Java Lab 1

Assignment 1

PRN: 21070126039 *Name: Jainil Patel* *Batch: AI/ML A2*

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:

```
/*
Date : 12-01-2021
Lab Assignment 1 - Part 1
PRN : 21070126039
Name : Jainil Patel
Batch : AIML A2

Problem Statement : Implement a menu-driven Java program Factorial to
                    implement these input methods in java (command line args, Scanner,
                    BufferedReader, DataInputStream, Console )
*/

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

public class Factorial
{
    public static void main(String[] args) throws IOException,
ArrayIndexOutOfBoundsException
    {

        Scanner sc = new Scanner(System.in);
        int num = 0;

        // Check if a command line argument is provided
        try {
            num = Integer.parseInt(args[0]);
        } catch (Exception ignored) {
        }

        // Print menu to choose input method
        System.out.println("Menu (taking input):");
        System.out.println("1. Use command line");
        System.out.println("2. Use Scanner");
        System.out.println("3. Use BufferedReader");
        System.out.println("4. Use DataInputStream");
        System.out.println("5. Use Console");
        System.out.println("6. Exit");

        System.out.print("Enter your choice :");

        int choice = new Scanner(System.in).nextInt() ;

        Input input = new Input();


        // Choose input method based on user's choice
        switch (choice) {
            case 1:

                System.out.println("Using Command line");
                System.out.print("Enter the number :");

                break;
            case 2:
                System.out.println("Using Scanner");
                System.out.print("Enter the number :");
```

```
                num = input.usingScanner();
                break;
            case 3:
                System.out.println("Using BufferedReader");
                System.out.print("Enter the number :");

                num = input.usingBufferedReader();
                break;
            case 4:
                System.out.println("Using DataInputStream");
                System.out.print("Enter the number :");

                num = input.usingDataInputStream();
                break;
            case 5:
                System.out.println("Using Console");
                System.out.print("Enter the number :");

                num = input.usingConsole();
                break;
            case 6:
                System.out.println("Exitting ...");
                System.exit(0);
                break;
            default:
                System.out.println("Invalid choice. Please try again.");
                break;
        }


        // Calculate factorial
        int output = factorial(num);
        // Print the result
        System.out.println("The factorial of " + num + ":" + output);
    }

    // Factorial function (ternary operator)
    static int factorial(int n) {
        return n == 0 ? 1 : n * factorial(n - 1);
    }
}

class Input
{
    // using Scanner
    int usingScanner ()
    {
        return new Scanner(System.in).nextInt() ;

    }

    // using BufferedReader
    int usingBufferedReader () throws IOException
    {

        BufferedReader reader = new BufferedReader(new InputStreamReader(System.in)) ;
        return Integer.parseInt(reader.readLine()) ;
    }

    // using DataInputStream
    int usingDataInputStream () throws IOException
    {
        // Create data input stream

        DataInputStream dis = new DataInputStream(System.in);
        return (Integer.parseInt(dis.readLine()));
    }

    // using Console
```

```
    int usingConsole ()
    {

        Console console = System.console();
        return Integer.parseInt(console.readLine());
    }

}
```

Output (Test Cases):

```
Menu (taking input):
1. Use command line
2. Use Scanner
3. Use BufferedReader
4. Use DataInputStream
5. Use Console
6. Exit
Enter your choice :2
Using Scanner
Enter the number :4
The factorial of 4:24

Menu (taking input):
1. Use command line
2. Use Scanner
3. Use BufferedReader
4. Use DataInputStream
5. Use Console
6. Exit
Enter your choice :3
Using BufferedReader
Enter the number :6
The factorial of 6:720

Menu (taking input):
1. Use command line
2. Use Scanner
3. Use BufferedReader
4. Use DataInputStream
5. Use Console
6. Exit
Enter your choice :4
Using DataInputStream
Enter the number :7
The factorial of 7:5040
```

```
PS C:\Users\Jainil Patel\Desktop\SIT\TY\Java\Lab_1\src> javac Factorial.java
PS C:\Users\Jainil Patel\Desktop\SIT\TY\Java\Lab_1\src> java Factorial 8
Menu (taking input):
1. Use command line
2. Use Scanner
3. Use BufferedReader
4. Use DataInputStream
5. Use Console
6. Exit
Enter your choice :1
Using Command line
Enter the number :The factorial of 8:40320
```

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:

```
/*
Date : 12-01-2021
Lab Assignment 1 - Part 2
PRN : 21070126039
Name : Jainil Patel
Batch : AIML A2

Problem Statement : 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 thatclass.(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)

*/

//Importing
import java.util.Scanner;


//Main class
public class SimpleCalculator
{
    public static void main(String[] args)              //Main method
    {
        Calculator calculator = new Calculator() ;          //Creating object of class
Calculator
        calculator.calculation();                           //Calling method calculation()
    }
}


//Class Calculator
class Calculator {
     void calculation()                                                  //Method calculation()
     {
        Scanner sc = new Scanner(System.in);

        while (true)
        {
            System.out.println("Menu:");                                        //Menu
            System.out.println("1. Addition");
            System.out.println("2. Subtraction");
            System.out.println("3. Multiplication");
            System.out.println("4. Division");
            System.out.println("5. Square Root");
            System.out.println("6. Power");
            System.out.println("7. Mean");
            System.out.println("8. Variance");
            System.out.println("9. Exit");
            System.out.print("Enter your choice: ");
            int choice = sc.nextInt();

            switch (choice)                                                     //Switch
Case
            {
                case 1:
//Addition
                    System.out.println("Addition");
                    System.out.print("Enter first number: ");
```

```
                    double num1 = sc.nextDouble();
                    System.out.print("Enter second number: ");
                    double num2 = sc.nextDouble();
                    System.out.println("Result: " + (num1 + num2));
                    break;
                case 2:
//Subtraction
                    System.out.println("Subtraction");
                    System.out.print("Enter first number: ");
                    num1 = sc.nextDouble();
                    System.out.print("Enter second number: ");
                    num2 = sc.nextDouble();
                    System.out.println("Result: " + (num1 - num2));
                    break;
                case 3:
//Multiplication
                    System.out.println("Multiplication");
                    System.out.print("Enter first number: ");
                    num1 = sc.nextDouble();
                    System.out.print("Enter second number: ");
                    num2 = sc.nextDouble();
                    System.out.println("Result: " + (num1 * num2));
                    break;
                case 4:
//Division
                    System.out.println("Division");
                    System.out.print("Enter first number: ");
                    num1 = sc.nextDouble();
                    System.out.print("Enter second number: ");
                    num2 = sc.nextDouble();
                    System.out.println("Result: " + (num1 / num2));
                    break;
                case 5:
//Square Root
                    System.out.println("Square Root");
                    System.out.print("Enter number: ");
                    num1 = sc.nextDouble();
                    System.out.println("Result: " + Math.sqrt(num1));
                    break;
                case 6:                                                    //Power
                    System.out.println("Power");
                    System.out.print("Enter base: ");
                    num1 = sc.nextDouble();
                    System.out.print("Enter exponent: ");
                    int exponent = sc.nextInt();
                    System.out.println("Result: " + Math.pow(num1, exponent));
                    break;
                case 7:                                                    //Mean
                    System.out.println("Mean");
                    double sum = 0;
                    int count = 0;
                    String input;
                    System.out.println("Enter numbers one by one, enter 'end' to stop
input:");
                    while (true) {
                        input = sc.next();
                        if (input.equalsIgnoreCase("end")) {
                            break;
                        }
                        sum += Double.parseDouble(input);
                        count++;
                    }
                    System.out.println("Mean: " + (sum / count));
                    break;
                case 8:
//Variance
                    System.out.println("Variance");
                    sum = 0;
                    count = 0;
                    double mean = 0;
```

```
                    double variance = 0;
                    System.out.println("Enter numbers one by one, enter 'end' to stop
input:");
                    while (true) {
                        input = sc.next();
                        if (input.equalsIgnoreCase("end")) {
                            break;
                        }
                        double num = Double.parseDouble(input);
                        sum += num;
                        count++;
                    }
                    mean = sum / count;
                    sc = new Scanner(System.in);
                    System.out.println("Enter numbers one by one, enter 'end' to stop
input:");
                    while (true) {
                        input = sc.next();
                        if (input.equalsIgnoreCase("end")) {
                            break;
                        }
                        double num = Double.parseDouble(input);
                        variance += Math.pow((num - mean), 2);
                    }
                    variance = variance / count;
                    System.out.println("Variance: " + variance);
                    break;
                case 9:                                                    //Exit
                    System.out.println("Exiting...");
                    System.exit(0);
                    break;
                default:                                                   //Invalid choice
                    System.out.println("Invalid choice!");
                    break;
            }
        }
    }
}
```

Output (Test Cases):

File - SimpleCalculator

```
"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent
:C:\Program Files\JetBrains\IntelliJ IDEA Community
Edition 2022.3.1\lib\idea_rt.jar=62538:C:\Program Files
\JetBrains\IntelliJ IDEA Community Edition 2022.3.1\bin
" -Dfile.encoding=UTF-8 -Dsun.stdout.encoding=UTF-8 -
Dsun.stderr.encoding=UTF-8 -classpath "C:\Users\Jainil
Patel\Desktop\SIT\TY\Java\Lab_1\out\production\Lab_1"
SimpleCalculator
Menu:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Square Root
6. Power
7. Mean
8. Variance
9. Exit
Enter your choice: 1
Addition
Enter first number: 88
Enter second number: 22
Result: 110.0
Menu:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Square Root
6. Power
7. Mean
8. Variance
9. Exit
Enter your choice: 2
Subtraction
Enter first number: 99
Enter second number: -1
Result: 100.0
Menu:
1. Addition
2. Subtraction
```

```
3. Multiplication
4. Division
5. Square Root
6. Power
7. Mean
8. Variance
9. Exit
Enter your choice: 3
Multiplication
Enter first number: 88
Enter second number: .8
Result: 70.4
Menu:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Square Root
6. Power
7. Mean
8. Variance
9. Exit
Enter your choice: 4
Division
Enter first number: 9
Enter second number: 5
Result: 1.8
Menu:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Square Root
6. Power
7. Mean
8. Variance
9. Exit
Enter your choice: 5
Square Root
Enter number: 529
Result: 23.0
```

```
Menu:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Square Root
6. Power
7. Mean
8. Variance
9. Exit
Enter your choice: 6
Power
Enter base: 5
Enter exponent: 3
Result: 125.0
Menu:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Square Root
6. Power
7. Mean
8. Variance
9. Exit
Enter your choice: 7
Mean
Enter numbers one by one, enter 'end' to stop input:
6
7
3
4
6
end
Mean: 5.2
Menu:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Square Root
```

```
6. Power
7. Mean
8. Variance
9. Exit
Enter your choice: 8
Variance
Enter numbers one by one, enter 'end' to stop input:
2
3
4
5
6
1
end
Enter numbers one by one, enter 'end' to stop input:
2
4
7
8
5
6
end
Variance: 7.25
Menu:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Square Root
6. Power
7. Mean
8. Variance
9. Exit
Enter your choice: 9
Exiting...

Process finished with exit code 0
```


GitHub Repository: https://github.com/astro215/SIT/tree/main/Java%20Lab/Lab%201