

The Data Frame Reference Manual

Data frames for Common Lisp, version 2.0

Steve Nunez <steve@symbolics.tech>

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1 Systems

The main system appears first, followed by any subsystem dependency.

1.1 data-frame

Author Steve Nunez <steve@symbolics.tech>

Source Control

(:git "https://github.com/lisp-stat/data-frame.git")

Bug Tracker

<https://github.com/Lisp-Stat/data-frame/issues>

License MS-PL

Description

Data frames for Common Lisp

Long Description

A data manipulation package, conceptually similar to R's data.frame, but with a lisp-oriented API.

Version 2.0

Dependencies

- alexandria
- alexandria+
- anaphora
- array-operations
- num-utils
- select
- let-plus

Source [data-frame.asd], page 3, (file)

Directory s:/src/data-frame/

Components

- [pkgdcl.lisp], page 3, (file)
- [utils.lisp], page 3, (file)
- [data-frame.lisp], page 3, (file)
- [pprint.lisp], page 5, (file)
- [formatted-output.lisp], page 5, (file)
- [summary.lisp], page 5, (file)
- [defdf.lisp], page 7, (file)
- [missing.lisp], page 7, (file)

2 Files

Files are sorted by type and then listed depth-first from the systems components trees.

2.1 Lisp

2.1.1 data-frame.asd

Location `/src/data-frame/data-frame.asd`

Systems `[data-frame]`, page 1, (system)

2.1.2 data-frame/pkgdcl.lisp

Parent `[data-frame]`, page 1, (system)

Location `pkgdcl.lisp`

Packages `[data-frame]`, page 9,

2.1.3 data-frame/utils.lisp

Dependency

`[pkgdcl.lisp]`, page 3, (file)

Parent `[data-frame]`, page 1, (system)

Location `utils.lisp`

Exported Definitions

`[column-type]`, page 14, (function)

Internal Definitions

- `[get-type]`, page 23, (function)
- `[types-in-column]`, page 26, (function)

2.1.4 data-frame/data-frame.lisp

Dependency

`[utils.lisp]`, page 3, (file)

Parent `[data-frame]`, page 1, (system)

Location `data-frame.lisp`

Exported Definitions

- `[add-column!]`, page 13, (function)
- `[add-columns]`, page 13, (function)
- `[add-columns!]`, page 13, (function)
- `[alist-df]`, page 13, (function)
- `[alist-dv]`, page 13, (function)
- `[column]`, page 14, (function)
- `[(setf column)]`, page 14, (function)
- `[column-names]`, page 14, (function)
- `[columns]`, page 14, (function)
- `[copy]`, page 14, (function)
- `[count-rows]`, page 14, (function)

- [data-frame], page 20, (class)
- [data-vector], page 20, (class)
- [df], page 15, (function)
- [df-remove-duplicates], page 15, (function)
- [do-rows], page 15, (function)
- [doc-string], page 18, (method)
- [(setf doc-string)], page 18, (method)
- [duplicate-key], page 19, (condition)
- [dv], page 15, (function)
- [key-not-found], page 20, (condition)
- [keys], page 15, (function)
- [make-df], page 15, (function)
- [make-dv], page 15, (function)
- [map-columns], page 15, (function)
- [map-df], page 16, (function)
- [map-rows], page 16, (function)
- [mask-rows], page 16, (function)
- [matrix-df], page 16, (function)
- [plist-df], page 16, (function)
- [plist-dv], page 16, (function)
- [remove-columns], page 17, (function)
- [replace-column], page 17, (function)
- [replace-column!], page 17, (function)
- [rows], page 17, (function)
- [substitute-key!], page 17, (function)

Internal Definitions

- [add-key!], page 21, (function)
- [add-keys], page 21, (function)
- [alist-data], page 22, (function)
- [check-column-compatibility], page 27, (generic function)
- [check-column-compatibility], page 27, (method)
- [check-column-compatibility], page 27, (method)
- [copy-ordered-keys], page 22, (function)
- [data], page 30, (class)
- [define-data-subclass], page 21, (macro)
- [ensure-arguments-alist], page 23, (function)
- [guess-alist?], page 23, (function)
- [key-index], page 23, (function)
- [keys-count], page 24, (function)
- [keys-vector], page 24, (function)
- [make-data], page 24, (function)
- [make-ordered-keys], page 24, (function)
- [ordered-keys], page 25, (function)

- [ordered-keys], page 28, (structure)
- [ordered-keys-p], page 25, (function)
- [ordered-keys-table], page 25, (function)
- [plist-data], page 25, (function)

2.1.5 data-frame/pprint.lisp

Dependency

[data-frame.lisp], page 3, (file)

Parent [data-frame], page 1, (system)

Location pprint.lisp

Exported Definitions

- [head], page 18, (method)
- [pprint-array], page 16, (function)
- [pprint-data-frame], page 16, (function)
- [tail], page 19, (method)

Internal Definitions

- [*max-digits*], page 21, (special variable)
- [*row-numbers-p*], page 21, (special variable)
- [2d-array-to-list], page 21, (function)
- [column-type-format], page 22, (function)
- [default-column-formats], page 27, (method)
- [max-decimal], page 24, (function)
- [max-width], page 25, (function)
- [printer-status], page 25, (function)
- [reverse-df], page 26, (function)

2.1.6 data-frame/formatted-output.lisp

Dependency

[pprint.lisp], page 5, (file)

Parent [data-frame], page 1, (system)

Location formatted-output.lisp

Exported Definitions

- [df-print], page 15, (function)
- [pprint-markdown], page 17, (function)

Internal Definitions

- [aesthetic-string], page 21, (function)
- [print-table], page 25, (function)
- [weave], page 27, (function)

2.1.7 data-frame/summary.lisp

Dependency

[formatted-output.lisp], page 5, (file)

Parent [data-frame], page 1, (system)

Location `summary.lisp`

Exported Definitions

- `[*column-summary-minimum-length*]`, page 13, (special variable)
- `[column-summary]`, page 18, (generic function)
- `[column-summary]`, page 18, (method)
- `[column-summary]`, page 18, (method)
- `[summary]`, page 19, (method)

Internal Definitions

- `[*column-summary-quantiles-threshold*]`, page 21, (special variable)
- `[bit-vector-summary]`, page 27, (structure)
- `[bit-vector-summary-count]`, page 22, (function)
- `[bit-vector-summary-length]`, page 22, (function)
- `[bit-vector-summary-p]`, page 22, (function)
- `[column-length]`, page 27, (generic function)
- `[column-length]`, page 27, (method)
- `[copy-bit-vector-summary]`, page 22, (function)
- `[copy-generic-vector-summary]`, page 22, (function)
- `[copy-quantiles-summary]`, page 22, (function)
- `[copy-vector-summary%]`, page 22, (function)
- `[ensure-not-ratio]`, page 23, (function)
- `[generic-vector-summary]`, page 28, (structure)
- `[generic-vector-summary-element-count-alist]`, page 23, (function)
- `[generic-vector-summary-length]`, page 23, (function)
- `[generic-vector-summary-p]`, page 23, (function)
- `[generic-vector-summary-quantiles]`, page 23, (function)
- `[make-bit-vector-summary]`, page 24, (function)
- `[make-generic-vector-summary]`, page 24, (function)
- `[make-quantiles-summary]`, page 24, (function)
- `[make-vector-summary%]`, page 24, (function)
- `[print-count-and-percentage]`, page 25, (function)
- `[quantiles-summary]`, page 29, (structure)
- `[quantiles-summary-count]`, page 26, (function)
- `[quantiles-summary-max]`, page 26, (function)
- `[quantiles-summary-min]`, page 26, (function)
- `[quantiles-summary-p]`, page 26, (function)
- `[quantiles-summary-q25]`, page 26, (function)
- `[quantiles-summary-q50]`, page 26, (function)
- `[quantiles-summary-q75]`, page 26, (function)
- `[vector-summary%]`, page 30, (structure)
- `[vector-summary%-length]`, page 26, (function)
- `[vector-summary%-p]`, page 27, (function)

2.1.8 data-frame/defdf.lisp

Dependency

[summary.lisp], page 5, (file)

Parent

[data-frame], page 1, (system)

Location

defdf.lisp

Exported Definitions

- [define-column-names], page 14, (function)
- [define-data-frame], page 13, (macro)

Internal Definitions

- [replace-key!], page 21, (macro)
- [show-symbols], page 26, (function)

2.1.9 data-frame/missing.lisp

Dependency

[defdf.lisp], page 7, (file)

Parent

[data-frame], page 1, (system)

Location

missing.lisp

Exported Definitions

- [drop-missing], page 18, (method)
- [missingp], page 18, (generic function)
- [missingp], page 19, (method)
- [missingp], page 19, (method)
- [missingp], page 19, (method)
- [missingp], page 19, (method)
- [missingp], page 19, (method)
- [missingp], page 19, (method)
- [missingp], page 19, (method)
- [replace-missing], page 19, (method)

Internal Definitions

[drop-na], page 22, (function)

3 Packages

Packages are listed by definition order.

3.1 data-frame

Source [pkgdcl.lisp], page 3, (file)

Nickname df

Use List

- select-dev
- select
- let-plus
- anaphora
- alexandria
- common-lisp

Exported Definitions

- [*column-summary-minimum-length*], page 13, (special variable)
- [add-column!], page 13, (function)
- [add-columns], page 13, (function)
- [add-columns!], page 13, (function)
- [alist-df], page 13, (function)
- [alist-dv], page 13, (function)
- [column], page 14, (function)
- [(setf column)], page 14, (function)
- [column-names], page 14, (function)
- [column-summary], page 18, (generic function)
- [column-summary], page 18, (method)
- [column-summary], page 18, (method)
- [column-type], page 14, (function)
- [columns], page 14, (function)
- [copy], page 14, (function)
- [count-rows], page 14, (function)
- [data-frame], page 20, (class)
- [data-vector], page 20, (class)
- [define-column-names], page 14, (function)
- [define-data-frame], page 13, (macro)
- [df], page 15, (function)
- [df-print], page 15, (function)
- [df-remove-duplicates], page 15, (function)
- [do-rows], page 15, (function)
- [doc-string], page 18, (generic function)
- [doc-string], page 18, (method)
- [(setf doc-string)], page 18, (method)

- [2d-array-to-list], page 21, (function)
- [add-key!], page 21, (function)
- [add-keys], page 21, (function)
- [aesthetic-string], page 21, (function)
- [alist-data], page 22, (function)
- [bit-vector-summary], page 27, (structure)
- [bit-vector-summary-count], page 22, (function)
- [bit-vector-summary-length], page 22, (function)
- [bit-vector-summary-p], page 22, (function)
- [check-column-compatibility], page 27, (generic function)
- [check-column-compatibility], page 27, (method)
- [check-column-compatibility], page 27, (method)
- [column-length], page 27, (generic function)
- [column-length], page 27, (method)
- [column-type-format], page 22, (function)
- [copy-bit-vector-summary], page 22, (function)
- [copy-generic-vector-summary], page 22, (function)
- [copy-ordered-keys], page 22, (function)
- [copy-quantiles-summary], page 22, (function)
- [copy-vector-summary%], page 22, (function)
- [data], page 30, (class)
- [default-column-formats], page 27, (generic function)
- [default-column-formats], page 27, (method)
- [define-data-subclass], page 21, (macro)
- [drop-na], page 22, (function)
- [ensure-arguments-alist], page 23, (function)
- [ensure-not-ratio], page 23, (function)
- [generic-vector-summary], page 28, (structure)
- [generic-vector-summary-element-count-alist], page 23, (function)
- [generic-vector-summary-length], page 23, (function)
- [generic-vector-summary-p], page 23, (function)
- [generic-vector-summary-quantiles], page 23, (function)
- [get-type], page 23, (function)
- [guess-alist?], page 23, (function)
- [key-index], page 23, (function)
- [keys-count], page 24, (function)
- [keys-vector], page 24, (function)
- [make-bit-vector-summary], page 24, (function)
- [make-data], page 24, (function)
- [make-generic-vector-summary], page 24, (function)
- [make-ordered-keys], page 24, (function)
- [make-quantiles-summary], page 24, (function)
- [make-vector-summary%], page 24, (function)

- [max-decimal], page 24, (function)
- [max-width], page 25, (function)
- [ordered-keys], page 25, (function)
- [ordered-keys], page 28, (structure)
- [ordered-keys-p], page 25, (function)
- [ordered-keys-table], page 25, (function)
- [plist-data], page 25, (function)
- [print-count-and-percentage], page 25, (function)
- [print-table], page 25, (function)
- [printer-status], page 25, (function)
- [quantiles-summary], page 29, (structure)
- [quantiles-summary-count], page 26, (function)
- [quantiles-summary-max], page 26, (function)
- [quantiles-summary-min], page 26, (function)
- [quantiles-summary-p], page 26, (function)
- [quantiles-summary-q25], page 26, (function)
- [quantiles-summary-q50], page 26, (function)
- [quantiles-summary-q75], page 26, (function)
- [replace-key!], page 21, (macro)
- [reverse-df], page 26, (function)
- [show-symbols], page 26, (function)
- [types-in-column], page 26, (function)
- [vector-summary%], page 30, (structure)
- [vector-summary%-length], page 26, (function)
- [vector-summary%-p], page 27, (function)
- [weave], page 27, (function)

4 Definitions

Definitions are sorted by export status, category, package, and then by lexicographic order.

4.1 Exported definitions

4.1.1 Special variables

column-summary-minimum-length [Special Variable]

Columns are only summarised when longer than this, otherwise they are returned as is.

Package [data-frame], page 9,

Source [summary.lisp], page 5, (file)

4.1.2 Macros

define-data-frame *DF BODY &optional DOC* [Macro]

Package [data-frame], page 9,

Source [defdf.lisp], page 7, (file)

4.1.3 Functions

add-column! *DATA KEY COLUMN* [Function]

Modify DATA (a data-frame or data-vector) by adding COLUMN with KEY. Return DATA.

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

add-columns *DATA &rest KEYS-AND-COLUMNS* [Function]

Return a new data-frame or data-vector with keys and columns added. Does not modify DATA (see README about accepted argument formats).

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

add-columns! *DATA &rest KEYS-AND-COLUMNS* [Function]

Modify DATA (a data-frame or data-vector) by adding columns with keys (see README about accepted argument formats).

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

alist-df *ALIST* [Function]

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

alist-dv *ALIST* [Function]

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

- column** *DATA KEY* [Function]
 Return column corresponding to key.
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
Writer [(setf column)], page 14, (function)
- (setf column)** *COLUMN DATA KEY* [Function]
 Set column corresponding to key.
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
Reader [column], page 14, (function)
- column-names** *DF* [Function]
 Return a list of column names in DF, as strings
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- column-type** *COL* [Function]
 Return the most specific type found in COL
Package [data-frame], page 9,
Source [utils.lisp], page 3, (file)
- columns** *DATA &optional SLICE* [Function]
 Return the columns of DATA as a vector, or a selection if given (keys are resolved).
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- copy** *DATA &key KEY* [Function]
 Copy data frame or vector. Keys are copied (and thus can be modified), columns or elements are copied using KEY, making the default give a shallow copy.
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- count-rows** *DATA-FRAME KEYS PREDICATE* [Function]
 Count the number of rows for which PREDICATE called on the columns corresponding to KEYS returns non-NIL.
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- define-column-names** *DF PACKAGE* [Function]
 Create a symbol macro for each column name in DF
 After running this function, you can refer to a column by its name. This is useful if the column names of a data frame have changed. Example: (define-column-names mtcars)
Package [data-frame], page 9,
Source [defdf.lisp], page 7, (file)

- df** *&rest PLIST-OR-ALIST* [Function]
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- df-print** *DF* [Function]
 Print DF to *standard-output* in table format
Package [data-frame], page 9,
Source [formatted-output.lisp], page 5, (file)
- df-remove-duplicates** *DATA* [Function]
 Return a modified copy of DATA from which any element (row, if a DATA-FRAME) that matches another element has been removed
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- do-rows** *DATA-FRAME KEYS FUNCTION* [Function]
 Traverse rows from first to last, calling FUNCTION on the columns corresponding to KEYS. Return no values.
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- dv** *&rest PLIST-OR-ALIST* [Function]
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- keys** *DATA* [Function]
 Vector of keys.
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- make-df** *KEYS COLUMNS* [Function]
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- make-dv** *KEYS COLUMNS* [Function]
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- map-columns** *DATA FUNCTION &optional RESULT-CLASS* [Function]
 Map columns of DATA-FRAME or DATA-VECTOR using FUNCTION. The result is a new DATA-FRAME with the same keys.
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)

map-df *DATA-FRAME KEYS FUNCTION RESULT-KEYS* [Function]

Map DATA-FRAME to another one by rows. Function is called on the columns corresponding to KEYS, and should return a sequence with the same length as RESULT-KEYS, which give the keys of the resulting data frame. RESULT-KETS should be either symbols, or of the format (symbol &optional (element-type t)).

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

map-rows *DATA-FRAME KEYS FUNCTION &key ELEMENT-TYPE* [Function]

Map rows using FUNCTION, on the columns corresponding to KEYS. Return the result with the given ELEMENT-TYPE.

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

mask-rows *DATA-FRAME KEYS PREDICATE* [Function]

Return a bit-vector containing the result of calling PREDICATE on rows of the columns corresponding to KEYS (0 for NIL, 1 otherwise).

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

matrix-df *KEYS MATRIX* [Function]

Convert a matrix to a data-frame with the given keys.

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

plist-df *PLIST* [Function]

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

plist-dv *PLIST* [Function]

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

pprint-array *ARR &optional STREAM ROW-NUMBERS-P* [Function]

Print an array to STREAM, defaulting to *standard-output*, in a tabular format. If ROW-NUMBERS-P, print row numbers.

Package [data-frame], page 9,

Source [pprint.lisp], page 5, (file)

pprint-data-frame *DATA-FRAME &optional STREAM ROW-NUMBERS-P MAX-DIGITS* [Function]

Print DATA-FRAME to STREAM using the pretty printer

Package [data-frame], page 9,

Source [pprint.lisp], page 5, (file)

pprint-markdown *DF &key STREAM ROW-NUMBERS* [Function]

Print data frame DF, in markdown format, to STREAM
If ROW-NUMBERS is true, also print row numbers as the first column

Package [data-frame], page 9,

Source [formatted-output.lisp], page 5, (file)

remove-columns *DATA KEYS* [Function]

ARGS: DATA data frame

KEYS list of keys (variables) to be removed

Return a new data-frame or data-vector with keys and columns removed. Does not modify DATA.

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

replace-column *DATA KEY FUNCTION-OR-COLUMN &key ELEMENT-TYPE* [Function]

Create a new data frame with new column KEY from data-frame DATA by replacing it either with the given column, or applying the function to the current values (ELEMENT-TYPE is used.)

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

replace-column! *DATA KEY FUNCTION-OR-COLUMN &key ELEMENT-TYPE* [Function]

Modify column KEY of data-frame DATA by replacing it either with the given column, or applying the function to the current values (ELEMENT-TYPE is used.)

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

rows *DATA* [Function]

Return the rows of DATA as a vector

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

substitute-key! *DF NEW OLD* [Function]

Substitute NEW key, a SYMBOL, for OLD in a data-frame.

Useful when reading data files that have an empty or generated column name.

Example: (substitute-key *cars* :name :||) to replace an empty symbol with :name

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

4.1.4 Generic functions

`column-summary` *COLUMN* [Generic Function]

Return an object that summarizes *COLUMN* of a DATA-FRAME. Primarily intended for printing, not analysis, returned values should print nicely.

Package [data-frame], page 9,

Source [summary.lisp], page 5, (file)

Methods

`column-summary` (*COLUMN* bit-vector) [Method]

`column-summary` (*COLUMN* vector) [Method]

`doc-string` *OBJECT* [Generic Function]

(`setf doc-string`) *NEW-VALUE OBJECT* [Generic Function]

Package [data-frame], page 9,

Methods

`doc-string` (*DATA* data) [Method]

automatically generated reader method

Source [data-frame.lisp], page 3, (file)

(`setf doc-string`) *NEW-VALUE* (*DATA* data) [Method]

automatically generated writer method

Source [data-frame.lisp], page 3, (file)

`drop-missing` *DF* &optional *PREDICATE* [Generic Function]

Package [data-frame], page 9,

Methods

`drop-missing` (*DF* data-frame) &optional *PREDICATE* [Method]

Remove all rows from *DF* that are missing values according to *PREDICATE*

Source [missing.lisp], page 7, (file)

`head` *DF* &optional *N* [Generic Function]

Package [data-frame], page 9,

Methods

`head` (*DF* data-frame) &optional *N* [Method]

Return the first *N* rows of *DF*; *N* defaults to 6

Source [pprint.lisp], page 5, (file)

`missingp` *DATA* [Generic Function]

Package [data-frame], page 9,

Source [missing.lisp], page 7, (file)

Methods

<code>missingp</code>	<i>DATA</i>	[Method]
<code>missingp</code>	(<i>DATA</i> (eq1 na))	[Method]
<code>missingp</code>	(<i>DATA</i> string)	[Method]
<code>missingp</code>	(<i>DATA</i> sequence)	[Method]
<code>missingp</code>	(<i>DATA</i> array)	[Method]
<code>missingp</code>	(<i>DATA</i> data-frame)	[Method]
<code>replace-missing</code>	<i>DF</i> <i>MAP-ALIST</i>	[Generic Function]
Package	[data-frame], page 9,	
Methods		
<code>replace-missing</code>	(<i>DF</i> data-frame) <i>MAP-ALIST</i>	[Method]
	Replace missing values with the values specified	
	The alist consists of a column name in the CAR and the replacement value in the CDR Example: (replace-missing mtcarsm '((mtcarsm:mpg . foo)))	
Source	[missing.lisp], page 7, (file)	
<code>summary</code>	<i>DF</i> &optional <i>STREAM</i>	[Generic Function]
Package	[data-frame], page 9,	
Methods		
<code>summary</code>	(<i>DF</i> data-frame) &optional <i>STREAM</i>	[Method]
	Deprecated. Print simple stastical summary of data frame	
Source	[summary.lisp], page 5, (file)	
<code>tail</code>	<i>DF</i> &optional <i>N</i>	[Generic Function]
Package	[data-frame], page 9,	
Methods		
<code>tail</code>	(<i>DF</i> data-frame) &optional <i>N</i>	[Method]
	Return the last N rows of DF; N defaults to 6	
Source	[pprint.lisp], page 5, (file)	

4.1.5 Conditions

<code>duplicate-key</code>	()	[Condition]
	Duplicate key.	
Package	[data-frame], page 9,	
Source	[data-frame.lisp], page 3, (file)	
Direct superclasses	error (condition)	
Direct slots		
	key	[Slot]
Initargs	:key	

`key-not-found ()` [Condition]
 Key not found.

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

Direct superclasses
 error (condition)

Direct slots

key [Slot]

Initargs :key

keys [Slot]

Initargs :keys

4.1.6 Classes

`data-frame ()` [Class]

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

Direct superclasses
 [data], page 30, (class)

Direct methods

- [replace-missing], page 19, (method)
- [drop-missing], page 18, (method)
- [missingp], page 19, (method)
- [summary], page 19, (method)
- [tail], page 19, (method)
- [head], page 18, (method)
- print-object (method)
- select (method)
- [check-column-compatibility], page 27, (method)
- as-array (method)
- dims (method)
- ncol (method)
- nrow (method)
- initialize-instance (method)

`data-vector ()` [Class]

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

Direct superclasses
 [data], page 30, (class)

Direct methods

- print-object (method)
- select (method)
- as-array (method)
- dims (method)

4.2 Internal definitions

4.2.1 Special variables

column-summary-quantiles-threshold [Special Variable]
If the number of reals exceeds this threshold, they will be summarized with quantiles.

Package [data-frame], page 9,

Source [summary.lisp], page 5, (file)

max-digits [Special Variable]

Package [data-frame], page 9,

Source [pprint.lisp], page 5, (file)

row-numbers-p [Special Variable]

Package [data-frame], page 9,

Source [pprint.lisp], page 5, (file)

4.2.2 Macros

define-data-subclass *CLASS ABBREVIATION* [Macro]

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

replace-key! *DF NEW OLD* [Macro]

Replace a key in DF, updating data package symbols Example: (replace-key! mtcars row-name x1)

Package [data-frame], page 9,

Source [defdf.lisp], page 7, (file)

4.2.3 Functions

2d-array-to-list *ARRAY* [Function]

Convert an array to a list of lists

Package [data-frame], page 9,

Source [pprint.lisp], page 5, (file)

add-key! *ORDERED-KEYS KEY* [Function]

Modify ORDERED-KEYS by adding KEY.

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

add-keys *ORDERED-KEYS &rest KEYS* [Function]

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

aesthetic-string *THING* [Function]

Return the string used to represent ‘thing’ when printing aesthetically.

Package [data-frame], page 9,

Source [formatted-output.lisp], page 5, (file)

- alist-data** *CLASS ALIST* [Function]
 Create an object of CLASS (subclass of DATA) from ALIST which contains key-column pairs.
- Package** [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- bit-vector-summary-count** *INSTANCE* [Function]
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- bit-vector-summary-length** *INSTANCE* [Function]
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- bit-vector-summary-p** *OBJECT* [Function]
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- column-type-format** *SEQUENCE* [Function]
 Return a format string for the most specific type found in sequence Use this for sequences of type T to determine how to format the column.
- Package** [data-frame], page 9,
Source [pprint.lisp], page 5, (file)
- copy-bit-vector-summary** *INSTANCE* [Function]
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- copy-generic-vector-summary** *INSTANCE* [Function]
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- copy-ordered-keys** *ORDERED-KEYS* [Function]
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- copy-quantiles-summary** *INSTANCE* [Function]
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- copy-vector-summary%** *INSTANCE* [Function]
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- drop-na** *DF* [Function]
 Remove all rows from DF that are missing values. Convenience R-like function.
- Package** [data-frame], page 9,
Source [missing.lisp], page 7, (file)

- ensure-arguments-alist** *REST* [Function]
Recognizes the following and converts them to an alist:
plist
alist
(plist)
(alist)
(data-frame)
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- ensure-not-ratio** *REAL* [Function]
When REAL is a RATIO, convert it to a float, otherwise return as is. Used for printing.
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- generic-vector-summary-element-count-alist** *INSTANCE* [Function]
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- generic-vector-summary-length** *INSTANCE* [Function]
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- generic-vector-summary-p** *OBJECT* [Function]
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- generic-vector-summary-quantiles** *INSTANCE* [Function]
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- get-type** *X* [Function]
Return the most specific type symbol for x
Package [data-frame], page 9,
Source [utils.lisp], page 3, (file)
- guess-alist?** *PLIST-OR-ALIST* [Function]
Test if the argument is an ALIST by checking its first element. Used for deciding which creation function to call.
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- key-index** *ORDERED-KEYS KEY* [Function]
Return the index for KEY.
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)

- keys-count** *ORDERED-KEYS* [Function]
 Number of keys.
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- keys-vector** *ORDERED-KEYS* [Function]
 Vector of all keys.
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- make-bit-vector-summary** **&key** (*LENGTH LENGTH*) (*COUNT COUNT*) [Function]
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- make-data** *CLASS KEYS COLUMNS* [Function]
 Create a DATA object from KEYS and COLUMNS. FOR INTERNAL USE. Always creates a copy of COLUMNS in order to ensure that it is an adjustable array with a fill pointer. KEYS are converted to ORDERED-KEYS if necessary.
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- make-generic-vector-summary** **&key** (*LENGTH LENGTH*) (*QUANTILES QUANTILES*) (*ELEMENT-COUNT-ALIST ELEMENT-COUNT-ALIST*) [Function]
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- make-ordered-keys** **&key** (*TABLE TABLE*) [Function]
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- make-quantiles-summary** **&key** (*COUNT COUNT*) (*MIN MIN*) (*Q25 Q25*) (*Q50 Q50*) (*Q75 Q75*) (*MAX MAX*) [Function]
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- make-vector-summary%** **&key** (*LENGTH LENGTH*) [Function]
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- max-decimal** *SEQUENCE &optional MAX-DIGITS* [Function]
 Return the maximum number of digits to the right of the decimal point in the numbers of SEQUENCE, equal to or less than MAX-DIGITS
Package [data-frame], page 9,
Source [pprint.lisp], page 5, (file)

- max-width** *SEQUENCE &optional MAX-WIDTH* [Function]
 Return the largest printed string size of the elements of SEQUENCE, equal to or less than MAX-WIDTH
Package [data-frame], page 9,
Source [pprint.lisp], page 5, (file)
- ordered-keys** *KEYS* [Function]
 Create an ORDERED-KEYS object from KEYS (a sequence).
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- ordered-keys-p** *OBJECT* [Function]
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- ordered-keys-table** *INSTANCE* [Function]
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- plist-data** *CLASS PLIST* [Function]
 Create an object of CLASS (subclass of DATA) from PLIST which contains keys and columns, interleaved.
Package [data-frame], page 9,
Source [data-frame.lisp], page 3, (file)
- print-count-and-percentage** *STREAM COUNT LENGTH* [Function]
 Print COUNT as is and also as a rounded percentage of
Package [data-frame], page 9,
Source [summary.lisp], page 5, (file)
- print-table** *ROWS &optional STREAM* [Function]
 Print ‘rows’ as a nicely-formatted table.
 Each row should have the same number of colums.
 Columns will be justified properly to fit the longest item in each one. Example:
 (print-table ‘((1 :red something)
 (2 :green more)))
 =>
 1 | RED | SOMETHING
 2 | GREEN | MORE

Package [data-frame], page 9,
Source [formatted-output.lisp], page 5, (file)
- printer-status** () [Function]
 Print values of all the printer variables
Package [data-frame], page 9,
Source [pprint.lisp], page 5, (file)

<code>quantiles-summary-count</code>	<i>INSTANCE</i>	[Function]
Package	[data-frame], page 9,	
Source	[summary.lisp], page 5, (file)	
<code>quantiles-summary-max</code>	<i>INSTANCE</i>	[Function]
Package	[data-frame], page 9,	
Source	[summary.lisp], page 5, (file)	
<code>quantiles-summary-min</code>	<i>INSTANCE</i>	[Function]
Package	[data-frame], page 9,	
Source	[summary.lisp], page 5, (file)	
<code>quantiles-summary-p</code>	<i>OBJECT</i>	[Function]
Package	[data-frame], page 9,	
Source	[summary.lisp], page 5, (file)	
<code>quantiles-summary-q25</code>	<i>INSTANCE</i>	[Function]
Package	[data-frame], page 9,	
Source	[summary.lisp], page 5, (file)	
<code>quantiles-summary-q50</code>	<i>INSTANCE</i>	[Function]
Package	[data-frame], page 9,	
Source	[summary.lisp], page 5, (file)	
<code>quantiles-summary-q75</code>	<i>INSTANCE</i>	[Function]
Package	[data-frame], page 9,	
Source	[summary.lisp], page 5, (file)	
<code>reverse-df</code>	<i>DF</i>	[Function]
Return DF with columns in reverse order		
Package	[data-frame], page 9,	
Source	[pprint.lisp], page 5, (file)	
<code>show-symbols</code>	<i>PKG</i>	[Function]
Print all symbols in PKG Example: (show-symbols 'mtcars)		
Package	[data-frame], page 9,	
Source	[defdf.lisp], page 7, (file)	
<code>types-in-column</code>	<i>SEQ</i>	[Function]
Return a list of the types found in SEQ		
Package	[data-frame], page 9,	
Source	[utils.lisp], page 3, (file)	
<code>vector-summary%-length</code>	<i>INSTANCE</i>	[Function]
Package	[data-frame], page 9,	
Source	[summary.lisp], page 5, (file)	

vector-summary%-p *OBJECT* [Function]

Package [data-frame], page 9,

Source [summary.lisp], page 5, (file)

weave &rest *LISTS* [Function]

Return a list whose elements alternate between each of the lists ‘lists’. Weaving stops when any of the lists has been exhausted.

Package [data-frame], page 9,

Source [formatted-output.lisp], page 5, (file)

4.2.4 Generic functions

check-column-compatibility *DATA COLUMN* [Generic Function]

Check if *COLUMN* is compatible with *DATA*.

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

Methods

check-column-compatibility (*DATA* data-frame) *COLUMN* [Method]

check-column-compatibility (*DATA* data) *COLUMN* [Method]

column-length *COLUMN* [Generic Function]

Return the length of column.

Package [data-frame], page 9,

Source [summary.lisp], page 5, (file)

Methods

column-length (*COLUMN* vector) [Method]

default-column-formats *ARRAY* [Generic Function]

Package [data-frame], page 9,

Methods

default-column-formats (*ARRAY* (eql simple-array)) [Method]

Return a list of formatting strings for *ARRAY*

The method returns a set of default formatting strings using heuristics.

Source [pprint.lisp], page 5, (file)

4.2.5 Structures

bit-vector-summary () [Structure]

Summary of a bit vector.

Package [data-frame], page 9,

Source [summary.lisp], page 5, (file)

Direct superclasses

[vector-summary%], page 30, (structure)

Direct slots

count		[Slot]
Type	alexandria:array-index	
Initform	0	
Readers	[bit-vector-summary-count], page 22, (function)	
Writers	(setf bit-vector-summary-count) (function)	

generic-vector-summary () [Structure]
 Summary for generic vectors.

Package [data-frame], page 9,

Source [summary.lisp], page 5, (file)

Direct superclasses

[vector-summary%], page 30, (structure)

Direct slots

quantiles		[Slot]
Type	(or null data-frame::quantiles-summary)	
Readers	[generic-vector-summary-quantiles], page 23, (function)	
Writers	(setf generic-vector-summary-quantiles) (function)	
element-count-alist		[Slot]
Type	list	
Readers	[generic-vector-summary-element-count-alist], page 23, (function)	
Writers	(setf generic-vector-summary-element-count-alist) (function)	

ordered-keys () [Structure]
 Representation of ordered keys.

TABLE maps keys to indexes, starting from zero.

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

Direct superclasses

structure-object (structure)

Direct methods

- print-object (method)
- select (method)
- canonical-representation (method)
- axis-dimension (method)

Direct slots

table		[Slot]
Type	hash-table	

Initform	(make-hash-table :test (function eq))	
Readers	[ordered-keys-table], page 25, (function)	
Writers	(setf ordered-keys-table) (function)	
quantiles-summary ()	Summary of a real elements (using quantiles).	[Structure]
Package	[data-frame], page 9,	
Source	[summary.lisp], page 5, (file)	
Direct superclasses	structure-object (structure)	
Direct slots		
count		[Slot]
Type	alexandria:array-index	
Initform	0	
Readers	[quantiles-summary-count], page 26, (function)	
Writers	(setf quantiles-summary-count) (function)	
min		[Slot]
Type	real	
Initform	0	
Readers	[quantiles-summary-min], page 26, (function)	
Writers	(setf quantiles-summary-min) (function)	
q25		[Slot]
Type	real	
Initform	0	
Readers	[quantiles-summary-q25], page 26, (function)	
Writers	(setf quantiles-summary-q25) (function)	
q50		[Slot]
Type	real	
Initform	0	
Readers	[quantiles-summary-q50], page 26, (function)	
Writers	(setf quantiles-summary-q50) (function)	
q75		[Slot]
Type	real	
Initform	0	
Readers	[quantiles-summary-q75], page 26, (function)	
Writers	(setf quantiles-summary-q75) (function)	

max [Slot]

Type real

Initform 0

Readers [quantiles-summary-max], page 26, (function)

Writers (setf quantiles-summary-max) (function)

vector-summary% () [Structure]

Base class for summarizing vectors. Not exported.

Package [data-frame], page 9,

Source [summary.lisp], page 5, (file)

Direct superclasses

structure-object (structure)

Direct subclasses

- [bit-vector-summary], page 27, (structure)
- [generic-vector-summary], page 28, (structure)

Direct slots

length [Slot]

Type alexandria:array-index

Initform 0

Readers [vector-summary%-length], page 26, (function)

Writers (setf vector-summary%-length) (function)

4.2.6 Classes

data () [Class]

This class is used for implementing both data-vector and data-matrix, and represents an ordered collection of key-column pairs. Columns are not assumed to have any specific attributes. This class is not exported.

Package [data-frame], page 9,

Source [data-frame.lisp], page 3, (file)

Direct superclasses

standard-object (class)

Direct subclasses

- [data-vector], page 20, (class)
- [data-frame], page 20, (class)

Direct methods

- as-alist (method)
- [check-column-compatibility], page 27, (method)
- element-type (method)
- doc-string (method)
- [doc-string], page 18, (method)

Direct slots

ordered-keys [Slot]

Type data-frame::ordered-keys

Initargs	:ordered-keys	
columns		[Slot]
Type	vector	
Initargs	:columns	
doc-string		[Slot]
Type	string	
Initargs	:nil	
Readers	[doc-string], page 18, (generic function)	
Writers	[(setf doc-string)], page 18, (generic function)	

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