**Assignment 3: Implementing a templatized Doubly Linked List ADT (DLADT).**

Part A: The ADT is called **DLADT**.

The DLADT contains a node pointer that points to the first node in the list.

The structure of the node is given below. The node is a template class, and contains generic datatype T.

class node

{

public:

T data;

node\* next, \*prev;

};

1. void insert(T a) //insert the node at the end.
2. bool remove (T a)
3. int count()
4. Constructor and destructor
5. int valAtCenterNode();
6. int removefromPosition(int index) //returns 0 if index is out of bounds.
7. void printForward() //MUST be a recursive function. Note: as an option, this function can also call another function that can be recursive.
8. void printBackward();

Part B: Driver Program. Test the following code. Then code should execute without errors and WITHOUT ANY CHANGES. I will copy paste this exact code in main and if there is an error of any sort, your entire code will be considered incorrect and incomplete.

DLADT<int> L;

for (int i = 0; i < 10; i++)

L.insert(i\*2);

cout << L.valAtCenterNode();

cout<<"\nRemoving: "<<L.removefromPosition(6)<<endl;

cout << L.valAtCenterNode();

if (L.remove(12))

cout << "Removed";

else

cout << "No Removed";

L.printBackward();

Part C: Application (or not)

Implement a digital Student Telephone Directory. Each node contains the following information:

1. First name or char first[20];
2. Last name char last[20];
3. Telephone number char tel[20];
4. Char roll no or char roll\_no[10];

You can do this using either way:

1. Create a struct record containing these elements, and use the templatized linked list OR
2. Create a struct record, new node class and linked list class for datatype record using template specialization
3. Store all student information in node and create a new linkedlist called **DLRecordADT**. Create

The program begins with a menu:

1. Enter a record
2. Delete a record
   1. By name
   2. By tel no.
3. Search a record
   1. By tel no
   2. By name //look in both first and last name
4. Print records. Format:

Name: <full name>

Roll No:

Telephone number:

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Name: <full name>

Roll No:

Telephone number:

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And so on…

Good luck!