Aim:

Define an interface "Geometric Shape" with methods area() and perimeter() (Both method's return type and parameter list should be void and empty respectively.)

Define classes like Triangle, Rectangle, and Circle implementing the "Geometric Shape" interface and calculate the area and perimeter of the respective Triangle, Rectangle, and Circle and also define the "Execute Main" class which includes the main method to test the above class. Prompt the user to enter the choice to select a shape and dimensions like length l, breadth b, side s, and radius r of each shape as required.

Note: For the value of π, utilize the Math.PI constant.

Constraint:
- $1 \leq l \leq 100$
- $1 \leq b \leq 100$
- $1 \leq s \leq 100$
- $1 \leq r \leq 100$

Input Format:
- The first line of the input consists of a number representing the choice to select a shape (integer).
- The next line of the input consists of the dimensions of the shape respectively.

Output Format:
- The first line of the output represents the area of the selected shape (float).
- The second line of the output represents the perimeter of the selected shape (float).

Source Code:

ExecuteMain.java

```java
import java.io.*;
import java.util.*;
class ExecuteMain {
    public static Scanner s=new Scanner(System.in);
    public static void main(String args[]) {
        System.out.println("Choose a geometric shape:");
        System.out.println("1.Triangle");
        System.out.println("2.Rectangle");
        System.out.println("3.Circle");
        System.out.println("Enter your choice:");
        int choice = s.nextInt();
        GeometricShape g;
        if(choice == 1) {
            g=new Triangle();
            g.area();
            g.perimeter();
        }
        else if(choice == 2) {
            g=new Rectangle();
            g.area();
            g.perimeter();
```

```java
        }
        else if(choice == 3) {
            g=new Circle();
            g.area();
            g.perimeter();
        }
        else {
            System.out.println("Invalid choice");
        }
    }
}
interface GeometricShape {
    void area();
    void perimeter();
}
class Triangle implements GeometricShape {
    int a,b,c;
    double p;
    Scanner s = new Scanner(System.in);
    Triangle() {
        System.out.println("Enter lengths of the three sides of Triangle:");
        a = s.nextInt();
        b = s.nextInt();
        c = s.nextInt();
    }
    public void area() {
        double s,d;
        s = (a+b+c)/2.0;
        d = (s-a)*(s-b)*(s-c);
        p = a+b+c;
        double area = Math.sqrt(s*d);
        System.out.println("Area of Triangle:"+area);
    }
    public void perimeter() {
        System.out.println("Perimeter of Triangle:"+p);
    }
}
class Rectangle implements GeometricShape {
    double l,b;
    Scanner s = new Scanner(System.in);
    Rectangle() {
        System.out.println("Enter length and breadth of Rectangle:");
        l = s.nextDouble();
        b = s.nextDouble();
    }
    public void area() {
        double area = l*b;
        System.out.println("Area of Rectangle:"+area);
    }
    public void perimeter() {
        System.out.println("Perimeter of Rectangle:"+(2.0*(l+b)));
    }
}
class Circle implements GeometricShape {
    double radius;
    Scanner s = new Scanner(System.in);
```

```
   Circle() {
      System.out.println("Enter radius of Circle:");
      radius = s.nextDouble();
   }
   public void area() {
      System.out.println("Area of Circle:"+((Math.PI)*radius*radius));
   }
   public void perimeter() {
      System.out.println("Circumference of Circle:"+(2.0*(Math.PI)*radius));
   }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Choose a geometric shape: 1
1.Triangle 1
2.Rectangle 1
3.Circle 1
Enter your choice: 1
Enter lengths of the three sides of Triangle: 3 4 5
Area of Triangle:6.0
Perimeter of Triangle:12.0

Test Case - 2
User Output
Choose a geometric shape: 2
1.Triangle 2
2.Rectangle 2
3.Circle 2
Enter your choice: 2
Enter length and breadth of Rectangle: 10 20
Area of Rectangle:200.0
Perimeter of Rectangle:60.0

Test Case - 3
User Output
Choose a geometric shape: 3
1.Triangle 3
2.Rectangle 3
3.Circle 3
Enter your choice: 3
Enter radius of Circle: 6
Area of Circle:113.09733552923255
Circumference of Circle:37.69911184307752

Test Case - 4
User Output

Choose a geometric shape: 5
1.Triangle 5
2.Rectangle 5
3.Circle 5
Enter your choice: 5
Invalid choice