Lab Exercise-2

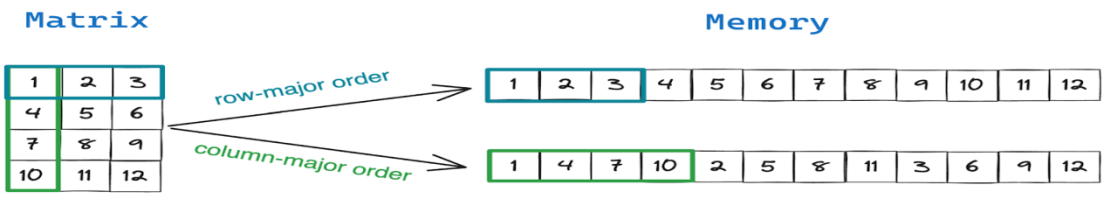
Date:22/07/2025

What is Row-Major Order?

In row-major order, elements of a 2D array are stored row by row in contiguous memory locations. Stores the entire first row first, then the second, and so on. Row elements are adjacent in memory, improving row-wise access speed.

What is Column-Major Order?

In **column-major order**, array elements are stored **column by column**. Stores all elements of the first column, then the second, and so on. Column elements are stored contiguously.



Identity Matrix :

An identity Matrix is a square matrix whose all diagonal elements are equal to 1 and the rest the elements are zero. The identity Matrix is also known as the Unit Matrix.


```
#include <stdio.h>


void createIdentityMatrix(int size) {
```

```
int matrix[size][size];


// Initialize the matrix
for (int i = 0; i < size; i++) {
   for (int j = 0; j < size; j++) {
      if (i == j) {
         matrix[i][j] = 1; // Set diagonal elements to 1
      } else {
         matrix[i][j] = 0; // Set other elements to 0
      }
   }
}
```

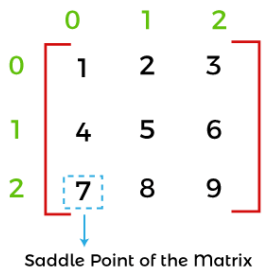
Q:1 Create an Identity Matrix of 4X4.

Q:2 WAP to solve the following 2D Array in C/C++

1. Write a C/C++ program to perform addition of two matrixes: C=A+B.
2. Write a C/C++ program to perform multiplication of two matrixes: C = A × B.
3. Create a program to:
   • Accept a matrix A (m x n).
   • Find its transpose A^T (n x m).
   • Display both the original and the transposed matrices.
4. Saddle Point of a Matrix Find and print all saddle points in a matrix. A saddle point is the minimum element in its row but the maximum in its column.

   What is the saddle point in a matrix?

   In a matrix, an element is called the **saddle point** that is the **minimum (or smallest) element row-wise and maximum (or largest) element column-wise.** The term saddle point is widely used in game theory.



Traverse all rows one by one and do the following for every row i.

-Find the minimum element of the current row and store the column index of the minimum element.

-Check if the row minimum element is also maximum in its column. We use the stored column index here.

-If yes, then saddle point else continues till the end of the matrix.

5. Declare and initialize a 3D array of size 2×3×4. Write a program to display all elements of the array and print the elements.