جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

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قسم الانظمة الطبية الذكية

Lecture: (5)
Major and minor diagonals in a one-dimensional and binary array in Java

Subject: Computer Programming
Class: One

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Major and minor diagonals in a one-dimensional and binary array in Java

● **First: The One-Dimensional Array (1D Array)**

Example:

int[] arr = {1, 2, 3, 4};

☞ It has no primary or secondary diagonals.

Because a diagonal requires **rows and columns**, and a one-dimensional array only has one dimension.

Therefore:

✕ No primary diagonal

✕ No secondary diagonal

● **Second: The 2D Array**

It must be a **square array (n × n)** in order to discuss diagonals.

Example:

```
 int[][] matrix = {

    {1, 2, 3},

    {4, 5, 6},
```

● **Main Diagonal**

These are the elements whose location is:

i == j

📌 **Elements: 1, 5, 9**

Code:

```
int n = matrix.length;

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

   System.out.print(matrix[i][n - i - 1] + " ");

}
```

💡 Important Notes

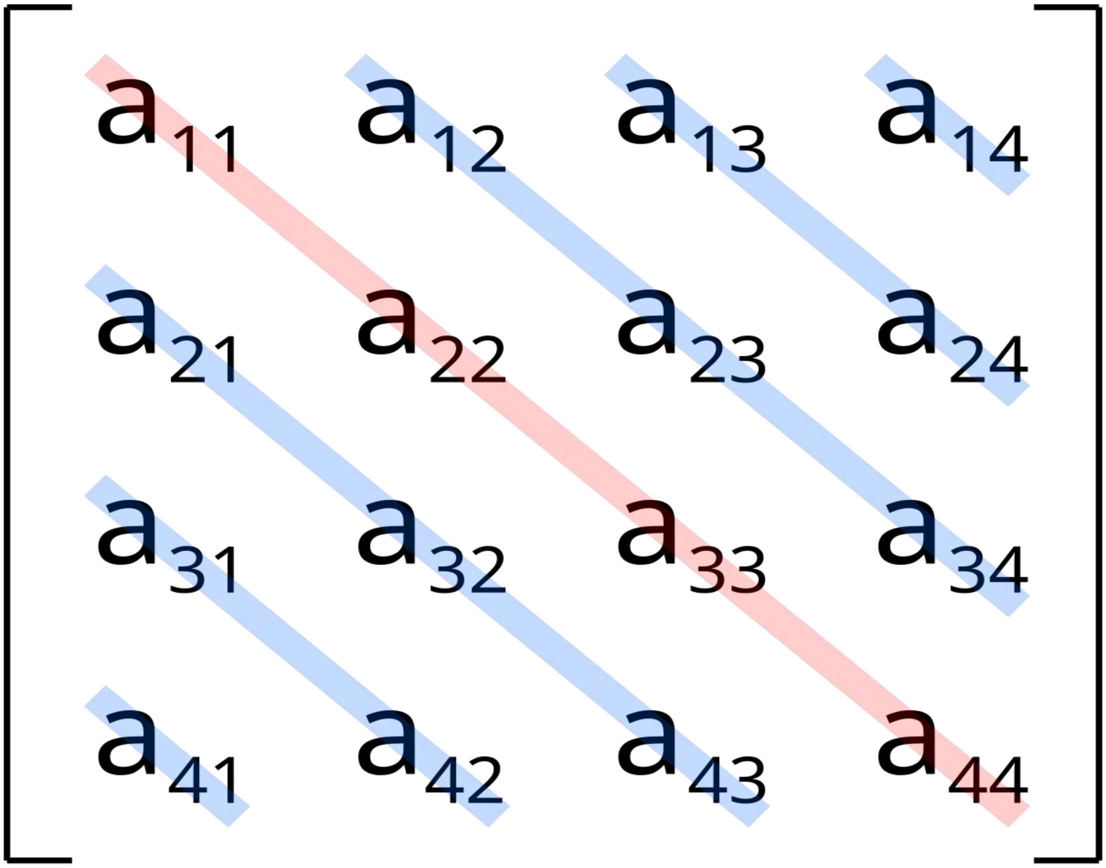
1.Diagonals only exist in **square matrices**.

2.The middle element (e.g., **5**) belongs to one of the diagonals if the number of rows is odd.

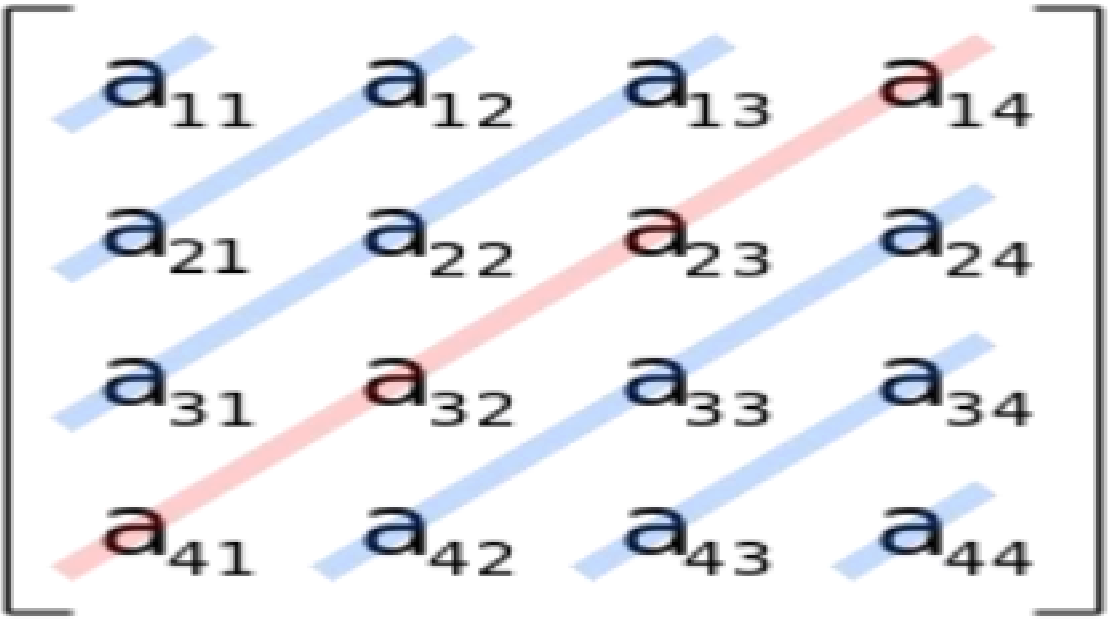
3.If the matrix is **not square**, we do not use the concept of a diagonal.

🔥 Quick Summary

Type	Main Diameter	Secondary Diameter
1D Array	Not Found	Not Found
2D Array	matrix[i][i]	matrix[i][n-i-1]



$$\begin{bmatrix} a_{11} & a_{12} & a_{13} & a_{14} \\ a_{21} & a_{22} & a_{23} & a_{24} \\ a_{31} & a_{32} & a_{33} & a_{34} \\ a_{41} & a_{42} & a_{43} & a_{44} \end{bmatrix}$$



$$\begin{bmatrix} a_{11} & a_{12} & a_{13} & a_{14} \\ a_{21} & a_{22} & a_{23} & a_{24} \\ a_{31} & a_{32} & a_{33} & a_{34} \\ a_{41} & a_{42} & a_{43} & a_{44} \end{bmatrix}$$

Code Main and Seconary in binary array

```
public class mainandsecondroy {
      public static void main(String[] args) {
            // TODO Auto-generated method stub
            int[][] matrix = {
                  {1, 2, 3},
                  {4, 5, 6},
                  {7, 8, 9}
              };
              int n = matrix.length;
              //Main Diagonal
              System.out.print("Main Diagonal: ");
              for (int i = 0; i < n; i++) {
                  System.out.print(matrix[i][i] + " ");
              }
              System.out.println();
              //Secondary Diagonal
              System.out.print("Secondary Diagonal: ");
              for (int i = 0; i < n; i++) {
                  System.out.print(matrix[i][n - i - 1] + " ");
              }}}
```

Output:

```
Main Diagonal: 1 5 9
Secondary Diagonal: 3 5 7
```