

Module no: 8

Multidimensional Arrays

Date: 19/10/2022

Agenda :-

- ① Creating 2D arrays
- ② Output
- ③ Input
- ④ Problems

2 D - arrays :-

Introduction :- Java 2d arrays are simply arrays or arrays. Each element is an array itself. These can be used to store matrices or grids.

Example :-

```
class Main {  
    public static void main (String [] args) {  
        int [] [] arr = new int [3] [4];  
    }  
}
```

Multi-Dimensional Arrays:

Program:

```
package com.company;

import java.util.Scanner;
public class Main {
    public static void main(String[] args) {
        // initializing 2d array
        int [][] arr = new int[3][3];
        int [][] arr_1 = {
            {1,2,3},
            {3,4,5},
            {5,6,7}
        };
        // accessing 2d array by specifying (index of index) of array
        System.out.println(arr_1[1][1]);
    }
}
```

Output:

```
"C:\Program Files\Java\jdk-21\bin\java.exe"
3
```

```
Process finished with exit code 0
```

Creating 2D arrays :-

```
int rows = 3;
```

```
int cols = 4;
```

```
int [][] arr = new int [rows][cols];
```

Visualizing :-

Index ↓	0	1	2	3
0	0	0	0	0
1	0	0	0	0
2	0	0	0	0

// initialized as zero - default by java.

changes can be done by Eg:- arr[0][2] = 'x';

Iterating over 2d arrays:-

To iterate over 2d arrays, we could be using nested loops. The outer loop will be used to iterate over the rows and the inner loop will be used to iterate over the columns.

Sample code :-

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

Multi-Dimensional Arrays – Accessing array elements using nested loop:

Program:

```
package com.company;

import java.util.Scanner;
public class Main {
    public static void main(String[] args) {
        // initializing 2d array
        int [][] arr = {
            {1,2,3},
            {3,4,5},
            {5,6,7},
            {7,8,9}
        };
        // accessing elements using nested loop
        int rows = 4;
        int cols = 3;
        for (int i = 0; i < rows; i++){ //iterating rows
            for (int j = 0; j < cols; j++){ //iterating cols
                System.out.print(arr[i][j] + " ");
            }
            System.out.println();
        }
    }
}
```

Output:

```
"C:\Program Files\Java\jdk-21\bin\java.exe"
1 2 3
3 4 5
5 6 7
7 8 9
```

```
Process finished with exit code 0
```

Multi-Dimensional Arrays – Inputs:

Program:

```
package com.company;

import java.util.Scanner;
public class Main {
    public static void main(String[] args) {
        // initializing 2d array with input
        Scanner sc= new Scanner(System.in);
        System.out.print("Enter the number of rows:");
        int rows = sc.nextInt();
        System.out.print("Enter the number of cols:");
        int cols = sc.nextInt();

        int arr[][] = new int[rows][cols];

        for (int i = 0; i < rows; i++){ //iterating rows
            for (int j = 0; j < cols; j++){ //iterating cols
                System.out.print("Enter the number for arr in "+ i + " th row and " + j + " th col: ");
                arr[i][j] = sc.nextInt();
            }
            System.out.println();
        }

        System.out.println("The array you had Created is:");
        for (int i = 0; i < rows; i++){ //iterating rows
            for (int j = 0; j < cols; j++){ //iterating cols
                System.out.print(arr[i][j]+" ");
            }
            System.out.println();
        }
    }
}
```

Output:

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Pro  
Enter the number of rows:2  
Enter the number of cols:3  
Enter the number for arr in 0 th row and 0 th col: 1  
Enter the number for arr in 0 th row and 1 th col: 2  
Enter the number for arr in 0 th row and 2 th col: 3  
  
Enter the number for arr in 1 th row and 0 th col: 3  
Enter the number for arr in 1 th row and 1 th col: 4  
Enter the number for arr in 1 th row and 2 th col: 5
```

The array you had Created is:

```
1 2 3  
3 4 5
```

```
Process finished with exit code 0
```