Data Structures and Algorithms

Lab Journal - Lab 8

Name: ___________________________________

Enrollment #: ___________________________________

Class/Section: ___________________________________

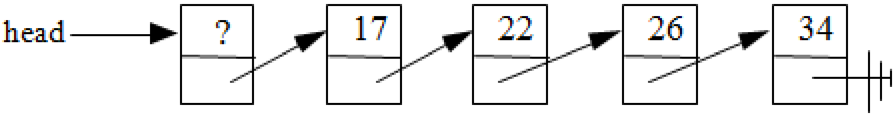
Objective

This lab session is aimed at introducing students to different variants of linked lists. Furthermore, the students will also implement a number of utility functions involving linked lists.

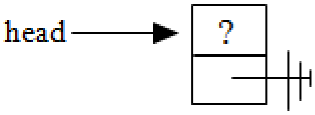
Task 1 :

Give answers to the following.

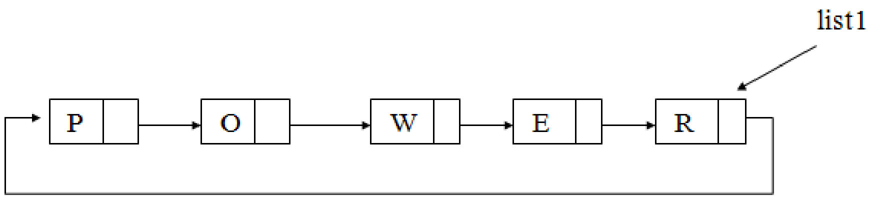
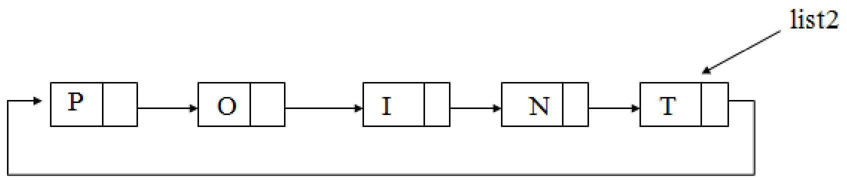
1. In some cases, a dummy header node is introduced in linked lists so that every node has a predecessor and generic insertions and deletions can be implemented.



An empty list, in such cases is given by:



Provide the implementation of the constructor of a linked list with a dummy header node.

2.	Provide the implementation of the function **`bool isEmpty()`** for a linked list having a dummy header node.
3.	Draw a circular linked list of integers with a single node having a value 0.
4.	Consider the following two circular linked lists with pointers on their last nodes.  

Write C++ statements to merge the two lists into one single list with contents POWERPOINT.

Task 2 :

Implement the following exercises.

Exercise 1

Implement the (class) Circular Linked List to create a list of integers. You need to provide the implementation of the member functions as described in the following.

```
class CList
{
private:
     Node * head;
public:
     CList();

     // Checks if the list is empty or not
     bool emptyList();

     // Inserts a new node with value 'value' at position 'pos'
     in the list
     void insert (int pos, int value);

     // Inserts a new node at the start of the list
     void insert_begin(int value);

     // Inserts a new node at the end of the list
     void insert_end(int value);
```

```
    // Deletes a node from position ‘pos’ of the list
    void deleteNode(int pos);

    // Deletes a node from the beginning of the list
    void delete_begin();

    // Deletes a node from the end of the list
    void delete_end();

    // Displays the values stored in the list
    void traverse();
};
```

Exercise 2

Write C++ functions to :

- Reverse a singly linked list with dummy header node using stack (rearrange links not just data).
- Display the contents of alternate nodes of circular doubly linked list.

Implement the given exercises and get them checked by your instructor. If you are unable to complete the tasks in the lab session, deposit this journal alongwith your programs (printed or handwritten) before the start of the next lab session.

S No.	Exercise	Checked By:
1.	Exercise 1	
2.	Exercise 2	

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