

DEPARTMENT OF COMPUTER ENGINEERING
CMPE110: Fundamentals of Computing and Programming
EXPERIMENT 2

Introduction to C++ Programming: Sequential code structure

Objectives:

- 1) Understand how to edit, compile and execute C++ computer codes.
- 2) Understand C++ programming: sequential code structure.

Note: Before solving any of the following problems, you should do the following steps: **understand** and **analyze** the problem, develop an **algorithm** and/or **flowchart** for the solution, and finally **convert** the **algorithm** to a **computer code**.

Q1) Complete the following code that reads the radius (**r**) and the height (**h**) of a cylinder and then computes its volume and surface area. The volume and the surface area are computed as $volume = \pi r^2 h$ $surface\ area = 2\pi r h + 2\pi r^2$

Note: Let all variables be of type float. A sample run of the code should be as

```
Enter the radius: 6.5
Enter the height: 9.5
The volume = 1275.86
The surface area = 658.37
```

```
#include<iostream>
using namespace std;
int main(){
//declare the variables
.....
// write necessary statements to read the radius from keyboard
.....
// write necessary statements to read the height from keyboard
.....
// perform the required operations
.....
// show the outputs on the monitor
.....
return 0;}
```

Q2) Write a program that prompts the user to enter two points (**x1, y1**) and (**x2, y2**) and displays their distances. The formula for computing the distance (**d**) is

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$. Note you can use **pow(a,0.5)** to compute \sqrt{a} . Let all variables be of type **double**.

Here is a sample run:

```
Enter x1 and y1: 1.5 -3.4
Enter x2 and y2: 4 5
The distance of the two points is 8.764131445842194
```

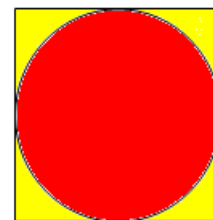
```
#include <iostream>
#include <cmath>
using namespace std;
int main()
{
    // Variable declarations
    .....
    // Prompt the user to enter the input.
    .....

    // Perform the required operation(s)
    .....
    // Print the output on the computer monitor
    .....
    return 0;}

```

Q3) Write a program that reads the radius of the circle inscribed inside the square and based on that it will print the values of red and yellow areas, shown in the figure below. Print the values with 2 digits after decimal point. Define the value of π (3.1416) as a constant. A sample run of your program gives the following:

```
Enter the value of the radius: 1.578
The yellow area is 2.14
The red area is 7.82
```



Q4) To calculate the total points of a student in CMPE110 course according to his midterm, lab, and final grades, the following weights are used:

```
Midterm 40%,
Final 50%,
Lab 10%.
```

Write a C++ code that reads the student's midterm, final and lab grades and then computes and prints on the computer monitor his total points.

A sample run of the program must be as follows:

```
*** Program to calculate the total points in CMPE110 course ***

Enter your grades in final, midterm, and quiz? 70 85 80
Your total point is 77.0
```