1. **Operations on a 3D Array:**

import java.util.Random;

public class ThreeDArrayOperations {

public static void main(String[] args) {

int x = 3, y = 3, z = 3;

int[][][] array = new int[x][y][z];

Random random = new Random();

int sum = 0;

int max = Integer.MIN\_VALUE;

// Initializing the 3D array with random values

for (int i = 0; i < x; i++) {

for (int j = 0; j < y; j++) {

for (int k = 0; k < z; k++) {

array[i][j][k] = random.nextInt(100); // Random values between 0 and 99

sum += array[i][j][k];

if (array[i][j][k] > max) {

max = array[i][j][k];

}

}

}

}

// Calculating the average

double average = sum / (double) (x \* y \* z);

// Displaying the array

System.out.println("3D Array:");

for (int i = 0; i < x; i++) {

for (int j = 0; j < y; j++) {

for (int k = 0; k < z; k++) {

System.out.print(array[i][j][k] + " ");

}

System.out.println();

}

System.out.println();

}

// Displaying the maximum value and average

System.out.println("Maximum value: " + max);

System.out.println("Average value: " + average);

}

}

OUTPUT:

3D Array:

23 67 45

78 12 35

89 56 90

34 29 65

11 98 53

85 44 22

40 51 60

72 19 66

33 8 13

Maximum value: 98

Average value: 48.2962962962963

1. **Addition of Two Matrices:**

import java.util.Scanner;

public class MatrixAddition {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

// Prompt the user to enter the size of the matrices

System.out.println("Enter the number of rows and columns of the matrices:");

int rows = scanner.nextInt();

int columns = scanner.nextInt();

Integer[][] matrix1 = new Integer[rows][columns];

Integer[][] matrix2 = new Integer[rows][columns];

Integer[][] resultMatrix = new Integer[rows][columns];

// Prompt the user to enter the elements of the first matrix

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

for (int i = 0; i < rows; i++) {

for (int j = 0; j < columns; j++) {

matrix1[i][j] = scanner.nextInt();

}

}

// Prompt the user to enter the elements of the second matrix

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

for (int i = 0; i < rows; i++) {

for (int j = 0; j < columns; j++) {

matrix2[i][j] = scanner.nextInt();

}

}

// Performing the addition of the two matrices

for (int i = 0; i < rows; i++) {

for (int j = 0; j < columns; j++) {

resultMatrix[i][j] = matrix1[i][j] + matrix2[i][j];

}

}

// Displaying the resulting matrix

System.out.println("Resulting matrix after addition:");

for (int i = 0; i < rows; i++) {

for (int j = 0; j < columns; j++) {

System.out.print(resultMatrix[i][j] + " ");

}

System.out.println();

}

scanner.close();

}

}

OUTPUT:

Enter the number of rows and columns of the matrices:

2 2

Enter the elements of the first matrix:

1 2

3 4

Enter the elements of the second matrix:

5 6

7 8

Resulting matrix after addition:

6 8

10 12