ECE 1261: Lab Assignment 1

We will start with a copy of program `chapter1_1` shown on pages 18 and 25-26 of your course textbook. This program computes the straight-line distance between two points in a plane. This program has been given to you in the accompanying file called chapter1_1.c on Blackboard. You will be using the C code from this file as the starting point for the instructions given below.

1. On Blackboard, open the file "chapter1_1.c" and copy-paste its contents into the main.c of your programming environment.

2. Insert a comment at the very top of the program with your name and a brief description of the program, e.g.

```
// your name
 // modifying chapter1_1.c
```

3. Compile and run to make sure it works.
4. Change the initialization of x1, y1, x2, and y2 so that each of these variables is multiplied by a factor of 10^{100}, for example x2=4 should be changed to x2=4e100. Then compile and run. Note the absurd format of the output that obscures the magnitude of the number.
5. Change the format from %5.2f to %5.2g, then compile and run again. Observe how the output changes.
6. Change the initialization of x1, y1, x2, and y2 so that each is multiplied by a factor of 10^{200}, for example x2=4e100 will be changed to x2=4e200. Then compile and run. Does the output seem correct?
7. On the left side of your screen, under Files, click on the three dots next to the main.c file and click download.
8. Finally, upload your downloaded code to Blackboard using the provided upload link under “Lab Assignments”.

Challenge Problem for you to try out (DO NOT submit):

Can you fix the program using scaling so that the output is correct for any *x,y* values?

Hint:

The scale factor, to prevent overflow when multiplying large numbers, is the larger in absolute value of *side_1* or *side_2*, which should be computed at run-time and stored in a *scale* variable.

To scale, *side_1* and *side_2* are divided by the scale factor before applying the distance formula. Then, this computed *distance* is multiplied by the scale factor to get the actual distance..

Note that floating-point absolute value in C is *fabs()* from `math.h`, not *abs()* from `stdlib.h` which is only for integers.