# PROGRAM 4:

Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea( ). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea( ) that prints the area of the given shape.

CODE:

```
import java.util.Scanner;

abstract class Shape {

    int dimension1, dimension2;

    abstract void printArea();
}

class Rectangle extends Shape {

    public Rectangle(int length, int breadth) {
        this.dimension1 = length;
        this.dimension2 = breadth;
    }
    @Override
    void printArea() {
        int area = dimension1 * dimension2;
        System.out.println("Area of Rectangle: " + area);
```

```
    }
}


class Triangle extends Shape {

    public Triangle(int base, int height) {
        this.dimension1 = base;
        this.dimension2 = height;
    }

    @Override
    void printArea() {
        double area = 0.5 * dimension1 * dimension2;
        System.out.println("Area of Triangle: " + area);
    }
}
class Circle extends Shape {

    public Circle(int radius) {
        this.dimension1 = radius;
        this.dimension2 = 0; // No second dimension for circle
    }


    @Override
    void printArea() {
        double area = Math.PI * dimension1 * dimension1;
        System.out.println("Area of Circle: " + area);
    }
}

public class ShapeAreaCalculator {

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

        while (true) {
            System.out.println("\n--- Shape Area Calculator ---");
            System.out.println("1. Rectangle");
```

```
            System.out.println("2. Triangle");
            System.out.println("3. Circle");
            System.out.println("4. Exit");
            System.out.print("Enter your choice: ");
            int choice = scanner.nextInt();

            Shape shape = null;

            switch (choice) {
                case 1:
                    System.out.print("Enter length of rectangle: ");
                    int length = scanner.nextInt();
                    System.out.print("Enter breadth of rectangle: ");
                    int breadth = scanner.nextInt();
                    shape = new Rectangle(length, breadth);
                    shape.printArea();
                    break;

                case 2:
                    System.out.print("Enter base of triangle: ");
                    int base = scanner.nextInt();
                    System.out.print("Enter height of triangle: ");
                    int height = scanner.nextInt();
                    shape = new Triangle(base, height);
                    shape.printArea();
                    break;

                case 3:
                    System.out.print("Enter radius of circle: ");
                    int radius = scanner.nextInt();
                    shape = new Circle(radius);
                    shape.printArea();
                    break;

                case 4:
                    System.out.println("Exiting the program.");
                    scanner.close();
                    return;

                default:
```

```
                    System.out.println("Invalid choice. Please try
again.");
            }
        }
    }
}
```

OUTPUT:

```
--- Shape Area Calculator ---
1. Rectangle
2. Triangle
3. Circle
4. Exit
Enter your choice: 1
Enter length of rectangle: 45
Enter breadth of rectangle: 95
Area of Rectangle: 4275

--- Shape Area Calculator ---
1. Rectangle
2. Triangle
3. Circle
4. Exit
Enter your choice: 2
Enter base of triangle: 88
Enter height of triangle: 44
Area of Triangle: 1936.0

--- Shape Area Calculator ---
1. Rectangle
2. Triangle
3. Circle
4. Exit
Enter your choice: 3
Enter radius of circle: 9
Area of Circle: 254.46900494077323

--- Shape Area Calculator ---
1. Rectangle
```

```
2. Triangle
3. Circle
4. Exit
Enter your choice: 4
Exiting the program.
```

NOTES:

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4. Develop a java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). provide three classes named Rectangle, Triangle and Circle such that each one of the classes

```
import java.util.Scanner;
abstract class Shape{
    int dim1;
    int dim2;
Shape(int dim1, int dim2){
    this.dim1 = dim1;
    this.dim2 = dim2;
abstract void printArea();
}
class Rectangle extends Shape{
    Rectangle(int width, int height){
        super(width, height);
}
@override
void printArea(){
    int area = dim1 * dim2;
    System.out.println("Area of Rectangle:"
        + area);
}
}
```

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```
@ override
void printArea () {
  double area = 0.5 * dim1 * dim2;
  System.out.println ("Area of Triangle " + area);
}
}

class Circle extends Shape {
      Circle (int radius) {
        super (radius, 0);
      }

@ override
  void printArea () {
    double area = Math.PI * dim1 * dim1;
System.out.println ("Area of Circle " + area);
}
}

class Main {
  public static void main (String [] args) {
  Shape rectangle = new Rectangle (5, 10);
  Shape triangle = new Triangle (4, 6);
  Shape circle = new Circle (3);
    rectangle.printArea ();
    triangle.printArea ();
    circle.printArea ();
  }
}
```

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output

```
Enter Shape of your choice.

1. Rectangle
2. Triangle
3. circle
4. Exit
1
Enter length and breadth
20
40
Area of Rectangle: 800
1. Rectangle
2. triangle
3. circle
4. Exit
2
Enter base and height
12
45
Area of triangle : 270.0
1. Rectangle
2. triangle
3. circle
4. Exit
3
Enter Radius of circle
10
Area of circle : 314.0
```

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1. Rectangle
2. Triangle
3. Circle
4. Exit
4
Exiting the program...