North South University

Department of Electrical & Computer Engineering

Course Project

SUMMER 2021

Course Name: Mobile and Wireless Application Development

Course No: CSE 486 **Sec:** 01

Faculty: Shaikh Shawon Arefin Shimon (SAS3)

Member 1:

Name: H. M. Tamim

ID: 1712305642

Email: hm.tamim@northsouth.edu

Git Repository: https://github.com/NSU-SU21-CSE486-1/1712305_SU21_CSE486_1/

Date Prepared: September 18, 2021

Overview

In this course project, we were instructed to design and develop an Android application called UniClubz that serves as a common platform for all clubs of all universities of Bangladesh. The application allows students to create an account, profile, join clubs, explore universities, events and a blood bank.

Implementations

To make the codebase clean and easily manageable, MVVM, singleton, and repository patterns were followed. Besides that, BaseFragment, BaseActivity, BaseBottomSheetFragment were written to reduce code boilerplates, and automate data binding, viewmodel.

It's a single activity architecture application, where navigations were managed by using Jetpack Navigation Graph.

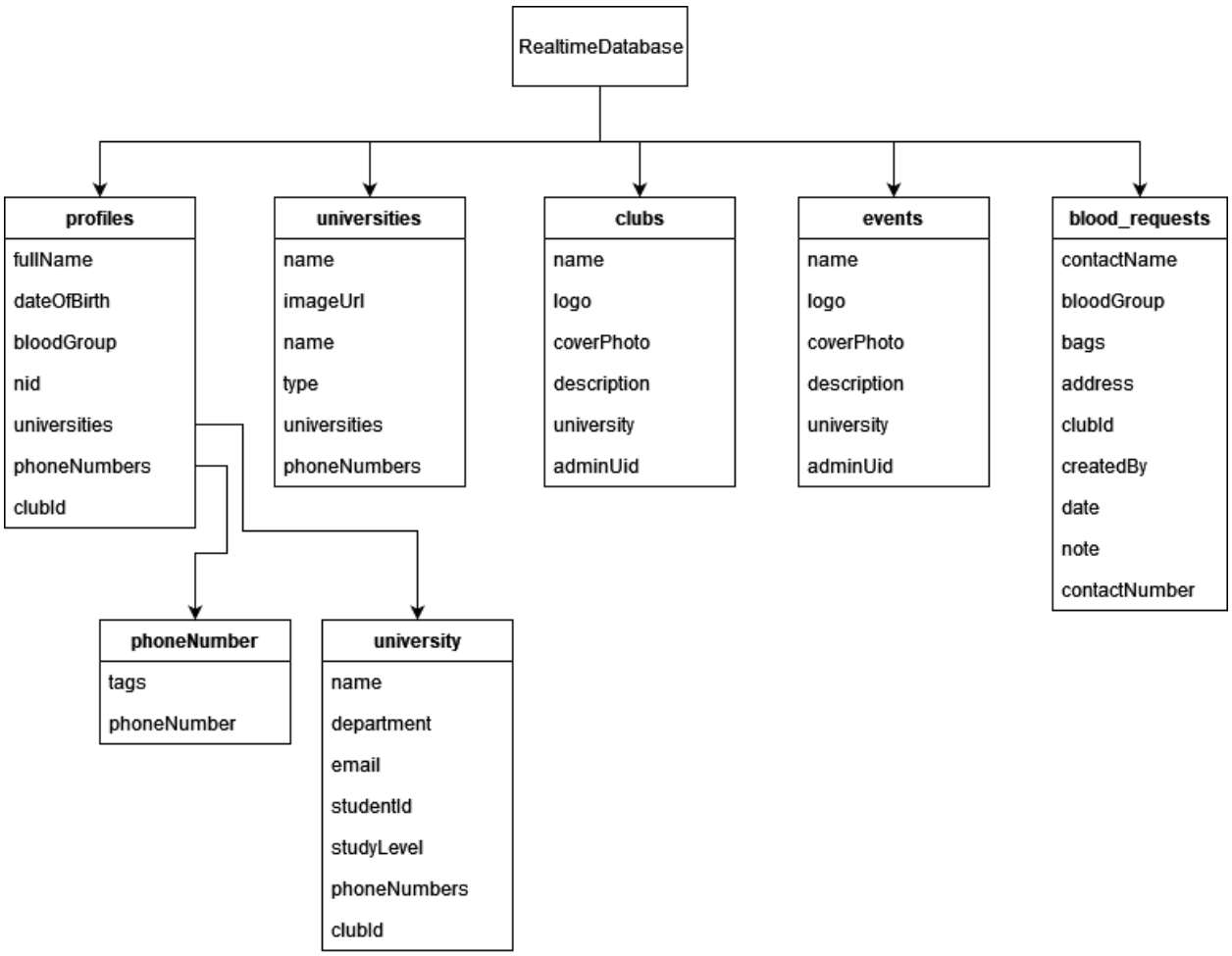
A standard directory structure was maintained throughout the project.

```
appId
    > data
        > pref
        > room
    > dependencyInjection
    > listener
        > model
        > Object/Entity List
    > ui
        > pageName
                > FragmentName
                > FragmentViewModel
                > controller
                > model
        > ……
    > utils
        > ….
    > App
```

For sending data from one fragment to another, serializable was used. Jetpack Dagger Hilt was used for dependency injection in the ViewModel constructor to receive data. Firebase Authentication service was used to manage student accounts and Firebase realtime database was used to store the rest of the data like profile, universities, clubs, events, blood requests etc.

Epoxy libraries were used to implement complex RecyclerView items and carousels.

Database Design(NoSQL)



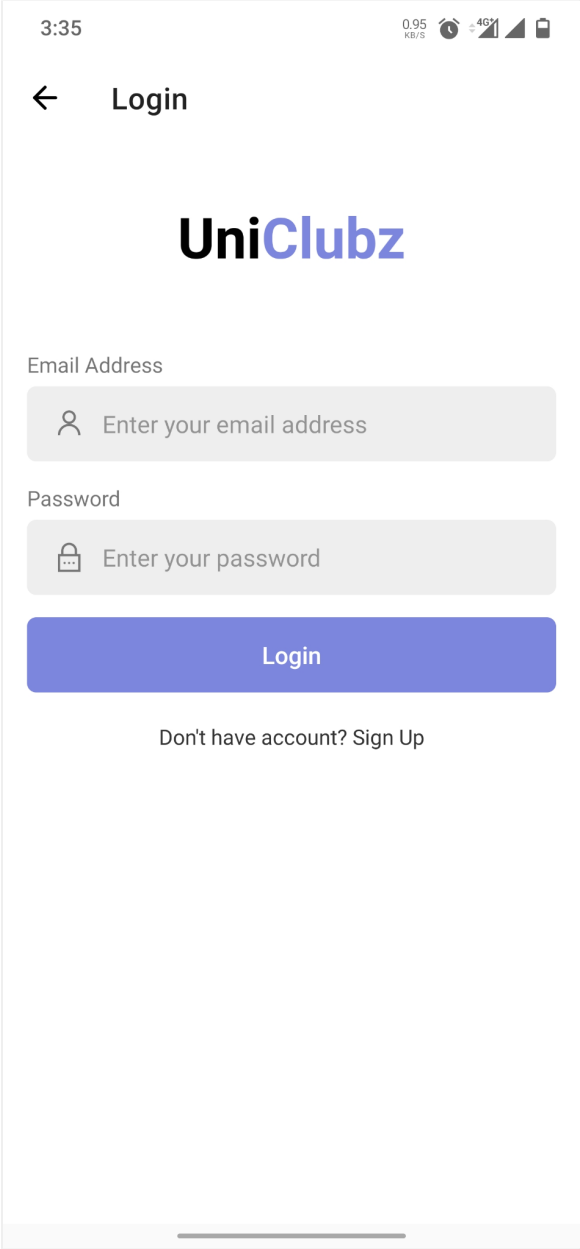
Each of those child has a unique id generated by Firebase realtime database.

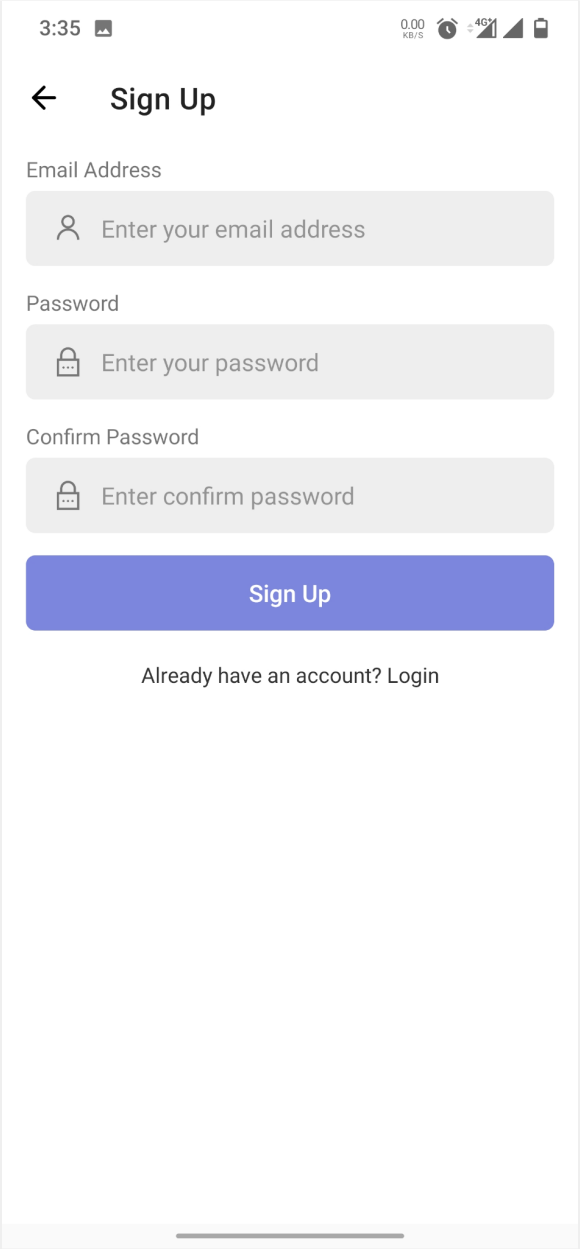
Features

The application has core 6 features.

1. Authentication
2. Student Profile
3. Universites
4. Clubs
5. Events
6. Blood Bank

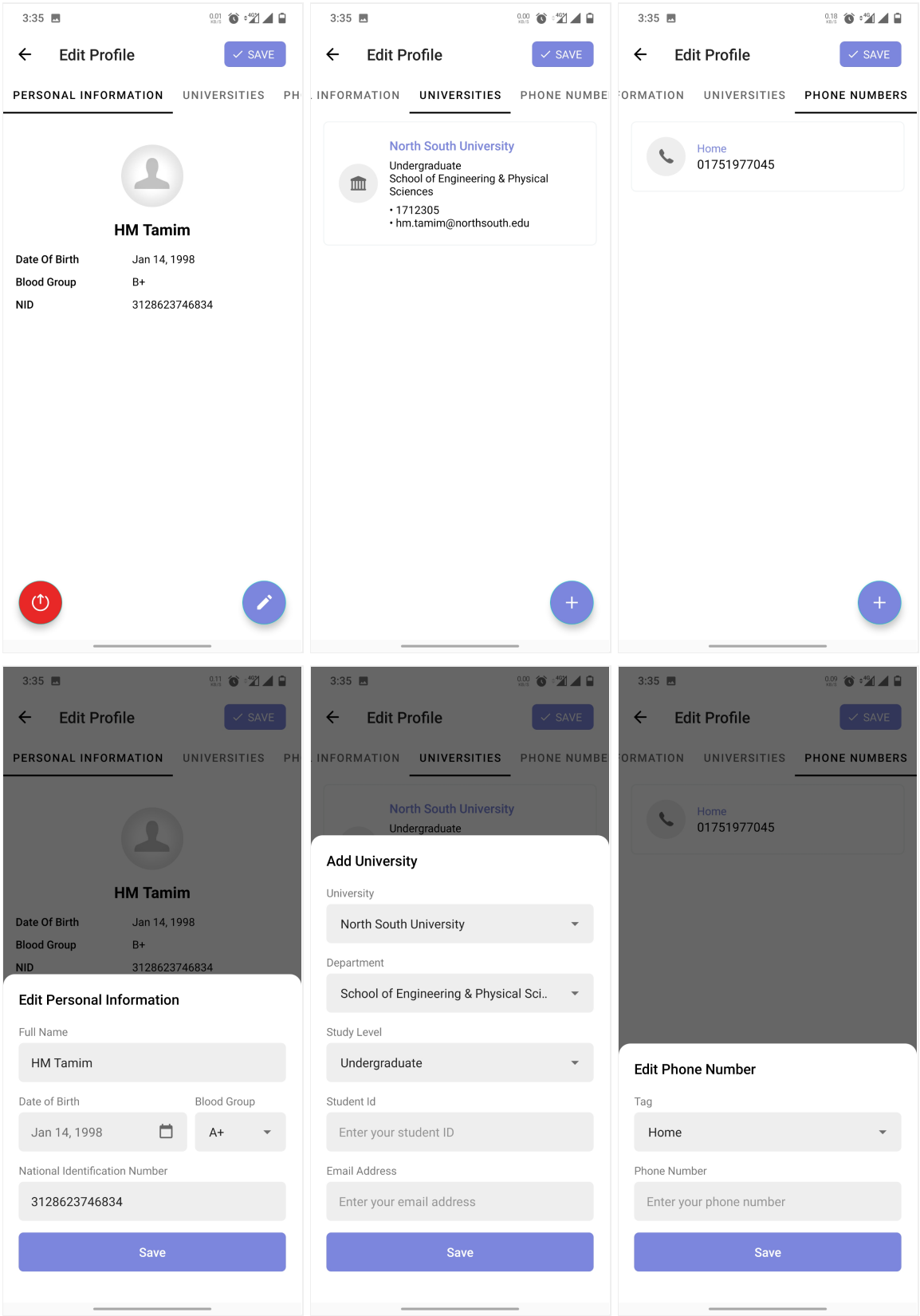
Authentication





For user account management, Firebase Authentication service was used. After signup, an unique user id is generated, which is saved to a shared preference to create a profile with that uid in the next step. Each input field has proper validation with toast. Error and expectation handle and loading bars for great user experience.

Student Profile



For edit profile flow, there are 4 fragments.

- UserProfileFragment
- PersonalInformationTabFragment
- UniversitiesTabFragment
- PhoneNumbersTabFragment

And also 3 bottom sheets.

- EditPersonalInformationBottomSheet
- EditUniversityBottomSheet
- EditPhoneNumberBottomSheet

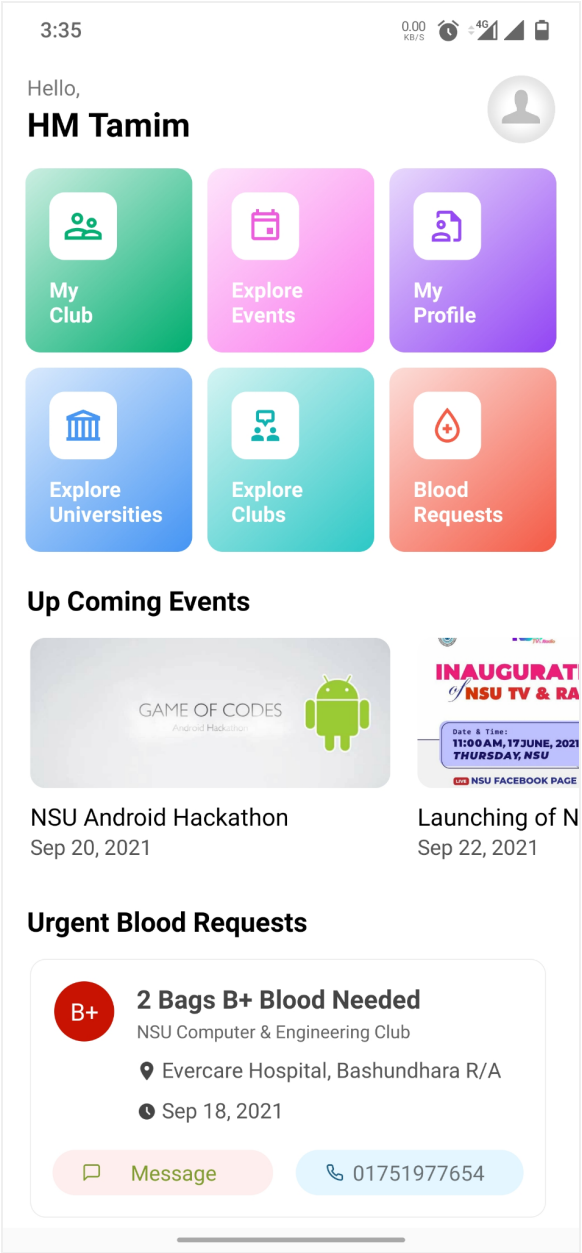
The tab based UI was implemented via ViewPager2 and FragmentStateAdapter. The fragments were added in the ViewPager adapter. TabLayoutMediator was used to connect TabLayout and ViewPager.

Separate bottom sheets were designed and implemented to insert or edit personal information, universities and phone numbers. To communicate BottomSheet to Fragment, a shared activity instance ViewModel and MutableLiveData were used. When data is inserted from the bottom sheet, that common LiveData was triggered which was observed in fragments to update user data. Then that data was used to populate the RecyclerView of University List, Phone Number List.

After entering all the data with step by step validation with a toast message, the user can click on the save button in the toolbar. Which will save the profile data in Firebase realtime database in that user's uid. After login or signup, user data is synced to share preference of the app.

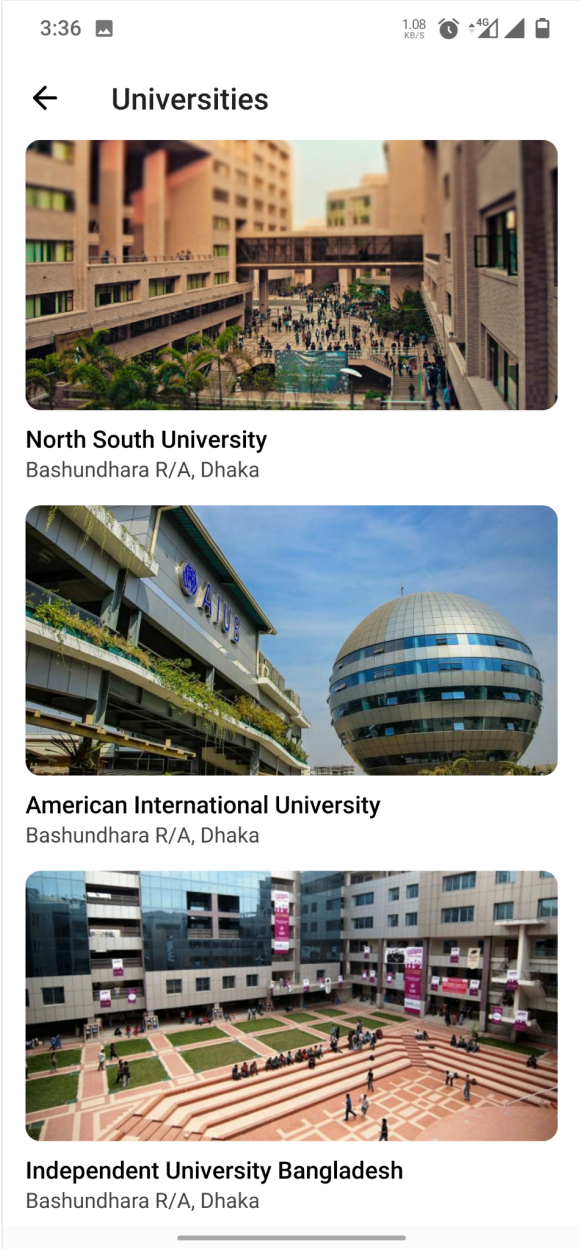
When a user visits the profile page again, it loads the user information from shared preference for easier profile management.

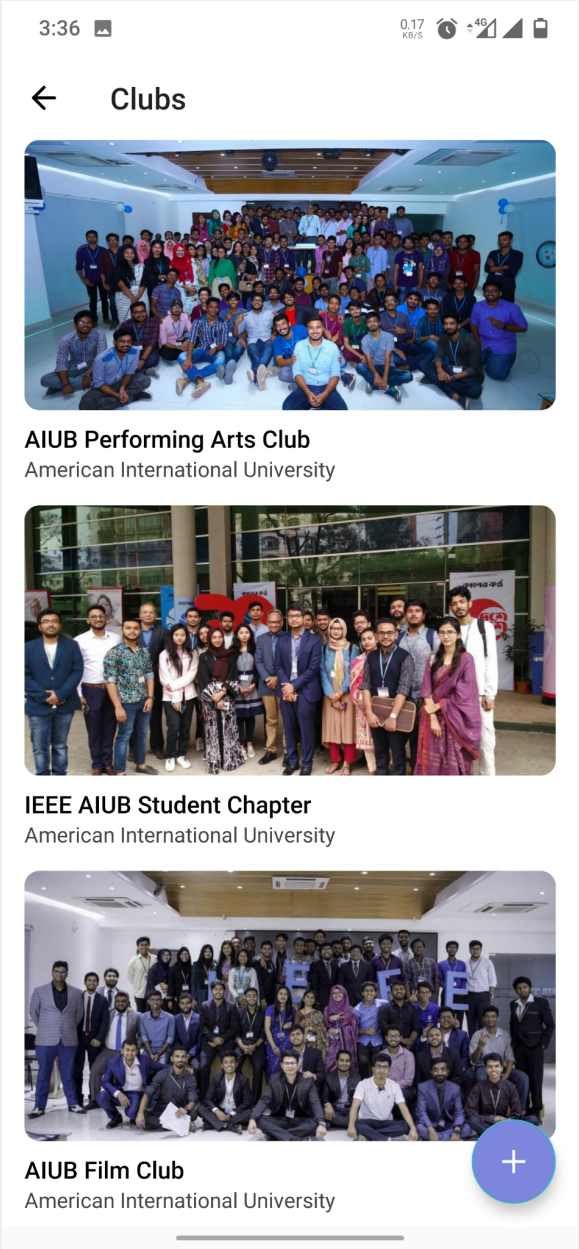
Home Page



After login/registration, the user is navigated to the home page. It shows basic information on the header, and 6 buttons for easier navigation to each feature. Also a scrollable carousel of the events and blood requests are shown here for a better UX. This complex few is implemented inside nested RecyclerView, via Epoxy Library.

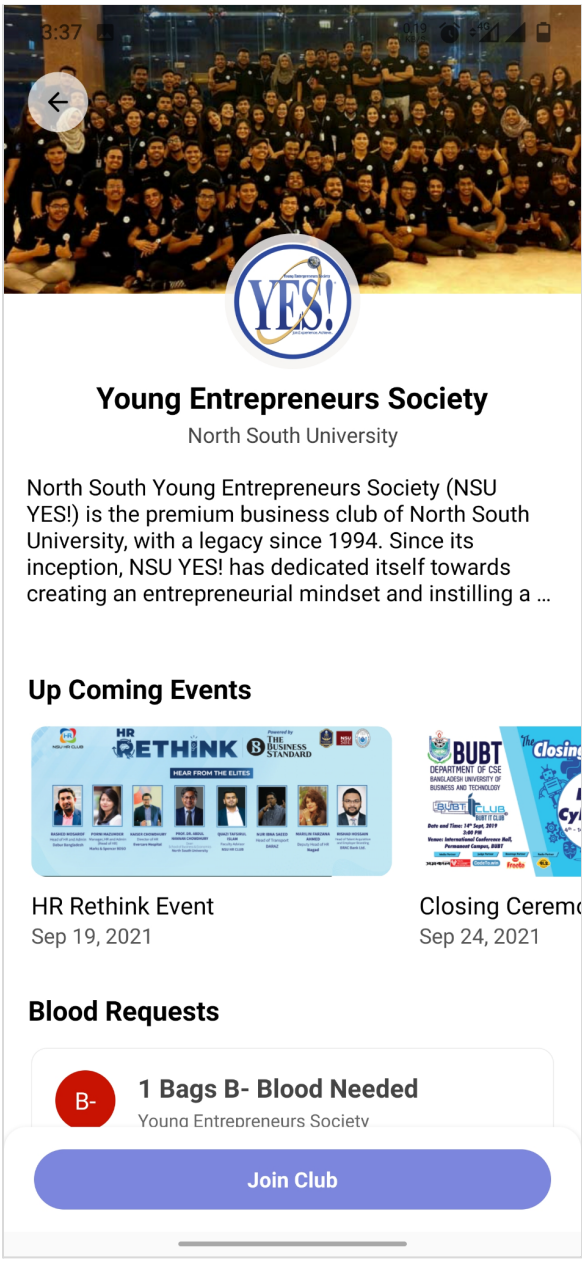
Explore Universities and Clubs

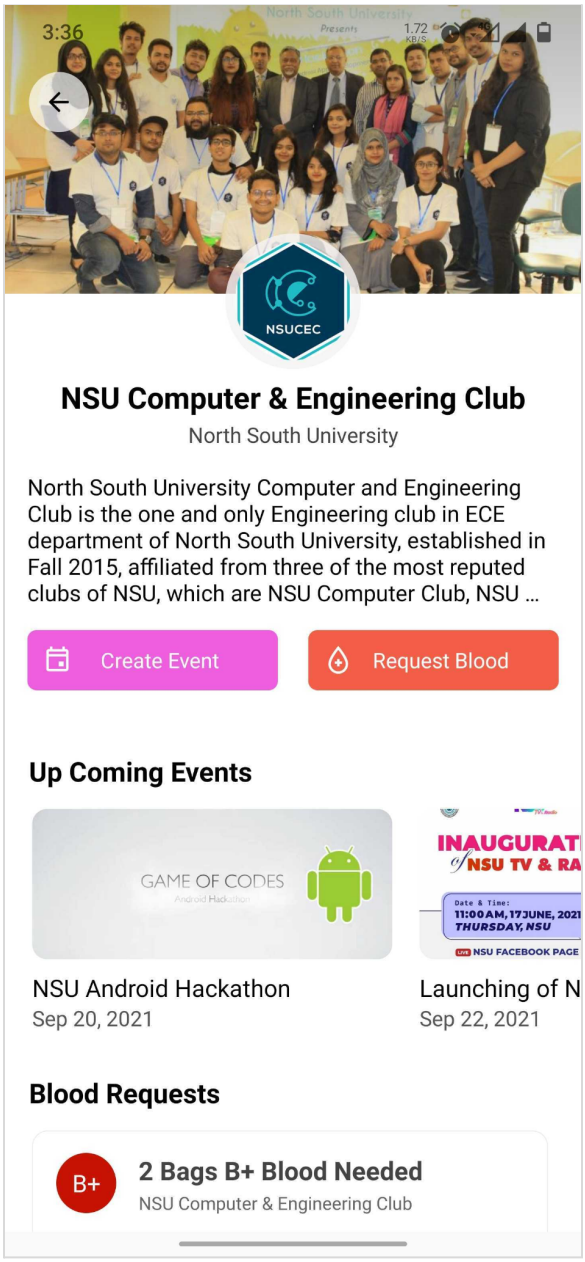




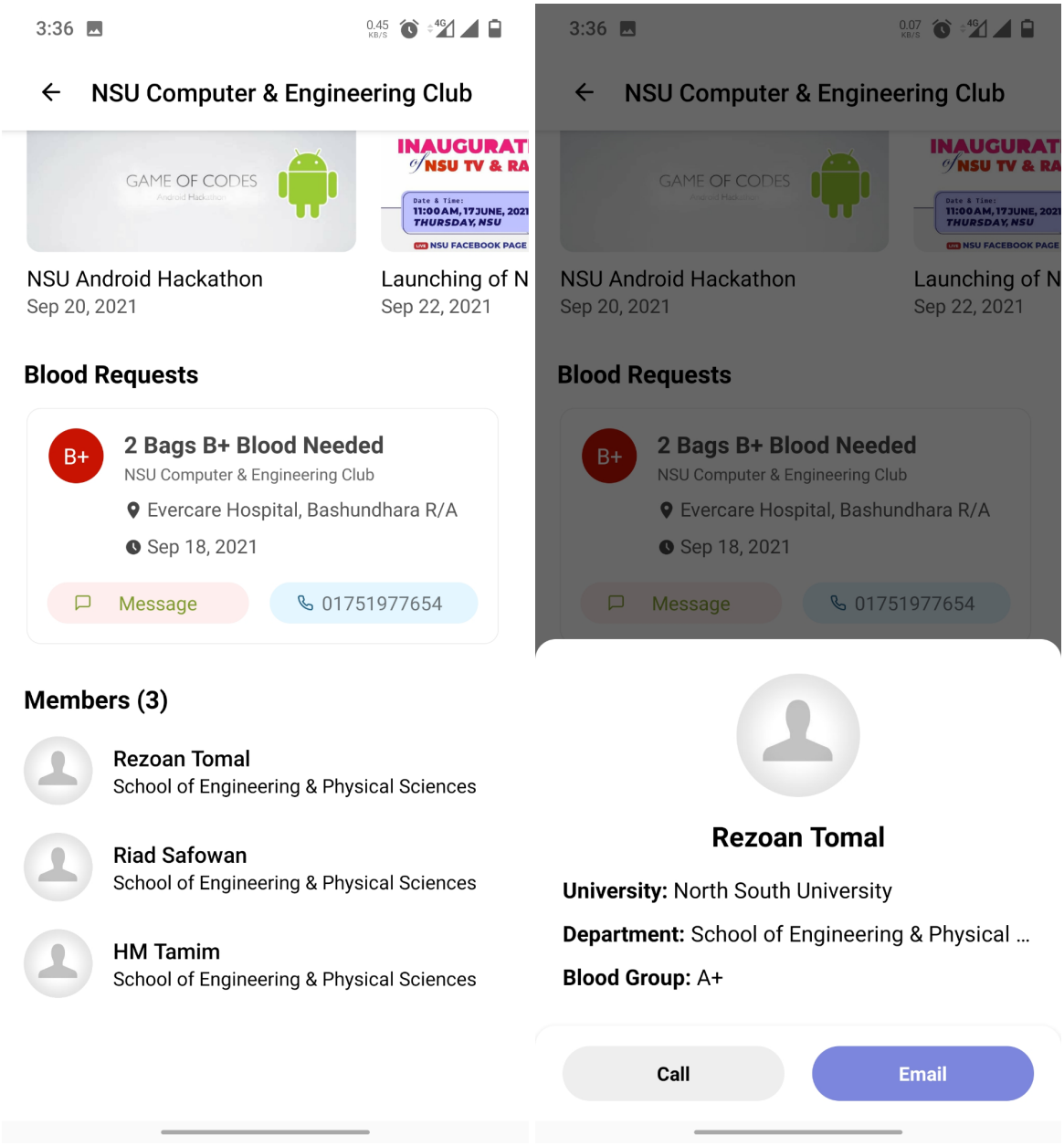
From the homepage, users can explore universities and clubs to join after registration. When a user clicks on a university card from its list, it navigates to the club list page where only clubs of that university are filtered via Realtime database query.

Club Details Page



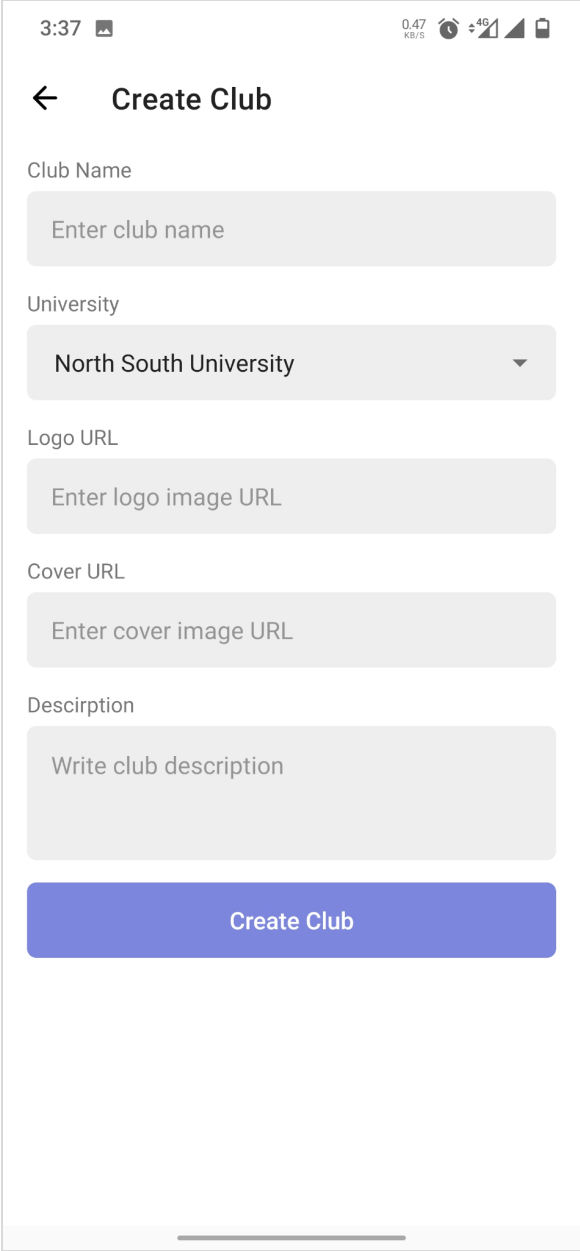


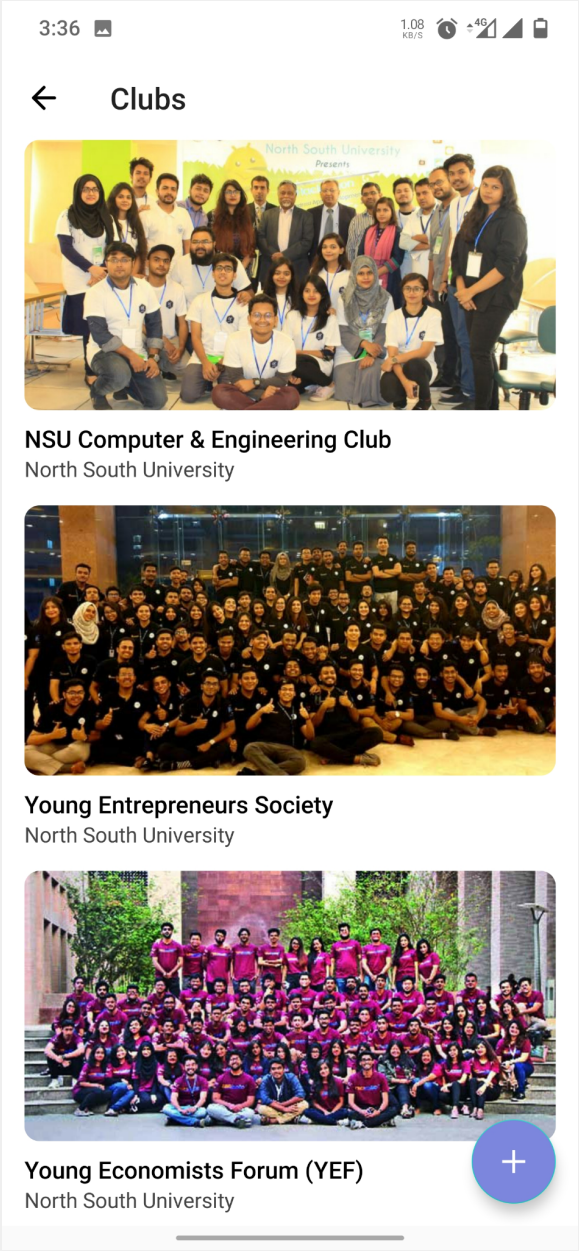
On the clubs details page, users can see the club details and a joined button if not already joined. If the user is the creator of that club, he/she will be able to see the Create Event, and Request Blood buttons. Besides, also the events, blood requests, members of that specific club are shown in the page.



From the member list, users can click and see the member profile in a bottom sheet. Where they can be basic information, call and email.

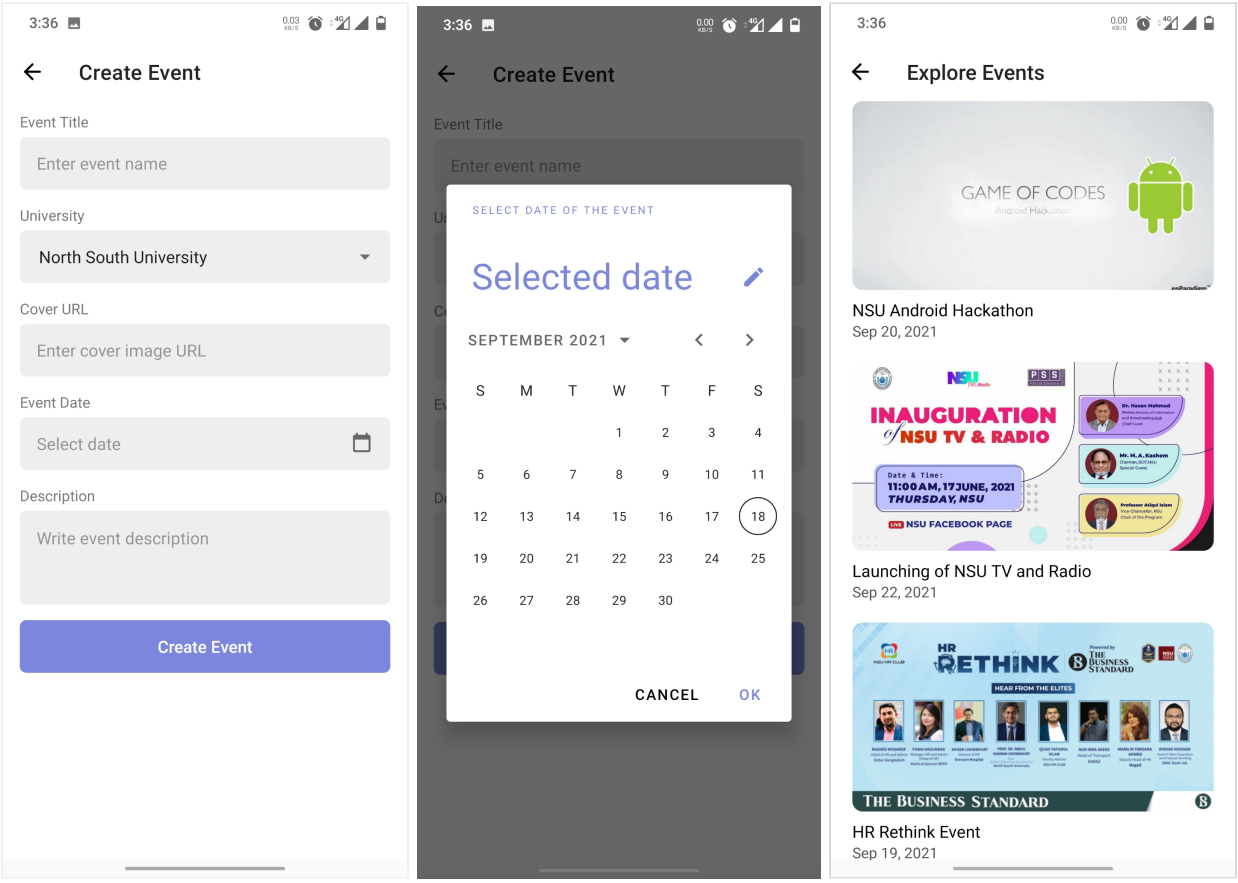
Club Registration





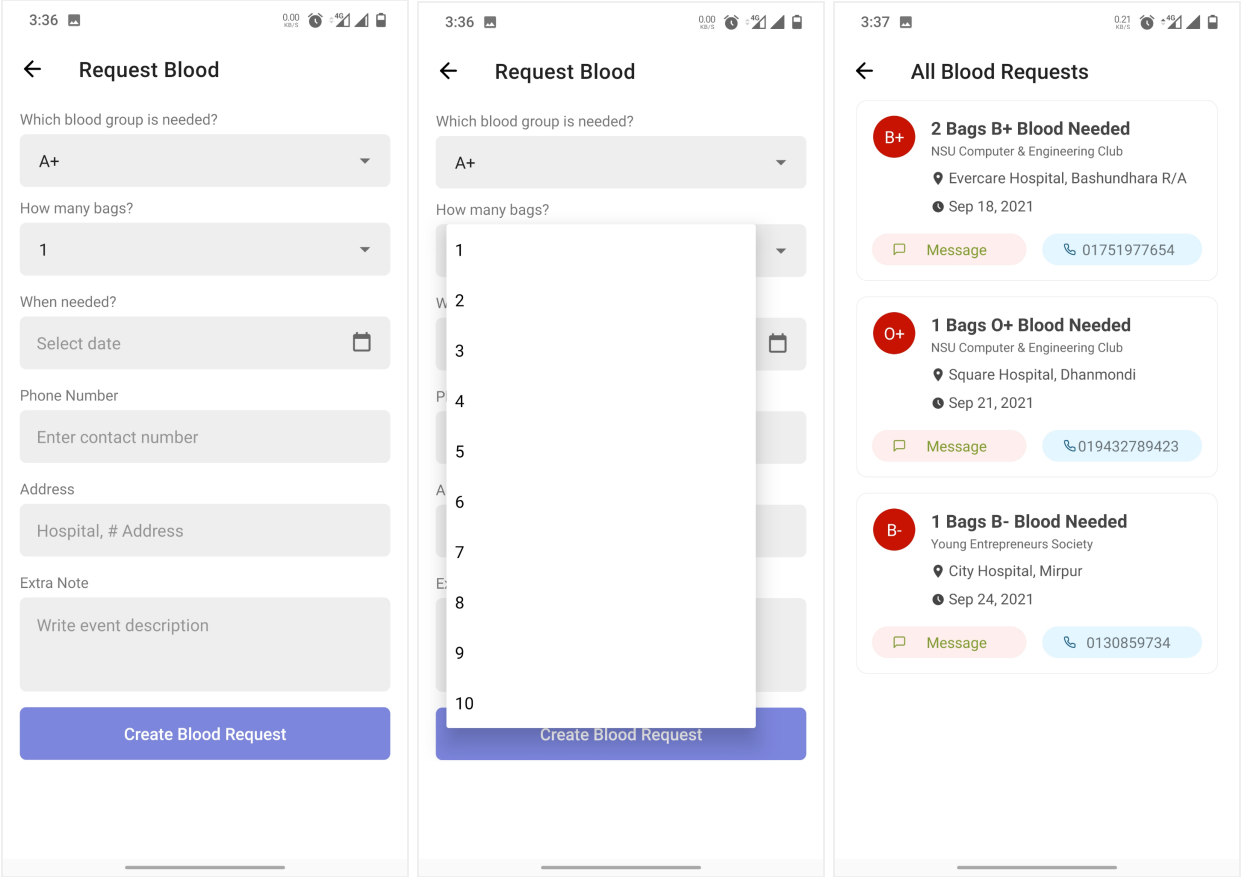
Users can create a club after entering proper information such as club name, logo image url, cover photo URL, university and description. Once the club is created in Firebase realtime database, they become the admin of that club. On club creation, a unique id is generated by using the push feature of Firebase realtime database.

Events



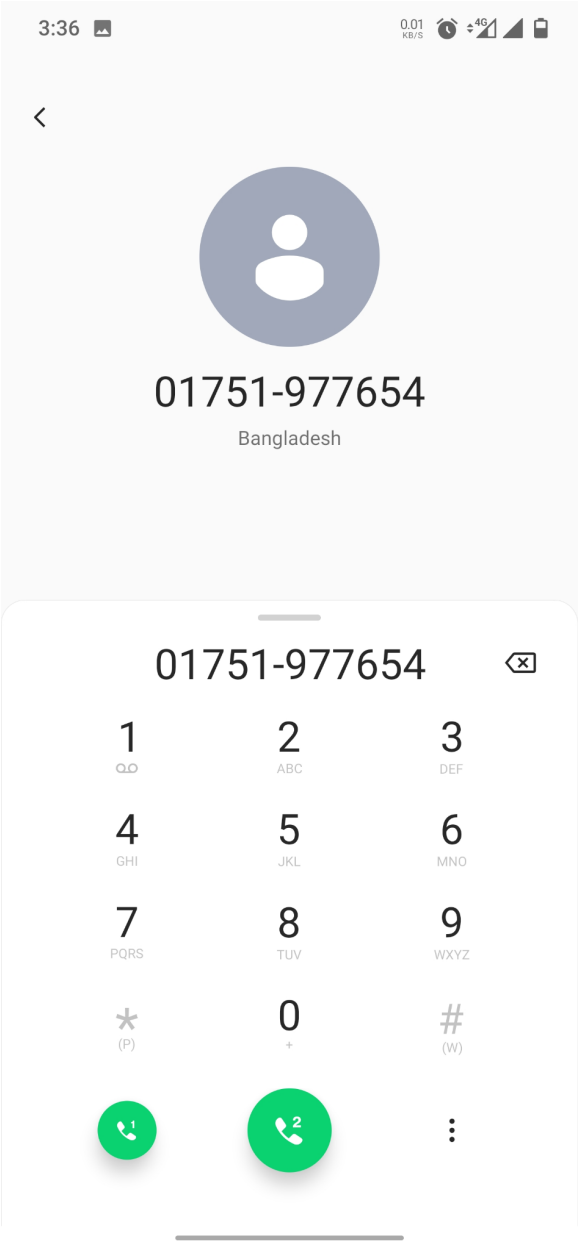
Only the club admin can create an event, by filling a form and entering a date. From the explore events list page, users can see all the events of all universities.

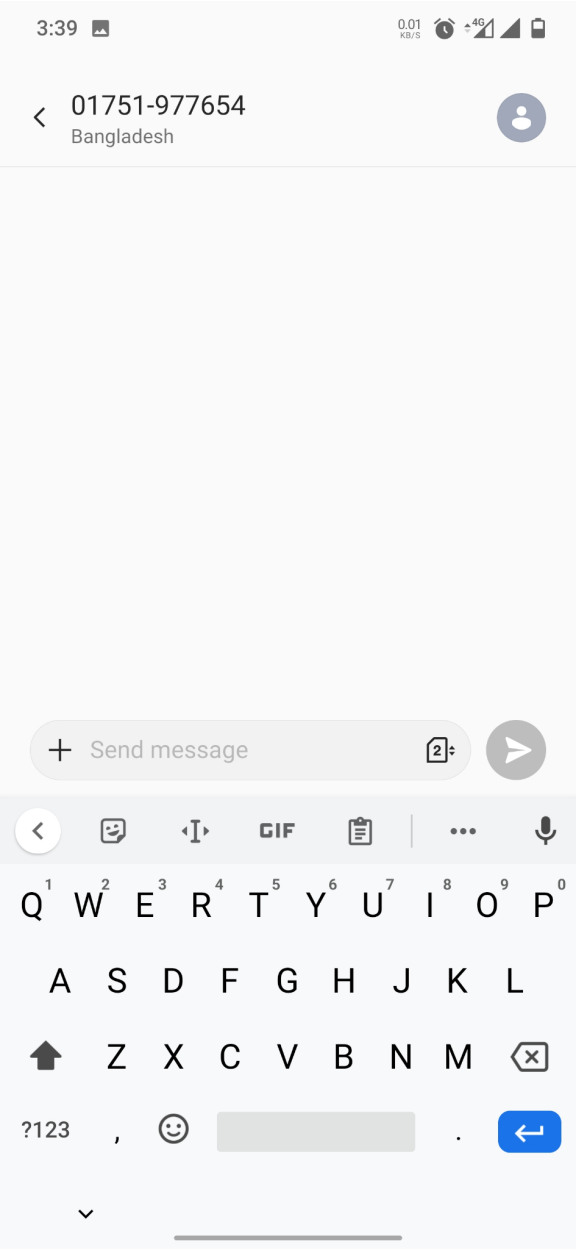
Blood Bank



Club admin can also request for blood by filling a form. In the All blood Requests page, all the blood requests are shown. Users can see the information and click on the message or call button to communicate easily.

Use of Intents





Built is Android intents are utilized for a better user experience. For example, for calling, sms or email in the blood bank section and member profile section.