

Day 18 – 2D Arrays in Java (Matrix Basics)

Today we are starting 2D Arrays in Java. A 2D array is also called a matrix. It stores data in rows and columns format.

1. What is a 2D Array?

A 2D array is an array of arrays. It is used to store data in tabular form like a table having rows and columns.

2. Declaration of 2D Array

```
dataType[][][] arrayName;
```

OR

```
dataType arrayName[][];
```

Example:

```
int[][][] matrix;
```

3. Creating a 2D Array

```
matrix = new int[3][3]; // 3 rows and 3 columns
```

4. Initialization at Declaration

```
int[][] arr = {  
    {1, 2, 3},  
    {4, 5, 6},  
    {7, 8, 9}  
};
```

5. Traversing a 2D Array (Nested Loops)

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

6. Complete Example – Print Matrix

```
class MatrixExample {  
    public static void main(String[] args) {  
        int[][] arr = {  
            {1, 2, 3},  
            {4, 5, 6},  
            {7, 8, 9}  
        };  
  
        for(int i = 0; i < arr.length; i++) {  
            for(int j = 0; j < arr[i].length; j++) {  
                System.out.print(arr[i][j] + " ");  
            }  
            System.out.println();  
        }  
    }  
}
```

7. Practice Set

1. Write a program to input a 2x2 matrix and print it.
2. Write a program to find sum of all elements in a 2D array.
3. Write a program to print diagonal elements of a matrix.
4. Write a program to find largest element in a matrix.