Lab-IV
National Institute of Technology Silchar
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Subject Code: CS-201 | Subject: Data Structures
Semester: 3rd | Department: CSE
Course: B.Tech | Section: A

You have to write the time complexities and space complexities in the lab copies for all questions.

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1. Write a program to rotate a matrix 90° anti-clockwise.
2. Given $m \times n$ matrix containing double values. Write a program to find the summation of each row and column.
3. Write a program to display a matrix in spiral order.
4. Write a program to display a square matrix's upper and lower triangular matrix. Also, write a program to print the principal and secondary principal diagonal matrix.
5. Write a program to swap major and minor diagonals of a square matrix
   Example input:
   0 1 2
   3 4 5
   6 7 8
   Output:
   2 1 0
   3 4 5
   8 7 6
6. A sparse matrix is a 2D array in which most of the elements are zero. To represent a sparse matrix, we consider the following matrix-

$$\begin{pmatrix} 0 & 0 & 4 & 0 & 0 \\ 3 & 0 & 0 & 1 & 0 \\ 0 & 2 & 0 & 0 & 5 \\ 0 & 0 & 0 & 2 & 0 \end{pmatrix}$$

   The above-given matrix can be represented using 2D array representation as given below-

$$\begin{bmatrix} 0 & 1 & 1 & 2 & 2 & 3 \\ 2 & 0 & 3 & 1 & 4 & 3 \\ 4 & 3 & 1 & 2 & 5 & 2 \end{bmatrix}$$

Alternatively, we can also represent the sparse matrix as given below-

$$\begin{bmatrix} 0 & 2 & 4 \\ 1 & 0 & 3 \\ 1 & 3 & 1 \\ 2 & 1 & 2 \\ 2 & 4 & 5 \\ 3 & 3 & 2 \end{bmatrix}$$

Given two sparse matrix representation $A[k][3]$ and $B[k][3]$. Write a program to add $A[k][3]$ and $B[k][3]$.