Program 1 {August 18, 2014}   **15 points**
Functions and Basic Variable Types in C
Due: Friday, September 5, 2014 at 11:59 p.m.

The purpose of this programming assignment is to familiarize the student with C syntax, the use of functions in C, and working with a variety of C variable types. The assignment can be written without using any C arrays, but you may use arrays in your solution. Your main routine should have the following define statement:

#define GRAPH_ROW 30

You are to write two C functions where all the formal parameters and the returned values are doubles:

1. A function that computes the Euclidean distance between two points in a two dimensional space. The function will take as input two points specified by the coordinates (x1, y1) and (x2, y2).

2. A function double **print_row** (double distance, double max) that prints out a SINGLE horizontal row for a bar graph. This function has as a maximum number of points in the bar graph as GRAPH_ROW. The function scales the output based on ceil (max).   For example if the call to print_row is:

    print_row (7.5, 69.1)

    the scaling of the print would be determined by 70/30 = 2 1/3. and the resultant print out would look something like:

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Main Assignment

This assignment is similar but not the same as the input flow for Lab 1 program. Assume the first integer read with scanf specifies n, the number of pairs of coordinates (x_1 , y_1) (x_2 , y_2) that are to follow as input with two coordinates per line of input. Your program should only read in one line of input each time scanf executes. However, the coordinates are to be read in as integers.

For each pair of points, compute and print out (using printf) the coordinates and their Euclidean distance.

As the input data is read in, you are to determine (on the fly) the minimum, the maximum and the average Euclidean distance for the n input coordinate pairs. You should redirect all output to a file "prog1.out".

Once all data has been read in, you are to produce a graph using three calls to print_row with one horizontal bar in the graph for the minimum, the average and the maximum Euclidean distance respectively. Note if the minimum is 0.0, the horizontal bar is empty. Additionally, the "max" used in the three calls to print_row should be the same, namely the maximum Euclidean distance.

What to turn in for Program 1 (prog1)

An official test file "prog1.dat" will be made available a few days before the due date, but you should develop the program initially using your own test data. Turn in your assignment using the *turnin* program on the CCC machines. You should turn in a tarred file that includes your source code, a prog1.out file for the official test data file and a README file. Note, you may include a *make* file if you are already familiar with *make.* However, this is NOT a requirement for program 1 because the plan is to work with *make* in Lab 2.