CL-2001
Data Structures
Lab # 4

Objectives:
- Singly Linked List
- Doubly Linked List
- Circular Linked List
- Linked List(insertion)
- Linked List(deletion)
- Linked List(searching)
- Linked List(Traversal)

Note: Carefully read the following instructions (*Each instruction contains a weightage*)

1. There must be a block of comments at start of every question's code by students; the block should contain brief description about functionality of code.
2. Comment on every function and about its functionality.
3. Mention comments where necessary such as comments with variables, loop, classes etc to increase code understandability.
4. Use understandable name of variables.
5. Proper indentation of code is essential.
6. Write a code in C++ language.
7. Make a Microsoft Word file and paste all of your C++ code with all possible screenshots of every task **outputs in Microsoft Word and submit word file. Do not submit .cpp file.**
8. First think about statement problems and then write/draw your logic on copy.
9. After copy pencil work, code the problem statement on MS Studio C++ compiler.
10. At the end when you done your tasks, attached C++ created files in MS word file and make your submission on Google Classroom. (Make sure your submission is completed).
11. Please submit your file in this format **19F1234_L4**.
12. **Do not submit your assignment after deadline. Late and email submission is not accepted.**
13. **Do not copy code from any source otherwise you will be penalized with negative marks.**

Problem: 1| Doubly Linked list | 60 mins

Write a menu driven C++ program for following functions of a doubly Linked list

```cpp
struct node
{
    int data;
    struct node *next;
    struct node *prev;
}

*start;

/*
 Class Declaration
 */
class double_llist
{
private:
        node *head;
        node *current_ptr;
        int count;

    public:
        void insert_at_begin(int value);
        void insert_after(int value, int position);
        void insert_at_end(int value);
        void delete_at_begin();
        void delete_before(int value, int position);
        void delete_at_end();
        void display_dlist();
        bool is_empty();
        double_llist()
        {
            head=NULL;
            current_ptr=NULL; //constructor for my class
            count=0;

        }
        ~double_llist()     {
                current_ptr=head;
                while( current_ptr != NULL )
                {
                        node* next = current_ptr->next_part;
                        delete current_ptr;
                        current_ptr = next;
                }
        }

};
```

Problem: 2 | Remove Duplicates | 30 mins

Write a C++ program to remove every duplicate from a doubly linked list.

Input:

NULL<-1<->2<->2<->3<->4<->4<->5<->5<->5->NULL

Output:

1<->2<->3<->4<->5<->NULL

Problem: 3 | Separate even and odd nodes | 30 mins

Create two doubly linked lists so that one can store the even data and other stores the odd data of the provided linked list having at least 10 nodes.

Input:

1->2->2->3->5->6->7->9->11->12

Output:

L1:1->3->5->7->9->11

L2:2->2->6->12

Problem: 4 | Linear to Circular Linked List | 30 mins

Write a function that accepts a linear linked list and converts it to a circular linked list both for singly and doubly linked list.

Problem: 5 | Circular Link List | 30 mins

Write a menu driven C++ program for following functions of a Circular Singly Linked list.
1. InsertAtBegin()
2. DeleteAtEnd()

☺   Best of luck

You are done with your exercise, submit on Classroom at given time.