Q11) Write 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.

```
import java.util.Scanner;

abstract class Shape{
    abstract double calculateArea();
    abstract double calculatePerimeter();
}

class Circle extends Shape{
    private double radius;

    public Circle(double radius){
        this.radius=radius;
    }

    @Override
    double calculateArea(){
        return Math.PI* Math.pow(radius, b:2);
    }

    @Override
    double calculatePerimeter(){
        return 2* Math.PI *radius;
    }
}

class Triangle extends Shape{
    private double side1, side2, side3;

    public Triangle(double side1, double side2, double side3){
```

```
        this.side1 = side1;
        this.side2 = side2;
        this.side3 = side3;
    }

    @Override
    double calculateArea() {
        double s = (side1 + side2 + side3) / 2;
        return Math.sqrt(s * (s - side1) * (s - side2) * (s - side3));
    }

    @Override
    double calculatePerimeter() {
        return side1 + side2 + side3;
    }
}

public class Hi {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.println("Enter the radius of the Circle: ");
        double circleRadius = scanner.nextDouble();
        Circle circle = new Circle(circleRadius);

        System.out.println("Enter the length of side 1 of the triangle: ");
        double triangleSide1 = scanner.nextDouble();
        System.out.println("Enter the length of side 2 of the triangle: ");
        double triangleSide2 = scanner.nextDouble();
```

```
System.out.println("Enter the length of sides of the triangle");
double triangleSide1 = scanner.nextDouble();
Triangle triangle = new Triangle(triangleSide1, triangleSide2, triangleSide3);

        scanner.close();

        System.out.println("\n Circle Area : " + circle.calculateArea());
        System.out.println("Circle Perimeter : " + circle.calculatePerimeter());
        System.out.println("\n Triangle Area : " + triangle.calculateArea());
        System.out.println("Triangle Perimeter : " + triangle.calculatePerimeter());
    }
}
```

Output:

```
Enter the radius of Circle : 2
Enter the length of side1 of the triangle : 3
Enter the length of side2 of the triangle : 3
Enter the length of side 3 of the triangle : 2

Circle Area : 12.56
Circle Perimeter : 12.56
Triangle Area = NaN
Triangle Perimeter : 38.0
```