Sardar Vallabhbhai National Institute of Technology, Surat Department of Artificial Intelligence Data Structure (AI102) B.Tech I - II Semester

Assignment-4

Write C/C++ program for the following

- Q1: Given a linked list of n nodes and an integer k, write a function to rotate the linked list counter clockwise by k nodes.
- Q2: Given an unsorted linked list of n nodes, remove duplicates from the list.
- Q3: Given a singly linked list of n nodes, detect if it contains a loop or not.
- Q4: Write a C/C++ program to implement **doubly linked list** with the following function
- (i) insertAtFirst(&head, new_data): This function should insert the new data/element at the beginning of the linked list.
- (ii) insertAtEnd(&head, new_data): This function should insert the new data/element at the end of the linked list
- (iii) insertAtMiddle(&head, new_data): This function should insert the new data/element at the middle of the linked list
- (iv) insertAfterNode(&head, given_node, new_data): This function should insert the new data/element after the given node in the linked list.
 - **Example:** Suppose, you want to insert 60 after node 40 in the given linked list $10 \leftrightarrow 20 \leftrightarrow 30 \leftrightarrow 40 \leftrightarrow 50$, the updated linked list will be $10 \leftrightarrow 20 \leftrightarrow 30 \leftrightarrow 40 \leftrightarrow 60 \leftrightarrow 50$
- (v) display(&head): This function should display the content of the linked list

Note:

- 1. If the linked list has 4 elements, let's say 10, 20, 30, and 40, the linked list should be displayed in the following format $10 \leftarrow 20 \leftarrow 30 \leftarrow 40$
- 2. After each operation, you should display the content of the linked list.