**UCS 2312 Data Structures Lab**

**Assignment 3: Doubly Linked List and its applications**

**Date of Assignment: 19.09.2023**

Create an ADT for the doubly linked list data structure with the following functions. Each node which consists of integer data, address of left and right nodes [CO1, K3]

Create a ListADT which has implementations for the following operations

1. Insert an item in the front of the list

void insertFront(listADT L, int c)

1. Insert an item at the end of the list

void insertEnd(listADT L, int c)

1. Insert an item ‘d’ after the first occurrence ‘c’ of the list

void insertMiddle(listADT L, int c, int d)

1. Display the items from the list

void displayItems(listADT L)

1. Delete the item present in the list

void deleteItem(listADT L, int c)

1. Search an element in the list and return the number of occurrences

int searchItem(listADT L, int c)

Write a program in C to test the ListADT for its operations with the following test cases.

Testcase:

Initially L is Empty

insertFront(L,6) 🡪 header🡨🡪6

insertEnd(L,2) 🡪 header🡨🡪2🡨🡪6

insertMiddle(L,2,1) 🡪 header🡨🡪2🡨🡪1🡨🡪6

insertMiddle(L,2,1) 🡪 header🡨🡪2🡨🡪1🡨🡪1🡨🡪6

search(L,1) 🡪 2

In addition, do the following operations:

1. Check whether the list contains duplicates?
2. Create separate lists containing even and odd numbers from the list
3. Add two 10-digit numbers using the list