**UCS 2312 Data Structures Lab**

**Exercise 2: ListADT and its applications**

**Date of Exercise: 19.09.2023**

Create an ADT for the linked list data structure with the following functions. list*ADT* will have the integer array and size. [CO1, K3]

1. insert(header,data) – Insert data into the list using inserting at front
2. display(header) – Display the elements of the list
3. insertAtEnd(header,data) – Insert data at the end of the list
4. searchElt(header, key) – return the value if found, otherwise return -1
5. findMiddleElt(header) – find the middle element in the list
6. reverseList(header) – Reverse the list
7. detectLoop(header) – return the status of whether the loop is present or not
8. deleteElt(header,data) – Deletes the element data

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

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| **Operation** | **Expected Output** |
| length(header) | 0 |
| insert(header,2) | 2 |
| insert(header,4) | 4, 2 |
| insert(header,6) | 6, 4, 2 |
| insert(header,8) | 8, 6, 4, 2 |
| length(header) | 4 |
| insertLast(header,1) | 8, 6, 4, 2, 1 |
| insertLast(header,3) | 8, 6, 4, 2, 1, 3 |
| length(header) | 6 |
| findMiddleElt(header) | 2 or 4 |
| reverseList(header) | 3, 1, 2, 4, 6, 8 |
| searchElt(4) | 4 |
| searchElt(5) | -1 |
| deleteElt(2) | 8, 6, 4, 1, 3 |

Best practices to be followed:

* Design before coding
* Usage of algorithm notation
* Use of multi-file C program
* Versioning of code

Write a program to subtract the given two polynomials

Example:

Poly1: 6x7+8x3 +7x2+9,

Poly2: 7x3+6

Resultant Poly: 6x7+15x3+7x2+15

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