Assignment 1

Part 1: Implement a menu-driven Java program (like fib or factorial) to implement these input methods in java (command line args, Scanner, BufferedReader, DataInputStream, Console).

Github Link: https://github.com/manan3044/Assignment_1

Code

1) Main.java

```
package Assignment1P1;

public class Main {
    public static void main(String[] args) {
        input inp = new input();
        factorial fact = new factorial();

        boolean run = true;
        int choice;
        int number;
        long result;

        do{
            System.out.print("\n\nWhich input method do you want to use:
\n1.Scanner\n2.BufferedReader\n3.DataInputStream\n4.Console\n5.Exit\n=");
            choice = inp.inputChoice();

            switch (choice)
            {
                case 1:
                    number = inp.scannerInput();
                    result = fact.calc(number);
                    System.out.print("The Factorial of " + number + "=
"+result);
                    break;

                case 2:
                    number = inp.bufferedReaderInput();
                    result = fact.calc(number);
                    System.out.print("The Factorial of " + number + "=
"+result);
                    break;

                case 3:
                    number = inp.dataInputStream();
                    result = fact.calc(number);
                    System.out.print("The Factorial of " + number + " =
"+result);
                    break;
```

```
                case 4:
                    number = inp.consoleInput();
                    result = fact.calc(number);
                    System.out.print("The Factorial of " + number + " =
"+result);
                    break;

                case 5:
                    run = false;
                    System.out.println("Thank you for using.");
                    break;

                default:
                    System.out.println("Invalid Choice");
            }

        }while(run);
    }
}
```

2)input.java

```
package Assignment1P1;

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

public class input {
    Scanner sc = new Scanner(System.in);
    public int inputChoice()
    {
        return sc.nextInt();
    }


    public int scannerInput()
    {
        System.out.print("Enter a number: ");
        return sc.nextInt();
    }


    public int bufferedReaderInput()
    {
        BufferedReader reader = new BufferedReader(new
InputStreamReader(System.in));

        try {
            System.out.print("Enter a number: ");
            String inpStr = reader.readLine();
            return Integer.parseInt(inpStr);
        }

        catch (IOException e)
        {
            return 0;
        }
    }
```

```
    public int dataInputStream()
    {
        DataInputStream dis = new DataInputStream(System.in);

        try
        {
            System.out.print("Enter a number: ");
            String inpStr = dis.readLine();
            return Integer.parseInt(inpStr);

        } catch (IOException e)
        {
            System.out.println("123");
            return  0;
        }
    }

    public int consoleInput() {
        Console console = System.console();
        if (console == null) {
            System.out.println("No console available");
            return 0;
        }
        String str = console.readLine("Enter a number: ");

        return Integer.parseInt(str);
    }

}
```

3)factorial.java

```
package Assignment1P1;

public class factorial {
    public long calc(long num)
    {
        if (num == 0 || num == 1)
        {
            return 1;
        }
        else {
            return num*calc(num-1);
        }
    }
}
```

Output

```
Which input method do you want to use:
1.Scanner
2.BufferedReader
3.DataInputStream
4.Console
5.Exit
=1
Enter a number: 4
The Factorial of 4= 24

Which input method do you want to use:
1.Scanner
2.BufferedReader
3.DataInputStream
4.Console
5.Exit
=2
Enter a number: 6
The Factorial of 6= 720

Which input method do you want to use:
1.Scanner
2.BufferedReader
3.DataInputStream
4.Console
5.Exit
=3
Enter a number: 8
The Factorial of 8 = 40320
```

```
Menu:
1. BufferedReader
2. Scanner
3. DataInputStream
4. Console
5. Exit
Enter your choice: 4
Enter a number: 5
The Factorial of 5 = 120
```

```
Which input method do you want to use:
1.Scanner
2.BufferedReader
3.DataInputStream
4.Console
5.Exit
=5
Thank you for using.

Process finished with exit code 0
```

Part 2: Implement a simple menu driven calculator in java to implement add, sub, multiplication, 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:

1)Main.java

```
package Assignment1P2;

public class Main
{
    public static void main(String[] args) {
        input inp = new input();
        calculator calc = new calculator();

        double[] nos = new double[2];
        int choice;
        boolean run = true;

        do{
            System.out.print("\n\nWhich operation do you want to perform:
\n1.Addition\n2.Subtraction\n3.Multiplication\n4.Division\n5.Power\n6.Squar
e\n7.Mean\n8.Variance\n9.Exit\n=");
            choice = inp.inputChoice();

            switch (choice)
            {
                case 1:
                    nos = inp.inputNumbers();
                    double sum = calc.add(nos[0], nos[1]);
                    System.out.println("Sum of " + nos[0] + " and " +
nos[1] + " = " + sum);
                    break;

                case 2:
                    nos = inp.inputNumbers();
                    double sub = calc.subtract(nos[0], nos[1]);
                    System.out.println("Difference of " + nos[0] + " and "
+ nos[1] + " = " + sub);
                    break;

                case 3:
                    nos = inp.inputNumbers();
                    double multiply = calc.multiply(nos[0], nos[1]);
                    System.out.println("Multiplication of " + nos[0] + "
and " + nos[1] + " = " + multiply);
                    break;

                case 4:
                    nos = inp.inputNumbers();
                    double div = calc.divide(nos[0], nos[1]);
                    System.out.println("Division of " + nos[0] + " and " +
nos[1] + " = " + div);
                    break;
```

```
                case 5:
                    double no = inp.inputNumber();
                    double srt = calc.srt(no);
                    System.out.println("Square Root of " + no + " = " +
srt);
                    break;

                case 6:
                    nos = inp.inputNumbers();
                    double power = calc.power(nos[0], nos[1]);
                    System.out.println(nos[0] + " power " + nos[1] + " = "
+ power);
                    break;

                case 7:
                    nos = inp.inputString();
                    double mean = calc.mean(nos);
                    System.out.println("Mean of numbers = " + mean);
                    break;

                case 8:
                    nos = inp.inputString();
                    double var = calc.variance(nos);
                    System.out.println("Variance of numbers = " + var);
                    break;

                case 9:
                    System.out.println("\nTHANK YOU FOR USING");
                    run = false;
                    break;

                default:
                    System.out.println("\nInvalid Operation");
            }
        }while(run);
    }
}
```

2)input.java

```
package Assignment1P2;
import java.util.Scanner;

public class input {
    public int inputChoice()
    {
        Scanner sc = new Scanner(System.in);
        return sc.nextInt();
    }
    public double inputNumber() {
        Scanner sc = new Scanner(System.in);

        System.out.print("Enter a number: ");
        return sc.nextDouble();
    }

    public double[] inputNumbers() {

        double[] numbers = new double[2];
```

```
        Scanner sc = new Scanner(System.in);

        System.out.print("Enter First Number: ");
        numbers[0] = sc.nextDouble();
        System.out.print("Enter Second Number: ");
        numbers[1] = sc.nextDouble();

        return numbers;
    }

    public double[] inputString()
    {
        Scanner s = new Scanner(System.in);
        int count=0;

        double[] d2 = new double[20];

        do {
            System.out.print("Enter your number: ");
            String str = s.next();
            if (str.equals("end")) {
                break;
            } else {

                double num = Double.parseDouble(str);
                d2[count] = num;
                count++;
            }
        }
        while(true);

        return d2;
    }
}
```

3)calculator.java

```
package Assignment1P2;

public class calculator
{
    public double add(double n1, double n2)
    {
        return n1+n2;
    }

    public double subtract(double n1, double n2)
    {
        return n1-n2;
    }

    public double multiply(double n1, double n2)
    {
        return n1*n2;
    }

    public double divide(double n1, double n2)
    {
        return n1/n2;
    }
```

```
    public double srt(double n1) {
        return Math.sqrt(n1);
    }

    public double power(double n1, double n2)
    {
        return Math.pow(n1,n2);
    }

    public double mean(double[] nums)
    {
        int count = 0;
        double sum = 0;

        for (int i=0; i < nums.length; i++)
        {
            if (nums[count] != 0.0)
            {
            sum = sum + nums[count];
            count++; }
        }
        return sum/count;
    }

    public double variance(double[] nums)
    {
        int count = 0;
        double var = 0;

        double mean = mean(nums);

        for (int i=0; i < nums.length; i++)
        {
            if (nums[count] != 0.0)
            {
                double sub = nums[count] - mean;
                var += power(sub,2.0);
                count++;
            }
        }
        var = var/(count-1);

        return var;
    }
}
```

Output

```
Which operation do you want to perform:
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Power
6.Square
7.Mean
8.Variance
9.Exit
=1
Enter First Number: 34
Enter Second Number: 69
Sum of 34.0 and 69.0 = 103.0


Which operation do you want to perform:
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Power
6.Square
7.Mean
8.Variance
9.Exit
=2
Enter First Number: 420
Enter Second Number: 20
Difference of 420.0 and 20.0 = 400.0
```

```
Which operation do you want to perform:
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Power
6.Square
7.Mean
8.Variance
9.Exit
=3
Enter First Number: 23
Enter Second Number: 3
Multiplication of 23.0 and 3.0 = 69.0


Which operation do you want to perform:
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Power
6.Square
7.Mean
8.Variance
9.Exit
=4
Enter First Number: 100
Enter Second Number: 5
Division of 100.0 and 5.0 = 20.0
```

```
Which operation do you want to perform:
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Power
6.Square Root
7.Mean
8.Variance
9.Exit
=5
Enter First Number: 2
Enter Second Number: 4
2.0 power 4.0 = 16.0


Which operation do you want to perform:
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Power
6.Square Root
7.Mean
8.Variance
9.Exit
=6
Enter a number: 144
Square Root of 144.0 = 12.0
```

```
Which operation do you want to perform:
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Power
6.Square Root
7.Mean
8.Variance
9.Exit
=8
Enter your number: 3
Enter your number: 4
Enter your number: 5
Enter your number: 6
Enter your number: 1
Enter your number: 2
Enter your number: end
Variance of numbers = 3.5
```

```
Which operation do you want to perform:
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Power
6.Square Root
7.Mean
8.Variance
9.Exit
=7
Enter your number: 3
Enter your number: 4
Enter your number: 5
Enter your number: 6
Enter your number: 7
Enter your number: end
Mean of numbers = 5.0
```

```
Which operation do you want to perform:
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Power
6.Square Root
7.Mean
8.Variance
9.Exit
=9

THANK YOU FOR USING
```