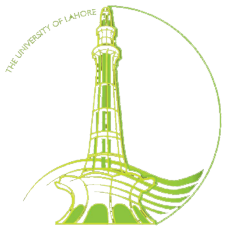

THE UNIVERSITY OF LAHORE ISLAMABAD CAMPUS

Data Structures & Algorithms (CS09203)

Lab Report

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Lab Report #:	06
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Experiment # 1
Create a C++ program to implement Doubly Linked List and Travers it

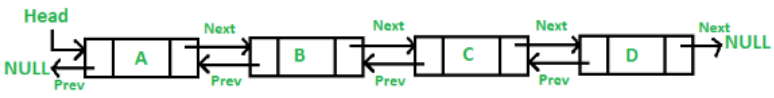
Objective
To understand and implement the DOubly Link List with basic Insertion, and Traversal.

Software Tool
1. Sublime Text Editor
2. Dev C++
3. Window 7 (32 Bit)

1 Theory

A doubly-linked list is a linked data structure that consists of a set of sequentially linked records called nodes. Each node contains two fields, called links, that are references to the previous and to the next node in the sequence of nodes.

A Doubly Linked List (DLL) contains an extra pointer, typically called previous pointer, together with next pointer and data which are there in singly linked list.



2 Task

2.1 Procedure: Task 1 Insertion at the start

In this Doubly Linked List user can insert integer type of the data and the data will always be inserted in the start of the list.

```
void insert(node* newNode){
        node* last_node = (node*)malloc(sizeof(node));
        last_node = head;
        head = newNode;
        newNode -> pre = NULL;
        newNode -> next = last_node;
        return;
}
```

Output:

Please see Figure 1 for output

2.2 Procedure: Task 2 Traverse

```
void display(){
        node* newNode = (node*)malloc(sizeof(node));
        newNode = head;
        cout<<"\n\nData in the list\n\n";
        while(newNode != NULL){
                cout<<newNode -> data<<" ";
                newNode = newNode -> next;
        }
        cout<<"\n\nPress any key to continue..";
        getch();
        return;
}
```

Output:

Please see Figure 2 for output

Source Code
https://goo.gl/ccBvqK

3 Conclusion

A Doubly linked list is a linear data structure where each element is a separate object. Each element is called as a node, that contains three item - the data, a reference to the previous node, and a reference to the next node. The last node has a reference to null. The entry point into a Doubly linked list is same as the simple linked list called the head of the list. A Doubly linked list is a dynamic data structure. The number of nodes in a list is not fixed and can grow and shrink on demand.

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(Concerned Teacher/Lab Engineer)

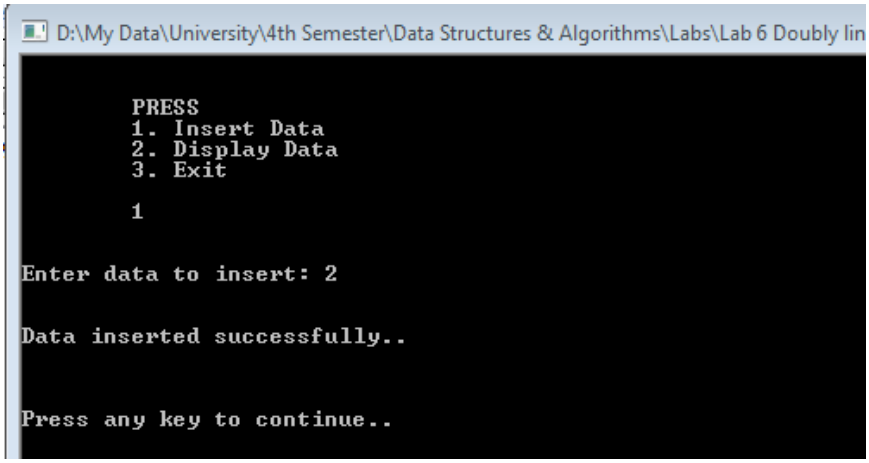

Figure 1: Inserting in the list

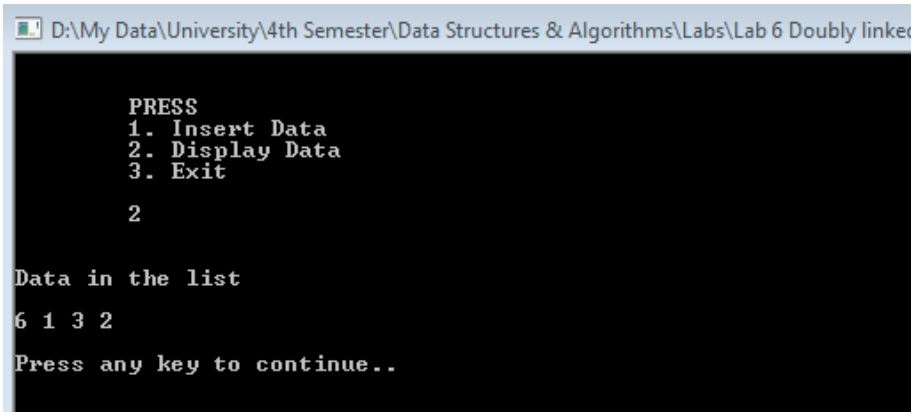

Figure 2: Displaying after insertion