

## Project SidePlot

The SidePlot class on the next page plots a function  $y$  vs  $x$ , on its side. In this case the function is the square,  $y = x*x$ , but other functions may be plotted also. The goal is to extend this program in many ways to be more general, more useful, more user-friendly, and ultimately more beautiful. It uses the routine outRow (times, mark), which prints a row of any given marks any number of times.

The essential idea is to take the given particular program, with many specific constants built in, and generalize it, so someone may use this program, by inputting the required data, instead of modifying the program constantly.

0. Enter this program, run it, and understand it.
1. Mark it  
Modify it to print another mark, other than the asterisk "\*".
2. Take Steps  
Change the step size and re-run the program. Modify this program to allow a user to enter the value of the step size. Try both larger and smaller sizes than the given one.
3. Re-Range.  
Extend the range, by prompting a user to enter the first and last values of  $x$ ;  
try it for negative values of  $x$ .
4. Scale it  
Modify it further to enter a scale factor, which multiplies  $y$  by some constant value. If the scale factor is 0.5 then it halves each value of  $y$ ; if the scale factor is 2.0 then it doubles each value. The user should input the scale factor.
5. Shift it  
Extend it to enter an amount to shift or displace  $y$  values by this fixed amount, so allowing for negative values of  $y$ .
6. Foolproof it  
Check that step size is not negative; and does not print off a page, and any other possible unpleasant situations.
7. Table it  
List the values of  $x$  and  $y$  to the left of the plot, as shown on the next page.
8. Box it  
Make an "outline" or box of "-" and "|" and "+" symbols around the plot, or at least around the top, bottom and left side.
9. Test and Show it  
Try your program with two different plots of different sizes (at least half a page), such as:
  - a. an approximation to sine  $y = x - x*x*x/6.0$  where  $x$  is radians (0 to  $\pi/2$ )
  - b. an interesting trigonometric function involving degrees from 0 to 360.
  - b. the Electric Maximum-Power function  $y = (120*120*x)/((x+6)*(x+6))$
  - c. any other function of your own, from Math, Physics, Business, etc
10. More  
Extend this project further in any other way you wish.

### Deliverables:

You are to do this as one program, not many individual programs.

Turn in also two plots; each plot should occupy at least half of a page.