**National University of Computer and Emerging Sciences**



Laboratory Manual

for

Data Structures Lab

| Course Instructor | Mr. Uzair Naqvi |
| --- | --- |
| Lab Instructor(s) | Marwa Khan |
| Section | BCS-3J |
| Semester | Fall 2022 |

**Department of Computer Science**

FAST-NU, Lahore, Pakistan

**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**

Now write a member function reverse which reverses the linked list.