**Fall 2012 CSC 150**

**LAB #6: Looping Structures**

Purpose: Work with counters, while/do-while loops and nested loops

**Lab 6.1** Work with while loops (**5 points**)

Before starting the lab activity, create an empty C++ project called Lab6\_1. Make a copy of the file **lab6\_1.cpp** from the Labs folder of the course website to your project folder, and add that file to the project. This program computes and displays the first n elements (for n greater than 2) of the Fibonacci sequence. The first seven Fibonacci elements are 1, 1, 2, 3, 5, 8, 13. The user inputs the number n from the keyboard. Modify the program so that the program does the following:

1. Finds and displays only the nth Fibonacci element and not the whole sequence.
2. Has a loop that repeats the code segment that finds an element until any negative number is entered by the user. That is, the program terminates when the user enters a negative value.
3. Sets a maximum of 45 for n. If a user enters a number greater than 45, the program displays the message “This program can only find up to the 45th element”. If a user enters 0, the program displays the message “Please enter a value between 1 and 45”. If the user enters 1 or 2, simply display the appropriate Fibonacci value.
4. Change the **while** loop that computes the Fibonacci numbers to a **for** loop.

**Sample runs of the program:**

**Sample run #1**

Enter the desired Fibonacci element: -12

Program exiting!

**Sample run #2**

Enter the desired Fibonacci element: 25

This number is: 75025

Enter the desired Fibonacci element: 0

Please enter a value between 1 and 45.

Enter the desired Fibonacci element: 1

This number is: 1

Enter the desired Fibonacci element: 50

This program can only find up to the 45th element.

Enter the desired Fibonacci element: 2

This number is: 1

Enter the desired Fibonacci element: -1

Program exiting!

After you run the program, show the results to the lab TA before you do the next lab activity.

**Lab 4.2** Work with for and nested loops (**5 points**)

Save your lab6\_1.cpp file, and close Lab6\_1 project. Create an empty C++ project called Lab6\_2. Make a copy of the file lab6\_2.cpp from the Labs folder of the course website to your project folder, and add that file to the project. This program computes the number of hours an employee worked overtime on a three-day period (Friday, Saturday and Sunday). Modify this program so that it will compute the effective number of hours that an employee worked during a week. For each person you enter the employee ID ( a number in the range 1000 – 9999) and total number of regular hours (s)he worked during a week. The effective number of hours is computed as follows:

Step 1: Compute the total number of hours an employee worked overtime.

Step 2: Multiple by 1.5 the total overtime hours computed in step 1

Step 3: Add the value of step 2 to the total number of regular hours that the employee worked during the week.

For each employee, display the employee ID and the total number of effective hours computed. The program should terminate when the user types CTRL-Z (end-of-file signal). Use the return value of **cin** to control the loop, for example: **while (cin >> var)**. Your program must validate the employee ID. A sample run of this program would be:

Please enter an employee ID (1000 - 9999) or CTRL-Z to stop: 2319

Number of regular hours worked in the week? 35

Number of overtime hours worked on day 1? 0

Number of overtime hours worked on day 2? 4

Number of overtime hours worked on day 3? 5

The total number of effective hours this week for employee 2319 is 48.50

Please enter an employee ID (1000 - 9999) or CTRL-Z to stop: 657

The employee ID is invalid. Please enter a valid ID (1000 - 9999): 570

The employee ID is invalid. Please enter a valid ID (1000 - 9999): 6570

Number of regular hours worked in the week? 34

Number of overtime hours worked on day 1? 5

Number of overtime hours worked on day 2? 6

Number of overtime hours worked on day 3? 0

The total number of effective hours this week for employee 6570 is 50.50

Please enter an employee ID (1000 - 9999) or CTRL-Z to stop: ^Z

Thank you for using the program. Bye!

**Save your program for the second activity, compile, run and show the output of your program to the lab TA before the end of the lab period**.

**Please, return this printed lab page to the TA. Thank you.**