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PROBLEM STATEMENT :	*Write a program to calculate the area of 4 rectangles, 5 squares and 2 circles.* *Create an abstract class 'Shape' with three abstract methods namely 'RectangleArea' taking two parameters, 'SquareArea' and 'CircleArea' taking one parameter each.* *The parameters of 'RectangleArea' are its length and breadth, that of 'SquareArea' is its side and that of 'CircleArea' is its radius.* *Now create another class 'Area' containing all the three methods 'RectangleArea', 'SquareArea' and 'CircleArea' for printing the area of rectangle, square and circle respectively.* *Create an object of class 'Area' and call all the three methods.*
THEORY:	**Interface Keyword:** The interface keyword in Java is used to declare interfaces, which are a core part of the Java programming language. Here's a brief note on the interface keyword: An interface in Java is a reference type that defines a contract or a set of methods that a class implementing the interface must adhere to. Interfaces are declared using the interface keyword. An interface can contain method declarations, but it does not provide any method implementations. By default, all methods declared in an interface are implicitly public and abstract. Interfaces can also include constants, which are public, static, and final by default. A class can implement multiple interfaces by separating them with commas in the implements clause.

	When a class implements an interface, it must provide an implementation for all the methods defined in the interface. An interface can extend one or more other interfaces using the extends keyword The interface keyword is a powerful tool in Java for achieving abstraction and defining contracts that classes must fulfill. It allows for code reusability, modularity, and the ability to implement multiple interfaces. **Multiple Inheritance using Interfaces:** In Java, multiple inheritance, where a class can inherit from multiple parent classes, is not directly supported to avoid the "diamond problem" and potential conflicts that may arise. However, Java achieves a form of multiple inheritance through interfaces. Here's how it works: 1. Interface: - An interface in Java is a contract that defines a set of methods that a class implementing the interface must provide. - An interface can be implemented by any number of classes, allowing those classes to share common behavior. - An interface can extend other interfaces, allowing for inheritance of method declarations. 2. Implementing Multiple Interfaces: - A class in Java can implement multiple interfaces by separating them with commas in the `implements` clause. - When a class implements multiple interfaces, it must provide an implementation for all the methods defined in each interface. - The class can provide its own implementation for each method, tailored to its specific needs. - By implementing multiple interfaces, a class inherits the method declarations and can be treated as an instance of each interface it implements.

PROGRAM:

```
import java.util.Scanner;
abstract class Shape{
    abstract double RectangleArea(double a , double b);
    abstract double SquareArea(double x);
    abstract double CircleArea(double r);

}
class Area extends Shape{
    int a,b;
    public double RectangleArea(double a , double b){
        return a*b ;
    }
    public double SquareArea(double x){
        return x*x;
    }
    public double CircleArea(double r){
        return 3.142*r*r;
    }
}
public class shapeArea{
    public static void main(String [] args){
        Scanner sc = new Scanner(System.in);
        Area A = new Area();
        int n=0;
        System.out.println("Enter 1 for Rectangle Area , 2
for Square Area , 3 for Circle Area, or 0 to exit");
        n = sc.nextInt();
        for(int i=4;i>0;i--){
            System.out.print("Enter the Sides of
Rectangle\n");
            int  x = sc.nextInt();
            int  y = sc.nextInt();
            System.out.println();
            System.out.println("Area of Rectangle is : \n" +
A.RectangleArea(x,y));
            System.out.println();
        }
        for(int i=5;i>0;i--){
            System.out.print("Enter the Side Of Square \n");
            int  c = sc.nextInt();
            System.out.println();
            System.out.println("Area of Square is : \n" +
A.SquareArea(c));
        }
        for(int i=2;i>0;i--){
            System.out.print("Enter the Radius of Circle
\n");
            int  d = sc.nextInt();
            System.out.println();
            System.out.println("Area of Circlee is : \n" +
A.CircleArea(d));
        }
    }
}
```

RESULT:

```
Area of Rectangle is :
12.0

Enter the Sides of Rectangle
5 6

Area of Rectangle is :
30.0

Enter the Sides of Rectangle
24 77

Area of Rectangle is :
1848.0

Enter the Sides of Rectangle
4 55

Area of Rectangle is :
220.0

Enter the Side Of Square
6

Area of Square is :
36.0
Enter the Side Of Square
```

```
Enter the Side Of Square
45

Area of Square is :
2025.0
Enter the Side Of Square
67

Area of Square is :
4489.0
Enter the Side Of Square
33

Area of Square is :
1089.0
Enter the Side Of Square
2

Area of Square is :
4.0
Enter the Radius of Circle
5

Area of Circlee is :
78.55
Enter the Radius of Circle
3
Area of Circlee is :
78.55
Enter the Radius of Circle
3

Area of Circlee is :
28.278

Process finished with exit code 0
```