Assignment-III

National Institute of Technology Silchar

Subject Code: CS-201 | Subject: Data Structures
Semester: 3rd B.Tech. | Department: CSE
Section: A | Due Date: 11^{th} September 2023

Answers should be submitted in a scanned copy of the handwritten format. Also, submit the source code of the corresponding questions in a zip folder.
Write functions for all questions given below.

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1. 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 $B[k][3]$.

   (a) Write a program to add $A[k][3]$ and $B[k][3]$.

   (b) Write a program to subtract $A[k][3]$ and $B[k][3]$.

   (c) Write a program to multiply $A[k][3]$ and $B[k][3]$.

   (d) Write a program to perform $(A[k][3])^n$.

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