Concordia University

Department of electrical and computer engineering

Course : COEN243/4-J-Programming Methodology I-Winter, 2016

Lab No 1 (Getting started with C++) (**10 Marks**) (due date January 29, 2016)

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Learning outcomes:

The main objective is to gain C++ technical programming skills, to introduce and use *structured programming*, mastering the top down *stepwise refinement* design methodology and writing codes in a disciplined systematic fashion. Specific learning outcomes are:

-To state and understand the problem statement

-To apply the top-down, stepwise refinement methodology to formulate algorithms using *pseudocode*,

-To transform the pseudocode to C++ code

- To analyze problems and write various C++ codes using control flow statements (such as If-Else, While, For, Do-While and Switch)

-To demonstrate skills in debugging and testing simple C++ codes with the objective of finding faults and improving code quality

-To modify and play with C++ codes enabling to gain insights of C++ structured programming, and C++ control statements intricacies.

For each question:

a) Read the problem statement,

b)Formulate the algorithm using pseudocode and top-down, stepwise refinement,

c)Write a C++ program

Question 1(2 Marks): (*Digits of an Integer*) Write a program that inputs a five-digit integer, separates the integer into its digits and prints them separated by three spaces each. [***Hint:*** Use the integer division and modulus operator.]. For example, if the user types in 42339, the program should print:
4 2 3 3 9

Question 2(3 Marks):(*Table*) Write a program that calculates the squares and cubes of the integers from 0 to 1. Use tabs to print the following neatly formatted table of values:

integer	square	cube
0	0	0
1	1	1
2	4	8
3	9	27
4	16	64
5	25	125
6	36	216
7	49	343
8	64	512
9	81	729
10	100	1000

Question 3(5 Marks): (*Body Mass Index Calculation*). The formulas for calculating the BMI are
BMI = (weightInPounds * 703) / (heightInInches * heightInInches)
or
BMI = weightInKilograms / (heightInMeters * heightInMeters)

Create a BMI calculator application that reads the user's weight in pounds and height in inches or, if you prefer, the user's weight in kilograms and height in meters), then calculates and displays the user's body mass index. Also, the application should display the following information from the Department of Health and Human Services/National Institutes of Health so the user can evaluate his/her BMI:
BMI VALUES
Underweight : less than 18.5
Normal : between 18.5 and 24.9
Overweight : between 25 and 29.9
Obese : 30 or greater

Guidelines for submission:
Submit through Moodle for each question (source code, executable, execution trace).
It is preferable to include the answers to the three questions in a one zip file. A DEMO is mandatory for this lab assignment.