



Al-Mustaqbal University
College of Sciences
Intelligent Medical System Department



جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

كلية العلوم
قسم الانظمة الطبية الذكية

Lecture: (2) **two-dimensional array**

Subject: Computer Programming

Class: One

**Lecturer: Dr. Maytham N.
Meqdad ,Programmer.Noor.H.Obaid**



two-dimensional array

```
public class lec2java {
    public static void main(String[] args) {
        // TODO Auto-generated method stub
        // 1. Array Declaration (3 rows and 3 columns)
        int[][] matrix = {
            {1, 2, 3}, // Row Index 0
            {4, 5, 6}, // Row Index 1
            {7, 8, 9}  // Row Index 2
        };

        System.out.println("Displaying the 2D Array Content:");

        // 2. Using Nested Loops to access and print the elements
        for (int i = 0; i < 3; i++) {           // Outer loop for Rows
            for (int j = 0; j < 3; j++) {       // Inner loop for Columns
                // Print the element followed by a space
                System.out.print(matrix[i][j] + " ");
            }
            // Print a new line after each row to create the table effect
            System.out.println();
        }
    }
}
```

Output: Displaying the 2D Array Content:

```
1 2 3
4 5 6

7 8 9
```



two-dimensional array

A binary array in Java is an "array within an array," and is defined as a data structure that organizes elements into a logical grid consisting of rows and columns.

1. Defining a binary array (based on the code)

the array is of type int (integers) and its size is 3*3

2. Explain the code in detail;

1. Declaration and Initialization Phase

```
int[][] matrix = {  
    {1, 2, 3}, // Row Index 0  
    {4, 5, 6}, // Row Index 1  
    {7, 8, 9} // Row Index 2  
};
```

1. int[][] matrix: Double brackets [][] tell Java that this is a two-dimensional matrix.

2. Values within brackets {}: Each group within the brackets represents a complete row.

3. The first row contains 1, 2, 3.

2. Outer Loop (Rows)

```
for (int i = 0; i < 3; i++) {
```

1. This loop is responsible for navigating between rows.

2. The variable i represents the current row number. It starts at 0 and ends at 2.

3. Inner Loop (Columns)

```
for (int j = 0; j < 3; j++) {  
    System.out.print(matrix[i][j] + " ");  
}
```

1. This loop works entirely within each row.

2. The variable j represents the column number.



3. `matrix[i][j]`: means "Retrieve the element in row *i* and column *j*".

4. Using ``print`` (without ``ln``) prints the elements next to each other on the same row.

4. Row Break

`System.out.println();`

1. This line is very important; it is executed after the column loop (*j*) has finished and before moving to the next row in the loop (*i*).

2. Its function is to move to a new line so that the array appears as a sorted table instead of a single long line.

Programming summary:

term	Meaning in the code
<code>matrix.length</code>	The number of rows (in your code) equals 3
<code>matrix[i].length</code>	The number of columns in the current row (equals 3)
<code>matrix[1][2]</code>	o access the element in the second row and third column (number 6).



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		Column 0	Column 1	Column 2
Row 0		0, 0	0, 1	0, 2
Row 1		1, 0	1, 1	1, 2
Row 2		2, 0	2, 1	2, 2