```java
package ex2;

/// Define the circle class with two constructors
public class Circle1 {

    double radius;

    /** Construct a circle with radius 1 */
    Circle1() {
        radius = 1.0;
    }

    /** Construct a circle with a specified radius */
    Circle1(double newRadius) {
        radius = newRadius;
    }

    /** Return the area of this circle */
    double getArea() {
        return radius * radius * Math.PI;
    }
}

```



```java
package ex2;

public class Circle2 {

    /** The radius of the circle */
    double radius;
    /** The number of the objects created */
    static int numberOfObjects = 0;

    /** Construct a circle with radius 1 */
    Circle2() {
        radius = 1.0;
        numberOfObjects++;
    }

    /** Construct a circle with a specified radius */
    Circle2(double newRadius) {
        radius = newRadius;
        numberOfObjects++;
    }

    /** Return numberOfObjects */
    static int getNumberOfObjects() {
        return numberOfObjects;
    }

    /** Return the area of this circle */
    double getArea() {
        return radius * radius * Math.PI;
    }
}

```

```java
package ex2;

public class Circle3 {

    /** The radius of the circle */
    private double radius = 1;
    /** The number of the objects created */
    private static int numberOfObjects = 0;

    /** Construct a circle with radius 1 */
    public Circle3() {
        numberOfObjects++;
    }

    /** Construct a circle with a specified radius */
    public Circle3(double newRadius) {
        radius = newRadius;
        numberOfObjects++;
    }

    /** Return radius */
    public double getRadius() {
        return radius;
    }

    /** Set a new radius */
    public void setRadius(double newRadius) {
        radius = (newRadius >= 0) ? newRadius : 0;
    }

    /** Return numberOfObjects */
    public static int getNumberOfObjects() {
        return numberOfObjects;
    }

    /** Return the area of this circle */
    public double getArea() {
        return radius * radius * Math.PI;
    }
}

```



```java
package ex2;

import java.util.Date;

/**
 *
 * @author vanting
 */
public class DateDemo {

    public static void main(String[] args) {
        //System.out.println(System.currentTimeMillis());
        System.out.println(new Date(System.currentTimeMillis() + 60*60*1000));
    }

}

```

```java

package ex2;

/**
 *
 * @author vanting
 */
public class TestCircle1 {

    /** Main method */
    public static void main(String[] args) {

        // Create a circle with radius 5.0
        Circle1 myCircle = new Circle1(5.0);
        System.out.println("The area of the circle of radius " +
                myCircle.radius + " is " + String.format("%.2f",
myCircle.getArea()));

        // Create a circle with radius 1
        Circle1 yourCircle = new Circle1();
        System.out.println("The area of the circle of radius " +
                yourCircle.radius + " is " + String.format("%.2f",
yourCircle.getArea()));

        // Modify circle radius
        yourCircle.radius = 100;
        System.out.println("The area of the circle of radius " +
                yourCircle.radius + " is " + String.format("%.2f",
yourCircle.getArea()));

    }
}

```



```java
package ex2;

public class TestCircle2 {

    /** Main method */
    public static void main(String[] args) {
        // Create c1
        Circle2 c1 = new Circle2();

        // Display c1 BEFORE c2 is created
        System.out.println("Before creating c2");
        System.out.println(
                "c1 is : radius (" + c1.radius + ") and number of Circle objects (" +
c1.numberOfObjects + ")");

        // Create c2
        Circle2 c2 = new Circle2(5);

        // Change the radius in c1
        c1.radius = 9;

        // Display c1 and c2 AFTER c2 was created
        System.out.println("\nAfter creating c2 and modifying c1's radius to 9");
        System.out.println(
                "c1 is : radius (" + c1.radius + ") and number of Circle objects (" +
c1.numberOfObjects + ")");
        System.out.println(
                "c2 is : radius (" + c2.radius + ") and number of Circle objects (" +
c2.numberOfObjects + ")");
    }
}

```

```java
package ex2;

// TestCircle3.java: Demonstrate private modifier
public class TestCircle3 {

    /** Main method */
    public static void main(String[] args) {
        // Create a Circle with radius 5.0
        Circle3 myCircle = new Circle3(5.0);
        System.out.println("The area of the circle of radius " +
                myCircle.getRadius() + " is " + String.format("%.2f",
myCircle.getArea()));

        // Increase myCircle's radius by 10%
        myCircle.setRadius(myCircle.getRadius() * 1.1);
        System.out.println("The area of the circle of radius " +
                myCircle.getRadius() + " is " + String.format("%.2f",
myCircle.getArea()));
    }
}

```



```java
package ex2;

public class TotalArea {

    /** Main method */
    public static void main(String[] args) {
        // Declare circleArray
        Circle3[] circleArray;

        // Create circleArray
        circleArray = createCircleArray();

        // Print circleArray and total areas of the circles
        printCircleArray(circleArray);
    }

    /** Create an array of Circle objects */
    public static Circle3[] createCircleArray() {
        Circle3[] circleArray = new Circle3[5];

        for (int i = 0; i < circleArray.length; i++) {
            circleArray[i] = new Circle3(10 + Math.random() * 90);
        }

        // Return Circle array
        return circleArray;
    }

    /** Print an array of circles and their total area */
    public static void printCircleArray(Circle3[] circleArray) {
        System.out.println("Radius\t\t" + "Area");
        for (int i = 0; i < circleArray.length; i++) {
            System.out.printf("%.2f\t\t%.2f\n", circleArray[i].getRadius(),
circleArray[i].getArea());
        }

        System.out.println("----------------------------------------");

        // Compute and display the result
        System.out.printf("The total areas of circles is \t %.2f \n",
sum(circleArray));
    }

    /** Add circle areas */
    public static double sum(Circle3[] circleArray) {
        // Initialize sum
        double sum = 0;

        // Add areas to sum
        for (int i = 0; i < circleArray.length; i++) {
            sum += circleArray[i].getArea();
        }

        return sum;
    }
}

```

```java
package ex2;

/**
 * Problem:
 *   In a 2D space, find the length of a line.
 *
 * @author vanting
 */
// The Main class
public class WarmUp {

    public static void main(String[] args) {

        Point s = new Point(2, 2);
        Point e = new Point(3, 3);
        Line ln = new Line(s, e);

        System.out.println("The length is " + ln.findLength());
        System.out.println("No. of points = " + Point.numOfPoints);

        // the procedural approach
        //System.out.println("The length is " + WarmUp.cStyleFunctionFindLength(2, 2, 3, 3));

    }

    public static double cStyleFunctionFindLength(int x1, int y1, int x2, int y2) {
        return Math.sqrt(Math.pow(x1 - x2, 2) + Math.pow(y1 - y2, 2));
    }
}

// The Point class
class Point {
    // data encapsulation

    private int x;
    private int y;
    static int numOfPoints = 0;

    Point(int n1, int n2) {
        x = n1;
        y = n2;
        numOfPoints++;
    }

    public int getX() {
        return x;
    }

    public int getY() {
        return y;
    }

    public void setX(int n) {
        if (n >= 0) {
            x = n;
        }
    }
}
```



```java

// The Line class
class Line {

    Point start;
    Point end;

    Line(Point n1, Point n2) {
        start = n1;
        end = n2;
    }

    double findLength() {
        return Math.sqrt(Math.pow(start.getX() - end.getX(), 2) + Math.pow(start.getY() - end.getY(), 2));
    }
}
```