PROGRAM 12

AIM : Calculate Area and Perimeter Using Interfaces

DATE : 03/03/2025

SOURCE CODE :

```
import java.util.Scanner;

interface Shape {
    double area();
    double perimeter();
}

class Circle implements Shape {
    double radius;

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

    public double area() {
        return Math.PI * radius * radius;
    }

    public double perimeter() {
        return 2 * Math.PI * radius;
    }
}

class Rectangle implements Shape {
    double length, width;

    Rectangle(double length, double width) {
        this.length = length;
        this.width = width;
    }

    public double area() {
        return length * width;
    }

    public double perimeter() {
```

```
        return 2 * (length + width);
    }
}

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

        do {
            System.out.println("\n1. Circle\n2. Rectangle\n3. Exit");
            System.out.print("Enter your choice: ");
            choice = scanner.nextInt();

            switch (choice) {
                case 1:
                    System.out.print("Enter radius: ");
                    double r = scanner.nextDouble();
                    Circle circle = new Circle(r);
                    System.out.println("Area: " + circle.area());
                    System.out.println("Perimeter: " + circle.perimeter());
                    break;
                case 2:
                    System.out.print("Enter length: ");
                    double l = scanner.nextDouble();
                    System.out.print("Enter width: ");
                    double w = scanner.nextDouble();
                    Rectangle rectangle = new Rectangle(l, w);
                    System.out.println("Area: " + rectangle.area());
                    System.out.println("Perimeter: " + rectangle.perimeter());
                    break;
                case 3:
                    System.out.println("Exiting...");
                    break;
                default:
                    System.out.println("Invalid choice!");
            }
        } while (choice != 3);
    }
}
```

OUTPUT :

```
24mca11@mcaserver:~/oop_lab$ javac AreaPerimeterCalculator.java
24mca11@mcaserver:~/oop_lab$ java AreaPerimeterCalculator

1. Circle
2. Rectangle
3. Exit
Enter your choice: 1
Enter radius: 5
Area: 78.53981633974483
Perimeter: 31.41592653589793

1. Circle
2. Rectangle
3. Exit
Enter your choice: 2
Enter length: 3
Enter width: 4
Area: 12.0
Perimeter: 14.0

1. Circle
2. Rectangle
3. Exit
Enter your choice: 3
Exiting...
```

PROGRAM 13

AIM : Program to Manage Employee Collection

DATE : 03/03/2025

SOURCE CODE :

```
import java.util.ArrayList;
import java.util.Scanner;

abstract class Employee {
    String name;
    double salary;

    Employee(String name, double salary) {
        this.name = name;
        this.salary = salary;
    }

    abstract double calculateSalary();

    void displayDetails() {
        System.out.println("\nName: " + name);
        System.out.println("Salary: " + calculateSalary());
    }
}

interface Benefits {
    double calculateBenefits();
}

class Manager extends Employee implements Benefits {
    double bonus;

    Manager(String name, double salary, double bonus) {
        super(name, salary);
        this.bonus = bonus;
    }

    double calculateSalary() {
        return salary + bonus;
    }
```

```
    public double calculateBenefits() {
        return 5000;
    }

    void assignProject(String projectName) {
        System.out.println(name + " assigned to project: " + projectName);
    }

    void assignProject(String projectName, int teamSize) {
        System.out.println(name + " assigned to project: " + projectName + " with team
size: " + teamSize);
    }
}

class Developer extends Employee implements Benefits {
    int experience;

    Developer(String name, double salary, int experience) {
        super(name, salary);
        this.experience = experience;
    }

    double calculateSalary() {
        return salary + (experience * 1000);
    }

    public double calculateBenefits() {
        return experience * 500;
    }
}

public class EmployeeManagement {
    public static void main(String[] args) {
        ArrayList<Employee> employees = new ArrayList<>();
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter number of employees: ");
        int numEmployees = scanner.nextInt();
        scanner.nextLine();

        for (int i = 0; i < numEmployees; i++) {
            System.out.println("\nEnter details for Employee " + (i + 1) + ":");
            System.out.print("Enter name: ");
            String name = scanner.nextLine();
```

```
            System.out.print("Enter salary: ");
            double salary = scanner.nextDouble();
            scanner.nextLine();

            System.out.print("Enter type (Manager/Developer): ");
            String type = scanner.nextLine();

        System.out.println("\nEmployee Details");
        for (Employee emp : employees) {
            emp.displayDetails();
            if (emp instanceof Benefits) {
                System.out.println("Benefits: " + ((Benefits) emp).calculateBenefits());
            }
        }

        scanner.close();
    }
}
```

OUTPUT :

```
24mca11@mcaserver:~/oop_lab$ javac EmployeeManagement.java
24mca11@mcaserver:~/oop_lab$ java EmployeeManagement
Enter number of employees: 2

Enter details for Employee 1:
Enter name: Anjali
Enter salary: 50000
Enter type (Manager/Developer): Developer
Enter experience (years): 5

Enter details for Employee 2:
Enter name: Minna
Enter salary: 25000
Enter type (Manager/Developer): Manager
Enter bonus amount: 5000

Employee Details

Name: Anjali
Salary: 55000.0
Benefits: 2500.0

Name: Minna
Salary: 30000.0
Benefits: 5000.0
```

PROGRAM 14

AIM : Graphics Package for Geometric Figures

DATE : 03/03/2025

SOURCE CODE :

TestShapes.java

```
import java.util.Scanner;
import Graphics.*;

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


        System.out.print("Enter length of Rectangle: ");
        double rectLength = scanner.nextDouble();
        System.out.print("Enter width of Rectangle: ");
        double rectWidth = scanner.nextDouble();
        Rectangle rectangle = new Rectangle(rectLength, rectWidth);

          System.out.println("\nArea of Rectangle: " + rectangle.area());


        System.out.print("\nEnter base of Triangle: ");
        double triBase = scanner.nextDouble();
        System.out.print("Enter height of Triangle: ");
        double triHeight = scanner.nextDouble();
        Triangle triangle = new Triangle(triBase, triHeight);

          System.out.println("\nArea of Triangle: " + triangle.area());


        System.out.print("\nEnter side of Square: ");
        double squareSide = scanner.nextDouble();
        Square square = new Square(squareSide);

          System.out.println("\nArea of Square: " + square.area());


        System.out.print("\nEnter radius of Circle: ");
        double circleRadius = scanner.nextDouble();
```

```
        Circle circle = new Circle(circleRadius);

          System.out.println("\nArea of Circle: " + circle.area());
        scanner.close();
          }
}
```

Circle.java

```
package Graphics;

public class Circle implements Shape {
    private double radius;

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

    @Override
    public double area() {
        return Math.PI * radius * radius;
    }
}
```

Rectangle.java

```
package Graphics;

public class Rectangle implements Shape {
    private double length;
    private double width;

    public Rectangle(double length, double width) {
        this.length = length;
        this.width = width;
    }

    @Override
    public double area() {
        return length * width;
    }
}
```

Triangle.java

```
package Graphics;

public class Triangle implements Shape {
    private double base;
    private double height;

    public Triangle(double base, double height) {
        this.base = base;
        this.height = height;
    }

    @Override
    public double area() {
        return 0.5 * base * height;
    }
}
```

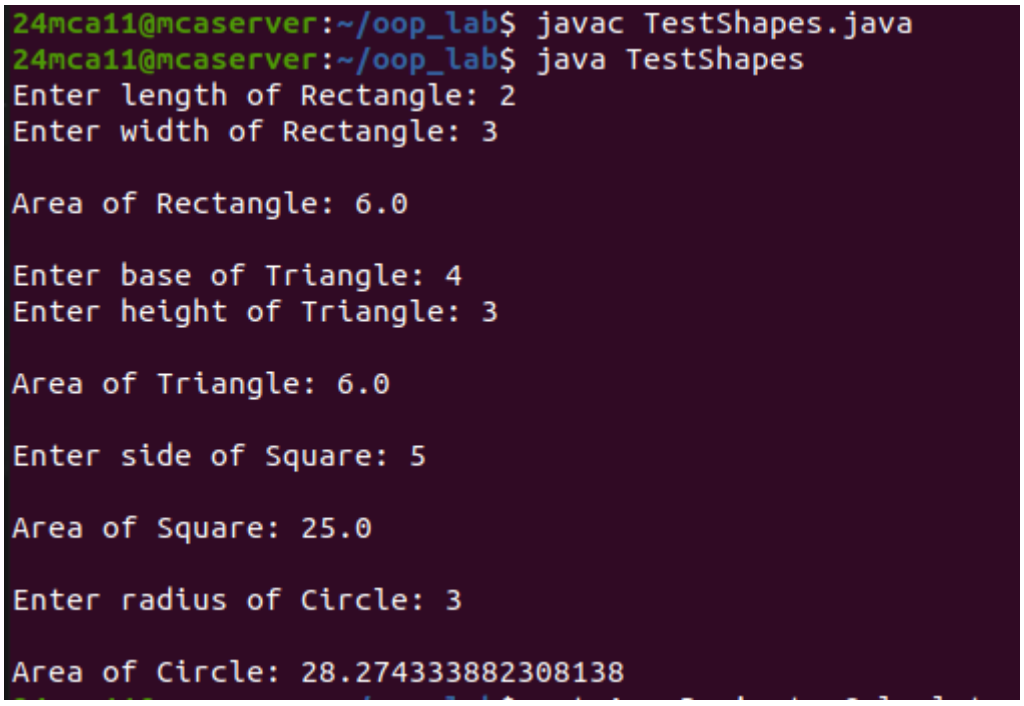
Square.java

```
package Graphics;

public class Square extends Rectangle {

    public Square(double side) {
        super(side, side);
    }
}
```

Shape.java

```
package Graphics;

public interface Shape {
    double area();
}
```

OUTPUT :


24mca11@mcaserver:~/oop_lab$ javac TestShapes.java
24mca11@mcaserver:~/oop_lab$ java TestShapes
Enter length of Rectangle: 2
Enter width of Rectangle: 3
Area of Rectangle: 6.0
Enter base of Triangle: 4
Enter height of Triangle: 3
Area of Triangle: 6.0
Enter side of Square: 5
Area of Square: 25.0
Enter radius of Circle: 3
Area of Circle: 28.274333882308138