

Name-Vedant Ulhe

Batch-AIML-B2

Assignment 1

Main.java

```
package Assign1;
```

```
public class Main {  
    public static void main(String[] args) {  
        // Create an instance of UserInput to handle user input  
        UserInput userInput = new UserInput();  
  
        // Get the user's choice of operation  
        String choice = userInput.getStringInput("Choose Operation: +, -, /, *, ^, var, stddev, avg");  
  
        // Check if the chosen operation is a basic arithmetic operation (+, -, *, /, ^)  
        if (choice.equals("+") || choice.equals("-") || choice.equals("*") || choice.equals("/") ||  
            choice.equals("^")) {  
            // Get user input for two numbers  
            double n1 = userInput.getDoubleInput("Enter First Number:");  
            double n2 = userInput.getDoubleInput("Enter Second Number:");  
            userInput.closeScanner(); // Close the scanner since input is complete  
  
            // Perform the chosen operation and display the result  
            if (choice.equals("+")) {  
                System.err.println(Calculator.add(n1, n2));  
            } else if (choice.equals("-")) {  
                System.err.println(Calculator.subtract(n1, n2));  
            } else if (choice.equals("*")) {  
                System.err.println(Calculator.multiply(n1, n2));  
            }  
        }  
    }  
}
```

```

    } else if (choice.equals("/")) {
        System.out.println(Calculator.divide(n1, n2));
    } else if (choice.equals("^")) {
        System.out.println(Calculator.power(n1, n2));
    } else {
        System.out.println("Invalid Operation");
    }
} else {
    // For statistical operations (var, stddev, avg), get an array input
    double[] arr = userInput.getArrayInput();
    userInput.closeScanner(); // Close the scanner since input is complete

    // Perform the chosen statistical operation and display the result
    if (choice.equals("var")) {
        System.out.println(Calculator.variance(arr));
    } else if (choice.equals("stddev")) {
        System.out.println(Calculator.stddev(arr));
    } else if (choice.equals("avg")) {
        System.out.println(Calculator.mean(arr));
    } else {
        System.out.println("Invalid Operation");
    }
}
}
}

```

Input.java

// UserInput.java

package Assign1;

import java.util.Scanner;

```
public class UserInput {  
    // Scanner object for reading input  
    private Scanner scanner;  
  
    // Constructor initializes the Scanner  
    public UserInput() {  
        scanner = new Scanner(System.in);  
    }  
  
    // Method to get a double input from the user with a prompt message  
    public double getDoubleInput(String message) {  
        System.out.println(message);  
        return scanner.nextDouble();  
    }  
  
    // Method to get a string input from the user with a prompt message  
    public String getStringInput(String message) {  
        System.out.println(message);  
        return scanner.nextLine();  
    }  
  
    // Method to get an array input from the user with a prompt message  
    public double[] getArrayInput() {  
        Scanner sc = new Scanner(System.in);  
  
        // Prompt user for the size of the array  
        System.out.println("Enter the size of the array:");  
        int size = sc.nextInt();  
  
        // Create an array to store the input elements
```

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double[] array = new double[size];

// Prompt user to enter each element of the array
System.out.println("Enter elements:");
for (int i = 0; i < size; i++) {
    // Check if the next input is a double
    if (sc.hasNextDouble()) {
        array[i] = sc.nextDouble();
    }
}
sc.close(); // Close the inner scanner
return array;
}

// Method to close the Scanner when it is no longer needed
public void closeScanner() {
    scanner.close();
}
}

```

Calculator.java

```

// Calculator.java
package Assign1;

import java.util.Arrays;

public class Calculator {
    // Method to add two numbers
    public static double add(double n1, double n2){

```

```
    return n1 + n2;  
}
```

```
// Method to subtract two numbers  
public static double subtract(double n1, double n2){  
    return n1 - n2;  
}
```

```
// Method to multiply two numbers  
public static double multiply(double n1, double n2){  
    return n1 * n2;  
}
```

```
// Method to divide two numbers  
public static double divide(double n1, double n2){  
    return n1 / n2;  
}
```

```
// Method to calculate the mean (average) of an array of numbers  
public static double mean(double[] arr){  
    return Arrays.stream(arr).sum() / arr.length;  
}
```

```
// Method to calculate the square root of a number  
public static double sqrt(double n){  
    return Math.pow(n, 0.5);  
}
```

```
// Method to calculate the standard deviation of an array of numbers  
public static double stddev(double[] arr){  
    double standardDeviation = 0.0;
```

```
// Calculate the sum of squared differences from the mean
for (double num : arr) {
    standardDeviation += Math.pow(num - mean(arr), 2);
}

// Calculate the square root of the average of squared differences
return Math.sqrt(standardDeviation / arr.length);
}

// Method to calculate the variance of an array of numbers
public static double variance(double[] arr){
    // Variance is the square root of the standard deviation
    return sqrt(stddev(arr));
}

// Method to calculate the power of a number raised to another number
public static double power(double n1, double n2){
    return Math.pow(n1, n2);
}
}
```