Assignment-1

1. Write a Java program that demonstrates various operations on a 3D array:
2. Initializing the 3D array with random values.
3. Finding the maximum value in the array.
4. Calculating the average of all elements.
5. Displaying the array.

Program:

```
import java.util.Random;
public class ThreeDimensionalArrayOperations  {
    public static void main(String[] args) {
        int[][][] array = new int[2][3][4]; // 3D array declaration
        // 1. Initialize with random values
        initializeArray(array);
        // 2. Find maximum value
        int max = findMaximum(array);
        System.out.println("Maximum value: " + max);
         // 3. Calculate average
   double average = calculateAverage(array);
        System.out.println("Average: " + average);
        // 4. Display array
        displayArray(array);
    }
    // Initialize array with random values
    private static void initializeArray(int[][][] array) {
        Random random = new Random();
        for (int i = 0; i < array.length; i++) {
```

```
            for (int j = 0; j < array[i].length; j++) {
                for (int k = 0; k < array[i][j].length; k++) {
                    array[i][j][k] = random.nextInt(50); // Random values between 0 and 99
                }
            }
        }
    }

    // Find maximum value in the array
    private static int findMaximum(int[][][] array) {
        int max = Integer.MIN_VALUE;
        for (int i = 0; i < array.length; i++) {
            for (int j = 0; j < array[i].length; j++) {
                for (int k = 0; k < array[i][j].length; k++) {
                    if (array[i][j][k] > max) {
                        max = array[i][j][k];
                    }
                }
            }
        }
        return max;
    }

    // Calculate average of all elements
    private static double calculateAverage(int[][][] array) {
        int sum = 0;
        int count = 0;
        for (int i = 0; i < array.length; i++) {
```

```
            for (int j = 0; j < array[i].length;  j++) {
                for (int k = 0; k < array[i][j].length;  k++) {
                    sum += array[i][j][k];
                    count++;
                }
            }
        }
        return (double) sum / count;
    }

    // Display array
    private static void displayArray(int[][][] array) {
        for (int i = 0; i < array.length; i++) {
            for (int j = 0; j < array[i].length;  j++) {
                for (int k = 0; k < array[i][j].length;  k++) {
                    System.out.print(array[i][j][k]  + " ");
                }
                System.out.println();
            }
            System.out.println();
        }
    }
}
```

Output:

```
Maximum value: 49
Average: 28.041666666666668
28 29 42 19
47 4 49 26
21 38 48 26
48 13 38 20
```

2. Write a Java program that performs addition of two matrices. The program should use a 2D array of wrapper class objects (e.g., Integer) for the matrix elements. Take two matrices as input, perform the addition operation, and display the resulting matrix.

Program:

```
public class MatrixAddition {
public static void main(String[] args) {
        // Declare matrices using Integer wrapper class
        Integer[][] matrix1 = {{1, 2, 3}, {4, 5, 6}};
        Integer[][] matrix2 = {{7, 8, 9}, {10, 11, 12}};
        // Add matrices
        Integer[][] result = addMatrices(matrix1, matrix2);
        // Display result
        displayMatrix(result);
    }
    // Add two matrices
    private static Integer[][] addMatrices(Integer[][] matrix1, Integer[][] matrix2) {
        int rows = matrix1.length;
        int cols = matrix1[0].length;

        Integer[][] result = new Integer[rows][cols];
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) {
                result[i][j] = matrix1[i][j] + matrix2[i][j];
            }
        }
```

```
        return result;
    }
    // Display matrix
    private static void displayMatrix(Integer[][] matrix) {
        for (int i = 0; i < matrix.length; i++) {
            for (int j = 0; j < matrix[0].length; j++) {
                System.out.print(matrix[i][j] + " ");
            }
            System.out.println();
        }
    }
}
```

Output: