

**LAB 3- Singly Linked List (Insert at End, Insert at Start)**

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Task: Implement a singly linked list with functions to insert a node at the start and at the end. Display the list after each insertion.

**ANSWER**

**CODE**

#include <iostream>

using namespace std;

class Node{

    public:

        int data;

        Node\* next;

        Node(int data){

            this->data=data;

            next=NULL;

        }

};

class LinkedList{

    public:

        Node\* head;

        LinkedList(){

            head=NULL;

        }

    //display

        void display(){

                Node\* tem=head;

                while(tem!=NULL){

                    cout<<tem->data<<"->";

                    tem=tem->next;

                }

                cout<<"Null\n";

            }

        //at start

        void insertAtStart(int d){

            Node\* newNode=new Node(d);

            newNode->next=this->head;

            this->head=newNode;

        }

        // at end

        void insertAtEnd(int d)

        {

            Node\* newNode=new Node(d);

            if(head==NULL){

                head=newNode;

                return;

            }

            Node\* tem=head;

                while(tem->next!=NULL){

                    tem=tem->next;

                }

                tem->next=newNode;

        }

};

int main(){

    LinkedList link;

    link.insertAtStart(10);

    cout << "Linked List Contents:" << endl;

    link.display();

    link.insertAtEnd(0);

    cout << "Linked List Contents:" << endl;

    link.display();

}

**How it works:**

1. **Insert at Start:**
   * **Create a new node.**
   * **Set its next pointer to the current head.**
   * **Update head to point to the new node.**
2. **Insert at End:**
   * **Create a new node.**
   * **Traverse the list to find the last node.**
   * **Set the last node’s next pointer to the new node.**
3. **Display Function:**
   * **Traverse the list and print each node’s value.**

**Why it works:**

* **Inserting at the start is O(1) (constant time) because we just update the head.**
* **Inserting at the end is O(n) because we traverse the list to find the last node.**

**OUTPUT**

**A screen shot of a computer

AI-generated content may be incorrect.**