

Assignment 1

Part1: Implement a menu-driven Java program (like fib or factorial) to implement these input methods in java. (command line args, Scanner, BufferedReader, DataInputStream, Console)

Code:

```
import java.io.*;
import java.util.Scanner;

public class InputMethodsMenu {
    public static void main(String[] args) throws IOException {
        BufferedReader br = new BufferedReader(new
InputStreamReader(System.in));
        DataInputStream dis = new DataInputStream(System.in);
        Console console = System.console();
        Scanner scanner = new Scanner(System.in);

        System.out.println("Select an input method: ");
        System.out.println("1. Command Line Arguments ");
        System.out.println("2. Scanner ");
        System.out.println("3. BufferedReader ");
        System.out.println("4. DataInputStream ");
        System.out.println("5. Console ");

        int choice = Integer.parseInt(br.readLine());

        switch (choice) {
            case 1:
                System.out.println("Enter data using command line
arguments: ");
                for (String arg : args) {
                    System.out.println(arg);
                }
                break;
            case 2:
                System.out.println("Enter data using Scanner: ");
                String inputScanner = scanner.nextLine();
                System.out.println("You entered: " + inputScanner);
                break;
            case 3:
                System.out.println("Enter data using BufferedReader: ");
                String inputBufferedReader = br.readLine();
                System.out.println("You entered: " + inputBufferedReader);
                break;
            case 4:
                System.out.println("Enter data using DataInputStream: ");
                String inputDataInputStream = dis.readLine();
                System.out.println("You entered: " + inputDataInputStream);
                break;
            case 5:
                if (console == null) {
                    System.out.println("Console is not available. ");
                    break;
                }
                System.out.println("Enter data using Console: ");
            
```

```

        String inputConsole = console.readLine();
        System.out.println("You entered: " + inputConsole);
        break;
    default:
        System.out.println("Invalid choice.");
    }

    //Closing
    br.close();
    dis.close();
}
}

```

Output:

Select an input method:

1. Command Line Arguments
 2. Scanner
 3. BufferedReader
 4. DataInputStream
 5. Console
- 2

Enter data using Scanner:

This is input using Scanner

You entered: This is input using Scanner

Select an input method:

1. Command Line Arguments
2. Scanner
3. BufferedReader
4. DataInputStream
5. Console

Enter data using BufferedReader:

This is input using BufferedReader

You entered: This is input using BufferedReader

Select an input method:

1. Command Line Arguments

2. Scanner

3. BufferedReader

4. DataInputStream

5. Console

Enter data using Console:

This is input using Console

You entered: This is input using Console

Part2: Implement a simple menu driven calculator in java to implement add, sub, mul, div, sqrt, power, mean, variance. Implement a separate Calculator class to include all related function inside that class. (Mean calculation: program reads numbers from the keyboard, summing them in the process until the user enters the string "end". It then stops input & displays the avg. of numbers)

Code:

```
import java.util.Scanner;

class Calculator {
    public static double add(double a, double b) {
        return a + b;
    }

    public static double subtract(double a, double b) {
        return a - b;
    }

    public static double multiply(double a, double b) {
        return a * b;
    }

    public static double divide(double a, double b) {
        if (b != 0) {
            return a / b;
        } else {
            System.out.println("Error: Cannot divide by zero.");
            return Double.NaN; // Not a Number
        }
    }

    public static double power(double base, double exponent) {
        return Math.pow(base, exponent);
    }

    public static double sqrt(double num) {
        return Math.sqrt(num);
    }

    public static double mean(double[] numbers) {
        double sum = 0;
        for (double num : numbers) {
            sum += num;
        }
        return sum / numbers.length;
    }

    public static double variance(double[] numbers) {
        double mean
            = mean(numbers);
        double sumSquaredDiff = 0;
        for (double num : numbers) {
            sumSquaredDiff += Math.pow(num - mean, 2);
        }
        return sumSquaredDiff / numbers.length;
    }
}

class CalculatorDemo {
    public static void main(String[] args) {
```

```

Scanner scanner = new Scanner(System.in);
Calculator calculator = new Calculator();

while (true) {
    System.out.println("Calculator Menu:");
    System.out.println("1. Add");
    System.out.println("2. Subtract");
    System.out.println("3. Multiply");
    System.out.println("4. Divide");
    System.out.println("5. Power");
    System.out.println("6. Square Root");
    System.out.println("7. Mean");
    System.out.println("8. Variance");
    System.out.println("9. Exit");

    System.out.print("Enter your choice: ");
    int choice = scanner.nextInt();

    if (choice == 9) {
        System.out.println("Exiting the calculator.");
        break;
    }

    double result;

    switch (choice) {
        case 1:
            System.out.print("Enter first number: ");
            double addA = scanner.nextDouble();
            System.out.print("Enter second number: ");
            double addB = scanner.nextDouble();
            result = Calculator.add(addA, addB);
            break;

        case 2:
            System.out.print("Enter first number: ");
            double subA = scanner.nextDouble();
            System.out.print("Enter second number: ");
            double subB = scanner.nextDouble();
            result = Calculator.subtract(subA, subB);
            break;

        case 3:
            System.out.print("Enter first number: ");
            double mulA = scanner.nextDouble();
            System.out.print("Enter second number: ");
            double mulB = scanner.nextDouble();
            result = Calculator.multiply(mulA, mulB);
            break;

        case 4:
            System.out.print("Enter numerator: ");
            double divA = scanner.nextDouble();
            System.out.print("Enter denominator: ");
            double divB = scanner.nextDouble();
            result = Calculator.divide(divA, divB);
            break;

        case 5:
            System.out.print("Enter base: ");
            double base = scanner.nextDouble();

```

```

        System.out.print("Enter exponent: ");
        double exponent = scanner.nextDouble();
        result = Calculator.power(base, exponent);
        break;

    case 6:
        System.out.print("Enter number: ");
        double sqrtNum = scanner.nextDouble();
        result = Calculator.sqrt(sqrtNum);
        break;

    case 7:
        System.out.print("Enter the count of numbers: ");
        int count = scanner.nextInt();
        double[] meanNumbers = new double[count];
        System.out.println("Enter numbers:");
        for (int i = 0; i < count; i++) {
            meanNumbers[i] = scanner.nextDouble();
        }
        result = Calculator.mean(meanNumbers);
        break;

    case 8:
        System.out.print("Enter the count of numbers: ");
        int varCount = scanner.nextInt();
        double[] varNumbers = new double[varCount];
        System.out.println("Enter numbers:");
        for (int i = 0; i < varCount; i++) {
            varNumbers[i] = scanner.nextDouble();
        }
        result = Calculator.variance(varNumbers);
        break;

    default:
        System.out.println("Invalid choice. Please choose a
valid option.");
        continue;
    }

    System.out.println("Result: " + result);
}

scanner.close();
}

```

Output:

Calculator Menu:

1. Add
2. Subtract
3. Multiply
4. Divide
5. Power

6. Square Root

7. Mean

8. Variance

9. Exit

Enter your choice: 3

Enter first number: 3

Enter second number: 3

Result: 9.0

Enter your choice: 6

Enter number: 256

Result: 16.0

Enter your choice: 8

Enter the count of numbers: 3

Enter numbers:

12

55

17

Result: 368.6666666666667

Enter your choice: 7

Enter the count of numbers: 5

Enter numbers:

12

14

16

33

19

Result: 18.8

GitHub Repository Link: <https://github.com/DeekshaM7/JavaPrograms>

