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## **Java Assignment 1**

Input Methods and Menu Based Calculator

```

1 public class MainClass {
2
3     public static void main(String[] args){
4
5         InputClass input = new InputClass();
6         Calc calc = new Calc();
7
8         // Assignment Part 1
9         boolean exitPart1 = false;
10        while (!exitPart1) {
11            System.out.println(
12                ""
13                Calculate Factorial using:-
14
15                1) Use Command Line Args
16                2) Use Scanner
17                3) Use BufferedReader
18                4) Use DataInputStream
19                5) Use Console
20                6) Go to part 2 of Assignment
21
22            ""
23
24            System.out.println("Your option: ");
25            int option = input.intInput();
26            switch (option) {
27                case 1:
28                    // factorial using Command Line Args
29                    input.factorialCommandLineArgs(args);
30                    break;
31
32                case 2:
33                    // factorial using Scanner
34                    input.factorialScanner();
35                    break;
36
37                case 3:
38                    // factorial using Buffered Reader
39                    input.factorialBufferedReader();
40                    break;
41
42                case 4:
43                    // factorial using Data input stream
44                    input.factorialDataInputStream();
45                    break;
46
47                case 5:
48                    // factorial using factorial console
49                    input.factorialConsole();
50                    break;
51
52                case 6:
53                    // exit part 1 and move to part 2
54                    exitPart1 = true;
55                    break;
56
57                default:
58                    System.out.println("Invalid Option");
59                    break;
60            }
61
62        }
63
64        // Assignment Part 2
65        boolean exitPart2 = false;
66        while (!exitPart2) {
67            System.out.println(
68                ""
69                1) Add
70                2) Sub
71                3) Multi
72                4) Div
73                5) Sqrt
74                6) Pow
75                7) Mean
76                8) Var
77                9) Exit
78
79            ""
80
81            System.out.println("Your option: ");
82            int option = input.intInput();
83            switch (option) {
84                case 1:
85                    // perform Addition
86                    System.out.println(String.format("Addition Result: ", calc.addition()));
87                    break;
88
89                case 2:
90                    // perform Subtraction
91                    System.out.println(String.format("Subtraction Result: ", calc.subtraction()));
92                    break;
93
94                case 3:
95                    // perform Multiplication
96                    System.out.println(String.format("Multiplication Result: ", calc.multiplication()));
97                    break;
98
99                case 4:
100                 // perform Division
101                 System.out.println(String.format("Division Result: ", calc.division()));
102                 break;
103
104                case 5:
105                 // perform SquareRoot
106                 System.out.println(String.format("SquareRoot Result: ", calc.squareRoot()));
107                 break;
108
109                case 6:
110                 // perform Power
111                 System.out.println(String.format("Power Result: ", calc.power()));
112                 break;
113
114                case 7:
115                 // perform Mean
116                 System.out.println(String.format("Mean Result: ", calc.mean()));
117                 break;
118
119                case 8:
120                 // perform Variance
121                 System.out.println(String.format("Variance Result: ", calc.variance()));
122                 break;
123
124                case 9:
125                 // dispose scanner class instance in InputClass object before exiting program
126                 input.disposeScanner();
127                 exitPart2 = true;
128                 break;
129
130                default:
131                 System.out.println("Invalid Option");
132                 break;
133            }
134
135        }
136    }
137 }
138

```

```

1 import java.lang.Math;
2
3 public class Calc {
4     // input class
5     InputClass input = new InputClass();
6
7     // Calculate factorial recursively
8     public int factorial(int x){
9         if(x <= 1) return x;
10        else return x * factorial(x - 1);
11    }
12
13
14    // Perform addition calculation
15    public double addition(){
16        System.out.println("Performing addition");
17        double num1 = input.doubleInput();
18        double num2 = input.doubleInput();
19
20        return num1 + num2;
21    }
22
23    // Perform subtraction calculation
24    public double subtraction(){
25        System.out.println("Performing subtraction");
26        System.out.println("Enter Number 1: ");
27        double num1 = input.doubleInput();
28        System.out.println("Enter Number 2: ");
29        double num2 = input.doubleInput();
30
31        return num1 - num2;
32    }
33
34    // perform multiplication calculation
35    public double multiplication(){
36        System.out.println("Performing multiplication");
37        System.out.println("Enter Number 1: ");
38        double num1 = input.doubleInput();
39        System.out.println("Enter Number 2: ");
40        double num2 = input.doubleInput();
41
42        return num1 * num2;
43    }
44
45    // perform division calculation
46    public double division(){
47        System.out.println("Performing division");
48        System.out.println("Enter Number 1: ");
49        double num1 = input.doubleInput();
50        System.out.println("Enter Number 2: ");
51        double num2 = input.doubleInput();
52
53        return num1 / num2;
54    }
55
56    // perform squareRoot calculation
57    public double squareRoot(){
58        System.out.println("Performing root");
59        System.out.println("Enter Number 1: ");
60        double num1 = input.doubleInput();
61
62        return Math.sqrt(num1);
63    }
64
65    // perform power calculation
66    public double power(){
67        System.out.println("Performing power");
68        System.out.println("Enter Number 1: ");
69        double num1 = input.doubleInput();
70        System.out.println("Enter Number 2: ");
71        double num2 = input.doubleInput();
72
73        return Math.pow(num1, num2);
74    }
75
76    // perform mean calculation
77    public double mean(){
78        System.out.println("Performing mean (type end to stop taking inputs)");
79        double sum = 0;
80        int count = 0;
81        while (true) {
82            System.out.println(String.format("Enter Number %d: ", count + 1));
83            String num = input.strInput();
84            // System.out.println(num == "end");
85            if(num.equals("end")){
86                break;
87            }
88            else{
89                sum += Integer.valueOf(num);
90                count += 1;
91            }
92        }
93
94        return sum/count;
95    }
96
97    // perform variance calculation
98    public double variance(){
99        System.out.println("Performing variance");
100        System.out.println("Enter number of inputs");
101        int len = Integer.valueOf(input.strInput());
102
103        double[] nums = new double[len];
104
105        // store inputs
106        for (int i = 0; i < len; i++) {
107            System.out.println(String.format("Enter Number %d: ", i + 1));
108            nums[i] = input.doubleInput();
109        }
110
111        // compute mean
112        double mean = 0;
113        for (double d : nums) {
114            mean += d;
115        }
116        mean /= len;
117
118        // calculate variance numerator
119        int var_numerator = 0;
120        for (double d : nums) {
121            var_numerator += Math.pow(d - mean, 2);
122        }
123
124        // return variance
125        return var_numerator / (len - 1);
126    }
127 }
128

```

```

1  import java.io.BufferedReader;
2  import java.io.Console;
3  import java.io.DataInputStream;
4  import java.io.IOException;
5  import java.io.InputStreamReader;
6  import java.util.Scanner;
7
8  public class InputClass {
9
10     // static scanner instance for entire program
11     private static Scanner sc = new Scanner(System.in);
12     private static Calc calc = new Calc();
13
14     // prints address of static Scanner instance
15     public void showSC_Hash(){
16         System.out.println(sc.hashCode());
17     }
18
19     // disposes static scanner instance
20     public void disposeScanner(){
21         sc.close();
22     }
23
24     // integer input using scanner class
25     public int intInput(){
26         int num = sc.nextInt();
27         return num;
28     }
29
30     // double input using scanner class
31     public double doubleInput(){
32         double num = sc.nextDouble();
33         return num;
34     }
35
36     // string input using scanner class
37     public String strInput(){
38         String str = sc.next();
39         return str;
40     }
41
42     // factorial using Command Line Args
43     public void factorialCommandLineArgs(String[] args){
44         try {
45             if(args.length > 0 && Integer.parseInt(args[0]) >= 0){
46                 int factorial_num = Integer.parseInt(args[0]);
47                 if(factorial_num == Integer.MIN_VALUE) System.out.println("Invalid Command Line input");
48                 else System.out.println(String.format("Factorial of %d is: %d", factorial_num, calc.factorial(factorial_num)));
49             }
50             else{
51                 System.out.println("Invalid Command Line input");
52             }
53         } catch (NumberFormatException e) {
54             System.out.println("Invalid Command Line input");
55         }
56     }
57
58     // factorial using Scanner
59     public void factorialScanner(){
60         System.out.println("Enter Number 1: ");
61         int factorial_num = intInput();
62         System.out.println(String.format("Factorial of %d is: %d", factorial_num, calc.factorial(factorial_num)));
63     }
64
65     // factorial using Buffered Reader
66     public void factorialBufferedReader(){
67         BufferedReader reader = new BufferedReader(new InputStreamReader(System.in));
68         try {
69             System.out.println("Enter Number 1: ");
70             int factorial_num = Integer.parseInt(reader.readLine());
71             System.out.println(String.format("Factorial of %d is: %d", factorial_num, calc.factorial(factorial_num)));
72         } catch (IOException | NumberFormatException e) {
73             System.out.println("Invalid input");
74         }
75     }
76
77     // factorial using Data input stream
78     public void factorialDataInputStream(){
79         DataInputStream dis = new DataInputStream(System.in);
80         try {
81             System.out.println("Enter Number 1: ");
82             int factorial_num = Integer.parseInt(dis.readLine());
83             System.out.println(String.format("Factorial of %d is: %d", factorial_num, calc.factorial(factorial_num)));
84         } catch (IOException | NumberFormatException e) {
85             System.out.println("Invalid input");
86         }
87     }
88
89     // factorial using factorial console
90     public void factorialConsole(){
91         Console console = System.console();
92         try {
93             System.out.println("Enter Number 1: ");
94             int factorial_num = Integer.parseInt(console.readLine());
95             System.out.println(String.format("Factorial of %d is: %d", factorial_num, calc.factorial(factorial_num)));
96         } catch (NumberFormatException e) {
97             System.out.println("Invalid input");
98         }
99     }
100 }
101

```

# Output

```
PS C:\Users\devbh\OneDrive\Desktop\College\Sem---4\Java\Assignments\Assignment1> javac mainclass.java
PS C:\Users\devbh\OneDrive\Desktop\College\Sem---4\Java\Assignments\Assignment1> java MainClass 3
    Calculate Factorial using:-
1
2) Use Scanner
3) Use BufferedReader
4) Use DataInputStream
5) Use Console
6) Go to part 2 of Assignment
Your option:
1
Factorial of 3 is: 6
    Calculate Factorial using:-
1
2) Use Scanner
3) Use BufferedReader
4) Use DataInputStream
5) Use Console
6) Go to part 2 of Assignment
Your option:
2
Enter Number 1:
3
Factorial of 3 is: 6
    Calculate Factorial using:-
1
2) Use Scanner
3) Use BufferedReader
4) Use DataInputStream
5) Use Console
6) Go to part 2 of Assignment
Your option:
3
Enter Number 1:
3
Factorial of 3 is: 6
    Calculate Factorial using:-
1
2) Use Scanner
3) Use BufferedReader
4) Use DataInputStream
5) Use Console
6) Go to part 2 of Assignment
Your option:
4
Code is in file but method is deprecated which causes compilation errors
    Calculate Factorial using:-
1
2) Use Scanner
3) Use BufferedReader
4) Use DataInputStream
5) Use Console
6) Go to part 2 of Assignment
Your option:
5
Enter Number 1:
3
Factorial of 3 is: 6
    Calculate Factorial using:-
1
2) Use Scanner
3) Use BufferedReader
4) Use DataInputStream
5) Use Console
6) Go to part 2 of Assignment
Your option:
6
1) Add
2) Sub
3) Multi
4) Div
5) Sqrt
6) Pow
7) Mean
8) Var
9) Exit
Your option:
1
Performing addition
1
2
Addition Result: 3.00
1) Add
2) Sub
3) Multi
4) Div
5) Sqrt
6) Pow
7) Mean
8) Var
9) Exit
Your option:
2
Performing subtraction
Enter Number 1:
3
Enter Number 2:
2
Subtraction Result: 1.00
1) Add
2) Sub
3) Multi
4) Div
5) Sqrt
6) Pow
7) Mean
8) Var
9) Exit
```

```
1 Your option:
2 3
3 Performing multiplication
4 Enter Number 1:
5 2
6 Enter Number 2:
7 3
8 Multiplication Result: 6.00
9 1) Add
10 2) Sub
11 3) Multi
12 4) Div
13 5) Sqrt
14 6) Pow
15 7) Mean
16 8) Var
17 9) Exit
18
19
20 Your option:
21 4
22 Performing division
23 Enter Number 1:
24 4
25 Enter Number 2:
26 2
27 Division Result: 2.00
28 1) Add
29 2) Sub
30 3) Multi
31 4) Div
32 5) Sqrt
33 6) Pow
34 7) Mean
35 8) Var
36 9) Exit
37
38
39 Your option:
40 5
41 Performing root
42 Enter Number 1:
43 5
44 SquareRoot Result: 2.24
45 1) Add
46 2) Sub
47 3) Multi
48 4) Div
49 5) Sqrt
50 6) Pow
51 7) Mean
52 8) Var
53 9) Exit
54
55
56 Your option:
57 6
58 Performing power
59 Enter Number 1:
60 2
61 Enter Number 2:
62 2
63 Power Result: 4.00
64 1) Add
65 2) Sub
66 3) Multi
67 4) Div
68 5) Sqrt
69 6) Pow
70 7) Mean
71 8) Var
72 9) Exit
73
74
75 Your option:
76 7
77 Performing mean (type end to stop taking inputs)
78 Enter Number 1:
79 1
80 Enter Number 2:
81 2
82 Enter Number 3:
83 -3
84 Enter Number 4:
85 4
86 Enter Number 5:
87 -2
88 Enter Number 6:
89 -2
90 Enter Number 7:
91 end
92 Mean Result: 0.00
93 1) Add
94 2) Sub
95 3) Multi
96 4) Div
97 5) Sqrt
98 6) Pow
99 7) Mean
100 8) Var
101 9) Exit
102
103
104 Your option:
105 8
106 Performing variance
107 Enter number of inputs
108 5
109 Enter Number 1:
110 1
111 Enter Number 2:
112 2
113 Enter Number 3:
114 3
115 Enter Number 4:
116 4
117 Enter Number 5:
118 5
119 Variance Result: 2.00
120 1) Add
121 2) Sub
122 3) Multi
123 4) Div
124 5) Sqrt
125 6) Pow
126 7) Mean
127 8) Var
128 9) Exit
129
130
131 Your option:
132 9
```