Department of
Computer Science & Engineering
University of Liberal Arts Bangladesh

Open-ended experiment-1

Course Title: Data Structure Lab **Course Code: 1302**	**Section: 04**
Course Teacher: Wahida Ferdose Urmi	**Semester: Spring 2025**
Total Marks: 20	**Submission Deadline: 08.04.2025**

General Instructions:

- This is an open-ended experiment. Students are expected to develop their own experiment;
- Show each step of your experimental procedure, data, and calculations;
- Discuss your results with relevant theories;
- Originality of the work is a must;
- Please refer to the assessment rubrics while preparing the report;
- Symbols, notations and abbreviations carry their usual meanings.

CO	Description	Domain/ level of learning taxonomy
CO1	Demonstrate various basic data structures and their operations.	Psychomotor/ L2, Affective / L2
CO2	Apply appropriate data structure for solving real-world problem	Psychomotor/ L2, Affective / L2
CO3	Develop applications using various data structures	Psychomotor/ L2, Affective / L2

Problem:

Library Book Management System

You are developing a simple Library Book Management System that keeps track of books available in a library. The system should allow the following operations:

1. Add a new book to the collection.
2. Remove a book by its unique book ID.
3. Search for a book by its title.
4. Display all books in sorted order by book ID.

Each book has the following attributes:

- Book ID (integer)
- Title (string)
- Author (string)

Open-ended features:

- **Use any programming language.**
- **Use any modern tools to solve the problem.**
- **Use necessary data structures to solve the problem.**

(* Do not copy from others ***)**

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Task No.	**Corresponding COs**	**Marks**
1. Provide a detailed explanation of the data structures used in the system, focusing on arrays and their operations.	CO1	2
2. Implement the Library Book Management System using an array, allowing users to add a new book to the collection.	CO1, CO2	4
3. Develop a function to remove a book from the collection by its unique book ID using array manipulation.	CO1, CO3	3
4. Design and implement a binary search algorithm to efficiently search for books by book ID in the array.	CO2	3
5. Use a sorting algorithm (Bubble Sort, Insertion Sort, or Selection Sort) to organize the books in ascending order based on their book ID.	CO1, CO3	3
6. Prepare and submit a well-structured lab report, documenting the use of arrays, sorting, and binary search in the implementation of the system.		3
7. Submit your program file. **Save the file in the following format: Library_Management_YourID.c (Replace "YourID" with your actual student ID: Example: Library_Management_2420000001.c)**		2