**Assignment 2**

**Library Book Borrowing System**

**Objectives:** To learn the implementation and manipulation of linked lists in C through a practical application: a Library Book Borrowing System.

**Description:** You are required to develop a prototype software to implement key functionalities of a computerized Library Book Borrowing System for a single library branch. The system will manage book borrowing for registered users.

**The system should support the following operations:**

* Borrow a book
* Return a book
* Check if a book is borrowed by a specific user
* Display all borrowed books and their borrowers

**NOTE:** The function prototypes are provided in library\_system.c. You **must** use the specified prototypes.

The book borrowing records should be **maintained using a linked list**. Each node of the linked list will store the following details:

* **Book Title** (maximum **100** characters)
* **Borrower’s Last Name** (maximum **50** characters)
* **Borrower’s First Name** (maximum **50** characters)

Your program should:

* Read input from a file named **library\_records.txt** (attached with the assignment).
* Write the output to a file named **output.txt**.

Each line in the input file represents an **operation**, as described below. You must implement **each operation as a separate function** in C, using **only linked lists**. **No other data structures are allowed**.

**Input Format**

The system will **read input from a file**, where:

* The **first integer on each line** represents an **operation code**.
* It is followed by the **book title** (enclosed in quotes), **borrower’s last name**, and **borrower’s first name**.

Refer to **library\_records.txt** for sample input.

**List of Operations**

**Operation 1: Borrow a Book**

This operation **adds** a new record to the **end of the linked list**.

**Input Format:**

1 “Book Title” LastName FirstName

**Expected Output:**

Borrowed "Book Title" by LastName, FirstName

**Operation 2: Return a Book**

This operation **removes** the corresponding record from the linked list.

**Input Format:**

2 “Book Title” LastName FirstName

**Expected Output:**

Returned "Book Title" by LastName, FirstName

**Operation 3: Check if a Book is Borrowed**

This operation **searches** for a **specific book and borrower** in the linked list.

**Input Format:**

3 “Book Title” LastName FirstName

**Expected Output:**

* If the book **is found**:

"Book Title" is borrowed by LastName, FirstName

* If the book **is not found**:

"Book Title" is not currently borrowed by LastName, FirstName

**Operation 4: Display All Borrowed Books**

This operation **prints a list** of all borrowed books and their borrowers.

**Input Format:**

4

**Expected Output:**

Borrowed Books List:

1. "The Great Gatsby" - Fitzgerald, Scott

2. "To Kill a Mockingbird" - Lee, Harper

**Operation 5: Quit the Program**

This operation **terminates the program**.

**Input Format:**

5

**Expected Output:**

Thank you for using the Library System!

**Example Output**

A **sample output file (output.txt)** is attached with this assignment.

**Deliverables**

You must submit the following:

* **Source Code:** Submit your library\_system.c file via **Webcourses (Canvas)**.

**Important Notes:**

* Your code will be tested with different input files, but all inputs will adhere to the constraints outlined in this assignment. You can assume that no book title will be empty and that each author will always have both a first and last name.
* Testing: Ensure your program runs correctly on Eustis.
* Coding Style: Follow the style guide provided with Assignment 1.
* Test Cases: Create your own additional test cases for validation.