**ECE 15200: Programming for Engineers**

**Purdue University Northwest, ECE Department**

Laboratory 2

**Instructions**:

* Submit only C++ source files (\*.cpp) for all the problems through Brightspace.
* Name each file following the format ***Lastname\_*Lab*X*\_p*Y*.cpp**, replace *Lastname, X,* and *Y* with your last name, lab #, and problem #, respectively.
* Put your name, assignment number, and date on the top of each source file (\*.cpp) as multi-line comment given below:

/\*

Class: ECE15200

Author: [Your Name]

Assignment: Lab [No.]

Date: [MM]/[DD]/[YY]

\*/

Remove the brackets after updating the information in them.

* PLEASE WORK ALONE. If any plagiarism is found, you will get ZERO. Never hesitate to discuss with the instructor/TA if stuck in any assignment problem.

**Problem 1.** (Lastname\_Lab2\_p1.cpp) [**10 points**] Copy the code from Lab2\_p1.cpp file and run it in <https://replit.com/languages/cpp>. After executing the program, you will know the memory storage required for each data type in memory. Copy the output of the code, paste it as comment in Lab2\_p1.cpp, and upload the file after renaming it following ***Lastname***\_Lab2\_p1.cpp. Replace ***Lastname*** with your last name.

**Problem 2.** (Lastname\_Lab2\_p2.cpp) [**10 points**] Copy the code from Lab2\_p2.cpp file and run it in <https://replit.com/languages/cpp>. After executing the program, you will know the minimum and maximum values for numeric data types. Copy the output of the code, paste it as comment in Lab2\_p2.cpp, and upload the file after renaming it as ***Lastname***\_Lab2\_p1.cpp. Replace ***Lastname*** with your last name.

**Problem 3.** (Lastname\_Lab2\_p3.cpp) [**20 points**] Write a C++ program that displays the following prompt to the user:

Enter the radius of sphere:

After accepting a value for the radius from keyboard input, your program should calculate and display the surface area and volume of the sphere. [*Hint*: Surface area of a sphere = **4 \* 3.1416 \* radius2**, Volume of the sphere = **4/3 \* 3.1416 \* radius3**]. Following is the example test case:

Enter the radius of sphere: 1

Surface area of the sphere: 12.5664

Volume of the sphere: 4.1888

**Problem 4.** (Lastname\_Lab2\_p4.cpp) [**20 points**] Write a C++ program that converts a given temperature in degree Fahrenheit into degree Celsius (worldwide unit for temperature). The program should display following prompt to the user:

Enter the temperature in degree Fahrenheit:

After accepting the value for degree Fahrenheit from keyboard input, the program should calculate and display the temperature in degree Celsius [*Hint*: Celsius = **(5/9)(Fahrenheit – 32**)]. Following is the example test case:

Enter the temperature in degree Fahrenheit: 41

Temperature in degree Celsius: 5

**Problem 5.** (Lastname\_Lab2\_p5.cpp) [**20 points**] Write a C++ program that will take the resistance values of two resistors (R1 and R2) and voltage (V) of the circuit from the keyboard input. The program should calculate and display the values of current (I) a) when the resistors are connected in series and b) when the resistors are connected in parallel. [*Hint*: **C = V/Req**, **Req (**in series**) = R1 + R2**, **Req (**in parallel**) = (R1\*R2)/(R1+R2)**]. Following is the example test case for the program:

Enter the values for R1 and R2: 2 2

Enter the value of V: 4

The value of I in series network: 1

The value of I in parallel network: 4

**Problem 6.** (Lastname\_Lab2\_p6.cpp) [**20 points**] Write a C++ program that will compute the distance between two points in a three dimensional space.

[*Hint*: distance =]

Following should be the prompt and output of the program:

Enter the co-ordinates of first point (x1, y1, z1): 0 0 0

Enter the co-ordinates of second point (x2, y2, z2): 1 1 1

Distance between two points is: 1.73205