

RUSHIL SHAH
PROGRAMMING IN JAVA
AIML – B1
22070126091

```
package rushil;

public class assignment1 {
    public static void main(String[] args) {
        int n = 5;
        generateFibonacci(n);
    }

    public static void generateFibonacci(int n) {
        int firstTerm = 0, secondTerm = 1;

        System.out.println("Fibonacci Series for " + n + " terms:");

        for (int i = 0; i < n; i++) {
            System.out.print(firstTerm + " ");

            int nextTerm = firstTerm + secondTerm;
            firstTerm = secondTerm;
            secondTerm = nextTerm;
        }
    }
}
```

Output:

```
Fibonacci Series for 5 terms:
0 1 1 2 3
```

2. Calculator

```
/*Rushil Shah
AIML-B1
22070126091
*/
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
```

RUSHIL SHAH
PROGRAMMING IN JAVA
AIML – B1
22070126091

```
String choice = userInput.getStringInput("Choose Operation: +, -,
/, *, ^, var, stddev, avg");

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");
    }
}
}
```

```
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){
```

RUSHIL SHAH
PROGRAMMING IN JAVA
AIML – B1
22070126091

```
        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);
    }
}
```

```
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);
    }
}
```

RUSHIL SHAH
PROGRAMMING IN JAVA
AIML – B1
22070126091

```
// 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();
}
}
```

Output:

```
<terminated> Main (3) [Java Application] C:\Users\rushi\p2\pool\plugins\org.eclipse
Choose Operation: +, -, /, *, ^, var, stddev, avg
+
Enter First Number:
1
Enter Second Number:
1
2.0
```

Github Link : <https://github.com/rushil23448/Programming-in-Java.git>