



National University of Sciences and Technology (NUST)
School of Electrical Engineering and Computer Science

Department of Software Engineering

CS 250: Data Structures and Algorithms

Class: BESE-7AB

Lab 02: Singly Linked List

CLO1: < Please write CLO>

Date: September 21st, 2017

Time: 09:00 am -12:00pm, 2:00pm – 5:00pm

Instructor: Dr. Muhammad Shahzad



Lab 2: 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++.

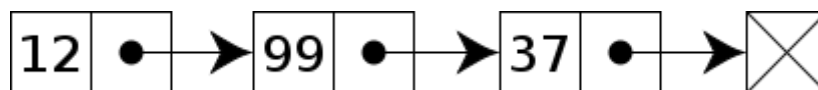
Tools/Software Requirement

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.



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.
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()
```

Deliverables

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

Note: Use proper indentation and comments. Lack of comments and indentation will result in deduction of marks. You will submit your working **.cpp** files in one **(.zip)** folder. The name of files and folder should follow this format. i.e. **YOUR_NAME_Lab#**