

Mac Graph

MacGraph is a graphic package constructed by Bill Sammons for Drexel University. Its purpose is to allow the user to demonstrate the graph of almost any function that he wishes. This package is fairly easy to use and conforms to the standard Macintosh user interface.

A. WINDOWS

First we will discuss the six windows that will open when the program is run. The first window, the uppermost and leftmost, is the title window. It displays the name of the current document. If no name exists, this window will display "Untitled."

The window directly to its right is the function window. This window starts with the characters "Y = ", this is followed by a blinking cursor. This is the window that will contain the function to be graphed. When the program is instructed to draw or redraw the graph, it will inspect what follows the "Y = " prompt. You should not destroy the function prompt at any time. This window has the standard editing features that most programs use. You can either type the function directly from the keyboard or you can use the function and number palates described below. You may also use either at any time. Note that when typing in a function you may use either upper or lower case without caution. **CAUTION:** You will get an illegal function message if you have too many right or left parens so be sure they pair off. It is suggested that you use parens around complex functions to be sure you get the correct plot. Another good place to use parens is when two mathematical instructions are side by side (i.e. if your function is $Y = X * -2$, the computer will interpret this incorrectly, you should use $Y = X * (-2)$ instead and the computer will now interpret your function correctly.) This program also has memory limitations. If your function is too long, the computer may run out of available memory. To avoid this, also use parens to split an extremely long, complex function into 3 or 4 smaller less complex parts.

The next window, directly below the title window, is the function palate. This palate contains all of the available functions understood by this program as well as mathematical expressions and constants. One mathematical expression you may not recognize is the \wedge . This is the exponent function so 2 to the 5th power would look like 2^5 . Also the factorial expression, represented by the exclamation point, will only evaluate positive whole numbers for its argument. To assure use no errors are encountered, the program automatically rounds the argument and gives the closest factorial or if the argument is negative, the factorial will return zero for its value.

To get one of these functions into the function window, simply click the mouse on the function you wish to insert at the present position of the blinking cursor.

The window directly to the right of the function palate is the graphing window. This is the window where all legitimate functions will be plotted. You may have many different kinds of graphs with many different parameters and specifications such as line, dot, character or bar graphs. You will use the menus to specify your preferences. These will be discussed in the menu section of this documentation.

The next window, directly below the function palate is the number palate. This is extremely similar to the function palate. To insert a number or the variable X, simply press the square containing the number you want. As before you can also use the keyboard to get the same effect.

The last window is the stored function palate. In this window you can store up to five functions and retrieve them simply by clicking on the one you want. To store a function in this window you must have the Store Function item in the file menu checked, you do this by selecting this item in the menu. Once this is done, insert the function in the function window and instruct the program to plot the function. Now, when you have exactly what you want saved in both the function window and the graph window, click the mouse in one of the five small graphs. You will notice that a miniature picture of the function that is plotted will appear in this spot. Now you can retrieve that function without retyping the function. To retrieve simply select the Load Function item in the file menu once, and then click on the box that has the function you want. The function and its graph will appear in the proper windows. You do not need to select the Store or Load Function items each time you want to store or load, the program will respond to the one that is checked which is usually the last one that was selected.

B. MENUS

MacGraph has four menus the apple menu, the file menu, the edit menu, and the preferences menu. We will discuss each separately.

1. The apple menu: This menu has the about feature for this program as well as the desk accessories in the system. Use these just like any other program.

2. The file menu:

a. New: This feature will clear all of the stored functions as well as the graph and function windows.

b. Open Graph Sheet: This will ask you to select the name of a file that has five stored functions in it. When you select a file, the five miniature pictures will be loaded and the Load Function item will be selected so all you have to do is click on the function you wish to have plotted.

- c. Close Graph Sheet: This will simply close the graph and stored function windows.
- d. Save: This will update the current document on the disk.
- e. Save As: This will save the current document as the name that you specify.
- f. Store Function: Select this item to use the stored functions for saving the graphs.
- g. Load Function: Select this item to use the stored functions for loading the graphs.
- h. Set Parameters: This function will call a dialog box in which you may specify the x and y minimum and maximum values. You must use integers. Also you can set how often the program will calculate the function. After specifying new parameters, the program will automatically regraph the present function that is in the function window.
- i. Graph Function: This simply graphs the function in the function window.
- j. Print Function: This will dump the function and the graph to the printer.
- k. Quit: Pretty obvious!!

3. The edit menu:

- a. Revert Parameters: This will revert the mins, maxs and increment parameters to the one immediately previous.
- b-e. Cut,Copy,Paste and Clear: These are the standard functions and will operate on the function window.

4. The preference menu:

- a. Line Graph: This is the normal graphing mode. This mode will connect each consecutive point calculated. For some graphs, such as TAN,COT et al, that have infinty breaks, you should not use this feature, instead use one of the other graph modes.
- b. Dot Graph: This mode will plot a 4x4 dot at the calculated points. You should use an increment small enough that you can see the graph accurately when using this mode.
- c. Character Graph: This feature will plot a character, specified by the user, at the calculated points. This is useful when comparing graphs.
- d. Bar Graph: This feature will simply draw a rectangle from the X axis to the calculated value of y.
- e-f. Update On/Off: This feature will turn the updating routines on or off. The reason for this is that the updating routines can take long periods of time, which can be annoying.
- g-h. Grid On/Off: This feature will allow the user to plot a grid on the screen or remove it for the next graph.

i-j. One/Multiple Graphs: Use the one graph option to see only the present graph or the multiple graph function to compare two or more graphs. **NOTE:** When using multiple graphs, be careful not to change the coordinate system at any time. Upon changing the coordinate system, the computer will erase the screen and replot only the present function.

5. The Graph Type Menu:

- a. 2D: This will set the program up to function for two dimensional graphs.
- b. 3D: This will set the program up to function for three dimensional graphs.
- c. Normal: This is set for plotting of functions only! (i.e. $Y = f(x)$ or $Z = f(x,y)$)
- d. Parametrics: This is set for plotting parametric equations. Note that when you switch to this state, extra symbols appear on the function window. When you click on one of these symbols, the program will swap the different individual parametric equations in to the function window in order to be edited. When you select this menu item a box will appear that is similar to the Set Parameters box. The functions of the two boxes are the same. You will use T and V as the variables for parametric equations. (i.e. $X = f(t,v)$, $Y = f(t,v)$, $Z = f(t,v)$) If you do not need both variables in your parametric equations, then simply set the maximum and minimum of the variable you don't need to the same value.

C. Special Features.

1. Zoom feature: There is a second way to change the minimum and maximum coordinate values. You can use the feature in the menus or you can click in the graphing window, and drag a rectangular box around the part of the graph you want to zoom in on. If you accidentally zoom in on the wrong section of the graph, you can use the Revert Parameters menu option to go back to the last set of values recorded. Note that the zoom feature is valid only for 2 dimension plots.

2: Aborting a graph: If at any time you want the program to stop plotting a graph, simply press the command key with the period key. This will abort the plot until the next time the computer is instructed to do so.

3: Printing more than one graph: You can print all of the graphs on a graph sheet from the Finder. To do this, simply select the graph sheet or sheets that you want to print and pull down the Print option from the file menu. This will open MacGraph and load, plot and print each of the five recorded functions. If you select more than one sheet, the program will go through each of the sheets one at a time. When all of the graphs have been printed, the program will quit to the Finder. If you do not want a graph printed, use the abort feature described above while the function is being plotted, the program will stop plotting and load the next function to be printed.

Please feel free to send any suggestions, complaints or even compliments to me

Bill Sammons
Instructional Support Group
32nd and Chestnut Streets
Phila, Pa. 19104