Java Program to Compute the Sum of Diagonals of a Matrix

For a given **2D square** matrix of size **N*N,** our task is to find the **sum of elements in the Principal and Secondary diagonals.**

For example, analyze the following 4 × 4 input matrix.

m00 m01 m02 m03
m10 m11 m12 m13
m20 m21 m22 m23
m30 m31 m32 m33

Basic Input/Output:
Input 1: *6 7 3 4*
8 9 2 1
1 2 9 6
6 5 7 2

Output 1: *Principal Diagonal: 26*
Secondary Diagonal: 14

Input 2: *2 2 2*
1 1 1
3 3 3

Output 2: *Principal Diagonal: 6*
Secondary Diagonal: 6

Understanding Diagonals in a Square Matrix:

- The diagonal on which the **row number and column number are the same** (like elements in positions like (1,1), (2,2), (3,3), (4,4), and so on) is known as the principal diagonal or main diagonal of a square matrix.
- The diagonal in which the **sum of the row number and column number is equal to one less than the size of the matrix** is called the secondary diagonal. It runs from the top-right corner to the bottom-left corner of a square matrix.

```
// Java Program to Find the Sum of Diagonals of a
Matrix


// Importing input output classes

import java.io.*;


// Main Class

public class Geeks

{


    // To calculate Sum of Diagonals

    static void Sum_of_Diagonals1(int[][] matrix, int
N)
```

```
    {
        // Declaring and initializing two variables to
zero
        // initially for primary and secondary diagonal
        // count
        int Pd = 0, Sd = 0;

        // Two Nested for loops for iteration over a
matrix
        // Outer loop for rows
        for (int k = 0; k < N; k++) {

            // Inner loop for columns
            for (int l = 0; l < N; l++) {

                // Condition for the principal
                // diagonal
                if (k == l)
                    Pd += matrix[k][l];
```

```
            // Condition for the secondary diagonal
            if ((k + l) == (N - 1))
                Sd += matrix[k][l];
        }
    }

    // Print and display the sum of primary
diagonal
    System.out.println("Sum of Principal
Diagonal:"
                    + Pd);
    // Print and display the sum of secondary
diagonal
    System.out.println("Sum of Secondary
Diagonal:"
                    + Sd);
  }
```

```
    // Main driver method
    static public void main(String[] args)
    {

        // Input integer array
        // Custom entries in an array
        int[][] b = { { 8, 2, 13, 4 },
                      { 9, 16, 17, 8 },
                      { 1, 22, 3, 14 },
                      { 15, 6, 17, 8 } };

        // Passing the array as an argument to the
        // function defined above
        Sum_of_Diagonals1(b, 4);

    }
}
```