LAB 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;
    int dimension2;

    public Shape(int dim1, int dim2) {
        this.dimension1 = dim1;
        this.dimension2 = dim2;
    }

    abstract void printArea();
}

class Rectangle extends Shape {
    public Rectangle(int length, int width) {
        super(length, width);
    }

    @Override
    void printArea() {
        int area = dimension1 * dimension2;
        System.out.println("Rectangle Area: " + area);
    }
}

class Triangle extends Shape {
    public Triangle(int base, int height) {
        super(base, height);
    }
```

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

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

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

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

        System.out.println("Choose a shape to calculate area:");
        System.out.println("1. Rectangle");
        System.out.println("2. Triangle");
        System.out.println("3. Circle");
        int choice = scanner.nextInt();

        switch (choice) {
            case 1:
                System.out.print("Enter length of Rectangle: ");
                int length = scanner.nextInt();
                System.out.print("Enter width of Rectangle: ");
                int width = scanner.nextInt();
                Rectangle rectangle = new Rectangle(length, width);
                rectangle.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();
                Triangle triangle = new Triangle(base, height);
```

```
                triangle.printArea();
                break;

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

            default:
                System.out.println("Invalid choice. Please choose 1, 2, or 3.");
                break;
        }

        scanner.close();
    }
}
```

OUTPUT:

```
Choose a shape to calculate area:
1. Rectangle
2. Triangle
3. Circle
1
Enter length of Rectangle: 10
Enter width of Rectangle: 20
Rectangle Area: 200
Choose a shape to calculate area:
1. Rectangle
2. Triangle
3. Circle
2
Enter base of Triangle: 10
Enter height of Triangle: 15
Triangle Area: 75.0
Choose a shape to calculate area:
1. Rectangle
2. Triangle
3. Circle
3
Enter radius of Circle: 7
Circle Area: 153.93804002589985
Choose a shape to calculate area:
```

```
1. Rectangle
2. Triangle
3. Circle
4
Invalid choice. Please choose 1, 2, or 3.
```

OBSERVATION:

Q) Lab 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.

```
import java.util.*;
abstract class shape{
        Scanner sc = new Scanner(System.in);
        int side1;
        int side2;
        abstract void printArea();
}
class rectangle extends shape{
        void printArea(){
            sout("Enter length and breadth:");
            side1 = sc.nextInt();
            side2 = sc.nextInt();
            sout("Area of rectangle:" + (side1 * side2));
        }
}
class triangle extends shape{
        void printArea(){
            System.out.println("Enter base and Height:");
            side1 = sc.nextInt();
            side2 = sc.nextInt();
            sout("Area of Triangle:" + (0.5 * side1 * side2));
        }
```

```
    void printArea() {
        Sout("Enter Radius of Circle: ");
        side1 = sc.nextInt();
        Sout("Area of circle: " + (3.14 * side1 * side1));
    }
}

class C4
public class print {
    public static void main(String[] args) {
        Sout("Enter shape of your choice: ");
        Scanner sc = new Scanner(System.in);
        while (true) {
            Sout("1. Rectangle \n 2. Triangle \n
                3. Circle \n 4. Exit");
            int choice = sc.nextInt();
            switch(choice) {
                case 1:
                rectangle rt = new rectangle();
                 rt.printArea();
                 break;
                case 2:
                triangle t = new triangle();
                t.printArea();
                 break;
                case 3:
                Circle c = new Circle();
                c.printArea();
                break;
                case 4:
                Sout("Exiting the program...");
                System.exit(0);
            }
        }
}
```

output

```
Enter Shape of your choice:
1. Rectangle
2. Triangle
3. Circle
4. Exit
1
Enter length and Breadth:
2
4
Area of Rectangle : 8
1. Rectangle
2. Triangle.
3. Circle
4. Exit.
2
Enter base and Height:
Area of Triangle: 5.0
1. Rectangle
2. Triangle
3. Circle
4. Exit
3
6
113.0394
1 Rectangle
2. Triangle
3. Circle
4. Exit
4
Exiting the program....
```