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**LAB 4 - SINGLY LINKED LIST (INSERT AT SPECIFIC LOCATION)**

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Subject: DSA LAB

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Task: Write a function to insert a node at a specific position in a singly linked list, ensuring valid position handling.

**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;

        }

            //at start

        void insertAtStart(int d){

            Node\* newNode=new Node(d);

            newNode->next=this->head;

            this->head=newNode;

        }

    //display

        void display(){

                Node\* tem=head;

                while(tem!=NULL){

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

                    tem=tem->next;

                }

                cout<<"Null\n";

            }

        // at specifc number:

        void insertAt(int d, int n) {

        Node\* newNode = new Node(d);

        if (n == 1) {

            newNode->next = head;

            head = newNode;

            return;

        }

        Node\* tem = head;

        int num = 1;

        while (tem != NULL && num < n - 1) {

            tem = tem->next;

            num++;

        }

        if (tem == NULL) {

            cout << "Invalid position: " << n << endl;

            delete newNode;

            return;

        }

        newNode->next = tem->next;

        tem->next = newNode;

    }

};

int main(){

    LinkedList link;

    link.insertAtStart(10);

    link.insertAtStart(20);

    link.insertAtStart(30);

    link.insertAt(101,1);

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

    link.display();

}

**How it works:**

1. **If inserting at position 1, update head.**
2. **Otherwise, traverse to n-1 position.**
3. **Insert the new node by updating pointers.**
4. **If n is out of range, print an error message.**

**Why it works:**

* **We ensure valid position handling (avoiding errors if the position is too large).**
* **The complexity is O(n) for general insertion.**

**OUTPUT**

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