COMP 248 - Winter 2016

Tutorial 9

Question 1

Write a class called Point, which models a 2D point with x and y coordinates.
It contains:

1. Two instance variables x (int) and y (int).
2. A **no-argument constructor** that construct a point at (0, 0).
3. A **constructor** that constructs a point with the given x and y coordinates.
4. **Accessor** and **Mutator** methods to get and set the instance variables x and y.
5. A **toString()** method that returns a string description of the instance in the format "(*x*, *y*)".
6. A method called **distance(int x, int y)** that returns the distance from *this* point to another point at the given (x, y) coordinates.
7. An overloaded **distance(Point p)** that returns the distance from *this* point to the given Point instance p.
8. Write a method called **reverse()** which will return a new point with the coordinates reversed. That is, if the point which invokes the method has coordinates (a, b), then the method should return a new point with coordinates (b, a).
9. Write a method called **moveBy (int a)** which will move a point by an integer value. The method will add to each coordinate the value passed as argument. So if the original point was (x1, y1), after this method is invoked it will have the coordinates (x1+a, y1+a), where a is the argument (the integer value).

Question 2

Write a class called Triangle, which models a triangle with 3 vertices, designed as follows: The Triangle class uses three Point instances (created in the earlier exercise) as the 3 vertices. The class contains:

1. Three private instance variables p1, p2, p3 (instances of Point), for the 3 vertices.
2. A constructor that constructs a MyTriangle given 3 instances of Point.
3. **Accessor** and **Mutator** methods to get and set the instance variables p1, p2, p3.
4. A **toString()** method that returns a string description of the instance in the format "Triangle of 3 points : (x1, y1), (x2, y2), (x3, y3)".
5. A **getPerimeter()** method that returns the length of the perimeter in double. You should use the distance() method of the Point class to compute the perimeter.
6. A method **printType(),** which prints "equilateral" if all the three sides are equal, "isosceles" if any two of the three sides are equal, or "scalene" if the three sides are different.

Question 3

Write a class called Test, which tests the classes Point and Triangle. Use the main method to perform the following:

1. Declare 3 points: p1 with coordinates (0,0) and p2 with coordinates (2,3) and p3 with coordinates (4,6).
2. Write the necessary statement(s) to display the coordinates of p1, p2 and p3.
3. Write a statement to reverse the coordinates of p2.
4. Write the necessary statement(s) to set the coordinates of p1 to be the reverse of p2. For example, if p1 is (1,2) and p2 is (2,3) then the coordinates of p1 will be changed to (3,2).
5. Write a statement to add 10 to both coordinates of p1.
6. Write the necessary statements to create a Triangle from the 3 points p1, p2 and p3.
7. Write the necessary statement(s) to calculate and print the perimeter of the triangle
8. Write the necessary statement to display the information of the triangle
9. Write the necessary statement to print the type of the triangle