Medical Tracking App

CS335 Project

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Abstract

Our project theme for our project was Healthcare and Medical Technology. We were given requirements and rough guidelines to develop a software system that includes 10 user stories, a complete set of diagrams representative of the system, a User Interface design of the system and a series of test cases. With all this in mind, we decided to develop an app that gave us the opportunity to explore these requirements in a clear and substantial way. We believed this was best done through an app that kept track of medical history, prescriptions and appointments, which incorporates personal users, doctors, pharmacists and EMTs.

Contributions

We believed that it would be beneficial for the development of this system if we all contributed to each segment of the project, so as to ensure that we all had a thorough understanding of each part of the system. We believed this would aid us more as the development went on and our knowledge of the system and of the skills of system development improved through consistent practice. As such every member of the group has

contributed to each part of the project through consistent group meetings, brainstorming sessions and communication, allowing us all to be knowledgeable on all aspects of our system and its development.

User Stories

Our User Stories express the functions of our system and their usefulness to any user in a variety of circumstances and environments.

1) Donal is a man in his 70's with dementia. While his family are able to support him to an extent, he inevitably has to interact with medical professionals by himself at times, and with multiple parties within the medical industry. His family buy him a smartphone and smartwatch so he can have the app. When he goes for regular check ups, no matter what hospital he goes to, he can have a QR code generated by either his phone or app that can be used to show his medical profile on a secure system. This relays any necessary information without needing to rely on him to communicate any important information. Any updates to his health status are able to be changed upon a medical professional passing a verification process.

2) James is a man who has a severe nut allergy. While eating out at a restaurant, he accidentally consumes food containing traces of nuts and experiences an anaphylactic reaction. Emergency services are called, and when paramedics arrive, they use the 'Emergency Medical Info' button that's present on his phone's lock screen. Without needing to unlock the device, they access his critical medical details that would be necessary in case of an emergency, including his severe nut allergy, blood type, and emergency contacts. The paramedics administer the correct treatment of an EpiPen immediately, preventing a life-threatening situation.

3) Elizabeth is a surgeon preparing to perform a serious operation on a patient named Sarah. Before they start the procedure, she has to ensure that Sarah has no underlying conditions that could cause complications throughout the procedure. Instead of relying on printed records or Sarah's memory, Elizabeth uses her hospital's secure system to access Sarah's real-time medical profile through the app. She confirms Sarah's history of mild asthma and adjusts the anesthesia plan accordingly. This streamlined access to up-to-date information helps prevent complications and ensures patient safety.

4) Michael is a man who suffers from a heart condition that requires frequent visits to the hospital for check ups on his health. He works long hours and is a father, and as such, he is very busy and risks forgetting appointments or not being able to be called for any relevant changes to his current appointments. Through the use of the appointment tracking and reminder function of the app, he is able to look at any upcoming appointments and receive notifications upon the change of any current appointments, which greatly minimises the risk of missing appointments or communication from the hospital in relation to them.

5) Brian is a GP, regularly sees patients for follow-up consultations. In the past, he often encountered outdated medical records, leading to confusion about whether a patient's treatment plan had changed. However, with the new medical tracking app in place, all certified medical professionals update patient records in real-time, with the expectation present further encouraging strict adherence to thorough recordkeeping. When a patient, Rachel, comes in for a routine checkup, Brian immediately sees the latest updates from her specialist regarding a recent change in her blood pressure medication. With accurate, up-to-date information at his fingertips, he provides the best possible care without needing to double-check records manually.

6) Sharon is a pharmacist, who Bernadette comes in to collect her prescription from. Bernadette's GP used the app to update her prescription, which she uses the app to show to their Sharon through the Sharon being able to scan a QR code on Bernadette's phone. Both Sharon and Bernadette prefer this as it reduces the need for communication from the medical professionals to the pharmacy directly, which is often delayed and on rare occasions even forgotten. As a registered pharmacist, Sharon is able to use a limited edit function in the app relating only to prescriptions, keeping any information about Bernadette's prescription up to date.

7) Noah is a competitive gymnast who has suffered from asthma since childhood. While competing at a national event, Noah feels short of breath and starts to experience signs of an asthma attack. The competition's medical team accessed his emergency information directly from his phone's lock screen without needing to unlock it. They immediately find details of his inhaler type and dosage and administer the correct treatment. This quick access to information prevents the situation from escalating and allows Noah to recover safely on-site.

8) Emma is a police officer who sustains a minor injury during a foot pursuit and is rushed to the hospital. Due to the stress of the situation, she forgets to mention that she is allergic to certain antibiotics. At the hospital, the medical staff scan a QR code from her smartphone, pulling up her full medical profile within seconds. The profile clearly lists her allergies and previous treatments. Using this information, the doctors avoid prescribing harmful antibiotics, ensuring Emma's safe and effective recovery.

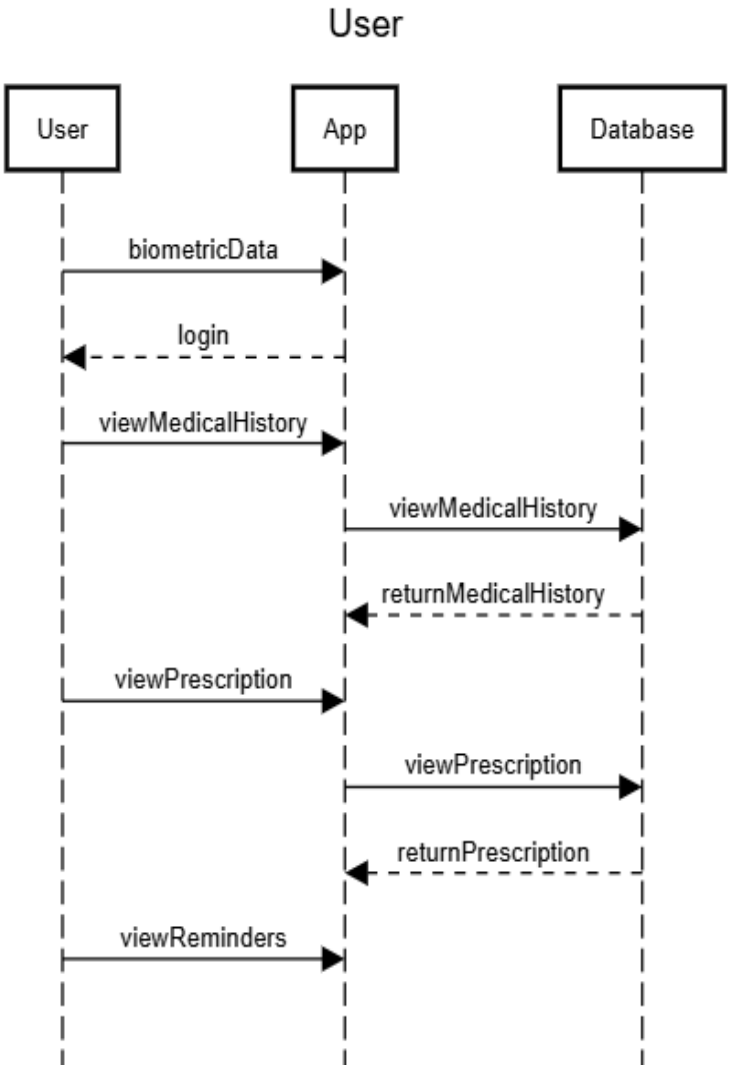
9) Dylan, who's currently recovering from a heart condition, sometimes forgets to take his medication. Using the app he sets up a schedule to remind him to take his medication. The app now sends out daily reminders with times as well as dosages. One day, when he's caught up in a busy schedule, the app sends out a notification that helps him to stay reminded of when he has to take his medication.

10) Sarah, a pharmacist, has a customer who says their doctor recently sent in a prescription. Sarah logs onto the system to access the customer's prescription and opens up the patient's prescription, which includes specific instructions. This information provides the exact medication the doctor prescribed.

Sequence Diagrams

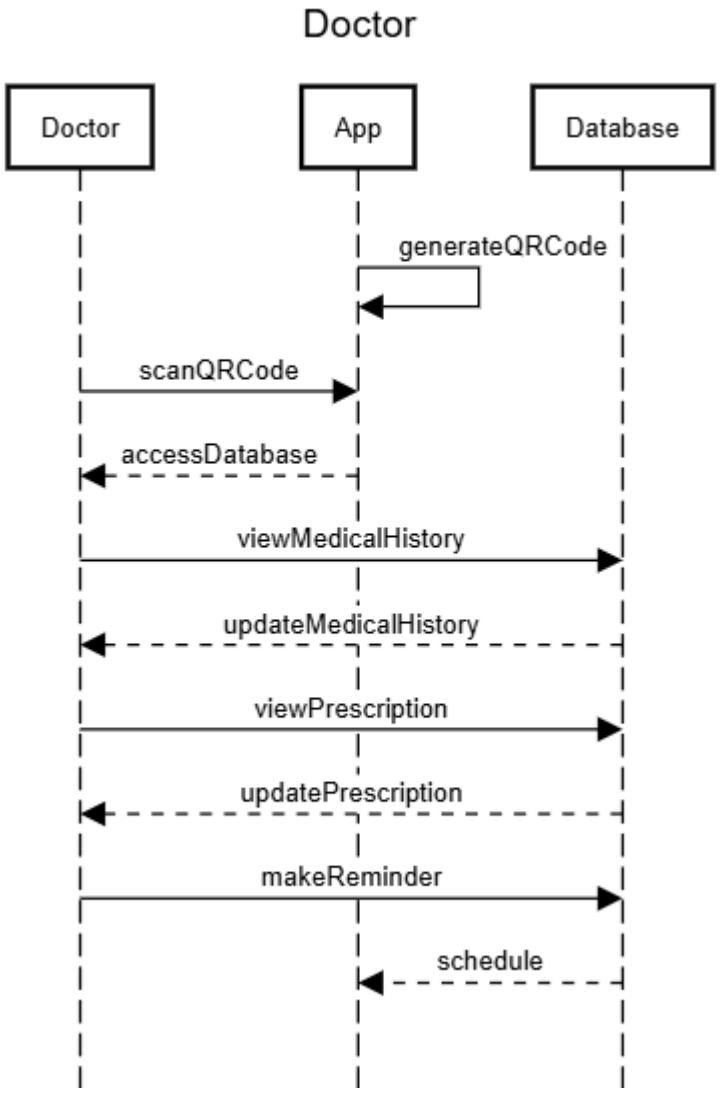
For our sequence diagram, we took on a more general approach of focusing on the overall user interactions rather than each individual user story. To accomplish this we focused on the main 4 users. A Personal User, a Doctor, a Pharmacist and an EMT.

This sequence diagram presents how a user, such as a patient, may interact with the app. It showcases the functions that the user can access such as being able to open the app through a lock screen for quick and easy access. It shows the ability to view their medical history and prescriptions, as well as reminders for medications or upcoming appointments.

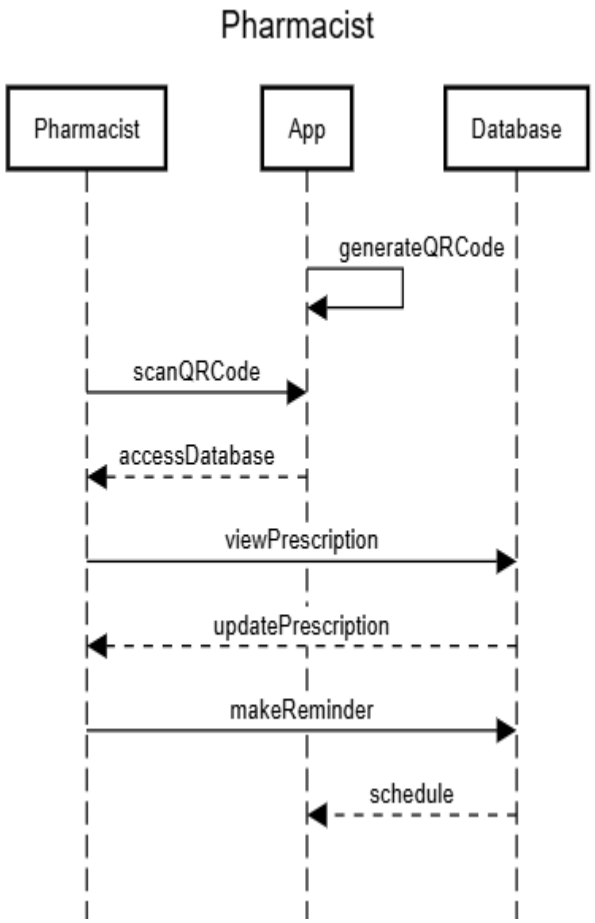


Our Doctor sequence diagram models how a doctor accesses the system, scans a patient's generated QR code, views their medical profile, and updates their medical history with new

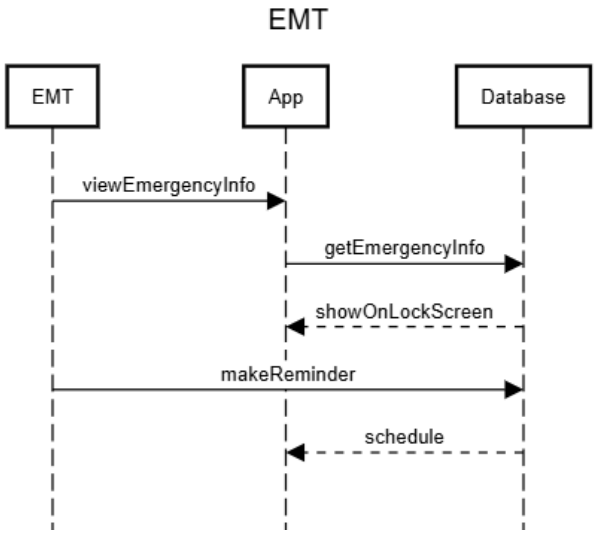
treatment notes or allergy records. It also shows how the Doctor can view and update prescriptions and schedule medical reminders to ensure continuous patient care.



Our Pharmacist sequence diagram shows how a pharmacist accesses the application, scans a QR code linked to a patient's prescription, views the prescribed medication details, updates the prescription if necessary, and creates medication reminders for the patient to ensure continuity of care

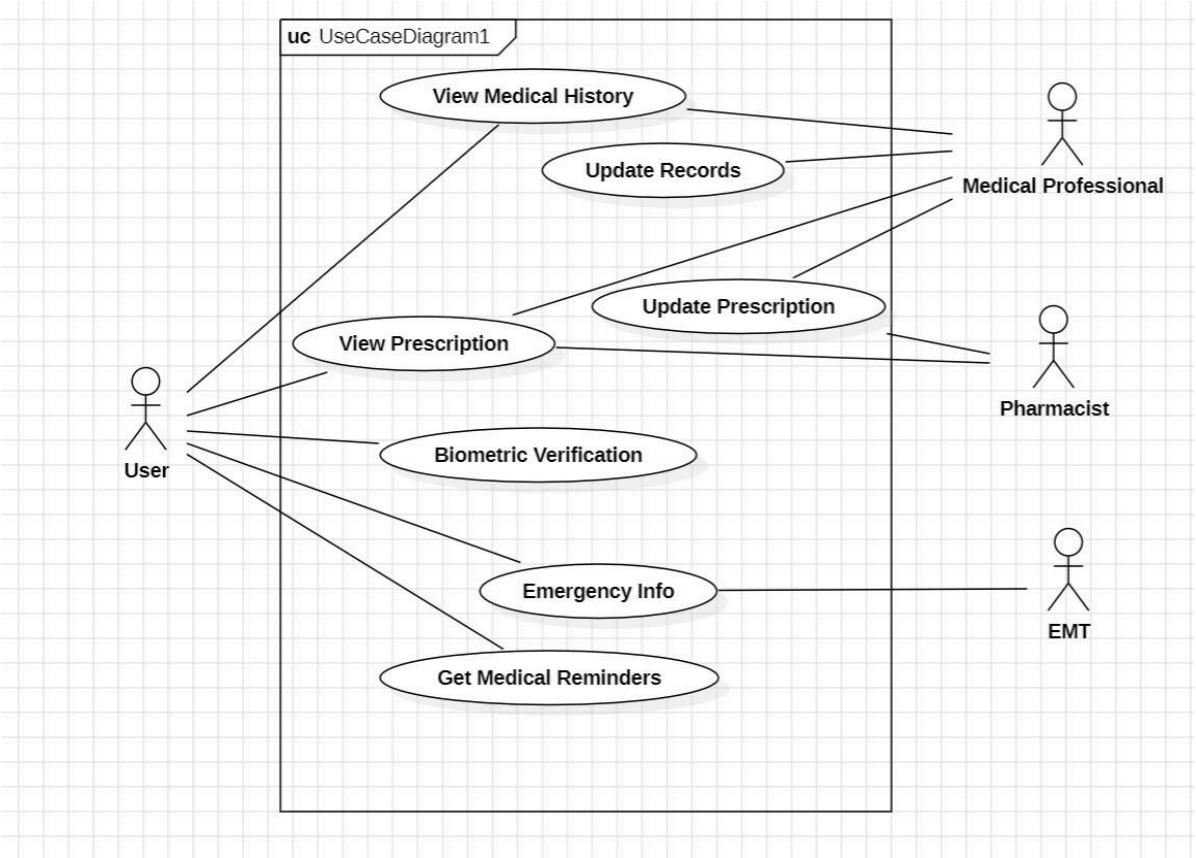


Our EMT diagram represents how an EMT accesses critical patient medical information directly from the lock screen of a device during emergencies. It highlights retrieving vital information such as allergies, blood type, and pre-existing conditions to guide immediate emergency response and enable the EMT to provide appropriate care quickly



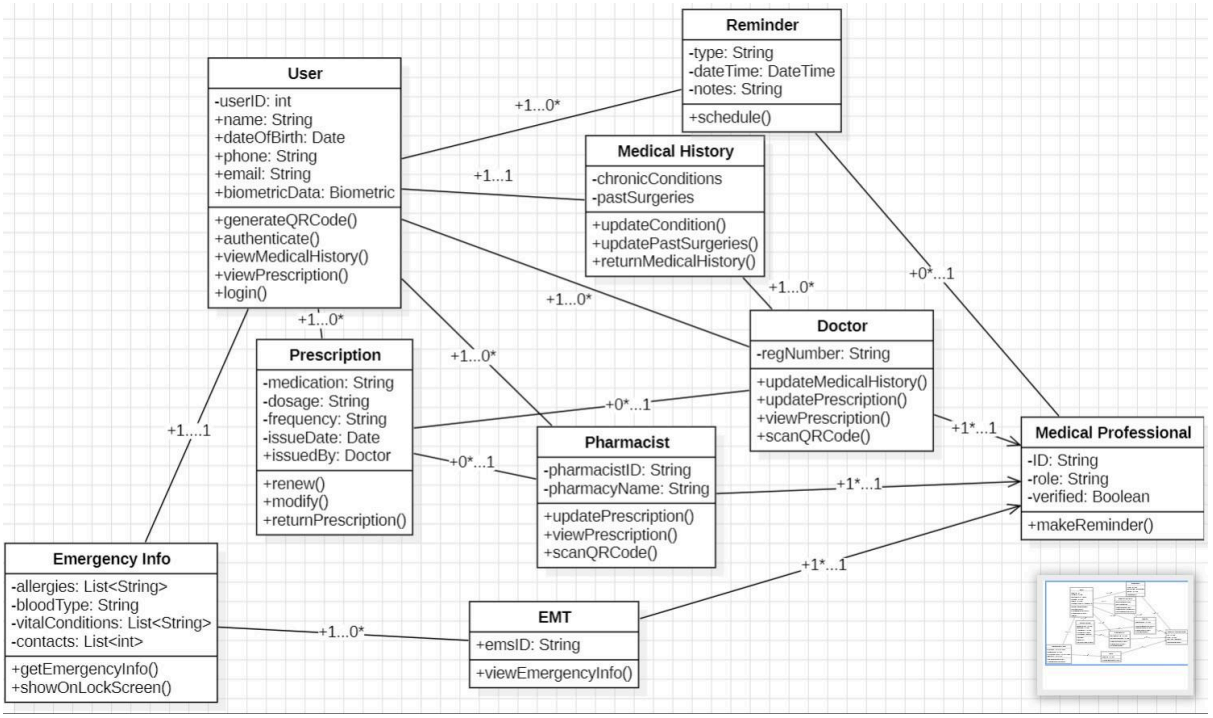
Use Case Diagram

Our Use Case diagram depicts the necessary functions of our relevant users to provide a clearer idea for development.



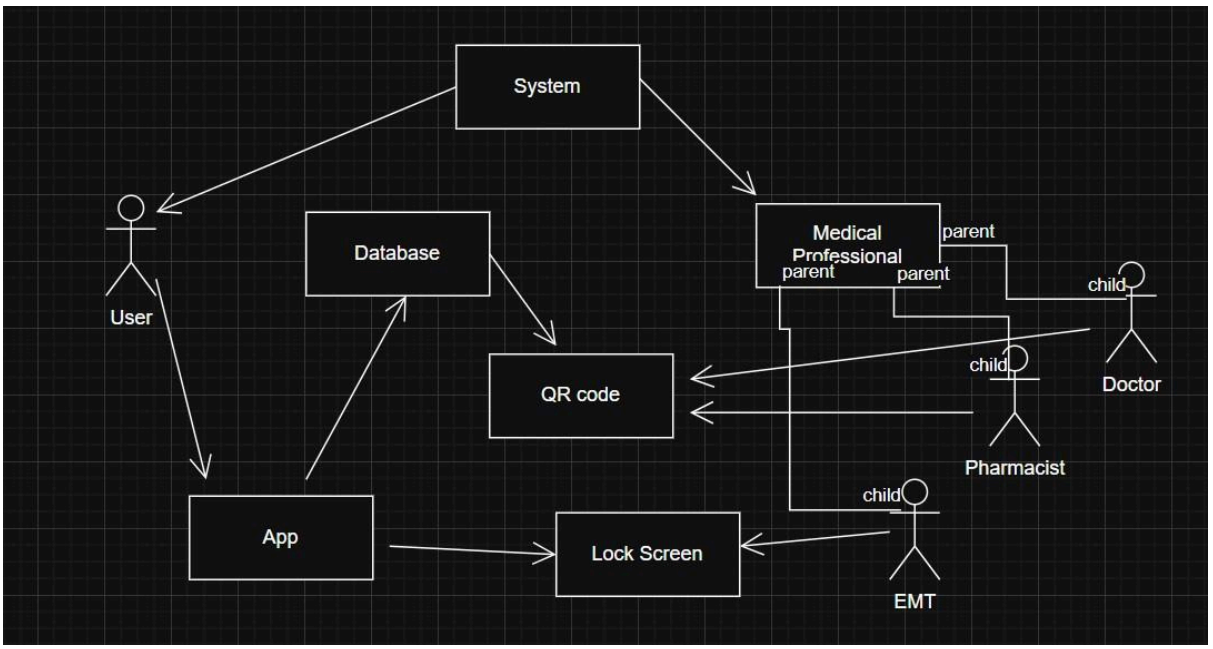
Class Diagram

Our Class Diagram helps illustrate the functions of all aspects of the system and relations between them



Architecture Diagram

Our architecture diagram illustrates the structure of the system, allowing for the user to observe a high level abstraction of it.


System
User
Database
Medical Professional
parent
parent
parent
child
Doctor
child
Pharmacist
QR code
child
EMT
App
Lock Screen

User Interface Design

Our User Interface design provides a visual representation of how the system would look as an app, and how its functions would be incorporated.

The emergency information function visible on the bottom corner of the lock screen expands upon being pressed

The home page is able to be accessed upon biometric verification

Once on the homepage, all relevant pages (Medical History, Prescription, Appointments and Reminders, Account) can be accessed


09:52 AM
Appointments And Reminders
Current Appointments
12/5/2025 St James Hospital - Check Up with Dr. Richards
Past Appointments
2/3/2025 St James Hospital - Check Up with Dr. Richards
10/1/2025 St James Hospital - Physio
12/11/2024 St Marks Hospital - Check Up with Dr. Richards
8/9/2024 St Josephs Hospital - Check Up with Dr. Jacobs
13/8/2024 St James Hospital - Physio for Post-Surgery Recovery
18/6/2024 St James Hospital - Arthroplasty Surgery
Contact to Reschedule Appointment
09:52 AM
Account
John Doe
Male
47
Email: JohnDoe@gmail.com
Phone Number: 086 987 6543
Change
Emergency Contact:
085 123 4567
Wife
Change
Blood Type: B-
Allergies:
Conditions:
-Atrial Arrhythmia
Pacemaker
Medication:
-Warfarin

Test Cases

As we don't have a tangible system to test on, we must come up with theoretical results and assume the system is working as intended in place of actual results. However, doing this allows us to clarify how standard actions lead to desired results. As such, our test cases are based on the most common user interactions with the system.

No	Test Cases	Test Data	Expected Results	Actual Result
1	Check if pressing the emergency info button shows emergency info	Emergency Info	Return Emergency Info	Pass
2	Check if biometric data can log user into the app	Biometric Data	Successfully Login to App	Pass
3	Check if user can check medical history	Medical History	Returns Medical History	Pass
4	Check if hospital system can login to database through scanner	QR Code	Successfully Login to Database	Pass
5	Check if doctor can update medical history	Medical History	Medical History is Updated	Pass
6	Check if doctor can update prescription	Prescription Info	Prescription is Updated	Pass
7	Check if a pharmacist can access a prescription	QR Code	Returns Prescription	Pass
8	Check if a pharmacist can update a prescription	Prescription Info	Updates Prescription	Pass
9	Check if a medical professional can schedule a reminder	Reminders	Reminder is Scheduled	Pass
10	Check if you can view past reminders	Reminders	Returns Past Reminders	Pass