Day 19 – 2D Array Input (Scanner) & Operations

Today we will learn how to take input in a 2D array using Scanner and perform basic matrix operations like addition, sum and finding largest element.

1. 2D Array Input using Scanner (Syntax)

```
Scanner sc = new Scanner(System.in);
int rows = sc.nextInt();
int cols = sc.nextInt();
int[][] arr = new int[rows][cols];

for(int i = 0; i < rows; i++) {
    for(int j = 0; j < cols; j++) {
        arr[i][j] = sc.nextInt();
    }
}
```

2. Complete Example – Input and Print Matrix

```
import java.util.*;
class MatrixInput {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int rows = 2, cols = 2;
        int[][] arr = new int[rows][cols];

        for(int i = 0; i < rows; i++) {
            for(int j = 0; j < cols; j++) {
                arr[i][j] = sc.nextInt();
            }
        }

        for(int i = 0; i < rows; i++) {
            for(int j = 0; j < cols; j++) {
                System.out.print(arr[i][j] + " ");
            }
            System.out.println();
        }
    }
}
```

3. Matrix Addition Logic

```
for(int i = 0; i < rows; i++) {
    for(int j = 0; j < cols; j++) {
        sum[i][j] = a[i][j] + b[i][j];
    }
}
```

4. Sum of All Elements

```
int total = 0;
for(int i = 0; i < rows; i++) {
    for(int j = 0; j < cols; j++) {
        total += arr[i][j];
    }
}
System.out.println("Sum = " + total);
```

5. Largest Element in Matrix

```
int max = arr[0][0];
for(int i = 0; i < rows; i++) {
    for(int j = 0; j < cols; j++) {
        if(arr[i][j] > max) {
            max = arr[i][j];
```

```
            }
        }
}
System.out.println("Largest = " + max);
```

6. Practice Set

1. Write a program to input a 3x3 matrix and print it.

2. Write a program to add two 2x2 matrices.

3. Write a program to find sum of each row in a matrix.

4. Write a program to find smallest element in a matrix.