The University of Lahore

Department of Computer Science & IT

CS-09204 Data Structures and Algorithm
Fall 2025

Assignment # 1b

Participant ID #	_____	**CLO: 4** **PLO:**
Total Marks:	60	**Obtained Marks:**

Objective:

Students will apply their knowledge of arrays, searching, sorting, and linked lists to solve a series of problems that simulate real-world scenarios.

Part 1: Working with Arrays {Marks 40}

1. **Task 1: Implement a Library Book Search System using Arrays**
   - **Problem**: Create an array that stores the titles of books in a library. Implement both sequential and binary search algorithms to allow users to find if a book is available.
   - **Deliverables**:
     - Code for storing book titles.
     - Functions for sequential and binary search.
     - Test cases showing both algorithms in action.
2. **Task 2: Sort the Library**
   - **Problem**: Implement a system that sorts the book titles in alphabetical order using both selection sort and bubble sort algorithms.
   - **Deliverables**:
     - Code for sorting the array using both sorting methods.
     - Test cases showing the sorted array.

Part 2: Link List and Integrate All Concepts {Marks 20}

3. **Task 3: Implement a Library Book Search System using a link list**
   - Create an array that stores the titles of books in a library using a link list, search for the book and return the node position (or pointer to the node)

4. **Task 4: Library Management System**

   - **Problem**: Combine the previous tasks into a simple library management system where:
     - Users can search for books.
     - Books can be sorted.
     - **A waiting list is maintained for popular books.**
   - **Deliverables**:
     - Integrated code combining arrays and linked lists
     - A demo showcasing the system in action.