

# Rajalakshmi Engineering College

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 3\_MCQ

Attempt : 1  
Total Mark : 15  
Marks Obtained : 14

#### **Section 1 : MCQ**

1. What will be the output of the given code?

```
public class Main {  
    public static void main(String[] args) {  
        int[] arr = {1, 2, 3, 4, 5};  
        int n = arr.length;  
        int temp = arr[0];  
  
        for (int i = 0; i < n - 1; i++) {  
            arr[i] = arr[i + 1];  
        }  
        arr[n - 1] = temp;  
  
        for (int num : arr) {  
            System.out.print(num + " ");  
        }  
    }  
}
```

```
    }  
}
```

**Answer**

2 3 4 5 1

**Status : Correct**

**Marks : 1/1**

2. What will be the output of the following code?

```
public class Test {  
    public static void main(String[] args) {  
        int[] x = {4, 8, 12};  
        int result = x[0] * x[2];  
        System.out.println(result);  
    }  
}
```

**Answer**

48

**Status : Correct**

**Marks : 1/1**

3. What will be the output of the following code?

```
class Q {  
    public static void main(String[] args) {  
        int[][] a = {  
            {1, 2},  
            {3, 4}  
        };  
        for (int i = 0; i < a.length; i++) {  
            for (int j = 0; j < a[0].length; j++) {  
                System.out.print(a[i][j] + " ");  
            }  
        }  
    }  
}
```

**Answer**

1 2 3 4

**Status : Correct**

**Marks : 1/1**

4. What will be the output of the following code?

```
class Q {  
    public static void main(String[] args) {  
        int[] a = {1, 2, 3, 4};  
        for (int i = 0; i < a.length; i++) {  
            if (a[i] % 2 == 0)  
                a[i] = 0;  
        }  
        System.out.println(a[1] + " " + a[3]);  
    }  
}
```

**Answer**

1 0

**Status : Wrong**

**Marks : 0/1**

5. What will be the output of the following code?

```
class Q {  
    public static void main(String[] args) {  
        int[][] a = {  
            {1, 2},  
            {3, 4}  
        };  
        int sum = 0;  
        for (int i = 0; i < a.length; i++)  
            for (int j = 0; j < a[0].length; j++)  
                sum += a[i][j];  
        System.out.println(sum);  
    }  
}
```

*Answer*

10

**Status : Correct**

**Marks : 1/1**

6. What will be the output of the following code?

```
class Q {  
    public static void main(String[] args) {  
        int[] a = {1, 2, 3, 4};  
        for (int i = 0; i < a.length / 2; i++) {  
            int temp = a[i];  
            a[i] = a[a.length - 1 - i];  
            a[a.length - 1 - i] = temp;  
        }  
        System.out.println(a[0]);  
    }  
}
```

*Answer*

4

**Status : Correct**

**Marks : 1/1**

7. What will be the output of the following code?

```
class Sample {  
    public static void main(String[] args) {  
        int[][] data = {  
            {1, 2},  
            {3, 4}  
        };  
        int sum = 0;  
  
        for (int[] row : data) {  
            for (int val : row) {  
                sum += val;  
            }  
        }  
    }  
}
```

```
        }  
        System.out.println("Sum = " + sum);  
    }  
}
```

**Answer**

Sum = 10

**Status :** Correct

**Marks :** 1/1

8. What will be the output of the following code?

```
class Q {  
    public static void main(String[] args) {  
        int[][] arr = {  
            {5, 6, 7},  
            {8, 9, 10}  
        };  
        System.out.println(arr[0][2]);  
    }  
}
```

**Answer**

7

**Status :** Correct

**Marks :** 1/1

9. What will be the output of the following code?

```
class Q {  
    public static void main(String[] args) {  
        int[] nums = {4, 2, 9, 5};  
        int max = nums[0];  
        for (int i = 1; i < nums.length; i++) {  
            if (nums[i] > max)  
                max = nums[i];  
        }  
        System.out.println(max);  
    }  
}
```

```
    }  
}
```

**Answer**

9

**Status : Correct**

**Marks : 1/1**

10. What will be the output of the following code?

```
class Sample {  
    public static void main(String[] args) {  
        int[] a = {1, 2, 3};  
        int product = 1;  
        for (int i = 0; i < a.length; i++) {  
            product *= a[i];  
        }  
        System.out.println(product);  
    }  
}
```

**Answer**

6

**Status : Correct**

**Marks : 1/1**

11. What will be the output of the following code?

```
class M {  
    public static void main(String[] args) {  
        int[][] arr = {  
            {1, 2},  
            {3, 4},  
            {5, 6}  
        };  
    }  
}
```

```
for (int i = 0; i < arr.length; i++) {  
    System.out.print(arr[i][0] + " ");  
}
```

```
}
```

**Answer**

1 3 5

**Status : Correct**

**Marks : 1/1**

12. What will be the output of the following code?

```
class Q {  
    public static void main(String[] args) {  
        int[] nums = {3, 6, 7, 2, 8};  
        int sum = 0;  
        for (int i = 0; i < nums.length; i++) {  
            if (nums[i] % 2 == 0)  
                sum += nums[i];  
        }  
        System.out.println(sum);  
    }  
}
```

**Answer**

16

**Status : Correct**

**Marks : 1/1**

13. What will be the output of the following code?

```
class ReverseArray {  
    public static void main(String[] args) {  
        int[] a = {1, 2, 3, 4};  
        for (int i = 0; i < a.length / 2; i++) {  
            int temp = a[i];  
            a[i] = a[a.length - 1 - i];  
            a[a.length - 1 - i] = temp;  
        }  
        for (int i : a)  
            System.out.print(i + " ");  
    }  
}
```

```
}
```

**Answer**

4 3 2 1

**Status : Correct**

**Marks : 1/1**

14. What will be the output of the following code?

```
class Q {  
    public static void main(String[] args) {  
        int[] a = {1, 2, 1, 3, 1, 4};  
        int count = 0;  
        for (int i = 0; i < a.length; i++) {  
            if (a[i] == 1) count++;  
        }  
        System.out.println(count);  
    }  
}
```

**Answer**

3

**Status : Correct**

**Marks : 1/1**

15. What will be the output of the following code?

```
class Sample {  
    public static void main(String[] args) {  
        int[][] matrix = {  
            {1, 2, 3},  
            {4, 5, 6}  
        };  
        System.out.println(matrix[1][2]);  
    }  
}
```

**Answer**

6

Status : Correct

Marks : 1/1

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 3\_Q1

Attempt : 1

Total Mark : 10

Marks Obtained : 10

#### **Section 1 : Coding**

##### **1. Problem Statement**

Rosh is intrigued by numerical patterns. Today, she stumbled upon a puzzle while working with arrays. She wants to compute the sum of the third-largest and second-smallest elements from a list of integers. She seeks your help to implement a program that solves this for her efficiently.

##### ***Input Format***

The first line of input is an integer N, representing the size of the array.

The second line of input consists of N space-separated integers, representing the elements of the array.

##### ***Output Format***

The output displays a single integer representing the sum of the third-largest and second-smallest elements in the array.

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: 10  
10 20 30 40 50 60 70 80 90 100  
Output: 100

### **Answer**

```
import java.util.*;  
public class Main{  
    public static void main(String[] args){  
        Scanner sc = new Scanner(System.in);  
        int N = sc.nextInt();  
        int[] arr = new int[N];  
        for (int i = 0; i < N; i++){  
            arr[i] = sc.nextInt();  
        }  
        Arrays.sort(arr);  
        int secondSmallest = arr[1];  
        int thirdLargest = arr[N - 3];  
        int result = secondSmallest + thirdLargest;  
        System.out.println(result);  
        sc.close();  
    }  
}
```

**Status : Correct**

**Marks : 10/10**

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 3\_Q2

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### **Section 1 : Coding**

##### **1. Problem Statement**

Monica is interested in finding a treasure but the key to opening is to get the sum of the main diagonal elements and secondary diagonal elements.

Write a program to help Monica find the diagonal sum of a square 2D array.

Note: The main diagonal of the array consists of the elements traversing from the top-left corner to the bottom-right corner. The secondary diagonal includes elements from the top-right corner to the bottom-left corner.

##### ***Input Format***

The first line of input consists of an integer N, representing the number of rows and columns.

The following N lines consist of N space-separated integers, representing the 2D array elements.

### **Output Format**

The first line of output prints "Sum of the main diagonal: " followed by an integer, representing the sum of the main diagonal.

The second line prints "Sum of the secondary diagonal: " followed by an integer, representing the sum of the secondary diagonal.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 3  
1 2 3  
4 5 6  
7 8 9

Output: Sum of the main diagonal: 15  
Sum of the secondary diagonal: 15

### **Answer**

```
import java.util.*;  
public class Main{  
    public static void main(String[] args){  
        Scanner sc = new Scanner(System.in);  
        int N = sc.nextInt();  
        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();  
            }  
        }  
        int mainDiagonalSum = 0;  
        int secondaryDiagonalSum = 0;  
        for (int i = 0; i < N; i++){  
            mainDiagonalSum += matrix[i][i];  
            secondaryDiagonalSum += matrix[i][N - 1 - i];  
        }  
        System.out.println("Sum of the main diagonal: " + mainDiagonalSum);  
    }  
}
```

```
        System.out.println("Sum of the secondary diagonal: "+  
secondaryDiagonalSum);  
    sc.close();  
}  
}
```

**Status : Correct**

**Marks : 10/10**

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 3\_Q3

Attempt : 1

Total Mark : 10

Marks Obtained : 10

#### **Section 1 : Coding**

##### **1. Problem Statement**

You are developing a warehouse management system for a shipping company. The system uses an integer array to represent the weights of packages in a specific order. To verify that the weight capacity is not exceeded, the program needs to calculate the sum of the weights of the first and last packages in the list.

Task:

Write a code to calculate the sum of the weights of the first and last packages in the list. The program should take an integer array as input and return the total weight of the first and last packages.

##### ***Input Format***

The first line of the input is an integer N representing the size of the array.

The second line of the input is N space-separated integer values.

#### **Output Format**

The output is displayed in the following format:

"Sum of the first and last elements: <>Sum<>"

Refer to the sample output for formatting specifications.

#### **Sample Test Case**

Input: 5

10 20 30 40 50

Output: Sum of the first and last elements: 60

#### **Answer**

```
import java.util.Scanner;

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

        int n = sc.nextInt();
        int[] weights = new int[n];

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

        int sum = calculateFirstLastSum(weights, n);

        System.out.println("Sum of the first and last elements: " + sum);

        sc.close();
    }

    public static int calculateFirstLastSum(int[] weights, int n) {
        return weights[0] + weights[n - 1];
    }
}
```

}

**Status : Correct**

**Marks : 10/10**

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 3\_Q4

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### **Section 1 : Coding**

##### **1. Problem Statement**

Sesha is developing a weather monitoring system for a region with multiple weather stations. Each weather station collects temperature data hourly and stores it in a 2D array.

Write a program that can add the temperature data from two different weather stations to create a combined temperature record for the region.

##### ***Input Format***

The first line of input consists of two space-separated integers N and M, representing the number of rows and columns of the matrices, respectively.

The next N lines consist of M space-separated integers, representing the values of the first matrix.

The following N lines consist of M space-separated integers, representing the values of the second matrix.

### ***Output Format***

The output prints the addition of the two matrices in N rows and M columns, representing the combined temperature record.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 3 3

1 2 3

4 5 6

7 8 9

1 1 1

2 2 2

3 3 3

Output: 2 3 4

6 7 8

10 11 12

### ***Answer***

```
import java.util.*;
public class Main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int N = sc.nextInt();
        int M = sc.nextInt();
        int[][] matrix1 = new int[N][M];
        int[][] matrix2 = new int[N][M];
        int[][] result = new int[N][M];
        for (int i = 0; i < N; i++){
            for (int j = 0; j < M; j++){
                matrix1[i][j] = sc.nextInt();
            }
        }
        for (int i = 0; i < N; i++){
            for (int j = 0; j < M; j++){
                matrix2[i][j] = sc.nextInt();
            }
        }
```

```
        }
    }
    for (int i = 0; i < N; i++){
        for (int j = 0; j < M; j++){
            result[i][j] = matrix1[i][j] + matrix2[i][j];
        }
    }
    for (int i = 0; i < N; i++){
        for (int j = 0; j < M; j++){
            System.out.print(result[i][j] + " ");
        }
        System.out.println();
    }
    sc.close();
}
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 3\_Q5

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### **Section 1 : Coding**

##### **1. Problem Statement**

Sharon is creating a program that finds the first repeated element in an integer array. The program should efficiently identify the first element that appears more than once in the given array. If no such element is found, it should appropriately display a message.

Help Sharon to complete the program.

##### ***Input Format***

The first line of input consists of an integer n, representing the number of elements in the array.

The second line consists of n space-separated integers, representing the array elements.

### ***Output Format***

If a repeated element is found, print the first element that appears more than once.

If no repeated element is found, print "No repeated element found in the array".

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 8  
12 21 13 14 21 36 47 21

Output: 21

### ***Answer***

```
import java.util.*;  
public class Main{  
    public static void main(String[] args){  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        int[] arr = new int[n];  
        for (int i = 0; i < n; i++){  
            arr[i] = sc.nextInt();  
        }  
        Set<Integer> seen = new HashSet<>();  
        int firstRepeated = -1;  
        for (int i = 0; i < n; i++){  
            if (seen.contains(arr[i])){  
                firstRepeated = arr[i];  
                break;  
            }  
            seen.add(arr[i]);  
        }  
        if (firstRepeated != -1){  
            System.out.println(firstRepeated);  
        } else {  
            System.out.println("No repeated element found in the array");  
        }  
        sc.close();  
    }  
}
```

}

**Status : Correct**

**Marks : 10/10**

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 3\_PAH

Attempt : 1  
Total Mark : 40  
Marks Obtained : 30

#### **Section 1 : Coding**

##### **1. Problem Statement**

Priya is building a system to automate image transformations using matrix operations. To do this, she needs to multiply two matrices representing pixel data and transformation rules.

Help Priya perform matrix multiplication and print the resulting matrix if the operation is valid.

##### ***Input Format***

The first line of input consists of two int values, representing the number of rows R1 and columns C1 of the first matrix.

The next  $R1 \times C1$  integers represent the elements of the first matrix.

The next line consists of two int values, representing the number of rows R2 and

columns C2 of the second matrix.

The next  $R_2 \times C_2$  integers represent the elements of the second matrix.

#### **Output Format**

If matrix multiplication is possible, print  $R_1$  lines, each containing  $C_2$  space-separated int values representing the resulting matrix.

Otherwise, print "Matrix multiplication not possible".

Refer to the sample output for formatting specifications.

#### **Sample Test Case**

Input: 2 3

1 2 3

4 5 6

3 2

7 8

9 10

11 12

Output: 58 64

139 154

#### **Answer**

```
import java.util.Scanner;

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

        int R1 = sc.nextInt();
        int C1 = sc.nextInt();
        int[][] matrix1 = new int[R1][C1];

        for (int i = 0; i < R1; i++) {
            for (int j = 0; j < C1; j++) {
                matrix1[i][j] = sc.nextInt();
            }
        }
    }
}
```

```
int R2 = sc.nextInt();
int C2 = sc.nextInt();
int[][] matrix2 = new int[R2][C2];

for (int i = 0; i < R2; i++) {
    for (int j = 0; j < C2; j++) {
        matrix2[i][j] = sc.nextInt();
    }
}

if (C1 != R2) {
    System.out.println("Matrix multiplication not possible");
} else {
    int[][] result = multiplyMatrices(matrix1, matrix2, R1, C1, C2);
    printMatrix(result, R1, C2);
}

sc.close();
}

public static int[][] multiplyMatrices(int[][] matrix1, int[][] matrix2, int R1, int C1,
int C2) {
    int[][] result = new int[R1][C2];

    for (int i = 0; i < R1; i++) {
        for (int j = 0; j < C2; j++) {
            result[i][j] = 0;
            for (int k = 0; k < C1; k++) {
                result[i][j] += matrix1[i][k] * matrix2[k][j];
            }
        }
    }

    return result;
}

public static void printMatrix(int[][] matrix, int rows, int cols) {
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            System.out.print(matrix[i][j]);
            if (j < cols - 1) {

```

```
        System.out.print(" ");
    }
}
System.out.println();
}
}
}
```

**Status : Correct**

**Marks : 10/10**

## 2. Problem Statement

Eminem is a billiard player who enjoys playing billiards and also likes solving mathematical puzzles. He notices that the billiard balls on the table are arranged in a grid, and he is curious to find the sum of the numbers written on each ball.

Write a program to find the sum of all the numbers written on each ball in the grid.

### ***Input Format***

The first line of input consists of an integer N, representing the number of rows.

The second line consists of an integer M, representing the number of columns.

The following lines N lines consist of M space-separated integers, representing the numbers written on each ball.

### ***Output Format***

The output prints an integer representing the sum of all the numbers written on each ball.

Refer to the sample output for the formatting specifications.

### ***Sample Test Case***

Input: 3

3  
1 2 3  
4 5 6  
7 8 9

Output: 45

### Answer

```
import java.util.Scanner;  
public class BilliardSum.java{  
    public static void main(String[] args){  
        Scanner sc = new Scanner(System.in);  
        int N = sc.nextInt();  
        int M = sc.nextInt();  
        int sum = 0;  
        for (int i = 0; i < N; i++){  
            for (int j = 0; j < M; j++){  
                sum += sc.nextInt();  
            }  
        }  
        System.out.println(sum);  
    }  
}
```

Status : Wrong

Marks : 0/10

### 3. Problem Statement

Egath is participating in a coding hackathon, and one of the challenges requires him to work with an array of integers. The task is to remove exactly one element from the array such that the sum of the remaining elements is a prime number.

Help Egath find the first possible prime sum by removing one element or determining if no such prime sum can be achieved.

#### *Input Format*

The first line of input consists of an integer N, representing the number of elements in the array.

The second line consists of N space-separated integers, representing the array elements.

#### **Output Format**

If removing one element results in a prime sum, print the sum.

If no such prime sum can be achieved by removing exactly one element, print "No valid prime sum found".

Refer to the sample output for formatting specifications.

#### **Sample Test Case**

Input: 3

1 2 3

Output: 5

#### **Answer**

```
import java.util.Scanner;

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

        int n = sc.nextInt();
        int[] arr = new int[n];

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

        int result = findFirstPrimeSum(arr, n);

        if (result == -1) {
            System.out.println("No valid prime sum found");
        } else {
            System.out.println(result);
        }
    }

    sc.close();
```

```
}

public static int findFirstPrimeSum(int[] arr, int n) {
    int totalSum = 0;
    for (int i = 0; i < n; i++) {
        totalSum += arr[i];
    }

    for (int i = 0; i < n; i++) {
        int sumWithoutElement = totalSum - arr[i];
        if (isPrime(sumWithoutElement)) {
            return sumWithoutElement;
        }
    }
    return -1;
}

public static boolean isPrime(int num) {
    if (num <= 1) {
        return false;
    }
    if (num <= 3) {
        return true;
    }
    if (num % 2 == 0 || num % 3 == 0) {
        return false;
    }

    for (int i = 5; i * i <= num; i += 6) {
        if (num % i == 0 || num % (i + 2) == 0) {
            return false;
        }
    }

    return true;
}
```

Status : Correct

Marks : 10/10

#### 4. Problem Statement

In a customer loyalty program, reward points are logged in a sorted array as customers make transactions. Occasionally, due to system errors, duplicate entries for the same transaction may appear. To ensure accurate reward calculations, it's crucial to remove these duplicates from the list.

Write a program to process the array of reward points, removing any duplicates while preserving the order of unique entries. The program should then display the cleaned list of unique reward points and the total count of these unique points.

##### ***Input Format***

The first line of input consists of an integer N, representing the number of reward points.

The second line consists of N space-separated integers, representing the reward points in sorted order.

##### ***Output Format***

The first line of output prints the cleaned list of unique reward points separated by a space.

The second line of output prints an integer representing the total count of unique reward points.

Refer to the sample output for the formatting specifications.

##### ***Sample Test Case***

Input: 3

100 100 200

Output: 100 200

2

##### ***Answer***

```
import java.util.Scanner;
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
  
        int n = sc.nextInt();  
        int[] rewardPoints = new int[n];  
  
        for (int i = 0; i < n; i++) {  
            rewardPoints[i] = sc.nextInt();  
        }  
  
        int[] uniquePoints = new int[n];  
        int uniqueCount = removeDuplicates(rewardPoints, uniquePoints, n);  
  
        for (int i = 0; i < uniqueCount; i++) {  
            System.out.print(uniquePoints[i]);  
            if (i < uniqueCount - 1) {  
                System.out.print(" ");  
            }  
        }  
        System.out.println();  
        System.out.println(uniqueCount);  
  
        sc.close();  
    }  
  
    public static int removeDuplicates(int[] arr, int[] unique, int n) {  
        if (n == 0) return 0;  
  
        int uniqueIndex = 0;  
        unique[uniqueIndex++] = arr[0];  
  
        for (int i = 1; i < n; i++) {  
            if (arr[i] != arr[i - 1]) {  
                unique[uniqueIndex++] = arr[i];  
            }  
        }  
  
        return uniqueIndex;  
    }  
}
```

**Status : Correct**

**Marks : 10/10**

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Scan to verify results



## 2024\_28\_III\_OOPS Using Java Lab

### **REC\_2028\_OOPS using Java\_Week 3\_CY**

Attempt : 1

Total Mark : 40

Marks Obtained : 40

#### **Section 1 : Coding**

##### **1. Problem Statement:**

Emma, a budding computer vision enthusiast, is working on a challenging image processing project. She has a square image represented as a 2D matrix of integers. As part of a special filter operation, she needs to rotate the image by 90 degrees clockwise, but there's a twist – she must perform the rotation in-place, using no extra space.

This means Emma has to rotate the matrix without creating a new one. Your task is to help her implement a Java program that takes this square matrix as input and rotates it within the same structure.

Can you help Emma efficiently rotate the image so that her project can move to the next stage?

##### ***Input Format***

The first line of input contains a single integer  $n$ , representing the number of rows and columns of the square matrix (i.e., the matrix is of size  $n \times n$ ).

The next  $n$  lines each contain  $n$  space-separated integers, representing the elements of each row of the 2D array.

### ***Output Format***

The first line of output prints "Rotated 2D Array:"

The next  $n$  lines of output print the rotated matrix.

Each line contains  $n$  space-separated integers representing a row of the rotated matrix.

Refer to the sample output for format specification.

### ***Sample Test Case***

Input: 3

1 2 3

4 5 6

7 8 9

Output: Rotated 2D Array:

7 4 1

8 5 2

9 6 3

### ***Answer***

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        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();
            }
        }
    }
}
```

```

    }

    rotateMatrix(matrix, n);

    System.out.println("Rotated 2D Array:");
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < n; j++) {
            System.out.print(matrix[i][j] + " ");
        }
        System.out.println();
    }

    sc.close();
}

public static void rotateMatrix(int[][] matrix, int n) {
    for (int layer = 0; layer < n / 2; layer++) {
        int first = layer;
        int last = n - 1 - layer;

        for (int i = first; i < last; i++) {
            int offset = i - first;

            int top = matrix[first][i];

            matrix[first][i] = matrix[last - offset][first];
            matrix[last - offset][first] = matrix[last][last - offset];
            matrix[last][last - offset] = matrix[i][last];
            matrix[i][last] = top;
        }
    }
}

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement:

Mason is participating in a coding challenge where he must manipulate an integer array. His task is to replace every element in the array with the next greatest element to its right. The last element of the array remains

unchanged, as there is no element to its right.

Your job is to help Mason write a program that performs this transformation and outputs the modified array.

### ***Input Format***

The first line of input contains an integer  $n$  representing the number of elements in the array.

The second line of input contains  $n$  space-separated integers representing the elements of the array.

### ***Output Format***

The output prints the modified array of  $n$  integers, where each element (except the last one) is replaced by the maximum element to its right, and the last element remains unchanged.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 6  
12 3 91 15 12 14  
Output: 91 91 15 14 14 14

### ***Answer***

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int[] arr = new int[n];

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

        replaceWithNextGreatest(arr, n);
    }
}
```

```
        for (int i = 0; i < n; i++) {
            System.out.print(arr[i]);
            if (i < n - 1) {
                System.out.print(" ");
            }
        }
        System.out.println();

        sc.close();
    }

    public static void replaceWithNextGreatest(int[] arr, int n) {
        int maxFromRight = arr[n - 1];

        for (int i = n - 2; i >= 0; i--) {
            int current = arr[i];
            arr[i] = maxFromRight;
            maxFromRight = Math.max(maxFromRight, current);
        }
    }
}
```

Status : Correct

Marks : 10/10

### 3. Problem Statement

Alex is a treasure hunter who collects valuable items during their quests. Each item has a specific point value, and Alex wants to maximize their score by strategically removing items one at a time.

The rule is simple: Alex removes the item with the highest point value in each step until no items are left, summing the values of the removed items to calculate the maximum score.

Help Alex to complete his task.

#### *Input Format*

The first line of input consists of an integer N, representing the size of the array.

The second line of input consists of N space-separated integers, representing the point values of the items.

### ***Output Format***

The output prints "Maximum Sum: " followed by the calculated maximum score after removing all items.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 14  
7 14 21 28 35 42 49 56 63 70 77 84 91 98  
Output: Maximum Sum: 735

### ***Answer***

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int[] items = new int[n];

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

        long maxSum = calculateMaximumSum(items, n);

        System.out.println("Maximum Sum: " + maxSum);

        sc.close();
    }

    public static long calculateMaximumSum(int[] items, int n) {
        long sum = 0;
        for (int i = 0; i < n; i++) {
            sum += items[i];
        }
    }
}
```

```
        return sum;  
    }  
}
```

**Status : Correct**

**Marks : 10/10**

#### 4. Problem Statement

Rina is managing the inventory for a library, where each row of a 2D matrix represents the number of different genres of books available on each shelf.

She wants to perform the following operations:

Transformation: Replace each element in a row with the sum of all elements in that row.  
Merging: After transformation, Rina will provide one additional matrix, and specify whether to merge the transformed matrix with this new matrix row-wise or column-wise.

#### *Input Format*

The first line contains two integers R and C, representing the number of rows and columns of the initial matrix.

The next R lines contain C space-separated integers, representing the book counts in the library.

The next line contains two integers MR and MC, representing the dimensions of the second matrix (to be merged).

The next MR lines contain MC space-separated integers, representing the second matrix.

The last line contains an integer mergeType:

- 0 Row-wise merging (append the second matrix below the transformed matrix).
- 1 Column-wise merging (append the second matrix to the right of the transformed matrix).

#### *Output Format*

The output prints "Transformed matrix: " followed by the transformed 2D matrix

where each element in a row is replaced with the sum of the elements in that row.

The output prints "Final merged matrix: ", followed by the merging based on mergeType.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 3 4

8 2 4 9

4 5 6 1

7 8 9 3

2 4

3 5 7 2

6 1 4 9

0

Output: Transformed matrix:

23 23 23 23

16 16 16 16

27 27 27 27

Final merged matrix:

23 23 23 23

16 16 16 16

27 27 27 27

3 5 7 2

6 1 4 9

### **Answer**

```
import java.util.Scanner;

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

        int R = sc.nextInt();
        int C = sc.nextInt();
        int[][] matrix1 = new int[R][C];
```

```
for (int i = 0; i < R; i++) {
    for (int j = 0; j < C; j++) {
        matrix1[i][j] = sc.nextInt();
    }
}

int MR = sc.nextInt();
int MC = sc.nextInt();
int[][] matrix2 = new int[MR][MC];

for (int i = 0; i < MR; i++) {
    for (int j = 0; j < MC; j++) {
        matrix2[i][j] = sc.nextInt();
    }
}

int mergeType = sc.nextInt();

transformMatrix(matrix1, R, C);

System.out.println("Transformed matrix:");
printMatrix(matrix1, R, C);

int[][] mergedMatrix = mergeMatrices(matrix1, matrix2, R, C, MR, MC,
mergeType);

System.out.println("Final merged matrix:");
if (mergeType == 0) {
    printMatrix(mergedMatrix, R + MR, C);
} else {
    printMatrix(mergedMatrix, R, C + MC);
}

sc.close();
}

public static void transformMatrix(int[][] matrix, int R, int C) {
    for (int i = 0; i < R; i++) {
        int rowSum = 0;
        for (int j = 0; j < C; j++) {
            rowSum += matrix[i][j];
        }
    }
}
```

```
        for (int j = 0; j < C; j++) {
            matrix[i][j] = rowSum;
        }
    }

    public static int[][] mergeMatrices(int[][] matrix1, int[][] matrix2, int R, int C, int
MR, int MC, int mergeType) {
        if (mergeType == 0) {
            int[][] merged = new int[R + MR][C];
            for (int i = 0; i < R; i++) {
                for (int j = 0; j < C; j++) {
                    merged[i][j] = matrix1[i][j];
                }
            }
            for (int i = 0; i < MR; i++) {
                for (int j = 0; j < MC; j++) {
                    merged[R + i][j] = matrix2[i][j];
                }
            }
            return merged;
        } else {
            int[][] merged = new int[R][C + MC];
            for (int i = 0; i < R; i++) {
                for (int j = 0; j < C; j++) {
                    merged[i][j] = matrix1[i][j];
                }
            }
            for (int i = 0; i < MR; i++) {
                for (int j = 0; j < MC; j++) {
                    merged[i][C + j] = matrix2[i][j];
                }
            }
            return merged;
        }
    }

    public static void printMatrix(int[][] matrix, int rows, int cols) {
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) {
                System.out.print(matrix[i][j]);
                if (j < cols - 1) {

```

```
        System.out.print(" ");
    }
}
System.out.println();
}
}
```

**Status : Correct**

**Marks : 10/10**