

# Package ‘memisc’

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**Type** Package

**Title** Management of Survey Data and Presentation of Analysis Results

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**Description** An infrastructure for the management of survey data including value labels, definable missing values, recoding of variables, production of code books, and import of (subsets of) 'SPSS' and 'Stata' files is provided. Further, the package allows to produce tables and data frames of arbitrary descriptive statistics and (almost) publication-ready tables of regression model estimates, which can be exported to 'LaTeX' and HTML.

**License** GPL-2

**LazyLoad** Yes

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**R topics documented:**

annotations	3
applyTemplate	4
as.array	5
as.symbols	6
By	7
cases	8
codebook	9
collect	11
contr	14
data.set	15
data.set manipulation	18
Descriptives	20
dimrename	21
foreach	22
format_html	23
format_html.codebook	25
format_html.ftable	26
ftable-matrix	27
genTable	28
getSummary	30
html	32
Iconv	36
importers	37
items	41
labels	44
measurement	46
Memisc	47
mtable	50
mtable_format_delim	55
mtable_format_html	56
mtable_format_latex	57
mtable_format_print	58
negative match	59
percent	60
percentages	62
query	63
recode	65
relabel	68
rename	69
reorder.array	70
retain	71
sample-methods	72
Sapply	73
sort-methods	74
styles	75
Substitute	76

Table . . . . .	76
to.data.frame . . . . .	78
toLatex . . . . .	79
Utility classes . . . . .	82
value.filter . . . . .	83
wild.codes . . . . .	85
withSE . . . . .	85
Write . . . . .	87

**Index** **88**

annotations *Adding Annotations to Objects*

**Description**

Annotations, that is, objects of class "annotation", are character vectors with all their elements named. Only one method is defined for this subclass of character vectors, a method for [show](#), that shows the annotation in a nicely formatted way. Annotations of an object can be obtained via the function `annotation(x)` and can be set via `annotation(x)<-value`.

Elements of an annotation with names "description" and "wording" have a special meaning. The first kind can be obtained and set via `description(x)` and `description(x)<-value`, the second kind can be obtained via `wording(x)` and `wording(x)<-value`. "description" elements are used in way the "variable labels" are used in SPSS and Stata. "wording" elements of annotation objects are meant to contain the question wording of a questionnaire item represented by an "item" objects. These elements of annotations are treated in a special way in the output of the `coodbook` function.

**Usage**

```

annotation(x)
## S4 method for signature 'ANY'
annotation(x)
## S4 method for signature 'item'
annotation(x)
## S4 method for signature 'data.set'
annotation(x)
annotation(x)<-value
## S4 replacement method for signature 'ANY,character'
annotation(x)<-value
## S4 replacement method for signature 'item,annotation'
annotation(x)<-value
## S4 replacement method for signature 'vector,annotation'
annotation(x)<-value

description(x)
description(x)<-value

wording(x)
    
```

```
wording(x)<-value

## S4 method for signature 'data.set'
description(x)
## S4 method for signature 'importer'
description(x)
```

### Arguments

x	an object
value	a character or annotation object

### Value

annotation(x) returns an object of class "annotation", which is a named character. description(x) and wording(x) each usually return a character string. If description(x) is applied to a [data.set](#) or an [importer](#) object, however, a character vector is returned, which is named after the variables in the data set or the external file.

### Examples

```
vote <- sample(c(1,2,3,8,9,97,99),size=30,replace=TRUE)
labels(vote) <- c(Conservatives = 1,
                 Labour        = 2,
                 "Liberal Democrats" = 3,
                 "Don't know"    = 8,
                 "Answer refused" = 9,
                 "Not applicable" = 97,
                 "Not asked in survey" = 99
                 )
missing.values(vote) <- c(97,99)
description(vote) <- "Vote intention"
wording(vote) <- "If a general election would take place next tuesday,
                the candidate of which party would you vote for?"
annotation(vote)
annotation(vote)["Remark"] <- "This is not a real questionnaire item, of course ..."
codebook(vote)
```

---

applyTemplate

*Apply a Formatting Template to a Numeric or Character Vector*

---

### Description

applyTemplate is called internally by [mtable](#) to format coefficients and summary statistics.

### Usage

```
applyTemplate(x,template,float.style=getOption("float.style"),
             digits=min(3,getOption("digits")),
             signif.symbols=getOption("signif.symbols"))
```

**Arguments**

x	a numeric or character vector to be formatted
template	a character vector that defines the template, see details.
float.style	A character string that is passed to <code>formatC</code> by <code>applyTemplate</code> ; valid values are "e", "f", "g", "fg", "E", and "G". By default, the <code>float.style</code> setting of <code>options</code> is used. The 'factory fresh' setting is <code>options(float.style="f")</code>
digits	number of significant digits to use if not specified in the template.
signif.symbols	a named vector that specifies how significance levels are symbolically indicated, values of the vector specify significance levels and names specify the symbols. By default, the <code>signif.symbols</code> setting of <code>options</code> is used. The "factory-fresh" setting is <code>options(signif.symbols=c("***"=.001, "**"=.01, "*"=.05))</code> .

**Details**

Character vectors that are used as templates may be arbitrary. However, certain character sequences may form *template expressions*. A template expression is of the form (`<POS>`:`<Format spec>`), where "`<POS>`" indicates the start of a template expression, "`<POS>`" stands for either an index or name that selects an element from `x` and "`<Format spec>`" stands for a *format specifier*. It may contain an letter indicating the style in which the vector element selected by `<POS>` will be formatted by `formatC`, it may contain a number as the number of significant digits, a "#" indicating that the number of significant digits will be at most that given by `getOption("digits")`, or \* that means that the value will be formatted as a significance symbol.

**Value**

`applyTemplate` returns a character vector in which template expressions in `template` are substituted by formatted values from `x`. If `template` is an array then the return value is also an array of the same shape.

**Examples**

```
applyTemplate(c(a=.00000000000000304,b=3),template=c("$1:g7#)($a:*)", " (($1:f2)) ")
applyTemplate(c(a=.00000000000000304,b=3),template=c("$a:g7#)($a:*)", " (($b:f2)) ")
```

as.array

*Converting Data Frames into Arrays***Description**

The `as.array` for data frames takes all factors in a data frame and uses them to define the dimensions of the resulting array, and fills the array with the values of the remaining numeric variables.

Currently, the data frame must contain all combinations of factor levels.

**Usage**

```
## S4 method for signature 'data.frame'
as.array(x,data.name=NULL,...)
```

**Arguments**

x	a data frame
data.name	a character string, giving the name attached to the dimension that corresponds to the numerical variables in the data frame (that is, the name attached to the corresponding element of the dimnames list).
...	other arguments, ignored.

**Value**

An array

**Examples**

```
BerkeleyAdmissions <- to.data.frame(UCBAdmissions)
BerkeleyAdmissions
as.array(BerkeleyAdmissions,data.name="Admit")
try(as.array(BerkeleyAdmissions[-1,],data.name="Admit"))
```

---

as.symbols

*Construction of Lists of Symbols*


---

**Description**

as.symbols and syms are functions potentially useful in connection with foreach and xapply. as.symbols produces a list of symbols from a character vector, while syms returns a list of symbols from symbols given as arguments, but it can be used to construct patterns of symbols.

**Usage**

```
as.symbols(x)
syms(...,paste=FALSE,sep="")
```

**Arguments**

x	a character vector
...	character strings or (unquoted) variable names
paste	logical value; should the character strings <a href="#">pasted</a> into one string?
sep	a separator string, passed to <a href="#">paste</a> .

**Value**

A list of language symbols (results of [as.symbol](#) - not graphical symbols!).

## Examples

```
as.symbols(letters[1:8])
syms("a",1:3,paste=TRUE)

sapply(syms("a",1:3,paste=TRUE),typeof)
```

## Description

The function `By` evaluates an expression within subsets of a data frame, where the subsets are defined by a formula.

## Usage

```
By(formula,expr,data=parent.frame())
```

## Arguments

<code>formula</code>	an expression or (preferably) a formula containing the names of conditioning variables or factors.
<code>expr</code>	an expression that is evaluated for any unique combination of values of the variables contained in <code>formula</code> .
<code>data</code>	a data frame, an object that can be coerced into a data frame (for example, a <a href="#">table</a> ), or an environment, from which values for the variables in <code>formula</code> or <code>expr</code> are taken.

## Value

A list of class "by", giving the results for each combination of values of variables in `formula`.

## Examples

```
berkeley <- Aggregate(Table(Admit,Freq)~.,data=UCBAdmissions)
(Bres <- By(~Dept,glm(cbind(Admitted,Rejected)~Gender,family="binomial"),data=berkeley))
# The results all have 'data' components
str(Bres[[1]]$data)

attach(berkeley)
(Bres <- By(~Dept,glm(cbind(Admitted,Rejected)~Gender,family="binomial")))
detach(berkeley)
```

---

 cases
 

---



---

*Distinguish between Cases Specified by Logical Conditions*


---

## Description

cases allows to simultaneously several cases determined by logical conditions. It can be used to code these case into a factor or as a multi-condition generalization of `ifelse`

## Usage

```
cases(..., check.xor)
```

## Arguments

...	A sequence of logical expressions or assignment expressions containing logical expressions as "right hand side".
check.xor	character (either "warn", "stop", or "ignore") or logical; if TRUE or equal to "stop" or "warn", cases checks, whether the case conditions are mutually exclusive and exhaustive. If this is not satisfied and check.xor equals "warn" a warning is shown, otherwise an error exception is raised.

## Details

There are two distinct ways to use this function. Either the function can be used to construct a factor that represents several logical cases or it can be used to conditionally evaluate an expression in a manner similar to `ifelse`.

For the first use, the ... arguments have to be a series of logical expressions. cases then returns a factor with as many levels as logical expressions given as ... arguments. The resulting factor will attain its first level if the first condition is TRUE, otherwise it will attain its second level if the second condition is TRUE, etc. The levels will be named after the conditions or, if name tags are attached to the logical expressions, after the tags of the expressions. Note that the logical expressions all need to evaluate to logical vectors of the same length, otherwise an error condition is raised.

For the second use, the ... arguments have to be a series of assignment expression of the type `<expression> <- <logical expression>` or `<logical expression> -> <expression>`. For cases in which the first logical expression is TRUE, the result of first expression that appears on the other side of the assignment operator become elements of the vector returned by cases, for cases in which the second logical expression is TRUE, the result of the second expression that appears on the other side of the assignment operator become elements of the vector returned by cases, etc. Note that the logical expressions also here all need to evaluate to logical vectors of the same length. The expressions on the other side of the assignment operator should also be either vectors of the same length and mode or should scalars of the same mode, otherwise unpredictable results may occur.



## Value

If it is called with logical expressions as ... arguments, cases returns a factor, if it is called with assignment expressions the function returns a vector with the same mode as the results of the "assigned" expressions and with the same length as the logical conditions.

## Examples

```
# Examples of the first kind of usage of the function
#
df <- data.frame(x = rnorm(n=20), y = rnorm(n=20))
df <- df[do.call(order,df),]
(df <- within(df,{
  x1=cases(x>0,x<=0)
  y1=cases(y>0,y<=0)
  z1=cases(
    "Condition 1"=x<0,
    "Condition 2"=y<0,# only applies if x >= 0
    "Condition 3"=TRUE
  )
  z2=cases(x<0,(x>=0 & y <0), (x>=0 & y >=0))
}))
xtabs(~x1+y1,data=df)
dd <- with(df,
  try(cases(x<0,
            x>=0,
            x>1,
            check.xor=TRUE)# let's be fussy
  )
)
dd <- with(df,
  try(cases(x<0,x>=0,x>1))
)
genTable(range(x)~dd,data=df)

# An example of the second kind of usage of the function:
# A construction of a non-smooth function
#
fun <- function(x)
  cases(
    x==0      -> 1,
    abs(x)> 1 -> abs(x),
    abs(x)<=1 -> x^2
  )
x <- seq(from=-2,to=2,length=101)
plot(fun(x)~x)
```

## Description

Function `codebook` collects documentation about an item, or the items in a data set or external data file. It returns an object that, when shown, print this documentation in a nicely formatted way.

## Usage

```
codebook(x)
## S4 method for signature 'item'
codebook(x)
## S4 method for signature 'atomic'
codebook(x)
## S4 method for signature 'factor'
codebook(x)
## S4 method for signature 'data.set'
codebook(x)
## S4 method for signature 'data.frame'
codebook(x)
## S4 method for signature 'importer'
codebook(x)
```

## Arguments

`x` an [item](#), numeric or character vector, factor, [data.set](#), [data.frame](#) or [importer](#) object for `codebook()`

## Value

An object of class "codebook", for which a [show](#) method exists that produces a nicely formatted output.

## Examples

```
Data <- data.set(
  vote = sample(c(1,2,3,8,9,97,99),size=300,replace=TRUE),
  region = sample(c(rep(1,3),rep(2,2),3,99),size=300,replace=TRUE),
  income = exp(rnorm(300,sd=.7))*2000
)

Data <- within(Data,{
  description(vote) <- "Vote intention"
  description(region) <- "Region of residence"
  description(income) <- "Household income"
  wording(vote) <- "If a general election would take place next tuesday,
    the candidate of which party would you vote for?"
  wording(income) <- "All things taken into account, how much do all
    household members earn in sum?"
  foreach(x=c(vote,region),{
    measurement(x) <- "nominal"
  })
})
```

```

measurement(income) <- "ratio"
labels(vote) <- c(
  Conservatives      = 1,
  Labour             = 2,
  "Liberal Democrats" = 3,
  "Don't know"       = 8,
  "Answer refused"   = 9,
  "Not applicable"   = 97,
  "Not asked in survey" = 99)
labels(region) <- c(
  England           = 1,
  Scotland          = 2,
  Wales             = 3,
  "Not applicable" = 97,
  "Not asked in survey" = 99)
foreach(x=c(vote,region,income),{
  annotation(x)["Remark"] <- "This is not a real survey item, of course ..."
})
missing.values(vote) <- c(8,9,97,99)
missing.values(region) <- c(97,99)
})

description(Data)

codebook(Data)

## Not run:
Write(description(Data),
  file="Data-desc.txt")
Write(codebook(Data),
  file="Data-cdbk.txt")

## End(Not run)

```

---

collect

*Collect Objects*


---

## Description

collect gathers several objects into one, matching the elements or subsets of the objects by [names](#) or [dimnames](#).

## Usage

```

collect(...,names=NULL,inclusive=TRUE)
## Default S3 method:
collect(...,names=NULL,inclusive=TRUE)
## S3 method for class 'array'
collect(...,names=NULL,inclusive=TRUE)
## S3 method for class 'matrix'

```

```

collect(...,names=NULL,inclusive=TRUE)
## S3 method for class 'table'
collect(...,names=NULL,sourcename=".origin",fill=0)
## S3 method for class 'data.frame'
collect(...,names=NULL,inclusive=TRUE,
        fussy=FALSE,warn=TRUE,sourcename=".origin")
## S3 method for class 'data.set'
collect(...,names=NULL,inclusive=TRUE,
        fussy=FALSE,warn=TRUE,sourcename=".origin")

```

## Arguments

...	more atomic vectors, arrays, matrices, tables, data.frames or data.sets
names	optional character vector; in case of the default and array methods, giving <code>dimnames</code> for the new dimension that identifies the collected objects; in case of the data.frame and data.set methods, levels of a factor indentifying the collected objects.
inclusive	logical, defaults to TRUE; should unmatched elements included? See details below.
fussy	logical, defaults to FALSE; should it count as an error, if variables with same names of collected data.frames/data.sets have different attributes?
warn	logical, defaults to TRUE; should an warning be given, if variables with same names of collected data.frames/data.sets have different attributes?
sourcename	name of the factor that identifies the collected data.frames or data.sets
fill	numeric; with what to fill empty table cells, defaults to zero, assuming the table contains counts

## Value

If `x` and all following ... arguments are vectors of the same mode (numeric, character, or logical) the result is a matrix with as many columns as vectors. If argument `inclusive` is TRUE, then the number of rows equals the number of names that appear at least once in each of the vector names and the matrix is filled with NA where necessary, otherwise the number of rows equals the number of names that are present in *all* vector names.

If `x` and all ... arguments are matrices or arrays of the same mode (numeric, character, or logical) and  $n$  dimension the result will be a  $n+1$  dimensional array or table. The extend of the  $n+1$ th dimension equals the number of matrix, array or table arguments, the extends of the lower dimension depends on the `inclusive` argument: either they equal to the number of `dimnames` that appear at least once for each given dimension and the array is filled with NA where necessary, or they equal to the number of `dimnames` that appear in all arguments for each given dimension.

If `x` and all ... arguments are tables then the result will be a table. The result

If `x` and all ... arguments are data frames or data sets, the result is a data frame or data set. The number of variables of the resulting data frame or data set depends on the `inclusive` argument. If it is true, the number of variables equals the number of variables that appear in each of the arguments at least once and variables are filled with NA where necessary, otherwise the number of variables equals the number of variables that are present in all arguments.

**Examples**

```

x <- c(a=1,b=2)
y <- c(a=10,c=30)

x
y

collect(x,y)
collect(x,y,inclusive=FALSE)

X <- matrix(1,nrow=2,ncol=2,dimnames=list(letters[1:2],LETTERS[1:2]))
Y <- matrix(2,nrow=3,ncol=2,dimnames=list(letters[1:3],LETTERS[1:2]))
Z <- matrix(3,nrow=2,ncol=3,dimnames=list(letters[1:2],LETTERS[1:3]))

X
Y
Z

collect(X,Y,Z)
collect(X,Y,Z,inclusive=FALSE)

X <- matrix(1,nrow=2,ncol=2,dimnames=list(a=letters[1:2],b=LETTERS[1:2]))
Y <- matrix(2,nrow=3,ncol=2,dimnames=list(a=letters[1:3],c=LETTERS[1:2]))
Z <- matrix(3,nrow=2,ncol=3,dimnames=list(a=letters[1:2],c=LETTERS[1:3]))

collect(X,Y,Z)
collect(X,Y,Z,inclusive=FALSE)

df1 <- data.frame(a=rep(1,5),b=rep(1,5))
df2 <- data.frame(a=rep(2,5),b=rep(2,5),c=rep(2,5))
collect(df1,df2)
collect(df1,df2,inclusive=FALSE)

data(UCBAdmissions)
Male <- as.table(UCBAdmissions[,1,])
Female <- as.table(UCBAdmissions[,2,])
collect(Male,Female,sourcename="Gender")
collect(unclass(Male),unclass(Female))

Male1 <- as.table(UCBAdmissions[,1,-1])
Female2 <- as.table(UCBAdmissions[,2,-2])
Female3 <- as.table(UCBAdmissions[,2,-3])
collect(Male=Male1,Female=Female2,sourcename="Gender")
collect(Male=Male1,Female=Female3,sourcename="Gender")
collect(Male=Male1,Female=Female3,sourcename="Gender",fill=NA)

f1 <- gl(3,5,labels=letters[1:3])
f2 <- gl(3,6,labels=letters[1:3])
collect(f1=table(f1),f2=table(f2))

```

**Description**

This package provides modified versions of `contr.treatment` and `contr.sum`. `contr.sum` gains an optional `base` argument, analog to the one of `contr.treatment`, furthermore, the `base` argument may be the name of a factor level.

`contr` returns a function that calls either `contr.treatment`, `contr.sum`, etc., according to the value given to its first argument.

The `contrasts` method for "item" objects returns a contrast matrix or a function to produce a contrast matrix for the factor into which the item would be coerced via `as.factor` or `as.ordered`. This matrix or function can be specified by using `contrasts(x)<-value`

**Usage**

```
contr(type,...)
contr.treatment(n, base=1,contrasts=TRUE)
contr.sum(n,base=NULL,contrasts=TRUE)
## S4 method for signature 'item'
contrasts(x,contrasts=TRUE,...)
## S4 replacement method for signature 'item'
contrasts(x,how.many) <- value
# These methods are defined implicitly by making 'contrasts' generic.
## S4 method for signature 'ANY'
contrasts(x,contrasts=TRUE,...)
## S4 replacement method for signature 'ANY'
contrasts(x,how.many) <- value
```

**Arguments**

<code>type</code>	a character vector, specifying the type of the contrasts. This argument should have a value such that, if e.g. <code>type="something"</code> , then there is a function <code>contr.something</code> that produces a contrast matrix.
<code>...</code>	further arguments, passed to <code>contr.treatment</code> , etc.
<code>n</code>	a number of factor levels or a vector of factor levels names, see e.g. <code>contr.treatment</code> .
<code>base</code>	a number of a factor level or the names of a factor level, which specifies the baseline category, see e.g. <code>contr.treatment</code> or <code>NULL</code> .
<code>contrasts</code>	a logical value, see <code>contrasts</code>
<code>how.many</code>	the number of contrasts to generate, see <code>contrasts</code>
<code>x</code>	a factor or an object of class "item"
<code>value</code>	a matrix, a function or the name of a function

**Value**

contr returns a function that calls one of `contr.treatment`, `contr.sum`, ... `contr.treatment` and `contr.sum` return contrast matrices. `contrasts(x)` returns the "contrasts" attribute of an object, which may be a function name, a function, a contrast matrix or NULL.

**Examples**

```
ctr.t <- contr("treatment",base="c")
ctr.t
ctr.s <- contr("sum",base="c")
ctr.h <- contr("helmert")
ctr.t(letters[1:7])
ctr.s(letters[1:7])
ctr.h(letters[1:7])

x <- factor(rep(letters[1:5],3))
contrasts(x)
x <- as.item(x)
contrasts(x)
contrasts(x) <- contr.sum(letters[1:5],base="c")
contrasts(x)
missing.values(x) <- 5
contrasts(x)
contrasts(as.factor(x))

# Obviously setting missing values after specifying
# contrast matrix breaks the contrasts.
# Using the 'contr' function, however, prevents this:

missing.values(x) <- NULL
contrasts(x) <- contr("sum",base="c")
contrasts(x)
missing.values(x) <- 5
contrasts(x)
contrasts(as.factor(x))
```

---

data.set

*Data Set Objects*


---

**Description**

"data.set" objects are collections of "item" objects, with similar semantics as data frames. They are distinguished from data frames so that coercion by `as.data.frame` leads to a data frame that contains only vectors and factors. Nevertheless most methods for data frames are inherited by data sets, except for the method for the `within` generic function. For the `within` method for data sets, see the details section.

Thus data preparation using data sets retains all informations about item annotations, labels, missing values etc. While (mostly automatic) conversion of data sets into data frames makes the data amenable for the use of R's statistical functions.

dsView is a function that displays data sets in a similar manner as View displays data frames. (View works with data sets as well, but changes them first into data frames.)

### Usage

```
data.set(..., row.names = NULL, check.rows = FALSE, check.names = TRUE,
         stringsAsFactors = default.stringsAsFactors(),
         document = NULL)
as.data.set(x, row.names=NULL, ...)
## S4 method for signature 'list'
as.data.set(x, row.names=NULL, ...)
is.data.set(x)
## S3 method for class 'data.set'
as.data.frame(x, row.names = NULL, optional = FALSE, ...)
## S4 method for signature 'data.set'
within(data, expr, ...)

dsView(x)
```

### Arguments

...	For the data.set function several vectors or items, for within further, ignored arguments.
row.names, check.rows, check.names, stringsAsFactors, optional	arguments as in <a href="#">data.frame</a> or <a href="#">as.data.frame</a> , respectively.
document	NULL or an optional character vector that contains documentation of the data.
x	for is.data.set(x), any object; for as.data.frame(x, ...) and dsView(x) a "data.set" object.
data	a data set, that is, an object of class "data.set".
expr	an expression, or several expressions enclosed in curly braces.

### Details

The as.data.frame method for data sets is just a copy of the method for list. Consequently, all items in the data set are coerced in accordance to their [measurement](#) setting, see [item](#) and [measurement](#).

The within method for data sets has the same effect as the [within](#) method for data frames, apart from two differences: all results of the computations are coerced into items if they have the appropriate length, otherwise, they are automatically dropped.

Currently only one method for the generic function as.data.set is defined: a method for "importer" objects.

### Value

data.set and the within method for data sets returns a "data.set" object, is.data.set returns a logical value, and as.data.frame returns a data frame.



**Examples**

```

Data <- data.set(
  vote = sample(c(1,2,3,8,9,97,99),size=300,replace=TRUE),
  region = sample(c(rep(1,3),rep(2,2),3,99),size=300,replace=TRUE),
  income = exp(rnorm(300,sd=.7))*2000
)

Data <- within(Data,{
  description(vote) <- "Vote intention"
  description(region) <- "Region of residence"
  description(income) <- "Household income"
  wording(vote) <- "If a general election would take place next tuesday,
    the candidate of which party would you vote for?"
  wording(income) <- "All things taken into account, how much do all
    household members earn in sum?"
  foreach(x=c(vote,region),{
    measurement(x) <- "nominal"
  })
  measurement(income) <- "ratio"
  labels(vote) <- c(
    Conservatives = 1,
    Labour = 2,
    "Liberal Democrats" = 3,
    "Don't know" = 8,
    "Answer refused" = 9,
    "Not applicable" = 97,
    "Not asked in survey" = 99)
  labels(region) <- c(
    England = 1,
    Scotland = 2,
    Wales = 3,
    "Not applicable" = 97,
    "Not asked in survey" = 99)
  foreach(x=c(vote,region,income),{
    annotation(x)["Remark"] <- "This is not a real survey item, of course ..."
  })
  missing.values(vote) <- c(8,9,97,99)
  missing.values(region) <- c(97,99)

  # These two variables do not appear in the
  # the resulting data set, since they have the wrong length.
  junk1 <- 1:5
  junk2 <- matrix(5,4,4)

})
# Since data sets may be huge, only a
# part of them are 'show'n
Data

## Not run:

# If we insist on seeing all, we can use 'print' instead

```

```

print(Data)

## End(Not run)

str(Data)
summary(Data)

## Not run:

# If we want to 'View' a data set we can use 'dsView'
dsView(Data)
# Works also, but changes the data set into a data frame first:
View(Data)

## End(Not run)

Data[[1]]
Data[1,]
head(as.data.frame(Data))

EnglandData <- subset(Data,region == "England")
EnglandData

xtabs(~vote+region,data=Data)
xtabs(~vote+region,data=within(Data, vote <- include.missings(vote)))

```

---

data.set manipulation *Manipulation of Data Sets*

---

## Description

Like data frames, data.set objects have [subset](#), [unique](#), [cbind](#), [rbind](#), [merge](#) methods defined for them.

The semantics are basically the same as the methods defined for data frames in the base package, with the only difference that the return values are data.set objects. In fact, the methods described here are front-ends to the corresponding methods for data frames, which are constructed such that the "extra" information attached to variables within data.set objects, that is, to item objects.

## Usage

```

## S4 method for signature 'data.set'
subset(x, ...)

## S4 method for signature 'data.set'
unique(x, incomparables = FALSE, ...)

## S3 method for class 'data.set'
cbind(..., deparse.level = 1)

```

```
## S3 method for class 'data.set'
rbind(..., deparse.level = 1)

## S4 method for signature 'data.set,data.set'
merge(x,y, ...)

## S4 method for signature 'data.set,data.frame'
merge(x,y, ...)

## S4 method for signature 'data.frame,data.set'
merge(x,y, ...)
```

### Arguments

<code>x,y</code>	<code>data.set</code> objects. On of the arguments to <code>merge</code> may also be an object coercable into a data frame and the result still is a <code>data.set</code> object.
<code>...</code>	for <code>subset</code> : a logical vector of the same length as the number of rows of the <code>data.set</code> and, optionally, a vector of variable names (tagged as <code>select</code> ); for <code>unique</code> : further arguments, ignored; for <code>cbind</code> , <code>rbind</code> : objects coercable into data frames, with at least one being a <code>data.set</code> object; for <code>merge</code> : further arguments such as arguments tagged with <code>by</code> , <code>by.x</code> , <code>by.y</code> , etc. that specify the variables by which to merge the data sets of data frames <code>x</code> and <code>y</code> .
<code>incomparables</code>	a vector of values that cannot be compared. See <a href="#">unique</a> .
<code>deparse.level</code>	an argument retained for reasons of compatibility of the default methods of <a href="#">cbind</a> and <a href="#">rbind</a> .

### Examples

```
ds1 <- data.set(
  a = rep(1:3,5),
  b = rep(1:5,each=3)
)
ds2 <- data.set(
  a = c(3:1,3,3),
  b = 1:5
)

ds1 <- within(ds1,{
  description(a) <- "Example variable 'a'"
  description(b) <- "Example variable 'b'"
})

ds2 <- within(ds2,{
  description(a) <- "Example variable 'a'"
  description(b) <- "Example variable 'b'"
})

str(ds3 <- rbind(ds1,ds2))
description(ds3)
```

```

ds3 <- within(ds1,{
  c <- a
  d <- b
  description(c) <- "Copy of variable 'a'"
  description(d) <- "Copy of variable 'b'"
  rm(a,b)
})
str(ds4 <- cbind(ds1,ds3))
description(ds4)

ds5 <- data.set(
  c = 1:3,
  d = c(1,1,2)
)
ds5 <- within(ds5,{
  description(c) <- "Example variable 'c'"
  description(d) <- "Example variable 'd'"
})
str(ds6 <- merge(ds1,ds5,by.x="a",by.y="c"))

# Note that the attributes of the left-hand variables
# have priority.
description(ds6)

```

---

 Descriptives

*Vectors of Univariate Sample Statistics*


---

### Description

Descriptives(x) gives a vector of sample statistics for use in [codebook](#).

### Usage

```

Descriptives(x,...)
## S4 method for signature 'atomic'
Descriptives(x,...)
## S4 method for signature 'item.vector'
Descriptives(x,...)

```

### Arguments

x                    an atomic vector or "item.vector" object.  
 ...                  further arguments, to be passed to future methods.

### Value

A numeric vector of sample statistics, containing the range, the mean, the standard deviation, the skewness and the (excess) kurtosis.

**Examples**

```
x <- rnorm(100)
Descriptives(x)
```

---

dimrename	<i>Change dimnames, rownames, or colnames</i>
-----------	---

---

**Description**

These functions provide an easy way to change the dimnames, rownames or colnames of an array.

**Usage**

```
dimrename(x, dim = 1, ..., gsub = FALSE, fixed = TRUE, warn = TRUE)
rowrename(x, ..., gsub = FALSE, fixed = TRUE, warn = TRUE)
colrename(x, ..., gsub = FALSE, fixed = TRUE, warn = TRUE)
```

**Arguments**

x	An array with dimnames
dim	A vector that indicates the dimensions
...	A sequence of named arguments
gsub	a logical value; if TRUE, <code>gsub</code> is used to change the dimnames of the object. That is, instead of substituting whole names, substrings of the dimnames of the object can be changed.
fixed	a logical value, passed to <code>gsub</code> . If TRUE, substitutions are by fixed strings and not by regular expressions.
warn	logical; should a warning be issued if the pattern is not found?

**Details**

`dimrename` changes the dimnames of `x` along dimension(s) `dim` according to the remaining arguments. The argument names are the *old* names, the values are the new names. `rowrename` is a shorthand for changing the rownames, `colrename` is a shorthand for changing the colnames of a matrix or matrix-like object.

If `gsub` is FALSE, argument tags are the *old* dimnames, the values are the new dimnames. If `gsub` is TRUE, arguments are substrings of the dimnames that are substituted by the argument values.

**Value**

Object `x` with changed dimnames.

**Examples**

```

m <- matrix(1,2,2)
rownames(m) <- letters[1:2]
colnames(m) <- LETTERS[1:2]
m
dimrename(m,1,a="first",b="second")
dimrename(m,1,A="first",B="second")
dimrename(m,2,"A"="first",B="second")

rowrename(m,a="first",b="second")
colrename(m,"A"="first",B="second")

```

---

 foreach

*Loop over Variables in a Data Frame or Environment*


---

**Description**

foreach evaluates an expression given as second argument by substituting in variables. The expression may also contain assignments, which take effect in the callers environment.

**Usage**

```
foreach(...)
```

**Arguments**

...           tagged and untagged arguments. The tagged arguments define the 'variables' that are looped over, the first untagged argument defines the expression which is evaluated.

**Examples**

```

x <- 1:3
y <- -(1:3)
z <- c("Uri", "Schwyz", "Unterwalden")
print(x)
print(y)
print(z)
foreach(var=c(x,y,z),           # assigns names
        names(var) <- letters[1:3] # to the elements of x, y, and z
        )
print(x)
print(y)
print(z)

ds <- data.set(
  a = c(1,2,3,2,3,8,9),
  b = c(2,8,3,2,1,8,9),
  c = c(1,3,2,1,2,8,8)
)

```

```

    )
  print(ds)
  ds <- within(ds,{
    description(a) <- "First item in questionnaire"
    description(b) <- "Second item in questionnaire"
    description(c) <- "Third item in questionnaire"

    wording(a) <- "What number do you like first?"
    wording(b) <- "What number do you like second?"
    wording(c) <- "What number do you like third?"

    foreach(x=c(a,b,c),{ # Lazy data documentation:
      labels(x) <- c( # a,b,c get value labels in one statement
        one = 1,
        two = 2,
        three = 3,
        "don't know" = 8,
        "refused to answer" = 9)
      missing.values(x) <- c(8,9)
    })
  })

  as.data.frame(ds)

  ds <- within(ds,foreach(x=c(a,b,c),{
    measurement(x) <- "interval"
  })))

  as.data.frame(ds)

```

---

format\_html

*Format Objects in HTML, show the HTML Format or Write it to a File*


---

## Description

show\_html is for showing objects in a convenient way in HTML format. write\_html writes them in HTML format into a file. Both functions call the generic format\_html for the format conversion.

## Usage

```

show_html(x, output = NULL, ...)
write_html(x, file, ...)

format_html(x, ...)

## S3 method for class 'data.frame'
format_html(x,
  toprule=2,midrule=1,bottomrule=2,
  split.dec=TRUE,

```

```

    row.names=TRUE,
    digits=getOption("digits"),
    format="f",
    style=df_format_stdstyle,
    margin="2ex auto",
    ...)

## S3 method for class 'matrix'
format_html(x,
  toprule=2,midrule=1,bottomrule=2,
  split.dec=TRUE,
  formatC=FALSE,
  digits=getOption("digits"),
  format="f",
  style=mat_format_stdstyle,
  margin="2ex auto",
  ...)

```

## Arguments

x	an object.
output	<p>character string or a function that determines how the HTML formatted object is shown.</p> <p>If output is a function, it is called with the path of a (temporary) file with HTML code, e.g. <i>RStudio</i>'s viewer function (which is available in the package <code>rstudioapi</code>).</p> <p>If output equals "stdout", the HTML code is written to the standard output stream (for use e.g. in output produced with <code>knitr</code>), if "file-show", the contents of a file with the HTML code is shown via <code>file.show</code>, and if "browser", the contents of a file with the HTML code is shown by the standard browser (via <code>browseURL</code>).</p> <p>This arguments has different defaults, depending of the type of the session. In non-interactive sessions, the default is "console", in interactive sessions other than <i>RStudio</i>, it is "browser", in interactive sessions with <i>RStudio</i> it is "file-show".</p> <p>These default settings can be overridden by the option "html_viewer" (see <a href="#">options</a>).</p>
file	character string; name or path of the file where to write the HTML code to.
toprule	integer; thickness in pixels of rule at the top of the table.
midrule	integer; thickness in pixels of rules within the table.
bottomrule	integer; thickness in pixels of rule at the bottom of the table.
split.dec	logical; whether numbers should be centered at the decimal point by splitting the table cells.
row.names	logical; whether row names should be shown/exported.
digits	number of digits to be shown after the decimal dot. This is only useful, if the "fable" object was created from a table created with <code>genTable</code> or the like.
formatC	logical; whether to use <code>formatC</code> instead of <code>format</code> to format cell contents.



format	a format string for <code>formatC</code>
style	string containing the standard CSS styling of table cells.
margin	character string, determines the margin and thus the position of the HTML table.
...	other arguments, passed on to formatter functions.

**Value**

format\_html character string with code suitable for inclusion into a HTML-file.

---

format\_html.codebook *Format Codebooks as HTML*

---

**Description**

This is the method of `format_html` for "codebook" objects as created by the eponymous function (see `codebook`)

**Usage**

```
## S3 method for class 'codebook'
format_html(x,
  toprule = 2, midrule = 1,
  padding = 3,
  var_tag = "code",
  varid_prefix = "", title_tag = "p",...)
```

**Arguments**

x	a "codebook" object
toprule	a non-negative integer; thickness of the line (in pixels) at the top of each codebook entry
midrule	a non-negative integer; thickness of the line (in pixels) that separates the header of an codebook entry from its body
padding	a non-negative integer; left-hand padding in "ex" of the codebook entry contents
var_tag	character string; the HTML tag that contains the name of the variable
varid_prefix	character string; a prefix added to the anchor IDs of the code entry titles (to facilitate the creation of tables of contents etc.)
title_tag	character string; the HTML tag that contains the title of the codebook entry (the variable name and its description)
...	further arguments, ignored.

**See Also**

See Also as `format_html`, `show_html`, `write_html`.

---

format\_html.ftable      *Format "Flattened Tables" as HTML*

---

## Description

This is the method of [format\\_html](#) for "ftable" objects (i.e. flattened contingency tables)

## Usage

```
## S3 method for class 'ftable'
format_html(x,
            show.titles = TRUE,
            digits = 0,
            format = "f",
            toprule = 2, midrule = 1, bottomrule = 2,
            split.dec = TRUE,
            style = ftable_format_stdstyle,
            margin="2ex auto",
            ...)
## S3 method for class 'ftable_matrix'
format_html(x,
            show.titles=TRUE,
            digits=0,
            format="f",
            toprule=2,midrule=1,bottomrule=2,
            split.dec=TRUE,
            style = ftable_format_stdstyle,
            margin="2ex auto",
            varontop,varinfront,
            ...)
```

## Arguments

x	an object of class <a href="#">ftable</a> .
show.titles	logical; should the names of the cross-classified variables be shown?
digits	number of digits to be shown after the decimal dot. This is only useful, if the "ftable" object was created from a table created with <a href="#">genTable</a> or the like.
format	a format string for <a href="#">formatC</a>
toprule	integer; thickness in pixels of rule at the top of the table.
midrule	integer; thickness in pixels of rules within the table.
bottomrule	integer; thickness in pixels of rule at the bottom of the table.
split.dec	logical; whether numbers should be centered at the decimal point by splitting the table cells.
style	string containing the stanard CSS styling of table cells.

margin	character string, determines the margin and thus the position of the HTML table.
varontop	logical; whether names of column variables should appear on top of factor levels
varinfront	logical; whether names of row variables should appear in front of factor levels
...	further arguments, ignored.

**See Also**

See Also as [format\\_html](#), [show\\_html](#), [write\\_html](#).

---

fable-matrix	<i>Combining flattened tables.</i>
--------------	------------------------------------

---

**Description**

With the method functions described here, flattened (contingency) tables can be combined into more complex objects, of class "fable\_matrix". For objects of these class format and print methods are provided

**Usage**

```
## S3 method for class 'fable'
cbind(..., deparse.level=1)

## S3 method for class 'fable'
rbind(..., deparse.level=1)

## S3 method for class 'fable_matrix'
cbind(..., deparse.level=1)

## S3 method for class 'fable_matrix'
rbind(..., deparse.level=1)

## S3 method for class 'fable_matrix'
format(x,quote=TRUE,digits=0,format="f",...)

## S3 method for class 'fable_matrix'
Write(x,
      file = "",
      quote = TRUE,
      append = FALSE,
      digits = 0,
      ...)

## S3 method for class 'fable_matrix'
print(x,quote=FALSE,...)
```

**Arguments**

...	for cbind and rbind methods, two or more objects of class "ftable" or "ftable_matrix"; for the other methods: further arguments, ignored.
deparse.level	ignored, retained for compatibility reasons only.
x	an object used to select a method.
quote	logical, indicating whether or not strings should be printed with surrounding quotes.
digits	numeric or integer, number of significant digits to be shown.
format	a format string as in <a href="#">formatC</a>
file	character string, containing a file path.
append	logical, should the output appended to the file?

**Value**

cbind and rbind, when used with "ftable" or "ftable\_matrix" objects, return objects of class "ftable\_matrix".

**Examples**

```
ft1 <- ftable(Sex~Survived,Titanic)
ft2 <- ftable(Age+Class~Survived,Titanic)
ft3 <- ftable(Survived~Class,Titanic)
ft4 <- ftable(Survived~Age,Titanic)
ft5 <- ftable(Survived~Sex,Titanic)

tab10 <- xtabs(Freq~Survived,Titanic)

(c12.10 <- cbind(ft1,ft2>Total=tab10))
(r345.10 <- rbind(ft3,ft4,ft5>Total=tab10))

## Not run:
tf <- tempfile()
Write(c12.10,file=tf)
file.show(tf)

## End(Not run)
```

---

genTable

*Generic Tables and Data Frames of Descriptive Statistics*


---

**Description**

genTable creates a table of arbitrary summaries conditional on given values of independent variables given by a formula.

Aggregate does the same, but returns a data.frame instead.

fapply is a generic function that dispatches on its data argument. It is called internally by Aggregate and genTable. Methods for this function can be used to adapt Aggregate and genTable to data sources other than data frames.

**Usage**

```
Aggregate(formula, data=parent.frame(), subset=NULL,
          sort = TRUE, names=NULL, addFreq=TRUE, as.vars=1,
          drop.constants=TRUE,...)

genTable(formula, data=parent.frame(), subset=NULL,
         names=NULL, addFreq=TRUE,...)

fapply(formula,data,...) # calls UseMethod("fapply",data)
## Default S3 method:
fapply(formula, data, subset=NULL,
       names=NULL, addFreq=TRUE,...)
```

**Arguments**

formula	a formula. The right hand side includes one or more grouping variables separated by '+'. These may be factors, numeric, or character vectors. The left hand side may be empty, a numerical variable, a factor, or an expression. See details below.
data	an environment or data frame or an object coercable into a data frame.
subset	an optional vector specifying a subset of observations to be used.
sort	a logical value; determines the order in which the aggregated data appear in the data frame returned by <code>Aggregate</code> . If <code>sort</code> is <code>TRUE</code> , then the returned data frame is sorted by the values of the grouping variables, if <code>sort</code> is <code>FALSE</code> , the order of resulting data frame corresponds to the order in which the values of the grouping variables appear in the original data frame.
names	an optional character vector giving names to the result(s) yielded by the expression on the left hand side of formula. This argument may be redundant if the left hand side results in is a named vector. (See the example below.)
addFreq	a logical value. If <code>TRUE</code> and <code>data</code> is a table or a data frame with a variable named "Freq", a call to <code>table</code> , <code>Table</code> , <code>percent</code> , or <code>nvalid</code> is supplied by an additional argument <code>Freq</code> and a call to <code>table</code> is translated into a call to <code>Table</code> .
as.vars	an integer; relevant only if the left hand side of the formula returns an array or a matrix - which dimension (rows, columns, or layers etc.) will transformed to variables? Defaults to columns in case of matrices and to the highest dimensional extend in case of arrays.
drop.constants	logical; variables that are constant across levels dropped from the result?
...	further arguments, passed to methods or ignored.

**Details**

If an expression is given as left hand side of the formula, its value is computed for any combination of values of the values on the right hand side. If the right hand side is a dot, then all variables in `data` are added to the right hand side of the formula.

If no expression is given as left hand side, then the frequency counts for the respective value combinations of the right hand variables are computed.

If a single factor is on the left hand side, then the left hand side is translated into an appropriate call to `table()`. Note that also in this case `addFreq` takes effect.

If a single numeric variable is on the left hand side, frequency counts weighted by this variable are computed. In these cases, `genTable` is equivalent to `xtabs` and `Aggregate` is equivalent to `as.data.frame(xtabs(...))`.

### Value

`Aggregate` results in a data frame with conditional summaries and unique value combinations of conditioning variables.

`genTable` returns a [table](#), that is, an array with class "table".

### See Also

[aggregate.data.frame](#), [xtabs](#)

### Examples

```
ex.data <- expand.grid(mu=c(0,100),sigma=c(1,10))[rep(1:4,rep(100,4)),]
ex.data <- within(ex.data,
  x<-rnorm(
    n=nrow(ex.data),
    mean=mu,
    sd=sigma
  )
)
```

```
Aggregate(~mu+sigma,data=ex.data)
Aggregate(mean(x)~mu+sigma,data=ex.data)
Aggregate(mean(x)~mu+sigma,data=ex.data,name="Average")
Aggregate(c(mean(x),sd(x))~mu+sigma,data=ex.data)
Aggregate(c(Mean=mean(x),StDev=sd(x),N=length(x))~mu+sigma,data=ex.data)
genTable(c(Mean=mean(x),StDev=sd(x),N=length(x))~mu+sigma,data=ex.data)
```

```
Aggregate(table(Admit)~.,data=UCBAdmissions)
Aggregate(Table(Admit,Freq)~.,data=UCBAdmissions)
Aggregate(Admit~.,data=UCBAdmissions)
Aggregate(percent(Admit)~.,data=UCBAdmissions)
Aggregate(percent(Admit)~Gender,data=UCBAdmissions)
Aggregate(percent(Admit)~Dept,data=UCBAdmissions)
Aggregate(percent(Gender)~Dept,data=UCBAdmissions)
Aggregate(percent(Admit)~Dept,data=UCBAdmissions,Gender=="Female")
genTable(percent(Admit)~Dept,data=UCBAdmissions,Gender=="Female")
```

**Description**

A generic function and methods to collect coefficients and summary statistics from a model object.  
It is used in [mtable](#)

**Usage**

```
## S3 method for class 'lm'
getSummary(obj, alpha=.05,...)
## S3 method for class 'glm'
getSummary(obj, alpha=.05,...)
## S3 method for class 'merMod'
getSummary(obj, alpha=.05, ...)

# These are contributed by Christopher N. Lawrence
## S3 method for class 'clm'
getSummary(obj, alpha=.05,...)
## S3 method for class 'polr'
getSummary(obj, alpha=.05,...)
## S3 method for class 'simex'
getSummary(obj, alpha=.05,...)

# These are contributed by Jason W. Morgan
## S3 method for class 'aftreg'
getSummary(obj, alpha=.05,...)
## S3 method for class 'coxph'
getSummary(obj, alpha=.05,...)
## S3 method for class 'phreg'
getSummary(obj, alpha=.05,...)
## S3 method for class 'survreg'
getSummary(obj, alpha=.05,...)
## S3 method for class 'weibreg'
getSummary(obj, alpha=.05,...)

# These are contributed by Achim Zeileis
## S3 method for class 'ivreg'
getSummary(obj, alpha=.05,...)
## S3 method for class 'tobit'
getSummary(obj, alpha=.05,...)
## S3 method for class 'hurdle'
getSummary(obj, alpha=.05,...)
## S3 method for class 'zeroinfl'
getSummary(obj, alpha=.05,...)
## S3 method for class 'betareg'
getSummary(obj, alpha=.05,...)
## S3 method for class 'multinom'
getSummary(obj, alpha=.05,...)
```

```

# These are contributed by Dave Atkins
# Method for 'glm' objects - to report
# exponentiated coefficients.
getSummary_expcoef(obj, alpha=.05,...)
## S3 method for class 'glm'
getSummary_expcoef(obj, alpha=.05,...)

```

### Arguments

obj	a model object, e.g. of class <code>lm</code> or <code>glm</code>
alpha	level of the confidence intervals; their coverage should be $1-\alpha/2$
...	further arguments; ignored.

### Details

The generic function `getSummary` is called by `mtable` in order to obtain the coefficients and summaries of model objects. In order to adapt `mtable` to models of classes other than `lm` or `glm` one needs to define `getSummary` methods for these classes and to set a summary template via `setSummaryTemplate`

### Value

Any method of `getSummary` must return a list with the following components:

coef	an array with coefficient estimates; the lowest dimension <i>must</i> have the following names and meanings:												
	<table> <tr> <td>est</td> <td>the coefficient estimates,</td> </tr> <tr> <td>se</td> <td>the estimated standard errors,</td> </tr> <tr> <td>stat</td> <td>t- or Wald-z statistics,</td> </tr> <tr> <td>p</td> <td>significance levels of the statistics,</td> </tr> <tr> <td>lwr</td> <td>lower confidence limits,</td> </tr> <tr> <td>upr</td> <td>upper confidence limits.</td> </tr> </table>	est	the coefficient estimates,	se	the estimated standard errors,	stat	t- or Wald-z statistics,	p	significance levels of the statistics,	lwr	lower confidence limits,	upr	upper confidence limits.
est	the coefficient estimates,												
se	the estimated standard errors,												
stat	t- or Wald-z statistics,												
p	significance levels of the statistics,												
lwr	lower confidence limits,												
upr	upper confidence limits.												
sumstat	The higher dimensions of the array correspond to the individual coefficients and, in multi-equation models, to the model equations. a vector containing the model summary statistics; the components may have arbitrary names.												

### Description

The functions described here form building blocks for the `format_html` methods functions for `codebook`, `fable`, `fable_matrix`, and `mtable` objects, etc.



The most basic of these functions is `html` which constructs an object that represents a minimal piece of HTML code, an object that is member of class "html\_elem". Yet unlike a character string containing HTML code, the resulting code element can relatively easily modified using the other functions presented here. The actual code is created, once `as.character` is applied to objects representing HTML code.

Larger sequences of HTML code can be prepared just by concatenating them with `c`, or by `html_group`, or by applying `as.html_group` to a list of "html\_elem" objects. All these result in objects of class "html\_group".

Attributes (such as `class`, `id` etc.) of HTML elements can be added to the call to `html`, but can also later recalled or modified with `attrs` or `setAttrs`. A potentially important attribute is of course the `style` attribute, which can contain CSS styling. It can be recalled or modified with `style` or `setStyle`. Styling strings can also be created with `html_style` or `as.css`

## Usage

```
html(tag, ..., .content = NULL, linebreak = FALSE)
html_group(...)
as.html_group(x)

content(x)
content(x)<-value
setContent(x,value)

attrs(x)
attrs(x)<-value
setAttrs(x,...)
## S3 method for class 'character'
setAttrs(x,...)
## S3 method for class 'html_elem'
setAttrs(x,...)
## S3 method for class 'html_group'
setAttrs(x,...)

css(...)
as.css(x)
style(x)
style(x) <- value
setStyle(x,...)
## S3 method for class 'character'
setStyle(x,...)
## S3 method for class 'html_elem'
setStyle(x,...)
## S3 method for class 'html_group'
setStyle(x,...)
```

**Arguments**

tag	a character string that determines the opening and closing tags of the HTML element. (The closing tag is relevant only if the element has a content.)
...	optional further arguments, named or not. For <code>html</code> : named arguments create the attributes of the HTML element, unnamed arguments define the content of the HTML element, i.e. whatever appears between opening and closing tags (e.g. <code>&lt;p&gt;</code> and <code>&lt;/p&gt;</code> ). Character strings, <code>"html_elem"</code> , or <code>"html_group"</code> objects can appear as content of a HTML element. For <code>setAttribs</code> : named arguments create the attributes of the HTML element, unnamed arguments are ignored. For <code>setStyle</code> : named arguments create the styling of the HTML element, unnamed arguments are ignored. For <code>html_group</code> : several objects of class <code>"html_elem"</code> or <code>"html_group"</code> . For <code>css</code> : named arguments (character strings!) become components of a styling in CSS format.
.content	an optional character string, <code>"html_elem"</code> , or <code>"html_group"</code> object
linebreak	a logical value or vector of length 2, determines whether linebreaks are inserted after the HTML tags.
x	an object. For <code>as.html_group</code> , this should be a list of objects of class <code>"html_elem"</code> or <code>"html_group"</code> . For <code>content</code> , <code>setContent</code> , <code>attribs</code> , <code>setAttribs</code> , <code>style</code> , <code>setStyle</code> , this should be an object of class <code>"html_elem"</code> or <code>"html_group"</code> .
value	an object of appropriate class. For <code>content&lt;-</code> : a character string, <code>"html_elem"</code> , or <code>"html_group"</code> object, or a concatenation thereof. For <code>attribs&lt;-</code> or <code>style&lt;-</code> : a named character vector.

**Details**

Objects created with `html` are lists with class attribute `"html_elem"` and components

**tag** a character string

**attributes** a named character vector

**content** a character vector, an `"html_elem"` or `"html_group"` object, or a list of such.

**linebreak** a logical value or vector of length 2.

Objects created with `html_group` or by concatenation of `"html_elem"` or `"html_group"` object are lists of such objects, with class attribute `"html_group"`.

**Examples**

```
html("img")
html("img",src="test.png")
html("div",class="element",id="first","Sisyphus")
html("div",class="element",id="first",.content="Sisyphus")
```

```
div <- html("div",class="element",id="first",linebreak=c(TRUE,TRUE))
content(div) <- "Sisyphus"
div

tag <- html("tag",linebreak=TRUE)
attribs(tag)["class"] <- "something"
attribs(tag)["class"]
tag

style(tag) <- c(color="#342334")
style(tag)
tag

style(tag)["bg"] <- "white"
tag

setStyle(tag,bg="black")
setStyle(tag,c(bg="black"))

c(div,tag,tag)

c(
  c(div,tag),
  c(div,tag,tag)
)

c(
  c(div,tag),
  div,tag,tag
)

c(
  div,tag,
  c(div,tag,tag)
)

content(div) <- c(tag,tag,tag)
div

css("background-color"="black",
    color="white")

as.css(c("background-color"="black",
    color="white"))

Hello <- "Hello World!"
Hello <- html("p",Hello)
style(Hello) <- c(color="white",
    "font-size"="40px",
```

```

      "text-align"="center")

Link <- html("a","More examples here ...",
            href="http://elff.eu/software/memisc",
            title="More examples here ...",
            style=css(color="white"))
Link <- html("p", " (" ,Link,")")
style(Link) <- c(color="white",
                "font-size"="15px",
                "text-align"="center")

Hello <- html("div",c(Hello,Link))
style(Hello) <- c("background-color"="#160666",
                 padding="20px")

show_html(Hello)

```

---

Iconv

---

*Convert Annotations, and Value Labels between Encodings*


---

## Description

This function uses the base package function `iconv` to translate variable descriptions (a.k.a variable labels) and value labels of `item`, `data.set`, and `importer` objects into a specified encoding.

It will be useful in UTF-8 systems when data file come in some ancient encoding like 'Latin-1' as long used by Windows systems.

## Usage

```

Iconv(x, from="", to="", ...)
## S3 method for class 'annotation'
Iconv(x, from="", to="", ...)
## S3 method for class 'data.set'
Iconv(x, from="", to="", ...)
## S3 method for class 'importer'
Iconv(x, from="", to="", ...)
## S3 method for class 'item'
Iconv(x, from="", to="", ...)
## S3 method for class 'value.labels'
Iconv(x, from="", to="", ...)

```

## Arguments

<code>x</code>	an object of which attributes are to be re-encoded.
<code>from</code>	a character string describing the original encoding

to                    a character string describing the target encoding  
 ...                    further arguments, passed to [iconv](#)

### Value

Iconv returns a copy of its first argument with re-encoded attributes.

### See Also

[iconv](#), [iconvlist](#)

### Examples

```
## Not run:
# Locate an SPSS 'system' file and get info on variables, their labels etc.
ZA5302 <- spss.system.file("Daten/ZA5302_v6-0-0.sav", to.lower=FALSE)

# Convert labels etc. from 'latin1' to the encoding of the current locale.
ZA5302 <- Iconv(ZA5302, from="latin1")

# Write out the codebook
writeLines(as.character(codebook(ZA5302)),
           con="ZA5302-cdbk.txt")

# Write out the description of the variables (their 'variable labels')
writeLines(as.character(description(ZA5302)),
           con="ZA5302-description.txt")

## End(Not run)
```

---

importers

*Object Oriented Interface to Foreign Files*


---

### Description

Importer objects are objects that refer to an external data file. Currently only Stata files, SPSS system, portable, and fixed-column files are supported.

Data are actually imported by ‘translating’ an importer file into a [data.set](#) using `as.data.set` or `subset`.

The importer mechanism is more flexible and extensible than [read.spss](#) and [read.dta](#) of package "foreign", as most of the parsing of the file headers is done in R. It is also adapted to efficiently load large data sets. Most importantly, importer objects support the [labels](#), [missing.values](#), and [descriptions](#), provided by this package.

**Usage**

```
spss.fixed.file(file,
  columns.file,
  varlab.file=NULL,
  codes.file=NULL,
  missval.file=NULL,
  count.cases=TRUE,
  to.lower=TRUE
)
```

```
spss.portable.file(file,
  varlab.file=NULL,
  codes.file=NULL,
  missval.file=NULL,
  count.cases=TRUE,
  to.lower=TRUE)
```

```
spss.system.file(file,
  varlab.file=NULL,
  codes.file=NULL,
  missval.file=NULL,
  count.cases=TRUE,
  to.lower=TRUE)
```

```
Stata.file(file)
```

```
## The most important methods for "importer" objects are:
## S4 method for signature 'importer'
subset(x, subset, select, drop = FALSE, ...)
```

```
## S4 method for signature 'importer'
as.data.set(x, row.names=NULL, optional=NULL,
  compress.storage.modes=FALSE, ...)
```

**Arguments**

x	an object that inherits from class "importer".
file	character string; the path to the file containing the data
columns.file	character string; the path to an SPSS/PSPP syntax file with a DATA LIST FIXED statement
varlab.file	character string; the path to an SPSS/PSPP syntax file with a VARIABLE LABELS statement
codes.file	character string; the path to an SPSS/PSPP syntax file with a VALUE LABELS statement
missval.file	character string; the path to an SPSS/PSPP syntax file with a MISSING VALUES statement

<code>count.cases</code>	logical; should cases in file be counted? This takes effect only if the data file does not already contain information about the number of cases.
<code>to.lower</code>	logical; should variable names changed to lower case?
<code>subset</code>	a logical vector or an expression containing variables from the external data file that evaluates to logical.
<code>select</code>	a vector of variable names from the external data file. This may also be a named vector, where the names give the names into which the variables from the external data file are renamed.
<code>drop</code>	a logical value, that determines what happens if only one column is selected. If TRUE and only one column is selected, <code>subset</code> returns only a single item object and not a <code>data.set</code> .
<code>row.names</code>	ignored, present only for compatibility.
<code>optional</code>	ignored, present only for compatibility.
<code>compress.storage.modes</code>	logical value; if TRUE floating point values are converted to integers if possible without loss of information.
<code>...</code>	other arguments; ignored.

## Details

A call to a ‘constructor’ for an importer object, that is, `spss.fixed.file`, `spss.portable.file`, `spss.syntax.file`, or `Stata.file`, causes R to read in the header of the data file and/or the syntax files that contain information about the variables, such as the columns that they occupy (in case of `spss.fixed.file`), variable labels, value labels and missing values.

The information in the file header and/or the accompanying files is then processed to prepare the file for importing. Thus the inner structure of an importer object may well vary according to what type of file is to be imported and what additional information is given.

The `as.data.set` and `subset` methods for “importer” objects internally use the generic functions `seekData`, `readData`, `readSlice`, and `readChunk`, which have methods for the subclasses of “importer”. These functions are not callable from outside the package, however.

The `subset` method for “importer” objects reads in the data ‘chunk-wise’ to create the subset of observations if the option “`subset.chunk.size`” is set to a non-NULL value, e.g. by `options(subset.chunk.size=1000)`. This may be useful in case of very large data sets from which only a tiny subset of observations is needed for analysis.

Since the functions described here are more or less complete rewrites based on the description of the file structure provided by the documentation for PSPP, they are perhaps not as thoroughly tested as the functions in the foreign package, apart from the frequent use by the author of this package.

## Value

`spss.fixed.file`, `spss.portable.file`, `spss.system.file`, and `Stata.file` return, respectively, objects of class “`spss.fixed.importer`”, “`spss.portable.importer`”, “`spss.system.importer`”, or “`Stata.importer`”, which, by inheritance, are also objects of class “importer”.

Objects of class “importer” have at least the following two slots:

ptr                    an external pointer

variables            a list of objects of class "item.vector" which provides a 'prototype' for the "data.set" set objects returned by the as.data.set and subset methods for objects of class "importer"

The as.data.frame for importer objects does the actual data import and returns a data frame. Note that in contrast to [read.spss](#), the variable names of the resulting data frame will be lower case, unless the importer function is called with to.lower=FALSE. If long variable names are defined (in case of a PSPP/SPSS system file), they take precedence and are *not* coerced to lower case.

### See Also

[codebook](#), [description](#), [read.spss](#)

### Examples

```
# Extract American National Election Study of 1948
nes1948.por <- unzip(system.file("anes/NES1948.ZIP", package="memisc"),
                    "NES1948.POR", exdir=tempfile())

# Get information about the variables contained.
nes1948 <- spss.portable.file(nes1948.por)

# The data are not yet loaded:
show(nes1948)

# ... but one can see what variables are present:
description(nes1948)

# Now a subset of the data is loaded:
vote.socdem.48 <- subset(nes1948,
                        select=c(
                          v480018,
                          v480029,
                          v480030,
                          v480045,
                          v480046,
                          v480047,
                          v480048,
                          v480049,
                          v480050
                        ))

# Let's make the names more descriptive:
vote.socdem.48 <- rename(vote.socdem.48,
                        v480018 = "vote",
                        v480029 = "occupation.hh",
                        v480030 = "unionized.hh",
                        v480045 = "gender",
                        v480046 = "race",
                        v480047 = "age",
                        v480048 = "education",
```



```

        v480049 = "total.income",
        v480050 = "religious.pref"
    )

# It is also possible to do both
# in one step:
# vote.socdem.48 <- subset(nes1948,
#       select=c(
#           vote           = v480018,
#           occupation.hh  = v480029,
#           unionized.hh   = v480030,
#           gender         = v480045,
#           race           = v480046,
#           age            = v480047,
#           education      = v480048,
#           total.income   = v480049,
#           religious.pref = v480050
#       ))

# We examine the data more closely:
codebook(vote.socdem.48)

# ... and conduct some analyses.
#
t(genTable(percent(vote)~occupation.hh,data=vote.socdem.48))

# We consider only the two main candidates.
vote.socdem.48 <- within(vote.socdem.48,{
  truman.dewey <- vote
  valid.values(truman.dewey) <- 1:2
  truman.dewey <- relabel(truman.dewey,
    "VOTED - FOR TRUMAN" = "Truman",
    "VOTED - FOR DEWEY"  = "Dewey")
})

summary(truman.relig.glm <- glm((truman.dewey=="Truman")~religious.pref,
  data=vote.socdem.48,
  family="binomial",
  ))

```

## Description

Objects of class `item` are data vectors with additional information attached to them like “value labels” and “user-defined missing values” known from software packages like SPSS or Stata.

**Usage**

```
## The constructor for objects of class "item"
## more convenient than new("item",...)
## S4 method for signature 'numeric'
as.item(x,
  labels=NULL, missing.values=NULL,
  valid.values=NULL, valid.range=NULL,
  value.filter=NULL, measurement=NULL,
  annotation=attr(x,"annotation"), ...
)
## S4 method for signature 'character'
as.item(x,
  labels=NULL, missing.values=NULL,
  valid.values=NULL, valid.range=NULL,
  value.filter=NULL, measurement=NULL,
  annotation=attr(x,"annotation"), ...
)

## S4 method for signature 'logical'
as.item(x,...)
# x is first coerced to integer,
# arguments in ... are then passed to the "numeric"
# method.

## S4 method for signature 'factor'
as.item(x,...)
## S4 method for signature 'ordered'
as.item(x,...)
## S4 method for signature 'POSIXct'
as.item(x,...)

## S4 method for signature 'double.item'
as.item(x,
  labels=NULL, missing.values=NULL,
  valid.values=NULL, valid.range=NULL,
  value.filter=NULL, measurement=NULL,
  annotation=attr(x,"annotation"), ...
)

## S4 method for signature 'integer.item'
as.item(x,
  labels=NULL, missing.values=NULL,
  valid.values=NULL, valid.range=NULL,
  value.filter=NULL, measurement=NULL,
  annotation=attr(x,"annotation"), ...
)

## S4 method for signature 'character.item'
```

```

as.item(x,
  labels=NULL, missing.values=NULL,
  valid.values=NULL, valid.range=NULL,
  value.filter=NULL, measurement=NULL,
  annotation=attr(x,"annotation"), ...
)

## S4 method for signature 'datetime.item'
as.item(x,
  labels=NULL, missing.values=NULL,
  valid.values=NULL, valid.range=NULL,
  value.filter=NULL, measurement=NULL,
  annotation=attr(x,"annotation"), ...
)

```

### Arguments

<code>x</code>	for <code>as.item</code> methods, any atomic vector; for the <code>as.character</code> , <code>as.factor</code> , <code>as.integer</code> , <code>as.double</code> , a vector with class <code>"item"</code> ; for the <code>unique</code> , <code>summary</code> , <code>str</code> , <code>print</code> , <code>[</code> , and <code>&lt;-</code> methods, a vector with class <code>labelled</code> .
<code>labels</code>	a named vector of the same mode as <code>x</code> .
<code>missing.values</code>	either a vector of the same mode as <code>x</code> , or a list with components <code>"values"</code> , vector of the same mode as <code>x</code> (which defines individual missing values) and <code>"range"</code> a matrix with two rows with the same mode as <code>x</code> (which defines a range of missing values), or an object of class <code>"missing.values"</code> .
<code>valid.values</code>	either a vector of the same mode as <code>x</code> , defining those values of <code>x</code> that are to be considered as valid, or an object of class <code>"valid.values"</code> .
<code>valid.range</code>	either a vector of the same mode as <code>x</code> and length 2, defining a range of valid values of <code>x</code> , or an object of class <code>"valid.range"</code> .
<code>value.filter</code>	an object of class <code>"value.filter"</code> , that is, of classes <code>"missing.values"</code> , <code>"valid.values"</code> , or <code>"valid.range"</code> .
<code>measurement</code>	level of measurement; one of <code>"nominal"</code> , <code>"ordinal"</code> , <code>"interval"</code> , or <code>"ratio"</code> .
<code>annotation</code>	a named character vector, or an object of class <code>"annotation"</code>
<code>...</code>	further arguments, ignored.

### See Also

[annotation](#) [labels](#) [value.filter](#)

### Examples

```

x <- as.item(rep(1:5,4),
  labels=c(
    "First"      = 1,
    "Second"     = 2,
    "Third"      = 3,

```

```

      "Fourth"      = 4,
      "Don't know" = 5
    ),
    missing.values=5,
    annotation = c(
      description="test"
    )
  ))
str(x)
summary(x)
as.numeric(x)

test <- as.item(rep(1:6,2),labels=structure(1:6,
                                           names=letters[1:6]))

test
test == 1
test != 1
test == "a"
test != "a"
test == c("a","z")
test != c("a","z")
test
test

codebook(test)

Test <- as.item(rep(letters[1:6],2),
               labels=structure(letters[1:6],
                               names=LETTERS[1:6]))

Test
Test == "a"
Test != "a"
Test == "A"
Test != "A"
Test == c("a","z")
Test != c("a","z")
Test
Test

as.factor(test)
as.factor(Test)
as.numeric(test)
as.character(test)
as.character(Test)

as.data.frame(test)[[1]]

```

**Description**

Value labels associate character labels to possible values of an encoded survey item. Value labels are represented as objects of class "value.labels".

Value labels of an item can be obtained using `labels(x)` and can be associated to items and to vectors using `labels(x) <- value`

Value labels also can be updated using the + and - operators.

**Usage**

```
labels(object,...)
labels(x) <- value
```

**Arguments**

<code>object</code>	any object.
<code>...</code>	further arguments for other methods.
<code>x</code>	a vector or "item" object.
<code>value</code>	an object of class "value.labels" or a vector that can be coerced into an "value.labels" object or NULL

**Examples**

```
x <- as.item(rep(1:5,4),
  labels=c(
    "First"      = 1,
    "Second"     = 2,
    "Third"      = 3,
    "Fourth"     = 4,
    "Don't know" = 5
  ),
  missing.values=5,
  annotation = c(
    description="test"
  ))
labels(x)
labels(x) <- labels(x) - c("Second"=2)
labels(x)
labels(x) <- labels(x) + c("Second"=2)
labels(x)

puv1 <- getOption("print.use.value.labels")
options(print.use.value.labels=FALSE)
x
options(print.use.value.labels=TRUE)
x
options(print.use.value.labels=puv1)
```

## Description

The measurement level of a "item" object, which is one of "nominal", "ordinal", "interval", "ratio", determines what happens to it, if it or the [data.set](#) containing it is coerced into a [data.frame](#). If the level of measurement level is "nominal", the it will be converted into an (unordered) [factor](#), if the level of measurement is "ordinal", the item will be converted into an [ordered](#) vector. If the measurement is "interval" or "ratio", the item will be converted into a numerical vector.

## Usage

```
## S4 method for signature 'item'  
measurement(x)  
## S4 replacement method for signature 'item'  
measurement(x) <- value  
is.nominal(x)  
is.ordinal(x)  
is.interval(x)  
is.ratio(x)
```

## Arguments

x                    an object, usually of class "item".  
value                a character string; either "nominal", "ordinal", "interval", or "ratio".

## Value

measurement(x) returns a character string. is.nominal, is.ordinal, is.interval, is.ratio return a logical value.

## References

Stevens, Stanley S. 1946. "On the theory of scales of measurement." *Science* 103: 677-680.

## See Also

[data.set](#), [item](#)

## Examples

```
answer <- sample(c(1,2,3,8,9),size=30,replace=TRUE)  
labels(answer) <- c(Conservatives = 1,  
                  Labour = 2,  
                  "Liberal Democrats" = 3,  
                  "Don't know" = 8,  
                  "Answer refused" = 9)
```

```
    )  
missing.values(answer) <- c(8,9)  
as.data.frame(answer)[[1]]  
measurement(answer) <- "interval"  
as.data.frame(answer)[[1]]
```

## Description

This package collects an assortment of tools that are intended to make work with R easier for the author of this package and are submitted to the public in the hope that they will be also be useful to others.

The tools in this package can be grouped into four major categories:

- Data preparation and management
- Data analysis
- Presentation of analysis results
- Programming

## Data preparation and management

### Survey Items

memisc provides facilities to work with what users from other packages like SPSS, SAS, or Stata know as 'variable labels', 'value labels' and 'user-defined missing values'. In the context of this package these aspects of the data are represented by the "description", "labels", and "missing.values" attributes of a data vector. These facilities are useful, for example, if you work with survey data that contain coded items like vote intention that may have the following structure:

Question: "If there was a parliamentary election next tuesday, which party would you vote for?"

- 1 Conservative Party
- 2 Labour Party
- 3 Liberal Democrat Party
- 4 Scottish Nation Party
- 5 Plaid Cymru
- 6 Green Party
- 7 British National Party
- 8 Other party
- 96 Not allowed to vote
- 97 Would not vote
- 98 Would vote, do not know yet for which party
- 99 No answer

A statistical package like SPSS allows to attach labels like 'Conservative Party', 'Labour Party',

etc. to the codes 1,2,3, etc. and to mark the codes 96, 97, 98, 99 as 'missing' and thus to exclude these variables from statistical analyses. memisc provides similar facilities. Labels can be attached to codes by calls like `labels(x) <- something` and expanded by calls like `labels(x) <- labels(x) + something`, codes can be marked as 'missing' by calls like `missing.values(x) <- something` and `missing.values(x) <- missing.values(x) + something`.

memisc defines a class called "data.set", which is similar to the class "data.frame". The main difference is that it is especially geared toward containing survey item data. Transformations of and within "data.set" objects retain the information about value labels, missing values etc. Using `as.data.frame` sets the data up for R's statistical functions, but doing this explicitly is seldom necessary. See `data.set`.

### More Convenient Import of External Data

Survey data sets are often relative large and contain up to a few thousand variables. For specific analyses one needs however only a relatively small subset of these variables. Although modern computers have enough RAM to load such data sets completely into an R session, this is not very efficient having to drop most of the variables after loading. Also, loading such a large data set completely can be time-consuming, because R has to allocate space for each of the many variables. Loading just the subset of variables really needed for an analysis is more efficient and convenient - it tends to be much quicker. Thus this package provides facilities to load such subsets of variables, without the need to load a complete data set. Further, the loading of data from SPSS files is organized in such a way that all informations about variable labels, value labels, and user-defined missing values are retained. This is made possible by the definition of `importer` objects, for which a `subset` method exists. `importer` objects contain only the information about the variables in the external data set but not the data. The data itself is loaded into memory when the functions `subset` or `as.data.set` are used.

### Recoding

memisc also contains facilities for recoding survey items. Simple recodings, for example collapsing answer categories, can be done using the function `recode`. More complex recodings, for example the construction of indices from multiple items, and complex case distinctions, can be done using the function `cases`. This function may also be useful for programming, in so far as it is a generalization of `ifelse`.

### Code Books

There is a function `codebook` which produces a code book of an external data set or an internal "data.set" object. A codebook contains in a conveniently formatted way concise information about every variable in a data set, such as which value labels and missing values are defined and some univariate statistics.

An extended example of all these facilities is contained in the vignette "anes48", and in `demo(anes48)`

## Data Analysis

### Tables and Data Frames of Descriptive Statistics

`genTable` is a generalization of `xtabs`: Instead of counts, also descriptive statistics like means or variances can be reported conditional on levels of factors. Also conditional percentages of a factor can be obtained using this function.

In addition an Aggregate function is provided, which has the same syntax as `genTable`, but gives a data frame of descriptive statistics instead of a table object.



### Per-Subset Analysis

`By` is a variant of the standard function `by`: Conditioning factors are specified by a formula and are obtained from the data frame the subsets of which are to be analysed. Therefore there is no need to `attach` the data frame or to use the dollar operator.

## Presentation of Results of Statistical Analysis

### Publication-Ready Tables of Coefficients

Journals of the Political and Social Sciences usually require that estimates of regression models are presented in the following form:

	Model 1	Model 2	Model 3
Coefficients			
(Intercept)	30.628*** (7.409)	6.360*** (1.252)	28.566*** (7.355)
pop15	-0.471** (0.147)		-0.461** (0.145)
pop75	-1.934 (1.041)		-1.691 (1.084)
dpi		0.001 (0.001)	-0.000 (0.001)
ddpi		0.529* (0.210)	0.410* (0.196)
Summaries			
R-squared	0.262	0.162	0.338
adj. R-squared	0.230	0.126	0.280
N	50	50	50

Such tables of coefficient estimates can be produced by `mtable`. To see some of the possibilities of this function, use `example(mtable)`.

### LaTeX Representation of R Objects

Output produced by `mtable` can be transformed into LaTeX tables by an appropriate method of the generic function `toLatex` which is defined in the package `utils`. In addition, `memisc` defines `toLatex` methods for matrices and `fTable` objects. Note that results produced by `genTable` can be coerced into `fTable` objects. Also, a default method for the `toLatex` function is defined which coerces its argument to a matrix and applies the matrix method of `toLatex`.

## Programming

### Looping over Variables

Sometimes users want to construct loops that run over variables rather than values. For example, if one wants to set the missing values of a battery of items. For this purpose, the package contains the function `foreach`. To set 8 and 9 as missing values for the items `knowledge1`, `knowledge2`, `knowledge3`, one can use

```
foreach(x=c(knowledge1,knowledge2,knowledge3),
        missing.values(x) <- 8:9)
```

### Changing Names of Objects and Labels of Factors

R already makes it possible to change the names of an object. Substituting the `names` or `dimnames` can be done with some programming tricks. This package defines the function `rename`, `dimrename`, `colrename`, and `rowrename` that implement these tricks in a convenient way, so that programmers (like the author of this package) need not reinvent the wheel in every instance of changing names of an object.

### Dimension-Preserving Versions of `lapply` and `sapply`

If a function that is involved in a call to `sapply` returns a result an array or a matrix, the dimensional information gets lost. Also, if a list object to which `lapply` or `sapply` are applied have a dimension attribute, the result loses this information. The functions `Lapply` and `Sapply` defined in this package preserve such dimensional information.

### Combining Vectors and Arrays by Names

The generic function `collect` collects several objects of the same mode into one object, using their names, `rownames`, `colnames` and/or `dimnames`. There are methods for atomic vectors, arrays (including matrices), and data frames. For example

```
a <- c(a=1,b=2)
b <- c(a=10,c=30)
collect(a,b)
```

leads to

```
  x y
a  1 10
b  2 NA
c NA 30
```

### Reordering of Matrices and Arrays

The `memisc` package includes a `reorder` method for arrays and matrices. For example, the `matrix` method by default reorders the rows of a matrix according the results of a function.

---

mtable

*Comparative Table of Model Estimates*

---

### Description

mtable produces a table of estimates for several models.

**Usage**

```

mtable(...,coef.style=getOption("coef.style"),
       summary.stats=TRUE,
       signif.symbols=getOption("signif.symbols"),
       factor.style=getOption("factor.style"),
       show.baselevel=getOption("show.baselevel"),
       baselevel.sep=getOption("baselevel.sep"),
       getSummary=eval.parent(quote(getSummary)),
       float.style=getOption("float.style"),
       digits=min(3,getOption("digits")),
       sdigits=digits,
       show.eqnames=getOption("mtable.show.eqnames",NA),
       gs.options=NULL
)
## S3 method for class 'memisc_mtable'
relabel(x, ..., gsub = FALSE, fixed = !gsub, warn = FALSE)

## S3 method for class 'memisc_mtable'
format(x,target=c("print","LaTeX","HTML","delim"),
       ...
)

## S3 method for class 'memisc_mtable'
print(x,
      center.at=getOption("OutDec"),
      topsep="=",bottomsep="=",sectionsep="-",...)

write.mtable(object,file="",
            format=c("delim","LaTeX","HTML"),...)

## S3 method for class 'memisc_mtable'
toLatex(object,...)

```

**Arguments**

...	as argument to <code>mtable</code> : several model objects, e.g. of class <code>lm</code> ; as argument to <code>print.memisc_mtable</code> , <code>toLatex.memisc_mtable</code> , <code>write.memisc_mtable</code> : further arguments passed to <code>format.memisc_mtable</code> ; as argument to <code>format.memisc_mtable</code> : further arguments passed to <code>format.default</code> ; as argument to <code>relabel.memisc_mtable</code> : further arguments passed to <code>dimrename</code> .
<code>coef.style</code>	a character string which specifies the style of coefficient values, whether standard errors, Wald/t-statistics, or significance levels are reported, etc. See <code>coef.style</code> .
<code>summary.stats</code>	if <code>FALSE</code> , no summary statistics are reported. If <code>TRUE</code> , all summary statistics produced by <code>getSummary</code> are reported. This argument may also contain a character vector with the names of the summary statistics to report
<code>signif.symbols</code>	a named numeric vector to specify the "significance levels" and corresponding symbols. The numeric elements define the significance levels, the attached names define the associated symbols.

<code>factor.style</code>	a character string that specifies the style in which factor contrasts are labeled. See <a href="#">factor.style</a> .
<code>show.baselevel</code>	logical; determines whether base levels of factors are indicated for dummy coefficients
<code>baselevel.sep</code>	character that is used to separate the base level from the level that a dummy variable represents
<code>getSummary</code>	a function that computes model-related statistics that appear in the table. See <a href="#">getSummary</a> .
<code>float.style</code>	default format for floating point numbers if no format is specified by <code>coef.style</code> .
<code>digits</code>	number of significant digits if not specified by the template returned from <a href="#">getCoeffTemplate</a> or <a href="#">getSummaryTemplate</a>
<code>sdigits</code>	integer; number of digits after decimal dot for summary statistics.
<code>show.eqnames</code>	logical; if TRUE, left-hand sides of equations are (always) shown in the table header; if FALSE, left-hand sides of equations are not shown; if NA, left-hand sides of equations are shown only if left-hand sides differ among models or one of the models has multiple equations.
<code>gs.options</code>	an optional list of arguments passed on to <code>getSummary</code>
<code>x</code> , object	an object of class <code>mtable</code>
<code>gsub</code> , <code>warn</code> , <code>fixed</code>	logical values, see <a href="#">relabel</a>
<code>target</code>	a character string which indicates the target format. Currently the targets "print" (see <a href="#">mtable_format_print</a> ), "LaTeX" (see <a href="#">mtable_format_latex</a> ), "HTML" (see <a href="#">mtable_format_html</a> ), and "delim" (see <a href="#">mtable_format_delim</a> ) are supported.
<code>center.at</code>	a character string on which resulting values are centered. Typically equal to ".". This is the default when <code>forLaTeX==TRUE</code> . If NULL, reported values are not centered.
<code>topsep</code>	a character string that is recycled to a top rule.
<code>bottomsep</code>	a character string that is recycled to a bottom rule.
<code>sectionsep</code>	a character string that is recycled to separate coefficients from summary statistics.
<code>file</code>	name of the file where to write to; defaults to console output.
<code>format</code>	character string that specifies the desired format.

## Details

`mtable` constructs a table of estimates for regression-type models. `format.memisc_mtable` formats suitable for use with output or conversion functions such as `print.memisc_mtable`, `toLatex.memisc_mtable`, or `write.memisc_mtable`.

**Value**

A call to `mtable` results in an object of class "mtable" with the following components:

<code>coefficients</code>	a list that contains the model coefficients,
<code>summaries</code>	a matrix that contains the model summaries,
<code>calls</code>	a list of calls that created the model estimates being summarised.

**Examples**

```
#### Basic workflow

lm0 <- lm(sr ~ pop15 + pop75, data = LifeCycleSavings)
lm1 <- lm(sr ~ dpi + ddpi, data = LifeCycleSavings)
lm2 <- lm(sr ~ pop15 + pop75 + dpi + ddpi, data = LifeCycleSavings)

mtable123 <- mtable("Model 1"=lm0,"Model 2"=lm1,"Model 3"=lm2,
  summary.stats=c("sigma","R-squared","F","p","N"))

(mtable123 <- relabel(mtable123,
  "(Intercept)" = "Constant",
  pop15 = "Percentage of population under 15",
  pop75 = "Percentage of population over 75",
  dpi = "Real per-capita disposable income",
  ddpi = "Growth rate of real per-capita disp. income"
))

# This produces output in tab-delimited format:
write.mtable(mtable123)

## Not run:
# This produces output in tab-delimited format:
file123 <- "mtable123.txt"
write.mtable(mtable123,file=file123)
file.show(file123)
# The contents of this file can be pasted into Word
# and converted into a Word table.

## End(Not run)

## Not run: texfile123 <- "mtable123.tex"
write.mtable(mtable123,format="LaTeX",file=texfile123)
file.show(texfile123)
## End(Not run)

#### Examples with UC Berkeley data

berkeley <- Aggregate(Table(Admit,Freq)~.,data=UCBAdmissions)

berk0 <- glm(cbind(Admitted,Rejected)~1,data=berkeley,family="binomial")
berk1 <- glm(cbind(Admitted,Rejected)~Gender,data=berkeley,family="binomial")
berk2 <- glm(cbind(Admitted,Rejected)~Gender+Dept,data=berkeley,family="binomial")
```

```

mtable(berk0,summary.stats=c("Deviance","N"))
mtable(berk1,summary.stats=c("Deviance","N"))

mtable(berk0,berk1,berk2,summary.stats=c("Deviance","N"))

mtable(berk0,berk1,berk2,
       coef.style="horizontal",
       summary.stats=c("Deviance","AIC","N"))
mtable(berk0,berk1,berk2,
       coef.style="stat",
       summary.stats=c("Deviance","AIC","N"))
mtable(berk0,berk1,berk2,
       coef.style="ci",
       summary.stats=c("Deviance","AIC","N"))
mtable(berk0,berk1,berk2,
       coef.style="ci.se",
       summary.stats=c("Deviance","AIC","N"))
mtable(berk0,berk1,berk2,
       coef.style="ci.se.horizontal",
       summary.stats=c("Deviance","AIC","N"))
mtable(berk0,berk1,berk2,
       coef.style="ci.p.horizontal",
       summary.stats=c("Deviance","AIC","N"))
mtable(berk0,berk1,berk2,
       coef.style="ci.horizontal",
       summary.stats=c("Deviance","AIC","N"))
mtable(berk0,berk1,berk2,
       coef.style="all",
       summary.stats=c("Deviance","AIC","N"))
mtable(berk0,berk1,berk2,
       coef.style="all.nostar",
       summary.stats=c("Deviance","AIC","N"))

mtable(by(berkeley,berkeley$Dept,
         function(x)glm(cbind(Admitted,Rejected)~Gender,
                        data=x,family="binomial")),
       summary.stats=c("Likelihood-ratio","N"))

mtable(By(~Gender,
         glm(cbind(Admitted,Rejected)~Dept,
             family="binomial"),
         data=berkeley),
       summary.stats=c("Likelihood-ratio","N"))

berkfull <- glm(cbind(Admitted,Rejected)~Dept/Gender - 1,
               data=berkeley,family="binomial")
relabel(mtable(berkfull),Dept="Department",gsub=TRUE)

#### Array-like semantics

mtable123 <- mtable("Model 1"=lm0,"Model 2"=lm1,"Model 3"=lm2,

```

```

summary.stats=c("sigma","R-squared","F","p","N"))

dim(mtable123)
dimnames(mtable123)
mtable123[c("dpi","ddpi"),
          c("Model 2","Model 3")]

#### Concatention
mt01 <- mtable(lm0,lm1,summary.stats=c("R-squared","N"))
mt12 <- mtable(lm1,lm2,summary.stats=c("R-squared","F","N"))
c(mt01,mt12) # not that this makes sense, but ...
c("Group 1"=mt01,
  "Group 2"=mt12)

```

---

mtable\_format\_delim    *Format for 'mtable' Objects for Writing into File*

---

## Description

mtable\_mtable\_print formats 'mtable' in a way suitable for output into a file with write.table

## Usage

```

mtable_format_delim(x,
                    colsep="\t",
                    rowsep="\n",
                    interaction.sep = " x ",
                    ...
                    )

```

## Arguments

x	an object of class mtable
colsep	a character string which separates the columns in the output.
rowsep	a character string which separates the rows in the output.
interaction.sep	a character string that separates factors that are involved in an interaction effect
...	further arguments, ignored.

## Value

A character string.

---

mtable_format_html	<i>HTML Formatting for 'mtable' Results</i>
--------------------	---

---

### Description

These functions formats 'mtable' objects into HTML format.

### Usage

```
mtable_format_html(x,
                    interaction.sep = NULL,
                    toprule=2,midrule=1,bottomrule=2,
                    split.dec=TRUE,
                    style=mtable_format_stdstyle,
                    margin="2ex auto",
                    ...
)
## S3 method for class 'memisc_mtable'
format_html(x,
            interaction.sep = NULL,
            toprule=2,midrule=1,bottomrule=2,
            split.dec=TRUE,
            style=mtable_format_stdstyle,
            margin="2ex auto",
            ...
)
```

### Arguments

x	an object of class mtable
toprule	integer; thickness in pixels of rule at the top of the table.
midrule	integer; thickness in pixels of rules within the table.
bottomrule	integer; thickness in pixels of rule at the bottom of the table.
interaction.sep	a character string that separates factors that are involved in an interaction effect or NULL. If NULL then a reasonable default is used (either a unicode character or an ampersand encoded HTML entity).
split.dec	logical; whether numbers should be centered at the decimal point by splitting the table cells.
style	string containing default the CSS styling.
margin	character string, determines the margin and thus the position of the HTML table.
...	further arguments, ignored.

### Value

A character string with code suitable for inclusion into a HTML-file.



**Examples**

```

lm0 <- lm(sr ~ pop15 + pop75, data = LifeCycleSavings)
lm1 <- lm(sr ~ dpi + ddpi, data = LifeCycleSavings)
lm2 <- lm(sr ~ pop15 + pop75 + dpi + ddpi, data = LifeCycleSavings)

mtable123 <- mtable("Model 1"=lm0,"Model 2"=lm1,"Model 3"=lm2,
  summary.stats=c("sigma","R-squared","F","p","N"))

(mtable123 <- relabel(mtable123,
  "(Intercept)" = "Constant",
  pop15 = "Percentage of population under 15",
  pop75 = "Percentage of population over 75",
  dpi = "Real per-capita disposable income",
  ddpi = "Growth rate of real per-capita disp. income"
))

show_html(mtable123)

```

---

mtable\_format\_latex    *Format 'mtable' Results for LaTeX*

---

**Description**

This function formats objects created by `mtable` for inclusion into LaTeX files.

**Usage**

```

mtable_format_latex(x,
  useDcolumn=getOption("useDcolumn",TRUE),
  colspec=if(useDcolumn)
    paste("D{.}{",LaTeXdec,"}{",ddigits,"}",sep="")
    else "l",
  LaTeXdec=".",
  ddigits=min(3,getOption("digits")),
  useBooktabs=getOption("useBooktabs",TRUE),
  toprule=if(useBooktabs) "\\toprule" else "\\hline\\hline",
  midrule=if(useBooktabs) "\\midrule" else "\\hline",
  cmidrule=if(useBooktabs) "\\cmidrule" else "\\cline",
  bottomrule=if(useBooktabs) "\\bottomrule" else "\\hline\\hline",
  interaction.sep = " $\\times$ ",
  sdigits=min(1,ddigits),
  compact=FALSE,
  sumry.multicol=FALSE,
  toLatex.escape.tex=getOption("toLatex.escape.tex",FALSE),
  ...
)

```

**Arguments**

x	an object of class mtable
useDcolumn	should the dcolumn LaTeX package be used? If true, you will have to include <code>\usepackage{dcolumn}</code> into the preamble of your LaTeX document.
colspec	LaTeX table column format specifier(s).
LaTeXdec	the decimal point in the final LaTeX output.
ddigits	alignment specification or digits after the decimal point.
useBooktabs	should the booktabs LaTeX package be used? If true, you will have to include <code>\usepackage{booktabs}</code> into the preamble of your LaTeX document.
toprule	appearance of the top border of the LaTeX tabular environment.
midrule	how are coefficients and summary statistics separated in the LaTeX tabular environment.
cmidrule	appearance of rules under section headings.
bottomrule	appearance of the bottom border of the LaTeX tabular environment.
interaction.sep	a character string that separates factors that are involved in an interaction effect
sdigits	integer; number of digits after decimal dot for summary statistics.
compact	logical; should the table be compact, without extra columns between multi-equation models?
sumry.multicol	logical, should summaries enclosed into <code>\multicol</code> commands?
toLatex.escape.tex	logical, should symbols <code>\\$, \_, and \^</code> be escaped with backslashes?
...	further arguments, ignored.

**Value**

A character string with code suitable for inclusion into a LaTeX-file.

---

mtable\_format\_print     *Print Format for 'mtable' Objects*

---

**Description**

mtable\_format\_print formats 'mtable' in a way suitable for screen output with 'print'.

**Usage**

```
mtable_format_print(x,
  topsep="=",
  bottomsep="=",
  sectionsep="-",
  interaction.sep = " x ",
  center.at=getOption("OutDec"),
  align.integers=c("dot","right","left"),
  padding = "  ",
  ...
)
```

**Arguments**

x	an object of class mtable
topsep	a character string that is recycled to a top rule.
bottomsep	a character string that is recycled to a bottom rule.
sectionsep	a character string that is recycled to separate coefficients from summary statistics.
interaction.sep	a character string that separates factors that are involved in an interaction effect
center.at	a character string on which resulting values are centered. Typically equal to ".". This is the default when forLaTeX==TRUE. If NULL, reported values are not centered.
align.integers	how to align integer values.
padding	a character string, usually whitespace, used to insert left- and right-padding of table contents.
...	further arguments, ignored.

**Value**

A character string.

---

negative match

*Negative Match*

---

**Description**

`%nin%` is a convenience operator: `x %nin% table` is equivalent to `!(x %in% table)`.

**Usage**

```
x %nin% table
```

**Arguments**

x                    the values to be matched  
 table                a values to be match against

**Value**

A logical vector

**Examples**

```
x <- sample(1:6,12,replace=TRUE)
x %in% 1:3
x %nin% 1:3
```

---

percent	<i>Table of Percentages with Percentage Base</i>
---------	--

---

**Description**

percent returns a table of percentages along with the percentage base. It will be useful in conjunction with [Aggregate](#) or [genTable](#).

**Usage**

```
percent(x,...)
## Default S3 method:
percent(x,weights=NULL,total=!(se || ci),
       se=FALSE,ci=FALSE,ci.level=.95,
       total.name="N",perc.label="Percentage",...)
## S3 method for class 'logical'
percent(x,weights=NULL,total=!(se || ci),
       se=FALSE,ci=FALSE,ci.level=.95,
       total.name="N",perc.label="Percentage",...)
```

**Arguments**

x                    a numeric vector or factor.  
 weights            a optional numeric vector of weights of the same length as x.  
 total              logical; should the total sum of counts from which the percentages are computed be included into the output?  
 se                  logical; should standard errors of the percentages be included?  
 ci                  logical; should confidence intervals of the percentages be included?  
 ci.level            numeric; nominal coverage of confidence intervals  
 total.name        character; name given for the total sum of counts

perc.label character; label given for the percentages if the table has more than one dimensions, e.g. if se or ci is TRUE.

... for percent.mresp: one or several 1-0 vectors or matrices otherwise, further arguments, currently ignored.

### Value

A table of percentages.

### Examples

```
x <- rnorm(100)
y <- rnorm(100)
z <- rnorm(100)
f <- sample(1:3,100,replace=TRUE)
f <- factor(f,labels=c("a","b","c"))

percent(x>0)
percent(f)

genTable(
  cbind(percent(x>0),
        percent(y>0),
        percent(z>0)) ~ f
)

gt <- genTable(
  cbind(percent(x>0,ci=TRUE),
        percent(y>0,ci=TRUE),
        percent(z>0,ci=TRUE)) ~ f
)

print(gt)
ftable(gt,row.vars=2,col.vars=c(3,1))

ex.data <- expand.grid(mean=c(0,25,50),sd=c(1,10,100))[rep(1:9,rep(250,9)),]
ex.data <- within(ex.data,x <- rnorm(n=nrow(ex.data),mean=ex.data$mean,sd=ex.data$sd))
ex.data <- within(ex.data,x.grp <- cases( x < 0,
                                       x >= 0 & x < 50,
                                       x >= 50 & x < 100,
                                       x >= 100
                                       ))
genTable(percent(x.grp)~mean+sd,data=ex.data)

Aggregate(percent(Admit,weight=Freq)~Gender+Dept,data=UCBAdmissions)
```

**Description**

The generic function `percentages` and its methods create one- or multidimensional tables of percentages. As such, the function `percentages` can be viewed as a convenience interface to [prop.table](#). However, it also allows to obtain standard errors and confidence intervals.

**Usage**

```
percentages(obj, ...)
## S3 method for class 'table'
percentages(obj,
            by=NULL, which=NULL, se=FALSE, ci=FALSE, ci.level=.95, ...)
## S3 method for class 'formula'
percentages(obj,
            data=parent.frame(), weights=NULL, ...)
## S3 method for class 'percentage.table'
as.data.frame(x, ...)
## S3 method for class 'xpercentage.table'
as.data.frame(x, ...)
```

**Arguments**

<code>obj</code>	an object; a contingency table or a formula. If it is a formula, its left-hand side determines the factor or combination of factors for which percentages are computed while its right-hand side determines the factor or combination of factors that define the groups within which percentages are computed.
<code>by</code>	a character vector with the names of the factor variables that define the groups within which percentages are computed. Percentages sum to 100 within combination of levels of these factors.
<code>which</code>	a character vector with the names of the factor variables for which percentages are computed.
<code>se</code>	a logical value; determines whether standard errors are computed.
<code>ci</code>	a logical value; determines whether confidence intervals are computed. Note that the confidence intervals are for infinite (or very large) populations.
<code>ci.level</code>	a numerical value, the required confidence level of the confidence intervals.
<code>data</code>	a contingency table (an object that inherits from "table") or a data frame or an object coercable into a data frame.
<code>weights</code>	an optional character string with the name of a variable containing weights.
<code>x</code>	an object coerced into a data frame.
<code>...</code>	Further arguments, ignored.

**Value**

An array that inherits classes "percentage.table" and "table". If percentages was called with `se=TRUE` or `ci=TRUE` then the result additionally inherits class "xpercentage.table".

**Examples**

```
# Two equivalent ways to create the same table
100*prop.table(UCBAdmissions)
percentages(UCBAdmissions)

# Three equivalent ways to create the same table
100*prop.table(UCBAdmissions,c(2,3))
(p0 <- percentages(UCBAdmissions,by=c("Gender","Dept")))
percentages(UCBAdmissions,which="Admit")
# Percentage table as data frame
as.data.frame(p0)

# Three equivalent ways to create the same table
100*prop.table(margin.table(UCBAdmissions,c(1,2)),2)
percentages(UCBAdmissions,which="Admit",by="Gender")
percentages(Admit~Gender,data=UCBAdmissions)

# Three equivalent ways to create the same table
100*prop.table(margin.table(UCBAdmissions,c(1,3)),2)
percentages(Admit~Dept,data=UCBAdmissions)
percentages(Admit~Dept,data=as.data.frame(UCBAdmissions),
            weights="Freq")

# Standard errors and confidence intervals
percentages(Admit~Dept,data=UCBAdmissions,se=TRUE)
percentages(Admit~Dept,data=UCBAdmissions,ci=TRUE)
(p<- percentages(Admit~Dept,data=UCBAdmissions,ci=TRUE,se=TRUE))

# An extended table of percentages as data frame
as.data.frame(p)
```

---

query

*Query an Object for Information*


---

**Description**

The function `query` can be used to search an object for a keyword.

The `data.set` and `importer` methods perform such a search through the annotations and value labels of the items in the data set.

**Usage**

```

query(x,pattern,...)
## S4 method for signature 'data.set'
query(x,pattern,...)
## S4 method for signature 'importer'
query(x,pattern,...)

## S4 method for signature 'item'
query(x,pattern,...)
# (Called by the methods above.)

```

**Arguments**

x	an object
pattern	a character string that gives the pattern to be searched for
...	optional arguments such as
	fuzzy logical, TRUE by default; use fuzzy search via <a href="#">agrep</a> or regexp search via <a href="#">grep</a>
	extended logical, defaults to FALSE; passed to <a href="#">grep</a>
	perl logical, defaults to TRUE; passed to <a href="#">grep</a>
	fixed logical, defaults to TRUE; passed to <a href="#">grep</a>
	ignore.case logical, defaults to TRUE; passed to <a href="#">grep</a> or <a href="#">agrep</a>
	insertions numerical value, defaults to 0.999999999; passed to <a href="#">agrep</a>
	deletions numerical value, defaults to 0; passed to <a href="#">agrep</a>
	substitutions numerical value, defaults to 0; passed to <a href="#">agrep</a>

**Value**

If both the annotation and the value labels of an item match the pattern the query method for 'item' objects returns a list containing the annotation and the value labels, otherwise if only the annotation or the value labels match the pattern, either the annotation or the value labels are returned, otherwise if neither matches the pattern, query returns NULL.

The methods of query for 'data.set' and 'importer' objects return a list of all non-NULL query results of all items contained by these objects, or NULL.

**Examples**

```

nes1948.por <- unzip(system.file("anes/NES1948.ZIP",package="memisc"),
                    "NES1948.POR",exdir=tempfile())
nes1948 <- spss.portable.file(nes1948.por)
query(nes1948,"TRUMAN")

```



recode

*Recode Items, Factors and Numeric Vectors***Description**

recode substitutes old values of a factor or a numeric vector by new ones, just like the recoding facilities in some commercial statistical packages.

**Usage**

```
## S4 method for signature 'vector'
recode(x,...,otherwise="NA")
## S4 method for signature 'factor'
recode(x,...,otherwise="NA")
## S4 method for signature 'item'
recode(x,...,otherwise="NA")
```

**Arguments**

x	An object
...	<p>One or more assignment expressions, each of the form <code>new.value &lt;- old.values</code>. <code>new.value</code> should be a scalar numeric value or character string. If one of the <code>new.values</code> is a character string, the return value of <code>recode</code> will be a factor and each <code>new.value</code> will be coerced to a character string that labels a level of the factor.</p> <p>Each <code>old.value</code> in an assignment expression may be a (numeric or character) vector. If <code>x</code> is numeric such an assignment expression may have the form <code>new.value &lt;- range(lower,upper)</code>. In that case, values between <code>lower</code> and <code>upper</code> are exchanged by <code>new.value</code>. If one of the arguments to <code>range</code> is <code>min</code>, it is substituted by the minimum of <code>x</code>. If one of the arguments to <code>range</code> is <code>max</code>, it is substituted by the maximum of <code>x</code>.</p> <p>In case of the method for labelled vectors, the <i>tags</i> of arguments of the form <code>tag = new.value &lt;- old.values</code> will define the labels of the new codes.</p> <p>If the <code>old.values</code> of different assignment expressions overlap, an error will be raised because the recoding is ambiguous.</p>
otherwise	a character string or some other value that the result may obtain. If equal to <code>NA</code> or <code>"NA"</code> , original codes not given an explicit new code are recoded into <code>NA</code> . If equal to <code>"copy"</code> , original codes not given an explicit new code are copied.

**Details**

`recode` relies on the lazy evaluation mechanism of *R*: Arguments are not evaluated until required by the function they are given to. `recode` does not cause arguments that appear in `...` to be evaluated. Instead, `recode` parses the `...` arguments. Therefore, although expressions like `1 <- 1:4` would cause an error action, if evaluated at any place elsewhere in *R*, they will not cause an error action, if

given to `recode` as an argument. However, a call of the form `recode(x, 1=1:4)`, would be a syntax error.

If John Fox' package "car" is installed, `recode` will also be callable with the syntax of the [recode](#) function of that package.

### Value

A numerical vector, factor or an item object.

### See Also

[recode](#) of package `car`.

### Examples

```
x <- as.item(sample(1:6,20,replace=TRUE),
             labels=c( a=1,
                       b=2,
                       c=3,
                       d=4,
                       e=5,
                       f=6))

print(x)

# A recoded version of x is returned
# containing the values 1, 2, 3, which are
# labelled as "A", "B", "C".
recode(x,
       A = 1 <- range(min,2),
       B = 2 <- 3:4,
       C = 3 <- range(5,max), # this last comma is ignored
       )

# This causes an error action: the sets
# of original values overlap.
try(recode(x,
          A = 1 <- range(min,2),
          B = 2 <- 2:4,
          C = 3 <- range(5,max)
          ))

recode(x,
       A = 1 <- range(min,2),
       B = 2 <- 3:4,
       C = 3 <- range(5,6),
       D = 4 <- 7
       )

# This results in an all-missing vector:
recode(x,
       D = 4 <- 7,
       E = 5 <- 8
```

```
)

f <- as.factor(x)
x <- as.integer(x)

recode(x,
  1 <- range(min,2),
  2 <- 3:4,
  3 <- range(5,max)
)

# This causes another error action:
# the third argument is an invalid
# expression for a recoding.
try(recode(x,
  1 <- range(min,2),
  3:4,
  3 <- range(5,max)
))

# The new values are character strings,
# therefore a factor is returned.
recode(x,
  "a" <- range(min,2),
  "b" <- 3:4,
  "c" <- range(5,6)
)

recode(x,
  1 <- 1:3,
  2 <- 4:6
)

recode(x,
  4 <- 7,
  5 <- 8,
  otherwise = "copy"
)

recode(f,
  "A" <- c("a", "b"),
  "B" <- c("c", "d"),
  otherwise="copy"
)

recode(f,
  "A" <- c("a", "b"),
  "B" <- c("c", "d"),
  otherwise="C"
)

recode(f,
  "A" <- c("a", "b"),
```

```
"B" <- c("c","d")
)
```

---

relabel

*Change labels of factors or labelled objects*


---

### Description

Function `relabel` changes the labels of a factor or any object that has a `names`, `labels`, `value.labels`, or `variable.labels` attribute. Function `relabel4` is an (internal) generic which is called by `relabel` to handle S4 objects.

### Usage

```
## Default S3 method:
relabel(x, ..., gsub = FALSE, fixed = TRUE, warn = TRUE)
## S3 method for class 'factor'
relabel(x, ..., gsub = FALSE, fixed = TRUE, warn = TRUE)

## S4 method for signature 'item'
relabel4(x, ...)
# This is an internal method, see details.
# Use relabel(x, ...) for 'item' objects
```

### Arguments

<code>x</code>	An object with a <code>names</code> , <code>labels</code> , <code>value.labels</code> , or <code>variable.labels</code> attribute
<code>...</code>	A sequence of named arguments, all of type character
<code>gsub</code>	a logical value; if TRUE, <code>gsub</code> is used to change the labels of the object. That is, instead of substituting whole labels, substrings of the labels of the object can be changed.
<code>fixed</code>	a logical value, passed to <code>gsub</code> . If TRUE, substitutions are by fixed strings and not by regular expressions.
<code>warn</code>	a logical value; if TRUE, a warning is issued if a change of labels was unsuccessful.

### Details

This function changes the names or labels of `x` according to the remaining arguments. If `gsub` is FALSE, argument tags are the *old* labels, the values are the new labels. If `gsub` is TRUE, arguments are substrings of the labels that are substituted by the argument values.

Function `relabel` is S3 generic. If its first argument is an S4 object, it calls the (internal) `relabel4` generic function.

**Value**

The object `x` with new labels defined by the ... arguments.

**Examples**

```
f <- as.factor(rep(letters[1:4],5))
levels(f)
F <- relabel(f,
  a="A",
  b="B",
  c="C",
  d="D"
)
levels(F)
```

```
f <- as.item(f)
labels(f)
F <- relabel(f,
  a="A",
  b="B",
  c="C",
  d="D"
)
labels(F)
```

---

 rename

*Change Names of a Named Object*


---

**Description**

rename changes the names of a named object.

**Usage**

```
rename(x, ..., gsub = FALSE, fixed = TRUE, warn = TRUE)
```

**Arguments**

<code>x</code>	Any named object
<code>...</code>	A sequence of named arguments, all of type character
<code>gsub</code>	a logical value; if TRUE, <code>gsub</code> is used to change the row and column labels of the resulting table. That is, instead of substituting whole names, substrings of the names of the object can be changed.
<code>fixed</code>	a logical value, passed to <code>gsub</code> . If TRUE, substitutions are by fixed strings and not by regular expressions.
<code>warn</code>	a logical value; should a warning be issued if those names to be changed are not found?

**Details**

This function changes the names of `x` according to the remaining arguments. If `gsub` is `FALSE`, argument tags are the *old* names, the values are the new names. If `gsub` is `TRUE`, arguments are substrings of the names that are substituted by the argument values.

**Value**

The object `x` with new names defined by the ... arguments.

**Examples**

```
x <- c(a=1, b=2)
rename(x,a="A",b="B")

str(rename(iris,
           Sepal.Length="Sepal_Length",
           Sepal.Width ="Sepal_Width",
           Petal.Length="Petal_Length",
           Petal.Width ="Petal_Width"
           ))
str(rename(iris,
           .="_"
           ,gsub=TRUE))
```

---

reorder.array

*Reorder an Array or Matrix*


---

**Description**

`reorder.array` reorders an array along a specified dimension according given names, indices or results of a function applied.

**Usage**

```
## S3 method for class 'array'
reorder(x,dim=1,names=NULL,indices=NULL,FUN=mean,...)
## S3 method for class 'matrix'
reorder(x,dim=1,names=NULL,indices=NULL,FUN=mean,...)
```

**Arguments**

<code>x</code>	An array
<code>dim</code>	An integer specifying the dimension along which <code>x</code> should be ordered.
<code>names</code>	A character vector
<code>indices</code>	A numeric vector
<code>FUN</code>	A function that can be used in <code>apply(x, dim, FUN)</code>
<code>...</code>	further arguments, ignored.

**Details**

Typical usages are

```
reorder(x, dim, names)
reorder(x, dim, indices)
reorder(x, dim, FUN)
```

The result of `reorder(x, dim, names)` is `x` reordered such that `dimnames(x)[[dim]]` is equal to the concatenation of those elements of `names` that are in `dimnames(x)[[dim]]` and the remaining elements of `dimnames(x)[[dim]]`.

The result of `reorder(x, dim, indices)` is `x` reordered along `dim` according to `indices`.

The result of `reorder(x, dim, FUN)` is `x` reordered along `dim` according to `order(apply(x, dim, FUN))`.

**Value**

The reordered object `x`.

**See Also**

The default method of [reorder](#) in package `stats`.

**Examples**

```
(M <- matrix(rnorm(n=25), 5, 5, dimnames=list(LETTERS[1:5], letters[1:5])))
reorder(M, dim=1, names=c("E", "A"))
reorder(M, dim=2, indices=3:1)
reorder(M, dim=1)
reorder(M, dim=2)
```

---

 retain

*Retain Objects in an Environment*


---

**Description**

`retain` removes all objects from the environment except those mentioned as argument.

**Usage**

```
retain(..., list = character(0), envir = parent.frame(), force=FALSE)
```

**Arguments**

<code>...</code>	names of objects to be retained, as names (unquoted) or character strings(quoted).
<code>list</code>	a character vector naming the objects to be retained.
<code>envir</code>	the environment from which the objects are removed that are not to be retained.
<code>force</code>	logical value. As a measure of caution, this function removes objects only from local environments, unless <code>force</code> equals <code>TRUE</code> . In that case, <code>retain</code> can also be used to clear the global environment, the user's workspace.

**Examples**

```

local({
  foreach(x=c(a,b,c,d,e,f,g,h),x<-1)
  cat("Objects before call to 'retain':\n")
  print(ls())
  retain(a)
  cat("Objects after call to 'retain':\n")
  print(ls())
})
x <- 1
y <- 2
retain(x)

```

sample-methods

*Take a Sample from a Data Frame-like Object***Description**

The methods below are convenience short-cuts to take samples from data frames and data sets. They result in a data frame or data set, respectively, the rows of which are a sample of the complete data frame/data set.

**Usage**

```

## S4 method for signature 'data.frame'
sample(x, size, replace = FALSE, prob = NULL)
## S4 method for signature 'data.set'
sample(x, size, replace = FALSE, prob = NULL)
## S4 method for signature 'importer'
sample(x, size, replace = FALSE, prob = NULL)

```

**Arguments**

x	a data frame or data set.
size	an (optional) numerical value, the sample size, defaults to the total number of rows of x.
replace	a logical value, determines whether sampling takes place with or without replacement.
prob	a vector of sampling probabilities or NULL.

**Value**

A data frame or data set.

**Examples**

```

for(.i in 1:4)
  print(sample(iris,5))

```



---

Sapply

*A Dimension Preserving Variant of "sapply" and "lapply"*


---

### Description

Sapply is equivalent to [sapply](#), except that it preserves the dimension and dimension names of the argument *X*. It also preserves the dimension of results of the function *FUN*. It is intended for application to results e.g. of a call to [by](#). Lapply is an analog to [lapply](#) insofar as it does not try to simplify the resulting list of results of *FUN*.

### Usage

```
Sapply(X, FUN, ..., simplify = TRUE, USE.NAMES = TRUE)
Lapply(X, FUN, ...)
```

### Arguments

<i>X</i>	a vector or list appropriate to a call to <a href="#">sapply</a> .
<i>FUN</i>	a function.
...	optional arguments to <i>FUN</i> .
<i>simplify</i>	a logical value; should the result be simplified to a vector or matrix if possible?
<i>USE.NAMES</i>	logical; if TRUE and if <i>X</i> is character, use <i>X</i> as names for the result unless it had names already.

### Value

If *FUN* returns a scalar, then the result has the same dimension as *X*, otherwise the dimension of the result is enhanced relative to *X*.

### Examples

```
berkeley <- Aggregate(Table(Admit,Freq)~.,data=UCBAdmissions)
berktest1 <- By(~Dept+Gender,
               glm(cbind(Admitted,Rejected)~1,family="binomial"),
               data=berkeley)
berktest2 <- By(~Dept,
               glm(cbind(Admitted,Rejected)~Gender,family="binomial"),
               data=berkeley)

sapply(berktest1,coef)
Sapply(berktest1,coef)

sapply(berktest1,function(x)drop(coef(summary(x))))
Sapply(berktest1,function(x)drop(coef(summary(x))))

sapply(berktest2,coef)
```

```
Sapply(berktest2,coef)
sapply(berktest2,function(x)coef(summary(x)))
Sapply(berktest2,function(x)coef(summary(x)))
```

---

 sort-methods

*Convenience Methods to Sort Data Frames and Data Sets*


---

## Description

The methods below return a sorted version of the data frame or data set, given as first argument.

## Usage

```
## S3 method for class 'data.frame'
sort(x,decreasing=FALSE,by=NULL,na.last=NA,...)
## S3 method for class 'data.set'
sort(x,decreasing=FALSE,by=NULL,na.last=NA,...)
```

## Arguments

x	a data frame or data set.
decreasing	a logical value, should sorting be in increasing or decreasing order?
by	a character name of variable names, by which to sort; a formula giving the variables, by which to sort; NULL, in which case, the data frame / data set is sorted by all of its variables.
na.last	for controlling the treatment of 'NA's. If 'TRUE', missing values in the data are put last; if 'FALSE', they are put first; if 'NA', they are removed
...	other arguments, currently ignored.

## Value

A sorted copy of x.

## Examples

```
DF <- data.frame(
  a = sample(1:2,size=20,replace=TRUE),
  b = sample(1:4,size=20,replace=TRUE))
sort(DF)
sort(DF,by=~a+b)
sort(DF,by=~b+a)
sort(DF,by=c("b","a"))
sort(DF,by=c("a","b"))
```

---

styles	<i>Formatting Styles for Coefficients, Factor Contrasts, and Summary Statistics</i>
--------	---

---

## Description

Methods for setting and getting templates for formatting model coefficients and summaries for use in `mtable`.

## Usage

```
setCoefTemplate(...)
getCoefTemplate(style)
getSummaryTemplate(x)
setSummaryTemplate(...)
summaryTemplate(x)
```

## Arguments

...	several tagged arguments; in case of <code>setCoefTemplate</code> the tags specify the <code>coef.styles</code> , in case of <code>setSummaryTemplate</code> they specify model classes. The associated values are <a href="#">templates</a> .
style	a character string with the name of a coefficient style, if left empty, all coefficient templates are returned.
x	a model or a name of a model class, for example "lm" or "glm"; if left empty, all summary templates are returned.

## Details

The style in which model coefficients are formatted by `mtable` is by default selected from the `coef.style` setting of [options](#), "factory-fresh" setting being `options(coef.style="default")`.

The appearance of factor levels in an `mtable` can be influenced by the `factor.style` setting of [options](#). The "factory-fresh" setting is `options(factor.style="($f): ($l)")`, where `($f)` stands for the factor name and `($l)` stands for the factor level. In case of treatment contrasts, the baseline level will also appear in an `mtable` separated from the current factor level by the `baselevel.sep` setting of [options](#). The "factory-fresh" setting is `options(baselevel.sep="-")`,

Users may specify additional coefficient styles by a call to `setCoefTemplate`.

In order to adapt the display of summary statistics of other model classes, users need to set a template for model summaries via a call to `setSummaryTemplate` or to define a method of the generic function `summaryTemplate`.

---

Substitute	<i>Substitutions in Language Objects</i>
------------	--

---

### Description

Substitute differs from `substitute` in so far as its first argument can be a variable that contains an object of mode "language". In that case, substitutions take place inside this object.

### Usage

```
Substitute(lang,with)
```

### Arguments

lang	any object, unevaluated expression, or unevaluated language construct, such as a sequence of calls inside braces
with	a named list, environment, data frame or data set.

### Details

The function body is just `do.call("substitute",list(lang,with))`.

### Value

An object of storage mode "language" or "symbol".

### Examples

```
lang <- quote(sin(x)+z)
substitute(lang,list(x=1,z=2))
Substitute(lang,list(x=1,z=2))
```

---

Table	<i>One-Dimensional Table of Frequences and/or Percentages</i>
-------	---

---

### Description

Table is a generic function that produces a table of counts or weighted counts and/or the corresponding percentages of an atomic vector, factor or "item.vector" object. This function is intended for use with `Aggregate` or `genTable`. The "item.vector" method is the workhorse of `codebook`.

**Usage**

```
## S4 method for signature 'atomic'
Table(x,weights=NULL,counts=TRUE,percentage=FALSE,...)
## S4 method for signature 'factor'
Table(x,weights=NULL,counts=TRUE,percentage=FALSE,...)
## S4 method for signature 'item.vector'
Table(x,weights=NULL,counts=TRUE,percentage=(style=="codebook"),
      style=c("table","codebook","nolabels"),
      include.missings=(style=="codebook"),
      missing.marker=if(style=="codebook") "M" else "*",...)
```

**Arguments**

`x` an atomic vector, factor or "item.vector" object

`counts` logical value, should the table contain counts?

`percentage` logical value, should the table contain percentages? Either the counts or the percentage arguments or both should be TRUE.

`style` character string, the style of the names or rownames of the table.

`weights` a numeric vector of weights of the same length as `x`.

`include.missings` a logical value; should missing values included into the table?

`missing.marker` a character string, used to mark missing values in the table (row)names.

`...` other, currently ignored arguments.

**Value**

The atomic vector and factor methods return either a vector of counts or vector of percentages or a matrix of counts and percentages. The same applies to the "item.vector" vector method unless `include.missing=TRUE` and `percentage=TRUE`, in which case total percentages and percentages of valid values are given.

**Examples**

```
with(as.data.frame(UCBAdmissions),Table(Admit,Freq))
Aggregate(Table(Admit,Freq)~.,data=UCBAdmissions)

A <- sample(c(1:5,9),size=100,replace=TRUE)
labels(A) <- c(a=1,b=2,c=3,d=4,e=5,dk=9)
missing.values(A) <- 9
Table(A,percentage=TRUE)
```

---

to.data.frame

*Convert an Array into a Data Frame*


---

### Description

to.data.frame converts an array into a data frame, in such a way that a chosen dimensional extent forms variables in the data frame. The elements of the array must be either atomic, data frames with matching variables, or coercable into such data frames.

### Usage

```
to.data.frame(X, as.vars=1, name="Freq")
```

### Arguments

X	an array.
as.vars	a numeric value; indicates the dimensional extent which defines the variables. Takes effect only if X is an atomic array. If as.vars equals zero, a new variable is created that contains the values of the array, that is, to.data.frame acts on the array X like as.data.frame(as.table(X))
name	a character string; the name of the variable created if X is an atomic array and as.vars equals zero.

### Value

A data frame.

### Examples

```
berkeley <- Aggregate(Table(Admit,Freq)~., data=UCBAdmissions)
berktest1 <- By(~Dept+Gender,
               glm(cbind(Admitted,Rejected)~1, family="binomial"),
               data=berkeley)
berktest2 <- By(~Dept,
               glm(cbind(Admitted,Rejected)~Gender, family="binomial"),
               data=berkeley)
Stest1 <- Lapply(berktest2, function(x)predict(x, , se.fit=TRUE)[c("fit", "se.fit")])
Stest2 <- Sapply(berktest2, function(x)coef(summary(x)))
Stest2.1 <- Lapply(berktest1, function(x)predict(x, , se.fit=TRUE)[c("fit", "se.fit")])
to.data.frame(Stest1)
to.data.frame(Stest2, as.vars=2)
to.data.frame(Stest2.1)
```

**Description**

Methods for the generic function `toLatex` of package “`utils`” are provided for generating LaTeX representations of matrices and flat contingency tables (see `fTable`). Also a default method is defined that coerces its first argument into a matrix and applies the matrix method.

**Usage**

```
## Default S3 method:
toLatex(object,...)

## S3 method for class 'matrix'
toLatex(object,
  show.titles=TRUE,
  show.vars=FALSE,
  show.xvar=show.vars,
  show.yvar=show.vars,
  digits=if(is.table(object)) 0 else getOption("digits"),
  format="f",
  useDcolumn=getOption("useDcolumn",TRUE),
  colspec=if(useDcolumn)
    paste("D{.}" , LaTeXdec, "{" , ddigits, "}" , sep="")
  else "r",
  LaTeXdec=".",
  ddigits=digits,
  useBooktabs=getOption("useBooktabs",TRUE),
  toprule=if(useBooktabs) "\\toprule" else "\\hline\\hline",
  midrule=if(useBooktabs) "\\midrule" else "\\hline",
  cmidrule=if(useBooktabs) "\\cmidrule" else "\\cline",
  bottomrule=if(useBooktabs) "\\bottomrule" else "\\hline\\hline",
  toLatex.escape.tex=getOption("toLatex.escape.tex",FALSE),
  ...)

## S3 method for class 'data.frame'
toLatex(object,
  digits=getOption("digits"),
  format="f",
  useDcolumn=getOption("useDcolumn",TRUE),
  numeric.colspec=if(useDcolumn)
    paste("D{.}" , LaTeXdec, "{" , ddigits, "}" , sep="")
  else "r",
  factor.colspec="l",
  LaTeXdec=".",
```

```

ddigits=digits,
useBooktabs=getOption("useBooktabs",TRUE),
toprule=if(useBooktabs) "\\toprule" else "\\hline\\hline",
midrule=if(useBooktabs) "\\midrule" else "\\hline",
cmidrule=if(useBooktabs) "\\cmidrule" else "\\cline",
bottomrule=if(useBooktabs) "\\bottomrule" else "\\hline\\hline",
row.names=is.character(attr(object,"row.names")),
NAas="",
toLatex.escape.tex=getOption("toLatex.escape.tex",FALSE),
...)

## S3 method for class 'ftable'
toLatex(object,
  show.titles=TRUE,
  digits=if(is.integer(object)) 0 else getOption("digits"),
  format=if(is.integer(object)) "d" else "f",
  useDcolumn=getOption("useDcolumn",TRUE),
  colspec=if(useDcolumn)
    paste("D{.}" ,LaTeXdec,"}" ,ddigits,"}" ,sep="")
    else "r",
  LaTeXdec=".",
  ddigits=digits,
  useBooktabs=getOption("useBooktabs",TRUE),
  toprule=if(useBooktabs) "\\toprule" else "\\hline\\hline",
  midrule=if(useBooktabs) "\\midrule" else "\\hline\\n",
  cmidrule=if(useBooktabs) "\\cmidrule" else "\\cline",
  bottomrule=if(useBooktabs) "\\bottomrule" else "\\hline\\hline",
  extrarowsep = NULL,
  toLatex.escape.tex=getOption("toLatex.escape.tex",FALSE),
  ...)

## S3 method for class 'ftable_matrix'
toLatex(object,
  show.titles=TRUE,
  digits=getOption("digits"),
  format="f",
  useDcolumn=getOption("useDcolumn",TRUE),
  colspec=if(useDcolumn)
    paste("D{.}" ,LaTeXdec,"}" ,ddigits,"}" ,sep="")
    else "r",
  LaTeXdec=".",
  ddigits=digits,
  useBooktabs=getOption("useBooktabs",TRUE),
  toprule=if(useBooktabs) "\\toprule" else "\\hline\\hline",
  midrule=if(useBooktabs) "\\midrule" else "\\hline",
  cmidrule=if(useBooktabs) "\\cmidrule" else "\\cline",
  bottomrule=if(useBooktabs) "\\bottomrule" else "\\hline\\hline",
  compact=FALSE,

```



```

varontop,varinfront,
groupsep="3pt",
grouprule=midrule,
toLatex.escape.tex=getOption("toLatex.escape.tex",FALSE),
...)
```

## Arguments

object	an <a href="#">f table</a> , a matrix or an object coercable into a matrix.
show.titles	logical, should variable names (in case of the <a href="#">f table</a> and <a href="#">table</a> methods) or row and column names (in case of the <a href="#">matrix</a> method) be appear in the LaTeX code?
show.vars, show.xvar, show.yvar	logical, should the names of the dimnames of object be shown in the margins of the LaTeX tabular? Such names usually represent the row and/or column variables of a two-dimensional <a href="#">table</a> .
digits	number of significant digits.
format	character containing a format specifier, see <a href="#">format</a> .
useDcolumn	logical, should the facilities of the <a href="#">dcolumn</a> LaTeX package be used? Note that, if TRUE, you will need to include <code>\usepackage{dcolumn}</code> in the preamble of your LaTeX document.
colspec	character, LaTeX table column format specifier(s).
numeric.colspec	character, LaTeX table column format specifier(s) for numeric vectors in the data frame.
factor.colspec	character, LaTeX table column format specifier(s) for factors in the data frame.
LaTeXdec	character, the decimal point in the final LaTeX output.
ddigits	integer, digits after the decimal point.
useBooktabs	logical, should the facilities of the <a href="#">booktabs</a> LaTeX package be used? Note that, if TRUE, you will need to include <code>\usepackage{booktabs}</code> in the preamble of your LaTeX document.
toprule	character string, TeX code that determines the appearance of the top border of the LaTeX tabular environment.
midrule	character string, TeX code that determines how coefficients and summary statistics are separated in the LaTeX tabular environment.
cmidrule	character string, TeX code that determines the appearance of rules under section headings.
bottomrule	character string, TeX code that determines the appearance of the bottom border of the LaTeX tabular environment.
extrarowsep	character string, extra code to be inserted between the column titles and the table body produced by toLatex.
compact	logical, if TRUE, extra column space between sub-tables is suppressed. Defaults to FALSE
varontop	logical, whether names of column variables should appear on top of factor levels

<code>varinfront</code>	logical, whether names of row variables should appear in front of factor levels
<code>groupsep</code>	character string, containing a TeX length; extra vertical space inserted between sub-tables, unless <code>compact</code> is <code>TRUE</code> .
<code>grouprule</code>	character string, TeX code that determines how sub-table headings are embellished.
<code>row.names</code>	logical, whether row names should be included in exported LaTeX code.
<code>NAas</code>	character string, how missing values should be represented.
<code>toLatex.escape.tex</code>	logical, should symbols <code>\\$, \_, and \^</code> be escaped with backslashes?
<code>...</code>	further argument, currently ignored.

### Examples

```
toLatex(diag(5))

toLatex(ftable(UCBAdmissions))

toLatex(rbind(
  ftable(margin.table(UCBAdmissions,c(2,1))),
  ftable(margin.table(UCBAdmissions,c(3,1)))
))
```

---

Utility classes

*Named Lists, Lists of Items, and Atomic Vectors*


---

### Description

The classes "named.list" and "item.list" are merely some 'helper classes' for the construction of the classes "data.set" and "importer".

Class "named.list" extends the basic class "list" by an additional slot "names". Its `initialize` method assures that the names of the list are unique.

Class "item.list" extends the class "named.list", but does not add any slots. From "named.list" it differs only by the `initialize` method, which calls that for "named.list" and makes sure that all elements of the list belong to class "item".

Classes "atomic" and "double" are merely used for method selection.

### Examples

```
new("named.list",a=1,b=2)

# This should generate an error, since the names
# are not unique.
try(new("named.list",a=1,a=2))

# Another error, one name is missing.
try(new("named.list",a=1,2))
```

```
# Also an error, the resulting list would be unnamed.
try(new("named.list",1,2))

new("item.list",a=1,b=2)

# Also an error: "item.list"s are "named.lists",
# and here the names would be non-unique.
try(new("item.list",a=1,a=2))
```

---

value.filter

*Value Filters*


---

### Description

Value filters, that is objects that inherit from class "value.filter", are a mechanism to distinguish between valid codes of a survey item and codes that are considered to be missing, such as the codes for answers like "don't know" or "answer refused".

Value filters are optional slot values of "item" objects. They determine which codes of "item" objects are replaced by NA when they are coerced into a vector or a factor.

There are three (sub)classes of value filters: "missing.values", which specify individual missing values and/or a range of missing values; "valid.values", which specify individual valid values (that is, all other values of the item are considered as missing); "valid.range", which specify a range of valid values (that is, all values outside the range are considered as missing). Value filters of class "missing.values" correspond to missing-values declarations in SPSS files, imported by [spss.fixed.file](#), [spss.portable.file](#), or [spss.system.file](#).

Value filters also can be updated using the + and - operators.

### Usage

```
value.filter(x)

missing.values(x)
missing.values(x)<-value

valid.values(x)
valid.values(x)<-value

valid.range(x)
valid.range(x)<-value

is.valid(x)
nvalid(x)
is.missing(x)
include.missings(x,mark="*")
```

**Arguments**

`x, value` objects of the appropriate class.

`mark` a character string, used to pasted to value labels of `x` (if present).

**Value**

`value.filter(x)`, `missing.values(x)`, `valid.values(x)`, and `valid.range(x)`, return the value filter associated with `x`, an object of class "value.filter", that is, of class "missing.values", "valid.values", or "valid.range", respectively.

`is.missing(x)` returns a logical vector indicating for each element of `x` whether it is a missing value or not. `is.valid(x)` returns a logical vector indicating for each element of `x` whether it is a valid value or not. `nvalid(x)` returns the number of elements of `x` that are valid.

For convenience, `is.missing(x)` and `is.valid(x)` also work for atomic vectors and factors, where they are equivalent to `is.na(x)` and `!is.na(x)`. For atomic vectors and factors, `nvalid(x)` returns the number of elements of `x` for which `!is.na(x)` is TRUE.

`include.missings(x, ...)` returns a copy of `x` that has all values declared as valid.

**Examples**

```
x <- rep(c(1:4,8,9),2,length=60)
labels(x) <- c(
  a=1,
  b=2,
  c=3,
  d=4,
  dk=8,
  refused=9
)
missing.values(x) <- 9
missing.values(x)
missing.values(x) <- missing.values(x) + 8
missing.values(x)
missing.values(x) <- NULL
missing.values(x)
missing.values(x) <- list(range=c(8,Inf))
missing.values(x)
valid.values(x)
print(x)
is.missing(x)
is.valid(x)
as.factor(x)
as.factor(include.missings(x))
as.integer(x)
as.integer(include.missings(x))
```

---

wild.codes	<i>Table of frequencies for unlabelled codes</i>
------------	--

---

**Description**

The function `wild.codes` creates a table of frequencies of those codes of an item that do not have labelled attached to them. This way, it helps to identify coding errors.

**Usage**

```
wild.codes(x)
## S4 method for signature 'item'
wild.codes(x)
```

**Arguments**

`x` an object of class "item"

**Value**

A table of frequencies (i.e. an array of class "table")

---

withSE	<i>Add Alternative Variance Estimates to Models Estimates</i>
--------	---

---

**Description**

A simple object-orientation infrastructure to add alternative standard errors, e.g. sandwich estimates or New-West standard errors to fitted regression-type models, such as fitted by `lm()` or `glm()`.

**Usage**

```
withSE(object, vcov, ...)

withVCov(object, vcov, ...)

## S3 method for class 'lm'
withVCov(object, vcov, ...)

## S3 method for class 'withVCov'
summary(object, ...)
## S3 method for class 'withVCov.lm'
summary(object, ...)
```

**Arguments**

object	a fitted model object
vcov	a function that returns a variance matrix estimate, a given matrix that is such an estimate, or a character string that identifies a function that returns a variance matrix estimate (e.g. "HAC" for vcovHAC).
...	further arguments, passed to vcov() or, respectively, to the parent method of summary()

**Details**

Using withVCov() an alternative variance-covariance matrix is attributed to a fitted model object. Such a matrix may be produced by any of the variance estimators provided by the "sandwich" package or any package that extends it.

withVCov() has no consequences on how a fitted model itself is printed or represented, but it does have consequences what standard errors are reported, when the function summary() or the function mtable() is applied.

withSE() is a convenience front-end to withVCov(). It can be called in the same way as withVCov, but also allows to specify the type of variance estimate by a character string that identifies the function that gives the covariance matrix (e.g. "OPG" for vcovOPG).

**Value**

withVCov returns a slightly modified model object: It adds an attribute named ".VCov" that contains the alternate covaraince matrix and modifies the class attribute. If e.g. the original model object has class "lm" then the model object modified by withVCov has the class attribute c("withVCov.lm", "withVCov", "lm").

**Examples**

```
## Generate poisson regression relationship
x <- sin(1:100)
y <- rpois(100, exp(1 + x))
## compute usual covariance matrix of coefficient estimates
fm <- glm(y ~ x, family = poisson)

library(sandwich)
fmo <- withVCov(fm,vcovOPG)
vcov(fm)
vcov(fmo)

summary(fm)
summary(fmo)

mtable(Default=fm,
        OPG=withSE(fm,"OPG"),
        summary.stats=c("Deviance","N")
        )

vo <- vcovOPG(fm)
```

```
mtable(Default=fm,
        OPG=withSE(fm,vo),
        summary.stats=c("Deviance", "N")
        )
```

---

Write

*Write Codebooks and Variable Descriptions into a Text File*

---

### **Description**

This is a convenience function to facilitate the creation of data set documents in text files.

### **Usage**

```
Write(x,...)
## S3 method for class 'codebook'
Write(x,file=stdout(),...)
## S3 method for class 'descriptions'
Write(x,file=stdout(),...)
```

### **Arguments**

x	a "codebook" or "descriptions" object.
file	a connection, see <a href="#">connections</a> .
...	further arguments, ignored or passed on to particular methods.

# Index

## \*Topic **file**

importers, 37

## \*Topic **manip**

By, 7

cases, 8

codebook, 9

collect, 11

dimrename, 21

items, 41

measurement, 46

query, 63

recode, 65

relabel, 68

rename, 69

reorder.array, 70

retain, 71

to.data.frame, 78

## \*Topic **misc**

applyTemplate, 4

genTable, 28

getSummary, 30

Iconv, 36

Memisc, 47

mtable, 50

mtable\_format\_delim, 55

mtable\_format\_latex, 57

mtable\_format\_print, 58

Sapply, 73

styles, 75

toLatex, 79

Write, 87

## \*Topic **programming**

as.symbols, 6

foreach, 22

Substitute, 76

## \*Topic **univar**

By, 7

percent, 60

Table, 76

## \*Topic **utilities**

applyTemplate, 4

collect, 11

getSummary, 30

Sapply, 73

[, data.set, atomic, atomic, ANY-method  
(data.set), 15

[, data.set, atomic, missing, ANY-method  
(data.set), 15

[, data.set, missing, atomic, ANY-method  
(data.set), 15

[, data.set, missing, missing, ANY-method  
(data.set), 15

[, importer, atomic, atomic, ANY-method  
(importers), 37

[, importer, atomic, missing, ANY-method  
(importers), 37

[, importer, missing, atomic, ANY-method  
(importers), 37

[, importer, missing, missing, ANY-method  
(importers), 37

[, item.vector, logical, missing, missing-method  
(items), 41

[, item.vector, numeric, missing, missing-method  
(items), 41

[, value.labels, logical, missing, missing-method  
(labels), 44

[, value.labels, numeric, missing, missing-method  
(labels), 44

[.html\_group (html), 32

[.memisc\_mtable (mtable), 50

[<-, data.set-method (data.set), 15

[<- .css (html), 32

[<- .html\_attributes (html), 32

[<- .html\_group (html), 32

%in%, numeric.item, character-method  
(items), 41

%nin% (negative match), 59

Aggregate, 60, 76



- Aggregate (genTable), 28
- aggregate.data.frame, 30
- agrep, 64
- annotation, 43
- annotation (annotations), 3
- annotation, ANY-method (annotations), 3
- annotation, data.set-method (annotations), 3
- annotation, item-method (annotations), 3
- annotation-class (annotations), 3
- annotation<- (annotations), 3
- annotation<-, ANY, character-method (annotations), 3
- annotation<-, item, annotation-method (annotations), 3
- annotation<-, vector, annotation-method (annotations), 3
- annotations, 3
- applyTemplate, 4
- Arith, missing.values, missing.values-method (value.filter), 83
- Arith, numeric, numeric.item-method (items), 41
- Arith, numeric.item, numeric-method (items), 41
- Arith, numeric.item, numeric.item-method (items), 41
- Arith, valid.range, valid.range-method (value.filter), 83
- Arith, valid.values, valid.values-method (value.filter), 83
- Arith, value.filter, vector-method (value.filter), 83
- Arith, value.labels, ANY-method (labels), 44
- as.array, 5
- as.array, data.frame-method (as.array), 5
- as.character, codebook-method (codebook), 9
- as.character, Date.item-method (items), 41
- as.character, datetime.item-method (items), 41
- as.character, item.vector-method (items), 41
- as.character.css (html), 32
- as.character.html\_elem (html), 32
- as.character.html\_group (html), 32
- as.css (html), 32
- as.data.frame, 16
- as.data.frame.character.item (items), 41
- as.data.frame.data.set (data.set), 15
- as.data.frame.double.item (items), 41
- as.data.frame.integer.item (items), 41
- as.data.frame.percentage.table (percentages), 62
- as.data.frame.xpercentage.table (percentages), 62
- as.data.set, 48
- as.data.set (data.set), 15
- as.data.set, importer-method (importers), 37
- as.data.set, list-method (data.set), 15
- as.factor, item.vector-method (items), 41
- as.html\_group (html), 32
- as.integer, item-method (items), 41
- as.item (items), 41
- as.item, character-method (items), 41
- as.item, character.item-method (items), 41
- as.item, Date-method (items), 41
- as.item, Date.item-method (items), 41
- as.item, datetime.item-method (items), 41
- as.item, double.item-method (items), 41
- as.item, factor-method (items), 41
- as.item, integer.item-method (items), 41
- as.item, logical-method (items), 41
- as.item, numeric-method (items), 41
- as.item, ordered-method (items), 41
- as.item, POSIXct-method (items), 41
- as.numeric, item-method (items), 41
- as.ordered, item.vector-method (items), 41
- as.symbol, 6
- as.symbols, 6
- as.vector, item-method (items), 41
- as.vector, value.labels-method (labels), 44
- atomic-class (Utility classes), 82
- attach, 49
- attrs (html), 32
- attrs<- (html), 32
- browseURL, 24
- By, 7, 49
- by, 49, 73

- c.html\_elem (html), 32
- c.html\_group (html), 32
- c.memisc\_mtable (mtable), 50
- cases, 8, 48
- cbind, 18, 19
- cbind.data.set (data.set manipulation), 18
- cbind.ftable (ftable-matrix), 27
- cbind.ftable\_matrix (ftable-matrix), 27
- character.item-class (items), 41
- codebook, 9, 20, 25, 40, 48, 76
- codebook, atomic-method (codebook), 9
- codebook, data.frame-method (codebook), 9
- codebook, data.set-method (codebook), 9
- codebook, factor-method (codebook), 9
- codebook, importer-method (codebook), 9
- codebook, item-method (codebook), 9
- codebook-class (codebook), 9
- coef.style, 51
- coef.style (styles), 75
- coerce, atomic, missing.values-method (value.filter), 83
- coerce, atomic, valid.range-method (value.filter), 83
- coerce, atomic, valid.values-method (value.filter), 83
- coerce, character, value.labels-method (labels), 44
- coerce, data.set, named.list-method (Utility classes), 82
- coerce, list, missing.values-method (value.filter), 83
- coerce, numeric, value.labels-method (labels), 44
- coerce, value.labels, character-method (labels), 44
- coerce, value.labels, numeric-method (labels), 44
- collect, 11, 50
- colrename, 50
- colrename (dimrename), 21
- Compare, character, numeric.item-method (items), 41
- Compare, numeric.item, character-method (items), 41
- connections, 87
- content (html), 32
- content<- (html), 32
- contr, 14
- contr.sum, 14
- contr.treatment, 14
- contrasts, 14
- contrasts (contr), 14
- contrasts, ANY-method (contr), 14
- contrasts, item-method (contr), 14
- contrasts<- (contr), 14
- contrasts<-, ANY-method (contr), 14
- contrasts<-, item-method (contr), 14
- css (html), 32
- data.frame, 10, 16, 46
- data.set, 4, 10, 15, 36, 37, 46, 48, 63
- data.set manipulation, 18
- data.set-class (data.set), 15
- Date.item-class (items), 41
- datetime.item-class (items), 41
- description, 37, 40
- description (annotations), 3
- description, data.set-method (annotations), 3
- description, importer-method (annotations), 3
- description<- (annotations), 3
- Descriptives, 20
- Descriptives, atomic-method (Descriptives), 20
- Descriptives, item.vector-method (Descriptives), 20
- df\_format\_stdstyle (format\_html), 23
- dim, data.set-method (data.set), 15
- dim, importer-method (importers), 37
- dim.memisc\_mtable (mtable), 50
- dimnames, 11, 12, 50
- dimnames, data.set-method (data.set), 15
- dimnames.memisc\_mtable (mtable), 50
- dimnames<-, data.set-method (data.set), 15
- dimrename, 21, 50, 51
- double-class (Utility classes), 82
- double.item-class (items), 41
- dsView (data.set), 15
- factor, 46
- factor.style, 52
- factor.style (styles), 75
- fapply (genTable), 28
- file.show, 24

- foreach, [22](#), [49](#)
- format, [24](#), [81](#)
- format, codebookEntry-method (codebook), [9](#)
- format, Date.item-method (items), [41](#)
- format, datetime.item-method (items), [41](#)
- format, item.vector-method (items), [41](#)
- format, missing.values-method (value.filter), [83](#)
- format, valid.range-method (value.filter), [83](#)
- format, valid.values-method (value.filter), [83](#)
- format.ftable\_matrix (ftable-matrix), [27](#)
- format.memisc\_mtable (mtable), [50](#)
- format\_html, [23](#), [25–27](#), [32](#)
- format\_html.codebook, [25](#)
- format\_html.ftable, [26](#)
- format\_html.ftable\_matrix (format\_html.ftable), [26](#)
- format\_html.memisc\_mtable (mtable\_format\_html), [56](#)
- formatC, [5](#), [24–26](#), [28](#)
- ftable, [26](#), [49](#), [79](#), [81](#)
- ftable-matrix, [27](#)
- ftable\_format\_stdstyle (format\_html.ftable), [26](#)
- ftable\_matrix (ftable-matrix), [27](#)
- genTable, [24](#), [26](#), [28](#), [48](#), [49](#), [60](#), [76](#)
- getCoefTemplate, [52](#)
- getCoefTemplate (styles), [75](#)
- getSummary, [30](#), [52](#)
- getSummary\_expcoef (getSummary), [30](#)
- getSummaryTemplate, [52](#)
- getSummaryTemplate (styles), [75](#)
- glm, [32](#)
- grep, [64](#)
- gsub, [21](#), [68](#), [69](#)
- html, [32](#)
- html\_group (html), [32](#)
- Iconv, [36](#)
- iconv, [36](#), [37](#)
- iconvlist, [37](#)
- ifelse, [8](#), [48](#)
- importer, [4](#), [10](#), [36](#), [48](#), [63](#)
- importer (importers), [37](#)
- importer-class (importers), [37](#)
- importers, [37](#)
- include.missings (value.filter), [83](#)
- include.missings, item-method (value.filter), [83](#)
- initialize, data.set-method (data.set), [15](#)
- initialize, item.list-method (Utility classes), [82](#)
- initialize, named.list-method (Utility classes), [82](#)
- initialize, spss.fixed.importer-method (importers), [37](#)
- initialize, spss.portable.importer-method (importers), [37](#)
- initialize, spss.system.importer-method (importers), [37](#)
- initialize, Stata.importer-method (importers), [37](#)
- initialize, value.labels-method (labels), [44](#)
- integer.item-class (items), [41](#)
- is.data.set (data.set), [15](#)
- is.interval (measurement), [46](#)
- is.missing (value.filter), [83](#)
- is.missing, atomic-method (value.filter), [83](#)
- is.missing, factor-method (value.filter), [83](#)
- is.missing, item.vector-method (value.filter), [83](#)
- is.nominal (measurement), [46](#)
- is.ordinal (measurement), [46](#)
- is.ratio (measurement), [46](#)
- is.valid (value.filter), [83](#)
- item, [10](#), [16](#), [36](#), [46](#), [82](#)
- item (items), [41](#)
- item-class (items), [41](#)
- item.list (Utility classes), [82](#)
- item.list-class (Utility classes), [82](#)
- item.vector-class (items), [41](#)
- items, [41](#)
- labels, [37](#), [43](#), [44](#), [48](#)
- labels, item-method (labels), [44](#)
- labels<- (labels), [44](#)
- labels<- , item, ANY-method (labels), [44](#)
- labels<- , item, NULL-method (labels), [44](#)
- labels<- , vector, ANY-method (labels), [44](#)

- Lapply, [50](#)
- Lapply (Sapply), [73](#)
- lapply, [50](#)
- lm, [32](#), [51](#)
  
- mat\_format\_stdstyle (format\_html), [23](#)
- Math, numeric.item-method (items), [41](#)
- Math2, numeric.item-method (items), [41](#)
- measurement, [16](#), [46](#)
- measurement, ANY-method (measurement), [46](#)
- measurement, item-method (measurement), [46](#)
- measurement<- (measurement), [46](#)
- measurement<- , item-method (measurement), [46](#)
- Memisc, [47](#)
- memisc (Memisc), [47](#)
- memisc-package (Memisc), [47](#)
- merge, [18](#)
- merge, data.frame, data.set-method (data.set manipulation), [18](#)
- merge, data.set, data.frame-method (data.set manipulation), [18](#)
- merge, data.set, data.set-method (data.set manipulation), [18](#)
- missing.values, [37](#), [48](#)
- missing.values (value.filter), [83](#)
- missing.values, item.vector-method (value.filter), [83](#)
- missing.values-class (value.filter), [83](#)
- missing.values<- (value.filter), [83](#)
- missing.values<- , ANY, atomic-method (value.filter), [83](#)
- missing.values<- , ANY, list-method (value.filter), [83](#)
- missing.values<- , atomic, missing.values-method (value.filter), [83](#)
- missing.values<- , item, ANY-method (value.filter), [83](#)
- missing.values<- , item, missing.values-method (value.filter), [83](#)
- missing.values<- , item, NULL-method (value.filter), [83](#)
- mtable, [4](#), [31](#), [32](#), [49](#), [50](#), [57](#), [75](#)
- mtable\_format\_delim, [52](#), [55](#)
- mtable\_format\_html, [52](#), [56](#)
- mtable\_format\_latex, [52](#), [57](#)
- mtable\_format\_print, [52](#), [58](#)
  
- mtable\_format\_stdstyle (mtable\_format\_html), [56](#)
  
- named.list (Utility classes), [82](#)
- named.list-class (Utility classes), [82](#)
- names, [11](#), [50](#)
- names, importer-method (importers), [37](#)
- negative match, [59](#)
- numeric.item-class (items), [41](#)
- nvalid, [29](#)
- nvalid (value.filter), [83](#)
  
- options, [5](#), [24](#), [75](#)
- ordered, [46](#)
  
- paste, [6](#)
- percent, [29](#), [60](#)
- percentages, [62](#)
- print, data.set-method (data.set), [15](#)
- print, Date.item-method (items), [41](#)
- print, datetime.item-method (items), [41](#)
- print, item.vector-method (items), [41](#)
- print.css (html), [32](#)
- print.ftable\_matrix (ftable-matrix), [27](#)
- print.html\_elem (html), [32](#)
- print.html\_group (html), [32](#)
- print.memisc\_mtable (mtable), [50](#)
- prop.table, [62](#)
  
- query, [63](#)
- query, data.set-method (query), [63](#)
- query, importer-method (query), [63](#)
- query, item-method (query), [63](#)
  
- rbind, [18](#), [19](#)
- rbind.data.set (data.set manipulation), [18](#)
- rbind.ftable (ftable-matrix), [27](#)
- rbind.ftable\_matrix (ftable-matrix), [27](#)
- read.dta, [37](#)
- read.spss, [37](#), [40](#)
- recode, [48](#), [65](#), [66](#)
- recode, factor-method (recode), [65](#)
- recode, item-method (recode), [65](#)
- recode, vector-method (recode), [65](#)
- relabel, [52](#), [68](#)
- relabel.memisc\_mtable (mtable), [50](#)
- relabel4 (relabel), [68](#)
- relabel4, item-method (relabel), [68](#)

- rename, [50, 69](#)
- reorder, [50, 71](#)
- reorder (reorder.array), [70](#)
- reorder.array, [70](#)
- rep,item.vector-method (items), [41](#)
- retain, [71](#)
- row.names,data.set-method (data.set), [15](#)
- rowrename, [50](#)
- rowrename (dimrename), [21](#)
- sample,data.frame-method (sample-methods), [72](#)
- sample,data.set-method (sample-methods), [72](#)
- sample,importer-method (sample-methods), [72](#)
- sample-methods, [72](#)
- Sapply, [50, 73](#)
- sapply, [50, 73](#)
- setAttribs (html), [32](#)
- setCoefTemplate (styles), [75](#)
- setContent (html), [32](#)
- setStyle (html), [32](#)
- setSummaryTemplate, [32](#)
- setSummaryTemplate (styles), [75](#)
- show, [3, 10](#)
- show,annotation-method (annotations), [3](#)
- show,codebook-method (codebook), [9](#)
- show,data.set-method (data.set), [15](#)
- show,Date.item-method (items), [41](#)
- show,datetime.item-method (items), [41](#)
- show,item.vector-method (items), [41](#)
- show,named.list-method (Utility classes), [82](#)
- show,spss.fixed.importer-method (importers), [37](#)
- show,spss.portable.importer-method (importers), [37](#)
- show,spss.system.importer-method (importers), [37](#)
- show,Stata.importer-method (importers), [37](#)
- show,value.filter-method (value.filter), [83](#)
- show,value.labels-method (labels), [44](#)
- show\_html, [25, 27](#)
- show\_html (format\_html), [23](#)
- sort-methods, [74](#)
- sort.data.frame (sort-methods), [74](#)
- sort.data.set (sort-methods), [74](#)
- spss.fixed.file, [83](#)
- spss.fixed.file (importers), [37](#)
- spss.fixed.importer-class (importers), [37](#)
- spss.portable.file, [83](#)
- spss.portable.file (importers), [37](#)
- spss.portable.importer-class (importers), [37](#)
- spss.system.file, [83](#)
- spss.system.file (importers), [37](#)
- spss.system.importer-class (importers), [37](#)
- Stata.file (importers), [37](#)
- Stata.importer-class (importers), [37](#)
- str.character.item (items), [41](#)
- str.data.set (data.set), [15](#)
- str.datetime.item (items), [41](#)
- str.double.item (items), [41](#)
- str.integer.item (items), [41](#)
- style (html), [32](#)
- style<- (html), [32](#)
- styles, [75](#)
- subset, [18, 48](#)
- subset,data.set-method (data.set manipulation), [18](#)
- subset,importer-method (importers), [37](#)
- Substitute, [76](#)
- substitute, [76](#)
- summary,data.set-method (data.set), [15](#)
- summary,Date.item-method (items), [41](#)
- summary,datetime.item-method (items), [41](#)
- summary,item.vector-method (items), [41](#)
- Summary,numeric.item-method (items), [41](#)
- summary.withVCov (withSE), [85](#)
- summaryTemplate (styles), [75](#)
- syms (as.symbols), [6](#)
- Table, [29, 76](#)
- table, [7, 30, 81](#)
- Table,atomic-method (Table), [76](#)
- Table,factor-method (Table), [76](#)
- Table,item.vector-method (Table), [76](#)
- template, [75](#)
- template (applyTemplate), [4](#)
- to.data.frame, [78](#)
- toLatex, [49, 79, 79](#)
- toLatex.memisc\_mtable (mtable), [50](#)

- unique, [18, 19](#)
- unique, data.set-method (data.set manipulation), [18](#)
- unique, item.vector-method (items), [41](#)
- Utility classes, [82](#)
- utils, [79](#)
  
- valid.range (value.filter), [83](#)
- valid.range, item.vector-method (value.filter), [83](#)
- valid.range-class (value.filter), [83](#)
- valid.range<- (value.filter), [83](#)
- valid.range<-, ANY, atomic-method (value.filter), [83](#)
- valid.range<-, atomic, valid.range-method (value.filter), [83](#)
- valid.range<-, item, valid.range-method (value.filter), [83](#)
- valid.values (value.filter), [83](#)
- valid.values, item.vector-method (value.filter), [83](#)
- valid.values-class (value.filter), [83](#)
- valid.values<- (value.filter), [83](#)
- valid.values<-, ANY, atomic-method (value.filter), [83](#)
- valid.values<-, atomic, valid.values-method (value.filter), [83](#)
- valid.values<-, item, valid.values-method (value.filter), [83](#)
- value.filter, [43, 83](#)
- value.filter, item-method (value.filter), [83](#)
- value.filter-class (value.filter), [83](#)
- value.labels-class (labels), [44](#)
- vcov.withVCov (withSE), [85](#)
  
- weighted.mean, item.vector-method (items), [41](#)
- wild.codes, [85](#)
- wild.codes, item-method (wild.codes), [85](#)
- within, [16](#)
- within, data.set-method (data.set), [15](#)
- withSE, [85](#)
- withVCov (withSE), [85](#)
- wording (annotations), [3](#)
- wording<- (annotations), [3](#)
- Write, [87](#)
- Write.ftable\_matrix (ftable-matrix), [27](#)
- write.mtable (mtable), [50](#)
  
- write\_html, [25, 27](#)
- write\_html (format\_html), [23](#)
  
- xtabs, [30, 48](#)