

Department of Computer Science
Software Engineering (CSC342)
Tutorial 7
(Class Diagram)

Situation: Libraries allow members to borrow books for a defined time period. Typically, a library operates in the following manner:

When a borrow request is made, it must be checked that a copy of the title requested is available. If a copy is available, the librarian must ensure that the borrow request is made by a valid member. This is done by asking for the member's card by the library staff member, which is checked for expiry date and number of books already issued. In case the card has expired, it is returned without an entry and no book is issued, otherwise an entry for issue date and expected return date is made and the book and card are returned.

When a book is returned, the return date is noted and in case it is greater than the expected return date, a fine is charged, whose record is maintained.

Following are the elaborated use cases of the situation above.

Use case Name: Issue Book

Actor: Librarian

Precondition: Book is unissued and available

Post condition: Book is issued.

<u>User Actions</u>	<u>System Response</u>
i. The user enters the Borrower's card number to check its expiry date.	i. System responses with the validation message. Exp1
ii. The user enters the book's information (title, ISBN, author) to check its availability.	ii. System responses with the availability of the book. Exp2
iii. The user directs the system to issue the book. Alt1	iii. The system responses with the issuing message after recording the issue date and expected return date. Use case ends.

Exception 1: Card is not validated. No book is issued. Use case ends

Exception 2: Book is not available. Go to step ii or ends the use case.

Alternative 1: User directs the system to cancel the transaction. Use case ends.

Use case Name: Return Book

Actor: Librarian

Precondition: Book is issued.

Post condition: Book is unissued.

<u>User Actions</u>	<u>System Response</u>
i. The user enters the book's information (title, ISBN, author) to check its Status	i. System displays the book information including issue, return date and fine if any. Exp1
ii. The user directs the system to return the book. Alt1	ii. The system responses with the successful return of the book after updating the status of the book, return date and fine if any. Use case ends.

Exception 1: Book is not available. Information is wrong. Go to step i.

Alternative 1: User directs the system to cancel the transaction. Use case ends.

a) Question: Identify the classes, their relationships and draw class diagram.

(For Home Work)

Situation (Continued): Besides borrow and return of books, a library must also handle the addition and removal of members and purchase of new books. Book's information includes its title, author, isbn, price etc. To become a member, a person must submit his particulars(name, email, phone, address) on the membership form obtained from the library, along with the library membership fee. Library administrator can register/update/delete a library user. He can view and print the outstanding books also. He can also add/update/view the information of a specific book. Administrator can also add/update/delete/view a new staff member. Staff member's information includes name, address, email, designation, username and password.

b) Question: Identify at least two more classes. Update the existing class diagram to accommodate new classes and their relationships.