6CS007 – Project and Professionalism

Project Proposal

Medicare

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1. Main Questions to Explore

1. What are the issues with developing easy to use and effective hospital management solution for patients and employees?

2. In what ways can current technology assist the performance of hospital operations?

3. What does today's healthcare organization networks not have? And how can Medicare meet those needs?

4. There are key questions asking about the technical issues for Medicare such as safety, availability, and multi-user carry.

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2. Project Overview

Medicare as a tool is web-based one, whose aim is to facilitate the management of hospitals. That will assist in arranging patient files, appointments, charging and general dealings between the patient and the healthcare institution.

Modern practice does required smarter means to match up to the patient needs as well as hospital productivity. A main interest Medicare has is to design an environment that is straightforward and easy to navigate for all users – doctors capable of handling technology as well as the layman patient.

The goal of Medicare is to advance the quality of hospital services while not increasing the complexity. In this, it integrates friendly and effective designs together with advanced technology to ease operations.

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3. Problems Medicare Will Address

3.1 Specific Problem

Many times, managing a hospital entails the use of several applications for tracking patients, billing and appointments. This results to complication, slowness and poor service delivery.

3.2 Who is Affected?

This affects doctors, nurses, hospital managers or board of managers, and most significantly the patients. Negligence can result in a failure to meet appointments, record complications or loss of time on a patient's treatment.

3.3 Existing Solutions and Their Weaknesses

Hospital software currently in use in many facilities worldwide is often complex, difficult to manage, or has insufficient compatibility between the various functionalities such as the patient records and billing systems.

3.4 Consequences of Not Addressing This Issue

In any hospital, the effects of these poor management systems include low patient satisfaction, poor operation and possibly, financial losses.

3.5 Examples

- **Scenario 1**: A patient appoints a date and time but does not get a reminder of the appointment and he or she never shows up.
- **Scenario 2**: A doctor wastes time and energy looking for missing, lost or even records that are only partially filled.

3.6 Impact of Solving These Issues

For Medicare, hospital will also save time, experience less mistake and give a better feel to both patient and workers.

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4. Goals and Objectives

4.1 Goal

Medicare primary purpose is to manage the hospitals processes in addition to enhancing the services offered to clients.

4.2 Objectives

- Possibility of secure registration for all type of users: patients, doctors, administrators.
- Ensure there are simple ways of scheduling appoints and reminding such an appoint.
- Maintain patient and doctor databases with more information contained.
- Limit account reconciliation by using a fast, easy invoice system.
- Provide other forms of communication via the internet.

- Data safety and reliability must be provided.

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5. Features Overview

5.1 Main Features

a. User Accounts: Secure and personalized access

- **How it will be done:**
    - It will be possible to sign in the application for every user (patient, doctor or admin) with the username and password.
    - Such a system will have four main features where the role of consultation and management of the system will be allocated for the entire system so that patient's records can only be seen by the patient the doctor can only access the records of the patient to be consulted and the admin will be also be able to monitor the entire system.

b. Appointment Scheduler: Book appointments effortlessly

- **How it will be done:**
    - Doctors will input their availability into their calendar in the system.
    - Patients just have to login, then choose their doctor of choice and see the available slots for him or her and book an appointment.
    - It will also be in a position to create personal alerts either through an e mail of up and coming schedules.
    - There will be availability to reschedule or cancel, giving the calendar a real–time feature upon doing so.

c. Patient Profiles: All health records in one place

- **How it will be done:**
    - Patients are able to build their account and fill in personal information and medical history.
    - Consultants include doctors and admins; they can upload and modify the information after consultation, such as diagnosis, prescription or lab report.
    - Patients will also be able to upload documents including old reports or insurance papers among others easily.

d. Doctor Profiles: Clear and updated doctor details

- **How it will be done:**

- Patients will see the doctors' information specialty.
- They will be able to use one for scheduling their calendar, and marking down their time off and modifications to it.
- Consultation details will be registered in the system so that a doctor can be informed of a patient's history prior to receiving him/her.

e. Billing: Easy payments and tracking

- **How it will be done:**
  - It will also include creating a detailed invoice of the services offered every after consultations or any form of treatment.
  - Patients will be able to pay digitally for their treatments through graphical user interface by credit cards, wallet users or online transactions (Khati).
  - Administrators will have a control panel for tracking payments and it results to prepare the financial statements for the hospital executives.

f. Communication: Direct contact with doctors

- **How it will be done:**
  - A secure chat feature will allow patients to communicate by sending messages to the doctors and follow up with questions.
  - Doctors can answer and even write down their prescriptions or recommendation right in the chat.

g. Notifications: Stay informed

- **How it will be done:**
  - The system will send notifications for important events like:
    - Confirmation notifications or a reminder for an appointment.
    - A prescription for a subsequent appointment or a review of instructions concerning the use of certain medication.

h. Admin Tools: Easy hospital management

- **How it will be done:**

A central admin dashboard will allow hospital staff to manage:

- Patient and doctor logins.

- Reporting and analytical tools will assist admins in witnessing patterns (as in traffic, revenue) and improve results.
- Admins are able to make configuration on what roles and permission certain people can access in any part of the system.

5.2 User Stories

a. User Accounts: Secure and Personalized Access

- As a patient, I could need the product when patient is allowed to enter personal account with username and password to view the data.
- A doctor to be able to access the system should log in with his/her credentials where he/she will find his/her patient consultations and records
- As an admin, I am rarely involved with the accounts, yet I need to be able to change users' roles and provide patients, doctors, and staff with the access to only a definite set of features.

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b. Appointment Scheduler: Book Appointments Effortlessly

- As a doctor, I want to submit my timetable in the system so that as a result, patients may fix appointments during my working period.
- As a patient, Apart from that, there are things like browsing through slots for the preferred doctor and making an appointment online.
- As a patient, I would also like to have my appointments I have remind me of my coming appointments through my email.
- As a patient, I need the flexibility of changing or even deleting my appointments, with the system's changed reflected at the same time so as to maintain a healthy schedule.
- As an admin, I would like to have real time tracking of appointments in a way that the general hospital schedule is not out of date.

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c. Patient Profiles: All Health Records in One Place

- As a patient, I want to make decisions about the contents of my profile, and decide what personal information and health data I have is visible and accessible in one place.
- As a doctor, I would like to be able to input consultation notes, diagnosis and prescriptions so that there is accurate record of the patient.

- As a patient, I should be allowed to upload other reports or insurance documents that are quite old, but easily accessible in my profile.
- As an admin, I would like to control and monitor the profiles of the patients to make sure all the data is entered and sorted.

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d. Doctor Profiles: Clear and Updated Doctor Details

- As a doctor, I want a profile that will show my qualification, area of specialization, experience, and languages in order for the patient to be informed that I am informed.
- As a doctor, I would like to schedule my working days and restrict the possibility for patients to take a date during my days off.
- As a doctor, Before consultation, I need consultation history of each patient so that I can have better treatment plan for the patients.

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e. Billing: Easy Payments and Tracking

- As a patient, During each consultation, I'd like to duly receive an elaborate invoice so that I comprehend the expenses.
- As a patient, I want to be able to make payments for my bills using credit cards, wallets or online transfers which should suit me.
- As a patient, I would like to have in my system where I should be notified of any payments which are due for payment so that I do not oversleep my payment schedules.
- As an admin, I need is a dashboard which would have records of payments and present financial statements so as to monitor the hospital revenue.

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f. Communication: Direct Contact with Doctors

- As a patient, I need a messaging service that is secure in order I can message my doctor once I am done with the consultation.
- As a doctor, I'd like to leave replies to messages to notify patients about their prescriptions as well as advice right in the chat window for efficiency.

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g. Notifications: Stay Informed

- As a patient, The concern is to get notifications for every appointment so that one is able to remind him or her about the scheduled appointment.
- As a patient, I would like reminders of when to take medication and when I need to visit the doctor again.
- As a doctor, In this case I should be notified when I am to attend various appointments so that I prepare for consultations.

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h. Admin Tools: Easy Hospital Management

- As an admin, I need an account management console where I would be able to control users and manage hospitals activities to guarantee their proper performance.
- As an admin, I want the reports and analytics tools to point out things such as when places are most busy or even revenue to have better decisions made.
- As an admin, Based on this it is my desire to implement roles and permission mechanisms to ensure only those people who are supposed to access certain types of information can do that.

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6. Visual Design Elements

6.1 Flowcharts

- **Flowchart for User Authentication** (Space for visual representation).

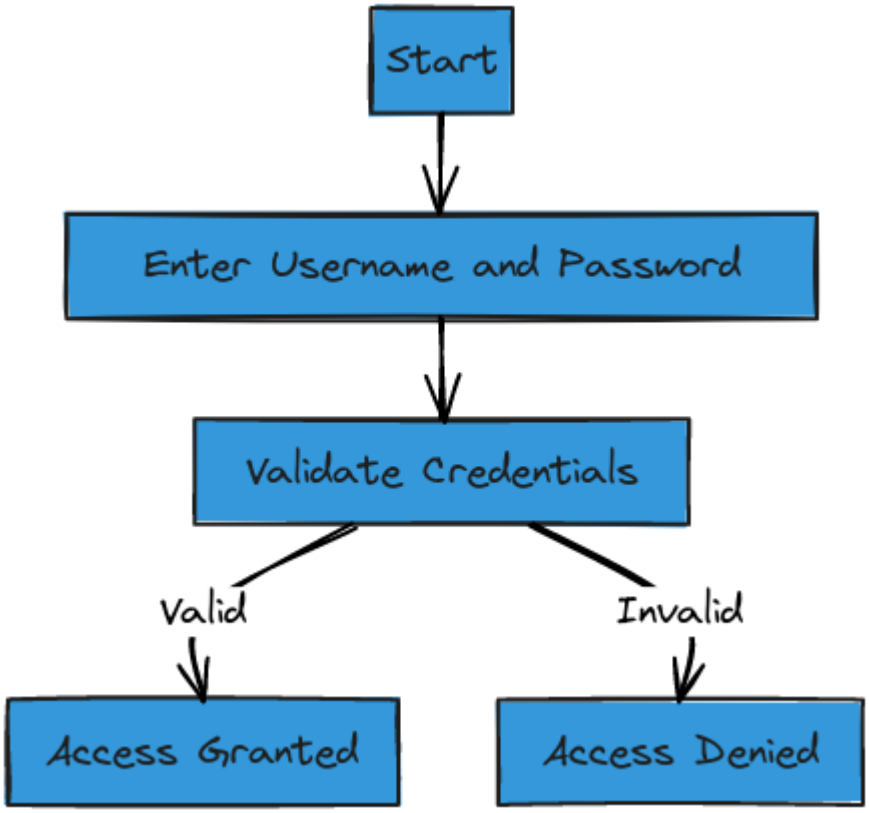


Figure 1 : ***Flowchart for User Authentication***

Below is an example, and a flowchart showing a simple authentication procedure. It starts with a start point, then the user enters his/her username and password. Then, the entered credentials are verified among users and correspondingly, the authorized user signs in. If the credentials are valid, then a person is allowed into the site; otherwise, access is restricted.

- **Flowchart for Appointment Booking** (Space for visual representation).

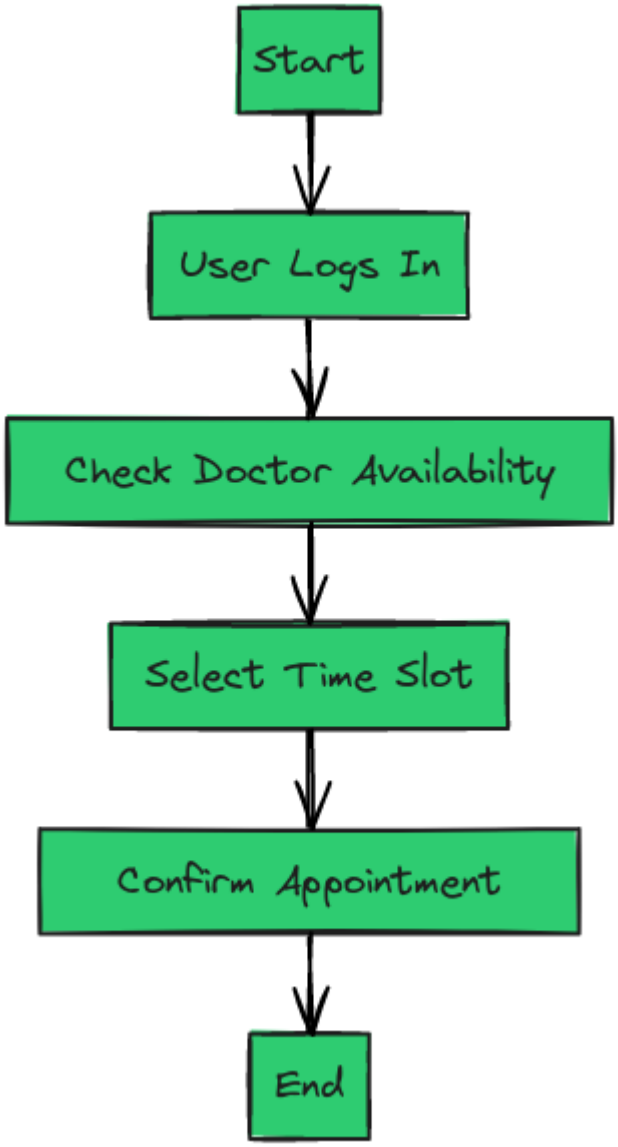


Figure 2: ***Flowchart for Appointment Booking***

This is a flowchart on how one can book a doctor's appointment. Here it begins with a user signing into the system. The system then secondly verifies the availability of the doctor. If available, the current selected time slot for the event is selected. The appointment is then made, and the process comes to a halt at this point.

- **Flowchart for Billing System** (Space for visual representation).

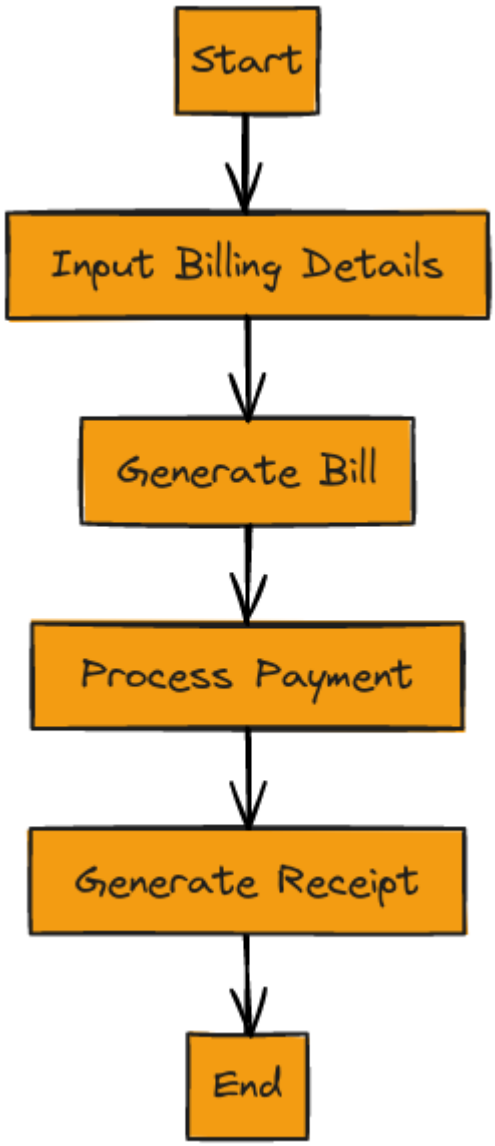


Figure 3: ***Flowchart for Billing System***

The flowchart presented below illustrates the process of making a payment. After putting the billing details, a particular bill is generated. Then follows the payment and then a receipt is issued. The process ends after that.

6.2 Activity Diagrams

- **User Registration Process** (Space for activity diagram).

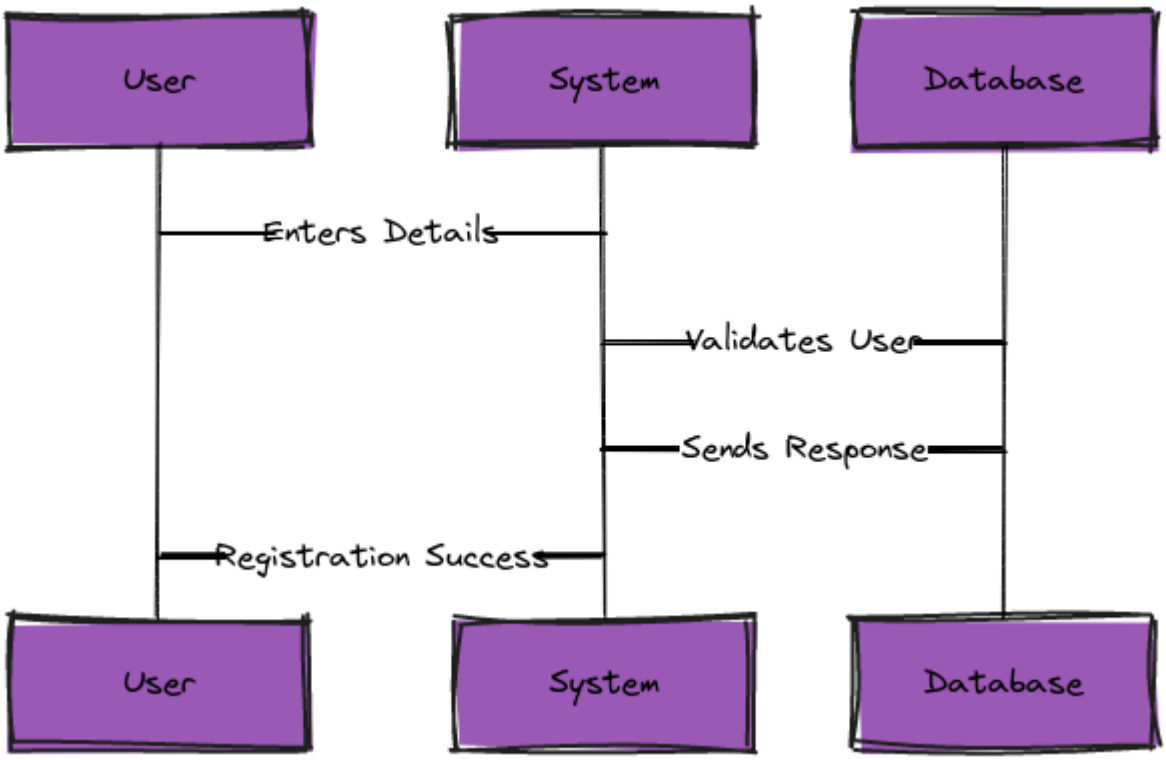


Figure 4: ***User Registration Process***

This diagram shows the activities involved in the registration of users of the system. In the first step, the user has filled his/her details into the system. It then contacts the database to check on the entered information and to compare them with the original data. The details are verified in the database and the system receives a response from the database. If the details are valid, the system makes a confirmation on the registration success to the user.

- **Patient Profile Management Workflow** (Space for activity diagram).

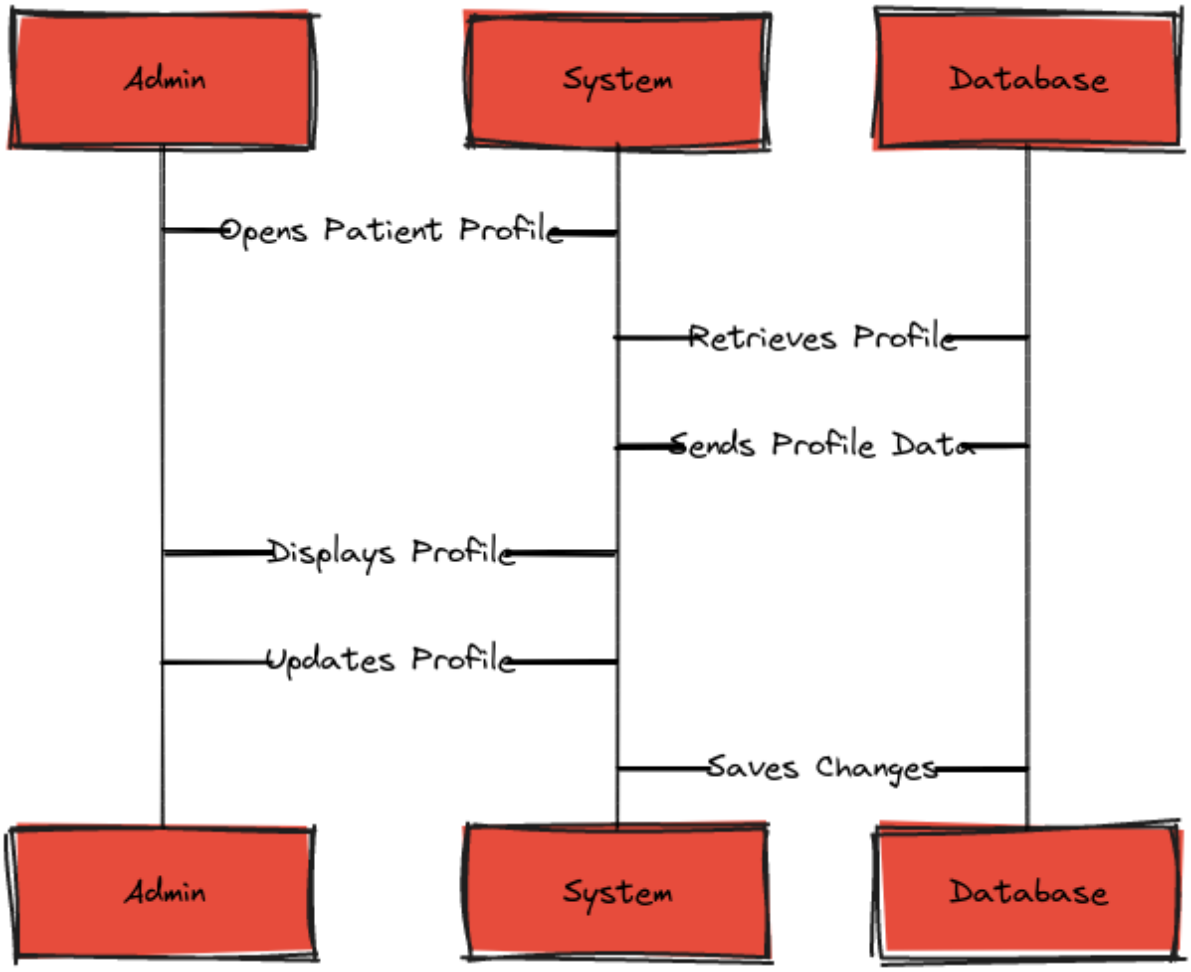


Figure 5: ***Patient Profile Management Workflow***

This diagram illustrates how an admin works on a patient database. First of all, the admin needs to access the particular patient's folder from the system. The profile data is then called from the databased and this is displayed to the admin of the system. Whenever the admin modifies some aspects of the profile, the system returns these modifications back to the database for correct storage.

- **Doctor Availability Scheduling** (Space for activity diagram)

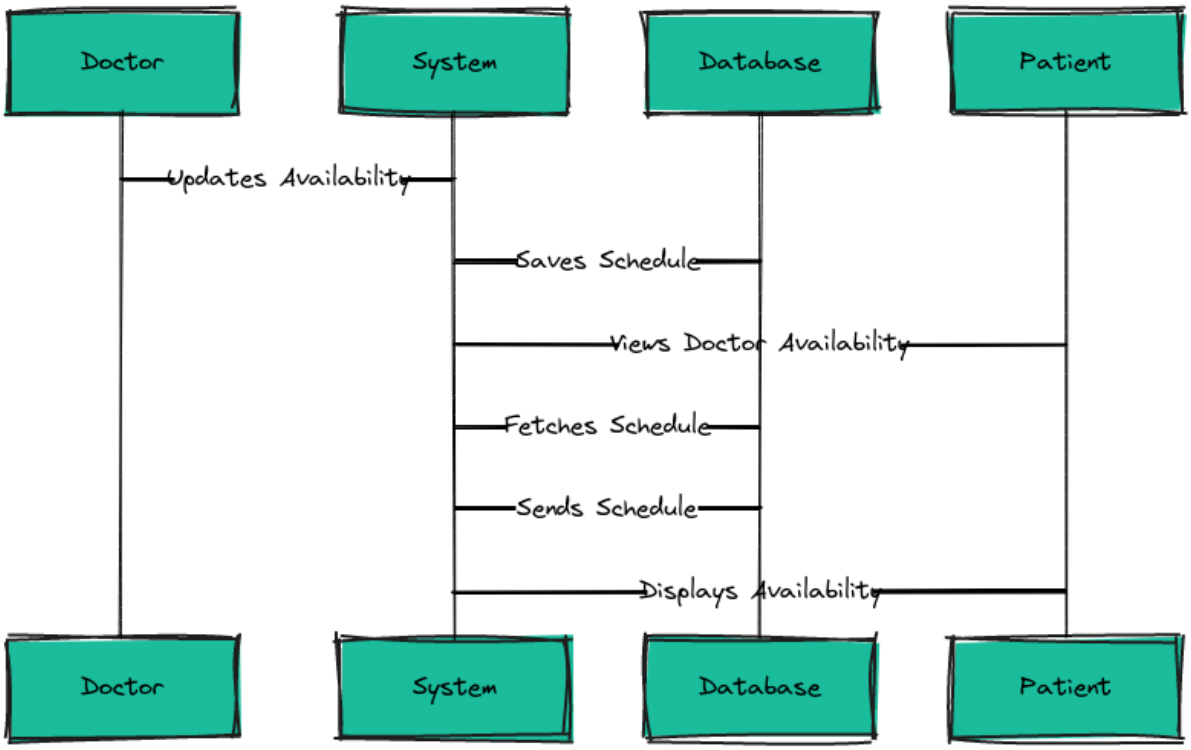


Figure 6: ***Doctor Availability Scheduling***

This diagram shows how a doctors' timetable is schedule and made available to patients. The doctor changes his or her availability with the system. The system stores this updated schedule on the database. If the patient just wants to see the doctor's schedule, the system retrieves the schedule that had been stored in the database, transmits the schedule data to the system, and then relays to the patient the schedule of the doctor.

6.3 Entity-Relationship Diagrams (ERD)

- **Hospital Management System Database Design** (Space for ERD).

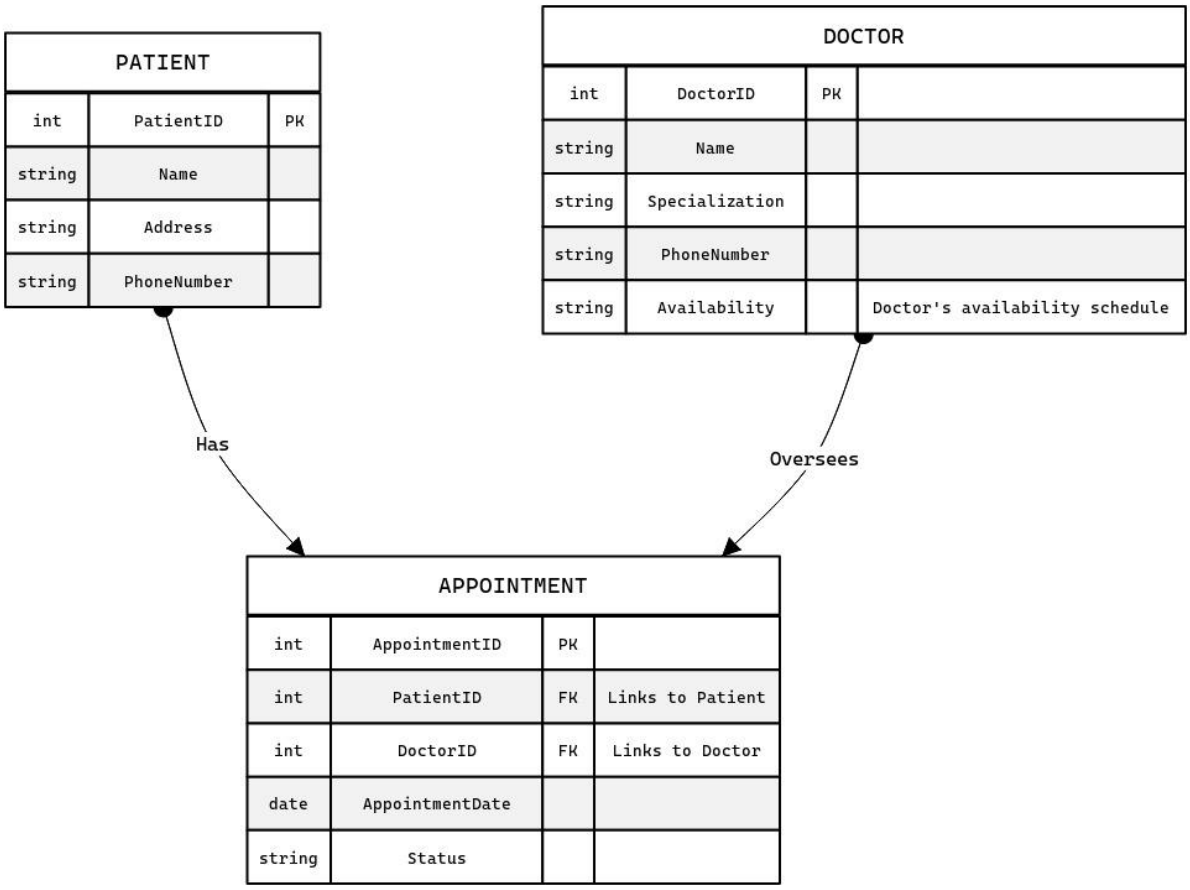


Figure 7: ***Hospital Management System Database Design***

6.4 Gantt Chart

- **Project Development Timeline** (Space for Gantt chart representation).

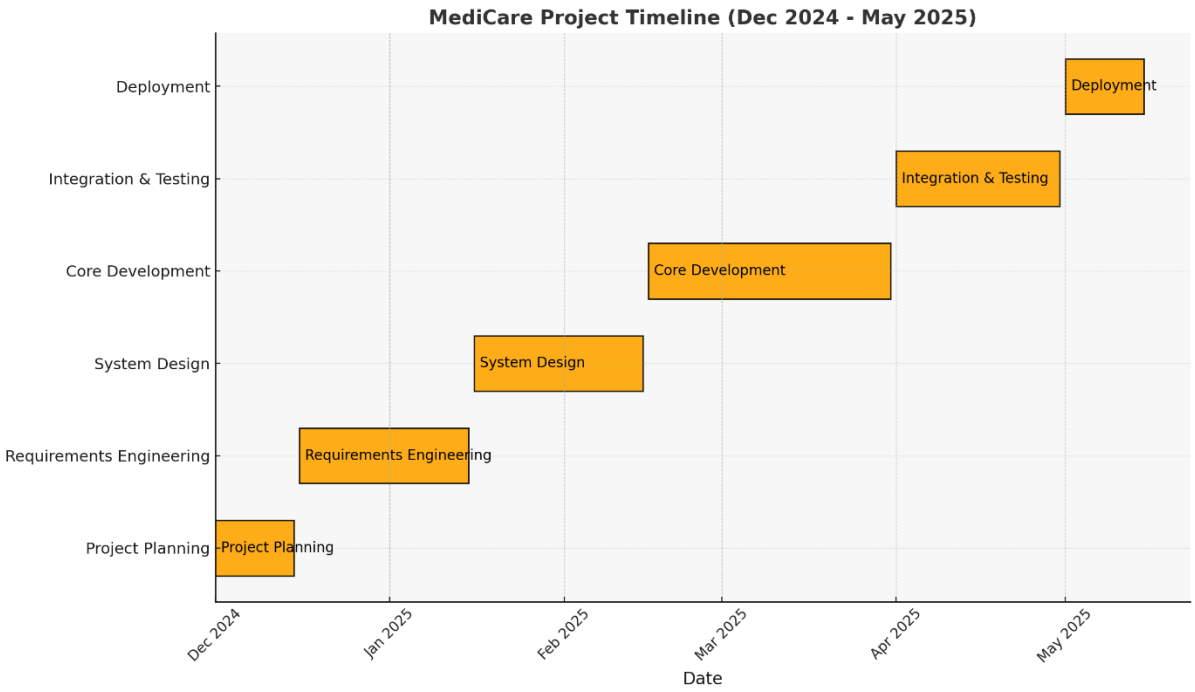
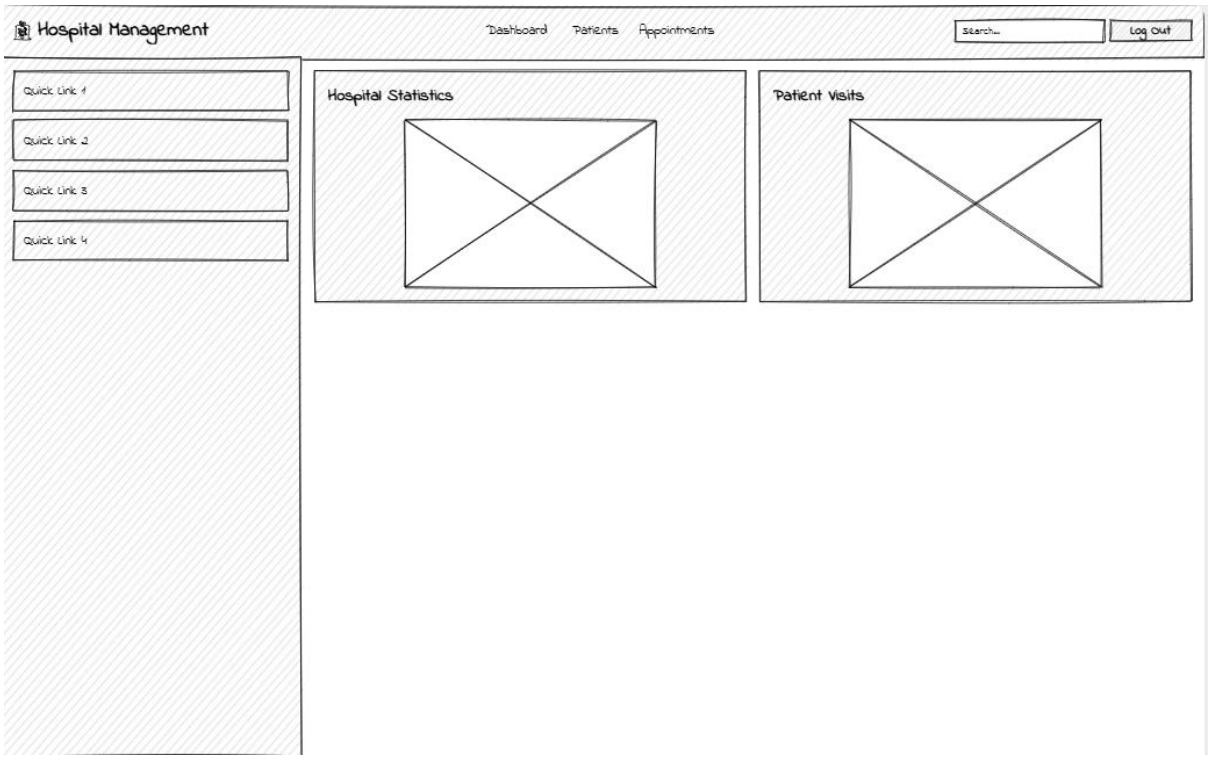


Figure 8: ***Project Development Timeline***

6.4 Wireframe



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7. Development Approach

7.1 Step-by-Step Plan

1. **Gather Requirements**: Know what users want on the system.
2. **Design**: Design clear and basic pages, as well as navigation patterns in the form of diagrams.
3. **Develop**: Develop all the features gradually; beginning with the registration of users.
4. **Test**: Is every possible component of the application operational to the last detail?
5. **Deploy**: Sign up for Medicare and ensure people get to use it.
6. **Feedback and Improve**: Run surveys to be able to improve it continually.

7.2 Tools and Technologies

- **Frontend**: React.js for simplicity and better UI or User Interface Design.
- **Backend**: Node.js and Express.js for all servers to be handled.
- **Database**: MongoDB for securely storing data e.g. patient's records and appointment as depicted below.
- **Security**: Secure accounts and data, two factors in authentication.
- **Deployment**: Hosting on trusted environment so that the system has availability.

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8. Reference

- **World Health Organization (WHO).** *Digital Health Interventions*. Retrieved from https://www.who.int.
    - WHO guidelines on implementing digital health technologies.

- **Health IT.gov.** *Benefits of Health IT*. Retrieved from https://www.healthit.gov.
    - Benefits and adoption of IT in the healthcare sector.

9. Additional Resources

- **Github**