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);
```

```
public Triangle(int base, int height) {
       this.dimension1 = base;
       this.dimension2 = height;
   void printArea() {
       double area = 0.5 * dimension1 * dimension2;
       System.out.println("Area of Triangle: " + area);
   public Circle(int radius) {
       this.dimension2 = 0; // No second dimension for circle
   void printArea() {
       double area = Math.PI * dimension1 * dimension1;
       System.out.println("Area of Circle: " + area);
public class ShapeAreaCalculator {
   public static void main(String[] args) {
           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;
        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();
        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();
        System.out.print("Enter radius of circle: ");
        int radius = scanner.nextInt();
        shape = new Circle(radius);
        shape.printArea();
        System.out.println("Exiting the program.");
        scanner.close();
```

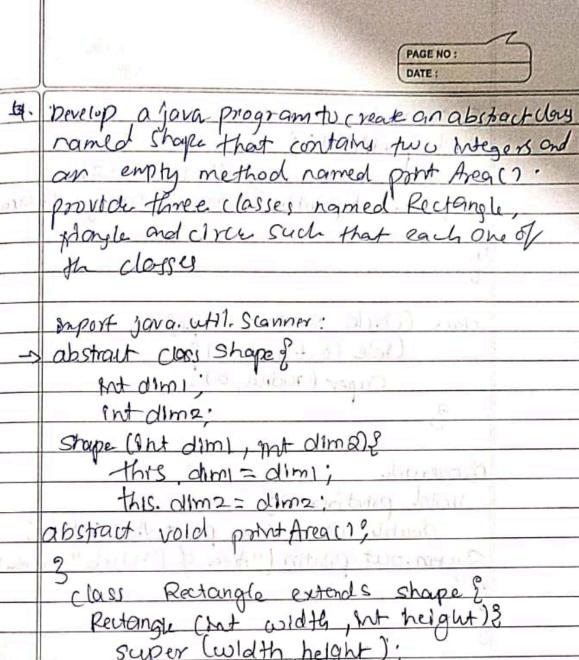
```
System.out.println("Invalid choice. Please try
again.");
}
}
}
```

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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