

# IT 623 Data Structures

## Lab:3 Exercise

### Question 1

Write a program to make a singly linked list with functions to:

1. Add node in front
2. Add node in back
3. Delete a node
4. Insert in between

Example Input:

- Add 10 at back
- Add 20 at back
- Add 5 at front
- Insert 15 after 10
- Delete 20

Expected Output:

5 -> 10 -> 15

### Question 2

Using the code of Question 1, try to add your student ID as input for the linked list. Delete the first 3 nodes from it, and then make a function which returns the sum of all the remaining node values.

Example Input:

- Student ID: 123456
- Linked List: 1 -> 2 -> 3 -> 4 -> 5 -> 6
- Delete first 3 nodes

Expected Output:

Linked List: 4 -> 5 -> 6

Sum = 15

### Question 3

Make a code to implement a doubly linked list which has the ability to add nodes in front and back, and delete elements.

Example Input:

- Add 10 at front
- Add 20 at back
- Add 5 at front
- Delete 20

Expected Output:

5 <-> 10

### Question 4

Using the code of Question 3, check if the node values added in the linked list are a palindrome or not.

Example Input:

Linked List: 1 <-> 2 <-> 3 <-> 2 <-> 1

Expected Output:

Palindrome: Yes

### Question 5

Make a program to implement a circular linked list.

Example Input:

- Add 10, 20, 30
- Traverse the list

Expected Output:

10 -> 20 -> 30 -> (back to head)