Assignment-1

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// Batch: AIML-A1

/*
PROGRAM DESCRIPTION-This is a Java program that creates a calculator. The program defines a class
"operations" that contains a method "calculate" which takes in two integers, num1 and num2, as input.
The method prompts the user to enter an operator and uses if-else statements to perform the
corresponding mathematical operation (addition, subtraction, multiplication, division, or modulus)
on the input integers. The program also contains a "main" method in the "Calculator1" class which
prompts the user to input two integers and calls the "calculate" method on them. The program will
continuously prompt the user for an operator and perform the operation until the user inputs
'X' or 'x' to exit the calculator.java (command line args, Scanner,BufferedReader, DataInputStream, Console )
 */

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

public class input_calculator {
    public static void main(String[] args) throws IOException, ArrayIndexOutOfBoundsException{
        {//commandline arguments
           System.out.println("Input taken trough commandline arguments: ");
           System.out.print("Enter a number: ");
           int num1 = Integer.parseInt(args[0]);
           System.out.println("Number entered (commandline): " + num1);

            //input option
            input_options.input();

            //calculator
            calculator.calculation();}

    }
}

class input_options {
    static void input() throws IOException{

        // Scanner object
        Scanner Sc = new Scanner(System.in);
        System.out.println("Input taken trough Scanner object: ");
        System.out.print("Enter a number: ");
        int num = Sc.nextInt();
        System.out.println("Number entered (Scanner): " + num);

        //BufferedReader object
        InputStreamReader r= new InputStreamReader(System.in);
        BufferedReader br = new BufferedReader(r);
        System.out.println("Input taken trough BufferedReader object: ");
        System.out.print("Enter a number: ");
        String n = br.readLine();
        int num2 = Integer.parseInt(n);
        System.out.println("Number entered (BufferedReader): " + num2);

        //DataInputStream object
        DataInputStream data = new DataInputStream(System.in);
        System.out.println("Input taken trough DataInputStream object: ");
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        System.out.print("Enter a number: ");
        int num3 = Integer.parseInt(data.readLine());
        System.out.println("Number entered (DataInputStream): " + num3);

        //console object
        Console c = System.console();
        System.out.println("Input taken trough console object: ");
        System.out.print("Enter a number: ");
        int num4 = Integer.parseInt(c.readLine());
        System.out.println("Number entered (console): " + num4);
    }
}


class calculator {
    static void calculation() {
        Scanner Sc = new Scanner(System.in);

        while (true) {
            System.out.println("Menu:");
            System.out.println("1. Add");
            System.out.println("2. Sub");
            System.out.println("3. Multiply");
            System.out.println("4. Divide");
            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) {
                case 1:
                    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:
                    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:
                    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:
                    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:
                    System.out.print("Enter number: ");
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                num1 = Sc.nextDouble();
                System.out.println("Result: " + Math.sqrt(num1));
                break;
            case 6:
                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:
                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:
                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:
                System.out.println("Exiting...");
                System.exit(0);
                break;
            default:
                System.out.println("Invalid choice!");
                break;
        }
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        }
    }
}
```

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Input taken trough scanner object:
Enter a number: 3
Number entered Input taken trough scanner object:
Enter a number: 1
Number entered (scanner): 1
Input taken trough BufferedReader object:
Enter a number: 2
Number entered (BufferedReader): 2
Input taken trough DataInputStream
object:
Enter a number: 3
Number entered (DataInputStream): 3Input taken trough console object:
Enter a number: 4
Number entered (console): 4

Menu:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Square Root
6. Power
7. Mean
8. Variance
9. Exit
Enter your choice: 2
Enter first number: 5
Enter second number: 3
Result: 2.0

Menu:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Square Root
6. Power
7. Mean
8. Variance
9. Exit
Enter your choice: 6
Enter base: 4
Enter exponent: 6
Result: 4096.0

Menu:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Square Root
6. Power
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7. Mean
8. Variance
9. Exit
Enter your choice: 5
Enter number: 144
Result: 12.0

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...(scanner): 3
Input taken trough BufferedReader object:
Enter a number: 5
Number entered (BufferedReader): 5
Input taken trough DataInputStream
object:
Enter a number: 7
Number entered (DataInputStream): 7Input taken trough console object:
Enter a number: 10
Number entered (console): 10

Menu:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Square Root
6. Power
7. Mean
8. Variance
9. Exit
Enter your choice: 3
Enter first number: 4
Enter second number: 7
Result: 28.0

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...
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