



ECE 264, Object-Oriented Software Development

Lab Assignment 2

Lab 2 :: 100 points (see Grading Notes for details)

Wednesday Session (Feb 6): Due Feb 8, 2013 (Friday);

Monday Session (Feb 11): Due Feb 13, 2013 (Wednesday);

1. Lab Objectives

This lab was designed to reinforce programming concepts from Chapter 2 of C++ How To Program, Eighth Edition. In this lab, you will practice:

- Using **cout** to output text and variables
- Using **cin** to input data from the users
- Using **if** statements to make decisions based on the truth or falsity of a condition
- Using the arithmetic operators to perform calculations
- Using relational operators to compare values.

The follow-up questions and activities also will give you practices:

- Comparing **<** to **<=**.
- Modifying existing code to perform the same task in a different manner
- Recognizing common mistakes with the **if** statement.

2. Deliverables

Submit your word format file to your class directory on the M:\ drive. Call your project *lab2_InputOutput1* and *Lab2_InputOutput2*, and ensure that your source files name is ***lab2_InputOutput1.cpp*** and ***lab2_InputOutput2.cpp*** respectively. You should place only the .cpp files on the M:\drive. Failure to meet this specification will reduce your grade, as described in the ECE 264 lab grading handout, which you are strongly encouraged to read before starting the lab.

3. Description of the Problem

3.1 Task 1 (***lab2_InputOutput1.cpp***)

Your task in this section is to write a simple program that just outputs the following information to the screen. Make sure that each piece of information is displayed on a separate line of your output, like this, so that there are at least 6 lines of output in your program:

Full Name
Your account name
Your Major(s)
A favorite restaurant
A favorite place in Dartmouth



UMass

Electrical and Computer
Engineering Department

ECE 264, **Object-Oriented Software Development**

Lab Assignment 2

Some interesting additional information

An example might be:

Robert A. Fulkerson
rfulkerson
Electrical Engineering
The Thai Pepper / Big Fred's Pizza Garden
AMC Oakview 24
Blind cave salamanders have hollow pits for eyes.

3.2 Task 2 (***lab2 InputOutput2.cpp***)

Write a program that inputs three integers from the keyboard, and prints the sum, average, product, smallest and largest of these numbers. The screen dialogue should appear as follows: [Note: 13, 27 and 14 are input by the user.] Please also read the template, comments and tips below carefully for your references before you write your own code.

Sample output

```
Input three different integers: 13 27 14
Sum is 54
Average is 18
Product is 4914
Smallest is 13
Largest is 27
```

**ECE 264, Object-Oriented Software Development**

Lab Assignment 2

Template

```
1 // Lab 1: numbercompare.cpp
2 #include <iostream> // allows program to perform input and output
3 using namespace std;
4
5 int main()
6 {
7     int number1; // first integer read from user
8     int number2; // second integer read from user
9     int number3; // third integer read from user
10    int smallest; // smallest integer read from user
11    int largest; // largest integer read from user
12
13    cout << "Input three different integers: "; // prompt
14    /* Write a statement to read in values for number1, number2 and
15       number3 using a single cin statement */
16
17    largest = number1; // assume first integer is largest
18
19    /* Write a statement to determine if number2 is greater than
20       largest. If so assign number2 to largest */
21
22    /* Write a statement to determine if number3 is greater than
23       largest. If so assign number3 to largest */
24
25    smallest = number1; // assume first integer is smallest
26
27    /* Write a statement to determine if number2 is less than
28       smallest. If so assign number2 to smallest */
29
30    /* Write a statement to determine if number3 is less than
31       smallest. If so assign number3 to smallest */
32
33    /* Write an output statement that prints the sum, average,
34       product, largest and smallest */
35 }
```

Problem-Solving Tips:

1. Prompt the user to input three integer values. You will use a single **cin** statement to read all three values.
2. Sometimes it is useful to make an assumption to help solve or simplify a problem. For example, we assume **number1** is the largest of the three values and assign it to **largest**. You will use **if** statements to determine whether **number2** or **number3** are larger.
3. Using **if** statement, compare largest to **number2**. If the content of **number2** is larger, then store the variable's value in **largest**.



ECE 264, Object-Oriented Software Development

Lab Assignment 2

4. Using an if statement, compare largest to number3. If the content of number3 is larger, then store the variable' value in largest. At this point you are guaranteed to have the largest value stored in largest.
5. Perform similar steps to those in Steps 2-4 to determine the smallest value
6. Write a statement that outputs the sum, average, product (i.e., multiplication), largest and smallest values.
7. Be sure to follow the spacing and indentation conventions mentioned in the text.

Follow-up Questions and Activities (**just for your extra practice if you have time, no submission**):

1. Modify your solutions to use three separate input parameters rather than one. Write a separate prompt for each input statement

```
Input first integer: 13
Input second integer: 27
Input third integer: 14
Sum is 54
Average is 18
Product is 4914
Smallest is 13
Largest is 27
```

4. Testing Your Program

- ✖ For this program, there is no user input so the only way to test your program is to run it and see if it displays all of the information correctly.
- ✖ In all of your programs, but especially a program where there isn't any user input, you should focus on making the output easy to read. One of the most difficult things for a user of your program to deal with is poorly formatted output. The easier your output is to read, the easier it is to identify the relevant information that you're producing.