

```
1 package v2;
2
3 import java.util.Scanner;
4
5 public class Circle {
6     public static void main(String[] args) {
7
8         Circle c1 = new Circle();
9         System.out.println(c1.toString("c1"));
10        c1.setRadius(5);
11        c1.setArea(Math.pow(c1.getRadius(), 2) * Circle.getPI());
12        System.out.println(c1.toString("c1"));
13
14        Circle c2 = new Circle();
15        System.out.println(c2.toString("c2"));
16        c2.initObject();
17        System.out.println(c2.toString("c2"));
18
19        Circle c3 = new Circle();
20        System.out.println(c3.toString("c3"));
21        c3.readRadius();
22        c3.setArea(Circle.getPI() * c3.getRadius() * c3.getRadius());
23        c3.setCircumference(Circle.getPI() * 2 * c3.getRadius());
24        c3.setDiameter(2 * c3.getRadius());
25        System.out.println(c3.toString("c3"));
26
27        Circle c4 = new Circle();
28        System.out.println(c4.toString("c4"));
29        c4.setRadius(156.13);
30        c4.calculateArea();
31        c4.calculateCircumference();
32        c4.setDiameter(2 * c4.getRadius());
33        System.out.println(c4.toString("c4"));
34
35        Circle c5 = new Circle();
36        System.out.println(c5.toString("c5"));
37        c5.setArea(200);
38        System.out.println(c5.toString("c5"));
39
40        Circle c6 = new Circle(100);
41        System.out.println(c6.toString("c6"));
42
43        Circle c7 = new Circle(125, 1023);
44        System.out.println(c7.toString("c7"));
45    }
46
47    // Instance variables
```

```
48     private static final double PI = Math.PI;
49     private double radius, diameter, circumference, area;
50
51     // compile time polymorphism with constructor overloading
52     public Circle() {
53         System.out.println("Zero param");
54         radius = 0;
55         calculateArea();
56         calculateCircumference();
57         setDiameter(0);
58     }
59
60     public Circle(double radius) {
61         System.out.println("1 param");
62         this.radius = radius;
63         calculateArea();
64         calculateCircumference();
65         setDiameter(radius);
66     }
67
68     public Circle(double radius, double area) {
69         System.out.println("2 param");
70         this.radius = radius;
71         calculateArea();
72         calculateCircumference();
73         setDiameter(radius);
74     }
75
76     // GETTER & SETTERS
77
78     public double getRadius() {
79         return radius;
80     }
81
82     public void setRadius(double radius) {
83         this.radius = radius;
84     }
85
86     public double getDiameter() {
87         return diameter;
88     }
89
90     public void setDiameter(double diameter) {
91         // this.diameter = diameter;
92         this.diameter = 2 * this.radius;
93     }
94
```

```
95     public double getCircumference() {
96         return circumference;
97     }
98
99     public void setCircumference(double circumference) {
100         this.circumference = circumference;
101     }
102
103     public double getArea() {
104         this.calculateArea();
105         return area;
106     }
107
108     public void setArea(double area) {
109         // this.area = area;
110         calculateArea();
111     }
112
113     public static double getPI() {
114         return PI;
115     }
116
117     // initialize instance variables
118     public void initObject() {
119         radius = 1000;
120         diameter = 2 * radius;
121         area = PI * radius * radius;
122         circumference = 2 * PI * radius;
123     }
124
125     public void readRadius() {
126         Scanner in = new Scanner(System.in);
127         System.out.println("Enter radius: ");
128         radius = in.nextDouble();
129         // diameter = 2*radius;
130         // area = PI * radius * radius;
131         // circumference = 2 * PI * radius;
132     }
133
134     // compute area
135     public void calculateArea() {
136         area = PI * radius * radius;
137     }
138
139     public void calculateCircumference() {
140         circumference = 2 * PI * radius;
141     }
```

```
142
143     public String toString(String name) {
144         return String.format("%s: [PI: %f, radius: %f, diameter: %f,
            circumference: %f, area: %f]", name, PI, radius,
145                                     diameter, circumference, area);
146     }
147
148 }
149
```