B.Sc. (Hons) in Information Technology
IT2080 IT Project

Activity 01 - Requirements Analysis Activity

Project Group: C1-64
Sub-Group : IT_WE_3.2

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Part 01

1. Brainstorm and identify a real-world problem that needs an IT solution. This can be a business requirement, a requirement of an organization to improve the current process or an innovative idea that solves a current issue.

Identifying the problem

Based on the problem statement, we observed that although large and medium-scale public and private healthcare sectors in Sri Lanka have digitized workflows, the current business processes in small clinics and independent practices reveal significant inefficiencies in managing patient records and doctor-patient interactions.
Unlike hospitals that use complex Electronic Health Record (EHR) systems, doctors often rely on manual record-keeping, handwritten prescriptions, and direct communication with patients via personal phone numbers during private consultations. Therefore, it can be observed that although the concept of a "family doctor" has long been established, maintaining a patient record is not common practice, and when it is, it is often limited to manual notetaking and only done when necessary. As a result, parties often rely on memory and encounter inefficient workflows with the risk of potential medical errors.

Proposed solution

As discussed with the client, the proposed platform is simple, private, and tailor-made for doctors who don't require complex EHR systems designed for hospitals for every consultation. The application will give full control over patient data and other necessary features to streamline patient care without unnecessary complexity.

What makes this solution different from a traditional EHR systems?

The system we propose is tailored to doctors/private practitioners, and not to a hospital, clinic or any physical location. Any doctor may use this platform anywhere they chose to conduct consultations, with a patient record system for their own reference.
Unlike EHR systems, there will be no centralized health record system. The individual doctor will own the patient record, similar to manual note taking, and these records cannot be changed by any other practitioner.
Therefore**,** doctors will only manage their own patients, making the system more practical and efficient for their workflow in private practice. In addition, the digitization will decrease patient turn-around time, with features that integrates telemedicine, tracks treatment progress, manages prescriptions, and collects patient feedback to streamline doctor-patient interactions after initial consultation.

2. Identify the users of the product and the benefit that they will get by the software system.

1. Doctors

- Allows doctors to independently manage patient records. Doctors no longer need to manually search for patient information across various documents, as everything is centralized in the system.
- Doctors can quickly view trends, previous diagnoses, treatments, and medical events to make informed decisions during consultations.
- Less time will be taken for background checks after initial consultation.
- The chat box functionality removes the need for patients to reach out via personal mobile numbers unless urgent, while eliminating the need for the doctor to identify and recall the patient by memory.
- Telemedicine and document sharing reduces the risk of doctors missing important details being overlooked or unseen in personal messaged, as all notification are automatically organized in one place.
- Allows doctors to track satisfaction levels and identify areas for improvement.
- The system generates periodic reports on prescriptions, helping doctors track drug usage trends and diagnoses.
- Features such as progress tracking allow for better patient care while being helpful for clinical research.
- The system reduces reliance on physical storage and ensures that all relevant patient documents are linked to the correct patient records.

2. Patients

- Patients do not need to bring physical copies of records of previous consultations with the same doctor.
- Patients can upload and share test results, scans, and medical documents to the doctor using the platform's document sharing.
- Patients have the option to contact the doctor through the chat to make consultations based on progress.
- Patients can submit feedback about their experience.
- Chat box could also be beneficial for clarifications after consultations.
- Patients can use audio consultations and avoid hospital charges and save time.
- Through telemedicine, patients can avoid unnecessary hospital visits for follow-up consultations, such as minor issues or routine check-ups.

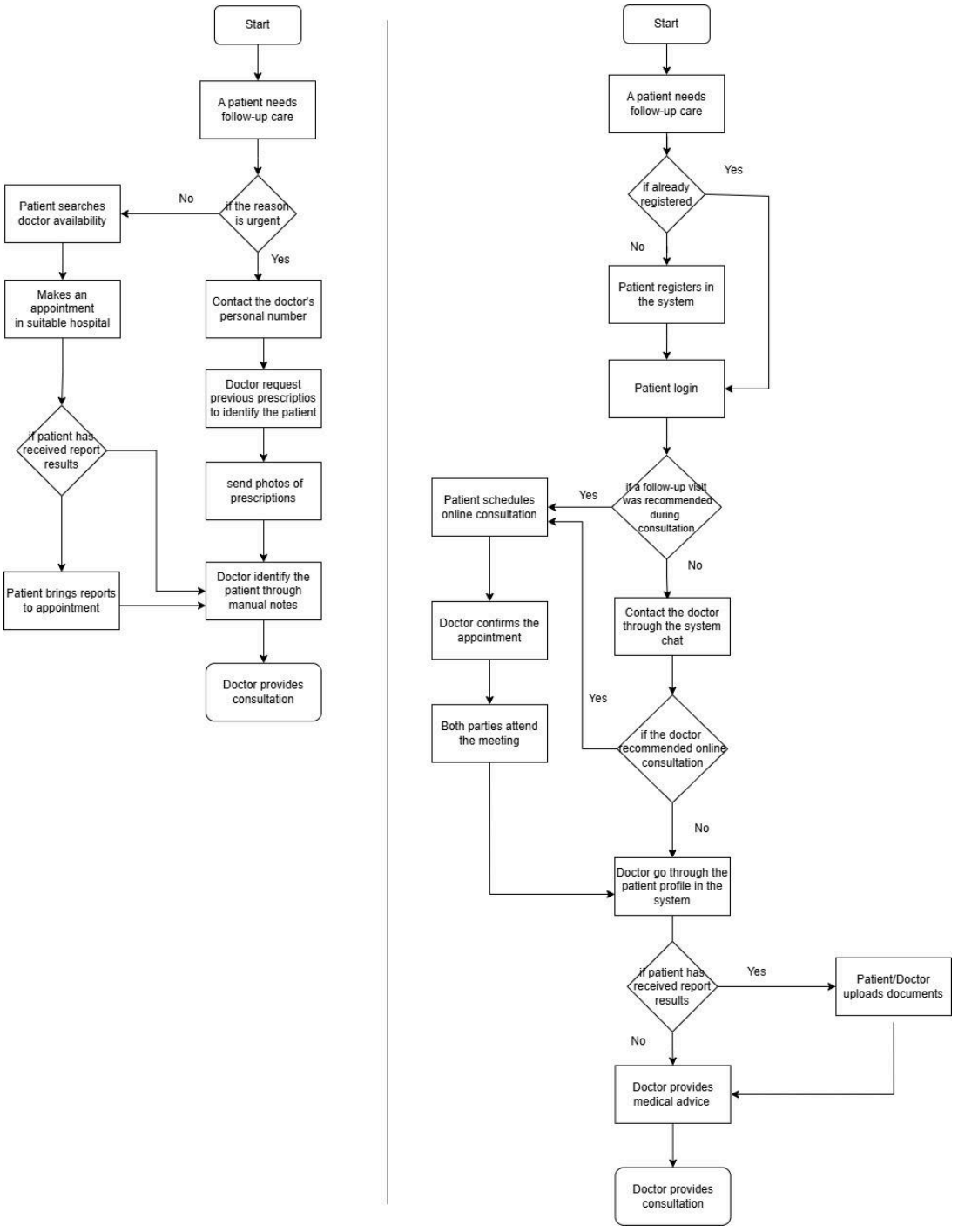
3. Authorized medical staff

- Maintaining patient records, documents, and appointment scheduling through the system significantly reduces the administrative workload for staff. This allows them to focus on more critical tasks, improving overall clinic operations.

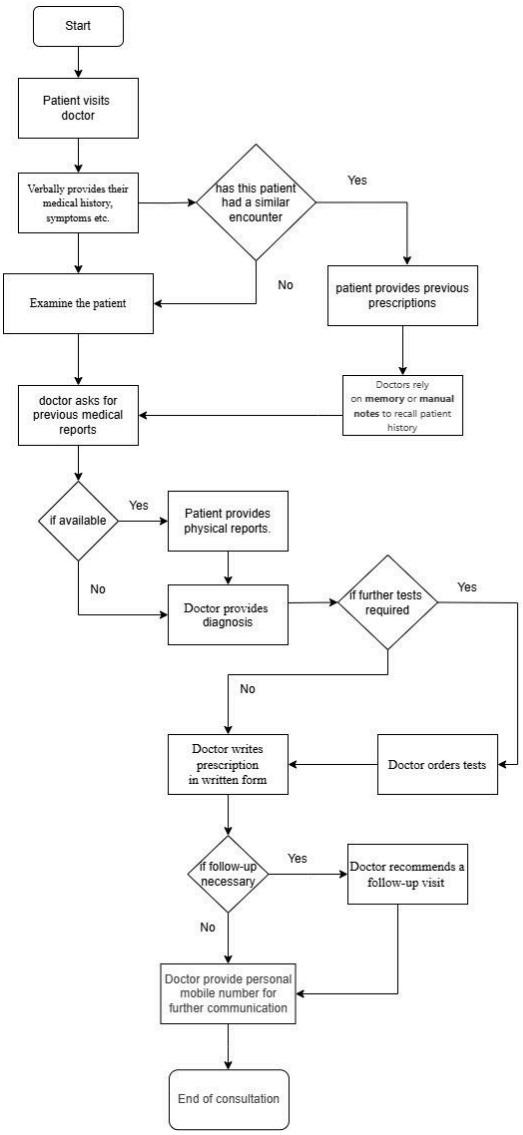
4. Administrator

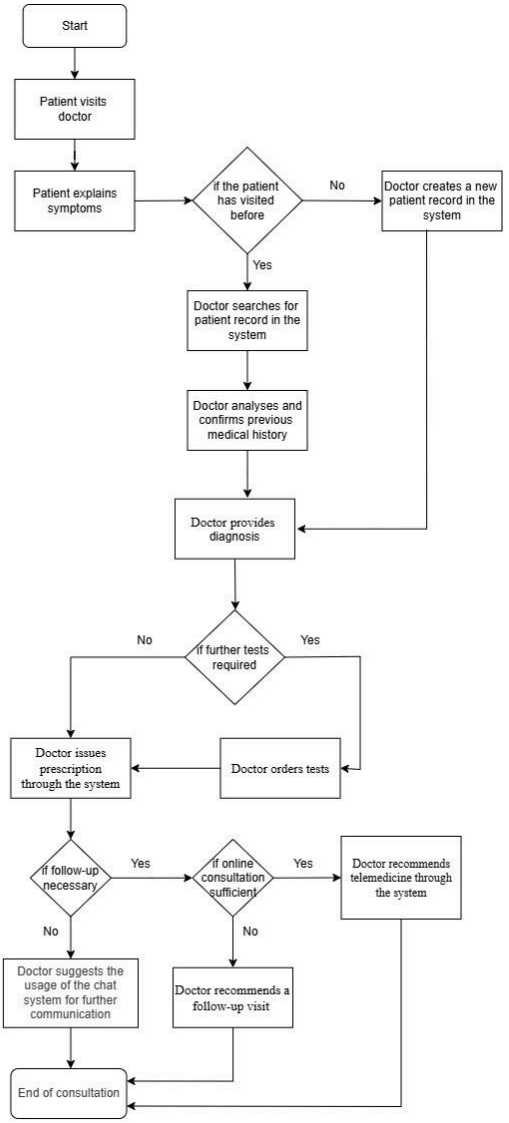
- The system automates subscription tracking, renewal reminders, and payment processing, reducing the manual effort required to manage doctor subscriptions and billing.
- System can generate reports on total revenue, active subscriptions, and payment history, for better financial planning and decision-making.

3. Sketch a diagram to show the current business process and the proposed improvements Telemedicine + chat-box (existing system(left) in comparison to new system(right)) .

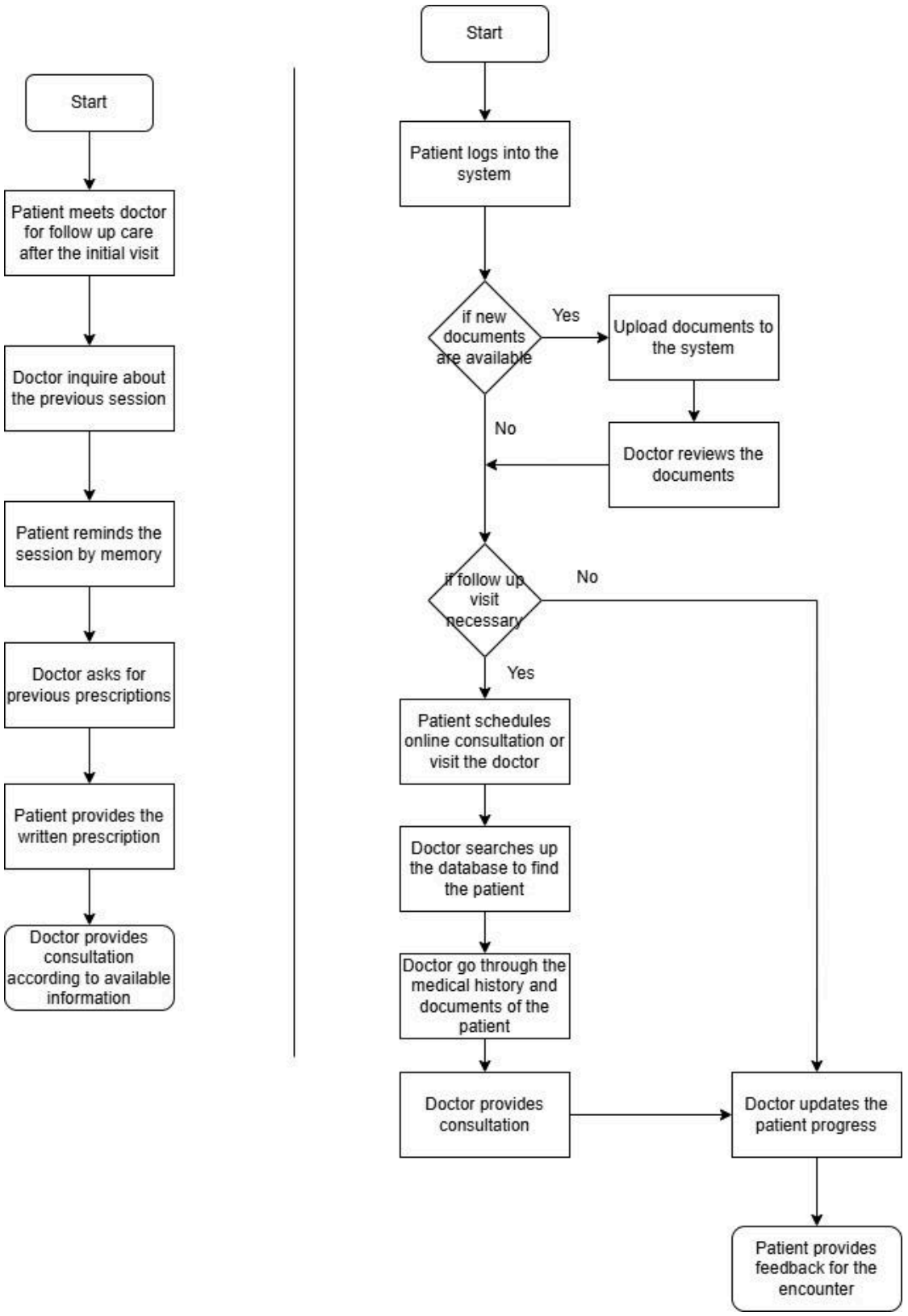


Independent patient record management & Prescription management with external drug database integration (existing system(left) in comparison to new system(right))

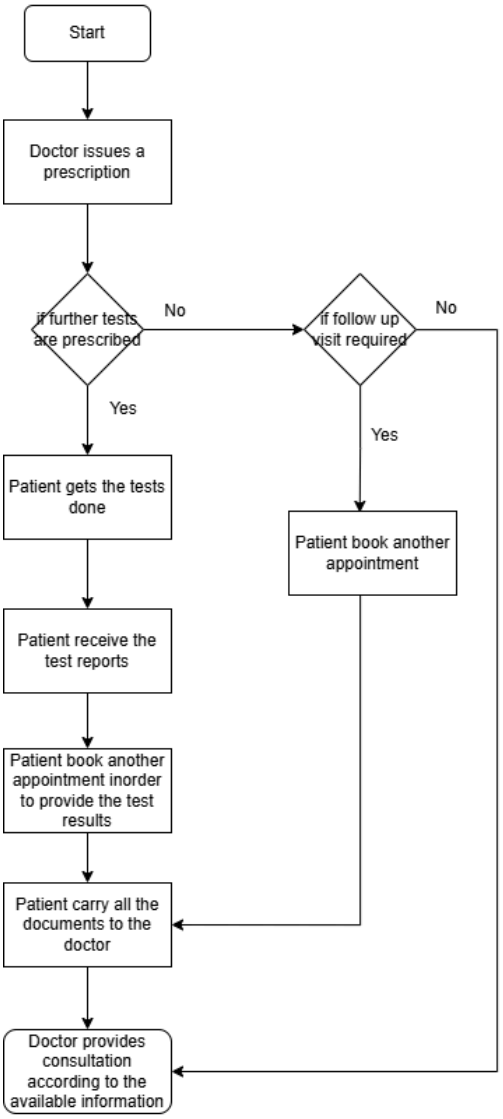


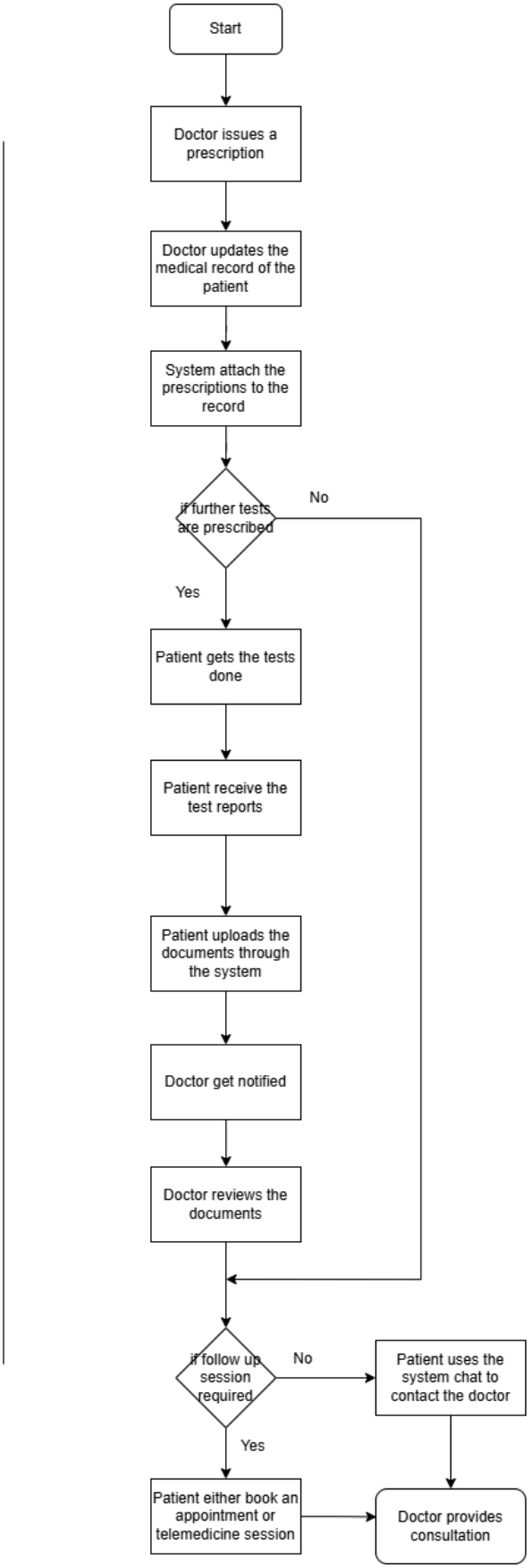


Feedback management and Progress tracking (existing system(left) in comparison to new system(right))



Document management and sharing.(existing system(left) in comparison to new system(right))





4. List the main features of the product that you are planning to develop.

Features for streamlining doctor-patient interactions

I. Independent patient record management.
II. Prescription management with external drug database integration.
III. Telemedicine (including online consultation management and a chat-box).
IV. Document management and sharing.
V. Feedback management and Progress tracking.

Administrative features

VI. User management.
VII. Subscription management and billing.

5. List of user requirements for the features you have identified.

Feature: Patient record management
Users: Doctor, Authorized staff
User Requirements:

- Doctors must be able to create, view**,** update and delete patient records.
- Patient record system must operate independently for each doctor.
- Only one doctor, and other roles given permission by the doctor should be able to view the record.
- Patients must not be able to view the record unless given permission by the doctor.
- Only the doctor who created the patient record can directly update medical-related fields within that record.
- Updates made to the record by other authorized personal must be flagged for approval by the doctor who created the record.
- Doctors can generate reports for a single patient record including entire patient medical and consultation history.
- Doctor must be able to search for a patient record using any combination of patient's name.
- Search functionality must have filter options to filter by fields such as gender, age, etc.
- Doctor must be able to sort or search a patient's encounters within the record by date

Feature: Prescription management
Users: Doctor, Patient
User Requirements:

- Doctor must be able to create, view, update, delete prescriptions.
- Drug name suggestions must be implemented for standardization.
- A Prescription should be integrated with the patient's record for each encounter.
- Patients should have the ability **to** view their prescriptions through their account dashboard.
- The system must be able to generate a prescription document for printing**.**
- The system should be able to generate a report based on prescriptions issued periodically to track trends in drug usage and related diagnoses**.**
- Doctor must be able to search or filter a prescription using patient's name, diagnosis or date.
- Search functionality should allow to sort prescriptions by date of issue.

Feature: Telemedicine management
Users: Doctor, Patient
User Requirements:

- Doctor must be able to enter and update his availability and duration of online consultations.
- System must automatically generate the appointment slots for a given period.
- Patient or Doctor may cancel appointments.
- System must notify the patients of any cancellations, or updates.
- Doctor must be shown the pending list of appointments in correct order.
- When the appointment is active the system must show the patient record corresponding to the patient's account to the doctor.
- System must generate a meeting link for each appointment and notify the doctor and patient.
- Patient should be able to access a chat box with the doctor if they had a recent encounter.
- Chat box alerts should be notified in the system.

Feature: Document management
Users: Doctor, Admin, Patient
User Requirements:

- Doctor must be able to upload, view, update, delete external medical documents of each patient.
- Patients much be able to upload or share test reports, scans, and other documents to the doctor and vice versa.
- Doctor must be notified when patient submits a document.
- Each external document must be linked to the patient's record.
- System must provide functionality to search and sort any document based on date**,** type of report, or patient name.
- System generated reports can be saved by the doctor and admin.

Feature: Feedback management and Progress tracking
Users: Doctor, Patient
User Requirements:

- Patient must be able to submit feedback of the consultation.
- System should notify the patient of a feedback form when the patient's encounter has been added by the doctor.
- Patient must be able update or delete feedback submitted by them within a specific timeframe.
- Patient should only be able to view their own feedback.
- Feedback received by the doctor must only be seen by the Doctor.
- System must be able to generate reports based of feedback to analyse user satisfaction.
- Doctors may flag encounters of the same condition for further patient satisfaction analysis.
- A report can be generated to view progress of the patient based on the flagged encounters.
- A doctor can search feedback received based on keywords and sort by date.

Subscription and Billing Management
Users: Admin
User Requirements:

- The admin can create, update, and manage the subscription plan for the platform.
- Doctors must subscribe and complete payment to access the platform's services.
- Patients do not need to pay for any services and can use the platform for free.
- The system must track subscription status and notify doctors before their plan expires.
- The admin can view and manage active and expired subscriptions.
- The system should restrict access to services for doctors with expired subscriptions.
- Payment confirmations and invoices accessible by the doctor and admin.
- Admin can generate reports on total revenue, active subscriptions, and payment history.
- The system should allow searching and filtering of invoices based on date, doctor name, and payment status.

User Management
Users: Admin
User Requirements:

- Patients and Doctors must be able to sign up and log in automatically without manual approval.
- Patients and doctors must be able to update their personal details (e.g., contact information).
- Administrators must be able to remove doctors if necessary (e.g., violations).
- Doctors must be notified before account removal and provided a grace period for resolution.
- The system should allow searching and filtering of doctors.
- Must display total active and inactive doctor accounts with subscription statuses.
- Provide active user statistics, including doctor and patient engagement.

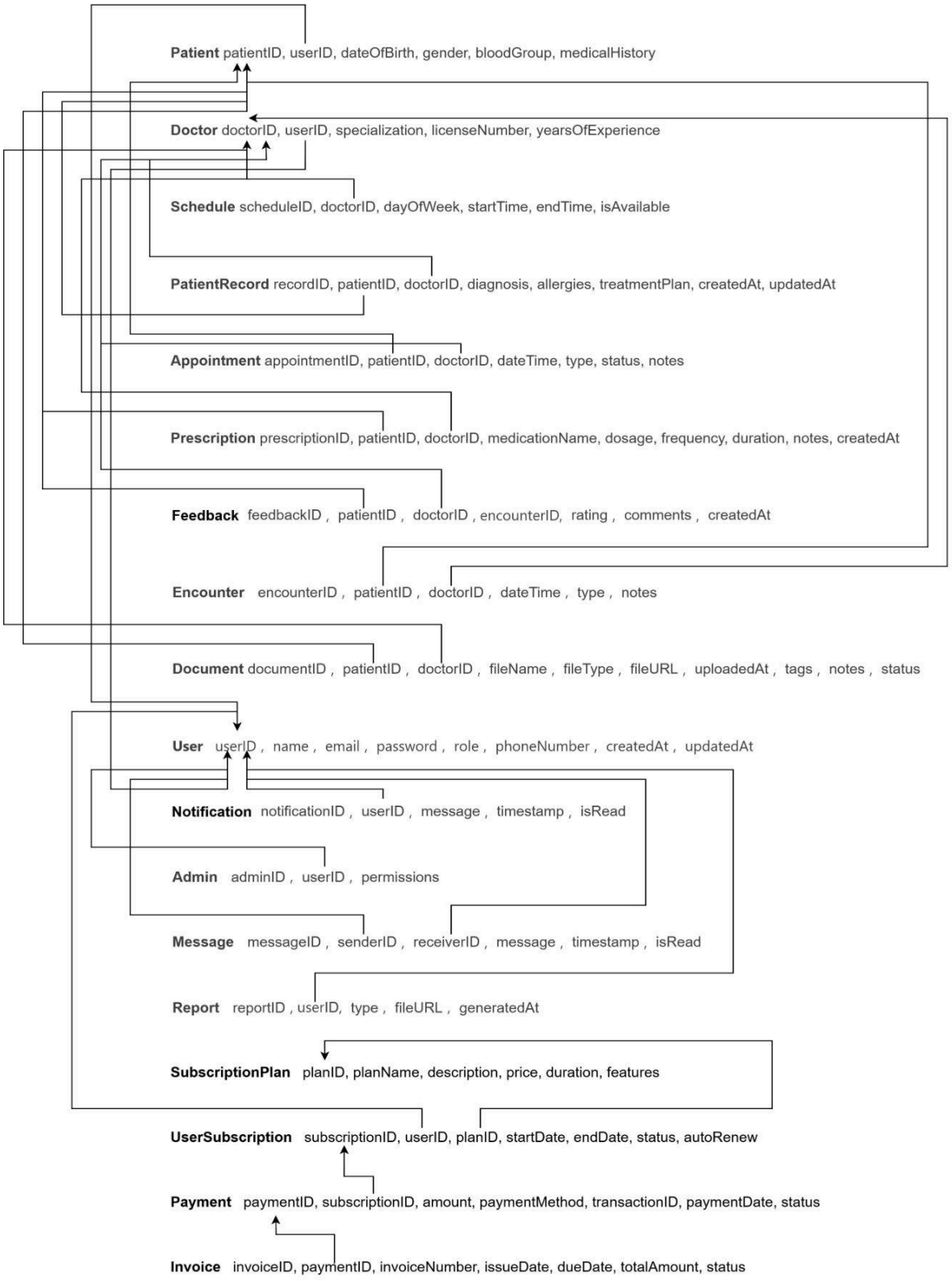
6. Suggest a suitable name for the project

HealthFlow - Clinical Workflow Management System

Part 02

Sketch the GUIs and database tables to demonstrate your understanding.

Database Tables


Patient patientID, userID, dateOfBirth, gender, bloodGroup, medicalHistory
Doctor doctorID, userID, specialization, licenseNumber, yearsOfExperience
Schedule scheduleID, doctorID, dayOfWeek, startTime, endTime, isAvailable
PatientRecord recordID, patientID, doctorID, diagnosis, allergies, treatmentPlan, createdAt, updatedAt
Appointment appointmentID, patientID, doctorID, dateTime, type, status, notes
Prescription prescriptionID, patientID, doctorID, medicationName, dosage, frequency, duration, notes, createdAt
Feedback feedbackID , patientID , doctorID , encounterID, rating , comments , createdAt
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Document documentID , patientID , doctorID , fileName , fileType , fileURL , uploadedAt , tags , notes , status
User userID , name , email , password , role , phoneNumber , createdAt , updatedAt
Notification notificationID , userID , message , timestamp , isRead
Admin adminID , userID , permissions
Message messageID , senderID , receiverID , message , timestamp , isRead
Report reportID , userID, type , fileURL , generatedAt
SubscriptionPlan planID, planName, description, price, duration, features
UserSubscription subscriptionID, userID, planID, startDate, endDate, status, autoRenew
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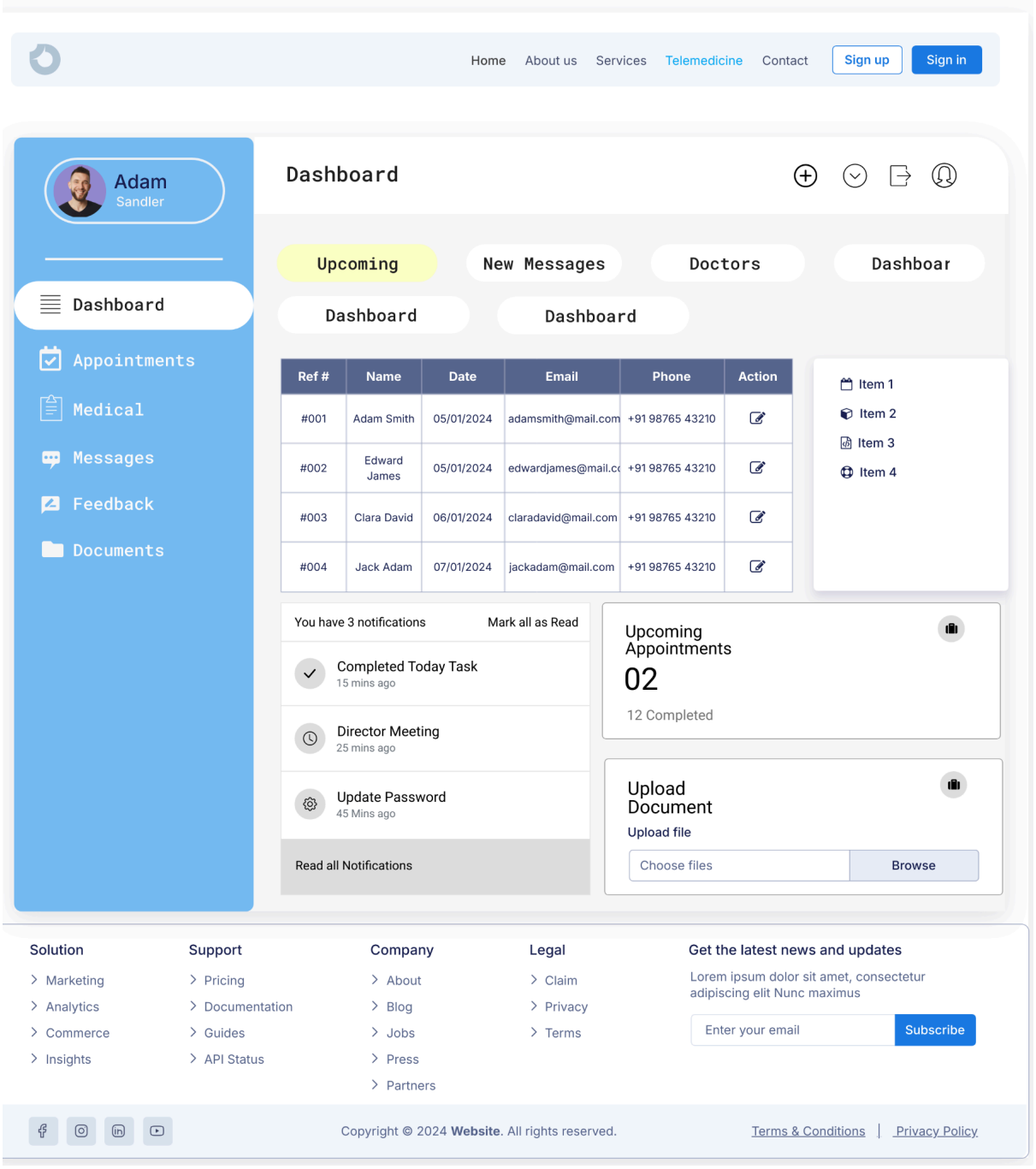
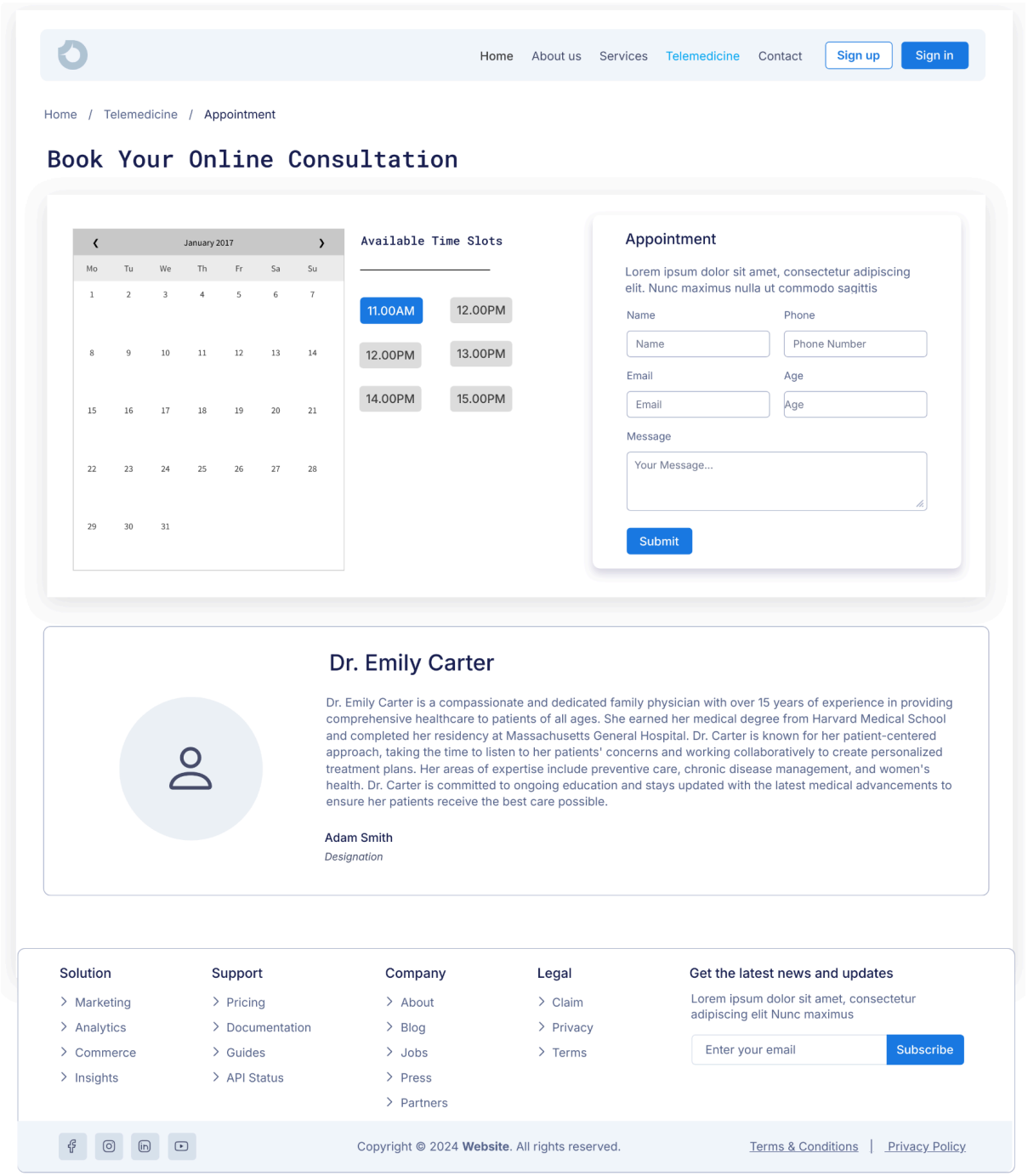
Invoice invoiceID, paymentID, invoiceNumber, issueDate, dueDate, totalAmount, status

Graphical User Interfaces

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Dr. Emily Carter
Dr. Emily Carter is a compassionate and dedicated family physician with over 15 years of experience in providing comprehensive healthcare to patients of all ages. She earned her medical degree from Harvard Medical School and completed her residency at Massachusetts General Hospital. Dr. Carter is known for her patient-centered approach, taking the time to listen to her patients' concerns and working collaboratively to create personalized treatment plans. Her areas of expertise include preventive care, chronic disease management, and women's health. Dr. Carter is committed to ongoing education and stays updated with the latest medical advancements to ensure her patients receive the best care possible.
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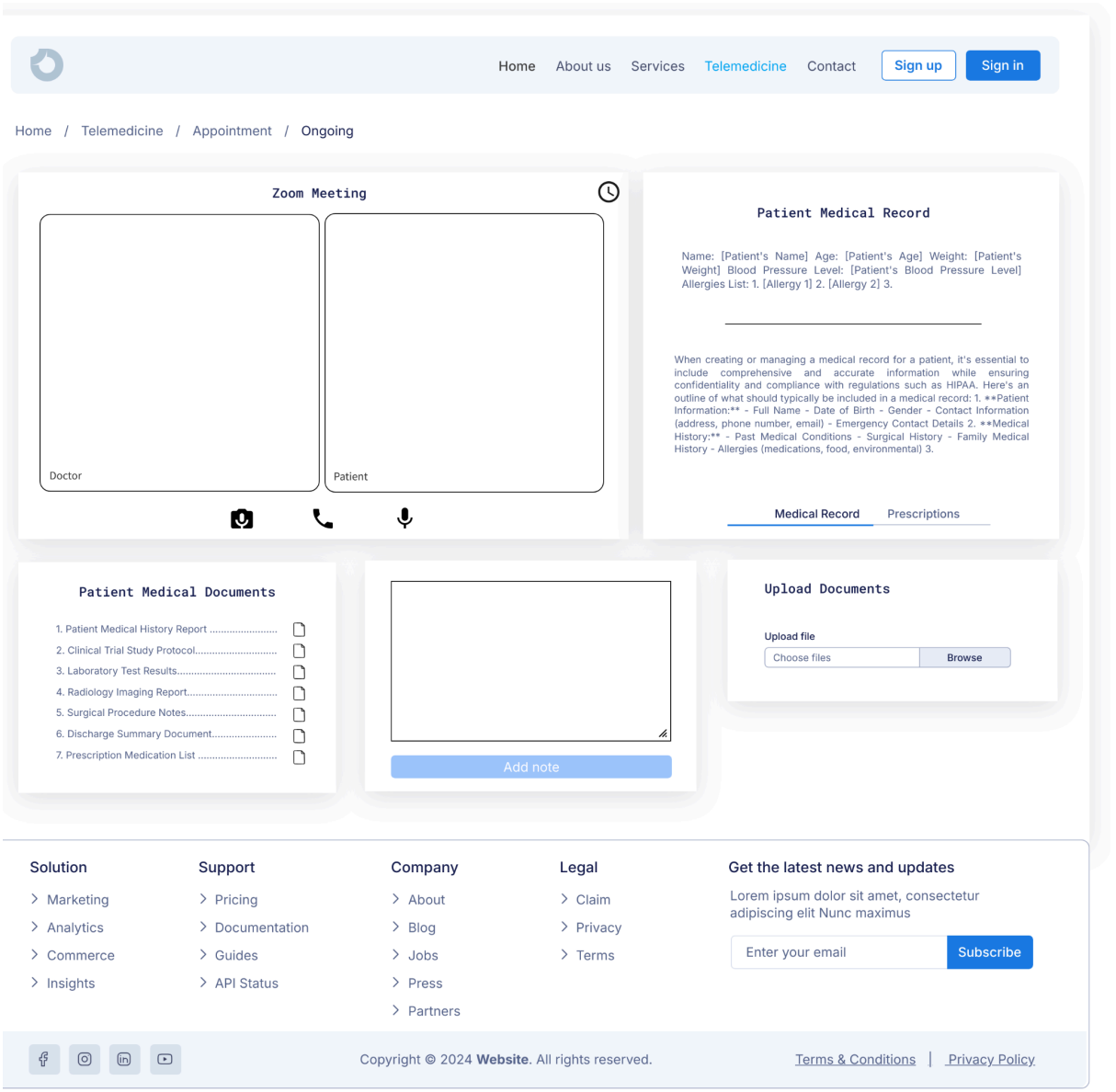
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Name: [Patient's Name] Age: [Patient's Age] Weight: [Patient's Weight] Blood Pressure Level: [Patient's Blood Pressure Level] Allergies List: 1. [Allergy 1] 2. [Allergy 2] 3.
When creating or managing a medical record for a patient, it's essential to include comprehensive and accurate information while ensuring confidentiality and compliance with regulations such as HIPAA. Here's an outline of what should typically be included in a medical record: 1. **Patient Information:** - Full Name - Date of Birth - Gender - Contact Information (address, phone number, email) - Emergency Contact Details 2. **Medical History:** - Past Medical Conditions - Surgical History - Family Medical History - Allergies (medications, food, environmental) 3.
Medical Record
Prescriptions
Patient Medical Documents
1. Patient Medical History Report
2. Clinical Trial Study Protocol
3. Laboratory Test Results
4. Radiology Imaging Report
5. Surgical Procedure Notes
6. Discharge Summary Document
7. Prescription Medication List
Add note
Upload Documents
Upload file
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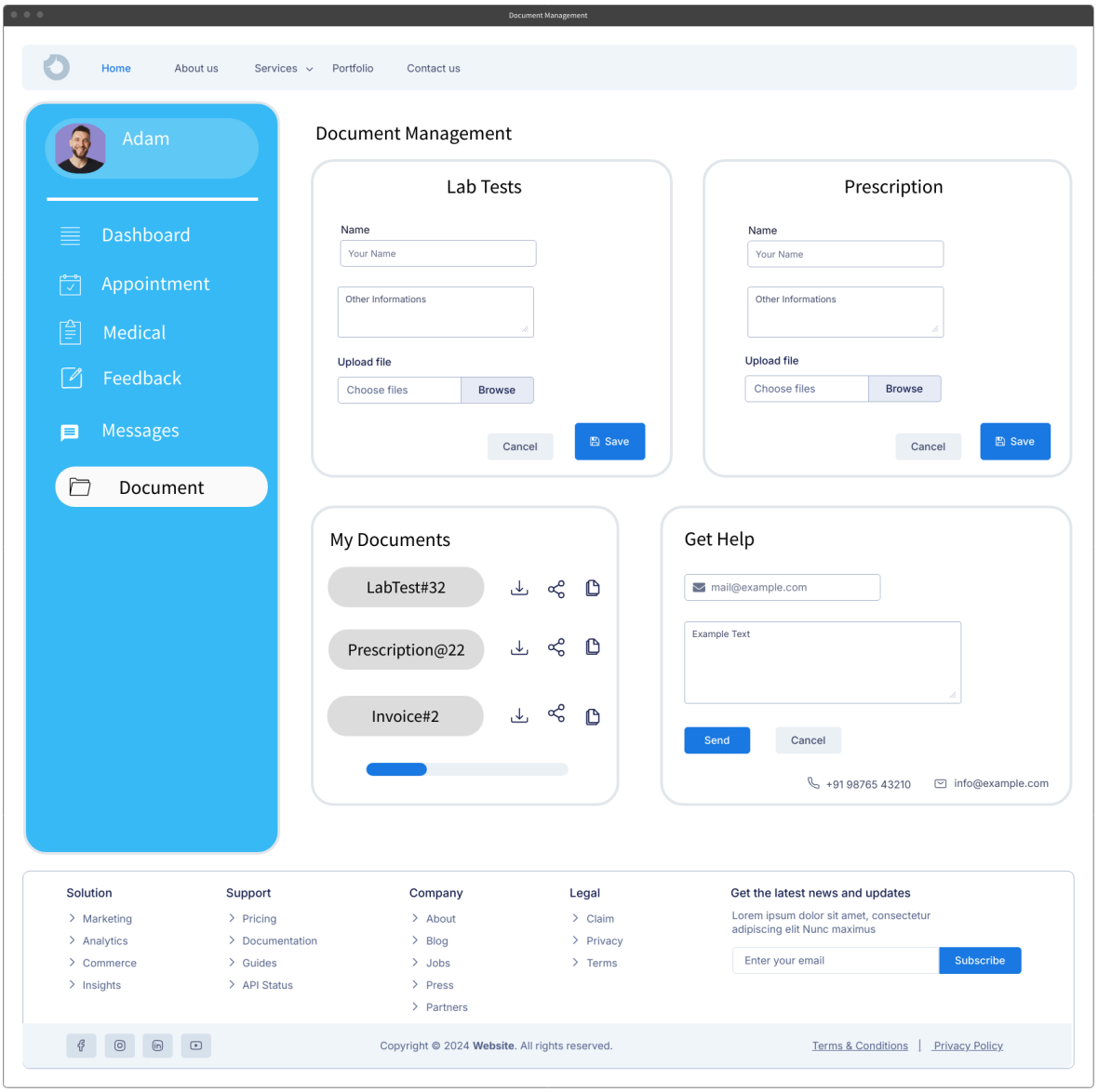
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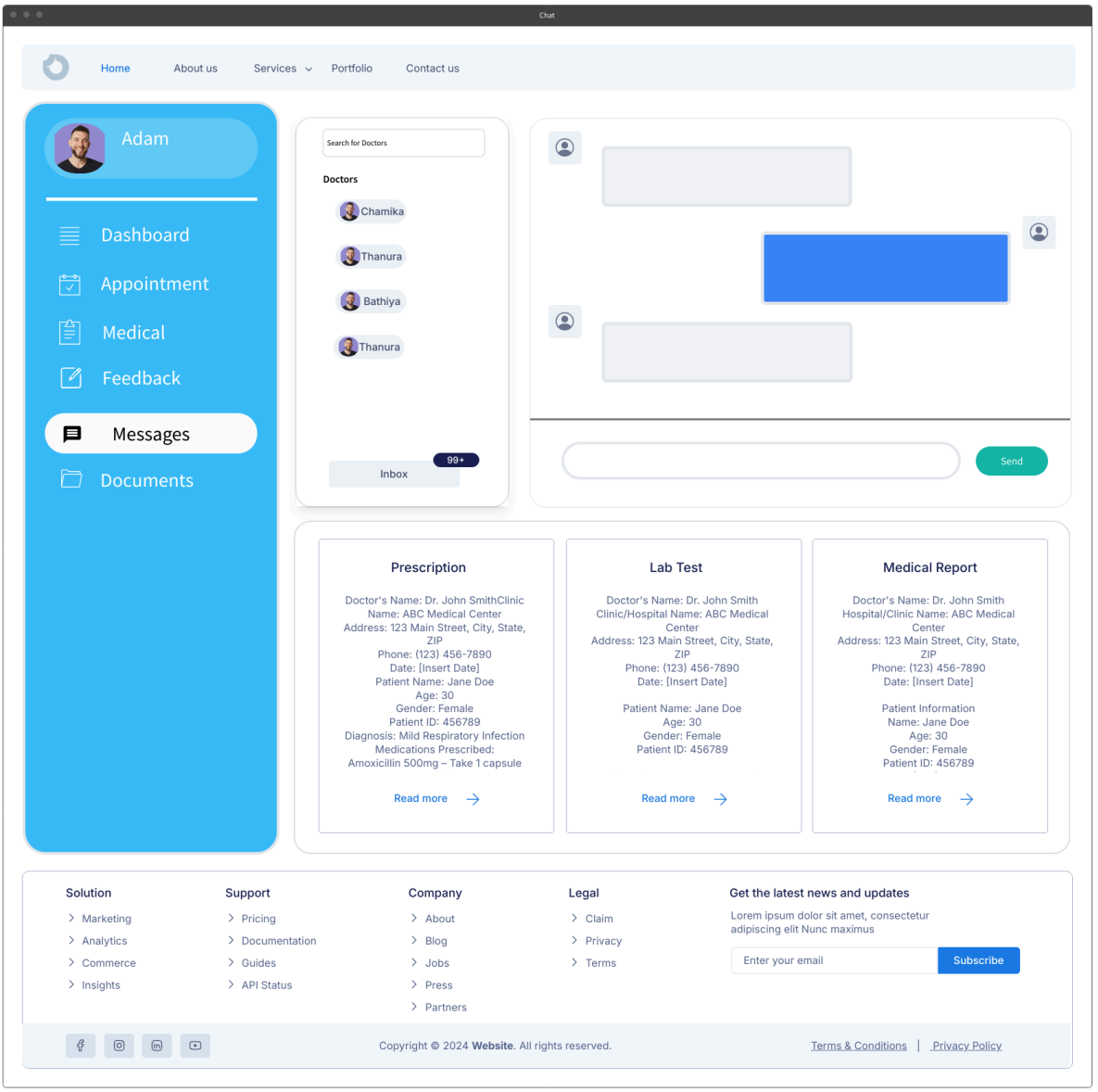
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Send
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Doctor's Name: Dr. John SmithClinic Name: ABC Medical Center
Address: 123 Main Street, City, State, ZIP
Phone: (123) 456-7890
Date: [Insert Date]
Patient Name: Jane Doe
Age: 30
Gender: Female
Patient ID: 456789
Diagnosis: Mild Respiratory Infection
Medications Prescribed:
Amoxicillin 500mg – Take 1 capsule
Read more
Lab Test
Doctor's Name: Dr. John Smith
Clinic/Hospital Name: ABC Medical Center
Address: 123 Main Street, City, State, ZIP
Phone: (123) 456-7890
Date: [Insert Date]
Patient Name: Jane Doe
Age: 30
Gender: Female
Patient ID: 456789
Read more
Medical Report
Doctor's Name: Dr. John Smith
Hospital/Clinic Name: ABC Medical Center
Address: 123 Main Street, City, State, ZIP
Phone: (123) 456-7890
Date: [Insert Date]
Patient Information
Name: Jane Doe
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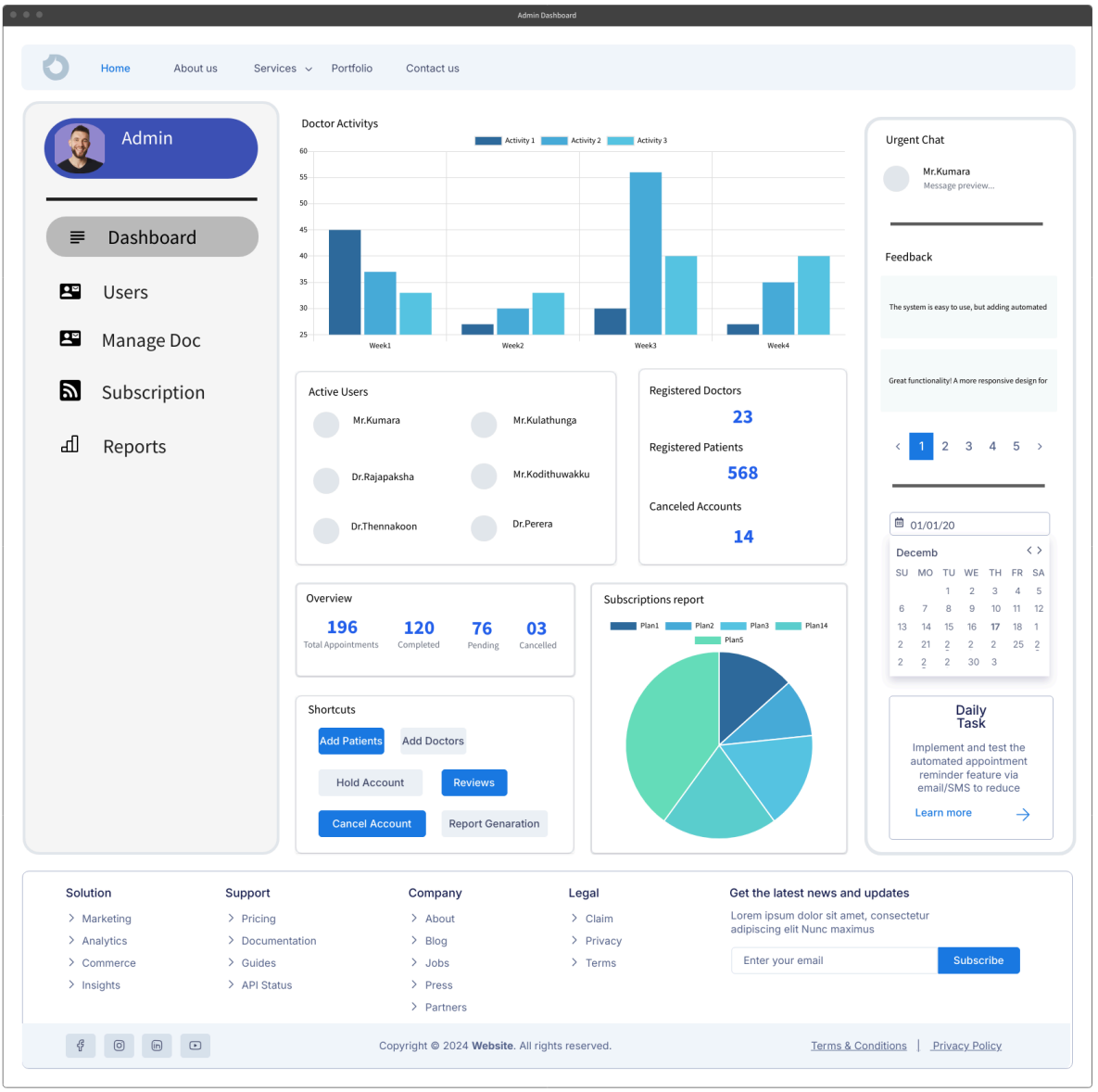
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Dr.Thennakoon
Dr.Perera
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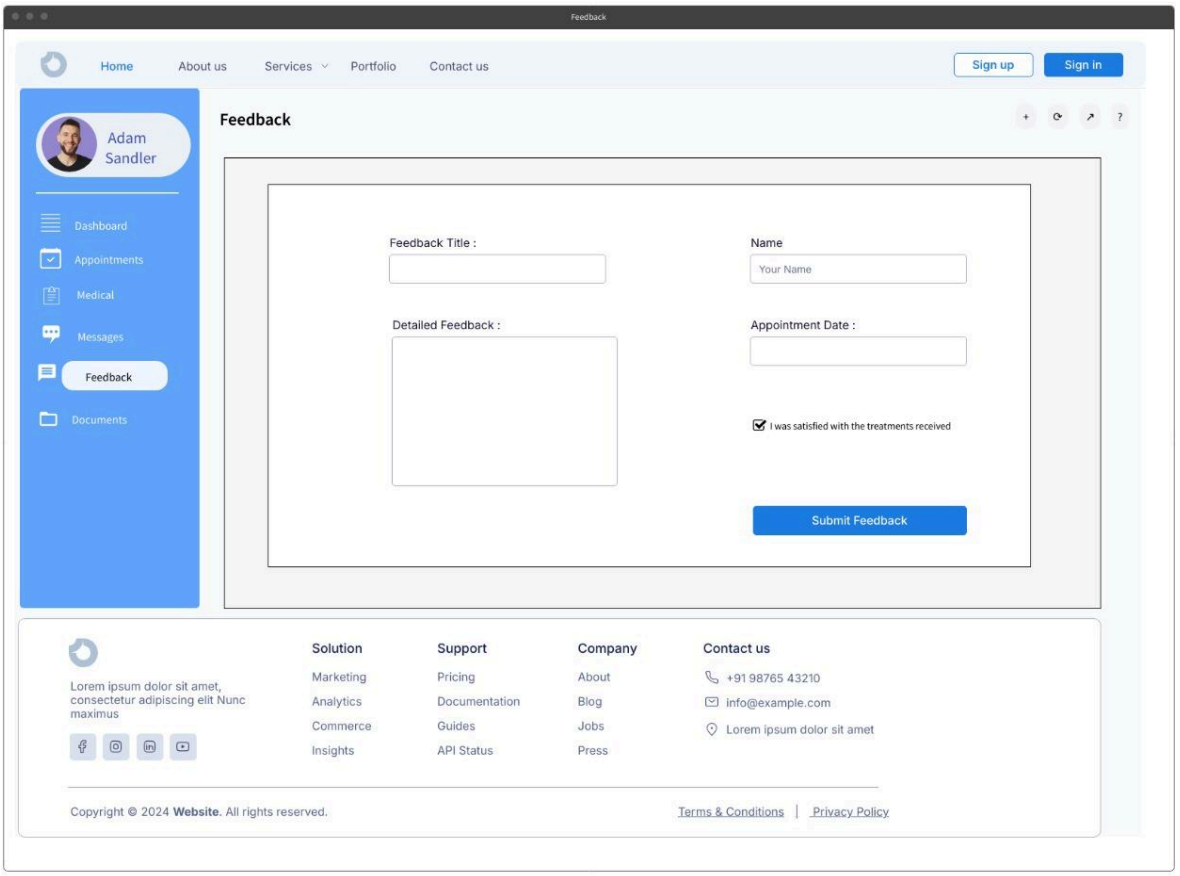
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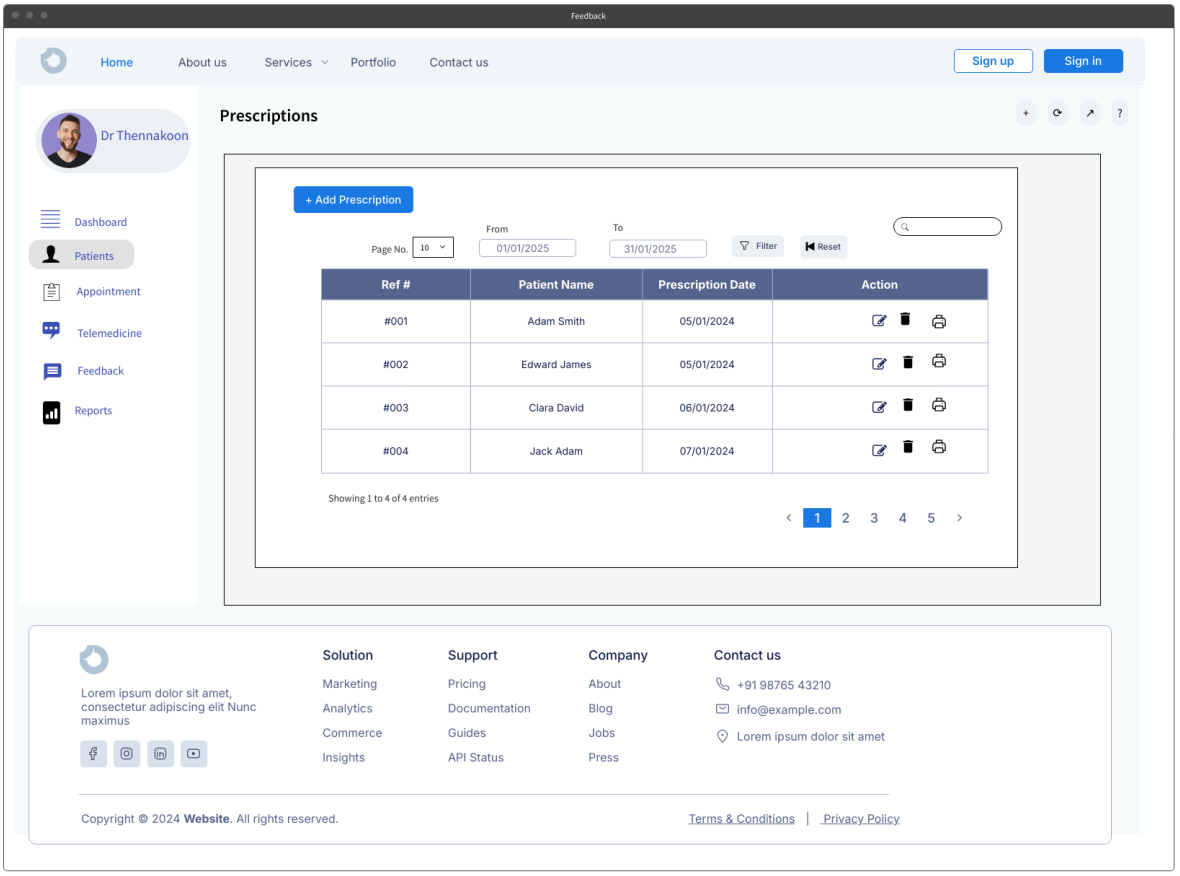
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Patient Name
Prescription Date
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#001
Adam Smith
05/01/2024
#002
Edward James
05/01/2024
#003
Clara David
06/01/2024
#004
Jack Adam
07/01/2024
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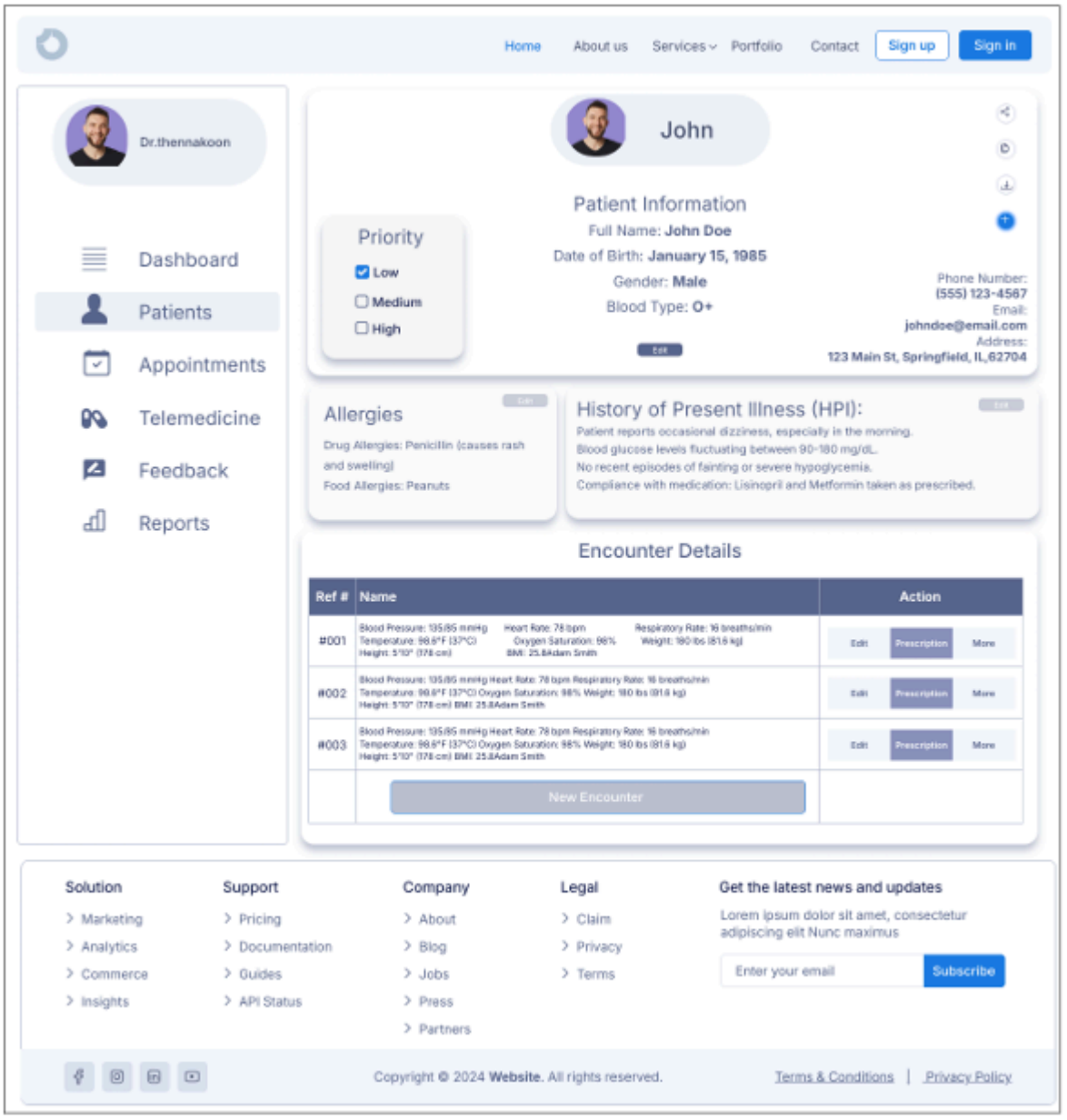
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John
Patient Information
Full Name: John Doe
Date of Birth: January 15, 1985
Gender: Male
Blood Type: O+
Priority
Low
Medium
High
Phone Number:
(555) 123-4567
Email:
johndoe@email.com
Address:
123 Main St, Springfield, IL,62704
Allergies
Drug Allergies: Penicillin (causes rash and swelling)
Food Allergies: Peanuts
History of Present Illness (HPI):
Patient reports occasional dizziness, especially in the morning.
Blood glucose levels fluctuating between 90-180 mg/dL.
No recent episodes of fainting or severe hypoglycemia.
Compliance with medication: Lisinopril and Metformin taken as prescribed.
Encounter Details
Ref #
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Edit
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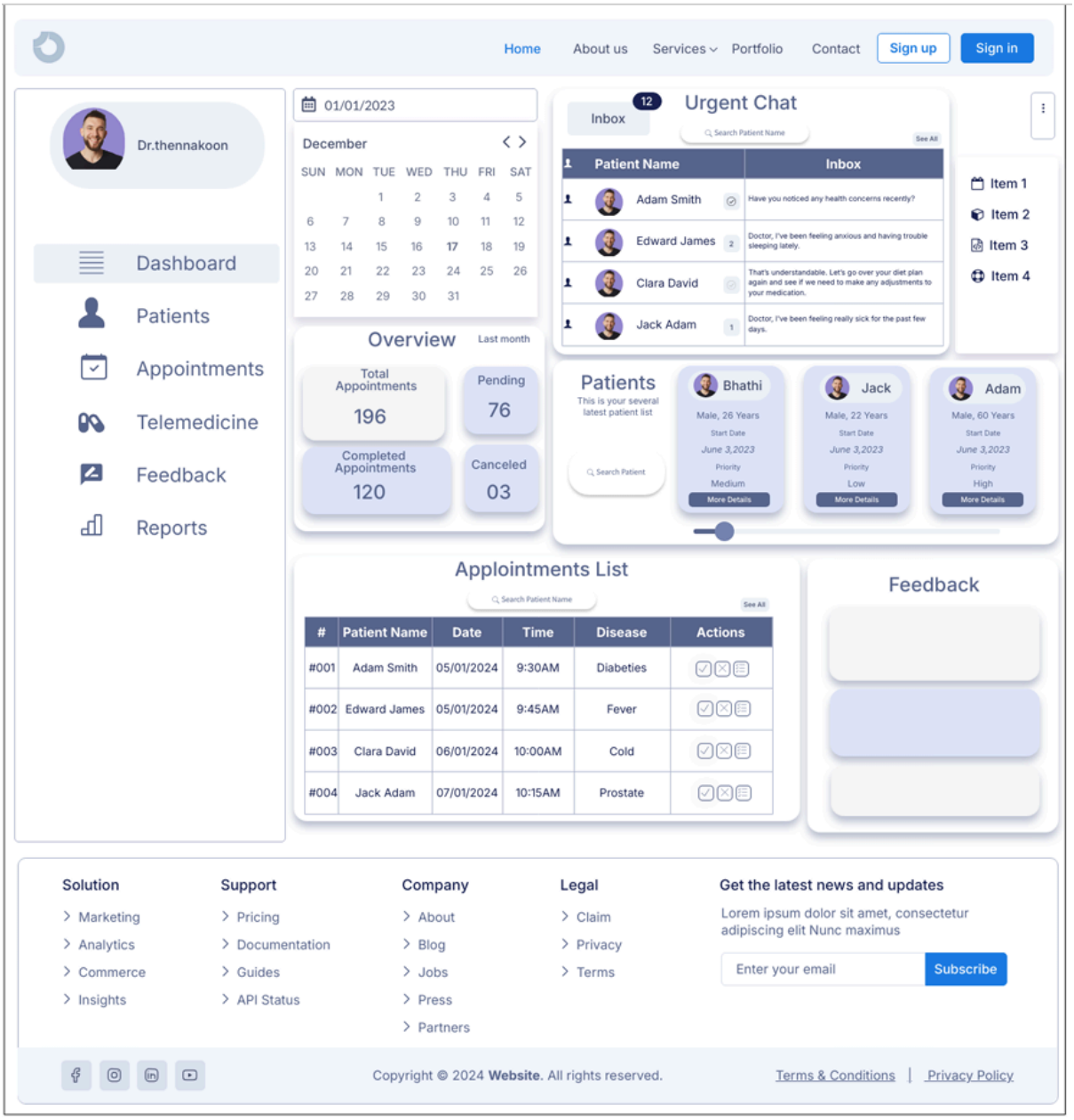
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01/01/2023
December
SUN MON TUE WED THU FRI SAT
Overview
Last month
Total Appointments
196
Pending
76
Completed Appointments
120
Canceled
03
Inbox
12
Urgent Chat
Patient Name
Inbox
Adam Smith
Edward James
Clara David
Jack Adam
Item 1
Item 2
Item 3
Item 4
Patients
This is your several latest patient list
Bhathi
Jack
Adam
Male, 26 Years
Male, 22 Years
Male, 60 Years
Start Date
June 3,2023
Priority
Medium
Low
High
More Details
Applointments List
Patient Name Date Time Disease Actions
#001 Adam Smith 05/01/2024 9:30AM Diabeties
#002 Edward James 05/01/2024 9:45AM Fever
#003 Clara David 06/01/2024 10:00AM Cold
#004 Jack Adam 07/01/2024 10:15AM Prostate
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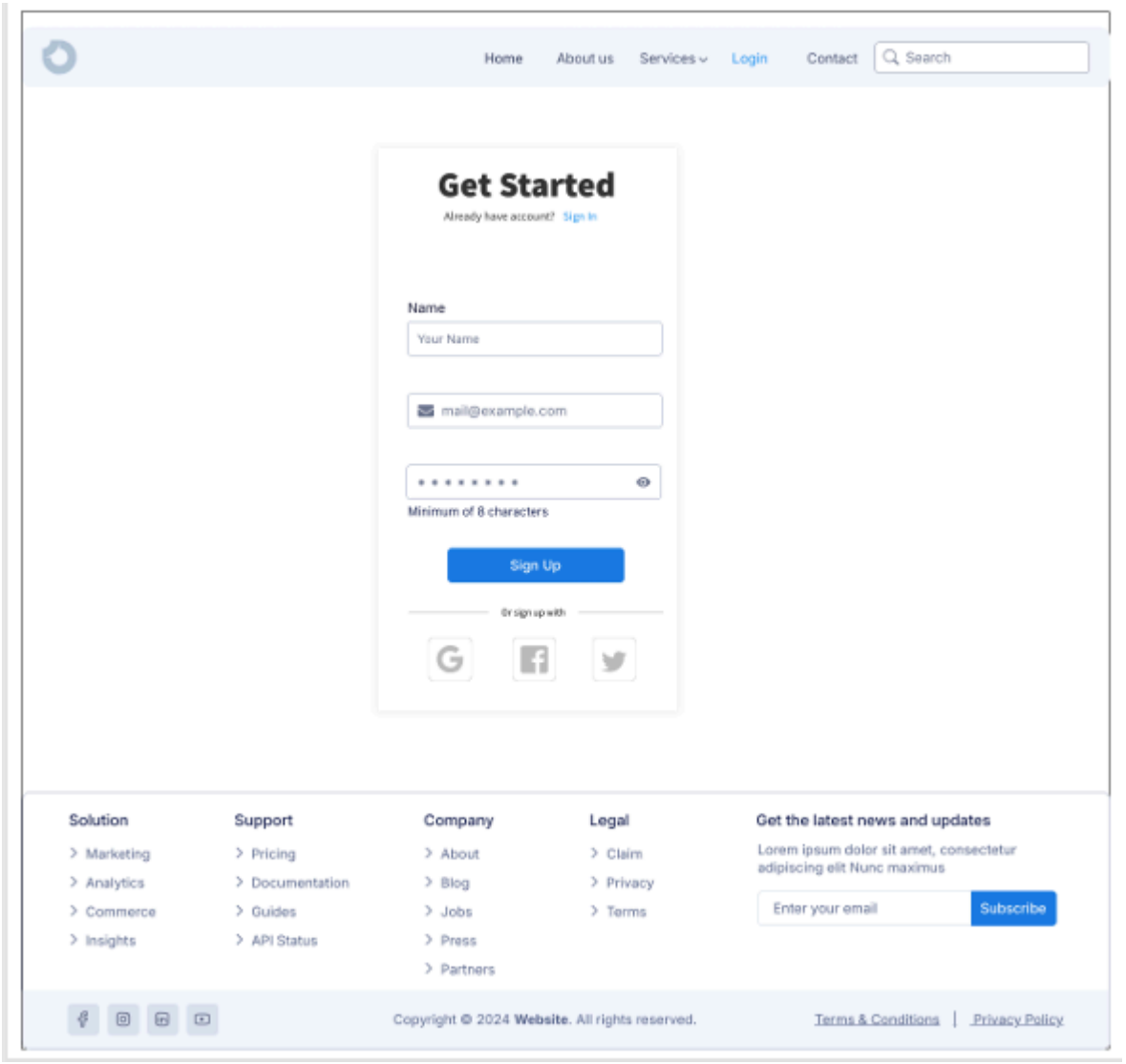
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