

# Rajalakshmi Engineering College

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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 : 40

#### 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 × 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  $R2 \times C2$  integers represent the elements of the second matrix.

### ***Output Format***

If matrix multiplication is possible, print R1 lines, each containing C2 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);  
  
        // Read dimensions and elements of the first matrix  
        int R1 = sc.nextInt();  
        int C1 = sc.nextInt();  
        int[][] A = new int[R1][C1];  
        for (int i = 0; i < R1; i++)  
            for (int j = 0; j < C1; j++)  
                A[i][j] = sc.nextInt();  
  
        // Read dimensions and elements of the second matrix
```

```

int R2 = sc.nextInt();
int C2 = sc.nextInt();
int[][] B = new int[R2][C2];
for (int i = 0; i < R2; i++)
    for (int j = 0; j < C2; j++)
        B[i][j] = sc.nextInt();

sc.close();

// Check if multiplication is possible (columns of A == rows of B)
if (C1 != R2) {
    System.out.println("Matrix multiplication not possible");
    return;
}

// Initialize result matrix
int[][] result = new int[R1][C2];

// Perform matrix multiplication
for (int i = 0; i < R1; i++) {
    for (int j = 0; j < C2; j++) {
        int sum = 0;
        for (int k = 0; k < C1; k++) {
            sum += A[i][k] * B[k][j];
        }
        result[i][j] = sum;
    }
}

// Print the result matrix
for (int i = 0; i < R1; i++) {
    for (int j = 0; j < C2; j++) {
        System.out.print(result[i][j]);
        if (j < C2 - 1) System.out.print(" ");
    }
    System.out.println();
}
}
}

```

**Status :** Correct

**Marks :** 10/10

## 2. 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***

```
// You are using Java  
import java.util.Scanner;
```

```

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

        int N = sc.nextInt();           // Number of points
        int[] arr = new int[N];
        for (int i = 0; i < N; i++) {
            arr[i] = sc.nextInt();       // Read sorted points
        }
        sc.close();

        if (N == 0) {
            System.out.println();
            System.out.println(0);
            return;
        }

        int count = 1;                  // Count of unique elements
        System.out.print(arr[0]);        // Print the first point

        for (int i = 1; i < N; i++) {
            if (arr[i] != arr[i - 1]) {
                System.out.print(" " + arr[i]); // Print unique point
                count++;
            }
        }

        System.out.println();           // New line for count
        System.out.println(count);      // Print count of unique points
    }
}

```

**Status :** Correct

**Marks :** 10/10

### 3. 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***

// You are using Java

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

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

```
        // Read number of rows and columns
```

```
        int N = sc.nextInt();
```

```
        int M = sc.nextInt();
```

```

int sum = 0;

// Read the grid values and compute sum
for (int i = 0; i < N; i++) {
    for (int j = 0; j < M; j++) {
        sum += sc.nextInt();
    }
}

// Print result with no extra spaces or newlines
System.out.print(sum);
}
}

```

**Status :** Correct

**Marks :** 10/10

#### 4. 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***

```
// You are using Java
import java.util.Scanner;
```

```
public class Main {
    // Function to check if a number is prime
    public static boolean isPrime(int num) {
        if (num <= 1)
            return false;
        if (num == 2)
            return true;
        if (num % 2 == 0)
            return false;
        for (int i = 3; i * i <= num; i += 2) {
            if (num % i == 0)
                return false;
        }
        return true;
    }

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

        // Read number of elements
        int N = sc.nextInt();

        int[] arr = new int[N];
        int totalSum = 0;

        // Read the array and compute total sum
        for (int i = 0; i < N; i++) {
            arr[i] = sc.nextInt();
        }
    }
}
```



```
        totalSum += arr[i];
    }

    // Try removing each element and check if the new sum is prime
    for (int i = 0; i < N; i++) {
        int newSum = totalSum - arr[i];
        if (isPrime(newSum)) {
            System.out.print(newSum); // No extra newline or space
            return;
        }
    }

    // If no valid prime sum found
    System.out.print("No valid prime sum found");
}
}
```

**Status :** Correct

**Marks :** 10/10