A
PROJECT REPORT
ON
LIBRARY BOOK LOCATOR

Under the subject

System Design Practice

B. Tech (CE) Sem VI

Submitted by

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CERTIFICATE

This is to certify that the project work carried out in the subject of System Design Practice entitled "Library Book Locator" and recorded in this report is a work of

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It is indeed a great pleasure to express our thanks and gratitude to all those who helped us during this project.

Theoretical knowledge is of no importance if one doesn't know the way of its implementation. We are thankful to our institute that provided us an opportunity to apply our theoretical knowledge through the project. We feel obliged in submitting this project as part of our curriculum.

We would like to take the opportunity to express our humble gratitude to our guide Prof. Siddharth P. Shah, under whom we undertook our project. His constant guidance and willingness to share his vast knowledge made us enhance our knowledge and helped us to complete the assigned tasks to perfection. Without his effort, support and an astonishing testing ability this project may not have succeeded.

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Chapter 1

Introduction

Library Book Locator is an online application that manages users resources or literary works such as books, magazines, articles, journals and reports. The users are able to search, locate, issue and add their desired books to their account through this android application. This app consists of a remote database that keeps a record of all the users and updates the book details and stores them appropriately. The books are classified with respect to their genre. The database maintains information such as the author of the book, date of publication, language, category and description. Users are permitted to issue their preferred books, which are available in the library. Only a maximum of 3 books are approved by the system that can be issued by a user at a time.

Users are required to first register themselves by providing valid details to the system. The application logs the user in the system and permits users to maintain and manage their profile. Users are granted access to all the resources entitled to them. They may search for a specific book, locate the book, issue the book and can set an issue date, 21 days after which the user gets notified for book renewal.

This system has been implemented and developed in JAVA and MySQL has been used to create and manage databases. Furthermore, Android Studio has been employed to execute the code.

Chapter 2

Software Requirements Specification

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1. Introduction

1.1 Purpose

The main objective of this document is to illustrate the requirements of project Library Book Locator. The document gives detailed description of both functional and non-functional requirements proposed by the client. The purpose of this project is to provide friendly environment to maintain the details of books, library members and allow its users to locate books easily.

1.2 Document Conventions

- Convention for Main Title
  Font Face: Times New Roman
  Font Style: Bold
  Font Size: 18
- Convention for Sub Title
  Font Face: Times New Roman
  Font Style: Bold
  Font Size: 14
- Convention for body
  Font Face: Times New Roman
  Font Style: Bold
  Font Size: 12

1.3 Intended Audience and Reading Suggestions

This document is intended for developers, project managers and testers. It elaborates upon the features, functions, interface details, hardware requirements and design. Readers are encouraged to commence with the purpose and scope of this product and ascertain more about the specific requirements, features, design and functions served by this product.

1.4 Product Scope

The Software Requirements Specification captures all the requirements in a single document. The Library Book Locater that is to be developed provides the members of the Library and employees of the library with books information, details about issued books and their renewal date notifications and many other facilities.

2. Overall Description

2.1 Product Perspective

The online library book locator is a package to be used by libraries to improve the efficiency of librarians, library employees & users. The online library book locator to be developed benefits greatly the members & the librarian of institute. The system provides books catalog & info to members & helps them to locate books to borrow from the library. The librarian can keep the book location updated all the time so that the members get updated info all the time.

2.2 Product Functions

The major functions of this product include the following:
1. A large database to store book details.
2. Issue books and raise notification.
3. User account that consists of a profile.

2.3 User Classes and Characteristics

The system provides different types of services based on the type of users [Member/Librarian]. The Librarian will be acting as the controller and he will have all the privileges of an administrator. The member can be either a student or staff of the university who will be accessing the Library online.
The features available to members are:

- Can view the different categories of books available in the Library.
- Can view the list of books available in each category.
- Can own an account in the library.
- Can view the books issued to him.
- Can locate a new book.
- Can search for a particular book.

2.4 Operating Environment

The product will be operating in android. It is an android app and shall operate in android Lollipop 5.0 (API 22). Also, it will be compatible with the latest android nougat 7.0 (API 25). The only requirement to use this application would be internet connection.
The hardware configuration includes:

Memory: 100 MB
Screen: 5” TFT display
TouchPad: Standard mobile keyboard.

2.5 Design and Implementation Constraints

The product is developed using Android framework. The backend database for this is SQL server. The product is accomplished with login facility so that specific function is available to specific student. Only registered users can have access to all its facilities.

2.6 User Documentation

The product will include user manual. The user manual will include product overview, complete configuration of the used software (such as SQL server), technical details, backup procedure and contact information which will include email address. There will be no online help for the product at this moment. The product will be compatible with android 5.0 (API 22) or higher. The databases will be created in the Microsoft SQL server 2000 and will be remotely hosted by admin.

2.7 Assumptions and Dependencies

The assumptions are:

- The coding should be error free.
- The system should be user-friendly so that it is easy to use for the users.
- The information of all users, books and libraries must be stored in a database that is accessible by admin only.
- The system should have more storage capacity and provide fast access to the database.
- The system should provide search facility and support quick transactions.
- The Library Book Locator is running 24 hours a day.
- Users may access from any android device that has Internet browsing capabilities and an Internet connection.
- Users must have their correct usernames and passwords to enter into their online accounts and do actions.

The dependencies are:

- The specific hardware and software due to which the product will be run.
- On the basis of listing requirements and specification the project will be developed and run.
- The end users (admin) should have proper understanding of the product.
- Any update regarding the book from the library is to be recorded to the database and the data entered should be correct.

The product needs following third party product:

- Microsoft SQL server to store the database.
- Android Studio to develop the Product.

3. External Interface Requirements

3.1 User Interfaces

The software provides good graphical interface for the user and can operate on the system, performing the required task such as create, update, viewing the details of the book.

1) It allows user to view quick reports like Book Issued/Returned in between particular time.
2) It provides stock verification and search facility based on different criteria.
3) The user interface must be customizable by the administrator.
4) All the modules provided with the application must fit into this graphical user interface and accomplish to the standard defined.

5) The design should be simple and all the different interfaces should follow a standard template.
6) The user interface should be able to interact with the user management module and a part of the interface must be dedicated to the login/logout module.

3.2 Hardware Interfaces

Server Side:

Operating System: Windows xp or above versions
Processor: Pentium, 3.0 GHz or higher
RAM: 256 Mb or more
Hard Drive: 10 GB or more

Client side:

Operating System: Android 5.0 (API 22) or above
Processor: 1 GHz or higher
RAM: 1 GB or more

3.3 Software Interfaces

This application is developed using Android framework as front end. Microsoft SQL Server as the back end to store the database.
Database: SQL Server.
Application: Android
Web Server: IIS (Internet Information Services)

3.4 Communications Interfaces

The Customer must connect to the Internet to access the Website:

- Mobile Data
- Wi-Fi

4. System Features

4.1 Registration and Login

Description: The users should be able to register and login by providing the required information and credentials, respectively.

Stimulus/Response: When the user clicks the register, the system should provide a form to input user information and after submission of that form when the user clicks login, the system permits the user to explore the features provided by the system.

Functional Requirements:

R1: The user should be able to register.

Input: User information

Output: Validation message

Processing: After the user inputs his/her information for registration and submits the same, the system saves the information and stores it in databases.

R2: The user should be able to login

Input: Username, Password

Output: Validation message

Processing: The system takes the username and password, and if correct, allows access to the system, otherwise prints message: "Username or Password is incorrect".

R3: All users must be authenticated; invalid users must not be granted access to the system.

Input: Username, Password

Output: Validation message

Processing: After the user enters username and password, the system authenticates the user and permits access if the user is valid. If it is an invalid user, the system dispatches "Access Denied" message.

4.2 Search book

Description: The user should be able to search the desired books in the catalogues.

Stimulus/Response: When the user types in the name of the specific book or article, the system searches for it in the database and makes it available to the user for download.

Functional Requirements:

R1: The user should be able to search specific books, articles, journals, etc.

Input: Name of the literature

Output: List of all literary works specifically associated with the user input.

Processing: The user types the name of the author or the literature. Then, the system validates the spelling and diction and matches the available materials with the user's input and hence, prints, on the user's screen, the list of available works pertaining to the search.

4.3 Book locate

Description: To maintain location of the book, the system has predefined status of its rack number to maintain the life cycle of the book.

Stimulus/Response: The status and the behavior is explained below:

- On the main activity, users can see a locate book button that will redirect users to the book locator.

- Users can search various books based on book name, author name and various other fields.
- On clicking the book name, details regarding the book will be fetched along with the rack number the book is kept.
- This will allow users to easily locate books.

4.4 Manage books

Description: The user should be able to manage his/her issued books and make necessary changes, such as renew or delete book.

Stimulus/Response: The app provides a button for renew and delete. The user may choose the feature to renew or delete a book.

5. Nonfunctional Requirements

The system must have uninterrupted access to the internet in order to access and utilize the system.

5.1 Performance Requirements

The proposed system that we are going to develop will be used as the chief performance system within the different campuses of the university which interact with the university staff and students. Therefore, it is expected that the database would perform functionally all the requirements that are specified by the university.

5.2 Safety Requirements

The database may get crashed at any certain time due to virus or operating system failure. Therefore, it is required to take the database backup so that the database is not lost. Proper UPS/inverter facility should be there in case of power supply failure.

5.3 Security Requirements

We are going to develop a secured database for the university. There are different categories of users namely teaching staff, administrator, library staff, students etc., depending upon the category of user the access rights are decided. It means if the user is an administrator then he can be able to modify the data, delete, append etc., all other users other than library staff only have the rights to retrieve the information about database.

5.4 Software Quality Attributes

1) There may be multiple admins creating the project, all of them will have the right to create changes to the system. But the members or other users cannot do changes.
2) The project should be open source.

3) The quality of the database is maintained in such a way so that it can be very user friendly to all the users of the database.
4) The user be able to easily download and install the system.

5.5 Business Rules

A business rule is anything that captures and implements business policies and practices. A rule can enforce business policy, make a decision, or infer new data from existing data. This includes the rules and regulations that the System users should abide by. This includes the cost of the project and the discount offers provided. The users should avoid illegal rules and protocols. Neither admin nor member should cross the rules and regulations.

6. Other Requirements

Depending upon the category of user the access rights are decided. It means if the user is an administrator then he can be able to modify the data, delete, append etc. All other users except the Librarian only have the rights to retrieve the information about database. Similarly, there will be different categories of books available. According to the categories of books their relevant data should be displayed. The categories and the data related to each category should be coded in the particular format.

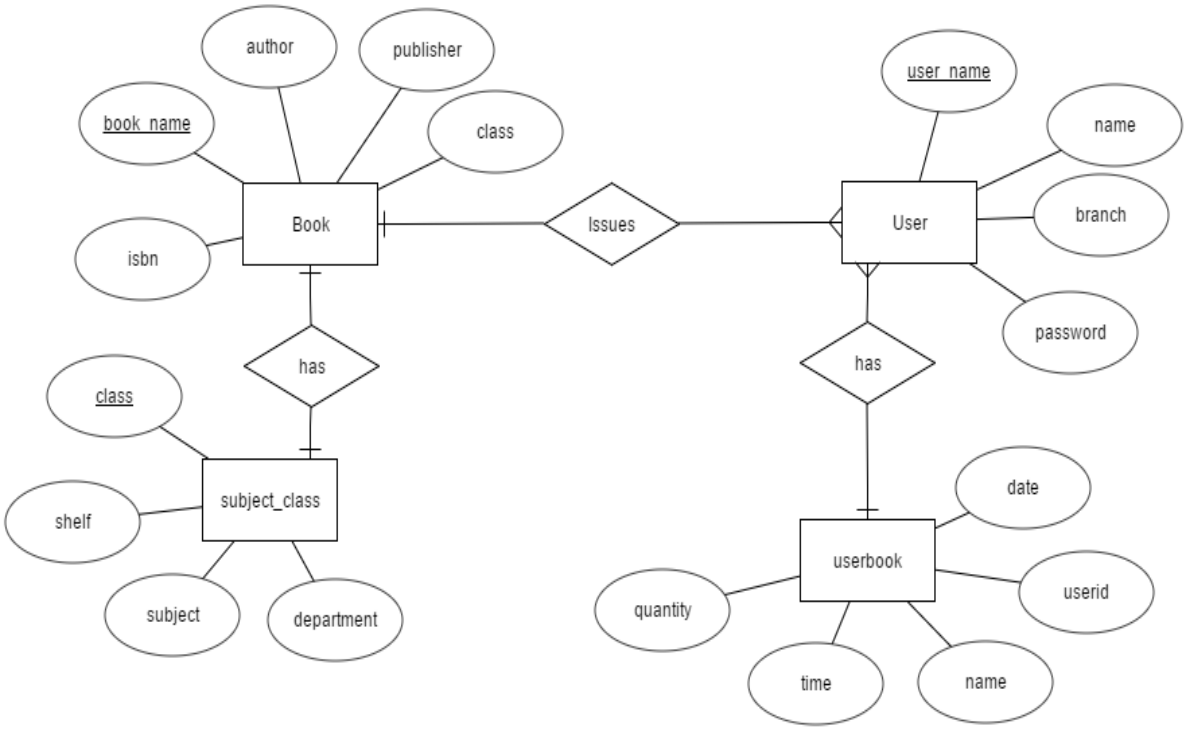
Appendix A: Glossary

All the terms in this document are self-explanatory. No acronyms or abbreviations have been used in this document.

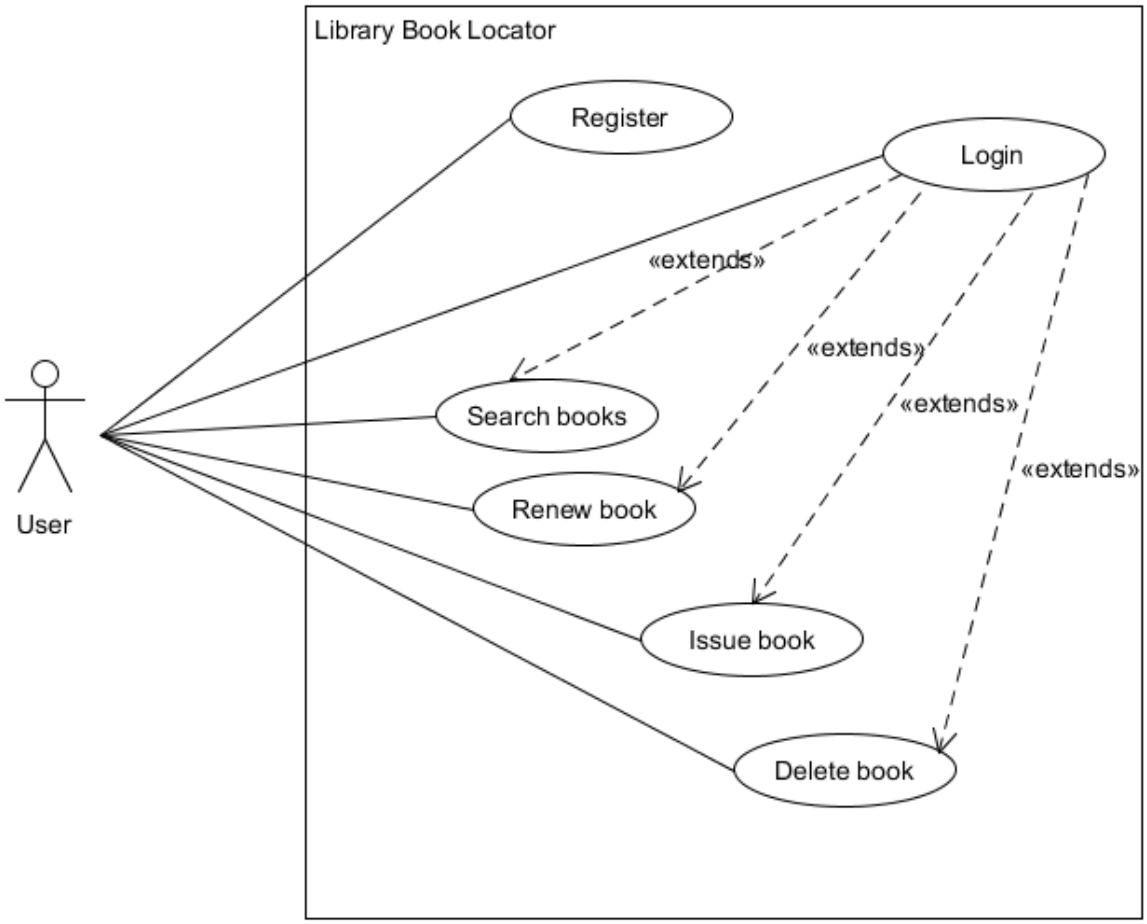
Chapter 3

Design

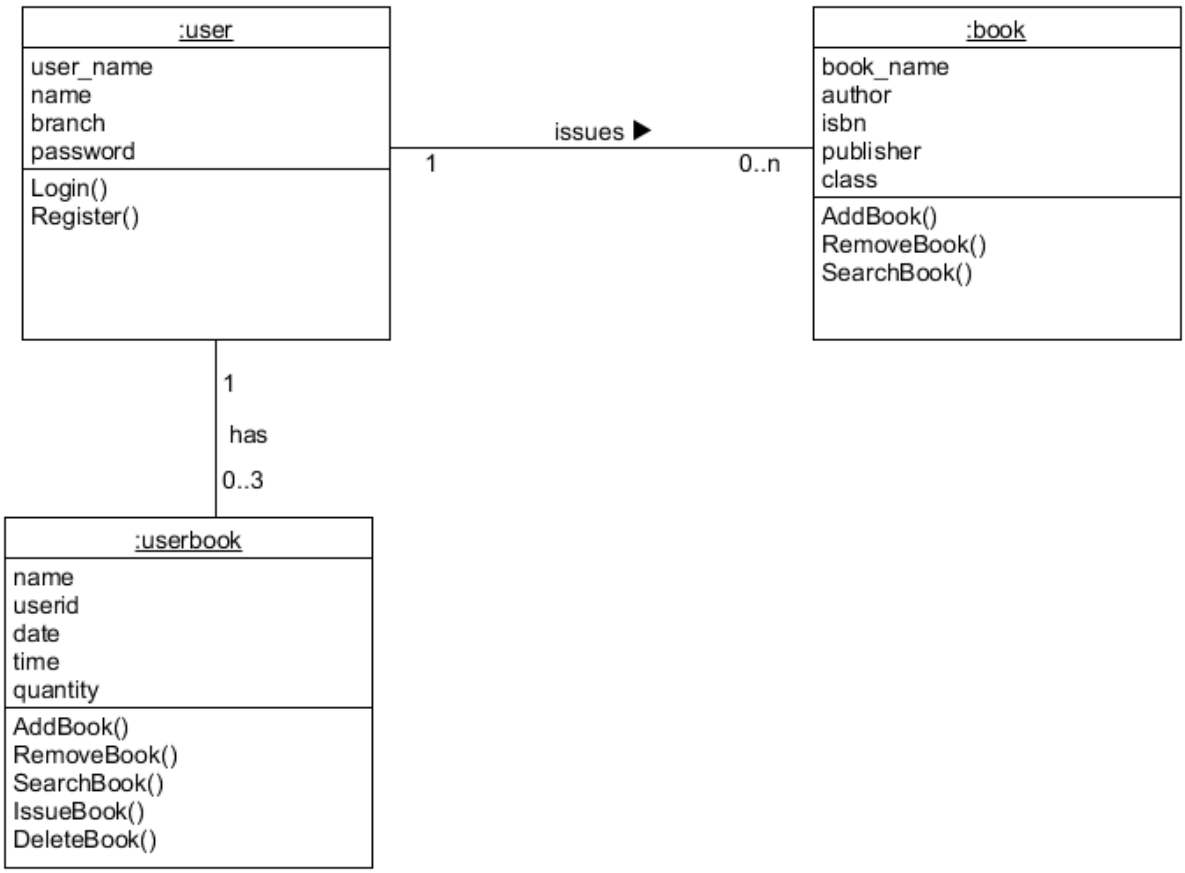
Entity-Relationship Diagram for *Library Book Locator*



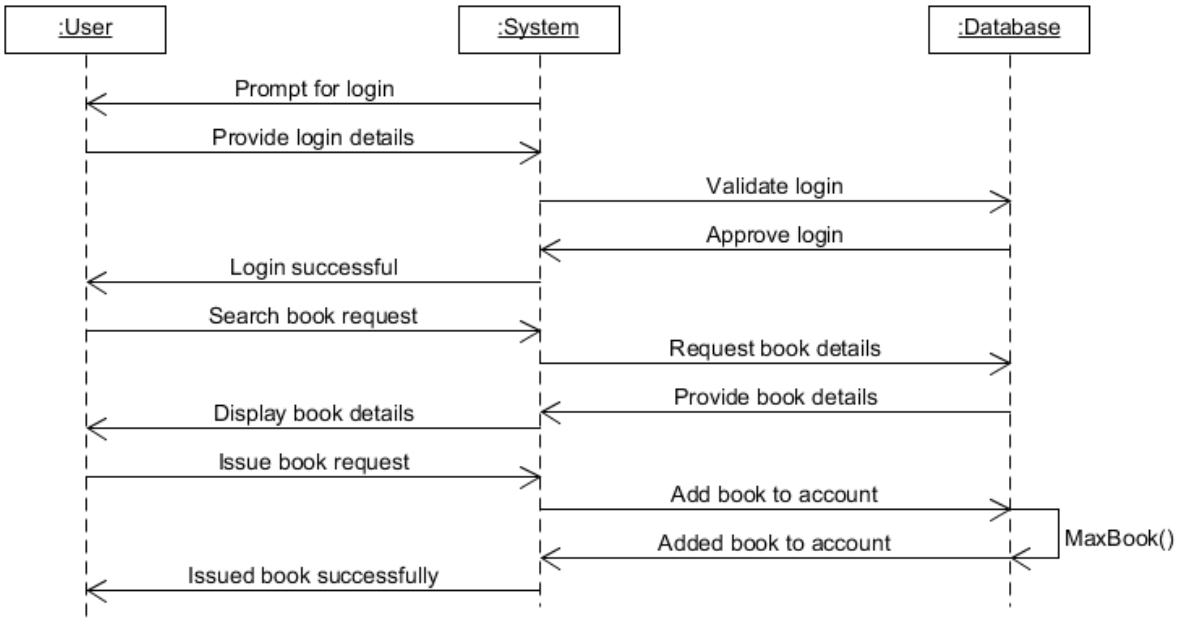
Use-Case Diagram for *Library Book Locator*



Class Diagram for *Library Book Locator*



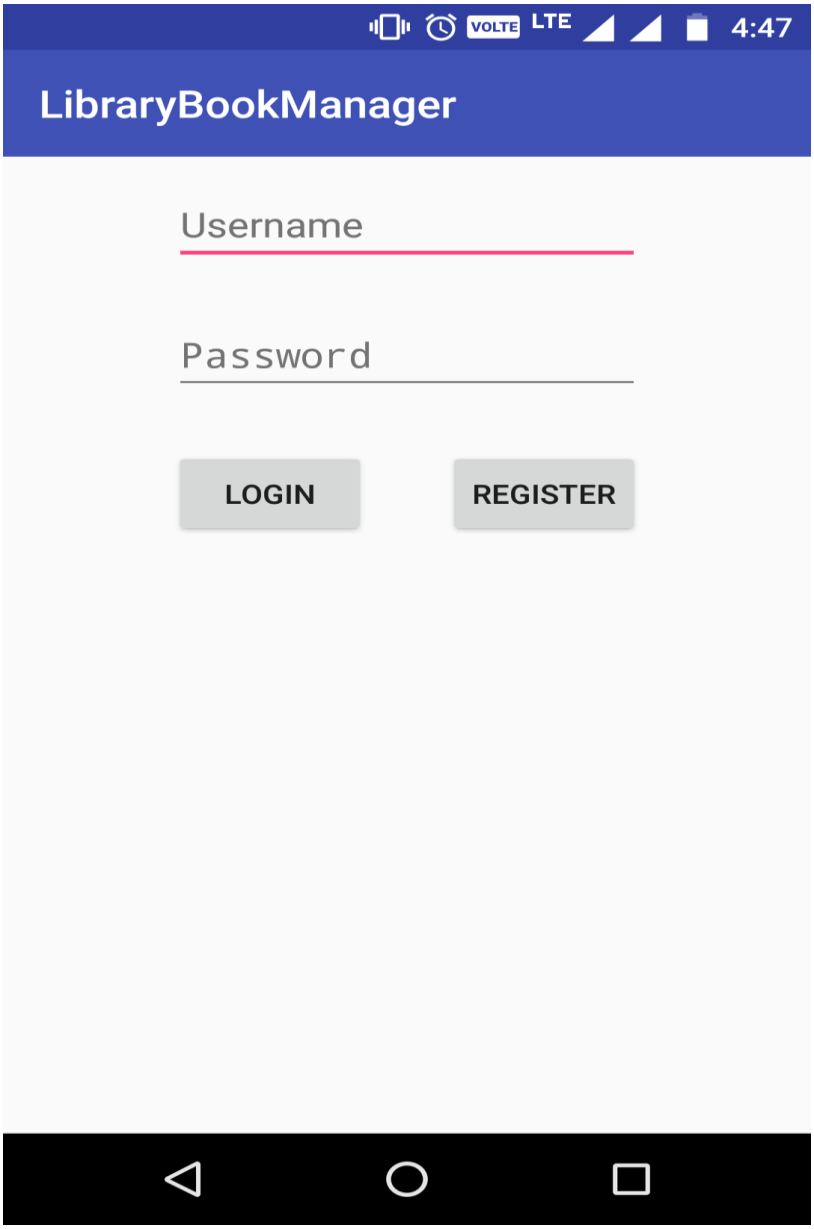
Sequence Diagram for *Library Book Locator*

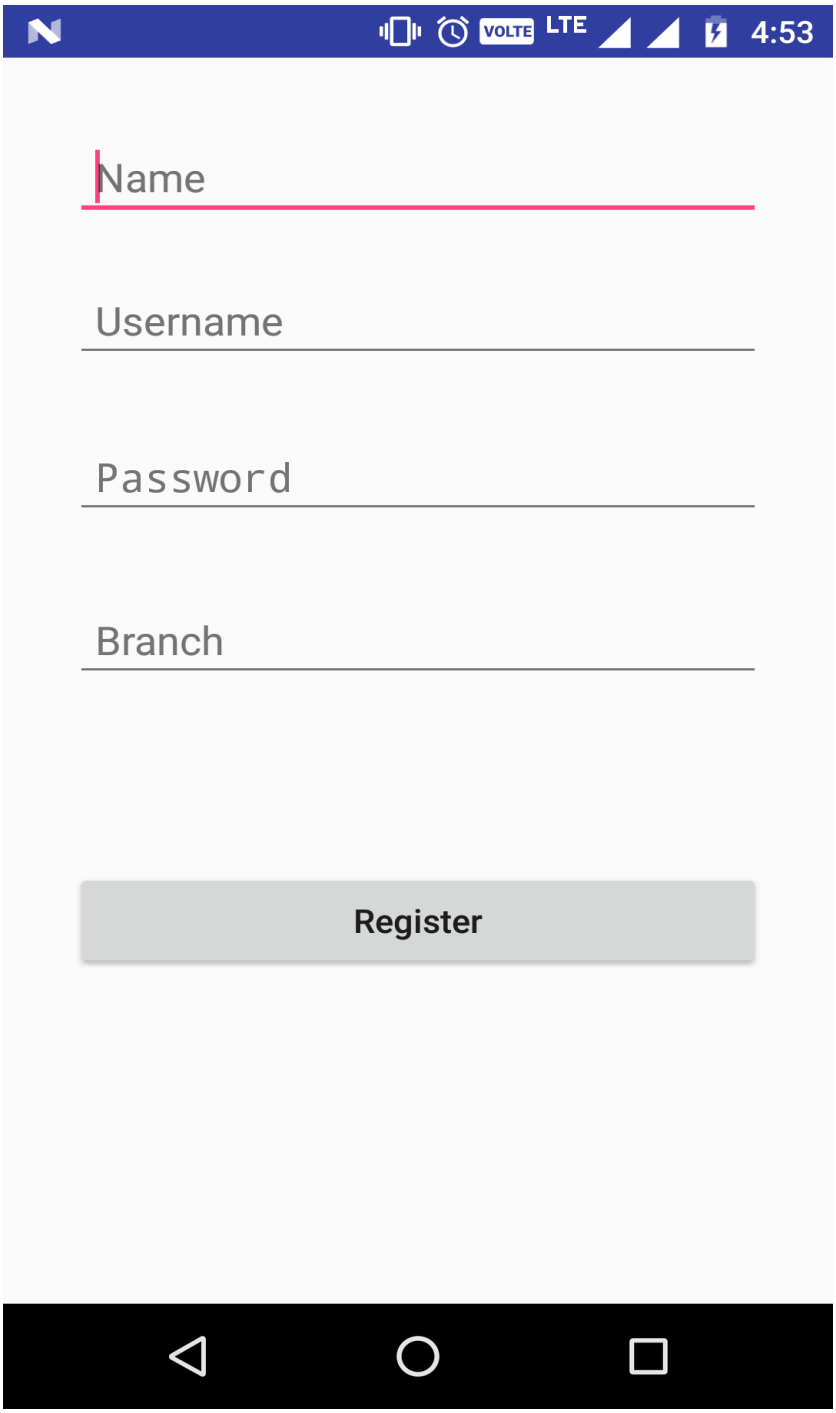


Chapter 4
Implementation

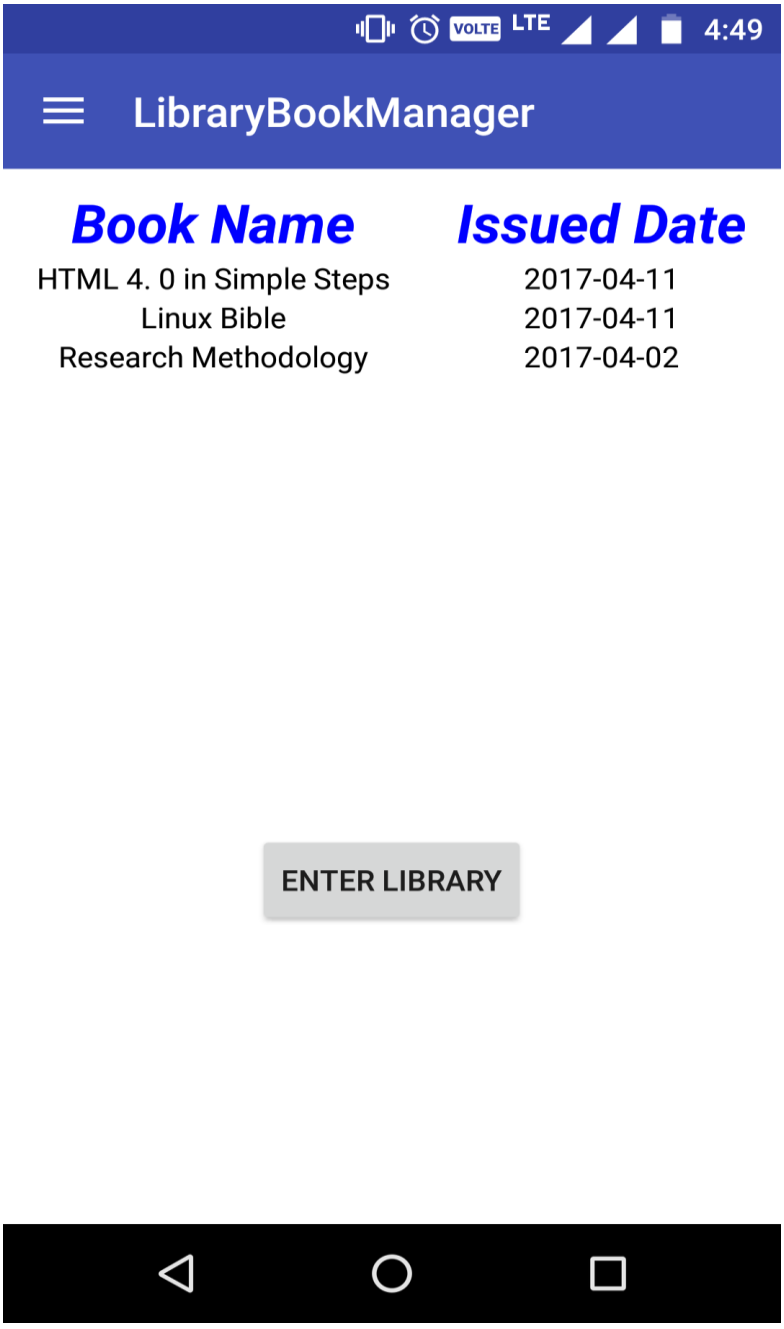
The main modules present in the system are:

1) Login module: This is the first module that opens up in app asking for login. If a user is new to the system, registration and then login is required to use the application.



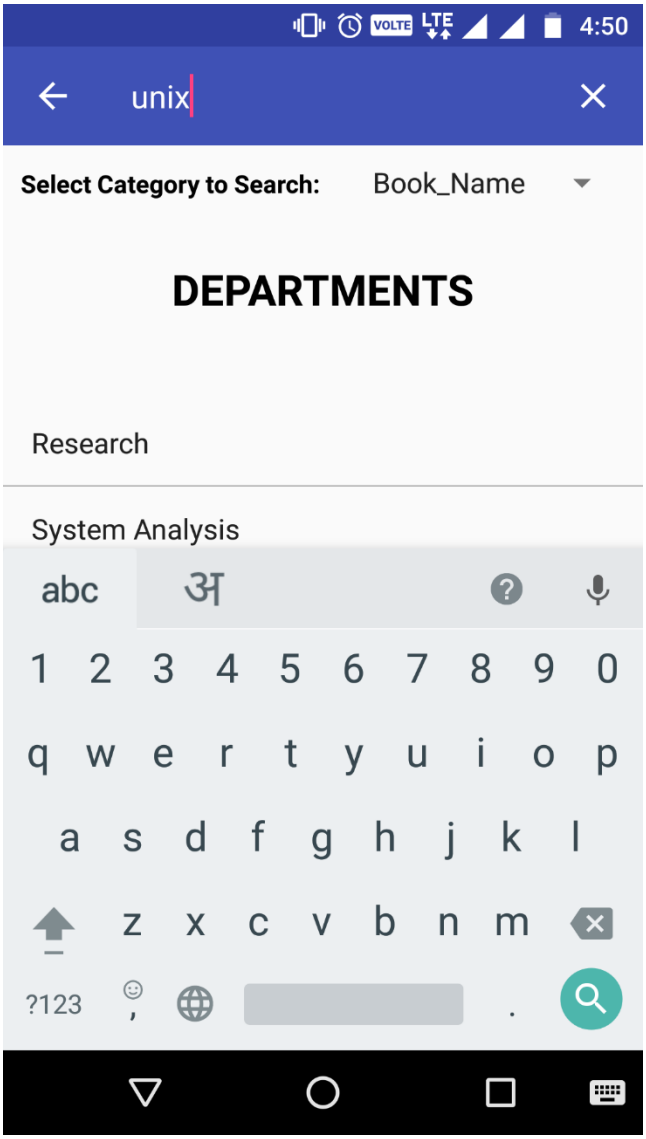

4:53
Name
Username
Password
Branch
Register

2) Homepage: After login, it is redirected to the homepage that has the list of currently issued books by a member. It has a “Enter Library” button that redirects to the Book Locator system.

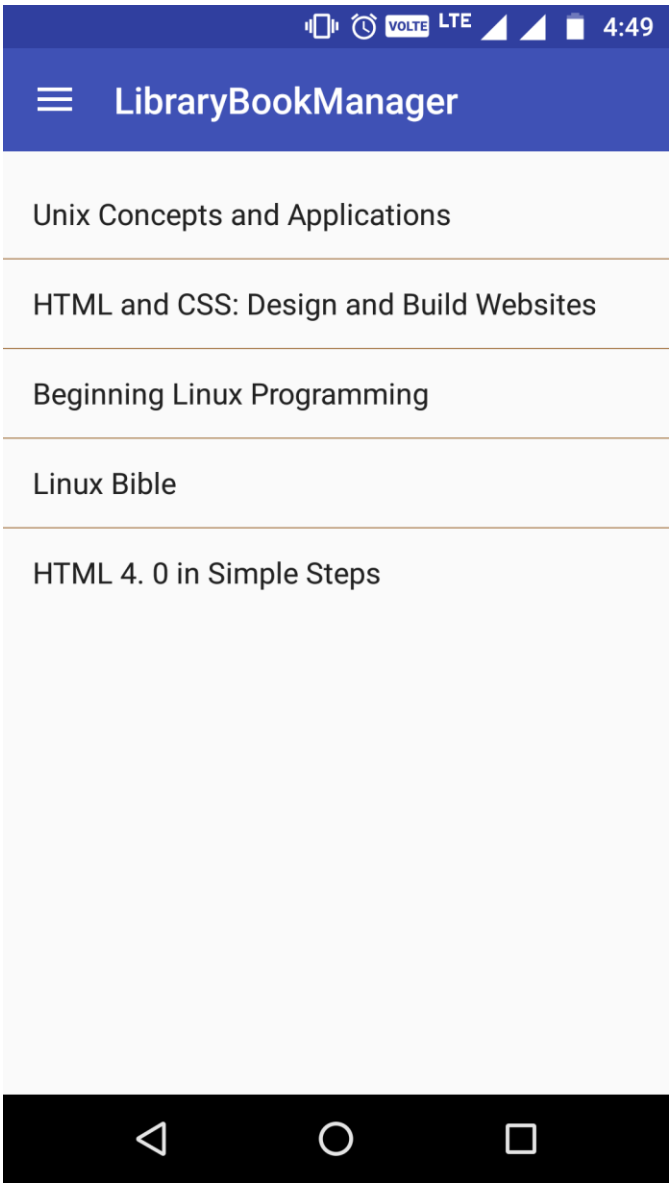


3) Book Locator: This activity is helpful for searching of books and view book details. This allows users to know its rack number and hence locate them easily.

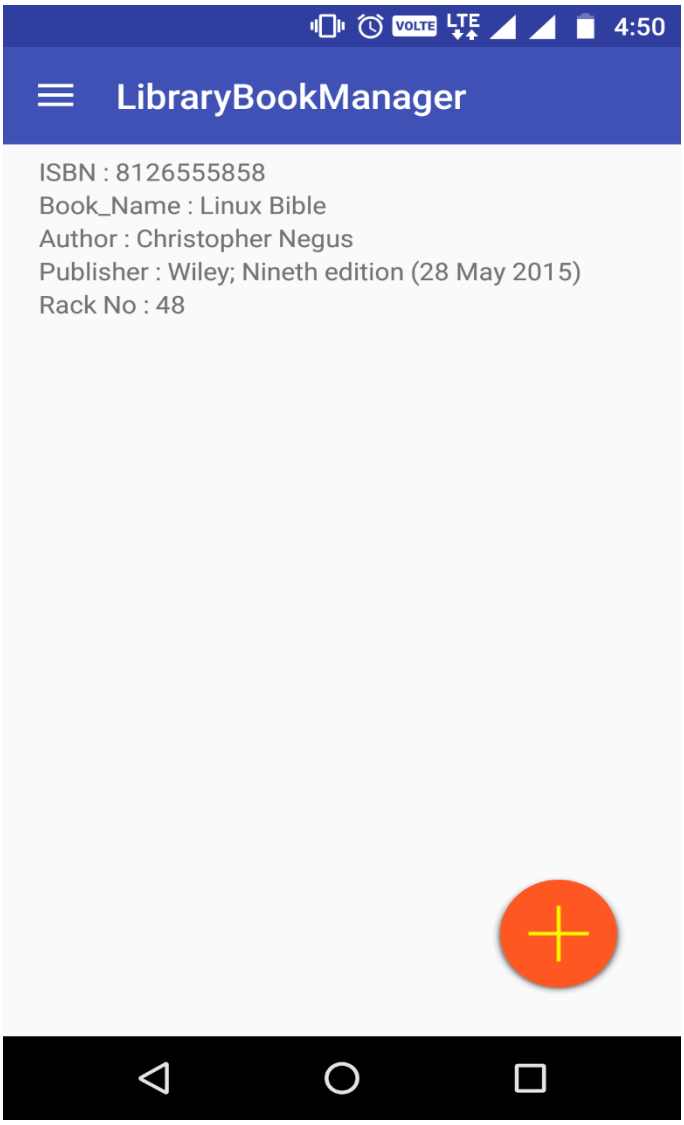
It has a search bar at the top that allows category wise search.



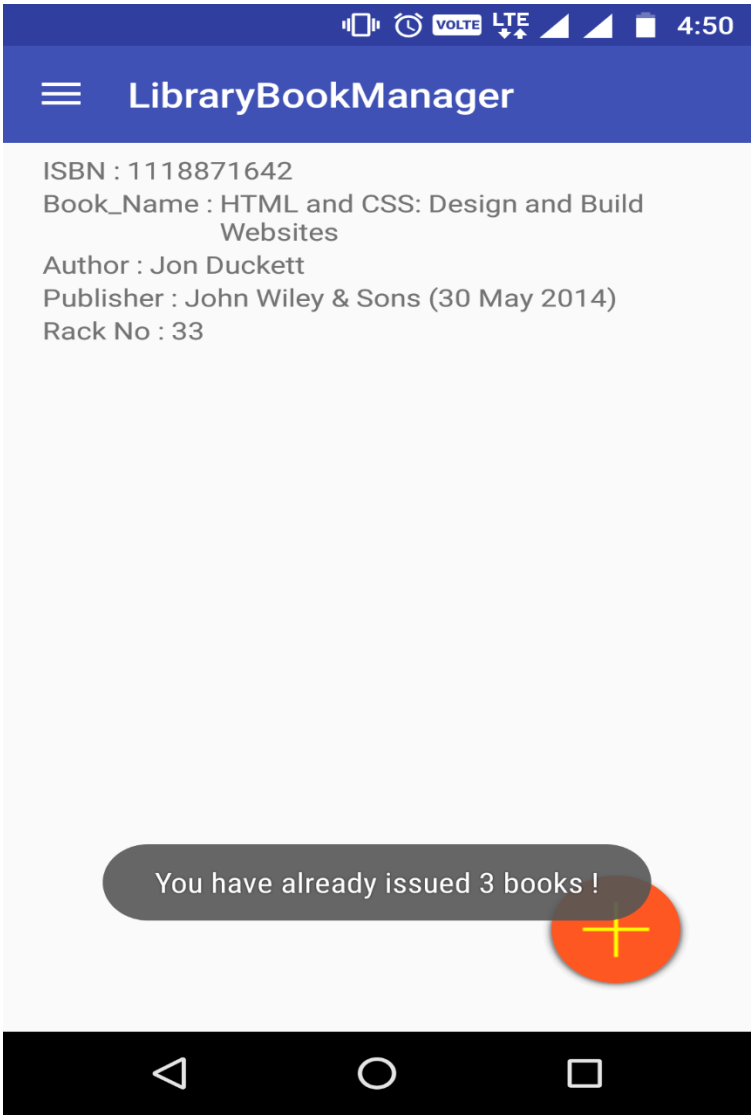
Department wise books can also be viewed.



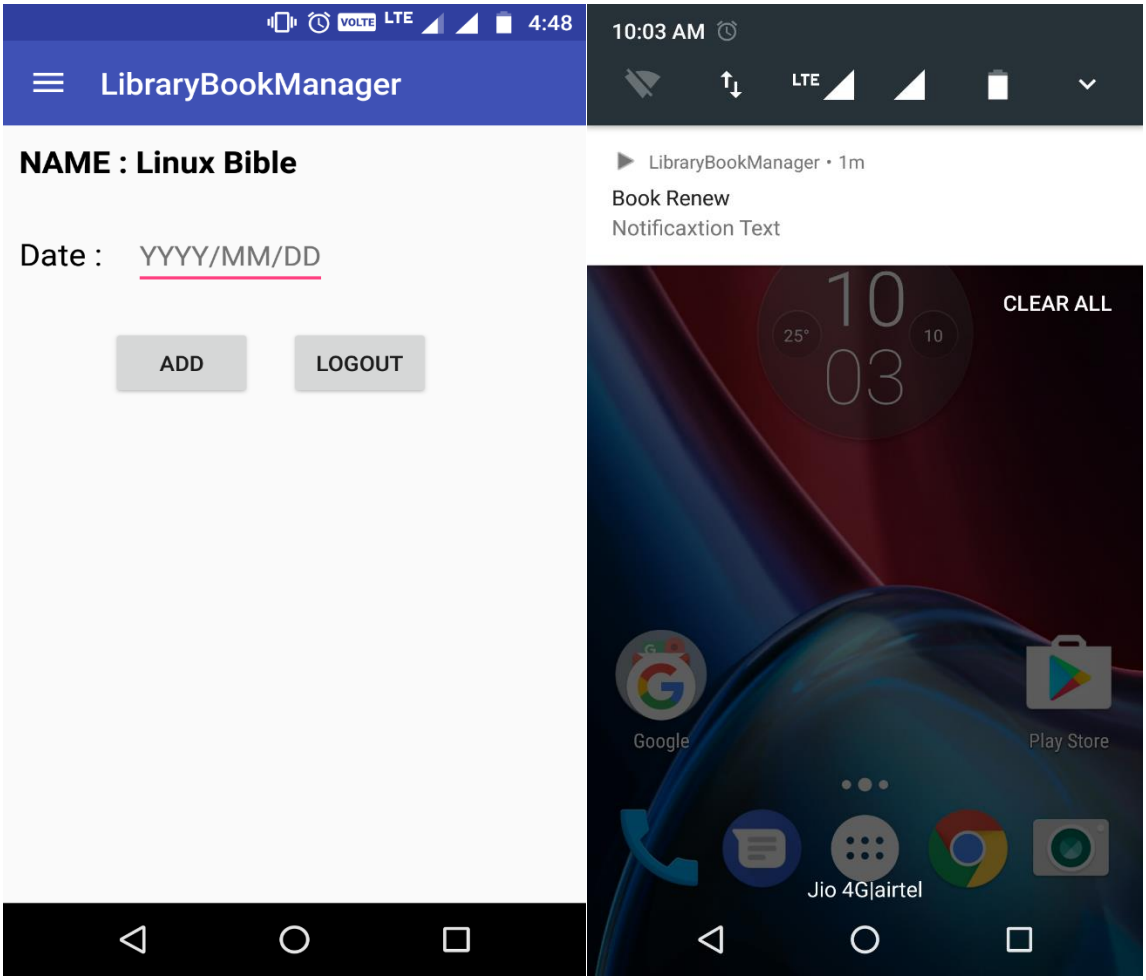
4) Book detail: On clicking the book name, user can view all book details.



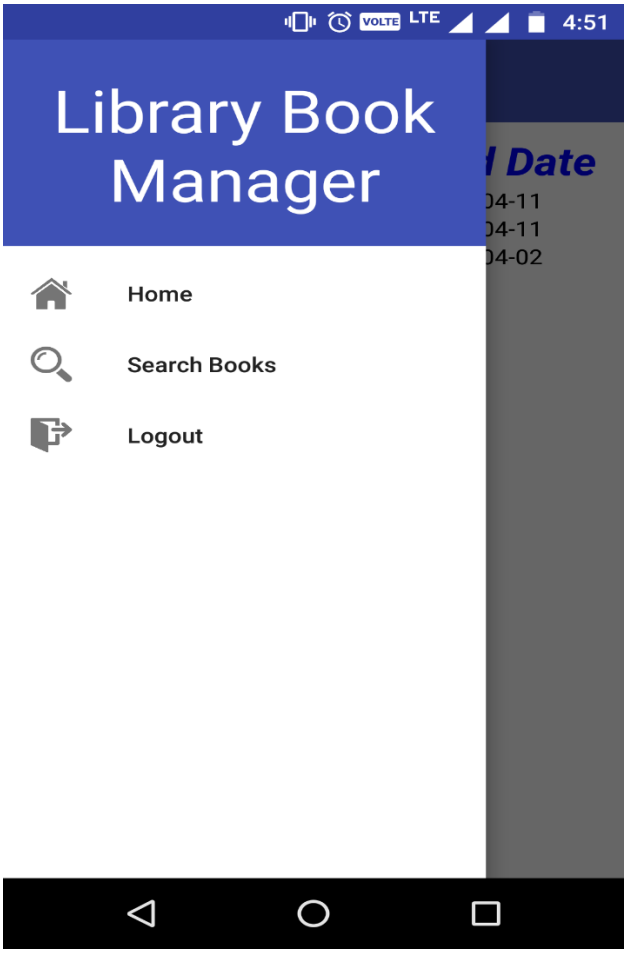
On clicking the add button, book is successfully added to the user account. A maximum of 3 books are allowed per user. Hence a toast is displayed if user tries to add more books.



5) Add book: This activity asks user to enter the date of issue for the book. After 21 days of book issue date, the user will be notified to renew the book.



6) Also, there is a drawer on the left side of every activity for home, search book and logout activity.



Chapter 5
Testing

Library Book Locator has been tested using Black-Box Testing method. The system behavior has been tested for various inputs such as incorrect credentials and book quantity exceeding the capacity. All functional requirements of the system have been tested and the system performs efficiently. The system satisfies all the functional requirements mentioned in the Software Requirements Specification.

Test Cases:

User	Scenarios	Sub Levels	Complexity	No. of Test cases
Reader	Login Page	Login	Complex	4
Reader	Registration	Enter information	Complex	4
Reader	Update account	Delete book	Complex	2
		Add book	Medium	3
		Renew book	Complex	2
Reader	Issue book	Max limit	Simple	2
Reader	Renew book	Check date	Medium	3
Reader	Notification	Check date & time	Complex	4
Reader	Logout	End session	Medium	2

Test Case Design:

Sr.No.	Test Case	Input	Expected Output	Actual output	Remark Test pass or fail?
1	Login	Correct Username, Correct Password	Redirect to Home page	Redirect to Login page	Pass
		Correct Username, Incorrect Password	Error message on login page	Error message on login page	Pass
		Incorrect User name, Correct Password	Error message on login page	Error message on login page	Pass
		Incorrect Username, Incorrect Password	Error message on login page	Error message on login page	Pass
2	Home Page	Click on the tab "Book Name"	Redirected to book detail activity	Redirected to book detail activity	Pass
		Click on the tab "Enter Library"	Redirected to Library Book Locator	Redirected to Library Book Locator	Pass
3	Library Locator Page	Select the search category from dropdown	Search category selected	Search category selected	Pass
4	Department Page	Click on the required Department	Redirected to selected department book list	Redirected to selected department book list	Pass
5	Book Detail page	Click on add book button	Redirected to set date activity	Redirected to set date activity	Pass

Chapter 6
Conclusion

Library Book Locator is an android application for readers of all age groups and provides essential functionalities such as login and registration, search, locate, issue and manage issued books. The user is first requested to login to the system by entering credentials, which are validated by the system in order to authenticate and authorize the users. Error messages are displayed for invalid credentials. The user can register by providing the necessary details. After login and registration, the user is provided access to the system. The session is managed. The user may search books by name, ISBN number, name of the author, or the category. In addition, issuing books is made simpler as the system provides the books on the user's machine and an add button on book details page. Descriptions, categories and languages are provided for each book. The user can locate preferred books, which are first validated by the system and then made available for users. This helps in preventing issuing of books to users with 3 books. Additionally, users are provided with the functionality to save books for later getting notified and update their profiles by renewing or deleting them. The changes made are reflected in the system's databases and are consistent with the information entered and modified by the user. The system has been tested for behavior and performance and runs efficiently on the client machine.

Chapter 7

Limitation and Future Extension

Library Book Locator is only limited to locating books and adding them in account.

In future, it can be integrated with the actual library database of any institute and can help its users. Also, a feature to get a sample of the book to be issued can be made available to the user, so that he can know if it is the right book he is searching for. It can later be converted to an actual e-library where users can download e-books and can even make purchases.