
GGC Library Management System

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May Allah guide us righteous path, provide us the strength to fulfill our duties towards Him and His creation, help us to be thankful for what He has destined for us, enable us to be firm with our morals and humanity and enlist us among those He is pleased with.
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DEDICATION

This project is dedicated to our parents whose love, prayers, hopes and encouragements have always been there behind every bit of our success.

We also dedicate this dissertation to our many Teachers. We will always appreciate all they have done, especially **Miss Faiza Rasheed** for helping us develop our technology skills and for helping us to master the leader dots.

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CHAPTER 1

INTRODUCTION

1.1. Introduction

A library management system is a software designed to manage all the functions of a library. It helps librarians to maintain the database of new books and the books that are borrowed by members along with their due dates. This system completely automates all the library's activities, from managing the acquisition, cataloging to serial control, issued/borrowed books, returned books & due date calculation, it helps in managing the daily work process in the library. The library management system software automatically organizes the books by categories, subject, author, topic, and maintains the records with ease.

The primary functions of adding and deleting, issuing and returning of books are made simple. The processes of book indexing, cataloging, book reservations, and overdue notifications are automated. The software system makes the process simpler and more accountable. The library management system allows a library to keep track of all its books, and also manage its members. Some of the services offered by a library management system include book requests by the members of the library, and denial or issuance of the requests by the librarian.

1.2 Background and Existing System

Before the advent of technology, libraries used to maintain their records manually. The manual library system was a time-consuming process and required a lot of effort from the librarians. The manual system was prone to errors, and it was difficult to keep track of the books that were borrowed by the members.

The manual system requires the librarians to maintain the records of the books that are borrowed by the members. The librarians have to manually enter the details of the books in the register, and they have to manually update the register when the books are returned.

1.3 Problems in Existing System

It's important to note that these problems may vary across different Library Management System platforms, and some providers actively address these issues through updates and improvements. Institutions should carefully evaluate their specific requirements and conduct thorough research to select an LMS that best aligns with their goals and overcomes these existing problems.

- Difficult in Offering wide range of services.
- Lack of storage space.
- Too much paper wastage.
- Data Security.
- Pressure on people to be correct in all details of their work in all time.

1.4 Proposed System

Proposed Library Management System is a Computer-based system that helps in managing and organizing the resources of a library, and the specific requirements and features would vary depending on the context and needs of the institutions implementing it.

- Interactive and Engaging Features.
- Integration of Library functions in a systematic way.
- Fast and Effortless gathering of all information in the library.
- Web-Based System.
- Efficient management of the library.

1.5 Main Modules

The main modules of Library Management System are given below:

- Admin Panel
 - Perform Registration.
 - Manage Students
 - Manage Faculty Staff
 - Manage Books
 - Manage Faculty Staff
 - Manage Books
 - View Details
 - Generate Reports
 - Maintain Records

- Student Panel
 - Login
 - Profile setup
 - Search books
 - View book details
 - Reserve books
 - Borrow books
 - Renew books
 - Read books
 - Analyze Transactions
 - Logout

- Faculty Staff Panel
 - Login
 - Profile setup
 - Search books
 - View books details
 - Reserve books
 - Borrow books
 - Renew books
 - Read books
 - Analyze transactions
 - Logout

1.6 Expected Outcome

Integrated environment is provided to Students and Faculty members. It helps them to provide a more efficient and effective way of utilizing library resources. It helps in keeping a record of all library resources, reducing paper wastage, and providing better security.

1.7 Tools & Technology:

- **Tools:**

- MS Visual Studio Code
- MS Visio
- Rational Rose
- Star UML
- Mongo DB Compass
- Postman
- Figma
- MS Word

- **Technology:**

- HTML5
- CSS 3
- JavaScript
- React JS
- Node JS
- Mongo DB
- Node Mailer

1.8 Activity Index

Schedule all the deliverables accordingly:

No	Activity	Duration	Deliverables
1	Project Selection	2 Weeks
2	Feasibility Study	2 Weeks
3	Making Proposal	2 Weeks	Proposal Documents
4	Defend Proposal	2 Weeks	Acceptance Certificate
5	Acquire Requirements	3 Weeks	Requirement Document
6	Analysis of Requirements	3 Weeks	Analysis Report
7	Identify Scope	1 Week	Scope Document
8	Write Specification	2 Weeks	Specification Document
9	Make Architecture Design	1 Week	Architecture Design
10	Make Detail Design	3 Weeks	Detail Design
11	Module Coding + Integration Coding	4 Weeks	Coding Document
12	Unit / Module Testing	1 Week	Unit Testing Report
13	Integration Testing	1 Week	Integration Testing Report
14	Final Project Defense		

CHAPTER 2

REQUIREMENT ANALYSIS

2.1 Requirement Analysis

Requirement's analysis in systems engineering and software engineering, encompasses those tasks that go into determining the needs or conditions to meet for a new or altered product taking account of the possibly conflicting requirements of the various stakeholders, analyzing, documenting, validating and managing software or system requirements.

2.2 Functional Requirements

The system should support management of all library affaire and Students and Staff activities related to their integration.

2.2.1 Administrator:

Admin can perform any of the function given below:

2.2.1.1 Books management

- Search: Can search any kind of book by its Name, Title and Author Name.
- Update: Can update any books information.
- Add: Can add new Books.
- Delete: Can delete Books.
- View: Can view the Books detail.

2.2.1.2 Staff management:

- Search: Can search any information related to Staff.
- Delete: Can delete both important and unimportant things related to Staff.
- View: Can view the Staff information and activities.
- Update: Can update the Staff information.
- Add: Can add new Staff members.

2.2.1.3 Student management:

- Search: Can search any information related to Students.
- Delete: Can delete both important and unimportant things related to Students.
- View: Can view the Student's information and activities.
- Update: Can update the Student information.
- Add: Can add new Students.

2.2.2 Students:

Students can perform the following functions:

- Login: Students can perform Login with the help username and password.
- Search: can search books that are required.
- View: can view all the information related to books.
- Reserve: can reserve books that are needed for study purpose or other.
- Borrow: can borrow books that are needed for study purpose or other.
- Feedback: Give feedback about any book that helps others.
- Return: can return books after its study.

2.2.3 Faculty Staff:

Faculty staff can perform the following functions:

- Login: Staff can perform Login with the help username and password.
- Search: can search books that are required.
- View: can view all the information related to books.
- Reserve: can reserve books that are needed for study purpose or other.
- Borrow: can borrow books that are needed for study purpose or other.
- Return: can return books after its study.

- Feedback: Give feedback about any book that helps others.
- Communicate with Students: Faculty staff can communicate with students.

2.3 Non-Functional Requirements

Non-functional requirements are given below:

- **Security:**

Requirements are important factors in this system as classified data will be stored in the Database. Admin validation will be done during login to ensure that the admin is valid and only the admin has access to all the data.

- **User friendly interface:**

The system will have consistent interface formats and button sets for all forms in the application, will have a user-friendly interface for all users and viewing formats, any type of users will be able to get the information and services provided by the system.

- **Ease of use:**

The system will be easily maintained by the administrator and it shall respond as fast as possible in performing the services mentioned.

2.4 Use Cases

A use case is a methodology used in system analysis to identify, clarify, and organize system requirements. The use case is made up of a set of possible sequences of interactions between systems and users in a particular environment and related to a particular goal. It consists of a group of elements (for example, classes and interfaces) that can be used together in a way that will have an effect larger than the sum of the separate elements combined. The use case should contain all system activities that have significance to the users. A use case can be thought of as a collection of possible scenarios related to a particular goal, indeed, the use case and goal are sometimes considered to be synonymous.

Table 1: UC_01 Administrator Login

Use Case Name	Administrator Login
Scope	Web App for Library Management System
Level	User goal
Primary Actor	Administrator
Supporting Actor	Database, Web App administrator, System
Stakeholders and interest	Administrator: can manage the students and staff and also update their information. Database: information is inserted into the database successfully System: can work properly
Pre-Condition	Web Application is in running form and main interface is shown
Post Condition	Accounts handling & Entering information about students
Main success scenario	<ul style="list-style-type: none">• Enter user name• Enter password• Click on login button• Verify username and password by system• Admin successfully login into system/application
Alternate Scenario	Re-enter the username or password
Special requirements	Font size 12, 14 and easy to watch from 1 m distance, use windows color scheme, it is more effective.
Frequency of occurrence	One time a day but in some cases many times

Table 2: UC_02 Administrator Logout

Use Case Name	Administrator Logout
Scope	Web App for Library Management
Level	User goal
Primary Actor	Administrator
Supporting Actor	Database, Web App administrator, System
Stakeholders and interest	Administrator: can logout from the website and go to login form Database: stop the interaction with the application System: system will go to login form
Pre-Condition	App is in running form and the user is logged-in
Post Condition	Back to login page
Main success scenario	<ul style="list-style-type: none">• Login• Select and click logout• Admin will successfully logout
Alternate Scenario	Remain login
Special requirements	Font size 12, 14 and easy to watch from 1 m distance, use windows color scheme, it is more effective.
Frequency of occurrence	One time a day but in some cases many times

Table 3: UC_03 Administrator Change Password

Use Case Name	Administrator Change Password
Scope	Web App for Library Management System
Level	User goal
Primary Actor	Administrator
Supporting Actor	Database, Web App administrator, System
Stakeholders and interest	Administrator: can the change the password and fill the fields required Database: update the password System: system will update
Pre-Condition	Enter to the login panel
Post Condition	Password changed successfully
Main success scenario	<ul style="list-style-type: none"> • Click change password option • Enter Old password • Enter new password • Confirm password • Submit
Alternate Scenario	N/A
Special requirements	Font size 12, 14 and easy to watch from 1 m distance, use windows color scheme, it is more effective.
Frequency of occurrence	One time a day but in some cases many times

Table 4: UC_04 Users Signup

Use Case Name	User Signup
Scope	Web App for Library Management System
Level	User goal
Primary Actor	Administrator
Supporting Actor	Database, Web App administrator, System
Stakeholders and interest	Administrator: can register the users that can be students and staff successfully Database: store information and update the database System: system will update
Pre-Condition	Enter to the login panel
Post Condition	Users registered successfully
Main success scenario	<ul style="list-style-type: none"> • Click on “Add User” option • Enter Information • Grant Permissions • Review Information • Registered
Alternate Scenario	N/A
Special requirements	Font size 12, 14 and easy to watch from 1 m distance, use windows color scheme, it is more effective.
Frequency of occurrence	One time a day but in some cases many times

Table 5: UC_05 Student Management

Use Case Name	Student Management
Scope	We App for Library Management System
Level	User goal
Primary Actor	Administrator
Supporting Actor	Database, Web App administrator, System
Stakeholders and interest	Administrator: can update and manage the students Database: can update the Students related information System: system is updated and maintained
Pre-Condition	Administration login
Post Condition	Database updated successfully
Main success scenario	<ul style="list-style-type: none">• can add Students• can delete Students• can update Student details• can save Students details
Alternate Scenario	Retry
Special requirements	Font size 12, 14 and easy to watch from 1 m distance, use windows color scheme, it is more effective.
Frequency of occurrence	One time a day but in some cases many times

Table 6: UC_06 Faculty Staff Management

Use Case Name	Faculty Staff Management
Scope	Web App for Library Management System
Level	User goal
Primary Actor	Administrator
Supporting Actor	Database, Web App administrator, System
Stakeholders and interest	Administrator: can view the staff details Database: maintain the record related to staff System: system will work successfully
Pre-Condition	Administration Login
Post Condition	Database updates successfully
Main success scenario	<ul style="list-style-type: none"> • can add new staff • can delete staff • can update Staff details • can save Staff details
Alternate Scenario	Retry
Special requirements	Font size 12, 14 and easy to watch from 1 m distance, use windows color scheme, it is more effective.
Frequency of occurrence	One time a day but in some cases many times

Table 7: UC_07 Books Management

Use Case Name	Books Management
Scope	We App for Library Management System
Level	User goal
Primary Actor	Administrator
Supporting Actor	Database, Web App administrator, System
Stakeholders and interest	Administrator: can manage the books Database: Books information is stored in database System: provide information related to books to students and staff
Pre-Condition	Administration Login
Post Condition	Database update successfully
Main success scenario	<ul style="list-style-type: none">• can add new books• can delete books• can update book detail• can save books details
Alternate Scenario	Retry
Special requirements	Font size 12, 14 and easy to watch from 1 m distance, use windows color scheme, it is more effective.
Frequency of occurrence	One time a day but in some cases many times

Table 8: UC_08 Generate Reports

Use Case Name	Generate Reports
Scope	We App for Library Management System
Level	User goal
Primary Actor	Administrator
Supporting Actor	Database, Web App administrator, System
Stakeholders and interest	Administrator: can manage and generate monthly or weekly reports Database: All records is stored in database System: provide information related to books to students and staff
Pre-Condition	Administration Login
Post Condition	Database update successfully
Main success scenario	<ul style="list-style-type: none">• can manage transactions• can maintain records• can generate reports
Alternate Scenario	Retry
Special requirements	Font size 12, 14 and easy to watch from 1 m distance, use windows color scheme, it is more effective.
Frequency of occurrence	One time a day but in some cases many times

Table 9: UC_09 User Login

Use Case Name	User Login
Scope	Web App for Library Management System
Level	User goal
Primary Actor	User
Supporting Actor	Database, Web app administrator, System
Stakeholders and interests	Student: can login successfully and search books Database: information related to students is stored in database successfully System: system can provide integrated environment b/w the student and library affaires
Pre-Condition	Web App is in running form and main interface is shown
Post Condition	Users can explore the App and Search the books according to their need
Main success scenario	<ul style="list-style-type: none"> • User will enter username • Enter password • Click on login button • Verify username and password by system • student successfully login into app
Alternate Scenario	Re-enter the username or password
Special requirements	Font size 12, 14 and easy to watch from 1 m distance, use windows color scheme, it is more effective.
Frequency of occurrence	One time a day but in some cases many times

Table 10: UC_10 User Logout

Use Case Name	User Logout
Scope	Web App for Library Management System
Level	User goal
Primary Actor	User
Supporting Actor	Database, Web App administrator, System
Stakeholders and interest	Student: can logout from the app successfully System: logout the student successfully
Pre-Condition	Web App is in running form and the user is logged-in
Post Condition	Back to login page
Main success scenario	<ul style="list-style-type: none">• Select and click logout• User will successfully logout
Alternate Scenario	Re-enter the username or password
Special requirements	Font size 12, 14 and easy to watch from 1 m distance, use windows color scheme, it is more effective.
Frequency of occurrence	One time a day but in some cases many times

Table 11: UC_11 User Change Password

Use Case Name	User Change Password
Scope	Web App for Library Management System
Level	User goal
Primary Actor	User
Supporting Actor	Database, Web App administrator, System
Stakeholders and interest	Student: can the change the password and fill the fields required Database: update the password System: system will update
Pre-Condition	Enter to the login panel
Post Condition	Password changed successfully
Main success scenario	<ul style="list-style-type: none">• Click change password option• Enter Old password• Enter new password• Confirm password• Submit
Alternate Scenario	N/A
Special requirements	Font size 12, 14 and easy to watch from 1 m distance, use windows color scheme, it is more effective.
Frequency of occurrence	One time a day but in some cases many times

Table 12: UC_12 Search Books

Use Case Name	Search Books
Scope	Web App for Library Management System
Level	User goal
Primary Actor	User
Supporting Actor	Database, Web app administrator, System
Stakeholders and interest	User: can search books by its title, name and author name Database: information related to books is stored in database successfully System: system can maintain the information related to books
Pre-Condition	Enter the App as Registered Student
Post Condition	Book Searched
Main success scenario	<ul style="list-style-type: none">• Click search bar for searching books• Find book according to need from searched books
Alternate Scenario	Retry
Special requirements	Font size 12, 14 and easy to watch from 1 m distance, use windows color scheme, it is more effective.
Frequency of occurrence	One time a day but in some cases many times

Table 13: UC_13 View Book Details

Use Case Name	View Book Details
Scope	Web App for Library Management System
Level	User goal
Primary Actor	User
Supporting Actor	Database, Web App administrator, System
Stakeholders and interest	User: can search books by its title, name and author name and view all details Database: information related to books is stored in database successfully System: system can maintain the information related to books
Pre-Condition	Enter the App as Registered User
Post Condition	Book Searched
Main success scenario	<ul style="list-style-type: none">• Click search bar for searching books• Find book according to need from searched book• View all details related to books that are required
Alternate Scenario	Retry
Special requirements	Font size 12, 14 and easy to watch from 1 m distance, use windows color scheme, it is more effective.
Frequency of occurrence	One time a day but in some cases many times

Table 14: UC_14 Reserve Books

Use Case Name	Reserve Books
Scope	Web App for Library Management System
Level	User goal
Primary Actor	User
Supporting Actor	Database, System
Stakeholders and interest	User: can successfully reserve books Database: can store the request information System: can maintain the records
Pre-Condition	Enter to the Login panel
Post Condition	Successfully request sent
Main success scenario	<ul style="list-style-type: none">• Click the search bar to search books• Select the books according to requirement• Click “Reserve Book” Button• The request will be sent to admin for reserving
Alternate Scenario	Retry
Special requirements	Font size 12, 14 and easy to watch from 1 m distance, use windows color scheme, it is more effective.
Frequency of occurrence	One time a day

Table 15: UC_15 Issue Books

Use Case Name	Issue Book
Scope	WebApp for Library Management System
Level	Admin goal
Primary Actor	Admin
Supporting Actor	Database, System
Stakeholders and interest	Admin: can successfully Issue books according to request. Database: can store the information of activities System: can maintain the records
Pre-Condition	Enter to the login panel
Post Condition	Successfully issue books
Main success scenario	<ul style="list-style-type: none">• Check the record of particular user and his account status.• Select the books that you want to Issue• Click “Issue Book” Button• The request will be execute successfully
Alternate Scenario	Retry
Special requirements	Font size 12, 14 and easy to watch from 1 m distance, use windows color scheme, it is more effective.
Frequency of occurrence	One time a day or in some cases many times

Table 16: UC_16 Renew Books

Use Case Name	Renew Books
Scope	Web App for Library Management System
Level	User goal
Primary Actor	Student
Supporting Actor	Database, Web App administrator, System
Stakeholders and interests	User: can successfully renew the book that is borrowed Database: status information related to book is stored in database successfully System: system can provide integrated environment between the User and library affairs
Pre-Condition	Web App is in running form and main interface is shown
Post Condition	Students can explore the App and Search the books and view books detail according to their need
Main success scenario	<ul style="list-style-type: none"> • Borrow the books that you need • Click “Renew Book” Button • The request will be sent to admin Successfully • The book is renewed Successfully
Alternate Scenario	Re-enter the username or password
Frequency of occurrence	One time a day but in some cases many times

Table 17: UC_17 Read eBooks

Use Case Name	Read eBooks
Scope	Web App for Library Management System
Level	User goal
Primary Actor	Student
Supporting Actor	Database, Web App administrator, System
Stakeholders and interest	Students: can read books in online mode successfully System: store the books in database successfully
Pre-Condition	Web App is in running form and the main interface is shown
Post Condition	Student must be registered
Main success scenario	<ul style="list-style-type: none">• Login• Search and select books that you want to read• The book will be opened successfully
Alternate Scenario	Re-enter the username or password
Special requirements	Font size 12, 14 and easy to watch from 1 m distance, use windows color scheme, it is more effective.
Frequency of occurrence	One time a day but in some cases many times

Table 18: UC_18 Fill Clearance Form

Use Case Name	Fill Clearance Form
Scope	Web App for Library Management System
Level	User goal
Primary Actor	Student
Supporting Actor	Database, Web App administrator, System
Stakeholders and interest	Students: can fill clearance form in case of passing out from the institute System: store and verify the information from database successfully
Pre-Condition	Web App is in running form and the main interface is shown
Post Condition	Student must be registered
Main success scenario	<ul style="list-style-type: none"> • Login • Click “Student Panel” • Select clearance form and fill it with correct information • Click “Submit” Button <p>Form will be submitted successfully</p>
Alternate Scenario	Re-enter the username or password
Frequency of occurrence	One time a day but in some cases many times

Table 19:UC_19 Edit Profile

Use Case Name	EDIT PROFILE
Scope	Web App for Library Management System
Level	User goal
Primary Actor	User
Supporting Actor	Database, Web App administrator, System
Stakeholders and interest	User: can change his profile settings like profile image, username, password etc. System: store and verify the information from database successfully
Pre-Condition	Web App is in running form and the main interface is shown
Post Condition	User must be registered
Main success scenario	<ul style="list-style-type: none">• Login• Click “Student or Staff Panel”• Select profile settings from the panel• Click “Profile” Button <p>Changes will be done after action successfully</p>
Alternate Scenario	Re-enter the username or password
Frequency of occurrence	One time a day but in some cases many times

Use Case Diagrams

A use case diagram is a graphic depiction of the interactions among the elements of a system. A use case is a methodology used in system analysis to identify, clarify, and organize system requirements. Use case diagrams are usually referred to as behavior diagrams used to describe a set of actions (use cases) that some system or systems (subject) should or can perform in collaboration with one or more external users of the system (actors).

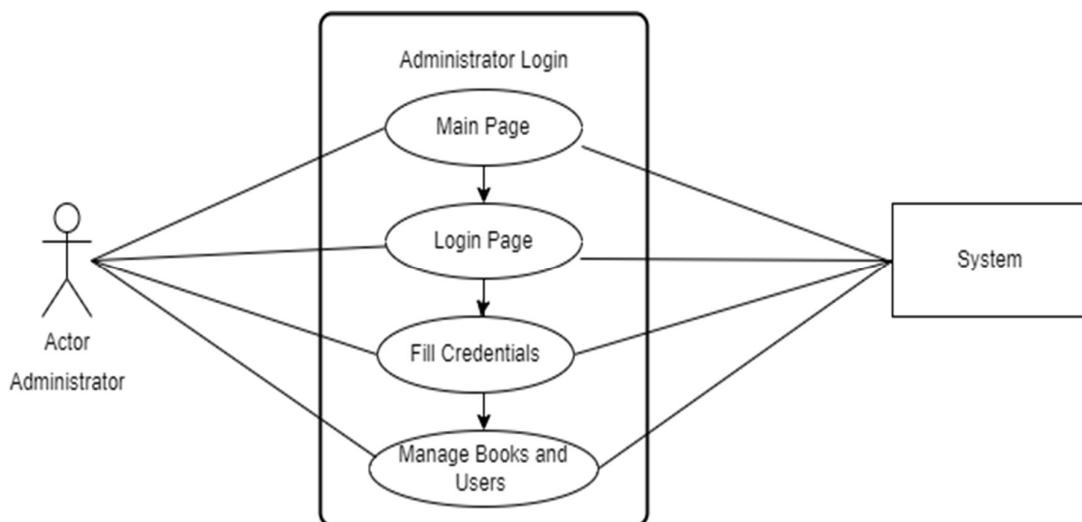


Figure 1: Use Case Diagram of Administrator Login

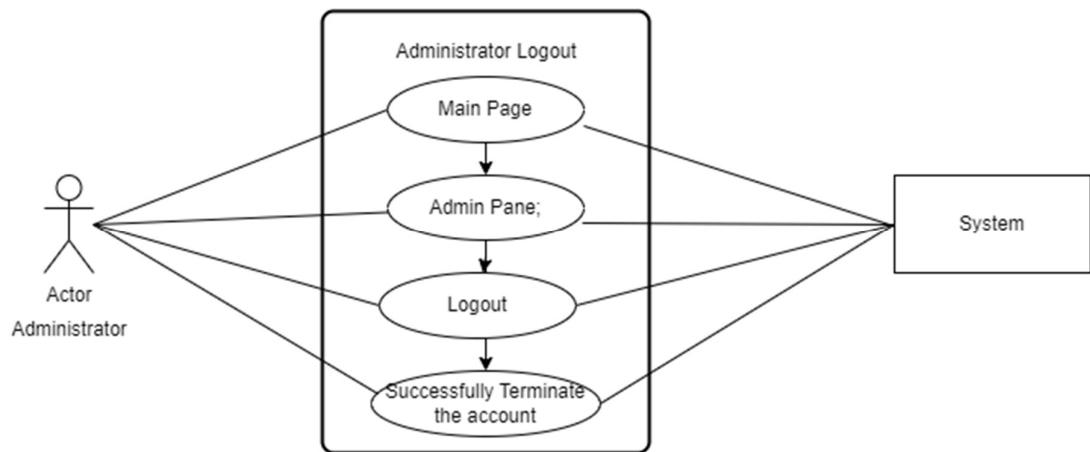


Figure 2: Use Case Diagram of Administrator Logout

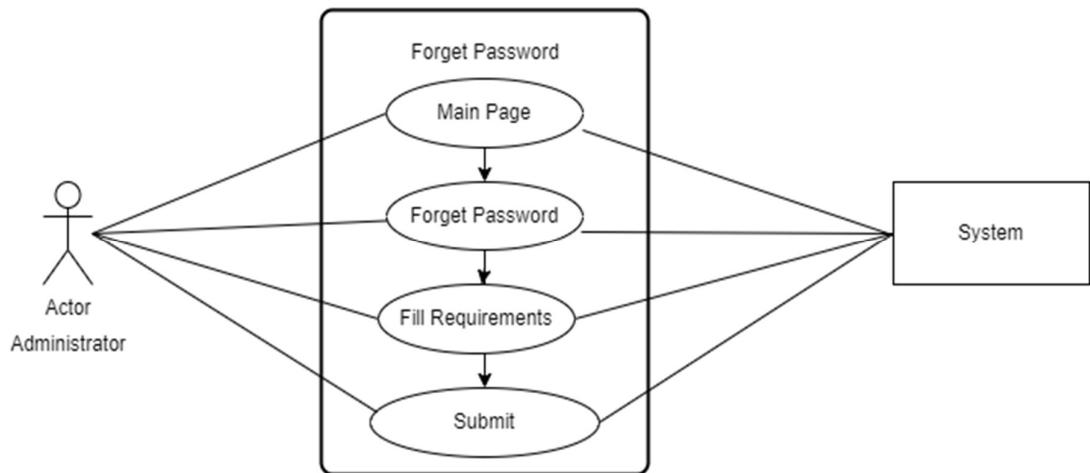


Figure 3: Use Case Diagram of Administrator Forget Password

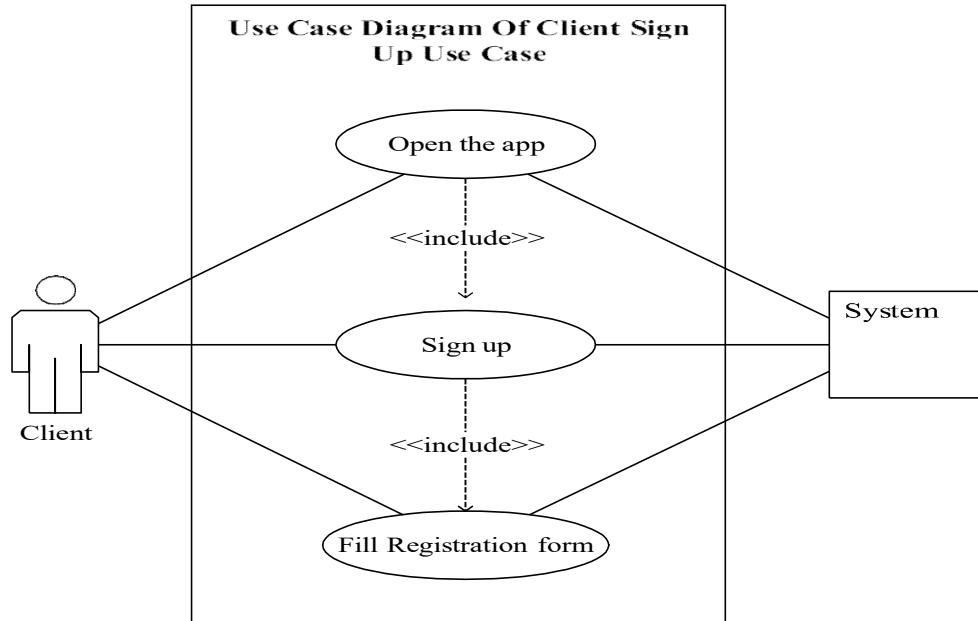


Figure 4: Use Case Diagram of User Sign up

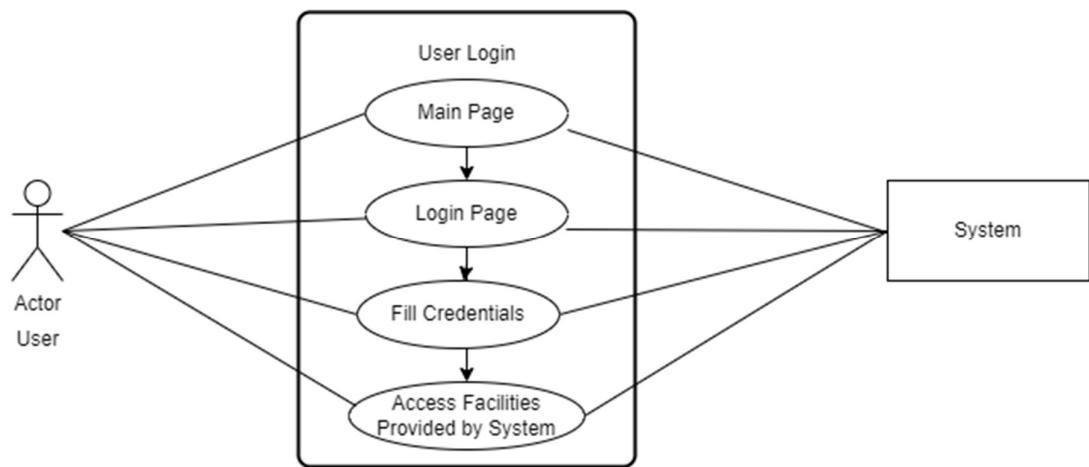


Figure 5: Use Case Diagram of User Login

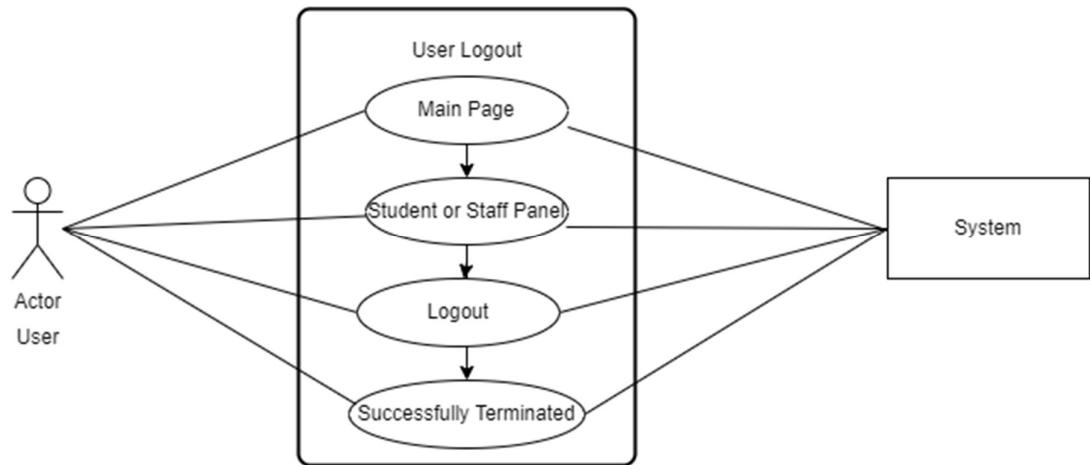


Figure 6: Use Case Diagram of User Logout

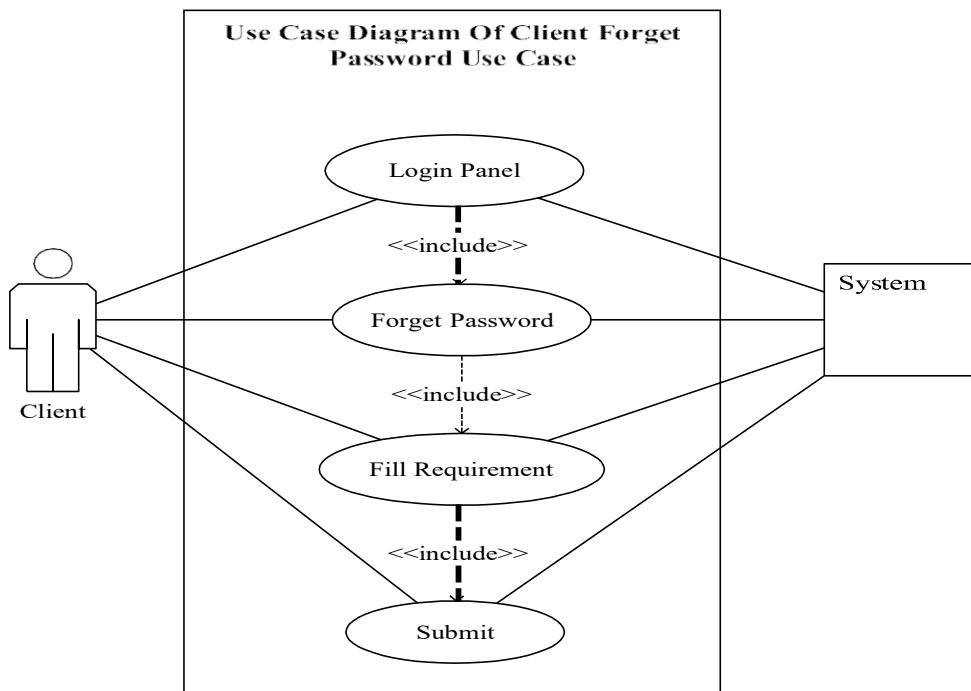


Figure 7: Use Case Diagram of User Forget Password

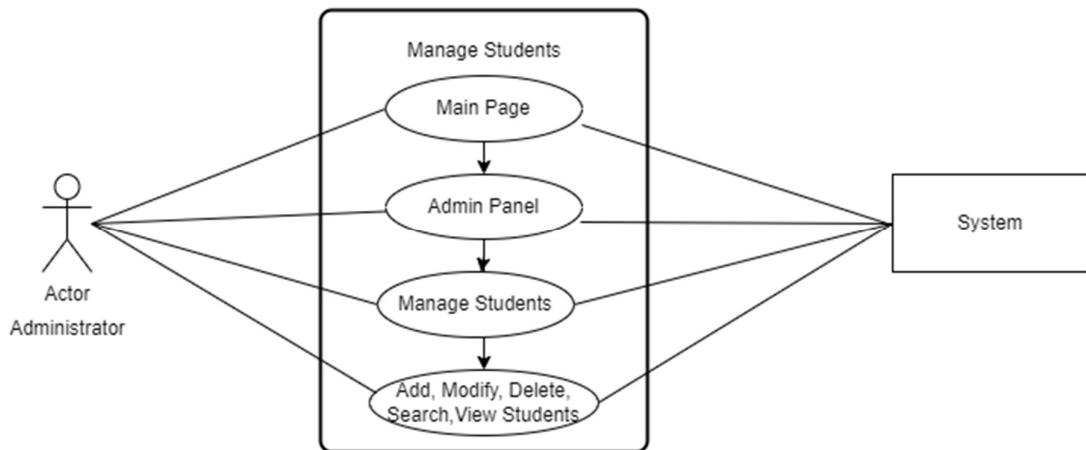


Figure 8: Use Case Diagram of Administrator Manage Students

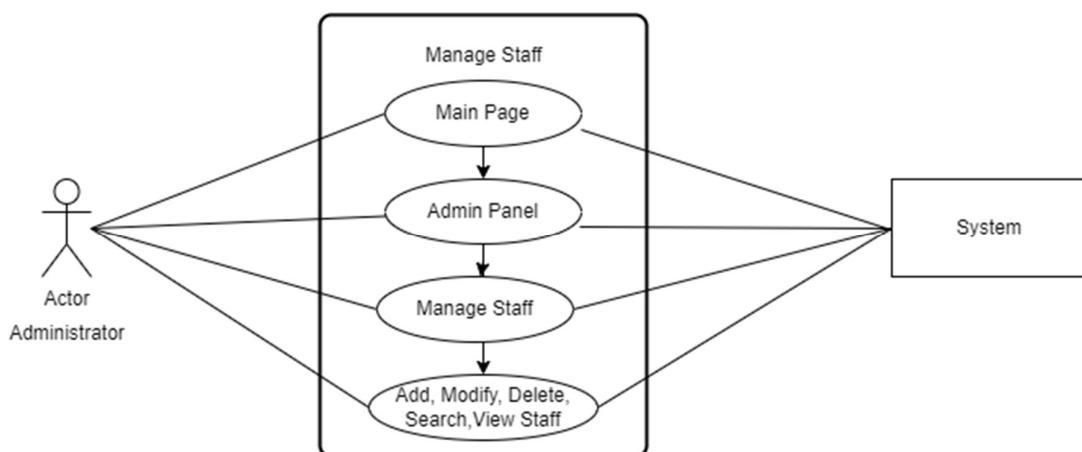


Figure 9: Use Case Diagram of Administrator Manage Staff

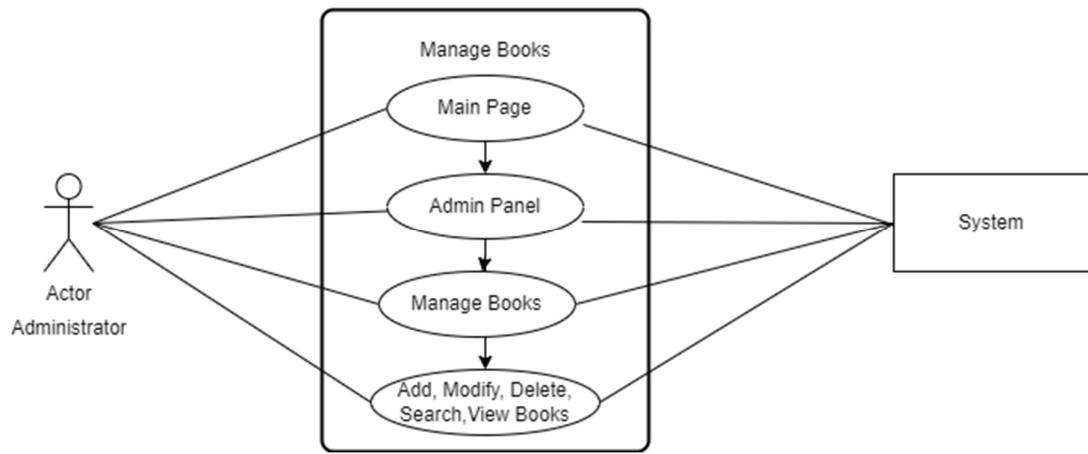


Figure 10: Use Case Diagram of Administrator Manage Books

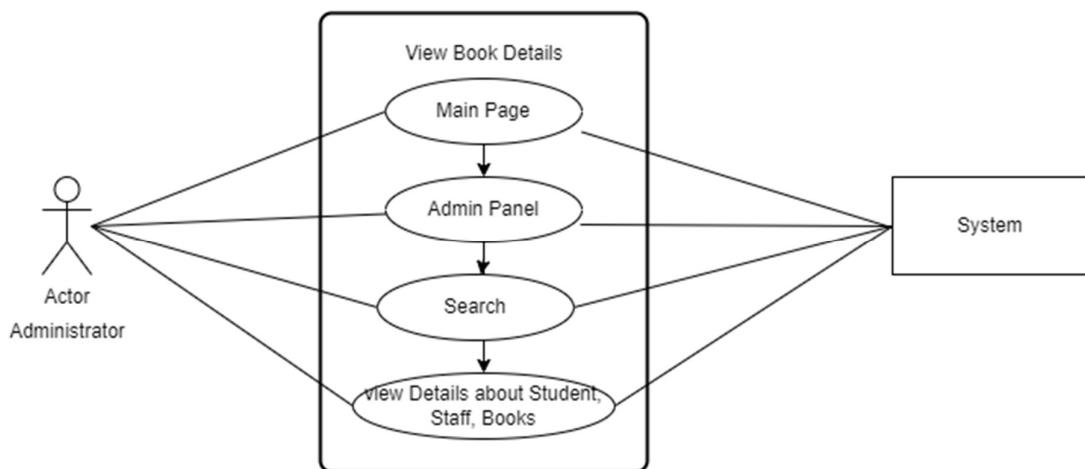


Figure 11: Use Case Diagram of Administrator View Details

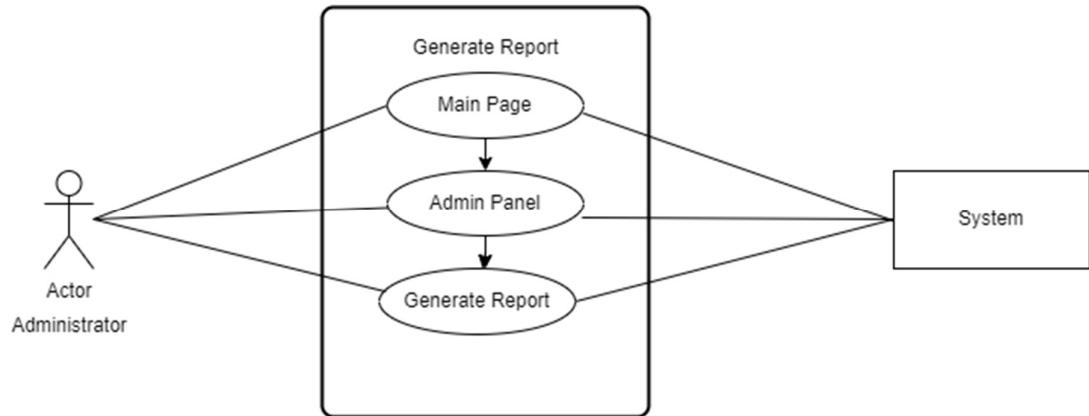


Figure 12: Use Case Diagram of Administrator Generate Report

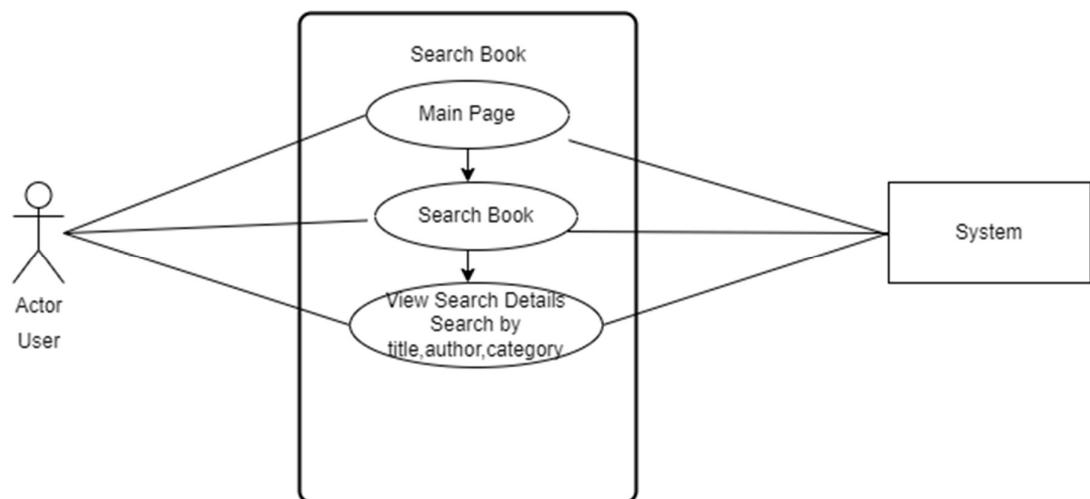


Figure 12: Use Case Diagram of User Search Book

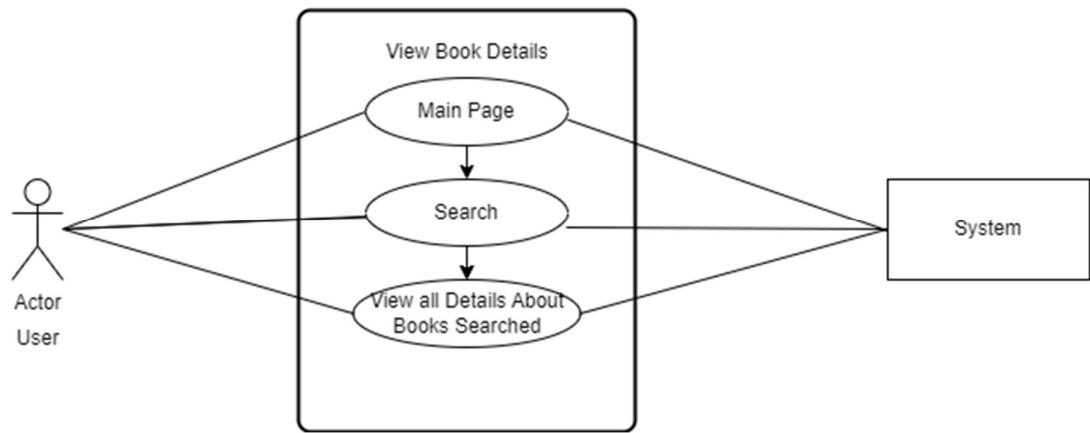


Figure 13: Use Case Diagram of User View Book Details

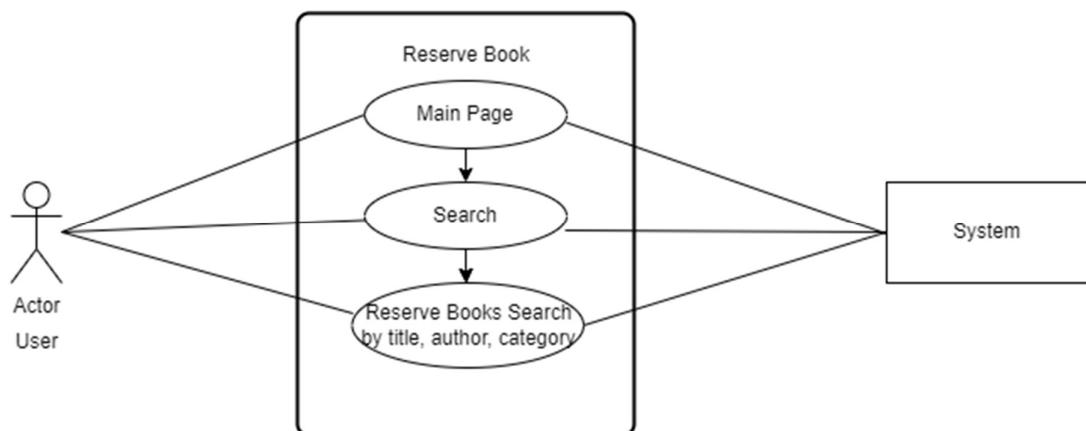


Figure 14: Use Case Diagram of User Reserve Book

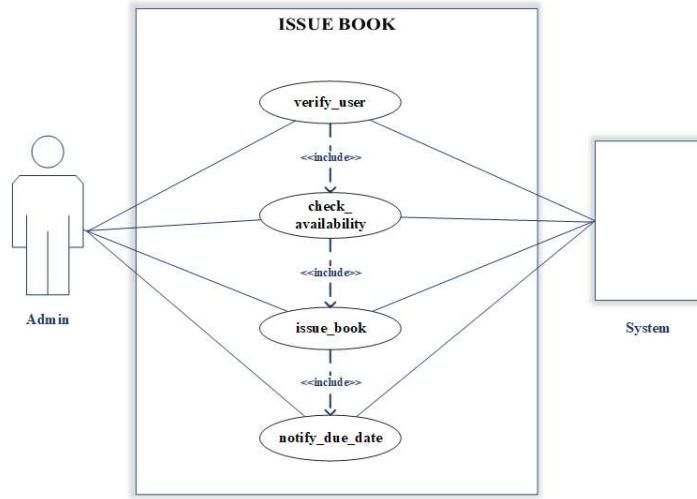


Figure 14: Use Case Diagram of Admin Issue Book

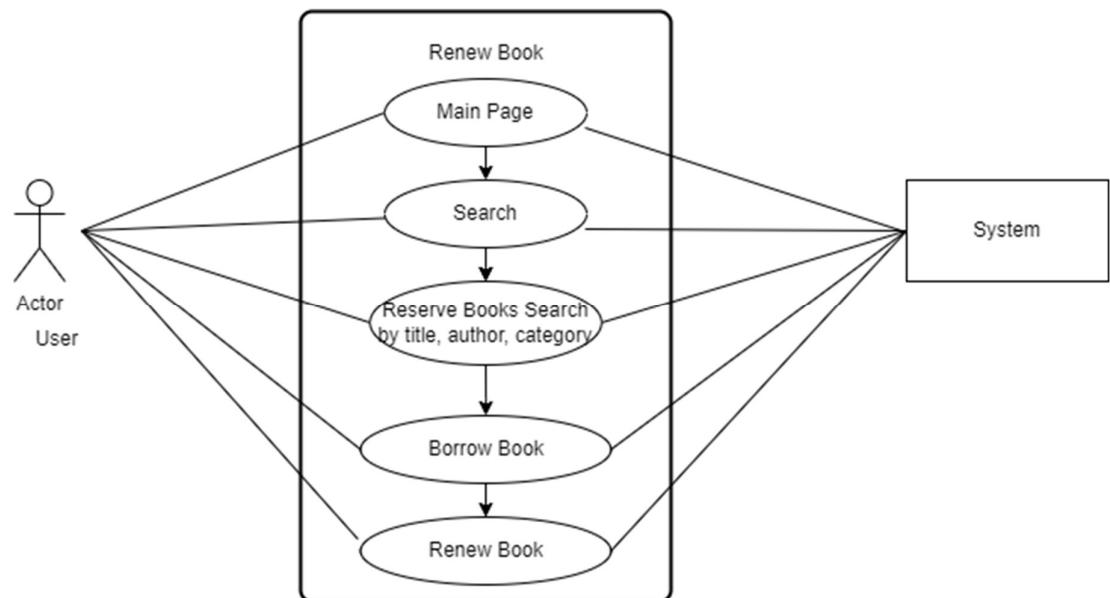


Figure 15: Use Case Diagram of User Renew Book

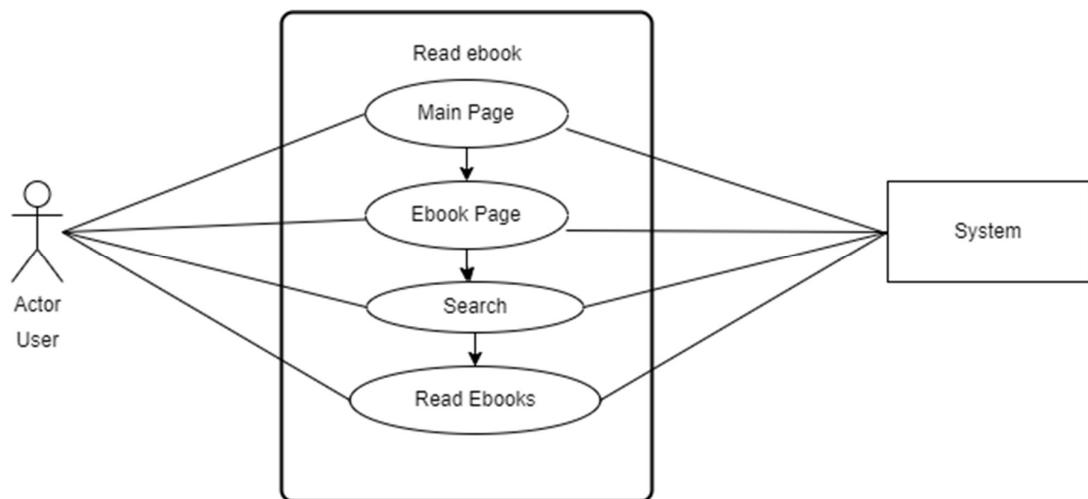


Figure 16: Use Case Diagram of User Read eBook

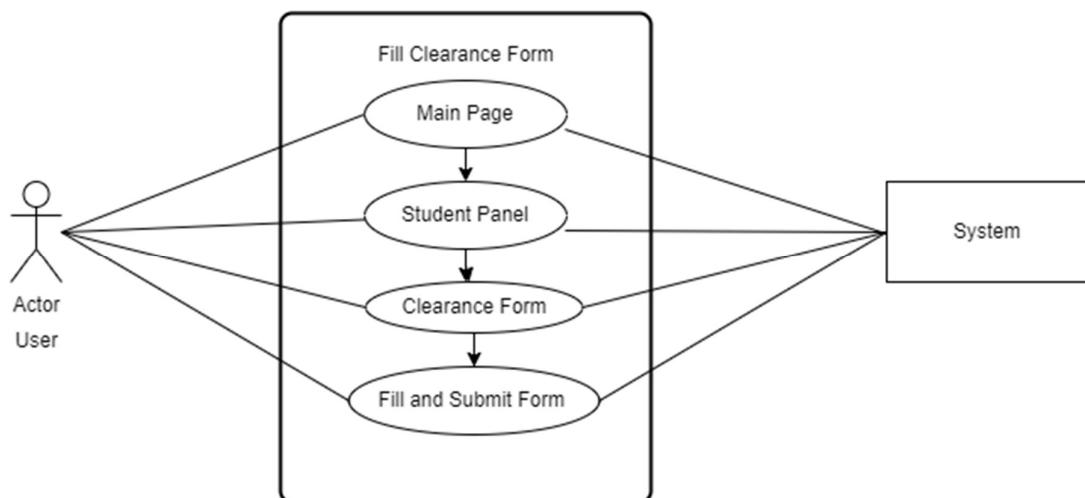


Figure 17: Use Case Diagram of User Clearance Form

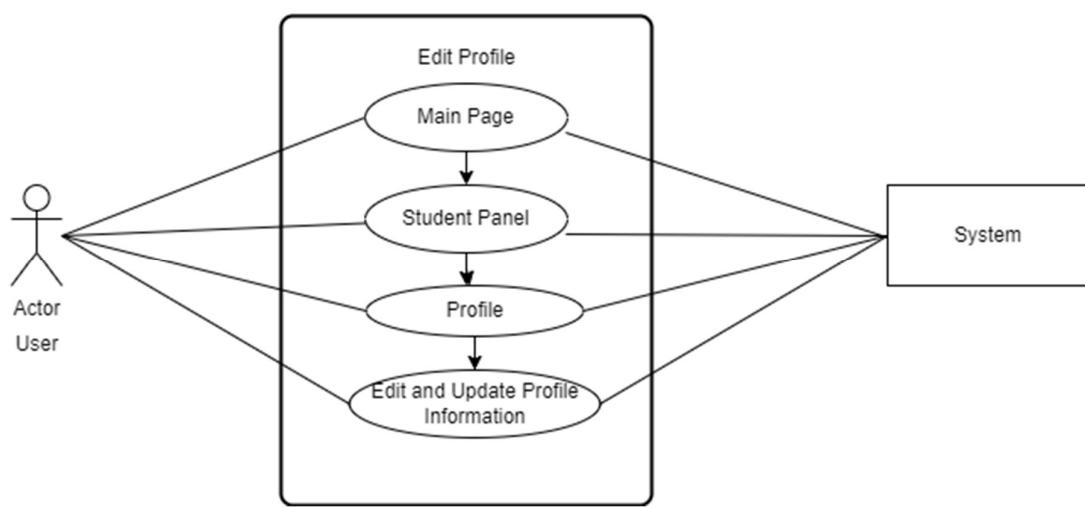


Figure 18: Use Case Diagram of Edit Profile

CHAPTER 3

DESIGN

3.1 DESIGN

Methods and approaches differ depending on what you are developing but whether that involves processes in the healthcare sector or product development at a company we can say with certainty that design will help you to find new solutions.

3.2 Class Diagram

A class diagram models the static structure of a system. It shows relationships between classes, objects, attributes, and operations. Classes represent an abstraction of entities with common characteristics. Associations represent the relationships between classes. Classes with rectangles divided into compartments. Place the name of the class in the first partition (centered, bolded, and capitalized), list the attributes in the second partition (left-aligned, not bolded, and lowercase), and write operations into the third.

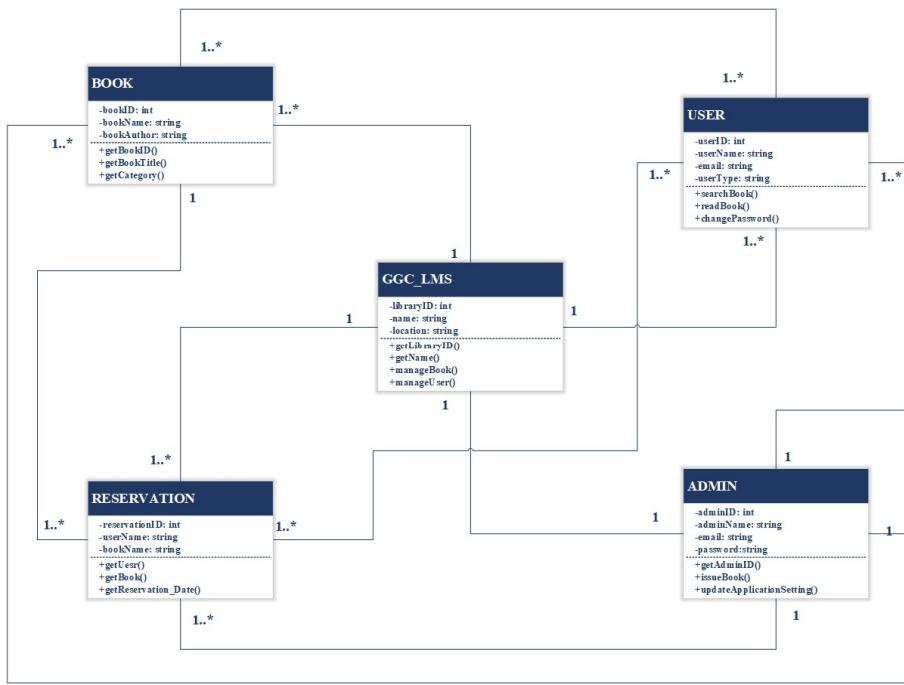


Figure 18: Class Diagram for Library Management System

3.3 Sequence Diagram

A Sequence diagram is an interaction diagram that shows how objects operate with one another and in what order. It is a construct of a chart. Sequence diagram shows object interactions arranged in time sequence. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. Sequence diagrams are typically associated with use cases realizations in the Logical View of the system under development. Sequence diagrams are sometimes called event diagrams or event scenarios. A collaboration diagram, also called a communication diagram or interaction diagram, is an illustration of the relationships and interactions among software objects in the Unified Modeling Language (UML).

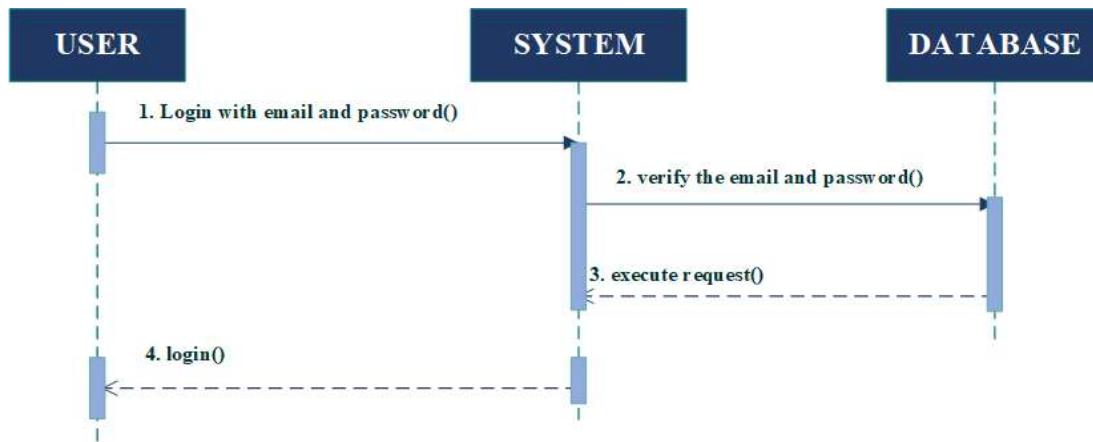


Figure 19: Sequence Diagram of Administrator Login

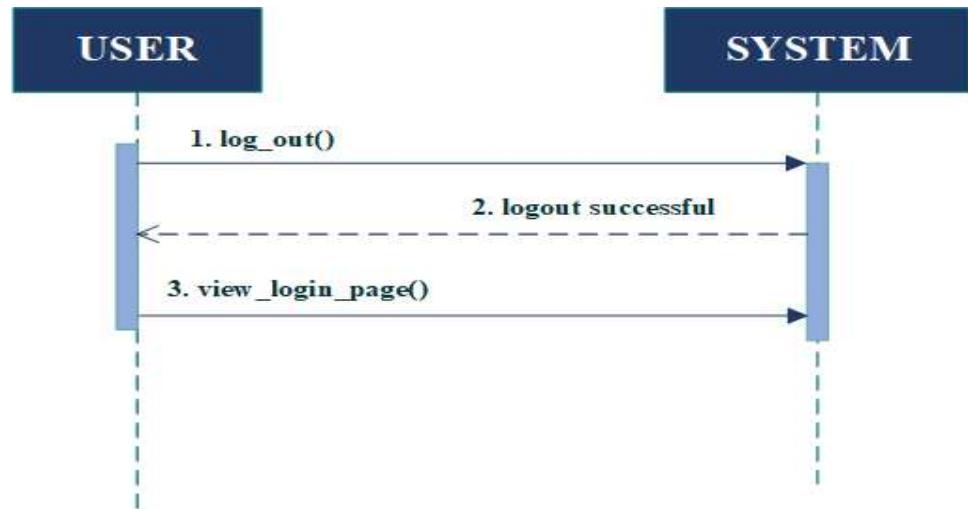


Figure 20: Sequence Diagram of Administrator Logout

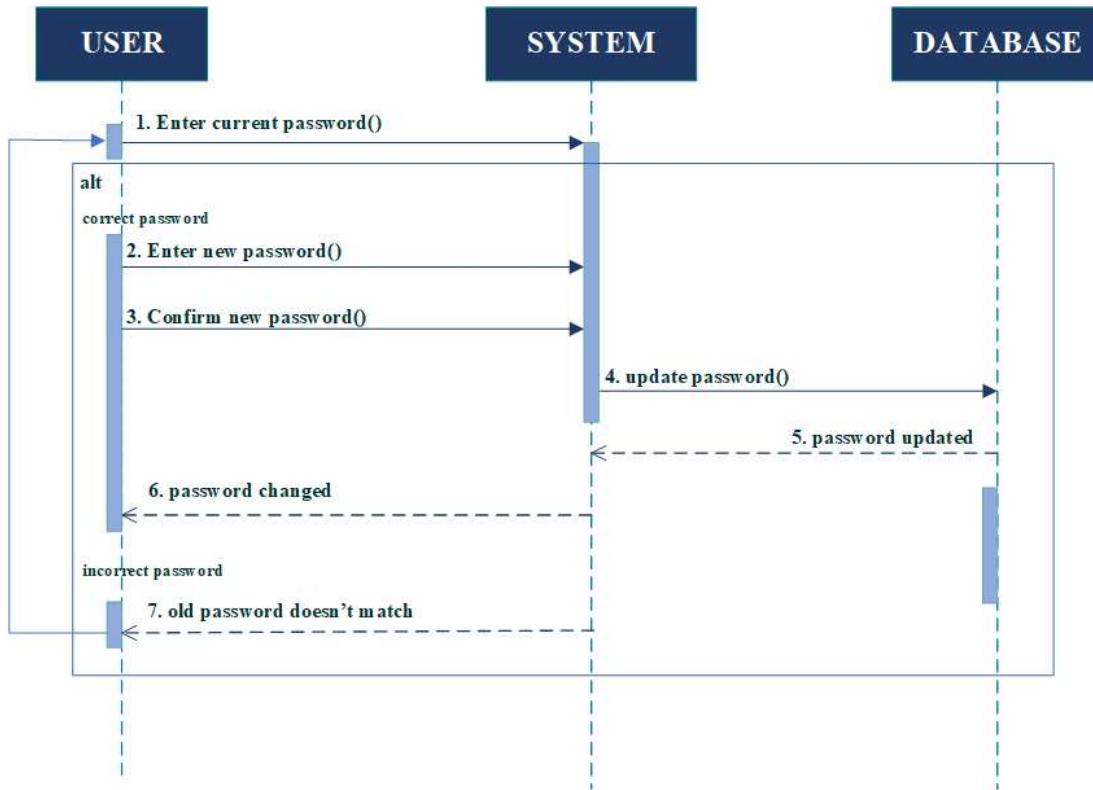


Figure 21: Sequence Diagram of Administrator change password

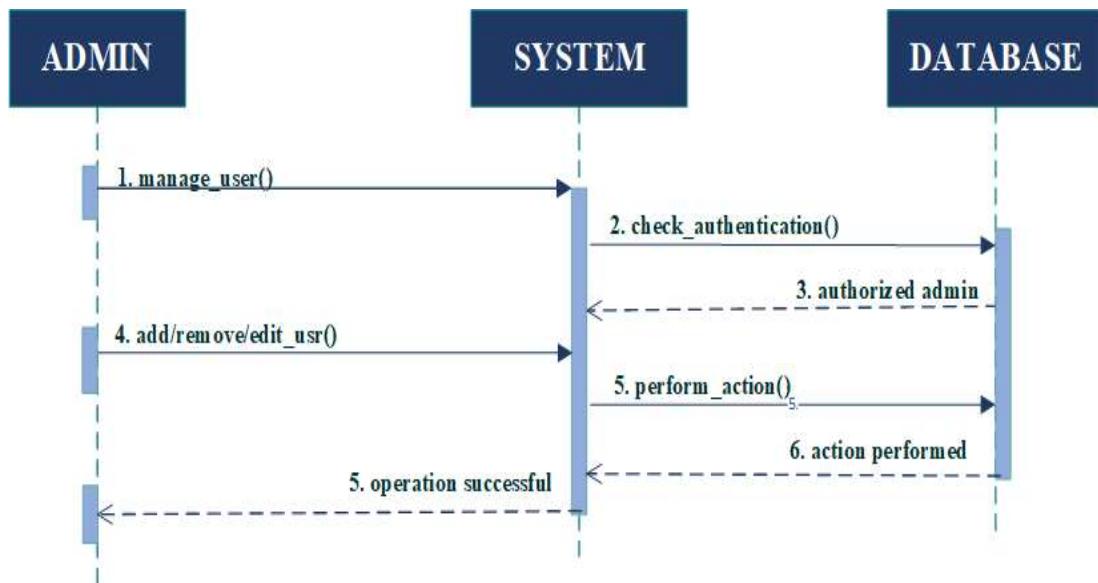


Figure 22: Sequence Diagram of Manage User

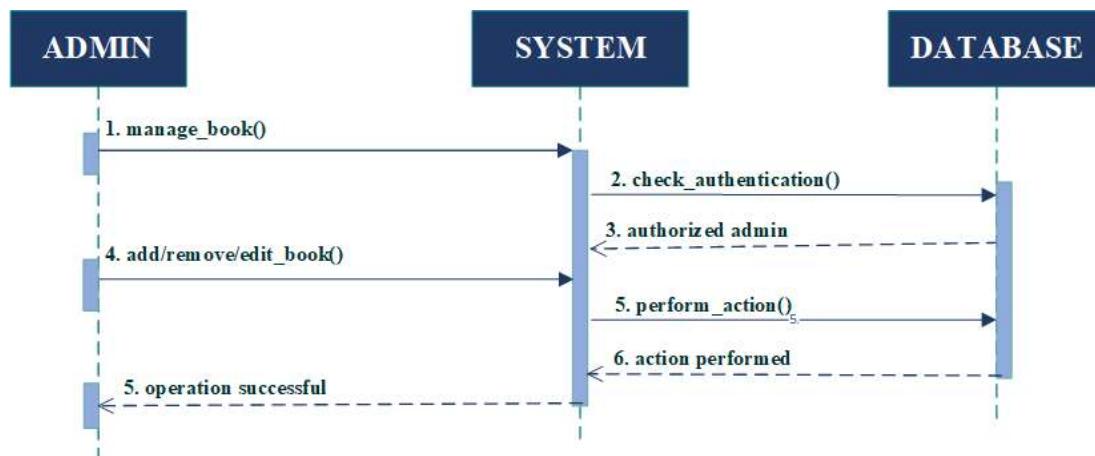


Figure 23: Sequence Diagram of Manage Book

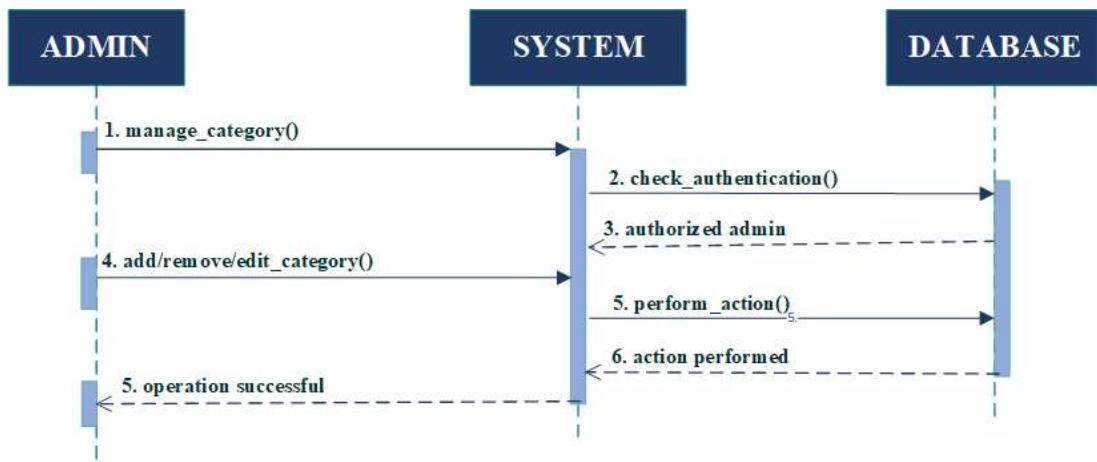


Figure 24: Sequence Diagram of Manage Category

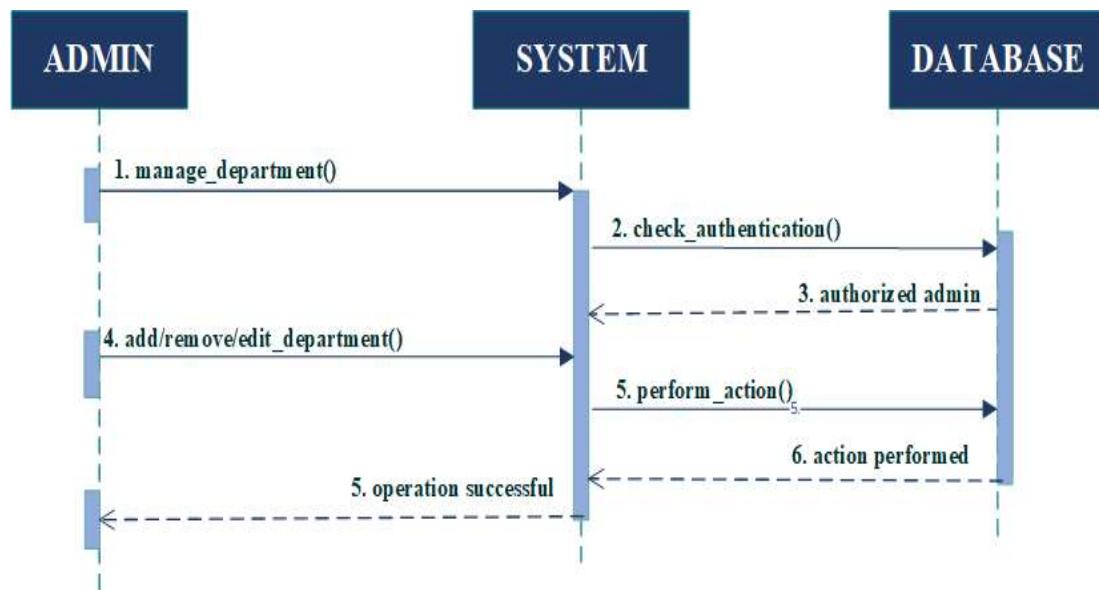


Figure 25: Sequence Diagram of Manage Department

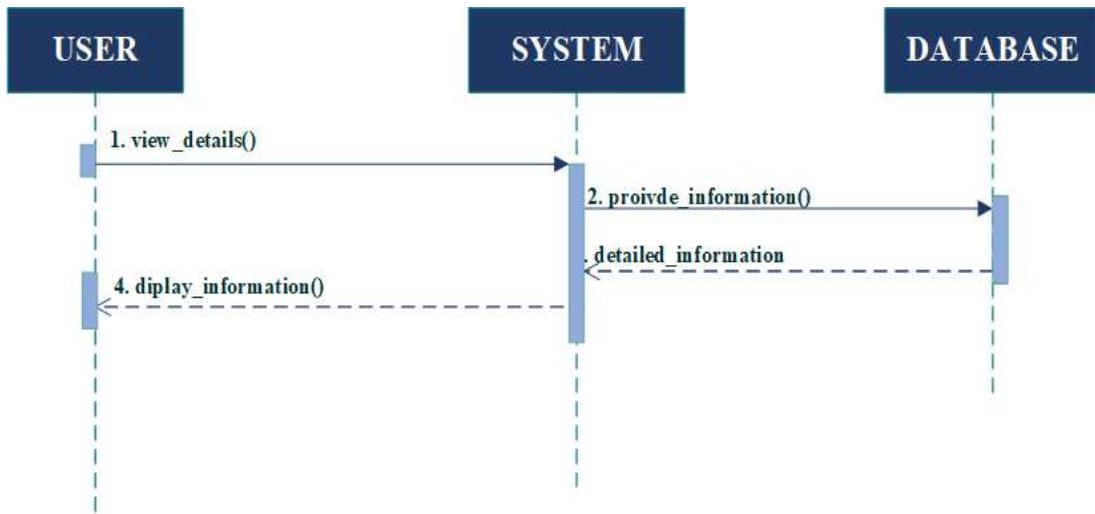


Figure 26: Sequence Diagram of View Details

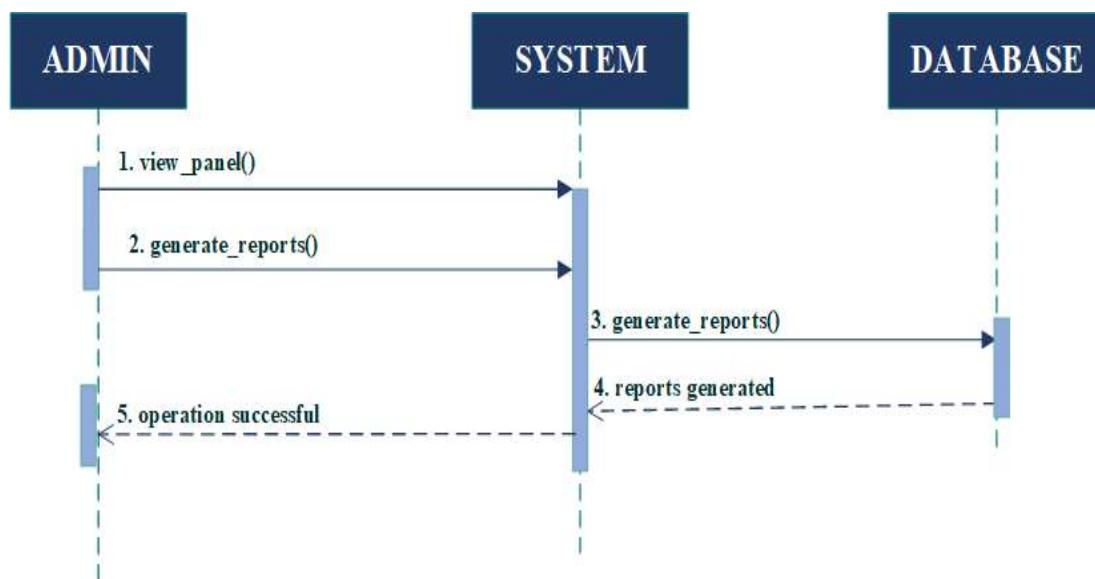


Figure 27: Sequence Diagram of Generate Report

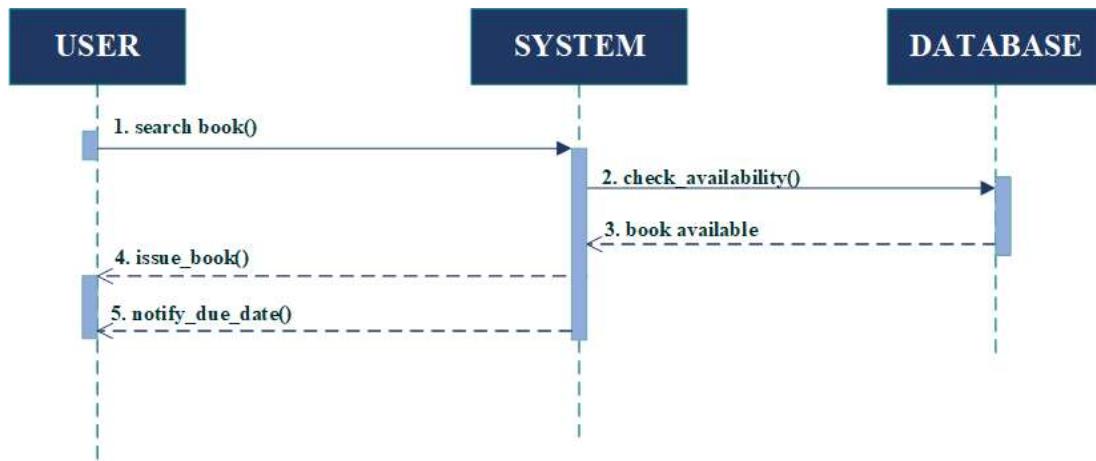


Figure 28: Sequence Diagram of Issue Book

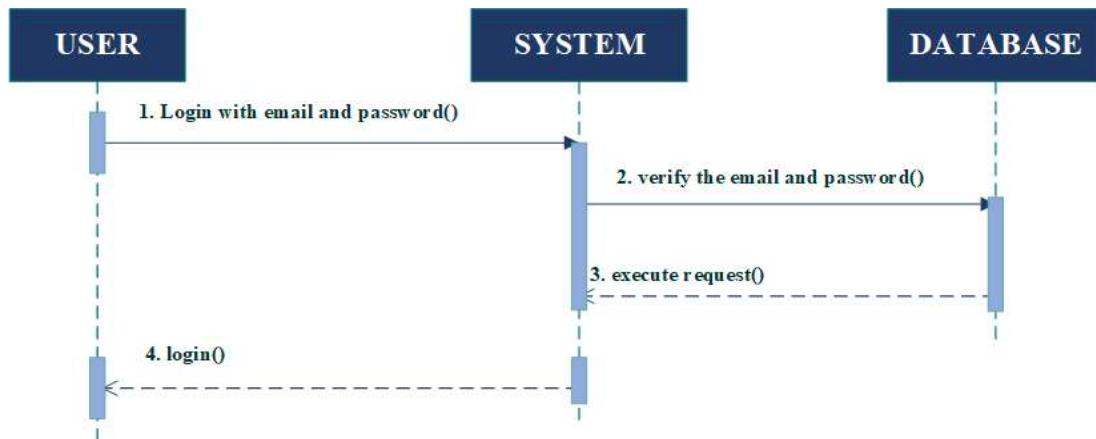


Figure 29: Sequence Diagram of User Login

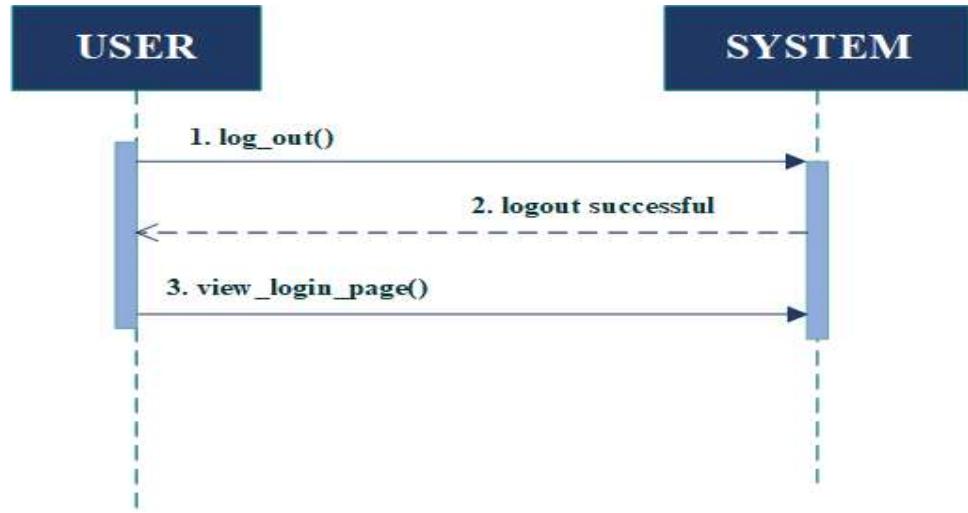


Figure 30: Sequence Diagram of User Logout

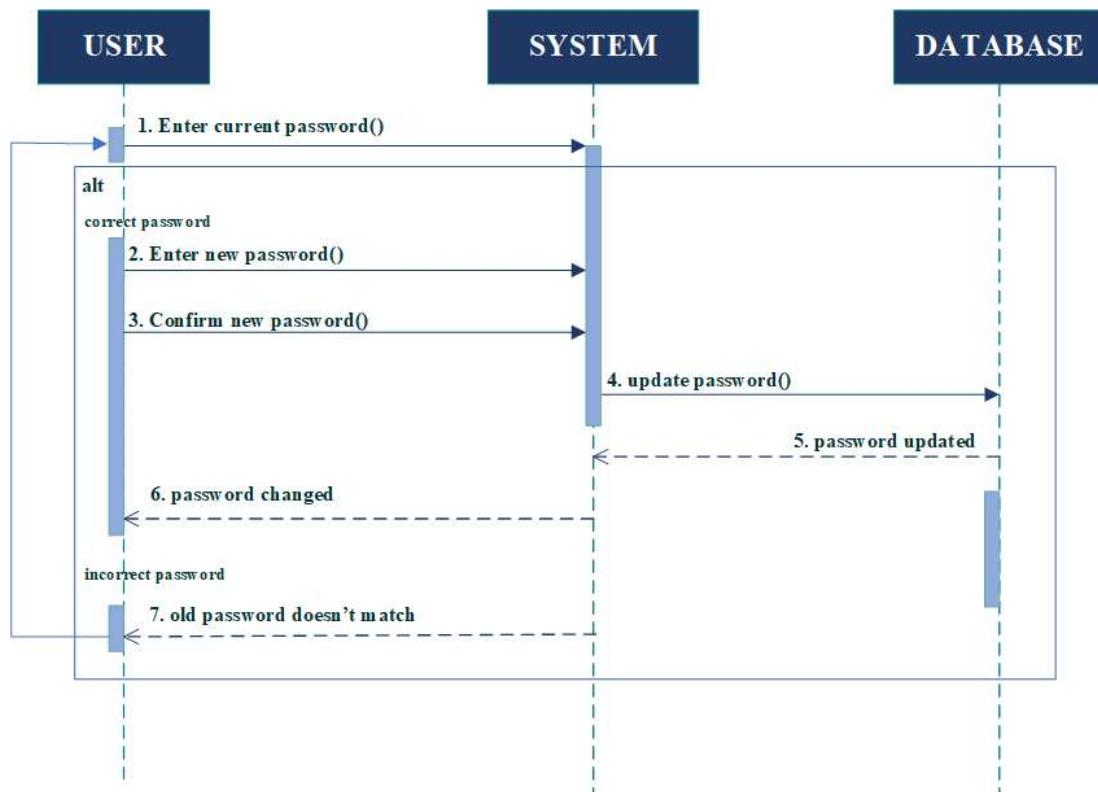


Figure 31: Sequence Diagram of Change Password

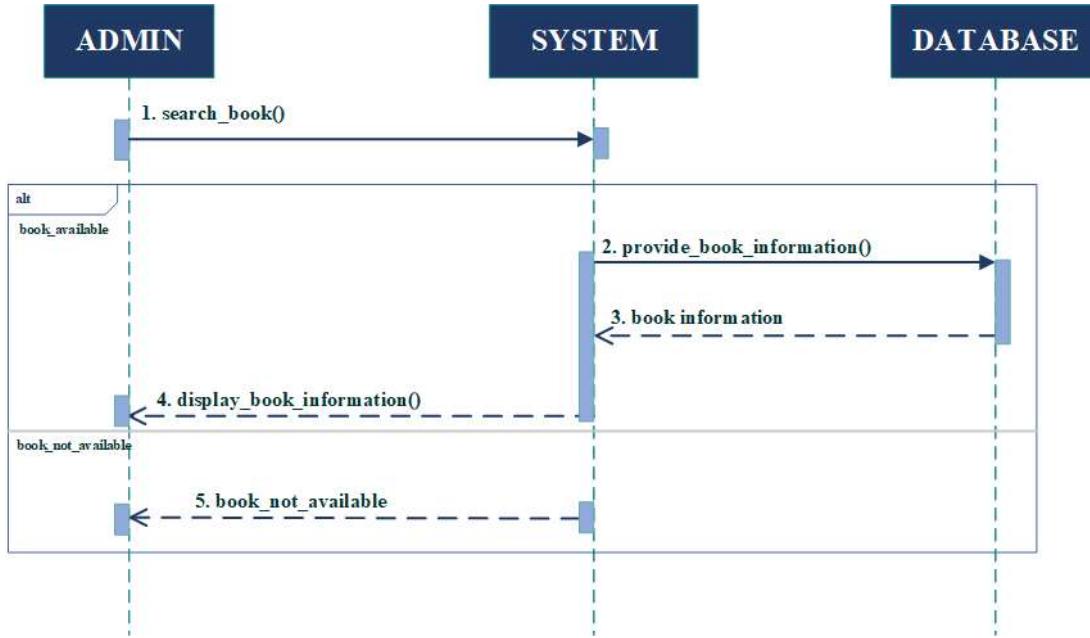


Figure 32: Sequence Diagram of Search Book

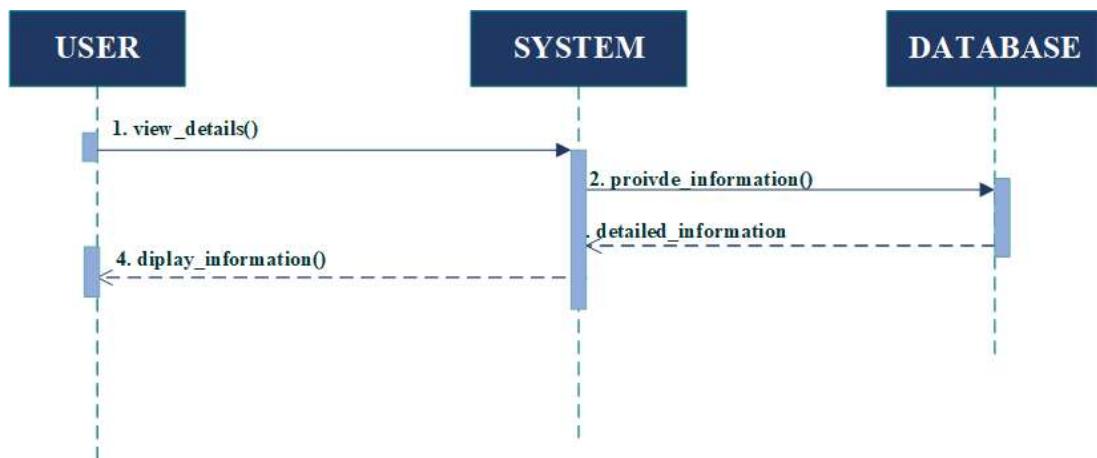


Figure 33: Sequence Diagram of User View Details

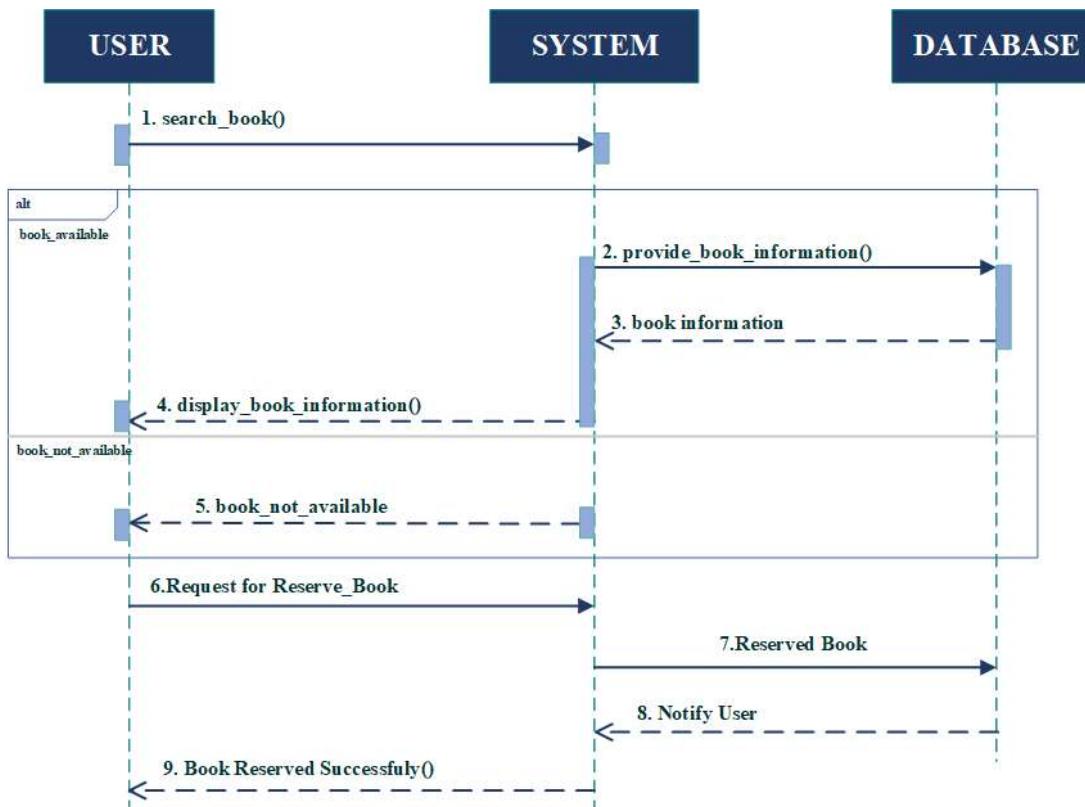


Figure 34: Sequence Diagram of Reserve Book

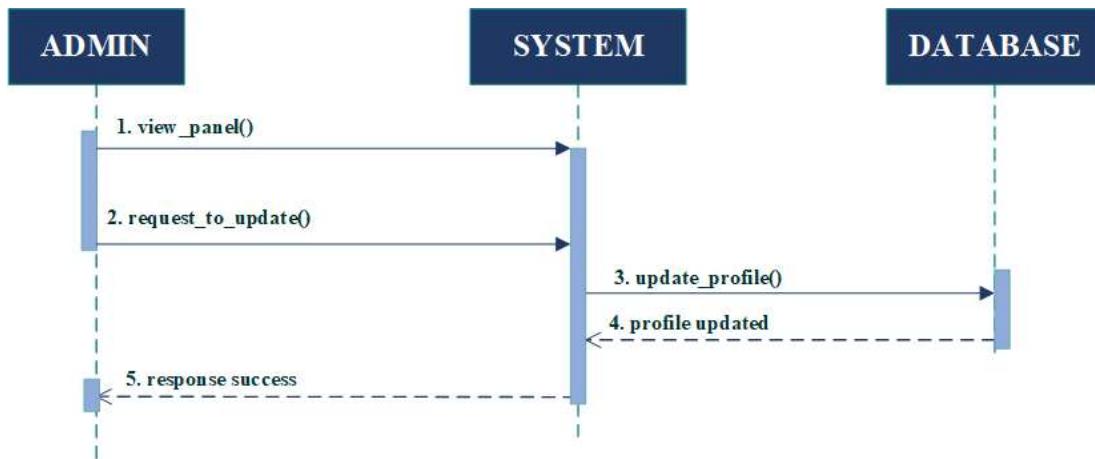


Figure 35: Sequence Diagram of Edit Profile

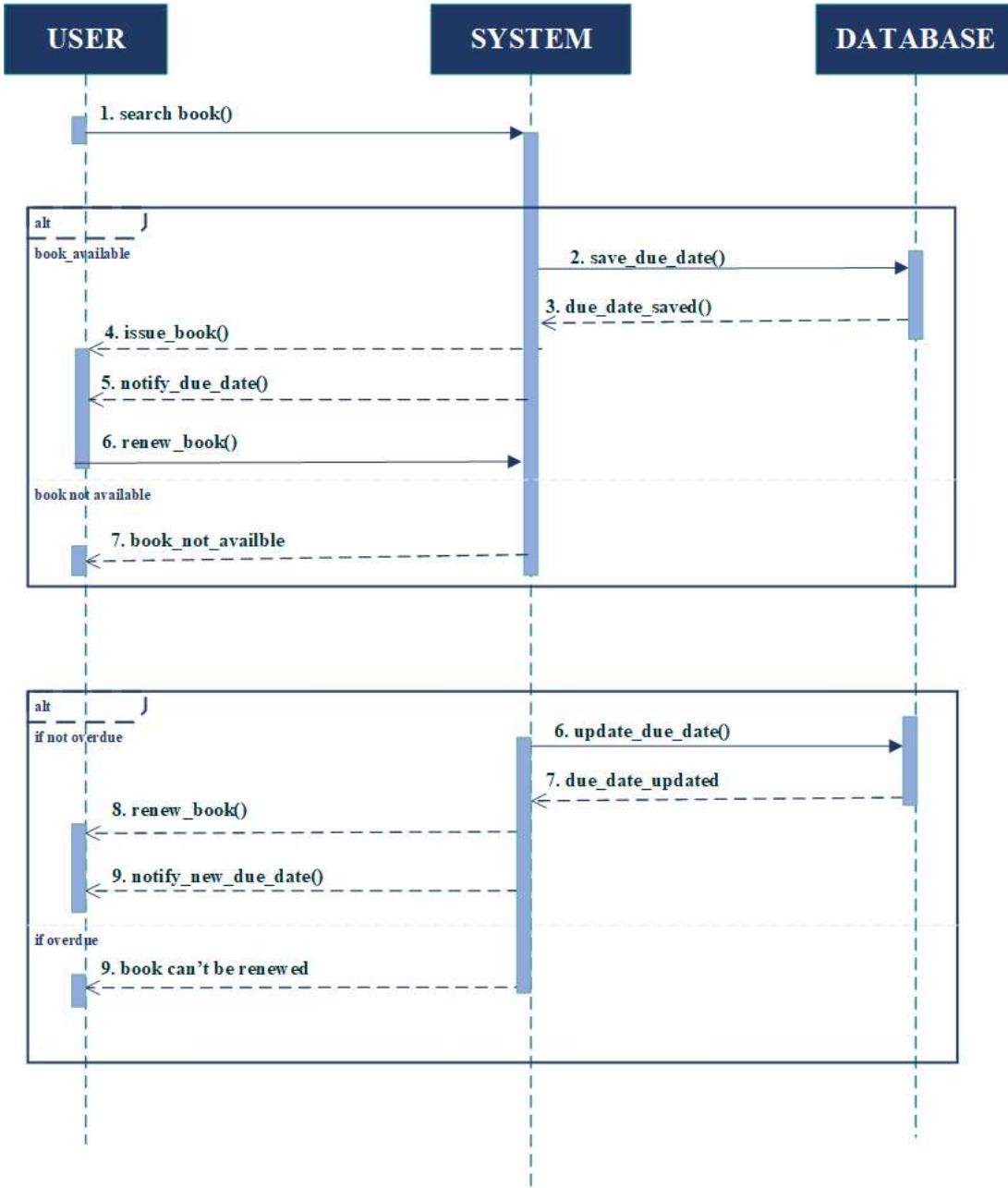


Figure 36: Sequence Diagram of Renew Book

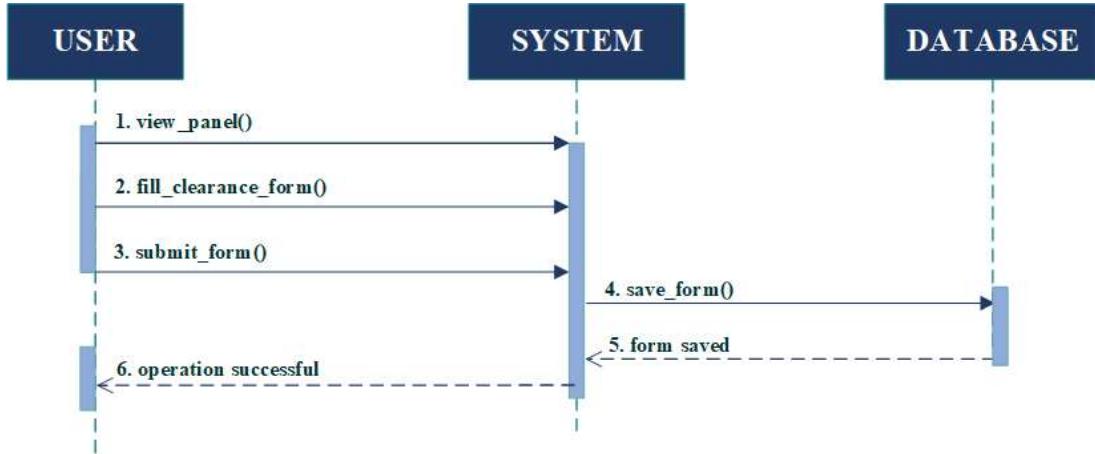


Figure 37: Sequence Diagram of Clearance Form

3.4 Collaboration Diagram

A collaboration diagram resembles a flowchart that portrays the roles, functionality and behavior of individual objects as well as the overall operation of the system in real time. Objects are shown as rectangles with naming labels inside. These labels are preceded by colons and may be underlined. The relationships between the objects are shown as lines connecting the rectangles. The messages between objects are shown as arrows connecting the relevant rectangles along with labels that define

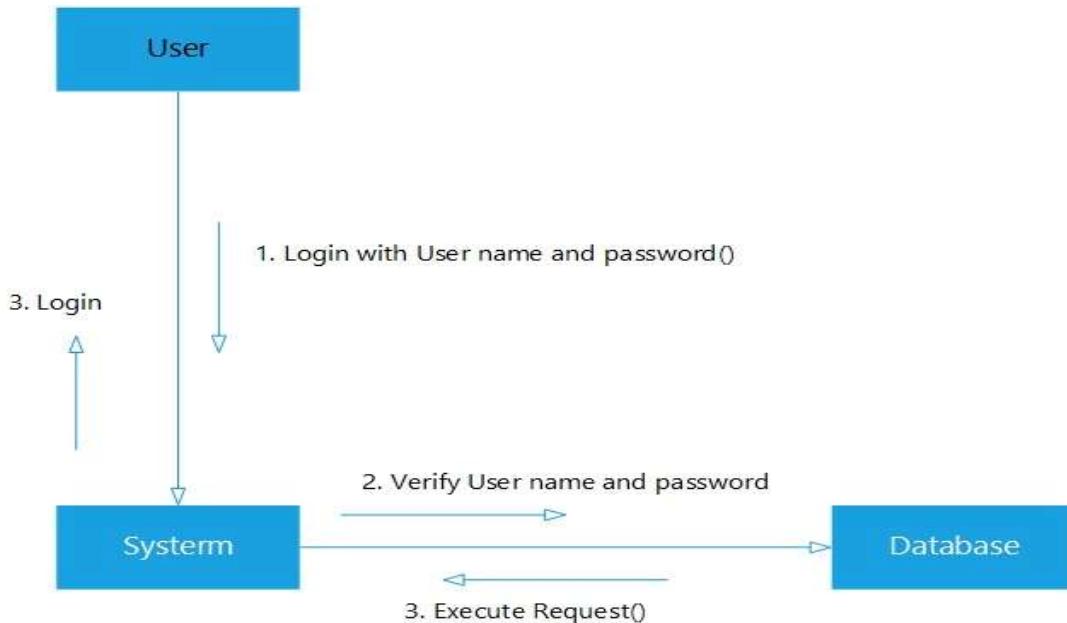


Figure 38: Collaboration Diagram of Administrator Login

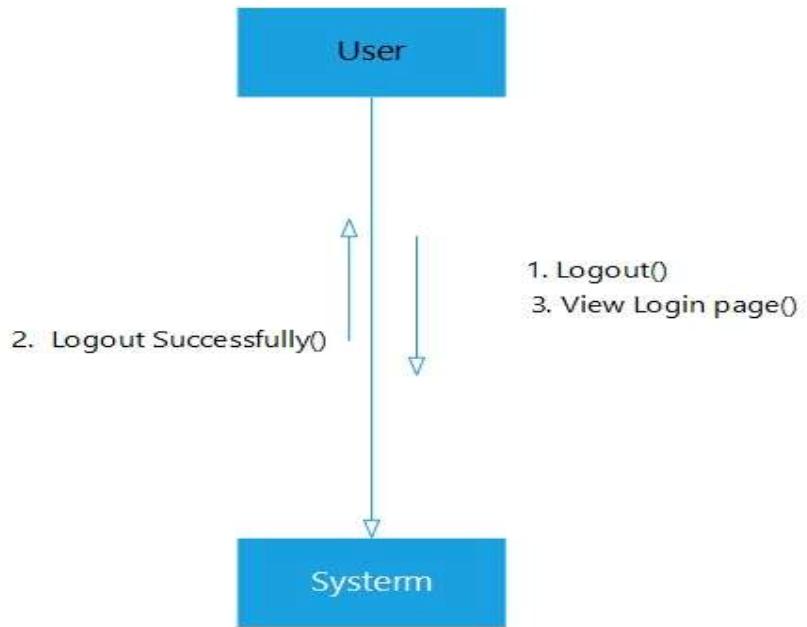


Figure 39: Collaboration Diagram of Administrator Logout

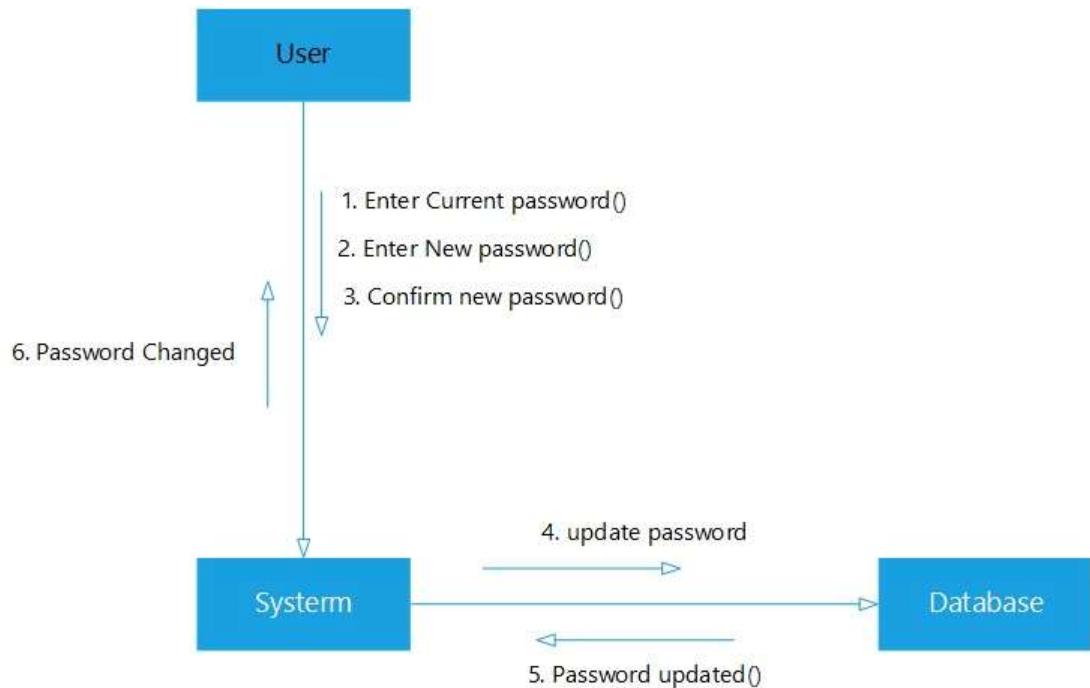


Figure 40: Collaboration Diagram of Administrator change password

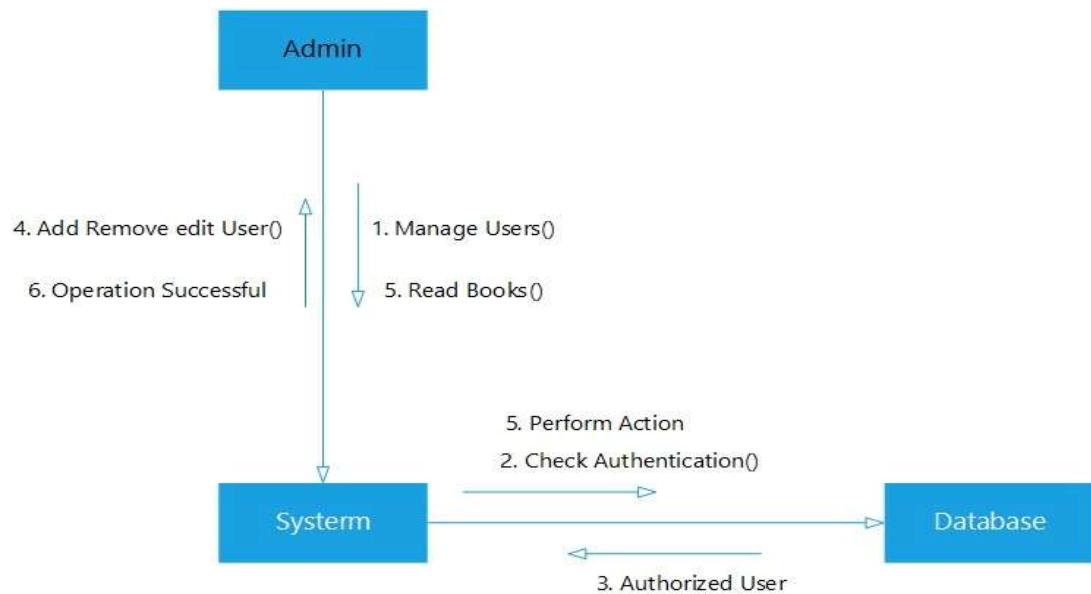


Figure 41: Collaboration Diagram of Manage User

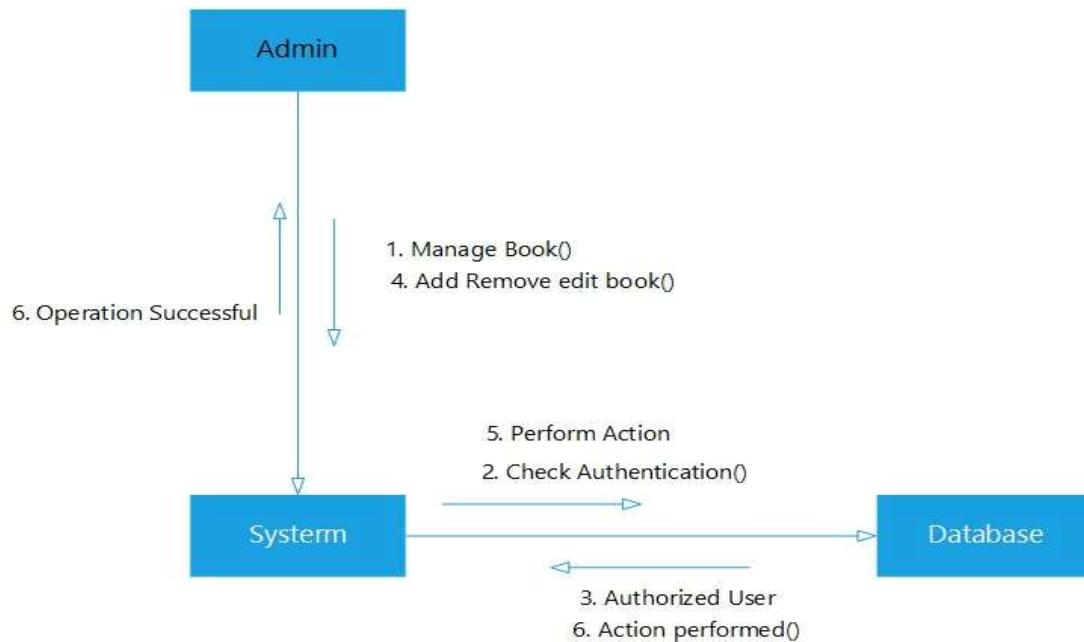


Figure 42: Collaboration Diagram of Manage Book

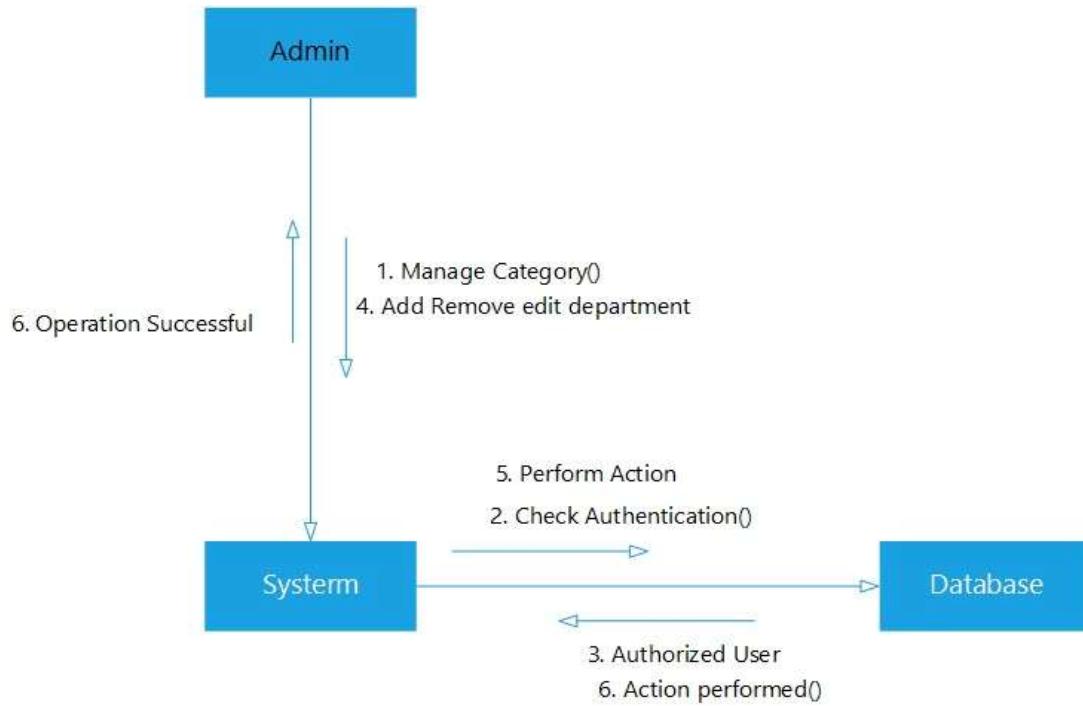


Figure 43: Collaboration Diagram of Manage Category

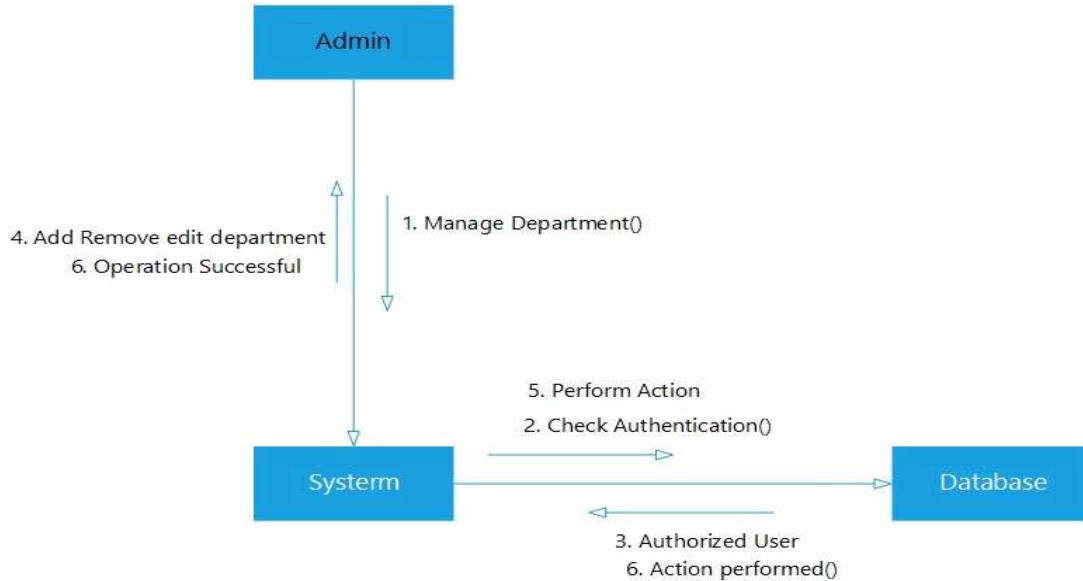


Figure 44: Collaboration Diagram of Manage Department

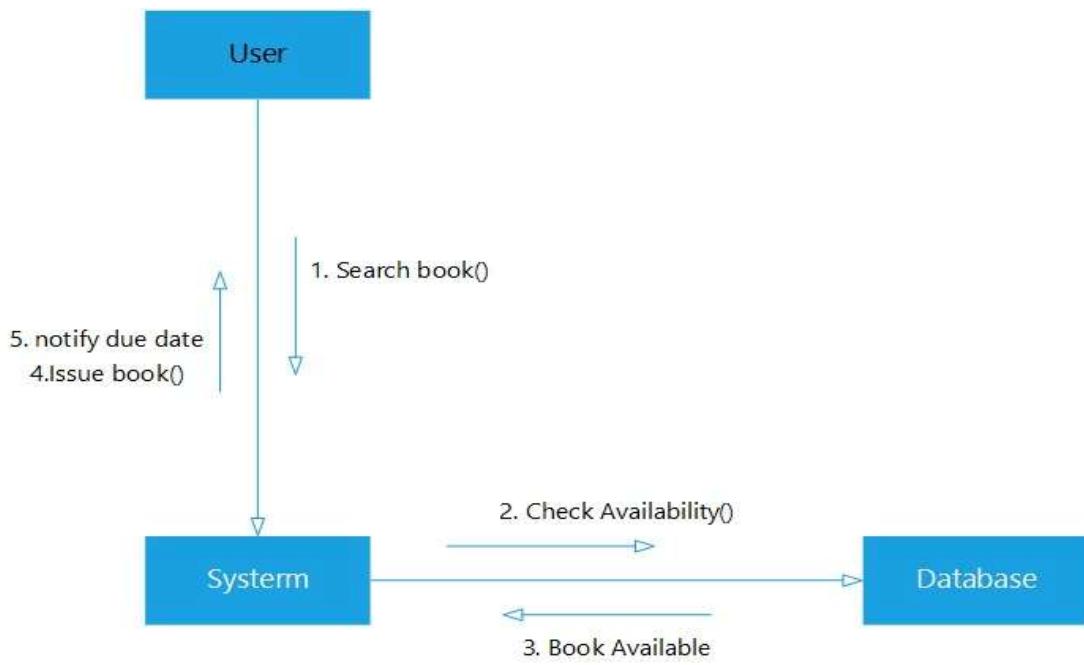


Figure 45: Collaboration Diagram of Issue Book

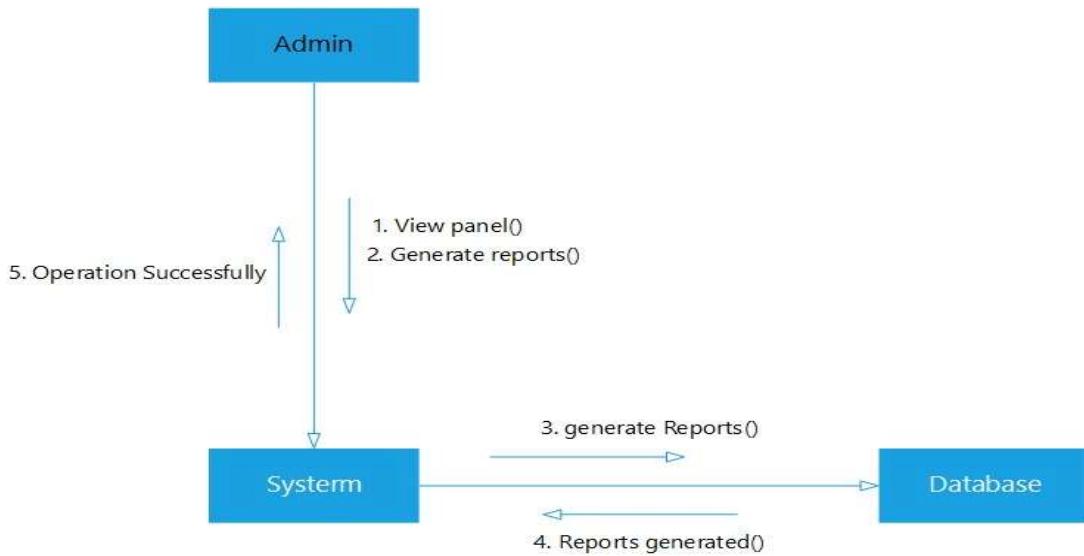


Figure 46: Collaboration Diagram of Generate Report

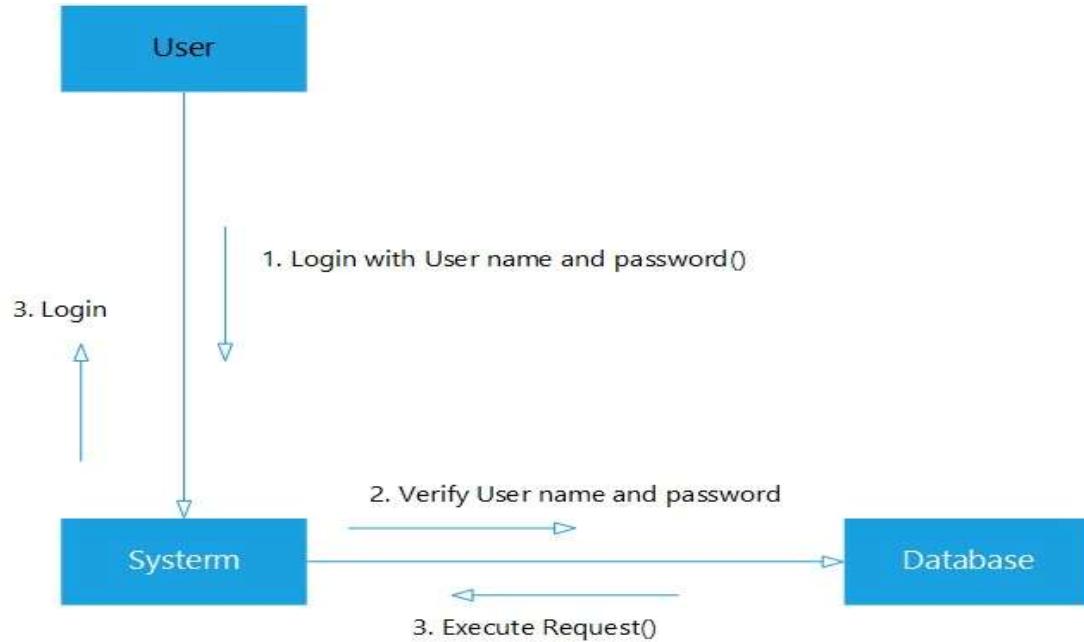


Figure 47: Collaboration Diagram of User Login

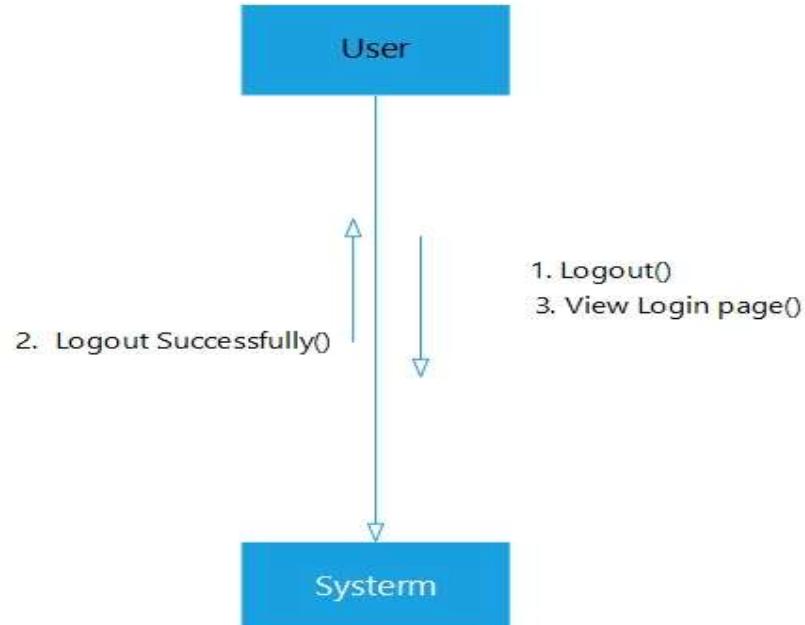


Figure 48: Collaboration Diagram of User Logout

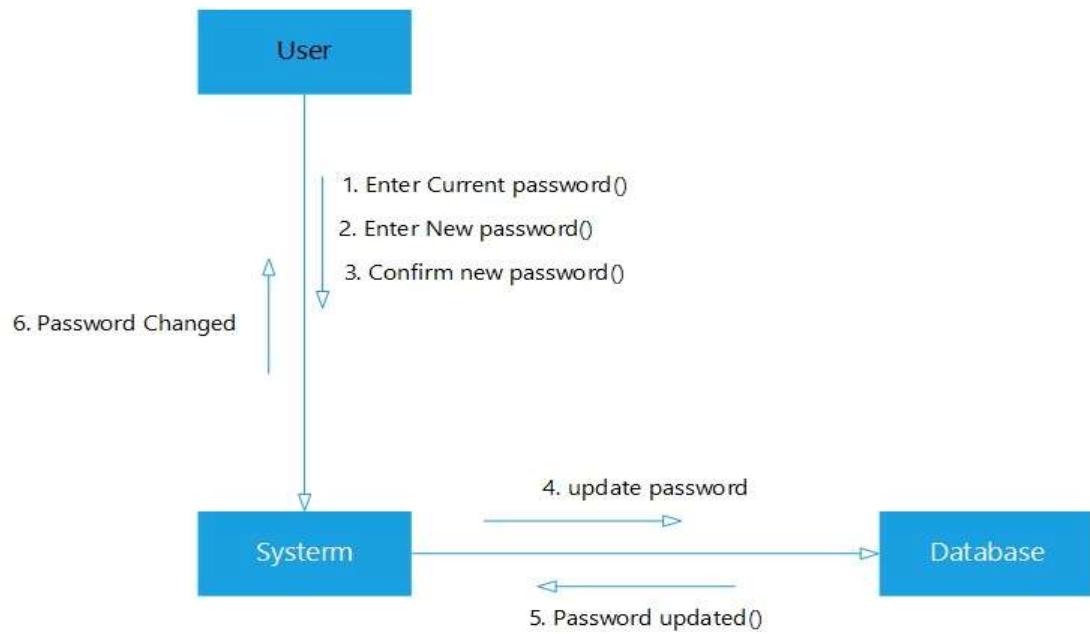


Figure 49: Collaboration Diagram of User Search Book

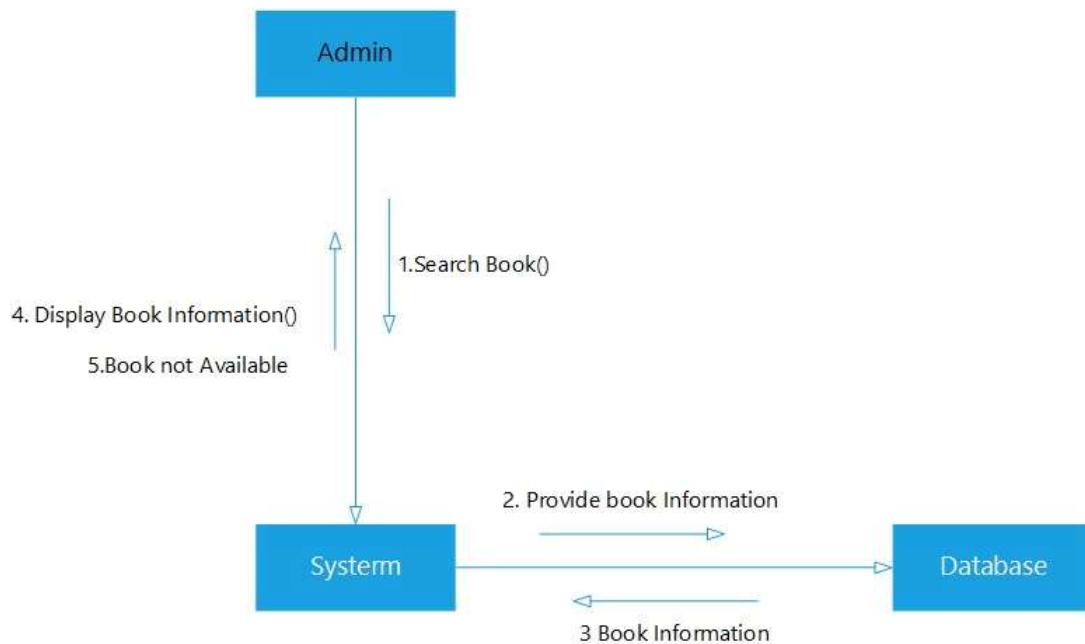


Figure 50: Collaboration Diagram of Search Book

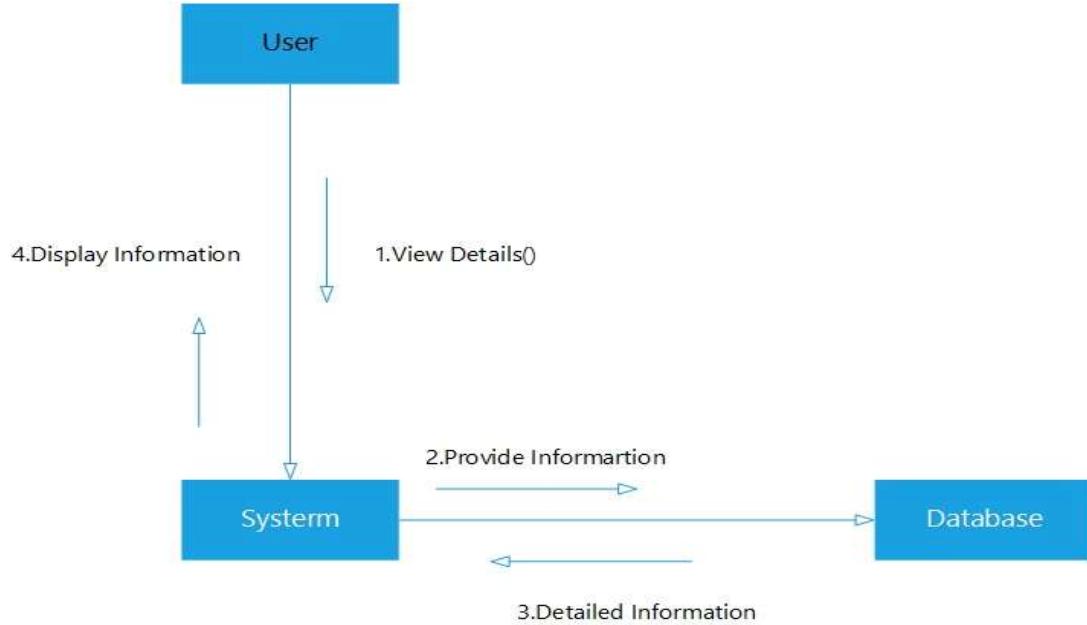


Figure 51: Collaboration Diagram of View Details

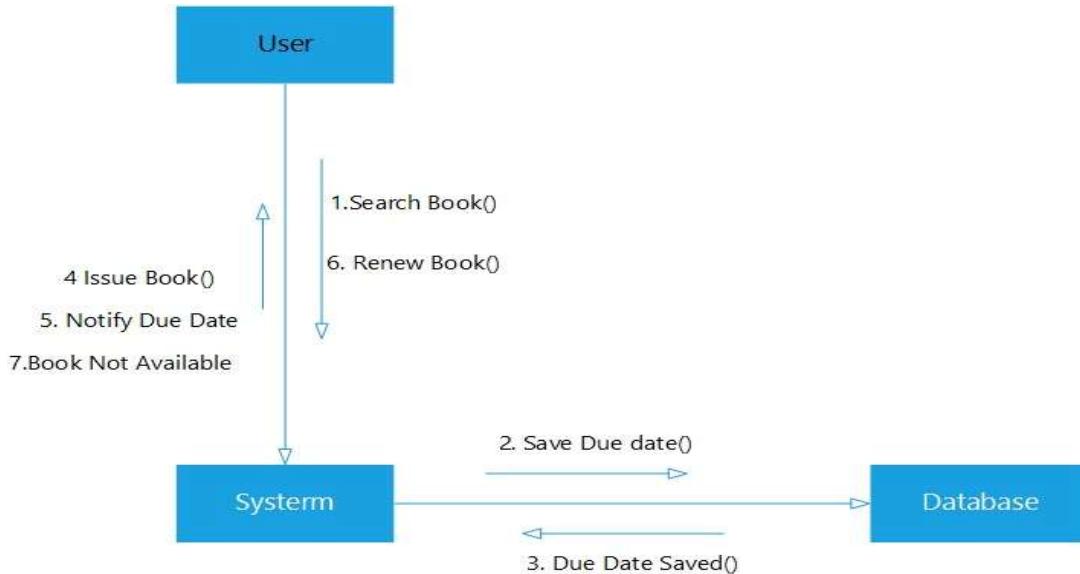


Figure 52: Collaboration Diagram of Renew Book

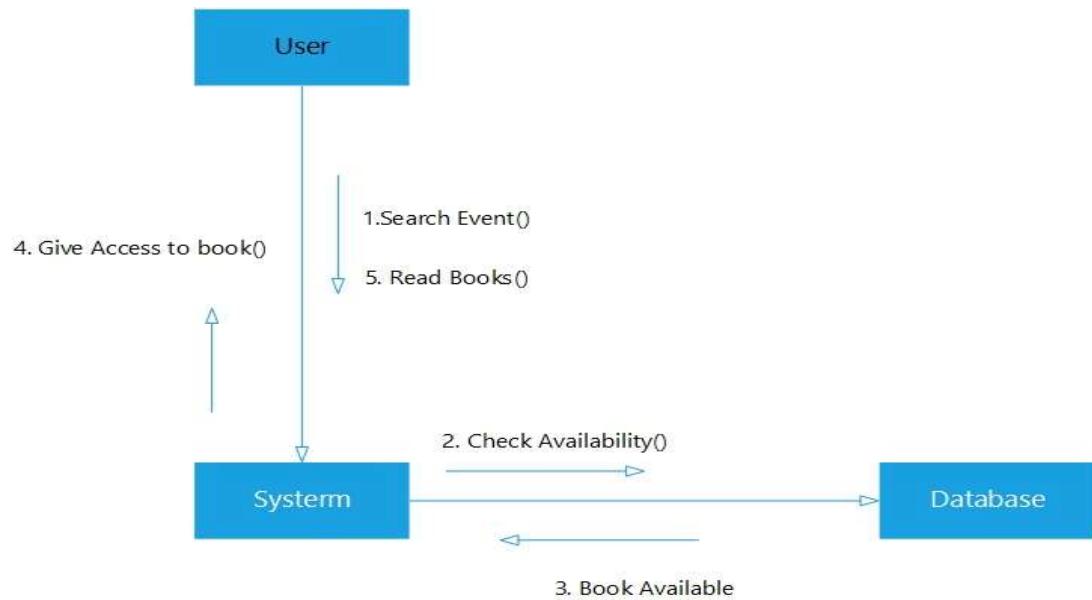


Figure 53: Collaboration Diagram of Read E-Book

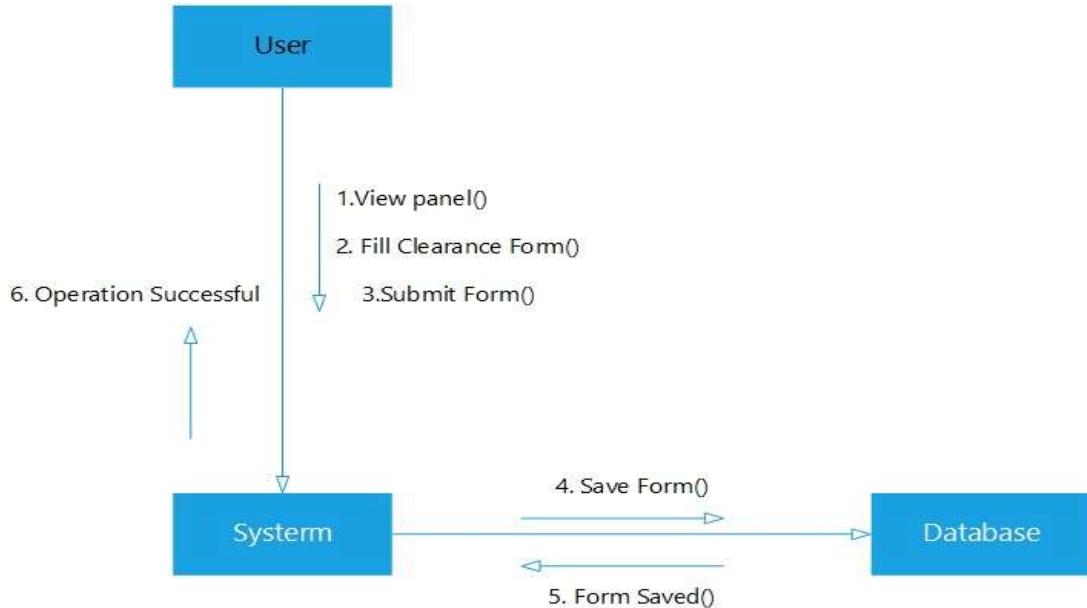


Figure 54: Collaboration Diagram of Clearance Form

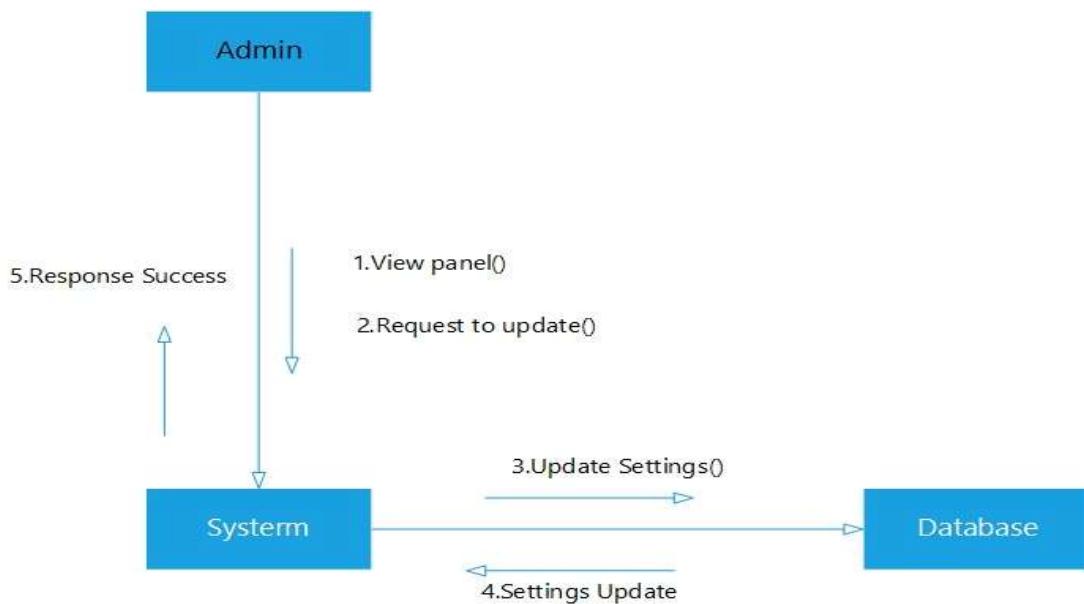


Figure 55: Collaboration Diagram of Edit Profile

CHAPTER 4

TESTING

4.1 Testing

Testing is the process of evaluating a system or its component(s) with the intent to find whether it satisfies the specified requirements or not. In simple words, testing is executing a system in order to identify any gaps, errors, or missing requirements in contrary to the actual requirements.

Table 20: Testing Admin Login

Test Engineer:	Shahzaib Afzal
Test Case ID:	TC-1
Related UC/FR/NFR	UC-01
Date:	05-09-2023
Purpose:	To Login
Pre-Req.:	Login as Administrator
Test Data:	Administrator login as their own Username or Password
Steps:	<ul style="list-style-type: none">• Steps to carry out the test.• Visit Login Page• Enter email and password• Click on login <p>Logged in Successfully</p>
Status:	Pass

Table 21: Testing Admin Logout

Test Engineer:	Nouman Aziz
Test Case ID:	TC-2
Related UC/FR/NFR	UC-02
Date:	05-09-2023
Purpose:	To logout from account
Pre-Req.:	Logged out from account
Test Data:	Back to login page
Steps:	Steps to carry out the test. <ul style="list-style-type: none">• Login• Click on logout Successfully Logged out
Status:	Pass

Table 22 :Testing Admin Change Password

Test Engineer:	Shahzaib Afzal
Test Case ID:	TC-9
Related UC/FR/NFR	UC-09
Date:	00-12-2023
Purpose:	Change Password
Pre-Req.:	Login as
Test Data:	Administrator logged in using his username and password
Steps:	Steps to carry out the test. <ul style="list-style-type: none">• Visit edit user section• Click “Change Password” option• Password Changed successfully
Status	Pass

Table 23: Testing Manage Students

Test Engineer:	Shahzaib Afzal
Test Case ID:	TC-1
Related UC/FR/NFR	UC-01
Date:	06-09-2023
Purpose:	To store students' details
Pre-Req.:	To manage students as Administrator
Test Data:	Administrator sign in as their own account to enter data
Steps:	Steps to carry out the test. <ul style="list-style-type: none">• Visit admin panel.• Add students.• Update students.• Delete students.• Students managed Successfully
Status:	Pass

Table 24: Testing Manage Staff

Test Engineer:	Mehran Ali
Test Case ID:	TC-2
Related UC/FR/NFR	UC-02
Date:	06-09-2023
Purpose:	To store staff details
Pre-Req.:	To manage staff as Administrator
Test Data:	Administrator sign in as their own account to enter data
Steps:	Steps to carry out the test. <ul style="list-style-type: none">• Visit admin panel.• Add students.• Update students.• Delete students.• Students managed Successfully
Status:	Pass

Table 25: Testing Books Management

Test Engineer:	Mehran Ali
Test Case ID:	TC-5
Related UC/FR/NFR	UC-05
Date:	06-09-2023
Purpose:	To store Books details
Pre-Req.:	To manage books as administrator
Test Data:	Administrator sign in as their own account to enter data
Steps:	Steps to carry out the test. <ul style="list-style-type: none">• Admin enter to the admin panel• Admin can add book• Admin can update book• Admin can delete book• Admin can modify book details• Books are managed Successfully
Status:	Pass

Table 26:Testing Generate Report

Test Engineer:	Mehran Ali
Test Case ID:	TC-6
Related UC/FR/NFR	UC-06
Date:	07-09-2023
Purpose:	To Generate Report
Pre-Req.:	Generate report as administrator
Test Data:	Administrator sign in as their own account to create monthly report
Steps:	Steps to Carry out the test. <ul style="list-style-type: none">• Admin enter to the admin panel• Click on “Generate Report” Button• Reports successfully generated
Status:	Pass

Table 27: Testing Student Login

Test Engineer:	Shahzaib Afzal
Test Case ID:	TC-1
Related UC/FR/NFR	UC-01
Date:	07-09-2023
Purpose:	To Login
Pre-Req.:	Login as Student
Test Data:	Student login as their own Username or Password
Steps:	Steps to carry out the test. <ul style="list-style-type: none">• Visit Login Page• Enter email and password• Click on login Logged in Successfully
Status:	Pass

Table 28: Testing Student Logout

Test Engineer:	Mehran Ali
Test Case ID:	TC-10
Related UC/FR/NFR	UC-10
Date:	08-09-2023
Purpose:	To logout from Student account
Pre-Req.:	Logged out from Student account
Test Data:	Back to login page
Steps:	<ul style="list-style-type: none">• Steps to carry out the test.• Login• Click on logout• Student successfully Logged out
Status:	Pass

Table 29: Testing Student Change Password

Test Engineer:	Mehran Ali
Test Case ID:	TC-11
Related UC/FR/NFR	UC-11
Date:	08-09-2023
Purpose:	To change student password
Pre-Req.:	Change student password
Test Data:	Student use their own username and password
Steps:	Steps to carry out the test. <ul style="list-style-type: none">• Click on “Forget Password” Option• Enter Email ID• Change Password• Paasword Changed Successfully
Status:	Pass

Table 30 :Testing Search Books

Test Engineer:	Nouman Aziz
Test Case ID:	TC-11
Related UC/FR/NFR	UC-11
Date:	08-09-2023
Purpose:	To search books
Pre-Req.:	Search Books
Test Data:	Client use their own username and password
Steps:	<p>Steps to carry out the test.</p> <ul style="list-style-type: none">• Click on “Search Bar” Option• Search book by author, title, name• Click on “Search” Button• Searched Book appeared Successfully
Status:	Pass

Table 31: Testing View Book Detail

Test Engineer:	Nouman Aziz
Test Case ID:	TC-11
Related UC/FR/NFR	UC-11
Date:	08-09-2023
Purpose:	To view book details
Pre-Req.:	View Books Detail
Test Data:	Client use their own username and password
Steps:	Steps to carry out the test. <ul style="list-style-type: none">• Click on “Search Bar” Option to search book• Select book for details• Got Details Successfully
Status:	Pass

Table 32: Testing Reserve Book

Test Engineer:	Nouman Aziz
Test Case ID:	TC-11
Related UC/FR/NFR	UC-11
Date:	08-09-2023
Purpose:	To reserve books
Pre-Req.:	Reserve Books
Test Data:	Client use their own username and password
Steps:	Steps to carry out the test. <ul style="list-style-type: none">• Click on “Search Bar” Option to search books• Select the book required• Click on “Reserve Book” Option• Book Reserved Successfully
Status:	Pass

Table 33: Testing Borrow Book

Test Engineer:	Nouman Aziz
Test Case ID:	TC-11
Related UC/FR/NFR	UC-11
Date:	08-09-2023
Purpose:	To borrow book
Pre-Req.:	Borrow Books
Test Data:	Client use their own username and password
Steps:	Steps to carry out the test. <ul style="list-style-type: none">• Click on “Search Bar” Option to search books• Select the book that required• Click on “Borrow Book” Button• Book Borrowed Successfully
Status:	Pass

Table 34: Testing Renew Books

Test Engineer:	Shahzaib Afzal
Test Case ID:	TC-11
Related UC/FR/NFR	UC-11
Date:	09-09-2023
Purpose:	To renew books
Pre-Req.:	Renew Books
Test Data:	Client use their own username and password
Steps:	Steps to carry out the test. <ul style="list-style-type: none">• Select the book that you want to renew• Click on “Renew Book” Option• Books Renewed Successfully
Status:	Pass
Purpose:	To change student password
Pre-Req.:	Change student password
Test Data:	Student use their own username and password

CHAPTER 5

CONCLUSION & FUTUREWOR

5.1 Future Work:

- **Expansion of digital collections:**

Continuously adding new and diverse digital resources, including e-books, e-journals, multimedia content, and open educational resources, to meet the evolving needs of users.
- **Mobile – friendly interfaces and services:**

Optimizing digital library systems for mobile devices, enabling users to access resources, including licensing, access, and usage tracking.
- **Integration with learning management systems:**

Connecting digital library systems with LMS platforms to provide seamless access to library resources and services for students and educators.
- **Integration of Artificial Intelligence and Machine Learning:**

Utilizing AI and ML technologies to improve search and recommendation algorithms, automate routine tasks, and provide more advanced analytics for library management.
- **Support for emerging technologies:**

Exploring the integration of technologies such as Virtual reality (VR), augmented reality (AR) and blockchain to enhance the discovery, access and use of digital library resources.
- **Enhanced metadata management:**

Developing more efficient and automated processes for metadata creation, enrichment, and maintenance to ensure accurate and comprehensive resource discovery.

5.2 Conclusion:

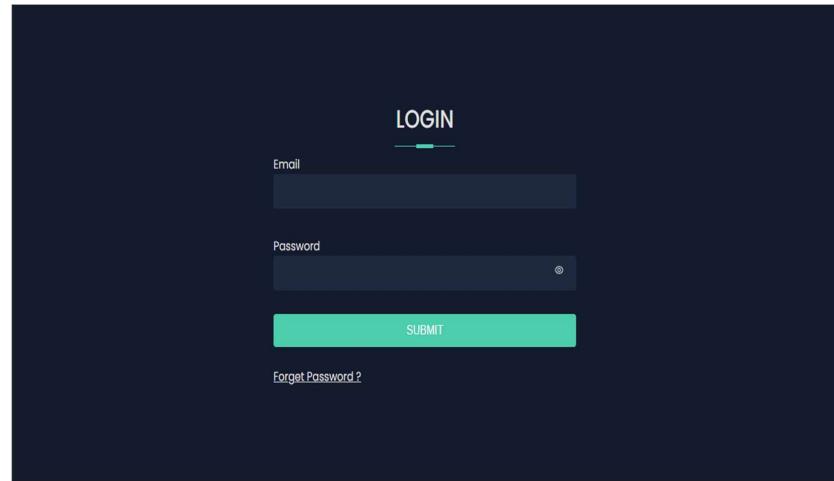
Library Management System offer several advantages over traditional library systems. They provide a practical solution to the existing issues of the traditional library system, such as slow and inefficient manual processes. They also offer improved and innovative services, converting librarians into cybrarians through automation of routine tasks. Library Systems are accessible from anywhere, at any time, and can be used to connect a digital library resource to a related resource. They can make digital library materials accessible to disparate communities.

In conclusion, digital library management systems are a necessary tool for organizations to remain relevant in a knowledge economy. They offer several advantages over traditional library systems, but also come with challenges that need to be addressed.

CHAPTER 6

USER MANUAL

Login

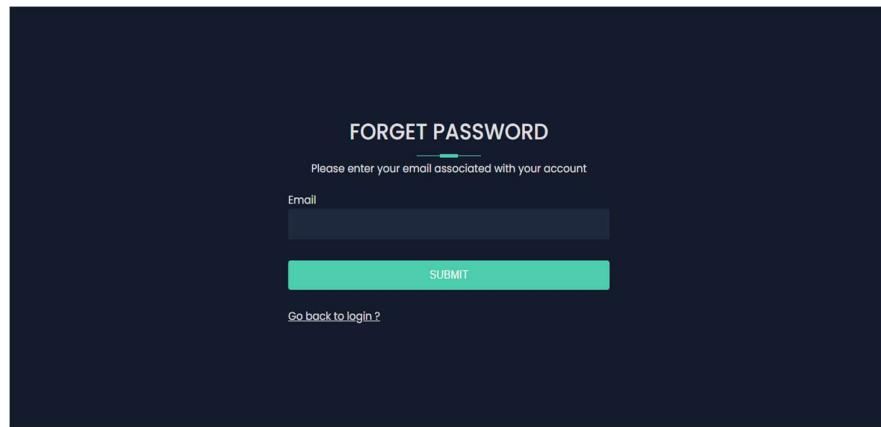


The image shows a dark-themed login form. At the top center is the word "LOGIN". Below it is a horizontal input field labeled "Email". Underneath the email field is another horizontal input field labeled "Password", which includes a small icon of an eye with a slash to its right. At the bottom of the form is a large green rectangular button labeled "SUBMIT". Below this button is a small link that says "Forgot Password ?".

Step 1: Open Website

Step 2: Click Login

Change Password

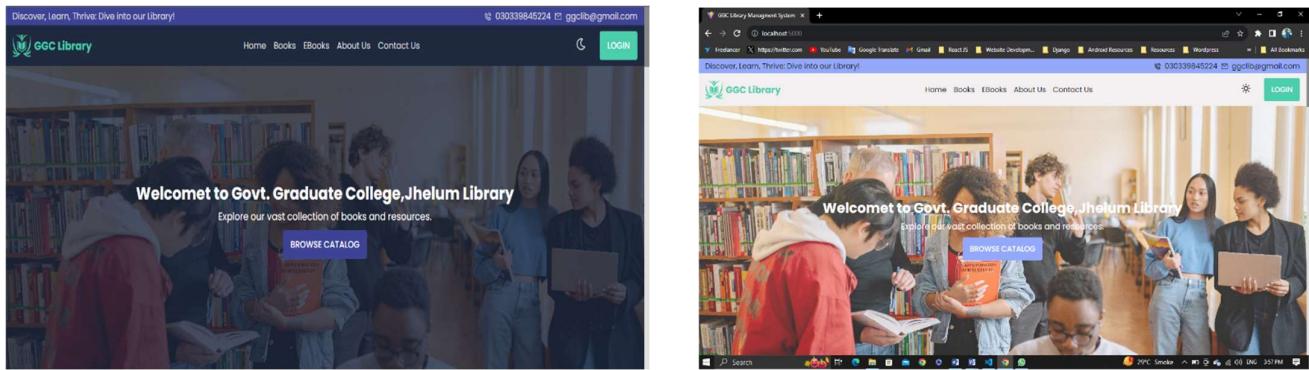


The image shows a dark-themed "FORGET PASSWORD" page. At the top center is the title "FORGET PASSWORD". Below it is a sub-instruction "Please enter your email associated with your account". There is a horizontal input field labeled "Email". At the bottom of the page is a large green rectangular button labeled "SUBMIT". Below this button is a small link that says "Go back to login ?".

Step 1: Open Website

Step 2: Open Login page then click on Forget Password

Hero Section



Step 1: Visit the Website of GCC LMS

Step 2: Login first if you are not Authorized

Step 3: Click on Home Page to view the hero section

Step 4: Click on Theme mode option to change the theme

Home Page



Step 1: Visit the Website of GCC LMS

Step 2: Login first if you are not Authorized

Step 3: Click on Home Page and view the page

Home page footer

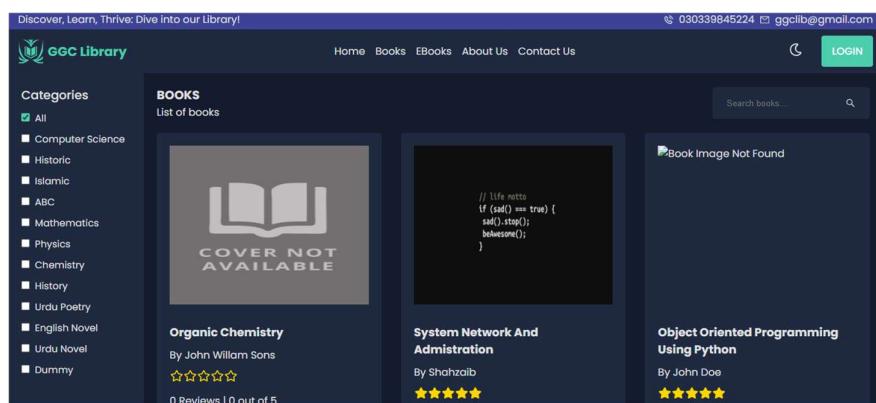


Step 1: Visit the Website of GCC LMS

Step 2: Login first if you are not Authorized

Step 3: Click on Home Page and scroll it down to use the footer options

Book Page

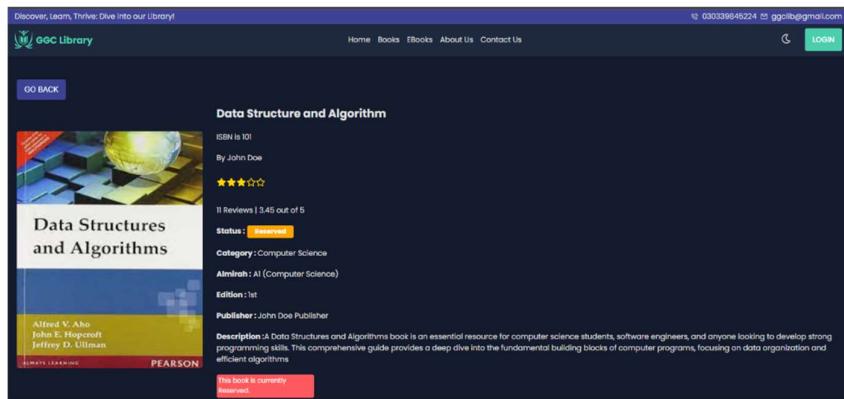


Step 1: Visit the Website of GCC LMS

Step 2: Login first if you are not Authorized

Step 3: Click on Book Page from navbar and Reserve, Borrow, and Renew books

View Book Details



Step 1: Open the website of GCC LMS

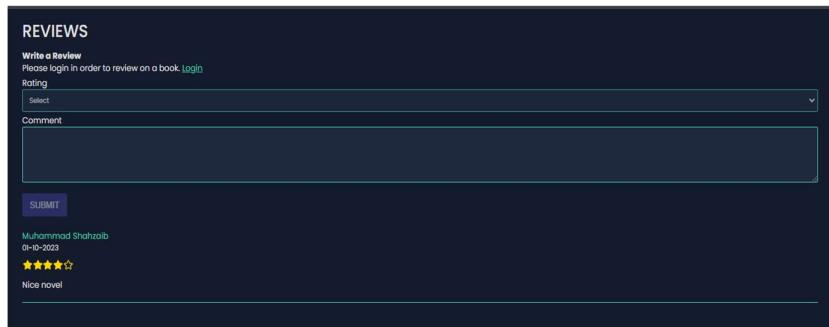
Step 2: Enter Email and password for Login

Step 3: Click on Login button

Step 4: Click on Book Page from navbar

Step 5: Click on any book that you want to read and view its details successfully

Reviews and Rating

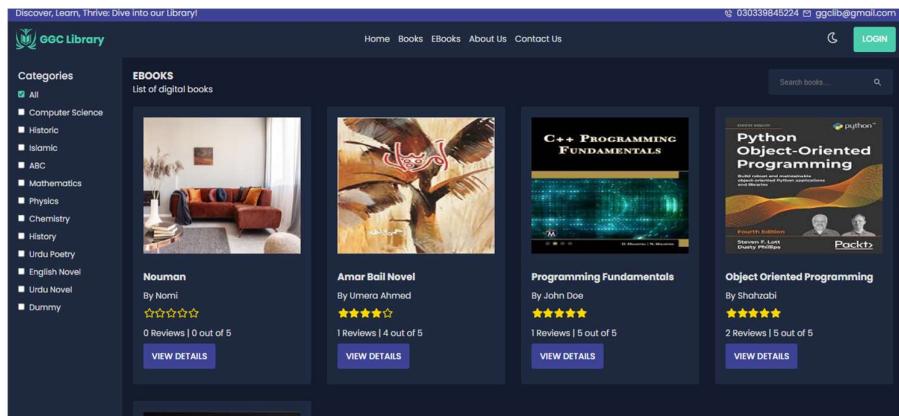


Step 1: Visit the Website of GCC LMS

Step 2: Login first if you are not Authorized

Step 3: Click on Book Page from navbar and give Review and Rating to any book

E-book Page



Step 1: Open the website of GCC LMS

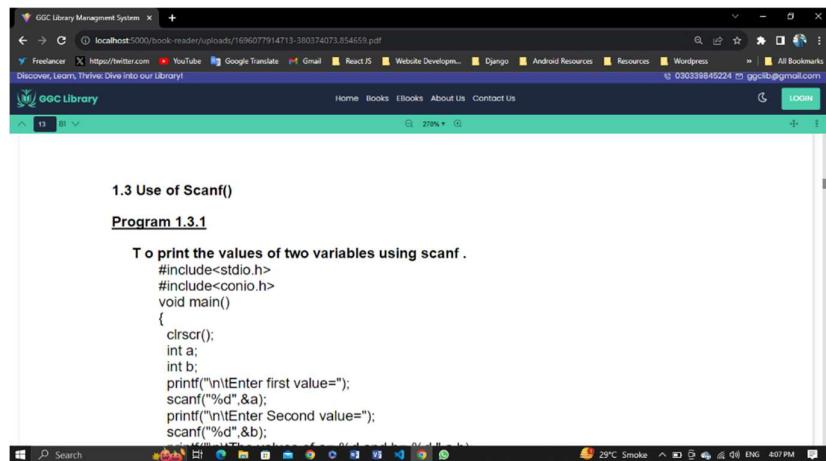
Step 2: Enter Email and password for Login

Step 3: Click on Login button

Step 4: Click on E-Book Page from navbar

Step 5: Click on any book that you want to read and view its details successfully

Read E-Book

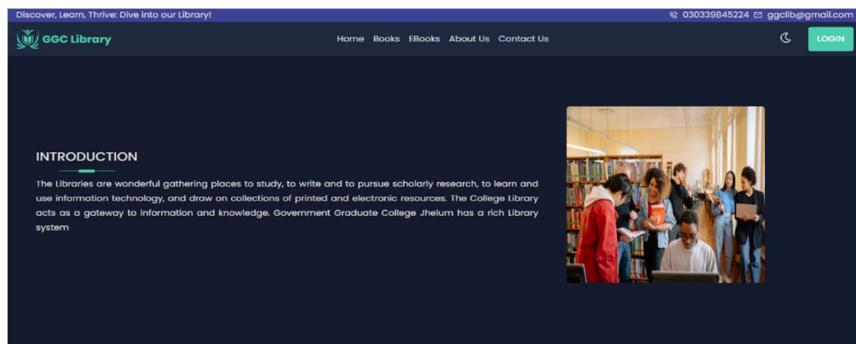


Step 1: Visit the Website of GCC LMS

Step 2: Login first if you are not Authorized

Step 3: Click on E-Book Page from navbar and Open any book that you want to read in pdf format

About Us Page

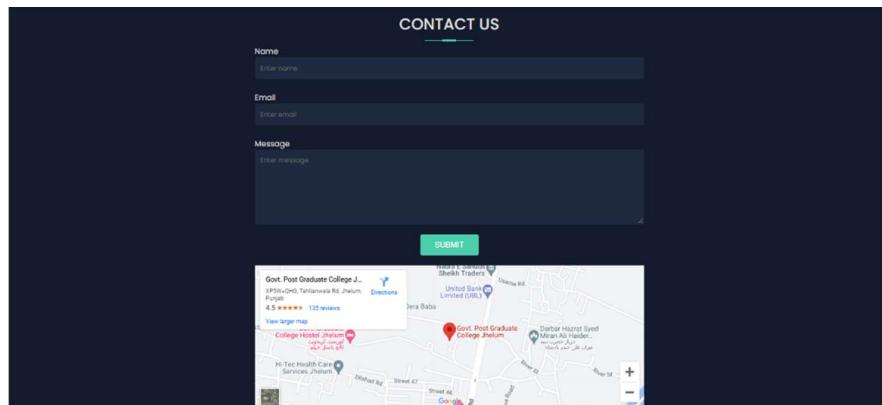


Step 1: Visit the Website of GCC LMS

Step 2: Login first if you are not Authorized

Step 3: Click on About Us page from navbar, then visit and read more to know us

Contact Us Page



Step 1: Open the website of GCC LMS

Step 2: Enter Email and password for Login

Step 3: Click on Login button

Step 4: Click on Contact Us Page from navbar

Step 5: Fill the requirements to contact us

Step 6: Click on Submit button

Admin Dashboard



Step 1: Open the website of GCC LMS

Step 2: Enter Email and password for Login

Step 3: Click on Login button

Step 4: Click on hamburger Icon from navbar

Step 5: Click on Admin Dashboard from sidebar

Manage Book Interface

The screenshot shows the 'MANAGE BOOKS' page of the GGC Library system. The sidebar on the left includes options like Admin (Admin), CORE (Dashboard, Transaction, Renew Books), USERS (Students, Teachers, Batches, Departments), and a profile picture of an admin. The main area has search fields for ISBN and title, and a filter by status dropdown. A table lists two books: 'Organic Chemistry' by John Willam Sons (Available) and 'System Network And Admistration' by Shahzaib (Issued). Each book row has three action buttons: a green eye icon, an orange edit icon, and a red trash icon. At the bottom, it says 'Showing 1-2 of 11 records' and has previous/next navigation buttons.

ISBN	Title	Author	Status	Actions
786	Organic Chemistry	John Willam Sons	Available	
10332	System Network And Admistration	Shahzaib	Issued	

Step 1: Open the website of GCC LMS

Step 2: Enter Email and password for Login

Step 3: Click on Login button

Step 4: Click on hamburger Icon from navbar

Step 5: Click on Admin Dashboard from sidebar

Step 6: Select the Manage Book option from sidebar and perform operations

Manage Student Interface

The screenshot shows the 'MANAGE STUDENTS' page of the GGC Library system. At the top, there are three search bars: 'Search by roll number...', 'Search by name...', and 'Search by email...'. Below them are buttons for 'ADD NEW', 'EXPORT TO CSV', and 'CLEAR'. A table lists student information with columns: Roll Number, Image, Name, Father Name, Email, and Actions. The first row shows a student with Roll Number 19721556-052, Name Ahmed Raza, Father Name Muhammad Raza, and Email ahmed@gmail.com. The second row shows a student with Roll Number 1335345234, Name Babar, Father Name Azam, and Email baber@gmail.com. Each row has three action buttons: a green eye icon, a yellow edit icon, and a red delete icon. At the bottom left, it says 'Showing 5-6 of 9 records'. At the bottom right, there are 'PREVIOUS', a page number '3', and 'NEXT' buttons.

Roll Number	Image	Name	Father Name	Email	Actions
19721556-052		Ahmed Raza	Muhammad Raza	ahmed@gmail.com	
1335345234		Babar	Azam	baber@gmail.com	

Step 1: Open the website of GCC LMS

Step 2: Enter Email and password for Login

Step 3: Click on Login button

Step 4: Click on hamburger Icon from navbar

Step 5: Click on Admin Dashboard from sidebar

Step 6: Select the Manage Student option from sidebar and perform operations

Issue Book Interface

The screenshot shows the 'ISSUED BOOKS' page of the GGC Library system. At the top, there are three search input fields: 'Search by ISBN...', 'Search by roll number...', and 'Search by email...'. To the right of these are 'ISSUE BOOK' and 'EXPORT TO CSV' buttons, along with a 'CLEAR' button. Below the search fields is a table with the following data:

ISBN	Roll Number/Email	Issued Date	Due Date	Fine	Fine Status	Actions
303	19721556-017	01-10-2023	13-10-2023	180	Not Paid	PAY FINE RETURN
104	19721556-017	05-10-2023	15-10-2023	160	Not Paid	PAY FINE RETURN

At the bottom left, it says 'Showing 1-2 of 3 records'. On the far right, there are 'PREVIOUS' and 'NEXT' buttons. The sidebar on the left is titled 'Admin (Admin)' and contains sections for 'CORE' (Dashboard), 'TRANSACTION' (Issued Books, Reserved Books, Returned Books, Renew Books), and 'USERS' (Students, Teachers, Batches, Departements).

Step 1: Open the website of GCC LMS

Step 2: Enter Email and password for Login

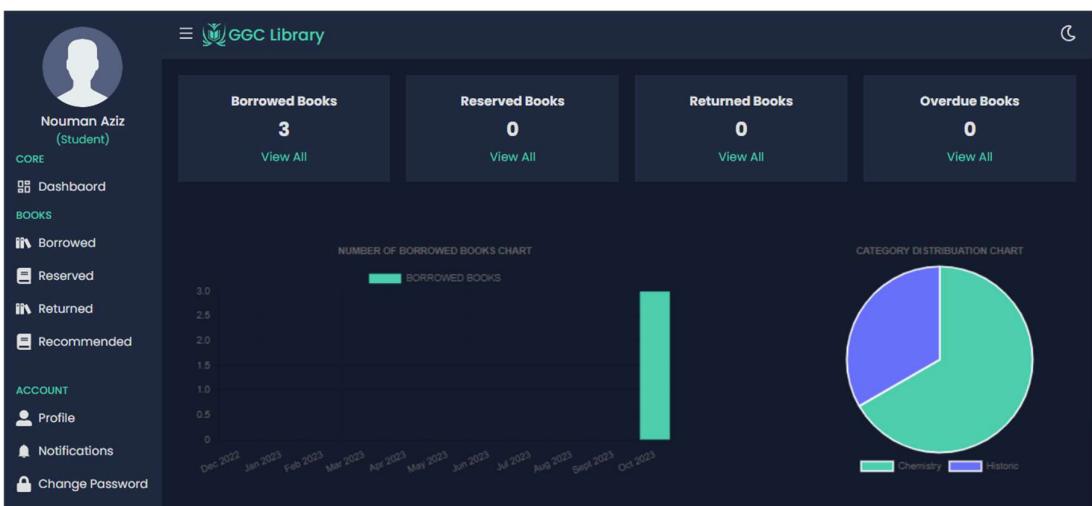
Step 3: Click on Login button

Step 4: Click on hamburger Icon from navbar

Step 5: Click on Admin Dashboard from sidebar

Step 6: Select the Issue Book option from sidebar and perform operations

User Dashboard Interface



Step 1: Open the website of GCC LMS

Step 2: Enter Email and password for Login

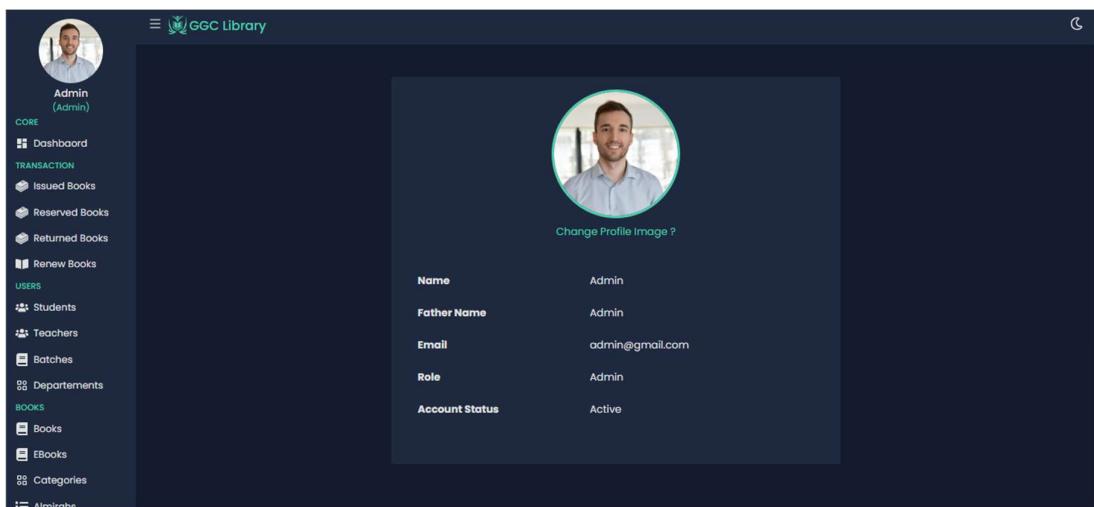
Step 3: Click on Login button

Step 4: Click on hamburger Icon from navbar

Step 5: Click on User Dashboard from sidebar

Step 6: Visit the User Dashboard and perform operations

User Profile Interface



Step 1: Open the website of GCC LMS

Step 2: Enter Email and password for Login

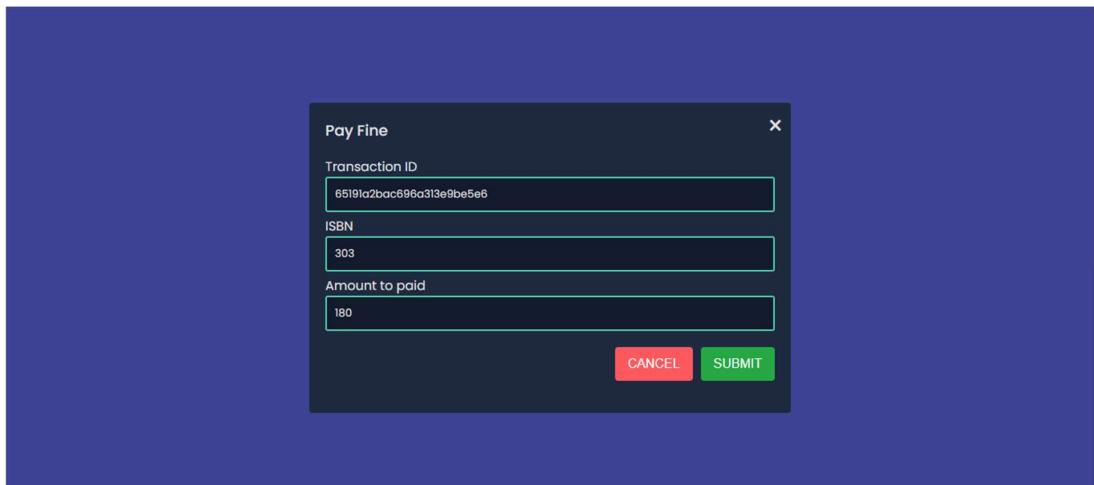
Step 3: Click on Login button

Step 4: Click on hamburger Icon from navbar

Step 5: Click on User Profile from sidebar

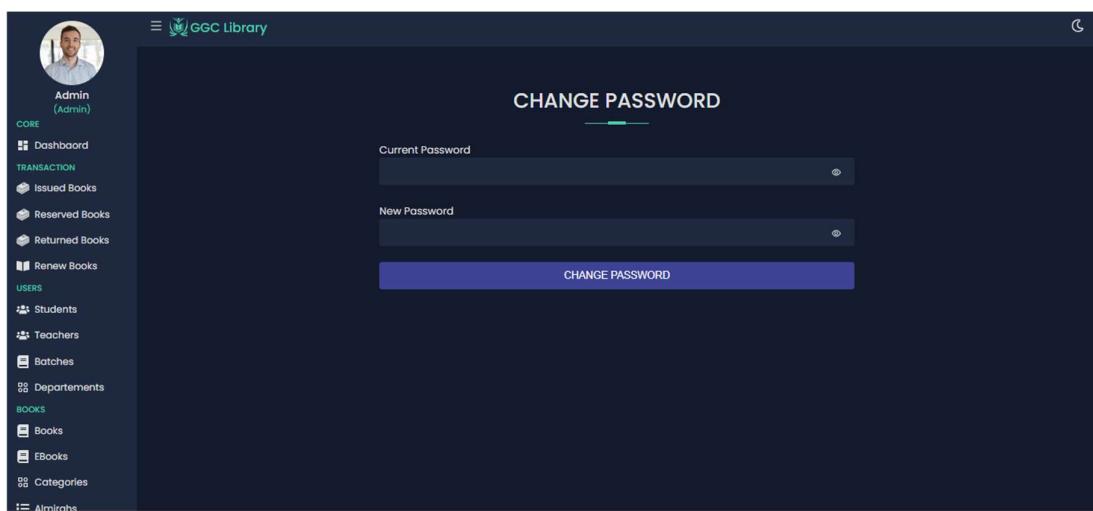
Step 6: Visit and read the User Profile successfully

Pay Fine Interface



- Step 1:** Open the website of GCC LMS
- Step 2:** Enter Email and password for Login
- Step 3:** Click on Login button
- Step 4:** Click on Hamburger Icon from navbar
- Step 5:** Click and drag the Scroll Button
- Step 6:** Select the pay fine Option
- Step 7:** Fill the required information
- Step 8:** Click on SUBMIT Button

Edit Profile Interface



Step 1: Open the website of GCC LMS

Step 2: Enter Email and password for Login

Step 3: Click on Login button

Step 4: Click on Hamburger Icon from navbar

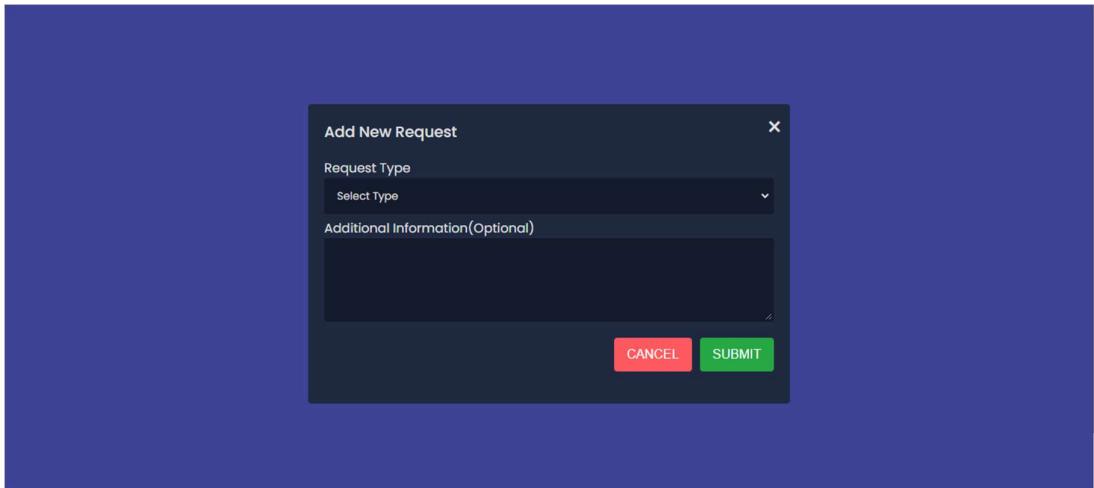
Step 5: Click on User Dashboard

Step 6: Click and drag the Scroll Button

Step 7: Select the Edit Profile Option

Step 8: Modify your Profile successfully

Clearance Form Interface



Step 1: Open the website of GCC LMS

Step 2: Enter Email and password for Login

Step 3: Click on Login button

Step 4: Click on Hamburger Icon from navbar

Step 5: Click on User Dashboard

Step 6: Click and drag the Scroll Button

Step 7: Select the Clearance form Option

Step 8: Fill the required information

Step 9: Click on SUBMIT Button

Manage Clearance Request Interface

The screenshot shows the 'MANAGE CLEARANCE REQUESTS' section of the GGC Library LMS. On the left, a sidebar menu for 'Admin (Admin)' lists categories like CORE, TRANSACTION, USERS, and BOOKS. The main area displays a summary of request status: PENDING (20), REJECTED (30), and APPROVED (1). Below this is a table with columns: Roll Number, Name, Request Type, Status, Date, and Actions. A single record is shown: Roll Number 1993939393, Name Nouman Aziz, Request Type Graduation, Status Pending, Date 31-10-2023, and Actions (Approve, Reject, View). At the bottom, it says 'Showing 1-1 of 1 records' and includes navigation buttons for PREVIOUS, 1, and NEXT.

Step 1: Open the website of GCC LMS

Step 2: Enter Email and password for Login

Step 3: Click on Login button

Step 4: Click on Hamburger Icon from navbar

Step 5: Click on Admin Dashboard

Step 6: Click and drag the Scroll Button

Step 7: Select the Manage Clearance request Option

Step 8: View and proceed the operation successfully

Approved Clearance Request Interface

No.	Made By	Type	Librarian Approval	Clerk Approval	HOD Approval	Actions
1	Nouman Aziz	Graduation	Pending	Pending	Pending	DOWNLOAD

Step 1: Open the website of GCC LMS

Step 2: Enter Email and password for Login

Step 3: Click on Login button

Step 4: Click on Hamburger Icon from navbar

Step 5: Click on Admin Dashboard

Step 6: Click and drag the Scroll Button

Step 7: Select the Approved Clearance request Option

Step 8: View and proceed the operation successfully

7. REFERENCES

- [1] "Clifton Park Halfmoon Public Library," [Online]. Available: <https://www.cphlibrary.org/>
- [2] "Brookline Libraries," [Online]. Available: <https://www.brooklinelibrary.org/>
- [3] "Public Library of Congress," [Online]. Available: <https://www.loc.gov/>