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Assignment - 1

Main file: package

Assign2; 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");
        }
    }
  }
}
```

Userinput file: package

Assign2;

import java.util.Scanner;

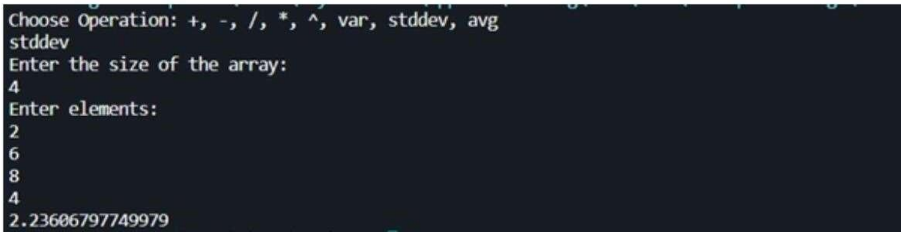
```
public class UserInput {
    // Scanner object for reading input private
    Scanner scanner;

    // 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 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 file: package
  Assign2;
 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);
    }
```

}

Output:


Choose Operation: +, -, /, *, ^, var, stddev, avg
stddev
Enter the size of the array:
4
Enter elements:
2
6
8
4
2.23606797749979