CSE108 – Computer Programming Laboratory

Spring 2022, Lab 1

This lab will be graded on a scale of 100. No collaboration is permitted.

Part 0. Write a complete C program (in main.c) that takes the coordinates of two points $A(x_1, y_1)$ *and* $B(x_2, y_2)$ on the cartesian plane **(as integers)** and perform the following tasks. *PS: Don't use any library other than stdio.h.*

Part 1. ***(25 pts) Midpoint Calculation:*** The program calculates the coordinates of the midpoint of these points and prints it out.

Part 2. ***(25 pts) Slope Calculation:*** The program calculates the slope of the line that passes through these points and prints it out.

Part 3. ***(25 pts) Area Calculation (Circle):*** Assuming that the line segment between *A* and *B* is the diameter of a circle and midpoint is the center, the program computes and prints out the area of this circle.

Part 4. ***(25 pts)*** Create a makefile to compile and run the program by creating main.**o** and main.**out** files respectively. Your **makefile** should perform the following commands: ***clear*** (the terminal), ***clean*** (the files), ***compile*** and ***run***.

Formulas:

$$Input\ Points: A(x_1, y_1)\ and\ B(x_2, y_2)$$

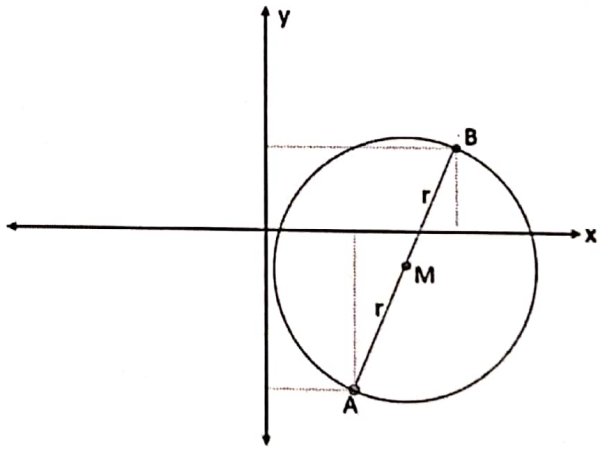
$$Midpoint: M(x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

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

$$Area\ of\ the\ circle: A = \pi r^2 \quad (\pi = 3.14)$$

Distance between two points $A(x_1, y_1)$ *and* $B(x_2, y_2)$*:*

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



Example input and output:

```
x1: 5
y1: 6
x2: -10
y2: -5

Midpoint: M(x,y) = (-2.5, 0.5)

Slope: m = (0.7)

Area: A = 271.6
```

$(2r)^2 = 15^2 + 11^2$

$225 + 121$

346

$\frac{\pi \cdot 4r^2}{4}$