Al-Mustaqbal University
College of Sciences
Intelligent Medical System Department

جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

كلية العلوم

قسم الانظمة الطبية الذكية

Lecture: (4)
two-dimensional array part2

Subject: Computer Programming
Class: One

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

two-dimensional array

write program in java requires the user to specify the size of the array and enter its values:

```
import java.util.Scanner;
public class lec3java {
	public static void main(String[] args) {
		// TODO Auto-generated method stub
		Scanner input = new Scanner(System.in);

	  // Ask user for the number of rows and columns
	  System.out.print("Enter number of rows: ");
	  int rows = input.nextInt();
	  System.out.print("Enter number of columns: ");
	  int cols = input.nextInt();

	  // Create the array with user-defined size
	  int[][] data = new int[rows][cols];

	  // Fill the array using nested loops
	  System.out.println("Enter the elements of the matrix:");
	  for (int r = 0; r < rows; r++) {
	      for (int c = 0; c < cols; c++) {
	          System.out.print("Element [" + r + "][" + c + "]: ");
	          data[r][c] = input.nextInt(); // Read input from keyboard
	      }
	  }

	  System.out.println("Matrix successfully filled.");
    }
	}
```

Output:

```
Enter number of rows: 3
Enter number of columns: 3
Enter the elements of the matrix:
Element [0][0]: 1
Element [0][1]: 2
Element [0][2]: 3
Element [1][0]: 4
Element [1][1]: 5
Element [1][2]: 6
Element [2][0]: 7
Element [2][1]: 8
Element [2][2]: 9
Matrix successfully filled.
```

*	0 column	1 column	2 column
0 row	1	2	3
1 row	4	5	6
2 row	7	8	9

two-dimensional array

write program in java Find the sum and average:

```
public class lec3java2 {
	public static void main(String[] args) {
		// TODO Auto-generated method stub
		int[][] grid = {
				{5, 15},//row 0
				{25, 35},//row1
				{45, 55}
			};//row2

			int sum = 0;
			int count = 0; //A counter to see the total number of items

			for (int i = 0; i < grid.length; i++) {//outer loop (i): it passes through rows 0 to 2.
				for (int j = 0; j < grid[i].length; j++) {// inner loop (j): passes over the columns within each row
					// Add current element to the running total
					sum += grid[i][j];
					count++; // Increment the counter
				}
			}

			// Calculate average (casting sum to double for precision)
			double average = (double) sum / count;

			System.out.println("Total Sum: " + sum);
			System.out.println("Average: " + average);
		}
	}
```

Output:

```
Total Sum: 180
Average: 30.0
```

.

two-dimensional array

Write program in javaSearch for an item

```
public class lec3java3 {
	public static void main(String[] args) {
		// TODO Auto-generated method stub
		// 1. Initialize a 2D array (3 rows and 3 columns)
	  int[][] matrix = {
		{10, 20, 30},
		{40, 50, 60},
		{70, 80, 90}
	  };

	  int target = 50; // The element we are looking for
	  boolean found = false;

	  // 2. Use nested loops to iterate through each element
	  for (int i = 0; i < matrix.length; i++) { // Outer loop for rows
		for (int j = 0; j < matrix[i].length; j++) { // Inner loop for
columns
			if (matrix[i][j] == target) {
				System.out.println("Element " + target + " found at Row:
" + i + ", Column: " + j);
				found = true;
				break; // Exit the inner loop
			}
		}
		// Exit the outer loop if the element is found
		if (found) break;
	  }

	  // 3. Final check if the element was not found
	  if (!found) {
		System.out.println("Element not found in the array.");
	  }
	}
}
```

Output:

```
Element 50 found at Row: 1, Column: 1
```

Write programm in java to sort elements

```
import java.util.Arrays;
public class lec3java4 {
public static void main(String[] args) {
            // TODO Auto-generated method stub
            // 1. Define an unsorted 2D array
        int[][] matrix = {
            {50, 10, 30},
            {20, 5, 15},
            {40, 60, 25}
        };

        System.out.println("Matrix before sorting rows:");
        printMatrix(matrix);

        // 2. Sort each row individually
        for (int i = 0; i < matrix.length; i++) {
            Arrays.sort(matrix[i]); // Sorts the current row i
        }

        System.out.println("\nMatrix after sorting each row:");
        printMatrix(matrix);
    }

    // Helper method to print the 2D array
    public static void printMatrix(int[][] matrix) {
        for (int[] row : matrix) {
            for (int element : row) {
                System.out.print(element + " ");
            }
            System.out.println();
        }
    }

      }
```