CPSC 1155 – Lab 2

Elementary Programming

Learning Objectives

This lab requires you to write simple C++ programs.

Lab Procedure

For each problem statement, follow the steps below:

1. Read the problem statement and clarify the problem.
2. Develop the **algorithm** that solves the problem and determine input, output, and processing (IPO: secc2.14 of text) along with the necessary variables. Use meaningful variable names.
3. Write a pseudocode (as required) and a C++ program that implements the algorithm. Add comments where needed.
4. Make sure you use a comments header as described in 1155\_CodingGuidelines.
5. Test, debug, and execute the program using typical values.
6. Submit according to the instruction in the "Lab Submissions" section.

Problem Statements

1. [4] (feet\_to\_meter.cpp, this is exercise 2.3 in the text) Write a **C++ program** that reads a number in feet, converts it to meters, and displays the result. One foot is .305 meter. Here is a sample run:

Enter a value for feet: 16.5

16.5 feet is 5.0325 meters

1. [4] (celsius\_to\_fahrenheit.cpp, this is exercise 2.1 in the text) Write a **C++ program** that reads a Celsius degree, converts it to Fahrenheit, and displays the result.

Here is a sample run:

Enter a degree in Celsius: 43

43 in Celsius is 109.4 Fahrenheit

1. [6] (rectangle.cpp) Write a **pseudocode** and **C++ program** that reads in the width and height of a rectangle, calculates and displays the area and perimeter of the rectangle. The input should be of type double.

Here is a sample run:

Enter the width and height of a rectangle: 12 5

The area is 60

The perimeter is 34

1. [8] (cost\_of\_driving.cpp, this is exercise 2.21 in the text) Write a **pseudocode** and a **C++ program** that prompts the user to enter the distance to drive, the fuel efficiency of the car in miles per gallon, and the price per gallon, and displays the cost of the trip. Here is a sample run:

Make sure to print the result with two decimal places. Hint: Check how to use [setprecision(n)](http://www.cplusplus.com/reference/iomanip/setprecision/) and [fixed](http://www.cplusplus.com/reference/ios/fixed/?kw=fixed) (sections 4.10.1 and 4.10.2 of the text).

Here is a sample run:

Enter the driving distance: 900.5

Enter miles per gallon: 25.5

Enter price per gallon: 3.55

The cost of driving is $125.36

1. [3] (sizeof\_data\_types.cpp, listings 2.5 in the text) C++ uses four types for integers or whole numbers: short, int, long, long long. There are three types for numbers with fractional part: float, double, long double.

Write a **C++ program** that displays the size of each of the above data types in bytes (seven data types). You may use the following statement:

//replace dataType with the above data types

cout << "Size of integer is: " << sizeof(dataType) << " bytes" << endl;

1. [3] (display\_time.cpp, Listing 2.7 in the text) Write a program that obtains a positive integer, as number of seconds, from a user. It then determines the minutes and remaining seconds from that amount of seconds.

Here is a sample run:

Enter a positive integer for seconds: 500

500 seconds is 8 minutes and 20 seconds

Lab Submissions

Submit a zip folder named as yourName\_Lab2.zip to Brightspace. This folder should be consisted of **C++ codes** in individual .cpp files and one pseudocode.txt file with all your **pseudocode**. Only submit pseudocode for the questions that require it. See the document about coding styles on Brightspace under the folder Resources.

If you have worked with a classmate, **please state both your name and your partner's name in all your files**.

Please make sure that all your .cpp files compile and run properly before submission. Your file must run properly in order to receive full marks.

**Total marks 28.**