National University of Computer and Emerging Sciences

Laboratory Manual

for

Data Structures Lab

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Section	CS-E
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Objectives:

In this lab, students will practice:

1. Doubly Linked List and its operations

Question 1

1. Implement a template class 'Node' that contains three data members: A template variable 'data', a Node pointer 'next', and another node pointer 'prev'. You may define any member functions, if required, for this template class.

2. Now using the above class, implement a doubly linked list which has **a dummy head and a dummy tail**, and supports the following operations:
   a. Insert at start: `void insertAtStart(T const element)`
   b. Insert at end: `void insertAtEnd(T const element)`
   c. Delete from Start: `void DeleteAtStart()`
   d. Delete from end: `void DeleteAtEnd()`
   e. Print `void print() const`
   f. Reverse all elements of linked list: `void reverse()`
   g. remove all duplicate values: `void removeDuplicates()`
   h. Insert value v1 before value v2: `bool insertBefore(T const v1, T const v2 )`
   i. Destructor

3. Now create a main function which has the following instructions:
   a. Define a doubly linked list object of type int.
   b. Insert 7 and 9 at end.
   c. Insert 9 at start.
   d. Now insert 10, and 9 at end.
   e. Now print the linked list.
   f. Remove all duplicate values.
   g. Insert 6 before 11.
   h. Print the linked list.
   i. Reverse all elements of linked list.
   j. Now print the linked list.