# Department of Computing

# School of Electrical Engineering and Computer Science

**CS-250: Data Structure and Algorithms**

**Class: BSCS 10C**

**Lab 3:  Singly Linked List**

**Date: 01thOctober, 2021**

**Time: 9:00 am – 11:50 am**

# Instructor: Prof. Dr. Faisal Shafait

# Lab Engineer: Mr. Aftab Farooq

# Lab 3: Singly Linked List

**Introduction**

This lab will introduce students with the practical implementation of linked list with its operations.

**Objectives**

Objective of this lab is to get familiar with singly linked list and implement them in C++.

**Tools/Software Requirement**

Visual Studio C++

**Description**

**Singly Linked List**

A Linked List, is a data structure consisting of a group of nodes which together represent a sequence. Under the simplest form, each node is composed of two parts i.e. data part and a reference part (also known as, a link) to the next node in the sequence. This structure allows efficient insertion or removal of elements from any position in the sequence.

## Singly-linked-list.svg

## The basic operation consist of

* Creating the list.
* Initialize pointers to NULL.
* Inserting nodes at beginning, last and specified location.
* Delete nodes from beginning, last and specified location.
* Traversing the list.
* Destroying the list.

**Lab Tasks**

Write a C++ program that can

1. Create a simple linked list using function, by inserting nodes at head.

Code:

2. Make a function that can insert another node at 3rd location.

3. Make a function that can display the lists made in 1 and 2.

4. Write a function that can delete node from the linked list selected by the user. Display it as well.

5. Write a function that can count the number of nodes present in list.

6. Create menu in main function to give call to all of the above functions depending upon user’s input.

**Hint:** First you will create the relevant classes, and the functions will belong to the List class.

//class of node

class node

{

public:

int value;

node \*next;

};

Required functions for list class are:

void insert\_at\_beginning(int new\_value)

void insert\_at\_loc(int location,int new\_value)

void del(int del\_value)

void display()

void count()

**Lab Grading:**

|  |  |
| --- | --- |
| **Task** | **Marks** |
| Lab Viva/Quiz | 5 |
| Comments/ Indentation | 2 |
| Solution Document | 2 |
| Output Screen Shots | 1 |
| -- | -- |
| Total | 10 |

**Deliverables**

Compile a single word document by filling in the solution part and submit this Word file on LMS. The name of word document should follow this format. i.e. **YourFullName(reg)\_Lab#.** This lab grading policy is as follows: The lab is graded between 0 to 10 marks. The submitted solution can get a maximum of 5 marks. At the end of each lab or in the next lab, there will be a viva related to the tasks. The viva has a weightage of 5 marks. Insert the solution/answer in this document. You must show the implementation of the tasks in the designing tool, along with your complete Word document to get your work graded. You must also submit this Word document on the LMS. In case of any problems discuss it by emailing it to [aftab.farooq@seecs.edu.pk](mailto:aftab.farooq@seecs.edu.pk).

**Note:** Students are required to upload the lab on LMS before deadline.

Use proper indentation and comments. Lack of comments and indentation will result in deduction of marks.