**National University of Computer and Emerging Sciences**



Laboratory Manual 04

for

Data Structures Lab

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| Section | BCS-3A |
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**Objectives:**

In this lab, students will practice:

1. Single Linked List
2. Doubly Linked List
3. Circular Doubly Linked List

**Question 1**

Implement a Singly linked list using template and friend classes which supports the following operations:

1. Insert in sorted order void insertSorted(T const element);
2. Print void print()
3. Print data of Nth node void printNth(int index)
4. Delete at Start void deleteAtStart ()
5. Delete at End void deleteAtTail()
6. Destructor

Now create a main function to test all the operations

**Question 2**

Implement a Doubly linked list using template and friend classes which supports the following operations:

* 1. Insert at start void insertAtHead(T const element);
  2. Insert at end void insertAtTail (T const element);
  3. Print void print() const;
  4. Print the linked list in reverse order void printReverse() const;
  5. Delete at Start void deleteAtStart ();
  6. Delete at End void deleteAtTail();
  7. Destructor

Create a main function to test all the operations

**Question 3**

1. Create a circular doubly linked list which supports following operations:
   1. Insert at start void insertAtHead(T const element);
   2. Insert at end void insertAtTail (T const element);
   3. Print void print() const;
   4. Check if linked list is circular bool isCircular()
   5. Delete at Start void deleteAtStart ();
   6. Delete at End void deleteAtTail();
   7. Destructor