Programming Fundamentals (BS-SE, Morning) *24-2-2020*

***Total marks: 25** (5 marks each task)*

Lab 2: Data types, operators, if else statements

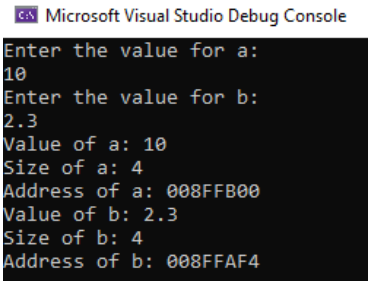
Note: Discussion with peers is not allowed. If there is any confusion you can ask TAs. Last hour of lab is reserved for evaluation purpose, so do proper time management and complete your tasks timely.

Question 1:

Write a program in c++ that do the following tasks:

1. Declare an integer variable named “a” and float variable named “b”.
2. Take input from user in these declared variables.
3. Print the following for each variable
    a. Its value
    b. Size of variable (in bytes)
    c. Its address (address of memory location allocated to that variable)

Expected output:



Question 2:

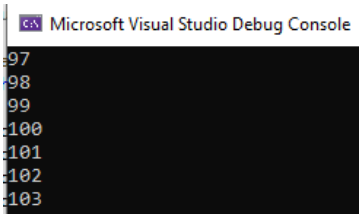
Write a program in c++ that do the following tasks:

1. Declare a character variable.
2. Initialize it with character ‘a’.
3. Print the ASCIIs of characters (a,b,c,d,e,f, and g) using series of cout statements, each for one character. You cout statement **should only have** variable c involved in it (with + operator obviously to make it handle ASCIIs). You cannot explicitly specify any character. That is, you cannot use do the following:

    Cout<<’b’+0; //to print ASCII of ‘b’ NOT ALLOWED

    Cout<<’b’+1 //to print ASCII of ‘c’ NOT ALLOWED

    Expected output:



Question 3:

Write a program in c++ that do the following tasks:

1. Declare character variable and take input in it from the user
2. Using *if, else if, and else* statements, find if the given character is a
    a. Lower case alphabet i.e. if it lies inside a range 'a' to 'z'
    b. Upper case alphabet i.e. if it lied inside a range 'A' to 'Z'
    c. Any character, other than upper and lower case alphabets

Your if else structure would be like:

```
If(   )//insert appropriate condition to check for lower case
{
        Display appropriate message
}
Else if(  ) //insert appropriate condition to check for upper case
{
        Display appropriate message
}
Else //insert appropriate condition to check for "any other character"
{
        Display appropriate message
}
```

Inside range conditions, you might need to check the correctness of two possibilities. For example, for lower case alphabet you need to check two things:

1. If character is greater than equal to ASCII of character 'a'
2. If character is less than equals to ASCII of character 'z'

Hint: If you recall, we have discussed relational operators (>= and <=) and logical operators (AND, OR) to handle conditional situations. In case of lower case alphabet both the conditions (>= and <=) must be true, therefore we need an AND logical operator (depicted with &&) between our two conditions. For example, if I have to check if any integer named 'num' lies within the range 2 to 5 then my conditional statement in C++ would be:

```
If( (num>=2) && (num<=5))
{
        //do something..

}
```

You need to write if else if and else statements, keeping in mind that procedure. If I want to check if character variable ***c*** is equal to 'a', then the if would be applied as:

```
If(c=='a')
{
}
```

Question 4:

Write a program that reads in five integers from user and determines and prints the largest and the smallest integers in the group using relational operators.

Question 5:

Write a program that reads in two integers and determines and prints if the first is a multiple of the second. (Hint: Use the modulus operator. For multiple, one number must be divisible to the other number.). You might need to use simple *if else* statement to print if the number is a multiple or not.