National University of Computer and Emerging Sciences



# Lab Manual 03

*for*

# Data Structures

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## Lab Manual 03

**Objectives:**

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

* Link list

## Problem 1

1. Implement a Struct ‘Node’ that contains two data members: An int 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:
   1. Insert at start void insertAtHead(T const element);
   2. Insert at end void insertAtTail (T const element);
   3. Print void print() const;
   4. Delete at Start void eraseAtHead ();
   5. Delete at End void eraseAtTail();
   6. Destructor
4. Now create a main function which has the following instructions:
   1. Define a linked list object of type int.
   2. Insert 2, 6, 7 at start
   3. Insert 3, 8, 1 at End
   4. Delete at Start
   5. Delete at End
   6. 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**)

1. 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**
2. 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**
3. Make a function sortedlinklist that insert element in link list in sorted order.