# LAB DIRECTIONS for LAB 2/12/2015
# Based on Lesson Set 4

1. Create a folder named Lesson Set 4. Put all files you create for this lab in this folder.

2. Download the Lesson Set 4 source files from ilearn and extract them into your Lesson Set 4 folder on your computer or jump drive.

Bring in the program `initialize.cpp` from the Lesson Set 4 source files. Follow the directions below to complete Exercise 1, Exercise 2, Exercise 3, & Exercise 4 from LAB 4.1.

## LAB 4.1 Relational Operators and the `if` Statement

*Exercise 1:* Run the program several times using a different input each time. Does the program do what you expect? Is so, explain what it is doing. If not, locate the error and fix it.

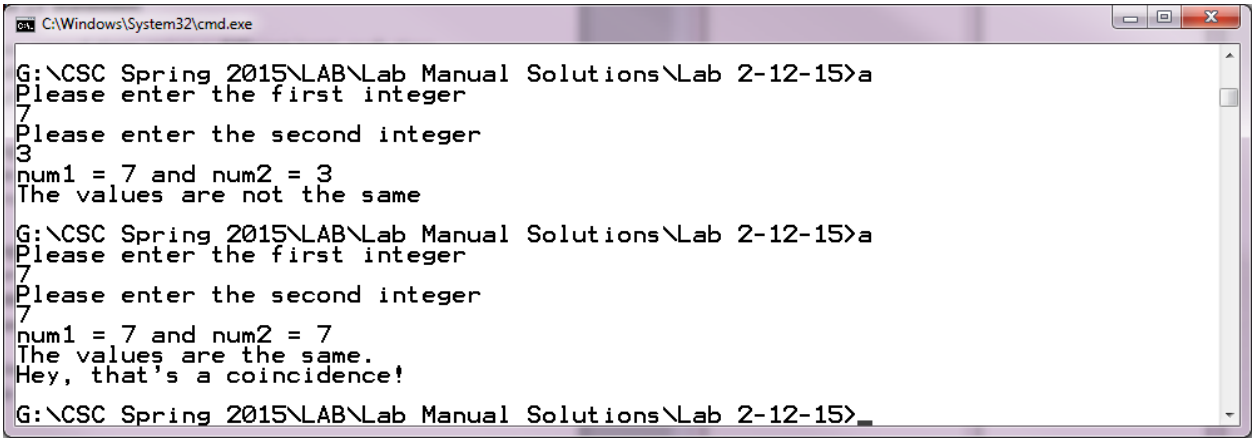
*Exercise 2:* Modify the program so that the user inputs both values to be tested for equality. Make sure you have a prompt for each input. Test the program with pairs of values that are the same and that are different.

*Exercise 3:* Modify the program so that when the numbers are the same it prints the following lines:

```
The values are the same.
Hey that's a coincidence!
```

*Exercise 4:* Modify the revised Exercise 3 program by replacing the two `if` statements with a single `if/else` statement. Run the program again to test the results.

Create a screen capture of your program running **AFTER Exercise 4. The screen capture should show your program running two times. First enter 7 for the first integer and 3 for the second integer. Second, enter 7 for both the first and second integers.** Paste the screen capture in a word processing document (MS Word, Open Office) named "Lesson Set 4 Screen Captures". Your screen capture should look similar to mine below:



3. Bring in the program grades.cpp from the Lesson Set 4 source files. Follow the directions below to complete Exercise 1, Exercise 2, & Exercise 3 from LAB 4.2. You do not have to turn in your answer to the question in Exercise 1 – just think about it.

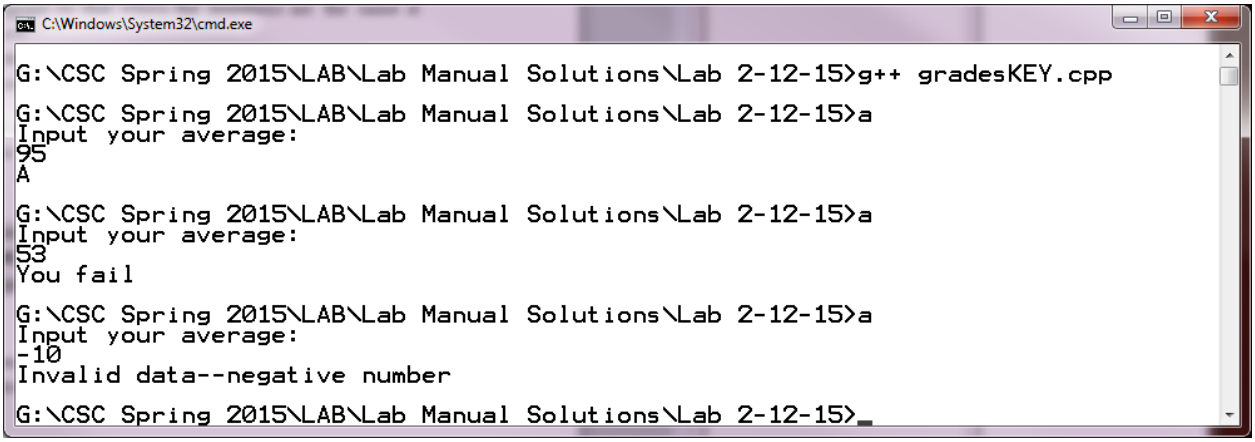
## LAB 4.2 `if/else if` Statements

*Exercise 1:* Run the program three times using 80, 55 and 60 for the average. What happens when you input 60 as the average? Modify the first if statement so that the program will also print "You Pass" if the average equals 60.

*Exercise 2:* Modify the program so that it uses an `if/else` statement rather than two `if` statements.

*Exercise 3:* Modify the program from Exercise 2 to allow the following categories: Invalid data (data above 100), 'A' category (90–100), 'B' category (80–89), "You Pass" category (60–79), "You Fail" category (0–59). What will happen to your program if you enter a negative value such as -12?

Create a screen capture of your program running **AFTER Exercise 3. The screen capture should show your program running three times. First, enter 95 for the average. Second, enter 53 for the average. Last, enter -10 for the average.** Add the screen capture to "Lesson Set 4 Screen Captures." Your screen capture should look similar to mine below:




4. Complete LAB 4.5, Option 1 as described below. You will create this program on your own and you will name it waterbill.cpp. Create a screen capture of your program running sample run 1 & sample run 2 below. Paste your screen capture in "Lesson Set 4 Screen Captures".

## LAB 4.5 Student Generated Code Assignments

*Option 1:* Write a program that prompts the user for their quarterly water bill for the last four *quarters*. The program should find and output their average *monthly* water bill. If the average bill exceeds $75, the output should include a message indicating that too much water is being used. If the average bill is at least $25 but no more than $75, the output should indicate that a typical amount of water is being used. Finally, if the average bill is less than $25, the output should contain a message praising the user for conserving water. Use the sample run below as a model for your output.

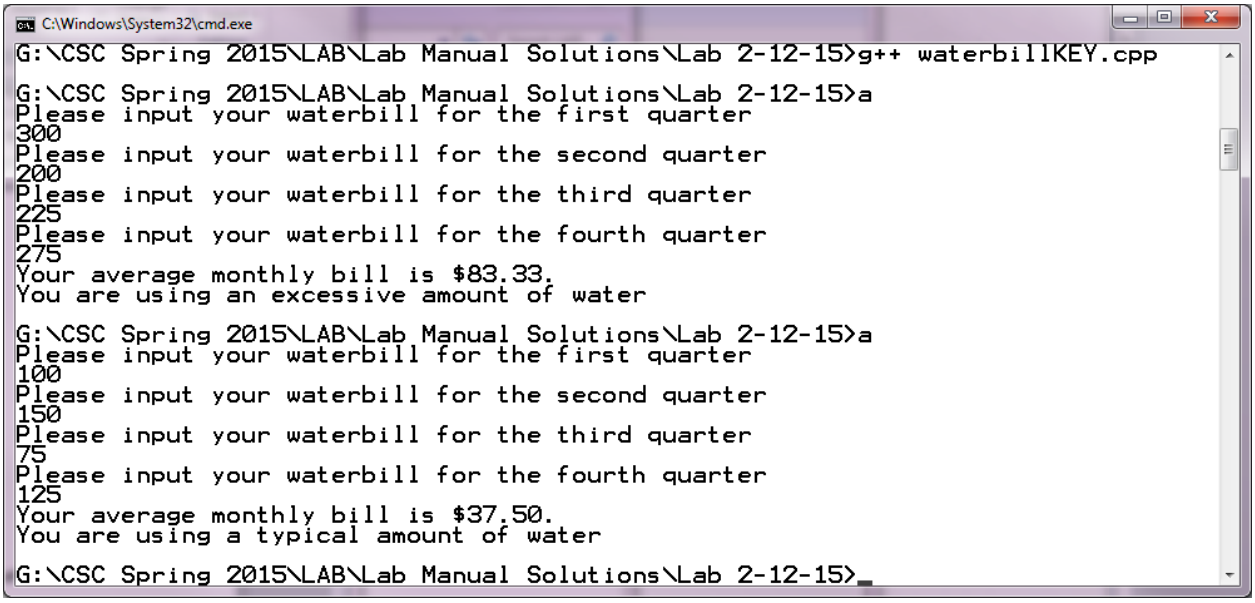
*Sample Run 1:*

```
Please input your water bill for quarter 1:
300

Please input your water bill for quarter 2:
200

Please input your water bill for quarter 3:
225

Please input your water bill for quarter 4:
275

Your average monthly bill is $83.33. You are using excessive amounts of water
```

*Sample Run 2:*

```
Please input your water bill for quarter 1:
100

Please input your water bill for quarter 2:
150

Please input your water bill for quarter 3:
75

Please input your water bill for quarter 4:
125

Your average monthly bill is $37.50. You are using a typical amount of water
```

Your screen capture should look similar to mine below:




5. **WHAT TO TURN IN:**

   **The following files should be zipped together in a folder and uploaded to the "LAB 02-12-2015" dropbox folder on ilearn.**

   a. initialize.cpp
   b. grades.cpp
   c. waterbill.cpp
   d. Lesson Set 4 Screen Captures