**National University of Computer and Emerging Sciences**



Laboratory Manual

for

Data Structures Lab

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**Objectives:**

In this lab, students will practice:

1. Singly Linked List

**Question 1**

1. Implement a template class ‘Node’ that contains two data members: A template variable ‘data’ and a Node pointer ‘next’. You may define any member functions, if required, for the template class.
2. Now using the above class, implement a singly linked list which supports the following operations:
3. Insert at start void insertAtStart(T const element);
4. Insert at end void insertAtEnd(T const element);
5. Print void print() const;
6. Search an element bool search(T const& element) const;
7. Check whether the list is empty bool isEmpty() const;
8. Insert value v1 before value v2 bool insertBefore(T const v1, T const v2 ) const;
9. Delete all occurrences of a given value void deleteAll(T const value)
10. Destructor
11. Delete from Start void DeleteAtStart();
12. Now create a main function which has the following instructions:
    1. Define a linked list object of type int.
    2. Insert 2, 6, and 7 at start
    3. Insert 9 at the end.
    4. Now insert 7, 8, and 9 at start.
    5. Delete all occurrences of 7.
    6. Now print the linked list.
    7. Search for 2, 9 and 10.
    8. Now delete from Start and print the linked list.

**Question 2**

**1.** Make a link list **A** that has 5 elements. (**e.g 4->1->5->8->3**).

**2**. Make a link list **B** that have 10 elements (**e.g 4->6->1->8->5->10->2->7->3->9**).

1. Make a function Union that takes two arguments link list **A** and link list **B** and return a new link list **C** that is union of link list **A** and **B.**