CIT233 Advanced C++ Spring 2017
Assignment #3

Assigned Date: Week 1: 1/17

Date Due: **Week 3**: **1/30**

This assignment is based on some of the material covered in **CIT 133**. Please submit your source file (.cpp) and any related input data files for each assignment via the Canvas system. Do not compress multiple files.

In order to get full credit, your programs MUST compile. Also, do not forget proper documentation of your code. USE functions at all times for a modular program. Follow the documentation notes at the end of this file. Make sure to properly INDENT your code and document your code at key portions of the code. **See the program requirements file that you must use as you develop your code.** This file can be found under the same link where you have picked up the text of this assignment.

Deliverable: 2 CPP files

1. Write a program that reads a set of integers into an array and find the sum of the odd and even integers. Use a sentinel value to end the input because you don't know the number of entries up front. Display the calculated sums. Find the lowest and highest value in the set of integers and display the results. USE FUNCTIONS. I need a **function** to gather the required input, return the sum of the odd values via the function and return the sum of the even values via a pass by address variable. I need a **function** to return the lowest and another **function** to return the highest value. I need a **function** to display the calculated sums, the lowest and the highest values in addition to the input data (the contents of the array). I need a **function** to write the input data to a file whose name is provided by the user from the keyboard. Make sure to call the functions and show how the program works.

2. The Powerball lottery allows participants to pick 5 numbers from numbers ranging from 1 to 69 and a Powerball number ranging from 1 to 26. The odds of winning is calculated by using the formula: (n! / (n-r)! * r!) * 26. So, the odds of winning the lottery is (69! / (64! * 5!)) * 26 = 292201338. NOTE that **n!** means the factorial of the number n. Because, Lottery process may change, **write a program** to read the upper value of the range of the numbers to pick (i.e. 69), number of numbers to select (i.e., 5) and the upper value of the range of the Powerball number (i.e., 26). Calculate the display the odds of winning the Lottery using the above formula. **USE FUNCTIONS.** For example, I need a **function** that calculates the factorial of any number. **NOTE**: Factorial calculation is a very simple calculation of the product of the numbers starting from 1 to the number desired for the factorial calculation. For example, factorial of 5 is 1*2*3*4*5 = 120.

Make sure to call the functions and show how the program works. Generate 5 numbers between 1 and 69 and 1 number between 1 and 26. These would be the winning numbers. Ask the user for 5 numbers and a Powerball number (representing what they have on their own ticket) and tell the user if he or she is a winner! For example, if the winning numbers were generated as: 8, 27, 34, 4, 19 and the Powerball of 10 and the user's numbers are 4, 8, 19, 27, 34 with the Powerball 10, the user is a winner. Any other number is a loser!!! Note that the order does not matter. I think using arrays makes your programming life very simple. NOTE: YOU ARE NOT creating all combinations of the Lottery numbers for this assignment. Keep it simple.

In order to properly document your code, all your programs must have the following minimal information. You may add additional documentation as you see fit.

Name:
Class name:
Date Assigned:
Date Due:
Time taken to complete this program:

In case you are writing your pseudocode in your CPP file, you can write something like:

```
/*****************
 1. start
 2. set x = 10
 3. set y = 20
 4. etc.
******************/
```

A brief explanation of the program.

Input variable list and a brief explanation of each main variable such as:
FurnType – The type of furniture
FurnSize – The size of furniture

Output variable list and a brief explanation of each variable such as:
Cost – The furniture cost

Note: List the main variables that you are using in your program. If you are writing a program to calculate income tax, then variables such as income, tax rate, filing status, etc. become the main variables in a program.

Document the critical steps of the program such as calculation of the average, the loop that displays the output (we're not using a loop for this assignment), or the place where

the furniture cost is calculated. For instance, I may have the following line of documentation in my code:
/* The user is prompted for furniture type and size */

Or,

//Calculate average grade