A

PROJECT REPORT

ON

Consultation Site For Healthcare

Submitted in partial fulfillment for the award of

Post Graduate Diploma in Advance Computing

(PG-DAC)
from

INSTITUTE OF EMERGING TECHNOLOGIES

Authorized Training Centre

Under the Guidance of

Ms. Sayali Patil

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CERTIFICATE

This is to certify that the project report entitled **Consultation Site For Healthcare** is a bonfire work carried out by **Ajim Sanadi, Amol Borse, Devyani Zode, Nida Kazi, Sanket Zambare** and submitted in partial fulfilment of the requirement for the C-DAC ACTS, DAC course in Institute of Emerging Technology in the batch of Feb 2025.

Course Coordinator **External Examiner**

ACKNOWLEDGEMENT

This project **Consultation Site For Healthcare** was a great learning experience for us and we are submitting this work to Advanced Computing Training School (CDAC).

We are very glad to mention the **Ms. Sayali Patil** for her valuable guidance to work on this project. Her guidance and support helped us to overcome various obstacles and intricacies during the course of project work.

Our most heart full thanks goes to **Mr. Sangram Patil (Director ,IET)** who gave all the required support and kind coordination to provide all the necessities like required hardware , internet facility and extra lab hours to complete the project and throughout the course up to the last day here in C-DAC ACTS, Pune.

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Abstract

The Consultation Site for Healthcare is a web-based application designed to improve and simplify the way patients and doctors interact. In today's fast-paced world, many people struggle to get timely medical care due to long distances, busy schedules, overcrowded clinics, or limited access to specialists. This system helps overcome these challenges by providing a digital platform where patients can easily connect with doctors from anywhere.The platform allows patients to register on the website, browse or search for doctors based on specialty ,book appointments online, and receive medical consultations through a chat box. After the consultation, patients can also download digital prescriptions directly from the system. Doctors can log in to manage their profiles, view upcoming appointments, consult with patients through the system, and issue digital prescriptions. This helps doctors organize their schedule efficiently and provide care without the need for in-person visits, unless necessary. Administrators play a key role in monitoring the system. They approve or verify doctor profiles, track system activity, and ensure smooth functioning of the platform. They also help maintain the security and integrity of the system.Overall, this platform aims to make healthcare more accessible, efficient, and user-friendly by reducing the need for physical visits, saving time, and ensuring that patients receive proper care even from remote locations. It also promotes the use of digital records, which helps keep patient history organized and easy to access.

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1. Introduction

Healthcare access remains a challenge in many parts of the world, especially for people living in rural areas. Traditional consultation methods often involve long waiting times, travel costs, and limited availability of specialist doctors. The rapid advancement of web technologies and secure communication protocols now allows the creation of online platforms where patients can connect with healthcare professionals virtually.The Consultation Site for Healthcare aims to bridge the gap between patients and doctors by providing an online system for appointment booking, prescription management while ensuring strict security and privacy of health records.The Online Healthcare Consultation System is designed to simplify and digitize healthcare interactions. Patients can book appointments, consult doctors remotely, and receive prescriptions from the comfort of their homes.

The system supports three primary user types:

Patients: Register, search for doctors, book appointments.

Doctors: Manage schedules, consult patients, provide prescriptions.

Admins: Monitor system activity, manage users, and oversee appointments.

2. Problem Definition & Scope

2.1 Problem Definition

1. **Long Travel Times for Rural Patients**
    - Patients living in remote or rural areas often have to travel long distances to reach healthcare facilities, resulting in delays in receiving timely medical care.
2. **Difficulty in Accessing Specialist Doctors**
    - Specialist doctors are usually concentrated in urban areas, making it challenging for patients in smaller towns or villages to consult them without significant travel.
3. **Time-Consuming Appointment Scheduling**
    - Manual or in-person appointment booking leads to delays, mismanagement, and sometimes double bookings, making the process inefficient.
4. **Overcrowding in Hospitals and Clinics**
    - High patient inflow, especially during peak hours, results in long waiting times and increased pressure on healthcare staff.
5. **Inconvenience and High Cost of Travel for Consultations**
    - Travel costs, time off from work, and related expenses add to the financial burden on patients, especially for follow-up visits.
6. **Avoidance of Medical Visits Due to Inconvenience or Fear**
    - Many patients delay or skip medical consultations due to travel hassle, fear of infection (as seen during the COVID-19 pandemic), or social stigma.

2.2 Goals & Objectives

1. **Develop a User-Friendly Web Platform for Online Consultations**
    - Create a website where patient can talk with doctors without visiting a clinic or hospital.
    - Focus on a simple, clean, and responsive design with clear buttons, icons, and step-by-step instructions.
    - Ensure smooth functionality across desktops, tablets, and mobile devices so patients can access services anytime, anywhere.
    - the platform accessible to users from different regions.
2. **Allow Patients to Search for Doctors Based on Specialization and Availability**
    - Provide search filters so patients can find doctors according to their health issues (e.g., dermatologists for skin problems, cardiologists for heart-related concerns).
    - Show detailed doctor profiles with qualifications, years of experience, consultation fees, and ratings from other patients.
    - Display real-time availability so patients can choose an appointment slot that fits their schedule.
3. **Enable Secure Appointment Booking and Chat-Based Consultation**
    - Allow patients to select a doctor, date, and time through an easy-to-use appointment booking system.
    - Provide secure, encrypted chat and messaging features to ensure private doctor–patient communication.
    - Keep a consultation history so patients can review past medical advice and prescriptions.
4. **Provide Doctors with Features to Manage Schedules and Issue Prescriptions**
    - Give doctors a dedicated panel where they can set working hours, approve or reject appointments, and view consultation history.
    - Enable doctors to issue secure, digitally signed prescriptions that patients can download or print.
    - Allow doctors to maintain digital medical records for returning patients, making follow-up consultations easier.
5. **Allow Administrators to Manage Users and Monitor Activities**
    - Include an admin dashboard to manage user accounts, verify doctor registrations, and remove inactive or fraudulent profiles.
    - Track platform usage analytics to improve service quality and identify high-demand specialties.
    - Provide tools for resolving disputes between patients and doctors quickly.

2.3 Major Constraints

- **Internet Connectivity**
    - A stable internet connection is required for smooth chat consultations.
    - Both doctors and patients must have reliable bandwidth to avoid disruptions during appointments.
- **Doctor Verification**
    - Only verified doctors should be allowed to provide consultations.
    - Verification must include qualifications, and credentials before granting access.
- **Secure Payment Integration**
    - Online payment systems must be secure.
    - Transaction records should be stored securely for transparency and dispute resolution.

Expected Outcomes:

- **Reduced Patient Waiting Times**
    - Online booking and remote consultations minimize the need for patients to wait in long queues at hospitals or clinics.
    - Appointment slots are pre-scheduled, allowing for better time management.
- **Improved Patient Record Management**
    - Digital records make it easier to store, retrieve, and update patient information.
    - Doctors can quickly review a patient's history before consultations for more accurate diagnosis.
- **Increased Doctor Productivity Through Better Scheduling**
    - Automated scheduling tools allow doctors to manage more patients efficiently.
    - Reduced idle time and streamlined consultations improve overall productivity.
- **Easy Access to Healthcare Specialists**
    - Patients can connect with specialists from any location without the need for physical travel.
    - Beneficial for rural areas where specialist doctors are not readily available.

- **Improved Convenience for Both Patients and Doctors**
    - Patients save time and travel costs, while doctors can manage consultations from any location.
    - Enables more flexible working hours for healthcare providers.
- **Online Doctor Access for Rural Areas**
    - People in villages can connect with doctors via secure chat or video consultations.
    - Reduces the need for long-distance travel to urban hospitals.
- **Elimination of Long Queues**
    - Appointment scheduling through the platform prevents crowding in hospital waiting rooms.
    - Especially useful during health emergencies or pandemics to avoid exposure risks.
- **Easy Appointment Booking**
    - Patients can choose preferred doctors and time slots based on availability.
    - The booking process is simple, even for users with minimal technical knowledge.
- **Sharing Medical History & Reports**
    - Patients can share previous medical records, reports, and history with doctors digitally.
    - Improves the quality and accuracy of consultations.
- **24/7 Availability of General Consultations**
    - The platform can support round-the-clock access for general health queries.
    - Provides emergency advice outside of regular clinic hours.

3. Software Requirement Specification (SRS)

3.1 Proposed System

The proposed system is a **web-based healthcare consultation platform** designed to bridge the gap between patients and doctors by providing an easy, secure, and convenient way to access healthcare services online. The platform will allow patients to **book appointments**, **receive online consultations**. At the same time, it will give doctors tools to manage their schedules, and issue prescriptions digitally. Administrators will play a key role in verifying doctors, monitoring system activity, and ensuring the security and smooth operation of the platform.

The system will address the problems faced in traditional healthcare delivery — such as long travel distances, overcrowded clinics, and difficulty accessing specialists — by offering an **integrated online solution** accessible from anywhere with an internet connection.

Key Features

1. **Patients**
    - **Registration & Login:** Patients will create secure accounts to access the platform.
    - **Doctor Search:** Ability to search for doctors based on specialization, location, ratings, and availability.
    - **Appointment Booking:** Select a doctor, choose a suitable time slot, and confirm the booking instantly.
    - **Consultations:** Receive consultations through secure chat and optional video calls.
2. **Doctors**
    - **Profile Management:** Maintain an up-to-date profile including specialization, experience, and consultation fees.
    - **Schedule Management:** Set available consultation slots and update them in real-time.
    - **Consultations:** Chat with patients securely and issue medical advice.
    - **Prescription Issuing:** send digital prescriptions to patients.
3. **Administrators**
    - **Doctor Verification:** Review and approve doctors' credentials before granting consultation rights.
    - **User Management:** Manage patient and doctor accounts, including resolving access issues.
    - **Activity Monitoring:** Track system activity to ensure smooth operation and detect any misuse.

Technical Specifications

- **Platform Accessibility:** The system will be accessible through any modern web browser, including Chrome, Firefox, Safari, and Edge.
- **Responsive Design:** The interface will be mobile-friendly, ensuring smooth use on smartphones, tablets, and desktops.
- **Security Measures:** secure authentication, and compliance with medical data privacy regulations.

Benefits of the Proposed System

- Reduces patient travel time and cost by enabling remote consultations.
- Improves accessibility to healthcare specialists for rural and underserved areas.
- Provides a centralized platform for managing appointments, prescriptions, and patient records.
- Enhances doctor productivity through better scheduling and reduced administrative work.
- Ensures patient confidentiality and data security through robust verification and encryption measures.

In conclusion, the proposed system will serve as a **comprehensive healthcare consultation platform**, benefiting patients, doctors, and administrators alike. It will combine **ease of use**, **security**, and **efficiency** to make healthcare services more accessible and reliable for all users.

3.2 Scope

Inclusions

1. **Online Doctor Search and Appointment Booking**
    - Patients will be able to search for doctors based on **specialization, ratings, and availability**.
    - The system will display each doctor's profile with details such as experience, consultation fees, and available time slots.
    - Appointment booking will be fast and intuitive, with instant confirmation.
2. **Real-Time Chat Consultations**
    - Secure, encrypted chat consultations between doctors and patients.
    - Chat history will be saved securely for future reference.
3. **Prescriptions**
    - Doctors will issue digitally signed prescriptions after consultations.
4. **Secure Patient chat**
    - Access to patient data will be restricted to authorized users only.
5. **Doctor Verification Process**
    - Doctors will be required to submit their credentials and other verification documents. (e.g Qualification, experience)
    - An admin will review and approve doctor profiles before they can provide consultations.
6. **Patient and Doctor Registration**
    - Separate registration processes for patients and doctors with secure authentication.
    - Patients will register with basic details, while doctors will submit professional and qualification details.
7. **Appointment Booking and Cancellation**
    - Patients can book and cancel appointments directly from the platform.
    - Cancellation policies and automated notifications will be in place to keep both parties informed.
8. **Admin Dashboard for Management**
    - A dedicated admin panel to manage users, verify doctors, and monitor activities.
    - Tools for resolving disputes, updating platform settings, and generating reports.

Exclusions:

- **Emergency Services**

  - The platform will not function as an emergency medical service provider.
  - Patients in critical conditions will be advised to seek immediate help from nearby hospitals or emergency response units.

- **Offline Health Record Digitization**

  - The system will not handle the process of manually converting paper-based medical records into digital format.
  - Any such digitization will remain the responsibility of patients or their healthcare providers.

- **In-Person Medical Treatments**

  - Physical examinations, surgeries, or any other in-person treatments will not be conducted through the platform.
  - The platform will only support **remote consultations** and digital medical advice.

- **Offline Medical Record Scanning**

  - The system will not provide scanning or uploading services for offline documents at physical locations.
  - Patients may upload digital copies of their records themselves, but document scanning services are excluded.

4. System Modules

4.1 Patient Module

Registration/login.

Search doctors by specialty and availability.

Book and cancel appointments.

Chat-based consultation.

digital prescriptions.

4.2 Doctor Module

Profile registration and verification.

View and manage upcoming appointments.

Chat consultations with patients.

Generate and share prescriptions.

4.3 Admin Module

Approve and verify doctors.

Manage patient and doctor accounts.

Monitor system activity.

Maintain security and compliance logs.

5.Performance Requirements

The telemedicine platform is designed to provide fast, reliable, and secure healthcare access for patients and doctors. The system must meet the following performance benchmarks to ensure smooth virtual consultations and uninterrupted communication.

5.1 System Performance

Concurrent Users

The platform should support at concurrent users without noticeable performance degradation.

Infrastructure should allow scaling concurrent users during peak times (e.g., seasonal health surges).

Response Time-

Average response time for standard operations (login, appointment booking, messaging) should be under 2-3 seconds under normal load.

Data Retrieval Speed-

Search queries for doctors, appointments, and medical records should return results in 2–3 seconds.

5.2 Reliability and Availability

System Uptime-

Maintain 99.9% uptime, excluding scheduled maintenance.

Implement automatic failover for core services such as authentication, and notifications.

Error Handling-

Display clear, patient-friendly error messages without revealing sensitive system details.

Provide retry options for failed actions like appointment booking or payment.

5.3 Security Performance

Authentication & Authorization

All API requests must use JWT-based authentication with role-based access control (RBAC).

Session timeout after sometime of inactivity for security.

Data Encryption

5.4 Scalability

Horizontal Scaling

Support containerized deployment (e.g., Docker) with load balancing for increased demand.

Database Optimization

Apply indexing to high-usage tables (Patients, Doctors, Appointments, Prescriptions).

5.5 Resource Utilization

Server Utilization

Maintain CPU usage below 70% and RAM usage below 80% under normal load.

Frontend Optimization

Minify and cache client-side resources (JavaScript, CSS) to improve load speed.

Ensure the web app scores 85+ on Google Lighthouse for performance on both desktop and mobile

5.6 Hardware Requirements

Operating System: Windows 10

Processor: Intel i3 or above

RAM: 4 GB minimum

Internet:2 Mbps or more

5.7 Software Requirements

Frontend:

HTML5, CSS3, JavaScript

React.js ,Bootstrap / CSS

Backend:

MS.NET CORE (C#)

REST API

Database:

SQL Express

Security:

HTTPS, SSL Certificates

JWT authentication

BCrypt.Net-Next encryption

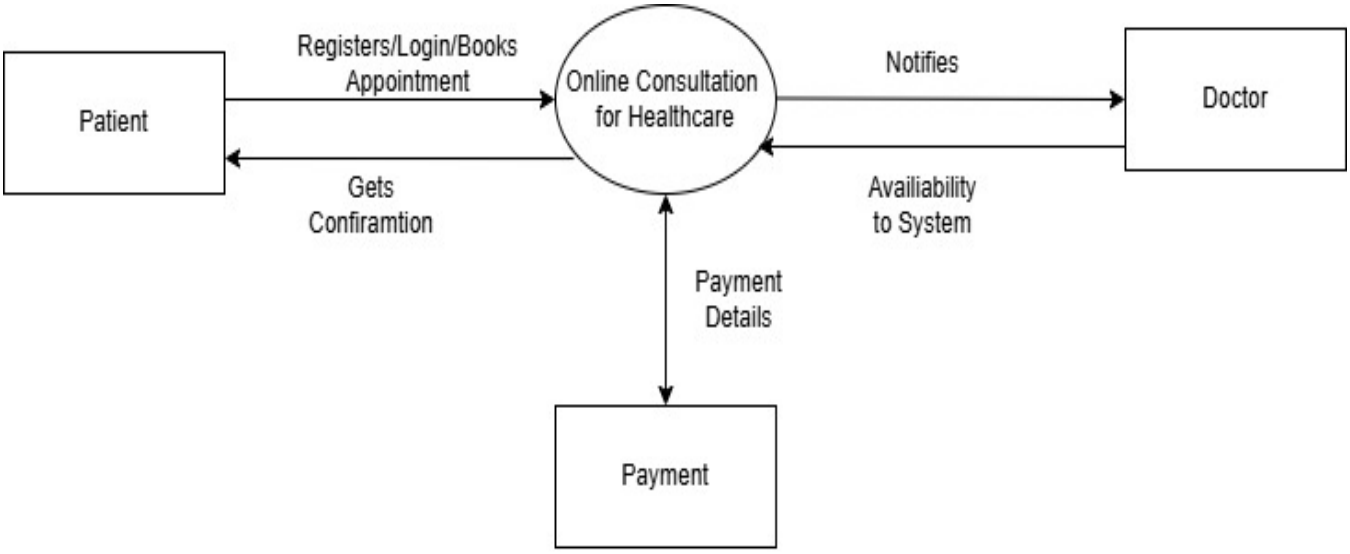
Operating Systems:

Server: Linux (Ubuntu/CentOS)

Client: Windows / macOS / Linux / Android / iOS

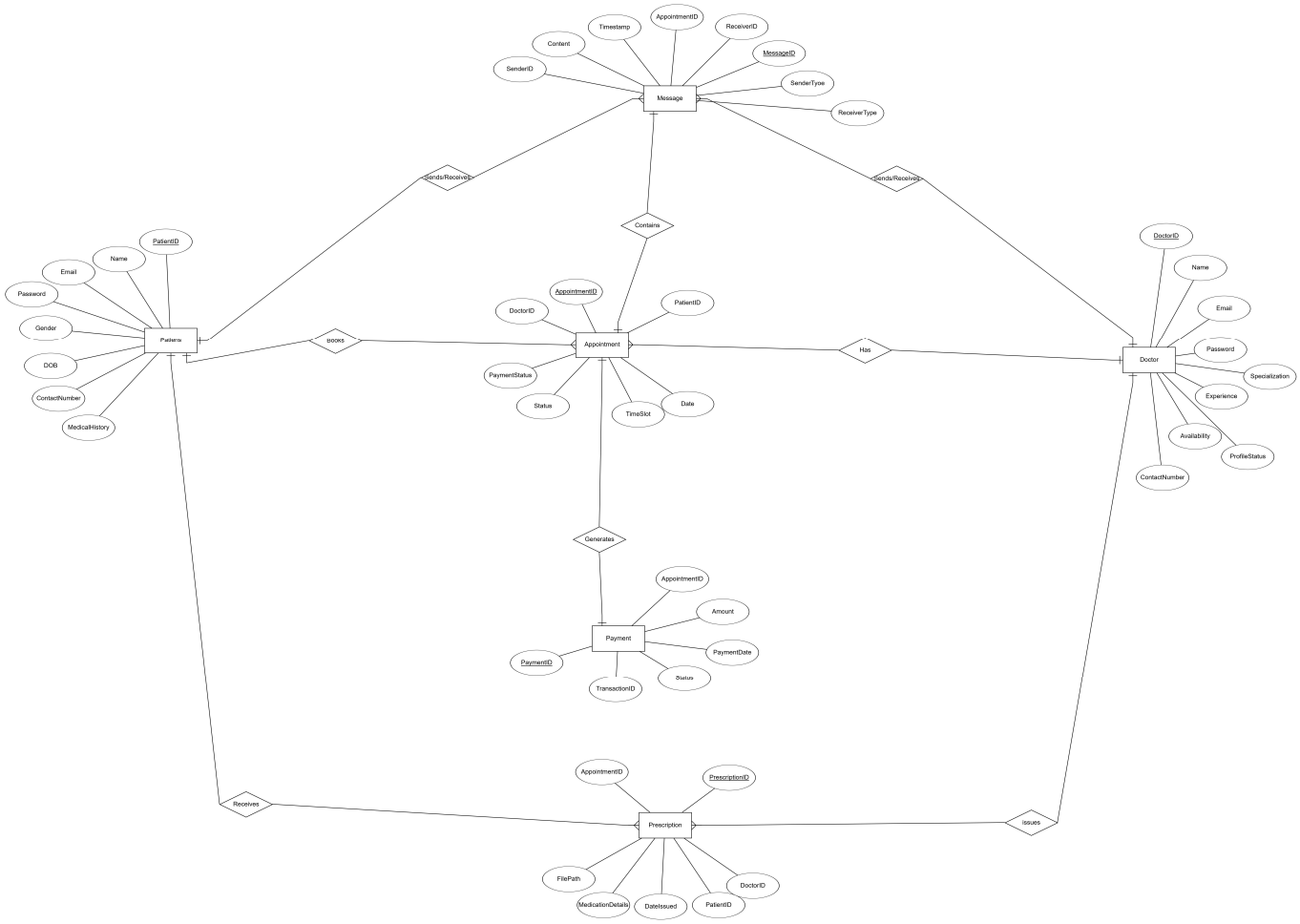
6. UML Diagram

6.1 Data Flow Diagram

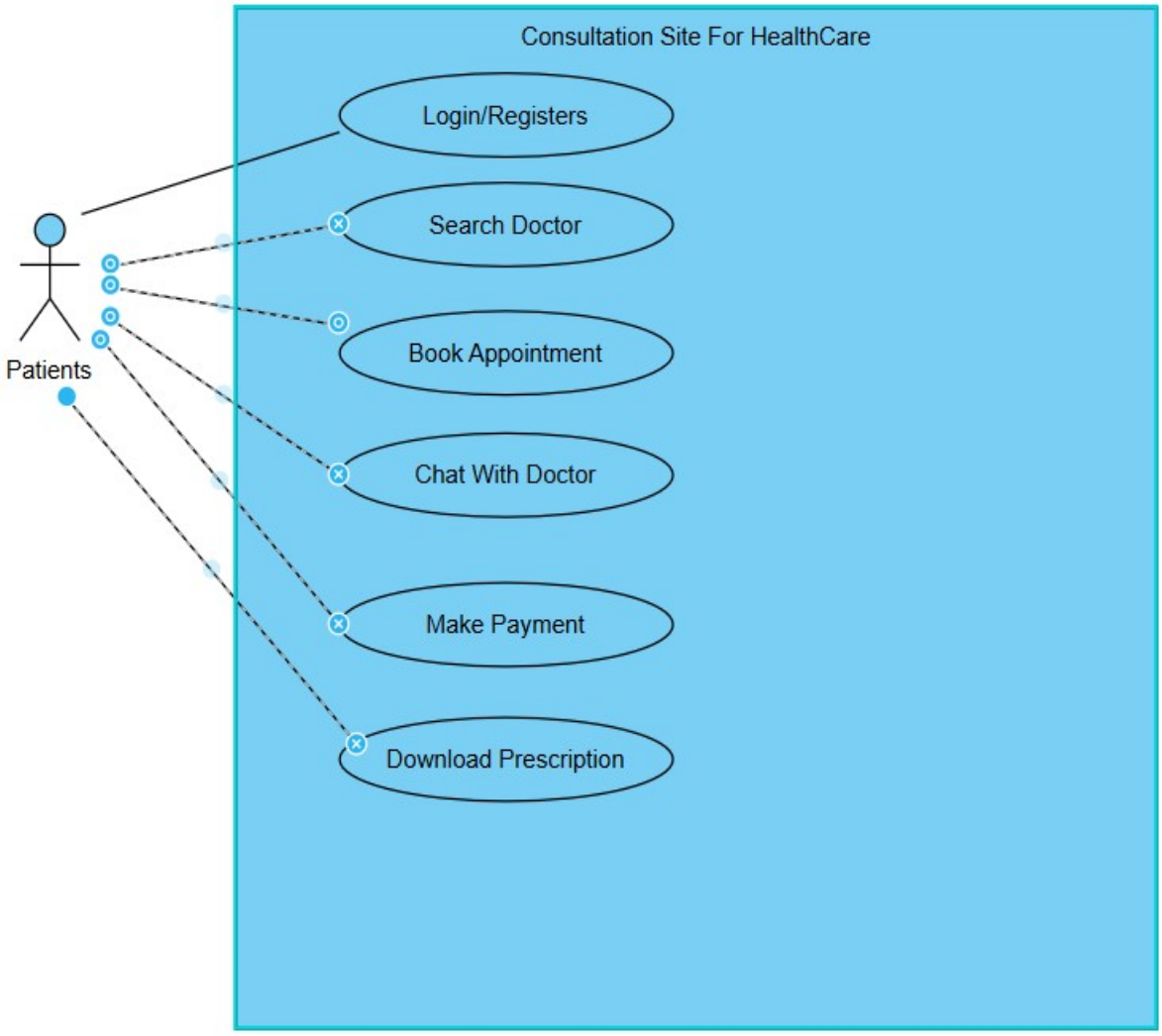


DFD Level
0

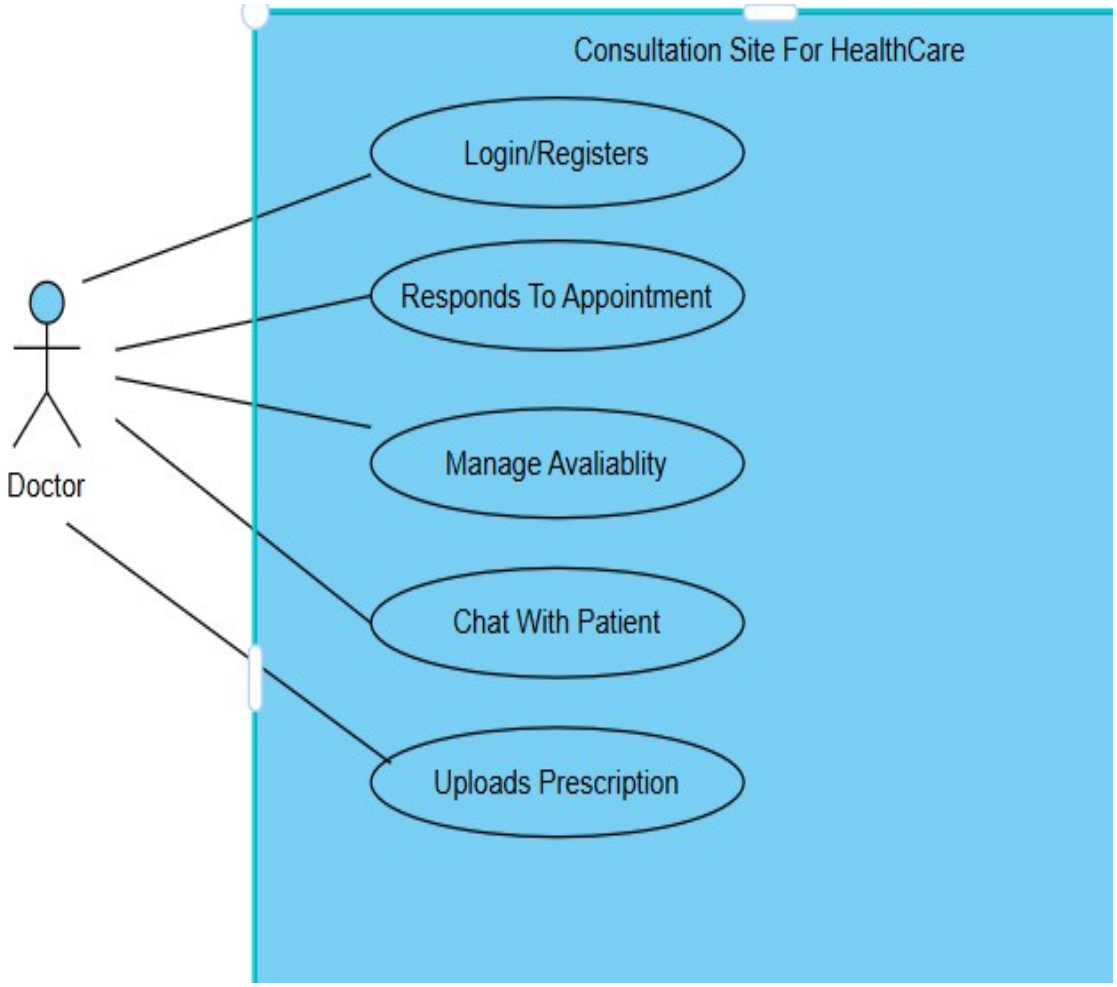
6.2 Entity Relationship Diagram



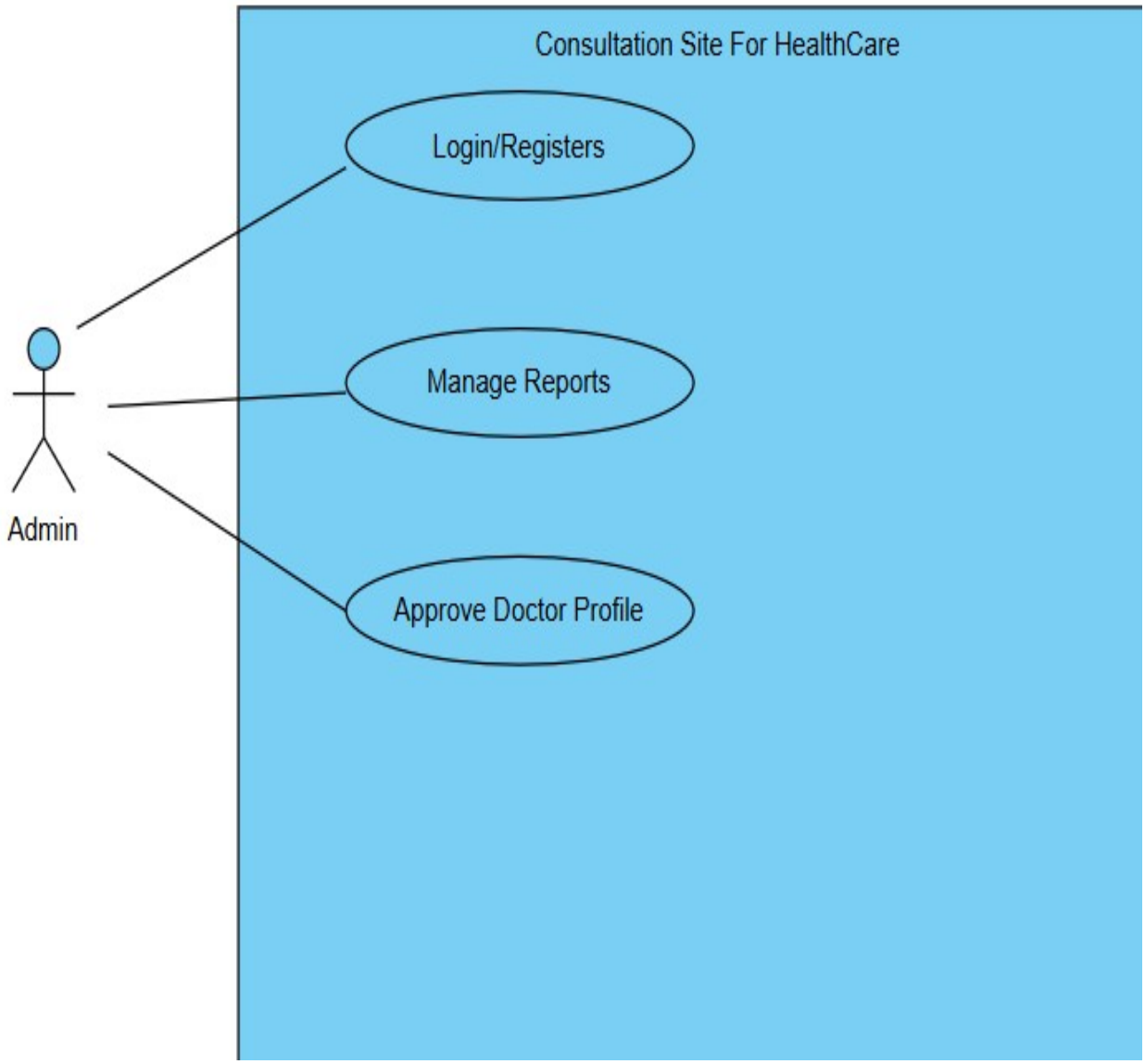
6.3.1 Use Case Diagram - Patient



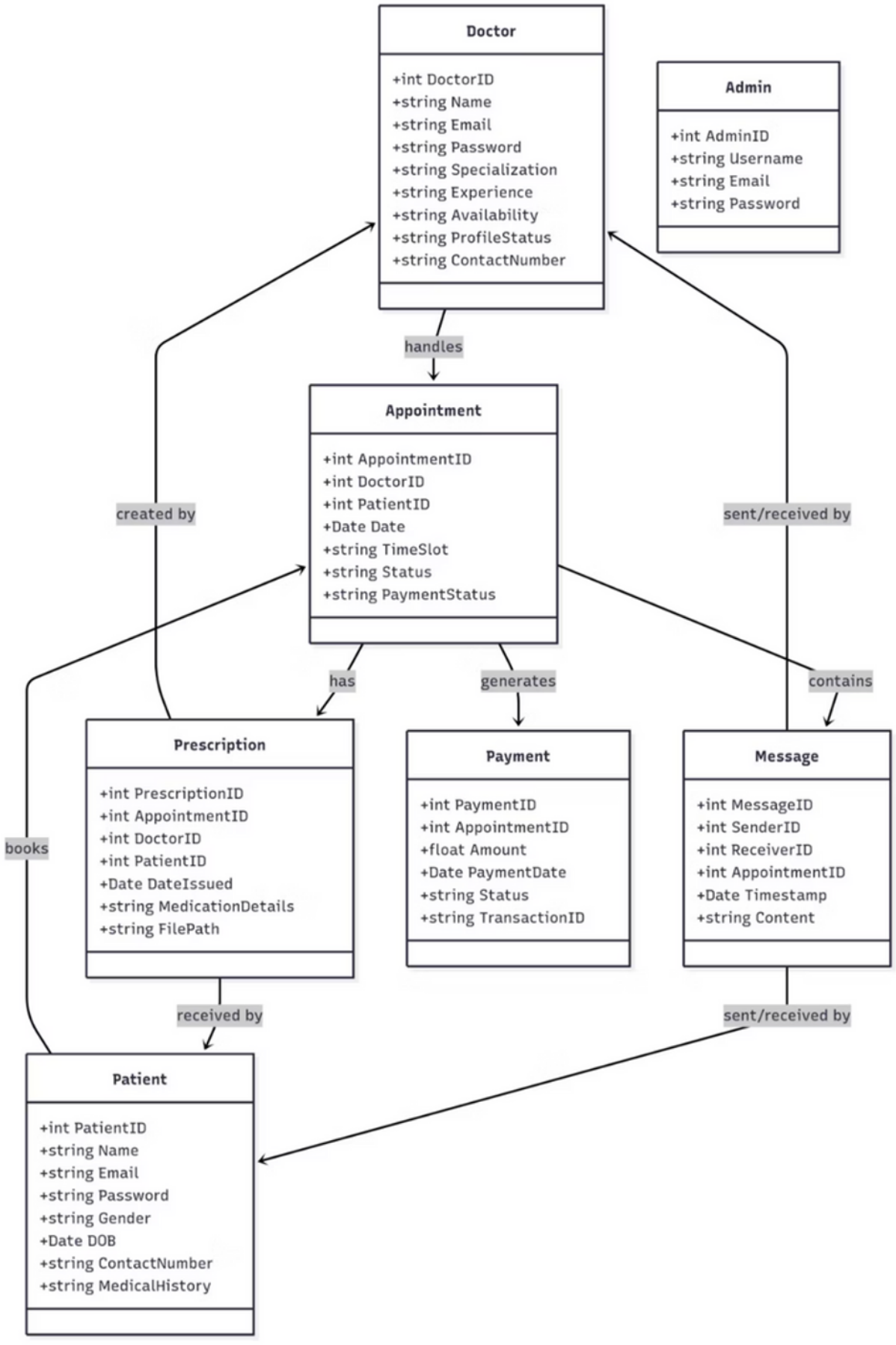
6.3.2 Use Case Diagram - Doctor



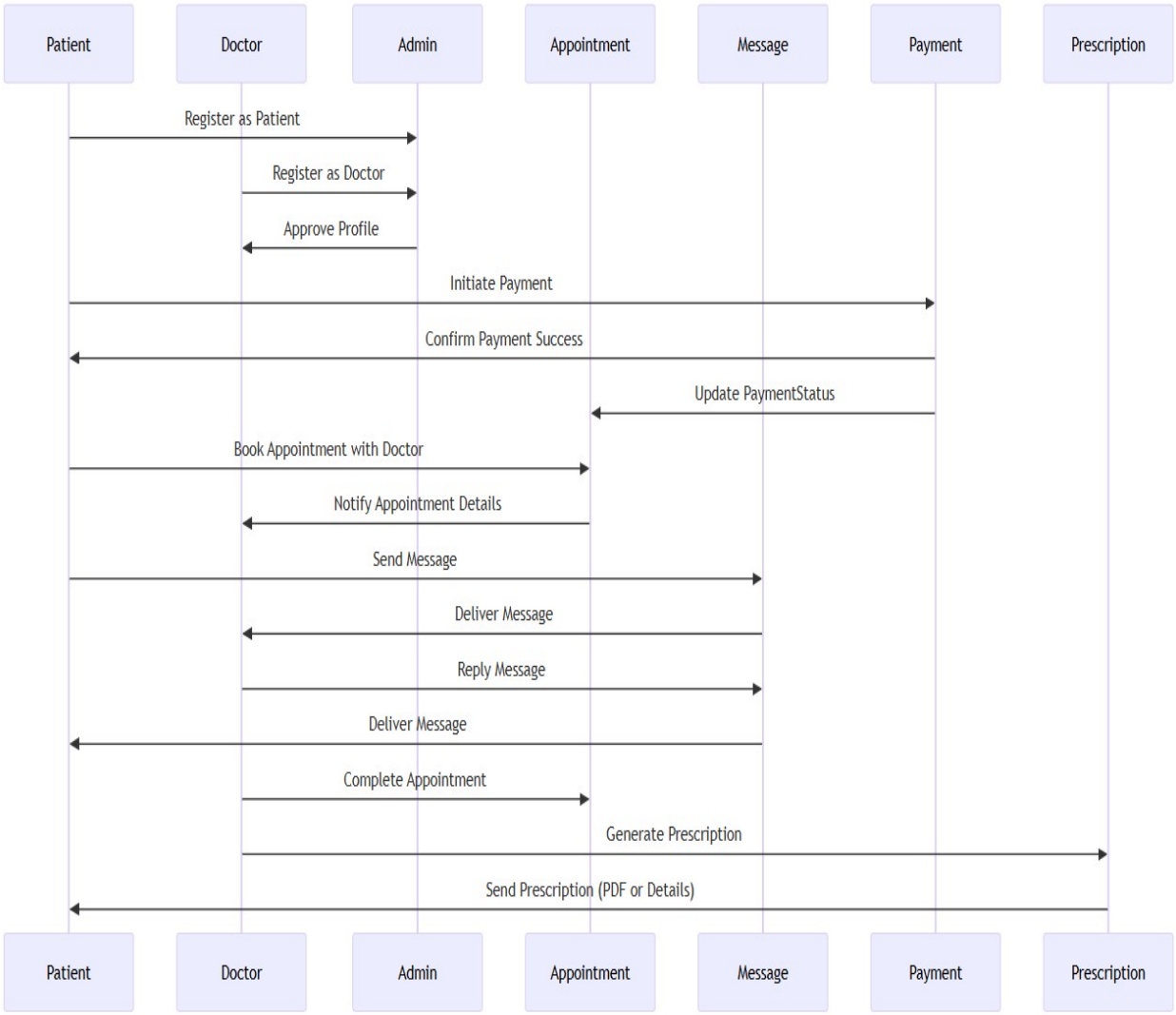
6.3.3 Use Case Diagram - Admin

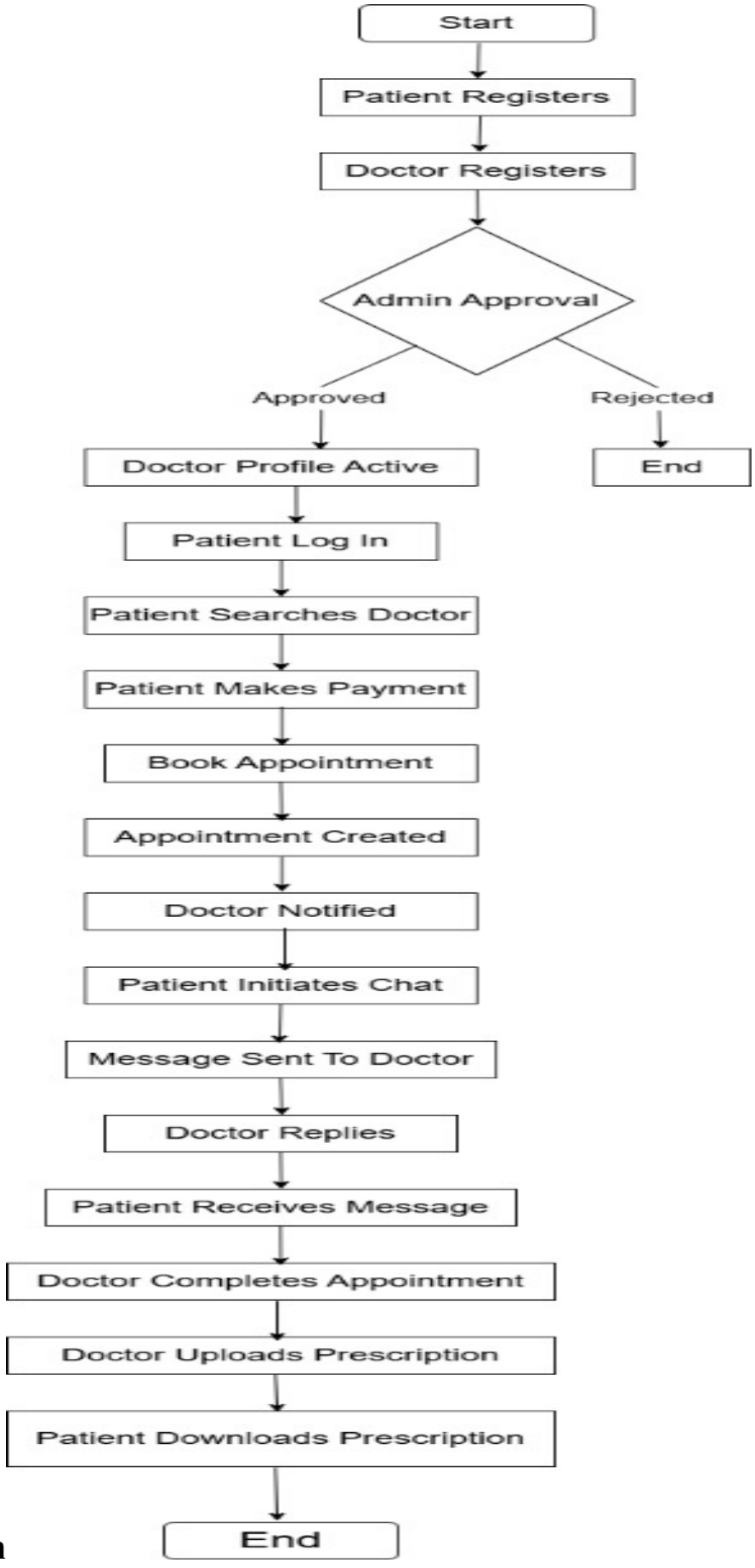


6.4 Class Diagram



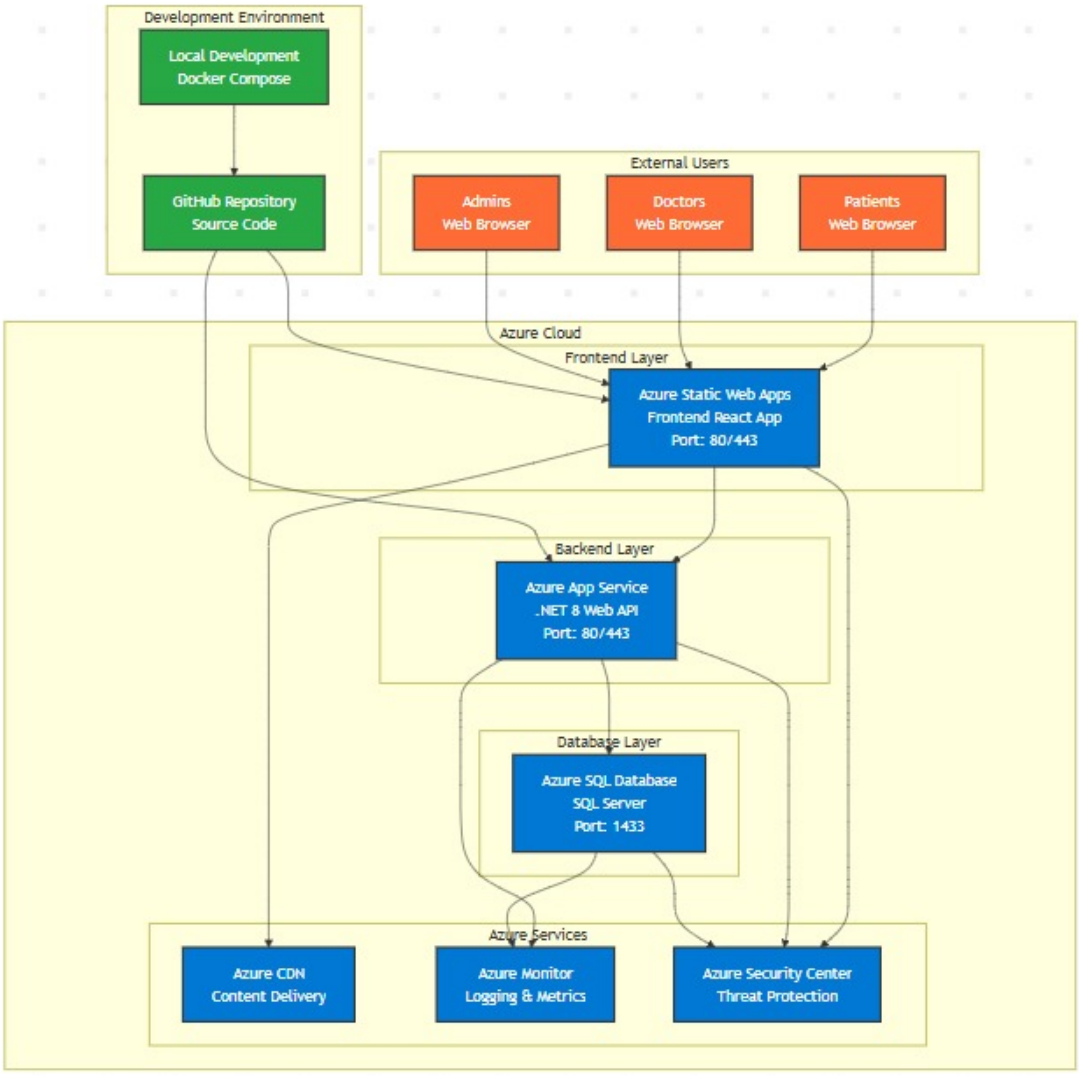
6.5 Sequence Diagram



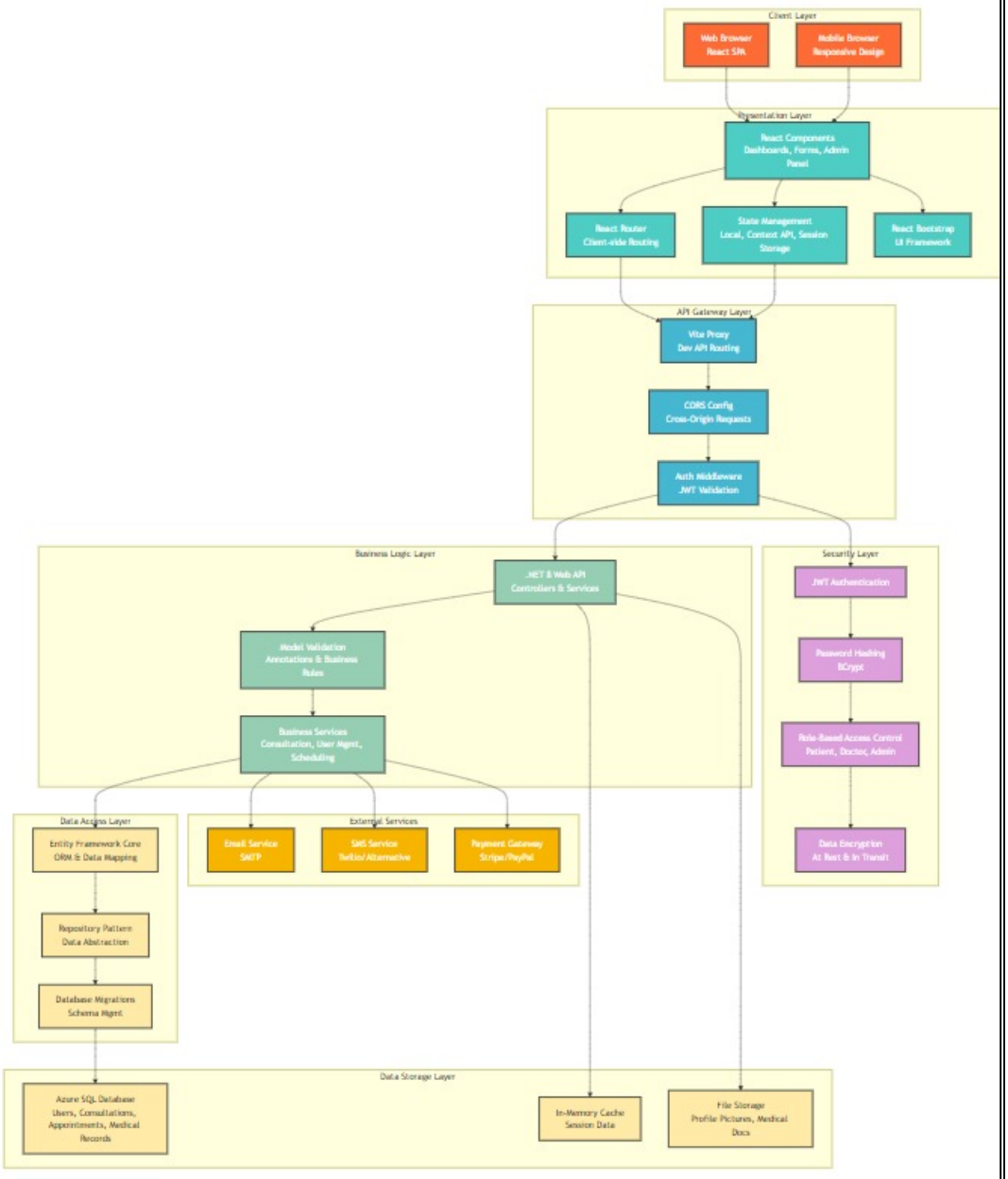


6.6Activity Diagram

6.7 Deployment Diagram



6.8 System Architecture

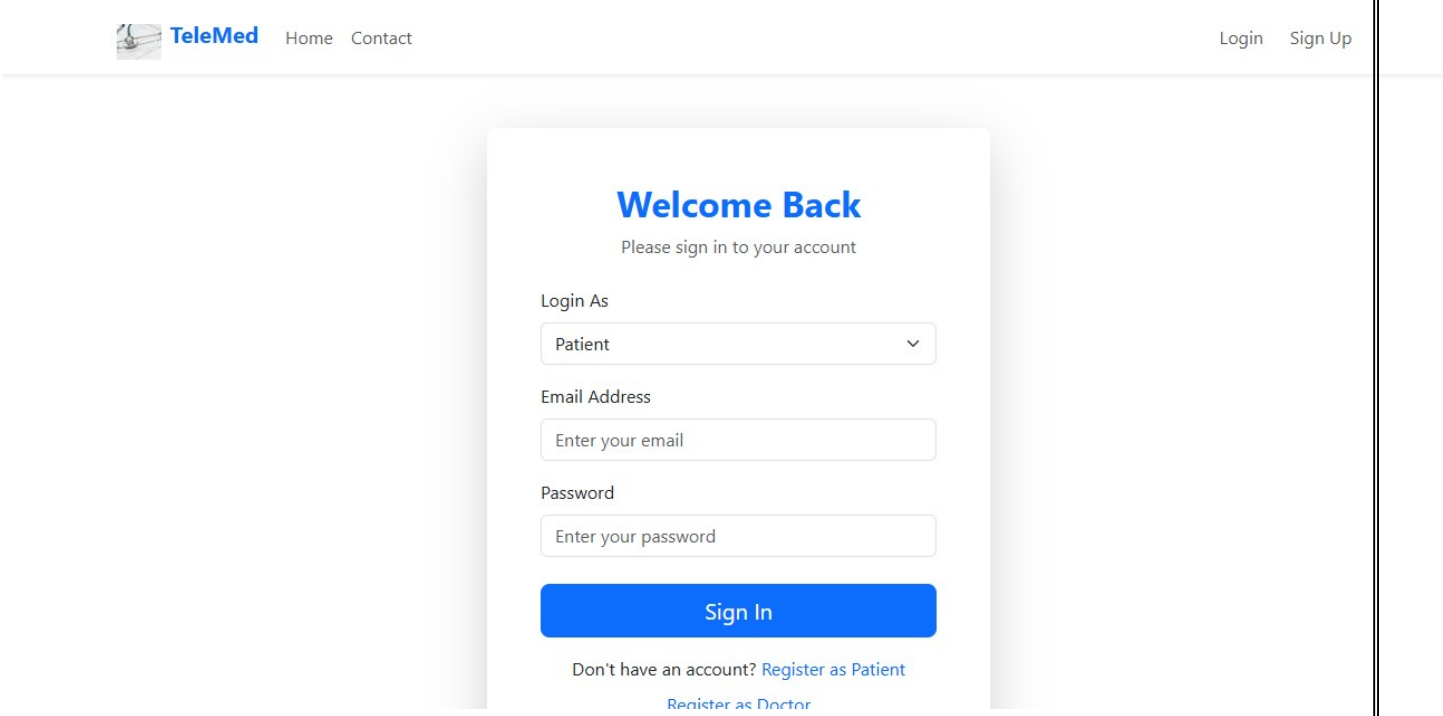


7 Test Cases

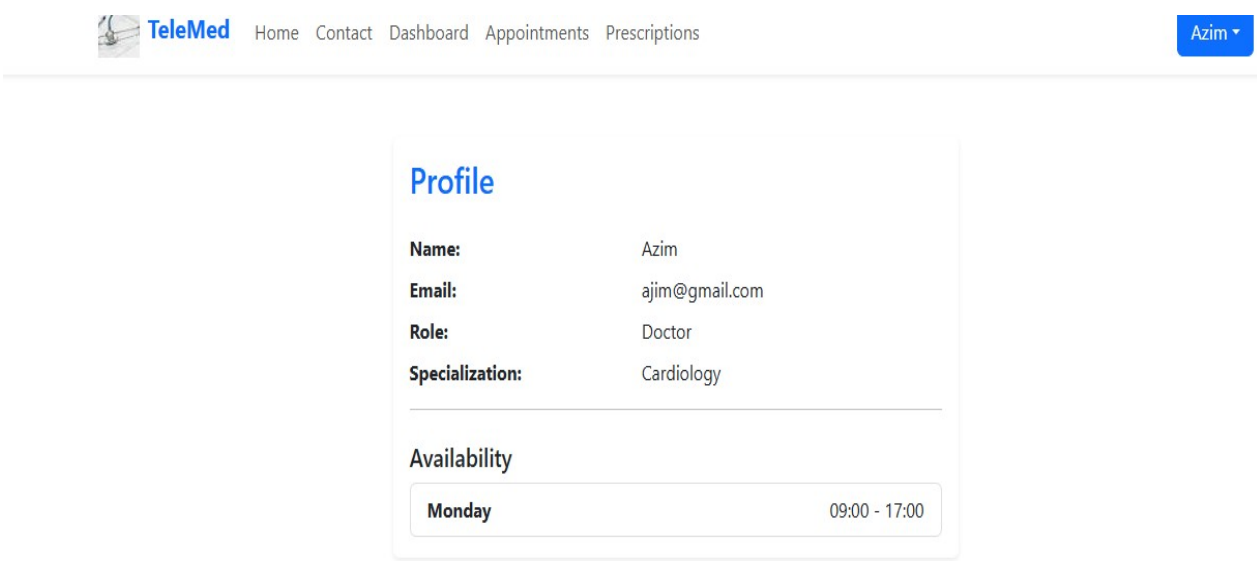
Test Case ID	Test Scenario	Test Steps	Expected Result	Actual Result	Status
TC 01	User Registration	Enter valid details (name, email, password) and submit	User account is created successfully	User account created successfully	Pass
TC 02	Login with valid credentials	Enter registered email and password	User is logged in and redirected to patient/doctor dashboard	User successfully logged in	Pass
TC 03	Login with invalid credentials	Enter incorrect email/password	Error message “Invalid credentials” displayed	Error message displayed	Pass
TC 04	Logout functionality	Click the "Logout" button after login	User is logged out and redirected to login page	User logged out and redirected to login page	Pass
TC 05	Doctor account verification	Doctor registers and uploads credentials	Admin verifies documents and activates account	Admin verified and activated	Pass
TC 06	Secure password storage (BCrypt)	Register new account and check database	Password stored in hashed format	Password stored in hashed format	Pass
TC 07	Forgotten password recovery	Click "Forgot Password", enter email, receive reset link	Password reset email sent and link allows secure reset	Password reset process worked	Pass
TC 08	Role-based access control	Login as doctor and patient separately	Doctor sees doctor dashboard; patient sees patient dashboard	Dashboards displayed correctly	Pass

8 Screenshots

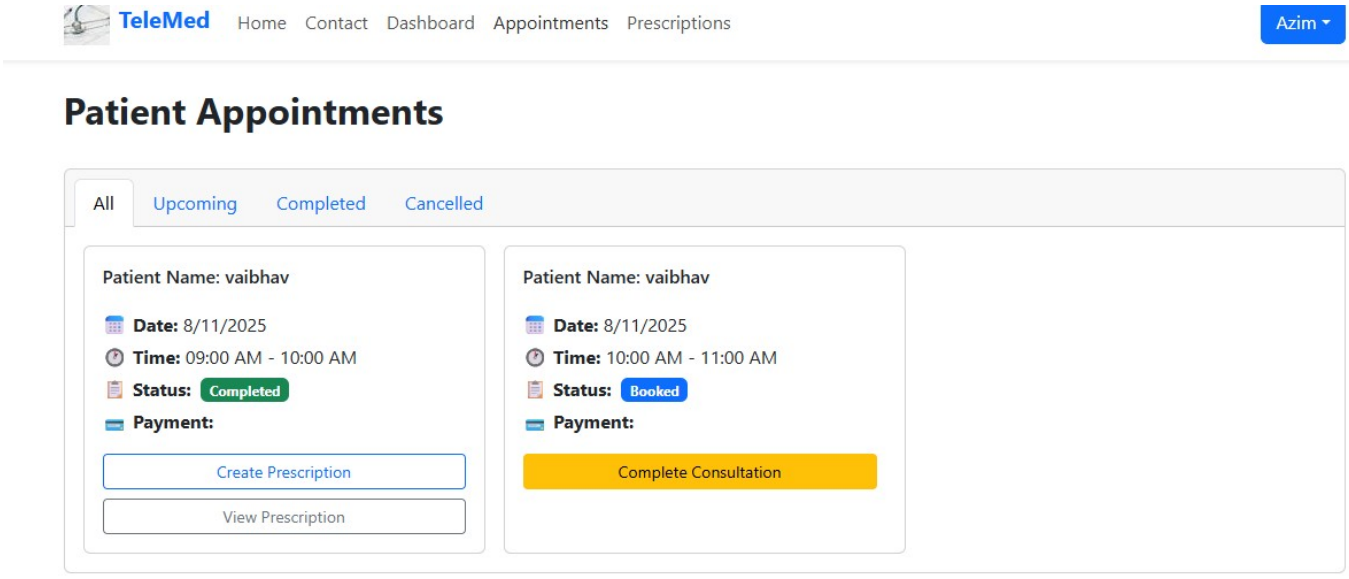
8.1 Patient Login



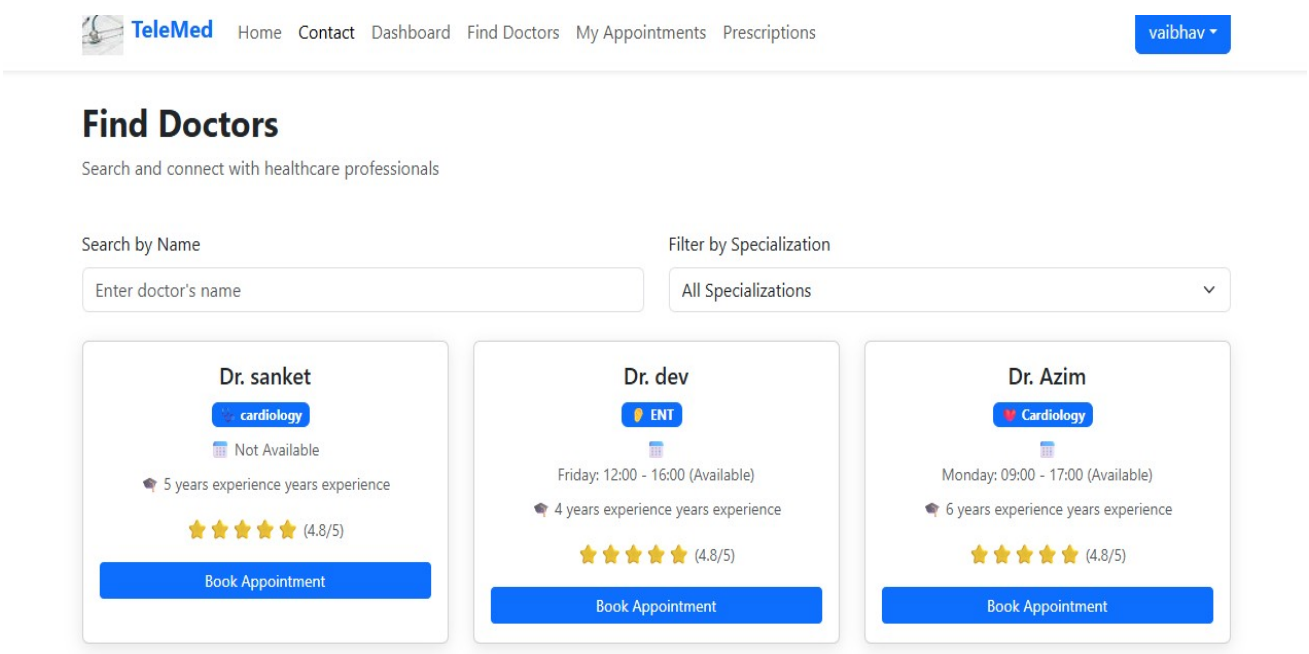
8.2Doctor Login Profile page



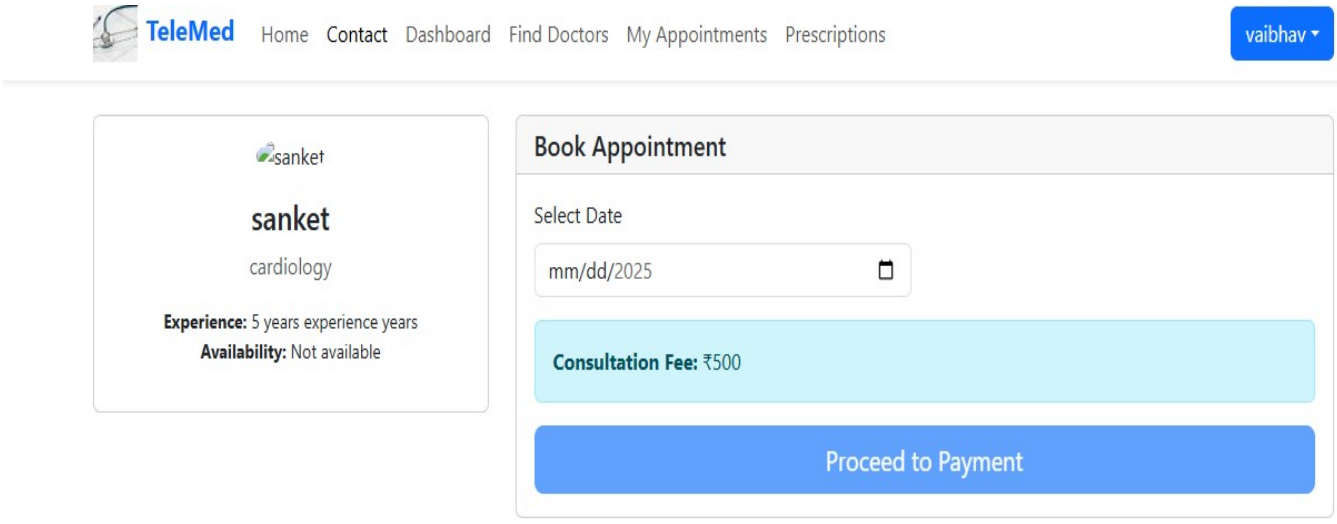
8.3 Doctor dashboard



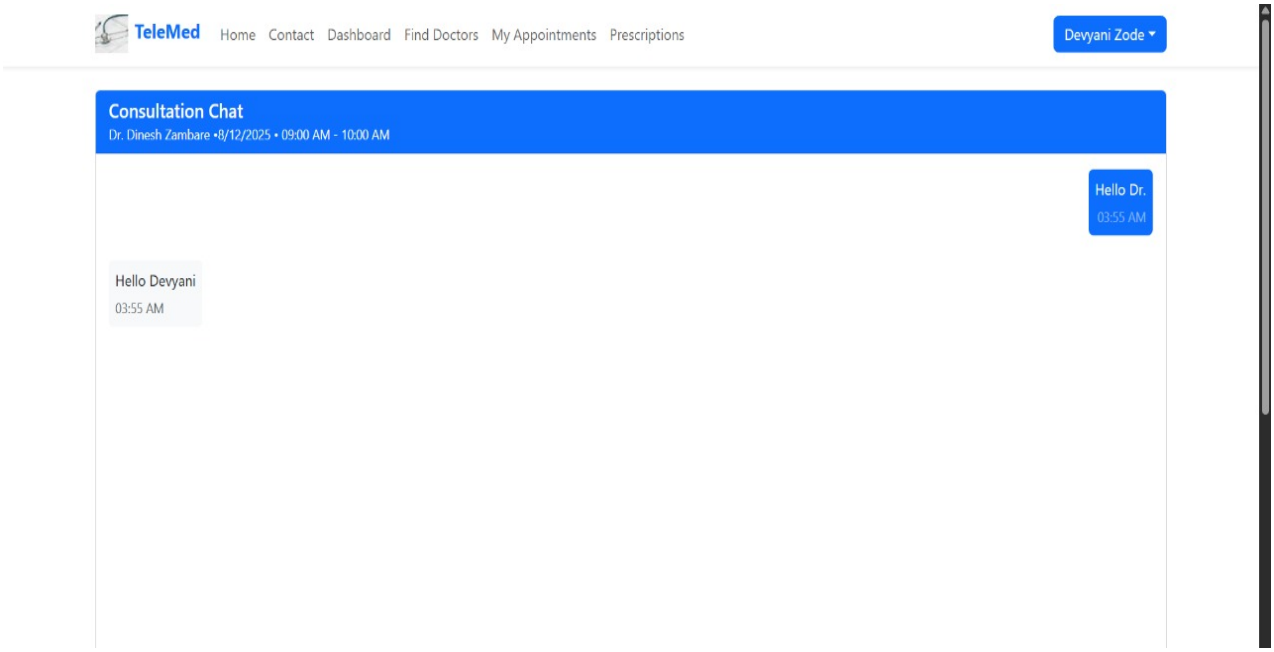
8.4 Patient Dashboard

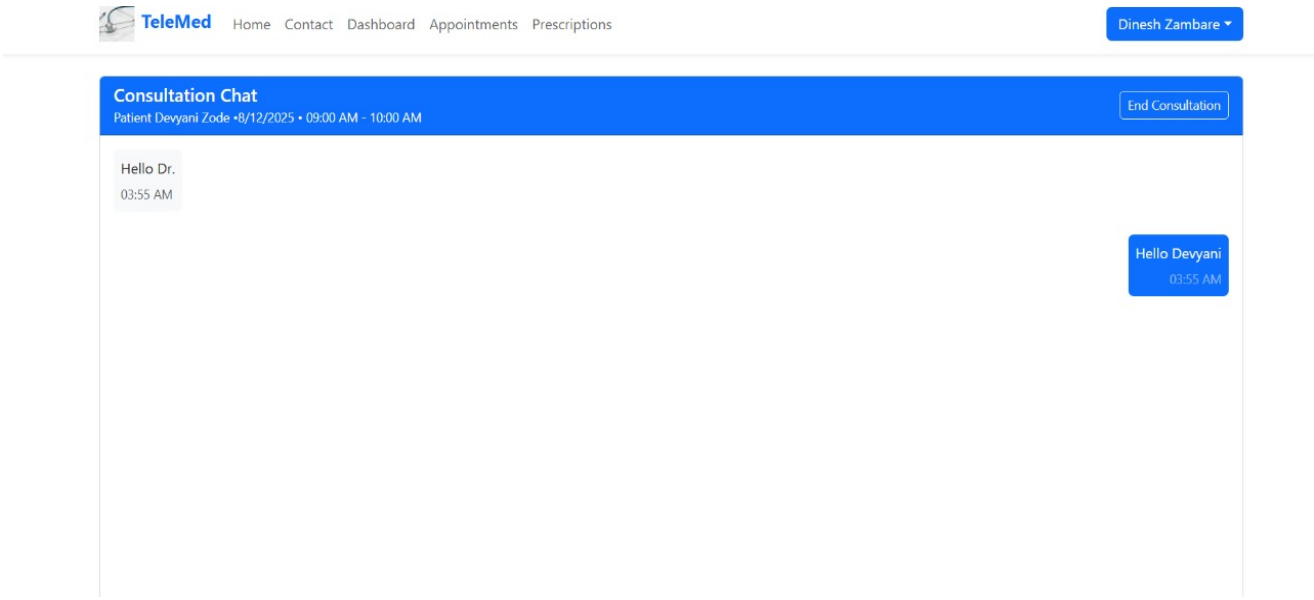


8.5 Book Appointment

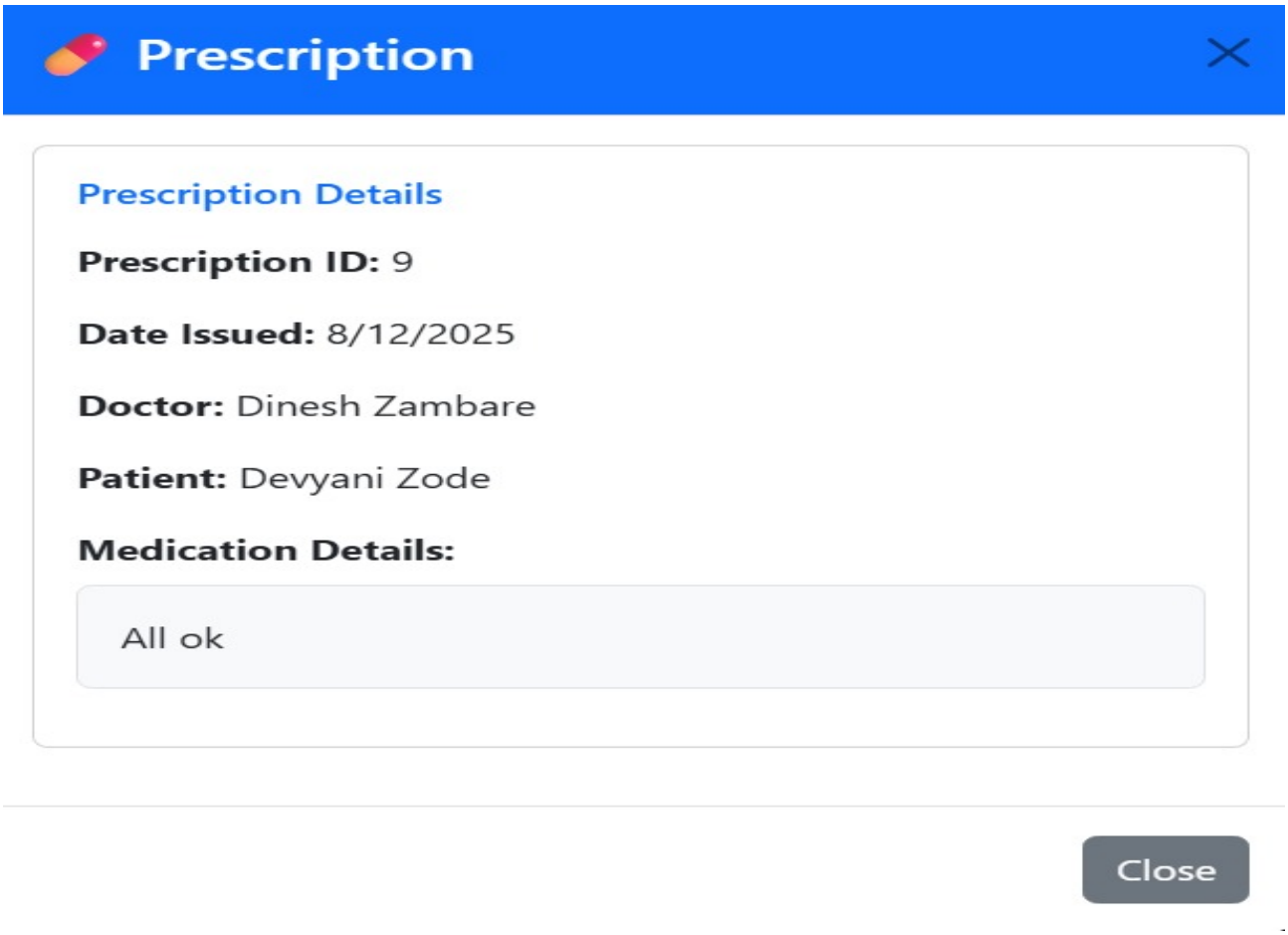


8.6 Doctor and patient Chat box





8.7 Prescription



9. REFERENCES

1. **Official Documentation**
    - ASP.NET Core Documentation – https://learn.microsoft.com/aspnet/core
    - React.js Documentation – https://react.dev
    - Microsoft SQL Server Documentation – https://learn.microsoft.com/sql
    - Tailwind CSS Documentation – https://tailwindcss.com/docs
2. **Industry Standards and Guidelines**
    - GDPR Compliance Guidelines – https://gdpr.eu
    - OWASP Security Guidelines – https://owasp.org
3. **API and Integration References**
    - Twilio SMS API – https://www.twilio.com/docs/sms
4. **Books and Publications**
    - "Pro ASP.NET Core MVC 6" by Adam Freeman
    - "Learning React" by Alex Banks and Eve Porcello
5. **Online Resources**
    - Stack Overflow – https://stackoverflow.com
    - GeeksforGeeks – https://www.geeksforgeeks.org
    - W3Schools – https://www.w3schools.com