**Bahria University, Lahore Campus**

Department of Computer Science

Lab Journal 06

**(Spring 2023)**

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| Course: | **Data Structures and Algorithm - Lab** | Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Course Code: | CSL-221 | Max Marks: 10 |
| Faculty’s Name: | Fatima Zulfiqar |  |

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enroll No: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Objective(s):

Upon completion of this lab session, learners will be able to:

* Implement Singly Linked List and its helping functions (insertion from start, insert from end, insert from any point, delete from start, delete from end, delete from any point, and display)
* Count number of nodes present in a Linked List.

## Lab Tasks:

**Task 1**

Implement doubly linked list data structure and perform following operations.

* Insert from start ()
* Insert from end ()
* Delete from start ()
* Delete from end ()
* Display ()

**Note:** The program should contain main-menu in such a way that the user can select either of the options until desires. Additionally the input to the node should be taken from the user.

**Task 2**

Add additional function **remove\_duplicates ()** in Task 1. The function should first display all elements present in a linked list and then all duplicate values/numbers should be removed from the list. The final list should contain non-duplicate nodes and only one occurrence of duplicate number.

**Sample Output:**

Original Linked List: 2 3 1 4 5 6 2 3 7 1 2 5 4 4 3

After Removing duplicates: 2 3 1 4 5 6 7

**Lab Grading Sheet :**

|  |  |  |  |
| --- | --- | --- | --- |
| **Task** | **Max Marks** | **Obtained Marks** | **Comments(*if any*)** |
| 1. | 05 |  |  |
| 2. | 05 |  |  |
| **Total** | **10** |  | **Signature** |

**Note : Attempt all tasks and get them checked by your Lab Instructor. Also for each task, attach a screenshot of the output.**