CS 150 Lab 7
Files & Loops

The objective of today's lab is to practice loops and reading from files.

- Be sure your output looks exactly like the specified output.
- Be sure to submit the completed project to CS150-01 Lab by Friday at 5pm.
- Be sure to follow the coding standards and add comments to your code!

Lab 7.1

Create a project called **07_1_Difference**. Next, create a text file called **numbers.txt** in the Resource Files directory. Do this by right-clicking on the Resource Files folder, Add New Item, then select Utility, then Text File (.txt) and enter a name of **numbers.txt** in the Name box. You will get an empty file and in that file type the following values. Note that numbers can be separated by a space or a tab:

```
43   26
75   17
23   66
87   41
32   74
17   82
98   16
68   68
-1   -1
```

You are to read each pair of numbers one line. Print each number and the difference between each number. Continue reading and printing until any negative number is read in at which time you are to stop. Here is the sample output from the above file.

```
**************
* Difference *
**************

X Value    Y Value    Difference
-------    -------    ----------
     43         26            17
     75         17            58
     23         66            43
     87         41            46
     32         74            42
     17         82            65
     98         16            82
     68         68             0
```

Do not use any special functions (like absolute value) in your solution. Your program should work with a file containing 0-unknown pair of numbers.

Show the instructor or TA your solution

Lab 7.2

The factorial, N!, of a number is defined as N! = N(N-1)(N-2) …(3)(2)(1) for values of N>=1. 0! is defined as 1. Given this definition, we see that 4! is 4(3)(2)(1) which is 24.

 Write a complete C++ program in a project called **07_2_Factorial** that prints the factorial of a number entered by the user. Your program must use a loop to validate that the user enters a non-negative integer less than 11.

```
*************
* Factorial *
*************

Find the Factorial of: 11
Find the Factorial of: -8
Find the Factorial of: 4

4! is 24
```
Show the instructor or TA your solution

Lab 7.3 Optional Challenge (Good exam review)

Write a complete C++ program in a project called **07_3_Fibonacci** to solve the following problem. The first few Fibonacci numbers are 0 1 1 2 3 5 ... After the first two Fibonacci numbers, each subsequent number is found by adding the previous two numbers. Write a complete C++ program that prints a table of Fibonacci numbers. Your program must validate that the user enters a number larger than 2 using a loop.

```
*** Fibonacci Table ***

Enter number of Fibonacci's: 0
Enter number of Fibonacci's: -8
Enter number of Fibonacci's: 6

Fibonacci Numbers
            0
            1
            1
            2
            3
            5
```

Show the instructor or TA your solution

1) Your programs are to compile without any errors or warnings.

2) Do not use any magic constants in your program. Define your constants before defining the rest of your program's variables.

Once your projects are complete, place your solution into the CS150-01 Drop folder on grace. Your solution is to have ALL previous projects completely working and correct.