/*

6. Develop a JAVA program to create an abstract class Shape with abstract methods calculateArea() and calculatePerimeter(). Create subclasses Circle and Triangle that extend the Shape class and implement the respective methods to calculate the area and perimeter of each shape.

*/

```
// Abstract Shape class
abstract class Shape {
    // Abstract methods to calculate area and perimeter
    abstract double calculateArea();
    abstract double calculatePerimeter();
}

// Circle class extending Shape
class Circle extends Shape {
    private double radius;

    // Constructor for Circle class
    public Circle(double radius) {
        this.radius = radius;
    }

    // Implementation of abstract method to calculate area for Circle
    @Override
    double calculateArea() {
        return Math.PI * radius * radius;
```

```
    }

    // Implementation of abstract method to calculate perimeter (circumference) for Circle
    @Override
    double calculatePerimeter() {
        return 2 * Math.PI * radius;
    }
}

// Triangle class extending Shape
class Triangle extends Shape {
    private double side1;
    private double side2;
    private double side3;

    // Constructor for Triangle class
    public Triangle(double side1, double side2, double side3) {
        this.side1 = side1;
        this.side2 = side2;
        this.side3 = side3;
    }

    // Implementation of abstract method to calculate area for Triangle using Heron's formula
    @Override
    double calculateArea() {
        double s = (side1 + side2 + side3) / 2;
        return Math.sqrt(s * (s - side1) * (s - side2) * (s - side3));
    }
```

```
    // Implementation of abstract method to calculate perimeter for Triangle
    @Override
    double calculatePerimeter() {
        return side1 + side2 + side3;
    }
}

// Main class
public class Main {
    public static void main(String[] args) {
        // Creating Circle and Triangle objects
        Circle circle = new Circle(5);
        Triangle triangle = new Triangle(3, 4, 5);

        // Calculating and displaying area and perimeter for Circle
        System.out.println("Circle - Area: " + circle.calculateArea() + ", Perimeter: " +
circle.calculatePerimeter());

        // Calculating and displaying area and perimeter for Triangle
        System.out.println("Triangle - Area: " + triangle.calculateArea() + ", Perimeter: " +
triangle.calculatePerimeter());
    }
}
```