## LAB 4: Decision Making

For each problem below:

- a) Analyze the problem by identifying input, output, formula, and constraint
- b) Design an algorithm to solve the problem using <u>pseudocode</u> (so that you could include the pseudocode in your program)
- c) Prepare several, appropriate number of <u>test data</u> to verify the correctness of your program
- d) Prepare, compile, link, and execute the program to solve the problem
- e) Test your program using the prepared test data
- f) Write proper documentation in the program. Include the following information to form a <u>banner</u> at the beginning of your program:

## **QUESTIONS**

1. Write a program that reads your lab mark from the keyboard (with an assumption that you'll enter only valid value, which is in between 0 to 100) and converts the mark to be over 15 percent. For example, if your lab mark is 90 then the converted lab score is 13.5. Next, print "My lab score is" followed by the lab score. If the lab mark percentage is more than 13, display "Well done!" message on the screen. Otherwise, print "Don't be sad, do your best in your final exam." message. This is followed by "[end-of-program]" message. Two samples input and output of the program are shown below and should guide you in writing the program:



2. Modify the program for Question (1). In this version of the program, read your quiz and mid-term exam scores in addition to the lab mark. Assume that the scores are in between 0 to 10 for the quiz and in between 0 to 15 for the mid-term exam. Next, print the lab, quiz and mid-term exam scores on the screen. If your quiz score is more than 8 and your mid-term exam score is more than or equals to 13, print the total of all the scores on the screen followed by "Well done!" message. Otherwise, print the total score followed by "Don't be sad, do your best in your final exam." message. A sample input and output of the program is as follows:



- (Hint: use logical operators &&, ||, or !)
- 3. Modify the program in Question (2). In this version of the program, validate the data input of all the scores before performing the rest of the tasks. If any of the lab mark or quiz score or mid-term exam score entered is not within its valid range (as mentioned in Questions (1) and (2)), print "Invalid data entered. Try again." message on the screen. A sample input and output of the program with invalid data input is as follows:



(Hint: use nested if...else statements and logical operators)

4. Modify the program written for Question 6 (Lab3 – Part 1). In this new program, reads a char data type option, either 'S' or 'A'. If the user select 'S', display on the screen the smiling face. Otherwise, display the angry face as follows:

MY SMILING/ANGRY FACE
Enter option [S/A]: A
(  * *  )
Angry Face
Rate this face
How many LIKE?: x
The angry face has x LIKE

5. Using nested if...else and logical operator, modify the program written for Question (4). In this new program, validate the data input of the option before performing the rest of the tasks.

