**Online Library System**

**Members:**

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**Introduction:**

Online Library System is an android application that is developed with the aim of providing the students a way of reserving books from University library. The idea of the application is not only to save the students’ time but also to make the library more digital and organized.

The application validates the student logins and allows the student to search any specific book based on the name of the book, ISBN number and reserve if it is available for reservation. Once the specific book is reserved, the student will be able to visit the library and pick the book specifying his student ID to the librarian, who can issue the book based on the student ID.

The librarian will then update the book’s availability status which gets updated in the books database and the same reflects in the student’s reservation table containing the date of issue and the last date to return the book back to the library.

**Application Analysis:**

This section defines the main elements for developing the application which includes the functional requirement, non-functional requirement, tools used, and the libraries that have been used in the application.

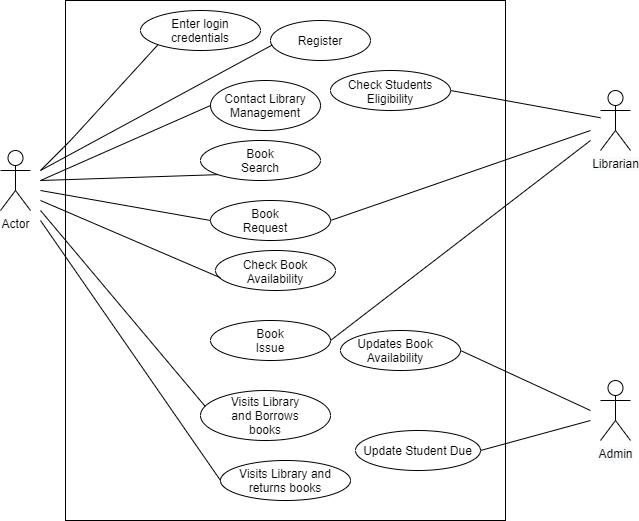
**Functional Requirements:**

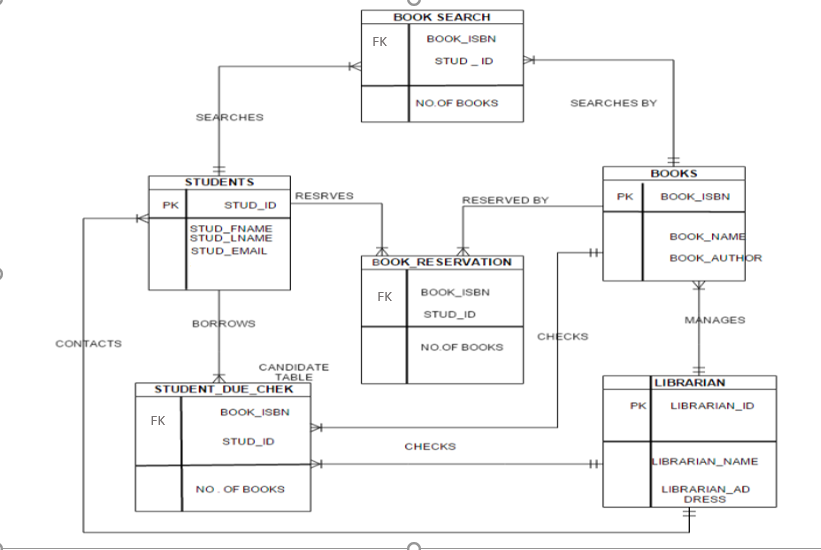
This describes the functionality of the system that enables the users to accomplish the tasks.

* Register and Login.
* Save the user’s login information.
* View the user’s profile details.
* Search for a book based on its name, ISBN and in a list of books.
* Request to reserve a book if eligible.
* Accept book reservation by using student’s Student ID.
* Viewing students details by using Student ID.
* Contact the library using external phone application.
* Redirect user to Library’s website.
* Showing library location on Map.

**UML diagrams**

**Use Case Diagram:**



**Entity Relationship Diagram of the Application:**

**Features used.**

* Shared Preferences.
* GPS Provider. – Google maps API
* Explicit intents for opening phone and browser.
* Bottom navigation with fragments.

**Tools Used:**

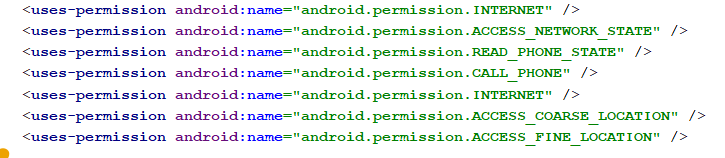
* Android Studio
* SQLite Database.

**Implementation:**

* Gradle file: All the necessary libraries that are used in the application are defined here.



* Android Manifest: All the permissions that application needs to access something are defined here.



**Application Functionality:**

**Users**: There are two types of users to whom the application is available:

1.Student

2.Librarian

3. Admin

**Description of Common Functionalities for both the users:**

**Loading Activity** – This is the first activity that comes up on opening the application. This activity fetches and loads the database. On the UI, an image is shown as the database loads.



Figure: Loading Activity

**Login Activity** – Users can login to the application using his credentials. For students who have registered, the login credentials are cross checked with those in the STUDENTS table. For Librarians, the login credentials are cross checked with those in the LIBRARIAN table. The user information is saved for the next login using **Shared Preferences** feature.

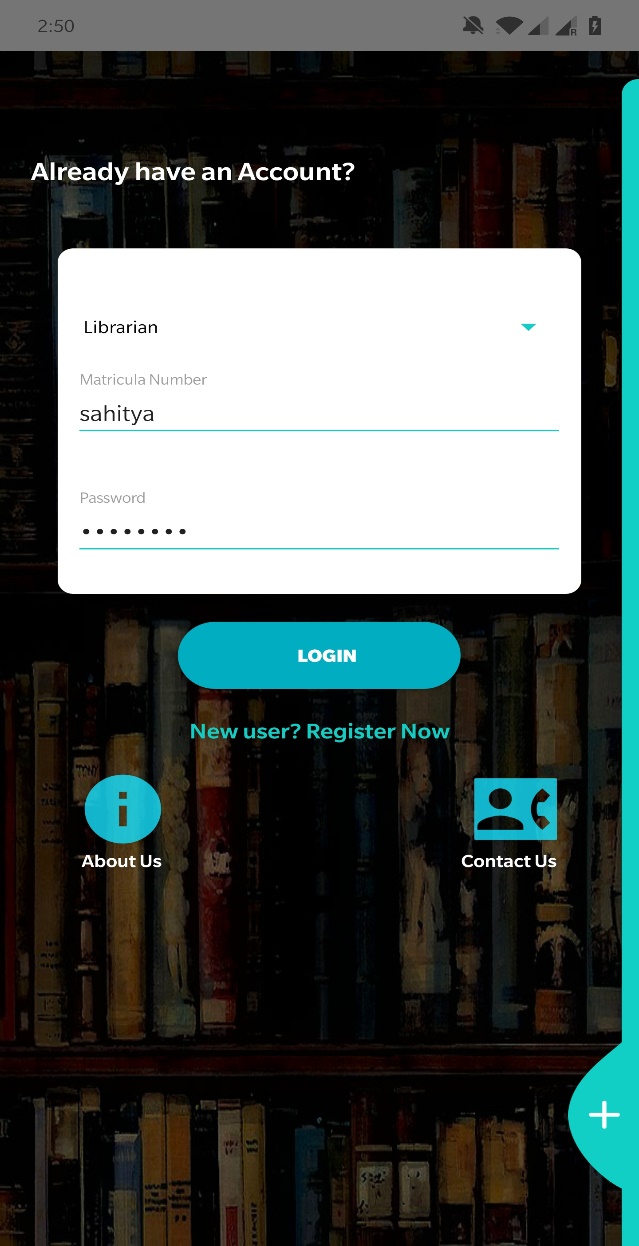


Figure: Login Activity

**Contact Us Activity** - This activity shows the contact details of the Library. Contact details include the following:

**Location**: On tapping, the application opens up another activity which shows the location of the library using **GPS provider**.

**Telephone**: On tapping the number, the number is copied on to dial pad of the users preferred phone application using **Implicit Intent**.

**Website URL:** On tapping on the URL, the URL is opened on the user’s preferred browser using **Implicit Intent**.



Figure: Contact Us Activity

**About Us Activity** – This activity shows the information about the university library such as rules and charges which are applied for not returning the books on time.

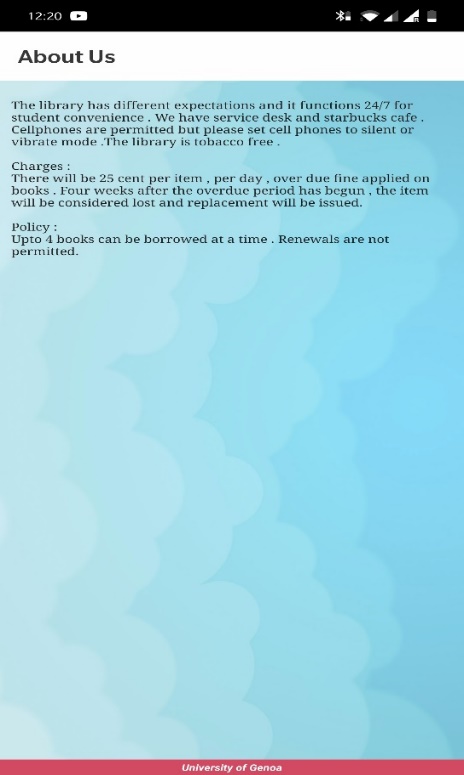


Figure: About Us Activity

**Map Activity** – This activity shows the location of the library. On tapping on the pointer, the name of the location shows.

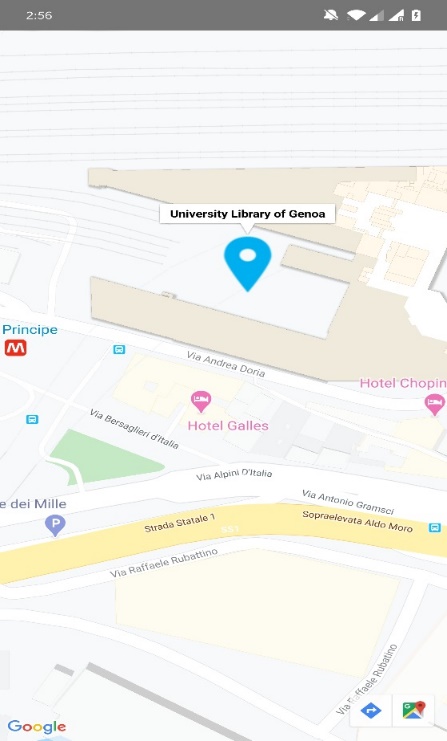


Figure: Map Activity

**Student Functionality:**

**Registration Activity –** Students who would like to use the application should fill in a few details like first name, last name, matricula number/ student ID, email and password in the registration activity.

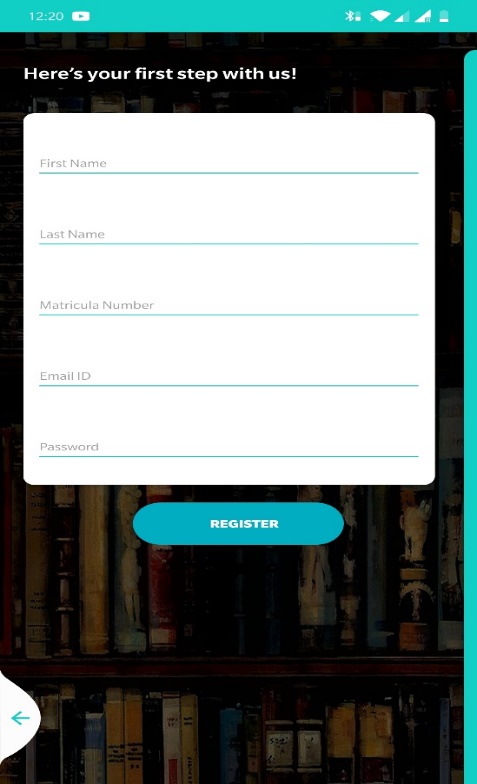


Figure: Registration Activity

The registration page is only for students since they’re larger in number unlike the Librarians. The admin provides the librarian’s login details by inserting them into the database directly.

On login, students would be able to view the following fragments:

**Profile Details Fragment** – A student can look at his/her details such as first name, last name, email address and number of books reserved.

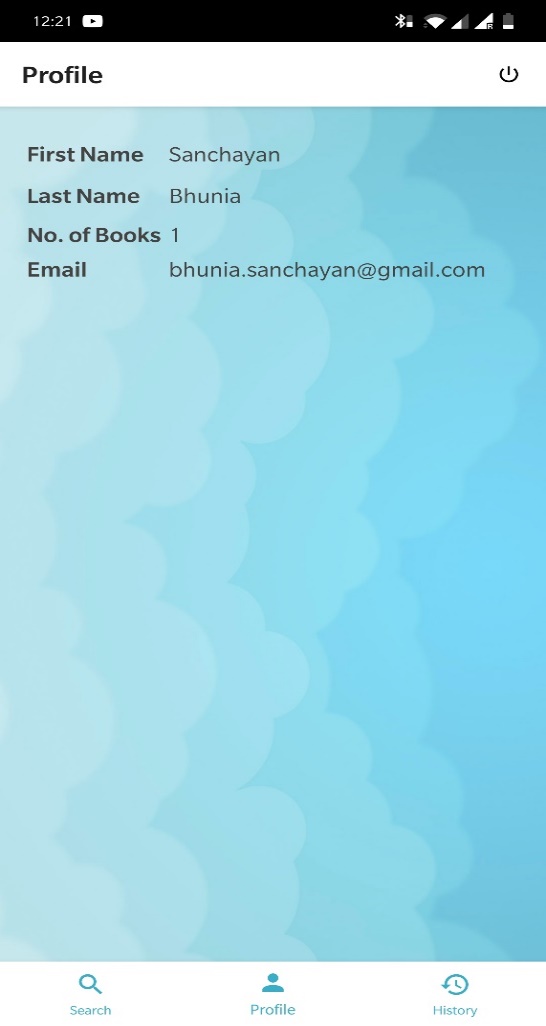


Figure: Profile Fragment

**Book Search Fragment** – A student can search for a book using three ways.

1. **Book Name**: Name of the book
2. **ISBN of the Book**: 10-digit number
3. **Book List**: List of all the books available.

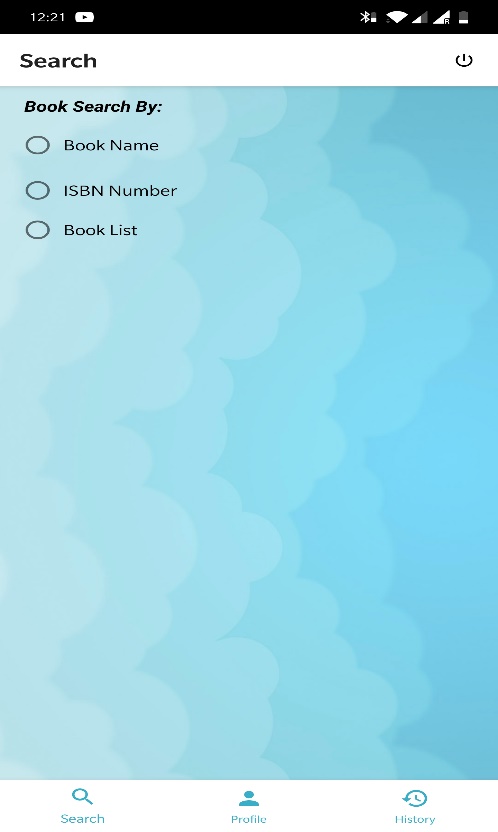


Figure: Search Fragment

**History Fragment**: Students would be able to look at their Book reservation history. It shows the Book names, ISBN, Date of Issue and Date of Return.



Figure: History Fragment

**Book Details Activity** – Here, the student can look at the details of the book such as the name of the book, Author of the book, ISBN of the book, description, Book availability, Reservation eligibility. A radio button is provided at the bottom for reserving the book if he is eligible.

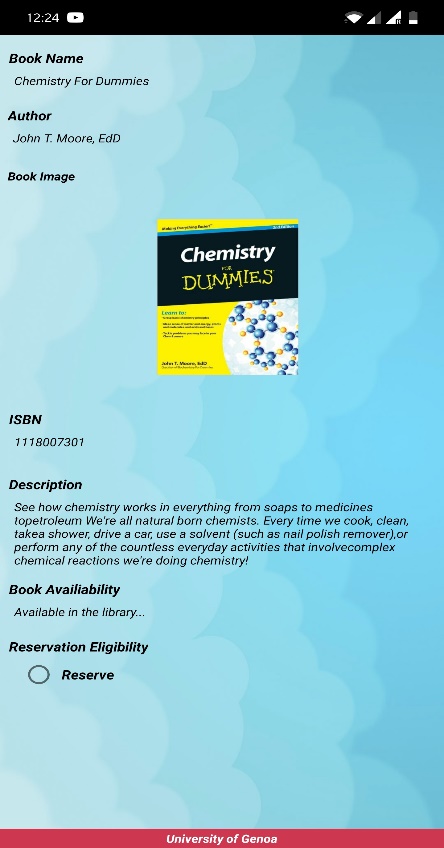
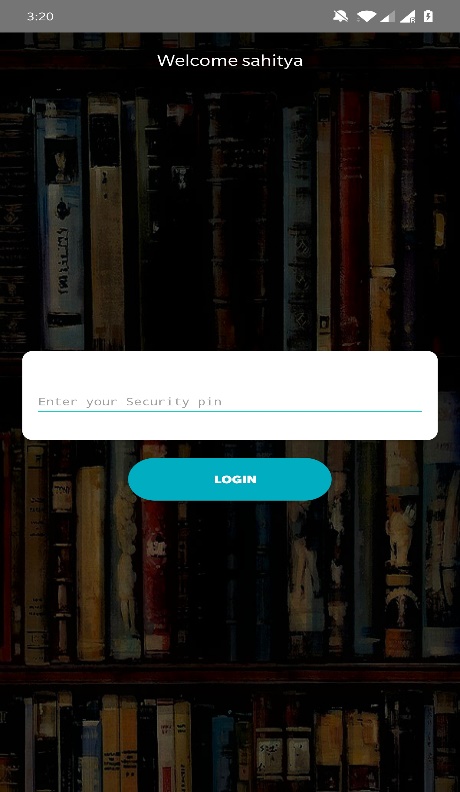


Figure: Book Details Activity

**Librarian Functionality:**

**Librarian Security Activity** – This activity provides an additional layer of security for the librarians. Here, the librarians are supposed to enter an additional security code given to them.



**Reserved Books Activity** – This activity shows the books that have been reserved by the students. The librarian can search for the Student ID and accept their requests by tapping on the book reserved.

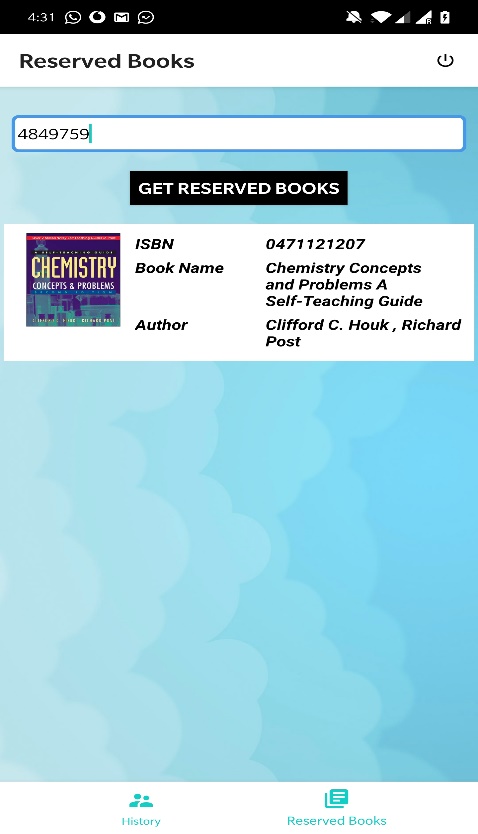


Figure: Reserved Books Fragment

**Student History Activity** – This activity shows all the information of the student (student details, book history). The librarian can search for a particular student id and the details pop up.

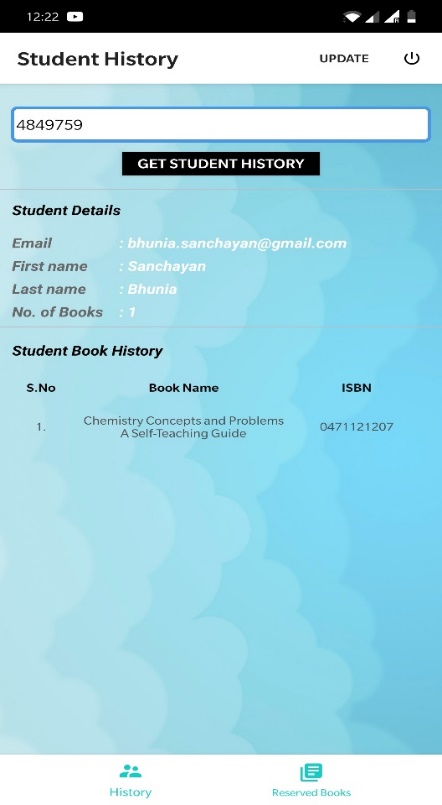


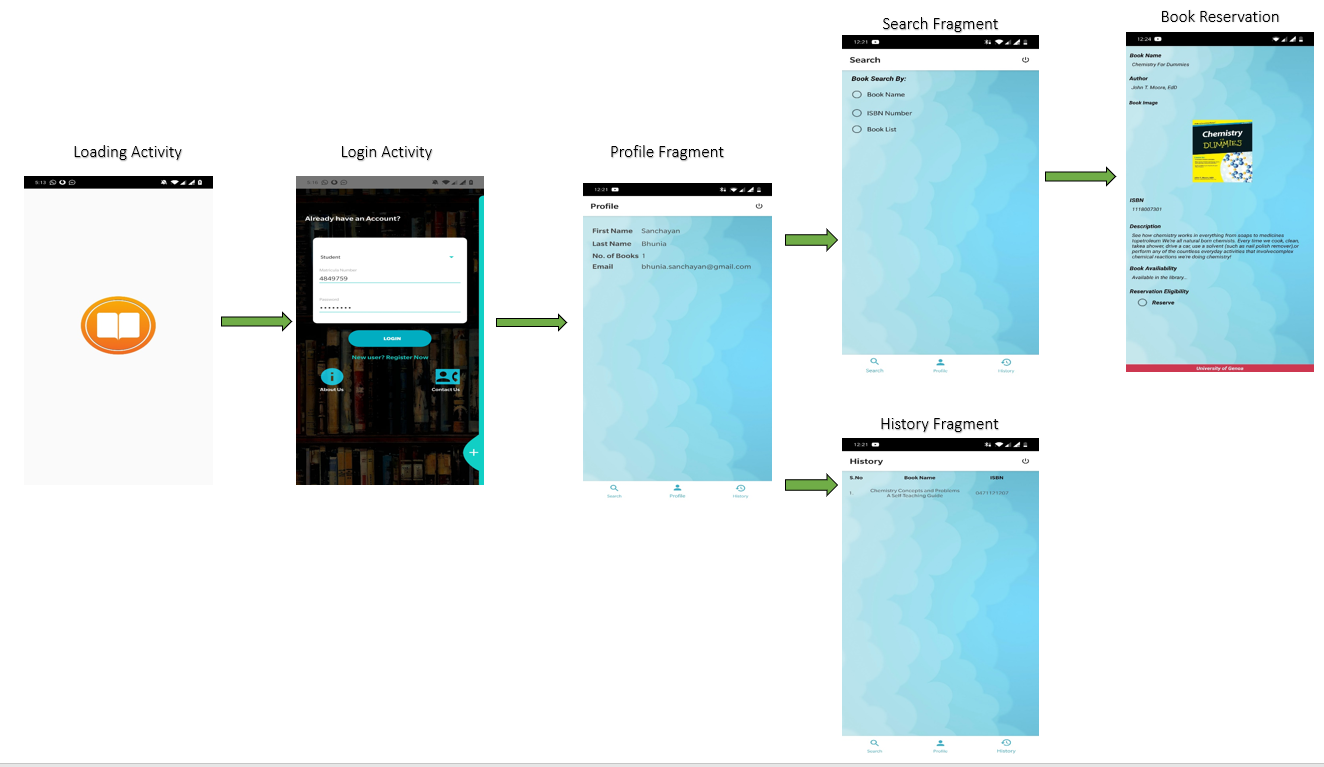
Figure: Student History Fragment

**Updating Details:**

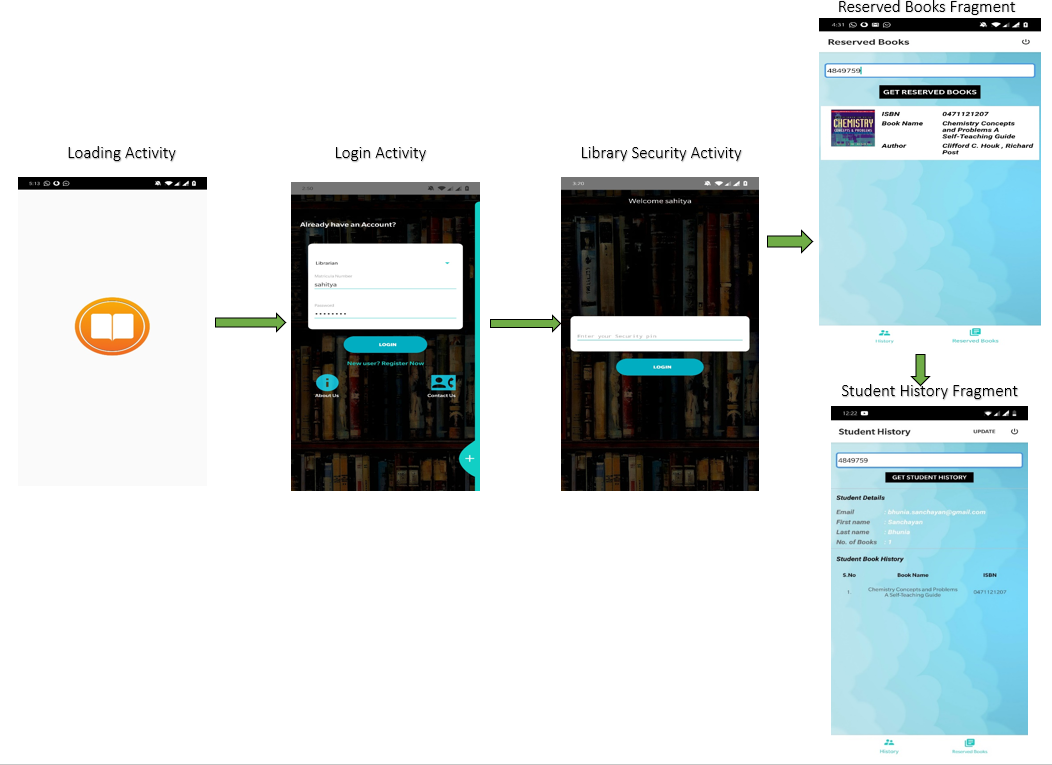
Updating Student Dues and Book Availability is taken care by the Admin User. This user has a direct access to the database.

**Navigation:**

**Student User Navigation:**



**Library User Navigation:**



Activities without logout buttons can exit be exited by using back button twice, after which an alert box for logout pops on the screen. On clicking yes, the user is **logged out**.

**How the application works:**

**Student details login (to skip Registration):**

ID: 4849759

Password: 1234qwer

**Librarian login details:**

ID: sahitya

Password: 1234qwer

Security password: zaq@okm

**Scenario: Reserving books**

1. Student logs in.
2. Navigates to Search Fragment.
3. Searches for a book using one of the three ways.
4. Details of a few books which are available in the library:

Books 1: ISBN: **1118007301**

Name: **Chemistry for Dummies**

1. Opens the book’s detail activity and reserves the book by using the radio button.
2. Student navigates to History Fragment and he would be able to see the list of books that he has reserved. (Date of Return is shown as “Not collected” since he has not collected it from the library yet)

**Scenario: Librarian accepting reserved books.**

1. Librarian logins in.
2. Librarian is asked for another security password.
3. Navigates to the Reserved Books Activity and searched for all the reserved books for the student using is ID. (In this case using **4849759**)
4. On tapping on the book in the list, the book is issued and the date of return is changed to 30 days from reserving.
5. The librarian can navigate to the Student History page and search with Student ID for looking at the student’s details. (In this case using **4849759**)

**Other Scenarios:**

1. Student with dues are not allowed to reserve books unless they pay their fine. (Fine is manually added into the database by the admin).

* To test this. Log with **4849759** as he has fine amount.

1. A student can reserve a maximum of 4 books.

* This can be tested by reserving 4 books on same Student account.

1. Books which are not available in the library are shown as “Not available” in the StudentBookReservation activity.

* To test this. Search by ISBN **0321651782** or by name “**Chemistry A Molecular Approach**” as it is set not available in the database.

1. Books which are reserved or issued to another student are shown as “Reserved By somebody” in the StudentBookReservation activity.

* Login from another Student user.

ID: 4849659

Password: 1234qwer

* To test this. Search by ISBN **0321693450** or by name “**Chemistry An Introduction to General, Organic and Biological Chemistry**” as its reserved by another student.

**Challenges Faced:**

1. Users data should not be mixed up.

* This was solved using session preferences.

2. The type of database to use. SQLite or Room

* SQLite was decided to be used since the application doesn’t really deal with very sensitive data, and is rather fast.