JAVA-PBL WEEK 3

Write a program to create a Circle class with the following members

Point p;//Point class contains two members double x,y;

double r;

String color;

Date dateCreated;//check Date API

//methods

Constructors (private and public)

Functional Methods

//calcArea()

//calcPeri()

//int compareTwoCircles(Circle c)

Returns 0 - overlap

Returns 1 - touch externally

Returns 2 - disjoint externally

Returns -1 - touch internally

Returns -2 - disjoint internally

Circle implements an interface called Comparable

Go through Comparable interface API and implement body of the method compareTo()

//write the body for compareTo()

//logic is Circles are compared based on their area

//Class CircleCollection

//members - Circle[]

sort circles in the Array based on increasing order of areas (Arrays.sort(), Collections.sort())

CODE

POINT CLASS

```
package circle_entity;

public class Point {
	private double x;
	private double y;
	private Point() {
		this.x=0;
		this.y=0;
	}
	public Point(double a,double b) {
		this();
		this.setCoordinate1(a);
		this.setCoordinate2(b);
	}
	public boolean setCoordinate1(double a) {
		if(a>=0 || a<=0) {
			this.x = a;
			return true;
		}
		return false;
	}
	public boolean setCoordinate2(double b) {
		if(b>=0 || b<=0) {
			this.y = b;
			return true;
		}
		return false;
	}
	public double getCoordinate1() {
		return this.x;
	}
	public double getCoordinate2() {
		return this.y;
	}
	public static double distance(Point a,Point b) {
		return Math.sqrt((b.x - a.x) * (b.x - a.x) + (b.y - a.y)*(b.y -
a.y));
	}
}
```

CIRCLE CLASS

```
package circle_entity;

import java.util.Date;

public class Circle implements Comparable<Circle> {
	private double r;
	private String color;
	private Date dateCreated;
	private Point p;
	private Circle() {
		this.r = 0;
		this.color = "Red";
		this.dateCreated = new Date();
```

```
		this.p = new Point(0,0);
	}
	public Circle(Point p,double r,String c) {
		this();
		this.setCentre(p);
		this.setRadius(r);
		this.setColor(c);
	}
	public boolean setCentre(Point p) {
		if(p != null) {
			this.p = p;
			return true;
		}
		return false;
	}
	public boolean setRadius(double r) {
		if(r>=0) {
			this.r = r;
			return true;
		}
		return false;
	}
	public void setColor(String c) {
			this.color = c;
		}
	public double getRadius() {
		return this.r;
	}
	public String getColor() {
		return this.color;
	}
	public Point getCentre() {
		return this.p;
	}
	public Date getDate() {
		return this.dateCreated;
	}
	public double calcArea() {
		return Math.PI * this.r*this.r;
	}
	public double calcPerimeter() {
		return 2*Math.PI*this.r;
	}
	public int compareTwoCircles(Circle c1,Circle c2) {
		double d = Point.distance(c1.getCentre(), c2.getCentre());
		if(Math.abs(c1.getRadius() - c2.getRadius()) < d && d <
c1.getRadius() + c2.getRadius())
			return 0;
		else if(d == c1.getRadius() + c2.getRadius())
			return 1;
		else if(d > c1.getRadius() + c2.getRadius())
			return 2;
		else if(d == Math.abs(c1.getRadius() - c2.getRadius()))
			return -1;
		else if(d < Math.abs(c1.getRadius() - c2.getRadius()))
			return -2;
		else
			return -3;
	}
```

```
	public int compareTo(Circle c) {
		if(this.calcArea() == c.calcArea())
			return 0;
		else if(this.calcArea() > c.calcArea())
			return 1;
		else
			return -1;
	}
	public String toString() {
		String out ="";
		out+=String.format("Centre of circle = (%f , %f)
%n",this.getCentre().getCoordinate1(),this.getCentre().getCoordinate2());
		out+=String.format("Perimeter = %f %n", this.calcPerimeter());
		out+=String.format("Area = %f %n", this.calcArea());
		out+=String.format("Color: %s %n", this.getColor());
		out+=String.format("Date Created: %s %n", this.getDate());
		return out;
	}
}
```

CIRCLECOLLECTION CLASS

```
package circle_collectors;

import java.util.*;
import circle_entity.*;

public class CircleCollection {
	private static Scanner  sc = new Scanner(System.in);
    static ArrayList<Circle> al = new ArrayList<Circle>();
    int count;
	public static void main(String[] args) {
		boolean repeat = true;
		while(repeat) {
				switch(mainMenu()) {
					case 1: insertCircle();
							break;
					case 2: displayCircleDetails();
							break;
					case 3: sortCircles();
							break;
					default: repeat = false;
				}
		}
	}
	private static void insertCircle() {
		System.out.println("Enter centre of circle:");
		System.out.println("Enter x-coordinate: ");
		double x = sc.nextDouble();
		System.out.println("Enter y-coordinate: ");
		double y = sc.nextDouble();
		Point p = new Point(x,y);
		System.out.println("Enter radius of circle: ");
		double r = sc.nextDouble();
		System.out.println("Enter color of circle: ");
		String color = sc.next();
		Circle c = new Circle(p,r,color);
		al.add(c);
```

```
        }
    private static int mainMenu() {
                System.out.println("1.Create Circle");
                System.out.println("2.Display circles");
                System.out.println("3.Sort Circles");
                System.out.println("Enter any other number to exit");
                return sc.nextInt();
        }
    private static void sortCircles() {
                Collections.sort(al);
                System.out.println(al);
        }
        private static void displayCircleDetails() {
                System.out.println(al);
        }
    public String toString() {
           String out="";
           for(int i=0;i<count;i++)
                  out+=this.al.get(i).toString();
           return out;
    }
}
```

OUTPUT

```
<terminated> CircleCollection [Java Application] C:\Program Files\Java\jdk-13.0.2\bin\javaw.exe (13-Sep-2020, 5:45:33 PM)
1.Create Circle
2.Display circles
3.Sort Circles
Enter any other number to exit
1
Enter centre of circle:
Enter x-coordinate:
4.5
Enter y-coordinate:
5.5
Enter radius of circle:
6
Enter color of circle:
blue
1.Create Circle
2.Display circles
3.Sort Circles
Enter any other number to exit
2
[Centre of circle = (4.500000 , 5.500000)
Perimeter = 37.699112
Area = 113.097336
Color: blue
Date Created: Sun Sep 13 17:45:59 IST 2020
]
```

```
1.Create Circle
2.Display circles
3.Sort Circles
Enter any other number to exit
1
Enter centre of circle:
Enter x-coordinate:
2.5
Enter y-coordinate:
3.5
Enter radius of circle:
5
Enter color of circle:
white
1.Create Circle
2.Display circles
3.Sort Circles
Enter any other number to exit
2
[Centre of circle = (4.500000 , 5.500000)
Perimeter = 37.699112
Area = 113.097336
Color: blue
Date Created: Sun Sep 13 17:45:59 IST 2020
, Centre of circle = (2.500000 , 3.500000)
Perimeter = 31.415927
Area = 78.539816
Color: white
Date Created: Sun Sep 13 17:46:25 IST 2020
, Centre of circle = (4.500000 , 5.500000)
Perimeter = 37.699112
Area = 113.097336
Color: blue
Date Created: Sun Sep 13 17:45:59 IST 2020
]
1.Create Circle
2.Display circles
3.Sort Circles
Enter any other number to exit
5
```