

HISTOGRAM DOCUMENTATION

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<LISPUSERS>HISTOGRAM contains a collection of functions that produce histograms, or bar-charts, given the appropriate data. The functions will place the bars in a window, and automatically scale the bars to fit properly in the window. If there are many items in the histogram, the window will be scrollable. All items are charted horizontally. This package is completely self-sufficient, and does not need another package for use.

The HISTOGRAM package, when using the highest-level function, SHOW.HISTOGRAM, will produce a window with the histogram in it. Some of the properties attached to this window in the process are :

(1) HISTOGRAM - an object known as a histogram, which is a list of items, each item being a small list of the form

(label value height-of-bar)

where *label* is the identifier of the value you are charting (it may be a string or a bitmap), *value* is the value you are charting, and *height-of-bar* is the height, in points, of the bar in the bar-chart.

(2) HISTOGRAM.BITMAP - a bitmap of the histogram. This is essentially the bar chart on a bitmap, and is what gets bitblted into the window to display the histogram.

(3) HISTOGRAM.POSITION - a single number. This is the y position of the bottom of the histogram bitmap in the coordinate system of the window you are using for display. This is used by the scroll and repaint functions.

Useful Functions:

The top-level function in the HISTOGRAM package is the function SHOW.HISTOGRAM. This procedure itself calls other lower-level but still useful functions such as HISTOGRAM, which produces a histogram object from the data, DISPLAY.HISTOGRAM, which displays the histogram in a window, MAKE.HISTOGRAM.BITMAP, which produces the histogram.bitmap given the histogram and a window, and PRINT.SCALE, which is a procedure that prints a scale at the top of the bitmap, and determines some "smart" number of divisions to give it.

In addition, the package adds on a HISTOGRAM.REPAINTFN and HISTOGRAM.RESHAPEFN.

SHOW.HISTOGRAM (*name/value-list window font title*)

This is the highest-level function in the package. It takes four arguments, the first being the data from which it will derive its histogram. The data is the name/value-list and is of the form:

((** . **)(** . **)(** . **)....), i.e. a list of dotted pairs, the car of each dotted pair being the label of the item, and the cdr being the value associated with it. The label may be either a string, atom, or bitmap.

The bar-chart will be displayed in *window*, if it is provided. If it is not, a window of appropriate size will be developed and the user prompted for a place for it. The histogram is always developed so that the bars of the bar-chart scale so that there need not be any reason to scroll horizontally. The window created by the histogram package will never exceed 500 bits wide by 500 bits tall.

The font is a font for all labels that are strings to be printed in. If not given, it defaults to HELVETICA 10. *Title* is the title for the window, and will be displayed in the title bar at the top of the window. This will default to "Histogram of Selected Data" if a title is not specified.

HISTOGRAM (*name/value-list font*)

This procedure produces the histogram object from the data. It is passed a list of dotted pairs, with the car of each item being the label, and the cdr being the value, and creates a list of lists, with each sublist being a list of three things; the label, value, and height-of-bar for the bar-chart bar. The font is required here get the third piece of information. At the moment, the height-of-bar is always equal to the font that the label will be displayed in minus 2.

DISPLAY.HISTOGRAM (*window font*)

This procedure displays a histogram in *window* by taking the histogram property off that window and creating a bitmap from it by using MAKE.HISTOGRAM.BITMAP. It then bitblts this bitmap onto the window. It displays all labels in the font *font* if it is a string. (defaults to HELVETICA 10). It is in this procedure that we set the window's SCROLLFN, REPAINTFN, and RESHAPEFN. In addition, we turn on scrolling in this procedure too.

MAKE.HISTOGRAM.BITMAP (*window font tab1 tab2 tab3 scale hist*)

This procedure creates the histogram bitmap property of the histogram.window. It does this by creating a blank bitmap of a width as wide as the window's, and a height that will be as tall as needed in which to display all the data plus a scale at the top. It prints a scale at the top using PRINT.SCALE and then goes through each item in the histogram, starting at the bottom of the bitmap, bitblts the label to x-position *tab1*, the value to x-position *tab2*, and the bar of the bar-chart to x-position *tab3*. When it finishes, it adds some number (approximately equal to the tallest item of the three, the label, the value, or the bar) to its current y-position, and now has the y-position for the next "line" of data.

PRINT.SCALE (*bitmap bartab scale hist font*)

Produces a scale at the top of the bitmap (histogram), with the number of divisions in that grid somehow related to the greatest value of all the values on the histogram. This grid is put here for orientation.