

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];

            }

        }

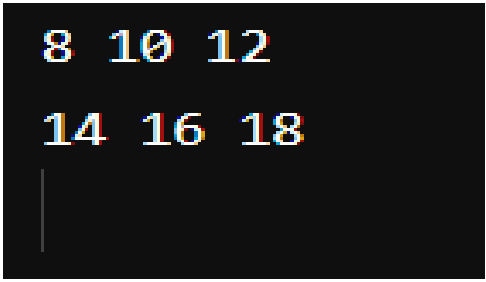
    }

}
```

```
        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:



```
8 10 12
14 16 18
```