Group 11

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1) Project Overview (1 short Paragraph)

We both worked on everything together and researched online. The lab uses four classes, Book class, Library class, Members class, and Main class. The main purpose of the project is to develop a Library System Management that displays the current books, and to allow people to borrow and return books. The key functionalities are adding books, removing books from the library and searching for the book. Some OOP concepts we had were that all variables are private, meaning we used setters and getters method to retrieve data. For each loop to iterate through the array list and if statements to flip the availability.

2) Class Descriptions (Short & Clear)

Book Class: the name represents books creation

Attributes: Private String Name, Private String Author, boolean isAvailable

Methods:

- Setters and Getters method: set and retrieves data
- borrowBook(): Checks for book's availability before allowing person to borrow book
- returnBook(): Returns book back to library

Library Class: the name represents the system that holds the books in a place

Attributes: ArrayList<Book> book1 = new ArrayList<>();

Methods:

- addBook(Book book): adds book into library using the Book class
- removeBook(String title): Removes book from library when its being borrowed by name search
- searchBook(String title): Checks to see if the book is in the library through title search.

Members class: The name represents the creation of members and borrowing and returning book

Atrributes: Private String name, private ArrayList<Book> book1;

Methods:

- Member(): Creating members
- BorrowBook(Library library, String title): Checks for book's availability before borrowing using the Library class and title name.
- ReturnBook(Library library, String title): Operates similarity as previous method, except it returns the book

Main class: The name represents the main driver class

Methods:

- All methods previously mentioned

3) Implementation Details (Short Summary)
System Functionality: The system stores books in an ArrayList within the Library class. Members can borrow books, which updates their availability to "Checked Out," and return them, setting them back to "Available." Books can also be added, removed, and searched within the library.

Class Interaction: The Library class manages the book collection, handling additions, removals, and searches. The Book class represents individual books with attributes like title, author, and availability. The Member class allows users to borrow and return books by interacting with the library. The Main class runs the program, demonstrating these interactions.

4) Test Cases (Table Format)

Action	Expected	Actual Output
Add Book	"Book added successfully"	"Book added successfully"
Search book	Displays book details	Displays book details
Borrow a book	Updates availability status	Updates availability status
Return a book	Marks book as available	Marks book as available
Remove a book	"Book removed successfully"	"Book removed successfully"

5) Challenges & Solutions (Briefly Explain)

We had the initial struggle of neither of our main function working in order to test out our code to make sure it was correct, We fixed this by fixing the main function as I was using Main and not main. We also faced issues with updating book status, searching/removing books, and preventing invalid borrow/return actions. We solved them using a boolean isAvailable for tracking status, case-insensitive title checks, and validation before borrowing or returning books.

7) References:

ArrayList:https://www.geeksforgeeks.org/arraylist-in-java/

Add method in ArrayList: https://www.geeksforgeeks.org/java-util-arraylist-add-method-java/

Stack Overflow:https://stackoverflow.com/questions/37562852/arraylist-with-two-methods-in-java

ArrayList slides from lectures