Labsheet 1- Introduction to C++

For each of the questions below, you are required to create a project, modify the main.cpp file by removing the statement **cout<<"Hello World!"<<endl;** then include the lines of code to perform the task that you need. You then build and run the program.

Note:
1. **The statement return 0; should always be the last statement before the }.**
2. In C++ the / is used for division. However the behaviour of the operator depends on its operands. If both operands are integer values, the operator performs an integer division and gives the quotient of the first operand divided by the second one. Thus 10/2 returns 5, while 10/4 returns 2. However, if (at least) one operand is a floating point value, the operation performed is a floating point division. Thus 10/4.0 returns 2.5.
3. C++ uses the operators ++ and - - to increment/decrement a variable by 1. Thus if x currently has value 5, x++ will result in x being assigned value 6, while x—will result in x being assigned value 4. We can also have ++x and --x. Their meanings and uses will be discussed at a later stage.
4. For each of the program below, ensure that you have a prompt for the user (an output specifying the required input), for each input. Also ensure that the output is informative enough.

Question 1
Write a program that requests the user to input the radius of a circle and it calculates and displays the area of the circle (Assume pi to be 3.142)

Question 2
Write a program that calculates the cost per square centimetre of a circular pizza, given its diameter and price as inputs.

Question 3
Write a program that asks the user his id number (use a simple integer value), score in CSE1017Y and CSE1019Y and output the user's name with his average score.

> **Sample inputs:**
> **Please Enter your id number: 28**
> **Enter your score in CSE1017Y: 65**
> **Enter your score in CSE1019Y: 75**

Question 4

A car travels a distance d1 at a speed s1, followed by a distance d2 at a speed s2 and finally a distance d3 at a speed s3. Assuming all distances to be in km and all speeds in km/h, write a program to input the values of s1, s2, s3 and d1, d2, d3 and display:

- The total distance travelled.
- The total time taken for the whole journey and
- The average speed over the journey.

Question 5

The Konditorei coffee shop sells coffee at Rs 25.00 a cup plus cost of delivery. For delivery, there is a fixed initial cost of Rs 15.00 and an additional cost Rs2.50 per cup . Eg. For one cup the delivery cost is Rs17.50, for 2 cups it is Rs 20.00, while for 10 cups it is Rs 40.00. Write a program that calculates the cost of an order. (Note: Input should be no. of cups ordered)

Question 6

The figure below shows a concrete cylindrical pillar with a cylindrical hole in the middle. The hole is of two parts. One part is of height *h1*, with radius *r1*, the other part is of height *h2*, with radius *r2*. The pillar has height *h* and radius *r*. Write a program, that takes as inputs the values of *h*, *r*, *h1*, *r1* and *r2* and calculates the volume of concrete required to construct such a pillar with the given values.

    Note: h = h1 + h2
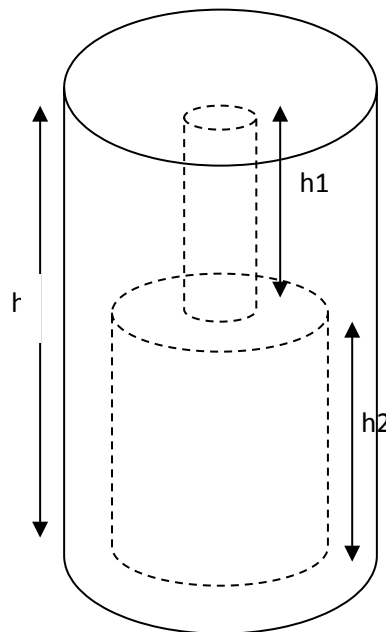
Question 7

Consider the program in question 3. Given that concrete is sold as full containers of size **y** m³, (where **y** is an integer). Modify the program so that it also allows as input the value of **y** and the cost of a container and displays the cost of concrete for a pillar.

Question 8

Two points in a plane are specified using the coordinates (x1, y1) and (x2, y2). Write a program that calculates the slope of a line through two non-vertical points entered by the user.

     Hint: $m = (y2 - y1)/(x2 - x1)$

Question 9

Write a program that accepts two points, like in question 5 above, and determines the distance between them. $d = \sqrt{((x2 - x1)^2 + (y2 - y1)^2)}$

Question 10

A toy is made of two balls, one fitted inside the other one as shown in the diagram below. The space in-between the balls is filled with a liquid. Write a program that allows the input of the radius of each of the balls and it calculates and displays the volume of the liquid.