



WELLBE

Personalized Patient
Care System

Project Proposal

SCS 2202 - Group Project I - CS Group 22

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Details of Project Supervisor and Co-supervisor

Proposed Project Supervisor

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Signature of the supervisor:

Date:

Proposed Project Co-Supervisor

Name of the co-supervisor: Mr. Thulasigaran

Signature of the co-supervisor:

Date:

1. Introduction to Project

1.1. Background

Personalized patient care systems represent a transformative approach in modern healthcare facilities, aiming to tailor medical services and treatments to streamlining healthcare processes. These systems integrate advanced technologies and comprehensive functionalities to enhance patient engagement, improve clinical outcomes, and optimize healthcare delivery. Key components and functions include:

- Patient- Centric Approach
- Clinical Decision Support (CDS)
- Data-Driven Insights
- Patient Engagement and Communication
- Care Coordination and Collaboration
- Regulatory Compliance and Security

1.2. Problem Statement

In modern healthcare environments, the challenges of fragmented patient care, inefficient communication channels, administrative complexity, and data security and compliance concerns underscore the urgent need for a comprehensive healthcare management system like **WellBe: Personalized Patient Care System**.

Fragmentation in Patient Care: Current healthcare systems often fail to provide a seamless patient care experience. Patients struggle with disjointed medical records, cumbersome appointment scheduling processes, and difficulty coordinating with their healthcare provider. This fragmentation leads to delays in accessing care, inconsistent treatment plans, and increased patient dissatisfaction.

Inefficient Communication Channels: Communication gaps between doctors, labs, pharmacies, and administrative staff hinder effective collaboration and information exchange. These gaps contribute to delays in diagnosis, treatment initiation, and medication distribution, ultimately impacting patient outcomes. Improving communication efficiency is crucial for enhancing care coordination and ensuring timely, accurate healthcare delivery.

Administrative Complexity: Healthcare facilities grapple with the complexities of managing patient profiles, scheduling appointments, and complying with regulatory requirements such as HIPAA and GDPR. Manual administrative processes not only increase operational costs but also pose challenges in maintaining data accuracy,

managing patient information securely, and meeting regulatory standards. Streamlining administrative workflows is essential for optimizing operational efficiency and improving overall service delivery.

Data Security and Compliance Concerns:

Ensuring robust data security and compliance with healthcare regulations is paramount for the successful implementation and operation of personalized patient care systems. The following considerations are essential:

- 1. Data Encryption:**

- **In Transit and At Rest:** Encrypting data both during transmission and when stored ensures that sensitive patient information is protected from unauthorized access.

- 2. Access Controls:**

- **Role-Based Access Control (RBAC):** Implementing RBAC ensures that only authorized personnel have access to specific data based on their role within the healthcare organization.
- **Multi-Factor Authentication (MFA):** Using MFA adds an additional layer of security by requiring multiple forms of verification before granting access to sensitive data.

- 3. Regular Security Audits and Assessments:**

- Conducting regular security audits and vulnerability assessments helps identify and mitigate potential security risks.
- Ensuring compliance with regulations such as HIPAA, GDPR, and other relevant laws through continuous monitoring and auditing.

- 4. Data Anonymization and De-Identification:**

- Employing techniques to anonymize or de-identify patient data where possible reduces the risk of exposure in case of a data breach.

- 5. Compliance with Regulatory Requirements:**

- Adhering to healthcare privacy laws and regulations such as HIPAA (Health Insurance Portability and Accountability Act) in the US, GDPR (General Data Protection Regulation) in the EU, and other regional regulations.
- Keeping abreast of changes in regulations and ensuring that systems and processes are updated accordingly.

- 6. Employee Training and Awareness:**

- Conducting regular training sessions for employees on data security best practices and the importance of compliance with regulations.
- Promoting a culture of security awareness within the organization.

- 7. Secure Software Development Practices:**

- Incorporating security into the software development lifecycle (SDLC) to ensure that applications are built with security in mind from the ground up.

- Regularly updating and patching software to protect against known vulnerabilities.
8. **Data Backup and Recovery:**
- Regularly backing up data to secure locations and ensuring that there are effective data recovery processes in place to mitigate data loss in case of a breach or other disaster.

1.3. Our Solution

WellBe addresses these challenges by offering a unified, integrated platform that enhances patient care coordination, improves communication among healthcare providers, simplifies administrative tasks, and ensures data security and regulatory compliance. By leveraging advanced technologies such as electronic health records (EHR), real-time communication tools, and predictive analytics, WellBe empowers healthcare facilities to deliver personalized care plans, streamline workflows, and enhance patient outcomes.

Through personalized care planning, streamlined communication channels, and robust security protocols, WellBe aims to transform healthcare delivery, mitigate operational challenges, and elevate patient care standards. By implementing WellBe, healthcare facilities can achieve greater efficiency, improved patient satisfaction, and enhanced clinical outcomes in a secure and compliant environment.

1.4. How Is It Different?

Unique Benefits of WellBe

- **Universal Accessibility:** Patients can access their medical records and health information from anywhere, at any time, providing flexibility and convenience.
- **Continuity of Care:** WellBe ensures that patients receive consistent and informed care, regardless of where they seek treatment, by making their complete medical history available to healthcare providers.
- **Efficiency and Convenience:** The system reduces administrative burdens and simplifies healthcare processes for both patients and providers, resulting in a more efficient and user-friendly experience.
- **Enhanced Patient Outcomes:** By offering personalized care plans and fostering proactive patient engagement, WellBe contributes to improved health outcomes and patient satisfaction.

2. Project Goals and Objectives

2.1. Project Goals

The main goal of the WellBe: Personalized Patient Care System project is to develop a comprehensive and user-friendly healthcare management system that enhances patient care by streamlining the processes of patient management, system administration, medical records handling, communication, and operational efficiencies across doctors, patients, labs, and pharmacies. The system aims to provide personalized care, improve access to healthcare services, ensure data security, and foster seamless interactions between all stakeholders in the healthcare ecosystem.

2.2. Project Objectives

Objective 1: Enhance Patient Engagement by personalized Health Plans

- Patients receive customized health plans based on their medical history, preferences, and lifestyle, leading to improved adherence and better health outcomes.

Objective 2: Improve Communication Between Patients and Healthcare Providers

- **Access to Medical Records:** Patients and doctors can access medical records anytime, ensuring accurate and up-to-date information during consultations.
- **Secure Messaging:** Patients can easily communicate with their healthcare providers, ask questions, and receive timely responses, reducing the need for frequent in-person visits.

Objective 3: Streamline Administrative Processes by automated Appointment Scheduling

- Patients can book, reschedule, or cancel appointments online, reducing administrative burden and minimizing no-shows.

Objective 4: Simplify and Enhance the Prescription Process

- **Patient Profile Access:** Doctors receive the patient's complete medical profile, including medical history, allergies, and current medications, ensuring informed decision-making and personalized care.
- **Integrated Prescription System:** When prescribing medications, doctors can select from an integrated list of medicines within the system, streamlining the prescription process and reducing the risk of errors.

Objective 5: Ensure Patients Attend Appointments by automated Appointment Reminders

- Patients receive automated reminders via SMS, prior to their appointments, reducing missed appointments and improving clinic efficiency.

3. Scope of the project

3.1 Project Boundaries

3.1.1. Users

- Patient
- Doctor
- Lab technician
- Pharmacist
- Administrative staff

3.1.2. In-scope

- Create a platform to centralize patient's medical and lab reports.
- Allow patients to register in the system either through administrative staffs or independently.
- Enable administrative staff to register doctors, pharmacists, and lab technicians into the system
- Allow the administrative staff to check patient presence and manage appointment orders.
- Allow patients to view their medical reports, prescriptions and health history.
- Enable doctors to call the next patient based on appointment order, then the patient's profile will be displayed to the doctor automatically. Then the doctor can access the patient's previous medical reports and health history.
- Provide patients with the ability to schedule appointments with doctors and make payments through the system.
- Enable doctors to view and manage their appointment schedules, including rescheduling after consulting with management.
- Allow doctors to create patient prescriptions.
- Enable pharmacists to view prescriptions by entering patient IDs and update prescription status after dispensing medications.
- Enable pharmacists and lab technicians to update remarks.
- Allow lab technicians to view required tests for patients by entering patient IDs.

- Enable lab technicians to release test's results and update the status of tests once they are completed.
- Facilitate chat functionality for patients to communicate with doctors for consultations or follow-ups and for lab technicians and pharmacists to communicate with hospital management.
- Send automated notifications for appointment reminders, test results availability, and prescription updates to patients, doctors, lab technicians, and pharmacists.
- Allow management to oversee and manage profiles of patients, doctors, lab technicians, and pharmacists.
- Implement security measures to protect sensitive medical information.

3.1.3. Out-of-Scope

- Provide a mobile application for patients to interact with the system easily.
- Facilitate video call functionality for patients to communicate with the doctors.
- Enable lab technicians and pharmacists to manage stock and inventory.
- Allow to manage employee records, including hiring, payroll, performance evaluations, and other human resources-related activities.
- In our system, we only consider doctors, pharmacists, and lab technicians as staff members.

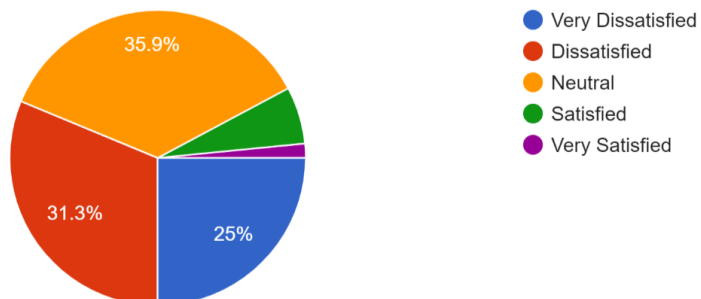
4. Project Feasibility

4.1. Social Feasibility

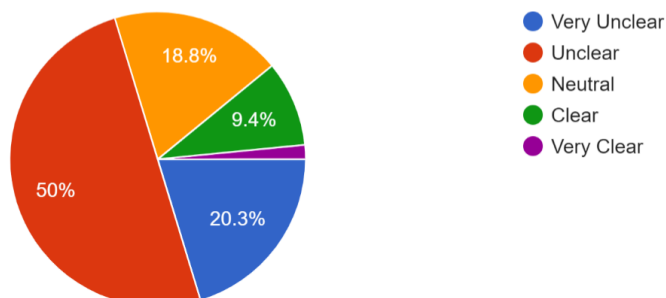
In Sri Lanka, the healthcare system faces numerous challenges that impact patient satisfaction and overall experience. Issues such as long waiting times for appointments, unclear handwritten prescriptions, delays in receiving test results, and the burden of carrying physical medical records are common. To address these problems, we are developing a comprehensive patient care system designed to improve patient comfort and streamline healthcare processes.

To understand the public's perspective and willingness to use a patient care system, we conducted a survey with the following questions:

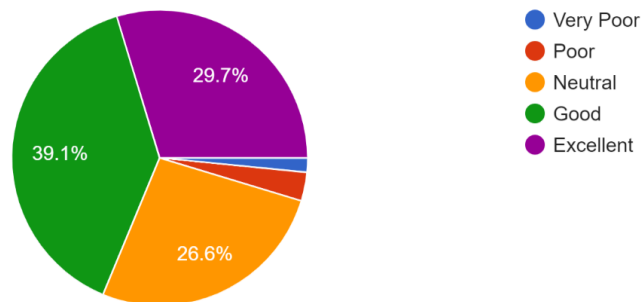
1. How satisfied are you with the waiting time for you to get an appointment at the hospital?



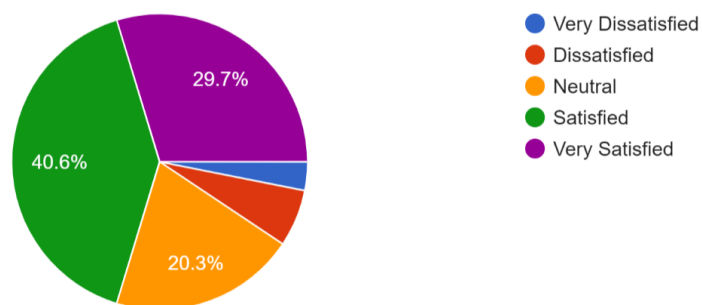
2. How would you rate the clarity of prescriptions provided by your doctor (in terms of understanding the handwriting)?



3. How would you rate the process of receiving test results through the patient care system?



4. How satisfied would you be with the reminders and notifications provided by the patient care system?



This survey had more than 60 responses and can be accessed [here](#)

The survey received over 60 responses, providing valuable insights into the current challenges faced by patients and their expectations from a patient care system.

The survey results indicate a strong demand for a patient care system that addresses current inefficiencies and enhances patient comfort. The positive response from the public confirms the social feasibility of implementing this system. By doing so, we aim to significantly improve the healthcare experience for patients and streamline the workflow for healthcare professionals.

4.2. Technical Feasibility

This section measures the flexibility of practical implementation of building our patient care system using the selected technical solutions. The main deliverable of this project is a web app built using HTML, CSS, and JavaScript on the frontend and PHP on the backend, which utilizes MySQL as the datastore. Apache HTTP Server is used to run the PHP applications.

The platform relies on the following components:

- **SMS Gateway:** To send notifications, reminders, and alerts to patients and caregivers.
- **Payment Gateway:** To process payments for services.
- **Google Meet:** To manage consultations and meetings between healthcare professionals and patients.
- **Figma or Canva:** For UI design.
- **GitHub:** For code collaboration and version control.

Most of these technologies are either open source or freely available. The team must gain adequate technical knowledge before and during the development process. It is a significant task, but the timeline allows us to acquire considerable technical expertise before starting the actual development work and to continue learning during the build.

4.3. Operational Feasibility

This section measures how well the proposed solution meets the user requirements of the system to solve the issues in the existing system. Therefore, it is necessary to meet desired requirements to be operationally feasible. Currently, most activities related to patient care are carried out through fragmented channels, including phone calls, emails, and paper records, which is time-consuming and often inefficient. These methods do not always provide the necessary details in an organized manner. Our platform proposes to classify and streamline relevant activities with respect to patient types and needs. Additionally, due to the ongoing healthcare challenges, including the need for remote consultations, it is essential to have a proper platform to connect patients with healthcare providers for medical opinions and care.

Our solution is a web application accessed through the internet. To use and operate the system:

- Users are required to have an internet connection.
- A computer with a recent version of a web browser should be available.
- Users must have a basic knowledge of IT and using the internet.
- For appointments, consultations, and payments, users need an intermediate level of knowledge in online and card-based transactions.

Because there is no need to provide special training to use the system or any dedicated HR resources to maintain the system, the project is operationally feasible.

Our platform will ensure that patients receive timely and organized care, reducing the inefficiencies present in the current system and improving overall patient satisfaction and outcomes.

4.4. Economical Feasibility

This section provides a detailed overview of the cost estimations and cost-benefit analysis for our solution:

- **Hosting Costs:** The platform requires hosting for both the application and the database. Utilizing the free tier capacity from a suitable cloud provider initially meets our needs for moderate traffic. As user base and traffic increase, scalability options may incur additional costs.
- **Domain Name:** Acquiring a ".LK" domain name costs approximately Rs. 3000 per year, enabling public access to the web application.
- **Operational Costs:** The primary operational cost of our system is SMS notifications, priced at Rs. 0.84 per notification. This cost ensures effective communication with users.
- **Payment Gateway:** We integrate a payment gateway to facilitate transactions. The chosen gateway offers a free plan with limitations, which currently suffices for our system requirements.
- **Development Tools:** We leverage open-source technologies and free tools such as Visual Studio Code for development, eliminating the need for paid licenses and reducing development expenses.
- **Labor Costs:** Development is undertaken by university undergraduates, mitigating labor costs associated with professional developers.
- **Cost vs. Benefits Analysis:** While there are initial costs for hosting, domain registration, SMS notifications, and potential scalability expenses, these investments are justified by the significant benefits our system provides, including enhanced patient communication and operational efficiency in healthcare delivery.
- **Savings:** Certain costs are minimized through strategic decisions, such as using localhost environments for development and leveraging free development tools. This approach optimizes resource allocation and enhances the overall economic feasibility of our solution.

By balancing costs with anticipated benefits and leveraging cost-saving measures like free payment gateway plans, our solution demonstrates strong economic feasibility, ensuring affordability and sustainability throughout its deployment and operation.

4.5. Legal and Ethical Feasibility

The patient care system ensures robust legal and ethical compliance across various dimensions:

- **Verification of User and Healthcare Provider Identities:** All users and healthcare providers undergo identity verification during registration, ensuring accountability and security.
- **Compliance with Healthcare Regulations:** The system adheres to applicable healthcare laws and regulations, including HIPAA (Health Insurance Portability and Accountability Act) and GDPR (General Data Protection Regulation), ensuring the secure handling of patient data.
- **Use of Open-Source Software:** Open-source software used in the application complies with respective licenses, fostering transparency and legal compliance in software development and deployment.
- **Transparency in Financial Transactions:** The system provides clear visibility into payment processes, billing, and transactions, ensuring transparency and accountability in financial dealings.
- **Prevention of Misuse:** Measures are in place to prevent misuse of prescriptions and medical advice, mitigating legal and ethical risks associated with improper use of healthcare services.
- **Data Security and Privacy:** Robust data security measures, including encryption protocols and access controls, safeguard patient information against unauthorized access and breaches.
- **Patient Consent:** Patient consent is obtained transparently for data handling and treatment procedures, respecting individual rights and privacy preferences.
- **Terms and Conditions:** Clear terms and conditions govern the use of the system, outlining responsibilities and expectations for users and providers.
- **Professional Integrity:** The system upholds professional integrity standards, promoting ethical conduct among healthcare providers and maintaining trust with patients.

These measures collectively ensure that the patient care system operates within legal boundaries, respects patient privacy, and upholds ethical standards in healthcare service delivery.

4.6. Schedule Feasibility

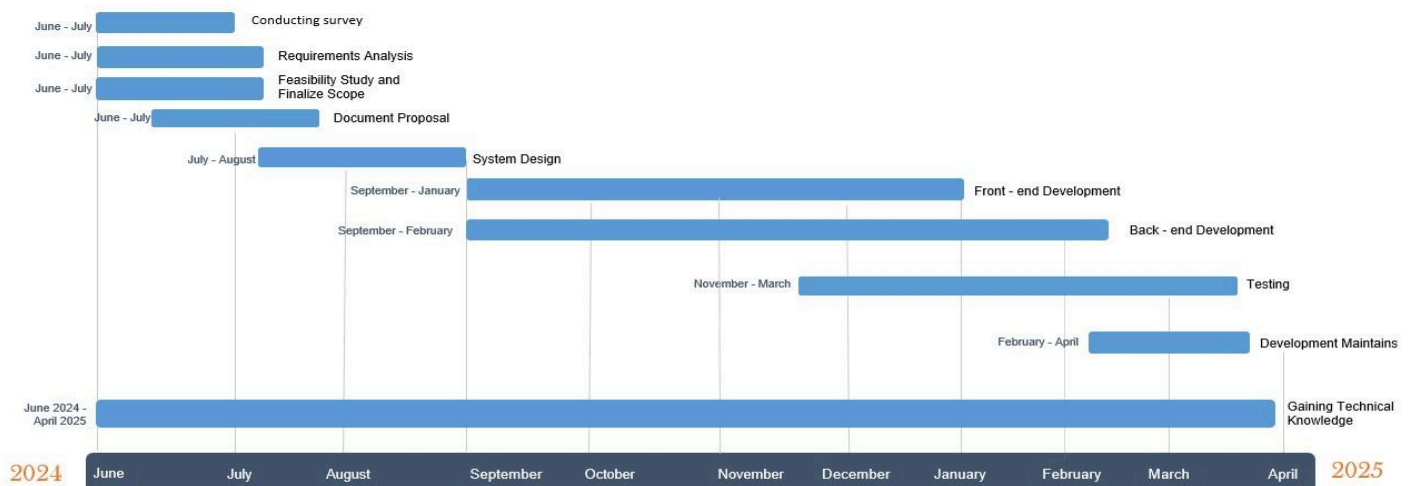
- The project spans a duration of 9 months.
- According to that, the estimated man hours for the project completion can be mentioned as follows:
 - Weekdays working hours = 5 hours
 - Weekend working hours = 5 hours
 - Number of team members = 4
 - Number of weeks = 36
 - Total man hours = $(5 + 5) * 4 * 36$ hours = 1440 hours
- We are using an iterative waterfall model for development, and with requirement gathering almost done, we can predict that with the identified features and scope it is possible to finish the other tasks of the SDLC and complete the development of the product by April 2025.
- Additionally, requirements are almost stable at this point, so there won't be any major changes to the requirements that can affect the schedule of the project.

5. Project Timeline

The project transits a total duration of 10 months - till the completion of the academic year. We are modeling our development process of the project using the Iterative waterfall method. In this method, every phase contains a feedback path to its previous stage. Further, we can go back and make changes to be more aligned with the requirements and the goals of the project by using received feedback and insights.

Using the requirements analysis and basic design of the system, we are confident that the project can be completed on time without any main changes in the schedule.

Project Gantt Chart:



6. Deliverables of the project



Web Based Application



User Guide



**Administrator's Manual
(With deployment instructions)**



SRS Document

7. Project Constraints and Assumptions

7.1. Project Constraints

- The development process will avoid using frameworks and libraries.
- The system will be built only in English, which may limit accessibility for non-English-speaking users.
- Users may require additional support and training if they lack basic technical knowledge of the system.
- The system must comply with data security and privacy regulations.
- Access to sensitive information is restricted based on user roles and permissions.

7.2. Project Assumptions

- Patients have to make payments to have their lab tests done and to get the results.
- All medical records and prescriptions follow relevant medical standards and regulations.
- Staff members such as doctors, lab technicians, and pharmacists are verified and authorized through administrative staff before gaining access to the system.
- Users are assumed to have basic knowledge of the system to perform their tasks effectively.
- The WellBe system will not include coverage for emergency medical cases.

8. Requirements

8.1. Functional Requirements

8.1.1 Administrative Staff

1. **Create Patient Profiles**
 - Create profiles for patients.
 - Fill in patient details (name, age, contact information, medical history, etc.).
2. **Edit Patient Profile**
 - Search for the patient profile by name or ID.
 - Select the profile to edit.
 - Update the necessary details.
3. **Delete Patient Profile**
 - Search for the patient profile by name or ID.
 - Select the profile to delete.
 - Confirm the deletion.
4. **Checking the present appointment numbers and updating the queue**
 - Check and update the presence of the next appointment number.
 - Update the queue of patients according to the appointment number.
 - Manage the absent patients' appointments.
5. **Create Doctor/Lab/Pharmacy Profiles**
 - Create profiles for doctors, labs, and pharmacists.
 - Select the type (Doctor, Lab, Pharmacy).
 - Enter the details (name, specialty, contact information, etc.).
6. **Edit Doctor/Lab/Pharmacy Profiles**
 - Search for the profile by name or ID.
 - Select the profile to edit.
 - Update the necessary details.
7. **Delete Doctor/Lab/Pharmacy Profiles**
 - Search for the profile by name or ID.
 - Select the profile to delete.
 - Confirm the deletion.
8. **Generate Needed Reports**
 - Select the type of report needed (e.g., daily patient report, lab test report).
 - Apply filters (date range, department, etc.).
 - Generate Reports.
 - Download or print the report.
9. **Give Access to Users**
 - Search for the user by name or ID.
 - Select the user and set the required permissions.
10. **Add and update the doctors' available time slots for consultations**
 - Add and update available time slots of doctors for consultation.
 - Manage the time slots of the appointment scheduler.

8.1.2. Doctor

1. **Login**
 - Login to the system using the credentials.
2. **View the Patient Profile**
 - Access the patient profile section.
 - Review personal details and medical history.
3. **View Previous Medical Records**
 - Review patient's past visits, diagnoses, and treatments.
 - Review previously prescribed medicine.
4. **Create New Medical Record**
 - Enter visit details, diagnosis, and treatment plan.
 - Enter newly prescribed medicine.
5. **Suggest Lab Tests**
 - Suggest required lab tests for patients.
 - Mention the type of test that needs to be done.
 - Submit the request to the lab.
6. **Prescribe Medicines**
 - Enter new records to the prescribed medicines.
 - Select medications and dosages.
 - Submit the prescriptions.
7. **Chat with Patients**
 - Open the chat section.
 - Select the patient from the list.
 - Send messages.
8. **Generate Treated Patients Report**
 - Generate reports summarizing the treated patient statistics.
 - Apply filters (current day) to get specified reports.
 - Download or print the report.
9. **Recommending Patients the Next Appointment**
 - Suggest a date and time for the next visit.
 - Update the patient's appointment schedule in the system.
10. **Check the Scheduled Appointments**
 - View the list of scheduled appointments for a particular day.
 - Manage and update appointments as needed.

8.1.3. Patient

1. **View Website**
 - Open the WellBe website in a browser.
2. **Create Profile**
 - Create profiles entering required personal data.
 - Fill in personal details and medical history.
3. **Edit Profile**
 - Login to the system.
 - Update personal information as needed.
 - Save the updated data.
4. **Login**
 - Login to the system using credentials.
5. **View Medical Reports**
 - View past medical records.
 - View and download available reports.
6. **View Lab Results**
 - Navigate to the lab results section.
 - View and download lab reports after the tests are done.
7. **Chat with Doctors**
 - Open the chat section.
 - Send messages to doctors via the management interface.
 - Receive replies from doctors directly.
8. **View Next Appointment**
 - View details of the next scheduled appointment.
 - Get reminders for the next appointment.
9. **Find a Doctor**
 - Search for doctors by specialty or name.
 - View doctor profiles and select a preferred doctor.
10. **Schedule an Appointment with the Doctor**
 - Select an available date and time from the doctor's schedule.
 - Book the appointment.
 - Receive confirmation.
 - If the appointment is canceled by either the doctor or the patient, reschedule the appointment (no refund provided).
11. **Pay for the Appointment**
 - Navigate to the payment section.
 - Complete the payment process online.
12. **Receive Notification for Appointment**
 - Receive reminders 1 day and 2 hours before the appointment via email or SMS.
 - Receive a notification when the doctor arrives, including the appointment number.

8.1.4. Lab Technician

1. **View Lab Requests**
 - View a list of requested test requests.
 - Manage incoming test requests.
2. **Update the Status of Lab Requests**
 - Change the status to "In Progress", "Pending" or "Completed" as appropriate.
3. **Upload Lab Results**
 - Upload the lab results to the system.
 - Notify the patient that the results are available.
4. **Print Lab Reports**
 - Generate and print lab reports if requested by the patient.
5. **Update Remarks**
 - Add remarks to lab reports, especially if handed over physically.
6. **Chat with the Management**
 - Use the chat section to communicate with management for clarifications or updates.
7. **Lab Report Ready Notification**
 - Notify patients when lab reports are ready for viewing in the system.

8.1.5. Pharmacist

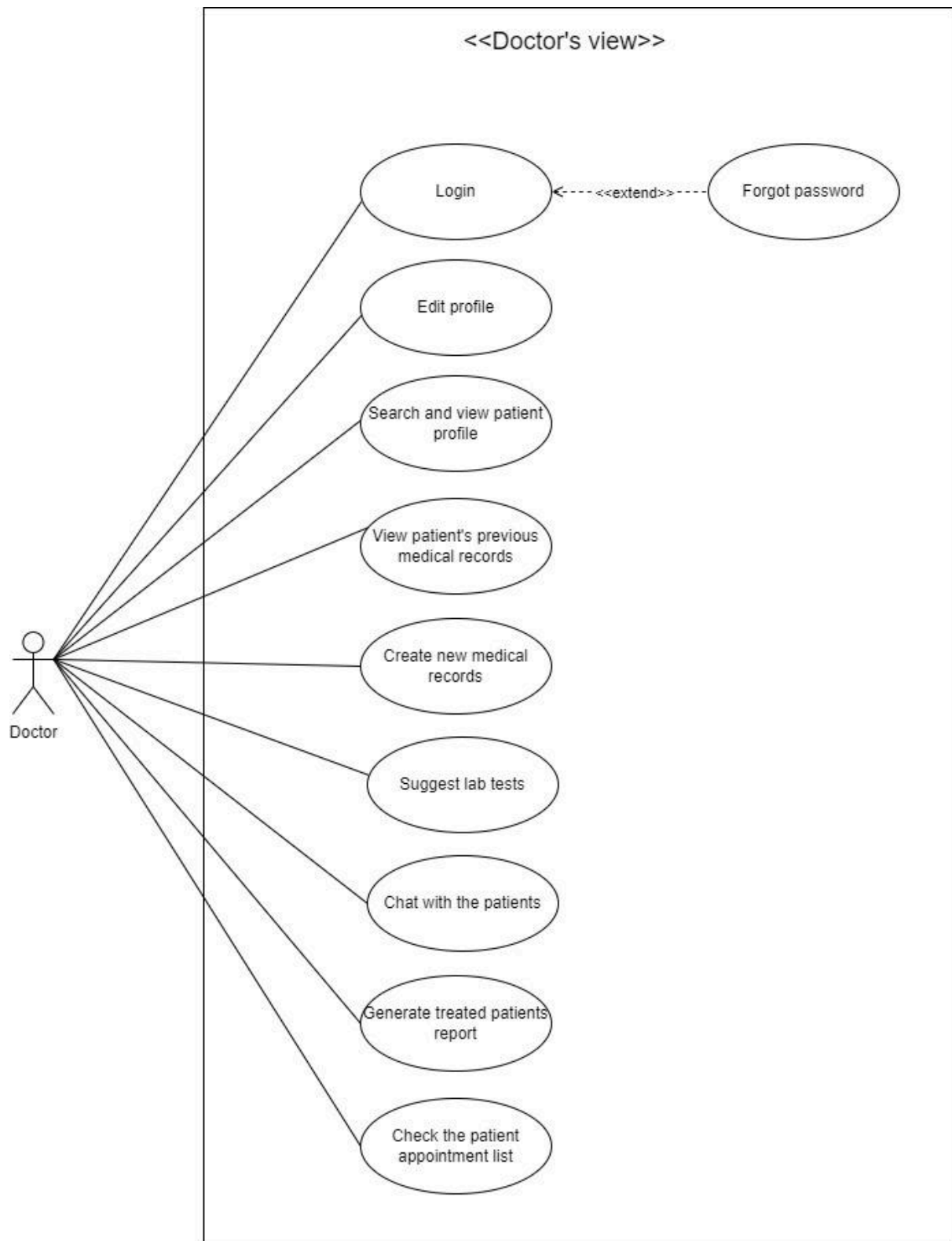
1. **View Medication Requests**
 - View and manage incoming prescription requests.
 - View the list of medicines prescribed to a patient.
2. **Update the Status of Medication Requests**
 - Change the status to "Processing", "Ready to Pick", or "Issued" as appropriate.
3. **Hand Over the Medicines**
 - Update the status to "Issued".
4. **Update Remarks**
 - Add remarks for physical handover of medicines or unavailability.
5. **Print Prescriptions**
 - Generate and print prescriptions if a medicine is not available or if requested by the patient.
6. **Chat with the Management**
 - Use the chat section to communicate with management for any issues or updates.
7. **Send Medicine Ready Notification**
 - Notify patients when medicines are ready for pick-up.

8.2. Use Case Diagrams

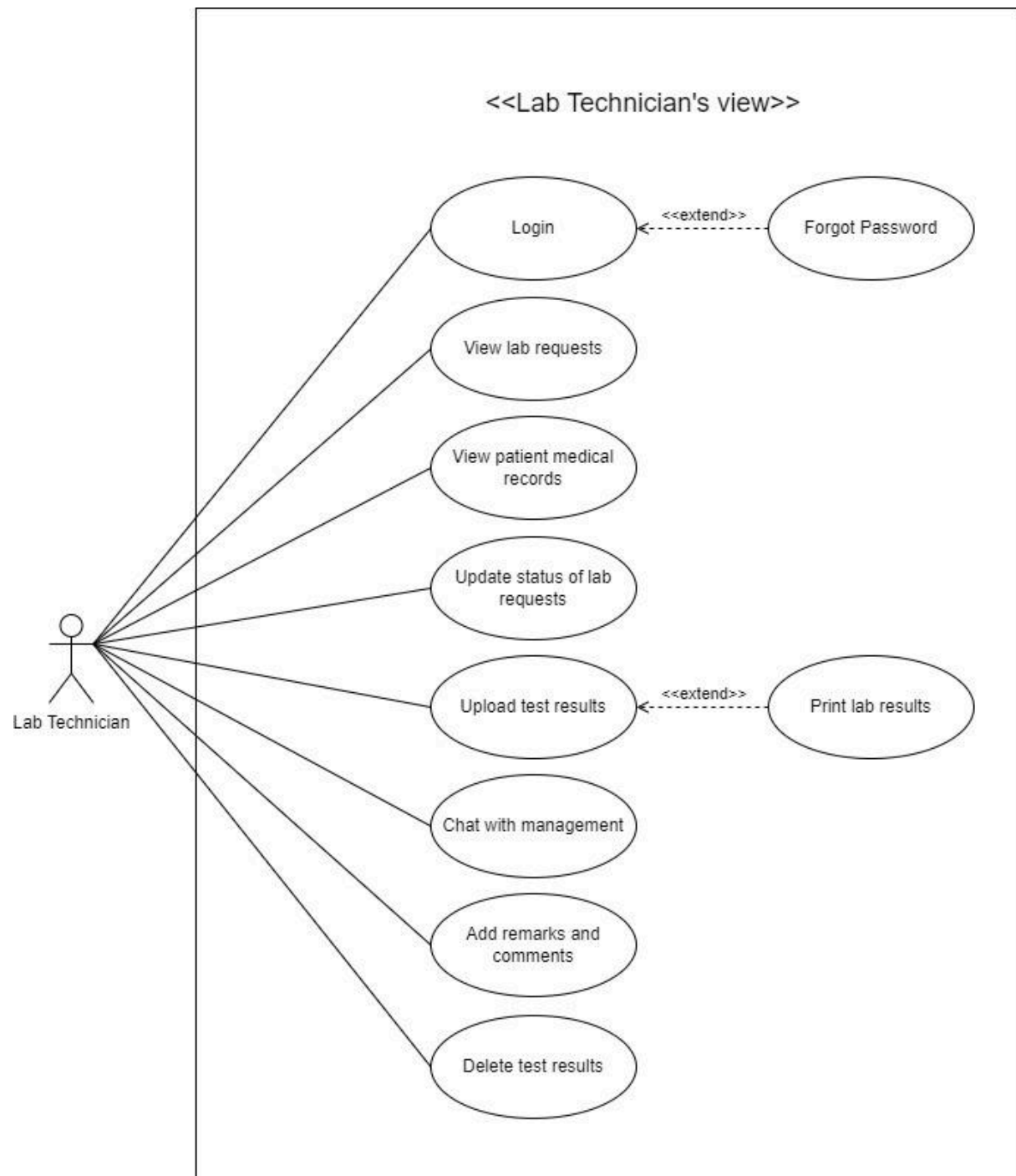
8.2.1 Unregistered / Registered Patient



8.2.2 Doctor



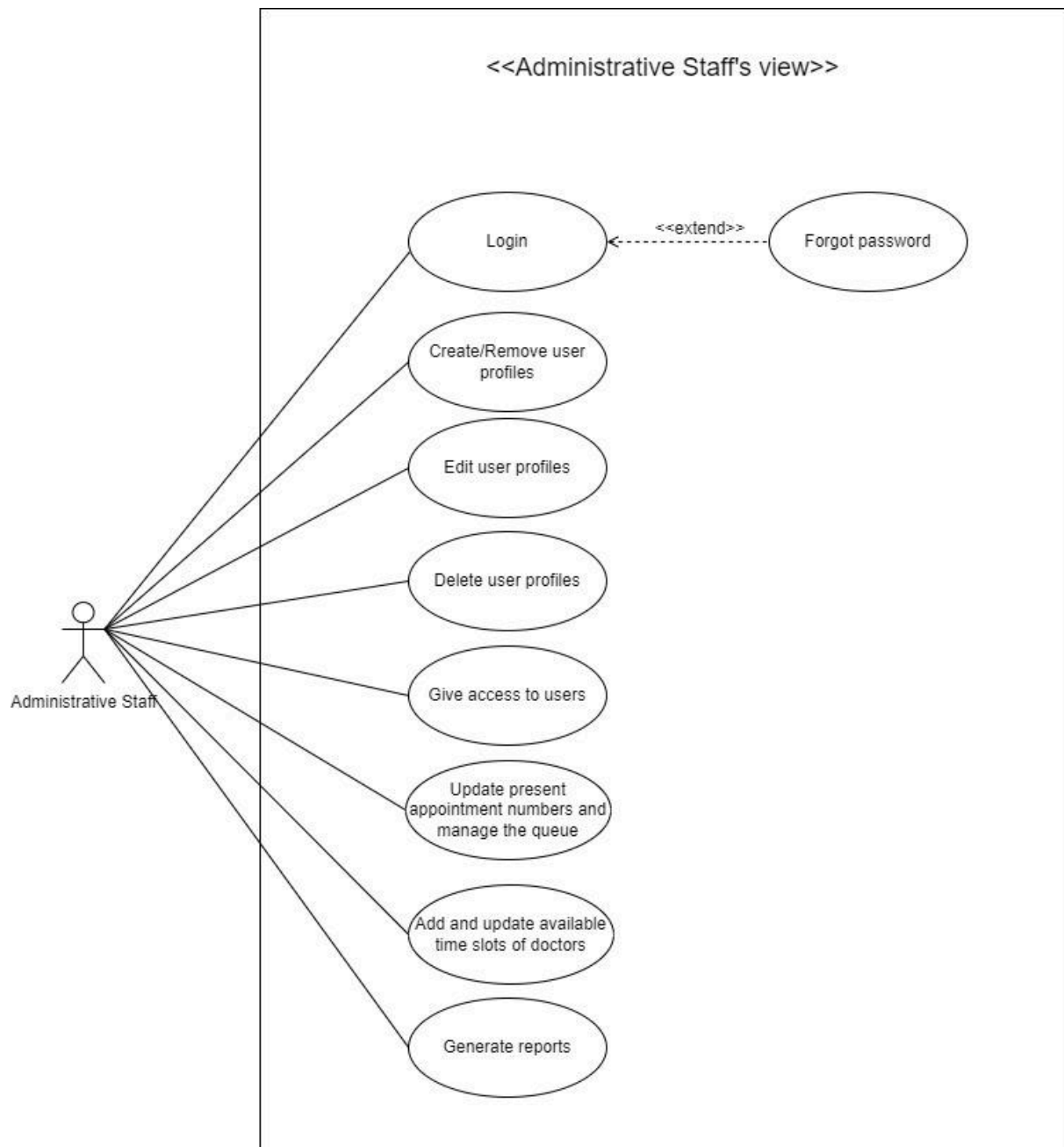
8.2.3 Lab Technician



8.2.4. Pharmacist



8.2.5. Administrative Staff



8.3. Use Case Descriptions

Use Case ID	1
Use Case Name	Register
Primary Actor/s	Patient, Administrative staff
Description	The event of users log into the system using their respective credentials
Pre-condition	Users must have valid credentials to register in the system.
Primary Flow	<ul style="list-style-type: none">● Access Register page● Enter the valid credentials and register into the system.
Exceptions	Display an error message if the user entered invalid credentials
Post-conditions	If the use register into the system successfully then the user has to enter the given credentials into login page

Use Case ID	2
Use Case Name	Login
Primary Actor/s	Patient, Doctor, Pharmacist, Lab technician, Administrative staff
Description	The event of user logs into the system using their respective credentials
Pre-condition	Users must have valid credentials used to register in the system.
Primary Flow	<ul style="list-style-type: none"> • Access login page. • Enter the valid credentials and log into the system.
Exceptions	Display an error message if the user entered invalid credentials
Post-conditions	If the use log into the system successfully then the user's personalized dashboard or interface is displayed, providing access to relevant features and information

Use Case ID	3
Use Case Name	Search patient profile
Primary Actor/s	Administrative staff
Description	The event of the administrative staff viewing the patient's health history
Pre-condition	User must log into the system as administrative staff.
Primary Flow	<ul style="list-style-type: none">● Enter patient id● Access patient records page● View the health history for the relevant patient
Exceptions	Display error message in case of entering incorrect patient id
Post-conditions	Administrative staff can successfully view the selected patient's profile

Use Case ID	4
Use Case Name	Delete profile
Primary Actor/s	Administrative staff
Description	This outlines the process by authorized management staff, who can delete a user profile from the system.
Pre-condition	The user must have the necessary administrative permissions to delete user profiles (e.g. management)
Primary Flow	<ul style="list-style-type: none"> • Administrative staff searches the profile to be deleted. • Administrative staff deletes the selected profile.
Exceptions	If the user profile has dependencies or linked records first, they must be resolved.
Post-conditions	The specified user profile is permanently deleted from the system.

Use Case ID	5
Use Case Name	Create medical record
Primary Actor/s	Doctor
Description	The event of the doctor creating the prescription
Pre-condition	The user must have the necessary permissions to create medical records for patients.
Primary Flow	<ul style="list-style-type: none">● Enter patient id● Access patient records page● Create a new record
Exceptions	Display an error message if the doctor attempts to save the medical report without filling in all the required fields.
Post-conditions	The new medical record is successfully created and saved in the system

Use Case ID	6
Use Case Name	Suggest lab test
Primary Actor/s	Doctor
Description	The event of the doctor suggesting the lab tests
Pre-condition	User must log into the system as a doctor.
Primary Flow	<ul style="list-style-type: none">● Enter patient ID● Access patient records page● Click suggest medical test button● Enter lab tests to record
Exceptions	Display an error message if the doctor attempts to suggest a medical test without providing all the necessary details (e.g., test type).
Post-conditions	The suggested lab tests are successfully recorded and associated with the correct patient

Use Case ID	7
Use Case Name	View next appointments
Primary Actor/s	Doctor, Patient
Description	The event of viewing users' (doctor's and patient's) appointment schedule and the details of appointment.
Pre-condition	User must log into the system as a doctor or as a registered patient
Primary Flow	<ul style="list-style-type: none">● User accesses the relevant home page.● View the calendar and click a specific day.● Display the appointments for that day along with their details.
Exceptions	If the user selects a day with no scheduled appointments, the system displays No appointments.
Post-conditions	User can see the full schedule, appointment times, and any specific notes related to each appointment

Use Case ID	8
Use Case Name	Forgot password
Primary Actor/s	Patient, Doctor, Pharmacist, Lab technician, Administrative staff
Description	This outlines the process by which users can reset their password in case they forget it. User has to verify his identity.
Pre-condition	The user attempting to reset their password must have previously registered their account in the system.
Primary Flow	<ul style="list-style-type: none"> • User clicks forgot password option. • System sends a verification code through SMS. • Users have to enter that verification code and reset the password.
Exceptions	If the user enters an invalid verification code system displays an error.
Post-conditions	After resetting the password the user enters into the login page then he has to enter his new password and username to log in.

Use Case ID	9
Use Case Name	Edit profile
Primary Actor/s	Patient, Doctor, Pharmacist, Lab technician, Administrative staff
Description	The event of editing a user profile within the system. Users have the ability to update personal details such as contact information and preferences.
Pre-condition	The user's profile information must be accessible and editable within the system interface.
Primary Flow	<ul style="list-style-type: none"> • Users have to log into the system. • Click edit profile option. • Then update profile and save changes.
Exceptions	If the user attempts to save changes with invalid or improperly formatted system triggers an error.
Post-conditions	The user's profile information is successfully updated and saved in the system.

Use Case ID	10
Use Case Name	Chat with patient
Primary Actor/s	Doctor
Description	The event of communicating with patient allowing for medical advice, answering questions
Pre-condition	The patient must have an active account and be within the doctor's care or have a scheduled appointment with the doctor.
Primary Flow	<ul style="list-style-type: none">• Doctor accesses the patient chat interface.• Doctor selects the not replied chats.• Reply to previous messages.
Exceptions	Display an error message when signal issues prevent the doctor from starting or continuing the chat session.
Post-conditions	Display a confirmation status indicating that the message was sent successfully

Use Case ID	11
Use Case Name	View patient medical records
Primary Actor/s	Doctor
Description	The event of the doctor viewing the patient's health history
Pre-condition	User must log into the system as a doctor.
Primary Flow	<ul style="list-style-type: none">• Enter patient id• Access patient records page• View the health history for the relevant patient
Exceptions	Display an error message if the user without necessary permissions attempts to view patient medical records
Post-conditions	doctor successfully views the selected patient's medical records, including medical history, previous prescriptions, and test results

Use Case ID	12
Use Case Name	View lab requests
Primary Actor/s	Lab technician
Description	The event of lab technician viewing the requests of lab tests to be done
Pre-condition	The patient should be suggested a lab test by a doctor
Primary Flow	<ul style="list-style-type: none">• Lab technician logs in to the system.• Go to the requested lab tests page.• Enter patient ID.• View the list of requested lab tests for the relevant patient.
Exceptions	Display an empty list in case the patient has not been suggested any tests
Post-conditions	Lab technician can start the process of the lab test

Use Case ID	13
Use Case Name	Update the status of lab requests
Primary Actor/s	Lab technician
Description	The event of updating the status of the lab test as the process goes on to ensure proper tracking and communication
Pre-condition	The lab technician is logged into the patient care system The system has lab requests suggested to the patient The lab tests have been received and are being processed
Primary Flow	<ul style="list-style-type: none"> • Lab technician selects a specific lab test request from the list • Update the status to “Received” when the lab test is viewed and accepted by a lab technician • Change the status to “In Progress” when the lab test is going on • Change the status to “Completed” when the test is done • System generates notifications to inform the relevant stakeholders (doctors and patients) about the updated status of the lab tests
Exceptions	<p>Change the status to “Pending” if the test cannot be done due to inventory issues</p> <p>Display error message when attempted to update the status with invalid data</p>
Post-conditions	<p>The status of the lab tests Is updated in the system</p> <p>Relevant stakeholders (doctors and patients) are notified of the updated status</p>

Use Case ID	14
Use Case Name	Upload lab test results
Primary Actor/s	Lab technician
Description	The event of uploading the test results once the tests are completed
Pre-condition	<p>The lab technician is logged into the patient care system</p> <p>The lab tests have been completed and results are available for upload</p>
Primary Flow	<ul style="list-style-type: none"> ● Lab technician navigates to the section for completed lab tests of the relevant patient ● Upload the completed lab test results along with any relevant documents or images associated with the test results ● Save the changes ● Print the lab test results to hand-over to the patient
Exceptions	System displays an error message when attempted to enter invalid data
Post-conditions	<p>The lab test results are successfully uploaded to the system</p> <p>The relevant stakeholders (doctors and patients) are notified that lab test results are available</p>

Use Case ID	15
Use Case Name	Chat with management
Primary Actor/s	Lab technician, Administrative staff
Description	The event of communicating efficiently with the management for updates, clarifications, and coordination
Pre-condition	<p>The lab technician is logged into the patient care system</p> <p>The system has a secure chat feature enabled for communication between lab technicians and management</p>
Primary Flow	<ul style="list-style-type: none"> • Lab technician navigates into the chat feature • System displays the chat interface, including a list of available management contacts • Selects a management contact from the list to initiate a chat • Lab technician composes a message and sends the message
Exceptions	If the selected management contact is unavailable, the system provides an option for the lab technician to leave a message or select an alternative contact
Post-conditions	<p>The lab technician successfully communicates with the management through the chat feature</p> <p>Any issues or concerns raised by the lab technician are addressed by the management</p>

Use Case ID	16
Use Case Name	Add remarks and comments
Primary Actor/s	Lab technician
Description	The event of providing additional context or observations related to the lab test results
Pre-condition	The lab technician is logged into the patient care system Lab tests have been completed and are ready for review
Primary Flow	<ul style="list-style-type: none"> • Lab technician navigates to the section of completed lab tests and selects a specific lab test • System displays the detailed information about the selected lab test • Lab technician enters relevant remarks and comments in the designated fields • Lab technician submits the remarks and comments
Exceptions	If the lab tech attempts to add remarks with invalid data, the system displays an error message and prompts the technician to correct the input before submitting
Post-conditions	The remarks and comments are successfully added to the lab test results The updated lab test results with remarks are visible to doctors and patients ³

Use Case ID	17
Use Case Name	Search for a doctor
Primary Actor's	Registered Patient
Description	This use case allows patients to search for and select doctors based on their specialty or name. It enables patients to view detailed profiles of doctors to make an informed decision about which doctor to choose for their medical needs.
Precondition	The patient is logged into the system
Primary Flow	<ul style="list-style-type: none"> ● Navigate to the "Find a Doctor" section. ● Search by specialty or name. ● View doctor profiles and select a preferred doctor.
Exception	No Doctors Found: <ul style="list-style-type: none"> ● Trigger: The search yields no results. ● System Response: Display a message indicating that no doctors match the search criteria and suggest modifying the search parameter
Post-conditions	The patient can find and select a doctor.

Use Case ID	18
Use Case Name	Schedule an appointment
Primary Actor's	Registered Patient
Description	This use case allows patients to schedule an appointment with a doctor by selecting a convenient time and date from the doctor's available schedule.
Precondition	The patient is logged into the WellBe system. The doctor has available appointment slots.
Primary Flow	<ul style="list-style-type: none"> ● Navigate to the "Find a Doctor" section. ● Search for doctors by specialty or name. ● View doctor profiles and select a preferred doctor. ● Select an available date and time from the doctor's schedule. ● Book the appointment. ● Receive confirmation of the appointment.

Exception	<p>No Available Slots:</p> <ul style="list-style-type: none"> ● Trigger: No available slots match the patient's criteria. ● System Response: Display a message indicating that no available slots match the selected criteria and suggest selecting different dates or times.
Post-conditions	<p>The patient successfully schedules an appointment with the doctor.</p> <p>If the appointment is canceled by either the doctor or the patient, rescheduling must be done (no refund provided).</p>

Use Case ID	19
Use Case Name	Pay for an appointment
Primary Actor's	Registered Patient
Description	This use case allows patients to complete the payment process for their scheduled appointments through the WellBe system. The patient can use various payment methods to ensure their appointment is confirmed.
Precondition	<p>The patient is logged into the WellBe system.</p> <p>The patient has a scheduled appointment that requires payment.</p>
Primary Flow	<ul style="list-style-type: none"> ● Navigate to the "Appointments" section. ● Select the scheduled appointment that requires payment. ● Click on "Pay for Appointment". ● Choose a preferred payment method (e.g., credit card, debit card, online banking, etc.). ● Enter payment details and confirm the payment. ● Review and confirm the payment details. ● Click "Submit" to process the payment. ● Receive a payment confirmation message. ● The appointment status is updated to "Paid"
Exception	<p>Payment Failure:</p> <ul style="list-style-type: none"> ● Trigger: The payment process fails due to incorrect payment details or insufficient funds. ● System Response: Display an error message indicating the reason for the payment failure and suggest corrective actions

	(e.g., re-enter payment details, use a different payment method).
Post-conditions	<p>The payment is successfully processed.</p> <p>The appointment status is updated to reflect that payment has been made.</p> <p>The patient receives a confirmation message for the payment.</p>

Use Case ID	20
Use Case Name	Receive reminders for appointment
Primary Actor's	Registered Patient
Description	This use case describes how a patient receives reminders for their upcoming appointment in the WellBe system.
Precondition	<p>The patient is logged into the WellBe system.</p> <p>The patient has a scheduled appointment.</p>
Primary Flow	<p>Scheduled Reminders:</p> <ul style="list-style-type: none"> • The system automatically sends reminders to the patient at specified intervals before the appointment. • 1 day before: The patient receives a reminder via email or SMS about the upcoming appointment. • 2 hours before: Another reminder is sent to the patient via email or SMS, providing additional notification closer to the appointment time.
Exception	<p>No Scheduled Appointment:</p> <ul style="list-style-type: none"> • Trigger: The patient does not have any upcoming appointments scheduled. • System Response: No reminders are sent, and the patient can schedule an appointment through the system if needed.
Post-conditions	<p>The patient receives reminders for their upcoming appointment as scheduled.</p> <p>Reminders help the patient prepare and remember their appointment details effectively</p>

Use Case ID	21
Use Case Name	Schedule an appointment
Primary Actor's	Registered Patient
Description	This use case describes the process of sending automated reminders to patients for their scheduled appointments. The reminders are sent via email or SMS to ensure patients are aware of their upcoming appointments
Precondition	The patient is logged into the WellBe system. The patient has a scheduled appointment in the system. The patient's contact information (email and/or phone number) is correctly entered in their profile.
Primary Flow	<p>System Check:</p> <ul style="list-style-type: none"> • The system continuously monitors scheduled appointments. <p>First Reminder:</p> <ul style="list-style-type: none"> • 1 day before the appointment, the system automatically sends a reminder to the patient's email and/or SMS. <p>Second Reminder:</p> <ul style="list-style-type: none"> • 2 hours before the appointment, the system sends a second reminder to the patient's email and/or SMS. <p>Appointment Arrival Notification:</p> <ul style="list-style-type: none"> • When the doctor arrives, the system sends a notification with the appointment number to the patient's email and/or SMS.
Exception	<p>Invalid Contact Information:</p> <ul style="list-style-type: none"> • Trigger: The patient's contact information is incorrect or outdated. • System Response: The system logs an error and attempts to notify the patient through alternative contact methods if available. The system may also alert the patient to update their contact information during their next login.
Post-conditions	The patient receives timely reminders and notifications for their appointment. The reminders help the patient to be aware of and attend their scheduled appointment on time.

Use Case ID	22
Use Case Name	Chat with a doctor
Primary Actor's	Registered Patient
Description	This use case describes how a patient can send messages to doctors through the WellBe system and receive direct replies from them
Precondition	The patient is logged into the WellBe system. The patient has a registered profile. The patient and doctor have access to the chat functionality.
Primary Flow	<p>Open Chat Section:</p> <ul style="list-style-type: none"> • The patient logs into the WellBe system. • The patient navigates to the "Chat with Doctors" section. <p>Send Messages via Management Interface:</p> <ul style="list-style-type: none"> • The patient selects the doctor they wish to chat with from the list of available doctors. • The patient types a message in the chat interface. • The patient clicks "Send" to dispatch the message. • The message is first received by the management interface for initial processing or forwarding to the relevant doctor. <p>Receive Replies from Doctors Directly:</p> <ul style="list-style-type: none"> • The doctor receives the forwarded message. • The doctor reviews the patient's message. • The doctor types a response and clicks "Send" to reply. • The patient receives a notification of a new message from the doctor. • The patient can read the message and continue the conversation as needed.
Exception	<p>Doctor Unavailable:</p> <ul style="list-style-type: none"> • Trigger: The selected doctor is unavailable or offline. • System Response: The system notifies the patient that the doctor is currently unavailable. The patient can choose to wait or select another doctor.
Post-conditions	<ul style="list-style-type: none"> • The patient successfully sends a message to the doctor and receives a reply. • The conversation is logged and can be accessed by both the patient and doctor for future reference

Use Case ID	23
Use Case Name	View Medical Records
Primary Actor's	Registered Patient
Description	This use case describes how a patient can view their medical records through the WellBe system.
Precondition	The patient is logged into the WellBe system. The patient has a registered profile. Medical records exist in the system for the patient.
Primary Flow	<p>Login:</p> <ul style="list-style-type: none"> The patient logs into the WellBe system using their username and password. <p>Navigate to Medical Records Section:</p> <ul style="list-style-type: none"> The patient navigates to the "Medical Records" section from the dashboard. <p>View Medical Records:</p> <ul style="list-style-type: none"> The system displays a list of available medical records, including past visits, diagnoses, treatments, and lab results. The patient selects a specific record to view detailed information. The patient can view and read through the selected medical record.
Exception	<p>No Medical Records Available:</p> <ul style="list-style-type: none"> Trigger: There are no medical records available for the patient in the system. System Response: The system notifies the patient that no medical records are available. The patient can contact support for further assistance.
Post-conditions	<ul style="list-style-type: none"> The patient successfully views their medical records. The patient has the option to download or print their medical records for personal use.

Use Case ID	24
Use Case Name	View and download lab reports
Primary Actor's	Registered Patient
Description	This use case describes how a patient can view and download their lab reports through the WellBe system.
Precondition	The patient is logged into the WellBe system. The patient has a registered profile. Lab reports exist in the system for the patient.
Primary Flow	<p>Login:</p> <ul style="list-style-type: none"> The patient logs into the WellBe system using their username and password. <p>Navigate to Lab Results Section:</p> <ul style="list-style-type: none"> The patient navigates to the "Lab Results" section from the dashboard. <p>View Lab Reports:</p> <ul style="list-style-type: none"> The system displays a list of available lab reports, including test names, dates, and statuses. The patient selects a specific lab report to view detailed information. The patient can view and read through the selected lab report. <p>Download Lab Reports:</p> <ul style="list-style-type: none"> If needed, the patient can choose to download the lab report by clicking the "Download" button. The system generates a downloadable file (e.g., PDF) of the lab report.
Exception	<p>No Lab Reports Available:</p> <ul style="list-style-type: none"> Trigger: There are no lab reports available for the patient in the system. System Response: The system notifies the patient that no lab reports are available. The patient can contact support for further assistance. <p>Access Denied:</p>

	<ul style="list-style-type: none"> ● Trigger: The patient tries to access the lab reports without proper authorization. ● System Response: The system denies access and prompts the patient to log in with the correct credentials or contact support.
Post-conditions	<ul style="list-style-type: none"> ● The patient successfully views their lab reports. ● The patient has the option to download the lab reports for personal use.

Use Case ID	25
Use Case Name	View next appointment
Primary Actor's	Registered Patient
Description	This use case describes how a patient views details of their next scheduled appointment within the WellBe system.
Precondition	The patient is logged into the WellBe system. The patient has a scheduled appointment.
Primary Flow	<p>Login:</p> <ul style="list-style-type: none"> ● The patient logs into the WellBe system using their username and password. <p>Navigate to Appointments Section:</p> <ul style="list-style-type: none"> ● The patient navigates to the "Appointments" section from the dashboard. <p>View Next Appointment:</p> <ul style="list-style-type: none"> ● The system displays a list of upcoming appointments. ● The patient selects or views the next scheduled appointment to see details such as: <ul style="list-style-type: none"> ○ Appointment date and time ○ Doctor's name and specialty ○ Clinic or location ○ Appointment type (e.g., follow-up, consultation)

Exception	<p>No Scheduled Appointments:</p> <ul style="list-style-type: none"> ● Trigger: The patient has no upcoming appointments scheduled. ● System Response: The system notifies the patient that no appointments are scheduled. The patient can contact the clinic to schedule a new appointment.
Post-conditions	<ul style="list-style-type: none"> ● The patient successfully views details of their next scheduled appointment. ● The patient is informed about the upcoming appointment details.

Use Case ID	26
Use Case Name	View Medication Requests
Primary Actor/s	Pharmacist
Description	The event of a pharmacist viewing and managing incoming prescription requests.
Pre-condition	The login credentials are already in the presence of the user
Primary Flow	<ul style="list-style-type: none"> ● The pharmacist logs into the system. ● Navigate to the medication requests section. ● View the list of incoming prescription requests. ● Manage each request as needed.
Exceptions	Display a message if there are no new prescription requests.
Post-conditions	Pharmacists can start processing the medication requests.

Use Case ID	27
Use Case Name	Update the Status of Medication Requests
Primary Actor/s	Pharmacist
Description	The event of a pharmacist updating the status of medication requests.
Pre-condition	There are existing medication requests in the system.
Primary Flow	<ul style="list-style-type: none"> • The pharmacist logs into the system. • Navigate to the medication requests section. • Select a medication request. • Change the status to "Ready to Pick", or "Issued" as appropriate.
Exceptions	Display error message in case of entering incorrect username or password
Post-conditions	The status of the medication request is updated.

Use Case ID	28
Use Case Name	Hand Over the Medicines
Primary Actor/s	Pharmacist
Description	The event of a pharmacist physically handing over the medicines to the patient and updating the system accordingly.
Pre-condition	Medication requests are marked as "Ready to Pick".
Primary Flow	<ul style="list-style-type: none"> • The pharmacist logs into the system. • Navigate to the medication requests section. • Select a request marked as "Ready to Pick". • Physically hand over the medicines to the patient. • Update the status to "Issued".
Exceptions	Display an error message if the status update fails.
Post-conditions	The medication request status is updated to "Issued".

Use Case ID	29
Use Case Name	Update Remarks
Primary Actor/s	Pharmacist
Description	The event of a pharmacist adding remarks for physical handover of medicines or unavailability.
Pre-condition	There are existing medication requests in the system.
Primary Flow	<ul style="list-style-type: none"> • The pharmacist logs into the system. • Navigate to the medication requests section. • Select a relevant medication request. • Add remarks regarding the physical handover or unavailability of medicines.
Exceptions	Display an error message if adding remarks fails.
Post-conditions	Remarks are added to the medication request.

Use Case ID	30
Use Case Name	Print Prescriptions
Primary Actor/s	Pharmacist
Description	The event of a pharmacist generating and printing prescriptions.
Pre-condition	A prescription needs to be printed due to unavailability of medicine or patient request.
Primary Flow	<ul style="list-style-type: none"> • The pharmacist logs into the system. • Navigate to the medication requests section. • Select a relevant medication request. • Generate and print the prescription.
Exceptions	Display an error message if printing fails.
Post-conditions	A printed prescription is available.

Use Case ID	31
Use Case Name	Chat with the Management
Primary Actor/s	Pharmacist
Description	The event of a pharmacist communicating with management for any issues or updates.
Pre-condition	The pharmacist needs to communicate with management.
Primary Flow	<ul style="list-style-type: none"> • The pharmacist logs into the system. • Navigate to the chat section. • Start a conversation with the management. • Discuss issues or provide updates as needed.
Exceptions	Display an error message if the chat system is unavailable.
Post-conditions	The pharmacist has communicated with management.

Use Case ID	32
Use Case Name	Send Medicine Ready Notification
Primary Actor/s	Pharmacist
Description	The event of a pharmacist notifying patients when their medicines are ready for pick-up.
Pre-condition	Medication requests are marked as "Ready to Pick".
Primary Flow	<ul style="list-style-type: none"> • The pharmacist logs into the system. • Navigate to the medication requests section. • Select a request marked as "Ready to Pick". • Send a notification to the patient.
Exceptions	Display an error message if sending the notification fails.
Post-conditions	The patient is notified that their medicines are ready for pick-up.

Use Case ID	33
Use Case Name	Appointment and Queue Management
Primary Actor/s	Administrative staff
Description	This use case ensures that patient appointments are managed efficiently and the queue is maintained in an orderly manner.
Pre-condition	The patient appointment data is available in the system.
Primary Flow	System updates the queue: <ul style="list-style-type: none">• The system processes the current appointments and updates the queue based on the appointment numbers.
Exceptions	Patient not found in the system: <ul style="list-style-type: none">• The administrative staff checks the appointment data manually and updates the system accordingly.
Post-conditions	<ul style="list-style-type: none">• The queue of patients is updated according to the appointment numbers.• Absent patients' appointments are managed.

8.4. Quality Attributes Requirements

When developing a patient care management system, several key quality attributes are essential to ensure it meets the needs of both healthcare providers and patients effectively. Here are some of the most important quality attributes:

8.4.1. Usability:

Usability in a patient care management system refers to how effectively, efficiently, and satisfactorily users can interact with the system to achieve their goals. Here are key aspects of usability in this context:

- **Ease of Use:** The system should have a user-friendly interface with clear navigation, making it easy for users to find and use features without extensive training.
- **Accessibility:** Ensure the system is accessible to users with disabilities, compliant with standards like WCAG.

8.4.2. Reliability

Reliability in a patient care management system refers to the system's ability to consistently perform its required functions under stated conditions for a specified period. Key aspects of reliability include:

- **Error Handling:** It should handle errors gracefully and ensure data integrity in the event of a failure.
- **Data integrity:** Ensuring that all patient data is accurately recorded, stored, and retrieved without corruption or loss.

8.4.3. Performance

Performance in a patient care management system refers to how well the system responds to user interactions and processes data, ensuring that tasks are completed in a timely and efficient manner. Key aspects of performance include:

- **Real time processing:** Ensuring that any updates or changes to patient data are reflected in real-time for accurate decision-making and care management.
- **Data analysis:** Generating reports and analytics efficiently to support decision-making processes.

8.4.4. Security

Security in a patient care management system is critical to protect sensitive patient information, ensure compliance with legal regulations, and maintain trust in the healthcare system. Key aspects of security include:

- **Data protection:** Patient data should be securely stored and transmitted, complying with regulations like HIPAA.
- **Encryption:** All patient data, both in transit and at rest, should be encrypted to prevent unauthorized access. Strong encryption methods help protect data from breaches.
- **Authentication and Authorization:** Robust mechanisms to ensure only authorized users can access sensitive information.
- **Role-Based Access Control:** Granting access based on user roles and responsibilities to ensure users only have access to the information and functionalities necessary for their tasks.
- **Backup and Recovery:** Performing regular backups of patient data to prevent data loss and ensure availability in case of system failure or cyberattacks.

8.4.5. Data Accuracy

Data accuracy in a patient care management system is crucial for ensuring that the information used for patient care is reliable, precise, and trustworthy. Here are key aspects of data accuracy in this context:

- **Precision:** Ensuring the data entered and processed is accurate and reliable.
- **Validation:** Incorporating checks to validate data input and updates.
- **Standardization:** Using standardized formats and terminologies (e.g. medical codes, units of measurement) to ensure consistency and reduce ambiguities.

8.3.6. Maintainability

Maintainability in a patient care management system refers to the ease with which the system can be modified to fix defects, improve performance, or adapt to a changing environment. Here are key aspects of maintainability in this context:

- **Modularity:** The system should be designed in a way that makes it easy to update and maintain.
- **Reusable components:** Using reusable components to avoid redundancy and simplify updates across the system.
- **Documentation:** Comprehensive documentation for users and developers, including system architecture, code comments, user manuals, and troubleshooting guides.
- **Up-to-Date Information:** Ensuring that all documentation is current and reflects the latest changes and updates in the system.
- **Code quality:** Adhering to consistent coding standards and best practices to maintain uniformity across the codebase.
- **Version Control:** Using version control system (Git) to track changes, manage code versions, and facilitate collaboration among developers.

9. Technologies to be used

Main Technologies

- Frontend HTML, CSS, JavaScript
- Backend PHP
- Database MySQL

These technologies were chosen to develop the application because they provide a good feature set, have a low learning curve and there are more resources to learn from. Because of that development work can be carried out, without heavily relying on frameworks and libraries. Also, all of the technologies are open source and freely available.

Other Technologies

Web server	Apache
Version Control & Repo. Hosting	Git - GitHub
Testing	Manual Testing
APIs	Payment Gateway, SMS
IDEs & Other tools	VS Code, WAMP, Draw.io, Google workspace, GitHub Projects, Figma




Since most of the project work is to be completed online, we are utilizing multiple online collaboration tools to be in sync with each other's work. Also, integration with third-party services are required for features such as payments handling, sending SMS.

10. Declaration

We as members of the project titled WellBe - Personalized Patient Care Management System, certify that we will carry out this project according to the guidelines provided by the coordinators and supervisors of the course as well as we will not incorporate, without acknowledgment, any material previously submitted for a degree or diploma in any university.

To the best of our knowledge and belief, the project work will not contain any material previously published or written by another person or ourselves except where due reference is made in the text of appropriate places.

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