Practice Exercise #22: Circle with Centre

http://www.comp.nus.edu.sg/~cs1020/4_misc/practice.html

Objective:

- Inheritance

Task Statement

You are given a **Circle** class as shown below.

```
// Circle class:
//   Instance attributes: colour, radius
// Aaron Tan

class Circle {

   /************** Data members **********************/
   protected String colour;
   protected double radius;

   /************** Constructors **********************/
   // Default constructor creates a yellow, radius 10.0 circle

   public Circle() {
      this("yellow", 10.0);
   }

   public Circle(String colour, double radius) {
      setColour(colour);
      setRadius(radius);
   }

   /**************** Accessors ************************/
   public String getColour() {
      return this.colour;   // 'this' is optional here
   }

   public double getRadius() {
      return this.radius;   // 'this is optional here
   }

   /**************** Mutators ************************/
   public void setColour(String colour) {
      this.colour = colour;  // 'this' is required here
   }

   public void setRadius(double radius) {
      this.radius = radius;  // 'this' is required here
   }
```

```
   /***************** Overriding methods ******************/
   // Overriding toString() method
   public String toString() {
      return "[" + getColour() + ", " + getRadius() + "]";
   }

   // Overriding equals() method
   public boolean equals(Object obj) {
      if (obj instanceof Circle) {
         Circle circle = (Circle) obj;
         return this.getColour().equals(circle.getColour()) &&
                this.getRadius() == circle.getRadius();
      }
      else
         return false;
   }
}
```

You are to create **CentredCircle**, a subclass of **Circle**. An instance of **CentredCircle** contains colour, radius and a centre which is a 2D point with coordinates of type **double**.

You are to use the class **Point2D.Double** for the centre. Refer to
http://docs.oracle.com/javase/7/docs/api/java/awt/geom/Point2D.Double.html
for more information.

A client program **TestCentredCircle.java** is also given. This program reads data of two circles, creates two objects of **CentredCircle**, displays their values and compares if they are identical, as shown in the sample inputs and outputs on the next page.

Note that if the colour entered is "Default", then a default yellow circle with radius 10.0 and centre at (0,0) is created.

You are not to modify the given programs **Circle.java** and **TestCentredCircle.java**.

You are to write and submit **CentredCircle.java**. In this program, you should do the following:

- Make **CentredCircle** a subclass of **Circle**
- Provide two constructors:
  - A default constructor **CentredCircle()** to create a yellow circle with radius 10.0 and centre at (0, 0)
  - A constructor **CentredCircle(String colour, double radius, Point2D.Double centre)**
  - You should use **super** wherever appropriate
- The accessor **getCentre()** and the mutator **setCentre(Point2D.Double centre)**
- Overriding methods **toString()** and **equals(Object obj)**
  - You should use **super** in the **equals(Object obj)** method

Sample Input #1

```
red
17.5
121.2 80.6
blue
21.3
-41.5 79.12
```

Sample Output #1

```
1st circle: [red, 17.5, (121,2,80.6)]
2nd circle: [blue, 21.3, (-41,5,79.12)]
They are not identical.
```

Sample Input #2

```
yellow
9.9
4.5 -8.0
yellow
9.9
4.5 -8.0
```

Sample Output #2

```
1st circle: [yellow, 9.9, (4.5,-8.0)]
2nd circle: [yellow, 9.9, (4.5,-8.0)]
They are identical.
```

Sample Input #3

```
Default
green
0.3
-1.4 2.1
```

Sample Output #3

```
1st circle: [yellow, 10.0, (0.0,0.0)]
2nd circle: [green, 0.3, (-1.4,2.1)]
They are not identical.
```