**Title:** “Write a Java Program to calculate area and perimeter of variety of shapes(circle and triangle)”

**Problem Description:** 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.

**Method:** Ensure that the program is well-structured, follows object-oriented principles, and provides clear and concise output demonstrating the functionality of each class and method.

**Theory Reference:** Module 3

**Code**

**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;

}

**double** calculateArea()

{

**return** Math.***PI*** \* radius \* radius;

}

**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;

}

**double** calculateArea()

{

// Using Heron's formula

**double** s = (side1 + side2 + side3) / 2;

**return** Math.*sqrt*(s \* (s - side1) \* (s - side2) \* (s - side3));

}

**double** calculatePerimeter()

{

**return** side1 + side2 + side3;

}

}

**public** **class** p6

{

**public** **static** **void** main(String[] args)

{

Scanner sc=**new** Scanner(System.***in***);

System.***out***.println("Enter the radius of circle");

**int** r=sc.nextInt();

Shape circle = **new** Circle(r);

System.***out***.println("Circle Area: " + circle.calculateArea());

System.***out***.println("Circle Perimeter: " + circle.calculatePerimeter());

System.***out***.println("Enter the sides of the triangle");

**int** s1=sc.nextInt();

**int** s2=sc.nextInt();

**int** s3=sc.nextInt();

Shape triangle = **new** Triangle(s1, s2, s3);

System.***out***.println("Triangle Area: " + triangle.calculateArea());

System.***out***.println("Triangle Perimeter: " + triangle.calculatePerimeter());

}

}