

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
NITK – Surathkal**

**CS204: Data Structures and Algorithms Lab
Assignment - 3**

Instructions:

1. Implement the following exercise using C.
2. You are required to complete this exercise on or before 18/11/2022.
3. Submit all the programs in a single `.zip` file.

Exercise:

1. Create a singly linked list and implement the following operations:
 - a. Insert node at the front.
 - b. Insert node at the end.
 - c. Insert node at a specified position
 - d. Delete node at the front.
 - e. Delete node at the end.
 - f. Delete node at a specified position
 - g. Traverse the list and print the elements of the list.
2. Create a doubly linked list and implement the following operations:
 - a. Insert node at the front.
 - b. Insert node at the end.
 - c. Insert node at a specified position
 - d. Delete node at the front.
 - e. Delete node at the end.
 - f. Delete node at a specified position.
 - g. Traverse the list and print the elements of the list.
3. Create a circular linked list and implement the following operations:
 - a. Insert node at the front.
 - b. Insert node at the end.
 - c. Insert node at a specified position.
 - d. Delete node at the front.
 - e. Delete node at the end.
 - f. Delete node at a specified position.
 - g. Traverse the linked list and print the elements of the list.

4. Create a circular doubly linked list and implement the following operations:
 - a. Insert node at the front.
 - b. Insert node at the end.
 - c. Insert node at a specified position
 - d. Delete node at the front.
 - e. Delete node at the end.
 - f. Delete node at the a specified position
 - g. Traverse the linked list and print the elements of the list.
5. Write a program to add two polynomials using Linked list.
6. Write a program to count the number of nodes in a given linked list.
7. Write a program to merge two sorted linked lists.
8. Write a program to concatenate two linked lists.
9. Write a program to reverse a linked list using:
 - a. Iterative approach
 - b. Recursive approach
10. Write programs to compare two linked lists:
 - a. Check if elements and arrangements are same in both the linked lists
 - b. Check if only elements are same.