National University of Computer and Emerging Sciences

Lab Manual

for

Object Oriented Programming

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Lab Manual 02

Objectives:

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

- ✓ Link list
- ✓ template

Problem 1

1. Implement a Struct 'Node' that contains two data members: A template variable 'data' and Node pointer 'next'.
2. Now implement a singly linked list class having two private data member Node pointer 'head' and Node pointer 'tail'. Please note that Node class is a nested class of linked list class. **(Note that Struct Node is defined inside the List class)**
3. Now implement the following operations for linked list class:

   a. Insert at start `void insertAtHead(T const element);`
   b. Insert at end `void insertAtTail (T const element);`
   c. Print `void print() const;`
   d. Delete at Start `void eraseAtHead ();`
   e. Delete at End `void eraseAtTail();`
   f. Destructor

4. Now create a main function which has the following instructions:
   a. Define a linked list object of type int.
   b. Insert 2, 6, 7 at start
   c. Insert 3, 8, 1 at End
   d. Delete at Start
   e. Delete at End
   f. Now print the linked list. **(Sample answer 6->2->3->8)**

Problem 2

1. Make a link list **A** that has 5 elements. (**e.g 4->1->5->8->3**)
2. Make a link list **B** that have 10 elements(**e.g 4->6->1->8->5->10->2->7->3->9**)
3. Make a function Union that takes two arguments link list **A** and link list **B** and return a new link list **C** that is union of link list **A** and **B**
4. Make a function Intersection that takes two argument link list **A** and link list **B** and return a new link list **C** that is intersection of link list **A** and **B**
5. Make a function sortedlinklist that insert element in link list in sorted order.