CS100 Computational Problem Solving
Fall 2019-20

Section 1

Tuesday, 12 November 2019

Lab 11: Exercise

Lab Guidelines

1. Make sure you get your work graded before the lab time ends.
2. You put all your work into th folder **Lab11_YourRollNo_TAname** and submit it on LMS (Assignment>Lab11) before the time the lab ends.
3. Talking to each other is NOT permitted. If you have a question, ask the lab assistants.
4. The object is not simply to get the job done, but to get it done in the way that is asked for in the lab.
5. Phone is NOT allowed. Put it in bag or at instructor desk.
6. Any cheating case will be reported to Disciplinary Committee without any delay.

Coding Conventions:

1. Constants are ALL_CAPS.
2. Variables are all_small.
3. All curly brackets defining a block must be vertically aligned.

Learning Objective:

1. PO-02 Develop proficiency in the practice of computing.
2. CO-02 To help students analyze and solve programming problems
3. LO-02 Critical Thinking and Analysis
4. LO-03 Problem Solving
5. LO-05 Responsibility

Marks: Name: _____ Roll #: _____

Task1									Total
									25

Task2									Total
									25

Task 3									Total
									25

Task 4									Total
									25

Total Marks Obtained

/100

TA: _____

Let's Begin

Task 1: [25 marks]

Write a function with following specifications:
Input: Any real number R
Output_1: Integer part of R
Output_2: Fractional part of R
Call your function in the main and verify its functionality. You must take input from the user.

Task 2: [25 marks]

Write functions:

double **distance**(…)
void **midpoint**(…)
void **slope**(…)

that compute the distance, midpoint, and slope of the line segment joining the points (x1, y1) and (x2, y2).

NOTE: There shouldn't be any cout statements inside the functions and your slope function should also handle the case of vertical line

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$M = (\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Test Cases:

```
Enter x1 : 3
Enter x2 : 3
Enter y1 : 5
Enter y2 : 6
Distance : 1
Midpoint : 3,5.5
Vertical - undefined slope
```

```
Enter x1 : 2
Enter x2 : 4
Enter y1 : 2
Enter y2 : 5
Distance : 3.60555
Midpoint : 3,3.5
Slope : 1.5
```

Task 3: **[25 marks]**

Write a **void function** which takes a string as an input parameter and reverses that string. Make sure that you take input from the user in the main and then input the string to the function. Your program should keep asking for input and keep showing its reverse until the user press “q”.

NOTE: There shouldn’t be any cout statements inside the function.

Task 4: **[25 marks]**

Write a functional program that takes a String as an input and produces all possible substrings of the string. Store all the substrings in one variable and then print the answer in the main. You are not allowed to declare more than one string variables in the main.

Sample input: One

Output: O n e On ne One
