Punjab University College of Information Technology

OOAD SEMESTER PROJECT

Online Library Management System

Submitted By:

MUQARRAB HUSSAIN	**BSEF20M508**
MEERUB TAHIR (Group Leader)	**BSEF20M521**
MUHAMMAD MOIN	**BSEF20M538**
MIAN BASIL AHTISHAM AHMAD	**BSEF20M543**
SYED AIZAZ UL HASSAN	**BSEF20M552**

Submitted To:

Ms. Amina Mustansir

Date:

13th Feb 2023

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1 Project Description:

Online Library Management System is a web based library management system. It maintains the information about the books, the users and the members to whom books are issued. This is very difficult to organize manually. Maintenance of all this information manually is a very complex task. The Online Library Management has been designed to computerize and automate the operations performed over the information about the members, book issues and returns and all other operations i.e fine, feedback. It reduces the workload of librarian as most of the manual work done is reduced.

2 Project Summary:

Online Library Management System is an application which refers to the library system used by librarian to manage the library using the web based system where he can add new books etc.

In this books and members' records are maintained by the librarian. With this system there will be no loss of book record or member record which generally happens when a manual library system is used. It helps librarian to manage the library with more convenience and in a more efficient way.

The librarian manages the modules of books, users, members. He can add books by their titles, authors' names, categories, novels etc. He manages the books reservation, issuance, fine details of the users/members if they don't return the books on due date. He also manages the feedback of the users, members and can cancel the membership of any member if he don't follow the regulations of the system.

On the other hand, the user can login the system after getting registered. He can search the books by their titles, authors' names and categories. He can get the membership of this system by all the required credentials i.e personal details and account details. He can borrow books, renew and reserve them. He can reset his password and also give feedback about the system and the books and other operations.

3 Summary of Requirements

Librarian:

1 Manage Catalogue:

Librarian manages the users, books and members.

1.1 Add Book:

Librarian can add the books in the system by giving the details of the books i.e title, author etc.

1.2 Update Book:

The librarian can update the details of the books.

1.3 Delete Book:

The librarian can update the details of the books.

1.4 Manage User:

Librarian manages the user and their issuance of books.

1.5 Manage Members:

Librarian manages the members, their borrowed books records and can cancel the membership.

2 Cancel Membership:

Librarian can easily cancel the membership of the member.

User:

1 Login:

The user logged into the system by using this feature.

He can only log in if he already registered.

2 Search Book:

The user can search the books by their titles, author names etc.

3 Get Membership:

The user can get the membership of the system by this feature. He can become member after providing the required details.

4 Book Issuance Module:

4.1 Borrow Book:

The user can borrow the book after searching the book if available.

4.2 Renew Book:

The user can renew the borrowed book before the due date.

4.3 Reserve Book

The user can reserve the book after selecting the desired book.

4.4 Pay Fine:

The user will have to pay the fine if he does not return the book on due date.

5 Give feedback:

The user can give feedback about the system services and the books as well.

4 Project Proposal

4.1 Project Title:

Online Library Management System

4.2 Overview Statement

This is going to be a general-purpose library management system. This is going to fulfil the need of an online library management system. The project was created with librarians and library users in consideration. Any person will be able to take membership of the library. They can search any book of any category. They can borrow, renew and give feedback. They can report any issue. The system provides the frequently asked questions section for the user to enhance their experience.

4.3 Project Goal

This will allow librarian to maintain records and keep track of books. Librarian will be able to upload new books and remove books. He will also be able to get the information of each member. This system will also allow the user to generate fees and fine slip.

4.4 Objectives

Efforts saving: It will reduce the work of a librarian and his work easy.

Time saving: This will be the web application anyone can access it through browser and check their status instead of going to library.

Data Maintenance: It will maintain the data of library, members and alert them accordingly.

Easy Access: Our web based system will help users to borrow books easily.

4.5 Project Success Criteria

The system is going to have a modern look and feel and will be easy to use. The UI is going to be interactive and user friendly.

4.6 Assumptions

- The payment of dues/fine and membership done using the challan will be verified by the admin physically.
- The system will be running 24/7.
- The user will not be able to edit his own account info.
- The Fine on each book will be the same and will be hard coded into the system.
- The standard time to return to return any book would be 2 weeks.

The system will be running completely on local servers, so it is completely depending on it. So, it will Require an uninterrupted internet Connection to perform properly.

Target End users:

Anyone who wants to borrow books.

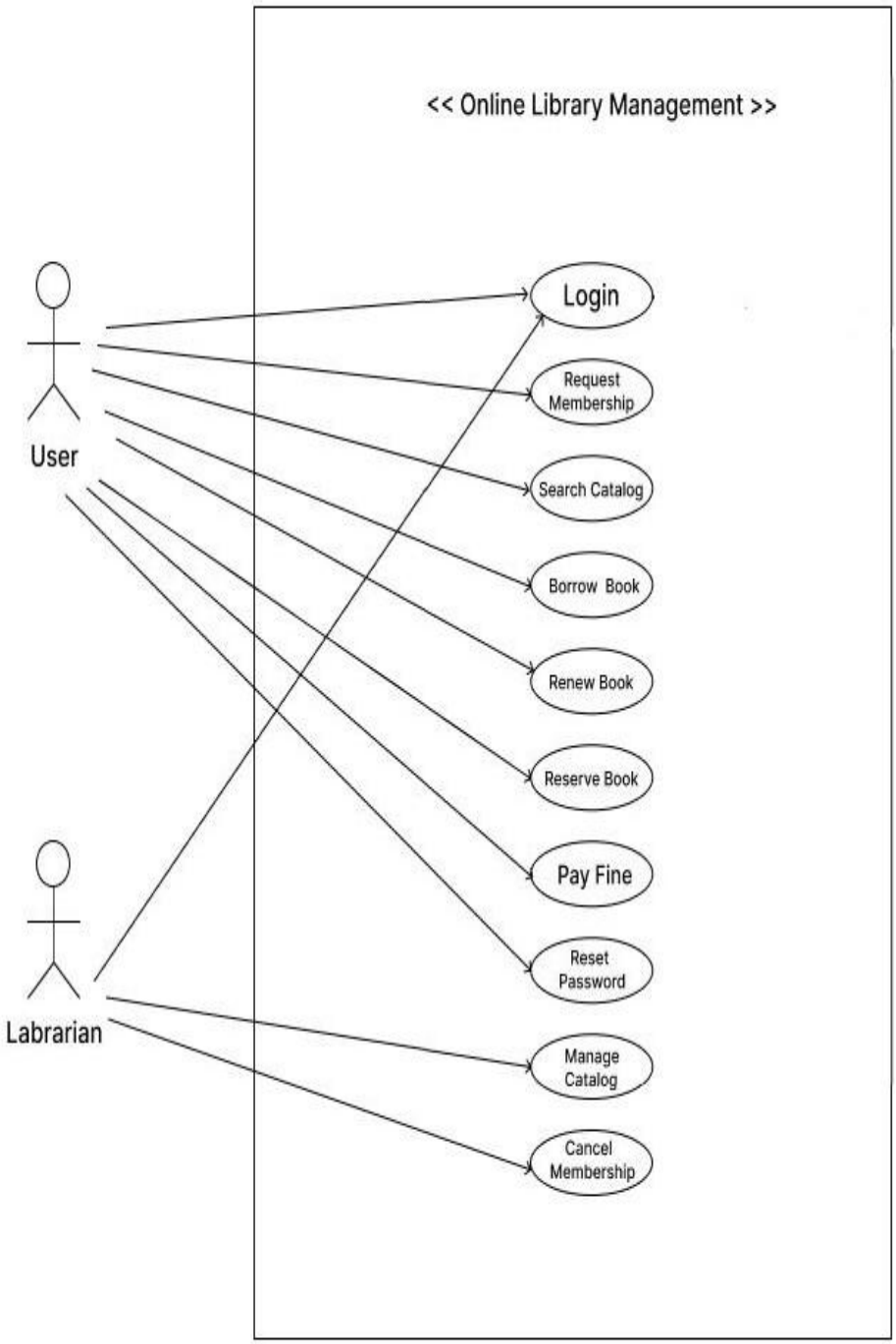
4.7 High-Level System Components

1. **Login**
   This component is about to get login the library management system.
   The user who already signed up can login to view, get membership of the system etc.
2. **Request Membership**
   This component is about to get the membership of the system.
   The user who logged in can apply/request to get membership after giving the correct credentials.
3. **Search Catalogue**
   This component is about to search the books in the system.
   The user who logged in can search the books by their titles, author names etc.
4. **Borrow Book**
   This component is about to borrow the book which you want if available.
   The user can borrow the available book which he wants and get the due date to return the book.
5. **Renew Book**
   This component is about to renew the book which he already borrowed.
   The user can get a new due date if he has renewed the book.
6. **Reserve Book**
   This component is about to reserve the book.
   The user can reserve the book according to his own date.
7. **Pay Fine**
   The user will have to pay fine if he did not return the book before the due date or not renewed the book till the due date.
8. **Reset Password**
   In this **t**he user can reset the password by entering the older password but if he forgot the password then he can recover/reset the password via email or phone number.
9. **Manage Catalogue**
   The librarian manages all the books and users. He can add, update and delete the book details in the system. He can also manages the users' data.
10. **Cancel Membership**
    The librarian can cancel the membership of the user if he requested or even if the member don't follow the rules.

5 OBJECT ORIENTED ANALYSIS

5.1 HIGH-LEVEL USE CASE DIAGRAM

This high level use case diagram illustrate and define the context and requirements of the important parts of the system.



5.2 USE CASE DESCRIPTON

The use case description is a text-based that describes the use case comprised of detailed, step-by-step interaction between the actor and the system. And also tells about the alternatives.

Name: MUQARRAB HUSSAIN
Roll Number: BSEF20M508

Use case name

Use case UC 1: Login

Primary Actor

User and Librarian

Stakeholders and Interests

User: User wants to login the library system e.g. for borrowing the book.
Librarian: Librarian needs to login for the management of library.
System: System will check the authentication.

Preconditions

The user is already registered/sign up in the system.

Post condition

The User logged in the system. The system shows the user and the librarian their respective dashboards.

Main Success Scenario

1. User clicks to login the system
2. User enter username
3. User enter the password
4. User selects the login button
5. System checks the username and password
6. System logged in the user and show dashboard

Extensions

5 a. Wrong Username

- System shows the message that enter correct username

5 b. Wrong Password

- System shows the message that enter correct password

Name: MUQARRAB HUSSAIN
Roll Number: BSEF20M508

Use case name

Use case UC 2: Request Membership

Primary Actor

User

Stakeholders and Interests

- User wants to apply for membership
- System will authenticate the required data for membership
- Librarian will accept the membership

Precondition

The user is already logged into the system.

Post condition

System will show the membership approved message.

Main Success Scenario

1. User selects the request membership button
2. User enter first name
3. User enter last name
4. User enter phone number
5. System sends 4 digit pin to phone number
6. User enter 4 digit pin
7. System validate PIN
8. User enter credit card number
9. User enter account title
10. System authenticates the credit card number and account title.
11. User selects submit membership button
12. System shows message of request submitted successfully.

Extensions

6 a. Wrong PIN

- System shows the message that enter correct PIN, we sent on your phone number

9 a. Wrong Credit Card Details

- System shows the message that enter correct credit card details

10 a. Press Submit Membership without Entering all Fields

System shows the message that fill all the required fields correctly

Name: MEERUB TAHIR
Roll Number: BSEF20M521

Use case name

Use case UC 3: Search Catalogue

Primary Actor

User

Stakeholders and Interests

- User: User wants to search any book without interruption
- System: System will let user know about whether the book is available or not
- Librarian: Librarian Solve functionality related problems

Preconditions

The user is already logged in to the system means that the user is authenticated and identified by the system

Post condition

The User searches the catalogue. Select on any book. Click ok and system will display that book.

Main Success Scenario

1. User Selects the menu option
2. User Click on Show menu
3. System presents a list of books
4. User Scrolls up or down the list
5. User Click Search option

6. Search box will open
7. User enters author's name, book name and edition of book
8. User clicks confirm book option
9. System presents required book

Extensions

3 a. Empty list

- System shows a message that list is empty need to be updated by librarian

7 a. Unavailable book

- System shows a message that your desired author's book is not available

Name: MEERUB TAHIR
Roll Number: BSEF20M521

Use case name

Use case UC 4: Borrow Book

Primary Actor

User

Stakeholders and Interests

- User wants to submit borrow book request without any interruption
- System will guide the user about the constraints (return date , time etc)
- Librarian will resolve any functionality related problems.

Precondition

The user is already logged in to system and searches his/her desired book through catalogue

Post condition

System will approve or rejects the borrow book request and let the user know about it

Main Success Scenario

1. User Selects the desired book.
2. System will check whether the book is available
3. User presses submit request option
4. User presses Borrow click
5. System shows due date of return
6. User click OK

Extensions

2 a. Book is not available

- System shows the message that the book is already borrowed by someone else

3 a. Press submit without requesting

- The System will display an error message if user presses submit request without selecting book

Name: MUHAMMAD MOIN
Roll Number: BSEF20M538

Use case name

Use case UC 5: Renew book

Primary Actor

User

Stakeholders and Interests

- User: User able to renew book for him/her without any ambiguity
- System: System will let user know about whether the book can be renewed or not
- Librarian: Librarian solve ambiguity related problems if occurred

Preconditions

The user is already logged in to the system , selected the book and has requested to borrow that particular book.

Post conditions

The system will ask a confirmation pop-up message. Click ok and system will renewed that book.

Main Success Scenario

1. User clicks on the menu of borrowed books
2. System will display the books that are being borrowed by user
3. User search the book by name (i.e, author, edition) in order to renew
4. User will select that particular book to renew
5. User will click on the option of Renew button
6. System will ask a confirmation pop-up message from user
7. User will confirm it by clicking OK
8. System will display the book as renewed now

Extensions

2 a. Borrowed books menu

- System will show a message of no borrowed book found in case if list is empty

3 a. Search book to renew

- System will show a message of no book found if user enters wrong book name

5 a. Renew option

- User can't renew a book that is already renewed

Name: MUHAMMAD MOIN
Roll Number: BSEF20M538

Use case name

Use case UC 6: Reserve book

Primary Actor

User

Stakeholders and Interests

- User: User wants to reserve a book without any interruption
- System: System will guide the user about the availability/record along with reservation details of book
- Librarian: Librarian will resolve any book reservation related issues.

Preconditions

The user is already logged in to system and searches his/her desired book through catalogue

Post conditions

System will display the book as reserved or not based on record and let the user know about it

Main Success Scenario

1. User searches the desired book.
2. System displays the book as available or not
3. User will select the book in order to reserve
4. User presses option of Reserve book
5. System shows whether the book is reserved or not
6. Eventually system will let user know about the reservation time expire date and details.

Extensions

2 a. If book is available

- System will allow user to reserve a book only if the book is not already reserved by someone else

2 b. If book is not available

- System will allow the user to reserve a book but will notify him/her about unavailability of book and will be reserved after it will available

5 a. Book reservation

- System will display a message of book is reserved if it is at least present in record even if it is unavailable

Name: MIAN BASIL AHTISHAM AHMAD
Roll Number: BSEF20M543

Use case name

Use case UC 7: Pay fine

Primary Actor

User

Stakeholders and Interests

- User: User able to check and pay fine for late return of book without ambiguity
- System: System will let user know about the record of late returning of book
- Librarian: Librarian solve ambiguity related problems if occurred

Preconditions

The user is already logged in to the system, has borrowed the book with a message of no return of book yet.

Post conditions

The system will show that user has successfully paid fine for late return of book.

Main Success Scenario

1. System will show up a message of not returned the borrowed book yet to user
2. System will ask to pay fine for it
3. User will select and click to pay fine button
4. System will show him/her amount to pay for fine with due date mentioned
5. User will click OK button to pay fine

Extensions

1 a. Not returned book

- System will display a message of not returned book with details of borrowed book name, date, time and due date of book return

5 a. Pay fine button

- After clicking OK button system will provide a Chalan to user to pay fine

Name: MIAN BASIL AHTISHAM AHMAD
Roll Number: BSEF20M543

Use case name

Use case UC 8: Reset Password

Primary Actor

User

Stakeholders and Interests

- User: User wants to reset its password.
- System: System will notify whether password has been reset or not.
- Librarian: Librarian can help user about giving useful information for reset passwords.

Preconditions

The user has the valid login id or password through the use login or enter in to the system.

Post condition

The User password has been reset successfully.

Main Success Scenario

1. User can reset password by just select the options to reset passwords from settings.
2. System will allow to reset user password.
3. User have to enter previous passwords and then new passwords twice time.
4. After the user enter the passwords.
5. If user forget its password and wants to recover it then it has two alternative methods.

Extensions

4 a. Entered Password

- A message appears, that says your password has been changed successfully.

5 a. Recovery via Email

- User can reset its password by email if he forgot its passwords.
- Simply the user can click the forgot passwords and then system will send a code to its associate email.
- By using that code user can reset its password.

5 b. Recovery via Phone No

- User can reset its password by phone no if he forgot its passwords.
- Google sent a notification to your phone no. Tap **Yes** on the notification, then type on your phone to verify it's you.
- By using that code or OPTP you can easily reset your passwords

Name: SYED AIZAZ UL HASSAN
Roll Number: BSEF20M552

Use case name

Use case UC 9: Manage Catalog

Primary Actor

Librarian

Stakeholders and Interests

- Librarian: He will click on the catalog, and he can publish the details of a book.
- Members: They can see the catalog and browse it.

Preconditions

- Librarian must log in with his credentials.

Success Guaranties

The librarian clicking on the catalog system must show him all books posted and an option for uploading new book details.

Main success scenario

1. The librarian must authenticate himself.
2. The librarian clicks on the catalog button.
3. The system must show him all books posted.
4. There will be a remove option for remove book details.
5. There will be an edit option for edit book details.
6. There will be an upload option for uploading book details.
7. There will be a preview option for preview book details.
8. There will be an option to set the book availability.

Extensions

1 a. Wrong Credentials

- If the librarian puts in the wrong credential system must display an error message.

4 a. Remove option

- If the librarian clicks on the remove option, the system must show a warning message and confirm it again.
- If the librarian ensures it system should remove the book.

7 a. Preview

- If the librarian upload book, the book detail system should give him an option of preview, which shows what it looks like after upload.

Name: SYED AIZAZ UL HASSAN
Roll Number: BSEF20M552

Use case name

Use case UC 10: Cancel Membership

Primary Actor

Librarian

Stakeholders and Interests

- Librarian: He will click on the membership, and he can cancel any member membership.
- Students: They are membership holders of the library.

Preconditions

- Librarian must log in with his credentials.
- Librarian must select the relevant member.

Success Guaranties

The librarian clicking on the member's option system must show him all members with their details.

Main success scenario

1. The librarian must authenticate himself.
2. The librarian clicks on the member's button.
3. The system must show him all members with details.
4. The librarian can select any member.
5. There will be an option to cancel any member membership.

Extensions

1 a. Wrong Credentials

- If the librarian puts in the wrong credential system must display an error message.

4 a. Select members

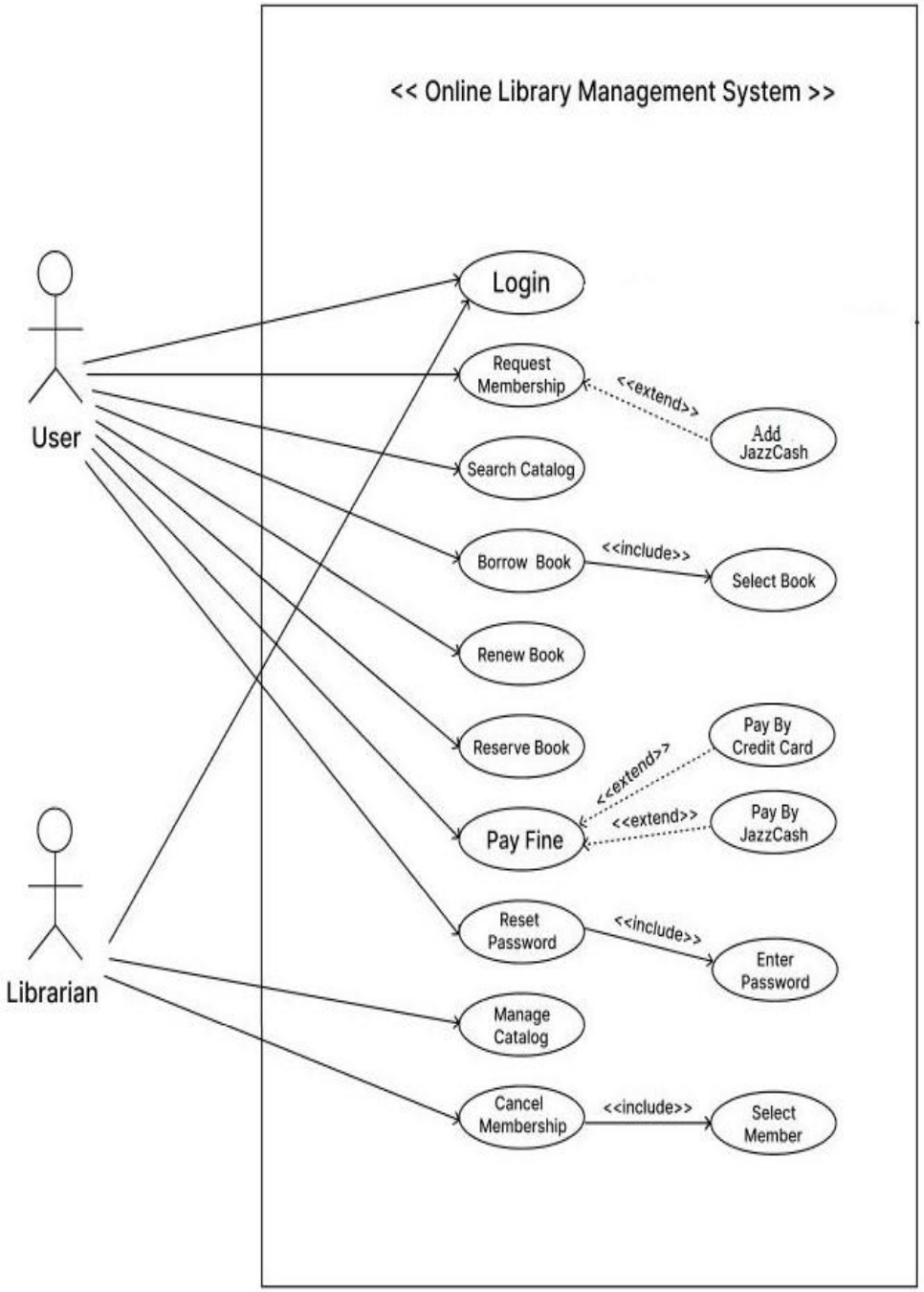
- The librarian can select a member or multiple members.

5 a. Cancel Membership

- When a librarian cancels, any membership system must ask him for a reason for canceling.

5.3 ANALYSIS LEVEL USE CASE DIAGRAM

This is diagram is used to analyze the online library management system. It helps to visualize the different types of roles in a system and how those roles interact with the system but in more detailed form than high level use case diagram.

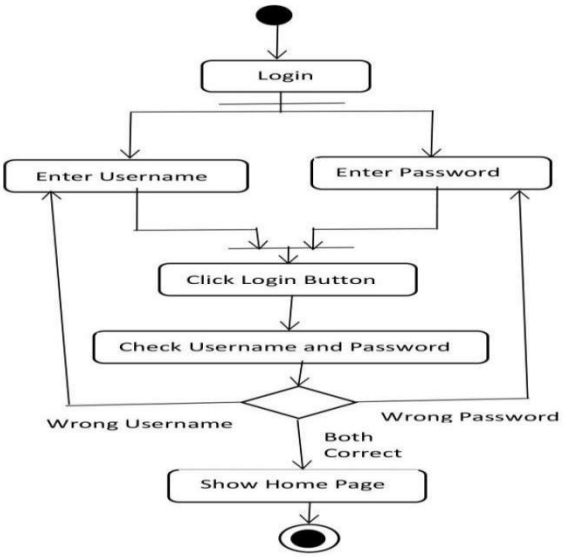


5.4 ACTIVITY DIAGRAM

It tells the control flow from a start point to a finish point showing the various decision paths that exist while the activity is being executed.

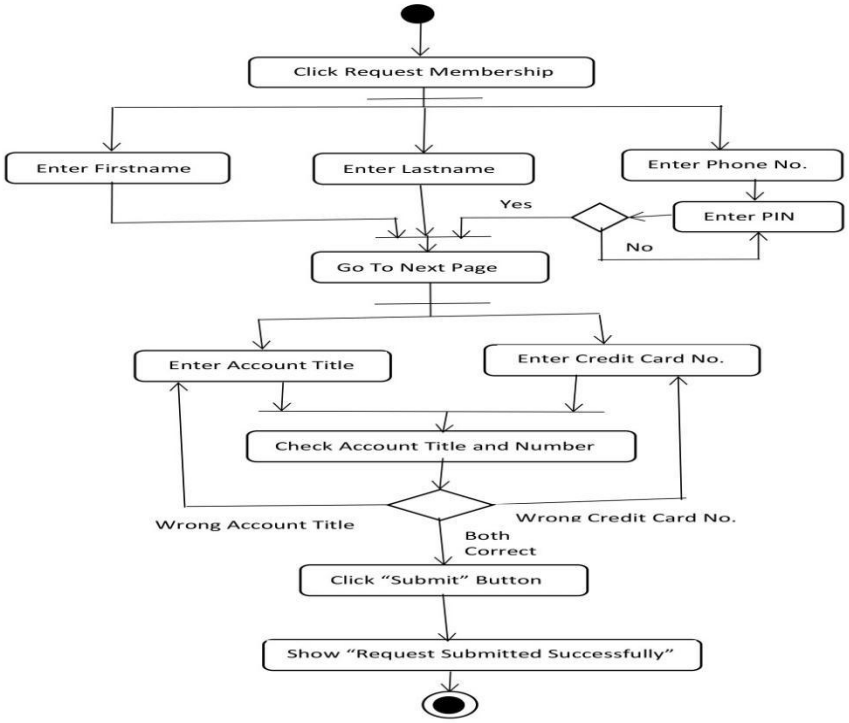
UC-1 : Login

Name: MUQARRAB HUSSAIN
Roll Number: BSEF20M508



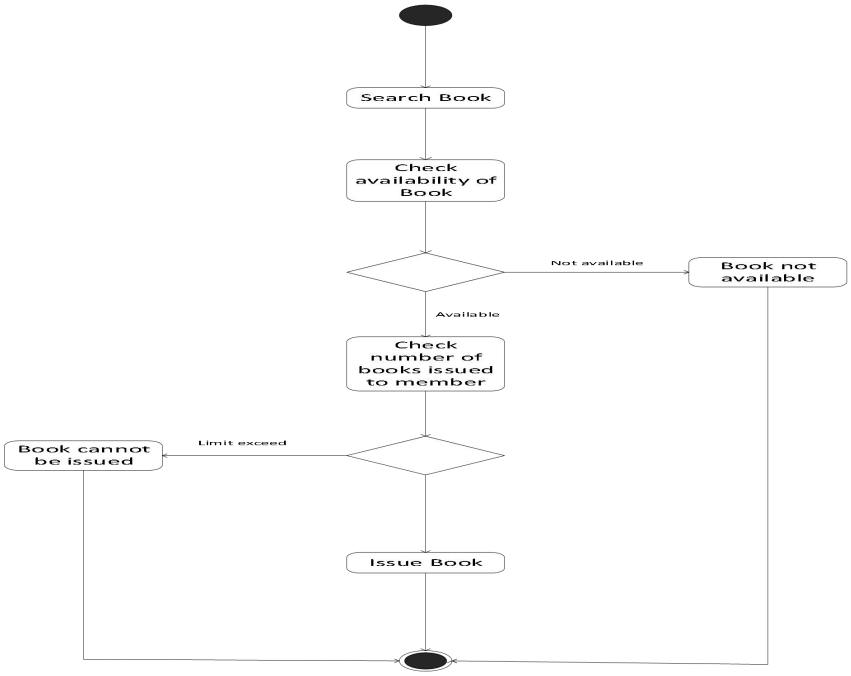
UC-2 : Request Membership

Name: MUQARRAB HUSSAIN
Roll Number: BSEF20M508



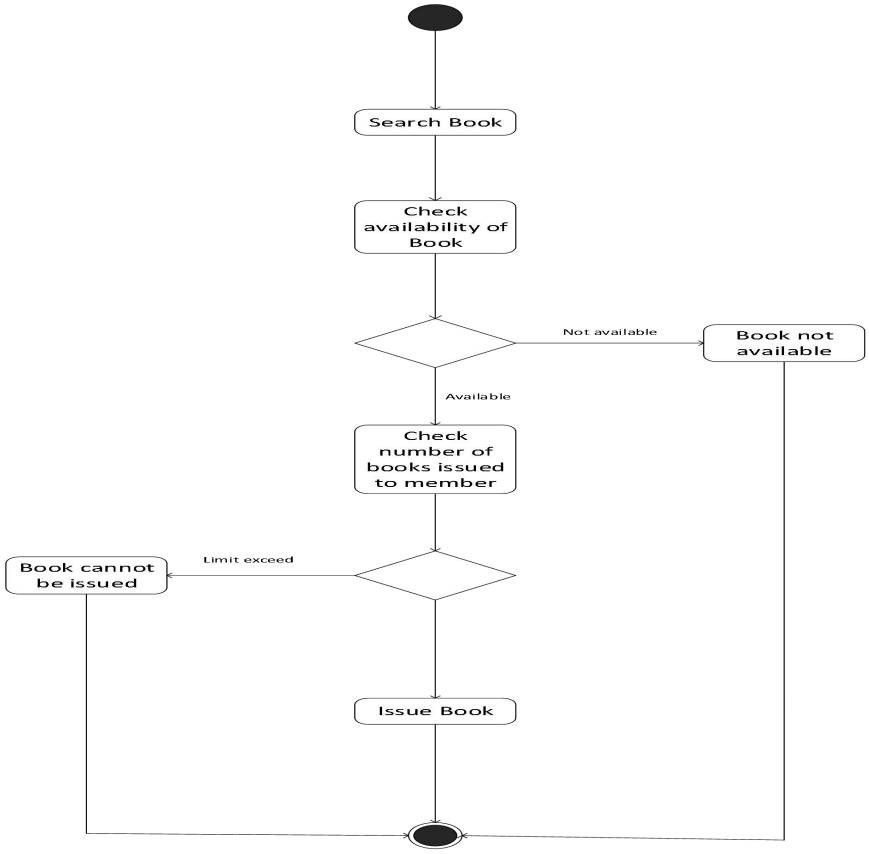
UC-3 : Search Catalogue

Name: MEERUB TAHIR
Roll Number: BSEF20M521



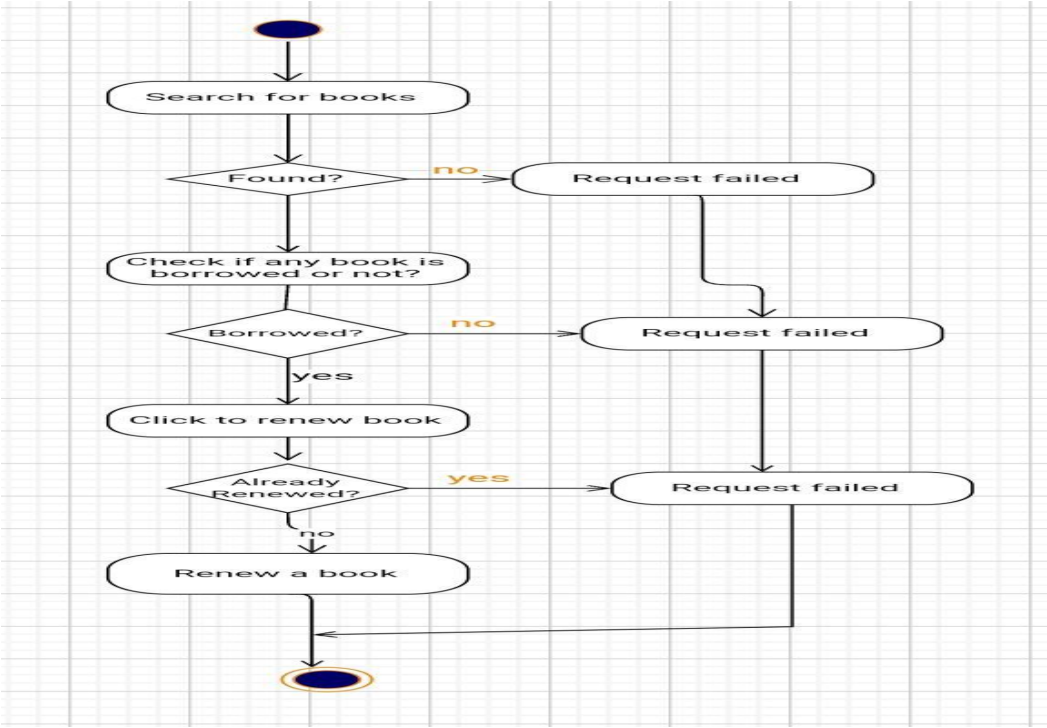
UC-4 : Borrow Book

Name: MEERUB TAHIR
Roll Number: BSEF20M521



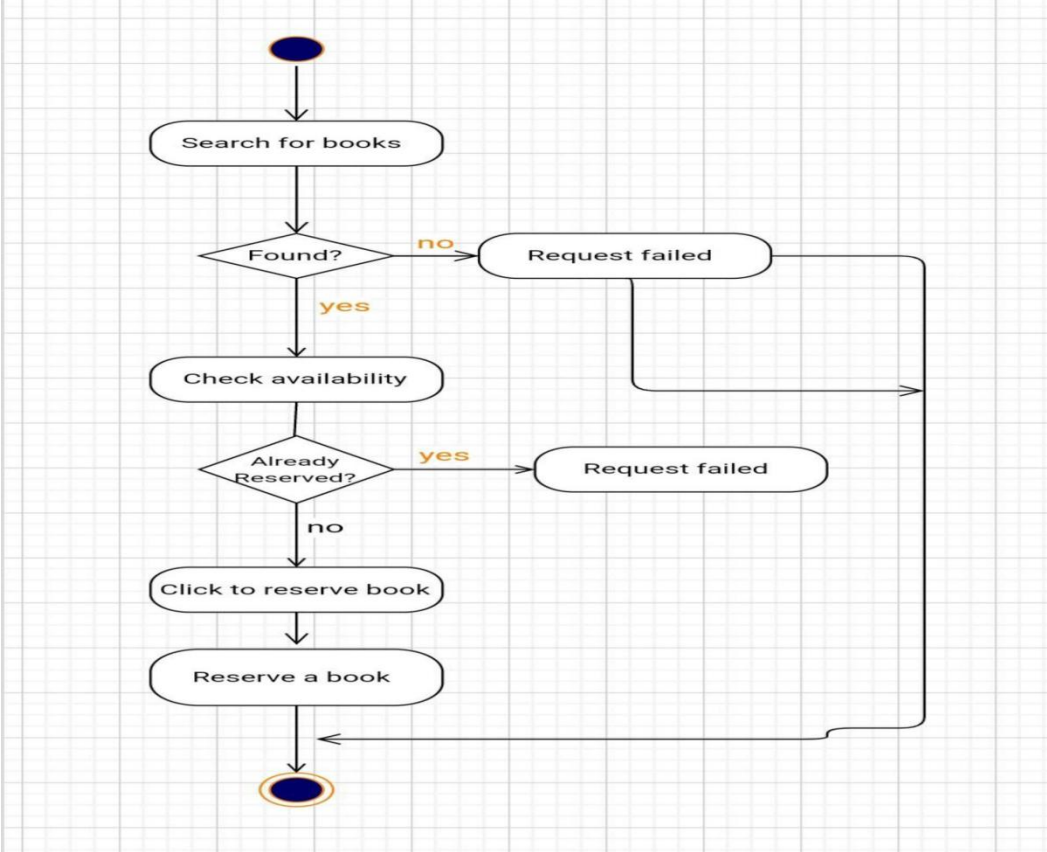
UC-5 : Renew Book

Name: MUHAMMAD MOIN
Roll Number: BSEF20M538



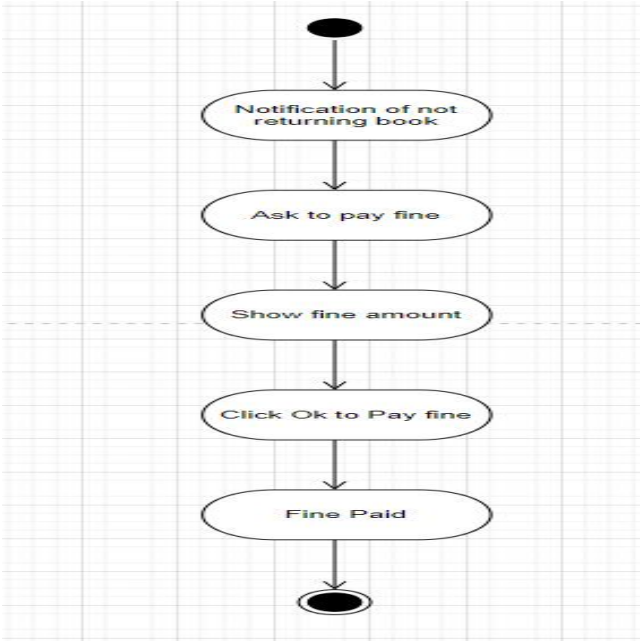
UC-6 : Reserve Book

Name: MUHAMMAD MOIN
Roll Number: BSEF20M538



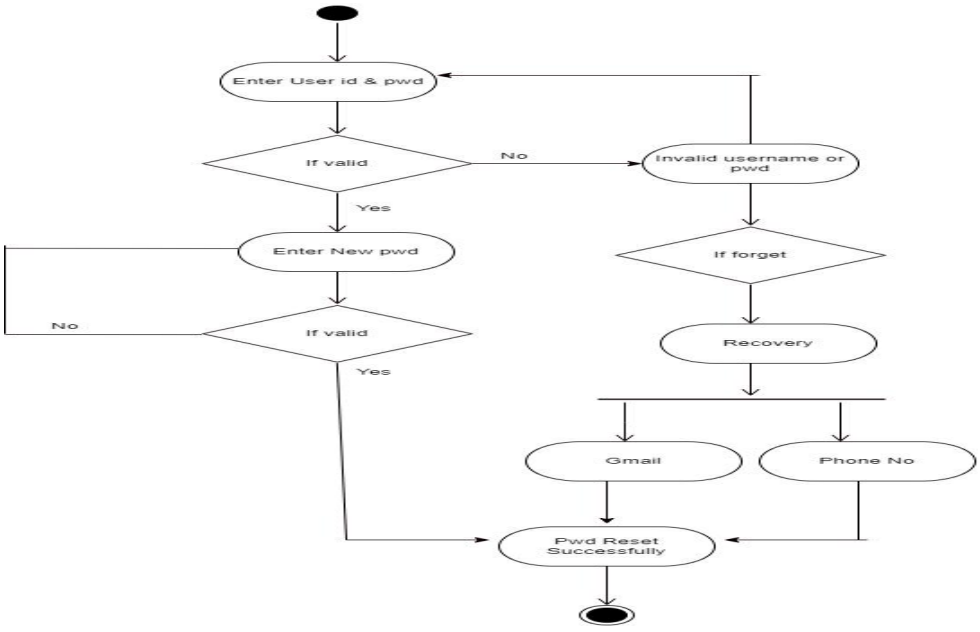
UC-7 : Pay Fine

Name: MIAN BASIL AHTISHAM AHMAD
Roll Number: BSEF20M543



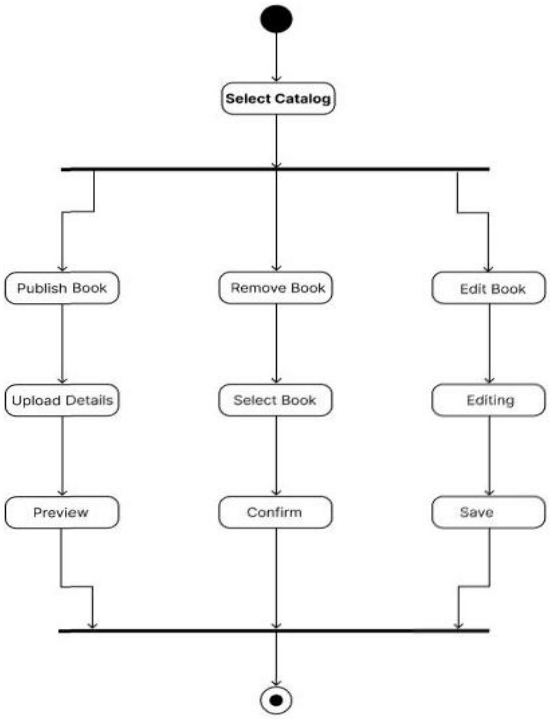
UC-8 : Reset Password

Name: MIAN BASIL AHTISHAM AHMAD
Roll Number: BSEF20M543



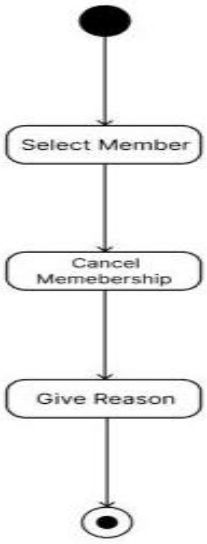
UC-9 : Manage Catalogue

Name: SYED AIZAZ UL HASSAN
Roll Number: BSEF20M552



UC-10 : Cancel Membership

Name: SYED AIZAZ UL HASSAN
Roll Number: BSEF20M552

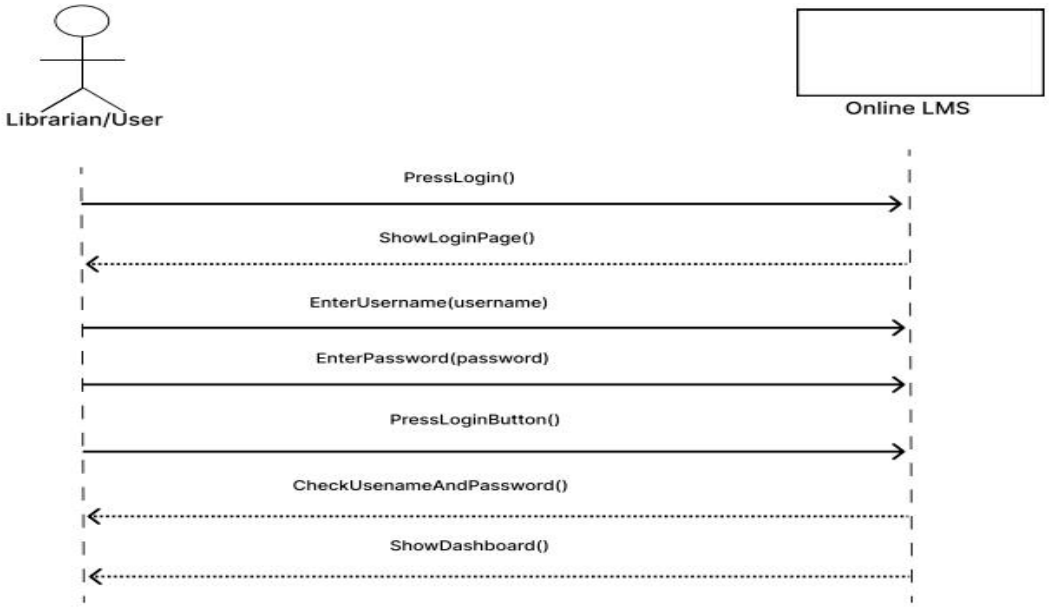


5.5 SYSTEM SEQUENCE DIAGRAM

This diagram tells a sequence wise(step-wise), modeling operations of the system in response to events.

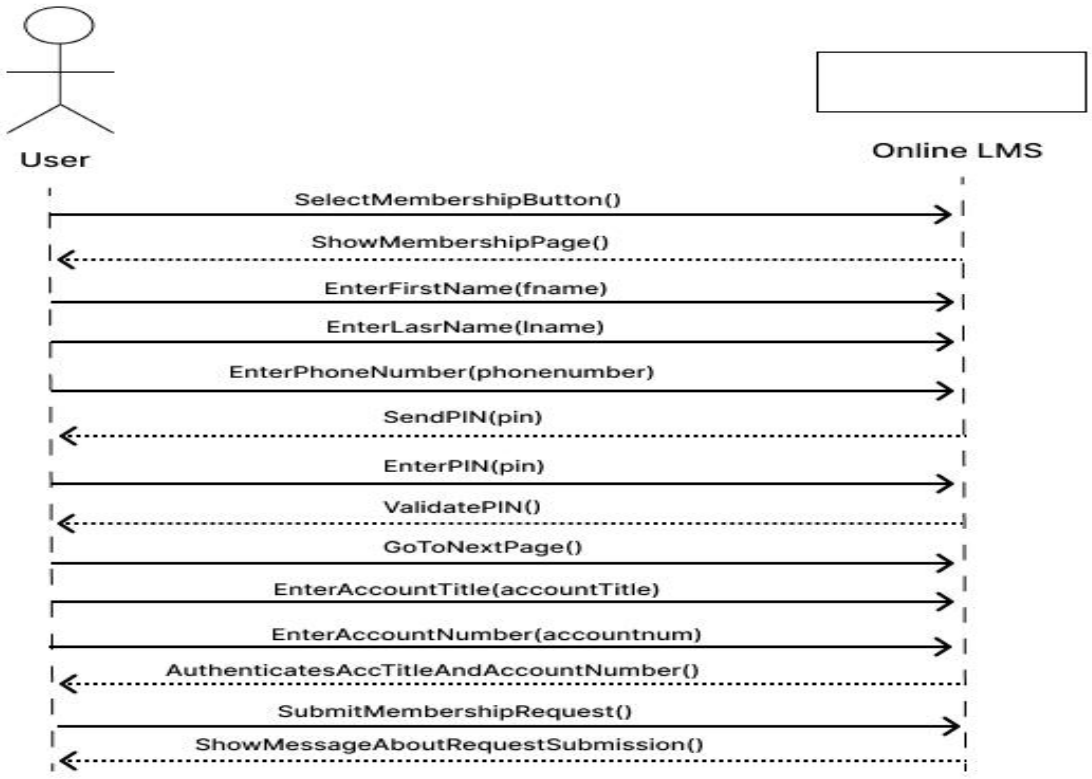
UC-1 : Login

Name: MUQARRAB HUSSAIN
Roll Number: BSEF20M508



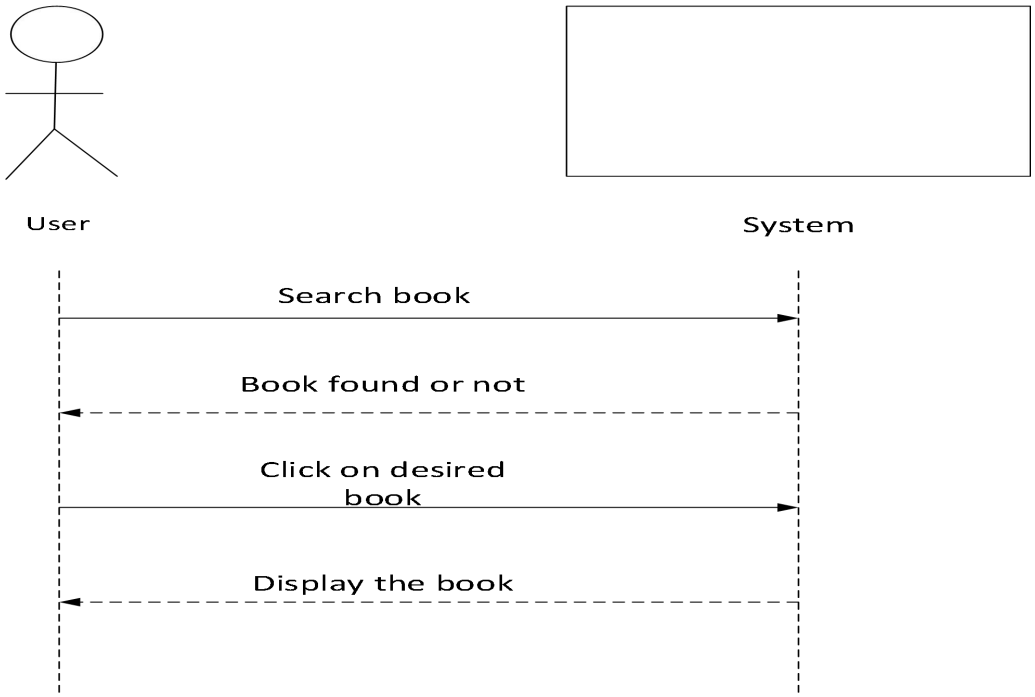
UC-2 : Request Membership

Name: MUQARRAB HUSSAIN
Roll Number: BSEF20M508



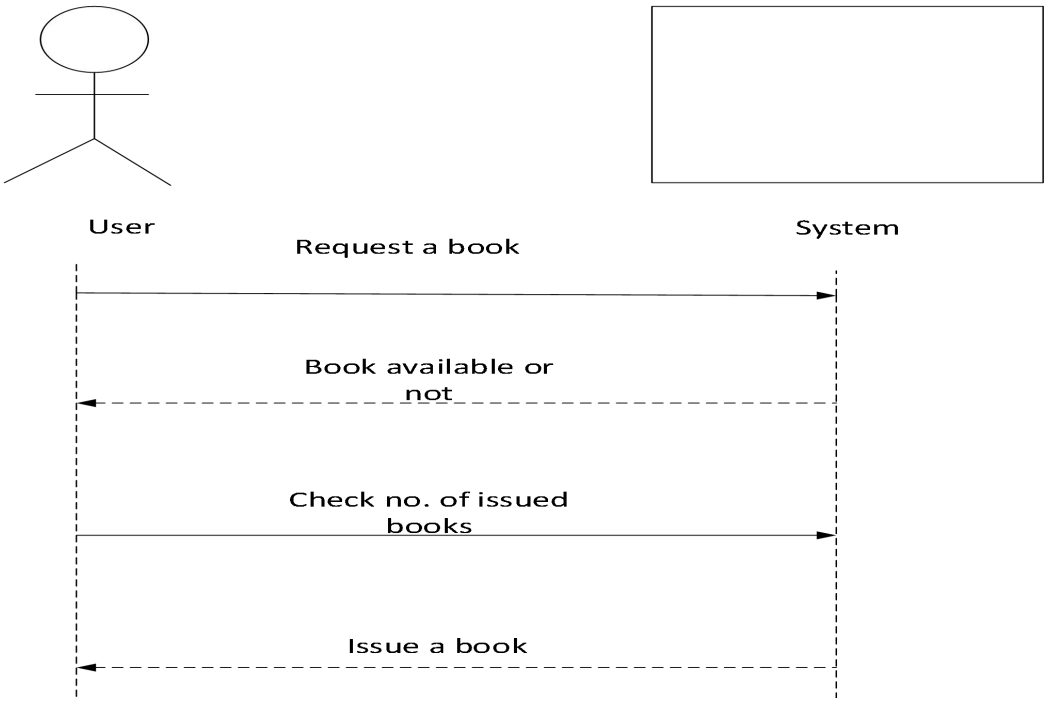
UC-3 : Search Catalogue

Name: MEERUB TAHIR
Roll Number: BSEF20M521



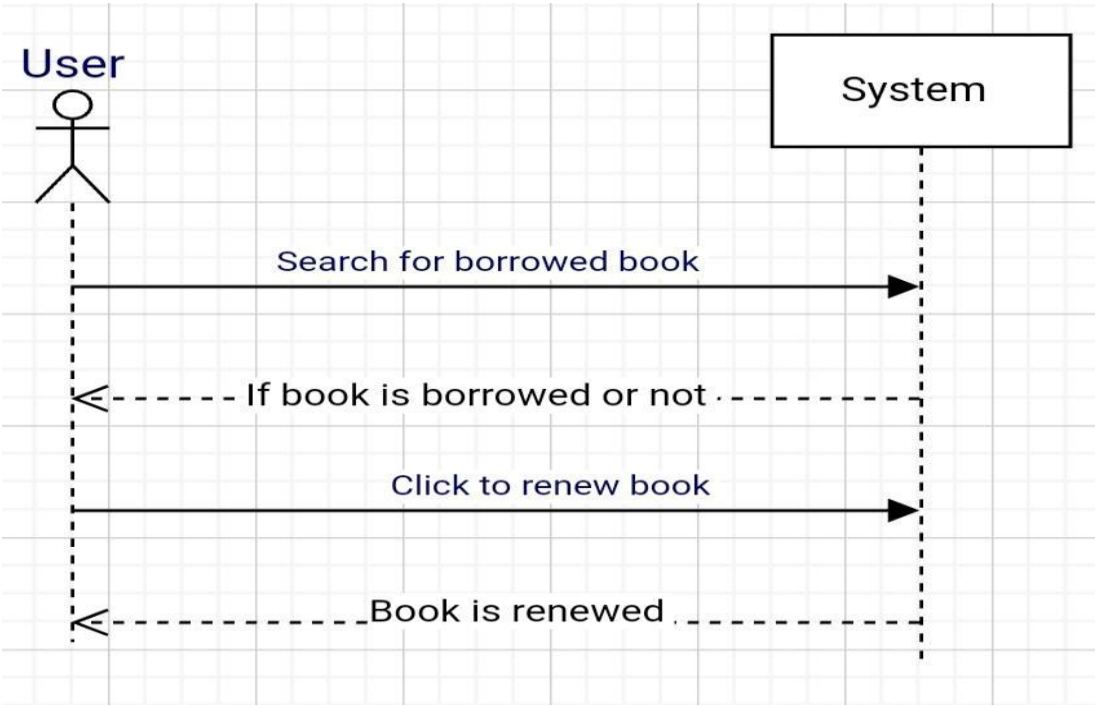
UC-4 : Borrow Book

Name: MEERUB TAHIR
Roll Number: BSEF20M521



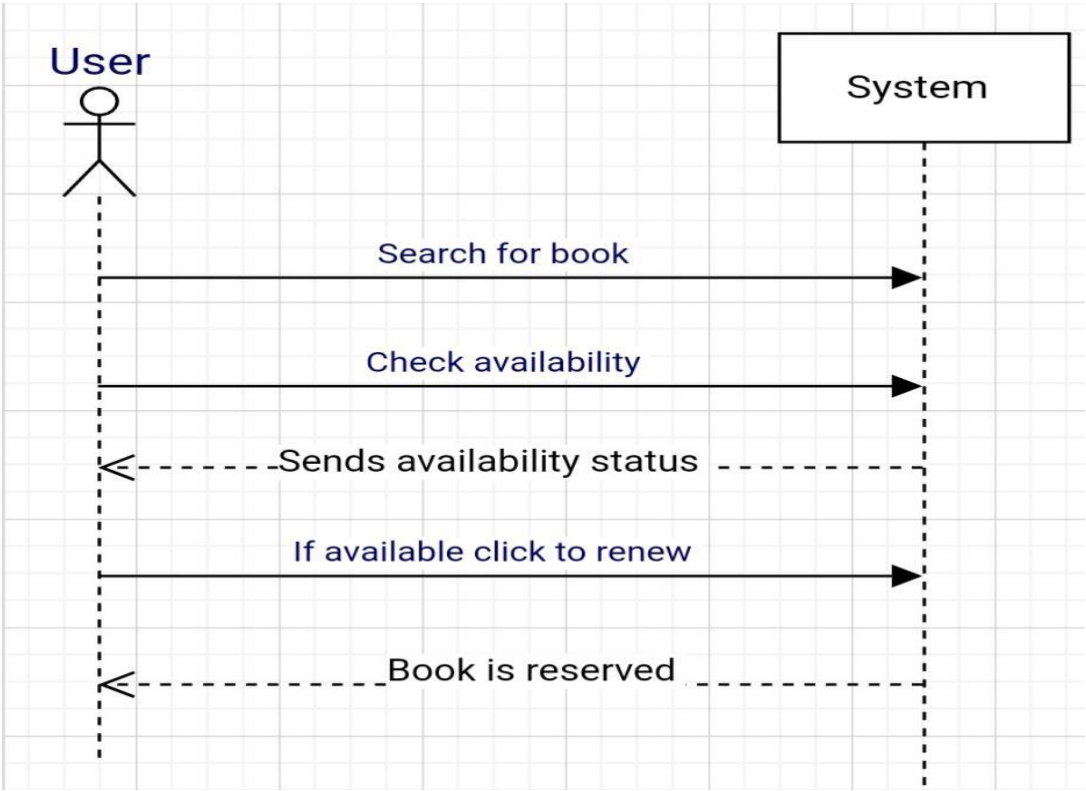
UC-5 : Renew Book

Name: MUHAMMAD MOIN
Roll Number: BSEF20M538



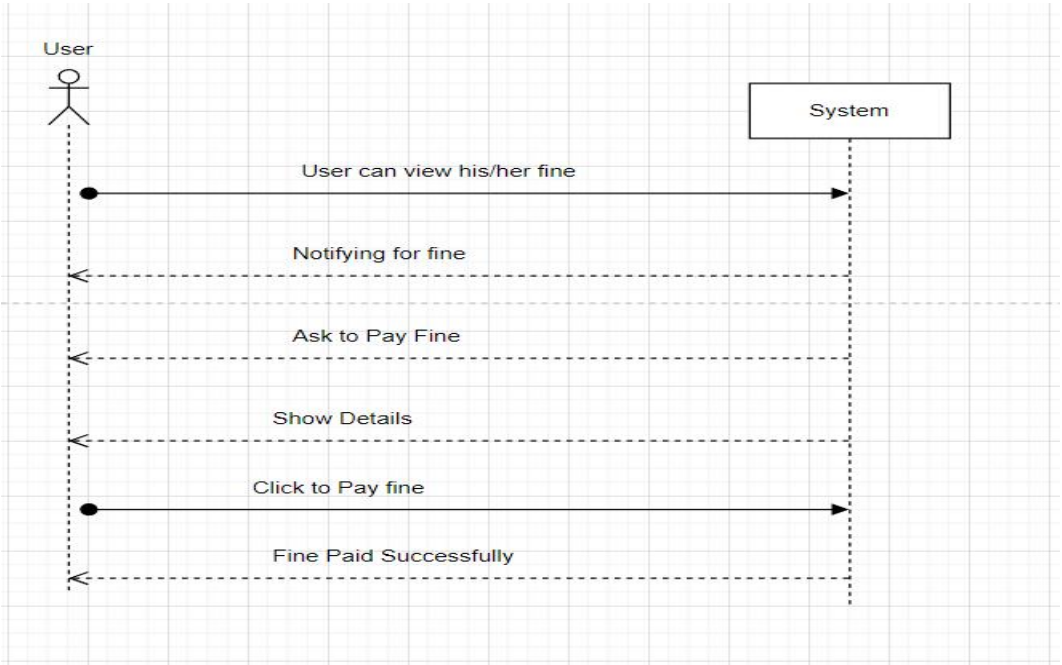
UC-6 : Reserve Book

Name: MUHAMMAD MOIN
Roll Number: BSEF20M538



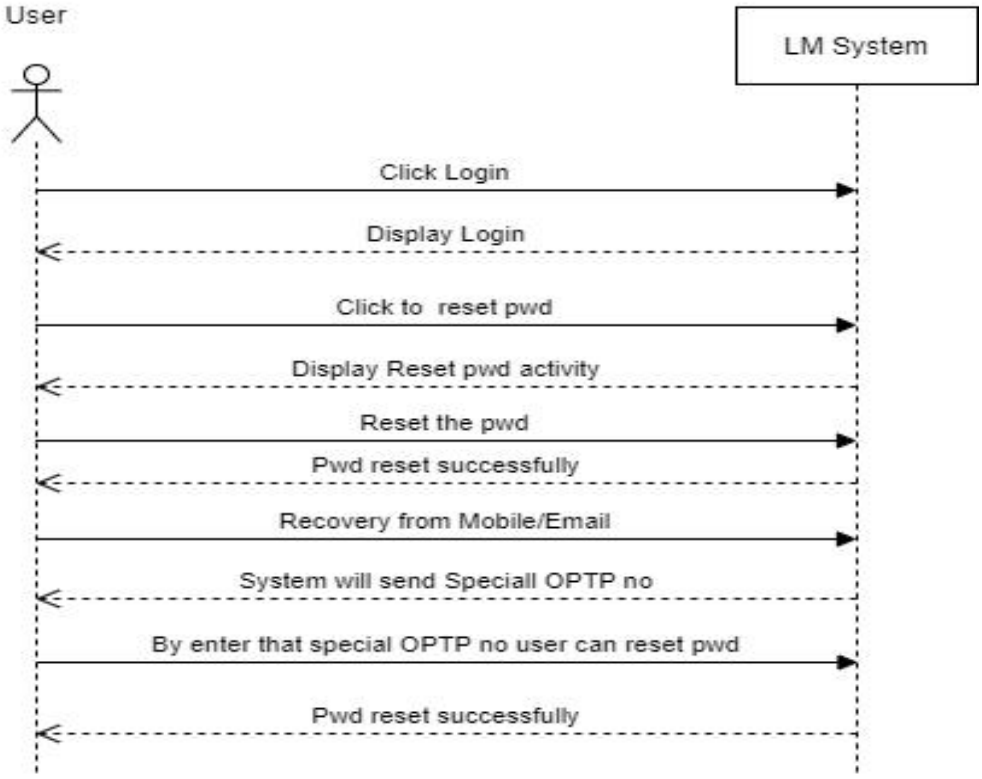
UC-7 : Pay Fine

Name: MIAN BASIL AHTISHAM AHMAD
Roll Number: BSEF20M543



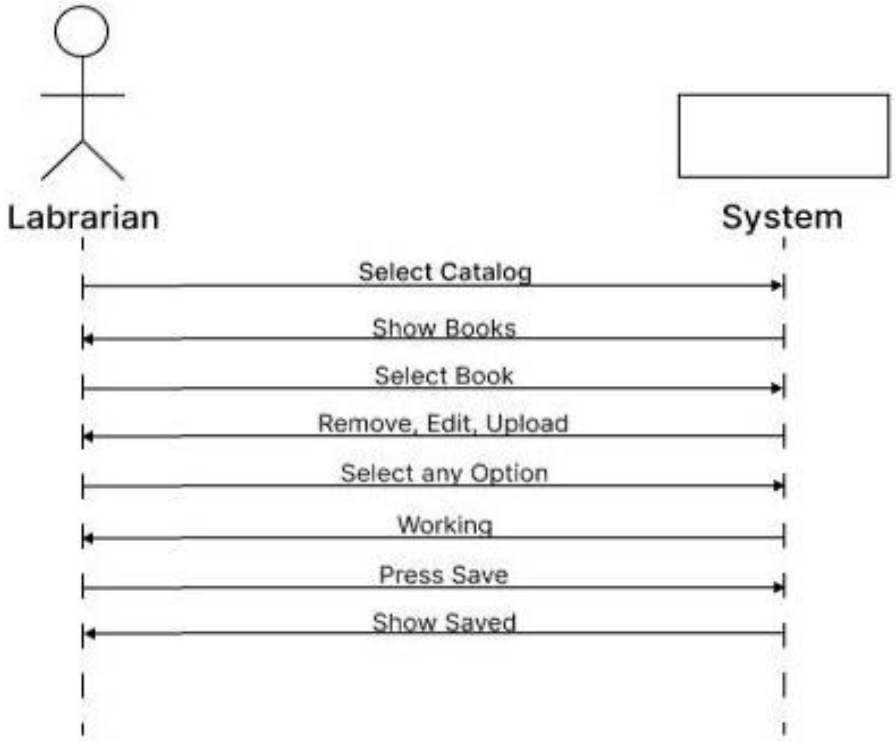
UC-8 : Reset Password

Name: MIAN BASIL AHTISHAM AHMAD
Roll Number: BSEF20M543



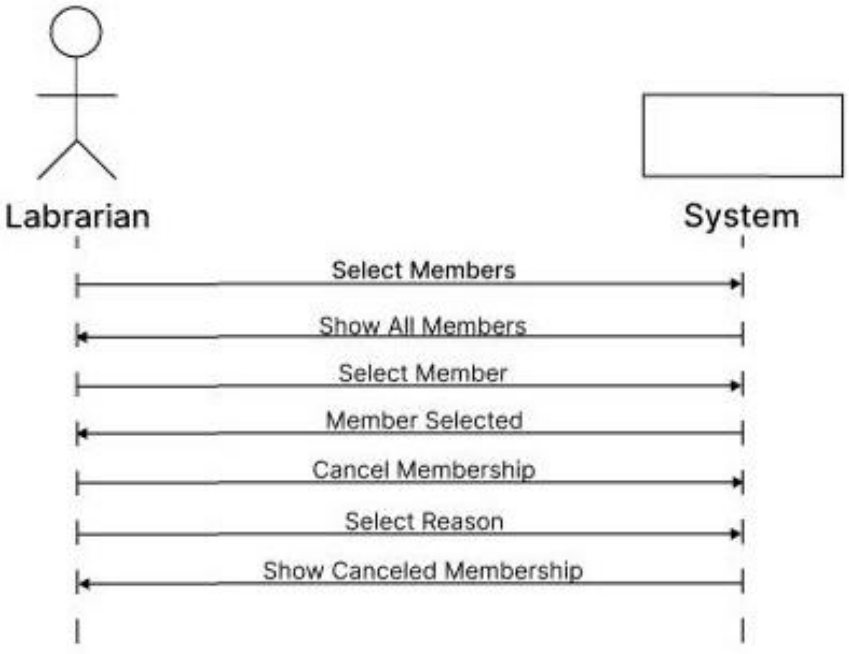
UC-9 : Manage Catalogue

Name: SYED AIZAZ UL HASSAN
Roll Number: BSEF20M552



UC-10 : Cancel Membership

Name: SYED AIZAZ UL HASSAN
Roll Number: BSEF20M552

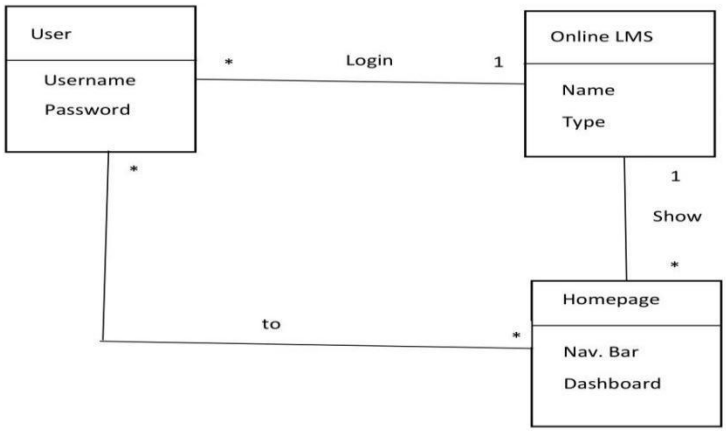


5.6 PARTIAL DOMAIN MODEL

This diagram shows a set of conceptual classes and associations. The associations were primarily derived from the candidate association checklist.

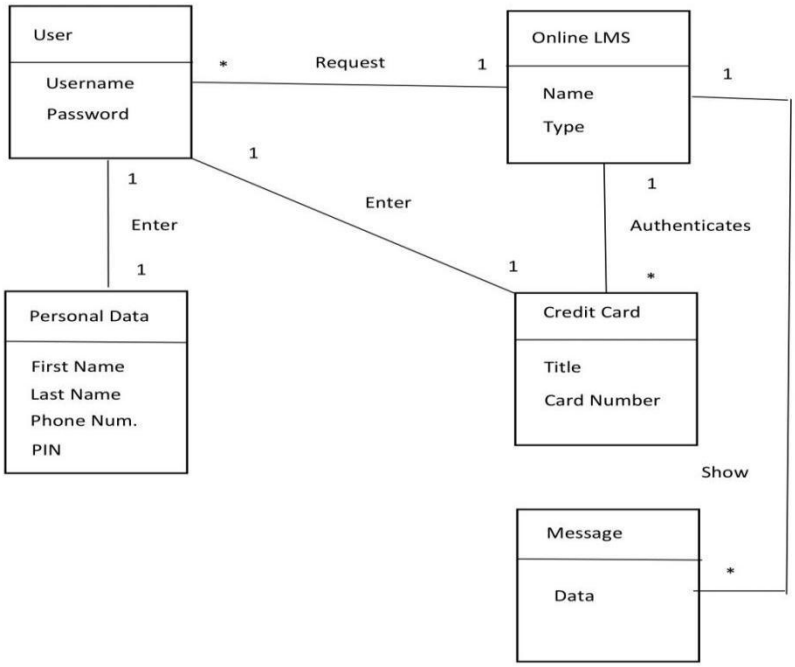
UC-1 : Login

Name: MUQARRAB HUSSAIN
Roll Number: BSEF20M508



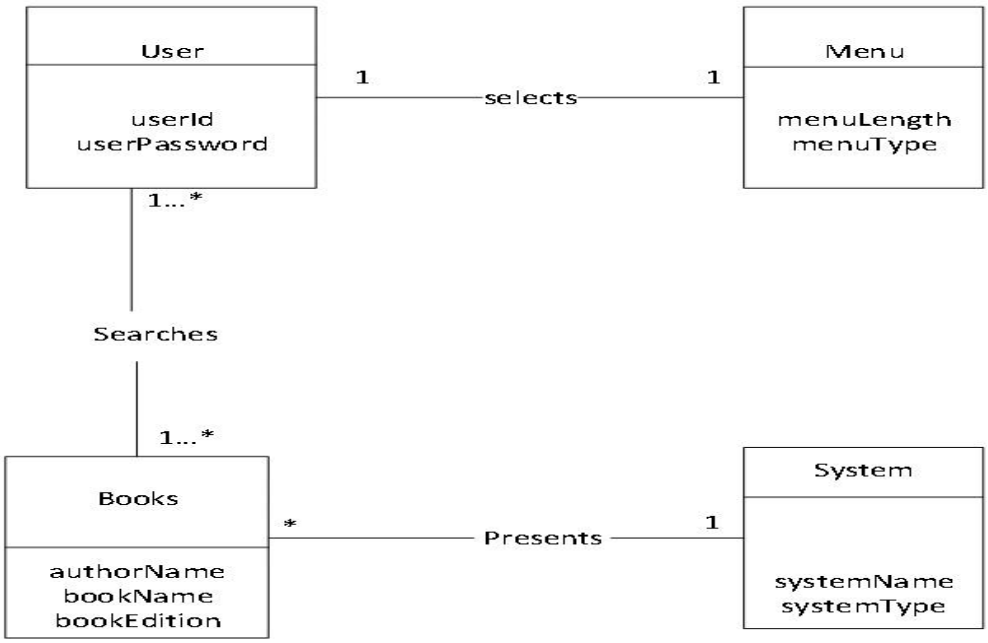
UC-2 : Request Membership

Name: MUQARRAB HUSSAIN
Roll Number: BSEF20M508



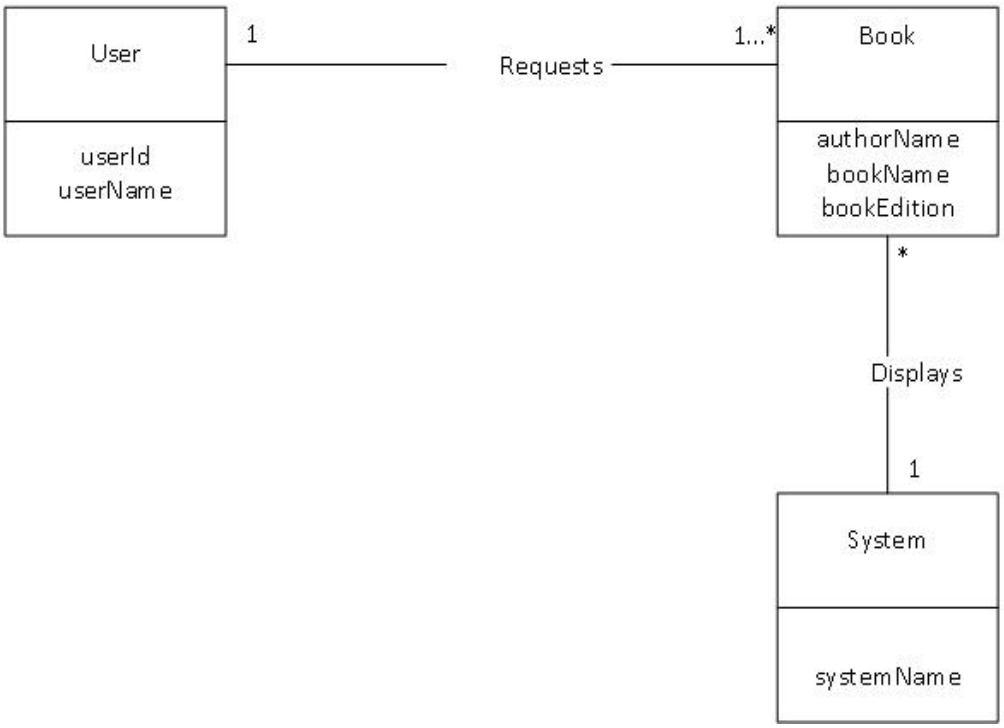
UC-3 : Search Catalogue

Name: MEERUB TAHIR
Roll Number: BSEF20M521



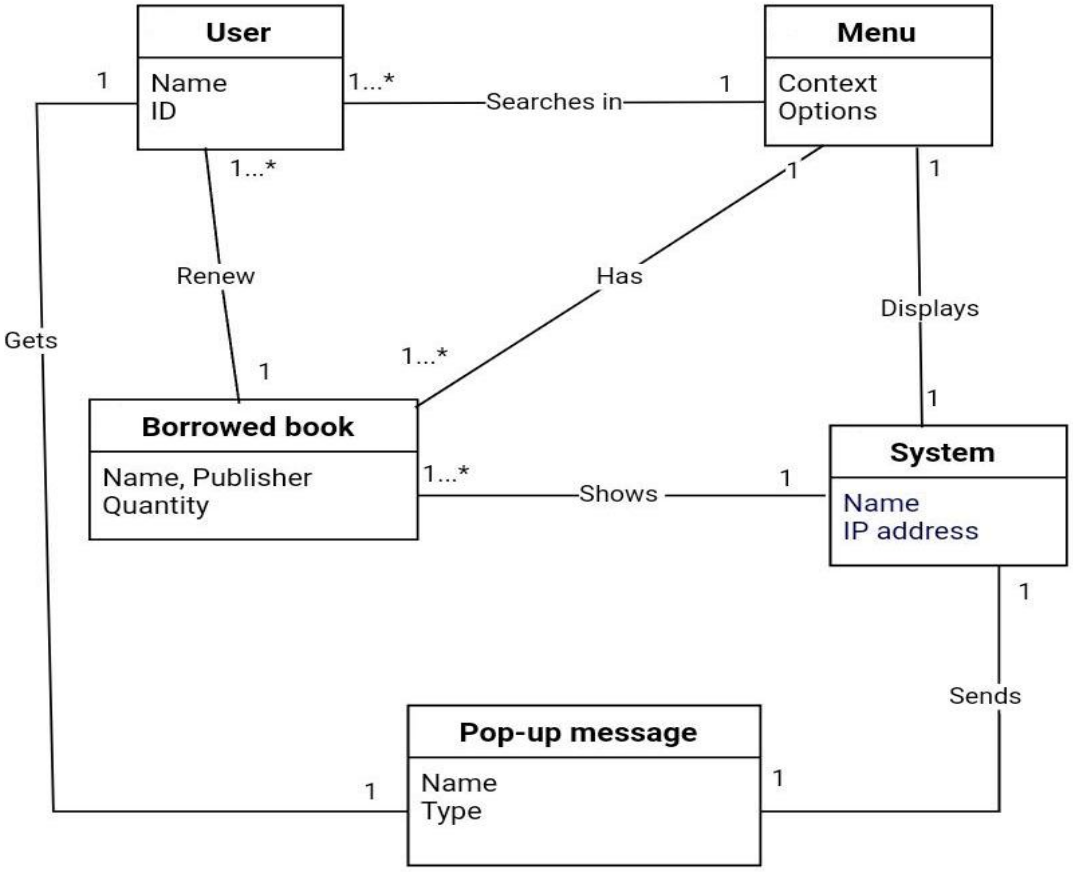
UC-4 : Borrow Book

Name: MEERUB TAHIR
Roll Number: BSEF20M521



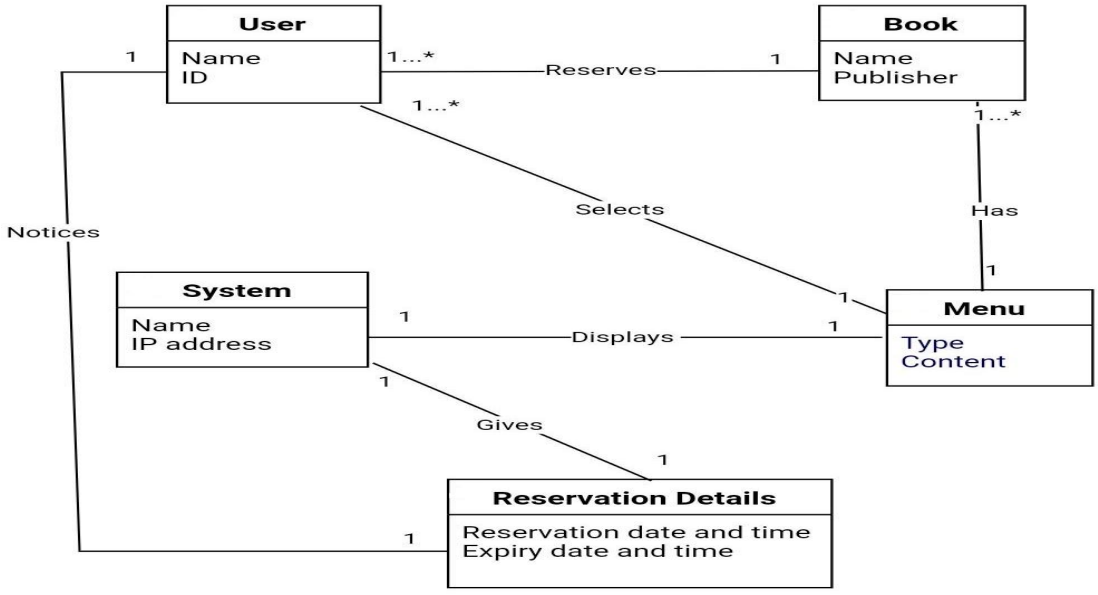
UC-5 : Renew Book

Name: MUHAMMAD MOIN
Roll Number: BSEF20M538



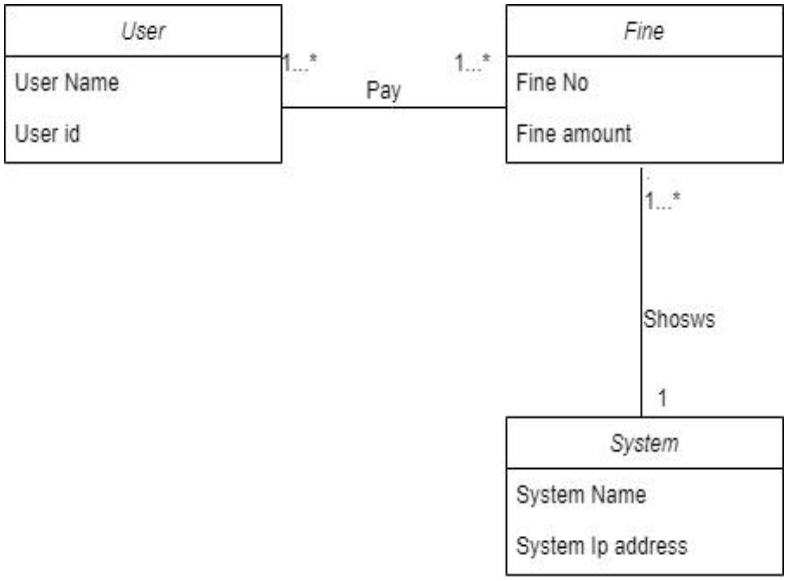
UC-6 : Reserve Book

Name: MUHAMMAD MOIN
Roll Number: BSEF20M538



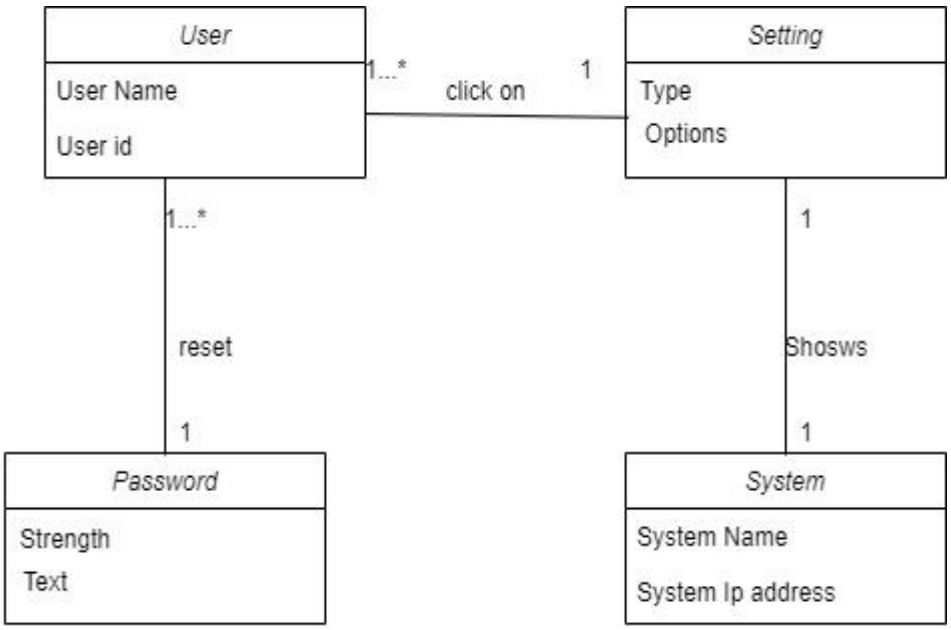
UC-7 : Pay Fine

Name: MIAN BASIL AHTISHAM AHMAD
Roll Number: BSEF20M543



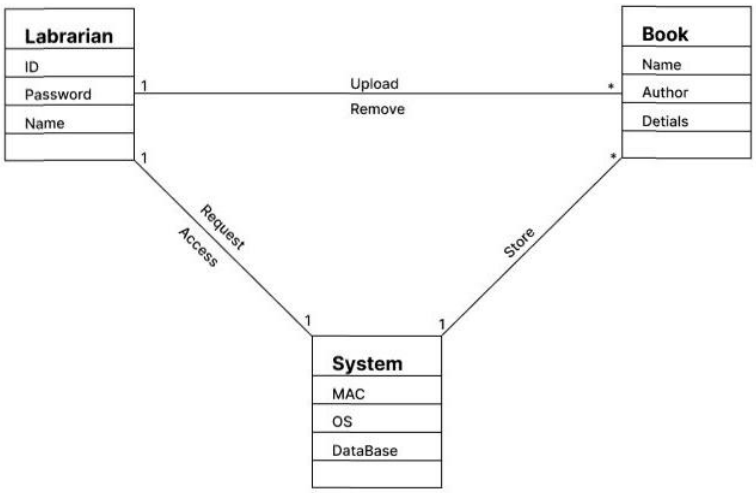
UC-8 : Reset Password

Name: MIAN BASIL AHTISHAM AHMAD
Roll Number: BSEF20M543



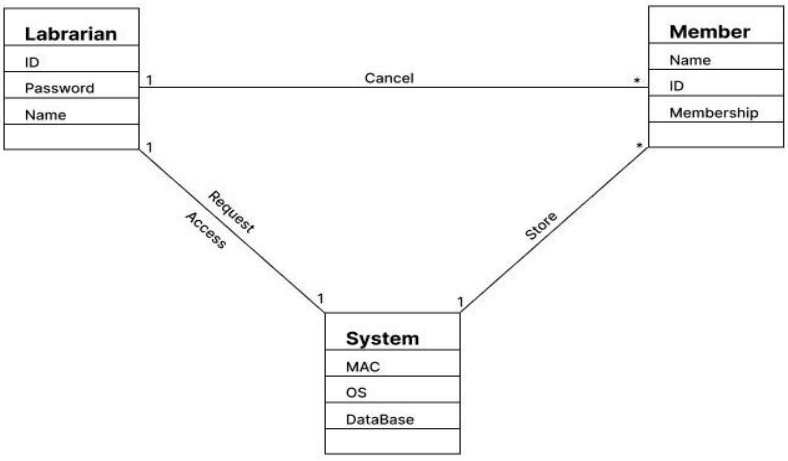
UC-9 : Manage Catalogue

Name: SYED AIZAZ UL HASSAN
Roll Number: BSEF20M552



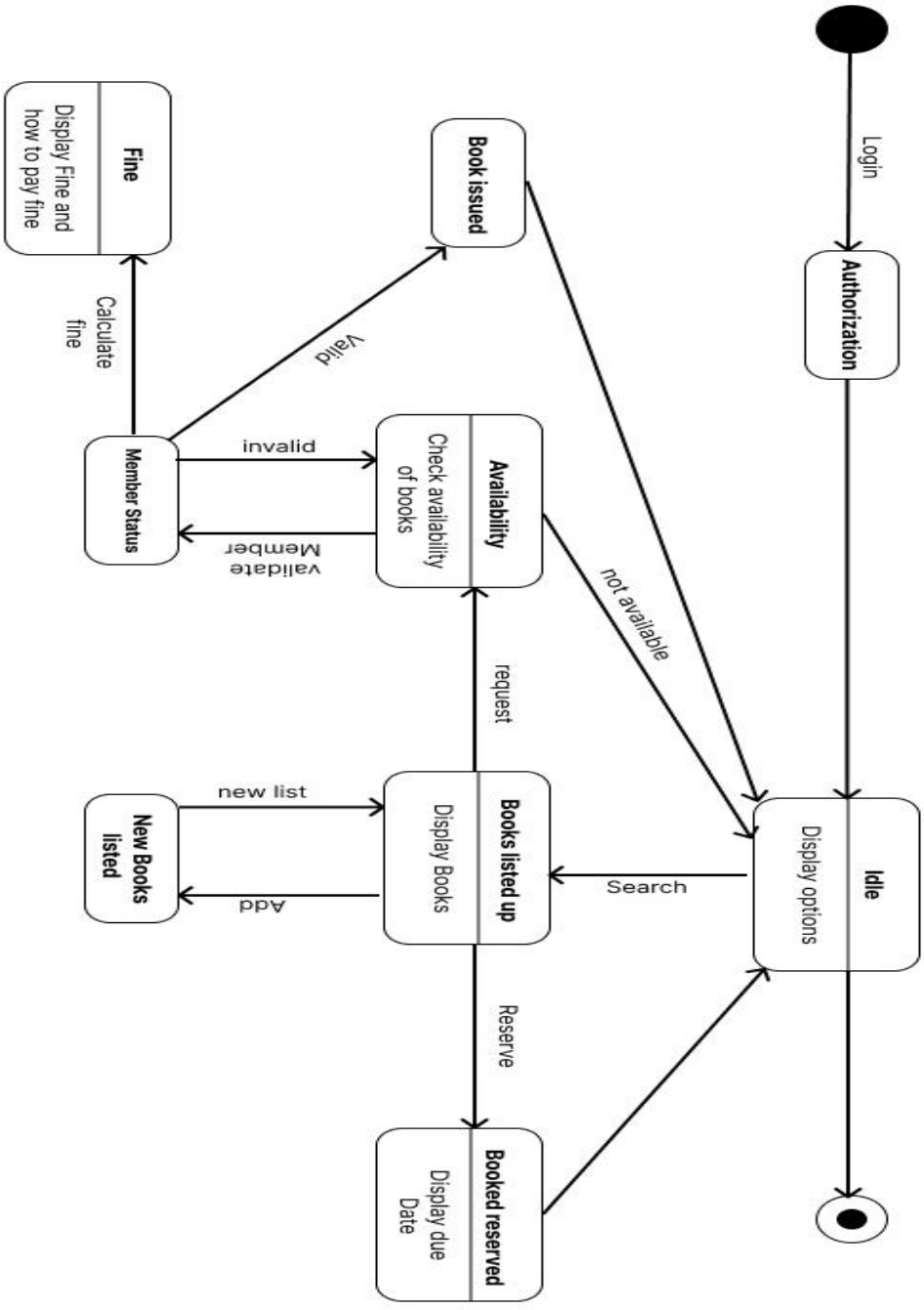
UC-10 : Cancel Membership

Name: SYED AIZAZ UL HASSAN
Roll Number: BSEF20M552



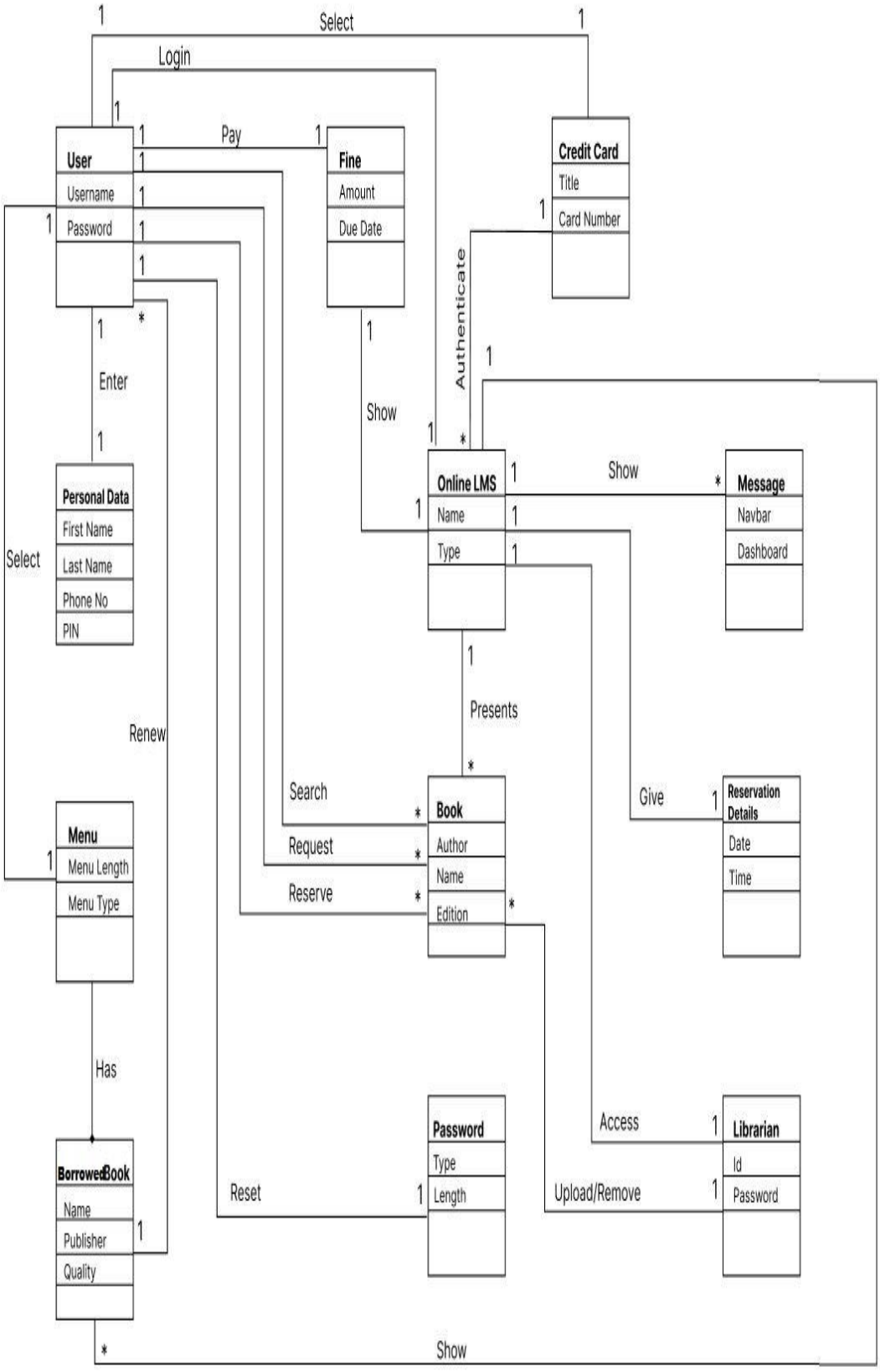
5.7 State Chart Diagram

This diagram describes the flow of control from one state to another state. States are defined as a condition in which an object exists and it changes when some event is triggered.



5.8 HIGH LEVEL DOMAIN MODEL

This diagram describes the conceptual classes and their associations of the whole system



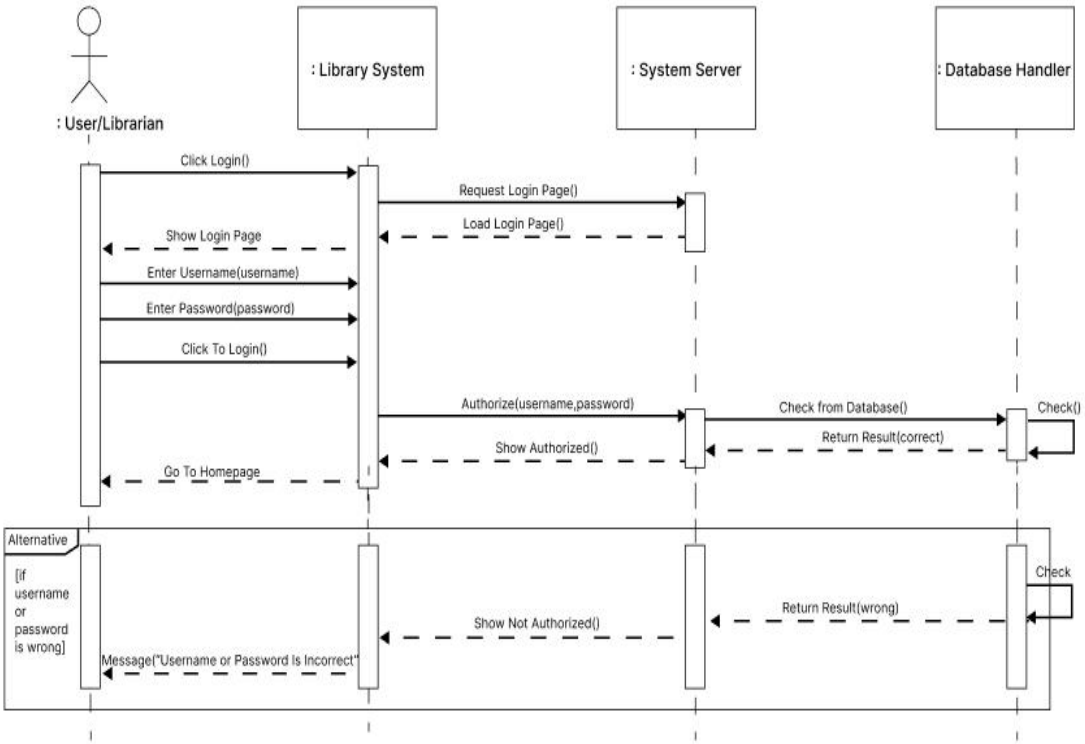
6 OBJECT ORIENTED DESIGN

6.1 Sequence Diagram:

UC-1 : Login:

Name: MUQARRAB HUSSAIN

Roll Number: BSEF20M508



Pattern: **MVC**

Model: System Server

View: Library System

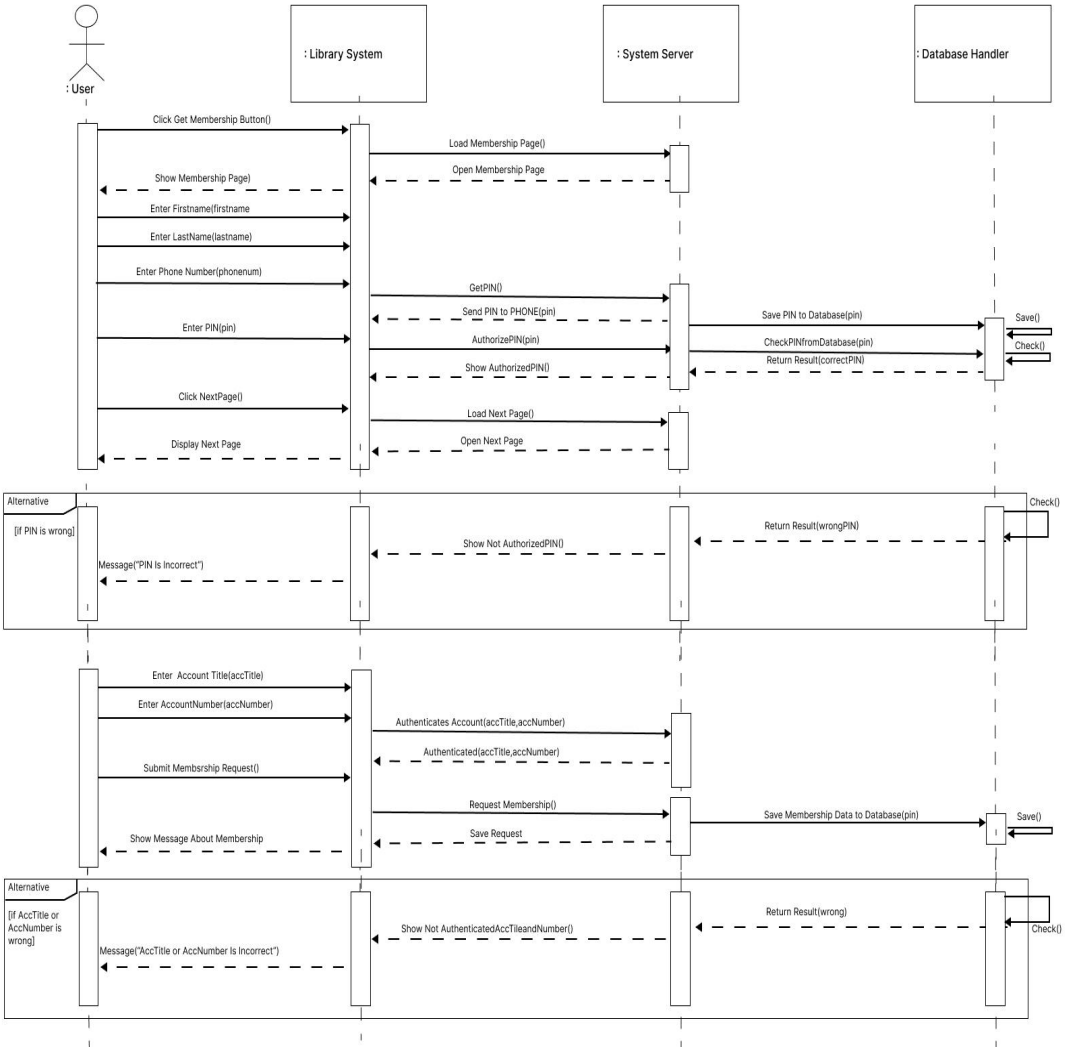
Controller: System Server

Data: Database Handler

UC-2 : Request Membership:

Name: MUQARRAB HUSSAIN

Roll Number: BSEF20M508



Pattern: **MVC**

Model: System Server

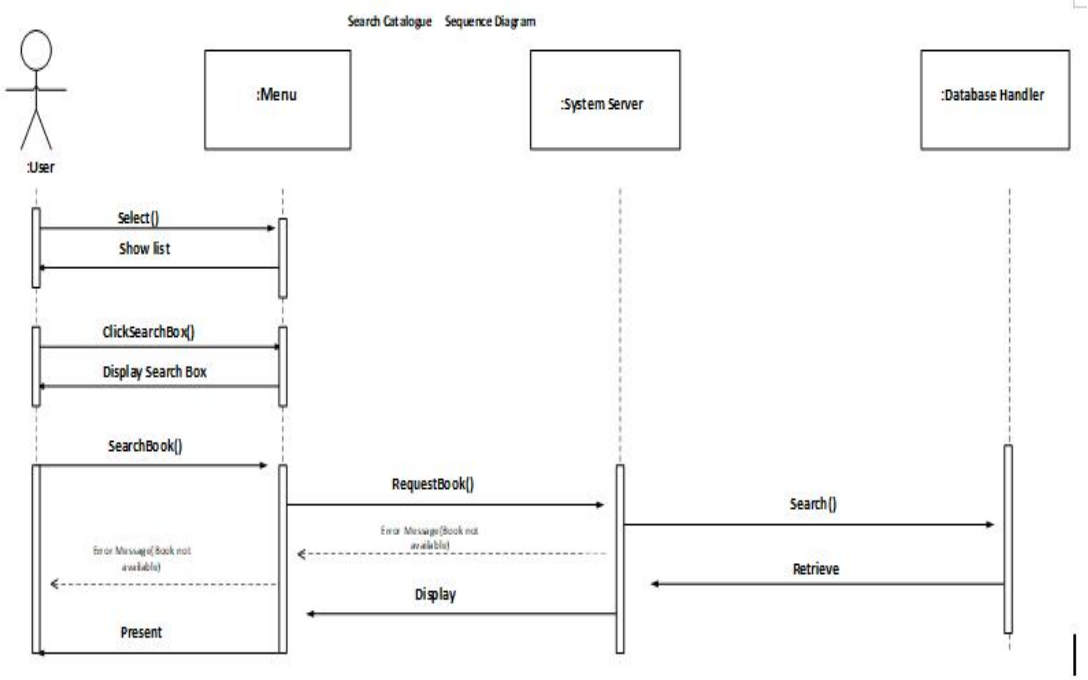
View: Library System

Controller: System Server

Data: Database Handler

UC-3 : Search Catalogue

Name: MEERUB TAHIR
Roll Number: BSEF20M521



Pattern: **MVC**

Model: System Server

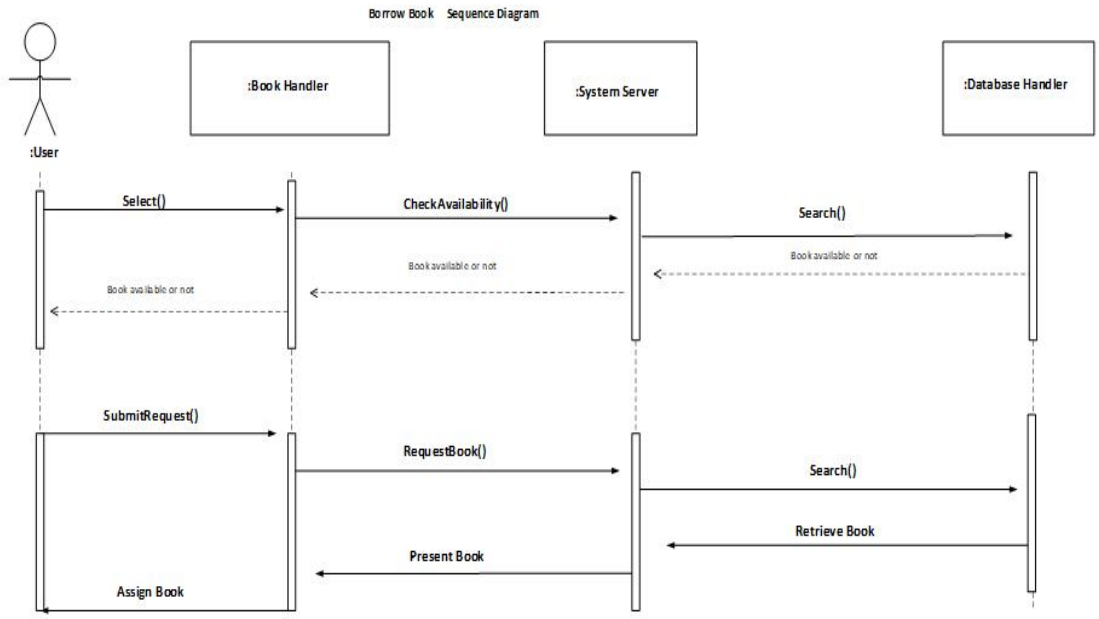
View: Menu

Controller: System Server

Data: Database Handler

UC-4 : Borrow Book

Name: MEERUB TAHIR
Roll Number: BSEF20M521



Pattern: **MVC**

Model: System Server

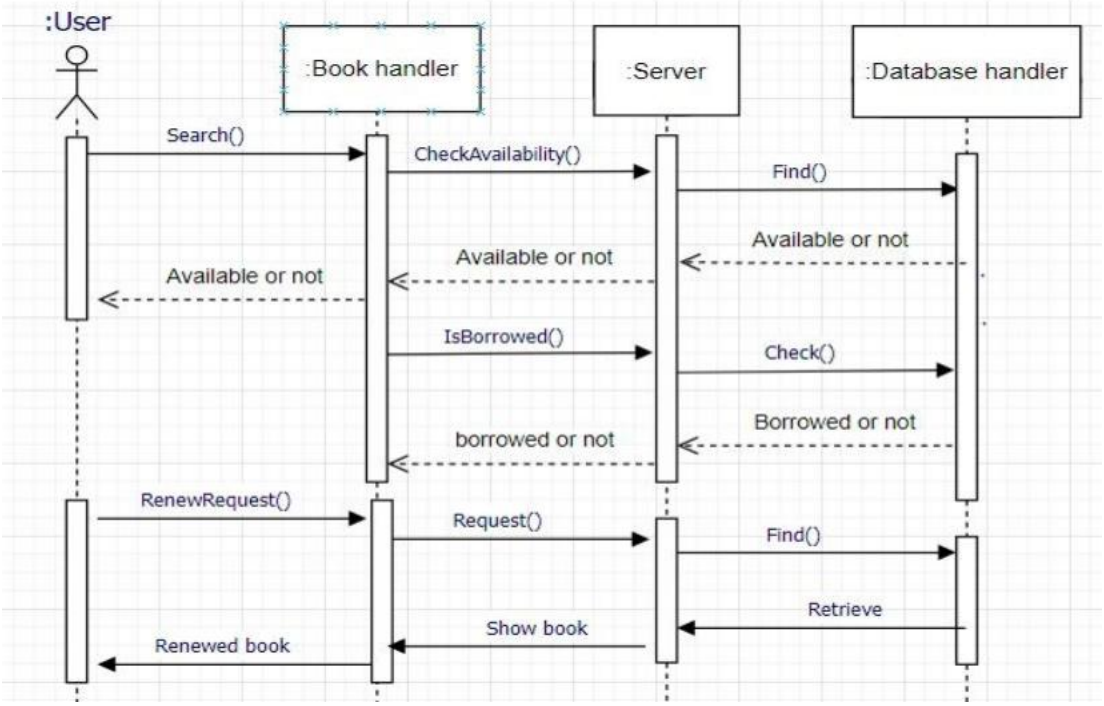
View: Book Handler

Controller: System Server

Data: Database Handler

UC-5 : Renew Book

Name: MUHAMMAD MOIN
Roll Number: BSEF20M538



Pattern: **MVC**

Model: Server

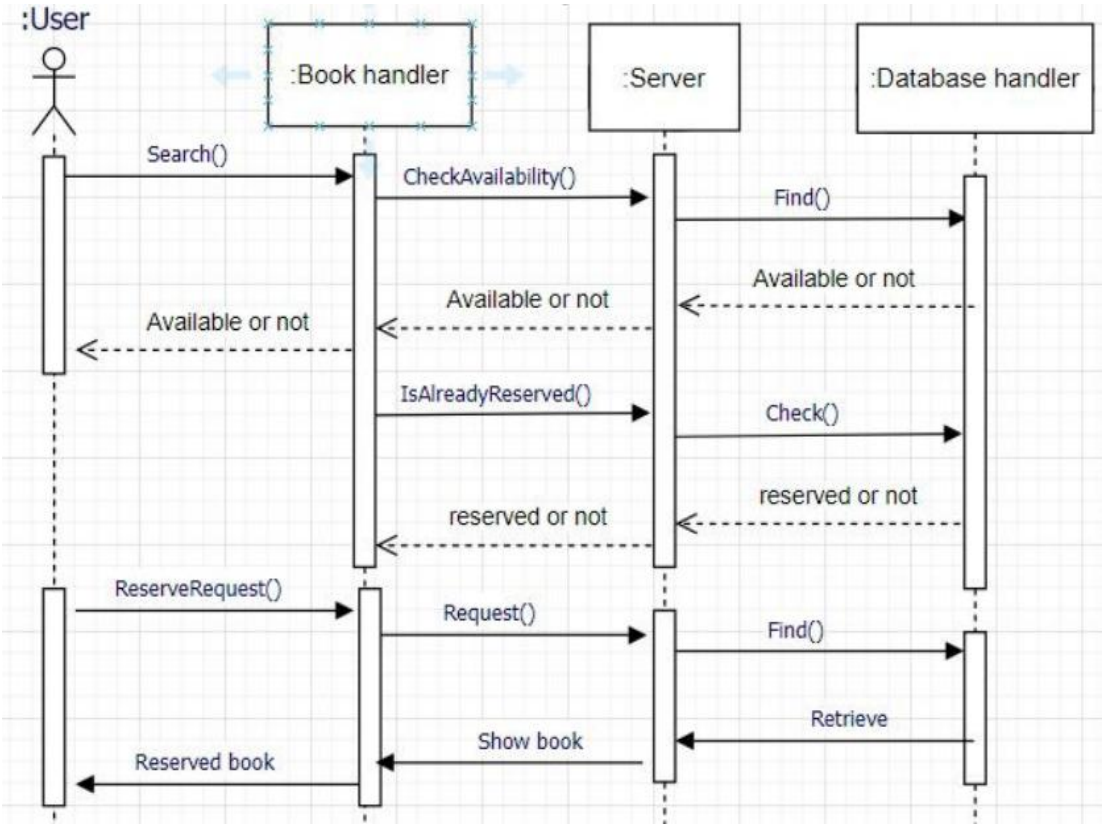
View: Book Handler

Controller: Server

Data: Database Handler

UC-6 : Reserve Book

Name: MUHAMMAD MOIN
Roll Number: BSEF20M538



Pattern: **MVC**

Model: System Server

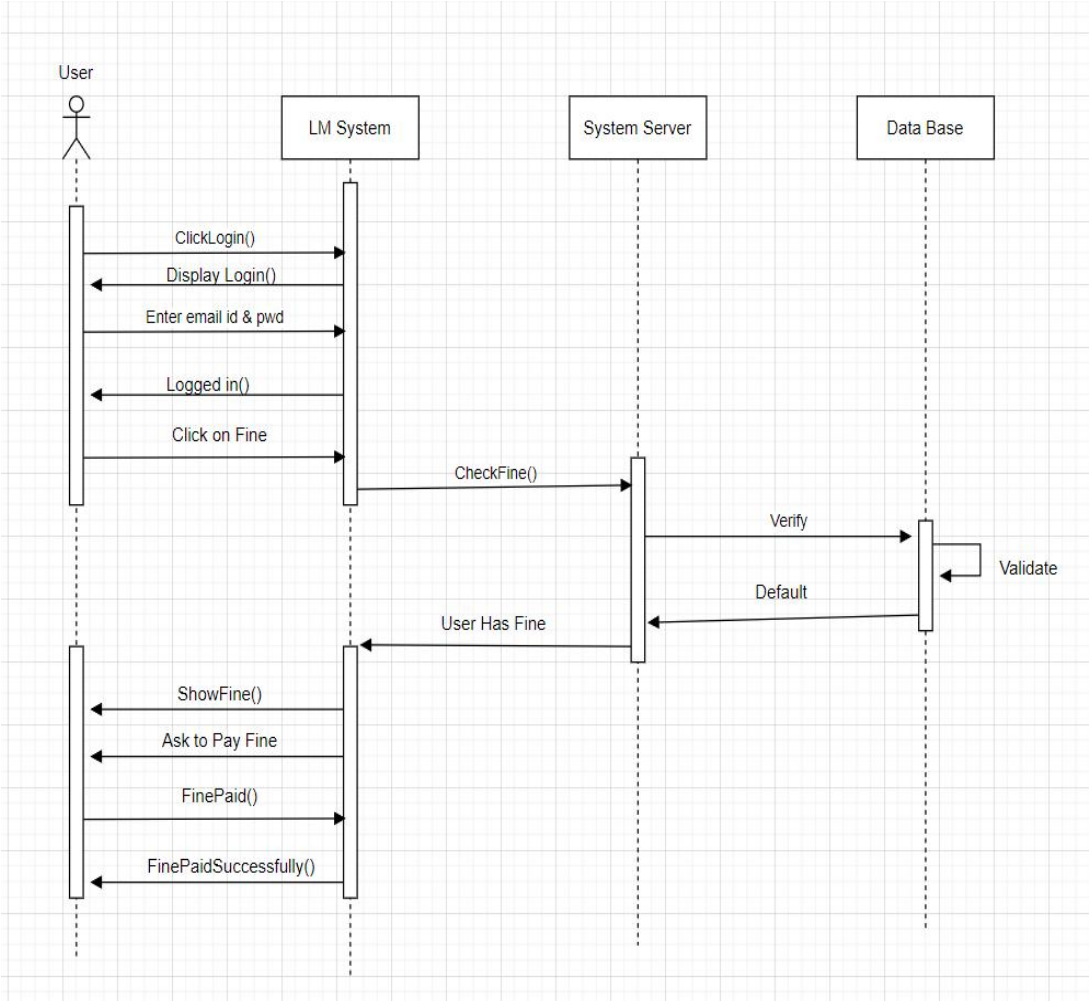
View: Book Handler

Controller: System Server

Data: Database Handler

UC-7 : Pay Fine

Name: MIAN BASIL AHTISHAM AHMAD
Roll Number: BSEF20M543



Pattern: **MVC**

Model: System Server

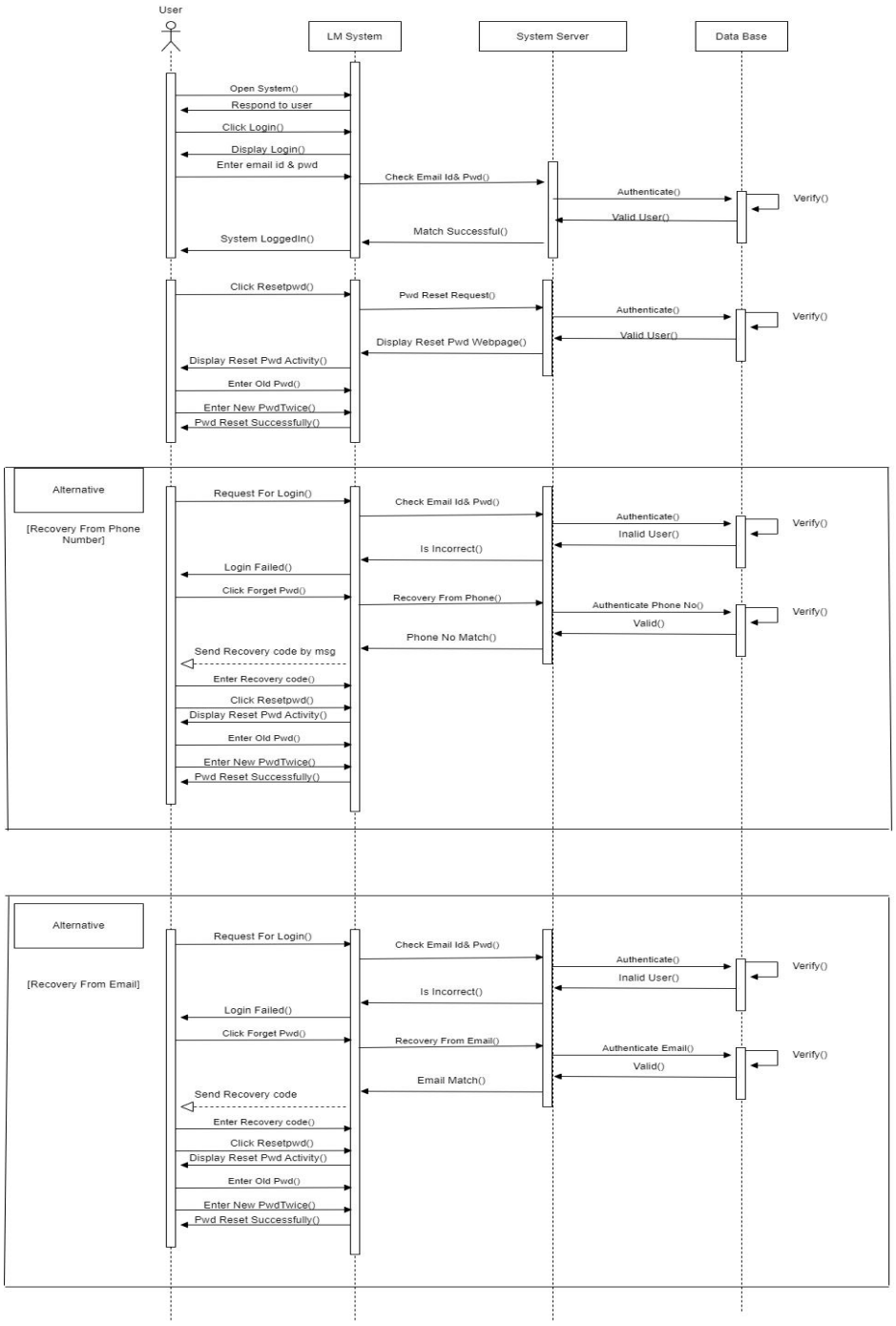
View: LM System

Controller: System Server

Data: Database

UC-8 : Reset Password

Name: MIAN BASIL AHTISHAM AHMAD
Roll Number: BSEF20M543



Pattern: **MVC**

Model: System Server

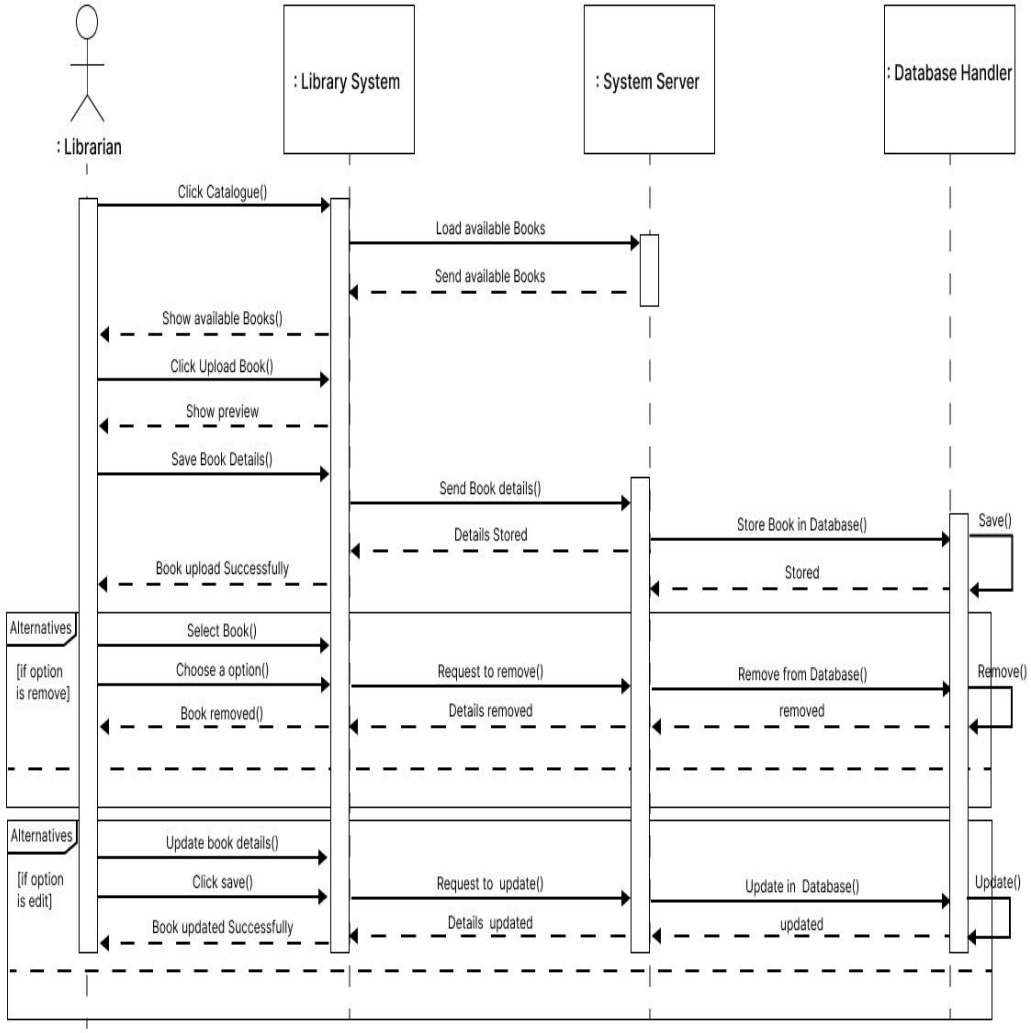
View: LM System

Controller: System Server

Data: Database

UC-9 : Manage Catalogue

Name: SYED AIZAZ UL HASSAN
Roll Number: BSEF20M552



Pattern: **MVC**

Model: System Server

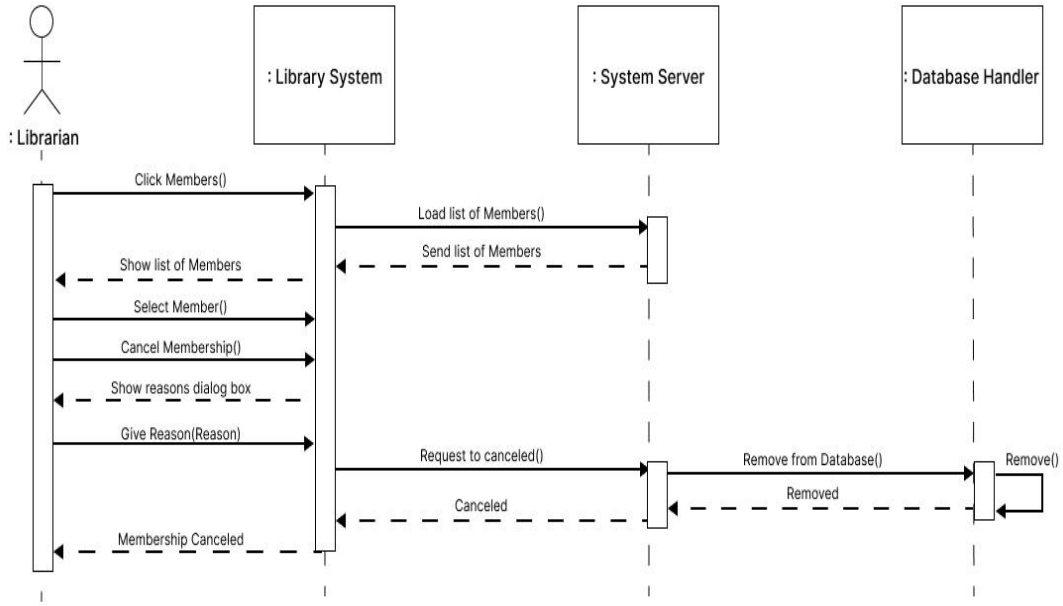
View: Library System

Controller: System Server

Data: Database Handler

UC-10 : Cancel Membership

Name: SYED AIZAZ UL HASSAN
Roll Number: BSEF20M552



Pattern: **MVC**

Model: System Server

View: Library System

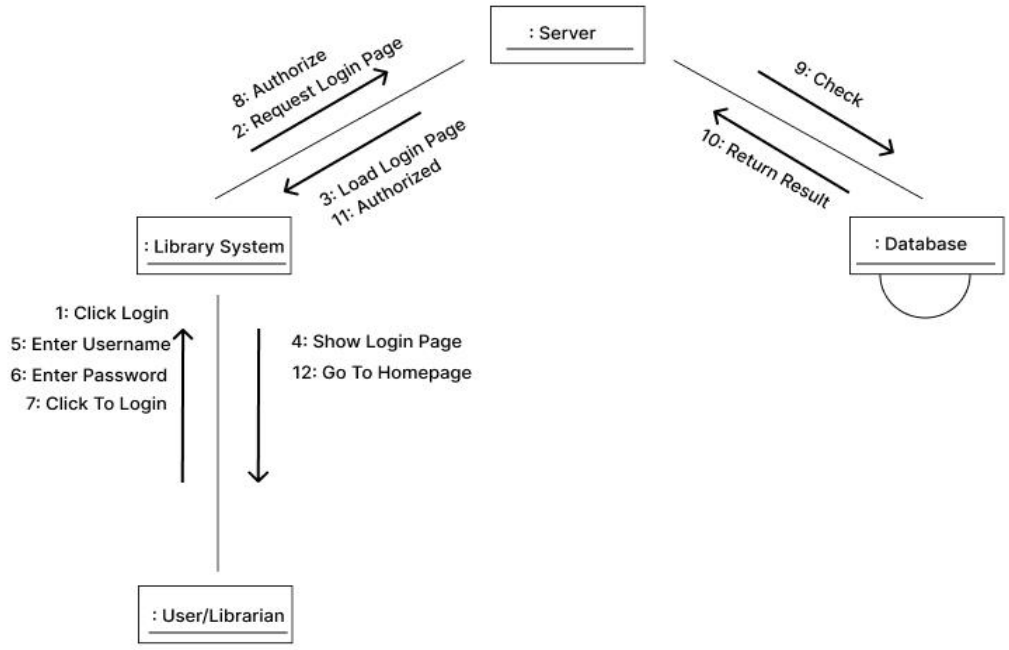
Controller: System Server

Data: Database

6.2 Collaboration Diagram:

UC-1 : Login

Name: MUQARRAB HUSSAIN
Roll Number: BSEF20M508



Pattern: **MVC**

Model: Server

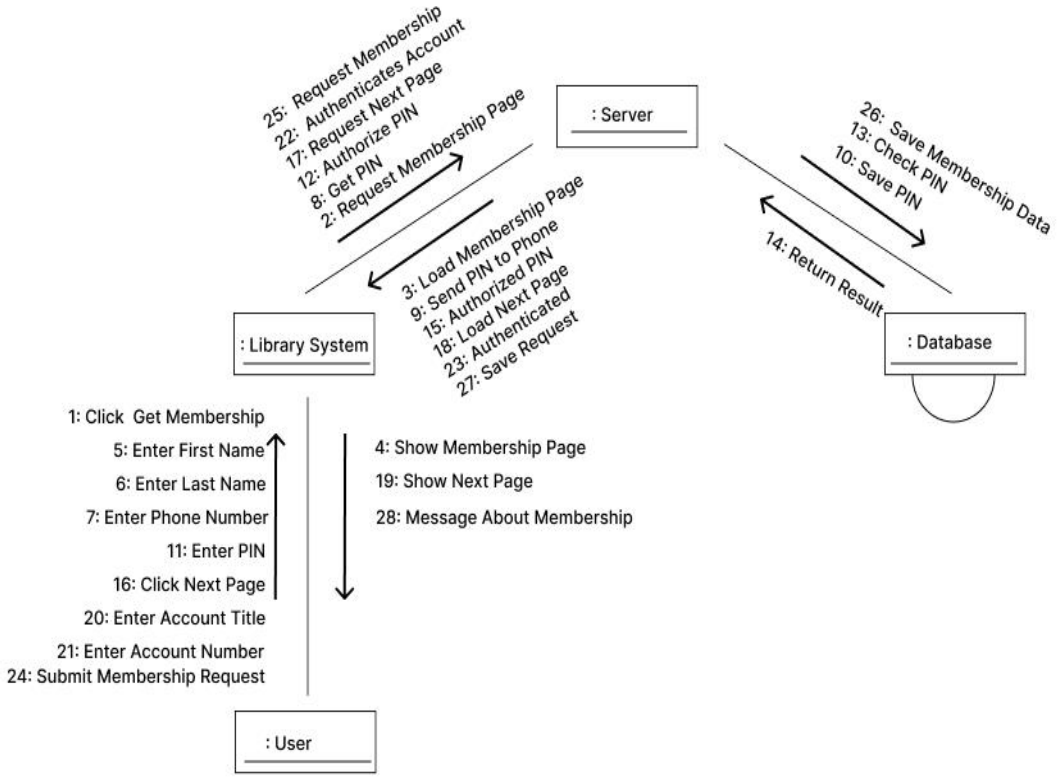
View: Library System

Controller: Server

Data: Database

UC-2 : Request Membership

Name: MUQARRAB HUSSAIN
Roll Number: BSEF20M508



Pattern: **MVC**

Model: Server

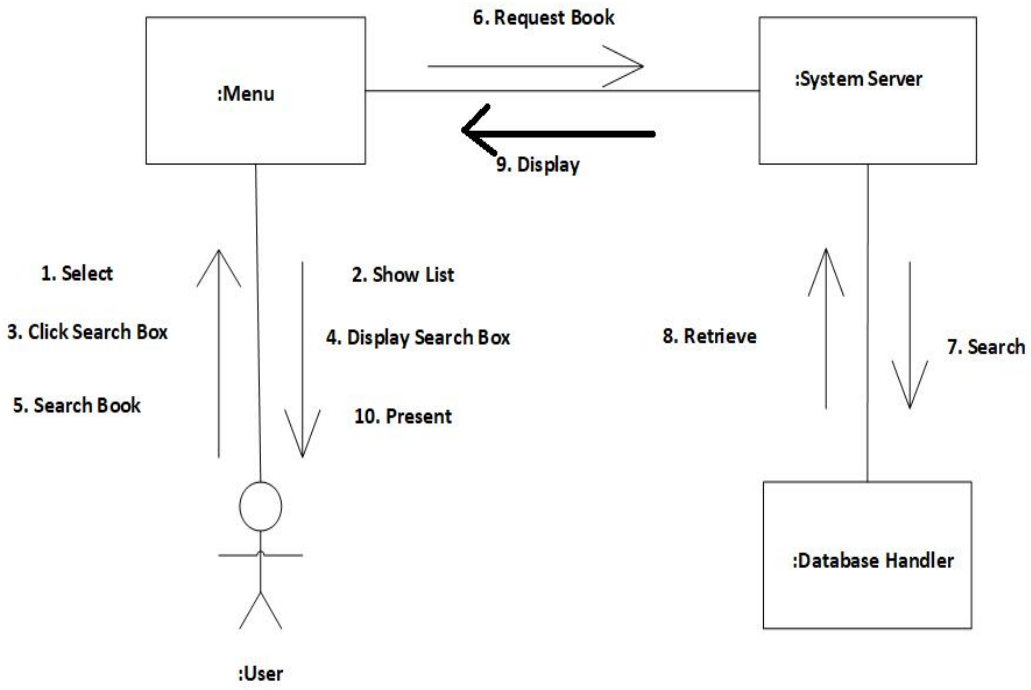
View: Library System

Controller: Server

Data: Database

UC-3 : Search Catalogue

Name: MEERUB TAHIR
Roll Number: BSEF20M521



Pattern: **MVC**

Model: System Server

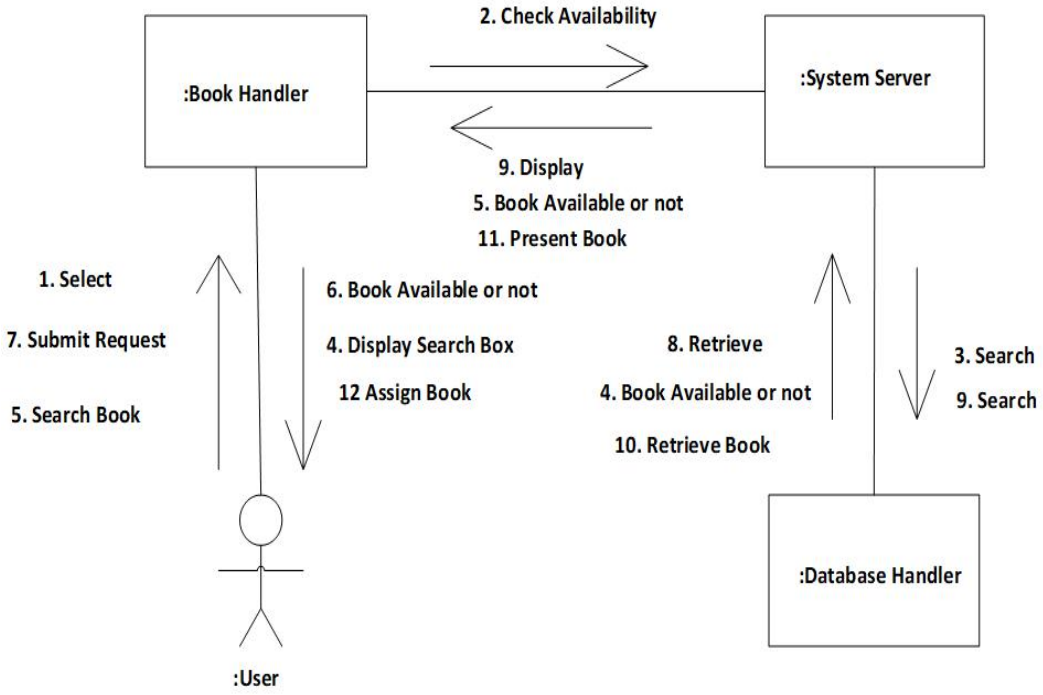
View: Menu

Controller: System Server

Data: Database Handler

UC-4 : Borrow Book

Name: MEERUB TAHIR
Roll Number: BSEF20M521



Pattern: **MVC**

Model: System Server

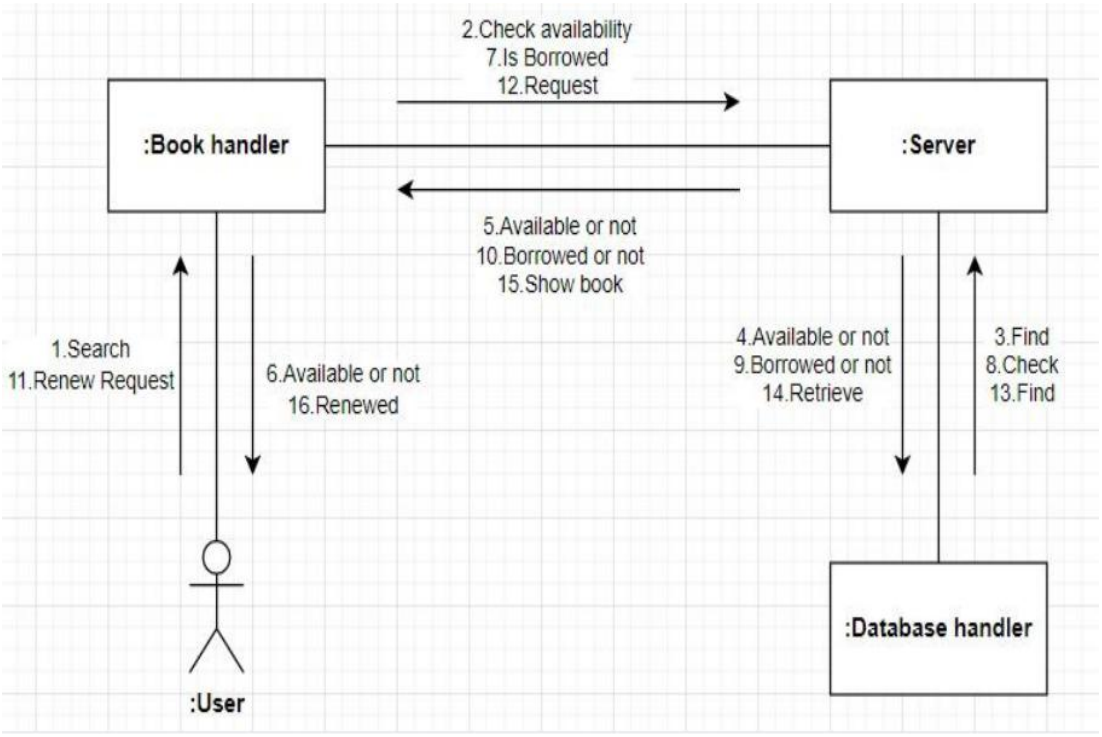
View: Book Handler

Controller: System Server

Data: Database Handler

UC-5 : Renew Book

Name: MUHAMMAD MOIN
Roll Number: BSEF20M538



Pattern: **MVC**

Model: Server

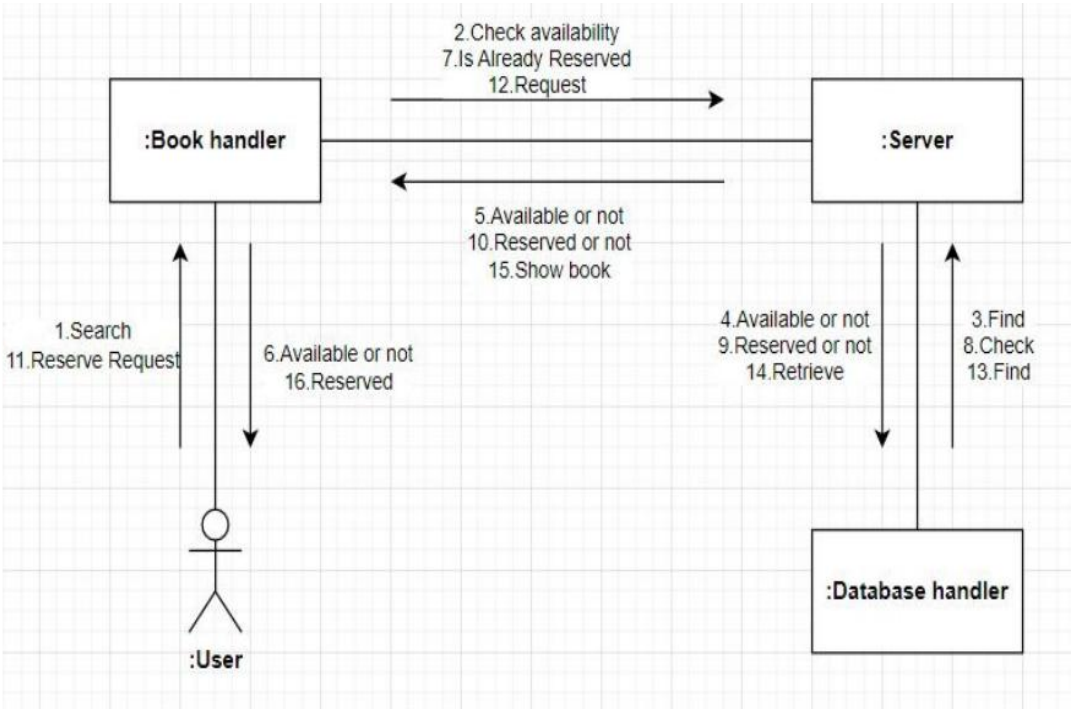
View: Book Handler

Controller: Server

Data: Database Handler

UC-6 : Reserve Book

Name: MUHAMMAD MOIN
Roll Number: BSEF20M538



Pattern: **MVC**

Model: Server

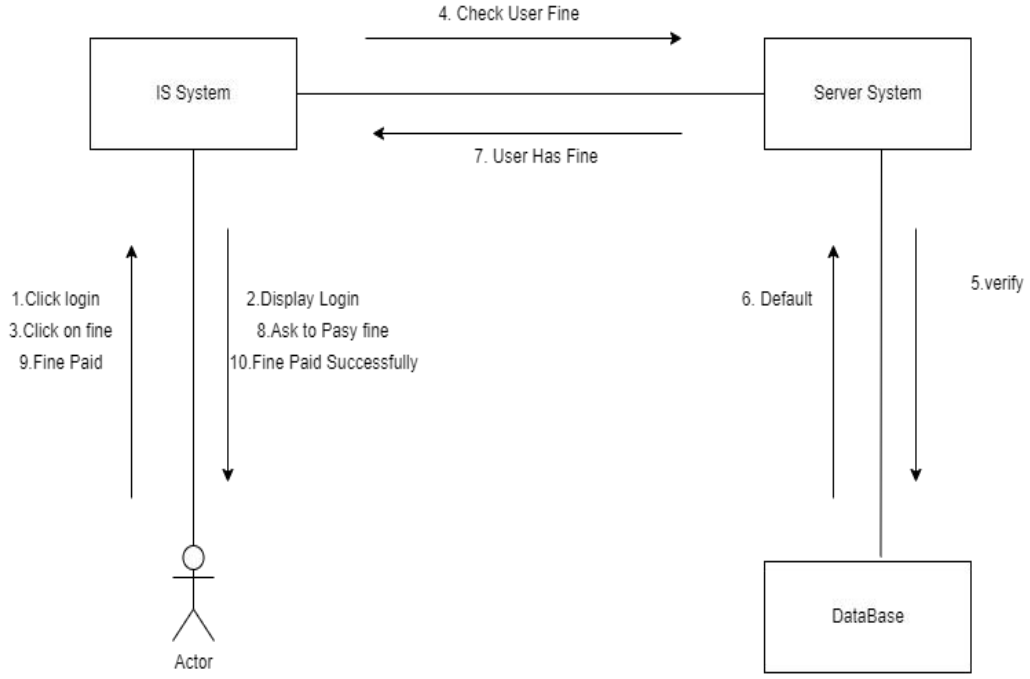
View: Book Handler

Controller: Server

Data: Database Handler

UC-7 : Pay Fine

Name: MIAN BASIL AHTISHAM AHMAD
Roll Number: BSEF20M543



Pattern: **MVC**

Model: System Server

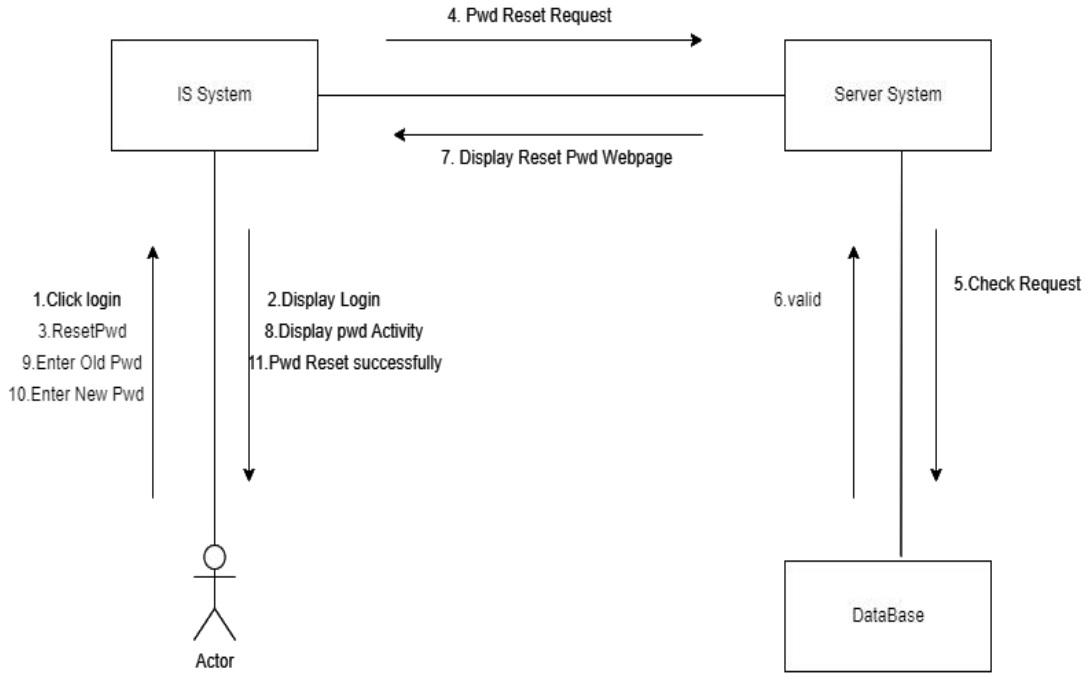
View: LM System

Controller: System Server

Data: Database

UC-8 : Reset Password

Name: MIAN BASIL AHTISHAM AHMAD
Roll Number: BSEF20M543



Pattern: **MVC**

Model: Server

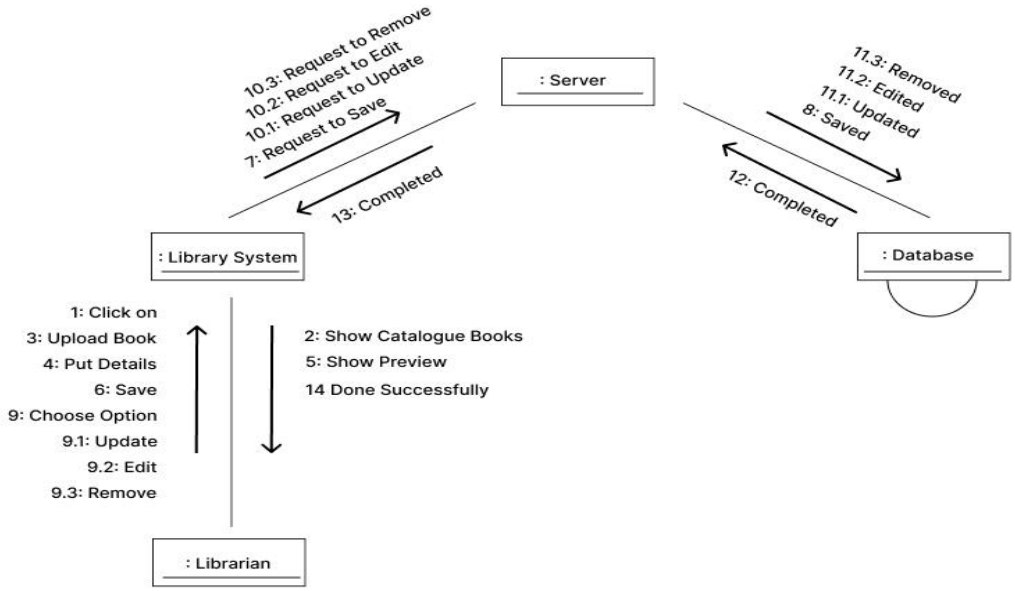
View: LM System

Controller: Server

Data: Database

UC-9 : Manage Catalogue

Name: SYED AIZAZ UL HASSAN
Roll Number: BSEF20M552



Pattern: **MVC**

Model: Server

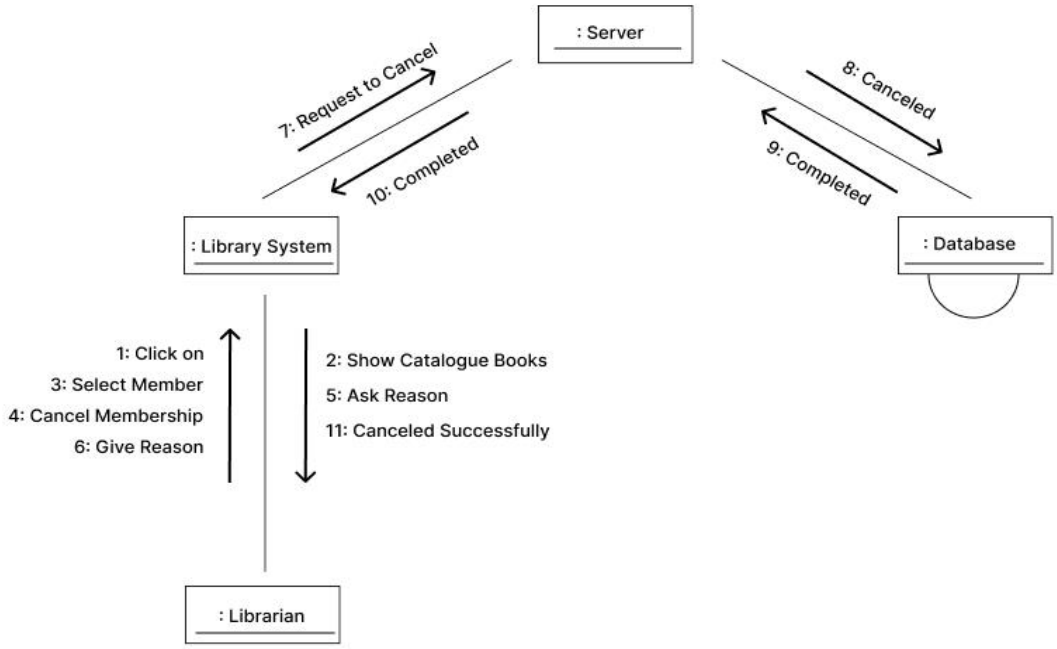
View: Library System

Controller: Server

Data: Database

UC-10 : Cancel Membership

Name: SYED AIZAZ UL HASSAN
Roll Number: BSEF20M552



Pattern: **MVC**

Model: Server

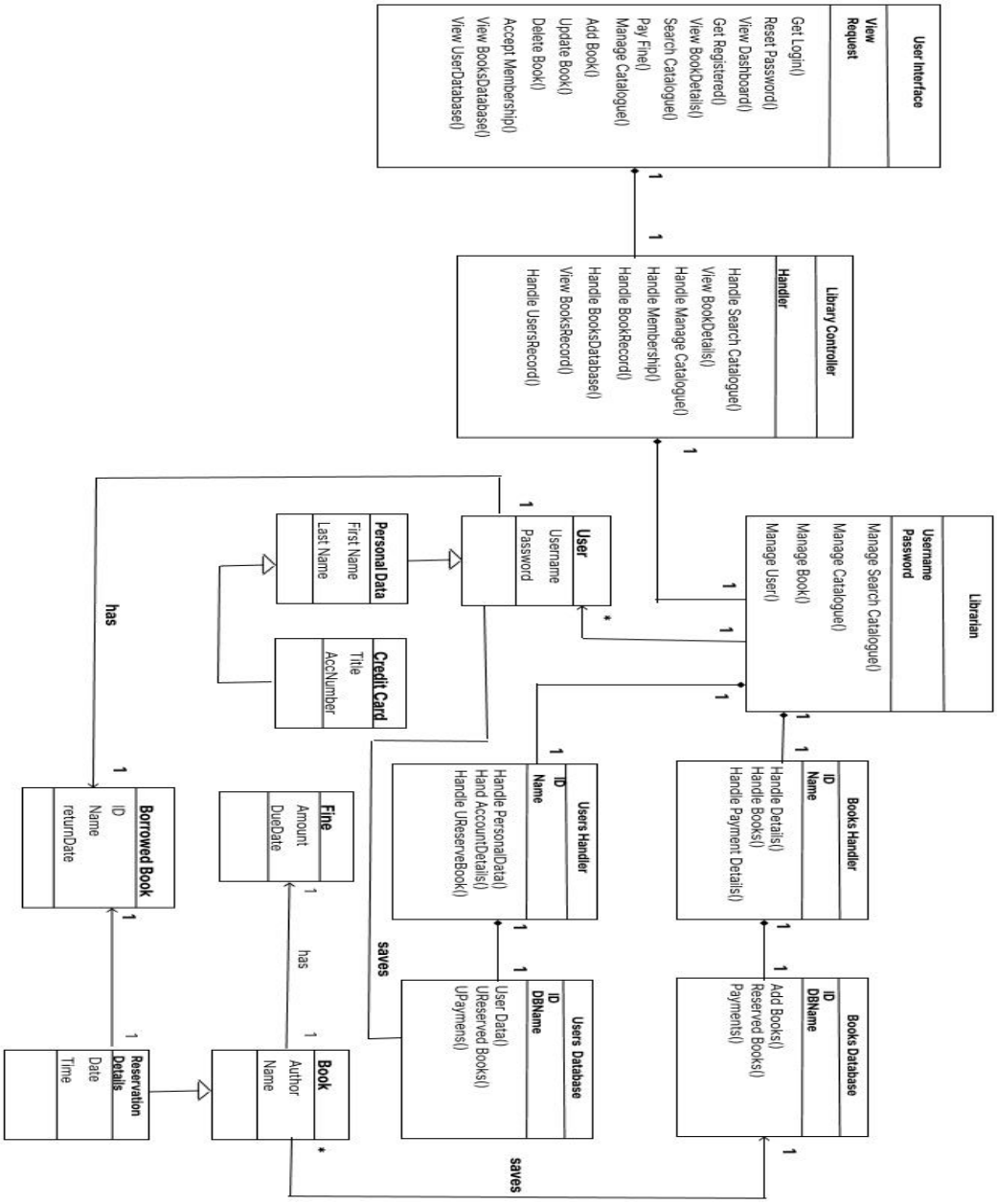
View: Library System

Controller: Server

Data: Database

6.3 Class Diagram:

This diagram describe the structure of the system. The diagram does this by showing each class and its attributes, methods, and relationships. Our library management system coordinates all the functions of a library.



Pattern: **MVC**

Model: **Handlers(User Handler,Book Handler)**

View: **User Interface**

Controller: **Library Controller**

Data: **Database**

6.4 Reason/Purpose to Apply MVC:

With the rapid increase of the network applications, MVC pattern is a very advanced design idea for Web application development. No matter which language you choose, no matter how complex the applications are, it can provide the most basic analysis method for the application model structural, provide a clear designing for products, and provide canonical reference for software engineering.
The use of MVC improves maintainability and re-usability of this system.

---------- Thanks----------