



**Faculty of Engineering and Applied Science**

**Mobile Application Development**

**Project Final Report**

**Group #14**

December 5, 2022

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## **Problem Statement**

This project was created in order to give university/college students a resource to save money on textbooks. As textbooks can cost upwards of a couple hundred dollars, we created this application to help students save money on textbooks. University students have a lot of responsibilities and loans to worry about along with the funds they have available to them, so it is imperative for them to somehow tackle the issue of buying expensive books at a cheaper price. Students who are going into class can search textbooks that are required, or students who are finished with a course and have no purpose for the textbook anymore can sell it to other students to get some money back.

## **Goals, Requirements, and Analysis**

The goal of this application is to give students a resource for selling/buying textbooks in a marketplace that is safe and efficient. Our application is meant to give students a place where they can either purchase used textbooks to save money, or to sell their used textbooks in order to get some money back. It should essentially act as a community marketplace similar to kijiji or facebook marketplace but only for books.

For the requirements of our application, we wanted to implement many requirements in order to create a reliable and secure application that students will continuously use throughout their university/college years. Requirements such as user-friendliness and visually appealing were created and implemented so that users will be able to understand how to use the application the very first time they use it so

that they are encouraged to use it again in the future. User retention was also implemented as there is a sign up/log in page in the application where students can have a database of receipts with the books that they have bought/sold in the past. The final requirements that were implemented were to have a user checkout and a search and sell page. These two pages in the application help users keep track of books they might want to purchase, publish books they want to sell, and a search function where students can type in the title of the book they are looking for but can't find in the recommended page.

After implementing the requirements through the goals and purpose of the application, a sufficient application was created that encouraged students to use in order to save money on textbooks. In further iterations of the application we hope to implement improvements to the sell page like enabling the user to be able to take photos of the book they want to sell on the market place.

## **The App Architecture**

While developing our application we decided to follow a standard architecture by having a user interface layer followed by a data layer. This structure encouraged us to evoke principles such as separation of concerns, drive user interface from data models, and single source of truth. This architecture resulted in our application having loose coupling and high cohesion.

User interface layer has two primary roles: display application data in a proper format and be the main point of user interaction. The UI layer is primarily made up of activities, fragments, and other corresponding classes and files. By limiting the direct

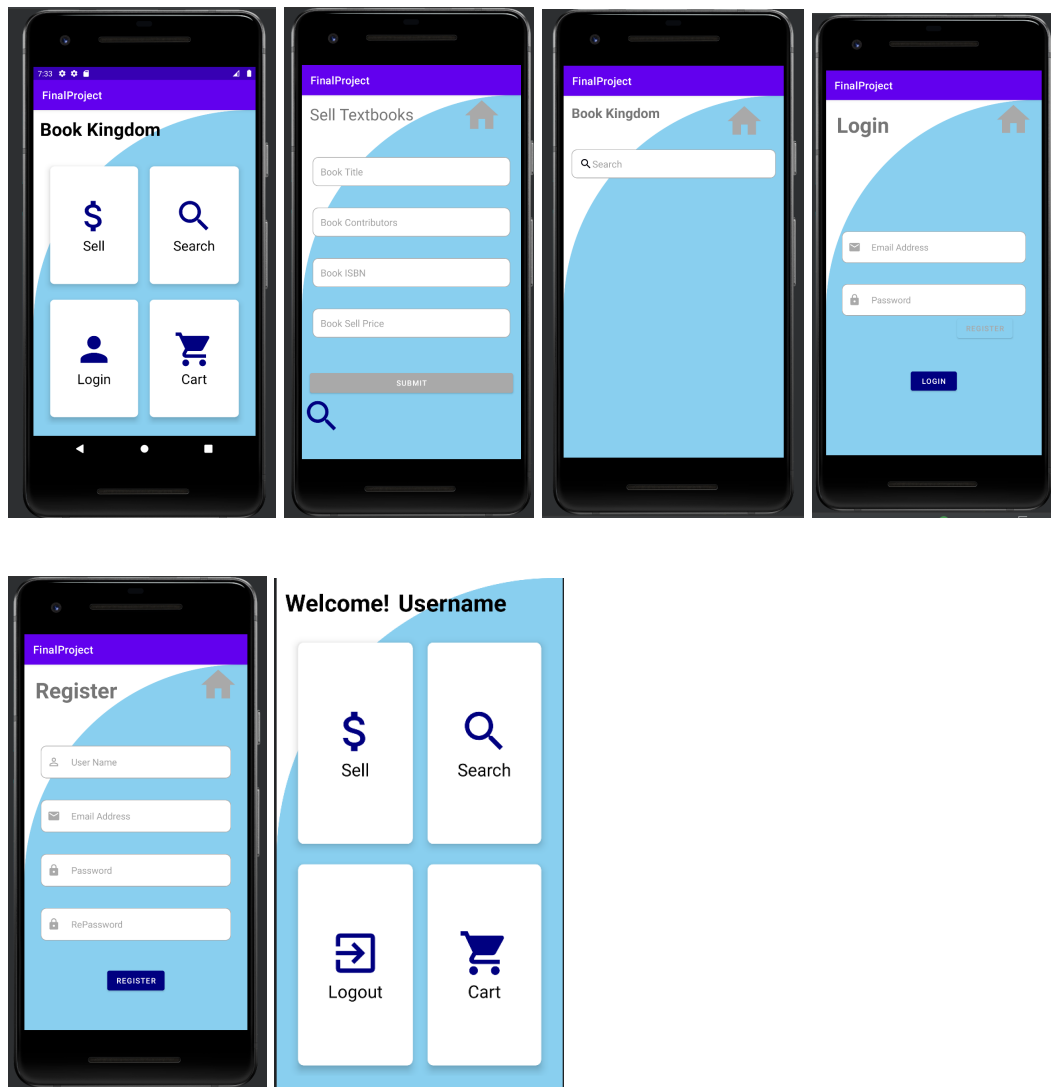
coding in activities and fragments while properly organizing resources ensures for separation of concerns. The UI takes data from the data layer and converts it into data that the UI can format and display. The UI needs to take user inputs and be able to interpret and reproduce as UI data. The UI layer is created and validated through android studio. Are application utilizes the resource drawable and values to insure loose coupling.

For the data layer we implemented Firebase to manage backend infrastructure. The data layer consists of application data and business logic. We used firebase authentication to manage the application user accounts. Doing so allowed for a secure way to protect user data and link users profile data to an account. In addition, we used Firebase Realtime database to store book listings. The Realtime database ensures that as a book is listed or sold the database is immediately updated. Firebase database separation allows for a single source of truth. Guaranteeing that application data is constant, accurate and up-to-date.

## **The tools used in the development**

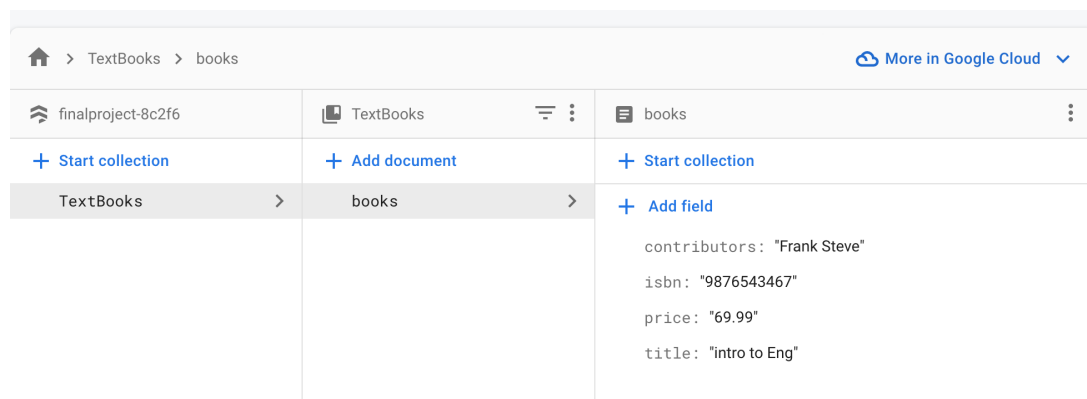
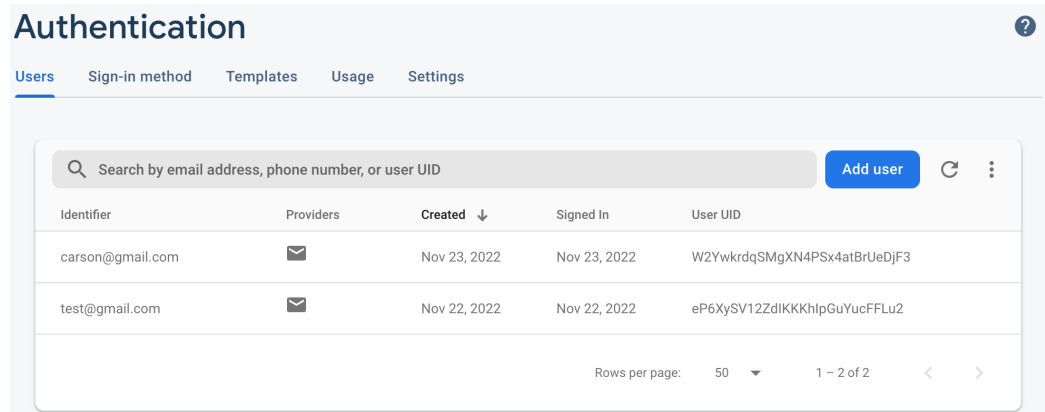
To help the development of the application, multiple tools were used. The main tool used was Android studio, which was the application used to create the app. Within Android studio, XML was used to style and format the activities, and Java was used to connect all of the activities and provide use to each activity. We also implemented a Firebase database which was used to save the user login information, and the books that were sold on the application.

## Screenshots of user interfaces



In the screenshots shown above, they display the different activities throughout the application. The first image shows the homepage of the application, where users can navigate to a specific section of their choice. In the second image, users are able to publish their book for sale by adding all the required information. The next image shows a search page where users can type in the title of the book they are looking for. Next, the final three images display the login and registration page for the user. The user can

either log in or register if they're new, and once they are logged in, the logged in page will display a welcome message with the user's name.



The two images displayed above show the Firebase Realtime database, and Firebase authentication where the users information is stored once an account is created, and the other image displays the collection of books that are on sale, which users have published.

## References

1. "Guide to app architecture : android developers," *Android Developers*. [Online]. Available:  
[https://developer.android.com/topic/architecture?gclid=Cj0KCQiAyracBhDoARIsACGFcS5yXquoXRAP685yHjlevcdtG8LuCQD-PPr0tUMLwDvUmKWUJZdRc78aAgEcEALw\\_wcB&gclsrc=aw.ds](https://developer.android.com/topic/architecture?gclid=Cj0KCQiAyracBhDoARIsACGFcS5yXquoXRAP685yHjlevcdtG8LuCQD-PPr0tUMLwDvUmKWUJZdRc78aAgEcEALw_wcB&gclsrc=aw.ds). [Accessed: 05-Dec-2022].
2. "Modern Dashboard Ui Design Android studio tutorial | Cardview android studio | grid layout android," *YouTube*, 17-Sep-2020. [Online]. Available:  
<https://www.youtube.com/watch?v=ixRXEoGAEZM>. [Accessed: 05-Dec-2022].
3. "Firebase authentication | login signup | forgot password | android studio | code the world," *YouTube*, 18-Jul-2022. [Online]. Available:  
<https://www.youtube.com/watch?v=X-UWzxQNAmg&t=497s>. [Accessed: 05-Dec-2022].