MINI PROJECT REPORT

ON

PRIMARY HEALTH CENTRE

Submitted by

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to

the A P J Abdul Kalam Technological University

in partial fulfillment of the requirements for the award of the degree

of

Bachelor of Technology

in

Computer Science and Engineering

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ST. JOSEPH'S COLLEGE OF ENGINEERING AND TECHNOLOGY

PALAI

JUNE :: 2023

DECLARATION

I undersigned hereby declare that the mini project report on "PRIMARY HEALTH CENTRE APP" submitted for partial fulfilment of the requirements for the award of degree of Bachelor of Technology of the APJ Abdul Kalam Technological University, Kerala is a bonafide work done by me under supervision of Prof. Dona Mary Cherian, Assistant Professor, Dept of CSE. This submission represents my ideas in my own words and where ideas and words of others have been included. I have adequately and accurately cited and referenced the original sources. I also declare that I have adhered to ethics of academic honesty and integrity and have not misrepresented or fabricated any data or idea or fact or source in my submission. I understand that any violation of the above will be a course for disciplinary action by the institute and/or the University and can also evoke panel action from the sources which have thus not been properly cited or from whom proper permission has not been obtained. This report has not been previously formed the basis for the award of any degree, diploma or similar title of any other University.

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CERTIFICATE

This is to certify that the report entitled **PRIMARY HEALTH CENTRE App** submitted by **SWEETY SONNY (SJC20CS117), SARANYA S NAIR (SJC20CS110), MEGHA RAJESH (SJC20CS088), LISS MARIA JOHN (SJC20CS082)** to the APJ Abdul Kalam Technological University in partial fulfilment of the requirements for the award of the Degree of Bachelor of Technology in Computer Science and Engineering is a bonafide record of the mini project work carried out by them under my guidance and supervision**.**

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I am extremely indebted to **Dr. Joby P.P**, Professor & Head, Department of Computer Science and Engineering for his valuable suggestions and encouragement during the course of this project work.

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ABSTRACT

Problem Statement: Developing an app for primary health centre can significantly improve healthcare delivery to patients in remote areas.

Developing an app for primary health centre can significantly improve healthcare delivery to patients in remote areas. This app can help in reducing the burden of work for health workers and increase efficiency in patient care. It can provide a platform for patients to book appointments, access their medical records, receive reminders for medication, and receive health education materials. The app also help health workers to manage patient records, track patient visits, and communicate with other healthcare professionals. In conclusion, developing an app for primary health centers can enhance healthcare delivery, improve patient outcomes, and promote overall public health.

Keywords: - Flutter, Firebase

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CHAPTER 1

INTRODUCTION

An app, short for application, is a software program designed to run on various devices such as smartphones, tablets, and computers. Apps serve a wide range of purposes and provide users with specific functionalities, services, or entertainment. There are various types of apps available, including social media apps, productivity apps, gaming apps, educational apps, and many more. Each app is typically designed to address a specific need or cater to a particular interest.

The popularity of apps has grown significantly in recent years, primarily due to the widespread use of smartphones and the convenience they offer. Developers create apps for different platforms such as iOS (Apple's operating system), Android (Google's operating system), and Windows. These apps are distributed through dedicated app stores such as the Apple App Store, Google Play Store, and Microsoft Store.

When users download and install an app, they can access its features and functionalities directly from their device. Apps can provide a wide range of services, such as allowing users to communicate with others, access information, perform tasks, entertain themselves, manage their schedules, track their health, or shop online.

1.1 Problem Statement

Developing an app for primary health centre can significantly improve healthcare delivery to patients in remote areas. The primary health care system is a critical component of healthcare delivery, aiming to provide essential healthcare services to individuals and communities. This app can help in reducing the burden of work for health workers and increase efficiency in patient care. It can provide a platform for patients to book appointments, access their medical records, receive reminders for medication, and receive health education materials. The app also help health workers to manage patient records, track patient visits, and communicate with other healthcare professionals. The app will

serve as a digital platform to improve access to information, health record management etc. In conclusion, developing an app for primary health centres can enhance healthcare delivery, improve patient outcomes, and promote overall public health.

1.2 Objectives and Scope

The objective of developing an app for PHC is to improve access to healthcare services, enhance patient experience, and streamline healthcare operations. Enable users to easily book appointments with healthcare providers, reducing waiting times and improving convenience for patients seeking primary healthcare service. Provide real-time information about doctors available at PHC centers, their specialties, working hours, and availability. This feature helps patients make informed decisions when selecting a healthcare provider. Send timely notifications and reminders to patients for upcoming appointments, medicine available, vaccination schedules, and other important healthcare-related information. This feature helps improve adherence to treatment plans and preventive care. It also provides the option for patients to request home healthcare services when they are unable to visit the PHC center. This feature ensures accessibility and convenience for patients with limited mobility or those requiring specialized care at home. It's important to note that the specific features and scope of the app may vary based on the target audience, geographical location, and requirements of the PHC organization.

CHAPTER 2

LITERATURE SURVEY

There are numerous hospital apps available in the market, but we have developed a unique app called PHC (Primary Health Center) with a specific focus on digitizing primary health centers. Our app aims to streamline the appointment booking process and reduce the workload on staff who currently rely on manual record-keeping. By digitizing primary health centers and offering these features, our app fills a specific gap in the market. While there are existing hospital apps available, they generally cater to larger healthcare systems and may not provide the exclusive functionality required by primary health centers. We have studied similar apps in the market to understand their features and functionalities, ensuring that our PHC app offers a comprehensive solution tailored to the specific needs of primary health centers.

2.1 MyChart (Epic Systems Corporation):

Its features include access to personal medical records and test results. Appointment scheduling and reminders. Secure messaging with healthcare providers. Prescription refill requests. Bill payment and insurance management.

Disadvantages:

Limited availability to hospitals and healthcare systems that use Epic Systems. May not offer all features if the healthcare provider doesn't fully implement them. Requires user authentication, which may be challenging for some patients.

2.2 Medscape (WebMD):

Its features include access to medical news, drug information, and clinical references. Continuing medical education (CME) courses for healthcare professionals. Drug interaction checker and pill identifier. Medical calculators and decision support tools.

Disadvantages:

Primarily targeted towards healthcare professionals, so some features may not be relevant to the general

public. The app may contain ads, which can be distracting. Not a substitute for personalized medical advice.

2.3 Ada (Ada Health):

Its features include symptom checker for self-assessment. Personalized health assessments based on user input. Information on various medical conditions and potential causes. Option to book appointments with healthcare providers.

Disadvantages:

Limited accuracy in diagnosing complex or rare conditions. Should not replace a professional medical evaluation and diagnosis. The app's recommendations may not always align with local healthcare guidelines.

2.4 Zocdoc:

Its features include ability to search for healthcare providers and book appointments. Patient reviews and ratings for doctors. Appointment reminders and notifications. Integration with calendar apps for scheduling convenience.

Disadvantages:

Availability may vary depending on the user's location. Not all healthcare providers may be listed on the platform. Limited to appointment booking and may not provide comprehensive medical information.

CHAPTER 3

SOFTWARE REQUIREMENT SPECIFICATION

Divided into 2 parts:

- Authentication & Authorization
- User modules

3.1 Authentication & Authorization

Authentication is the process of verifying the identity of a user or entity attempting to access a system or application. In the PHC app, authentication ensures that only legitimate users are allowed access. User Registration: Users would register for an account by providing their credentials such as username and password. They might also need to provide additional information like name, email, and contact details. Login Credentials: When a user wants to log in to the app, they enter their registered username and password. Verification: The app would then verify the provided credentials against the stored user data. If the credentials match, the user is granted access. Only admin users would have authorization for certain privileged actions. Admin users would have access to administrative functionalities and sensitive data that regular users may not have. These could include managing user accounts, accessing and modifying critical system settings, or generating reports. The PHC app can ensure secure access to sensitive data, grant appropriate privileges to admin users, and provide a personalized and tailored experience to all users.

3.1.1 Login Module

The app's login screen includes an option to "Login with Google" . When users choose this option, it triggers the Google Sign-In flow. Upon selecting "Login with Google," users are redirected to the Google authorization page. Here, they enter their Google account credentials to authenticate themselves. Upon login, the app can present the user with a personalized dashboard that showcases relevant information, such as book appointments, health records, notifications . After login, users gain access to various PHC features, such as booking appointments, notification, in-home service .

3.2 User modules

There are two user modules. Their functions as well as their respective duties are given below:

3.2.1 Admin

- Use case: Gives input information about the staffs, medicines available
- Notifies about the updates regarding vaccines
- The Admin module is the strongest part of the proposed Application .It controls the overall working of the PHC .It keeps track of the day to day activities of the PHC .It includes managing appointments received, doctors list, medicines available. The admin module ensures the integrity and ensures that the app runs smoothly.

3.2.2 User

The Patient/User module is the beneficiary part of the app. The user can easily access all the services which includes book appointments, In home services, help desk, get notified about vaccinations. They can query about their doubts. By simply creating an account can make them to access all the services

- Can book appointment
- Check the availability of medicines and vaccination dates
- Check the details of doctors on duty
- View patient history

CHAPTER 4

SYSTEM DESIGN

4.1 Activity Diagram

Activity diagram is another important behavioral diagram in UML diagram to describe dynamic aspects of the system. Activity diagram is essentially an advanced version of flowchart that models the flow from one activity to another activity. Activity diagrams can be regarded as a form of a structured flowchart combined with a traditional data flow diagram. Typical flowchart techniques lack constructs for expressing concurrency. However, the join and split symbols in activity diagrams only resolve this for simple cases; the meaning of the model is not clear when they are arbitrarily combined with decisions or loops.

This diagram shows the activities while a user and Admin uses the app. The user starts by logging into the PHC app or registering for a new account. After successful login or registration, the user is directed to the Dashboard Screen. From the Dashboard Screen, the user can choose to view staff information, medicines available, in-home services, receive vaccine updates, or access notifications. The admin starts by logging into the PHC app admin panel. After successful login, the admin is directed to the Admin Dashboard. From the Admin Dashboard, the admin can choose to manage medicines, manage vaccination dates, manage doctors on duty, or view patient history. This activity diagram showcases the flow of activities on the admin side and user of the PHC app, specifically for book appointments, medicines, vaccination dates, doctors on duty, notifications and viewing patient history.

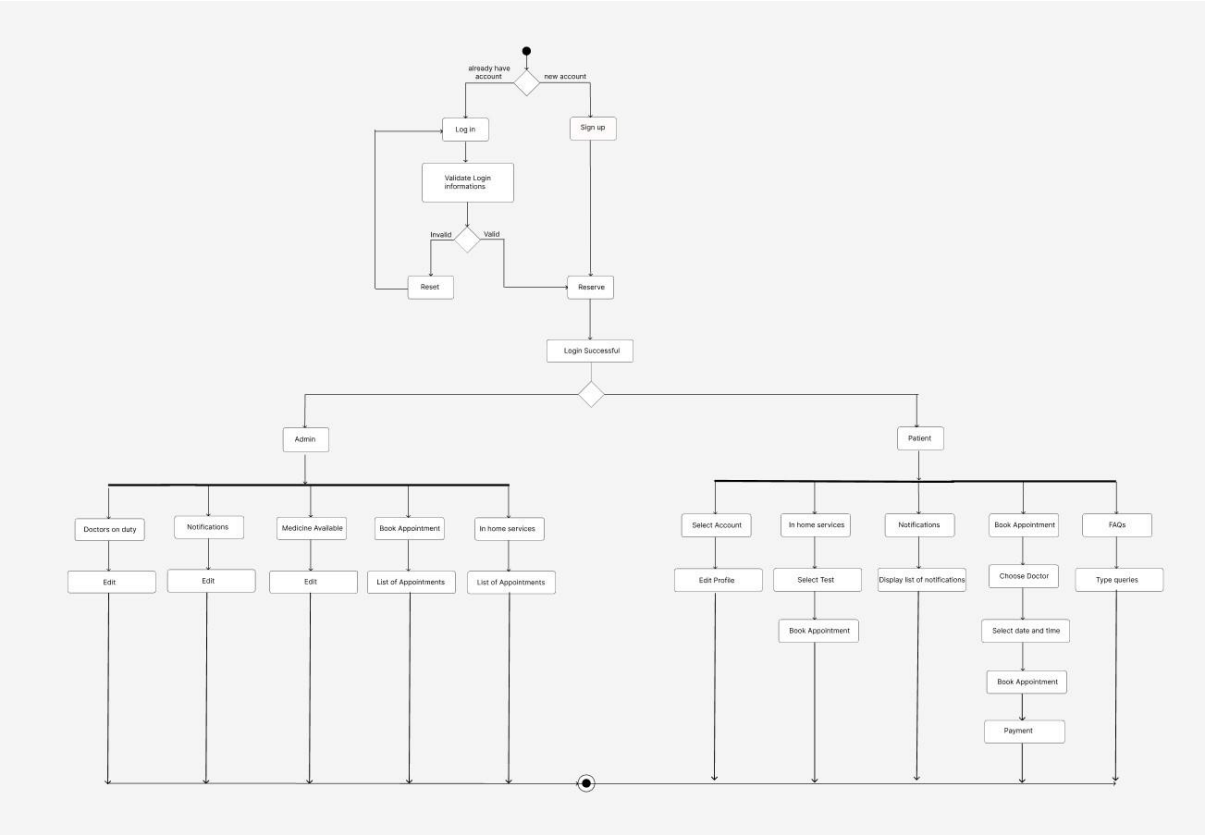


Fig: 4.1: Activity Diagram

4.2 Use Case Diagram

A use case diagram is a graphical depiction of a user's possible interactions with the system. A use case diagram shows various use cases and different types of users the system has and will often be accompanied by other types of diagrams as well. The use cases are represented by either circles or ellipses. The actors are often shown as stick figures.

In Admin side the admin can schedule appointments for users,manage and update the list of available medicines in the PHC,arrange and manage in-home services for patients,view and manage the doctors currently available for duty and send notifications to users regarding important updates or information.In User side, users can request and schedule appointments with doctors, request medical services to be provided at their homes,seek assistance or support from the PHC staff, log in to access personalized features and information and receive notifications from the PHC regarding their appointments, important updates, or general health-related information.

Fig: 4.2: Use Case Diagram

CHAPTER 5

SYSTEM IMPLEMENTATION

5.1 Technologies Used

5.1.1 FLUTTER

Flutter is an open-source UI software development kit (SDK) created by Google. It allows developers to build cross-platform applications for mobile, web, and desktop from a single codebase with Flutter, developers write code once and can use it to build applications for multiple platforms, including iOS, Android, web, and desktop. This helps in saving time and effort by eliminating the need to develop separate codebases for different platforms. Flutter uses the Dart programming language, which is also developed by Google. Dart is a modern, object-oriented language that offers features like a just-in-time (JIT) compiler and a ahead-of-time (AOT) compiler, making Flutter apps fast and efficient. One of the standout features of Flutter is its hot reload capability. Developers can make changes to the code and instantly see the results in the app without having to restart or rebuild the entire application. This feature greatly speeds up the

5.1.2 FIREBASE

Firebase is a comprehensive mobile and web development platform provided by Google. It offers a wide range of tools and services that developers can utilize to build, improve, and scale their applications. Here is an explanation of the key features and components of Firebase:

Real-time Database: Firebase's Real-time Database is a cloud-hosted NoSQL database that allows developers to store and synchronize data in real-time across clients. It uses a real-time data synchronization model, enabling seamless data updates and collaboration between multiple users.

Authentication: Firebase provides robust authentication services, allowing developers to easily implement user authentication and authorization in their applications. It supports various authentication methods, including email/password, social media logins (e.g., Google, Facebook, Twitter), and phone number authentication.

Cloud Firestore: Cloud Firestore is a flexible and scalable NoSQL document database provided by Firebase. It offers a more advanced querying and data modeling approach compared to the Real-time Database. Cloud Firestore supports automatic real-time data synchronization, offline data persistence, and

powerful querying capabilities.

5.2 RESULTS

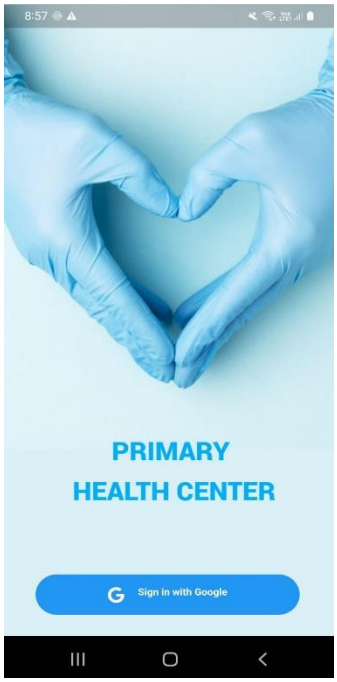
The system architecture consists of an app which is the front end that is developed using Flutter. The Backend of this application is built using Firebase.

5.2.1 Frontend

From the user's perspective, individuals can authenticate themselves to access the platform. Upon successful authentication, they are directed to the home page, where they can conveniently book appointments, receive notifications, and schedule in-home services. After selecting a preferred appointment, users are seamlessly redirected to the payment page to complete the transaction. In case of any queries or concerns, a dedicated help page is available to provide assistance. Users also have the option to edit their profile by simply clicking on the edit profile icon.

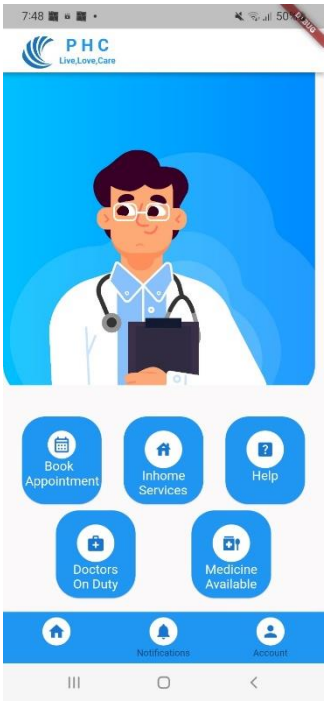
From the admin's perspective, the administrator possesses various capabilities. They can effectively monitor financial transactions, manage and allocate time slots for appointment bookings, send informative notifications to users regarding specific days or events, and update the list of available doctors for a given day.

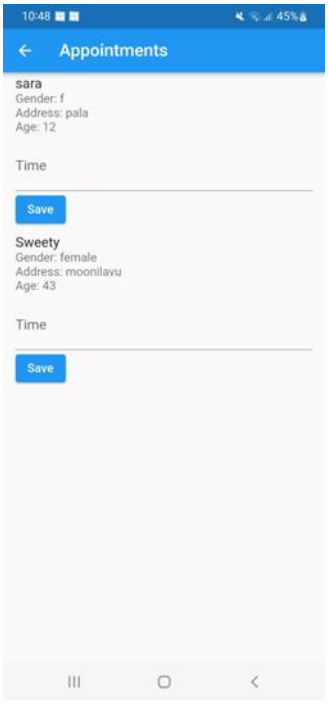
5.2.1.1 Sign-in page



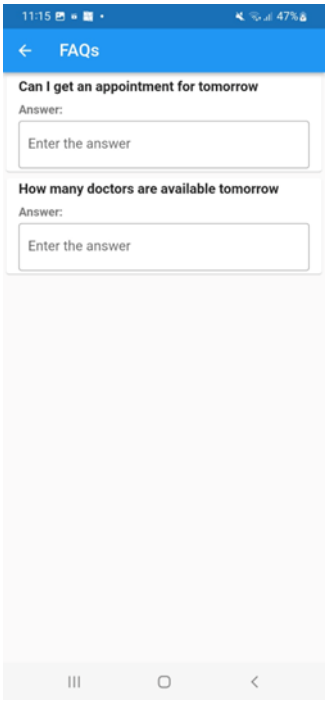
Upon launching the app, users will be prompted to sign in using their Google accounts. Once the sign-in process is completed, they will be automatically redirected to the home page.

5.2.1.2 Admin

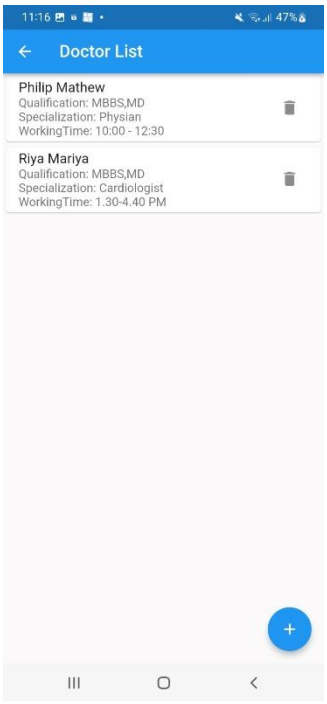


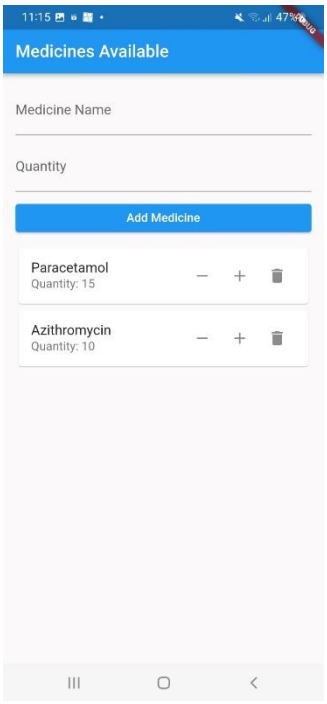


The admin section of the app features five icons for easy navigation: "Book Appointment", "In-Home Service", "Help", "Doctors on Duty" and "Medicine Availability". By selecting the "Book Appointment" icon, the admin gains access to view and manage appointment requests. They can allocate suitable time slots for each booking request.

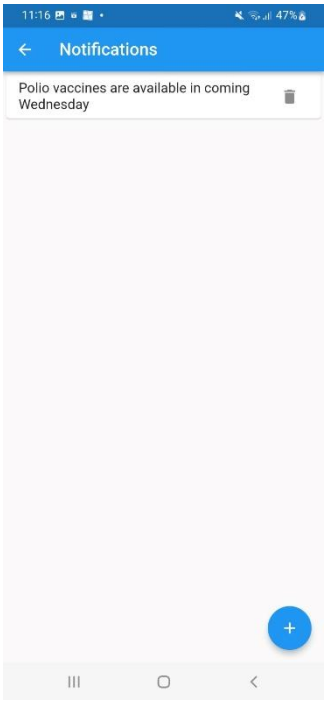


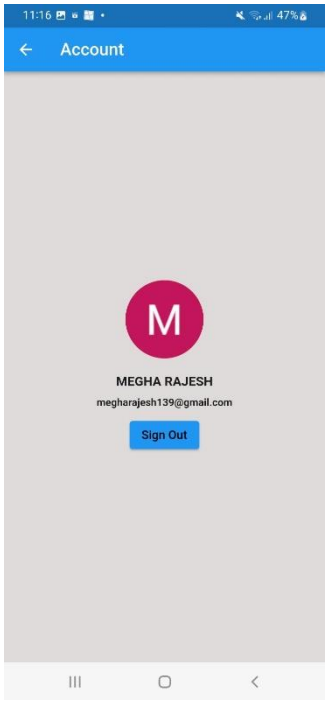
Clicking on the "In-Home Service" icon allows the admin to view and handle requests for in-home services, enabling them to schedule dates and time slots for each booking. The "Help" button empowers the admin to promptly address user queries. They can view and provide clarifications through this feature.





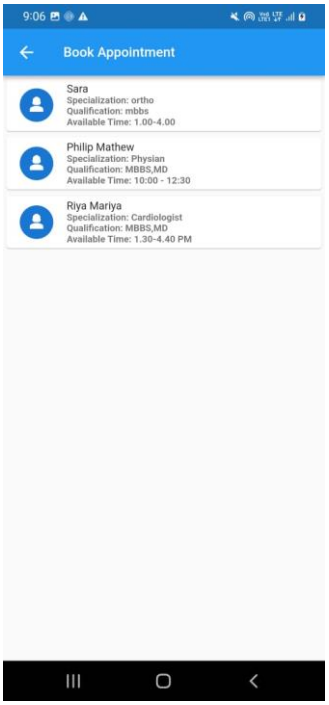
Using the "Doctors on Duty" icon, the admin can add or remove doctors' details for a specific day. This functionality allows for efficient management of the medical staff. With the "Medicine Availability" option, the admin can effortlessly add or remove medicines from the primary health center's inventory. Furthermore, they have the ability to adjust the quantity of each medicine as needed.

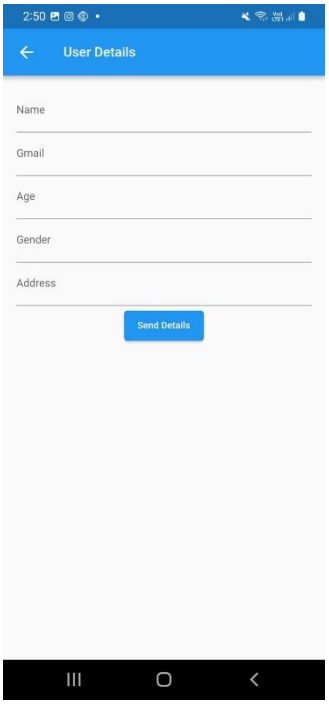




To keep users informed, the admin can utilize the notification icon to send important announcements via the app. Lastly, within the account icon, the admin can conveniently sign out from the application.

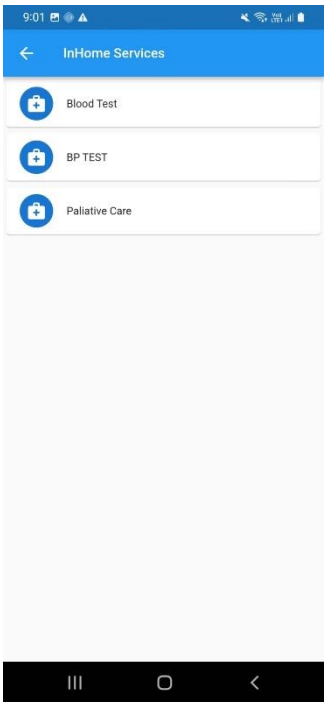
5.2.1.3 USER

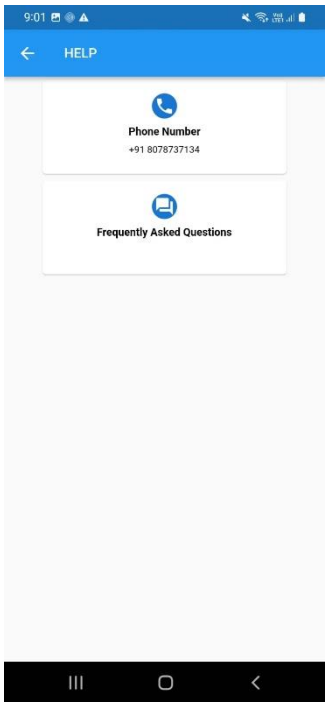




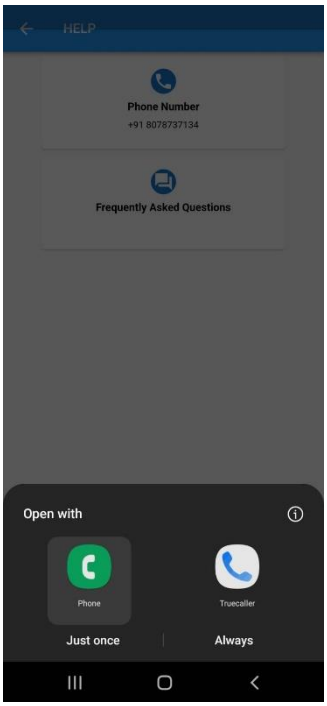
The user section of the app comprises three icons: "Book Appointment," "In-Home Service," and "Help." By selecting the "Book Appointment" icon, users can schedule appointments. Upon clicking the icon, they will be directed to a page displaying the available doctors for that specific day. Upon selecting a desired

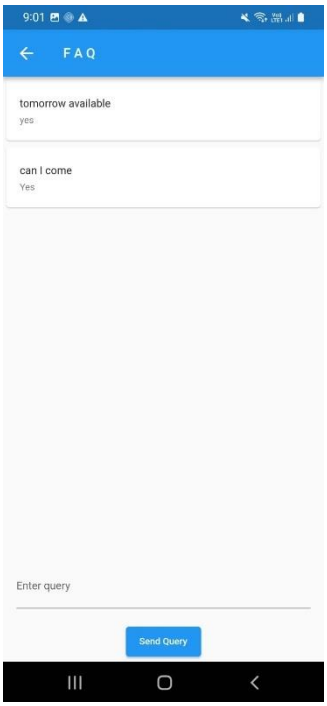
doctor, users will be prompted to fill in their details, and once submitted, their appointment request will be sent to the admin for processing.



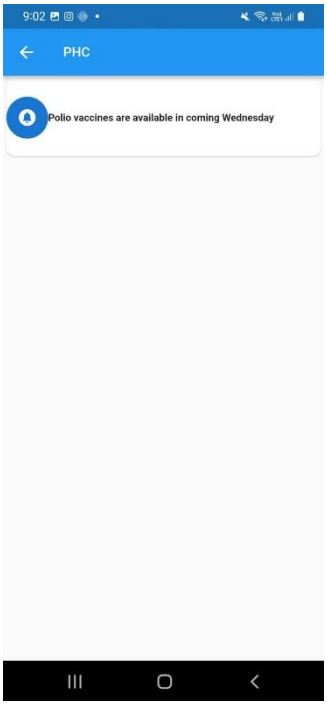


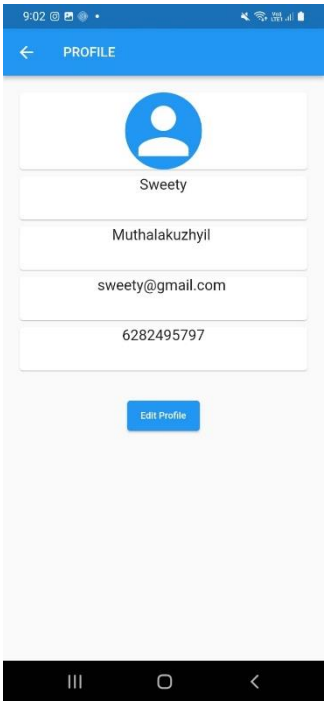
Our app offers three types of in-home services, including blood tests, BP tests, and palliative care. Users can book these services by clicking on the respective service icon. Similar to booking an appointment, they will be asked to provide the necessary details before submitting their service request.
Users can address any queries related to the hospital by clicking on the "Help" icon.

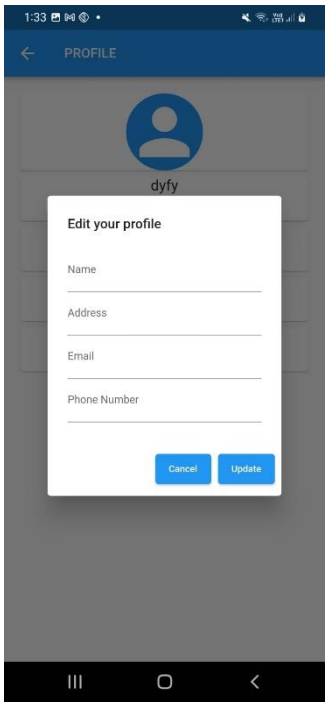




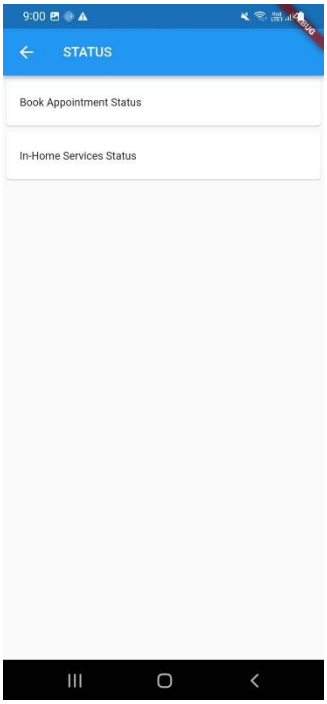
There are two methods available to clarify doubts. Firstly, users have the option to directly call the center for assistance. Alternatively, they can utilize the FAQ section to find answers to commonly asked questions.

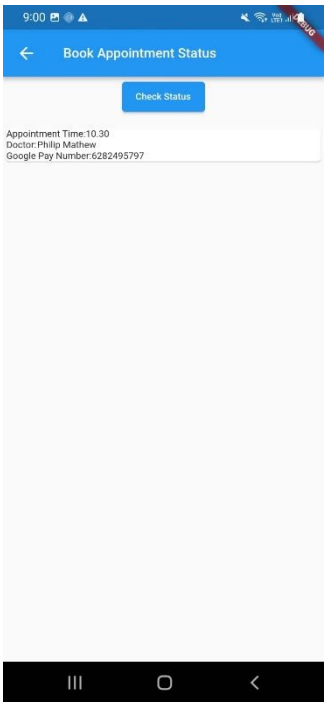


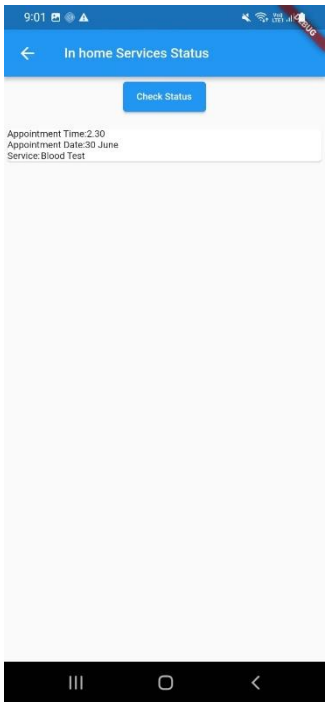




The "Notification" icon displays notifications received from the user side, keeping users informed about important updates. Within the account icon, users can access their account profile and make changes by clicking the "Edit Profile" button. By filling in the required details, users can update and modify their account information



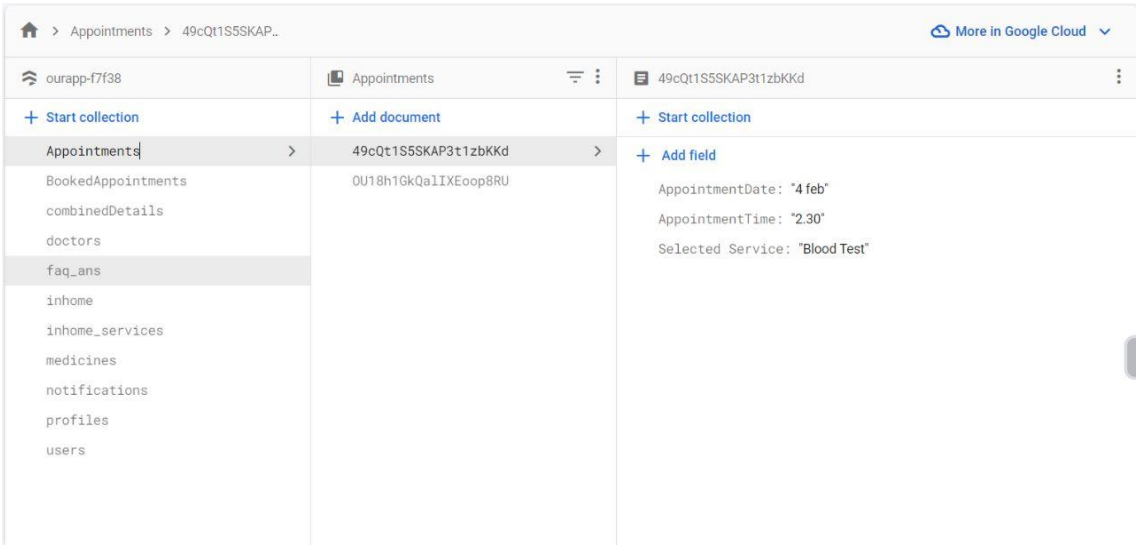




In the top right corner, a dropdown button is available, providing two options. The first option allows users to check the status of their appointments, whether they are for booking appointments or in-home services. The second option allows users to sign out from their account.

5.2.2 Backend

The administration side manages the backend of the application. User authentication information, such as name and email, is securely stored in Firebase. The admin side retrieves user details, such as appointment bookings and in-home service requests, from Firebase. While some details are stored in Firebase and not fetched by the admin, the database efficiently organizes data into collections and documents. Each document is identified by a unique document ID, facilitating easy retrieval and manipulation of information. Firebase excels in handling large volumes of records effectively. Its responsiveness allows for quick information retrieval. Additionally, adding new data or modifying and deleting existing data is straightforward. Developers and testers can readily test the application without wasting time on complex setup and configuration processes.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notifications
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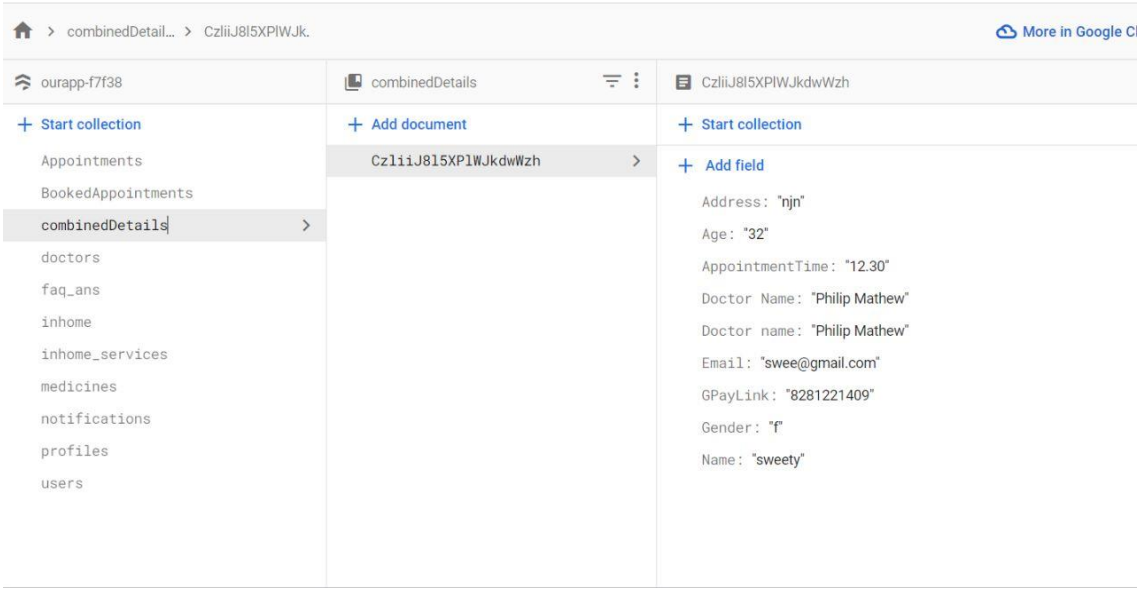
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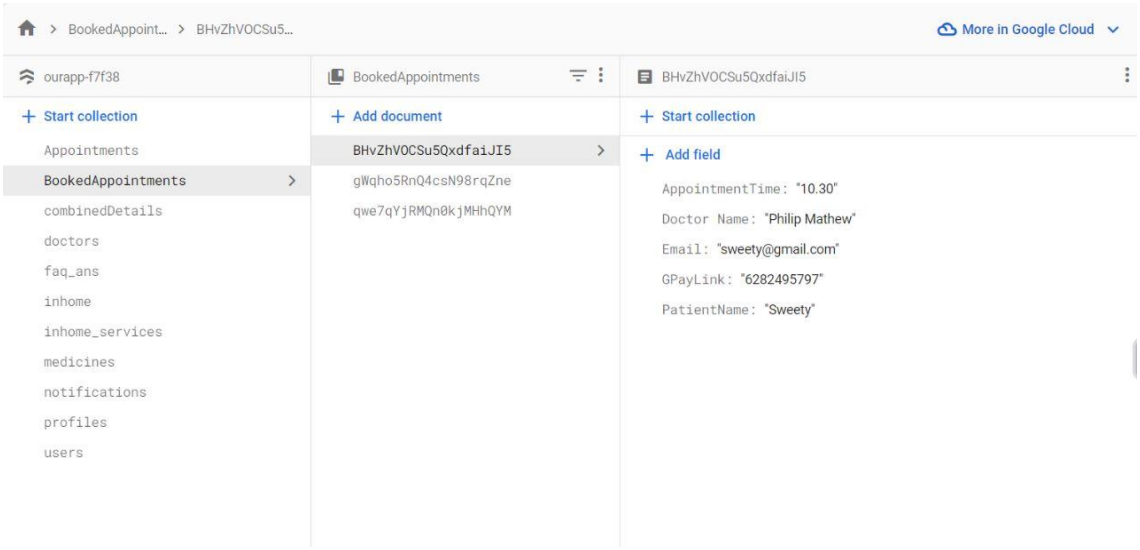
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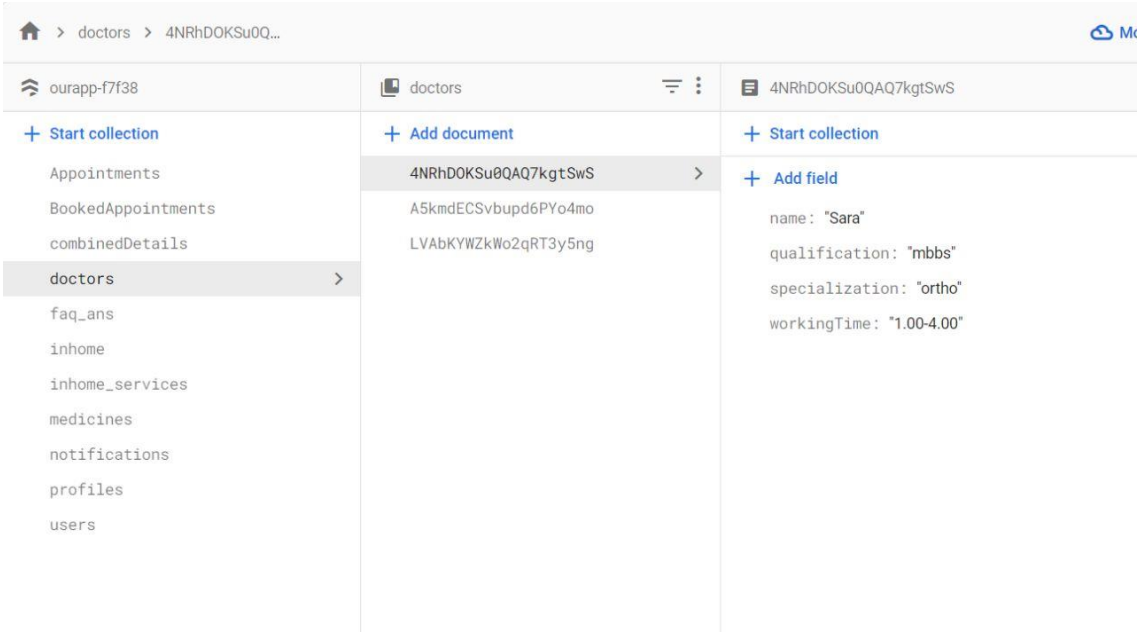
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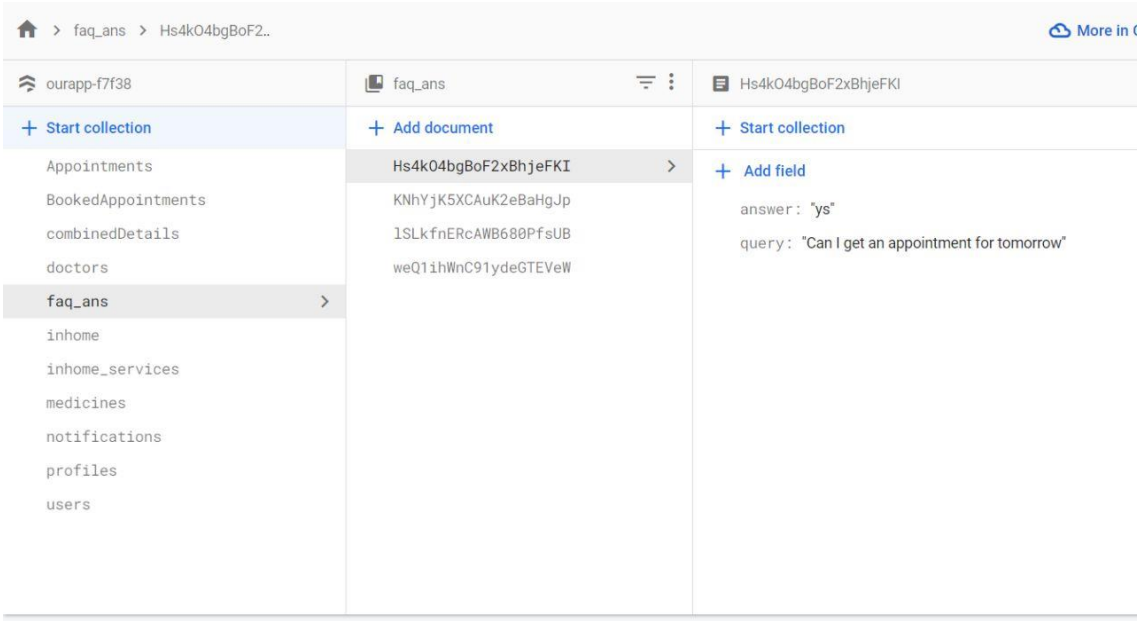
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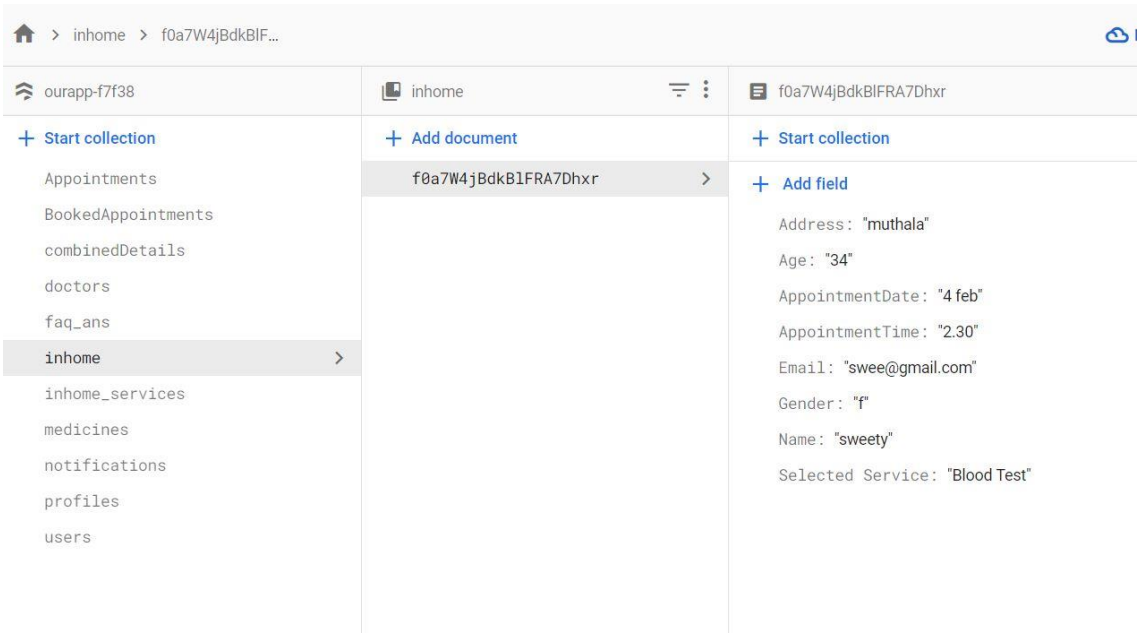
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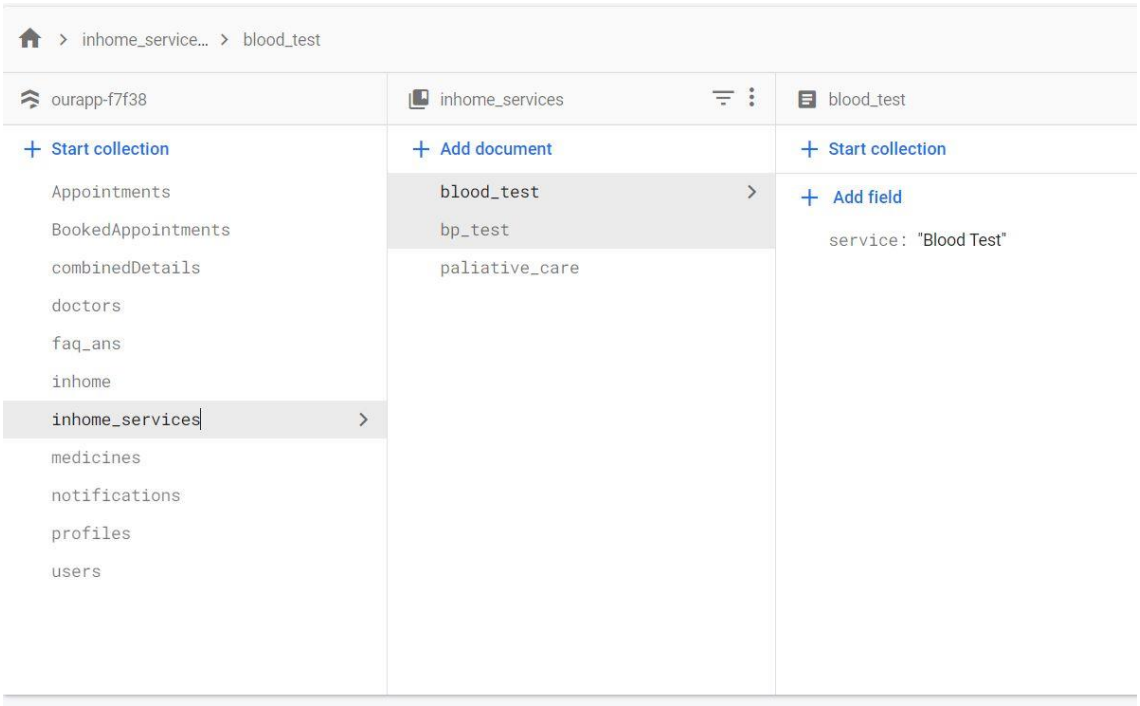
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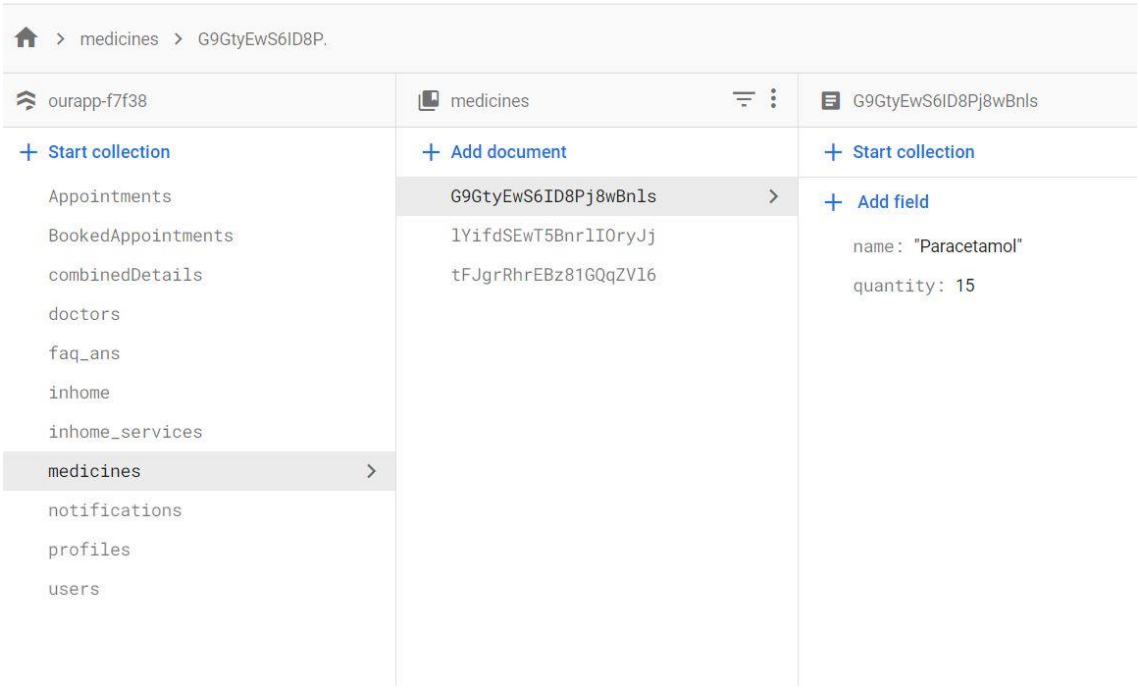
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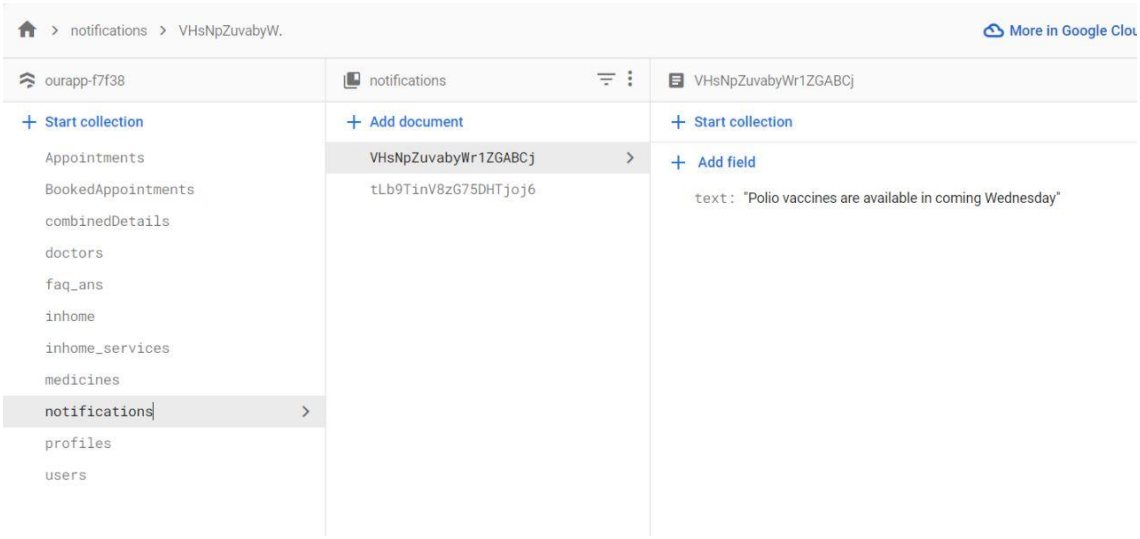
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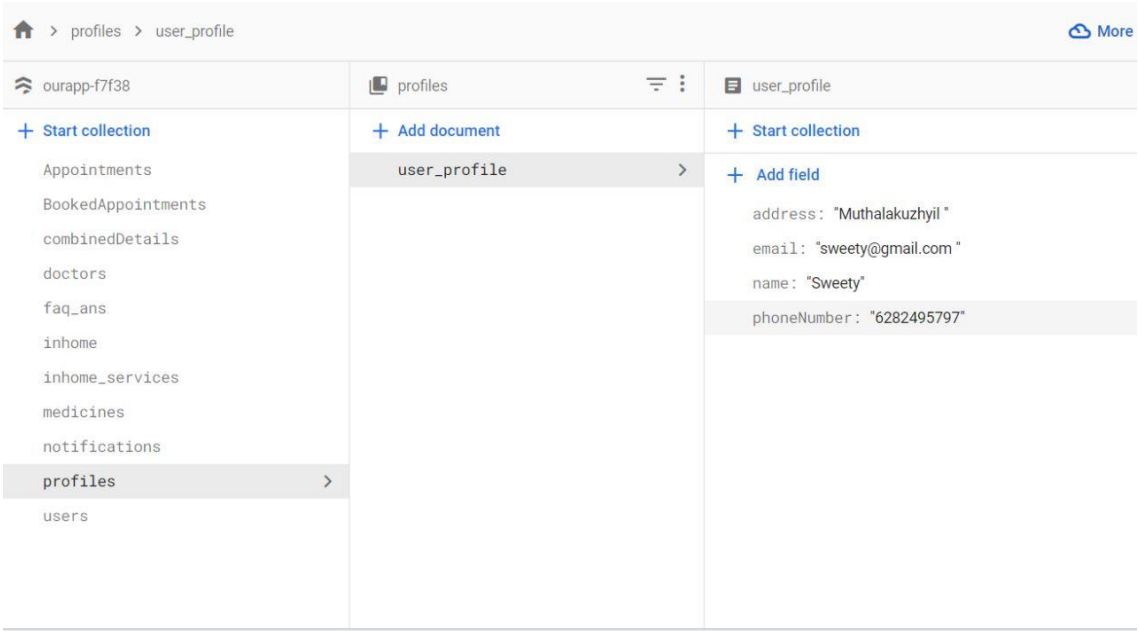
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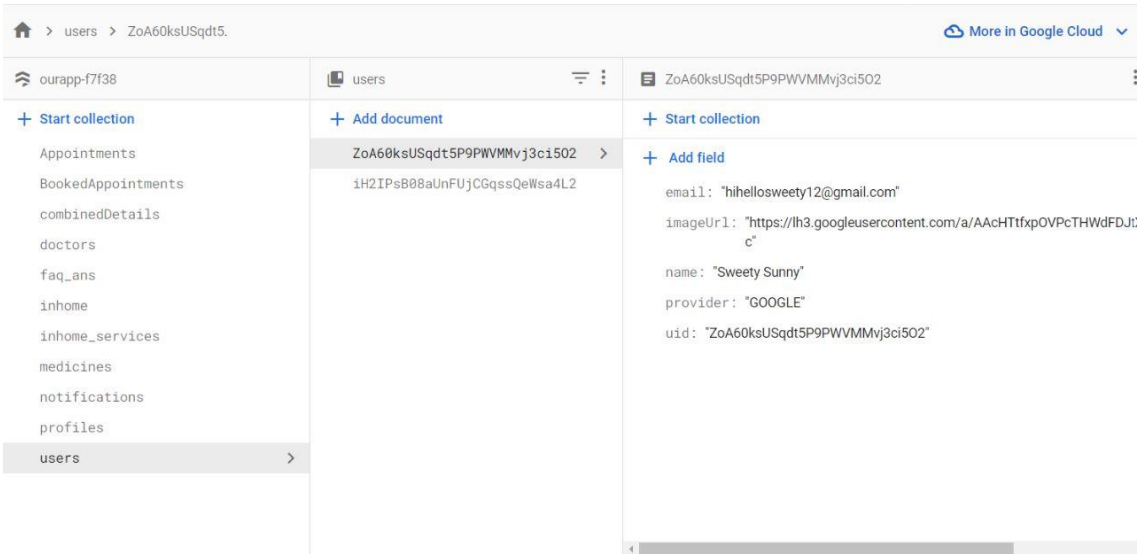
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CHAPTER 6

TESTING

6.1 Various Testing Methods

6.1.1 Unit Testing

Unit testing is a software development process in which the smallest testable parts of an application, called units, are individually and independently scrutinized for proper operation. This testing methodology is done during the development process by the software developers and sometimes QA staff. The main objective of unit testing is to isolate written code to test and determine if it works as intended.

6.1.2 Integration Testing

Integration Testing is defined as a type of testing where software modules are integrated logically and tested as a group. A typical software project consists of multiple software modules, coded by different programmers. The purpose of this level of testing is to expose defects in the interaction between these software modules when they are integrated

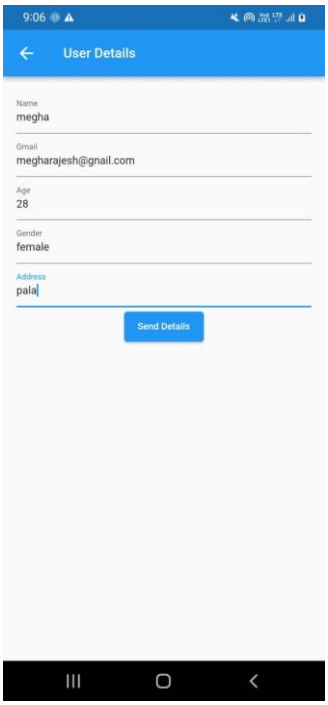
6.1.3 Functional Testing

Functional testing is a type of testing that seeks to establish whether each application feature works as per the software requirements. Each function is compared to the corresponding requirement to ascertain whether its output is consistent with the end user's expectations. The testing is done by providing sample inputs, capturing resulting outputs, and verifying that actual outputs are the same as expected outputs.

6.1.4 Load Testing

Load testing is a type of performance testing that simulates a real-world load on any software, application, or website. Without it, your application could fail miserably in real-world conditions. That's why we build tools like Retrace to help you monitor application performance and fix bugs before your code ever gets to production. Load testing examines how the system behaves during normal and high loads and determines if a system, piece of software, or computing device can handle high loads given a high demand of end-users. This tool is typically applied when a software development project nears completion.

6.2 Testing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Gmail
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Gender
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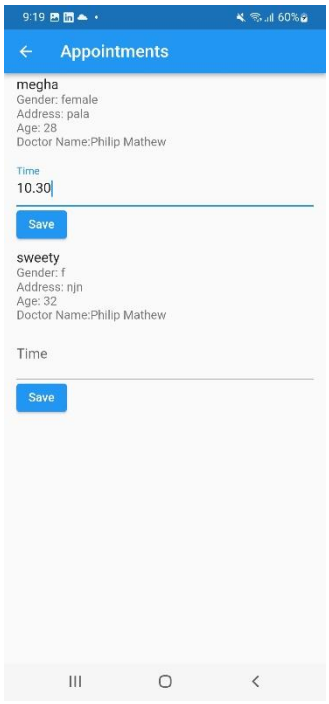
Address
pala
Send Details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Age: 28
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Time
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Time
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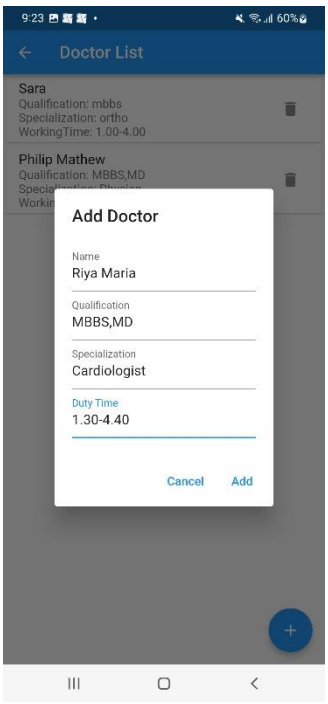
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Specialization: ortho
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Qualification: MBBS,MD
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Name
Riya Maria
Qualification
MBBS,MD
Specialization
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Duty Time
1.30-4.40
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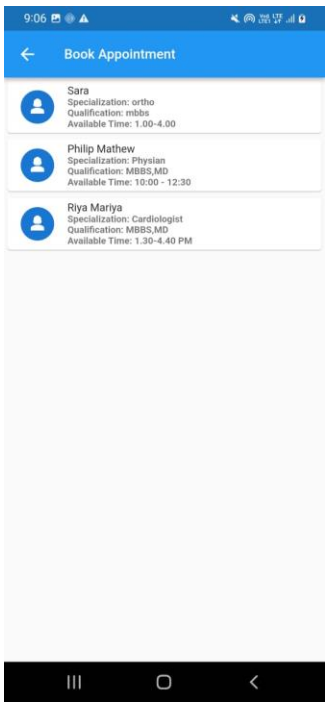
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Qualification: MBBS,MD
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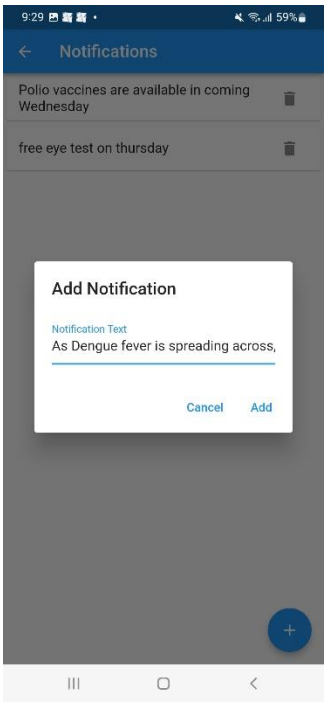
Qualification: MBBS,MD
Available Time: 1.30-4.40 PM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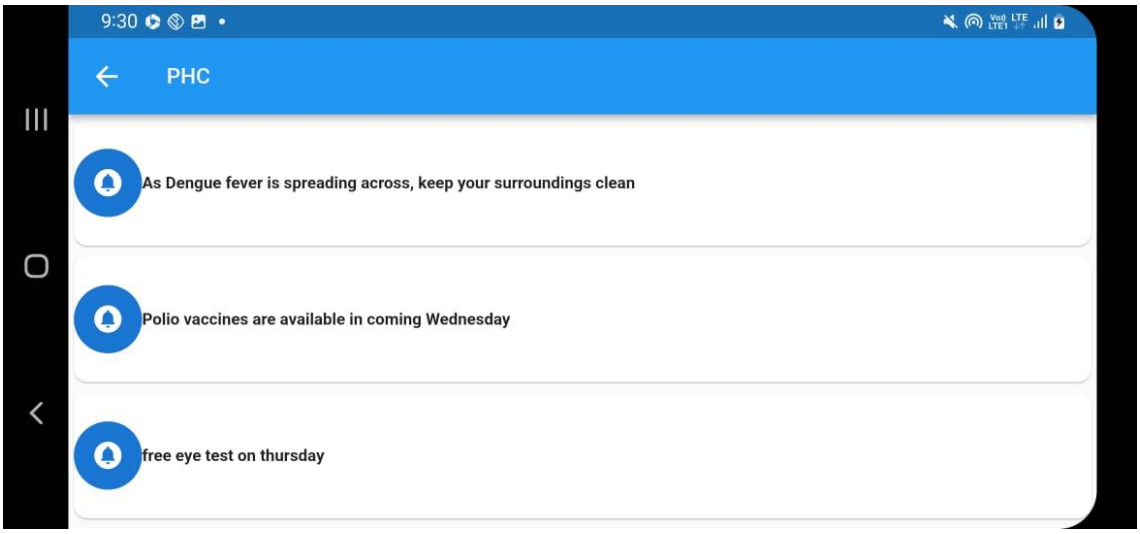
59%
Notifications
Polio vaccines are available in coming Wednesday
free eye test on thursday
Add Notification
Notification Text
As Dengue fever is spreading across,
Cancel
Add


9:30
PHC
As Dengue fever is spreading across, keep your surroundings clean
Polio vaccines are available in coming Wednesday
free eye test on thursday

CONCLUSION

In conclusion, developing a Primary Healthcare Center (PHC) app can bring several benefits and improvements to the healthcare service. By creating a PHC app, you can provide a convenient and accessible platform for users to interact with healthcare services and professionals. The app enables users to access healthcare services anytime and is particularly beneficial for individuals and those residing in remote areas. Integrating in-home medical services into the app provides users with the convenience of receiving healthcare services at their residences. This feature can be particularly beneficial for patients with chronic illnesses or individuals requiring specialized care.

The app can offer a dedicated support system where users can access FAQs, seek assistance, ask queries, and receive updates or notifications regarding their appointments and test results. When developing a PHC app, it is crucial to ensure user-friendly interfaces, robust security measures to protect sensitive data, and compatibility across different devices and platforms. Collaborating with healthcare professionals and obtaining user feedback during the development process can help create a comprehensive and valuable app that meets the needs of both users and administrators.

REFERENCES

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