Practical 1

Aim:

To write a Java program that calculates the sum and average of a set of numbers using loops.

Objective:

To develop a Java program that calculates the sum and average of a set of numbers efficiently, allowing the user to input the total number of elements and the respective values. This will demonstrate the use of loops for iterative processing and basic arithmetic operations.

Theory:

In Java, loops like for, while, and do-while are used for repetitive operations. The program will utilize a for loop to iterate through the user inputs. The sum of the numbers is accumulated in a variable, and the average is calculated by dividing the sum by the count of numbers (n). Input handling and result display are achieved using the Scanner class and System.out for output.

Algorithm:

1. **Start** the program.
2. **Input** the number of elements (n) from the user.
3. **Initialize**:

    1. sum = 0
    2. average = 0

4. For i = 1 to n:

    1. Prompt the user to enter a number.
    2. Add the number to sum.

5. After the loop, calculate average = sum / n.
6. **Output** the sum and average.
7. **End** the program.

Program:

```java
import java.util.Scanner;

public class SumAndAverage {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Input: Total number of elements
        System.out.print("Enter the number of elements: ");
        int n = scanner.nextInt();

        // Initialize variables for sum and average
        int sum = 0;
        double average;

        // Loop to input numbers and calculate sum
        for (int i = 1; i <= n; i++) {
            System.out.print("Enter number " + i + ": ");
            int num = scanner.nextInt();
            sum += num; // Add each number to sum
        }

        // Calculate the average
        average = (double) sum / n;

        // Output: Sum and average
        System.out.println("Sum of the numbers: " + sum);
        System.out.println("Average of the numbers: " + average);

        scanner.close();
    }
}
```

Output:

```
Enter the number of elements: 5
Enter number 1: 10
Enter number 2: 20
Enter number 3: 30
Enter number 4: 40
Enter number 5: 50
Sum of the numbers: 150
Average of the numbers: 30.0
```

Conclusion:

This program successfully calculates the sum and average of a set of numbers entered by the user using a loop. By employing loops, the program efficiently processes multiple inputs, performs calculations, and outputs the results. The logic is dynamic, allowing any number of inputs as specified by the user.