

```
1 import java.util.Scanner;
2
3 // Base class: Shape
4 class Shape {
5     protected double radius; // Radius of the cylinder
6     protected double height; // Height of the cylinder
7     protected final double PI = 3.14159; // Constant value for PI
8
9     // Constructor to initialize radius and height
10    public Shape(double radius, double height) {
11        this.radius = radius;
12        this.height = height;
13    }
14 }
15
16 // Derived class: Cylinder, which inherits from Shape
17 class Cylinder extends Shape {
18
19     // Constructor to initialize radius and height using the base class constructor
20    public Cylinder(double radius, double height) {
21        super(radius, height);
22    }
23
24    // Method to calculate the surface area of the cylinder
25    public double calculateArea() {
26        double area = 2 * PI * radius * radius + 2 * PI * radius * height;
27        return area;
28    }
29
30    // Method to calculate the volume of the cylinder
31    public double calculateVolume() {
32        double volume = PI * radius * radius * height;
33        return volume;
34    }
35 }
36
```

```
37 // Main class: Program entry point
38 public class Main {
39     public static void main(String[] args) {
40         Scanner scanner = new Scanner(System.in);
41
42         // Ask user for the radius and height of the cylinder
43         System.out.print("Enter the radius of the cylinder: ");
44         double radius = scanner.nextDouble();
45
46         System.out.print("Enter the height of the cylinder: ");
47         double height = scanner.nextDouble();
48
49         // Create a Cylinder object with the provided radius and height
50         Cylinder cylinder = new Cylinder(radius, height);
51
52         // Calculate and display the area of the cylinder
53         double area = cylinder.calculateArea();
54         System.out.println("Surface Area of the Cylinder: " + area);
55
56         // Calculate and display the volume of the cylinder
57         double volume = cylinder.calculateVolume();
58         System.out.println("Volume of the Cylinder: " + volume);
59     }
60 }
```



TAB



```
Enter the radius of the cylinder: 3
Enter the height of the cylinder: 2
Surface Area of the Cylinder: 94.24769999999998
Volume of the Cylinder: 56.548619999999999
[Program finished]
```