**National University of Computer and Emerging Sciences**



Laboratory Manual 03

for

Data Structures Lab

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| Course Instructor | Dr. Saira Karim |
| Lab Instructor(s) | Ms. Fariha Maqbool  Ms. Muntaha Zaigham |
| Section | BCS-3E |
| Semester | Fall 2022 |

**Department of Computer Science**

FAST-NU, Lahore, Pakistan

**Objectives:**

In this lab, students will practice:

1. Single Linked List
2. Doubly Linked List

**Question 1**

Implement a Singly linked list using template and nested 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. Search an element bool search(T const& element)
5. Delete at Start void deleteAtStart ()
6. Delete at End void deleteAtTail()
7. Delete duplicate elements from this sorted list (Traverse only once)
8. Destructor

Now create a main function to test all the operations

**Question 2**

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. 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. Make a function **swapNodes** in **doubly linked list** 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** in **singly linked list** 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**