IT313 Software Engineering
LAB 7 : Domain Analysis Modeling & Sequence Diagram

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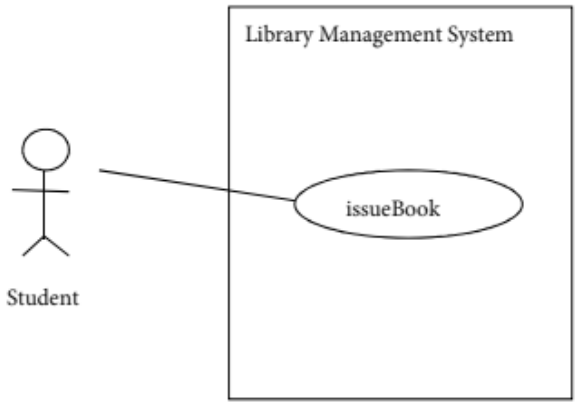
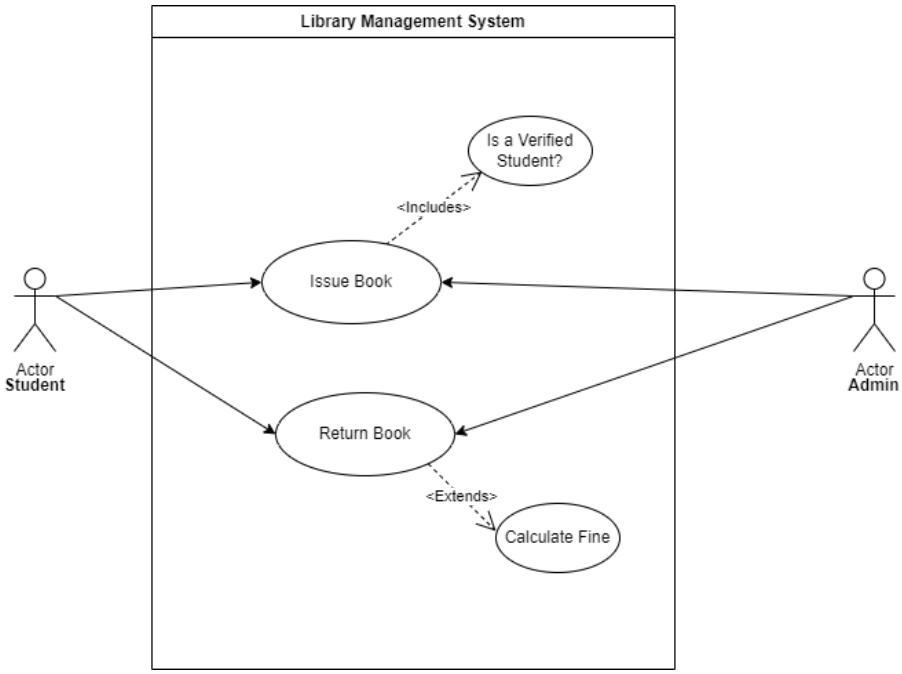
Q.1. Consider the following piece of text

“A library maintains multiple reading materials which include books, journals, and magazines. The books are issued to the registered students of the institute, for a specified period of time. The issued books are to be returned back to the library. Delayed returns are subjected to stipulated fines. The issue-return process is administered by one of the librarians through an authenticated Library Management System.”



1. Complete the use case diagram for the above problem text along with use case documentation for “issueBook” use case.



2. The sequence diagram for the “issueBook” use case.
(Hint: Here you need to identify various analysis objects (corresponding to entity, boundary, and control classes), and show their interaction to realise the “issueBook” use case.)

Ans:

Title: Library Book Borrowing and Return System

Description:
This system caters to the needs of students, faculty members, and staff by facilitating the borrowing and return of library books. Students have the privilege of borrowing available books and are obligated to return them promptly. In cases where a book is returned after its due date, students are required to settle any fines incurred. This use case provides an overview of the book borrowing and return process, along with the associated outcomes.

Actors:

1. Student
2. Librarian
3. Library System

Preconditions:
Student is at library having a valid book information to issue

Trigger:
A student's library visit, whether for borrowing or returning a book, initiates this process.

Postcondition:
The library's database is updated with relevant information regarding the borrowed or returned book.

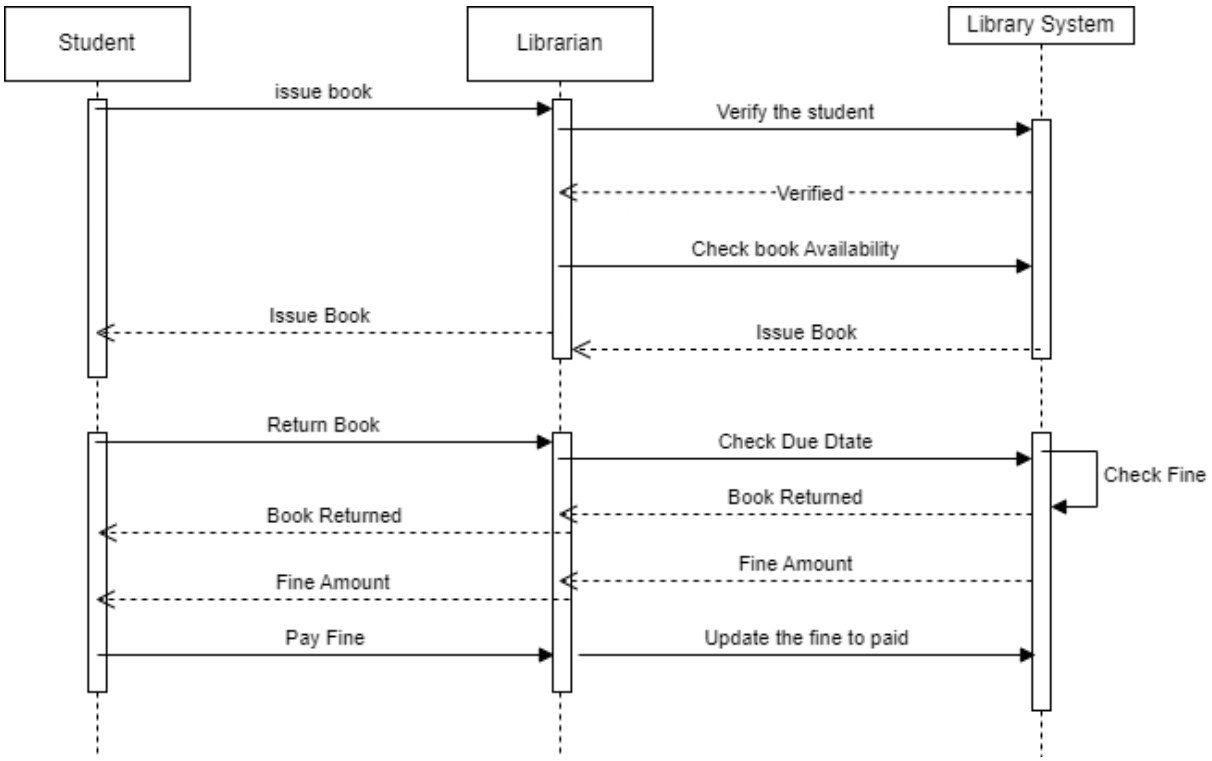
Flow:
1. When a student intends to borrow a book:
    - The student approaches the librarian.
    - The librarian verifies the book's availability within the library.
    - If the book is accessible, the librarian lends it to the student.
    - The librarian logs the transaction details in the library database.
2. When a student returns a book:
    - The student returns the book to the librarian.
    - The librarian checks the due date of the book.
    - If the student has surpassed the due date, the librarian computes the applicable fine.

- The librarian collects the fine from the student and processes the book's return.
- The librarian updates the library database to reflect the returned book information.

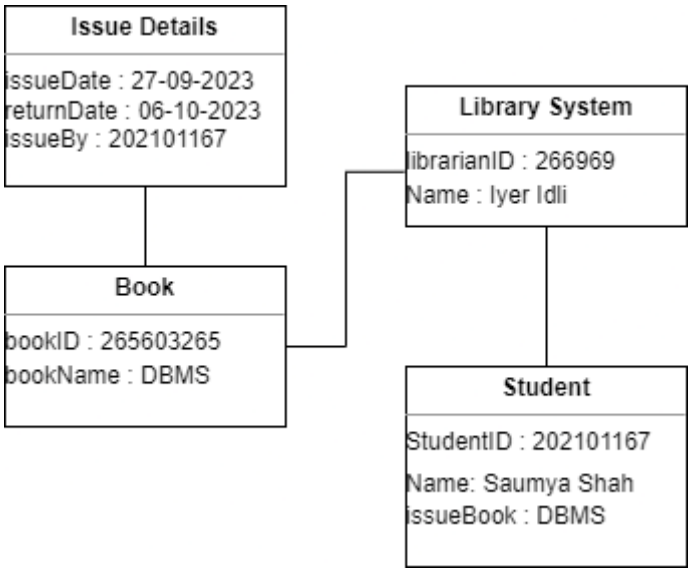
Alternative Flows:

- If the requested book is unavailable in the library, the librarian notifies the student and provides alternative options or informs them of the anticipated restocking date.

Sequence Diagram:



3. Draw the **analysis object diagram** for the “issueBook” use case analysis.



Q.2. To give an exam, an instructor first notifies the students of the exam date and the material to be covered. She then prepares the exam paper (with sample solutions), gets it copied to produce enough copies for the class, and hands it out to students on the designated time and location. The students write their answers to exam questions and hand in their papers to the instructor. The instructor then gives the exam papers to the TAs, along with sample solutions to each question, and gets them to mark it. She then records all marks and returns the papers to the students.

Draw a ***sequence diagram*** that represents this process. Make sure to show when each actor is participating in the process. Also, show the operation that is carried out during each
interaction, and what its arguments are.