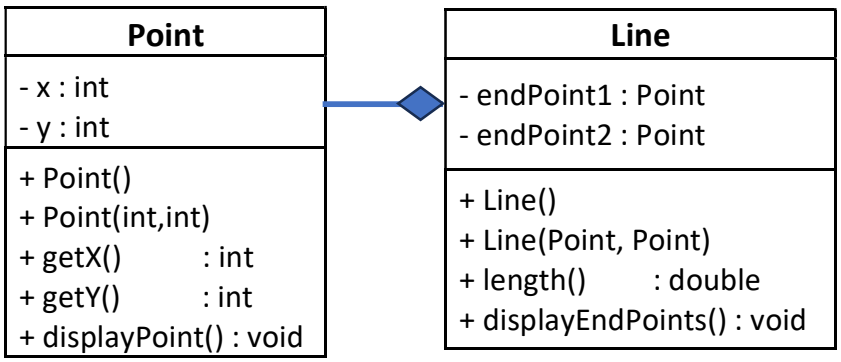
23CSE111-OBJECT-ORIENTED PROGRAMMING

LAB SHEET - 3

Exercise 3.1 (Concept : Association between classes)

- Create a package called PolygonApp. And define the following classes
- Create a class called **Point** which represents points on 2D plane. Include getter functions to return the coordinate values, display function to display the point in (x,y) format. Appropriate constructors should be given in the class definition.
- Create a class called Line which has data members to represent the two end points of the line. Include constructors, and functions to find the length of the line using the formula leng =$\sqrt{((x2 - x1)^2 + (y2 - y1)^2)}$ and to display the end points of the line.

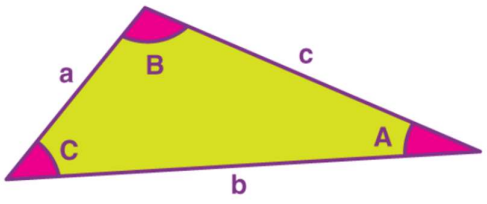


- Write a Main1 class in which the main() function is defined. Get the coordinates of two points from the user and create two Point objects. Create a Line object with the above two points as end points. Display the length of the line and the coordinate values of the end points.

Exercise 3.2 (Concept : Association between classes)

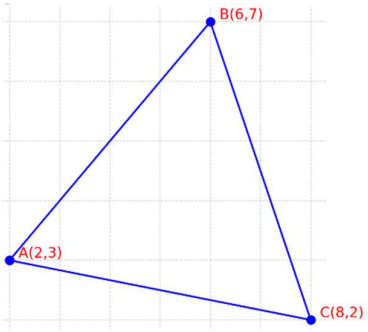
- Define a class called Triangle which has three data members to represent the three sides of the Triangle. Include member functions to find the semi-perimeter of the triangle s = (a + b + c)/2. The length of each side (a,b,c) has to calculated using the

length() function in Lin class. Include another member function to calculate the area of the triangle using the following formula area = √[s × (s – a) × (s – b) × (s – c)].



Triangle
-side1 : Line -side2 : Line -side3 : Line
+Triangle() + Triangle(Line, Line, Line) + calculateArea() : double +calculateSemiPerimeter() : double

- Write a Main2 class with main() function. Get the coordinate values of the three corners of the triangle. Create an object of the Triangle class. Initialize the object using parameterized constructor. For example, Vertex A: (2, 3) Vertex B: (6, 7) Vertex C: (8, 2). Find the area of the triangle ABC.



Exercise 3.3 (Concept : Association between classes, array of objects)

- Define a class called Polygon which has edges and number of sides as data members. The edges are represented as objects of Line. The constructor get the number of sides from the user and get the vertices from the user and set the (x,y) values of it. The getName() function returns the name of the polygon like triangle, rectangle etc based on the number of sides. The displayEdges() function display the coordinates of end points of each line.

- Write the Main3 class with main() function. Create two objects of Polygon, one triangle and one rectangle. Check the name of the polygon using getName() function. Display the edges of both triangle and rectangle.