This assignment is a take-home assignment. No extensions whatsoever will be provided. Late submissions will attract a penalty of **5%** of total marks every **6 hours** after the deadline. If there is any ambiguity or inconsistency in a question, please seek clarification from the teaching staff. Please read the entire text below very carefully before starting its implementation.

Plagiarism: All submitted assignments are expected to be the result of your individual effort. You should never misrepresent someone else's work as your own. In case any plagiarism case is detected, it will be dealt with as per IIITD plagiarism policy and without any relaxations:

 https://www.iiitd.ac.in/sites/default/files/docs/education/AcademicDishonesty.pdf

Please note that you are not allowed to discuss the lab assignment's design/solution (e.g. classroom page discussions, etc.). Anyone who is found doing this will be treated as a plagiarism case. No excuses!

NOTE: We won't respond to any query because you missed to read the description carefully. We will ONLY respond to valid questions. Make sure you ask all your doubts in advance and not at the last minute.

Topics: Classes, Objects, Encapsulation & Class Relationships

Instructions
- Develop a Library Management System application using Object-Oriented Programming (OOP) principles.
- Make appropriate classes that represent different entities and functionalities within the library system.
- Design a menu-driven interface for users to interact with the library system.

- Ensure that your code works for all possible scenarios.
- If the code does not compile using Maven, you will get a zero.

Implement a library system for IIITD. You can use the interface either as a librarian or as a student. A librarian manages members/students and books of the library. A librarian can view, register or remove members. They can also view books, add a book, remove a book, issue a book and collect dues/fines. The fine is applied as 3 rupees per day post the return due date of a book. Assume the due date for all books to be 10 days after the issue date. If a member is returning a book after the due date, the book will be returned and a balance will be due on the member. Before issuing a new book the balance should be paid by the member to the librarian. A member can view all available books, borrow a book, return a book, view their own books, and pay dues.There may be multiple copies of a single book. A member can only borrow a book if there is an available copy of the book which is not issued. A member can hold at most 2 books at a time.

Functionalities:

1. Add Book:
- Allow a librarian to add a new book to the library.
- Take input for book details (book ID, title, author, total copies).

2. Remove Book:
- Allow a librarian to remove a book from the library.
- Take input for book ID.

3. Register Member:
- Allow a librarian to add a new member to the library.
- Take input for member details (name, age, etc).
- The Phone Number can act as an unique input to identify the members uniquely.

4. Remove Member:
- Allow a librarian to remove a member from the library.
- Take input for member ID. Here also, we can take input as username and phone no etc.

5. Enter as a member
   - Takes the member name and phone number as input and logs in as the particular member, if already registered .
   - If not registered, gives an error message.

6. Issue Book:
   - Allow a member to borrow a book from the library, given his penalty amount is zero. If he owes the library penalty money, he should first clear that before issuing a new book.
   - Display available books and take input for book ID.

7. Return Book:
   - Allow a member to return a borrowed book.
   - Display borrowed books and take input for book ID.

8. List Books:
   - Display a list of all available books in the library.

9. List Members:
   - Display a list of all registered members of the library.

10. Calculate Fine:
   - Calculate and display the fine amount for a book if it's returned after the due date (10 days). Here for ease of testing, take 1 sec = 1 day.

11. Exit:
   - Terminate the application.

Guidelines:
   - Implement input validation to handle incorrect or invalid user inputs.
   - Ensure proper error handling and display user-friendly error messages.
   - Apply OOP principles to improve code organization and readability.

Submission:

Submit File Name format: A1_RollNumber.zip

Important:

The code should be composed and presented using **Maven**. Additionally, please provide a **Readme** document that comprehensively outlines the procedures for executing your code. Ensure that the **pom.xml** file is included in your submission as well. These requirements are essential to facilitate the evaluation of your submission. **If any of these is missing, you will get a zero**.

SAMPLE RUN

Library Portal Initialized….

----

1.   Enter as a librarian
2.   Enter as a member
3.   Exit

1

----

1.   Register a member
2.   Remove a member
3.   Add a book
4.   Remove a book
5.   View all members along with their books and fines to be paid
6.   View all books
7.   Back

1

Name: **Rick Dunphy**

Age: **21**

Phone no**: 9999999993**

Member Successfully Registered with <Member ID>!

3

1.	Book title: **Harry Potter**
2.	Author: **J.K. Rowling**
3.	Copies: **2**

Book Added Successfully!

1.	Register a member
2.	Remove a member
3.	Add a book
4.	Remove a book
5.	View all members along with their books and fines to be paid
6.	View all books
7.	Back

6

Book ID - **1**

Name - **Harry Potter**

Author - **JK Rowling**

Book ID - **2**

Name - **Harry Potter**

Author - **JK Rowling**

1.	Register a member
2.	Remove a member
3.	Add a book
4.	Remove a book
5.	View all members along with their books and fines to be paid
6.	View all books
7.	Back

7

----
1.   Enter as a librarian
2.   Enter as a member
3.   Exit

2

Name : Rick Dunphy

Phone No: 9999999990

Member with Name: Rick Dunphy and Phone No: 9999999990 doesn't exist.

----

1. Enter as a librarian
2. Enter as a member
3. Exit

2

Name: Rick Dunphy

Phone No: 9999999993

Welcome Rick. Member ID: <MemberID>

----

1.   List Available Books
2.   List My Books
3.   Issue book
4.   Return book
5.   Pay Fine
6.   Back

3

Book ID: **1**

Book Name: **Harry Potter**

Book Issued Successfully!

----

1.   List Available Books
2.   List My Books

3.   Issue book
4.   Return book
5.   Pay Fine
6.   Back

4

Enter Book ID: **1**

Book ID: 1 successfully returned. 12 Rupees has been charged for a delay of 4 days.

----

1.   List Available Books
2.   List My Books
3.   Issue book
4.   Return book
5.   Pay Fine
6.   Back

5

You had a total fine of Rs. 12. It has been paid successfully!

----

1.   List Available Books
2.   List My Books
3.   Issue book
4.   Return book
5.   Pay Fine
6.   Back

6

----

1.   Enter as a librarian
2.   Enter as a member
3.   Exit

3

Thanks for visiting!