

# Package ‘fmtr’

May 10, 2024

**Type** Package

**Title** Easily Apply Formats to Data

**Version** 1.6.4

**Author** David Bosak

**Maintainer** David Bosak <dbosak01@gmail.com>

**Description** Contains a set of functions that can be used to apply formats to data frames or vectors. The package aims to provide functionality similar to that of SAS® formats. Formats are assigned to the format attribute on data frame columns. Then when the `fdata()` function is called, a new data frame is created with the column data formatted as specified. The package also contains a `value()` function to create a user-defined format, similar to a SAS® user-defined format.

**License** CC0

**Encoding** UTF-8

**URL** <https://fmtr.r-sassy.org>, <https://github.com/dbosak01/fmtr>

**BugReports** <https://github.com/dbosak01/fmtr/issues>

**Depends** R (>= 3.6.0), common

**Suggests** testthat, knitr, rmarkdown, covr, logr, utils, dplyr, libr

**Imports** tibble, stats, crayon, Rcpp

**RoxygenNote** 7.3.1

**VignetteBuilder** knitr

**LinkingTo** Rcpp

**NeedsCompilation** yes

**Repository** CRAN

**Date/Publication** 2024-05-10 04:50:03 UTC

**R topics documented:**

as.data.frame.fcat	3
as.data.frame.fmt	4
as.data.frame.fmt_lst	5
as.fcat	6
as.fcat.data.frame	7
as.fcat.fmt_lst	9
as.fcat.list	9
as.fcat.tbl_df	10
as.flist	12
as.flist.data.frame	14
as.flist.fcat	16
as.flist.list	19
as.flist.tbl_df	20
as.fmt	22
as.fmt.data.frame	23
condition	25
descriptions	26
fapply	28
fapply2	31
fattr	32
fattr<-	34
fcat	35
fdata	36
flist	38
fmt_cnt_pct	40
fmt_mean_sd	41
fmt_median	42
fmt_n	43
fmt_quantile_range	44
fmt_range	45
formats	46
FormattingStrings	48
is.fcat	49
is.flist	50
is.format	51
justification	52
labels.fmt	53
print.fcat	55
print.fmt	56
print.fmt_lst	56
read.fcat	57
read.flist	58
value	59
widths	61
write.fcat	62
write.flist	64

---

as.data.frame.fcat      *Convert a format catalog to a data frame*


---

### Description

This function takes the information stored in a format catalog, and converts it to a data frame. This data frame is useful for storage, editing, saving to a spreadsheet, etc. The data frame shows the name of the formats, their type, and the format expression. For user-defined formats, the data frame populates additional columns for the label and order.

### Usage

```
## S3 method for class 'fcat'
as.data.frame(x, row.names = NULL, optional = FALSE, ...)
```

### Arguments

x	The format catalog to convert.
row.names	Row names of the return data frame. Default is NULL.
optional	TRUE or FALSE value indicating whether converting to syntactic variable names is desired. In the case of formats, the resulting data frame will always be returned with syntactic names, and this parameter is ignored.
...	Any follow-on parameters.

### Value

A data frame that contains the values stored in the format catalog.

### See Also

Other fcat: [as.fcat\(\)](#), [as.fcat.data.frame\(\)](#), [as.fcat.fmt\\_lst\(\)](#), [as.fcat.list\(\)](#), [fcat\(\)](#), [is.fcat\(\)](#), [print.fcat\(\)](#), [read.fcat\(\)](#), [write.fcat\(\)](#)

### Examples

```
# Create a format catalog
c1 <- fcat(num_fmt = "%.1f",
          label_fmt = value(condition(x == "A", "Label A"),
                           condition(x == "B", "Label B"),
                           condition(TRUE, "Other")),
          date_fmt = "%d%b%Y")

# Convert catalog to data frame to view the structure
df <- as.data.frame(c1)
print(df)
#   Name Type Expression  Label Order
# 1  num_fmt   S      %.1f         NA
```

```

# 2 label_fmt    U  x == "A" Label A    NA
# 3 label_fmt    U  x == "B" Label B    NA
# 4 label_fmt    U      TRUE  Other    NA
# 5 date_fmt     S    %d%b%Y           NA

# Convert data frame back to a format catalog
c2 <- as.fcat(df)
c2
# # A format catalog: 3 formats
# - $date_fmt: type S, "%d%b%Y"
# - $label_fmt: type U, 3 conditions
# - $num_fmt: type S, "%.1f"

```

---

as.data.frame.fmt      *Casts a format to a data frame*

---

### Description

Cast a format object to a data frame. This function is a class-specific implementation of the the generic `as.data.frame` method.

### Usage

```

## S3 method for class 'fmt'
as.data.frame(
  x,
  row.names = NULL,
  optional = FALSE,
  ...,
  name = deparse(substitute(x, env = environment()))
)

```

### Arguments

<code>x</code>	An object of class "fmt".
<code>row.names</code>	Row names of the return data frame. Default is NULL.
<code>optional</code>	TRUE or FALSE value indicating whether converting to syntactic variable names is options. In the case of formats, the resulting data frame will always be returned with syntactic names, and this parameter is ignored.
<code>...</code>	Any follow-on parameters.
<code>name</code>	An optional name for the format. By default, the name of the variable holding the format will be used.

### See Also

Other `fmt`: [as.fmt\(\)](#), [as.fmt.data.frame\(\)](#), [condition\(\)](#), [is.format\(\)](#), [labels.fmt\(\)](#), [print.fmt\(\)](#), [value\(\)](#)

---

as.data.frame.fmt\_lst *Convert a formatting list to a data frame*

---

## Description

This function takes the information stored in a formatting list, and converts it to a data frame. The data frame format is useful for storage, editing, saving to a spreadsheet, etc. The data frame shows the name of the formats, their type, and the format expression. For user-defined formats, the data frame populates additional columns for the label and order.

## Usage

```
## S3 method for class 'fmt_lst'
as.data.frame(x, row.names = NULL, optional = FALSE, ...)
```

## Arguments

x	The formatting list to convert.
row.names	Row names for the returned data frame. Default is NULL.
optional	TRUE or FALSE value indicating whether converting to syntactic variable names is desired. In the case of formats, the resulting data frame will always be returned with syntactic names, and this parameter is ignored.
...	Any follow-on parameters.

## Value

A data frame that contains the values stored in the formatting list.

## See Also

Other flist: [as.flist\(\)](#), [as.flist.data.frame\(\)](#), [as.flist.fcat\(\)](#), [as.flist.list\(\)](#), [as.flist.tbl\\_df\(\)](#), [flist\(\)](#), [is.flist\(\)](#), [print.fmt\\_lst\(\)](#), [read.flist\(\)](#), [write.flist\(\)](#)

## Examples

```
# Create a formatting list
c1 <- flist(num_fmt = "%.1f",
           label_fmt = value(condition(x == "A", "Label A"),
                             condition(x == "B", "Label B"),
                             condition(TRUE, "Other")),
           date_fmt = "%d%b%Y")

# Convert catalog to data frame to view the structure
df <- as.data.frame(c1)
print(df)
#   Name Type Expression  Label Order
# 1 num_fmt   S      %.1f         NA
# 2 label_fmt U   x == "A" Label A   NA
```

```

# 3 label_fmt    U  x == "B" Label B    NA
# 4 label_fmt    U      TRUE  Other    NA
# 5 date_fmt     S   %d%b%Y           NA

# Convert data frame back to a formatting list
c2 <- as.flist(df)
c2
# # A formatting list: 3 formats
# - type: column
# - simplify: TRUE
#   Name Type Expression  Label Order
# 1 date_fmt    S   %d%b%Y           <NA>
# 2 label_fmt    U  x == "A" Label A    <NA>
# 3 label_fmt    U  x == "B" Label B    <NA>
# 4 label_fmt    U      TRUE  Other    <NA>
# 5 num_fmt     S     %.1f           <NA>

```

---

as.fcat

*Generic casting method for format catalogs*


---

## Description

A generic method for casting objects to a format catalog. Individual objects will inherit from this function.

## Usage

```
as.fcat(x)
```

## Arguments

x                    The object to cast.

## Value

A format catalog, created using the information in the input object.

## See Also

For class-specific methods, see [as.fcat.data.frame](#), [as.fcat.list](#), and [as.fcat.fmt\\_lst](#).

Other fcat: [as.data.frame.fcat\(\)](#), [as.fcat.data.frame\(\)](#), [as.fcat.fmt\\_lst\(\)](#), [as.fcat.list\(\)](#), [fcat\(\)](#), [is.fcat\(\)](#), [print.fcat\(\)](#), [read.fcat\(\)](#), [write.fcat\(\)](#)

---

as.fcat.data.frame      *Convert a data frame to a format catalog*

---

## Description

This function takes a data frame as input and converts it to a format catalog based on the information contained in the data frame. The data frame should have 5 columns: "Name", "Type", "Expression", "Label" and "Order".

## Usage

```
## S3 method for class 'data.frame'  
as.fcat(x)
```

## Arguments

x                      The data frame to convert.

## Details

The `as.fcat.data.frame` converts a data frame to a format catalog. A corresponding conversion for class `"tbl_df"` converts a tibble.

To understand the structure of the input data frame, create a format and use the `as.data.frame` method to convert the format to a data frame. Then observe the columns and organization of the data.

## Value

A format catalog based on the information contained in the input data frame.

## Input Data Frame Specifications

The input data frame should contain the following columns:

- **Name:** The name of the format
- **Type:** The type of format. See the type codes below.
- **Expression:** The formatting expression. The expression will hold different types of values depending on the format type.
- **Label:** The label for user-defined, "U" type formats.
- **Order:** The order for user-defined, "U" type formats.

Any additional columns will be ignored. Column names are case-insensitive.

Valid values for the "Type" column are as follows:

- **U:** User Defined List created with the [value](#) function.
- **S:** A formatting string of formatting codes. See [FormattingStrings](#).

- **F**: A vectorized function.
- **V**: A named vector lookup.

The "Label" and "Order" columns are used only for a type "U", user-defined format created with the `value` function.

### See Also

Other fcat: `as.data.frame.fcat()`, `as.fcat()`, `as.fcat.fmt_lst()`, `as.fcat.list()`, `fcat()`, `is.fcat()`, `print.fcat()`, `read.fcat()`, `write.fcat()`

### Examples

```
# Create a format catalog
c1 <- fcat(num_fmt = "%.1f",
          label_fmt = value(condition(x == "A", "Label A"),
                           condition(x == "B", "Label B"),
                           condition(TRUE, "Other")),
          date_fmt = "%d-%b-%Y")
```

```
# Convert catalog to data frame to view the structure
df <- as.data.frame(c1)
print(df)
```

#	Name	Type	Expression	Label	Order
1	num_fmt	S	%.1f		NA
2	label_fmt	U	x == "A"	Label A	NA
3	label_fmt	U	x == "B"	Label B	NA
4	label_fmt	U	TRUE	Other	NA
5	date_fmt	S	%d-%b-%Y		NA

```
# Convert data frame back to a format catalog
c2 <- as.fcat(df)
c2
```

```
# # A format catalog: 3 formats
# - $date_fmt: type S, "%d-%b-%Y"
# - $label_fmt: type U, 3 conditions
# - $num_fmt: type S, "%.1f"
```

```
# Use re-converted catalog
fapply(123.456, c2$num_fmt)
# [1] "123.5"
```

```
fapply(c("A", "B", "C", "B"), c2$label_fmt)
# [1] "Label A" "Label B" "Other" "Label B"
```

```
fapply(Sys.Date(), c2$date_fmt)
# [1] "07-Jan-2024"
```



---

as.fcat.fmt_lst	<i>Convert a formatting list to a format catalog</i>
-----------------	--

---

### Description

The `as.fcat.list` function converts a formatting list to a format catalog. For additional information on formatting lists, see [flist](#).

### Usage

```
## S3 method for class 'fmt_lst'  
as.fcat(x)
```

### Arguments

`x` The formatting list to convert.

### Value

A format catalog based on the formats contained in the input formatting list.

### See Also

Other fcat: [as.data.frame.fcat\(\)](#), [as.fcat\(\)](#), [as.fcat.data.frame\(\)](#), [as.fcat.list\(\)](#), [fcat\(\)](#), [is.fcat\(\)](#), [print.fcat\(\)](#), [read.fcat\(\)](#), [write.fcat\(\)](#)

---

as.fcat.list	<i>Convert a list to a format catalog</i>
--------------	---

---

### Description

The `as.fcat.list` function converts a list of formats to a format catalog. Items in the list must be named.

### Usage

```
## S3 method for class 'list'  
as.fcat(x)
```

### Arguments

`x` The list to convert. List must contained named formats.

### Value

A format catalog based on the formats contained in the input list.

**See Also**

Other fcat: [as.data.frame.fcat\(\)](#), [as.fcat\(\)](#), [as.fcat.data.frame\(\)](#), [as.fcat.fmt\\_lst\(\)](#), [fcat\(\)](#), [is.fcat\(\)](#), [print.fcat\(\)](#), [read.fcat\(\)](#), [write.fcat\(\)](#)

---

<code>as.fcat.tbl_df</code>	<i>Convert a tibble to a format catalog</i>
-----------------------------	---

---

**Description**

This function takes a data frame as input and converts it to a format catalog based on the information contained in the data frame. The data frame should have 5 columns: "Name", "Type", "Expression", "Label" and "Order".

**Usage**

```
## S3 method for class 'tbl_df'
as.fcat(x)
```

**Arguments**

`x`                    The data frame to convert.

**Details**

The `as.fcat.data.frame` converts a data frame to a format catalog. A corresponding conversion for class "tbl\_df" converts a tibble.

To understand the structure of the input data frame, create a format and use the `as.data.frame` method to convert the format to a data frame. Then observe the columns and organization of the data.

**Value**

A format catalog based on the information contained in the input data frame.

**Input Data Frame Specifications**

The input data frame should contain the following columns:

- **Name:** The name of the format
- **Type:** The type of format. See the type codes below.
- **Expression:** The formatting expression. The expression will hold different types of values depending on the format type.
- **Label:** The label for user-defined, "U" type formats.
- **Order:** The order for user-defined, "U" type formats.

Any additional columns will be ignored. Column names are case-insensitive.

Valid values for the "Type" column are as follows:

- **U**: User Defined List created with the [value](#) function.
- **S**: A formatting string of formatting codes. See [FormattingStrings](#).
- **F**: A vectorized function.
- **V**: A named vector lookup.

The "Label" and "Order" columns are used only for a type "U", user-defined format created with the [value](#) function.

### See Also

Other fcat: [as.data.frame.fcat\(\)](#), [as.fcat\(\)](#), [as.fcat.fmt\\_lst\(\)](#), [as.fcat.list\(\)](#), [fcat\(\)](#), [is.fcat\(\)](#), [print.fcat\(\)](#), [read.fcat\(\)](#), [write.fcat\(\)](#)

### Examples

```
# Create a format catalog
c1 <- fcat(num_fmt = "%.1f",
          label_fmt = value(condition(x == "A", "Label A"),
                            condition(x == "B", "Label B"),
                            condition(TRUE, "Other")),
          date_fmt = "%d-%b-%Y")

# Convert catalog to data frame to view the structure
df <- as.data.frame(c1)
print(df)
#   Name Type Expression Label Order
# 1 num_fmt  S      %.1f      NA
# 2 label_fmt U  x == "A" Label A  NA
# 3 label_fmt U  x == "B" Label B  NA
# 4 label_fmt U      TRUE  Other  NA
# 5 date_fmt  S  %d-%b-%Y      NA

# Convert data frame back to a format catalog
c2 <- as.fcat(df)
c2
# # A format catalog: 3 formats
# - $date_fmt: type S, "%d-%b-%Y"
# - $label_fmt: type U, 3 conditions
# - $num_fmt: type S, "%.1f"

# Use re-converted catalog
fapply(123.456, c2$num_fmt)
# [1] "123.5"

fapply(c("A", "B", "C", "B"), c2$label_fmt)
# [1] "Label A" "Label B" "Other"  "Label B"

fapply(Sys.Date(), c2$date_fmt)
# [1] "07-Jan-2024"
```

---

as.flist *Convert to a formatting list*

---

### Description

Converts an object to a formatting list. All other parameters are the same as the `flist` function.

### Usage

```
as.flist(x, type = "column", lookup = NULL, simplify = TRUE)
```

### Arguments

<code>x</code>	Object to convert.
<code>type</code>	The type of formatting list. Valid values are 'row' or 'column'. The default value is 'column'.
<code>lookup</code>	A lookup vector. Used for looking up the format from the formatting list. This parameter is only used for 'row' type formatting lists.
<code>simplify</code>	Whether to simplify the results to a vector. Valid values are TRUE or FALSE. Default is TRUE. If the value is set to FALSE, the return type will be a list.

### Details

To apply more than one formatting object to a vector, use a formatting list. There are two types of formatting list: column and row. The column type formatting lists applies all formats to all values in the vector. The row type formatting list can apply a different format to each value in the vector.

Further, there are two styles of row type list: ordered and lookup. The ordered style applies each format in the list to the vector values in the order specified. The ordered style will recycle the formats as needed. The lookup style formatting list uses a lookup to determine which format from the list to apply to a particular value of the vector. The lookup column values should correspond to names on the formatting list.

Examples of column type and row type formatting lists are given below.

### Value

A formatting list object.

### See Also

Other `flist`: [as.data.frame.fmt\\_lst\(\)](#), [as.flist.data.frame\(\)](#), [as.flist.fcat\(\)](#), [as.flist.list\(\)](#), [as.flist.tbl\\_df\(\)](#), [flist\(\)](#), [is.flist\(\)](#), [print.fmt\\_lst\(\)](#), [read.flist\(\)](#), [write.flist\(\)](#)

**Examples**

```

## Example 1: Formatting List - Column Type ##
# Set up data
v1 <- c(Sys.Date(), Sys.Date() + 30, Sys.Date() + 60)

# Create formatting list
f11 <- flist("%B", "The month is: %s")

# Apply formatting list to vector
fapply(v1, f11)
# [1] "The month is: October" "The month is: November" "The month is: December"

## Example 2: Formatting List - Row Type ordered ##
# Set up data
# Notice each row has a different data type
l1 <- list("A", 1.263, as.Date("2020-07-21"),
          "B", 5.8732, as.Date("2020-10-17"))

# These formats will be recycled in the order specified
f12 <- flist(type = "row",
            c(A = "Label A", B = "Label B"),
            "%.1f",
            "%d%b%Y")

fapply(l1, f12)
# [1] "Label A" "1.3" "21Jul2020" "Label B" "5.9" "17Oct2020"

## Example 3: Formatting List - Row Type with lookup ##

#' # Create formatting list
f13 <- flist(type = "row",
            DEC1 = "%.1f",
            DEC2 = "%.2f",
            PCT1 = "%.1f%")

# Set up data
df <- data.frame(CODE = c("DEC1", "DEC2", "PCT1", "DEC2", "PCT1"),
                VAL = c(41.258, 62.948, 12.125, 65.294, 15.825))

# Assign lookup
f13$lookup <- df$CODE

# Apply Formatting List
fapply(df$VAL, f13)
# [1] "41.3" "62.95" "12.1%" "65.29" "15.8%"

## Example 4: Formatting List - Values with Units ##

#' # Create formatting list
f14 <- flist(type = "row",
            BASO = "%.2f x10(9)/L",

```

```

EOS = "%.2f x10(9)/L",
HCT = "%.1f%",
HGB = "%.1f g/dL")

# Set up data
df <- data.frame(CODE = c("BASO", "EOS", "HCT", "HGB"),
                 VAL = c(0.02384, 0.14683, 40.68374, 15.6345))

# Assign lookup
f14$lookup <- df$CODE

# Apply Formatting List
df$VALC <- fapply(df$VAL, f14)

# View results
df
#   CODE      VAL      VALC
# 1 BASO 0.02384 0.02 x10(9)/L
# 2 EOS  0.14683 0.15 x10(9)/L
# 3 HCT 40.68374      40.7%
# 4 HGB 15.63450      15.6 g/dL

```

---

as.flist.data.frame    *Convert a data frame to a formatting list*

---

## Description

Converts a data frame to a formatting list. All other parameters are the same as the `flist` function.

## Usage

```

## S3 method for class 'data.frame'
as.flist(x, type = "column", lookup = NULL, simplify = TRUE)

```

## Arguments

<code>x</code>	Data frame to convert.
<code>type</code>	The type of formatting list. Valid values are 'row' or 'column'. The default value is 'column'.
<code>lookup</code>	A lookup vector. Used for looking up the format from the formatting list. This parameter is only used for 'row' type formatting lists.
<code>simplify</code>	Whether to simplify the results to a vector. Valid values are TRUE or FALSE. Default is TRUE. If the value is set to FALSE, the return type will be a list.

## Details

To apply more than one formatting object to a vector, use a formatting list. There are two types of formatting list: column and row. The column type formatting lists applies all formats to all values in the vector. The row type formatting list can apply a different format to each value in the vector.

Further, there are two styles of row type list: ordered and lookup. The ordered style applies each format in the list to the vector values in the order specified. The ordered style will recycle the formats as needed. The lookup style formatting list uses a lookup to determine which format from the list to apply to a particular value of the vector. The lookup column values should correspond to names on the formatting list.

Examples of column type and row type formatting lists are given below.

## Value

A formatting list object.

## See Also

Other flist: [as.data.frame.fmt\\_lst\(\)](#), [as.flist\(\)](#), [as.flist.fcat\(\)](#), [as.flist.list\(\)](#), [as.flist.tbl\\_df\(\)](#), [flist\(\)](#), [is.flist\(\)](#), [print.fmt\\_lst\(\)](#), [read.flist\(\)](#), [write.flist\(\)](#)

## Examples

```
## Example 1: Formatting List - Column Type ##
# Set up data
v1 <- c(Sys.Date(), Sys.Date() + 30, Sys.Date() + 60)

# Create formatting list
fl1 <- flist("%B", "The month is: %s")

# Apply formatting list to vector
fapply(v1, fl1)
# [1] "The month is: October" "The month is: November" "The month is: December"

## Example 2: Formatting List - Row Type ordered ##
# Set up data
# Notice each row has a different data type
l1 <- list("A", 1.263, as.Date("2020-07-21"),
          "B", 5.8732, as.Date("2020-10-17"))

# These formats will be recycled in the order specified
fl2 <- flist(type = "row",
             c(A = "Label A", B = "Label B"),
             "%.1f",
             "%d%b%Y")

fapply(l1, fl2)
# [1] "Label A" "1.3" "21Jul2020" "Label B" "5.9" "17Oct2020"

## Example 3: Formatting List - Row Type with lookup ##
```

```

#' # Create formatting list
f13 <- flist(type = "row",
            DEC1 = "%.1f",
            DEC2 = "%.2f",
            PCT1 = "%.1f%%")

# Set up data
df <- data.frame(CODE = c("DEC1", "DEC2", "PCT1", "DEC2", "PCT1"),
                VAL = c(41.258, 62.948, 12.125, 65.294, 15.825))

# Assign lookup
f13$lookup <- df$CODE

# Apply Formatting List
fapply(df$VAL, f13)
# [1] "41.3" "62.95" "12.1%" "65.29" "15.8%"

## Example 4: Formatting List - Values with Units ##

#' # Create formatting list
f14 <- flist(type = "row",
            BASO = "%.2f x10(9)/L",
            EOS = "%.2f x10(9)/L",
            HCT = "%.1f%",
            HGB = "%.1f g/dL")

# Set up data
df <- data.frame(CODE = c("BASO", "EOS", "HCT", "HGB"),
                VAL = c(0.02384, 0.14683, 40.68374, 15.6345))

# Assign lookup
f14$lookup <- df$CODE

# Apply Formatting List
df$VALC <- fapply(df$VAL, f14)

# View results
df
#   CODE      VAL      VALC
# 1 BASO 0.02384 0.02 x10(9)/L
# 2 EOS 0.14683 0.15 x10(9)/L
# 3 HCT 40.68374      40.7%
# 4 HGB 15.63450      15.6 g/dL

```



**Description**

Converts a format catalog to a formatting list. All other parameters are the same as the `flist` function.

**Usage**

```
## S3 method for class 'fcat'
as.flist(x, type = "column", lookup = NULL, simplify = TRUE)
```

**Arguments**

<code>x</code>	Format catalog to convert.
<code>type</code>	The type of formatting list. Valid values are 'row' or 'column'. The default value is 'column'.
<code>lookup</code>	A lookup vector. Used for looking up the format from the formatting list. This parameter is only used for 'row' type formatting lists.
<code>simplify</code>	Whether to simplify the results to a vector. Valid values are TRUE or FALSE. Default is TRUE. If the value is set to FALSE, the return type will be a list.

**Details**

To apply more than one formatting object to a vector, use a formatting list. There are two types of formatting list: column and row. The column type formatting lists applies all formats to all values in the vector. The row type formatting list can apply a different format to each value in the vector.

Further, there are two styles of row type list: ordered and lookup. The ordered style applies each format in the list to the vector values in the order specified. The ordered style will recycle the formats as needed. The lookup style formatting list uses a lookup to determine which format from the list to apply to a particular value of the vector. The lookup column values should correspond to names on the formatting list.

Examples of column type and row type formatting lists are given below.

**Value**

A formatting list object.

**See Also**

Other `flist`: `as.data.frame.fmt_lst()`, `as.flist()`, `as.flist.data.frame()`, `as.flist.list()`, `as.flist.tbl_df()`, `flist()`, `is.flist()`, `print.fmt_lst()`, `read.flist()`, `write.flist()`

**Examples**

```
## Example 1: Formatting List - Column Type ##
# Set up data
v1 <- c(Sys.Date(), Sys.Date() + 30, Sys.Date() + 60)

# Create formatting list
fl1 <- flist("%B", "The month is: %s")
```

```

# Apply formatting list to vector
fapply(v1, fl1)
# [1] "The month is: October" "The month is: November" "The month is: December"

## Example 2: Formatting List - Row Type ordered ##
# Set up data
# Notice each row has a different data type
l1 <- list("A", 1.263, as.Date("2020-07-21"),
          "B", 5.8732, as.Date("2020-10-17"))

# These formats will be recycled in the order specified
fl2 <- flist(type = "row",
            c(A = "Label A", B = "Label B"),
            "%.1f",
            "%d%b%Y")

fapply(l1, fl2)
# [1] "Label A" "1.3" "21Jul2020" "Label B" "5.9" "17Oct2020"

## Example 3: Formatting List - Row Type with lookup ##
#' # Create formatting list
fl3 <- flist(type = "row",
            DEC1 = "%.1f",
            DEC2 = "%.2f",
            PCT1 = "%.1f%")

# Set up data
df <- data.frame(CODE = c("DEC1", "DEC2", "PCT1", "DEC2", "PCT1"),
                VAL = c(41.258, 62.948, 12.125, 65.294, 15.825))

# Assign lookup
fl3$lookup <- df$CODE

# Apply Formatting List
fapply(df$VAL, fl3)
# [1] "41.3" "62.95" "12.1%" "65.29" "15.8%"

## Example 4: Formatting List - Values with Units ##
#' # Create formatting list
fl4 <- flist(type = "row",
            BASO = "%.2f x10(9)/L",
            EOS = "%.2f x10(9)/L",
            HCT = "%.1f%",
            HGB = "%.1f g/dL")

# Set up data
df <- data.frame(CODE = c("BASO", "EOS", "HCT", "HGB"),
                VAL = c(0.02384, 0.14683, 40.68374, 15.6345))

```

```

# Assign lookup
fl4$lookup <- df$CODE

# Apply Formatting List
df$VALC <- fapply(df$VAL, fl4)

# View results
df
#   CODE      VAL      VALC
# 1 BASO 0.02384 0.02 x10(9)/L
# 2 EOS  0.14683 0.15 x10(9)/L
# 3 HCT  40.68374      40.7%
# 4 HGB  15.63450      15.6 g/dL

```

---

as.flist.list

*Convert a list to a formatting list*


---

## Description

Converts a normal list to a formatting list. All other parameters are the same as the `flist` function.

## Usage

```

## S3 method for class 'list'
as.flist(x, type = "column", lookup = NULL, simplify = TRUE)

```

## Arguments

<code>x</code>	List to convert.
<code>type</code>	The type of formatting list. Valid values are 'row' or 'column'. The default value is 'column'.
<code>lookup</code>	A lookup vector. Used for looking up the format from the formatting list. This parameter is only used for 'row' type formatting lists.
<code>simplify</code>	Whether to simplify the results to a vector. Valid values are TRUE or FALSE. Default is TRUE. If the value is set to FALSE, the return type will be a list.

## Details

To apply more than one formatting object to a vector, use a formatting list. There are two types of formatting list: column and row. The column type formatting lists applies all formats to all values in the vector. The row type formatting list can apply a different format to each value in the vector.

Further, there are two styles of row type list: ordered and lookup. The ordered style applies each format in the list to the vector values in the order specified. The ordered style will recycle the formats as needed. The lookup style formatting list uses a lookup to determine which format from the list to apply to a particular value of the vector. The lookup column values should correspond to names on the formatting list.

Examples of column type and row type formatting lists are given below.

**Value**

A formatting list object.

**See Also**

[flist](#) function documentation for additional details.

Other flist: [as.data.frame.fmt\\_lst\(\)](#), [as.flist\(\)](#), [as.flist.data.frame\(\)](#), [as.flist.fcat\(\)](#), [as.flist.tbl\\_df\(\)](#), [flist\(\)](#), [is.flist\(\)](#), [print.fmt\\_lst\(\)](#), [read.flist\(\)](#), [write.flist\(\)](#)

**Examples**

```
# Example 1: Create flist from list - column type
lst1 <- list("%d%b%Y", "%.1f")
fl1 <- as.flist(lst1, type = "column")

# Example 2: Create flist from list - row type
lst2 <- list(lookup = c(A = "Label A", B = "Label B"),
            dec1 = "%.1f",
            dt1 = "%d%b%Y")
fl2 <- as.flist(lst2, type = "row")
```

---

<code>as.flist.tbl_df</code>	<i>Convert a tibble to a formatting list</i>
------------------------------	--

---

**Description**

Converts a tibble to a formatting list. All other parameters are the same as the `flist` function.

**Usage**

```
## S3 method for class 'tbl_df'
as.flist(x, type = "column", lookup = NULL, simplify = TRUE)
```

**Arguments**

<code>x</code>	Tibble to convert.
<code>type</code>	The type of formatting list. Valid values are 'row' or 'column'. The default value is 'column'.
<code>lookup</code>	A lookup vector. Used for looking up the format from the formatting list. This parameter is only used for 'row' type formatting lists.
<code>simplify</code>	Whether to simplify the results to a vector. Valid values are TRUE or FALSE. Default is TRUE. If the value is set to FALSE, the return type will be a list.

## Details

To apply more than one formatting object to a vector, use a formatting list. There are two types of formatting list: column and row. The column type formatting lists applies all formats to all values in the vector. The row type formatting list can apply a different format to each value in the vector.

Further, there are two styles of row type list: ordered and lookup. The ordered style applies each format in the list to the vector values in the order specified. The ordered style will recycle the formats as needed. The lookup style formatting list uses a lookup to determine which format from the list to apply to a particular value of the vector. The lookup column values should correspond to names on the formatting list.

Examples of column type and row type formatting lists are given below.

## Value

A formatting list object.

## See Also

Other flist: [as.data.frame.fmt\\_lst\(\)](#), [as.flist\(\)](#), [as.flist.data.frame\(\)](#), [as.flist.fcat\(\)](#), [as.flist.list\(\)](#), [flist\(\)](#), [is.flist\(\)](#), [print.fmt\\_lst\(\)](#), [read.flist\(\)](#), [write.flist\(\)](#)

## Examples

```
## Example 1: Formatting List - Column Type ##
# Set up data
v1 <- c(Sys.Date(), Sys.Date() + 30, Sys.Date() + 60)

# Create formatting list
fl1 <- flist("%B", "The month is: %s")

# Apply formatting list to vector
fapply(v1, fl1)
# [1] "The month is: October" "The month is: November" "The month is: December"

## Example 2: Formatting List - Row Type ordered ##
# Set up data
# Notice each row has a different data type
l1 <- list("A", 1.263, as.Date("2020-07-21"),
          "B", 5.8732, as.Date("2020-10-17"))

# These formats will be recycled in the order specified
fl2 <- flist(type = "row",
             c(A = "Label A", B = "Label B"),
             "%.1f",
             "%d%b%Y")

fapply(l1, fl2)
# [1] "Label A" "1.3" "21Jul2020" "Label B" "5.9" "17Oct2020"

## Example 3: Formatting List - Row Type with lookup ##
```

```

#' # Create formatting list
f13 <- flist(type = "row",
            DEC1 = "%.1f",
            DEC2 = "%.2f",
            PCT1 = "%.1f%%")

# Set up data
df <- data.frame(CODE = c("DEC1", "DEC2", "PCT1", "DEC2", "PCT1"),
                VAL = c(41.258, 62.948, 12.125, 65.294, 15.825))

# Assign lookup
f13$lookup <- df$CODE

# Apply Formatting List
fapply(df$VAL, f13)
# [1] "41.3" "62.95" "12.1%" "65.29" "15.8%"

## Example 4: Formatting List - Values with Units ##

#' # Create formatting list
f14 <- flist(type = "row",
            BASO = "%.2f x10(9)/L",
            EOS = "%.2f x10(9)/L",
            HCT = "%.1f%%",
            HGB = "%.1f g/dL")

# Set up data
df <- data.frame(CODE = c("BASO", "EOS", "HCT", "HGB"),
                VAL = c(0.02384, 0.14683, 40.68374, 15.6345))

# Assign lookup
f14$lookup <- df$CODE

# Apply Formatting List
df$VALC <- fapply(df$VAL, f14)

# View results
df
#   CODE      VAL      VALC
# 1 BASO 0.02384 0.02 x10(9)/L
# 2 EOS  0.14683 0.15 x10(9)/L
# 3 HCT 40.68374    40.7%
# 4 HGB 15.63450    15.6 g/dL

```

---

as.fmt

*Generic casting method for formats*


---

## Description

A generic method for casting objects to a format. Individual objects will inherit from this function.

**Usage**

```
as.fmt(x)
```

**Arguments**

x                    The object to cast.

**Value**

A formatting object, created using the information in the input object.

**See Also**

Other fmt: [as.data.frame.fmt\(\)](#), [as.fmt.data.frame\(\)](#), [condition\(\)](#), [is.format\(\)](#), [labels.fmt\(\)](#), [print.fmt\(\)](#), [value\(\)](#)

---

as.fmt.data.frame            *Convert a data frame to a user-defined format*

---

**Description**

This function takes a data frame as input and converts it to a user-defined format based on the information contained in the data frame. The data frame should have 5 columns: "Name", "Type", "Expression", "Label" and "Order".

**Usage**

```
## S3 method for class 'data.frame'  
as.fmt(x)
```

**Arguments**

x                    The data frame to convert.

**Details**

The `as.fmt.data.frame` function converts a data frame to a user-defined format.

To understand the structure of the input data frame, create a user-defined format and use the `as.data.frame` method to convert the format to a data frame. Then observe the columns and organization of the data.

**Value**

A format catalog based on the information contained in the input data frame.

## Input Data Frame Specifications

The input data frame should contain the following columns:

- **Name:** The name of the format
- **Type:** The type of format. See the type codes below.
- **Expression:** The formatting expression. The expression will hold different types of values depending on the format type. Within the data frame, this expression is stored as a character string.
- **Label:** The label for user-defined, "U" type formats.
- **Order:** The order for user-defined, "U" type formats.
- **Factor:** An optional column for "U" type formats that sets the "as.factor" parameter. Valid values are TRUE, FALSE, or NA.

Any additional columns will be ignored. Column names are case-insensitive.

Valid values for the "Type" column are as follows:

- **U:** User Defined List created with the [value](#) function.
- **S:** A formatting string of formatting codes. See [FormattingStrings](#).
- **F:** A vectorized function.
- **V:** A named vector lookup.

The "Label", "Order", and "Factor" columns are used only for a type "U", user-defined format created with the [value](#) function.

## See Also

Other fmt: [as.data.frame.fmt\(\)](#), [as.fmt\(\)](#), [condition\(\)](#), [is.format\(\)](#), [labels.fmt\(\)](#), [print.fmt\(\)](#), [value\(\)](#)

## Examples

```
# Create a user-defined format
f1 <- value(condition(x == "A", "Label A"),
           condition(x == "B", "Label B"),
           condition(TRUE, "Other"))

# Convert user-defined format to data frame to view the structure
df <- as.data.frame(f1)
print(df)

# Name Type Expression Label Order Factor
# 1 f1 U x == "A" Label A NA FALSE
# 2 f1 U x == "B" Label B NA FALSE
# 3 f1 U TRUE Other NA FALSE

# Convert data frame back to a user-defined format
f2 <- as.fmt(df)
```



```
# Use re-converted format
fapply(c("A", "B", "C", "B"), f2)
# [1] "Label A" "Label B" "Other"   "Label B"
```

---

condition

*Define a condition for a user-defined format*


---

## Description

The `condition` function creates a condition for a user-defined format. It is typically used in conjunction with the `value` function.

## Usage

```
condition(expr, label, order = NULL)
```

## Arguments

<code>expr</code>	A valid R expression. The value in the expression is identified by the variable 'x', i.e. <code>x == 'A'</code> or <code>x &gt; 3 &amp; x &lt; 6</code> . The expression should not be quoted. The expression parameter will accept equality, relational, and logical operators. It will also accept numeric or string literals. String literals should be quoted. It will not accept functions or any expression that includes a comma. For these more complex operations, it is best to use a vectorized function. See <code>fapply</code> for an example of a vectorized function.
<code>label</code>	A label to be assigned if the expression is TRUE. The label can any valid literal value. Typically, the label will be a character string. However, the label parameter does not restrict the data type. Meaning, the label could also be a number, date, or other R object type. The label may also be a string format, which allows you to perform conditional formatting.
<code>order</code>	An optional integer order number. When used, this parameter will effect the order of the labels returned from the <code>labels.fmt</code> function. The purpose of the parameter is to control ordering of the format labels independently of the order they are assigned in the conditions. The order parameter is useful when you are using the format labels to assign ordered levels in a factor.

## Details

The `condition` function creates a condition as part of a format definition. The format is defined using the `value` function. The condition is defined as an expression/label pair. The expression parameter can be any valid R expression. The label parameter can be any valid literal. Conditions are evaluated in the order they are assigned. A default condition is created by assigning the expression parameter to TRUE. If your data can contain missing values, it is recommended that you test for those values first. Any data values that do not meet one of the conditions will fall through the format as-is.

The condition object is an S3 class of type "fmt\_cond". The condition labels can be extracted from the format using the `labels` function.

The format object may be applied to a vector using the `fapply` function. See [fapply](#) for further details.

### Value

The new condition object.

### See Also

[fdata](#) to apply formatting to a data frame, [value](#) to define a format, [levels](#) or [labels.fmt](#) to access the labels, and [fapply](#) to apply the format to a vector.

Other fmt: [as.data.frame.fmt\(\)](#), [as.fmt\(\)](#), [as.fmt.data.frame\(\)](#), [is.format\(\)](#), [labels.fmt\(\)](#), [print.fmt\(\)](#), [value\(\)](#)

### Examples

```
# Set up vector
v1 <- c("A", "B", "C", "B")

# Define format
fmt1 <- value(condition(x == "A", "Label A"),
              condition(x == "B", "Label B"),
              condition(TRUE, "Other"))

# Apply format to vector
v2 <- fapply(v1, fmt1)
v2
# [1] "Label A" "Label B" "Other"   "Label B"
```

---

descriptions

*Get or set descriptions for data frame columns*

---

### Description

The `descriptions` function extracts all assigned description attributes from a data frame, and returns them in a named list. The function also assigns description attributes from a named list.

### Usage

```
descriptions(x)
```

```
descriptions(x) <- value
```

### Arguments

<code>x</code>	A data frame or tibble
<code>value</code>	A named list of description values.

## Details

If descriptions are assigned to the "description" attributes of the data frame columns, the `descriptions` function will extract those values. The function will return the description values in a named list, where the names correspond to the name of the column that the description was assigned to. If a column does not have a description attribute assigned, that column will not be included in the list.

When used on the receiving side of an assignment, the function will assign descriptions to a data frame. The description values should be in a named list, where each name corresponds to the name of the data frame column to assign values to.

Finally, if you wish to clear out the description attributes, assign a `NULL` value to the `descriptions` function.

## Value

A named list of description values.

## See Also

[fdata](#) to display formatted data, [value](#) to create user-defined formats, and [fapply](#) to apply formatting to a vector.

## Examples

```
# Take subset of data
df1 <- mtcars[1:5, c("mpg", "cyl") ]

# Print current state
print(df1)
#           mpg cyl
# Mazda RX4      21.0  6
# Mazda RX4 Wag  21.0  6
# Datsun 710      22.8  4
# Hornet 4 Drive  21.4  6
# Hornet Sportabout 18.7  8

# Assign descriptions
descriptions(df1) <- list(mpg = "Miles per Gallon", cyl = "Cylinders")

# Display descriptions
descriptions(df1)
# $mpg
# [1] "Miles per Gallon"
#
# $cyl
# [1] "Cylinders"

# Clear descriptions
descriptions(df1) <- NULL

# Confirm descriptions are cleared
descriptions(df1)
# list()
```

---

`fapply`*Apply formatting to a vector*

---

### Description

The `fapply` function applies formatting to a vector.

### Usage

```
fapply(x, format = NULL, width = NULL, justify = NULL)
```

### Arguments

<code>x</code>	A vector, factor, or list to apply the format to.
<code>format</code>	A format to be applied.
<code>width</code>	The desired character width of the formatted vector. Default value is <code>NULL</code> , meaning the vector will be variable width.
<code>justify</code>	Whether to justify the return vector. Valid values are <code>'left'</code> , <code>'right'</code> , <code>'center'</code> , <code>'centre'</code> , or <code>'none'</code> .

### Details

The `fapply` function accepts several types of formats: formatting strings, named vectors, vectorized functions, or user-defined formats. It also accepts a formatting list, composed of any of the previous types. The function will first determine the type of format, and then apply the format in the appropriate way. Results are returned as a vector.

The function also has parameters for width and justification.

Parameters may also be passed as attributes on the vector. See the `fattr` function for additional information on setting formatting attributes.

### Value

A vector of formatted values.

### Types of Formats

The `fapply` function will process any of the following types of formats:

- **Formatting string:** A single string will be interpreted as a formatting string. See the [FormattingStrings](#) documentation for further details.
- **Named vector:** A named vector can serve as a lookup list or decode for a vector. You can use a named vector to perform simple lookups on character vectors.
- **Format object:** A format object may be created using the `value` function. The format object is included in the `fmtr` package, and is specially designed for data categorization.

- **Vectorized formatting function:** A vectorized function provides the most flexibility and power over your formatting. You can use an existing formatting function from any package, or create your own vectorized formatting function using [Vectorize](#).

fapply will also accept a formatting list, which can contain any number of formats from the above list. To create a formatting list, see the [flist](#) function.

### See Also

[fcat](#) to create a format catalog, [value](#) to define a format, [fattr](#) to easily set the formatting attributes of a vector, and [flist](#) to define a formatting list. Also see [fdata](#) to apply formats to an entire data frame, and [FormattingStrings](#) for how to define a formatting string.

### Examples

```
## Example 1: Formatting string ##
v1 <- c(1.235, 8.363, 5.954, 2.465)

# Apply string format.
fapply(v1, "%.1f")
# [1] "1.2" "8.4" "6.0" "2.5"

## Example 2: Named vector ##
# Set up vector
v2 <- c("A", "B", "C", "B")

# Set up named vector for formatting
fmt2 <- c(A = "Label A", B = "Label B", C = "Label C")

# Apply format to vector
fapply(v2, fmt2)
# [1] "Label A" "Label B" "Label C" "Label B"

## Example 3: User-defined format ##
# Define format
fmt3 <- value(condition(x == "A", "Label A"),
              condition(x == "B", "Label B"),
              condition(TRUE, "Other"))

# Apply format to vector
fapply(v2, fmt3)
# [1] "Label A" "Label B" "Other" "Label B"

## Example 4: Formatting function ##
# Set up vectorized function
fmt4 <- Vectorize(function(x) {

  if (x %in% c("A", "B"))
    ret <- paste("Label", x)
  else
    ret <- "Other"
```

```

    return(ret)
  })

# Apply format to vector
fapply(v2, fmt4)
# [1] "Label A" "Label B" "Other" "Label B"

## Example 5: Formatting List - Row Type ##
# Set up data
# Notice each row has a different data type
v3 <- list(2841.258, "H", Sys.Date(),
          "L", Sys.Date() + 60, 1382.8865)
v4 <- c("int", "char", "date", "char", "date", "int")

# Create formatting list
lst <- flist(type = "row", lookup = v4,
            int = function(x) format(x, digits = 2, nsmall = 1,
                                     big.mark=","),
            char = value(condition(x == "H", "High"),
                          condition(x == "L", "Low")),
            date = "%d%b%Y")

# Apply formatting list to vector
fapply(v3, lst)
# [1] "2,841.3" "High" "06Jan2024" "Low" "06Mar2024" "1,382.9"

## Example 6: Formatting List - Column Type ##
# Set up data
v5 <- c(Sys.Date(), Sys.Date() + 30, Sys.Date() + 60)
v5
# [1] "2024-01-06" "2024-02-05" "2024-03-06"

# Create formatting list
lst <- flist("%B", "This month is: %s", type = "column")

# Apply formatting list to vector
fapply(v5, lst)
# [1] "This month is: January" "This month is: February" "This month is: March"

# Example 7: Conditional Formatting
# Data vector
v6 <- c(8.38371, 1.46938, 3.28783, NA, 0.98632)

# User-defined format
fmt5 <- value(condition(is.na(x), "Missing"),
              condition(x < 1, "Low"),
              condition(x > 5, "High"),
              condition(TRUE, "%.2f"))

# Apply format to data vector
fapply(v6, fmt5)
# [1] "High" "1.47" "3.29" "Missing" "Low"

```

---

`fapply2`*Apply formatting to two vectors*

---

**Description**

The `fapply2` function applies formatting to two different vectors, and combines them into a single vector. This function is useful in cases where your data is in two different variables, and you would like them displayed as a single column for reporting purposes. For example, if you wish to create one column to display mean and standard deviation.

**Usage**

```
fapply2(  
  x1,  
  x2,  
  format1 = NULL,  
  format2 = NULL,  
  sep = " ",  
  width = NULL,  
  justify = NULL  
)
```

**Arguments**

<code>x1</code>	A vector, factor, or list to apply the format1 to.
<code>x2</code>	A second vector, factor, or list to which format2 will be applied.
<code>format1</code>	A format to be applied to the first input.
<code>format2</code>	A format to be applied to the second input.
<code>sep</code>	A separator to use between the two formatted values. Default is a single blank space (" ").
<code>width</code>	The desired character width of the formatted vector. Default value is NULL, meaning the vector will be variable width.
<code>justify</code>	Whether to justify the return vector. Valid values are 'left', 'right', 'center', 'centre', or 'none'.

**Details**

The `fapply2` function works nearly the same as `fapply`. The difference is it has parameters for two vectors and formats instead of one. The output of the function is a single vector. The function essentially calls `fapply` on each vector and pastes them together afterwards.

There is an additional `sep` parameter so you can define a separator between the two formatted values. The `width` and `justify` parameters will apply to the single vector result. The function will also pick up format attributes on the supplied vectors.

The `fapply2` function accepts any of the format types that `fapply` accepts. See `fapply` for additional information on the types of formats that can be applied.

Parameters may also be passed as attributes on the vector. See the [fattr](#) function for additional information on setting formatting attributes.

### Value

A vector of formatted values.

### See Also

[fapply](#) to format a single input, [fcat](#) to create a format catalog, [value](#) to define a format, [fattr](#) to easily set the formatting attributes of a vector, and [flist](#) to define a formatting list. Also see [fdata](#) to apply formats to an entire data frame, and [FormattingStrings](#) for how to define a formatting string.

### Examples

```
# Create sample data
dt <- c(2.1, 5, 6, 9, 2, 7, 3)

# Calculate mean and standard deviation
v1 <- mean(dt)
v2 <- sd(dt)

# Apply formats and combine
fapply2(v1, v2, "%.1f", "(%.2f)")
# [1] "4.9 (2.66)"
```

---

fattr

*Set formatting attributes*

---

### Description

Assign formatting attributes to a vector.

### Usage

```
fattr(
  x,
  format = NULL,
  width = NULL,
  justify = NULL,
  label = NULL,
  description = NULL,
  keep = TRUE
)
```



**Arguments**

x	The vector or data frame column to assign attributes to.
format	The format to assign to the format attribute. The format can be a formatting string, a named vector decode, a vectorized formatting function, or a formatting list.
width	The desired width of the formatted output.
justify	Justification of the output vector. Valid values are 'none', 'left', 'right', 'center', or 'centre'.
label	A label string to assign to the vector. This parameter was added for convenience, as the label is frequently assigned at the same time the formatting attributes are assigned.
description	A description string to assign to the vector. This parameter was added for convenience, as the description is frequently assigned at the same time the formatting attributes are assigned.
keep	Whether to keep any existing formatting attributes and transfer to the new vector. Default value is TRUE.

**Details**

The `fattr` function is a convenience function for assigning formatting attributes to a vector. The function accepts parameters for `format`, `width`, and `justify`. Any formatting attributes assigned can be applied using `fapply` or `fdata`.

**Value**

The vector with formatting attributes assigned.

**See Also**

`fdata` to apply formats to a data frame, `fapply` to apply formats to a vector. See [FormattingStrings](#) for documentation on formatting strings.

**Examples**

```
# Create vector
a <- c(1.3243, 5.9783, 2.3848)

# Assign format attributes
a <- fattr(a, format = "%.1f", width = 10, justify = "center")

# Apply format attributes
fapply(a)
# [1] " 1.3 " " 6.0 " " 2.4 "
```

---

fattr<-                      *Set formatting attributes*

---

## Description

Assign formatting attributes to a vector

## Usage

```
fattr(x) <- value
```

## Arguments

x	The vector or data frame column to assign attributes to.
value	A named vector of attribute values.

## Details

The `fattr` function is a convenience function for assigning formatting attributes to a vector. The function accepts a named list of formatting attributes. Valid names are 'format', 'width', 'justify', 'label' and 'description'. See [fattr](#) for additional details.

## See Also

[fdata](#) to apply formats to a data frame, [fapply](#) to apply formats to a vector.

## Examples

```
# Create vector
a <- c(1.3243, 5.9783, 2.3848)

# Assign format attributes
fattr(a) <- list(format = "%.1f")

# Apply format attributes
fapply(a)
# [1] "1.3" "6.0" "2.4"
```

---

fcat *Create a format catalog*

---

## Description

A format catalog is a collection of formats. A format collection allows you to manage and store formats as a unit. The `fcat` function defines the format catalog.

## Usage

```
fcat(..., log = TRUE)
```

## Arguments

<code>...</code>	A set of formats. Pass the formats as a name/value pair. Multiple name/value pairs are separated by a comma.
<code>log</code>	Whether to log the creation of the format catalog. Default is TRUE. This parameter is used internally.

## Details

A format catalog is an S3 object of class "fcat". The purpose of the catalog is to combine related formats, and allow you to manipulate all of them as a single object. The format catalog can be saved to/from a file using the `write.fcat` and `read.fcat` functions. A format catalog can also be converted to/from a data frame using the `as.fcat.data.frame` and `as.data.frame.fcat` functions. Formats are accessed in the catalog using list syntax.

A format catalog can be used to assign formats to a data frame or tibble using the `formats` function. Formats may be applied using the `fdata` and `fapply` functions.

A format catalog may contain any type of format except a formatting list. Allowed formats include a formatting string, a named vector lookup, a user-defined format, and a vectorized formatting function. A formatting list can be converted to a format catalog and saved independently. See the `flist` function for more information on formatting lists.

## Value

The format catalog object.

## See Also

`formats` function for assigning formats to a data frame, and the `fdata` and `fapply` functions for applying formats.

Other fcat: `as.data.frame.fcat()`, `as.fcat()`, `as.fcat.data.frame()`, `as.fcat.fmt_lst()`, `as.fcat.list()`, `is.fcat()`, `print.fcat()`, `read.fcat()`, `write.fcat()`

## Examples

```
# Create format catalog
c1 <- fcat(num_fmt = "%.1f",
          label_fmt = value(condition(x == "A", "Label A"),
                           condition(x == "B", "Label B"),
                           condition(TRUE, "Other")),
          date_fmt = "%d%b%Y")

# Use formats in the catalog
fapply(2, c1$num_fmt)
# [1] "2.0"

fapply(c("A", "B", "C", "B"), c1$label_fmt)
# [1] "Label A" "Label B" "Other" "Label B"

fapply(Sys.Date(), c1$date_fmt)
# [1] "06Jan2024"
```

---

fdata

*Format a data frame or tibble*


---

## Description

The `fdata` function applies formatting attributes to the entire data frame.

## Usage

```
fdata(x, ...)
```

## Arguments

`x` A data frame or tibble to be formatted.  
`...` Any follow-on parameters to the format function.

## Details

If formats are assigned to the "format" attributes of the data frame columns, the `fdata` function will apply those formats to the specified columns, and return a new, formatted data frame. Formats can be specified as formatting strings, named vectors, user-defined formats, or vectorized formatting functions. The `fdata` function will apply the format to the associated column data using the [fapply](#) function. A format can also be specified as a formatting list of the previous four types. See the [fapply](#) function for additional information.

After formatting each column, the `fdata` function will call the base R [format](#) function on the data frame. Any follow on parameters will be sent to the format function.

The `fdata` function will also apply any width or justify attributes assigned to the data frame columns. These attributes can be controlled at the column level. Using attributes to assign formatting and `fdata` to apply those attributes gives you a great deal of control over how your data is presented.

**Value**

A new, formatted data frame or tibble with the formats applied.

**See Also**

[fcat](#) to create a format catalog, [fapply](#) to apply a format to a vector, [value](#) to define a format object, [fattr](#) to assign formatting specifications to a single column/vector, and the [formats](#), [widths](#), and [justification](#) functions to get or set formatting for an entire data frame. Also see [FormattingStrings](#) for documentation on formatting strings.

**Examples**

```
# Construct data frame from state vectors
df <- data.frame(state = state.abb, area = state.area)[1:10, ]

# Calculate percentages
df$pct <- df$area / sum(state.area) * 100

# Before formatting
df
#   state  area      pct
# 1    AL 51609 1.42629378
# 2    AK 589757 16.29883824
# 3    AZ 113909 3.14804973
# 4    AR  53104 1.46761040
# 5    CA 158693 4.38572418
# 6    CO 104247 2.88102556
# 7    CT  5009 0.13843139
# 8    DE  2057 0.05684835
# 9    FL 58560 1.61839532
# 10   GA 58876 1.62712846

# Create state name lookup list
name_lookup <- state.name
names(name_lookup) <- state.abb

# Assign formats
formats(df) <- list(state = name_lookup,
                    area = function(x) format(x, big.mark = ","),
                    pct = "%.1f%")

# Apply formats
fdata(df)
#   state  area  pct
# 1  Alabama 51,609 1.4%
# 2  Alaska 589,757 16.3%
# 3  Arizona 113,909 3.1%
# 4  Arkansas 53,104 1.5%
# 5  California 158,693 4.4%
# 6  Colorado 104,247 2.9%
# 7  Connecticut 5,009 0.1%
# 8  Delaware 2,057 0.1%
```

```
# 9      Florida 58,560 1.6%
# 10     Georgia 58,876 1.6%
```

---

flist *Create a formatting list*

---

## Description

A formatting list contains more than one formatting object.

## Usage

```
flist(..., type = "column", lookup = NULL, simplify = TRUE)
```

## Arguments

...	A set of formatting objects.
type	The type of formatting list. Valid values are 'row' or 'column'. The default value is 'column'.
lookup	A lookup vector. Used for looking up the format from the formatting list. This parameter is only used for 'row' type formatting lists.
simplify	Whether to simplify the results to a vector. Valid values are TRUE or FALSE. Default is TRUE. If the value is set to FALSE, the return type will be a list.

## Details

To apply more than one formatting object to a vector, use a formatting list. There are two types of formatting list: column and row. The column type formatting lists applies all formats to all values in the vector. The row type formatting list can apply a different format to each value in the vector.

Further, there are two styles of row type list: ordered and lookup. The ordered style applies each format in the list to the vector values in the order specified. The ordered style will recycle the formats as needed. The lookup style formatting list uses a lookup to determine which format from the list to apply to a particular value of the vector. The lookup column values should correspond to names on the formatting list.

Examples of column type and row type formatting lists are given below.

## Value

A vector or list of formatted values. The type of return value can be controlled with the `simplify` parameter. The default return type is a vector.

## See Also

[fapply](#) for information on how formats are applied to a vector, [value](#) for how to create a user-defined format, and [as.flist](#) to convert an existing list of formats to a formatting list. Also see [FormattingStrings](#) for details on how to use formatting strings.

Other flist: [as.data.frame.fmt\\_lst\(\)](#), [as.flist\(\)](#), [as.flist.data.frame\(\)](#), [as.flist.fcat\(\)](#), [as.flist.list\(\)](#), [as.flist.tbl\\_df\(\)](#), [is.flist\(\)](#), [print.fmt\\_lst\(\)](#), [read.flist\(\)](#), [write.flist\(\)](#)

**Examples**

```

## Example 1: Formatting List - Column Type ##
# Set up data
v1 <- c(Sys.Date(), Sys.Date() + 30, Sys.Date() + 60)

# Create formatting list
f11 <- flist("%B", "The month is: %s")

# Apply formatting list to vector
fapply(v1, f11)
# [1] "The month is: October" "The month is: November" "The month is: December"

## Example 2: Formatting List - Row Type ordered ##
# Set up data
# Notice each row has a different data type
l1 <- list("A", 1.263, as.Date("2020-07-21"),
          "B", 5.8732, as.Date("2020-10-17"))

# These formats will be recycled in the order specified
f12 <- flist(type = "row",
             c(A = "Label A", B = "Label B"),
             "%.1f",
             "%d%b%Y")

fapply(l1, f12)
# [1] "Label A" "1.3" "21Jul2020" "Label B" "5.9" "17Oct2020"

## Example 3: Formatting List - Row Type with lookup ##

#' # Create formatting list
f13 <- flist(type = "row",
             DEC1 = "%.1f",
             DEC2 = "%.2f",
             PCT1 = "%.1f%")

# Set up data
df <- data.frame(CODE = c("DEC1", "DEC2", "PCT1", "DEC2", "PCT1"),
                 VAL = c(41.258, 62.948, 12.125, 65.294, 15.825))

# Assign lookup
f13$lookup <- df$CODE

# Apply Formatting List
fapply(df$VAL, f13)
# [1] "41.3" "62.95" "12.1%" "65.29" "15.8%"

## Example 4: Formatting List - Values with Units ##

#' # Create formatting list
f14 <- flist(type = "row",
             BASO = "%.2f x10(9)/L",

```

```

EOS = "%.2f x10(9)/L",
HCT = "%.1f%%",
HGB = "%.1f g/dL")

# Set up data
df <- data.frame(CODE = c("BASO", "EOS", "HCT", "HGB"),
                 VAL = c(0.02384, 0.14683, 40.68374, 15.6345))

# Assign lookup
f14$lookup <- df$CODE

# Apply Formatting List
df$VALC <- fapply(df$VAL, f14)

# View results
df
#   CODE      VAL      VALC
# 1 BASO 0.02384 0.02 x10(9)/L
# 2 EOS  0.14683 0.15 x10(9)/L
# 3 HCT 40.68374      40.7%
# 4 HGB 15.63450      15.6 g/dL

```

---

 fmt\_cnt\_pct

*Formatted count and percent*


---

## Description

A function to calculate and format a count and percent.

## Usage

```
fmt_cnt_pct(x, denom = NULL, format = "%5.1f", na = NULL, zero = NULL)
```

## Arguments

x	The input data vector or data frame column.
denom	The denominator to use for the percentage. By default, the parameter is <code>NULL</code> , meaning the function will use the number of non-missing values of the data vector as the denominator. Otherwise, supply the denominator as a numeric value.
format	A formatting string suitable for input into the <code>sprintf</code> function. By default, this format is defined as <code>"%5.1f"</code> , which displays the value with one decimal place.
na	The value to return for any NA value encountered in the input vector. Usually this parameter is passed as a string, such as <code>"-"</code> , yet any value can be supplied.
zero	The value to return for any zero values encountered in the input vector. Usually this value is supplied as string such as <code>"0 (-)"</code> .



**Details**

This function calculates a percent and appends to the provided count. The input vector is assumed to contain the counts. This function will not perform counting. It will calculate percentages and append to the given counts.

The result is then formatted using `sprintf`. By default, the number of non-missing values in the input data vector is used as the denominator. Alternatively, you may supply the denominator using the **denom** parameter. You may also control the percent format using the **format** parameter. The function will return any NA values in the input data unaltered.

If the calculated percentage is between 0% and 1%, the function will display "< 1.0%" as the percentage value. Zero values will be displayed as "( 0.0%)"

**Value**

A character vector of formatted counts and percents.

**See Also**

Other helpers: `fmt_mean_sd()`, `fmt_median()`, `fmt_n()`, `fmt_quantile_range()`, `fmt_range()`

**Examples**

```
v1 <- c(4, 3, 8, 6, 9, 5, NA, 0, 7, 4, 3, 7)

# Format count and percent
fmt_cnt_pct(v1)

# Output
# [1] "4 ( 36.4%)" "3 ( 27.3%)" "8 ( 72.7%)" "6 ( 54.5%)"
# [5] "9 ( 81.8%)" "5 ( 45.5%)" NA          "0 ( 0.0%)"
# [9] "7 ( 63.6%)" "4 ( 36.4%)" "3 ( 27.3%)" "7 ( 63.6%)"

# Custom values for NA and zero
fmt_cnt_pct(v1, na = "N/A", zero = "0 (-)")

# Custom NA and zero output
# [1] "4 ( 36.4%)" "3 ( 27.3%)" "8 ( 72.7%)" "6 ( 54.5%)"
# [5] "9 ( 81.8%)" "5 ( 45.5%)" "N/A"      "0 (-)"
# [9] "7 ( 63.6%)" "4 ( 36.4%)" "3 ( 27.3%)" "7 ( 63.6%)"
```

---

 fmt\_mean\_sd

*Formatted mean and standard deviation*


---

**Description**

A function to calculate and format a mean and standard deviation.

**Usage**

```
fmt_mean_sd(x, format = "%.1f", sd_format = NULL)
```

**Arguments**

x	The input data vector or data frame column.
format	A formatting string suitable for input into the <code>sprintf</code> function. By default, this format is defined as <code>"%.1f"</code> , which displays the mean and standard deviation with one decimal place.
sd_format	An optional format for the standard deviation. If this parameter is not supplied, the standard deviation will be formatted the same as the mean, according to the <code>'format'</code> parameter.

**Details**

This function calculates a mean and standard deviation, and formats using `sprintf`. You may control the format using the **format** parameter. Function will ignore NA values in the input data. Results are returned as a character vector.

**Value**

The formatted mean and standard deviation.

**See Also**

Other helpers: `fmt_cnt_pct()`, `fmt_median()`, `fmt_n()`, `fmt_quantile_range()`, `fmt_range()`

**Examples**

```
v1 <- c(4.3, 3.7, 8.7, 6.1, 9.2, 5.6, NA, 0.7, 7.8, 4.9)

# Format mean and standard deviation
fmt_mean_sd(v1)
# "5.7 (2.7)"
```

---

fmt\_median

*Formatted Median*

---

**Description**

A function to calculate and format a median.

**Usage**

```
fmt_median(x, format = "%.1f")
```

**Arguments**

x	The input data vector or data frame column.
format	A formatting string suitable for input into the <code>sprintf</code> function. By default, this format is defined as <code>"%.1f"</code> , which displays the value with one decimal place.

## Details

This function calculates a median using the stats package `median` function, and then formats the output using `sprintf`. You may control the format using the **format** parameter. Function will ignore any NA values in the input data. Results are returned as a character vector.

## Value

The formatted median value.

## See Also

Other helpers: `fmt_cnt_pct()`, `fmt_mean_sd()`, `fmt_n()`, `fmt_quantile_range()`, `fmt_range()`

## Examples

```
v1 <- c(4.3, 3.7, 8.7, 6.1, 9.2, 5.6, NA, 0.7, 7.8, 4.9)

# Format median
fmt_median(v1)
# "5.6"
```

---

fmt\_n

*Formatted Count*

---

## Description

A function to calculate and format a numeric count.

## Usage

```
fmt_n(x)
```

## Arguments

x                    The input data vector or data frame column.

## Details

This function calculates a count using the Base R `sum` function. NA values are not counted. Results are returned as a character vector.

## Value

The formatted count value.

## See Also

Other helpers: `fmt_cnt_pct()`, `fmt_mean_sd()`, `fmt_median()`, `fmt_quantile_range()`, `fmt_range()`

## Examples

```
# Create example vector
v1 <- c(4.3, 3.7, 8.7, 6.1, 9.2, 5.6, NA, 0.7, 7.8, 4.9)

# Format n
fmt_n(v1)
# "9"
```

---

fmt_quantile_range	<i>Formatted Quantile Range</i>
--------------------	---------------------------------

---

## Description

A function to calculate and format a quantile range.

## Usage

```
fmt_quantile_range(  
  x,  
  format = "%.1f",  
  sep = "-",  
  lower = 0.25,  
  upper = 0.75,  
  type = 7  
)
```

## Arguments

x	The input data vector or data frame column.
format	A formatting string suitable for input into the <code>sprintf</code> function. By default, this format is defined as "%.1f", which displays the value with one decimal place.
sep	The character to use as a separator between the two quantiles.
lower	The lower quantile range. Default is .25.
upper	The upper quantile range. Default is .75.
type	An integer between 1 and 9 selecting one of the nine quantile algorithms. The default is 7, which is the standard R default. If you are trying to match SAS results, use type 2. See the <a href="#">quantile</a> function documentation for further details.

## Details

This function calculates a quantile range using the stats package `quantile` function, and then formats the output using `sprintf`. You may control the format using the **format** parameter. Function will ignore any NA values in the input data. Results are returned as a character vector.

By default, the function calculates the 1st and 3rd quantiles at .25 and .75. The upper and lower quantile ranges may be changed with the upper and lower parameters.

**Value**

The formatted quantile range.

**See Also**

Other helpers: [fmt\\_cnt\\_pct\(\)](#), [fmt\\_mean\\_sd\(\)](#), [fmt\\_median\(\)](#), [fmt\\_n\(\)](#), [fmt\\_range\(\)](#)

**Examples**

```
# Create example vector
v1 <- c(4.3, 3.7, 8.7, 6.1, 9.2, 5.6, NA, 0.7, 7.8, 4.9)

# Format Quantiles
fmt_quantile_range(v1)
# "4.3 - 7.8"
```

---

fmt\_range

*Formatted Range*

---

**Description**

A function to calculate and format a numeric range.

**Usage**

```
fmt_range(x, format = "%s", sep = "-")
```

**Arguments**

x	The input data vector or data frame column.
format	A formatting string suitable for input into the <a href="#">sprintf</a> function. By default, this format is defined as "%s", which simply converts the value to a string with no specific formatting.
sep	The token used to separate the minimum and maximum range values. Default value is a hyphen ("-").

**Details**

This function calculates a range using the Base R [range](#) function, and then formats the output using [sprintf](#). You may control the format using the **format** parameter. Any NA values in the input data are ignored. Results are returned as a character vector.

**Value**

The formatted range values.

**See Also**

Other helpers: [fmt\\_cnt\\_pct\(\)](#), [fmt\\_mean\\_sd\(\)](#), [fmt\\_median\(\)](#), [fmt\\_n\(\)](#), [fmt\\_quantile\\_range\(\)](#)

**Examples**

```
# Create example vector
v1 <- c(4.3, 3.7, 8.7, 6.1, 9.2, 5.6, NA, 0.7, 7.8, 4.9)

# Format range
fmt_range(v1)
# "0.7 - 9.2"
```

---

formats

*Get or set formats for a data frame*

---

**Description**

The `formats` function extracts all assigned formats from a data frame, and returns them in a named list. The function also assigns formats from a named list.

**Usage**

```
formats(x)
```

```
formats(x) <- value
```

**Arguments**

<code>x</code>	A data frame or tibble
<code>value</code>	A named list of formats

**Details**

If formats are assigned to the "format" attributes of the data frame columns, the `formats` function will extract those formats. The function will return the formats in a named list, where the names correspond to the name of the column that the format was assigned to. If a column does not have a format attribute assigned, that column will not be included in the list.

When used on the receiving side of an assignment, the function will assign formats to a data frame. The formats should be in a named list, where each name corresponds to the data frame column to assign the format to.

The `formats` function can also accept a format catalog as input. This feature allows you to save formats in metadata, load them into a format catalog, and quickly assign them to a data frame or tibble. See the [fcat](#) function for additional information.

Finally, if you wish to clear out format attributes, assign a `NULL` value to the `formats` function.

**Value**

A named list of formats.

**See Also**

[fdata](#) to display formatted data, [value](#) to create user-defined formats, [fapply](#) to apply formats to a vector, and [fcats](#) to create a format catalog. Also see [FormattingStrings](#) for documentation on formatting strings.

**Examples**

```
# Take subset of data
df1 <- mtcars[1:5, c("mpg", "cyl") ]

# Print current state
print(df1)
#           mpg cyl
# Mazda RX4      21.0  6
# Mazda RX4 Wag  21.0  6
# Datsun 710      22.8  4
# Hornet 4 Drive  21.4  6
# Hornet Sportabout 18.7  8

# Assign formats
attr(df1$mpg, "format") <- value(condition(x >= 20, "High"),
                                condition(x < 20, "Low"))
attr(df1$cyl, "format") <- function(x) format(x, nsmall = 1)

# Display formatted data
fdata(df1)
#           mpg cyl
# Mazda RX4      High 6.0
# Mazda RX4 Wag  High 6.0
# Datsun 710      High 4.0
# Hornet 4 Drive  High 6.0
# Hornet Sportabout Low 8.0

# Extract format list
lst <- formats(df1)

# Alter format list and reassign
lst$mpg <- value(condition(x >= 22, "High"),
                 condition(x < 22, "Low"))
lst$cyl <- function(x) format(x, nsmall = 2)
formats(df1) <- lst

# Display formatted data
fdata(df1)
#           mpg cyl
# Mazda RX4      Low 6.00
# Mazda RX4 Wag  Low 6.00
# Datsun 710      High 4.00
```

```
# Hornet 4 Drive      Low 6.00
# Hornet Sportabout  Low 8.00

# Clear formats
formats(df1) <- NULL

# Confirm formats are cleared
formats(df1)
# list()
```

---

FormattingStrings      *Formatting Strings*

---

## Description

Formatting codes for formatting strings follow the conventions of the base R `strptime` and `sprintf` functions. See below for further details.

## Details

The `fmt` packages accepts single strings as formatting specifications. These formatting strings are interpreted differently depending on the data type of the vector being formatted. For date and datetime vectors, the string will be interpreted as an input to the base R `strptime` function. For all other types of vectors, the formatting string will be interpreted as an input to the `sprintf` function.

The formatting codes for these functions are simple to use. For example, the code `fapply(as.Date("1970-01-01"), "%B %d, %Y")` will produce the output "January 01, 1970". The code `fapply(1.2345, "%.1f")` will produce the output "1.2".

Below are some commonly used formatting codes for dates:

- `%d` = day as a number
- `%a` = abbreviated weekday
- `%A` = unabbreviated weekday
- `%m` = month
- `%b` = abbreviated month
- `%B` = unabbreviated month
- `%y` = 2-digit year
- `%Y` = 4-digit year
- `%H` = hour (24 hour clock)
- `%I` = hour (12 hour clock)
- `%M` = minute
- `%S` = second
- `%p` = AM/PM indicator



See the [strftime](#) function for additional codes and examples of formatting dates and times.

Below are some commonly used formatting codes for other data types:

- %s = string
- %d = integer
- %f = floating point number

See the [sprintf](#) function for additional codes and examples of formatting other data types.

### See Also

[fapply](#) for formatting vectors, and [fdata](#) for formatting data frames.

### Examples

```
# Examples for formatting dates and times
t <- Sys.time()
fapply(t, "%d/%m/%Y")           # Day/Month/Year
fapply(t, "%d%b%Y")            # Day abbreviated month year
fapply(t, "%y-%m")             # Two digit year - month
fapply(t, "%A, %B %d")         # Weekday, unabbreviated month and date
fapply(t, "%Y-%m-%d %H:%M:%S %p") # Common timestamp format

# Examples for formatting numbers
a <- 1234.56789
fapply(a, "%f")                # Floating point number
fapply(a, "%.1f")              # One decimal place
fapply(a, "%8.1f")             # Fixed width
fapply(a, "%-8.1f")            # Fixed width left justified
fapply(a, "%08.1f")            # Zero padded
fapply(a, "%+.1f")             # Forced sign
fapply(-a, "%+.1f")            # Negative
fapply(a, "%.1f%")             # Percentage
fapply(a, "$%.2f")             # Currency
fapply(a, "The number is %f.") # Interpolation
```

---

is.fcat

*Class test for a format catalog*

---

### Description

This function tests whether an object is a format catalog. The format catalog has a class of "fcat".

### Usage

```
is.fcat(x)
```

### Arguments

x                    The object to test.

**Value**

TRUE or FALSE, depending on whether or not the object is a format catalog.

**See Also**

Other fcat: [as.data.frame.fcat\(\)](#), [as.fcat\(\)](#), [as.fcat.data.frame\(\)](#), [as.fcat.fmt\\_lst\(\)](#), [as.fcat.list\(\)](#), [fcat\(\)](#), [print.fcat\(\)](#), [read.fcat\(\)](#), [write.fcat\(\)](#)

**Examples**

```
# Create format catalog
c1 <- fcat(num_fmt = "%.1f",
          label_fmt = value(condition(x == "A", "Label A"),
                           condition(x == "B", "Label B"),
                           condition(TRUE, "Other")),
          date_fmt = "%d%b%Y")

# Test for "fcat" class
is.fcat(c1)
# [1] TRUE

is.fcat(Sys.Date())
# [1] FALSE
```

---

is.flist

*Is object a formatting list*


---

**Description**

Determines if object is a formatting list of class 'fmt\_lst'.

**Usage**

```
is.flist(x)
```

**Arguments**

x                    Object to test.

**Value**

TRUE or FALSE, depending on class of object.

**See Also**

Other flist: [as.data.frame.fmt\\_lst\(\)](#), [as.flist\(\)](#), [as.flist.data.frame\(\)](#), [as.flist.fcat\(\)](#), [as.flist.list\(\)](#), [as.flist.tbl\\_df\(\)](#), [flist\(\)](#), [print.fmt\\_lst\(\)](#), [read.flist\(\)](#), [write.flist\(\)](#)

## Examples

```
# Create flist
flst <- flist("%d%b%Y", "%.1f")
is.flist(flst)
is.flist("A")
```

---

is.format

*Determine whether an object is a user-defined format*

---

## Description

The `is.format` function can be used to determine if an object is a user-defined format of class "fmt".

## Usage

```
is.format(x)
```

## Arguments

x                    A user-defined format of class "fmt".

## Details

The `is.format` function returns TRUE if the object passed is a user-defined format. User-defined formats are defined using the `value` function. See the [value](#) function help for further details.

## Value

A logical value or TRUE or FALSE.

## See Also

[value](#) to define a format, [condition](#) to define the conditions for a format, and [fapply](#) to apply the format to a vector.

Other fmt: [as.data.frame.fmt\(\)](#), [as.fmt\(\)](#), [as.fmt.data.frame\(\)](#), [condition\(\)](#), [labels.fmt\(\)](#), [print.fmt\(\)](#), [value\(\)](#)

## Examples

```
# Define format
fmt1 <- value(condition(x == "A", "Label A"),
             condition(x == "B", "Label B"),
             condition(TRUE, "Other"))

# Check for format
is.format(fmt1)
# [1] TRUE
```

```
is.format("A")  
# [1] FALSE
```

---

justification

*Get or set justification for data frame columns*

---

## Description

The `justification` function extracts all assigned justify attributes from a data frame, and returns them in a named list. The function also assigns justify attributes from a named list.

## Usage

```
justification(x)
```

```
justification(x) <- value
```

## Arguments

<code>x</code>	A data frame or tibble
<code>value</code>	A named list of justification values.

## Details

If justification values are assigned to the "justify" attributes of the data frame columns, the `justification` function will extract those values. The function will return the justification values in a named list, where the names correspond to the name of the column that the justification was assigned to. If a column does not have a justify attribute assigned, that column will not be included in the list.

When used on the receiving side of an assignment, the function will assign justification to a data frame. The justification values should be in a named list, where each name corresponds to the name of the data frame column to assign values to.

Finally, if you wish to clear out the justification attributes, assign a NULL value to the `justification` function.

## Value

A named list of justification values.

## See Also

[fdata](#) to display formatted data, [value](#) to create user-defined formats, and [fapply](#) to apply formatting to a vector.

**Examples**

```

# Take subset of data
df1 <- mtcars[1:5, c("mpg", "cyl") ]

# Print current state
print(df1)
#           mpg cyl
# Mazda RX4      21.0   6
# Mazda RX4 Wag  21.0   6
# Datsun 710     22.8   4
# Hornet 4 Drive  21.4   6
# Hornet Sportabout 18.7   8

# Assign justification
justification(df1) <- list(mpg = "left", cyl = "right")
widths(df1) <- list(mpg = 12, cyl = 10)

fdata(df1)
#           mpg      cyl
# Mazda RX4      21         6
# Mazda RX4 Wag  21         6
# Datsun 710     22.8        4
# Hornet 4 Drive  21.4        6
# Hornet Sportabout 18.7        8

# Display justification
justification(df1)
# $mpg
# [1] "left"
#
# $cyl
# [1] "right"

# Display widths
widths(df1)
# $mpg
# [1] 12
#
# $cyl
# [1] 10

# Clear justification
justification(df1) <- NULL

# Confirm justifications are cleared
justification(df1)
# list()

```

## Description

The labels function creates a vector of labels associated with a user-defined format.

## Usage

```
## S3 method for class 'fmt'  
labels(object, ...)
```

## Arguments

object	A user-defined format of class "fmt".
...	Following arguments.

## Details

The condition function creates a condition as part of a format definition. Each condition has a label as part of its definition. The labels function extracts the labels from the conditions and returns them as a vector. While the labels will typically be of type character, they can be of any data type. See the [condition](#) function help for further details.

## Value

A vector of label values.

## See Also

[value](#) to define a format, [condition](#) to define the conditions for a format, and [fapply](#) to apply the format to a vector.

Other fmt: [as.data.frame.fmt\(\)](#), [as.fmt\(\)](#), [as.fmt.data.frame\(\)](#), [condition\(\)](#), [is.format\(\)](#), [print.fmt\(\)](#), [value\(\)](#)

## Examples

```
# Define format  
fmt1 <- value(condition(x == "A", "Label A"),  
              condition(x == "B", "Label B"),  
              condition(TRUE, "Other"))  
  
# Extract labels  
labels(fmt1)  
# [1] "Label A" "Label B" "Other"
```

---

print.fcat	<i>Print a format catalog</i>
------------	-------------------------------

---

### Description

A class-specific instance of the `print` function for format catalogs. The function prints the format catalog in a tabular manner. Use `verbose = TRUE` to print the catalog as a list.

### Usage

```
## S3 method for class 'fcat'
print(x, ..., verbose = FALSE)
```

### Arguments

<code>x</code>	The format catalog to print.
<code>...</code>	Any follow-on parameters.
<code>verbose</code>	Whether or not to print the format catalog in verbose style. By default, the parameter is <code>FALSE</code> , meaning to print in tabular style.

### Value

The object, invisibly.

### See Also

Other `fcat`: [as.data.frame.fcat\(\)](#), [as.fcat\(\)](#), [as.fcat.data.frame\(\)](#), [as.fcat.fmt\\_lst\(\)](#), [as.fcat.list\(\)](#), [fcat\(\)](#), [is.fcat\(\)](#), [read.fcat\(\)](#), [write.fcat\(\)](#)

### Examples

```
#' # Create format catalog
c1 <- fcat(num_fmt = "%.1f",
          label_fmt = value(condition(x == "A", "Label A"),
                           condition(x == "B", "Label B"),
                           condition(TRUE, "Other")),
          date_fmt = "%d%b%Y")

# Print the catalog
print(c1)
# # A format catalog: 3 formats
# - $num_fmt: type S, "%.1f"
# - $label_fmt: type U, 3 conditions
# - $date_fmt: type S, "%d%b%Y"
```

---

print.fmt	<i>Print a format</i>
-----------	-----------------------

---

### Description

Prints a format object. This function is a class-specific implementation of the the generic print method.

### Usage

```
## S3 method for class 'fmt'
print(
  x,
  ...,
  name = deparse(substitute(x, env = environment())),
  verbose = FALSE
)
```

### Arguments

x	An object of class "fmt".
...	Any follow-on parameters to the print function.
name	The name of the format to print. By default, the variable name that holds the format will be used.
verbose	Turn on or off verbose printing mode. Verbose mode will print object as a list. Otherwise, the object will be printed as a table.

### See Also

Other fmt: [as.data.frame.fmt\(\)](#), [as.fmt\(\)](#), [as.fmt.data.frame\(\)](#), [condition\(\)](#), [is.format\(\)](#), [labels.fmt\(\)](#), [value\(\)](#)

---

print.fmt_lst	<i>Print a formatting list</i>
---------------	--------------------------------

---

### Description

Print a formatting list

### Usage

```
## S3 method for class 'fmt_lst'
print(x, ..., verbose = FALSE)
```



**Arguments**

x	The formatting list to print
...	Follow-on parameters to the print function
verbose	Whether to print in summary or list-style.

**See Also**

Other flist: [as.data.frame.fmt\\_lst\(\)](#), [as.flist\(\)](#), [as.flist.data.frame\(\)](#), [as.flist.fcat\(\)](#), [as.flist.list\(\)](#), [as.flist.tbl\\_df\(\)](#), [flist\(\)](#), [is.flist\(\)](#), [read.flist\(\)](#), [write.flist\(\)](#)

---

read.fcat	<i>Read a format catalog from the file system</i>
-----------	---

---

**Description**

The `read.fcat` function reads a format catalog from the file system. The function accepts a path to the format catalog, reads the catalog, and returns it.

**Usage**

```
read.fcat(file_path)
```

**Arguments**

file_path	The path to the format catalog.
-----------	---------------------------------

**Value**

The format catalog as an R object.

**See Also**

Other fcat: [as.data.frame.fcat\(\)](#), [as.fcat\(\)](#), [as.fcat.data.frame\(\)](#), [as.fcat.fmt\\_lst\(\)](#), [as.fcat.list\(\)](#), [fcat\(\)](#), [is.fcat\(\)](#), [print.fcat\(\)](#), [write.fcat\(\)](#)

**Examples**

```
# Create format catalog
c1 <- fcat(num_fmt = "%.1f",
          label_fmt = value(condition(x == "A", "Label A"),
                           condition(x == "B", "Label B"),
                           condition(TRUE, "Other")),
          date_fmt = "%d%b%Y")

# Get temp directory
tmp <- tempdir()

# Save catalog to file system
```

```
pth <- write.fcat(c1, dir_path = tmp)

# Read from file system
c2 <- read.fcat(pth)

# Use formats in the catalog
fapply(2, c1$num_fmt)
# [1] "2.0"

fapply(c("A", "B", "C", "B"), c1$label_fmt)
# [1] "Label A" "Label B" "Other" "Label B"

fapply(Sys.Date(), c1$date_fmt)
# [1] "07Jan2024"
```

---

read.flist

*Read a formatting list from the file system*

---

### Description

The `read.flist` function reads a formatting list from the file system. The function accepts a path to the formatting list, reads the list, and returns it.

### Usage

```
read.flist(file_path)
```

### Arguments

`file_path`      The path to the formatting list.

### Value

The formatting list as an R object.

### See Also

Other flist: [as.data.frame.fmt\\_lst\(\)](#), [as.flist\(\)](#), [as.flist.data.frame\(\)](#), [as.flist.fcat\(\)](#), [as.flist.list\(\)](#), [as.flist.tbl\\_df\(\)](#), [flist\(\)](#), [is.flist\(\)](#), [print.fmt\\_lst\(\)](#), [write.flist\(\)](#)

### Examples

```
# Create formatting list
f1 <- flist(f1 = "%5.1f",
           f2 = "%6.2f",
           type = "row")

# Get temp directory
tmp <- tempdir()
```

```
# Save formatting list to file system
pth <- write.flist(fl, dir_path = tmp)

# Read from file system
fr <- read.flist(pth)

# Create sample data
dat <- c(12.3844, 292.28432)

# Use formats in the catalog
fapply(dat, fr)
# [1] " 12.4" "292.28"
```

---

value	<i>Create a user-defined format</i>
-------	-------------------------------------

---

### Description

The value function creates a user-defined format.

### Usage

```
value(..., log = TRUE, as.factor = FALSE)
```

### Arguments

...	One or more <a href="#">condition</a> functions.
log	Whether to log the creation of the format. Default is TRUE. This parameter is used internally.
as.factor	If TRUE, the <a href="#">fapply</a> function will return the result as an ordered factor. Otherwise, the result will be returned as a vector. Default is FALSE.

### Details

The value function creates a user defined format object, in a manner similar to a SAS® format. The value function accepts one or more [condition](#) arguments that define the format. The conditions map an R expression to a label. When applied, the format will return the label corresponding to the first true expression.

The format object is an S3 class of type "fmt". When the object is created, the **levels** attribute of the object will be set with a vector of values assigned to the **labels** property of the [condition](#) arguments. These labels may be accessed either from the [levels](#) function or the [labels](#) function. If no order has been assigned to the conditions, the labels will be returned in the order the conditions were passed to the value function. If an order has been assigned to the conditions, the labels will be returned in the order specified.

The format object may be applied to a vector using the [fapply](#) function. See [fapply](#) for further details.

Note that the label may also be a string format. That means a user-defined format can be used to apply string formats conditionally. This capability is useful when you want to conditionally format data values.

**Value**

The new format object.

**See Also**

[condition](#) to define a condition, [levels](#) or [labels.fmt](#) to access the labels, and [fapply](#) to apply the format to a vector.

Other fmt: [as.data.frame.fmt\(\)](#), [as.fmt\(\)](#), [as.fmt.data.frame\(\)](#), [condition\(\)](#), [is.format\(\)](#), [labels.fmt\(\)](#), [print.fmt\(\)](#)

**Examples**

```
## Example 1: Character to Character Mapping ##
# Set up vector
v1 <- c("A", "B", "C", "B")

# Define format
fmt1 <- value(condition(x == "A", "Label A"),
              condition(x == "B", "Label B"),
              condition(TRUE, "Other"))

# Apply format to vector
fapply(v1, fmt1)
# [1] "Label A" "Label B" "Other"   "Label B"

## Example 2: Character to Integer Mapping ##
fmt2 <- value(condition(x == "A", 1),
              condition(x == "B", 2),
              condition(TRUE, 3))

# Apply format to vector
fapply(v1, fmt2)
# [1] 1 2 3 2

## Example 3: Categorization of Continuous Variable ##
# Set up vector
v2 <- c(1, 6, 11, 7)

# Define format
fmt3 <- value(condition(x < 5, "Low"),
              condition(x >= 5 & x < 10, "High"),
              condition(TRUE, "Out of range"))

# Apply format to vector
fapply(v2, fmt3)
# [1] "Low"           "High"          "Out of range" "High"

### Example 4: Conditional formatting
v3 <- c(10.398873, 12.98762, 0.5654, 11.588372)

fmt4 <- value(condition(x < 1, "< 1.0"),
```

```
condition(TRUE, "%.2f"))  
  
fapply(v3, fmt4)  
# [1] "10.40" "12.99" "< 1.0" "11.59"
```

---

**widths***Get or set column widths for a data frame*

---

### Description

The `widths` function extracts all assigned widths from a data frame, and returns them in a named list. The function also assigns widths from a named list.

### Usage

```
widths(x)
```

```
widths(x) <- value
```

### Arguments

<code>x</code>	A data frame or tibble
<code>value</code>	A named list of widths. The widths must be positive integers greater than zero.

### Details

If widths are assigned to the "width" attributes of the data frame columns, the `widths` function will extract those widths. The function will return the widths in a named list, where the names correspond to the name of the column that the width was assigned to. If a column does not have a width attribute assigned, that column will not be included in the list.

When used on the receiving side of an assignment, the function will assign widths to a data frame. The widths should be in a named list, where each name corresponds to the data frame column to assign the width to.

Finally, if you wish to clear out the width attributes, assign a `NULL` value to the `widths` function.

### Value

A named list of widths. The widths must be positive integers greater than zero.

### See Also

[fdata](#) to display formatted data, [value](#) to create user-defined formats, and [fapply](#) to apply formats to a vector.

## Examples

```
# Take subset of data
df1 <- mtcars[1:5, c("mpg", "cyl") ]

# Print current state
print(df1)
#           mpg cyl
# Mazda RX4      21.0  6
# Mazda RX4 Wag  21.0  6
# Datsun 710     22.8  4
# Hornet 4 Drive  21.4  6
# Hornet Sportabout 18.7  8

# Assign widths
widths(df1) <- list(mpg = 12, cyl = 10)

# Display formatted data
fdata(df1)
#           mpg      cyl
# Mazda RX4      21.0     6
# Mazda RX4 Wag  21.0     6
# Datsun 710     22.8     4
# Hornet 4 Drive  21.4     6
# Hornet Sportabout 18.7     8

# View assigned widths
widths(df1)
# $mpg
# [1] 12
#
# $cyl
# [1] 10

# Clear widths
widths(df1) <- NULL

# Confirm widths are cleared
widths(df1)
# list()
```

---

write.fcat

*Write a format catalog to the file system*

---

## Description

The `write.fcat` function writes a format catalog to the file system. By default, the catalog will be written to the current working directory, using the variable name as the file name. These defaults can be overridden using the appropriate parameters. The catalog will be saved with a file extension of ".fcat".

**Usage**

```
write.fcat(x, dir_path = getwd(), file_name = NULL)
```

**Arguments**

x	The format catalog to write.
dir_path	The directory path to write the catalog to. Default is the current working directory.
file_name	The name of the file to save the catalog as. Default is the name of the variable that contains the catalog. The ".fcat" file extension will be added automatically.

**Value**

The full path of the saved format catalog.

**See Also**

Other fcat: [as.data.frame.fcat\(\)](#), [as.fcat\(\)](#), [as.fcat.data.frame\(\)](#), [as.fcat.fmt\\_lst\(\)](#), [as.fcat.list\(\)](#), [fcat\(\)](#), [is.fcat\(\)](#), [print.fcat\(\)](#), [read.fcat\(\)](#)

**Examples**

```
# Create format catalog
c1 <- fcat(num_fmt = "%.1f",
          label_fmt = value(condition(x == "A", "Label A"),
                           condition(x == "B", "Label B"),
                           condition(TRUE, "Other")),
          date_fmt = "%d%b%Y")

# Get temp directory
tmp <- tempdir()

# Save catalog to file system
pth <- write.fcat(c1, dir_path = tmp)

# Read from file system
c2 <- read.fcat(pth)

# Use formats in the catalog
fapply(2, c1$num_fmt)
# [1] "2.0"

fapply(c("A", "B", "C", "B"), c1$label_fmt)
# [1] "Label A" "Label B" "Other" "Label B"

fapply(Sys.Date(), c1$date_fmt)
# [1] "07Jan2024"
```

---

write.flist	<i>Write a formatting list to the file system</i>
-------------	---

---

### Description

The `write.flist` function writes a formatting list to the file system. By default, the formatting list will be written to the current working directory, using the variable name as the file name. These defaults can be overridden using the appropriate parameters. The catalog will be saved with a file extension of ".flist".

### Usage

```
write.flist(x, dir_path = getwd(), file_name = NULL)
```

### Arguments

<code>x</code>	The formatting list to write.
<code>dir_path</code>	The directory path to write the catalog to. Default is the current working directory.
<code>file_name</code>	The name of the file to save the catalog as. Default is the name of the variable that contains the formatting list. The ".flist" file extension will be added automatically.

### Value

The full path of the saved formatting list.

### See Also

Other flist: [as.data.frame.fmt\\_lst\(\)](#), [as.flist\(\)](#), [as.flist.data.frame\(\)](#), [as.flist.fcat\(\)](#), [as.flist.list\(\)](#), [as.flist.tbl\\_df\(\)](#), [flist\(\)](#), [is.flist\(\)](#), [print.fmt\\_lst\(\)](#), [read.flist\(\)](#)

### Examples

```
# Create formatting list
fl <- flist(f1 = "%5.1f",
           f2 = "%6.2f",
           type = "row")

# Get temp directory
tmp <- tempdir()

# Save formatting list to file system
pth <- write.flist(fl, dir_path = tmp)

# Read from file system
fr <- read.flist(pth)
```



```
# Create sample data
dat <- c(12.3844, 292.28432)

# Use formats in the catalog
fapply(dat, fr)
# [1] " 12.4" "292.28"
```

# Index

- \* **fcats**
  - as.data.frame.fcats, 3
  - as.fcats, 6
  - as.fcats.data.frame, 7
  - as.fcats.fmt\_lst, 9
  - as.fcats.list, 9
  - fcats, 35
  - is.fcats, 49
  - print.fcats, 55
  - read.fcats, 57
  - write.fcats, 62
- \* **flists**
  - as.data.frame.fmt\_lst, 5
  - as.flists, 12
  - as.flists.data.frame, 14
  - as.flists.fcats, 16
  - as.flists.list, 19
  - as.flists.tbl\_df, 20
  - flists, 38
  - is.flists, 50
  - print.fmt\_lst, 56
  - read.flists, 58
  - write.flists, 64
- \* **fmts**
  - as.data.frame.fmt, 4
  - as.fmts, 22
  - as.fmts.data.frame, 23
  - condition, 25
  - is.format, 51
  - labels.fmt, 53
  - print.fmt, 56
  - value, 59
- \* **helpers**
  - fmt\_cnt\_pct, 40
  - fmt\_mean\_sd, 41
  - fmt\_median, 42
  - fmt\_n, 43
  - fmt\_quantile\_range, 44
  - fmt\_range, 45
  - as.data.frame.fcats, 3, 6, 8–11, 35, 50, 55, 57, 63
  - as.data.frame.fmt, 4, 23, 24, 26, 51, 54, 56, 60
  - as.data.frame.fmt\_lst, 5, 12, 15, 17, 20, 21, 38, 50, 57, 58, 64
  - as.fcats, 3, 6, 8–11, 35, 50, 55, 57, 63
  - as.fcats.data.frame, 3, 6, 7, 9, 10, 35, 50, 55, 57, 63
  - as.fcats.fmt\_lst, 3, 6, 8, 9, 10, 11, 35, 50, 55, 57, 63
  - as.fcats.list, 3, 6, 8, 9, 9, 11, 35, 50, 55, 57, 63
  - as.fcats.tbl\_df, 10
  - as.flists, 5, 12, 15, 17, 20, 21, 38, 50, 57, 58, 64
  - as.flists.data.frame, 5, 12, 14, 17, 20, 21, 38, 50, 57, 58, 64
  - as.flists.fcats, 5, 12, 15, 16, 20, 21, 38, 50, 57, 58, 64
  - as.flists.list, 5, 12, 15, 17, 19, 21, 38, 50, 57, 58, 64
  - as.flists.tbl\_df, 5, 12, 15, 17, 20, 20, 38, 50, 57, 58, 64
  - as.fmts, 4, 22, 24, 26, 51, 54, 56, 60
  - as.fmts.data.frame, 4, 23, 23, 26, 51, 54, 56, 60
  - condition, 4, 23, 24, 25, 51, 54, 56, 59, 60
  - descriptions, 26
  - descriptions<- (descriptions), 26
  - fapply, 25–27, 28, 31–38, 47, 49, 51, 52, 54, 59–61
  - fapply2, 31
  - fattr, 28, 29, 32, 32, 34, 37
  - fattr<-, 34
  - fcats, 3, 6, 8–11, 29, 32, 35, 37, 46, 47, 50, 55, 57, 63

`fdata`, 26, 27, 29, 32–35, 36, 47, 49, 52, 61  
`flist`, 5, 9, 12, 15, 17, 20, 21, 29, 32, 35, 38, 50, 57, 58, 64  
`fmt_cnt_pct`, 40, 42, 43, 45, 46  
`fmt_mean_sd`, 41, 41, 43, 45, 46  
`fmt_median`, 41, 42, 42, 43, 45, 46  
`fmt_n`, 41–43, 43, 45, 46  
`fmt_quantile_range`, 41–43, 44, 46  
`fmt_range`, 41–43, 45, 45  
`format`, 36  
`formats`, 35, 37, 46  
`formats<- (formats)`, 46  
`FormattingStrings`, 7, 11, 24, 28, 29, 32, 33, 37, 38, 47, 48  
  
`is.fcat`, 3, 6, 8–11, 35, 49, 55, 57, 63  
`is.flist`, 5, 12, 15, 17, 20, 21, 38, 50, 57, 58, 64  
`is.format`, 4, 23, 24, 26, 51, 54, 56, 60  
  
`justification`, 37, 52  
`justification<- (justification)`, 52  
  
`labels.fmt`, 4, 23–26, 51, 53, 56, 60  
`levels`, 26, 60  
  
`median`, 43  
  
`print.fcat`, 3, 6, 8–11, 35, 50, 55, 57, 63  
`print.fmt`, 4, 23, 24, 26, 51, 54, 56, 60  
`print.fmt_lst`, 5, 12, 15, 17, 20, 21, 38, 50, 56, 58, 64  
  
`quantile`, 44  
  
`range`, 45  
`read.fcat`, 3, 6, 8–11, 35, 50, 55, 57, 63  
`read.flist`, 5, 12, 15, 17, 20, 21, 38, 50, 57, 58, 64  
  
`sprintf`, 40–45, 48, 49  
`strptime`, 48, 49  
`sum`, 43  
  
`value`, 4, 7, 8, 11, 23–29, 32, 37, 38, 47, 51, 52, 54, 56, 59, 61  
`Vectorize`, 29  
  
`widths`, 37, 61  
`widths<- (widths)`, 61  
`write.fcat`, 3, 6, 8–11, 35, 50, 55, 57, 62  
`write.flist`, 5, 12, 15, 17, 20, 21, 38, 50, 57, 58, 64