

# Package ‘tangram’

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**Title** The Grammar of Tables

**Version** 0.8.3

**Description** Provides an extensible formula system to quickly and easily create production quality tables. The processing steps are a formula parser, statistical content generation from data as defined by formula, followed by rendering into a table. Each step of the processing is separate and user definable thus creating a set of composable building blocks for highly customizable table generation. A user is not limited by any of the choices of the package creator other than the formula grammar. For example, one could chose to add a different S3 rendering function and output a format not provided in the default package, or possibly one would rather have Gini coefficients for their statistical content in a resulting table. Routines to achieve New England Journal of Medicine style, Lancet style and Hmisc::summaryM() statistics are provided. The package contains rendering for HTML5, Rmarkdown and an indexing format for use in tracing and tracking are provided.

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'compile-clmm2.R' 'compile-operators.R' 'compile-post.R'  
'parser.R' 'compile.R' 'compile-rms.R' 'compile-typing.R'  
'helper-format.R' 'hmisc-cut2.R' 'hmisc-lm.fit.qr.bare.R'  
'hmisc-impute.R' 'hmisc-biVar.R' 'iify.R' 'render-csv.R'  
'render-html5.R' 'render-index.R' 'render-latex-map.R'  
'render-latex.R' 'render-rmd.R' 'render-rtf.R'  
'render-summary.R' 'smd.R' 'transform-hmisc.R'

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 'transform-smd.R'

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+. tangram	<i>Provide a "+" operator for rbind of tangram tables</i>
------------	---

---

## Description

The plus operator provides an rbind for tangram tables

## Usage

```
## S3 method for class 'tangram'
x + y
```

## Arguments

x	left argument for rbind
y	right argument for rbind

## Value

A row wise merged tangram object

---

add_footnote	<i>Add a footnote to a table</i>
--------------	----------------------------------

---

**Description**

Add a footnote to a table

**Usage**

```
add_footnote(table, footnote)
```

**Arguments**

table	tangram; the tangram table to modify
footnote	character; The footnote to add

**Value**

the modified table

---

add_indent	<i>Add indentations to left column row headers</i>
------------	--

---

**Description**

Add indentations to left column row headers. Note: will only work on cell\_header cells.

**Usage**

```
add_indent(table, amounts = 2, rows = NULL, columns = NULL)
```

**Arguments**

table	Output of tangram::tangram()
amounts	numeric; Specifies number of spaces to add. A vector that is either a single value or vector of the same size as the height of the table. If positions is specified then it must be the same length. Defaults to 2, which each pair of spaces converts naturally in rendering to HTML, LaTeX, etc..
rows	numeric; A vector of numeric row numbers for the rows that need to be indented. Defaults to NULL which indents all.
columns	numeric; Column to apply indent to, defaults to 1

**Value**

the modified table

**Examples**

```
x <- tangram(drug ~ bili + albumin, pbc)
add_indent(x)
add_indent(x, amounts=10)
add_indent(x, amounts=c(0, 0, 2, 4))
add_indent(x, rows=c(3))
add_indent(x, rows=c(3, 4), amounts=c(4, 2))
```

---

args_flatten	<i>Flatten variable arguments</i>
--------------	-----------------------------------

---

**Description**

Take variable arguments, flatten vectors and lists, but do not flatten cells (which are lists) e.g.  
 args\_flatten(NA, list(1,2,3), 4:6, c(7,8,9))

**Usage**

```
args_flatten(...)
```

**Arguments**

... variable arguments

**Value**

a list of the arguments, with vectors and lists flattened

---

as.categorical	<i>Convert data type to a factor if it's not already</i>
----------------	--

---

**Description**

Convert data type to a factor if it's not already

**Usage**

```
as.categorical(x)
```

**Arguments**

x Data to convert to factor

**Value**

Data as a factor

## Examples

```
as.categorical(1:3)
```

---

ASTBranch

*A left/right branch in an Abstract Syntax Tree. This inherits from ASTNode, and is intended to be a base class as well. Should never be instantiated directly as once again the semantic information is contained in the class name.*

---

## Description

A left/right branch in an Abstract Syntax Tree. This inherits from ASTNode, and is intended to be a base class as well. Should never be instantiated directly as once again the semantic information is contained in the class name.

A left/right branch in an Abstract Syntax Tree. This inherits from ASTNode, and is intended to be a base class as well. Should never be instantiated directly as once again the semantic information is contained in the class name.

## Format

[R6Class](#) object.

## Super class

[tangram::ASTNode](#) -> ASTBranch

## Public fields

left A pointer to the left node below this one  
right A pointer to the right node below this one

## Methods

### Public methods:

- [ASTBranch\\$distribute\(\)](#)
- [ASTBranch\\$reduce\(\)](#)
- [ASTBranch\\$clone\(\)](#)

**Method** [distribute\(\)](#): Call to distribute multiplication nodes, just recursively calls left and right node distribute functions

*Usage:*

```
ASTBranch$distribute()
```

**Method** [reduce\(\)](#): Attached data to nodes by processing data.frame appropriately. Recursively calls left and right nodes to reduces on data.frame

*Usage:*

ASTBranch\$reduce(df)

*Arguments:*

df (data.frame) Data frame to reduce over

**Method** clone(): The objects of this class are cloneable with this method.

*Usage:*

ASTBranch\$clone(deep = FALSE)

*Arguments:*

deep Whether to make a deep clone.

---

ASTFunction

*A specified function call as an ASTNode*

---

## Description

A specified function call as an ASTNode

A specified function call as an ASTNode

## Format

R6Class object.

## Super class

tangram::ASTNode -> ASTFunction

## Public fields

r\_expr A string containing the raw r expression from inside the parenthesis

data Data stored as a result of reduction

## Methods

### Public methods:

- [ASTFunction\\$new\(\)](#)
- [ASTFunction\\$factors\(\)](#)
- [ASTFunction\\$name\(\)](#)
- [ASTFunction\\$string\(\)](#)
- [ASTFunction\\$reduce\(\)](#)
- [ASTFunction\\$clone\(\)](#)

**Method** new(): Construct a node representing a function call

*Usage:*

```
ASTFunction$new(value, r_expr)
```

*Arguments:*

value (character) The name of the function call

r\_expr Any r expression to be evaluated inside the call

**Method** factors(): Returns all terminal nodes, this is a terminal node so returns self

*Usage:*

```
ASTFunction$factors()
```

**Method** name(): Returns the function call as character

*Usage:*

```
ASTFunction$name()
```

**Method** string(): Returns a re-parsable representation of the node

*Usage:*

```
ASTFunction$string()
```

**Method** reduce(): Given a data.frame execute the function in that environment and associate the result as data.

*Usage:*

```
ASTFunction$reduce(data)
```

*Arguments:*

data (data.frame) The data.frame to use as the environment for the function execution

**Method** clone(): The objects of this class are cloneable with this method.

*Usage:*

```
ASTFunction$clone(deep = FALSE)
```

*Arguments:*

deep Whether to make a deep clone.

## Examples

```
ASTFunction$new("log", "x+2")$string()
```

---

 ASTMultiply

*The multiplication of two terms, as an ASTNode.*


---

**Description**

The multiplication of two terms, as an ASTNode.

The multiplication of two terms, as an ASTNode.

**Format**

R6Class object.

**Super classes**

`tangram::ASTNode` -> `tangram::ASTBranch` -> `ASTMultiply`

**Public fields**

`left` The AST tree to the left.

`right` The AST tree to the right.

`type` The specified type of this node

**Methods****Public methods:**

- `ASTMultiply$new()`
- `ASTMultiply$distribute()`
- `ASTMultiply$factors()`
- `ASTMultiply$string()`
- `ASTMultiply$clone()`

**Method** `new()`: Construct a multiplication node

*Usage:*

`ASTMultiply$new(left, right)`

*Arguments:*

`left` (ASTNode) nodes to the left of the multiplication

`right` (ASTNode) nodes to the right of the multiplication

**Method** `distribute()`: Rearrange nodes distribution multiplication across parenthesis

*Usage:*

`ASTMultiply$distribute()`

**Method** `factors()`: return all terminal nodes on left and right

*Usage:*

ASTMultiply\$factors()

**Method** string(): Return a re-parseable string

*Usage:*

ASTMultiply\$string()

**Method** clone(): The objects of this class are cloneable with this method.

*Usage:*

ASTMultiply\$clone(deep = FALSE)

*Arguments:*

deep Whether to make a deep clone.

### Examples

```
ASTMultiply$new(ASTVariable$new("x"), ASTVariable$new("y"))$string()
```

---

ASTNode

*A Node in an Abstract Syntax Tree (AST)*

---

### Description

A Node in an Abstract Syntax Tree (AST)

A Node in an Abstract Syntax Tree (AST)

### Details

This is the root R6 class of any term of the AST which is created when parsing a table formula. This should only be used as a base class as the class information carries the semantic meaning of a given node.

### Public fields

format Any formatting directive passed to this node.

value A string of additional information contained by the node.

### Methods

#### Public methods:

- [ASTNode\\$terms\(\)](#)
- [ASTNode\\$distribute\(\)](#)
- [ASTNode\\$string\(\)](#)
- [ASTNode\\$reduce\(\)](#)
- [ASTNode\\$set\\_format\(\)](#)
- [ASTNode\\$clone\(\)](#)

**Method** `terms()`: Returns this node

*Usage:*

`ASTNode$terms()`

**Method** `distribute()`: Distributes data across multiplications and rearranges nodes

*Usage:*

`ASTNode$distribute()`

**Method** `string()`: Returns string representation of node

*Usage:*

`ASTNode$string()`

**Method** `reduce()`: Given a set of data, associates it with AST nodes

*Usage:*

`ASTNode$reduce(data)`

*Arguments:*

`data` (data.frame) data to associate across nodes

**Method** `set_format()`: Override the formatting directive for this node

*Usage:*

`ASTNode$set_format(x)`

*Arguments:*

`x` (numeric,character) the formatting directive

**Method** `clone()`: The objects of this class are cloneable with this method.

*Usage:*

`ASTNode$clone(deep = FALSE)`

*Arguments:*

`deep` Whether to make a deep clone.

---

ASTPlus

*The addition of two terms, in an ASTNode.*

---

## Description

The addition of two terms, in an ASTNode.

The addition of two terms, in an ASTNode.

## Format

[R6Class](#) object.

**Super classes**

`tangram::ASTNode` -> `tangram::ASTBranch` -> `ASTPlus`

**Public fields**

`data` Just returns the R6 name 'ASTPlus'

`left` The node to the left of this node

`right` The node to the right of this node

**Methods****Public methods:**

- `ASTPlus$new()`
- `ASTPlus$terms()`
- `ASTPlus$string()`
- `ASTPlus$clone()`

**Method** `new()`: Construct a new node that represents addition

*Usage:*

```
ASTPlus$new(left, right)
```

*Arguments:*

`left` (`ASTNode`) Node on the left side of the addition

`right` (`ASTNode`) Node on the right side of the addition

**Method** `terms()`: Returns a vector of the left and right terms

*Usage:*

```
ASTPlus$terms()
```

**Method** `string()`: A parsable string representation of this node.

*Usage:*

```
ASTPlus$string()
```

**Method** `clone()`: The objects of this class are cloneable with this method.

*Usage:*

```
ASTPlus$clone(deep = FALSE)
```

*Arguments:*

`deep` Whether to make a deep clone.

**Examples**

```
ASTPlus$new(ASTVariable$new("x"), ASTVariable$new("y"))$string()
```

---

ASTTableFormula	<i>The root ASTNode of a formula.</i>
-----------------	---------------------------------------

---

### Description

The root ASTNode of a formula.

The root ASTNode of a formula.

### Format

[R6Class](#) object.

### Super classes

[tangram::ASTNode](#) -> [tangram::ASTBranch](#) -> ASTTableFormula

### Public fields

left The AST tree for the columns.

right The AST tree for the rows.

### Methods

#### Public methods:

- [ASTTableFormula\\$new\(\)](#)
- [ASTTableFormula\\$terms\(\)](#)
- [ASTTableFormula\\$string\(\)](#)
- [ASTTableFormula\\$clone\(\)](#)

**Method** `new()`: Create a new formula node

*Usage:*

```
ASTTableFormula$new(left, right)
```

*Arguments:*

left The left side of the "~" as an AST

right The right side of the "~" as an AST

**Method** `terms()`: Returns all terminal nodes from left and right

*Usage:*

```
ASTTableFormula$terms()
```

**Method** `string()`: A re-parseable string representing the AST

*Usage:*

```
ASTTableFormula$string()
```

**Method** `clone()`: The objects of this class are cloneable with this method.

*Usage:*

```
ASTTableFormula$new(clone(deep = FALSE))
```

*Arguments:*

deep Whether to make a deep clone.

**Examples**

```
ASTTableFormula$new(ASTVariable$new("x"), ASTVariable$new("y"))$string()
```

---

 ASTVariable

*A Variable in an Abstract Syntax Tree (AST)*


---

**Description**

A Variable in an Abstract Syntax Tree (AST)

A Variable in an Abstract Syntax Tree (AST)

**Format**

[R6Class](#) object.

**Details**

This node represents a variable of interest in the AST. A variable's name is recorded in the value field, and must conform to the rules of identifiers in R. This class inherits from [ASTNode](#).

**Methods**

`new(identifier, format=NA, type=NA)`

`terms()` Returns the node

`distribute()` Applies the distributive property to the node, and returns the resulting node.

`string()` Returns the string formula of the node

`name()` Return a human representation of a node

`reduce(data)` Given a set of data, perform the logical reduction of the current node.

**Super class**

[tangram::ASTNode](#) -> ASTVariable

**Public fields**

`data` The associated data post reduction

`type` The identified type of this node (defaults: Categorical, Numeric)

## Methods

### Public methods:

- `ASTVariable$new()`
- `ASTVariable$factors()`
- `ASTVariable$name()`
- `ASTVariable$string()`
- `ASTVariable$reduce()`
- `ASTVariable$clone()`

**Method** `new()`: This method creates an AST node representing a variable of a given identifier. An optional format consisting of a string of a number or a c-style printf string. An option type denoting a forced type cast of that variable.

*Usage:*

```
ASTVariable$new(identifier, format = NA, type = NA)
```

*Arguments:*

`identifier` (character) Variable name  
`format` (character, numeric) Formatting directive  
`type` (character) any additional type information

**Method** `factors()`: Returns all terminal nodes under this. Since this is a terminal node, returns self

*Usage:*

```
ASTVariable$factors()
```

**Method** `name()`: Returns the text name of this node. For an intercept, returns "All"

*Usage:*

```
ASTVariable$name()
```

**Method** `string()`: Returns name of variable with optional format and type information

*Usage:*

```
ASTVariable$string()
```

**Method** `reduce()`: Given a data.frame, associates correct variable with this node

*Usage:*

```
ASTVariable$reduce(d)
```

*Arguments:*

`d` (data.frame) data.frame to reduce

**Method** `clone()`: The objects of this class are cloneable with this method.

*Usage:*

```
ASTVariable$clone(deep = FALSE)
```

*Arguments:*

`deep` Whether to make a deep clone.

## Examples

```
ASTVariable$new("x", "2", "Continuous")$string()
```

---

cbind.tangram	<i>A cbind for generated table tangram objects.</i>
---------------	---

---

**Description**

Execute the equivalent of an cbind for generated tables

**Usage**

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

**Arguments**

... tangram objects to cbind  
 deparse.level numeric; not used

**Value**

A merged tangram object

---

cell	<i>Construct a table cell from an object</i>
------	--

---

**Description**

Any R object can be used as a cell value. Attributes are used to store additional classes of that cell attached to the object. This is a helper function to attach all the additional attributes to the provided object

**Usage**

```
cell(x, ...)
```

**Arguments**

x R object to attach attributes too  
 ... Each additional argument becomes an attribute for the object

**Details**

Certain attributes have special meaning: - 'names' is appended to the front of a value, e.g. "P=" for a p-value. - 'sep' is used to join values, e.g. ", " for a list of values. - 'class' denotes special rendering handling, e.g. generally passed as CSS class to HTML5 - 'reference' a list of reference symbols to put inside the cell - 'row' and 'col' should refer to the row / column if key generation is needed - 'subrow' and 'subcol' further delineate the key value of a cell for key generation

**Value**

The modified R object

---

cell_header	<i>Create a cell_header object of the given text.</i>
-------------	---

---

**Description**

A cell\_header object represents a label cell inside a table. It can also contain units.

**Usage**

```
cell_header(text, units = NULL, class = NULL, ...)
```

**Arguments**

text	character; The text of the label. May include a subset of LaTeX greek or math.
units	character; An optional field that contains units
class	character; An optional field for additional S3 classes (e.g. could be used in html rendering for CSS)
...	optional extra information to attach

**Value**

A cell\_header object

**Examples**

```
cell_header("Yahoo")
cell_header("Concentration", "mg/dl")
cell_header("Concentration", "mg/dl", src="A")
```

---

cell_label	<i>Create an cell_label (S3) object of the given text.</i>
------------	--

---

**Description**

A cell\_label object represents a label cell inside a table. It can also contain units.

**Usage**

```
cell_label(text, units = NULL, class = NULL, ...)
```

**Arguments**

text	character; The text of the label. May include a subset of LaTeX greek or math.
units	character; An optional field that contains units
class	character; An optional field for additional S3 classes (e.g. could be used in html rendering for CSS)
...	optional extra information to attach

**Value**

A tangram object

**Examples**

```
cell_label("Compaction Method")
cell_label("Concentration", "mg/dl")
cell_label("Concentration", "mg/dl", subcol="A")
```

---

cell_n	<i>Create an cell_n (S3) object of the given statistic</i>
--------	--

---

**Description**

A cell\_n object contains an n value. Essentially, this is just a helper that appends the cell\_n class to the given object and makes sure it's a cell S3 object as well.

**Usage**

```
cell_n(n, class = NULL, hdr = FALSE, possible = NULL, ...)
```

**Arguments**

n	The numerical value
class	character; An optional field for additional S3 classes (e.g. could be used in html rendering for CSS)
hdr	logical; Construct an n value for a header (defaults to FALSE)
possible	numerical; The total N that was possible
...	optional extra information to attach

**Value**

A cell\_n object.

**Examples**

```
cell_n(20)
```

---

cell_subheader	<i>Create a cell_subheader object of the given text.</i>
----------------	--

---

**Description**

A cell\_subheader object represents a label cell inside a table. It can also contain units.

**Usage**

```
cell_subheader(text, units = NULL, class = NULL, ...)
```

**Arguments**

text	character; The text of the label. May include a subset of LaTeX greek or math.
units	character; An optional field that contains units
class	character; An optional field for additional S3 classes (e.g. could be used in html rendering for CSS)
...	optional extra information to attach

**Value**

A cell\_subheader object.

**Examples**

```
cell_subheader("Concentration")
cell_subheader("Concentration", "mg/dl")
cell_subheader("Concentration", "mg/dl", src="A")
```

---

cell_transform	<i>Create a function to transform all cells of a table</i>
----------------	--

---

**Description**

Given a function that operates on a table cell and returns the modified cell, return a function that given a table applies that function to all cells and returns the modified table.

**Usage**

```
cell_transform(FUN, ...)
```

**Arguments**

FUN	function to apply, must return the modified cell
...	additional arguments to pass into function

**Value**

a table modification function

---

col_header	<i>A set of magrittr operators for tanger tables</i>
------------	--

---

**Description**

A set of magrittr operators for tanger tables

**Usage**

col\_header(table, ..., sub = TRUE)

row\_header(table, ..., sub = TRUE)

write\_cell(table, x, ...)

home(table)

cursor\_up(table, n = 1)

cursor\_down(table, n = 1)

cursor\_left(table, n = 1)

cursor\_right(table, n = 1)

cursor\_pos(table, nrow, ncol)

carriage\_return(table)

line\_feed(table, n = 1)

new\_line(table)

new\_row(table)

new\_col(table)

table\_apply(table, x, FUN, ...)

add\_col(table, ...)

add\_row(table, ...)

```
set_footnote(table, footnote)
```

```
set_id(table, id)
```

```
set_caption(table, caption)
```

```
set_style(table, style)
```

```
set_colspan(table, span)
```

```
set_rowspan(table, span)
```

### Arguments

table	tangram; The tangram table being built
...	additional argument passed
sub	logical; Is this a subheader
x	object of focus in operation
n	numeric; number of times to perform operation
nrow	numeric; number of rows
ncol	numeric; number of columns
FUN	function; function to apply
footnote	character; footnote to add
id	character; id of table
caption	character; caption of table
style	character; styling in compiling table and in rendering
span	numeric; number of rows or columns to span

---

```
csv
```

```
Generate an csv from a tangram or cell object
```

---

### Description

Given a tangram object create an index representation.

### Usage

```
csv(object, ...)
```

```
## S3 method for class 'tangram'
csv(object, file = NULL, sep = ",", ...)
```

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

**Arguments**

object	The cell header to render to HTML5
...	additional arguments to renderer. Unused
file	File to write result into
sep	separator to use

**Value**

A string containing the csv file

---

custom_css	<i>Return a CSS file as a string</i>
------------	--------------------------------------

---

**Description**

Given a filename, this function will load the file name from the current working directory. If it is not found from the current working directory it will search in the package for a a matching filename and load that instead. If an id is specified, that will be prepended to all CSS selectors (TODO: make this substitution more robust). The result is returned as a string.

**Usage**

```
custom_css(filename, id = NA)
```

**Arguments**

filename	Name of the CSS file to load
id	CSS id to prepend to all entries

**Value**

String of possibly modified CSS file

**Examples**

```
custom_css("lancet.css", "tbl1")
```

---

del_col	<i>Delete given column(s) from a table</i>
---------	--

---

**Description**

Given a table, remove the specified column

**Usage**

```
del_col(table, col)
```

**Arguments**

table	the table to modify
col	vector containing column(s) to drop

**Value**

the modified table

---

del_row	<i>Delete a row(s) from a table</i>
---------	-------------------------------------

---

**Description**

Given a table, remove the specified row

**Usage**

```
del_row(table, row)
```

**Arguments**

table	the table to modify
row	vector with row numbers to drop

**Value**

the modified table

---

derive_label	<i>Derive label of AST node.</i>
--------------	----------------------------------

---

**Description**

Determine the label of a given AST node. NOTE: Should have data attached via reduce before calling.

**Usage**

```
derive_label(node, capture_units = FALSE, ...)
```

**Arguments**

node	Abstract syntax tree node.
capture_units	logical; Capture units from parenthesis ending a label
...	Other arguments, ignored

**Value**

A string with a label for the node

---

drop_statistics	<i>Drop all statistics columns from a table.</i>
-----------------	--

---

**Description**

Delete from a table all columns that contain statistics

**Usage**

```
drop_statistics(table)
```

**Arguments**

table	the table to remove statistical columns
-------	---

**Value**

the modified table

---

format_guess	<i>Guess the best format for a given set of numerical data</i>
--------------	--

---

**Description**

Given a vector of data, default to 3 significant digits or all if maximum is greater than zero

**Usage**

```
format_guess(x)
```

**Arguments**

x                    numeric; basic math and quantile function must work on data passed in

**Value**

numeric; the digits past the decimal recommended for display

**Examples**

```
format_guess(rnorm(100))
format_guess(rnorm(100, sd=1e-6))
```

---

hmisc_data_type	<i>Determine data type of a vector loosely consistent with Hmisc.</i>
-----------------	---

---

**Description**

Determine data type of a vector loosely consistent with Hmisc.

**Usage**

```
hmisc_data_type(x, category_threshold = NA)
```

**Arguments**

x                    Vector to determine type of  
category\_threshold    The upper threshold of unique values for which a vector is considered categorical.

**Value**

One of the following strings: Binomial, Categorical, or Numerical.

**See Also**[hmisc](#)**Examples**

```

hmisc_data_type(c(1,2,3))
hmisc_data_type(factor(c("A", "B", "C")))
hmisc_data_type(factor(c("A", "B", "B", "A")))
hmisc_data_type(factor(c(TRUE, FALSE, TRUE, FALSE)))

```

---

hmisc\_intercept\_cleanup

*Cleanup an intercept only model*


---

**Description**

Cleanup an intercept only table that was generated from the hmisc default transform. This drops the statistics column, and modifies the header to eliminate blank space.

**Usage**

```
hmisc_intercept_cleanup(table)
```

**Arguments**

table            the table to modify

**Value**

the modified table

---

hmisc\_p

*Cell Generation functions for hmisc default*


---

**Description**

Each function here is called when a cell is generated. Overriding these in a formula call will allow one to customize exactly how each cell's contents are generated. While this serves as the base template for transforms, it is by no means required if one develops their own bundle of data transforms. One can create any number of cell level styling choices.

**Usage**

```

hmisc_p(p, pformat = "%1.3f", include_p = TRUE)

hmisc_iqr(
  x,
  format = NA,
  na.rm = TRUE,
  names = FALSE,
  type = 8,
  msd = FALSE,
  quant = c(0.25, 0.5, 0.75),
  ...
)

hmisc_fraction(numerator, denominator, format = 3, ...)

hmisc_fstat(f, df1, df2, p, class = NULL, ...)

hmisc_chi2(chi2, df, p, class = NULL, ...)

hmisc_spearman(S, rho, p, class = NULL, ...)

hmisc_wilcox(V, p, class = NULL, ...)

hmisc_cell

```

**Arguments**

p	numeric; p-value to format
pformat	numeric or character; Significant digits or fmt to pass to sprintf
include_p	logical; include the leading P on the output string
x	numeric; whose sample quantiles are wanted. NA and NaN values are not allowed in numeric vectors unless na.rm is TRUE.
format	numeric or character; Significant digits or fmt to pass to sprintf
na.rm	logical; if true, any NA and NaN's are removed from x before the quantiles are computed.
names	logical; if true, the result has a names attribute. Set to FALSE for speedup with many probs.
type	integer; specify algorithm to use in constructing quantile. See quantile for more information.
msd	logical; compute an msd attribute containing mean and standard deviation
quant	numeric; The quantiles to display. Should be an odd length vector, since the center value is highlighted.
...	additional arguments passed
numerator	numeric; The value of the numerator

denominator	numeric; The value of the denominator
f	The value of the f-statistic
df1	1st dimension degrees of freedom
df2	2nd dimension degrees of freedom
class	character; An optional field for additional S3 classes (e.g. could be used in html rendering for CSS)
chi2	The value of the $X^2$ statistic
df	degrees of freedom
S	The value of the spearman statistic
rho	The rho value of the test
V	The value of the Wilcoxon statistic

**Format**

An object of class `list` of length 8.

**Value**

A formatted string or cell as appropriate

`hmisc_p`

Given a style in number of digits or a `printf` style specifier it renders the p-value and checks to see if it's all zeros, then switches the output to a less than.

`hmisc_iqr`

Construct a cell which has the interquartile ranges specified.

`hmisc_fraction`

Construct a cell which has the fraction specified in an `hmisc` format

`hmisc_fstat`

Construct a cell which has the `fstat` specified in an `hmisc` format.

`hmisc_chi2`

Construct a cell which has the  $\chi^2$  specified in an `hmisc` format

`hmisc_spearman`

Construct a cell which has the spearman specified in an `hmisc` format

`hmisc_wilcox`

Construct a cell which has the Wilcoxon specified in an `hmisc` format

## misc\_cell

List of data transforms for a cell of a table.

```
misc_cell <- list(  
  n      = cell_n,  
  iqr    = misc_iqr,  
  fraction = misc_fraction,  
  fstat  = misc_fstat,  
  chi2   = misc_chi2,  
  spearman = misc_spearman,  
  wilcox = misc_wilcox,  
  p      = misc_p  
)
```

## See Also

[misc](#)

## Examples

```
misc_p(1e-6)  
misc_p(0.234)  
misc_p(1.234e-6, 5)  
misc_p(1.234e-6, 6)  
require(stats)  
misc_iqr(rnorm(100), '3')  
misc_fraction(1, 4, 3)  
misc_fstat(4.0, 10, 20, 0.004039541)  
misc_chi2(5.33, 6, 0.2)  
misc_spearman(20, 0.2, 0.05)  
misc_wilcox(20, 0.2)
```

---

html5

*S3 html5 Method function for use on a tangram to generate HTML5*

---

## Description

S3 html5 Method function for use on a tangram to generate HTML5

## Usage

```
html5(object, id, ...)
```

## Arguments

object	The cell to render to HTML5
id	A unique identifier for traceability in indexing
...	additional arguments to renderer.

---

html5.cell	<i>Convert an abstract cell object into an HTML5 string</i>
------------	---

---

**Description**

Given a cell class create an HTML5 representation.

**Usage**

```
## S3 method for class 'cell'
html5(object, id, ..., class = NULL)
```

**Arguments**

object	The cell to render to HTML5
id	A unique identifier for traceability
...	additional arguments to renderer. Unused
class	An additional class attribute for the HTML5 element

**Value**

A text string rendering of the given cell as a <td> with several <span>'s.

---

html5.cell_header	<i>Convert an abstract cell_header object into an HTML5 string</i>
-------------------	--

---

**Description**

Given a cell\_header class create an HTML5 representation.

**Usage**

```
## S3 method for class 'cell_header'
html5(object, id, ..., class = NULL)
```

**Arguments**

object	The cell subheader to render to HTML5
id	A unique identifier for traceability
...	additional arguments to renderer. Unused
class	additional class attributes for CSS rendering

**Value**

A text string rendering of the given subheader as a <td> with several <span>'s.

---

html5.cell_label	<i>Convert a cell_label object into an HTML5 string</i>
------------------	---

---

**Description**

Given a cell\_label class create an HTML5 representation.

**Usage**

```
## S3 method for class 'cell_label'
html5(object, id, ..., class = NULL)
```

**Arguments**

object	The cell label to render to HTML5
id	A unique identifier for traceability
...	additional arguments to renderer. Unused
class	An additional class attribute for the HTML5 element

**Value**

A text string rendering of the given label as a <td> with several <span>'s.

---

html5.cell_n	<i>Convert an abstract cell_n object into an HTML5 string</i>
--------------	---

---

**Description**

Given a cell\_n class create an HTML5 representation.

**Usage**

```
## S3 method for class 'cell_n'
html5(object, id, ..., class = NULL)
```

**Arguments**

object	The cell n to render to HTML5
id	A unique identifier for traceability
...	additional arguments to renderer. Unused
class	An additional class attribute for the HTML5 element

**Value**

A text string rendering of the given n as a <td> with several <span>'s.

---

html5.cell\_subheader     *Convert an abstract cell\_subheader object into an HTML5 string*

---

### Description

Given a cell\_subheader class create an HTML5 representation.

### Usage

```
## S3 method for class 'cell_subheader'
html5(object, id, ..., class = NULL)
```

### Arguments

object	The cell subheader to render to HTML5
id	A unique identifier for traceability
...	additional arguments to renderer. Unused
class	additional class attributes for CSS rendering

### Value

A text string rendering of the given subheader as a <td> with several <span>'s.

---

html5.character     *Default conversion to HTML5 for a character cell*

---

### Description

Produces table cell

### Usage

```
## S3 method for class 'character'
html5(object, id, ..., class = NA)
```

### Arguments

object	The cell to render to HTML5
id	A unique identifier for traceability
...	additional arguments to renderer. Unused
class	An additional class attribute for the HTML5 element

### Value

An empty html5 td of the given class

---

html5.default	<i>Default conversion to HTML5 for an abstract table element</i>
---------------	--

---

**Description**

Gives a warning and produces an empty `<td></td>` cell

**Usage**

```
## Default S3 method:
html5(object, id, ..., class = NA)
```

**Arguments**

object	The cell to render to HTML5
id	A unique identifier for traceability
...	additional arguments to renderer. Unused
class	An additional class attribute for the HTML5 element

**Value**

An empty html5 td of the given class

---

html5.logical	<i>Default conversion to HTML5 for a logical cell</i>
---------------	---

---

**Description**

Produces table cell or nothing if it's an NA. This is useful for dealing with rowspan and colspan.

**Usage**

```
## S3 method for class 'logical'
html5(object, id, ..., class = NA)
```

**Arguments**

object	The cell to render to HTML5
id	A unique identifier for traceability
...	additional arguments to renderer. Unused
class	An additional class attribute for the HTML5 element

**Value**

An empty html5 td of the given class

---

html5.tangram	<i>Convert a tangram class into an HTML5 string</i>
---------------	---

---

### Description

Given a tangram class, a series of conversion creates an HTML5 representation of the table. It may be an HTML5 fragment or it may be a complete web page.

### Usage

```
## S3 method for class 'tangram'
html5(
  object,
  id = NULL,
  caption = NULL,
  fragment = NULL,
  style = NULL,
  footnote = NULL,
  inline = NULL,
  fixed_thead = NULL,
  ...
)
```

### Arguments

object	The cell table to render to HTML5
id	A unique identifier for the table (strongly recommended). If not provided, caption will be used.
caption	A string caption for the table
fragment	A boolean flag that determines whether a fragment or a complete HTML5 document is generated
style	A string containing a style filename to include as inline CSS. It first searches the drive for the file, if that fails it looks inside the package for a matching css file.
footnote	Any footnotes to include under the table.
inline	DEPRECATED
fixed_thead	logical; fixes the header using position sticky in CSS defaults to FALSE
...	additional arguments to renderer. Unused

### Details

The package includes several css files for styling. At present the following exist: 'hmisc.css', 'lancet.css', 'lancet-stripped.css' and 'nejm.css'

### Value

A text string rendering of the given table in HTML5

---

index	<i>Generate an index from a tangram or cell object</i>
-------	--

---

**Description**

Given a tangram object create an index representation.

**Usage**

```
index(object, ...)
```

**Arguments**

object	The cell header to render to HTML5
...	additional arguments to renderer. Unused

**Value**

A matrix or list of strings containing key, source and value

---

index.cell_label	<i>Generate an index from a label object</i>
------------------	--

---

**Description**

Overrides to generate no indexing on labels

**Usage**

```
## S3 method for class 'cell_label'
index(object, id = "tangram", key.len = 4, ...)
```

**Arguments**

object	cell; The cell for indexing
id	character; an additional specifier for the object key
key.len	numeric; length of key to generate
...	additional arguments to renderer. Unused

**Value**

A list of strings containing key, source and value

---

index.default	<i>Generate an index from a cell object</i>
---------------	---

---

**Description**

Given a cell class create an index representation. If no source is specified no index will be generated.

**Usage**

```
## Default S3 method:
index(object, id = "tangram", name = NULL, key.len = 4, ...)
```

**Arguments**

object	cell; The cell for indexing
id	character; an additional specifier for the object key
name	character; optional names of elements inside object
key.len	numeric; length of generated key
...	additional arguments to renderer. Unused

**Value**

A list of strings containing key, source and value

---

index.list	<i>Generate an index from a list object</i>
------------	---

---

**Description**

Given a cell class create an index representation. If no source is specified no index will be generated.

**Usage**

```
## S3 method for class 'list'
index(object, id = "tangram", key.len = 4, ...)
```

**Arguments**

object	cell; The cell for indexing
id	character; an additional specifier for the object key
key.len	numeric; length of key to generate
...	additional arguments to renderer. Unused

**Value**

A list of strings containing key, source and value

---

index.tangram	<i>Generate an an index from a tangram object</i>
---------------	---

---

**Description**

Given a tangram class create an index representation.

**Usage**

```
## S3 method for class 'tangram'
index(object, id = "tangram", key.len = 4, ...)
```

**Arguments**

object	The tangram for indexing
id	an additional specifier for the object key
key.len	numeric; length of keys generated (affects collision probability)
...	additional arguments to renderer. Unused

**Value**

A matrix of strings containing key, source and value

---

insert_column	<i>Insert a column into a tangram table</i>
---------------	---

---

**Description**

Insert a column into a tangram table. Will fill with empty cells is not enough cells are specified.

**Usage**

```
insert_column(table, after, ..., class = NULL)
```

**Arguments**

table	the table to modify
after	numeric; The column to position the new row after. Can be zero for inserting a new first row.
...	Table cells to insert. Cannot be larger than existing table.
class	character; Classes to apply as directives to renderers

**Value**

the modified table

---

insert_row	<i>Insert a row into a tangram table</i>
------------	--

---

**Description**

Insert a row into a tangram table. Will fill with empty cells is not enough cells are specified.

**Usage**

```
insert_row(table, after, ..., class = NULL)
```

**Arguments**

table	the table to modify
after	numeric; The row to position the new row after. Can be zero for inserting a new first row.
...	Table cells to insert. Cannot be larger than existing table.
class	character; Classes to apply as directives to renderers

**Value**

the modified table

---

is.binomial	<i>Determine if a vector is binomial or not</i>
-------------	---

---

**Description**

Determine if a vector is binomial or not

**Usage**

```
is.binomial(x, threshold = NA)
```

**Arguments**

x	Vector to determine type of
threshold	The upper threshold of unique values for which a vector is considered categorical.

**Value**

a Boolean: TRUE / FALSE

**Examples**

```
is.binomial(c(1,2,3))
is.binomial(factor(c("A","B","C")))
is.binomial(factor(c("A","B","B","A")))
is.binomial(factor(c(TRUE, FALSE, TRUE, FALSE)))
is.binomial(c('M', 'F', 'M', 'F'), 10)
```

---

is.categorical	<i>Determine if a vector is categorical or not</i>
----------------	--

---

**Description**

Determine if a vector is categorical or not

**Usage**

```
is.categorical(x, threshold = NA)
```

**Arguments**

x	Vector to determine type of
threshold	The upper threshold of unique values for which a vector is considered categorical.

**Value**

A Boolean: TRUE / FALSE

**Examples**

```
is.categorical(c(1,2,3))
is.categorical(c(rep(1,20), rep(2, 20), rep(3, 20)), threshold=5)
is.categorical(c("A","B","B"))
is.categorical(factor(c("A","B","C")))
is.categorical(factor(c("A","B","B","A")))
is.categorical(factor(c(TRUE, FALSE, TRUE, FALSE)))
```

---

key	<i>Key derivation helper function</i>
-----	---------------------------------------

---

**Description**

This function should generate a string that uniquely identifies a piece of data present in a table. In a report with multiple tables the id is used to preserve uniqueness.

**Usage**

```
key(x, id)
```

**Arguments**

x	cell object to derive key for
id	the unique id of the table being keyed

**Details**

This function relies on the object being keyed having at a minimum character attributes for row and col. Additional specifies for embedded tables are given with subrow and subcol. The row and col are automatically appended when using a `table_builder`. However the subrow and subcol must be added by the user to a cell of a table.

---

lancet	<i>Style Bundle for Lancet style</i>
--------	--------------------------------------

---

**Description**

List of lists, should contain a "Type" entry with a function to determine type of vector passed in. Next entries are keyed off returned types from function, and represent the type of a row. The returned list should contain the same list of types, and represents the type of a column. Thus it now returns a function to process the intersection of those two types.

**Usage**

```
lancet
```

**Format**

An object of class `list` of length 5.

---

lancet_cell	<i>Cell Generation functions for Lancet styling</i>
-------------	---

---

**Description**

Each function here is called when a cell is generated. Overriding these in a formula call will allow one to customize exactly how each cell's contents are generated.

**Usage**

```
lancet_cell
```

**Format**

An object of class `list` of length 8.

---

lancet_fraction	<i>Create an cell_fraction (S3) in NEJM style of the given data</i>
-----------------	---

---

**Description**

A cell object contains a statistical result of a fraction/percentage in nejm style

**Usage**

```
lancet_fraction(numerator, denominator, format = NULL, ...)
```

**Arguments**

numerator	numeric; The value of the numerator
denominator	numeric; The value of the denominator
format	numeric or character; a string formatting directive
...	optional extra information to attach

**Value**

A `cell_fraction` object.

**Examples**

```
lancet_fraction(1, 4, 3)
```

---

lancet_mean_sd	<i>Create a mean/sd cell object of the given data in Lancet style</i>
----------------	---

---

### Description

Create a mean/sd cell object of the given data in Lancet style.

### Usage

```
lancet_mean_sd(  
  x,  
  format = NA,  
  na.rm = TRUE,  
  names = FALSE,  
  type = 8,  
  msd = FALSE,  
  quant = c(0.25, 0.5, 0.75),  
  ...  
)
```

### Arguments

x	numeric vector whose sample quantiles are wanted. NA and NaN values are not allowed in numeric vectors unless na.rm is TRUE.
format	numeric or character; Significant digits or fmt to pass to sprintf
na.rm	logical; if true, any NA and NaN's are removed from x before the quantiles are computed.
names	logical; ignored. For compatibility with hmisc_iqr
type	integer; ignored. For compatibility with hmisc_iqr
msd	logical; ignored. For compatibility with hmisc_iqr
quant	numeric; ignored. For compatibility with hmisc_iqr
...	additional arguments to constructing cell

### Value

A cell object.

### Examples

```
require(stats)  
lancet_mean_sd(rnorm(100), '3')
```

---

 latex

*Render to LaTeX methods for tangram cell objects*


---

### Description

Each of these methods will render the cell object as a LaTeX fragment

### Usage

```

latex(object, ...)

## Default S3 method:
latex(object, ...)

## S3 method for class 'cell'
latex(object, na.blank = TRUE, ...)

## S3 method for class 'cell_label'
latex(object, ...)

## S3 method for class 'logical'
latex(object, ...)

## S3 method for class 'cell_header'
latex(object, ...)

## S3 method for class 'cell_subheader'
latex(object, ...)

## S3 method for class 'tangram'
latex(object, fragment = TRUE, filename = NULL, append = FALSE, ...)

```

### Arguments

object	object; the item to render to latex
...	additional arguments
na.blank	logical; Display NAs as blanks.
fragment	logical; Is this a complete LaTeX document or just the table fragment
filename	character; filename to write LaTeX into
append	logical; Should the write be an append operation or overwrite

### Details

There are additional arguments possible to control the rendering, but due to some oddities between CRAN requirements and how R handles defaults (for full details see the source code) they are as follows

- \* cgroup.just character; The text of the column justification used in the table
- \* arraystretch numeric; The arraystretch parameter used for vertical spacing
- \* style character; can be null or "nejm" for different table styling
- \* rel\_size numeric; a scaling to be applied to the entire table, e.g. rel\_size=-2
- \* placement character; placement directive, defaults to "H"

**Value**

the LaTeX rendering

**Examples**

```
latex(cell_label("123"))
latex(hmisc_iqr(rnorm(20)))
latex(hmisc_fraction(45, 137))
tbl <- tangram(drug~bili, pbc, "tbl")
latex(tbl)
```

---

latexify

*LaTeX safe string conversion*

---

**Description**

LaTeX safe string conversion. This transforms a string handling Markdown characters and UNI-CODE as best it can with an automated pass.

**Usage**

```
latexify(x)
```

**Arguments**

x                      string to make LaTeX safe

**Value**

valid LaTeX code

---

latex_template	<i>Return a LaTeX template that works with tangram</i>
----------------	--

---

**Description**

Pandoc in the current version of RStudio does not allow for setting package options to xcolor and this has made it incompatible with the LaTeX generated by this package. This provides a known working template.

**Usage**

```
latex_template()
```

**Details**

An example header would look like the following:

```
— title: "A Document Full of Beautiful Tables" output: pdf_document: "r tangram::latex_template()"
—
```

**Value**

filename of LaTeX template

**Examples**

```
latex_template()
```

---

nejm	<i>Style Bundle for Closer to NEJM style</i>
------	--

---

**Description**

List of lists, should contain a "Type" entry with a function to determine type of vector passed in. Next entries are keyed off returned types from function, and represent the type of a row. The returned list should contain the same list of types, and represents the type of a column. Thus it now returns a function to process the intersection of those two types.

**Usage**

```
nejm
```

**Format**

An object of class `list` of length 5.

---

nejm_cell	<i>Cell Generation functions for nejm default</i>
-----------	---

---

### Description

Each function here is called when a cell is generated. Overriding these in a formula call will allow one to customize exactly how each cell's contents are generated.

### Usage

```
nejm_cell
```

### Format

An object of class list of length 9.

### Details

While this serves as the base template for transforms, it is by no means required if one develops their own bundle of data transforms. One can create any number of cell level styling choices.

---

nejm_fraction	<i>Create an cell_fraction (S3) in NEJM style of the given data</i>
---------------	---

---

### Description

A cell object contains a statistical result of a fraction/percentage in nejm style

### Usage

```
nejm_fraction(numerator, denominator, format = NULL, ...)
```

### Arguments

numerator	numeric; The value of the numerator
denominator	numeric; The value of the denominator
format	numeric or character; a string formatting directive
...	optional extra information to attach

### Value

A cell\_fraction object.

### Examples

```
nejm_fraction(1, 4, 3)
```

---

 nejm\_iqr

---

 Create a interquartile range cell object of the given data NEJM style
 

---

## Description

Construct a cell which has the 3 interquartile ranges specified.

## Usage

```
nejm_iqr(
  x,
  format = NA,
  na.rm = TRUE,
  names = FALSE,
  type = 8,
  msd = FALSE,
  quant = c(0.25, 0.5, 0.75),
  ...
)
```

## Arguments

<code>x</code>	numeric vector whose sample quantiles are wanted. NA and NaN values are not allowed in numeric vectors unless <code>na.rm</code> is TRUE.
<code>format</code>	numeric or character; Significant digits or <code>fmt</code> to pass to <code>sprintf</code>
<code>na.rm</code>	logical; if true, any NA and NaN's are removed from <code>x</code> before the quantiles are computed.
<code>names</code>	logical; if true, the result has a <code>names</code> attribute. Set to FALSE for speedup with many probs.
<code>type</code>	integer; specify algorithm to use in constructing quantile. See <code>quantile</code> for more information.
<code>msd</code>	logical; compute an <code>msd</code> attribute containing mean and standard deviation
<code>quant</code>	numeric; The quantiles to display. Should be an odd length vector, since the center value is highlighted.
<code>...</code>	additional arguments to constructing cell

## Value

A `cell_quantile` object.

## Examples

```
require(stats)
nejm_iqr(rnorm(100), '3')
```

---

nejm_range	<i>Create a NEJM style range</i>
------------	----------------------------------

---

**Description**

Construct a cell which has the range of the given data in NEJM style

**Usage**

```
nejm_range(x, format, ...)
```

**Arguments**

x	numeric vector whose range is desired
format	numeric or character; an argument to pass to the formatting function
...	additional arguments to passed to cell()

---

Parser	<i>The parser class for generating abstract syntax trees for given table formulas.</i>
--------	--

---

**Description**

The parser class for generating abstract syntax trees for given table formulas.

The parser class for generating abstract syntax trees for given table formulas.

**Format**

[R6Class](#) object.

**References**

Aho, A. V., Lam, M. S., Sethi, R., and Ullman, J. D. (2006) *Compilers: Principles, Techniques, and Tools*, 2nd edition. Addison Wesley.

**Public fields**

input	Storage for input string of a formula
pos	The current parsing position
len	The length of the input

## Methods

### Public methods:

- `Parser$new()`
- `Parser$expect()`
- `Parser$peek()`
- `Parser$eat_whitespace()`
- `Parser$next_token()`
- `Parser$format()`
- `Parser$r_expression()`
- `Parser$factor()`
- `Parser$term()`
- `Parser$expression()`
- `Parser$table_formula()`
- `Parser$run()`
- `Parser$clone()`

**Method** `new()`: Create a parser

*Usage:*

`Parser$new()`

**Method** `expect()`: Specify expectation of next token from lexer

*Usage:*

`Parser$expect(id)`

*Arguments:*

`id` The token id expected in stream, otherwise it's an error

**Method** `peek()`: Peek at the next token from parser

*Usage:*

`Parser$peek()`

**Method** `eat_whitespace()`: Remove white space to find start of next token

*Usage:*

`Parser$eat_whitespace()`

**Method** `next_token()`: Returns next lexical token

*Usage:*

`Parser$next_token()`

**Method** `format()`: Return format string as token from lexical stream

*Usage:*

`Parser$format()`

**Method** `r_expression()`: Return R expression as token from lexical stream

*Usage:*

Parser\$r\_expression()

**Method** factor(): Return next factor as token.

*Usage:*

Parser\$factor()

**Method** term(): Parse and return next term in stream

*Usage:*

Parser\$term()

**Method** expression(): Parse and return next expression in stream

*Usage:*

Parser\$expression()

**Method** table\_formula(): Parse and return table formula from stream

*Usage:*

Parser\$table\_formula()

**Method** run(): Run the parser

*Usage:*

Parser\$run(x)

*Arguments:*

x (character,formula) The table specification to parse

**Method** clone(): The objects of this class are cloneable with this method.

*Usage:*

Parser\$clone(deep = FALSE)

*Arguments:*

deep Whether to make a deep clone.

## Examples

```
Parser$new()$run("col1 + col2 + col3 ~ drug*age+spiders")
```

---

pbcc

*Mayo Clinic Primary Biliary Cirrhosis Data*

---

### Description

D This data is from the Mayo Clinic trial in primary biliary cirrhosis (PBC) of the liver conducted between 1974 and 1984. A total of 424 PBC patients, referred to Mayo Clinic during that ten-year interval, met eligibility criteria for the randomized placebo controlled trial of the drug D-penicillamine. The first 312 cases in the data set participated in the randomized trial and contain largely complete data. The additional 112 cases did not participate in the clinical trial, but consented to have basic measurements recorded and to be followed for survival. Six of those cases were lost to follow-up shortly after diagnosis, so the data here are on an additional 106 cases as well as the 312 randomized participants.

### Usage

pbcc

### Format

An object of class `data.frame` with 418 rows and 19 columns.

### Details

A nearly identical data set found in appendix D of Fleming and Harrington; this version has fewer missing values.

Included for use in example from `Hmisc`.

---

pipe.tangram

*Provide a "v" operator for cbind of tangram tables*

---

### Description

The pipe operator provides an cbind for tangram tables

### Usage

```
## S3 method for class 'tangram'
x | y
```

### Arguments

x	left argument for rbind
y	right argument for rbind

**Value**

A column wise merged tangram object

---

print.cell	<i>Print methods for tangram objects</i>
------------	--

---

**Description**

Print methods for tangram objects

**Usage**

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

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

## S3 method for class 'summary.tangram'
print(x, ...)
```

**Arguments**

x	object; the item to render
...	additional arguments passed to summary

**Value**

the text summary

**Examples**

```
print(cell_label("123"))
print(hmisc_iqr(rnorm(20)))
print(hmisc_fraction(45, 137))
print(tangram(1,1) %>%
  row_header("row") %>%
  col_header(1,2,3) %>%
  add_col("A", "B", "C"))
print(tangram(drug~bili, pbc))
```

---

proc_tab	<i>Tangram transform for proc_tab style summaries via a function</i>
----------	--

---

**Description**

Given a function that produces a vector of tangram cells, will generate a table

**Usage**

```
proc_tab(table, row, column, fun = NULL, overall = FALSE, ...)
```

**Arguments**

table	The table builder object
row	The row from the abstract syntax tree that parsed the formula
column	The column from the abstract syntax tree that parsed the formula
fun	The function to apply to the broken out categories
overall	Provide a summary of categorical breakdowns
...	additional arguments to pass to fun

---

rbind.tangram	<i>An rbind for generated tables tangram objects.</i>
---------------	---

---

**Description**

Execute the equivalent of an rbind for generated tables

**Usage**

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

**Arguments**

...	tangram objects to rbind
deparse.level	numeric; not used

**Value**

A merged tangram object

---

render_f	<i>Format a vector of provided numeric values</i>
----------	---

---

**Description**

Given a vector of data return as strings formatted as requested

**Usage**

```
render_f(x, format)
```

**Arguments**

x	numeric; the data to format. Must work with quantile function.
format	numeric or character; If numeric preserve that many position past the decimal, if character pass directly into sprintf as format string

**Value**

character; formatted values as character strings

**Examples**

```
render_f(rnorm(5), 3)
render_f(round(rnorm(5), 2), "%010.03f")
```

---

render_route_tangram	<i>Router for rendering method</i>
----------------------	------------------------------------

---

**Description**

This functions detects if knitr is loaded, and does it's best to determine the output format from knitr and returns the appropriate rendering function.

**Usage**

```
render_route_tangram()
```

**Value**

A rendering function to use

---

replace_cell	<i>Replace a cell's contents</i>
--------------	----------------------------------

---

**Description**

Replace a cell in a table

**Usage**

```
replace_cell(table, row, col, object, ...)
```

**Arguments**

table	the tangram table to modify
row	numeric; The row to modify
col	numeric; The column to modify
object	The cell or object to replace in a table
...	Additional parameters passed to cell function if not given a cell object

**Value**

the modified table

---

rmd	<i>Generate an Rmd table entry from a cell object</i>
-----	---

---

**Description**

Given a cell object generate the corresponding piece of an Rmd table

**Usage**

```
rmd(object, key = FALSE, ...)

## Default S3 method:
rmd(object, key = FALSE, ...)

## S3 method for class 'cell'
rmd(object, key = FALSE, ...)

## S3 method for class 'cell_n'
rmd(object, key = FALSE, ...)

## S3 method for class 'tangram'
rmd(object, key = NULL, append = FALSE, pad = 10, ...)
```

**Arguments**

object	The cell_fstat for indexing
key	A filename to write key values into. Can be false if no key file is desired.
...	additional arguments to renderer. Unused
append	logical; Should the key file be appended too, or overwritten
pad	numeric; Minimum width of columns can be a single or vector of numerics.

**Value**

A string representation of the table

**Examples**

```
rmd(tangram(drug ~ bili, pbc))
```

---

rows

*S3 object to return number of rows/cols in object*

---

**Description**

Number of rows/cols in provided object

**Usage**

```
rows(x)
```

```
cols(x)
```

```
## S3 method for class 'list'
rows(x)
```

```
## S3 method for class 'list'
cols(x)
```

**Arguments**

x                    object; object to determine requested count

---

rtf	<i>S3 rtf Method function for use on abstract table class</i>
-----	---

---

**Description**

S3 rtf Method function for use on abstract table class

**Usage**

```
rtf(object, id, ...)
```

**Arguments**

object	The cell to render to RTF
id	A unique identifier for the table (strongly recommended). If not provided, caption will be used.
...	additional arguments to renderer. Unused at present.

**Value**

A text string rendering of the given table

---

rtf.default	<i>Default conversion to RTF for an abstract table element</i>
-------------	--

---

**Description**

Gives a warning and produces an empty cell

**Usage**

```
## Default S3 method:
rtf(object, id, ...)
```

**Arguments**

object	The cell to render to RTF
id	A unique identifier for traceability
...	additional arguments to renderer. Unused

**Value**

A RTF string rendering of the given cell

---

rtf.tangram

---

*Convert a tangram into an RTF string or file*


---

**Description**

Given a tangram class, a series of conversion creates an rtf representation of the table.

**Usage**

```
## S3 method for class 'tangram'
rtf(
  object,
  id = NA,
  caption = NA,
  fragment = FALSE,
  widths = NA,
  footnote = NA,
  filename = NA,
  append = FALSE,
  point = 9,
  ...
)
```

**Arguments**

object	The cell table to render to RTF
id	A unique identifier for the table (strongly recommended).
caption	A string caption for the table
fragment	A boolean flag that determines whether a fragment or a complete RTF document is generated
widths	RTF requires specified left margin and column widths, this allows user control over these (inches)
footnote	Any footnotes to include under the table.
filename	A filename to write resulting rtf file to
append	A boolean for whether or not to append to given filename
point	Main font point size
...	additional arguments Fto renderer. Unused

**Value**

A text string rendering of the given table

---

select_col	<i>Select given column(s) from a table</i>
------------	--

---

**Description**

Given a table, select the specified column(s)

**Usage**

```
select_col(table, col)
```

**Arguments**

table	the table to modify
col	vector containing column(s) to select

**Value**

the modified table

---

select_row	<i>Select given row(s) from a table</i>
------------	---

---

**Description**

Given a table, select the specified rows

**Usage**

```
select_row(table, row)
```

**Arguments**

table	the table to modify
row	vector with row numbers to select

**Value**

the modified table

---

smd	<i>List of lists, should contain a "Type" entry with a function to determine type of vector passed in. Next entries are keyed off returned types from function, and represent the type of a row. The returned list should contain the same list of types, and represents the type of a column. Thus it now returns a function to process the intersection of those two types.</i>
-----	---

---

**Description**

List of lists, should contain a "Type" entry with a function to determine type of vector passed in. Next entries are keyed off returned types from function, and represent the type of a row. The returned list should contain the same list of types, and represents the type of a column. Thus it now returns a function to process the intersection of those two types.

**Usage**

smd

**Format**

An object of class list of length 5.

---

smd_cell	<i>Cell Generation functions for SMD comparisons of categorical to numerical</i>
----------	--

---

**Description**

Each function here is called when a cell is generated. Overriding these in a formula call will allow one to customize exactly how each cell's contents are generated.

**Usage**

smd\_cell

**Format**

An object of class list of length 7.

**Details**

While this serves as the base template for transforms, it is by no means required if one develops their own bundle of data transforms. One can create any number of cell level styling choices.

---

smd\_compare

---

*Create a SMD for a categorical set of column versus a numerical row*


---

### Description

Given a row and column object from the parser apply a Kruskal test and output the results horizontally. 1 X (n + no. categories + test statistic)

### Usage

```
smd_compare(
  table,
  row,
  column,
  cell_style,
  style,
  smdformat = NULL,
  pformat = NULL,
  weight = NULL,
  test = FALSE,
  ...
)
```

### Arguments

table	The table object to modify
row	The row variable object to use (numerical)
column	The column variable to use (categorical)
cell_style	list; cell styling functions
style	character; chosen styling to final table
smdformat	numeric, character or function; A formatting directive to be applied to smd
pformat	numeric, character or function; A formatting directive to be applied to p-values
weight	numeric; Vector of weights to apply to data when computing SMD
test	logical; include statistical test results
...	absorbs additional arguments. Unused at present.

### Value

The modified table object

---

smd_contingency	<i>Create a contingency table with SMD given a row column of a formula</i>
-----------------	--

---

**Description**

Create a contingency table with SMD given a row column of a formula

**Usage**

```
smd_contingency(
  table,
  row,
  column,
  cell_style,
  style,
  smdformat = NULL,
  collapse_single = TRUE,
  weight = NULL,
  test = FALSE,
  pformat = NULL,
  ...
)
```

**Arguments**

table	The tablebuilder object
row	The row node from the parser of the formula
column	The column node provided by the parser of the formula
cell_style	A list of all individual cell stylings to apply
style	The global style to apply.
smdformat	The format command to apply to smd
collapse_single	Should single factor variables be collapsed
weight	Any weighting to apply to data for computation of SMD
test	logical; include statistical test results
pformat	numeric, character or function; A formatting directive to be applied to p-values
...	Additional arguments to provide cell generation functions

**Value**

The resulting sub table constructed

---

smd\_dist *Create an SMD distance cell*

---

### Description

Create an SMD distance cell. It calls the smd function then formats the result. If the result rounds to all zeros then it appends a less than sign and bumps the least significant digit to one.

### Usage

```
smd_dist(x, group, format, weight = NULL, ...)
```

### Arguments

x	vector; variable to evaluate with smd
group	factor; A grouping to apply. Must have 2 levels.
format	formatting to apply to result
weight	numeric; Weighting to apply to computation. Defaults to NULL.
...	additional arguments to pass to cell generation

### Value

a tangram cell

---

smd\_fraction *Create a fraction cell in the smd transform*

---

### Description

Create a fraction cell in the smd transform. In this instance it print the numerator followed by percentage in parenthesis.

### Usage

```
smd_fraction(num, den, format, ...)
```

### Arguments

num	numerator of fraction
den	denominator of fraction
format	formatting to apply to result
...	additional arguments to pass to cell generation

### Value

a tangram cell

---

smd_meansd	<i>Create an SMD mean and standard deviation cell</i>
------------	---

---

**Description**

Create an SMD mean and standard deviation cell. In this case it prints the mean with the standard deviation in parenthesis

**Usage**

```
smd_meansd(x, format, ...)
```

**Arguments**

x	vector; variable to evaluate with smd
format	formatting to apply to result
...	additional arguments to pass to cell generation

**Value**

a tangram cell

---

standard_difference	<i>Compute the standardized mean distance between 2 groups for numerical or categorical information. Using method described in 'A unified approach to measuring the effect size between two groups using SAS' by Dongsheng Yand and Jarrod E. Dalton, 2012. SAS Global Forum 2012</i>
---------------------	---

---

**Description**

Compute the standardized mean distance between 2 groups for numerical or categorical information. Using method described in 'A unified approach to measuring the effect size between two groups using SAS' by Dongsheng Yand and Jarrod E. Dalton, 2012. SAS Global Forum 2012

**Usage**

```
standard_difference(x, group, weight = NULL)
```

**Arguments**

x	vector; data to estimate effect size for groups
group	vector; the grouping variable.
weight	vector; weighting information for x

---

 summarize\_kruskal\_horz

*Style Bundle for Hmisc defaults*


---

### Description

List of lists, should contain a "Type" entry with a function to determine type of vector passed in. Next entries are keyed off returned types from function, and represent the type of a row. The returned list should contain the same list of types, and represents the type of a column. Thus it now returns a function to process the intersection of those two types. There are additionally a list of cell tranforms that can be overridden and a default footnote if none is specified.

### Usage

```
summarize_kruskal_horz(
  table,
  row,
  column,
  cell_style,
  pformat = NULL,
  msd = FALSE,
  quant = c(0.25, 0.5, 0.75),
  overall = NULL,
  test = FALSE,
  ...
)

summarize_kruskal_vert(
  table,
  row,
  column,
  cell_style,
  collapse_single = TRUE,
  pformat = NULL,
  msd = FALSE,
  test = FALSE,
  ...
)

summarize_chisq(
  table,
  row,
  column,
  cell_style,
  pformat = NULL,
  collapse_single = TRUE,
  overall = NULL,
```

```

    test = FALSE,
    row_percents = FALSE,
    useNA = "no",
    ...
)

summarize_spearman(
  table,
  row,
  column,
  cell_style,
  pformat = NULL,
  test = FALSE,
  ...
)

hmisc

```

### Arguments

table	The table object to modify
row	The row variable object to use (numerical)
column	The column variable to use (categorical)
cell_style	list; cell styling functions
pformat	numeric, character or function; A formatting directive to be applied to p-values
msd	logical; Include mean and standard deviation with quantile statistics
quant	numeric; Vector of quantiles to include. Should be an odd number since the middle value is highlighted on display.
overall	logical or character; Include overall summary statistics for a categorical column. Character values are assumed to be true and used as column header.
test	logical or function; include statistical test results. Function signature must be function(row, col, cell_style, ...)
...	absorbs additional arguments. Unused at present.
collapse_single	logical; default TRUE. Categorical variables with a two values collapse to single row.
row_percents	logical; use denominator across rows instead of columns.
useNA	character; Specifies whether to include NA counts in the table. The allowed values correspond to never "no" (Default), only if the count is positive "ifany" and even for zero counts "always". An NA column is always excluded.

### Format

An object of class `list` of length 5.

**Value**

The modified table object

`summarize_kruskal_horz`

Given a row and column object apply a Kruskal test and output the results horizontally. 1 X (n + no. categories + test statistic)

`summarize_kruskal_vert`

Given a row and column object from the parser apply a Kruskal test and output the results vertically (#Categories+1) X (N, Summary, Statistic)

`summarize_chisq`

Given a row and column object from the parser apply a chi<sup>2</sup> test and output the results

`summarize_spearman`

Given a row and column object from the parser apply a Spearman test and output the results in a 1X3 format.

`hmisc`

```
hmisc <- list(
  Type      = hmisc_data_type,
  Numerical = list(
    Numerical = summarize_spearman,
    Categorical = summarize_kruskal_horz
  ),
  Categorical = list(
    Numerical = summarize_kruskal_vert,
    Categorical = summarize_chisq
  ),
  Cell      = hmisc_cell,
  Footnote  = "N is the number of non-missing value. ^1^Kruskal-Wallis. ^2^Pearson. ^3^Wilcoxon."
)
```

**See Also**

[hmisc\\_data\\_type](#), [tangram](#), [hmisc\\_cell](#)

---

summarize\_nejm\_horz    *Create a summarization for a categorical set of column versus a numerical row in NEJM style*

---

## Description

Given a row and column object from the parser apply a Kruskal test and output the results horizontally. 5 X (n + no. categories + test statistic)

## Usage

```
summarize_nejm_horz(
  table,
  row,
  column,
  cell_style,
  pformat = NULL,
  msd = FALSE,
  quant = c(0.25, 0.5, 0.75),
  overall = NULL,
  test = FALSE,
  useNA = "no",
  ...
)
```

## Arguments

table	The table object to modify
row	The row variable object to use (numerical)
column	The column variable to use (categorical)
cell_style	list; cell styling functions
pformat	numeric, character or function; A formatting directive to be applied to p-values
msd	logical; Include mean and standard deviation with quantile statistics
quant	numeric; Vector of quantiles to include. Should be an odd number since the middle value is highlighted on display.
overall	logical or character; Include overall summary statistics for a categorical column. Character values are assumed to be true and used as column header.
test	logical or function; include statistical test results. Function signature must be function(row, col, cell_style, ...)
useNA	character; Specifies whether to include NA counts in the table. The allowed values correspond to never "no" (Default), only if the count is positive "ifany" and even for zero counts "always". An NA column is always excluded.
...	absorbs additional arguments. Unused at present.

**Value**

The modified table object

---

summarize_nejm_vert	<i>Create a summarization for a categorical row versus X numerical column</i>
---------------------	---

---

**Description**

Given a row and column object from the parser apply a Kruskal test and output the results vertically (#Categories+1) X (N, Summary, Statistic)

**Usage**

```
summarize_nejm_vert(
  table,
  row,
  column,
  cell_style,
  collapse_single = TRUE,
  pformat = NULL,
  msd = FALSE,
  test = FALSE,
  quant = c(0.25, 0.5, 0.75),
  ...
)
```

**Arguments**

table	The table object to modify
row	The row variable object to use (categorical)
column	The column variable to use (numerical)
cell_style	list; cell styling functions
collapse_single	logical; default TRUE. Categorical variables with a two values collapse to single row.
pformat	numeric, character or function; A formatting directive to be applied to p-values
msd	logical; include msd in summary
test	logical; include statistical test results
quant	numeric; vector of quantiles to include. Should be an odd number since the middle value is highlighted on display.
...	absorbs additional arguments. Unused at present.

**Value**

The modified table object

---

summary.tangram	<i>The default method for rendering tangram objects</i>
-----------------	---

---

### Description

A tangram is a summary, so it returns itself. Otherwise convert to a text representation.

### Usage

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

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

### Arguments

object	object; the item to render
...	additional arguments passed to summary

### Value

the text summary

### Examples

```
summary(cell_label("123"))
summary(hmisc_iqr(rnorm(20)))
summary(hmisc_fraction(45, 137))
summary(tangram(1,1) %>%
  row_header("row") %>%
  col_header(1,2,3) %>%
  add_col("A", "B", "C"))
summary(tangram(drug~bili, pbc))
```

---

table_flatten	<i>Given a tangram object with embedded tables, flattens to a single table.</i>
---------------	---

---

### Description

Flattening function to expanded embedded tables inside table cells.

### Usage

```
table_flatten(table)
```

**Arguments**

table            the table object to flatten

**Value**

the flattened table object

---

tangram.clmm2	<i>Table creation methods</i>
---------------	-------------------------------

---

**Description**

The tangram method is the principal method to create tables. It uses R3 method dispatch. If one specifies rows and columns, one gets an empty table of the given size. A formula or character will invoke the parser and process the specified data into a table like `Hmisc::summaryM`. Given an `rms` object it will summarize that model in a table. A `data.frame` is converted directly into a table as well for later rendering. Can create tables from `summary.rms()`, `anova.rms()`, and other `rms` object info to create a single pretty table of model results. The `rms` and `Hmisc` packages are required.

**Usage**

```
## S3 method for class 'clmm2'
tangram(
  x,
  id = NULL,
  style = "hmisc",
  caption = NULL,
  footnote = NULL,
  digits = NULL,
  ...
)

## S3 method for class 'summary.clmm2'
tangram(
  x,
  id = NULL,
  style = "hmisc",
  caption = NULL,
  footnote = NULL,
  digits = NULL,
  pformat = "%1.3f",
  include_p = FALSE,
  ...
)

tangram(x, ...)
```

```
## S3 method for class 'numeric'
tangram(
  x,
  cols,
  id = NULL,
  caption = NULL,
  style = "hmisc",
  footnote = NULL,
  fixed_thead = NULL,
  ...
)

## S3 method for class 'anova.lme'
tangram(
  x,
  id = NULL,
  style = "hmisc",
  caption = NULL,
  footnote = NULL,
  digits = NULL,
  fixed_thead = NULL,
  ...
)

## S3 method for class 'data.frame'
tangram(
  x,
  id = NULL,
  colheader = NA,
  caption = NULL,
  style = "hmisc",
  footnote = NULL,
  after = NA,
  quant = seq(0, 1, 0.25),
  msd = TRUE,
  as.character = NULL,
  fixed_thead = NULL,
  exclude = NULL,
  ...
)

## S3 method for class 'formula'
tangram(
  x,
  data = NULL,
  id = NULL,
  transforms = NULL,
  caption = NULL,
```

```
    style = "hmisc",
    footnote = NULL,
    after = NA,
    digits = NA,
    fixed_thead = NULL,
    exclude = NULL,
    ...
)

## S3 method for class 'character'
tangram(x, ...)

## S3 method for class 'table'
tangram(
  x,
  id = NULL,
  percents = FALSE,
  digits = 1,
  test = FALSE,
  footnote = NULL,
  ...
)

## S3 method for class 'ftable'
tangram(x, id = NULL, ...)

## S3 method for class 'matrix'
tangram(x, digits = NULL, ...)

## S3 method for class 'tbl_df'
tangram(x, ...)

## S3 method for class 'lm'
tangram(x, ...)

## S3 method for class 'summary.lm'
tangram(x, id = NULL, format = NULL, pformat = NULL, tformat = NULL, ...)

## S3 method for class 'rms'
tangram(
  x,
  data = NULL,
  short.labels = NULL,
  footnote = NULL,
  rnd.digits = 2,
  rnd.stats = rnd.digits,
  ...
)
```

**Arguments**

<code>x</code>	object; depends on S3 type, could be rows, formula, string of a formula, data.frame or numerical rows, an rms.model
<code>id</code>	character; A unique character id used to identify this table over multiple runs. No spaces.
<code>style</code>	character; Desired rendering style, currently supports "hmisc", "nejm", and "lancet". Defaults to "hmisc"
<code>caption</code>	character; A string with the desired caption
<code>footnote</code>	character; A vector of character strings as footnotes
<code>digits</code>	numeric; default number of digits to use for display of numerics
<code>...</code>	addition models or data supplied to table construction routines
<code>pformat</code>	function or character; A function to format p values
<code>include_p</code>	logical; Include p-value when printing statistic
<code>cols</code>	numeric; An integer of the number of cols to create
<code>fixed_thead</code>	logical; On conversion to HTML5 should headers be treated as fixed?
<code>colheader</code>	character; Use as column headers in final table
<code>after</code>	function or list of functions; one or more functions to further process an abstract table
<code>quant</code>	numeric; A vector of quantiles to use for summaries
<code>msd</code>	logical; Include mean and standard deviation in numeric summary
<code>as.character</code>	logical; if true data.frames all variables are passed through as.character and no numerical summary is provided.
<code>exclude</code>	vector or list; When x is a data.frame this exclusion criteria is applied to the data. If this is a list then each list pair is the (column name, criteria). It is preferred to use a list to be specific.
<code>data</code>	data.frame; data to use for rendering tangram object
<code>transforms</code>	list of lists of functions; that contain the transformation to apply for summarization
<code>percents</code>	logical; Display percents when rendering a table object. Defaults to FALSE
<code>test</code>	logical or function; Perform default test or a statistical function that will return a test result when passed a row and column
<code>format</code>	numeric or character; Format to apply to statistic
<code>tformat</code>	numeric or character; format to apply to t-value
<code>short.labels</code>	numeric; Named vector of variable labels to replace in interaction rows. Must be in format c("variable name" = "shortened label").
<code>rnd.digits</code>	numeric; Digits to round reference, comparison, result and CI values to. Defaults to 2.
<code>rnd.stats</code>	numeric; Digits to round model LR, R2, etc to. Defaults to rnd.digits.

**Details**

Note that additional arguments are passed to any subsequent transform. This means that a lot of possible arguments are not documented here but in the transform applied. Examine their documentations for additional possible arguments if needed.

**Value**

A tangram object (a table).

**See Also**

Possible transforms are (see [hmisc](#)) (\*default\*), [nejm](#) and [lancet](#).

**Examples**

```
tangram(1, 1)
tangram(data.frame(x=1:3, y=c('a','b','c')), id="mytbl1")
tangram(drug ~ bili + albumin + protime + sex + age + spiders, pbc, id="mytbl2")
tangram("drug~bili+albumin+stage::Categorical+protime+sex+age+spiders", pbc, "mytbl3")
```

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Token

*A token in the formula grammar*


---

**Description**

A token in the formula grammar

A token in the formula grammar

**Format**

[R6Class](#) object.

**Public fields**

`id` The token identifier, E.g. "LPAREN"

`name` Information about the token, useful with IDENTIFIERS.

**Methods****Public methods:**

- [Token\\$new\(\)](#)
- [Token\\$clone\(\)](#)

**Method** `new()`: Construct a lexical token

*Usage:*

```
Token$new(id, name = "")
```

*Arguments:*

id (character) The lexical id of the token

name (character) Additional token information if needed

**Method** clone(): The objects of this class are cloneable with this method.

*Usage:*

Token\$clone(deep = FALSE)

*Arguments:*

deep Whether to make a deep clone.

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