MODEL DRIVEN SOFTWARE ENGINEERING (COEN 6312)

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Deliverable 2: Domain Analysis and Requirements

Submitted to

Professor Abdelwahab Hamou-Lhadj

By

Team - High5

Jithin Nair(27093888)
NandKishore(27644396)
Renuka Milkoori(27188196)
Swamy Yogya Reddy(27170386)
Sai Teja(27757824)

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1. Introduction

As now a days everything being digitalized, most of the users are using their tablets, mobile phones or desktops to read the books or documents. Hence our E-Library is one such platform that allows all its users to use the huge collection of the resources available within a click away. E-Library is the online repository of documents, books, journals, special editions of different categories. Whenever a user registers into the system, he/she will be given the login credentials and the privileges on has requested for.

There are several functionalities that the system provides for its user like, the registered user can search for book/document or any resource that is available in the system and asks for the document to borrow for the period allowed. If the document is not available in the system, user can request for the document to the librarian. Librarian monitors all the transactions being carried out in the system and manages records accordingly. The user has to pay the fee according to the subscription one has, although all the payment transactions will be carried out by the third party payment gateway.

Notational Convention
For better understanding, the terms ‘books’ and ‘documents’ are considered synonyms they are used interchangeably.

2. Requirements Specification

Requirements are the set of features that must be included in the system. All the requirements are gathered before the actual design and implementation, so that it gives a clear picture of how the system is expected to perform. Requirements specification provides a complete description of the software and its intended purpose.

The main emphasis should be on:

- Inputs to the system.
- Outputs expected from the system.
- People involved in the working of the system.

2.1 Actors Description

A role played by an entity external to the system, as perceived from the system's point of view, when it uses the system. A Software system is associated with different types of Actors. Each and every Actor performs functions and uses the software accordingly. The different types of actors identified in the system are listed below.

2.1.1 Primary Actor

An Actor who initiates a use case and uses the system to achieve a goal. The primary actors identified in the E-Library System are Administrator, Librarian and the User. These three actors interact with the system either by adding or requesting the appropriate information from the system.

2.1.2 Secondary Actor

Secondary Actors play the supporting role for the primary actors in achieving the goal of use case. The secondary actors considered in the E-Library System are hardware and software used by the users to interact.

The hardware is the different types of devices used by the users to access the system, these also help to keep a check on the catalogs and other system information. The software actors are various databases, servers and the payment gateway. They perform operations like saving and retrieving the information from the user.

3. List of Requirements

The Requirements of a Software system are primarily classified into two types.
Functional Requirements
Non-Functional Requirements

3.1 Functional Requirements

Functional Requirements define the function of the system and its intended behavior. This behavior may be expressed as services, tasks or functions the system is required to perform.

Registration

The User and Librarian needs to register to access the E-Library system.
The Admin will approve the registration of all actors and grants privileges depending on the type of account.
The Admin has the privileges to unregister the user account.

Login

The user has to provide valid credentials to get the access of the E-library System.

User Requirements

The user should be able to access all the documents in the catalogue once he/she is logged into the system.
The user should be able to search for a particular document by using keywords in the search box.
The user should be able to add and remove the documents from the 'bag' before the final checkout.
The user should be able to process the payment for the selected document.
The user should be able to have complete access of the document borrowed.
The user should be able to cancel the document and request for a refund.
The user should be able to return the document borrowed.
The user should be able to renew the document by processing extra payment.
The user should be able to place the request for the documents which are not on the catalogue.
The user should be able to receive notification about the deadline of the document.

Librarian Requirements

The librarian should be able to manage the E-Library System.
The librarian should be able to add and remove documents in the catalogue.
The librarian should be able to modify and update any changes on the catalogue.
The librarian should be able to access the profile of the user.
The librarian should be able to approve the requests of the user.
The librarian should be able to send notifications to the user.
The librarian should be able to process a refund request from the user.
The librarian should be able to maintain the records of all users.

Admin Requirements

The Admin should have special privileges to the E-Library System.
The Admin should be able to give appropriate privileges to different accounts.
The Admin should be able to manage the accounts.
The Admin should be able to view the list of users.
The Admin should be able to generate different reports to assess the system.
The Admin should be able to unregister any user from the system.
The Admin should have a complete access of the payment gateway.

3.2 Non-Functional Requirements

Non-Functional requirements define the attributes and the overall qualities of the system. They specify the external constraints the system must be able to satisfy.

Usability: The ability of the user to understand and use the system efficiently. The E-library system's UI should be designed in such a way that a student/lender who has less computer knowledge can easily access it. It may be for searching a book/author or to login to the system or the payment system.

Reliability: The system should be highly reliable and should perform the functions with required precision .The system's ability to the compute the user operations and to manage them without any system crash and having a failure-free environment by having countermeasures.

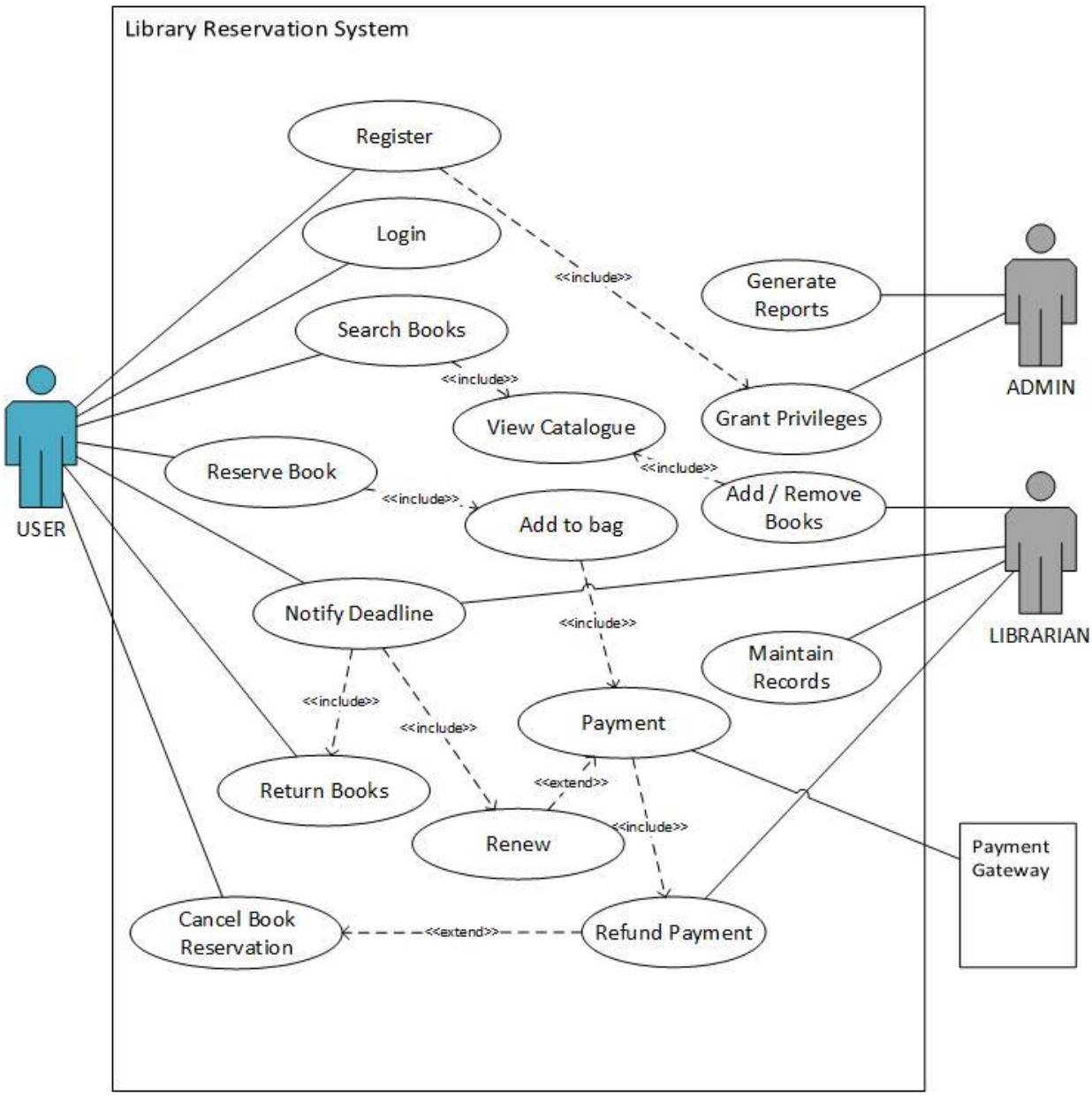
Effectiveness: The UI of the system should be user-friendly which can be more effective. It helps the user to operate the system without others help.

Performance: The response time should be very less for any execution. And the high processing work can improve the performance of the system

Portability: The system should be able to run in several platforms. It can be any operating system or it can be any browser.

Security: As the system executes payment services and has personal data of user so the system should be secure enough and should be aware of vulnerabilities. Securing the application with user authentication, encrypted passwords and SSL certificates.

4. Use case Diagram of the System

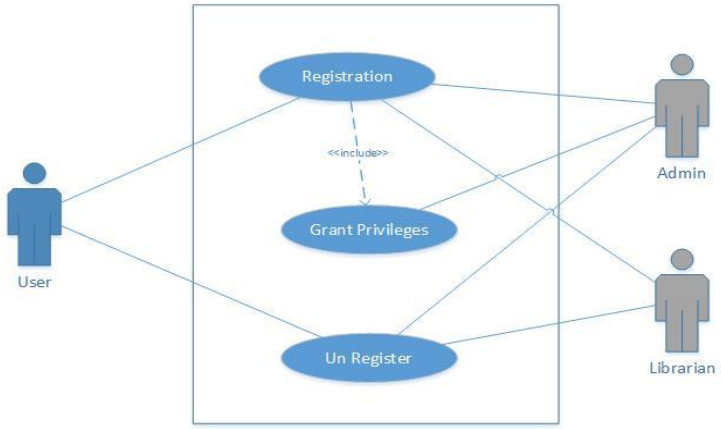


Note:

1. We have refrained from showing UML Note and Dependency to keep the diagram from being overcrowded.
2. We have also not shown every possible association but only the necessary ones. For example, if A is associated with B, B is associated with C and A is associated with C, we have not shown the association between A and C, we assume the flow or retrieval of information is derived.
3. We have used the 'High-Medium-Low' approach for prioritization of use cases.

5. Description of Use cases

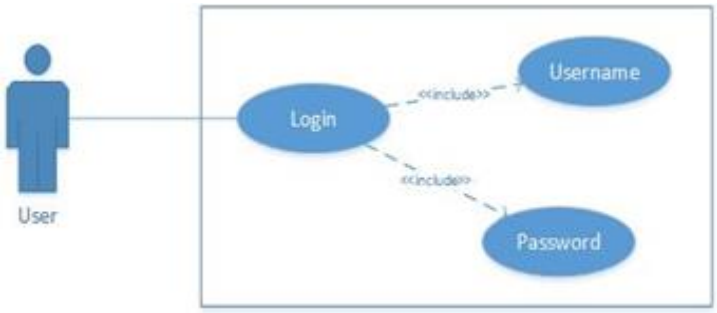
1. User Registration



Use Case ID:	**UC1**
Use Case Name:	Registration
Priority	High
Description:	User should register to use the services of the E-library system.
Actors:	User, Librarian, Admin
Preconditions:	User is not registered.
Post conditions:	The User registration is successful.
Main Success Scenario:	1. The user choses register option. 2. The system displays the registration page. 3. The user provides all the necessary information as an input to the system. 4. The system validates the given information. 5. The system should update the database and display a confirmation message for the new user.
Exceptions:	a) When the registration is unsuccessful the system displays an

	error message if the user enters incomplete information or wrong information. b) The system asks the user to enter the information again.

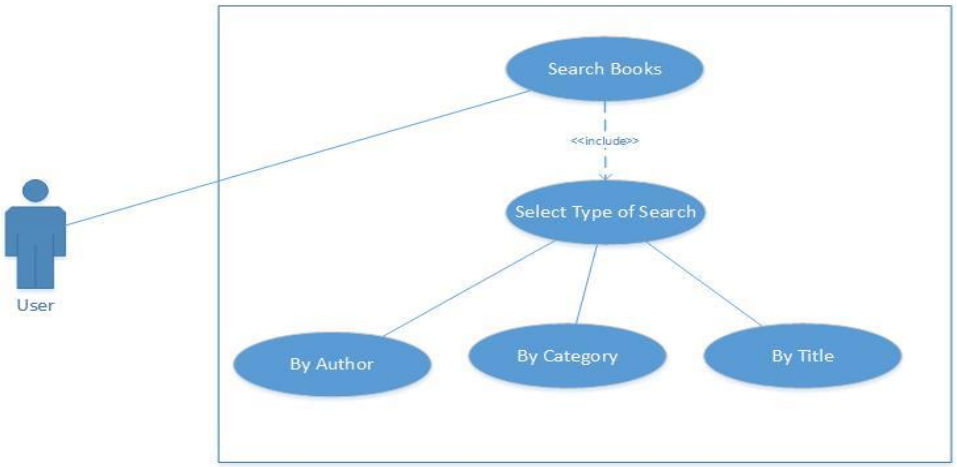
2. <u>Login</u>



Use Case ID:	**UC2**
Use Case Name:	Login
Priority:	High
Description:	Login functionality helps the user to log into the system with valid credentials.
Actors:	Admin, User and Librarian
Pre-conditions:	User should register before logging in.
Post-conditions:	The system redirects the user to home page of the E-Library system.
Main Success Scenario:	1. User selects the login option. 2. User enters the login information 3. The system validates the information and authorize the user to login. 4. System displays the homepage of the user.
Exceptions:	a) If the user enters wrong information or if the information is missing.

	b) The system prompts the user to re-enter the login credentials.

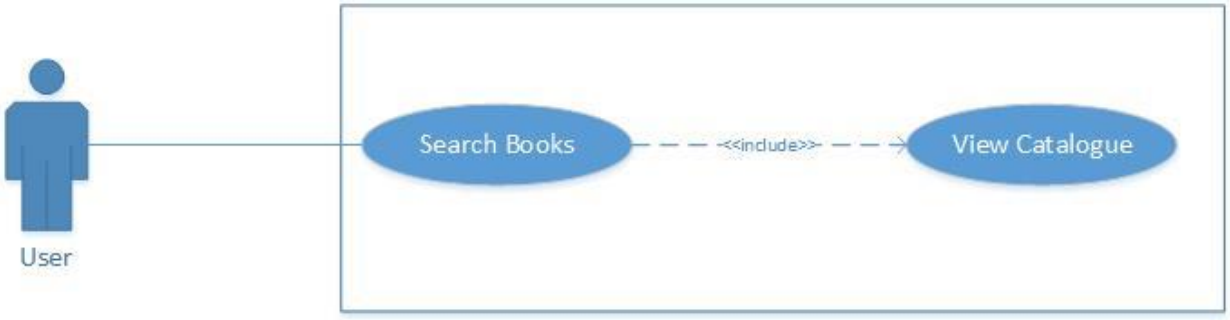
3. Search Books



Use Case ID:	**UC3**
Use Case Name:	Search books
Priority:	Medium
Description:	This use case helps the user to search for the books by title, author and category.
Actors:	User
Preconditions:	The user is already logged into the system. The user should have a prior knowledge of the book.
Post conditions:	1. User searches for the book 2. The system displays the catalogue. 3. The search criteria should display the documents.

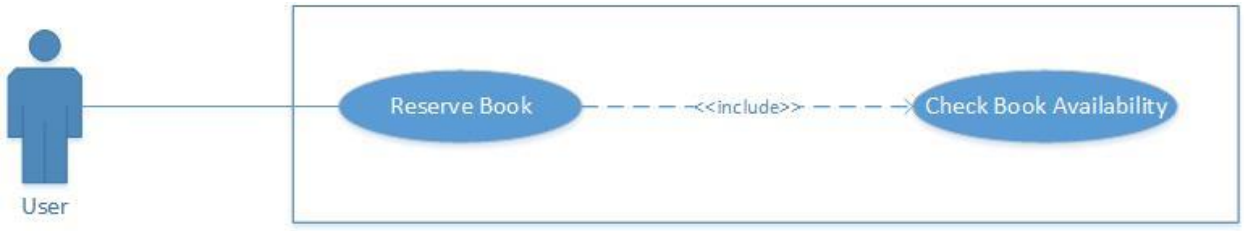
Main Success Scenario:	1. The User enters the name of the book in the search bar. 2. The User is redirected to the catalogue page. 3. The system displays the list of books from the database according to the given information by the user.
Alternative flow:	1. The User enters the name of the book in the search bar. 2. The User is redirected to the catalogue page. 3. The User doesn't get the exact book from the search results. 4. The User selects advanced search options. 5. The User finds the books that he/she was searching for.
Exceptions:	a) The User enters the wrong information of the book. b) When the System is unable to retrieve the information from the database it should display the necessary suggestions required to provide the valid information. c) The User enters the information that has no match. d) No result will be displayed if the user enters the information that doesn't match any document.

4. <u>View catalogue</u>



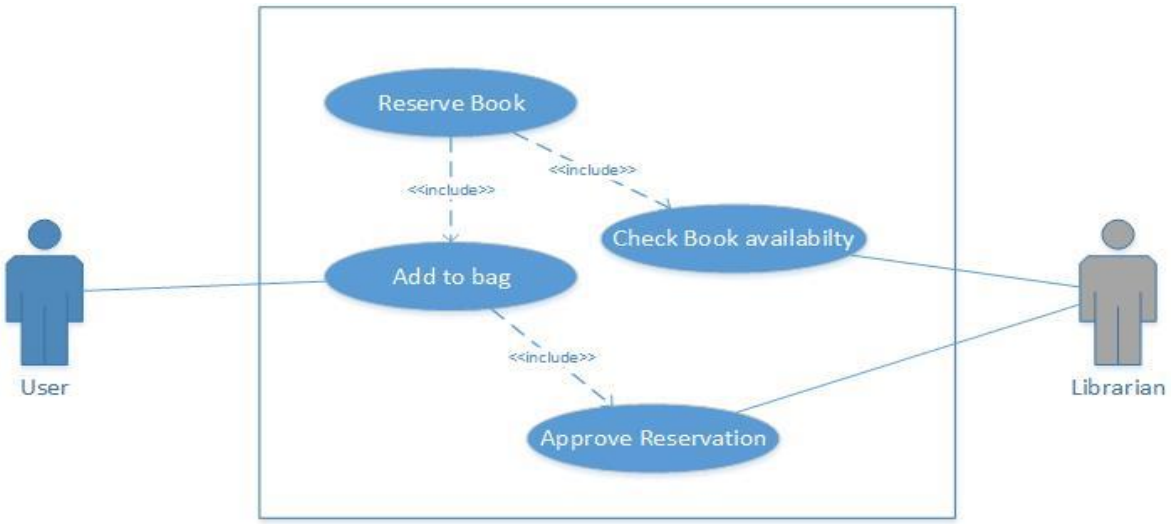
Use Case ID:	**UC4**
Use Case Name:	View Catalogue
Priority:	Low
Description:	This use case helps the User to view the searched books.
Actors:	User
Preconditions:	1. User should be active on his account. 2. The User should have already searched for the books.
Post conditions:	The system displays the catalogue to the user.
Main Success Scenario:	1. The user logs into the system. 2. The user searches for the desired book. 3. The system displays the book which is in the catalogue.
Alternative flow:	N/A
Exceptions:	1. The User enters the wrong information of the book. 2. An error message is displayed on the screen.

5. Reserve Book



Use Case ID:	**UC5**
Use Case Name:	Reserve book
Priority:	High
Description:	This use case helps the User to reserve a book of his/her interest.
Actors:	User
Preconditions:	1. User should be active on his account. 2. The book should be available in the catalogue.
Post conditions:	A success message is displayed for the User that the book is been reserved.
Main Success Scenario:	1. The user logs into the system. 2. The user searches for the desired book. 3. The system displays the book which is in the catalogue. 4. The user chooses the reserve option to reserve the book. 5. System checks the availability of the book. 6. If the book is available, the user is allowed to reserve the book.
Alternative flow:	N/A
Exceptions:	1. The book will not be able to reserve because of the unsuccessful payment or inadequacy of the book. 2. The system displays an error message due to unsuccessful reservation of book.

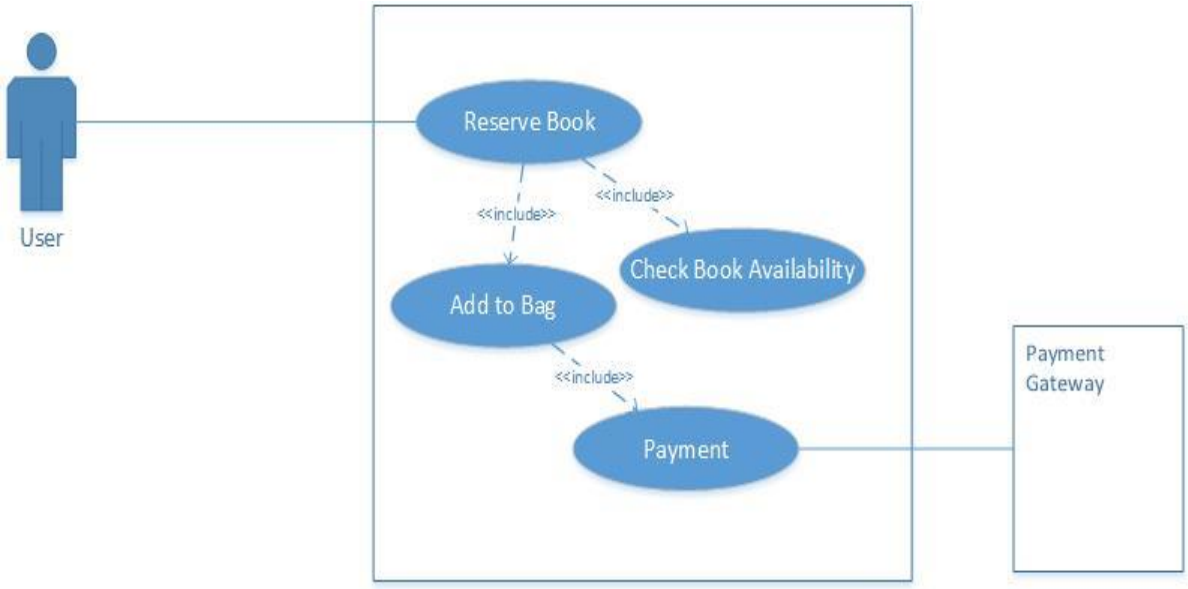
6. Add to bag



Use Case ID:	**UC6**
Use Case Name:	Add to bag
Priority:	High
Description:	This use case helps the user to add books to his bag.
Actors:	User and Librarian
Preconditions:	The user is already reserved the book.
Post conditions:	The system displays a successful message for the adding the book into the bag successfully.
Main Success Scenario:	1. The user logs into the system. 2. The user searches for the desired book. 3. The system displays the book which is in the catalogue. 4. The user chooses the reserve option to reserve the book 5. The system reserves the book if it is available. 6. The book is added to bag. 7. The system displays a successful message for the adding the

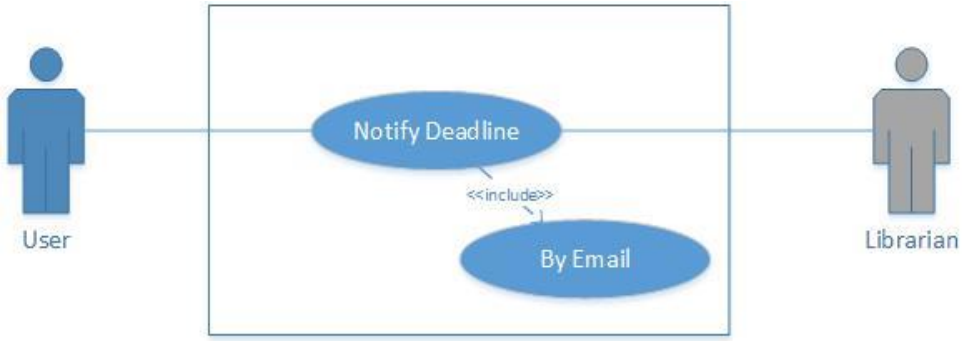
	book into the bag successfully.
Alternative flow:	1. The User searches for the desired book. 2. The system displays the book which is in the catalogue. 3. The User selects the book of his choice. 4. The User then selects Watch option and keeps a track of the book. 5. The User reserves the book when he/she needs it and then add the book to the bag.
Exceptions:	N/A

7. <u>Payment</u>



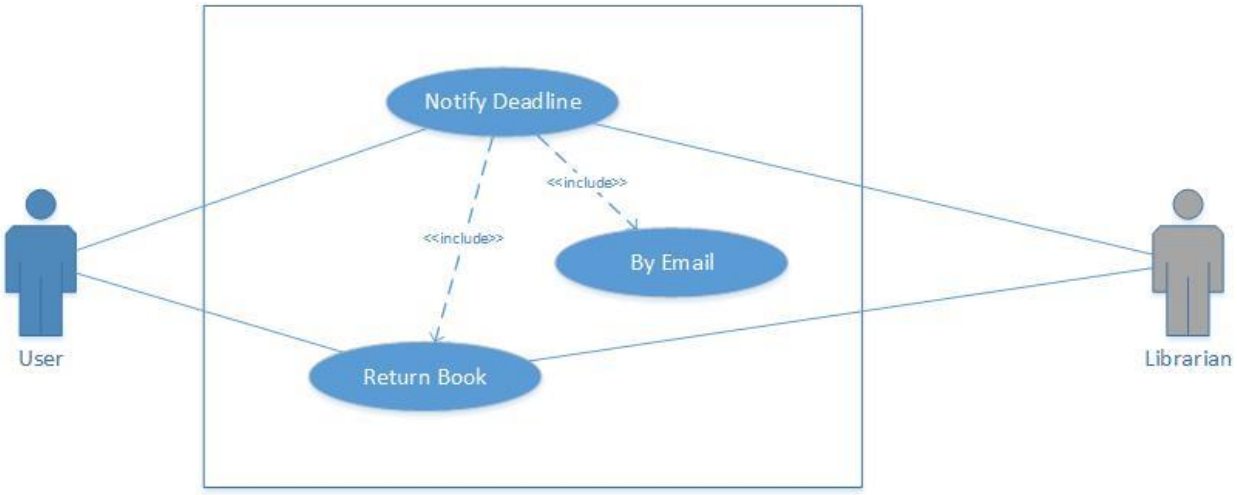
Use Case ID:	**UC7**
Use Case Name:	Payment
Priority:	High
Description:	The user selects the payment option and check-out with books in the bag.
Actors:	User and Payment Gateway
Preconditions:	The System will allow the user to select the payment method from the list of available options.
Post conditions:	After validation of payment details from the user, the book will be reserved successfully.
Main Success Scenario:	1. User will select the payment option from the list of payment options like: • Debit card payment • Credit card payment • Gift card payment 2. User should fill out the details for the payment method selected.
Alternative flow:	The system displays an error message, if the information given by the user is missing or wrong.
Exceptions:	a) User wants to modify the payment option. b) User was unable to find the payment option of choice.

8. Notify Deadline



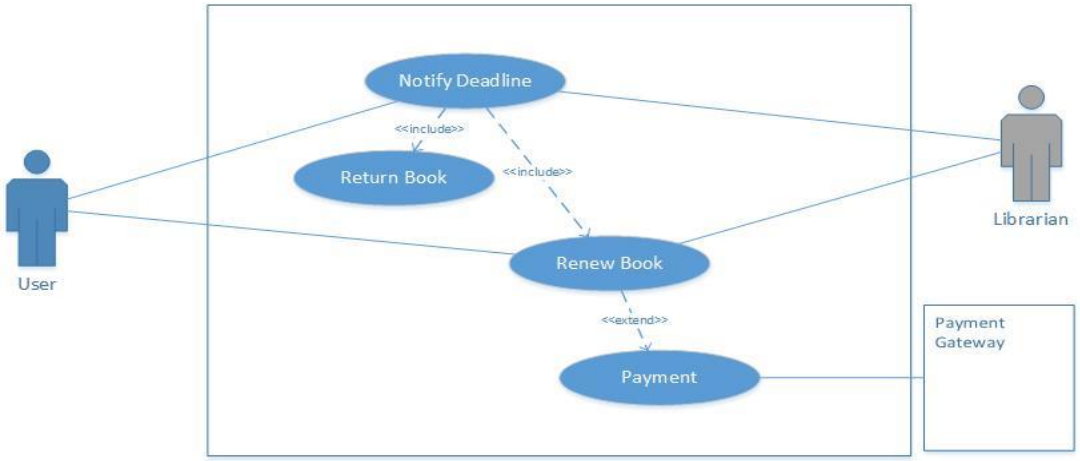
Use Case ID:	**UC8**
Use Case Name:	Notify Deadline
Priority:	High
Description:	The Librarian issues a deadline notification to the user through an email.
Actors:	User and Librarian
Preconditions:	The User should be having at least one book subscription.
Post conditions:	The User gets an email from the Librarian reminding about the deadline
Main Success Scenario:	1. The Librarian keeps a check on the User accounts. 2. Issues a notification if the deadline is approaching. 3. The User gets the notification by Email.
Alternative flow:	N/A
Exceptions:	N/A

9. Return Books



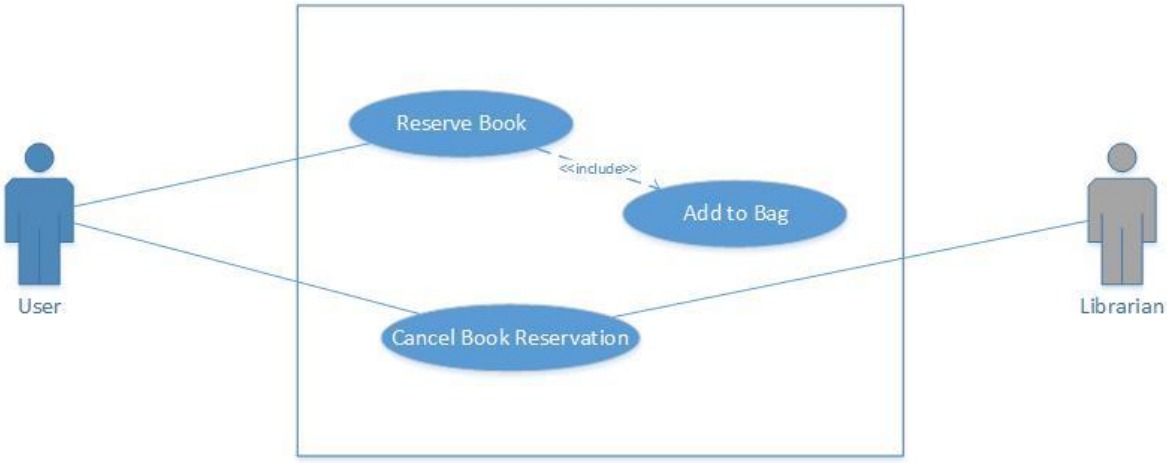
Use Case ID:	**UC9**
Use Case Name:	Return Books
Priority:	High
Description:	Return book will depend on the number of rental days, with which it will determine the deadline and notify the user before it's due.
Actors:	User and Librarian
Preconditions:	The User has an active book subscription.
Post conditions:	The User completes the return book successfully.
Main Success Scenario:	1. The User will get a notification about the deadline of the book. 2. The User will return the book which he/she has subscribed. 3. The User can no longer access the book.
Alternative flow:	N/A
Exceptions:	a) The User could not receive any notification of the deadline. b) The User forgets to return the book within the deadline.

10. Renew



Use Case ID:	**UC10**
Use Case Name:	Renew
Priority:	High
Description:	This use case helps user to extend the deadline or renew the book.
Actor:	User
Preconditions:	The book should belong to the user's account before renewing it.
Post conditions:	1. The book is renewed as per the user's request. 2. The system updates the database and the book gets renewed
Main Success Scenario:	1. When the User chooses renew option, the system verifies the User's information and redirects to the payment gateway. 2. After the payment, the system displays the successfully renewed message on the screen.
Alternative flow:	N/A
Exceptions:	1. The document could not be renewed to the user due to unsuccessful payment or if the User fails to renew the book before deadline. 2. An error message is displayed to the user.

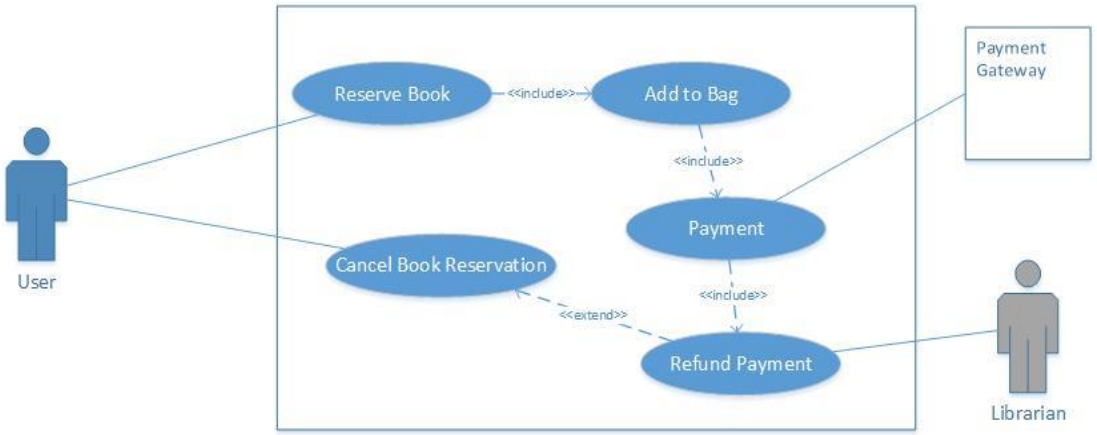
11. Cancel Book Reservation



Use Case ID:	**UC11**
Use Case Name:	Cancel Book Reservation
Priority:	High
Description:	This use case describes the scenario where the User cancels the book reservation.
Actors:	User and Librarian
Preconditions:	The User should be having an incorrect version or wrong book subscription.
Post conditions:	The User request for cancel book reservation is successful.
Main Success Scenario:	1. User chooses cancel book reservation option displayed next to the reserve book option. 2. The Librarian approves the user request. 3. Order gets cancelled successfully. 4. User receives email confirmation for order cancellation.

Alternative flow:	N/A
Exceptions:	The User decides to quit the transaction session midway.

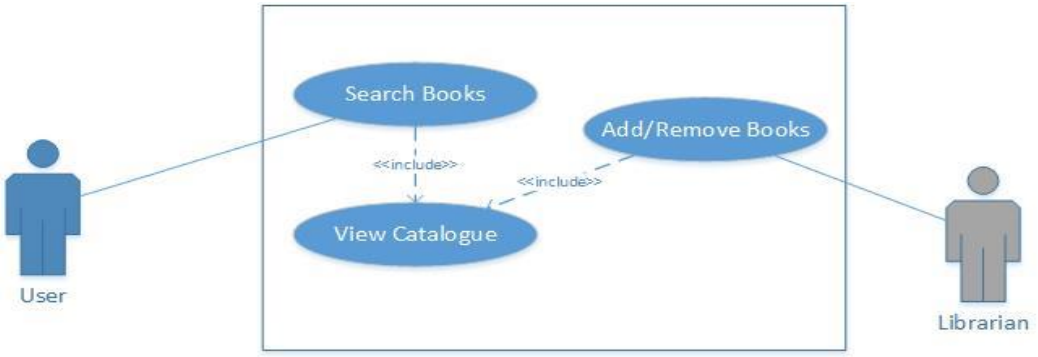
12. <u>Refund Payment</u>



Use Case ID:	**UC12**
Use Case Name:	Refund Payment
Priority:	High
Description:	This use case describes the scenario where the User cancels the book reservation and requests for a refund.
Actors:	User, Librarian and Payment Gateway
Preconditions:	The User should be having an incorrect or wrong book subscription.
Post conditions:	The User request for refund payment is successful.
Main Success Scenario:	1. User chooses cancel book reservation option 2. The Librarian approves the User request. 3. The User receives email confirmation for order cancellation. 4. The User requests for refund payment.

	5. The Librarian processes the User request. 6. The refund payment transaction is completed upon Librarian approval with help of payment gateway.
Alternative flow:	N/A
Exceptions:	The User decides to quit the transaction session midway.

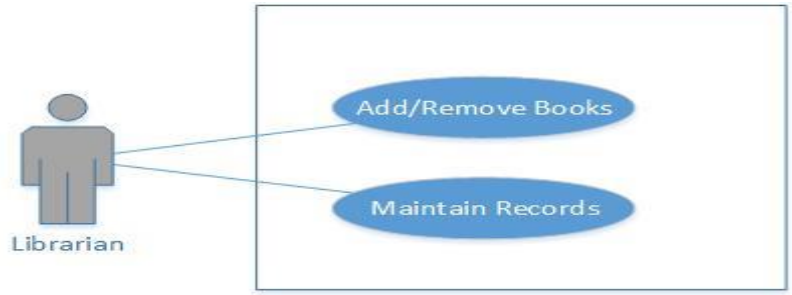
13. <u>Add/Remove Books</u>



Use Case ID:	**UC13**
Use Case Name:	Add/Remove books
Priority:	High
Description:	This use case describes the scenario where the Librarian updates the list of books.
Actors:	Librarian
Preconditions:	The Librarian should have at least one book to add or remove from the list.
Post conditions:	The Librarian completes updating list of books.
Main Success Scenario:	1. The Librarian selects the set of books that should be updated on the catalogue.

	2. The Librarian updates either by adding or removing books from the catalogue.
Alternative flow:	N/A
Exceptions:	a) The Librarian makes an error while updating the catalogue. b) The system shows an error message that informs the Librarian of the error. c) The system prompt the Librarian to fix the wrong information or to add the missing information.

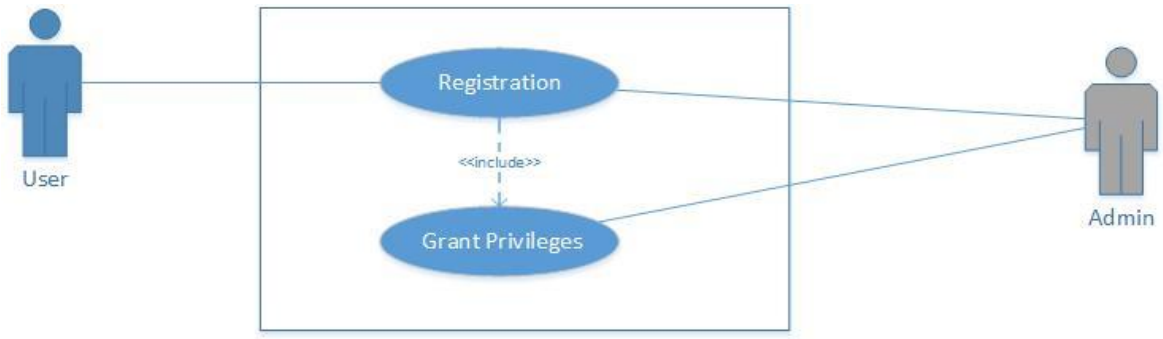
14. <u>Maintain Records</u>



Use Case ID:	**UC14**
Use Case Name:	Maintain Records
Priority:	Medium
Description:	This use case describes the scenario where the Librarian maintains all the records of E-Library System.
Actors:	Librarian
Preconditions:	The Librarian should have prior knowledge of records in the E-Library System.
Post conditions:	The Librarian maintains all the records of the system appropriately.

Main Success Scenario:	1. The Librarian keeps a check on all the User accounts. 2. The Librarian maintains the records of the Users regularly in the database. 3. The Librarian keeps a track of all the transactions of the payment gateway. 4. The Librarian maintains all the records of the payment in the database.
Alternative flow:	N/A
Exceptions:	N/A

15. <u>Grant Privileges</u>



Use Case ID:	**UC15**
Use Case Name:	Grant Privileges
Priority:	Medium
Description:	This use case describes the scenario where the Admin of E-Library System provides privileges to the new User.
Actors:	Admin and User
Preconditions:	The User should be registered to the E-Library System.

Post conditions:	The user should be provided with a set of appropriate privileges.
Main Success Scenario:	1. The user registers into the system successfully. 2. Admin provides the privileges to the user. 3. The User can access the system with the privileges provided by the Admin.
Alternative flow:	N/A
Exceptions:	The User is unable to register as he/she fails to provide valid information. The Admin cannot grant the privileges to the User.

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