



Khulna University of Engineering & Technology

Department of Computer Science and Engineering

Project Report

Course Code: CSE-2200

Course Title: Advanced Programming

Project Title: ICU Bed

Platform: Android

Submitted to:

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Date of submission: 23.06.2021

Objectives:

1. To develop an android application that will let hospital admins to easily provide and update information about their available hospital beds
2. To develop a system where ICU bed finders can easily search for hospitals with available ICU beds
3. To develop a system where provider admins can easily handle the requests for available ICU beds
4. To develop an android application that will let finders easily book available ICU beds, handle their requests and confirm payment
5. To develop an android application that will let the users to call and email the hospital admins
6. To develop a user friendly and attractive UI

Introduction:

Recently, COVID-19 has become a global phenomenon. It has created a great challenge for our hospital management systems. Many people are facing difficulties to quickly find the right hospital with available hospital ICU beds. ICU Bed is a project that will help the users who are looking for available ICU (finder) and ICU provider admins to interact easily. If a finder wants to book a bed time prior, he/she can do so by using this app. A provider admin can also confirm the booking, update their hospital details and these all will be stored in the realtime database. A provider admin can also update the information about the available beds in the hospital. All these modules will be able to help the finders and the provider admins with more convenience and in a more efficient way. To develop this project, mainly Android Studio and Firebase Database are used.

Android Studio is the official IDE(Integrated Development Environment) for android platform development and is freely available. It is designed specifically for Android development and I am using it to develop the app, as thus far the app is exclusive to android. I am using the 4.2.1 version of Android Studio which provides-

- Simple integration
- Better design and distribution
- Advance code completion
- User Interface (UI)
- System Stability

Google Firebase is a mobile platform for helping to develop app, and increase user base. It's made up of features that can be matched to fit the needs of the user. Most of the features on Firebase are free to use. I will be using Firebase for app sign in options and authentication and to maintain a user database.

The benefits of Firebase are-

- It is a cloud-hosted database.
- Data is stored as JSON and synchronized in realtime to every client that is connected. All of the clients will share one Realtime Database and automatically will receive newest data.
- It is a NoSQL database which makes it very fast and as-a-result, it can sync data in realtime. The connected device receives that update within milliseconds.
- Firebase Authentication helps to build a secure authentication.
- One can provide any social networking login with very few lines code.

Implementation

❖ Detailed Description-

The detailed design including modules and sub modules of the application is as follows:

Splash screen and Home Page:

The application starts with a splash screen. The splash screen will stay for 3 seconds and then the home page will appear. In the home page, the user will find two buttons for two types of user modules-

1. Provider Admin
2. Finder

The user needs to sign-up to use the application.

User registration:

The users can either register as a provider admin or as a finder.

Here provider admins will have to register their hospital with necessary information such as hospital name, hospital address, district, email address, password, contact number, total ICU beds and available ICU beds. They also need to provide the number and prices of Covid general beds, non-Covid general beds, Covid ICU beds and non-Covid ICU beds.

In case of finders, they only need to sign up using an email address and password.

Once the users have provided all necessary information for registration, the information and user type (i.e. provider or finder) will be stored in firebase database and they will be allowed to login.

The users will find a Text saying “New here? Sign Up” in Log in page through which they can go to registration page.

Login and reset password:

If a user is already registered, he can login to the application by using his registered email address and password. If he wants to reset his password, he will need to click on “Forgot Password?” text and provide his email address where a reset password link will be sent. Through the link he can enter a new password for login.

If the user is already logged in, he can directly go to provider admin or finder home page after checking their user type status. But if the user is registered as finder, he can log in as a provider admin and vice versa. They will see a message saying “You are not a finder”/ “You are not a provider”.

Provider admin homepage:

After logging in as a provider admin, the user will come to provider admin homepage where he will find three buttons such as:

1. **My Hospital:** In My Hospital option, the provider admins will go to Hospital Details page where they can find and update the information about their hospital such as hospital name, hospital address, total ICU bed, available bed numbers and price of different types of beds. There are three textview with onClickListener such as-
 - **Update-** This option will allow the admins to do a full update of their hospital details such hospital address, district, contact number, total ICU bed, available icu bed, Covid general bed, Non Covid general bed, Covid ICU general bed, Non Covid Covid ICU general bed and there prices respectively.
 - **Short Update-** This option will allow the admins do only update the available bed numbers. They can either add bed or minus bed within the limit of total ICU beds.

- **Request Bed-** This option will allow the admins to see all the received requests for ICU beds and patients details such as name, address, email, phone, bed type, number of bed, price and status. The admin can either accept or reject the request. They can also delete the request from their request list.
2. **Hospital List:** The user will find information about all the hospitals that have registered by this application. They will find the hospital name and the number of available of beds in that hospital. There is search option in this page that will help them to **search** and find the hospital near their location. They need to input their district or hospital name. If they select a hospital from the list, it will take them to the hospital details page of that hospital. They will be able to see information about other hospital and can contact them by **phone call** or **email**. If the provider admin selects their hospital from the list, they will see their hospital profile and can update information.
 3. **Request List:** This option will allow the admins to see all the requests they have received for ICU beds and the patients' details such as name, address, email, phone, requested bed type, number of bed, price and status. The admin can either **accept** or **reject** the request. They can also delete the request from their request list.

Finder homepage:

After logging in as a finder, the user will come to finder homepage where he/she will find two buttons for two options such as:

1. **Hospital List:** The finders will see the information about all the hospitals that have registered by this application. They will find the hospital name and the number of available of beds in that hospital. There is search option in this page that will help them to search and find the hospital near their location. They only need to input their district or hospital name. If they select a hospital from the list, it will take them to the hospital details page of that hospital. They will be able to see information about their available beds, bed types and price of them. They can request to book a bed and also can call and email the hospital authority. There is request bed option that will show them the request history of that hospital. Finders can **cancel** a request. They can **delete**

the request from the list. There is a **payment** option that will provide them a **payment card** for payment procedure.

2. **Request List:** This option will allow the finders to see all the booking requests they have made for ICU beds and the hospital details such as name of the hospital, email, bed type, number of bed, price and status. The finder can cancel the booking request and delete the request from their request list. The payment option will provide them a payment card for payment procedure.

Flowchart / block diagram

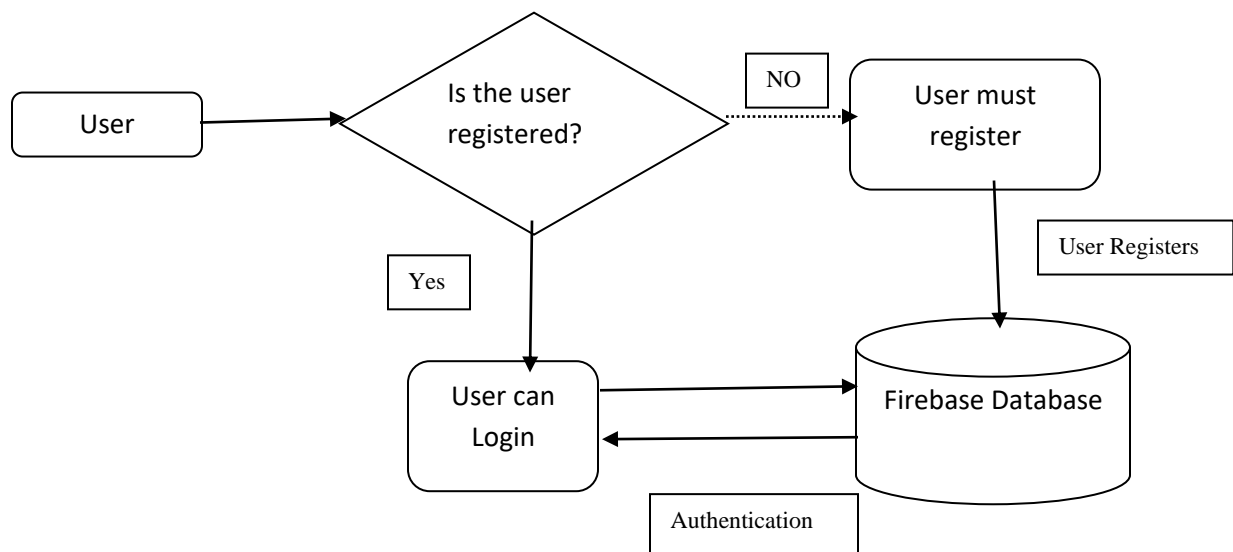


Fig 1.1: Flowchart for Log In process

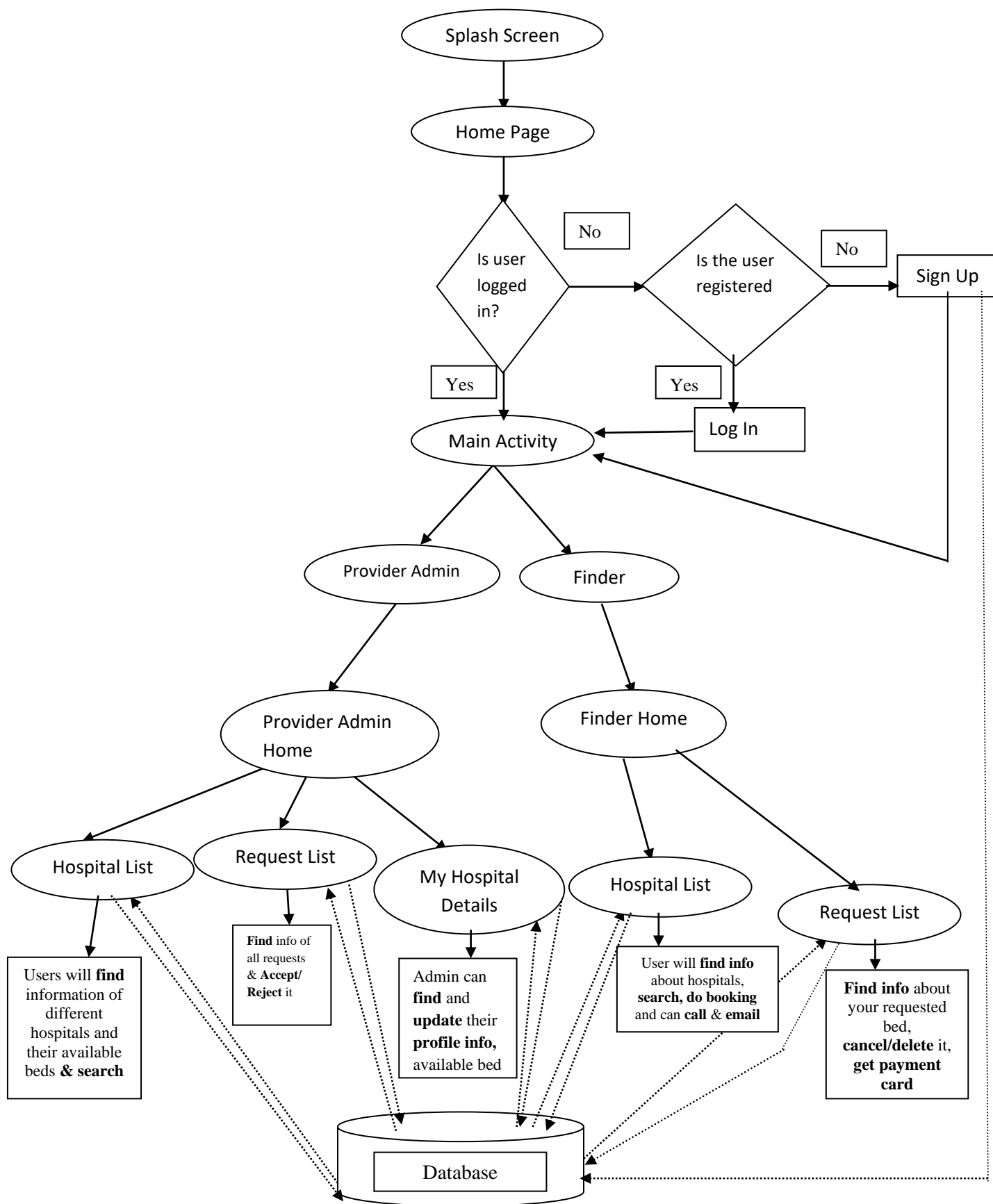


Fig 1.2: Flowchart of the ICU BED app's activity

❖ Schema diagram



Fig 1.3: Firebase database nodes for all user accounts(provider admin and finders), admin(booking requests for individual admins), allRequest(all booking requests for a finders in different hospital), provider(for users' type), request(all booking requests of a finders for in a specific hospital), users(all provider admin's hospital details)

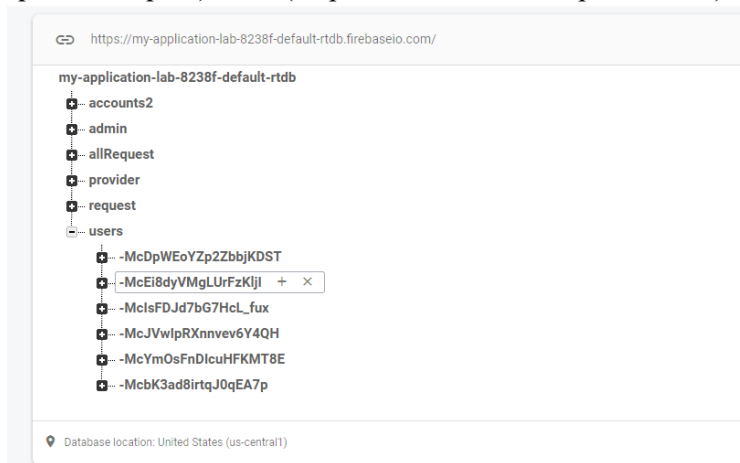


Fig 1.4: “users” database used for hospital registration and provider admins’ hospital details

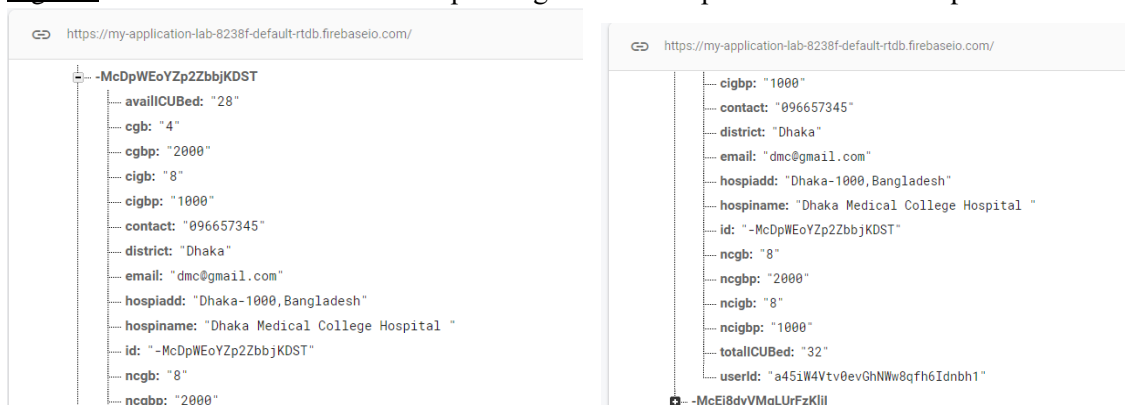


Fig 1.5: Details of a child under “users” database

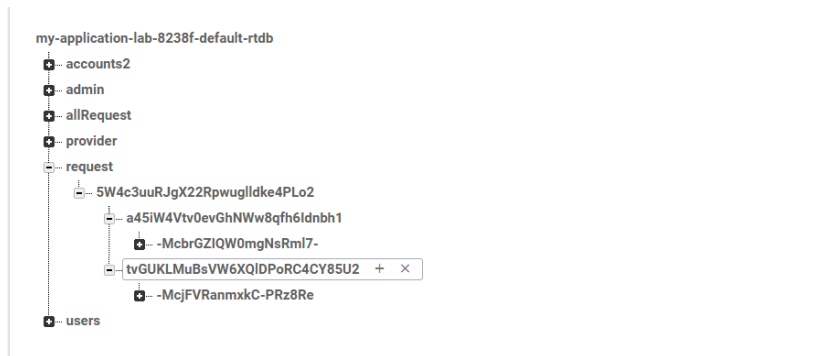


Fig 1.6: “request” database for a finders request in various hospitals

Fig 1.7: Details of child under “request” database

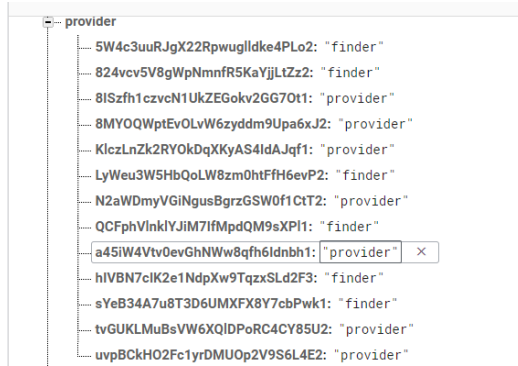


Fig 1.8: “provider” database for user type

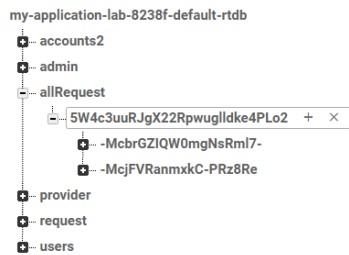


Fig 1.9: “allRequest” database for user’s booking request in overall hospitals

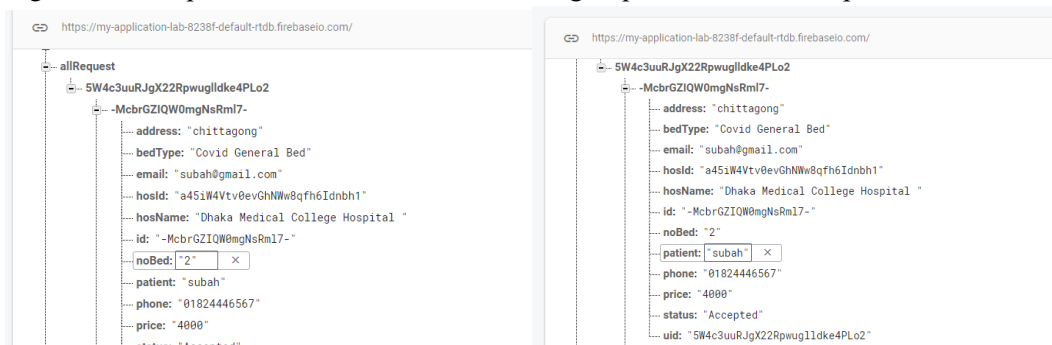


Fig 1.10: Details of a child under “allRequests” database

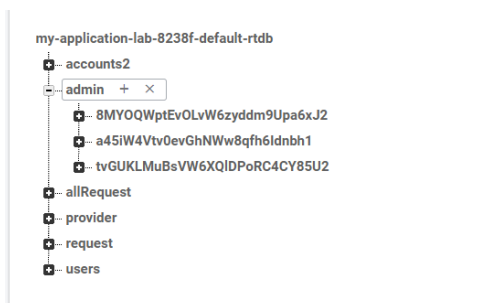


Fig 1.11: “admin” database for all requests received by a particular provider admin

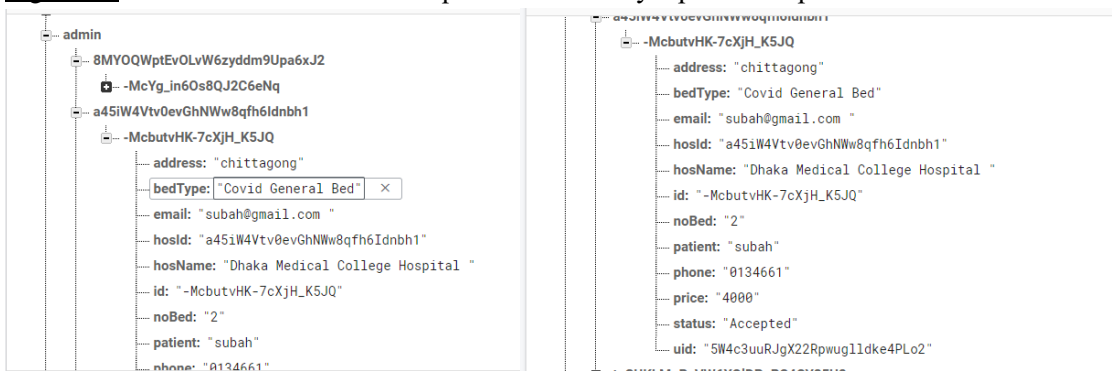


Fig 1.12: Details of child under “admin” database

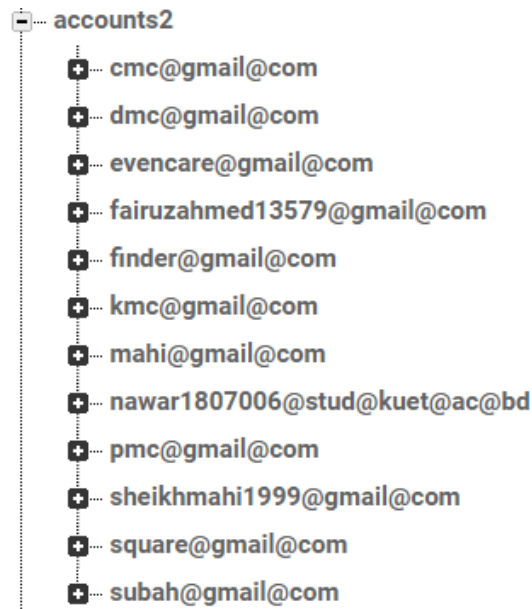


Fig 1.13: “account2” database to check the users’ status who is already logged in

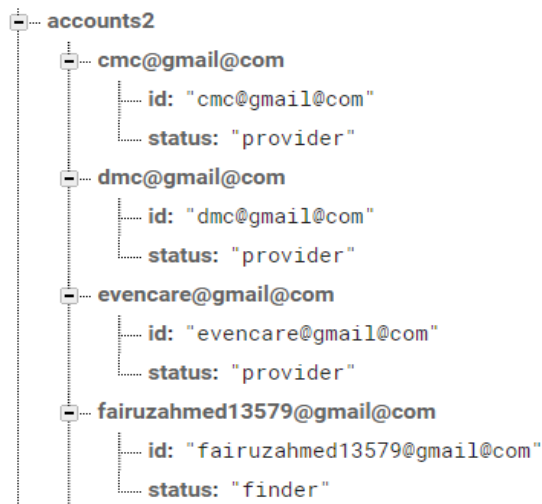


Fig 1.14: Details of child under “account2” database

❖ Detailed Visualization



Fig 1.15: Splash Screen

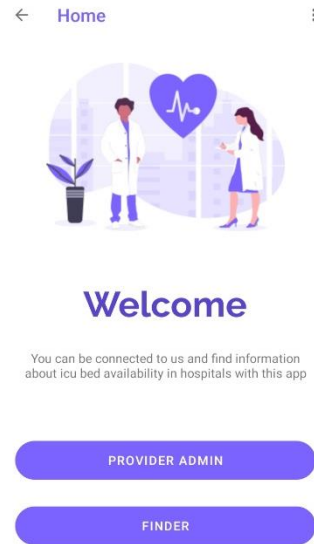


Fig 1.16: Home Page

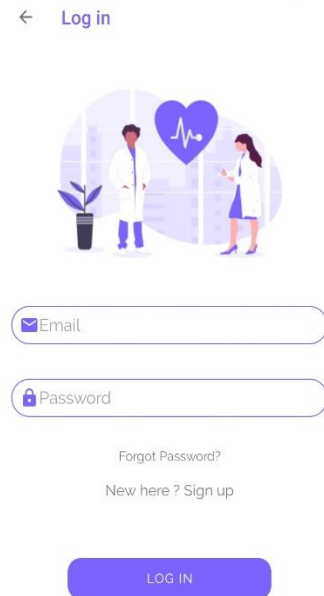


Fig 1.17: Log in Page

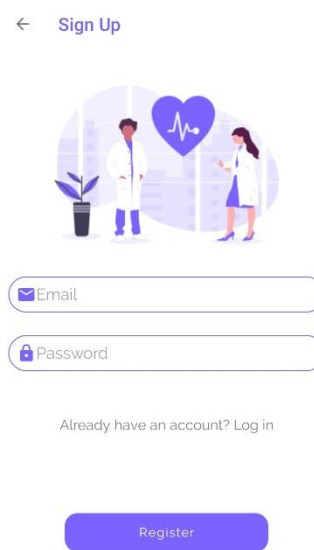


Fig 1.18: Finder Sign Up

← Sign Up

Hospital Info

Hospital Name

Hospital Address

District

Contact Number

Total ICU Bed

Available ICU Bed

Covid General Bed

Covid General Bed Price

Non Covid General Bed

Non Covid General Bed Price

Covid ICU General Bed

Covid ICU General Bed Price

Non Covid ICU General Bed

Non Covid ICU General Bed Price

Email


Password

Already registered? Log in

Register

Fig 1.19: Provider Admin
Sign up

← Log in



Reset Password?

Enter your email to receive reset password link

NO YES

Forgot Password?

New here ? Sign up

LOG IN

Fig 1.20: Reset Password



You can be connected to us and find information about icu bed availability in hospitals with this app

Hospital List
Find info about different hospitals here

GO

Request List
Find info about requested beds

GO



You can be connected to us and find information about icu bed availability in hospitals with this app

Request List
Find info about requested beds

GO

My Hospital
Find and update info about your hospital

GO

Fig 1.21: Provider Admin Home



You can be connected to us and find information about icu bed availability in hospitals with this app

Hospital List
Find info about different hospitals here

GO

Request List
Find information about your requests

GO

Fig 1.22: Finder Home

Search

Total 6 results found

Dhaka Medical College Hospital Available Seats 28

Ma - O Shishu Hospital Available Seats 20

EverCare Hospital Available Seats 26

Square Hospital Limited Available Seats 30

Parkview Hospital Available Seats 24

Khulna Medical College Hospital Available Seats 20

Fig 1.23: Hospital List

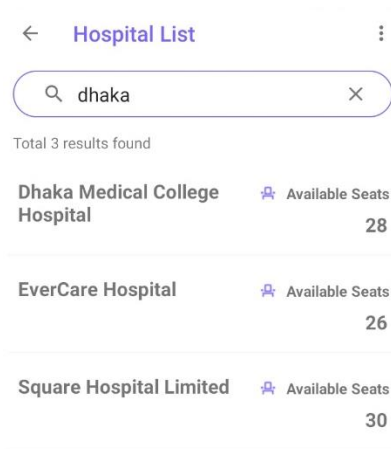


Fig 1.24: Search



Fig 1.25: Toolbar

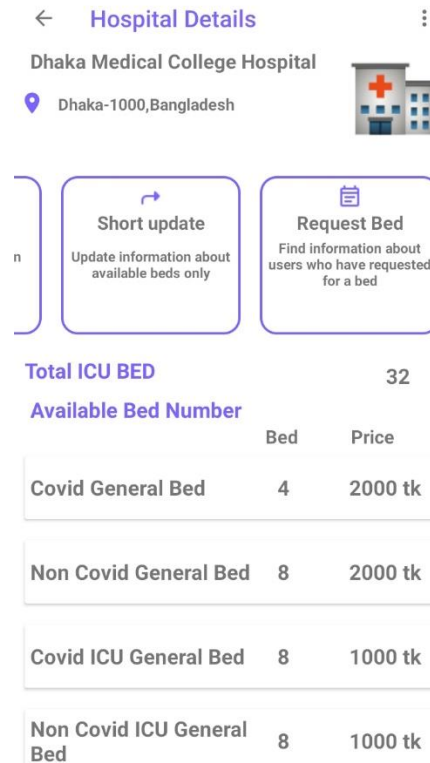
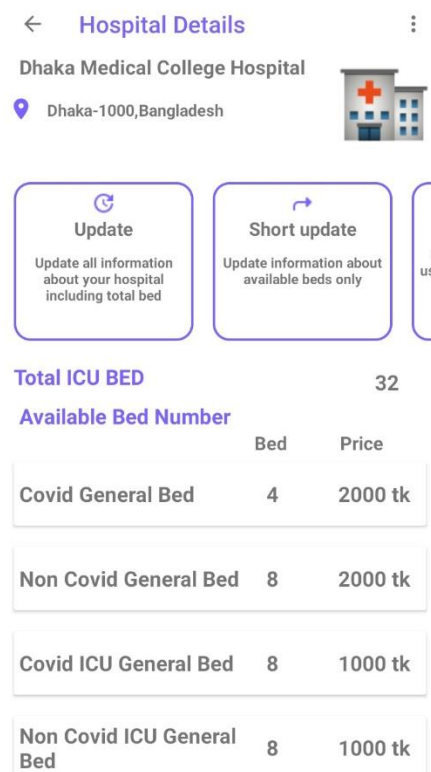


Fig 1.26: Provider Admin Hospital

← **Update**

Hospital Info

Hospital Address

District

Contact Number

Total ICU Bed

Available ICU Bed

Covid General Bed

Covid General Bed Price

Non Covid General Bed

Non Covid General Bed Price

Covid ICU General Bed

Covid ICU General Bed Price

Non Covid ICU General Bed

Non Covid ICU General Bed Price

Update

Fig 1.27: Update

← **Hospital Details**

Dhaka Medical College Hospital

Dhaka-1000,Bangladesh

Select your bed type

☐ Covid General Bed

☐ Non Covid General Bed

☐ Covid ICU General Bed

☐ Non Covid ICU General Bed

No of Booking Bed

Add Bed **Minus Bed**

Covid ICU General Bed	8	1000 tk
Non Covid ICU General Bed	8	1000 tk

Fig 1.28: Short Update

← **Request Bed List** ⋮

Total 1 requests found

Patient Name: subah

Address: chittagong

Email: subah@gmail.com

Phone: 0134661

Bed Type: Covid General Bed

No of Bed: 2

Status: Accepted

Price: 4000

Accept **Reject**

Delete

Fig 1.29: Request List for provider

← Hospital Details

Ma - O Shishu Hospital

Chittagong

Call Email

Booking
You can book beds from here

Request Bed
You can find information about your requested beds here

Total ICU BED 20

Available Bed Number

	Bed	Price
Covid General Bed	4	4000 tk
Non Covid General Bed	4	4000 tk
Covid ICU General Bed	5	5000 tk
Non Covid ICU General Bed	5	5000 tk

Fig 1.30: Hospital Details for Finder

← Request Bed List

Bed Type: Covid General Bed

No of Bed: 2

Status: Accepted

Price: 4000

CANCEL PAYMENT

DELETE

Fig 1.31: Finder Request List (respective hospital)

← Booking your Bed

Select your bed type

☐ Covid General Bed

☐ Non Covid General Bed

☐ Covid ICU General Bed

☐ Non Covid ICU General Bed

Patient Name

Address

Email

Phone

No of Booking Bed

Request

Fig 1.33: Booking Layout

← My Request Bed List

Hospital: Dhaka Medical College Hospital

Bed Type: Covid General Bed

No of Bed: 2

Status: Accepted

Price: 4000

CANCEL PAYMENT

DELETE

Hospital: Ma - O Shishu Hospital

Bed Type: Covid General Bed

No of Bed: 1

Status: Pending

Price: 4000

CANCEL PAYMENT

DELETE

Fig 1.32: Finder All Request List

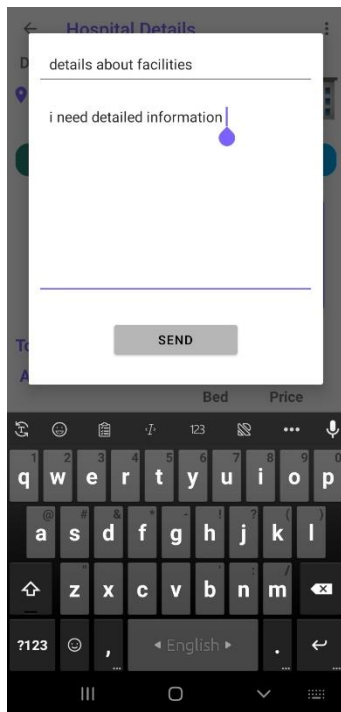


Fig 1.34: Email Layout

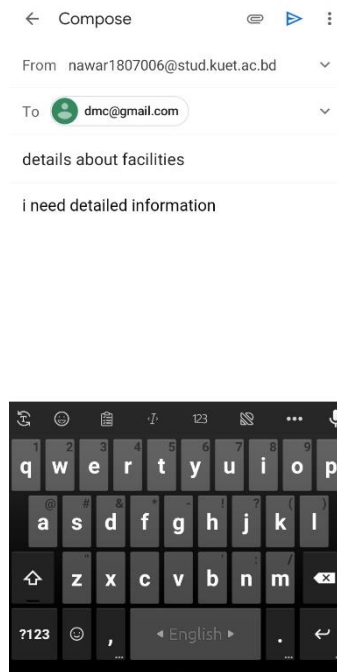


Fig 1.35: After pressing send button

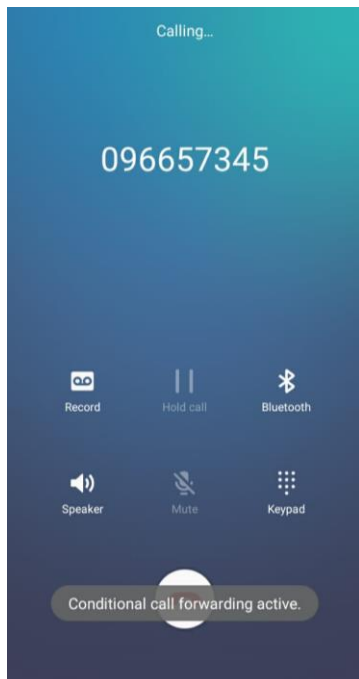


Fig 1.36: After pressing Call Button

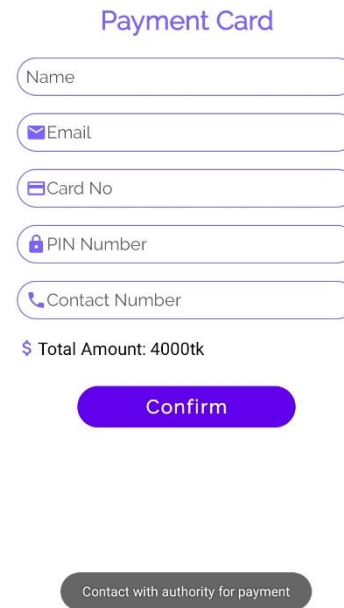


Fig 1.37: Payment Card

Target vs Actual Accomplishments

The target of this project was as follows-

- To create a user friendly application where users can easily find information about ICU bed availability
- To create a system where the provider admin can easily provide their information and update it
- To create a system where the provider admin can easily handle the booking requests
- To create a system where a finder can easily communicate with provider admin and book a hospital bed
- To create a system where a finder can easily analyze and compare the prices of bed of different hospitals
- To include a payment system for the patients

After completing this project, we were able to create a system where both the provider admins and finders could stay connected and get necessary information. The finders were able to search for different hospitals, see hospital details, contact with the admins through phone or email and book a bed. There were also able to get a payment card for themselves. On the other hand, the provider admins were able to make their own hospital profile with detailed information and update it time to time. They were able to handle the request list also by accepting or rejecting the requests.

Risk and Issues:

The application needs network connection to operate properly. So it won't be able to provide any information without network. It also will not get new updated information without internet. There's no payment system added to this application. As-a-result, a finder cannot complete payment procedures directly through this.

Discussion and Conclusion:

In this project, I tried to solve the problem faced by patients and hospital authorities while finding available ICU beds in nearby hospitals. This project has accomplished 90% of its target. This project has been a really great experience and opportunity to learn and to experiment. I have learned how to use Android Studio

and Firebase efficiently through this project. I have also learned to design different types of user interface. I have also faced different types of problems that were mostly related to Firebase database, Firebase keys and also about passing the right value/key from one activity to another in Android Studio. I have also managed to include a booking system in the application along with information about hospital bed availability. The only limitation of this project is that there is no direct payment system added i.e. Bkash. Besides continuous and tireless effort, the guidance of my respected teachers has also shaped this project as a successful outcome. I would like to express my humble gratitude for their valuable advices. Hence, it can be said that the project was overall successful.

References:

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6. https://www.youtube.com/watch?v=q9JQZAK6Z1g&list=PLgH5QX0i9K3oDurEmECb5U_BZ1hrLaHx-&index=3
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10. <https://www.youtube.com/watch?v=NO2hah2ntdw&list=PLgH5QX0i9K3p9xzYLFGdfYliIRBLVDRV5&index=148>
11. <https://www.youtube.com/watch?v=jKrcw3EPY5o&list=PLgH5QX0i9K3p9xzYLFGdfYliIRBLVDRV5&index=149>
12. <https://www.youtube.com/watch?v=afMsmNNepn0&list=PLgH5QX0i9K3p9xzYLFGdfYliIRBLVDRV5&index=150>