

DENTAL APPOINTMENT USING MOBILE APPLICATION DEVELOPMENT

BY

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A REPORT

SUBMITTED TO

Universiti Tunku Abdul Rahman

in partial fulfillment of the requirements

for the degree of

BACHELOR OF INFORMATION TECHNOLOGY (HONOURS)

COMMUNICATIONS AND NETWORKING

**Faculty of Information and Communication Technology
(Kampar Campus)**

JUNE 2024

REPORT STATUS DECLARATION FORM

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Academic Session: June 2024

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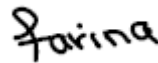
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It is hereby certified that GO JUN YONG (ID No: 20ACB02621) has completed this final year project entitled "DENTAL APPOINTMENT USING MOBILE APPLICATION DEVELOPMENT" under the supervision of Dr Farina Saffa binti Mohamad Samsamnun (Supervisor) from the Department of Computer and Communication, Faculty of Information and Communication Technology.

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ACKNOWLEDGEMENTS

I would like to express my sincere thanks and appreciation to my supervisors, Dr. Farina Saffa binti Mohamad Samsamnun who has given me this bright opportunity to engage in developing dental appointment mobile application. It is my first step to establish a career in the mobile application development field. A million thanks to her for giving me some idea during the process of development, especially in the objectives and report section.

To some of my special friends in my life, Kwang Jia Xian and Ng Jian Nian, for their patience, unconditional support and love, and for standing by my side during hard times.

Finally, I must say thanks to my parents and my family for their love, support and continuous encouragement throughout the course.

ABSTRACT

In an era when technology is revolutionizing healthcare, the dental industry is not immune to the transformative potential of innovation. The project aims to bridge the gap between traditional dental appointment scheduling methods and the expectations of modern patients seeking the convenience of mobile apps in their medical experience. The project focuses on the development of a comprehensive mobile app designed to simplify dental appointment management, facilitate access to oral health care services, and enhance communication between patients and dental offices. This project will provide an easy-to-use interface so that all new users can quickly learn to use it and have a better online booking appointment experience. The software used to develop the mobile application is Android Studio, while the hardware used is a mobile phone with the Android operating system. This mobile application not only includes patient end users booking their appointment but also provides dentist end users to confirm appointments from patients. For the patient side, patients can search for their nearby clinic by selecting the clinic icon in the google maps and a page will pop up and show which dentist is working in the dentist. By clicking the dentist icon, it will show up the dentist's available time slot to let patients choose their visit time. In the make payment section, patients can also choose a variety of payment methods such as cash on counter, online banking, and e-wallet. For the dentist side, the dentist can open their available time slot for patient booking. Finally, all the visit history will be saved on both patient and dentist side.

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Chapter 1

Introduction

1.1 Project Background

In recent years, the healthcare industry has seen some incredible changes as technology becomes more integrated into patient care. One of the areas where technology can greatly benefit is the dental appointment scheduling system.

Now, dental care is a crucial part of overall well-being. A confident smile, which conveys a range of emotions, is an integral part of good oral health and aesthetics [1]. Routine dental check-ups and timely treatments are essential for maintaining oral health. However, the process of scheduling and managing dental appointments has often been a real headache for both patients and dental clinics. Other work, such as checking insurance information, could take much longer like days to weeks [2]. Telehealth and telecommunication technology have the potential to revolutionize how dentists and patients communicate, exchange health information, and even reach underserved populations. Telehealth is not a specific service, but a collection of means to enhance care and education delivery [10]. Telehealth technologies have been available and used in the delivery of oral health services for quite some time [9]. The benefits of telemedicine in dentistry are even more promising given the rapid growth of information technology and the accessibility to the internet. Several studies have encouraged the use of telemedicine in the post-COVID-19 era [3], [4], [5].

This project seeks to bridge the gap between traditional, often cumbersome appointment booking methods and the expectations of modern patients accustomed to mobile applications' convenience in various aspects of their lives.

This project will focus on developing a mobile application for dental appointment management to enhance access to oral healthcare services with telehealth technologies. This mobile application will enable patients to schedule, reschedule, and cancel dental appointments conveniently from their smartphones or other mobile devices. Additionally, the mobile application will allow dentists and dental clinics to manage their appointment schedules more efficiently, reducing wait times and improving overall patient satisfaction. Furthermore, this

app will enable seamless interaction between dentists and patients, allowing for the exchange of important health information and even facilitating teleconsultations. Overall, the development of this mobile application for dental appointment management holds great potential in improving access to oral healthcare services, particularly for underserved populations.

1.2 Problem Statement and Motivation

1.2.1 Difficult to schedule suitable time for both patients and dentists.

Many factors affect the performance of traditional appointment systems including arrival and service time variability, patient and provider preferences, available information technology and the experience level of the scheduling staff [6]. The traditional process of scheduling dental appointments can be inconvenient and time-consuming for patients. Patients also may have to call the dentist's office multiple times to find a time that works for them. This can be especially difficult for patients who have busy schedules or who live in rural areas. For dental clinics, managing a high volume of incoming calls can overwhelm staff, leading to errors in appointment bookings, long wait times for patients on hold, and missed opportunities for scheduling appointments efficiently.

1.2.2 Difficult to finding and selecting nearby clinics.

Patients often face challenges in finding and selecting nearby clinics that meet their needs. Traditional methods of locating healthcare facilities, such as searching online directories or relying on word of mouth, can be time-consuming and inefficient. This lack of a streamlined and user-friendly solution can lead to delays in receiving necessary medical care, causing frustration for patients and potentially worsening health outcomes.

1.2.3 Difficult to remember or save the consultation record.

One of the challenges is human error. It is difficult for patients or dentists to remember all the previous record details accurately, especially the dentists need to deal with lots of patients or cases. Even though all the consultation can be recorded in document, it may still have faced some challenges. The dentists or cashiers often have busy schedules with back-to-back

appointments during peak hours. Taking the time to thoroughly document each consultation might be difficult, especially if you are rushed to move on to the next patients or clients.

1.3 Project Objectives

1.3.1 To develop a mobile application that streamlines the process of scheduling dental appointments.

Sometimes, clinics often overbook extra patients because they do not show up, which can lead to overcrowding and patient dissatisfaction. This situation represents a significant waste of operational costs and resources [7]. So, the application will allow patients to view available time slots in real-time and select an appointment that fits their schedule without needing to call the clinic. For dental clinics, the application will reduce the burden on staff by automating appointment bookings, minimizing errors, and ensuring that the scheduling process is handled efficiently. Users no longer need to go to the clinic to queue up to wait for their consultation time.

1.3.2 To develop a user-friendly mobile application that has a map showing nearby clinics for users to select nearby clinics.

This mobile application provides a google map for making users (patient) choose their nearby clinic easily. In this mobile application, users only need to give permission to this app; it will locate users' location and show all the nearby clinics. After that, users can book appointments by clicking the clinic icon and choose their favourite dentists and their available time for consultation. By simplifying the process of finding and choosing a clinic, the application aims to enhance the patient experience and improve access to healthcare services.

1.3.3 To develop a storing consultation record system that allow patients and dentists to save the consultation record.

This mobile application provides the function of saving the history of consultation records on both patients and dentists' side. On the patient side, they can review the details of the last consultation record like which time, which clinic and what are the problems. On the dentist side, they can save costs for printing the documents, enhancing the quality of their services and maintaining trust with clients.

1.4 Project Scopes

The main purpose for this project is to make patients easier and more convenient to schedule dental appointments by developing a mobile application. By creating an intuitive and user-friendly app, we aim to put the power of appointment scheduling directly into the hands of patients. This will empower them to choose appointment times that suit their schedules, receive timely reminders, and access important clinic information at their convenience. This shift toward patient-centric scheduling aims to reduce patient stress and anxiety associated with dental visits, potentially leading to more regular check-ups and improved oral health outcomes.

The following are the features of the two main functions of this mobile application:

User module (Client/Patient)

- a) Users able to fill in personal information to register for a patient account.
- b) Users able to view or modify their personal information in profile page.
- c) Users able to search for their nearby clinic.
- d) Users able to choose favourite dentists and available time.
- e) Users able to make or cancel the appointments.
- f) Users able to make payment throughout some of payment methods such as cash on counter, online banking, and e-wallet.
- g) Users able to review their previous appointments details.

Admin module (Dentist)

- a) Admin able to fill in personal information to register for a dentist account.
- h) Admin able to view or modify their personal information in profile page.
- b) Admin able to open and close their available time slots.
- c) Admin able to view what is the upcoming appointment.
- d) Admin able to review their previous appointments details.

1.5 Project Contributions

This project seeks to make a meaningful contribution to the field of dental healthcare by developing a user-friendly mobile application specifically designed for dental appointment management. The application will empower patients to effortlessly schedule and manage their dental appointments. In addition, the application will help to reduce the workload of dental receptionists, freeing them up to focus on other tasks. This will improve the efficiency of dental practices and make it easier for them to provide quality care to their patients. By addressing the traditional dental appointment scheduling and management, this system aims to provide a more efficient and user-friendly experience for both patients and dental clinics, improving the quality of dental care. It is emphasized that there is a need for better dental infrastructure, patient care, and enhanced health insurance coverage for dental care [8].

1.6 Report Organization

In this report, Chapter 1 contains various important components, including project background, problem statement and motivation, project objectives, project scopes, project contributions, and report organization. These parts work together to give developers an in-depth understanding of the project's purpose and goals, making the development process easier with clearer objectives. In Chapter 2, a detailed evaluation of existing projects linked to the proposed project provided as a valuable reference. This evaluation allows developers to assess the strengths and weaknesses of comparable features and user interface designs in current works, providing ideas for minimizing weaknesses and capitalizing on strengths in the development of the new project. A comparative analysis between existing projects and the proposed project will be presented in tabular form, aiding developers in identifying areas for improvement and innovation. Chapter 3 presents the system methodology, system architecture, system requirement and project milestone. Chapter 4 highlights the system design. Chapter 5 is the system implementation and operation. Chapter 6 is the system evaluation, testing and result. Finally, Chapter 7 presents the conclusion of the report, summarizing key findings and insights gained throughout the project.

Chapter 2

Literature Review

2.1 Review of the Previous Works

2.1.1 Review on De Dentiste

De Dentiste is a Dental Clinic mobile app that is an office located in Pakistan that helps their patients get convenient and timely access to dentists. In Figure 2.1, it shows that the app provides 2 ways of making an appointment which are scheduling a visit and online consultation.



Figure 2.1 Appointment Methods

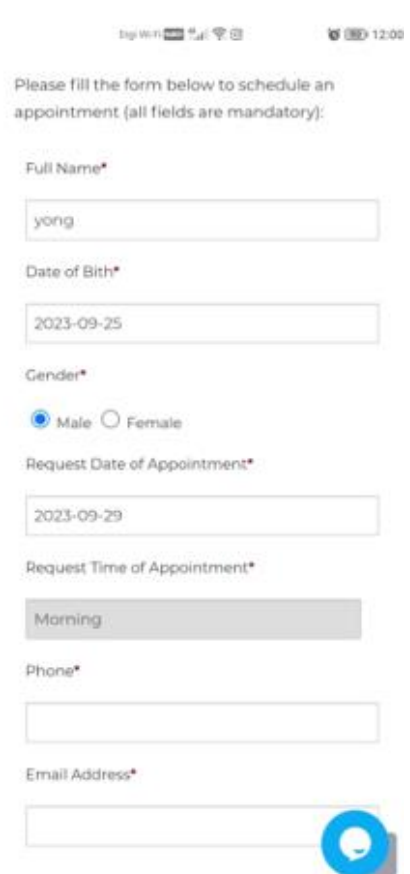


Figure 2.2 Schedule Visit Method

With the Schedule a visit appointment method in Figure 2.2, the doctor can get information like phone numbers and emails from patients to contact the patient. The patient can choose a suitable time slot to schedule a visit. After that, wait for the doctor to confirm

whether the time slot is suitable for him or not. During their first visit to the clinic, the dental concierge will review a questionnaire with the patient and answer any questions the patient may have. At that time, the dental concierge will discuss the practice's policies, review the patient's medical and dental histories, and provide the patient with a list of the pricing structure.

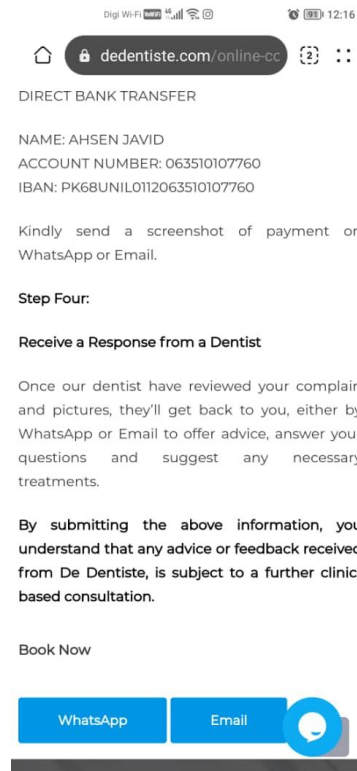


Figure 2.3 Online Consultation Method

Figure 2.3 shows that the online consultation method needs to complete and submit the step via WhatsApp or Email for further consultation from a dentist. Step one is to Take Photo of Your teeth, step two is to Explain Your Issue and step three is to make and screenshot payment. The last step is to wait for the response from the dentist.

Strengths

- De Dentiste provides two ways of making an appointment which are scheduling a visit and online consultation.

Weaknesses

- With Schedule a visit appointment method, clients/patients still need to wait for the dentist to confirm whether the timeslot is suitable for him or not.

2.1.2 Review on HotDoc

HotDoc is a mobile app for patients booking doctor appointments. It provides an online booking and appointment calendar system that does not require integration with your clinical of software. Patients can Make Online Bookings for themselves and their families with their preferred practitioner.

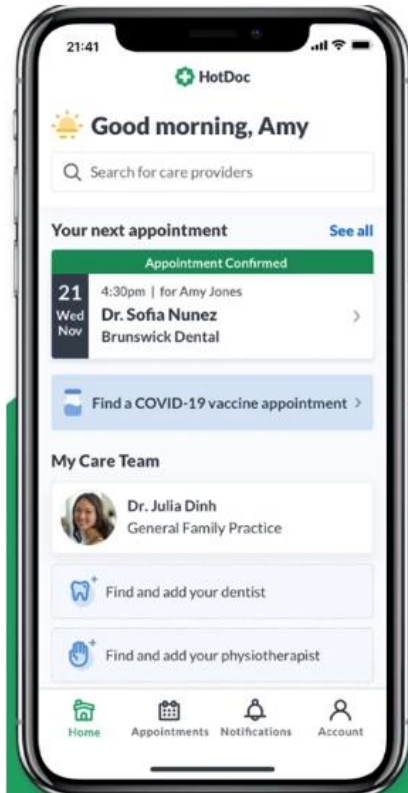


Figure 2.4 HotDoc View Appointment

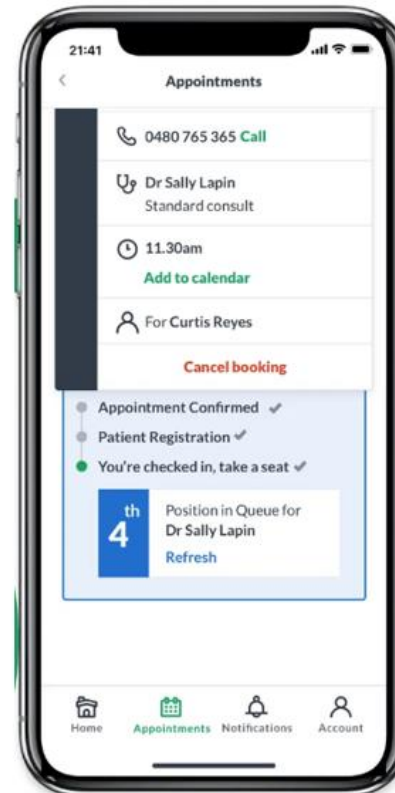


Figure 2.5 HotDoc View Patient Queue

HotDoc views the details of the appointment confirmed in Figure 2.4. In Figure 2.5, the app will show the patient’s place in the queue after check-in and not be left guessing.

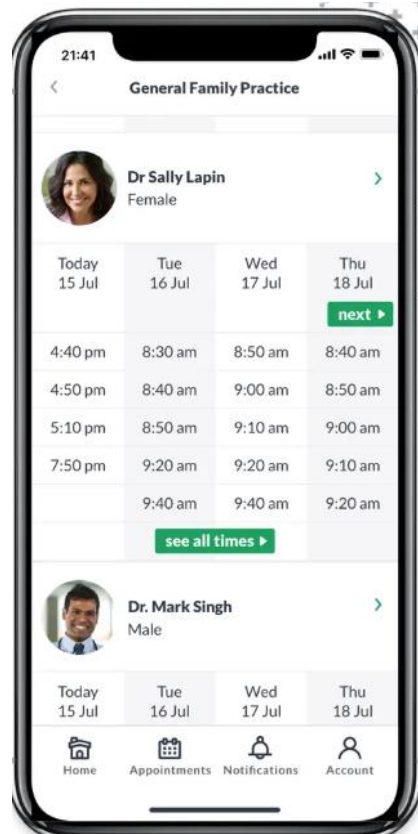


Figure 2.6 HotDoc Practitioner Timeslots

The most crucial part of HotDoc is patient can see the practitioners' all available time and choose the time slot that is suitable. Figure 2.6 shows the practitioners' available time.

Strengths

- HotDoc provides a function where patients can see the dentists' all available time and choose the time slot that is suitable.

Weaknesses

- The design of the HotDoc interface is messy and the instructions are unclear, it could be frustrating for users.

2.1.3 Review on Medicosearch

Medicosearch is a booking mobile application in the medical sector with patients and healthcare providers together. Patients can easily find their preferable healthcare providers on the Internet and book an appointment directly online. The online appointment service decreases the healthcare provider's administrative work, reduces no-shows and prevents misunderstandings.

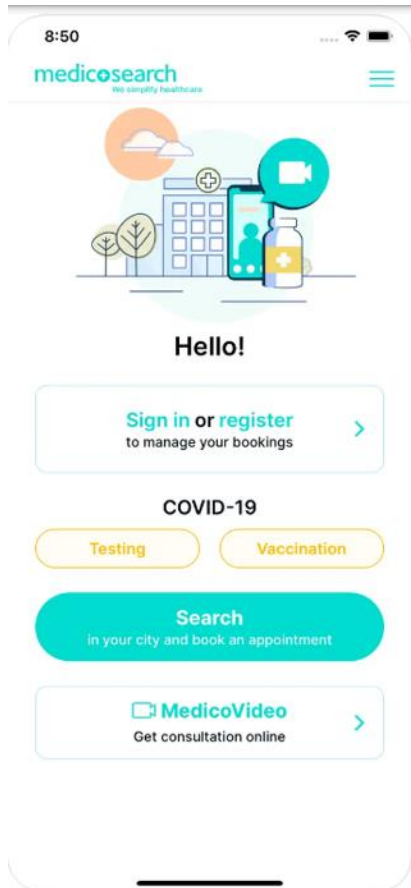


Figure 2.7 MedicoVideo

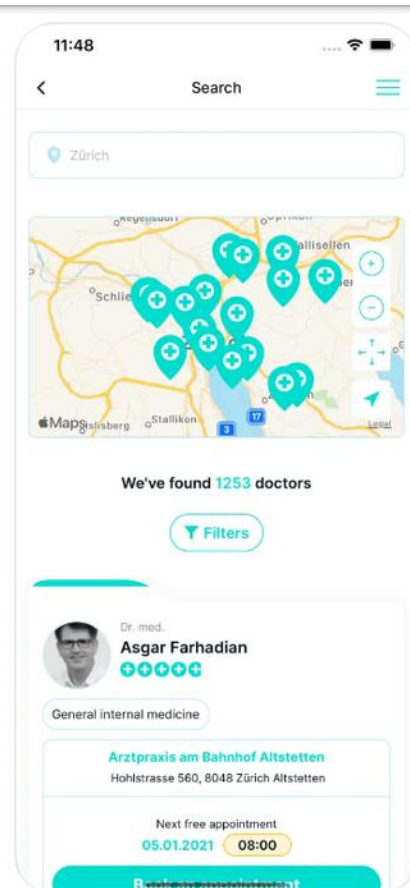


Figure 2.8 Nearby healthcare providers

In Figure 2.7, it shows the main page of the Medicosearch app. Figure 2.8 shows that this app will search the patient's nearby healthcare providers and let the patient filter the healthcare providers.

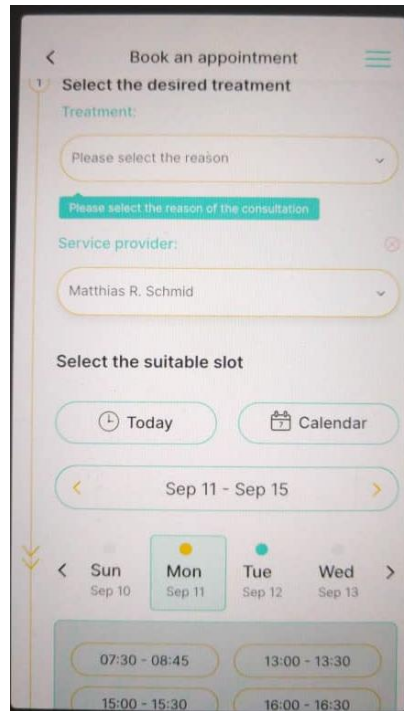


Figure 2.9 Medicosearch Book Appointment

Apart from that, this app allows patients to see the practitioners' available times and choose a suitable time slot as shown in Figure 2.9.

Strengths

- Medicosearch provides functions that show nearby clinics to users.
- Medicosearch provides a function where patients can see the dentists' all available time and choose the time slot that is suitable.

Weaknesses

- Medicosearch requires users to have healthcare knowledge for understanding because they contain some professional information in the mobile application.

2.2 Comparison between Previous Works and Proposed Work

Table 2.1 Limitation & Comparison between De Dentiste, HotDoc and Medicosearch

	De Dentiste	HotDoc	Medicosearch	Proposed Work
User Interface and Functionality	Simple	Messy	Messy	Simple and clear
Show nearby dentist/clinic			✓	✓
No need to waits for the dentist's reply		✓	✓	✓
No need to provides personal information when arriving at the clinic	✓	✓	✓	✓
Enable see dentist's available timeslot		✓	✓	✓
Save history on the patient and dentist side		✓	✓	✓
Wide area		✓	✓	✓

Chapter 3

System Methodology

3.1 System Requirement

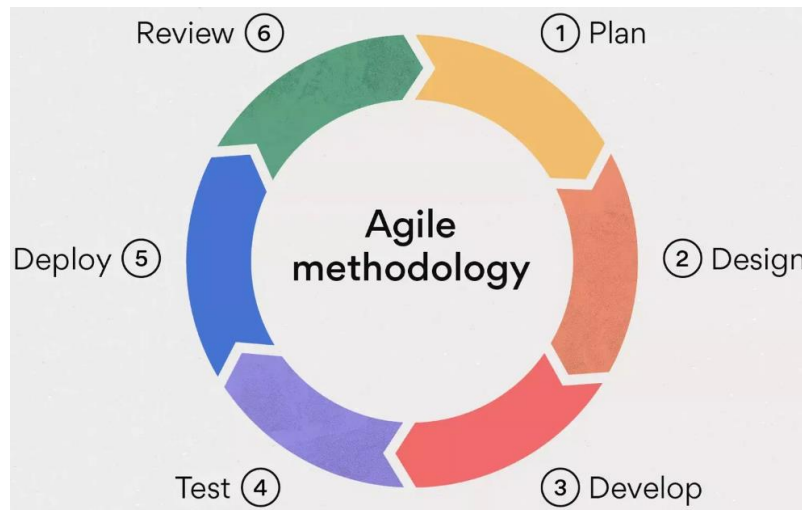


Figure 3.1 Agile Methodology Diagram

Agile is a popular, iterative approach to software development that emphasizes flexibility, collaboration, customer feedback, and small, fast releases. It is designed to adapt to changing requirements and deliver functional software incrementally, which helps teams respond to the dynamic nature of the project. In Figure 3.1, the processes of the project were categorized into separate phases in the development, which were development phases, testing phases, deployment phases and monitoring phases [11], but in agile methodology will include planning phases and designing phases initially. The purpose of developing a methodology is to ensure that the project is correctly implemented and that the activities run smoothly. Below are the steps of applying Agile methodology for developing a dental appointment app.

1. Planning phase:

Define the project vision and objectives. The key features such as appointment booking and scheduling

2. Designing phase:

Create the Product Backlog. The backlog should reflect all the work needed to improve the app. For example, user registration page, view appointment slot page, view history page and so on.

3. Development phase:

Break down the work into short iterations. Selects items from the product backlog to work on during the sprint, focusing on the highest-priority tasks. Works on the selected features, with regular testing and integration.

4. Testing phase:

Test the app to catch and fix issues early. Engage real users to provide feedback on usability and functionality.

5. Deployment phase:

Automate the build, testing, and deployment processes to release updates quickly and reliably. Release functional parts of the app early to get real user feedback.

6. Review/ Monitoring phase:

Continuously monitor app performance and user feedback. Adapt the app based on changing user needs or feedback.

3.2 System Requirement

3.2.1 Hardware

The hardware involved in this project is a laptop and an Android mobile device. Laptop to develop the Dental Appointment application and debug the application when facing issues. An Android mobile device used for testing and deploying this application in android operating systems.



Figure 3.2 Laptop (Nitro AN515-55)

In Figure 3.2 shows that Nitro AN515-55 is a high-performance gaming laptop, designed for both gaming enthusiasts and power users who require significant processing capability. This is the hardware to deploy the application.

Table 3.1 Specifications of laptop

Description	Specifications
Model	Nitro AN515-55
Processor	Intel Core i5-10300H
Operating System	Windows 11
Graphic	NVIDIA GeForce GTX 1660Ti
Screen Resolution	1920 x 1080
Memory	16GB RAM
Storage	475GB



Figure 3.3 Android mobile device (NEN-L22)

Figure 3.3 shows that the device for testing the application, which is Android mobile device (NEN-L22). It offers a balanced mix of functionality and affordability for users looking for a practical, budget-friendly option. For others platform like Apple and Huawei that not contain Android System cannot install the application.

Table 3.2 Specifications of Android mobile device

Description	Specifications
Model	NEN-L22
Processor	Qualcomm SM6115 Snapdragon 662
Operating System	Android 10
Memory	8GB RAM
Storage	128GB

3.2.2 Software

Android Studio

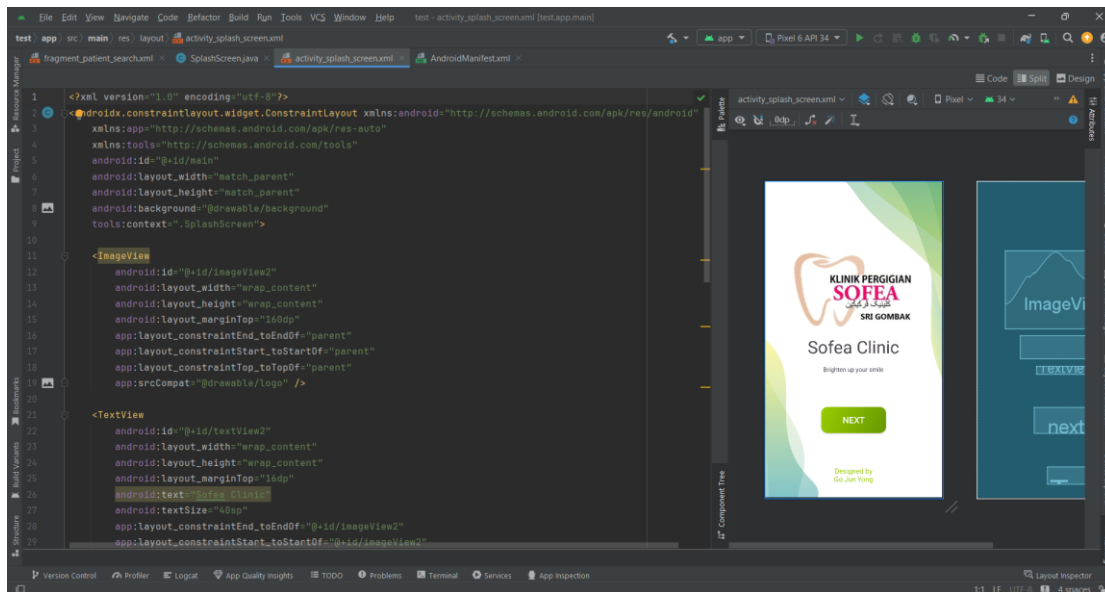


Figure 3.4 Android Studio

In Figure 3.4, Android Studio contains an Android virtual device that can be able to run the development application. The advantage of running it on a virtual device is that during the testing phase, it is much easier because there is no need to constantly run the app on a phone if that is not necessary. It is easier to debug the app when facing some issues during the testing phase. Moreover, Android Studio supports several structured programming code modules that can be used as a separate building, testing, and debugging process for each functional unit.

Google Firebase

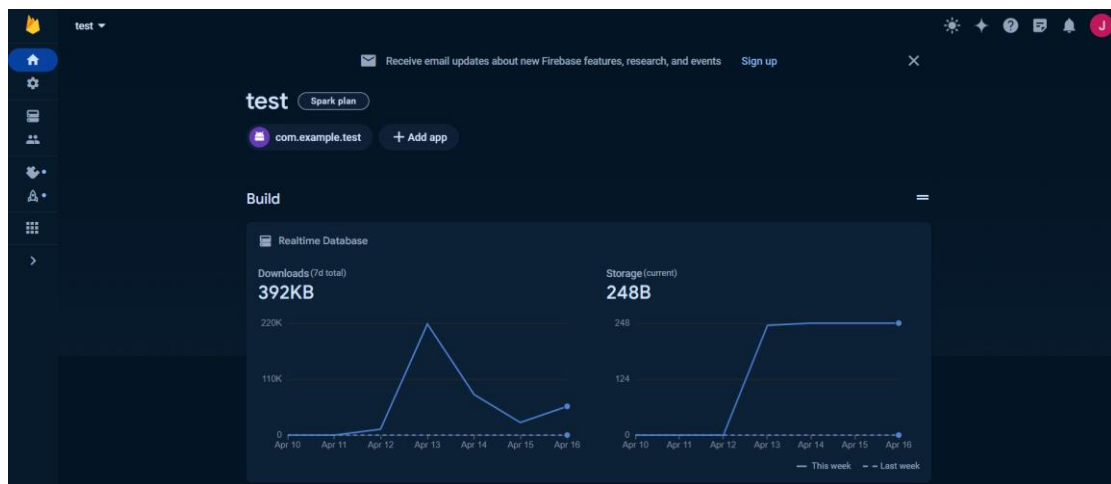


Figure 3.5 Google Firebase

In Figure 3.5, Google Firebase is a platform developed by Google that provides a suite of tools for building and managing web and mobile applications. In this project include numerous services such as Authentication (using methods like email/password, Google and Facebook), Realtime Database (store and sync data between users in real time) and Cloud Storage (store user-generated content such as images).

Google Cloud

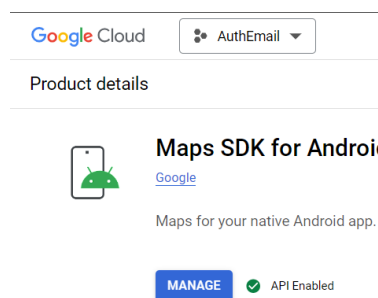


Figure 3.6 Google Cloud (Maps SDK)

In Figure 3.6, Google Cloud Platform (GCP) is a suite of cloud computing services offered by Google, covering areas such as compute, storage, databases, machine learning, networking, and more. It provides a robust infrastructure for building, deploying, and scaling applications and services. In this project include numerous services such as Google Maps SDK (providing functionalities like displaying maps, adding markers).

3.3 Project Milestones

3.3.1 Project timeline (FYP 1)

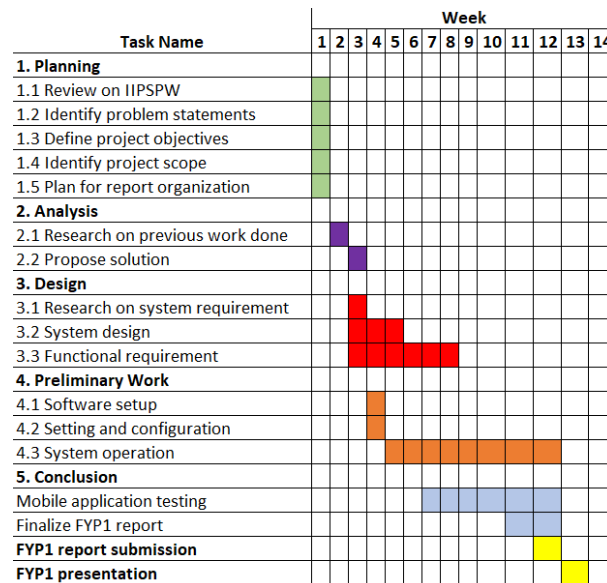


Figure 3.7 Project I Timeline

In Figure 3.7 shows that the progress was completed on time in FYP 1 as the planning.

3.3.2 Project timeline (FYP 2)

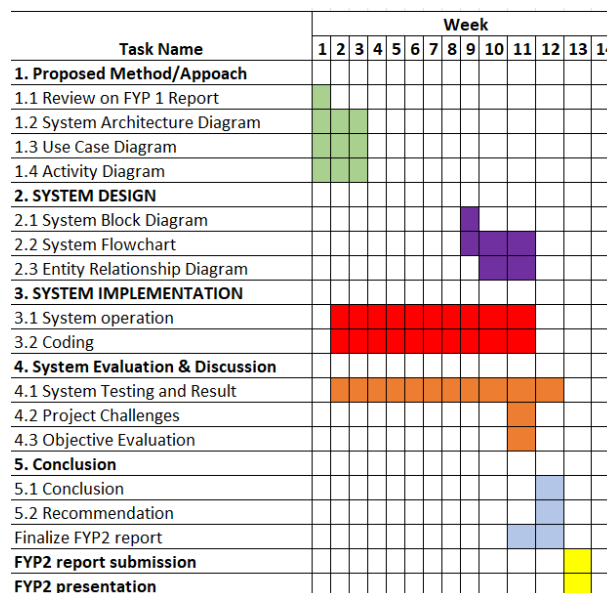


Figure 3.8 Project II Timeline

In Figure 3.8 shows that the project timeline planning in FYP 2.

3.4 System Architecture Design/Overview

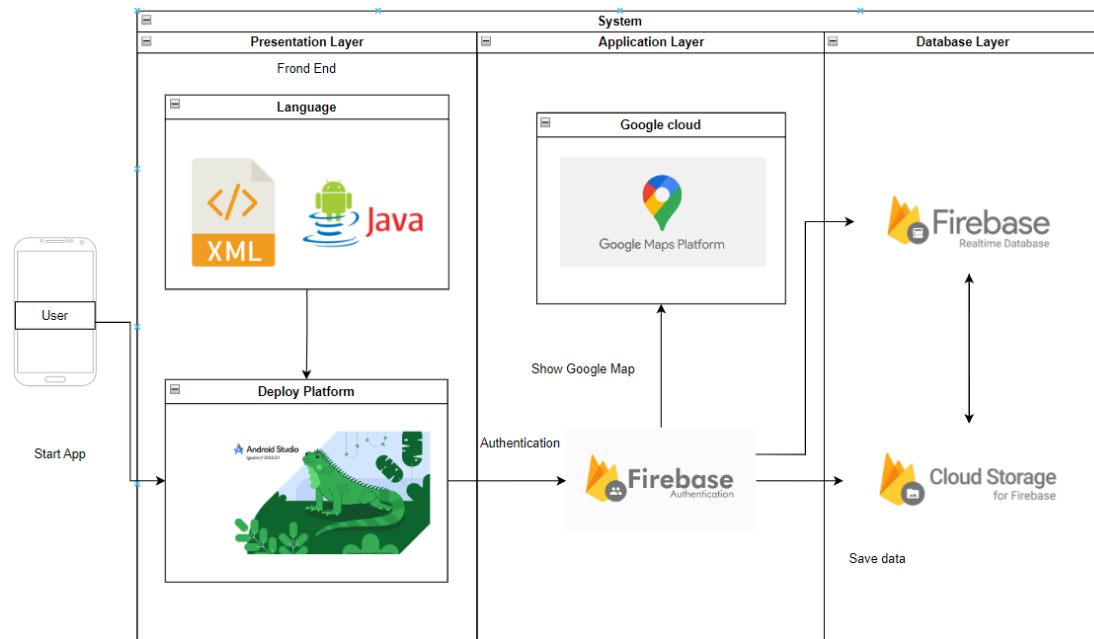


Figure 3.9 System Architecture Diagram

The Figure 3.9 shows the system architecture of the proposed system. The deployment platform is Android Studio, and the system is implemented using the Java programming language. Android Studio provides the framework and XML layout to build the user interface of the mobile application.

When a user starts using the Dental Appointment application, they must register an account and authenticate through Firebase Authentication at the application layer. Once registered successfully, the user's information is stored in the Firebase Realtime Database at the database layer. After logging into the application, the user can choose their preferred dentist to book an appointment. All records are stored in the Firebase Realtime Database.

The user is allowed to upload their picture for reference, and the image will be stored in Firebase Storage. The user can search for their preferred dentist on Google Maps. Finally, the content will be loaded onto the user's device to complete the data process.

3.5 Use Case Diagram

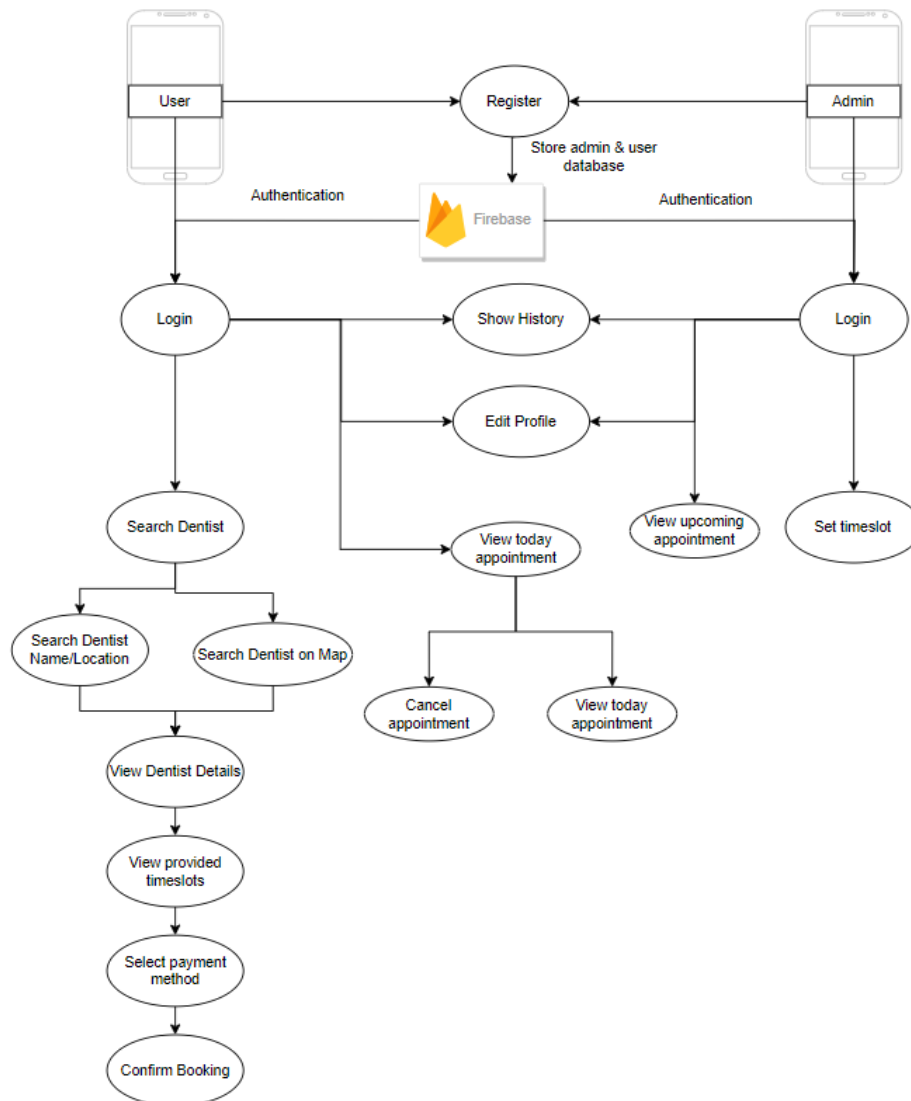


Figure 3.10 Use Case Diagram

In Figure 3.10 shows a smooth flow for booking and managing dental appointments with clear interaction points between the users and the system. Both User and Admin can register and authenticate through Firebase, which stores the database for both roles. After authentication, both can log in to access the system. For the user actions, users can search for a dentist either by name/location or through a map interface. Once a dentist is selected, the user can view their details and available appointment times set by the dentist/admin. After selecting a timeslot, the user chooses a payment method and confirms the booking. Users can cancel an upcoming appointment if needed. For Admin actions, admins can set available timeslots for the dentists. Lastly, both user and admin can check appointments for the current day, view their past appointments and update their profile information.

3.6 Flow of Event

3.6.1 Register

Table 3.3 Patient Register Flow Description

User	Patient
Main Flow	<ol style="list-style-type: none"> 1. User clicks the Sign-Up link and enter sign up page. 2. User enters email, phone number, name and password. 3. User clicks on sign up button. 4. Account creates successful.
Alternative Flow	<ol style="list-style-type: none"> 1. System displays error message if password not valid. 2. System displays error message if email not valid. 3. System displays error message if the email already registered. 4. User can review the password by click the “show password” checkbox.

Table 3.4 Dentist Register Flow Description

User	Dentist
Main Flow	<ol style="list-style-type: none"> 1. User clicks the Sign-Up link and enter sign up page. 2. User selects the location of clinic he worked for. 3. User enters email, phone number, name and password. 4. User clicks on sign up button. 5. Account creates successful.
Alternative Flow	<ol style="list-style-type: none"> 1. System displays error message if password not valid. 2. System displays error message if email not valid. 3. System displays error message if the email already registered. 4. System displays error message if the location unselects. 5. User can review the password by click the “show password” checkbox.

3.6.2 Login

Table 3.5 Patient Login Flow Description

User	Patient
Main Flow	<ol style="list-style-type: none"> 1. User enters their email and password. 2. User clicks on the Login Button. 3. System goes to the Patient Main page.
Alternative Flow	<ol style="list-style-type: none"> 1. System displays error message if the email does not register or password incorrect. 2. User can review the password by click the “show password” checkbox.

Table 3.6 Dentist Login Flow Description

User	Dentist
Main Flow	<ol style="list-style-type: none"> 1. User enters their email and password. 2. User clicks on the Login Button. 3. System goes to the Dentist Main page.
Alternative Flow	<ol style="list-style-type: none"> 1. System displays error message if the email does not register or password incorrect. 2. User can review the password by click the “show password” checkbox.

3.6.3 View Today Appointment

Table 3.7 Patient View Today Appointment Flow Description

User	Patient
Main Flow	<ol style="list-style-type: none"> 1. User able to review today appointment. 2. User able to see the booked dentist name, picture, clinic location, date and time.
Alternative Flow	<ol style="list-style-type: none"> 1. User can click on Complete Button after finished the appointment. 2. User can click on Cancel Button to cancel today appointment. 3. It will show today to appointment to user when there is no appointment made on today.

3.6.4 View Upcoming Appointment

Table 3.8 Dentist View Upcoming Appointment Flow Description

User	Dentist
Main Flow	<ol style="list-style-type: none"> 1. User able to review today upcoming appointment. 2. User able to see the booked patient name, picture, clinic location, date and time.
Alternative Flow	<ol style="list-style-type: none"> 1. It will show today to appointment to user when there is no appointment made on today.

3.6.5 Show History

Table 3.9 Patient History Flow Description

User	Patient
Main Flow	<ol style="list-style-type: none"> 1. User able to review the history after completed the appointment. 2. The history details involve booked dentist name, picture, clinic location, date and time.

Table 3.10 Dentist History Flow Description

User	Dentist
Main Flow	<ol style="list-style-type: none"> 1. User able to review the history after completed the appointment. 2. The history details involve booked patient name, picture, payment method, date and time.

3.6.6 Search Dentist

Table 3.11 Patient Search Dentist Flow Description

User	Patient
Main Flow	<ol style="list-style-type: none"> 1. User can select which methods to search dentist. 2. User clicks on the Search by Name Button, system goes to the Search Dentist Name/Location page 3. User clicks on the Search in Map Button; system goes to the Search Dentist on Map page

3.6.7 Edit profile

Table 3.12 Patient Edit Profile Flow Description

User	Patient
Main Flow	<ol style="list-style-type: none"> 1. User able to review their information. 2. By clicking the pencil icon, the user able to edit profile. 3. The profile information includes patient's picture, name, email, phone number and address.
Alternative Flow	<ol style="list-style-type: none"> 1. The profile cannot become editable before the pencil icon is clicked.

Table 3.13 Dentist Edit Profile Flow Description

User	Dentist
Main Flow	<ol style="list-style-type: none"> 1. User able to review their information. 2. By clicking the pencil icon, the user able to edit profile. 3. The profile information includes dentist's picture, name, email, phone number, experience work in years and brief about dentist.
Alternative Flow	<ol style="list-style-type: none"> 1. The profile cannot become editable before the pencil icon is clicked.

3.6.8 View Dentist Details

Table 3.14 Patient View Dentist Details Flow Description

User	Patient
Main Flow	<ol style="list-style-type: none"> 1. When user clicks on the dentist, it will show the dentist's information. 2. User can select the timeslots provided by dentist. 3. User can select their preferable payment method. 4. User can confirm the booking by viewing all the details. 5. When user the confirm booking button, the appointment will book successful.
Alternative Flow	<ol style="list-style-type: none"> 1. The book appointment will not function before user select a timeslot. 2. System displays error message if user does not select their payment method. 3. System displays success message if user book the appointment successful.

3.6.9 Set timeslot

Table 3.15 Dentist Set Timeslot Flow Description

User	Dentist
Main Flow	<ol style="list-style-type: none">1. User can select the date and add their available timeslot.2. User can cancel the timeslot.
Alternative Flow	<ol style="list-style-type: none">1. Alert dialog will show to the user. To let the user double confirm the timeslot will be canceled.

3.7 Activity Diagram

3.7.1 User Authentication (Patient and Dentist)

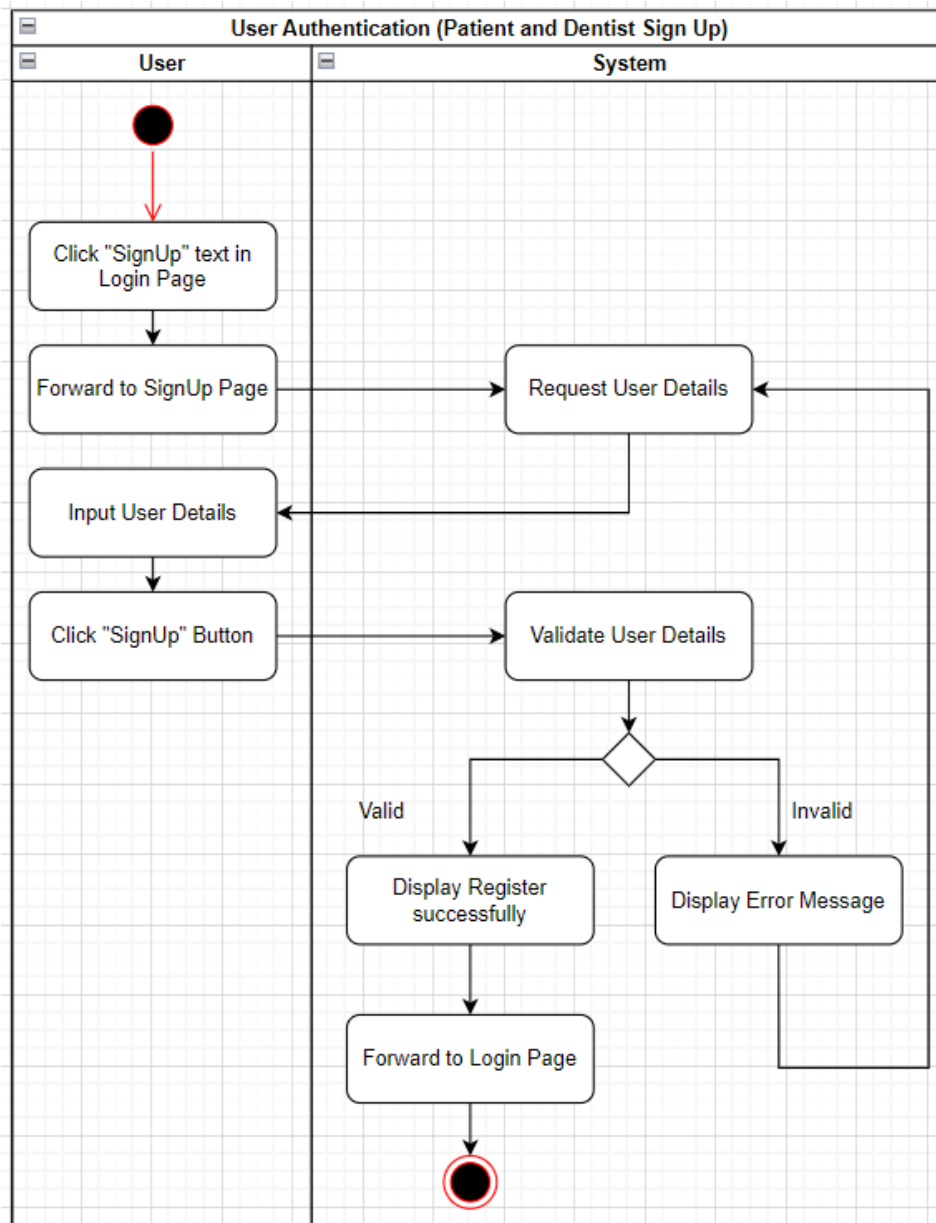


Figure 3.11 Sign Up Activity Diagram

The diagram in Figure 3.11 shows the steps for user registration. The User clicks “SignUp” text, inputs details, and submits the form. The System requests and validates the details. If valid, a success message is displayed, and the user is redirected to the login page. If invalid, an error message is shown, prompting the user to correct their input.

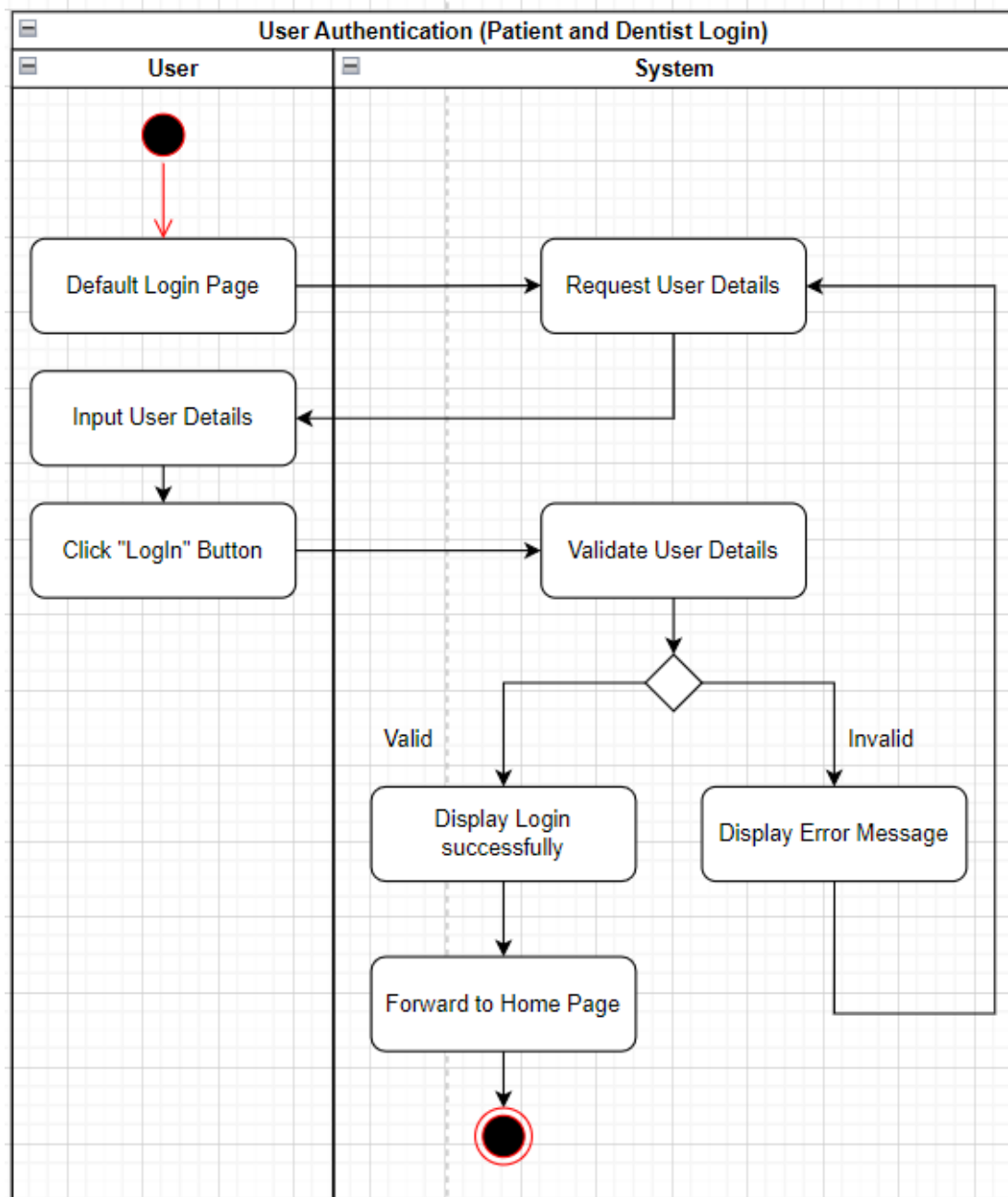


Figure 3.12 Login Activity Diagram

The diagram in Figure 3.12 shows the steps for user login. The User enter the default login page, inputs details, and submits the form. The System requests and validates the details. If valid, a success message is displayed, and the user is redirected to respective home page. If invalid, an error message is shown, prompting the user to correct their input.

3.7.2 Home Module (Patient and Dentist)

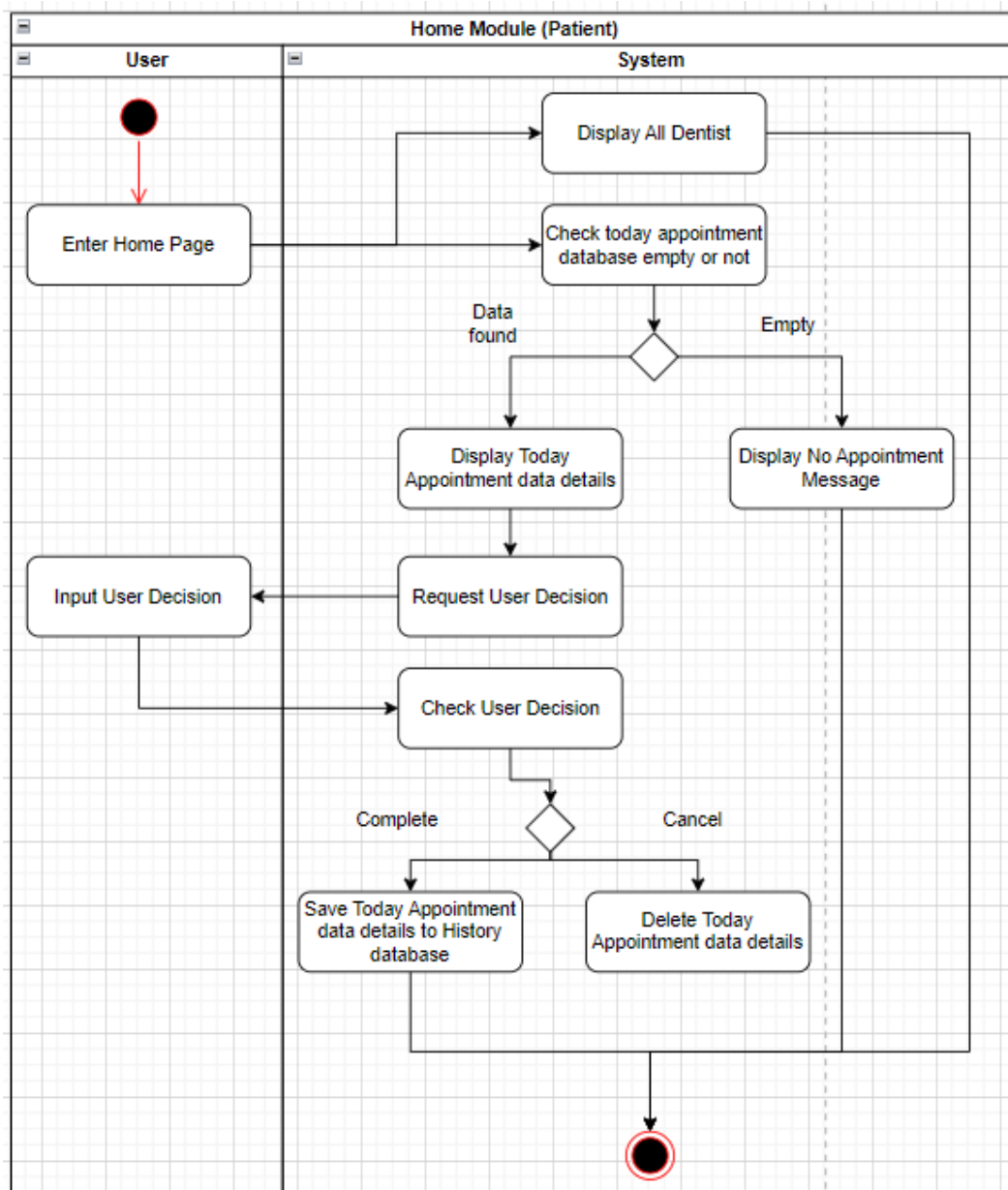


Figure 3.13 Home Module (Patient) Activity Diagram

The diagram in Figure 3.13 shows the process for a patient managing appointments in the home module. The User enters the home page, and the System checks if there is a scheduled appointment for today. If no appointment is found, it displays a "No Appointment" message. If an appointment exists, the system shows the details and asks for the user's decision (complete or cancel). The user's decision either saves the appointment to history (if complete) or deletes it (if canceled).

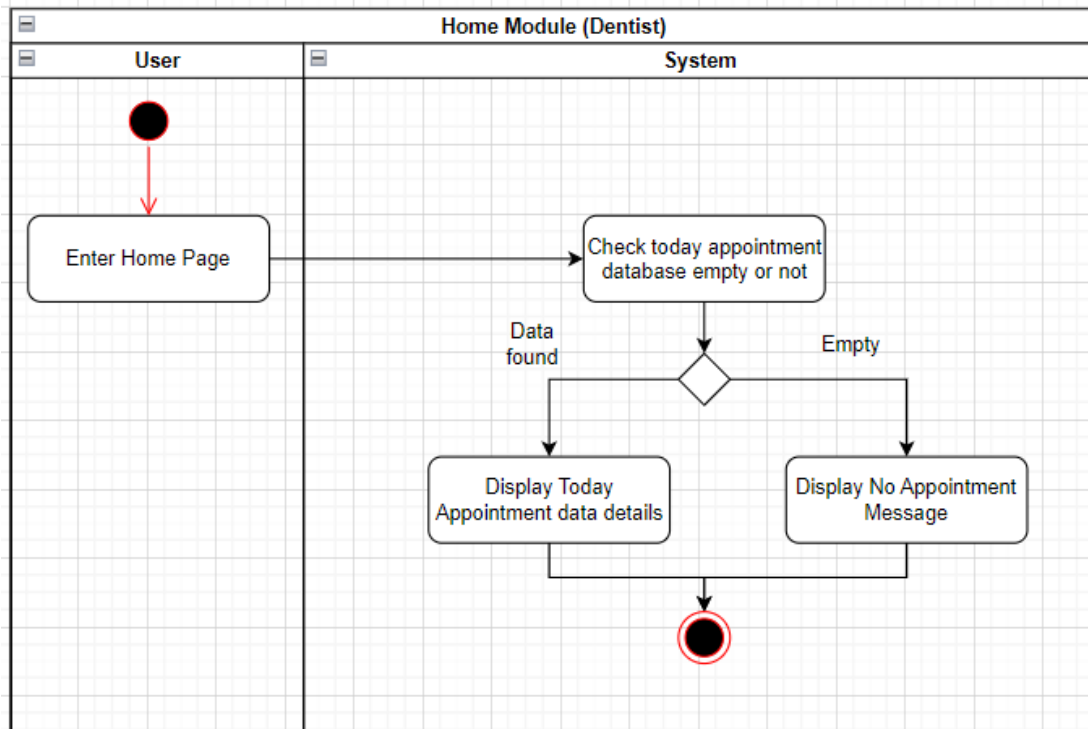


Figure 3.14 Home Module (Dentist) Activity Diagram

The diagram in Figure 3.14 shows the process for a dentist managing appointments in the home module. The User enters the home page, and the System checks if there is a scheduled appointment for today. If no appointment is found, it displays a "No Appointment" message. If an appointment exists, the system shows the details.

3.7.3 History Module (Patient and Dentist)

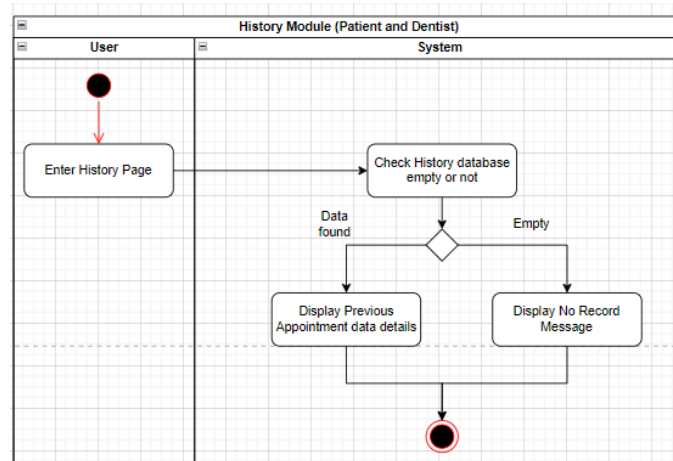


Figure 3.15 History Module (Patient and Dentist) Activity Diagram

The diagram in Figure 3.15 shows the process for both patient and dentist managing appointments in the history module. The User enters the history page, and the System checks if there is a past appointment record. If no appointment is found, it displays empty page. If an appointment exists, the system shows the details.

3.7.4 Profile Module (Patient and Dentist)

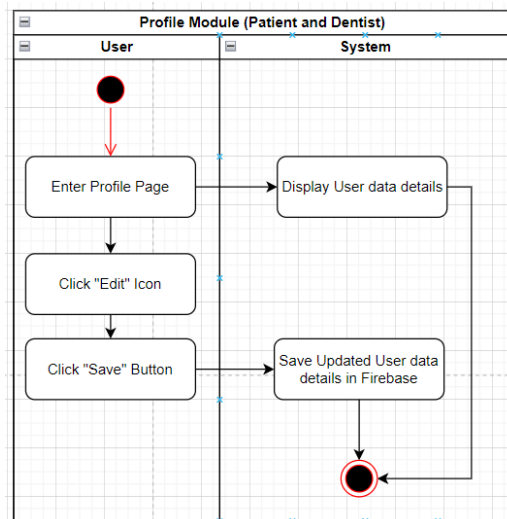


Figure 3.16 Profile Module (Patient and Dentist) Activity Diagram

The diagram in Figure 3.16 shows the process for both patient and dentist managing profile in the profile module. The User enters the profile page, and the System displays the user data details. The user can edit their profile and save updated data in Firebase.

3.7.5 Appointment Module (Dentist)

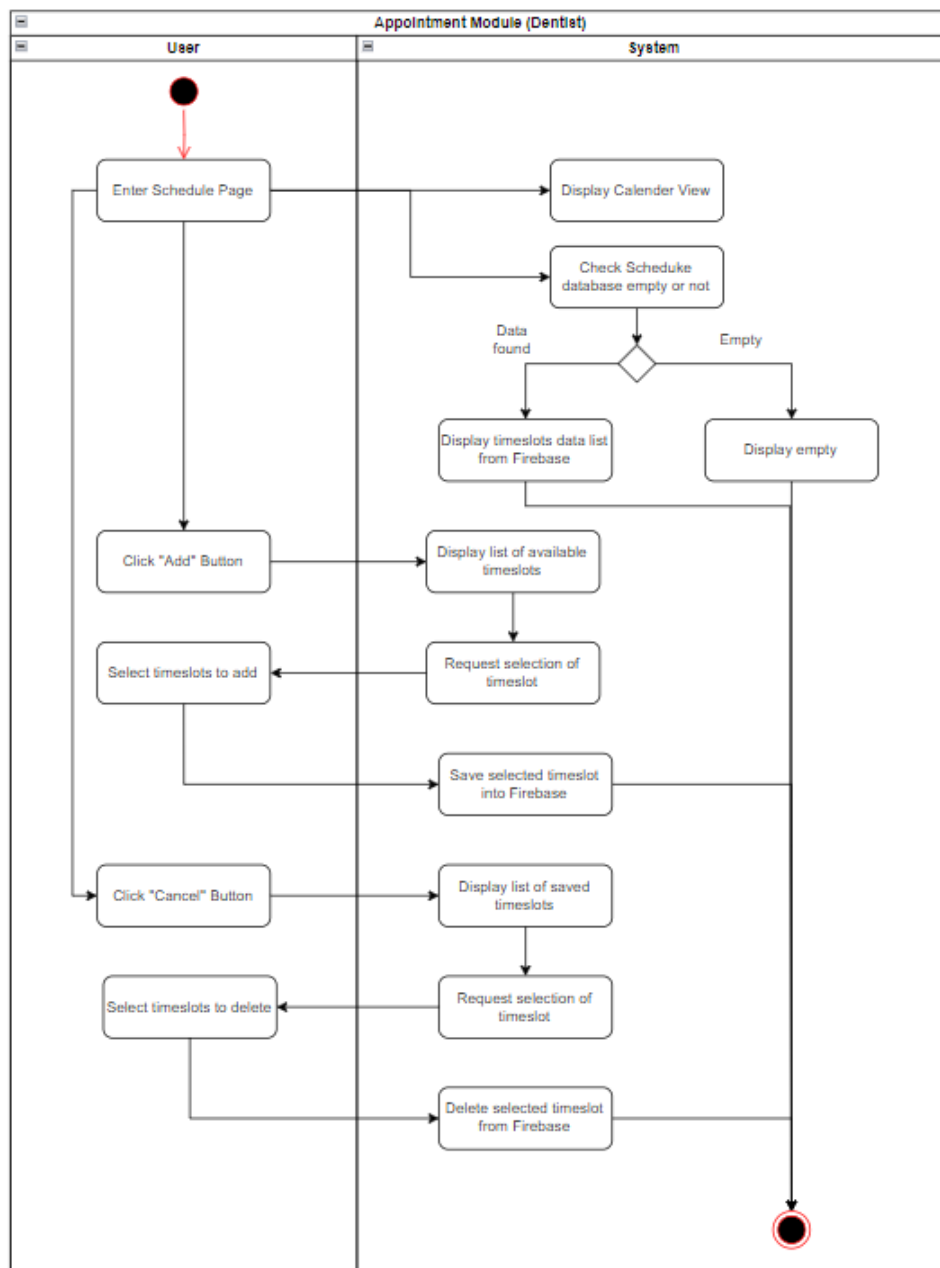


Figure 3.17 Appointment Module (Dentist) Activity Diagram

The diagram in Figure 3.17 shows the process for a dentist managing appointment module. The dentist can enter the schedule page, where the system displays a calendar and checks for existing data in Firebase. If data is found, it shows available timeslots. The dentist can then add or delete timeslots, with the system saving or removing the selections in Firebase.

3.7.6 Appointment Module (Patient)

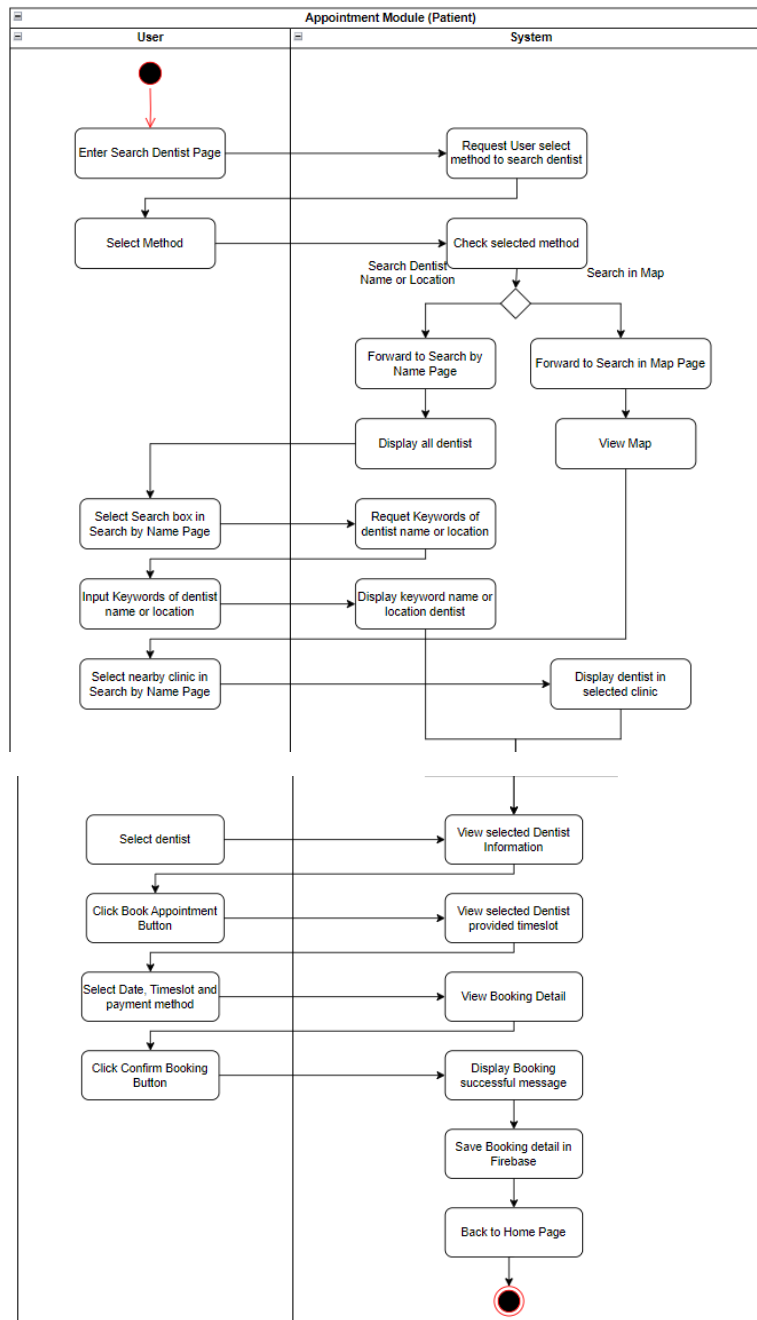


Figure 3.18 Appointment Module (Patient) Activity Diagram

The diagram in Figure 3.18 shows the process for a patient to search for and book a dentist appointment. The patient can search for a dentist either by name or using a map. Once a dentist is selected, the patient views the dentist's details and available timeslots, chooses a timeslot, selects a payment method, and confirms the booking. The system then saves the booking in Firebase, displays a confirmation message, and returns the patient to the home page.

Chapter 4

System Design

4.1 System Block Diagram

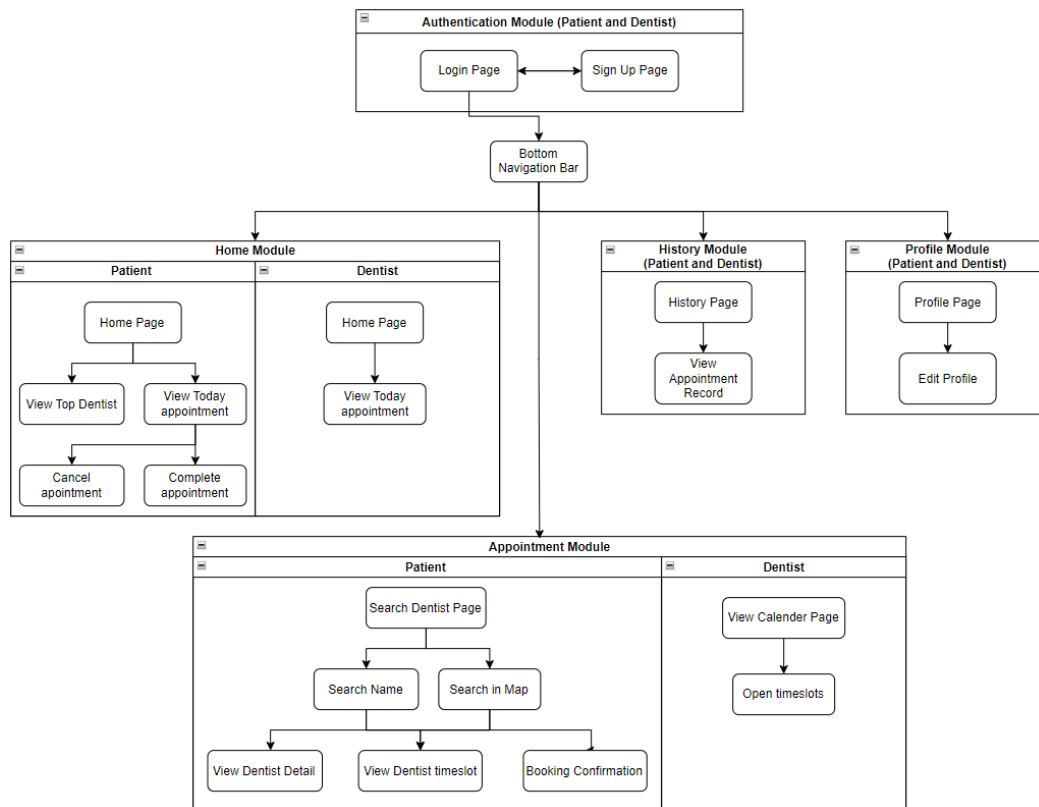


Figure 4.1 System Block Diagram

Figure 4.1 shows the system block diagram of the proposed mobile application. The mobile application consists of five modules: the Authentication module, Home module, Appointment module, History module, and Profile module. The Authentication module allows users to register an account for the app; registration is required before logging in. The Home module serves both Patient and Dentist users. For Patient users, it provides options to view Top Dentists, view Today's Appointments, cancel appointments, and mark appointments as complete. For Dentist users, it allows them to view today's appointments. The Appointment module enables Dentist users to set available time slots for Patient users. Patient users can search for dentists by name or location on a map, view dentist details, see available time slots, and confirm bookings. The fourth module, the History module, allows both users to view previous appointment records. Lastly, users can edit their profiles in the Profile module.

4.2 System Flowchart

4.2.1 Flowchart of User Authentication (Patient and Dentist)

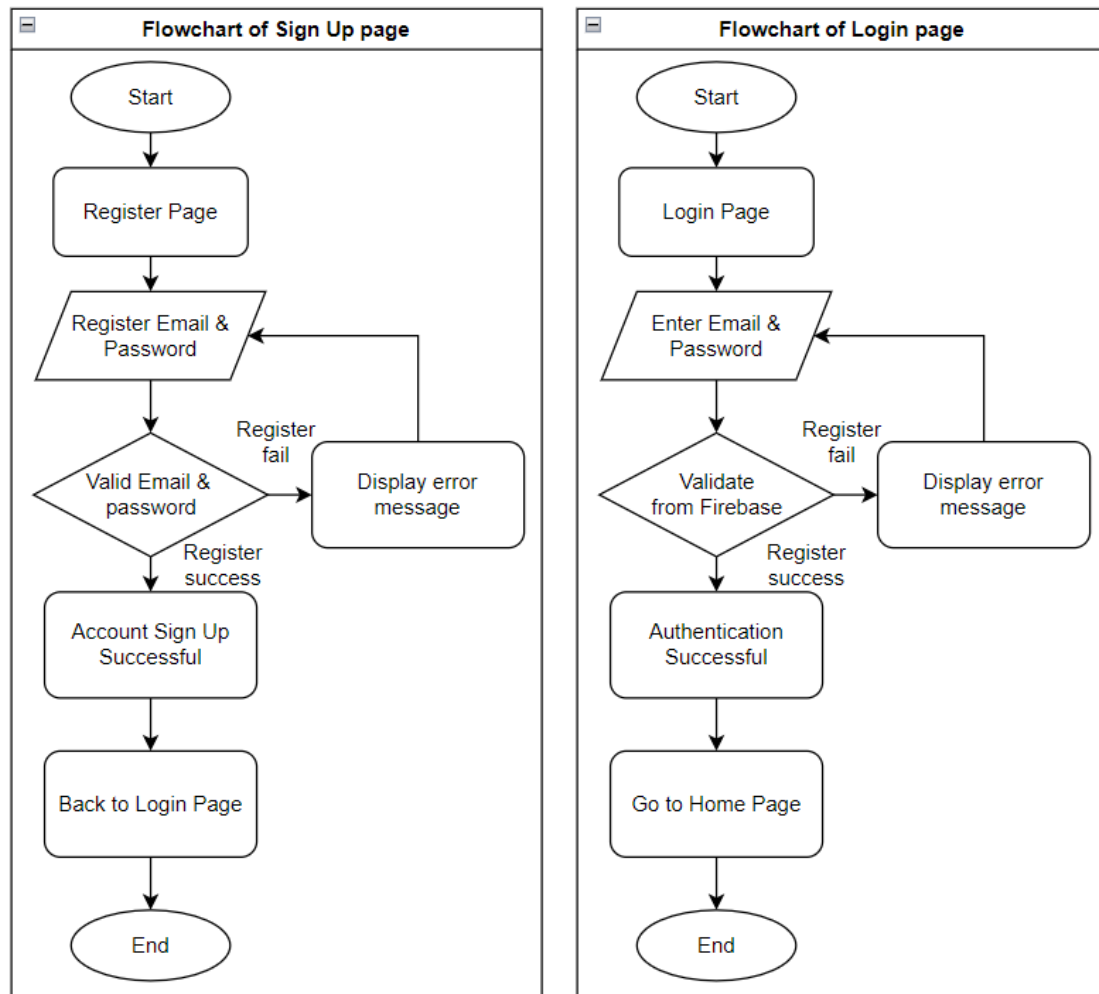


Figure 4.2 User Authentication (Patient and Dentist) Flowchart

The Figure 4.2 shows that the flowchart of user authentication for both patient and dentist. In Sign-Up page, the user register with enter email and password. If valid email and password, a success message is displayed, and the user is redirected to the login page. If invalid, an error message is shown, prompting the user to correct their input. In Login page, the user login with enter email and password. If valid email and password, a success message is displayed, and the user is redirected to the home page. If invalid, an error message is shown, prompting the user to correct their input.

4.2.2 Flowchart of Home Module (Patient and Dentist)

Home Page

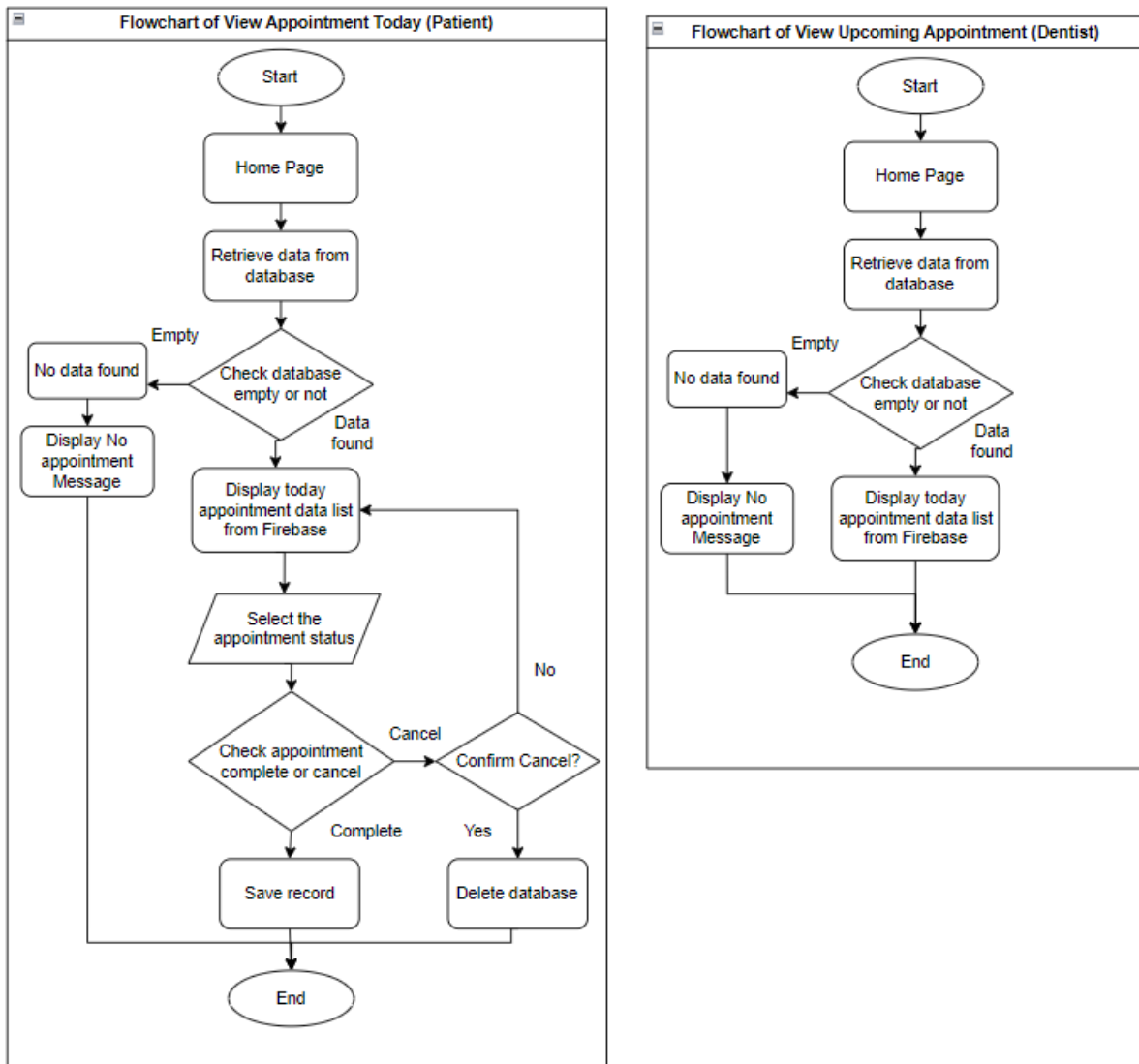


Figure 4.3 Home Module (Patient and Dentist) Flowchart

The Figure 4.3 shows that the flowchart of home module for both patient and dentist. For the patient side, user enters the home page. If today no appointment, it displays a "No Appointment" message. If an appointment exists, the app shows the details. If the appointment cancels by user, the details will be deleted. If the consultation completed, it saves the record to database. For the dentist side, user enters the home page. If today no appointment, it displays a "No Appointment" message. If an appointment exists, the app shows the details.

4.2.3 Flowchart of History Module (Patient and Dentist)

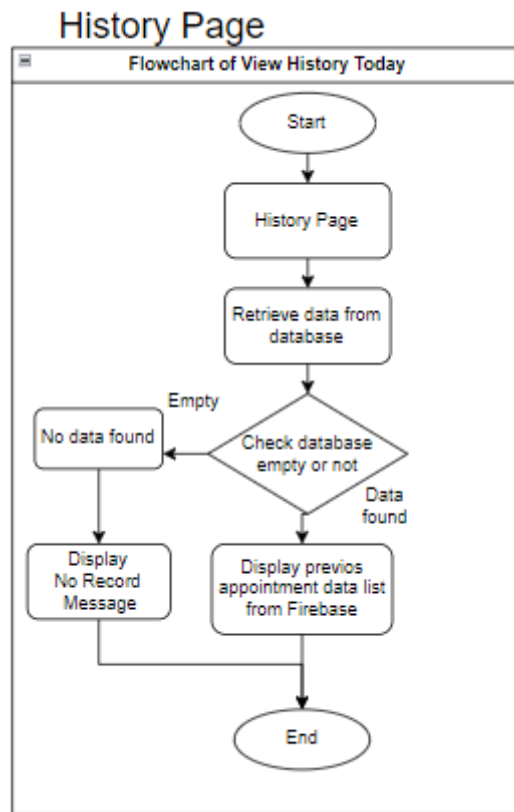


Figure 4.4 History Module (Patient and Dentist) Flowchart

The Figure 4.4 shows that the flowchart of history module for both patient and dentist. The User enters the history page. If no appointment is found, it displays empty page. If an appointment exists, it shows the details of past appointment.

4.2.4 Flowchart of Profile Module (Patient and Dentist)

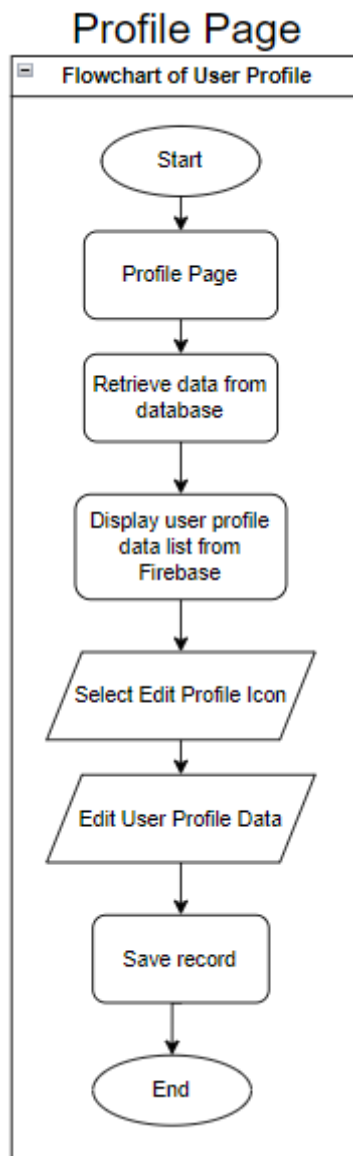


Figure 4.5 Profile Module (Patient and Dentist) Flowchart

The Figure 4.5 shows that the flowchart of profile module for both patient and dentist. The User enters the profile page and displays the user data details. The user can edit their profile and save updated data in Firebase.

4.2.5 Flowchart of Appointment Module (Dentist)

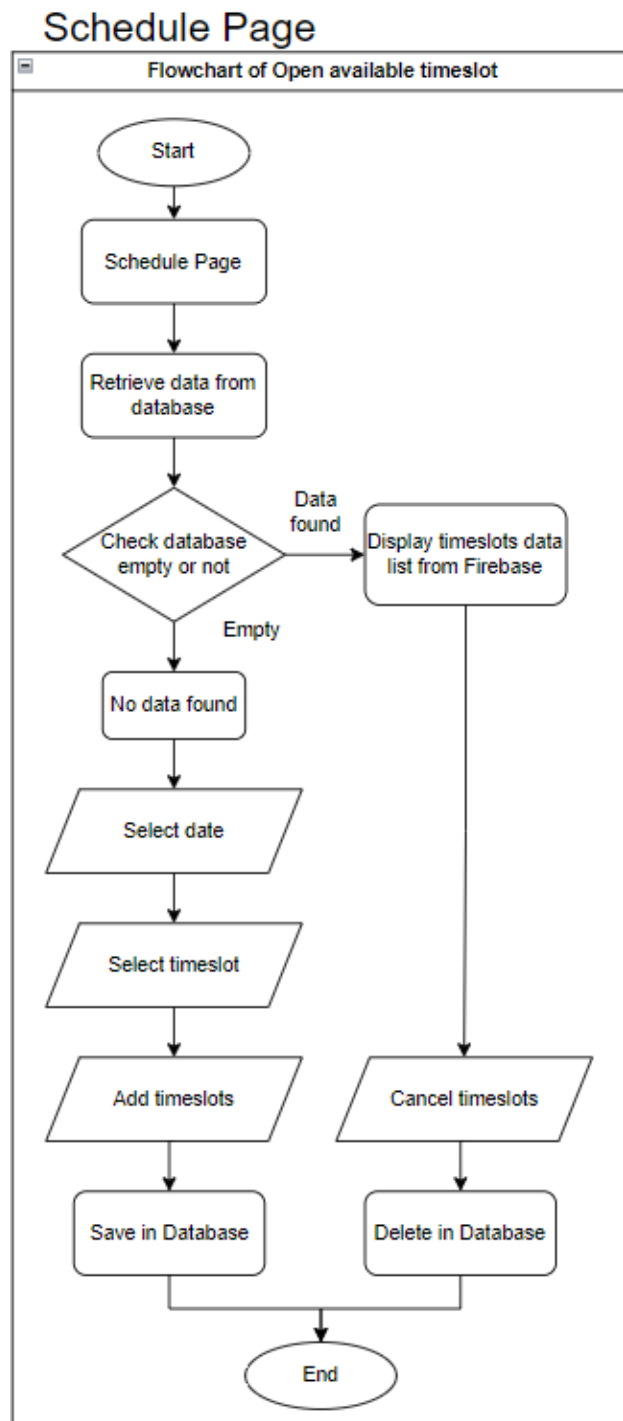


Figure 4.6 Appointment Module (Dentist) Flowchart

The Figure 4.6 shows that the flowchart of appointment module for dentist. The user enters the schedule page. If data is found, it shows the previously added timeslots. The dentist can then add or delete timeslots and save or delete in database.

4.2.6 Flowchart of Appointment Module (Patient)

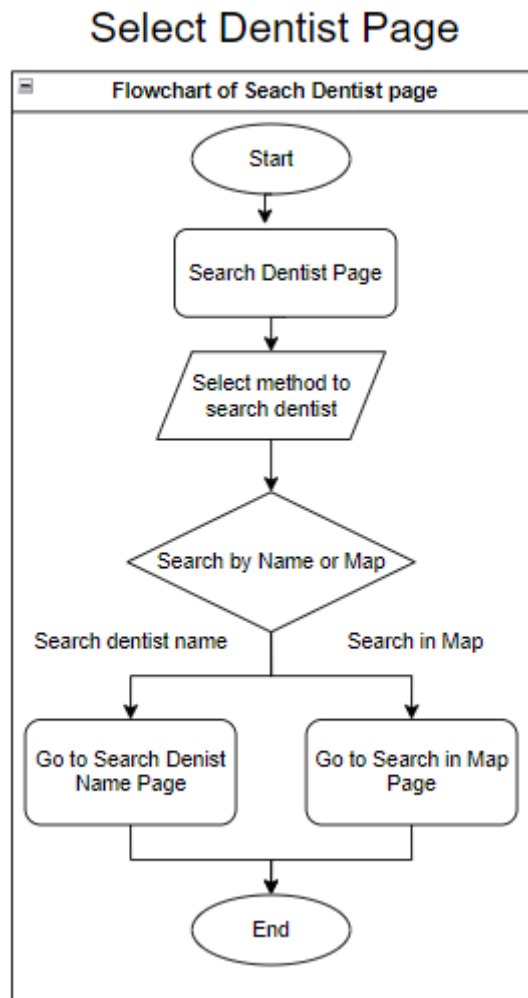


Figure 4.7 Appointment Module (Patient) Flowchart

The Figure 4.7 shows that the flowchart of appointment module for patient. The patient can choose method to search dentist. There are 2 methods provided which are search dentist by name and search dentist in map.

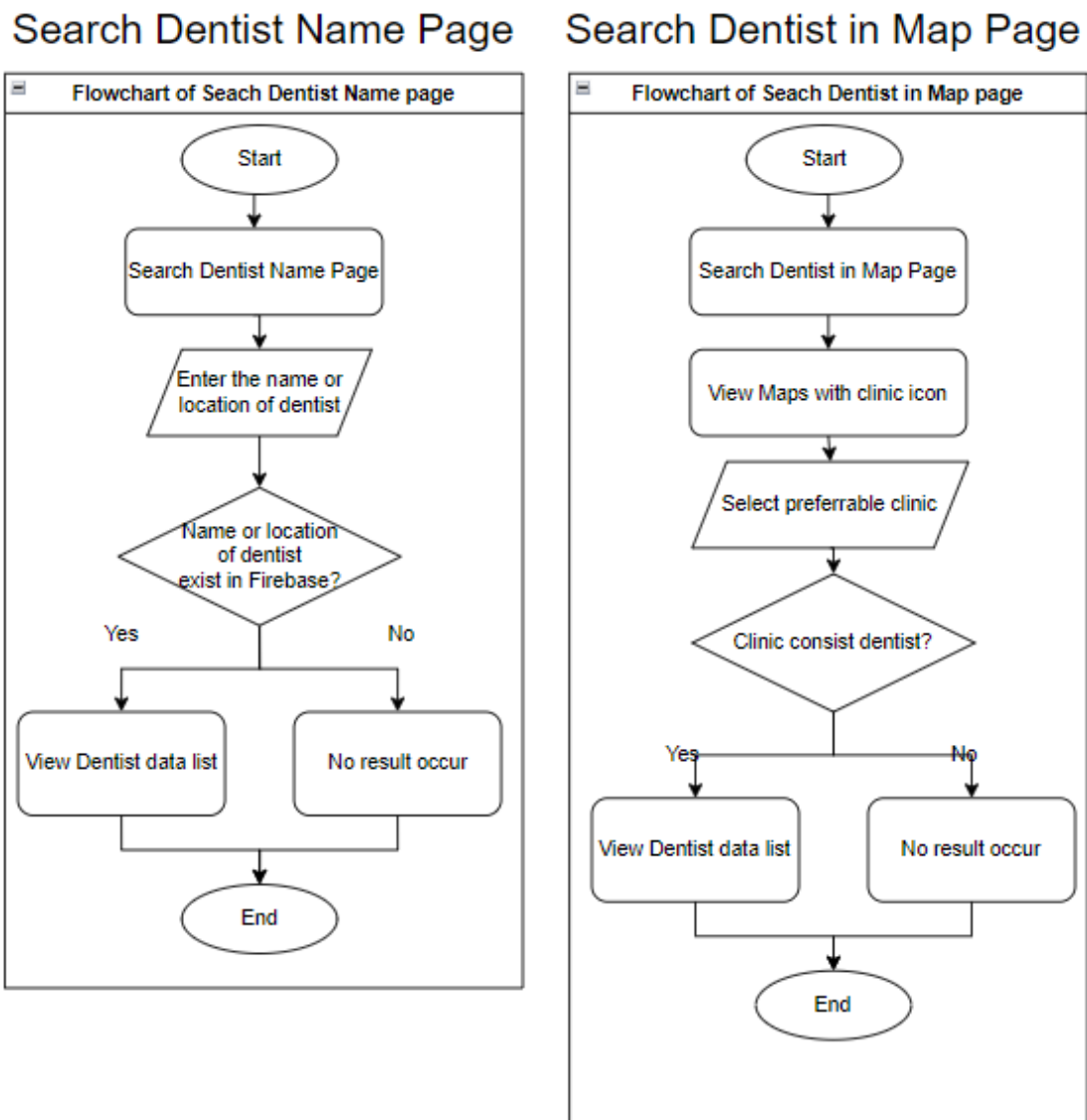


Figure 4.8 Search Dentist Name and Dentist in Map Flowchart

The Figure 4.8 shows that the flowchart of search dentist methods for patient. In the Search Dentist Name method, user can enter name or location of the dentist. If the name or location valid, it will show all dentist list. Otherwise, show empty result. In the Search Dentist in Map method, user can select dentist by select the clinic in the Map. If the clinic contain dentist, it will show all dentist list. Otherwise, show empty result.

View Dentist Data Page

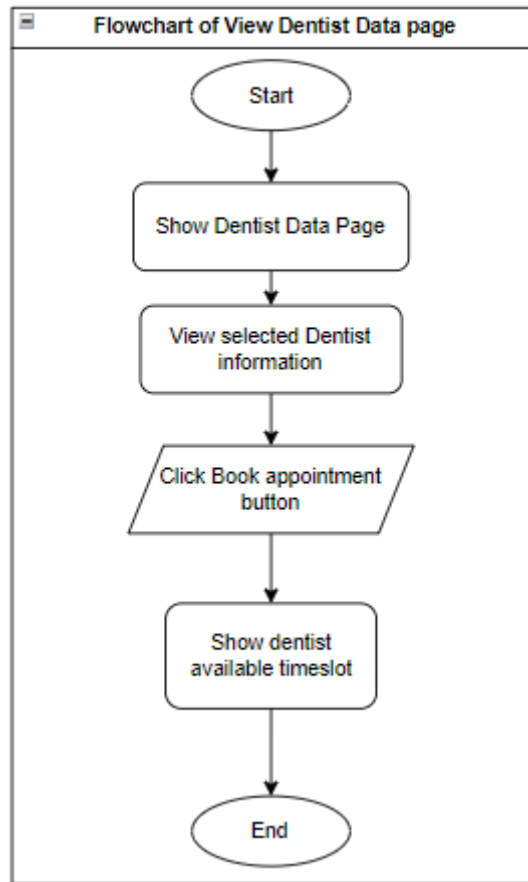


Figure 4.9 View Dentist Data Flowchart

The Figure 4.9 shows that the flowchart of view dentist data for patient. When user select their preferred dentist, it will show the dentist’s information and available timeslots.

Booking Confirmation Page

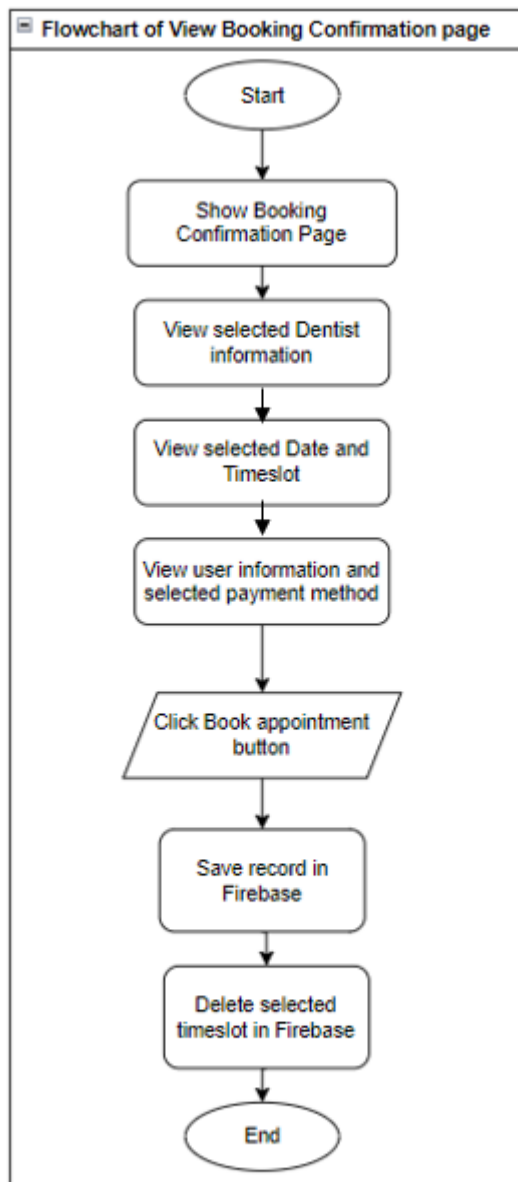


Figure 4.10 Booking Information Flowchart

Show Dentist Timeslot Page

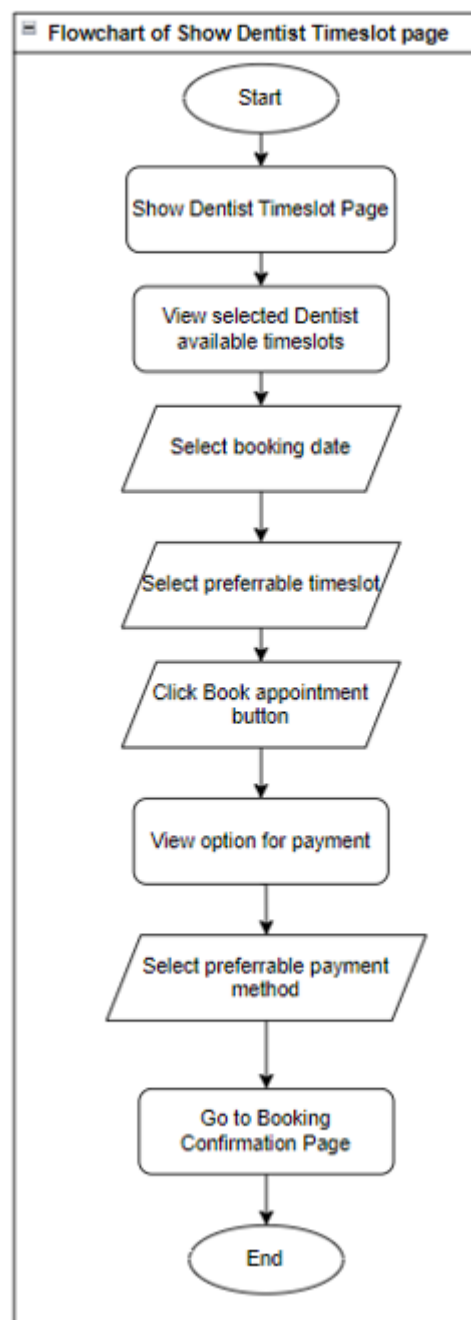


Figure 4.11 Show Dentist Timeslots Flowchart

The Figure 4.11 shows that the flowchart of show dentist timeslot for patient. User can select their preferable timeslots and payment method. The Figure 4.10 shows that the flowchart of booking information for patient. After the select a timeslot and payment method, it will let user make confirmation before booking.

4.3 Entity Relationship Diagram

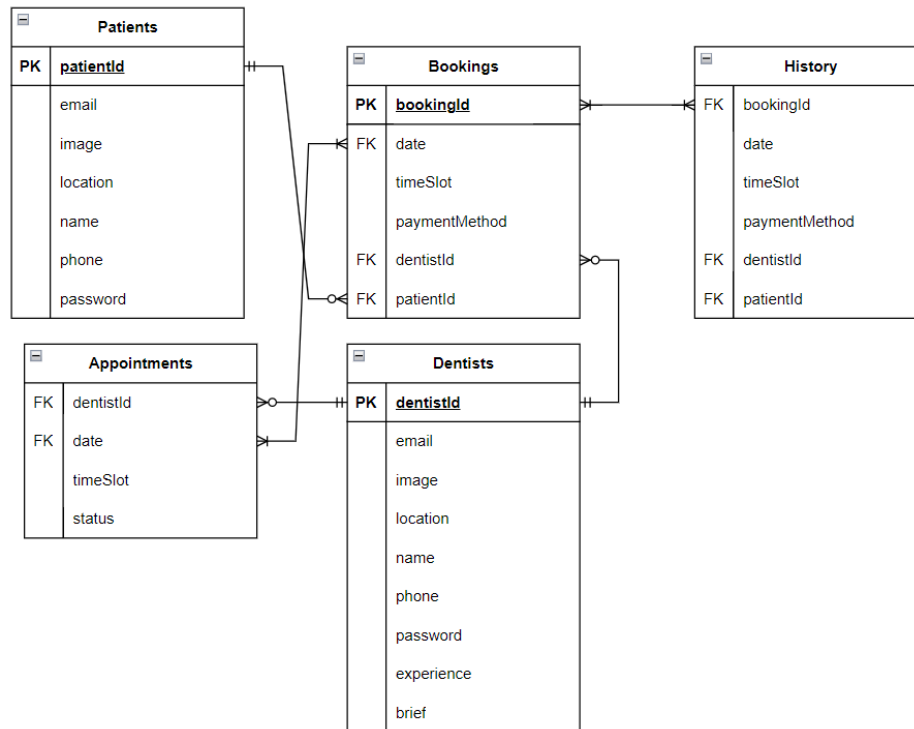


Figure 4.12 Entity Relationship Diagram

In Figure 4.12 shows an Entity-Relationship Diagram (ERD) representing a database for a dental clinic management system. The diagram contains five entities: Patients, Dentists, Bookings, Appointments, and History. In the patient part, when a patient registered an account, the Firebase will store the account with email, name, phone and password, the system will generate patientId for each patient as primary key. When the patient wants to search for a dentist, the system will get the keywords from the patient and retrieve the dentistId, showing the dentist details to the patient. When the patient books the appointment, the system will generate a bookingId for each appointment as the primary key. There is a one-to-many relationship between Patients and Bookings, where each patient can have multiple bookings, but each booking is associated with only one patient. In the dentist part, when a dentist registers an account, the Firebase will store the account with email, location, name, phone and password, the system will generate dentistId for each dentist as primary key. There is a one-to-many relationship between Dentists and Bookings, where each dentist can be associated with multiple bookings, but each booking is associated with only one dentist. There is a one-to-many relationship between Bookings and History, where each booking can have multiple historical entries.

Chapter 5

System Implementation

5.1 Software Setup

To start development of the mobile application, android studio needed to be installed in laptop.

5.1.1 Android Studio

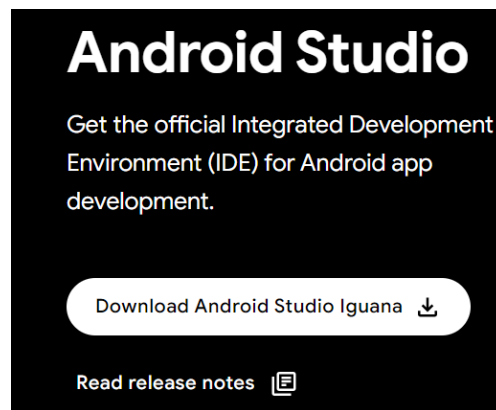


Figure 5.1 Android Studio Installation

Figure 5.1 shows that Android Studio installed in Nitro AN515-55 laptop.

Requirement	Minimum	Recommended
OS	64-bit Microsoft Windows 8	Latest 64-bit version of Windows
RAM	8 GB RAM	16 GB RAM or more
CPU	x86_64 CPU architecture; 2nd generation Intel Core or newer, or AMD CPU with support for a Windows Hypervisor Framework.	Latest Intel Core processor
Disk space	8 GB (IDE and Android SDK and Emulator)	Solid state drive with 16 GB or more
Screen resolution	1280 x 800	1920 x 1080

Figure 5.2 System Requirements for Windows

Figure 5.2 shows the laptop only meets the minimum requirements so decided to change it to 16RAM which is more recommended to get best performance.

5.2 Setting and Configuration

5.2.1 Firebase

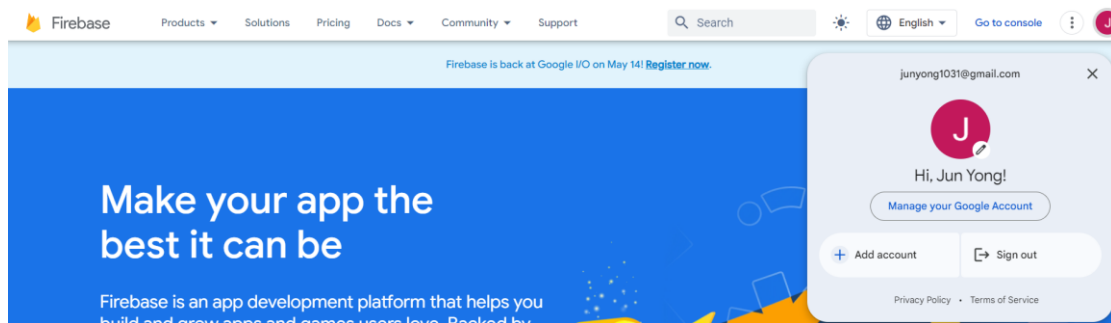


Figure 5.3 Firebase Login

Figure 5.3 shows that sign up an account to login in Firebase console.

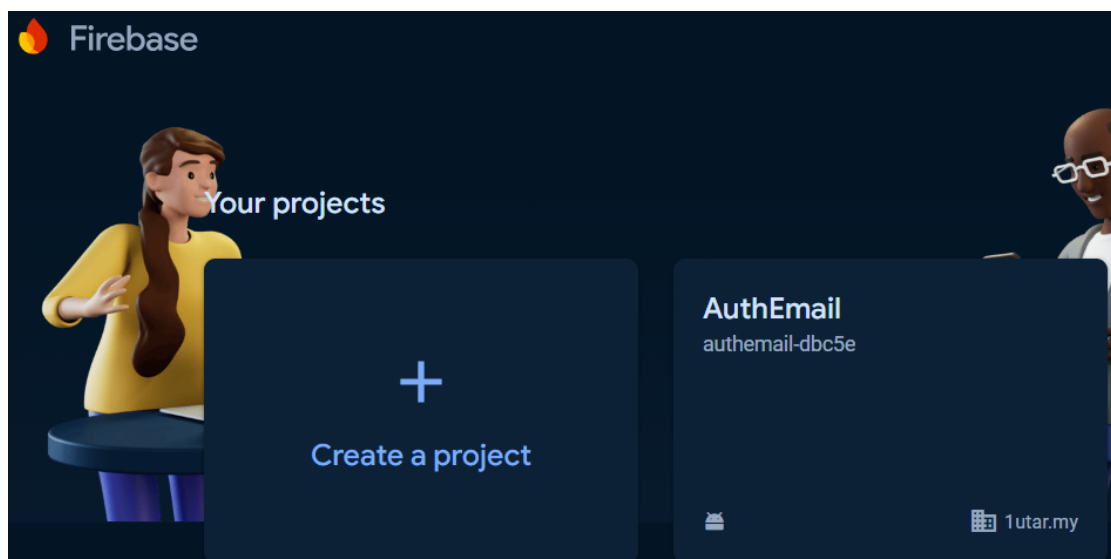


Figure 5.4 Firebase console

In Figure 5.4 shows that already created a project call “AuthEmail”.

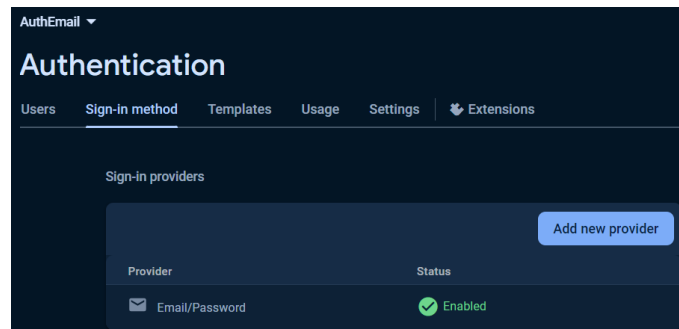


Figure 5.5 Firebase Authentication

In Figure 5.5 shows that the sign-in method, “Email/Password” already change the status to “Enabled”.

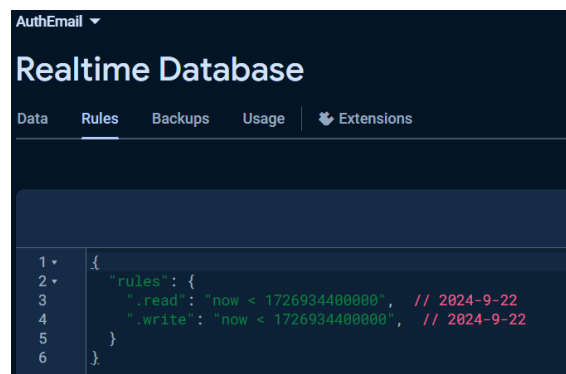


Figure 5.6 Firebase Realtime Database

In Figure 5.6 shows that the Firebase Realtime Database is activated and ready to store data.

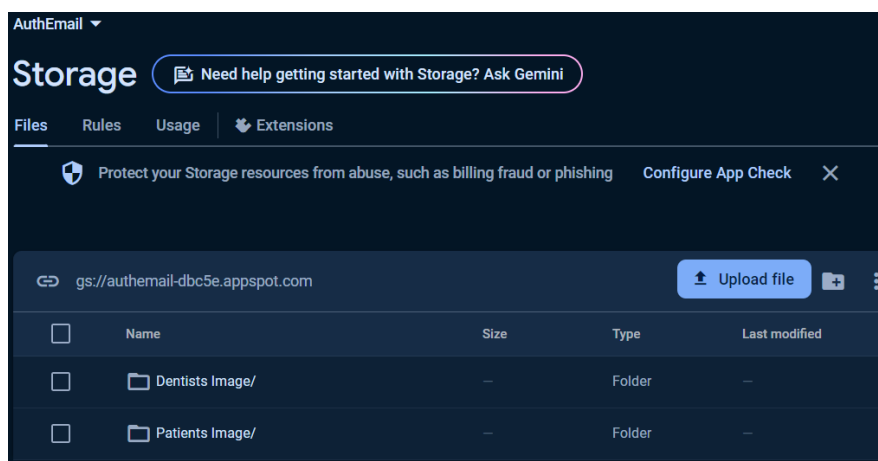


Figure 5.7 Firebase Storage

In Figure 5.7 shows that the Firebase Storage is activated and ready to store image.

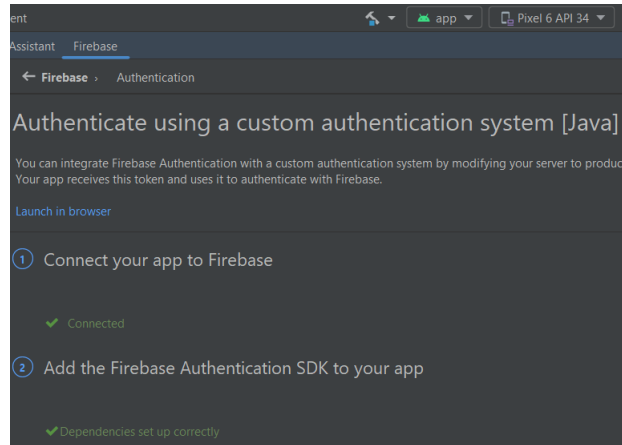


Figure 5.8 Android Studio link to Firebase Authentication

In Figure 5.8, in Android Studio, choose Firebase and select “Authenticate using a custom authentication system” option, connect app to Firebase successfully.

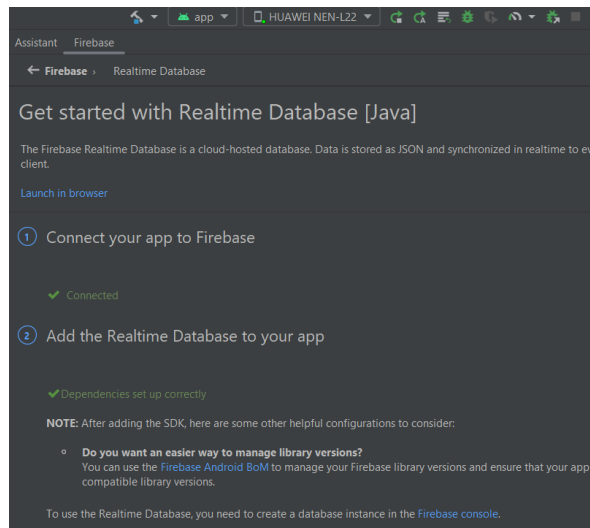


Figure 5.9 Android Studio link to Firebase Realtime Database

In Figure 5.9, in Android Studio, choose Firebase and select “Realtime Database” option, connect app to Firebase successfully.

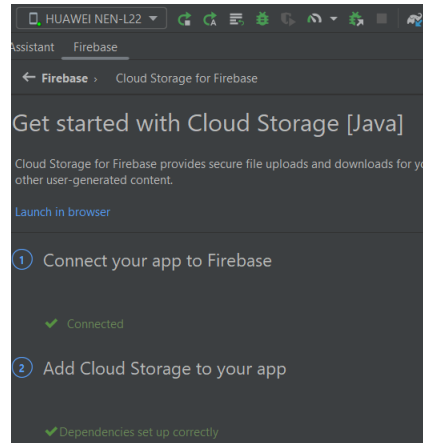


Figure 5.10 Android Studio link to Firebase Cloud Storage

In Figure 5.10, in Android Studio, choose Firebase and select “Cloud Storage for Firebase” option, connect app to Firebase successfully.

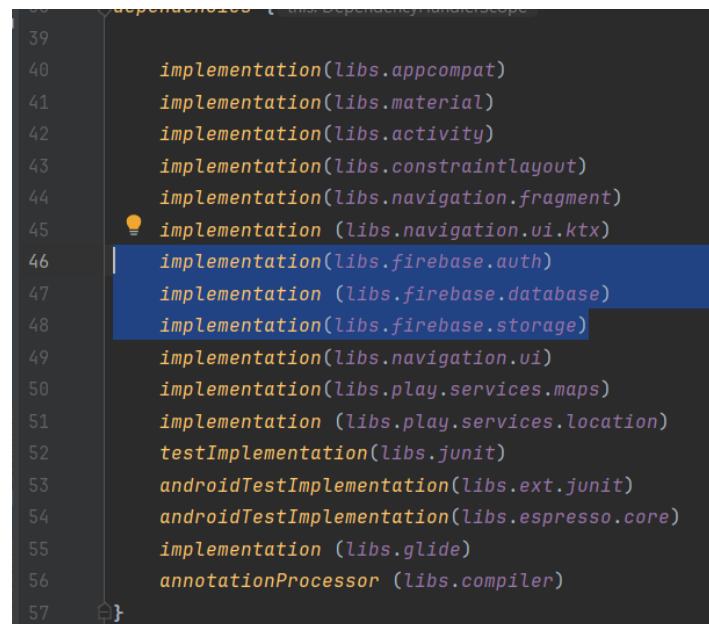


Figure 5.11 Android Studio App Dependencies

In Figure 5.11, in build.gradle.kts file, set up dependencies of Authentication, Realtime Database and Cloud Storage correctly in line 46,47,48.

5.2.2 Google Cloud

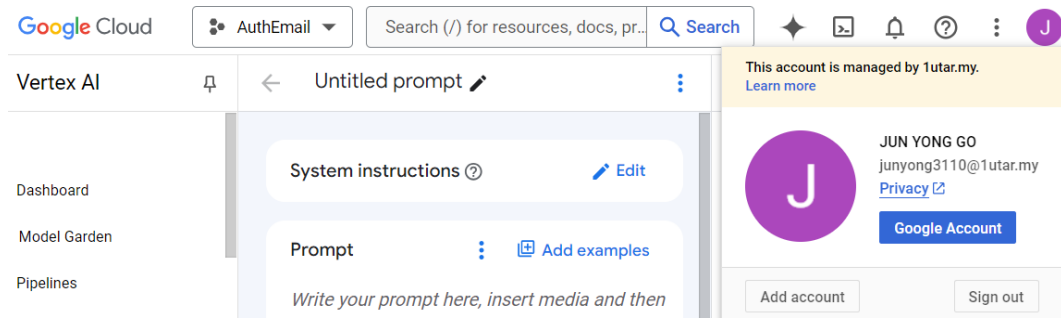


Figure 5.12 Google Cloud Login

Figure 5.12 shows that sign up an account to login in Google Cloud.

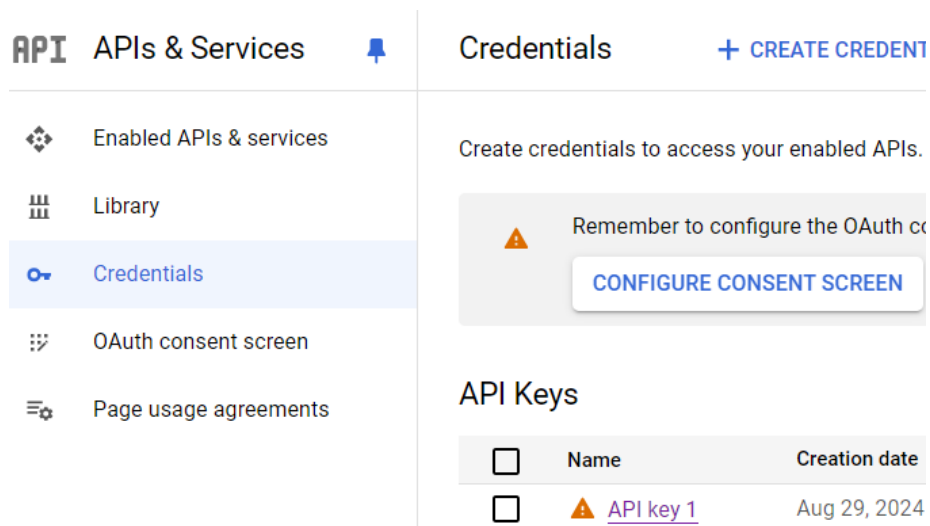


Figure 5.13 Google Cloud

Figure 5.13 shows the Google Cloud set up. In the APIs & Services go to credentials, click create credentials then the API key 3 created.

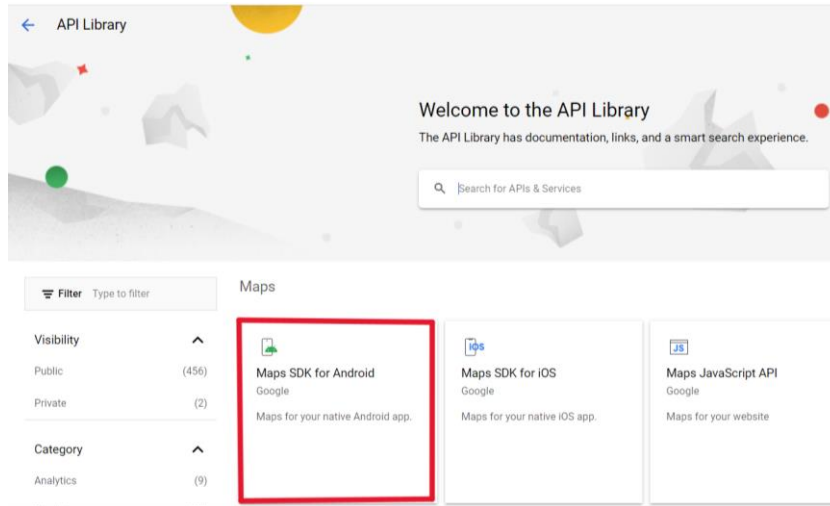


Figure 5.14 Google Cloud API Library

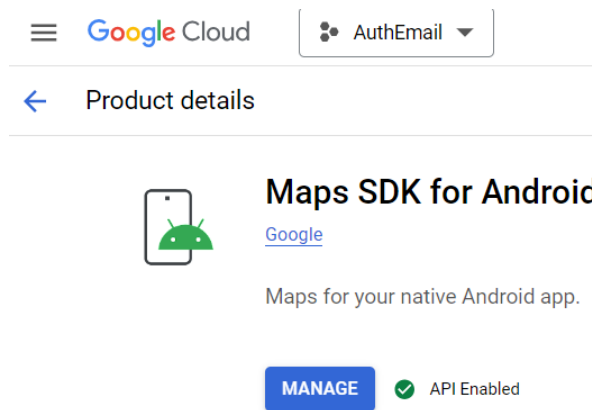


Figure 5.15 Google Cloud Maps SDK for Android

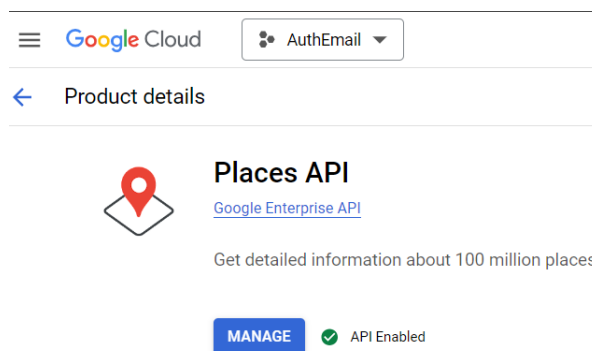
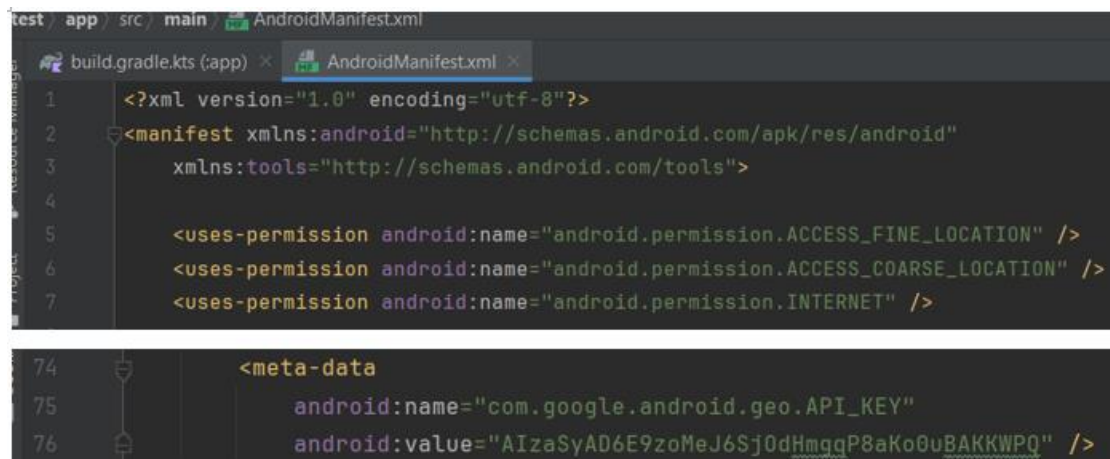


Figure 5.16 Google Cloud Places API

In Figure 5.14, in the API Library, choose Maps SDK for Android. Enable the Maps SDK for Android. In Figure 5.15, it shows that this service already applied to Maps SDK for Android. Enables for the Places API. In Figure 5.16, it shows that this service already applied to Places SDK.



```
test / app / src / main / AndroidManifest.xml
build.gradle.kts (:app) x AndroidManifest.xml x
1 <?xml version="1.0" encoding="utf-8"?>
2 <manifest xmlns:android="http://schemas.android.com/apk/res/android"
3   xmlns:tools="http://schemas.android.com/tools">
4
5   <uses-permission android:name="android.permission.ACCESS_FINE_LOCATION" />
6   <uses-permission android:name="android.permission.ACCESS_COARSE_LOCATION" />
7   <uses-permission android:name="android.permission.INTERNET" />
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74   <meta-data
75     android:name="com.google.android.geo.API_KEY"
76     android:value="AIzaSyAD6E9zoMeJ6Sj0dHmggP8aKo0uBAKKWPQ" />
```

Figure 5.17 Android Studio AndroidManifest.xml

In Figure 5.17, line 5, 6, 7, 74, 75 and 76 inserted into AndroidManifest.xml to enable the Google Maps in the mobile application.

5.3 System Operation

5.3.1 Main Activity

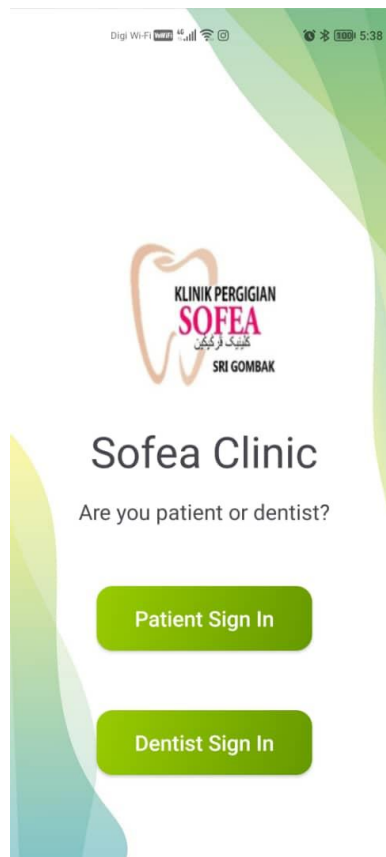


Figure 5.18 Main Activity Page

In Figure 5.18 shows that when the application started, the Main Activity is the default page for the new user. For the user that already sign up an account as a patient or dentist or haven't log out, it will direct to respective home page. Then, the user needs to select sign in as a patient or dentist.

5.3.2 Login Activity (Patient & Dentist)

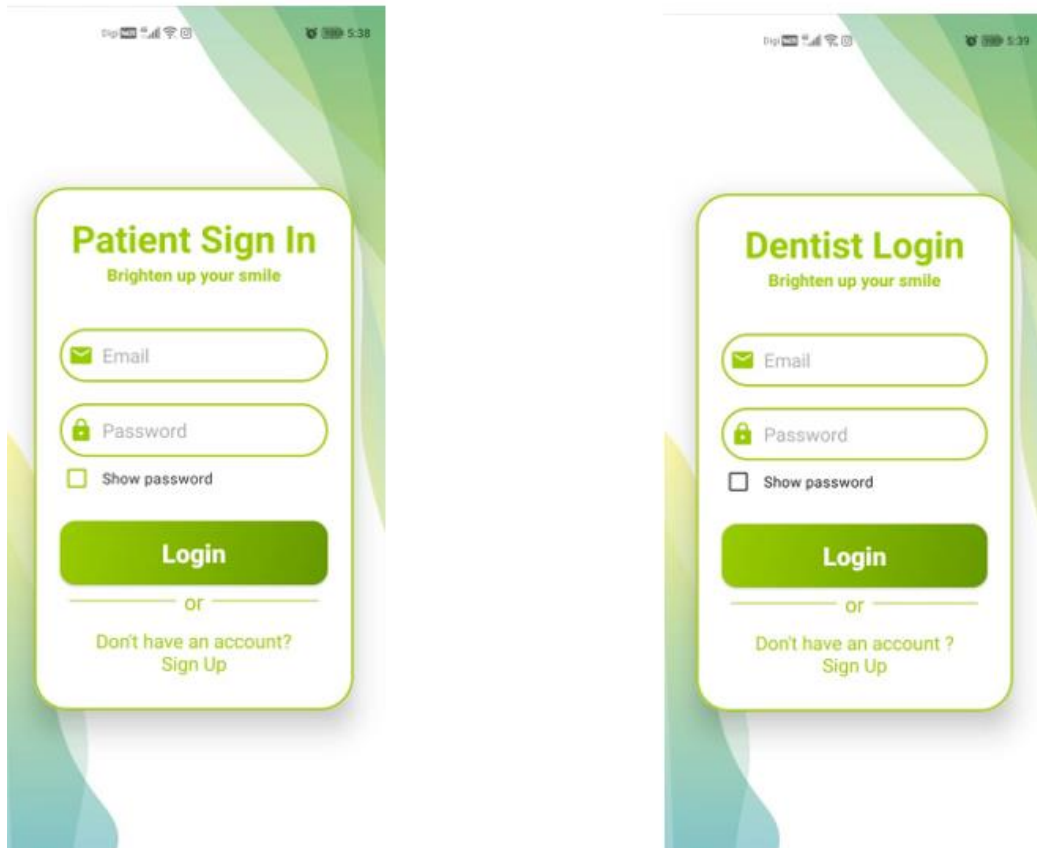


Figure 5.19 Login Activity Page (Patient & Dentist)

In Figure 5.19 shows that the Login page lets users enter their email and password for login. Users can click the Show Password checkbox to show the password. If the email and password are empty, it will show the message “Please enter your email and password” and will not go to the next step. After entering the email and password, the Firebase will check if the user registered in the database or not. If not, it will not go to the main page and users need to sign up for an account. After the user enters email and password correctly, they can click the “Login” button to log into the main page of the mobile application.

5.3.3 Sign Up Activity (Patient & Dentist)

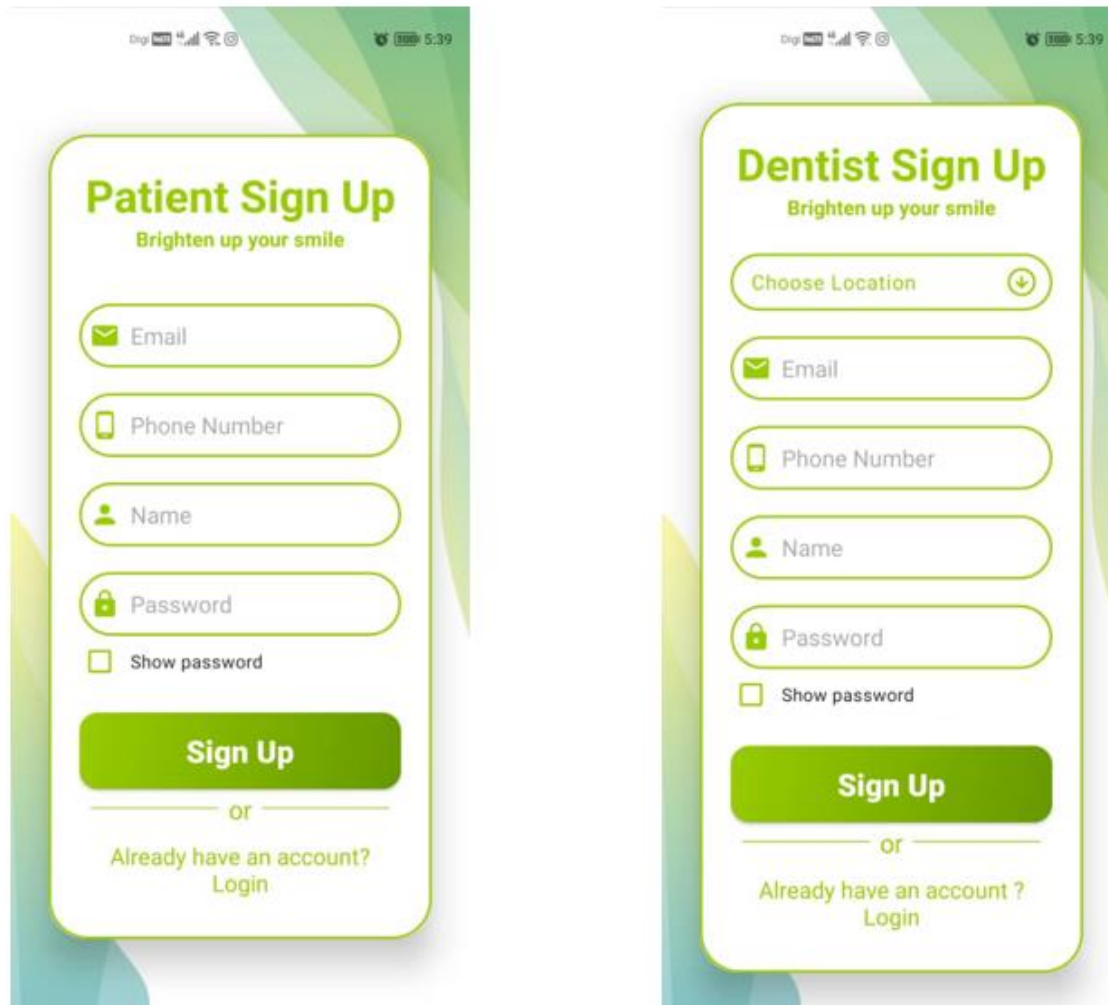


Figure 5.20 Sign Up Page (Patient & Dentist)

In Figure 5.20 shows that the Sign-Up page for patients will need to enter their information, email, phone number, name and password for signing up an account. The dentist part will need to enter information like location, email, phone number, name and password to sign up as a dentist. The user email will be stored in Firebase Authentication and the user information will be stored in Firebase Realtime Database.

5.3.4 Dentist Home Fragment

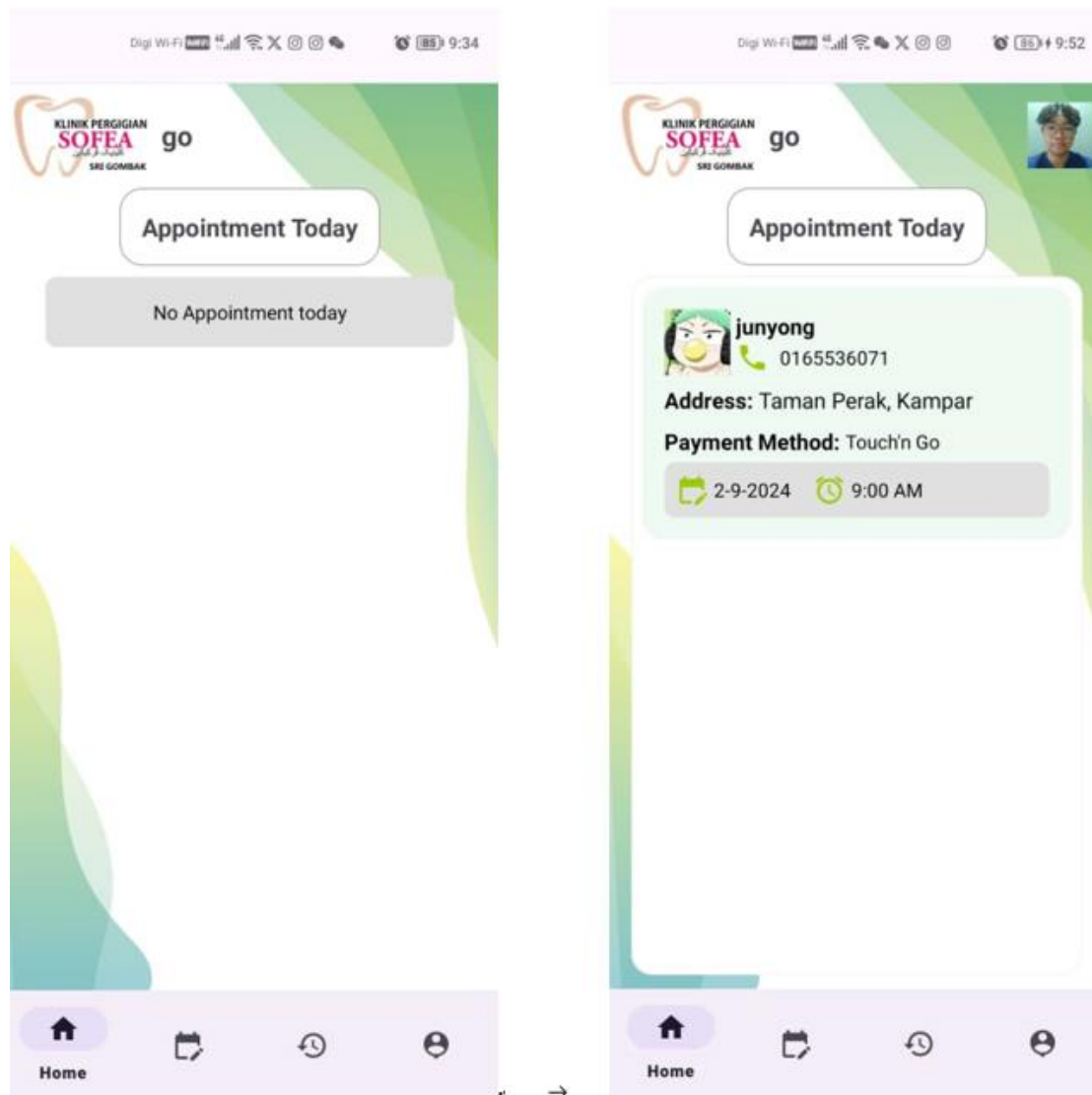


Figure 5.21 Dentist Home Page and Bottom Navigation Drawer Layout

In Figure 5.21 shows that after the user login successfully as a dentist, they will log into the Dentist Home page. If there is no booking, the Dentist Home Page displays “No Appointment today”. When the user gets an appointment, it will display the patient’s name, phone, address, payment method, date and time slot. Below the home page, a bottom navigation drawer will show up. There are 4 fragments in the bottom navigation drawer menu which are “Home”, “Schedule”, “History” and “User Profile”. When the user clicks the icon of the other fragment, it will direct to the relative fragment.

5.3.5 Dentist Schedule Fragment

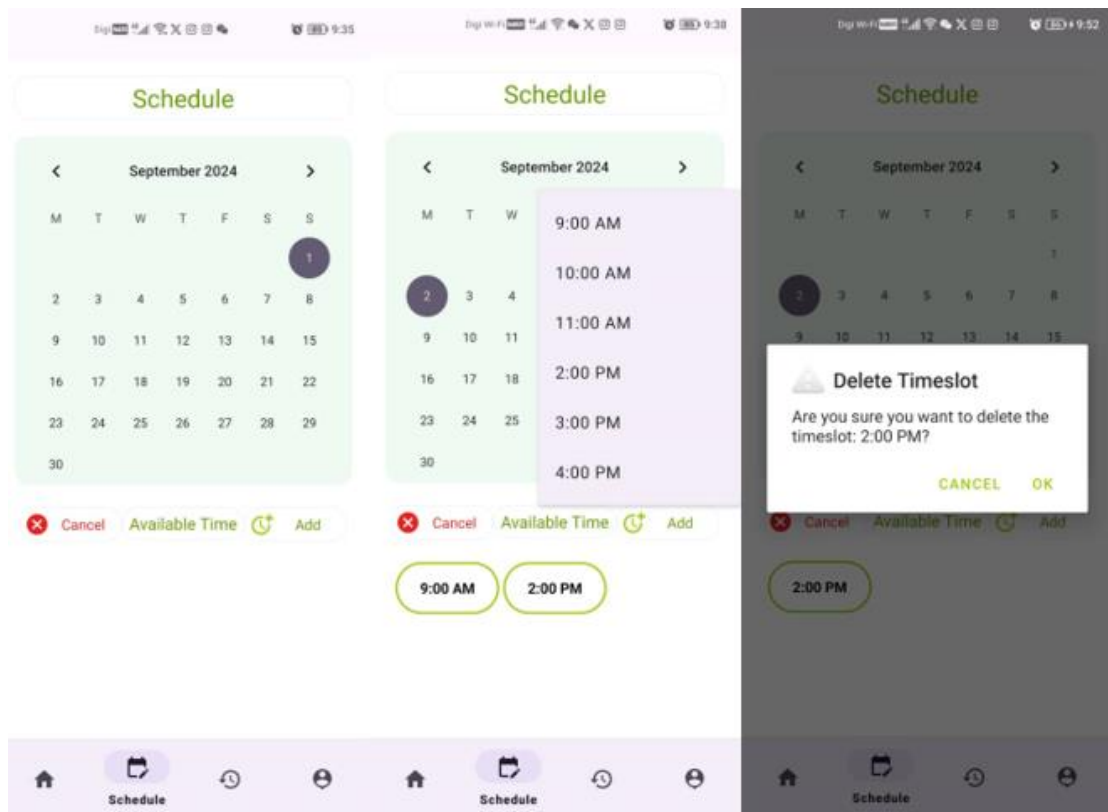


Figure 5.22 Dentist Schedule Fragment

In Figure 5.22 shows that in the Dentist Schedule Fragment, user can select date and add time slot for their customer. The user can delete the timeslot that added before, it will show alert box to let user confirm to delete.

5.3.6 Dentist History Fragment

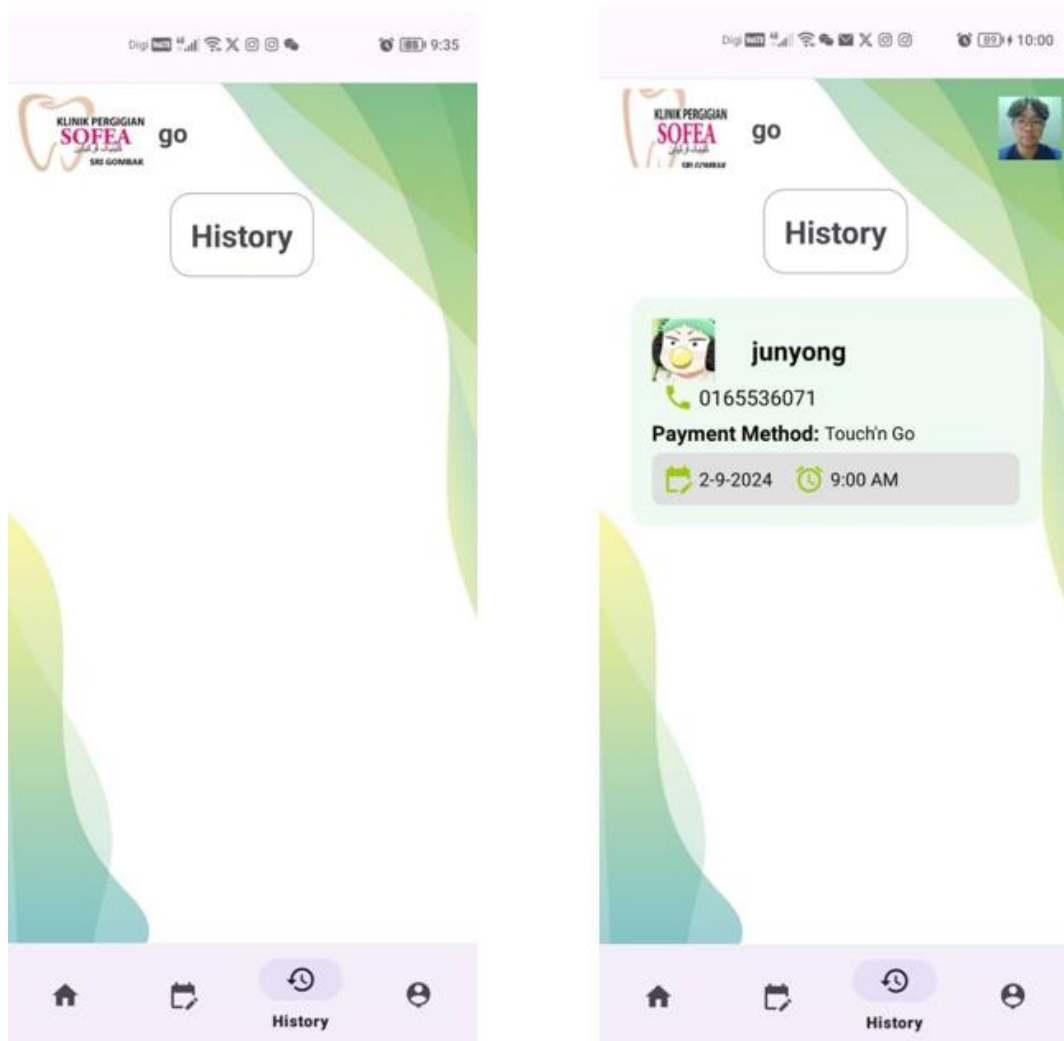


Figure 5.23 Dentist History Fragment

In Figure 5.23 shows that if there is no booking history, the Dentist History Fragment displays nothing. When the appointment is finished, it will display the patient's name, phone, payment method, date and time slot.

5.3.7 Dentist Profile Fragment

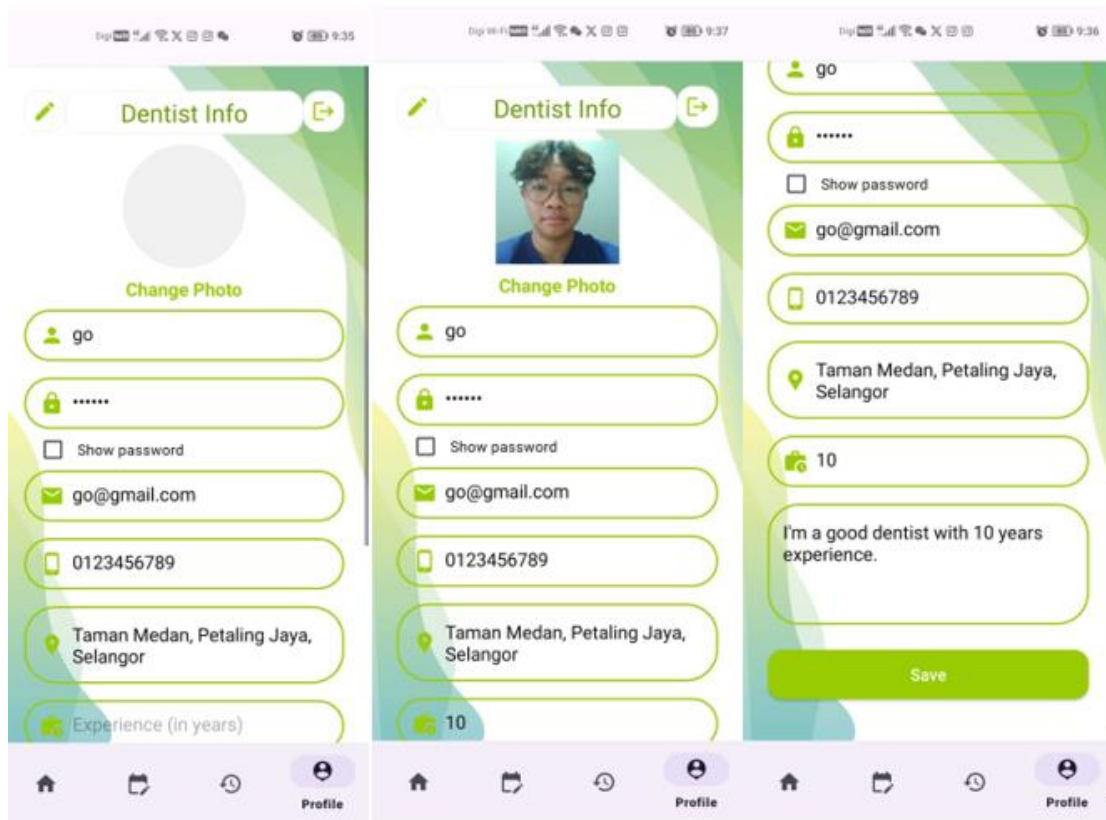


Figure 5.24 Dentist Profile Fragment

In Figure 5.24 shows that when a user goes to the Dentist Profile Fragment, the registered data like name, password, email, phone number and clinic location will display on the fragment. Users can decide to edit the profile by clicking the top left pencil icon. The user cannot change the email and password. When a user clicks the Save button, the whole data will be saved in Firebase Realtime Database and photo will be saved in Cloud Storage.

5.3.8 Patient Home Fragment

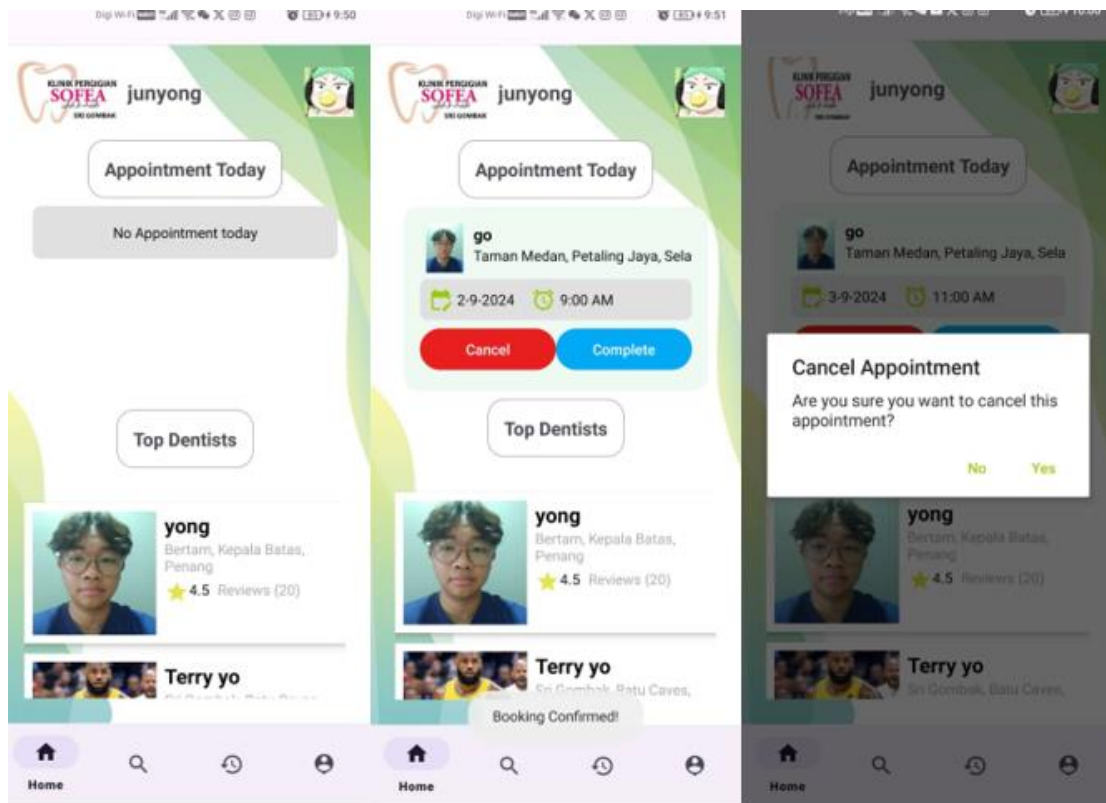


Figure 5.25 Patient Home Fragment and Bottom Navigation Drawer Layout

In Figure 5.25 shows that if there is no booking, the Patient Home Page displays “No Appointment today”. When the user gets an appointment, it will display the dentist’s name, phone, address, payment method, date and time slot. The user can delete the timeslot that was added before, it will show an alert box to. Let the user confirm to delete. Below the home page, a bottom navigation drawer will show up. There are 4 fragments in the bottom navigation drawer menu which are “Home”, “Search”, “History” and “User Profile”. When the user clicks the icon of the other fragment, it will direct to the relative fragment.

5.3.9 Patient Search Fragment

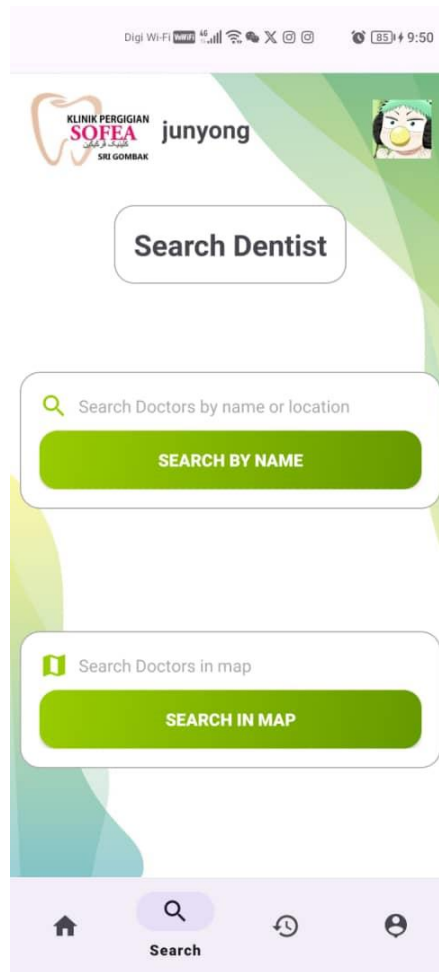


Figure 5.26 Patient Search Fragment

In Figure 5.26 shows that the Patient Search Fragment will provide 2 methods for users to search their preferable dentist. If the user wants to search by name or enter a keyword of location, the user can click the “Search by Name” Button. If a user wants to search in a Map, the user can click the “Search in Map” Button.

5.3.10 Patient Search by Name Activity

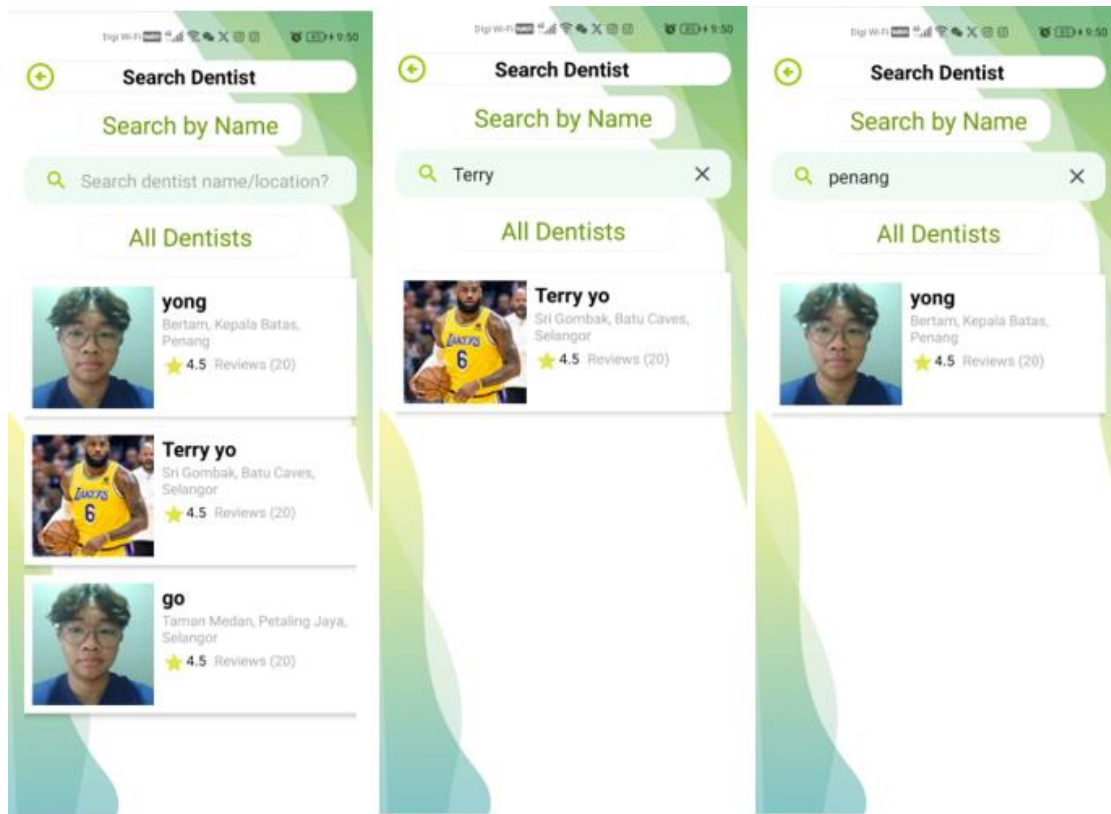


Figure 5.27 Patient Search by Name Activity

In Figure 5.27 shows that the user can enter the keyword in the search box. The application will help to filter the result for the user.

5.3.11 Patient Search in Map Activity

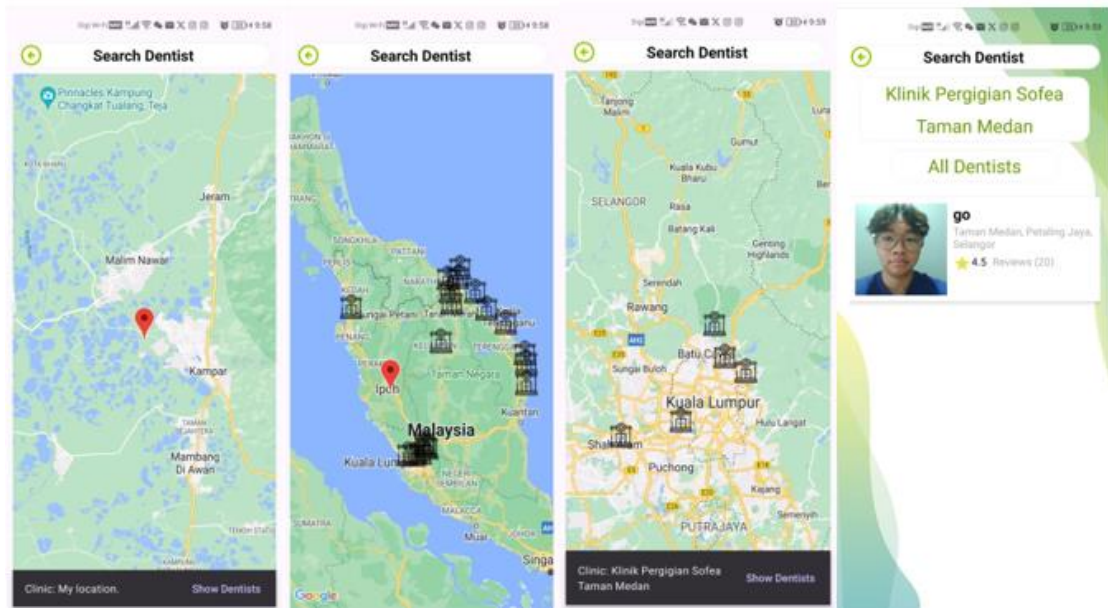


Figure 5.28 Patient Search in Map Activity

In Figure 5.28 shows that in the Patient Search in Map Activity, the user can get his current location in Google Maps. It will show all the clinics nearby the user. Users can click on the clinic icon, then the name of the clinic will show out. If the user clicks on the Show Dentists, the clinic name and the dentist who worked in the clinic will show to the user.

5.3.12 Patient View Dentist Details Activity

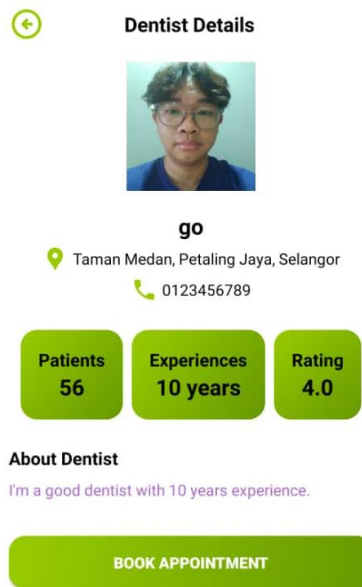


Figure 5.29 Patient View Dentist Details Activity

In Figure 5.29, it shows the Dentist Details after the user clicks on the dentist.

5.3.13 Patient View Dentist Available Timeslots Activity

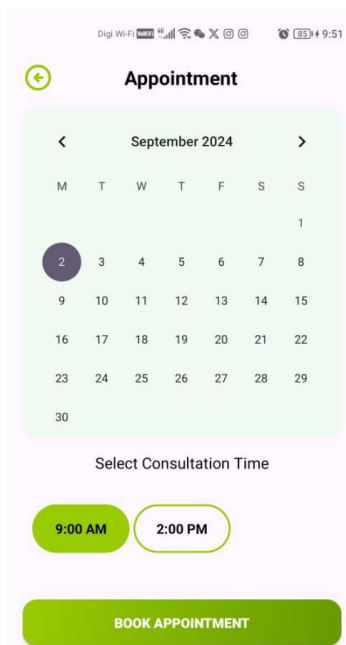


Figure 5.30 Patient View Dentist Available Timeslots Activity

In Figure 5.30, users can select the date and time slots that are provided by the dentist.

5.3.14 Patient Select Payment Method Activity

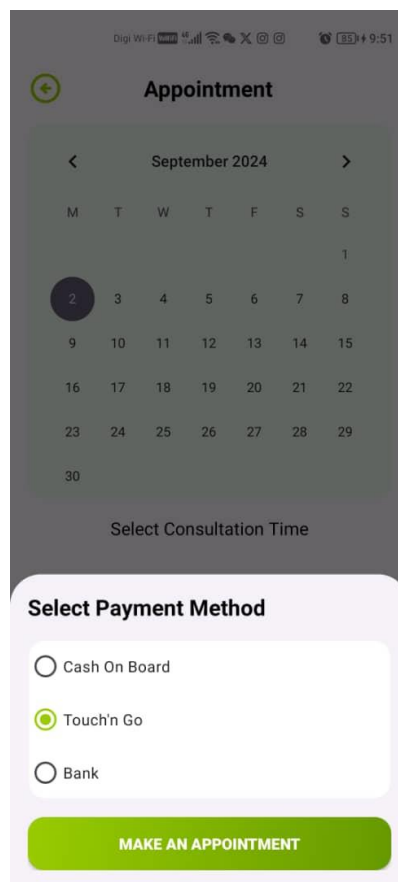


Figure 5.31 Patient Select Payment Method Activity

In Figure 5.31 shows that users can select their preferred payment method such as Cash on Board, Touch'n Go e-wallet and Bank. After finishing the appointment, the clinic will provide the selected service to the user.

5.3.15 Patient Booking Confirmation Activity

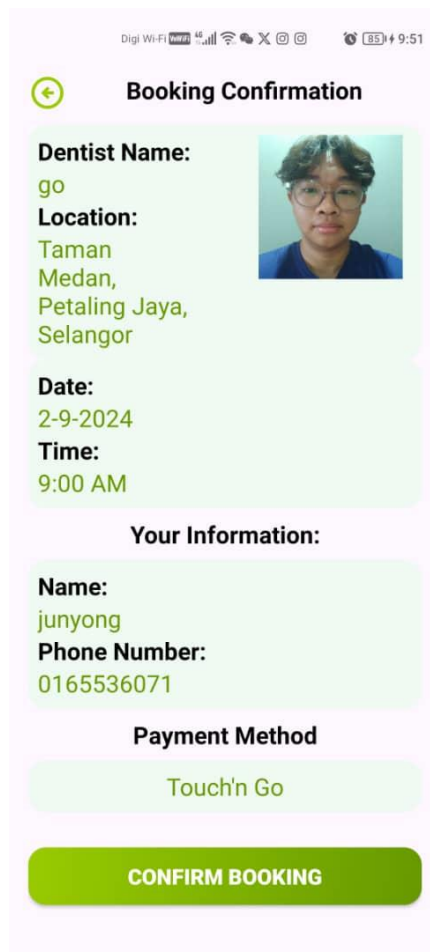


Figure 5.32 Patient Select Payment Method Activity

In Figure 5.32 shows that the booking confirmation page will show to the user before the booking is completed. This is to let the user double check the information provided correctly.

5.3.16 Patient History Fragment

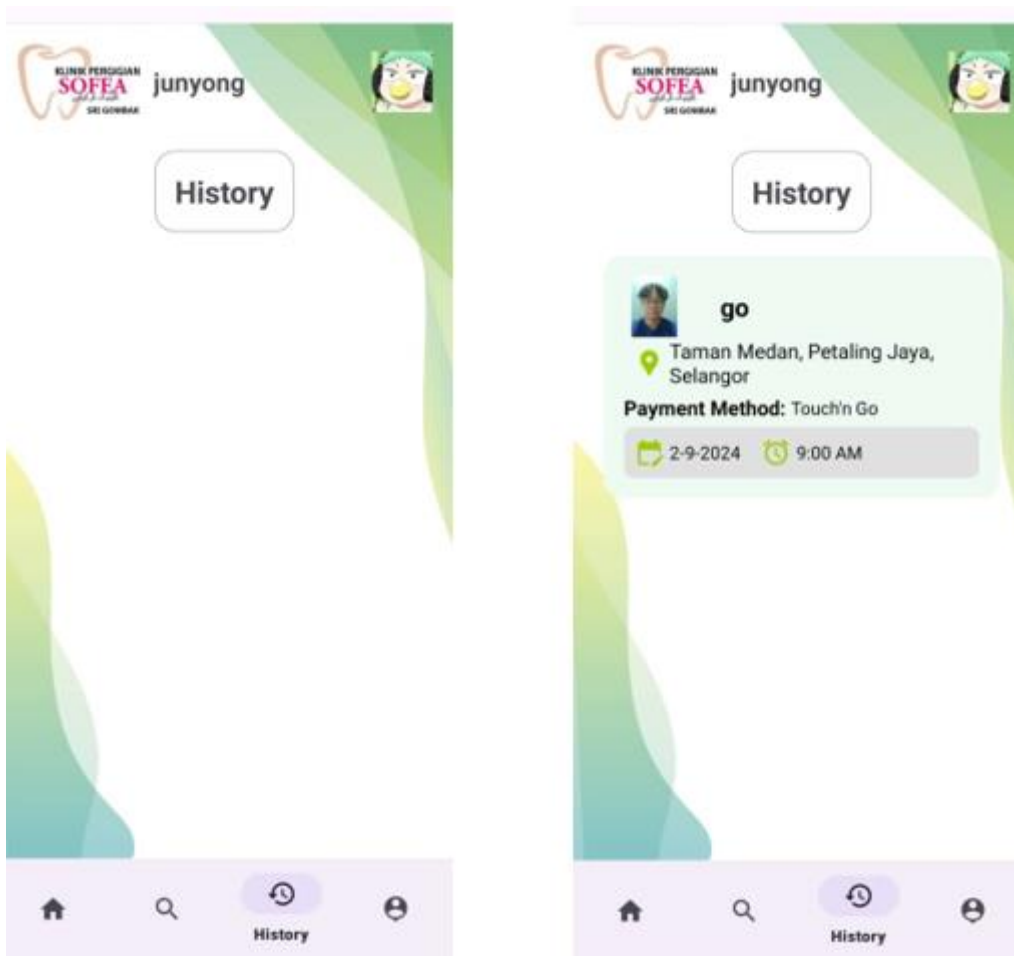


Figure 5.33 Patient History Fragment

In Figure 5.33 shows that if there is no booking history, the Patient History Fragment displays nothing. When the appointment is finished, it will display the dentist's name, clinic location, payment method, date and time slot.

5.3.17 Patient Profile Fragment

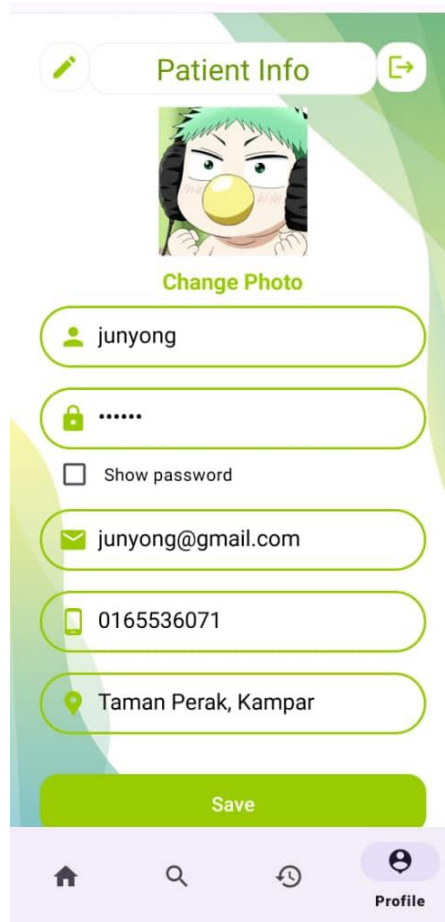


Figure 5.34 Patient Profile Fragment

In Figure 5.34 shows that when a user goes to the Patient Profile Fragment, the registered data like name, password, email and phone will display on the fragment. Users can decide to edit the profile by clicking the top left pencil icon. The user cannot change the email and password. When a user clicks the Save button, the whole data will be saved in Firebase Realtime Database and photo will be saved in Cloud Storage.

5.3.18 Sign Out Function

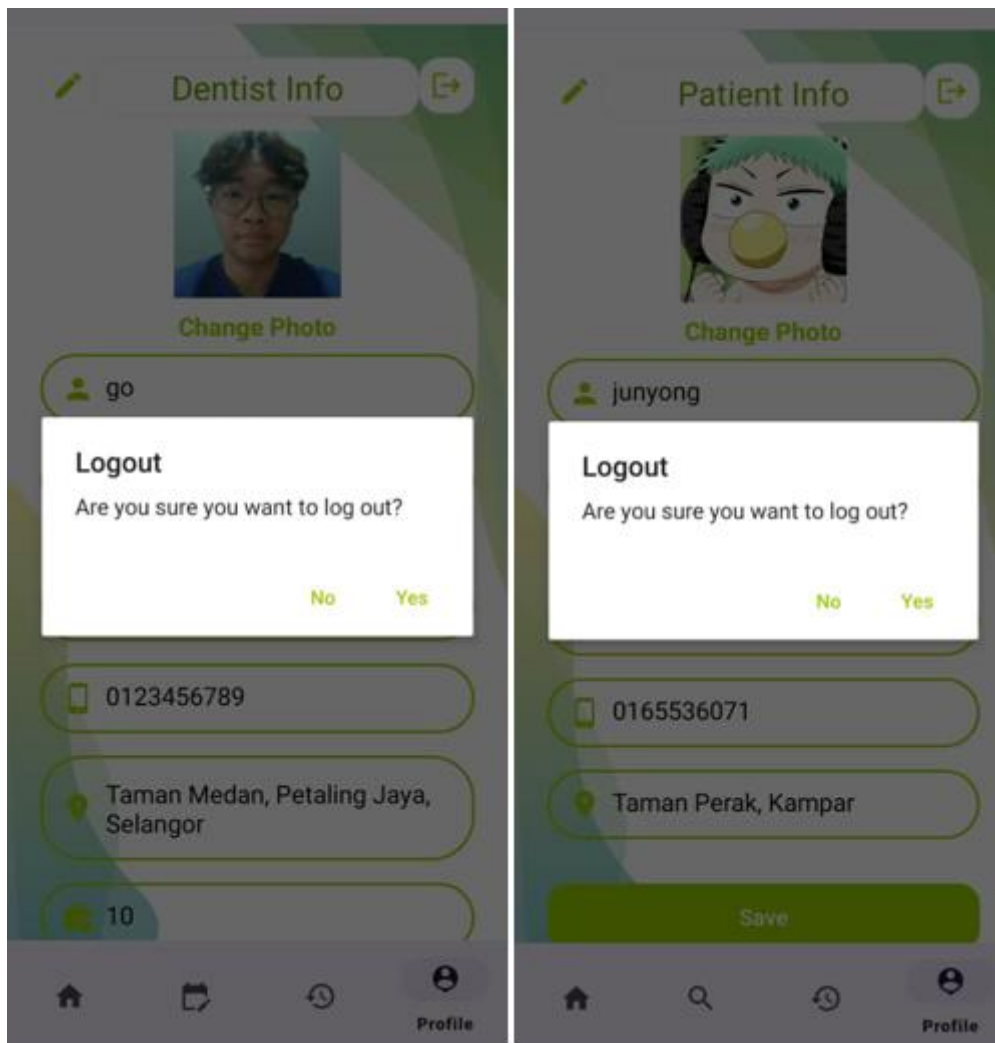


Figure 5.35 Sign Out Dialog

In Figure 5.35 shows that users can logout the current account by selecting the Sign out from click the top right sign out icon in User Profile Fragment. Once clicking the icon, a confirmation dialog will pop up and when the user clicks Yes, the system will exit the current user account and forward the user back to the Main Activity page.

Chapter 6

System Evaluation and Discussion

6.1 System Testing & Result

To evaluate the project's performance and ensure it met the objectives, several testing scenarios were carried out to test the functionalities of the mobile application thoroughly.

Test Scenario: User Register

Table 6.1 Patient & Dentist Register Account

Test Case	Input	Expected Output	Actual Output	Pass/Fail
Patient & Dentist Register Account	Click Sign Up without fill all input fields	Show error message and fail register	Show "Please fill all details" message	Pass
	Use email address in invalid format	Show error message and fail register	Show "Please enter a valid email address" message	Pass
	Use email address already registered	Show error message and fail register	Show "This email is already registered." message	Pass
	Sign Up without fill at least 6 characters of password	Show error message and fail register	Show "Password must at least 6 characters" message.	Pass
	Click Show password checkbox	Show password	Password displayed	Pass
	Click Show password checkbox again	Hide password	Hidden password	Pass
	Fill with valid email, password, phone & name	Show successful register message	Registration successfully	Pass

CHAPTER 6

	Click Login text View	Back to Login Page	Back to Login Page	Pass
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Test Scenario: User Login

Table 6.2 Patient & Dentist Login

Test Case	Input	Expected Output	Actual Output	Pass/Fail
Patient & Dentist Login	Click Sign Up without fill all input fields	Show error message and fail login	Show “Please fill all details” message	Pass
	Use email address in invalid format	Show error message and fail login	Show “Please enter a valid email address” message	Pass
	Click Sign Up without fill at least 6 characters of password	Show error message and fail login	Show “Password must be at least 6 characters” message.	Pass
	Click Show password checkbox	Show password	Password displayed	Pass
	Click Show password checkbox again	Hide password	Hidden password	Pass
	Fill with wrong email and password	Show error message and fail login	Show “Sign in failed. Please check your email and password.” message.	Pass
	Fill with correct email and password	Show Login successfully message	Forward to Home page	Pass
	Click Sign Up text View	Forward to Sign Up Page	Forward to Sign Up Page	Pass

Test Scenario: Home Page

Table 6.3 Patient Home Page

Test Case	Input	Expected Output	Actual Output	Pass/Fail
Patient Home Page	Top dentist list show dentists	Dentist list appears	Dentist list appears	Pass
	System gets username and show	Show username on top of page	Show username on top of page	Pass
	User haven't uploaded their photo	Right corner doesn't show photo	Right corner empty	Pass
	User have uploaded their photo	Right corner show photo	Right corner show user photo	Pass
	User clicks the dentist card view	Show dentist detail in dentist detail page	Show dentist detail in dentist detail page	Pass
	User haven't made an appointment	No appointment appears	Show "No appointment today" message	Pass
	User makes an appointment	Appointment details show	Appointment details show	Pass
	User clicks the complete button on appointment	The appointment record will transfer to history	The appointment details clear and show in history	Pass
	User clicks the cancel button on appointment	An alert dialog appears	An alert dialog appears	Pass
	User clicks yes on the cancel dialog	The appointment record deleted	The appointment record deleted	Pass
User clicks no on the cancel dialog	Go back to home page	Go back to home page	Pass	

Table 6.4 Dentist Home Page

Test Case	Input	Expected Output	Actual Output	Pass/Fail
Dentist Home Page	System gets username and show	Show username on top of page	Show username on top of page	Pass
	User haven't uploaded their photo	Right corner doesn't show photo	Right corner empty	Pass
	User have uploaded their photo	Right corner show photo	Right corner show user photo	Pass
	No patient made an appointment	No appointment appears	Show "No appointment today" message	Pass
	Patient makes an appointment	Appointment details show	Appointment details show	Pass

Test Scenario: Navigation menu

Table 6.5 Navigation menu

Test Case	Input	Expected Output	Actual Output	Pass/Fail
Show Bottom Navigation Menu Bar	Access bottom navigation menu bar	Display navigation bar from bottom	Display navigation bar from bottom	Pass
Redirect Page	Click on different navigation tab to change page.	Redirect to selected page successfully.	Redirect to selected page successfully.	Pass

Test Scenario: Patient Schedule Module

Table 6.6 Patient Schedule Module

Test Case	Input	Expected Output	Actual Output	Pass/Fail
Patient Search Page	System gets username and show	Show username on top of page	Show username on top of page	Pass
	User haven't uploaded their photo	Right corner doesn't show photo	Right corner empty	Pass
	User have uploaded their photo	Right corner show photo	Right corner show user photo	Pass
	Select Search by Name method	Redirect to Search by Name page	Redirect to Search by Name page successfully	Pass
	Select Search in Map method	Redirect to Search in Map page	Redirect to Search in Map page successfully	Pass
Search by Name Page	Show dentists list	Dentist list appears	Dentist list appears	Pass
	Enter keyword of dentist's name or location	Respective dentist list appears	Respective dentist list appears	Pass
	User clicks the dentist list card view	Show dentist detail in dentist detail page	Show dentist detail in dentist detail page	Pass
	Click "Back" icon	Back to Patient Search Page	Back to Patient Search Page	Pass
Search in Map Page	Get user location	Show user location	Show user location	Pass

	Click clinic icon	Show clinic name & provide link to show dentist list	Show clinic name & provide link to show dentist list	Pass
	Click the “Show Dentist” hypertext	Show dentists list worked in selected clinic	Show dentists list worked in selected clinic	Pass
	User clicks the dentist list card view	Show dentist detail in dentist detail page	Show dentist detail in dentist detail page	Pass
	Click “Back” icon	Back to Patient Search Page	Back to Patient Search Page	Pass
Dentist detail page	Enter the dentist detail page	Show selected dentist details	Show selected dentist details	Pass
	Click “Book Appointment” Button	Forward to Dentist timeslot Page	Forward to Dentist timeslot Page	Pass
	Click “Back” icon	Back to dentist list card view	Back to dentist list card view	Pass
Dentist timeslot Page	Click “Book Appointment” Button without select date and timeslot	Show error message and fail go to next step	Show “Please select a date and time slot” message	Pass
	Click “Book Appointment” Button after select date and timeslot	Show “Select Payment Method” Bottom Sheet Dialog	Show “Select Payment Method” Bottom Sheet Dialog	Pass
	Click “Back” icon	Back to Dentist detail page	Back to Dentist detail page	Pass
	Click “Make Appointment” Button without	Show error message and fail go to next step	Show “Please select a payment method” message	Pass

	select payment method			
	Click “Make Appointment” Button after select payment method	Forward to Booking Confirmation Page	Forward to Booking Confirmation Page	Pass
Booking confirmation page	Enter the Booking Confirmation Page	Show dentist & user information and user’s payment method	Show dentist & user information and user’s payment method	Pass
	Click “Back” icon	Back to Dentist timeslot Page	Back to Dentist timeslot Page	Pass
	Click “Confirm Booking” Button	Save booking details in Firebase and back to Patient Home Page	Show “Booking Confirmed!” message	Pass

Test Scenario: Dentist Schedule Module

Table 6.7 Dentist Schedule Page

Test Case	Input	Expected Output	Actual Output	Pass/Fail
Dentist Schedule Page	Click Add Button	Show timeslots list	Show timeslots list	Pass
	Select timeslot to add	Timeslots appear under calendar	Timeslots appear under calendar	Pass
	Click Delete Button	Show saved timeslots list	Show saved timeslots list	Pass
	Select timeslot to delete	An alert dialog appears	An alert dialog appears	Pass
	Clicks ok on the Delete dialog	The selected timeslots delete	The selected timeslots delete	Pass

	Clicks cancel on the Delete dialog	Back to Dentist Schedule Page	Back to Dentist Schedule Page	Pass
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Test Scenario: History Module

Table 6.8 Patient History Page

Test Case	Input	Expected Output	Actual Output	Pass/Fail
Patient History Page	System gets username and show	Show username on top of page	Show username on top of page	Pass
	User haven't uploaded their photo	Right corner doesn't show photo	Right corner empty	Pass
	User have uploaded their photo	Right corner show photo	Right corner show user photo	Pass
	User doesn't complete an appointment	No history appears	No history appears	Pass
	User completed an appointment	Completed appointment details show	Completed appointment details show	Pass

Table 6.9 Dentist History Page

Test Case	Input	Expected Output	Actual Output	Pass/Fail
Dentist History Page	System gets username and show	Show username on top of page	Show username on top of page	Pass
	User haven't uploaded their photo	Right corner doesn't show photo	Right corner empty	Pass
	User have uploaded their photo	Right corner show photo	Right corner show user photo	Pass
	No patient completed an appointment	No history appears	No history appears	Pass
	Patient completed an appointment	Completed appointment details show	Completed appointment details show	Pass

Test Scenario: Profile Module

Table 6.10 Patient Profile Page

Test Case	Input	Expected Output	Actual Output	Pass/Fail
Patient Profile Page	System gets username, email, password & phone number	Show username, email, password & phone number in respective Edit Text View	Show username, email, password & phone number in respective Edit Text View	Pass
	Click Edit icon on the left corner of page	Image View of photo, Edit Text View of name, phone and location become enable	Image View of photo, Edit Text View of name, phone and location become enable	Pass
	User haven't uploaded their photo	The image View empty	The image View empty	Pass
	User have uploaded their photo	The image View show user's photo	The image View show user's photo	Pass
	Click Save Button	The edited data update in Firebase	Show "Profile Update successfully" message	Pass
	Click Logout icon on the right corner of page	An alert dialog appears	An alert dialog appears	Pass
	Clicks Yes on the Logout dialog	Forward to Main Activity Page	Forward to Main Activity Page	Pass
Clicks No on the Logout dialog	Back to Patient Profile Page	Back to Patient Profile Page	Pass	

Table 6.11 Dentist Profile Page

Test Case	Input	Expected Output	Actual Output	Pass/Fail
Dentist Profile Page	System gets username, email, password, location and phone number	Show username, email, password, location and phone number in respective Edit Text View	Show username, email, password, location and phone number in respective Edit Text View	Pass
	Click Edit icon on the left corner of page	Image View of photo, Edit Text View of name, phone, experience and brief become enable	Image View of photo, Edit Text View of name, phone, experience and brief become enable	Pass
	User haven't uploaded their photo	The image View empty	The image View empty	Pass
	User have uploaded their photo	The image View show user's photo	The image View show user's photo	Pass
	Click Save Button	The edited data update in Firebase	Show "Profile Update successfully" message	Pass
	Click Logout icon on the right corner of page	An alert dialog appears	An alert dialog appears	Pass
	Clicks Yes on the Logout dialog	Forward to Main Activity Page	Forward to Main Activity Page	Pass
Clicks No on the Logout dialog	Back to Dentist Profile Page	Back to Dentist Profile Page	Pass	

6.2 Project Challenges

During the project, several challenges were encountered while developing the dental appointment application. The initial difficulty occurred when the laptop struggled to handle the simultaneous operation of Android Studio, a virtual device for testing, and other browsers. This resulted in lagging performance and frequent shutdowns of the virtual device. Recognizing the inadequacy of the existing 8GB RAM, the developer decided to upgrade to a more robust 16GB RAM, effectively resolving the performance issues and enabling seamless development of the application.

The second challenge surfaced during attempts to connect to Firebase for user and admin authorization. Despite extensive searches on search engines and video platforms like Google, Microsoft Bing, and YouTube, no solution was found. Assistance was sought from a friend named Kwang Jia Xian, who provided guidance on resolving the issue. It was explained that Firebase required the Sha-1 from the Android Studio project's signing report to be copied and pasted into Firebase for authentication, successfully overcoming the hurdle.

The third challenge emerged when integrating Google Maps into the project. Upon attempting to enable the Maps SDK for Android via Google Cloud, a prompt appeared requesting activation of the account as a billing account. Initially assuming the service required payment, the developer hesitated. However, upon revisiting the page, it was discovered that the Maps SDK for Android service was already enabled, indicating a misunderstanding regarding the billing requirement.

6.3 Objective Evaluation

6.3.1 To develop a mobile application that streamlines the process of scheduling dental appointments.

In a way the mobile application brings efficiency in scheduling of dental appointments. The interface of the app makes the appointment booking process easy for the users where they make their choices of clinic, date and time without much struggle. Speaking of benefits, this feature is equally useful for the patients and helps clinics handle their schedules much better.

6.3.2 To develop a user-friendly mobile application that has a map showing nearby clinics for users to select nearby clinics.

The application is well-developed and contains a feature with the map of the area with the nearby dental clinics. This feature entails the convenience of being able to easily browse through the list in search of clinics in their region. The integration with map services also guarantees an opportunity of proper tracking of one's location, a feature that is greatly benefiting users in search of a good clinic nearby.

6.3.3 To develop a storing consultation record system that allow patients and dentists to save the consultation record.

The application also has an efficient structure for the keeping of the records of consultations and enables patients and dentists to store and access some consultation history. Such system permits to restore all past records with ease which is very important for as it helps with the follow up treatment and the patient history. This feature allows for security of the information kept and implements privacy policies on all patient records. This function also helps the dentists in serving the patients better by going through the past records and the patients can understand their oral health better.

Chapter 7

Conclusion and Future Work

7.1 Conclusion

This project title is Dental Appointment using Mobile Application Development. The main objective is developing a user-friendly mobile application that allows patients to schedule, reschedule, and cancel dental appointments and enables dental clinics to efficiently manage their appointment schedules. This project consists of 2 modules, user/patient and admin/dentist. Users can choose their nearby clinic, select preferred dentist, user's available time and book appointment. For admin, he can open their available time slot to users and review the previous consultation details. Some mobile applications like De Dentiste, HotDoc and Medicosearch have their own strengths and weaknesses. This project assesses the strengths and weaknesses of comparable features and user interface designs in current works for minimizing weaknesses and capitalizing on strengths in the development of this project. Furthermore, user interfaces that meet functional requirements have been established and developed. Some useful software like Android Studio, Firebase and Google Cloud are also used in the development of mobile applications.

In conclusion, the successful implementation of this dental appointment mobile app marks an important step towards modernizing dental care management. By continuing to build on this foundation for future enhancements, the app has the potential to become an indispensable tool for patients and dentists.

7.2 Future Work

It can thus be concluded that the main goals of the project have been met, and there is still room for improvements that could improve the application and the experience of its users. A potential area of enhancement can be enhancement of new features, for instance, AI that gives suggestions for the best time to set an appointment through analysing previous activities of the user. Also, the possibility of adding telemedicine compatibility would enable patients to talk with their dentists without visiting the clinic, which is also an advantage.

When it comes to the further development of the application, one of the most significant directions is the growth of the number of clinics in the application's database. Now, it is a single clinic – SoFea Clinic. Though the application has potential for growth as, in the future, the app might develop into a large healthcare platform that also includes clinics from all over Malaysia. It is an expansion that would make the application a single window to all the dental services and clinics across the country where patients can visit. By targeting both the urban and rural clinics, the app could add closure to the disparity of inadequate health care by making more users benefit from it.

One more might be to extend the program further and make it available in multiple languages. Being a multicultural society Malaysia has people from different origins speaking different languages such as Malay, Chinese, Tamil and English. If the application is given in different languages, then there would be a possibility of reaching individuals who have poor English-speaking skills. This enhancement would also not only make the app more friendly for people of different cultures but also makes it friendly for anyone from the targeted cultures to comfortably use the app by just choosing his or her preferred language.

Lastly, if the application is further developed and given the incorporation of users' feedback, it could be a core tool in management of healthcare in Malaysia making it a connected and efficient system.

REFERENCES

- [1] P. Hellyer, “Where traditional dentistry and aesthetics meet” *Br Dent J* 231, 179 (2021).
<https://doi.org/10.1038/s41415-021-3325-0>
- [2] N/A, “Step-by-Step Guide to Dental Appointment Scheduling” Unitek College (Sept 2022)
<https://www.unitekcollege.edu/blog/step-by-step-guide-to-dental-appointment-scheduling/>
- [3] M.A.Y. Yamin and B.A. Alyoubi, “Adoption of telemedicine applications among Saudi citizens during COVID-19 pandemic: An alternative health delivery system” *Journal of Infection and Public Health* (2020), 13, 1845–1855.
<https://doi.org/10.1016/j.jiph.2020.10.017>
- [4] D. Giansanti et al., “A Narrative Review of the Launch and the Deployment of Telemedicine in Italy during the COVID-19 Pandemic” *Healthcare* (2022), 10, 415.
<https://doi.org/10.3390/healthcare10030415>
- [5] S. Arain et al., “Implementation of Pharmacist-led Telepsychiatry Services: Challenges and Opportunities in the Midst of COVID-19” *Journal of Technology in Behavioral Science* (2022). <https://doi.org/10.1007/s41347-022-00266-2>
- [6] W. Gupta and B. Denton, “Appointment scheduling in health care: Challenges and opportunities” *IIE Transactions* (2008). <https://doi.org/10.1080/07408170802165880>
- [7] C.J. Yan et al., “Comparison of Traditional and Open-Access Appointment Scheduling for Exponentially Distributed Service Time” *Journal of Healthcare Engineering*, vol. 6, Article ID 328476, 32 pages, (2015) <https://doi.org/10.1260/2040-2295.6.3.345>
- [8] E.T. Adebayo et al., “Patient assessment of the quality of dental care services in a Nigerian hospital.” *Journal of Hospital Administration* 3, no. 6 (2014): 20-28.
<https://www.researchgate.net/publication/287442397>

REFERENCES

- [9] P. Glassman et al., “Using telehealth technologies to improve oral health for vulnerable and underserved populations.” *Journal of the California Dental Association* vol. 40,7 (2012): 579-85. <https://pubmed.ncbi.nlm.nih.gov/22916379/>
- [10] P. Glassman et al., “The Virtual Dental Home: Bringing Oral Health to Vulnerable and Underserved Populations.” *Journal of the California Dental Association*. 40. (2012): 569-77.
https://www.researchgate.net/publication/230731272_The_virtual_dental_home_bringing_oral_health_to_vulnerable_and_underserved_populations
- [11] N. Uyen, “The Four Phases of the Software Development Lifecycle” govloop (2019).
<https://www.govloop.com/software-development-lifecycle-phases/>

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Y3S2	Study week no.: 1
Student Name & ID: Go Jun Yong (20ACB02621)	
Supervisor: Dr Farina Saffa binti Mohamad Samsamnun	
Project Title: Dental Appointment using mobile application development	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- I have done the report on Chapter 1, Chapter 2 and some of Chapter 3.

2. WORK TO BE DONE

- Start to develop the dentist part
- Continue develop the patient part

3. PROBLEMS ENCOUNTERED

- No problem encountered in week 1.

4. SELF EVALUATION OF THE PROGRESS

- Need to study more about Android Studio.

Farina

Supervisor's signature

Go Jun Yong

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Y3S2	Study week no.: 3
Student Name & ID: Go Jun Yong (20ACB02621)	
Supervisor: Dr Farina Saffa binti Mohamad Samsamnun	
Project Title: Dental Appointment using mobile application development	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- I have done created the dentist signup and login page
- Create some fragment and activity for the dentist part

2. WORK TO BE DONE

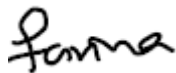
- Start to do the profile page for dentist and patient

3. PROBLEMS ENCOUNTERED

- No problem encountered in week 3.

4. SELF EVALUATION OF THE PROGRESS

- Need to learn how to design a better User Interface Design



Supervisor's signature



Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Y3S2	Study week no.: 5
Student Name & ID: Go Jun Yong (20ACB02621)	
Supervisor: Dr Farina Saffa binti Mohamad Samsamnun	
Project Title: Dental Appointment using mobile application development	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- I have done profile page for dentist and patient

2. WORK TO BE DONE

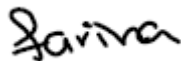
- Continue develop the home page for patient and dentist

3. PROBLEMS ENCOUNTERED

- No problem encountered in week 5.

4. SELF EVALUATION OF THE PROGRESS

- Need to learn how to design a better User Interface Design



Supervisor's signature



Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Y3S2	Study week no.: 7
Student Name & ID: Go Jun Yong (20ACB02621)	
Supervisor: Dr Farina Saffa binti Mohamad Samsamnun	
Project Title: Dental Appointment using mobile application development	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- I have done Home page for dentist and patient

2. WORK TO BE DONE

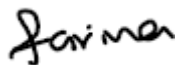
- Start developing the schedule page for dentist and patient

3. PROBLEMS ENCOUNTERED

- No problem encountered in week 7.

4. SELF EVALUATION OF THE PROGRESS

- Need to learn how to design a better User Interface Design



Supervisor's signature



Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Y3S2	Study week no.: 9
Student Name & ID: Go Jun Yong (20ACB02621)	
Supervisor: Dr Farina Saffa binti Mohamad Samsamnun	
Project Title: Dental Appointment using mobile application development	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- I have done Schedule page for dentist and patient

2. WORK TO BE DONE

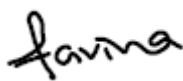
- Continue in History page for dentist and patient

3. PROBLEMS ENCOUNTERED

- No problem encountered in week 9.

4. SELF EVALUATION OF THE PROGRESS

- Need to schedule time effectively



Supervisor's signature



Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Y3S2	Study week no.: 11
Student Name & ID: Go Jun Yong (20ACB02621)	
Supervisor: Dr Farina Saffa binti Mohamad Samsamnun	
Project Title: Dental Appointment using mobile application development	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- The application already done developed

2. WORK TO BE DONE

- Need to complete some of Chapter 6 and Chapter 7 Conclusion
- Need to complete the poster design
- Submit the FYP2 report

3. PROBLEMS ENCOUNTERED

- No problem encountered in week 11.

4. SELF EVALUATION OF THE PROGRESS

- Need to schedule time effectively


Farina

Supervisor's signature


Yes

Student's signature

Poster



DENTAL APPOINTMENT APPLICATION




PREPARED BY:
GO JUN YONG (20ACB02621)

SUPERVISED BY:
DR FARINA SAFFA BINTI MOHAMAD SAMSAMNUN

INTRODUCTION

A confident smile, which conveys a range of emotions, is an integral part of good oral health. This app allows patients to schedule, reschedule, and cancel dental appointments effectively.



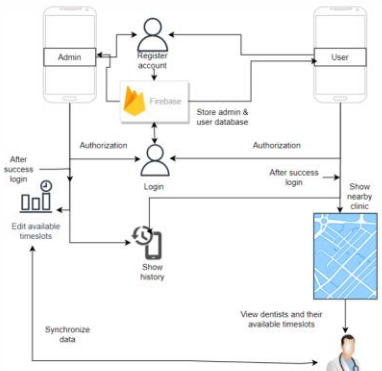
OBJECTIVES

- To develop a mobile application that streamlines the process of scheduling dental appointments.
- To develop a user-friendly mobile application that has a map showing nearby clinics for users to select nearby clinics.
- To develop a storing consultation record system that allow patients and dentists to save the consultation record.

CONCLUSION

This app aims to bridge the divide between traditional, sometimes clunky appointment booking methods and the expectations of modern patients who appreciate the convenience of mobile applications in all aspects of their lives.

SYSTEM DESIGN



```

graph TD
    Admin[Admin] --> Register[Register account]
    Register --> Firebase[Firebase]
    Firebase --> Store[Store admin & user database]
    Store --> User[User]
    User --> Login[Login]
    Login --> Auth[Authorization]
    Auth --> Firebase
    Firebase --> Admin
    Admin --> Edit[Edit available timeslots]
    Admin --> Show[Show history]
    Admin --> Sync[Synchronize data]
    User --> ShowNearby[Show nearby clinic]
    ShowNearby --> View[View dentists and their available timeslots]
    
```

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FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

Full Name(s) of Candidate(s)	Go Jun Yong
ID Number(s)	20ACB02621
Programme / Course	Bachelor of Information Technology (Honours) Communications and Networking
Title of Final Year Project	Dental Appointment using mobile application development

Similarity	Supervisor's Comments (Compulsory if parameters of originality exceeds the limits approved by UTAR)
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Based on the above results, I hereby declare that I am satisfied with the originality of the Final Year Project Report submitted by my student(s) as named above.

Farina

 Signature of Supervisor
 Name: Dr Farina Saffa binti Mohamad Samsamun
 Date: 10/9/2024

 Signature of Co-Supervisor
 Name: _____
 Date: _____



UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF INFORMATION & COMMUNICATION

TECHNOLOGY (KAMPAR CAMPUS)

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Student Name	Go Jun Yong
Supervisor Name	Dr Farina Saffa binti Mohamad Samsamnun

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(Signature of Student)

Date: 2 September 2024