verbose methods. Example:

```
foo <- function(..., verbose=FALSE) {
  # enter() will never be called if verbose==FALSE, thus no error.
  verbose && enter(verbose, "Loading")
}
```

Thus, R.utils is not required for `foo()`, but for `foo(verbose==Verbose(level=-1))` it is.

Moreover, if using the `NullVerbose` class for ignoring all verbose messages, the above trick will indeed speed up the code, because the value of a NullVerbose reference variable is always `FALSE`.

Extending the Verbose class

If extending this class, make sure to output messages via `*writeRaw()` or one of the other output methods (which in turn all call the former). This guarantees that `*writeRaw()` has full control of the output, e.g. this makes it possible to split output to standard output and to file.

Author(s)

Henrik Bengtsson (`http://www.braju.com/R/`)

See Also

`NullVerbose`.

Examples

```
verbose <- Verbose(threshold=-1)

header(verbose, "A verbose writer example", padding=0)

enter(verbose, "Analysis A")
for (kk in 1:10) {
  printf(verbose, "step %d\n", kk)
  if (kk == 2) {
    cat(verbose, "Turning ON automatic timestamps")
    timestampOn(verbose);
  } else if (kk == 4) {
    timestampOff(verbose);
    cat(verbose, "Turned OFF automatic timestamps")
    cat(verbose, "Turning OFF verbose messages for steps ", kk, "-6")
    off(verbose)
  } else if (kk == 6) {
    on(verbose)
    cat(verbose, "Turned ON verbose messages just before step ", kk+1)
  }

  if (kk %in% c(5,8)) {
    enter(verbose, "Sub analysis ", kk)
    for (jj in c("i", "ii", "iii")) {
      cat(verbose, "part ", jj)
    }
    exit(verbose)
  }
}
cat(verbose, "All steps completed!")
exit(verbose)

ruler(verbose)
cat(verbose, "Demo of some other methods:")
str(verbose, c(a=1, b=2, c=3))
print(verbose, c(a=1, b=2, c=3))
summary(verbose, c(a=1, b=2, c=3))
evaluate(verbose, rnorm, n=3, mean=2, sd=3)

ruler(verbose)
newline(verbose)
```

---

whichVector.logical

Identifies TRUE elements in a logical vector

Description

Identifies TRUE elements in a logical vector. This method is faster than which() for logical vectors, especially when there are no missing values.

Usage

```
## S3 method for class 'logical'
whichVector(x, na.rm=TRUE, use.names=TRUE, ...)
```

Arguments

x	A logical vector of length N.
na.rm	If TRUE, missing values are treated as FALSE, otherwise they are returned as NA.
use.names	If TRUE, the names attribute is preserved, otherwise it is not return.
...	Not used.

Value

Returns an integer vector of length less or equal to N.

Benchmarking

Simple comparison on R v2.7.1 on Windows XP, show that this implementation can be more than twice as fast as which(), especially when there are no missing value (and na.rm=FALSE) is used.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

which()

Examples

```
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Simulate two large named logical vectors,
# one with missing values one with out
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
N <- 1e6;

# Vector #1
x <- sample(c(TRUE, FALSE), size=N, replace=TRUE);
names(x) <- seq_along(x);

# Vector #2
y <- x
y[sample(N, size=0.1*N)] <- NA;


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Validate consistency
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
stopifnot(identical(which(x), whichVector(x)));
```

```
stopifnot(identical(which(y), whichVector(y)));


# - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Benchmarking
# - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
# Number of iterations
K <- 5;

t1 <- 0;
for (kk in 1:K) {
  t1 <- t1 + system.time({ idxs1 <- which(x) });
};

t2 <- 0;
for (kk in 1:K) {
  t2 <- t2 + system.time({ idxs2 <- whichVector(x, na.rm=FALSE) });
};

cat(sprintf("whichVector(x, na.rm=FALSE)/which(x): %.2f\n", (t2/t1)[3]));
stopifnot(identical(idxs1, idxs2));


t1 <- 0;
for (kk in 1:K) {
  t1 <- t1 + system.time({ idxs1 <- which(y) });
};

t2 <- 0;
for (kk in 1:K) {
  t2 <- t2 + system.time({ idxs2 <- whichVector(y) });
};

cat(sprintf("whichVector(y)/which(y): %.2f\n", (t2/t1)[3]));
stopifnot(identical(idxs1, idxs2));
```

`wrap.array` *Reshape an array or a matrix by permuting and/or joining dimensions*

Description

Reshape an array or a matrix by permuting and/or joining dimensions.

A useful application of this is to reshape a multidimensional `array` to a `matrix`, which then can be saved to file using for instance `write.table()`.

Usage

```
## S3 method for class 'array'
wrap(x, map=list(NA), sep=".", ...)
```

Arguments

x	An array or a matrix.
map	A list of length equal to the number of dimensions in the reshaped array. Each element should be an integer vectors specifying the dimensions to be joined in corresponding new dimension. One element may equal NA to indicate that that dimension should be a join of all non-specified (remaining) dimensions. Default is to wrap everything into a vector.
sep	A character pasting joined dimension names.
...	Not used.

Details

If the indicies in `unlist(map)` is in a non-increasing order, aperm() will be called, which requires reshuffling of array elements in memory. In all other cases, the reshaping of the array does not require this, but only fast modifications of attributes `dim` and `dimnames`.

Value

Returns an array of `length(map)` dimensions, where the first dimension is of size `prod(map[[1]])`, the second `prod(map[[2]])`, and so on.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

`*unwrap()`. See aperm().

Examples

```
# Create a 3x2x3 array
dim <- c(3,2,3)
ndim <- length(dim)
dimnames <- list()
for (kk in 1:ndim)
  dimnames[[kk]] <- sprintf("%s%d", letters[kk], 1:dim[kk])
x <- 1:prod(dim)
x <- array(x, dim=dim, dimnames=dimnames)


cat("Array 'x':\n")
print(x)


cat("\nReshape 'x' to its identity:\n")
y <- wrap(x, map=list(1, 2, 3))
print(y)
# Assert correctness of reshaping
```

```
stopifnot(identical(y, x))


cat("\nReshape 'x' by swapping dimensions 2 and 3, i.e. aperm(x, perm=c(1,3,2)):\n")
y <- wrap(x, map=list(1, 3, 2))
print(y)
# Assert correctness of reshaping
stopifnot(identical(y, aperm(x, perm=c(1,3,2))))


cat("\nWrap 'x' to a matrix 'y' by keeping dimension 1 and joining the others:\n")
y <- wrap(x, map=list(1, NA))
print(y)
# Assert correctness of reshaping
for (aa in dimnames(x)[[1]]) {
  for (bb in dimnames(x)[[2]]) {
    for (cc in dimnames(x)[[3]]) {
      tt <- paste(bb, cc, sep=".")
      stopifnot(identical(y[aa,tt], x[aa,bb,cc]))
    }
  }
}


cat("\nUnwrap matrix 'y' back to array 'x':\n")
z <- unwrap(y)
print(z)
stopifnot(identical(z,x))


cat("\nWrap a matrix 'y' to a vector and back again:\n")
x <- matrix(1:8, nrow=2, dimnames=list(letters[1:2], 1:4))
y <- wrap(x)
z <- unwrap(y)
print(z)
stopifnot(identical(z,x))


cat("\nWrap and unwrap a randomly sized and shaped array 'x2':\n")
maxdim <- 5
dim <- sample(1:maxdim, size=sample(2:maxdim))
ndim <- length(dim)
dimnames <- list()
for (kk in 1:ndim)
  dimnames[[kk]] <- sprintf("%s%d", letters[kk], 1:dim[kk])
x2 <- 1:prod(dim)
x2 <- array(x, dim=dim, dimnames=dimnames)

cat("\nArray 'x2':\n")
print(x)

# Number of dimensions of wrapped array
ndim2 <- sample(1:(ndim-1), size=1)
```

```
# Create a random map for joining dimensions
splits <- NULL;
if (ndim > 2)
  splits <- sort(sample(2:(ndim-1), size=ndim2-1))
splits <- c(0, splits, ndim);
map <- list();
for (kk in 1:ndim2)
  map[[kk]] <- (splits[kk]+1):splits[kk+1];

cat("\nRandom 'map':\n")
print(map)

cat("\nArray 'y2':\n")
y2 <- wrap(x2, map=map)
print(y2)

cat("\nArray 'x2':\n")
z2 <- unwrap(y2)
print(z2)

stopifnot(identical(z2,x2))
```

`writeBinFragments` *Writes binary data to disjoint sections of a connection or a file*

Description

Writes binary data to disjoint sections of a connection or a file.

Usage

```
## Default S3 method:
writeBinFragments(con, object, idxs, size=NA, ...)
```

Arguments

`con`	A `connection` or the pathname of an existing file.
`object`	A `vector` of objects to be written.
`idxs`	A `vector` of (non-duplicated) indices or a Nx2 `matrix` of N from-to index intervals specifying the elements to be read. Positions are always relative to the start of the file/connection.
`size`	The size of the data type to be read. If `NA`, the natural size of the data type is used.
`...`	Additional arguments passed to `writeBin()`.

Value

Returns nothing.

Author(s)

Henrik Bengtsson (http://www.braju.com/R/)

See Also

readBinFragments().

Examples

```
## Not run: # See example(readBinFragments.connection)
```

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