**National University of Computer and Emerging Sciences**



Laboratory Manual 03

for

Data Structures Lab

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

In this lab, students will practice:

1. Doubly Linked List

**Question 1**

Implement a Doubly linked list using template and nested 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. Delete at Start void deleteAtStart ();
  5. Delete at End void deleteAtTail();
  6. Destructor

Create a main function to test all the operations

**Question 2**

1. Make a function **insertSorted** that takes an element as argument and inserts in doubly linked list in sorted order
2. Make a function **DeleteDuplicates** that deletes the duplicate elements from this sorted list (Traverse only once)
3. Make a function **swapNodes** that takes a number **‘n’** as argument and swaps the nth node from start with the nth node from end

**Input** List :2 -> 3 -> 5 -> 9 -> 10 -> 7  
 n : 2  
**Output:**  
2 -> 10 -> 5 -> 9 -> 3 -> 7

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**