CSC 130 Scientific Programming   SP14

Programming Assignment 2 – the slope of a line and its y-intercept / pgm2.c
Due: Thursday, February 5, before class

<u>This homework programming assignment must be your own (individual) work as defined in the course syllabus and discussed in class.</u>

Problem:
Write a simple C program that calculates the corresponding y-coordinate for any x-coordinate on a line defined by two points. These points are input specified as pairs of x and y coordinates in the two-dimensional Cartesian coordinate system. You need to determine the slope of the line and the y-intercept for the line plotted by these two points and store this data in memory.

The program must prompt the user for the coordinates of the first point, X1 and then Y1, and then prompt the user for the second point, X2 and then Y2. After that, the program should calculate and then print out the slope, y-intercept and the line equation in the format of:

$$y = m * x + b$$

Finally, the program must prompt the user for the x-coordinate of the third point, X3. After that, the program should calculate and then print out the y-coordinate of the third point.

Name the C source code file **pgm2.c**. You must include the following program identification comment block at the start of your C source code file and add the correct relevant information. The pledge must be present.

```
/***********************************************************************
 * Program 2: pgm2.c
 *
 * Programmer: information that you must provide
 *
 * Due Date: information that you must provide
 *
 * CSC130 Fall 2015
 *
 * I pledge I neither gave nor received unauthorized aid on this program.
 *
 * Description: information that you must provide
 *
 * Inputs: information that you must provide
 *
 * Output: information that you must provide
 *
 ***********************************************************************/
```

The input/output formats for your program should look like this:

```
enter 1st X coordinate:
enter 1st y coordinate:
enter 2nd X coordinate:
enter 2nd y coordinate:

slope = ±9.999999
y-intercept = ±9.999999

line equation:
y = ±9.999999 * x + ±9.999999

enter 3rd X coordinate:
3rd y coordinate = ±9.999999
```

Your knowledge of mathematics, an explanation of the C built-in **float data type** [with its format strings for printf() and scanf()], and this program description provides the information you will need to solve this problem and write the program, but we will have a group problem solving session in class before the program is due. This will allow us to fully understand the problem and to develop a structured top-down design for your algorithm and for the program.

Part of this assignment is to develop the algorithm before you code the program. You are expected to submit a written copy of the algorithm in pseudo code or diagram. The algorithm may be on paper or submitted on Blackboard as a file with the C source code and Makefile. An algorithm that fits on one page is reasonable.

For this assignment

- o Submit the C source code (pgm2.c) file(s) for grading as a Blackboard assignment
- o Include your Makefile
- o Include a copy of your algorithm

Your source code will be compiled using the make in a command-prompt shell.

Remember the class policy on late submissions – no late submissions are allowed unless prior arrangement is made with the instructor.