Experiment No : 7

PRN : 22UAI021

Title: Write a program to implement mathematical package for arithmetic, statistical and trigonometric operations.

Program :

```
package MyMath;

public class Arithmetic {

    // Method for addition of two float values
    public float add(float a, float b) {
        return a + b;
    }

    // Method for subtraction of two float values
    public float subtract(float a, float b) {
        return a - b;
    }

    // Method for multiplication of two float values
    public float multiply(float a, float b) {
        return a * b;
```

```java
    }

    // Method for division of two float values
    public float divide(float a, float b) {
        if (b == 0) {
            throw new ArithmeticException("Division by zero is not
allowed.");
        }
        return a / b;
    }
}




package MyMath;

public class Stat {

    // Method to get the minimum value from an array of floats
    public float min(float[] values) {
        float min = values[0];
        for (float value : values) {
            if (value < min) {
                min = value;
```

```java
        }
    }
    return min;
}


// Method to get the maximum value from an array of floats
public float max(float[] values) {
    float max = values[0];
    for (float value : values) {
        if (value > max) {
            max = value;
        }
    }
    return max;
}


// Method to count the number of elements in an array
public int count(float[] values) {
    return values.length;
}


// Method to get the sum of elements in an array
public float sum(float[] values) {
    float sum = 0;
```

```java
        for (float value : values) {

            sum += value;

        }

        return sum;

    }


    // Method to calculate the average of elements in an array

    public float average(float[] values) {

        return sum(values) / count(values);

    }

}
```

```java
package MyMath;

public class Trig {

    private double angle; // Angle in degrees


    // Constructor to initialize the angle

    public Trig(double angle) {

        this.angle = angle;

    }
```

```java
    // Convert degrees to radians
    private double toRadians() {
        return Math.toRadians(angle);
    }

    // Method to get sine of the angle
    public double getSine() {
        return Math.sin(toRadians());
    }

    // Method to get cosine of the angle
    public double getCosine() {
        return Math.cos(toRadians());
    }

    // Method to get tangent of the angle
    public double getTangent() {
        return Math.tan(toRadians());
    }

    // Method to get secant of the angle
    public double getSecant() {
        return 1 / Math.cos(toRadians());
    }
```

```java
    // Method to get cosecant of the angle
    public double getCosecant() {
        return 1 / Math.sin(toRadians());
    }


    // Method to get cotangent of the angle
    public double getCotangent() {
        return 1 / Math.tan(toRadians());
    }
}




import MyMath.Trig;
import MyMath.Arithmetic;
import MyMath.Stat;

public class PackDemo {
    public static void main(String[] args) {
        // Demonstrating Trig operations
        Trig trig = new Trig(45); // Angle in degrees
        System.out.println("Sine of 45 degrees: " + trig.getSine());
        System.out.println("Cosine of 45 degrees: " + trig.getCosine());
```
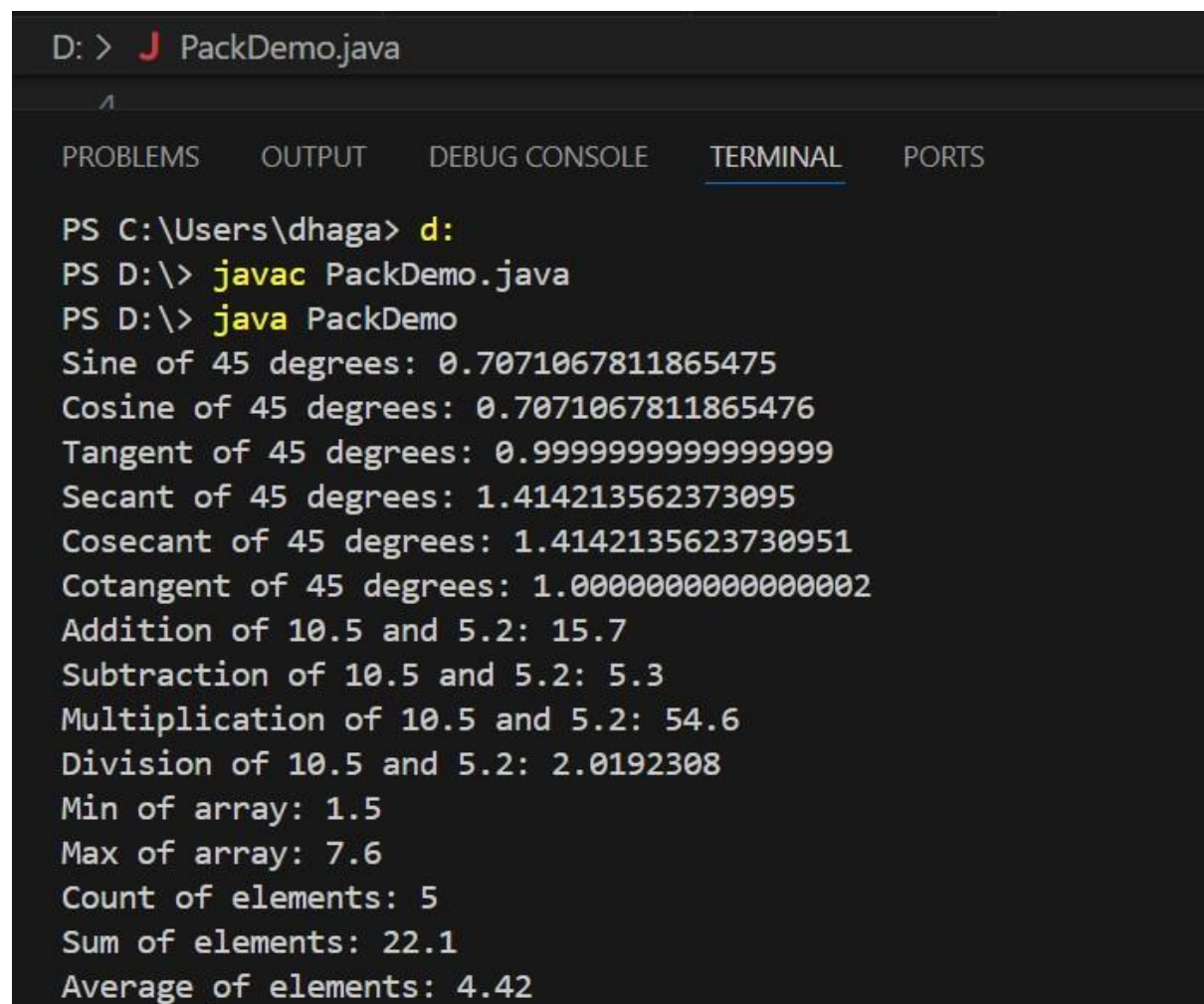
```java
        System.out.println("Tangent of 45 degrees: " + trig.getTangent());

        System.out.println("Secant of 45 degrees: " + trig.getSecant());

        System.out.println("Cosecant of 45 degrees: " +
trig.getCosecant());

        System.out.println("Cotangent of 45 degrees: " +
trig.getCotangent());


        // Demonstrating Arithmetic operations

        Arithmetic arithmetic = new Arithmetic();

        float a = 10.5f, b = 5.2f;

        System.out.println("Addition of " + a + " and " + b + ": " +
arithmetic.add(a, b));

        System.out.println("Subtraction of " + a + " and " + b + ": " +
arithmetic.subtract(a, b));

        System.out.println("Multiplication of " + a + " and " + b + ": " +
arithmetic.multiply(a, b));

        System.out.println("Division of " + a + " and " + b + ": " +
arithmetic.divide(a, b));


        // Demonstrating Stat operations

        Stat stat = new Stat();

        float[] numbers = {1.5f, 2.3f, 4.8f, 7.6f, 5.9f};

        System.out.println("Min of array: " + stat.min(numbers));

        System.out.println("Max of array: " + stat.max(numbers));

        System.out.println("Count of elements: " + stat.count(numbers));
```

```java
        System.out.println("Sum of elements: " + stat.sum(numbers));

        System.out.println("Average of elements: " +
stat.average(numbers));

    }

}
```

Output :