National University of Computer and Emerging Sciences

Lab Manual

For

Data Structures Lab

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Lab Manual 03

Objectives:

After performing this lab, students shall be able to revise:

Doubly Link List

Problem 1

Implement a template class **'Node'** that contains three data members: A template variable 'data', a Node pointer 'next', and another node pointer 'prev'. Now using the above class, implement a doubly integer linked list (having two pointer head and tail) which supports the following operations:

a) void insertAtHead(int const element);
b) void insertAtTail(int const element);
c) void DeleteFromHead();
d) void DeleteFromTail();
e) void printForward() const; This function should print values from head to tail.
f) void PrintReverse() const; This function should print values from Tail to head.
g) int size() const; This function should return the size of Doubly Linked List.
h) int ReturnMiddle() const;.
i) bool IsEmpty(); Return true if FRONT/TAIL is pointing to NULL otherwise false.
j) int FindMax() const;
k) void InsertAfter(val, key); It should enter the new Node with the value key, after the first occurance of value val. If not found insert at Tail
l) void InsertBefore(val, key); It should enter the new Node with the value key, before the first occurance of value val. If not found insert at Tail
m) int FindMax() const;
n) bool Swap(LeftIndex,RightIndex): Swap the Node on Left index with Node on Right index, you are not allowed to swap the data, you have to swap the addresses of these nodes to apply the Swap. take care of the edge cases like swapping the first and last value. Maintain the previous pointers as well. **(BONUS)**
o) void merge(LinkedList &firstHalf, LinkedList &secondHalf); Merge two link lists in one list.
p) Copy Constructor
q) Destructor

Good Luck