

# Homework Assignment- 4

Due date - September 7, 2016

August 31, 2016

## Problem 1:

Implement Sparse Matrix ADT using Linked List and perform the following operations over the Sparse Matrix ADT:

1. Addition of two Sparse Matrices
2. Subtraction of two Sparse Matrices and
3. Multiply a matrix and a vector

**Input Description:** Assuming the above numbering to be option numbers for corresponding operations, your program must take **option** as first input and depending on operation, further input description is as follows:

**Option 1 & 2:** First line will contain two space separated integers **m** and **n** where  $m$  corresponds to the number of rows and  $n$  to the number of columns.

Next **2m** lines contain  $n$  space separated integers each with first  $m$  lines corresponding to the elements of the first matrix and rest  $m$  to the elements of the second matrix

**Option 3:** Everything same as option 1 & 2 except the last  $m$  lines will each contain only a single integer denoting the elements of  $m \times 1$  vector

**Note:** Your program must terminate if user enters -1

**Output Description:** There must be as many number of lines as the number of rows in the resulting matrix with each line containing space-separated elements of the row **Example:** testcases along with solutions will be updated soon

## Question 2

In this Question, you're supposed to implement operations on **Circular Linked List**. These type of lists have a property that the last node of the list points to first node and thus forms a cyclic-list

Implement functions declared in **CList.h** in **CList.c** and if implemented successfully running the script must pass all the testcases. Driver program, named **q2.c**, has been included in **Code** directory

## Question 3

As part of this question, you're supposed to implement functions to perform operations on **Doubly-Linked-List**. These type of lists are used in applications which requires traversal in both directions from the current node. For Example- in lift simulators where movements in both directions happen, browser history where users can switch back and forth between pages and so.

implement functions declared in **DList.h** in **DList.c** and use the driver program **q3.c** to check your implementation as you did in Lab.