OOPS IN JAVA

TUTORIAL - 5

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Roll No: 45

S3 CSE B

Matrix in Java

Module - 2

Qn 1) Write a Java program that finds the maximum element in each row of a given 3D matrix and returns the results in a separate array.

```java
/*
TUTORIALS 5
MATRIX IN JAVA
QN 1)
Write a Java Program that finds the maximum element in each row of a given 3D Matrix and
returns the results in a separate array.
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*/


package tutorials;
import java.util.Scanner;

public class Tutorials5qn1 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int rows, cols;
```
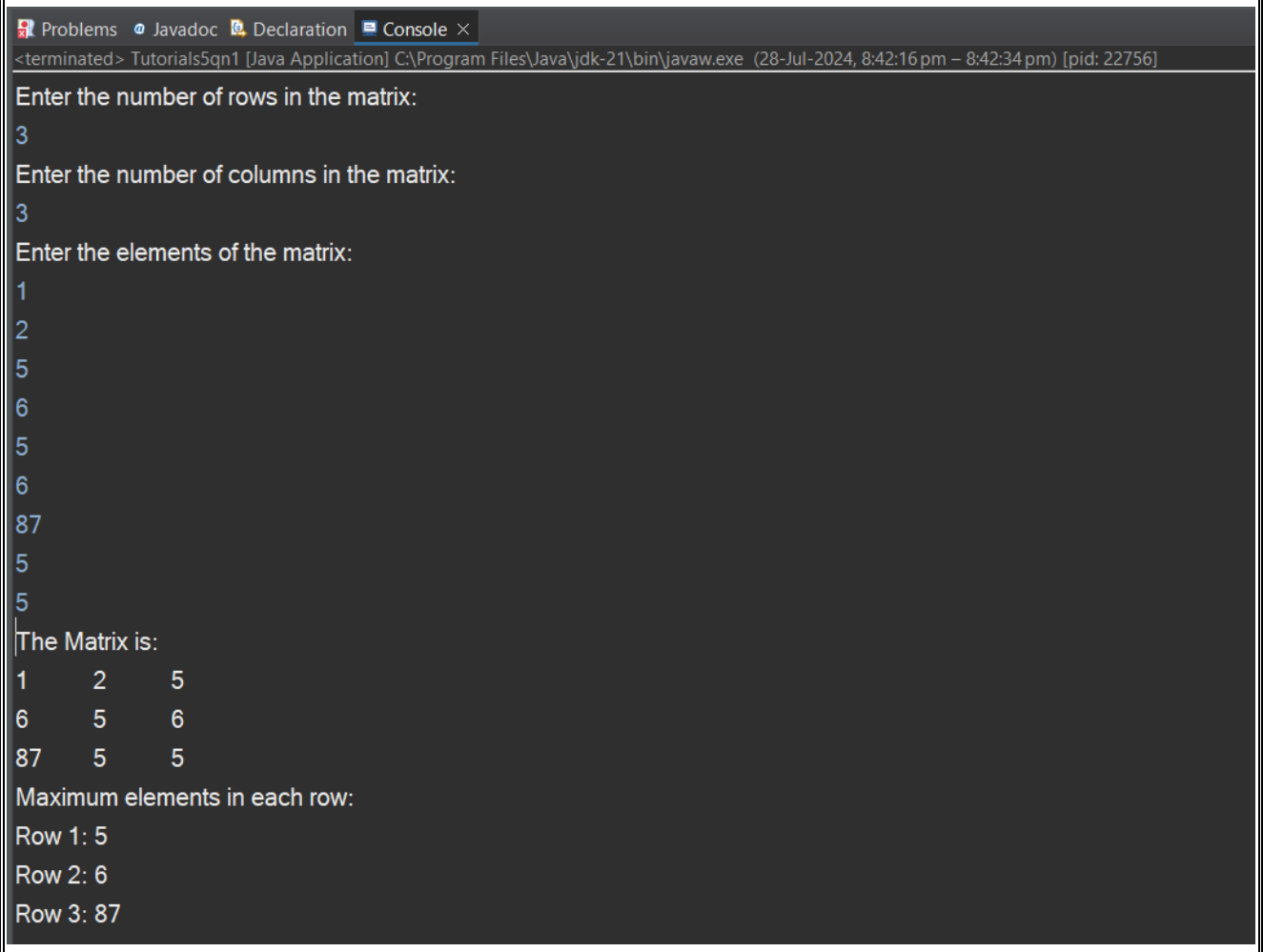

```java

        System.out.println("Enter the number of rows in the matrix: ");
        rows = sc.nextInt();
        System.out.println("Enter the number of columns in the matrix: ");
        cols = sc.nextInt();

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

        System.out.println("Enter the elements of the matrix: ");
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) {
                matrix[i][j] = sc.nextInt();
        }
    }

        System.out.println("The Matrix is: ");
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) {
                System.out.print(matrix[i][j] + "\t");
        }
            System.out.println();
    }

        System.out.println("Maximum elements in each row: ");
        for (int i = 0; i < rows; i++) {
            int max = matrix[i][0];
            for (int j = 0; j < cols; j++) {
                if (matrix[i][j] > max) {
                    max = matrix[i][j];
          }
        }
            System.out.println("Row " + (i + 1) + ": " + max);
    }
  }
}


```

OUTPUT:


Problems
Javadoc
Declaration
Console
<terminated> Tutorials5qn1 [Java Application] C:\Program Files\Java\jdk-21\bin\javaw.exe (28-Jul-2024, 8:42:16 pm – 8:42:34 pm) [pid: 22756]
Enter the number of rows in the matrix:
3
Enter the number of columns in the matrix:
3
Enter the elements of the matrix:
1
2
5
6
5
6
87
5
5
The Matrix is:
1 2 5
6 5 6
87 5 5
Maximum elements in each row:
Row 1: 5
Row 2: 6
Row 3: 87

Qn 2) Write a java program to multiply each element of a matrix by a scalar value .also display the resultant matrix after multiplication.

ArithmeticandConcatenatio... | Numbersign.java | Tutorials5qn1.java | *Tutorials5qn2.java | Tutorials5qn3.java | Tutorials5qn4.java

```java
/*
 TUTORIALS 5
 MATRIX IN JAVA
 QN 2)
 Write a java program to multiply each element of a matrix by a scalar value
.also display the resultant matrix after multiplication.

 Karthik Krishnan
 S3 CSE B
 Roll: 45
 */

package tutorials;
import java.util.Scanner;
public class Tutorials5qn2 {

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        int cols, rows;
        System.out.println("Enter the number of rows of the matrix: ");
        rows = sc.nextInt();

        System.out.println("Enter the number of columns of the matrix: ");
        cols = sc.nextInt();

        //User to enter the elements
        int[][] matrix = new int[rows][cols];

        System.out.println("Enter the elements: ");
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) {
                matrix[i][j] = sc.nextInt();
            }
        }

        //Display the matrix
        System.out.println("The Matrix is: ");
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) {
                System.out.print(matrix[i][j] + " ");
            }
            System.out.println();
        }

```

```
        //User to enter the scalar value
        System.out.println("Enter the scalar value to multiply with the matrix: ");
        int scalar = sc.nextInt();

        //Display the scalar matrix after scalar multiplication
        System.out.println("The resulting matrix after scalar multiplication is: ");
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) {
                System.out.print(matrix[i][j] * scalar + " ");
            }
            System.out.println();
        }

        sc.close();
    }
}
```

OUTPUT:

Problems Javadoc Declaration Console ×

<terminated> Tutorials5qn2 [Java Application] C:\Program Files\Java\jdk-21\bin\javaw.exe (28-Jul-2024, 11:37:27 pm – 11:37:54 pm) [pid: 21668]

```
Enter the number of rows of the matrix:
3
Enter the number of columns of the matrix:
3
Enter the elements:
1
2
3
4
5
6
7
8
9
The Matrix is:
1 2 3
4 5 6
7 8 9
Enter the scalar value to multiply with the matrix:
5
The resulting matrix after scalar multiplication is:
5 10 15
20 25 30
35 40 45
```

Qn 3) write a java program to generate an identity matrix of a given size.

ArithmeticandConcatenation... | Numbersign.java | Tutorials5qn1.java | Tutorials5qn2.java | Tutorials5qn3.java | Tutorials5qn4.java

```java
/*
TUTORIALS 5
MATRIX IN JAVA
QN 3)
Write a java program to generate an identity matrix of a given size.

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Roll: 45
*/
package tutorials;
import java.util.Scanner;

public class Tutorials5qn3 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the size of the identity matrix (n for an nxn matrix): ");
        int n = scanner.nextInt();
        int[][] matrix = new int[n][n];

        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n; j++) {
                if (i == j) {
                    matrix[i][j] = 1;
                } else {
                    matrix[i][j] = 0;
                }
            }
        }

        System.out.println("The identity matrix is: ");

        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n; j++) {
                System.out.print(matrix[i][j] + "\t");
            }
            System.out.println();
        }

        scanner.close();
    }
}
```

OUTPUT:

Problems | Javadoc | Declaration | Console

<terminated> Tutorials5qn3 [Java Application] C:\Program Files\Java\jdk-21\bin\javaw.exe (28-Jul-2024, 11:35:07 pm – 11:35:15 pm) [pid: 2472]

```
Enter the size of the identity matrix (n for an nxn matrix): 3
The identity matrix is:
1       0       0
0       1       0
0       0       1
```

Qn 4) write a java program to check if a given matrix is symmetric in Java?

ArithmeticandConcatenation... | Numbersign.java | Tutorials5qn1.java | Tutorials5qn2.java | Tutorials5qn3.java | Tutorials5qn4.java

```java
/*
 TUTORIALS 5
 MATRIX IN JAVA
 QN 4)
 Write a java program to check if a given matrix is symmetric in Java?

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 */
package tutorials;

import java.util.Scanner;

public class Tutorials5qn4 {

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        System.out.print("Enter the size of the square matrix (n for n×n matrix): ");
        int n = sc.nextInt();

        System.out.println("Enter the elements of the matrix:");

        int[][] matrix = new int[n][n];
        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n; j++) {
                matrix[i][j] = sc.nextInt();
            }
        }

        System.out.println("The matrix is:");
        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n; j++) {
                System.out.print(matrix[i][j] + "\t");
            }
            System.out.println();
        }

        boolean Symmetric = true;
        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n; j++) {
                if (matrix[i][j] != matrix[j][i]) {
                    Symmetric = false;
                    break;
                }
            }
        }

        System.out.println(Symmetric ? "The matrix is symmetric." : "The matrix is not symmetric.");
        sc.close();
    }
}
```
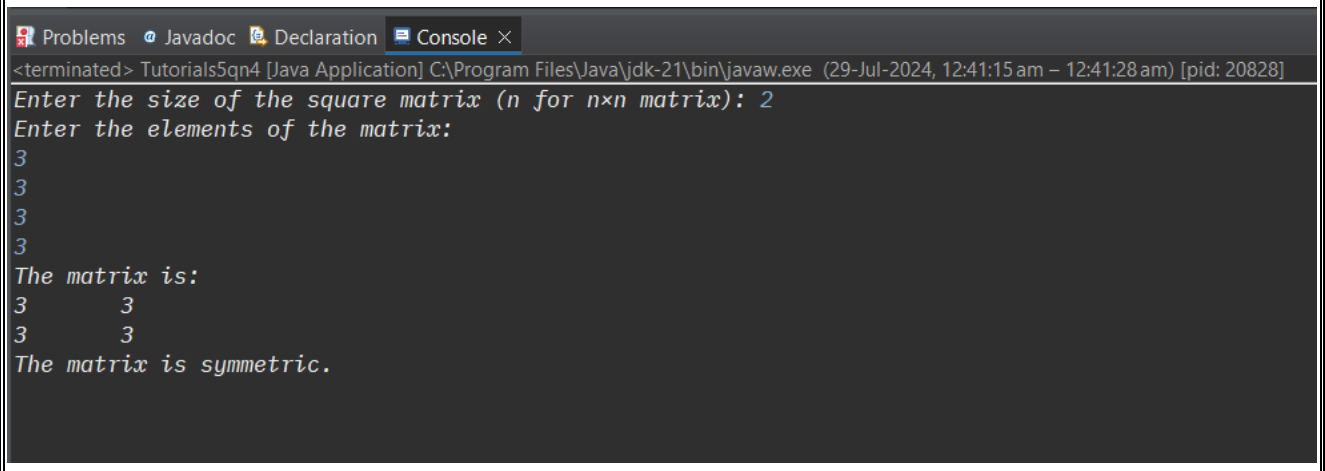

OUTPUT:


Problems
Javadoc
Declaration
Console
<terminated> Tutorials5qn4 [Java Application] C:\Program Files\Java\jdk-21\bin\javaw.exe (29-Jul-2024, 12:41:15 am – 12:41:28 am) [pid: 20828]
Enter the size of the square matrix (n for n×n matrix): 2
Enter the elements of the matrix:
3
3
3
3
The matrix is:
3 3
3 3
The matrix is symmetric.


Problems
Javadoc
Declaration
Console
<terminated> Tutorials5qn4 [Java Application] C:\Program Files\Java\jdk-21\bin\javaw.exe (29-Jul-2024, 12:41:48 am – 12:42:06 am) [pid: 6708]
Enter the size of the square matrix (n for n×n matrix): 3
Enter the elements of the matrix:
1
5
7
8
4
3
2
5
6
The matrix is:
1 5 7
8 4 3
2 5 6
The matrix is not symmetric.