# **Project Proposal**

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CPSC 471: Database Management System

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### **1. Introduction**

**Definitions**: A **Clinic Management System database (CMS)** is a digital solution designed to manage, organize, and optimize hospital operations, such as patient records, room bookings, and doctor scheduling.

**Summarize the Problem**: Clinics often face challenges managing large volumes of data efficiently, leading to bottlenecks within the system causing delays in patient care and administrative inefficiencies. This can result in many patients being unable to access medical services due to lower availability and increases the chance of lost or voided information.

**Summarize the Solution**: This project proposes a centralized database model to streamline clinical operations, improve data accessibility, and enhance patient care.

**Motivation**: The CMS will demonstrate how database systems can address real-world problems in healthcare management, ensuring efficiency and better patient outcomes.

**Describe the Format of the Rest of the Proposal**: This proposal is organized as follows:

* Problem Definition: Explains the history, relevance, and challenges of the problem.
* Proposed Solution: Outlines the project's goals and deliverables.
* Motivation: Highlights the necessity and uniqueness of the solution.
* Conclusion: Summarizes the project and provides a timeline.
* References : Lists resources used for research and implementation.

### **2. Problem Definition**

**History of the Problem**Clinics have traditionally relied on manual systems to manage appointments, doctor schedules, and resource allocation. These methods are error-prone and inefficient, particularly in busy facilities.

**Why is this Problem Interesting?**Efficient hospital management is necessary for patient care and resource utilization. Solving this problem with a database system offers both academic and practical value, showcasing the real-world impact of database design.

**When and Why Does the Problem Occur?**The problem occurs during busy or peak times when clinics face high patient volumes. This includes instances where patients are trying to book appointments, whether they are new or returning. At the same time, the system also needs to manage appointment rescheduling, cancellations, and updates to doctor availability demands, scheduling conflicts, resource mismanagement, and delays in patient care can easily arise.

**Is the Problem Already Solved? What is Done Now?**Large Clinics use advanced CMS or MSS (Medical Scheduling Software) solutions like **DoctorConnect** or **PractiseQ**, but these are expensive and complex, making them unsuitable for smaller facilities. Many clinics still use outdated or manual methods for managing these tasks.

**Are there Similar Systems or Solutions?**Yes, systems like **DoctorConnect** or **NexHealth** exist, but they are designed for larger institutions and involve high costs. Open-source alternatives like **OpenMRS** are available, but they often require technical expertise for implementation and maintenance.

**Are there Possible Improvements to Current Solutions?**Existing solutions can be simplified and tailored to smaller facilities. Focusing on essential functions like appointment booking, and doctor and staff availability, while eliminating unnecessary complexities can improve usability and accessibility.

### **3. Proposed Solution**

The proposed solution is to develop a **Clinic Management System (CMS)** that streamlines the process of managing patient appointments, doctor schedules, and clinic operations. By focusing on the core functionalities required for clinic workflows, this system will provide an efficient and reliable database model for both front-end users (patients) and back-end users (clinic staff).

#### **What Does this Project Achieve?**

This project aims to create a centralized database system that helps with key operations of a clinic, such as appointment booking, managing doctor availability, and handling patient information. The CMS reduces manual errors, eliminates scheduling conflicts, and enhances the clinic’s operational efficiency.

#### **What Will the Project Produce?**

The project will produce a functional database system with the following features:

1. **Appointment Management:**
   * Patients can book appointments for available dates based on doctor schedules.
   * The system checks and ensures no overlapping appointments for the same doctor.
   * Allows clinic staff to reschedule or cancel appointments.
2. **Doctor Availability Management:**
   * Backend users can input and manage doctor schedules.
   * Displays real-time doctor availability to patients during booking.
   * Prevents overbooking or conflicts in doctor schedules.
3. **Patient Record Management:**
   * Maintains a database of patient details, including contact information, medical history, and past appointments.
   * Allows patients to update personal information, such as address or phone number.
   * Tracks returning patients’ history for better service.
4. **Booking Report:**
   * Patients can specify at the time of booking in a comment box, what regards/problem they are booking it for with a doctor.
5. **Feedback or Complaint System :**
   * A simple module where patients can provide feedback or raise concerns.
   * Backend users can track and review complaints efficiently.

#### **Describe in Relative Detail the Features of Each Product:**

**Appointment Booking Interface:**

* Provides an intuitive interface for patients to select a preferred doctor, view available time slots, and book an appointment.
* Ensures appointments cannot overlap and provides notifications for unavailable slots.

**Doctor Schedule Management:**

* Enables clinic staff to add, update, or block doctor schedules (e.g., for holidays or emergencies).
* Displays the weekly availability of doctors for internal and patient use.

**Patient Database:**

* Stores structured information about patients, enabling easy retrieval and updates.
* Links patient records with their booked appointments and medical history for seamless integration.
* Show patient records for previously booked appointments and comments left by patients

**Backend Administration:**

* Clinic staff can manage all appointments, including rescheduling or cancellations.
* Access to override patient information, delete or add a new patient, and update doctor’s availability.

**Feedback System**

* A basic form for patients to submit complaints or feedback.
* Backend users can manage complaints and log their resolution status

### **4. Motivation**

Efficient Clinic management is important to ensure timely and quality patient care, especially in facilities with limited resources. Many clinics still rely on outdated systems or manual processes, which result in delays, inefficiencies, and data errors that negatively impact patient outcomes.

Our project stands out because it focuses on creating a streamlined, user-friendly clinic management system tailored to the needs of smaller healthcare facilities that cannot afford costly, complex solutions. By simplifying essential operations, such as patient records, staff and doctor scheduling, we provide an accessible solution without unnecessary complexities.

This project demonstrates how database management systems can address real-world problems in healthcare, reducing errors, improving operational efficiency, and enhancing patient care. It emphasizes usability and accessibility, making it a valuable contribution to the healthcare industry, particularly for smaller facilities.

### **5. Conclusion**

This project addresses the challenges faced by smaller healthcare facilities in managing their operations efficiently. The primary problem stems from the reliance on manual processes or expensive, complex systems, which result in delays, scheduling conflicts, and data errors that negatively impact patient care. The motivation for this project lies in creating an accessible, cost-effective solution tailored to the needs of smaller clinics, focusing on essential functionalities without unnecessary complexities. By leveraging database management systems, the proposed Clinic Management System (CMS) streamlines patient appointment booking, doctor schedule management, and patient record maintenance to enhance overall efficiency and service quality.

The proposed solution includes a centralized database system that reduces manual errors, optimizes scheduling processes and improves data accessibility for both front-end users (patients) and back-end users (clinic staff). Additional optional features, such as reporting and feedback systems, further enhance the usability and operational insights provided by the CMS. This project demonstrates how technology can address real-world healthcare challenges while emphasizing user-friendly design and scalability for future enhancements.

**Estimated Timeline:**

* **Week 1–2:** Requirement gathering, initial database design, and system architecture planning.
* **Week 3–4:** Development of core database functionalities, including patient record management and appointment booking modules.
* **Week 5:** Integration of doctor schedule management and testing of the database system for functionality and correctness.
* **Week 6:** Development of optional features, such as reporting and feedback systems.
* **Week 7:** Implementation of the front-end interface for patient and staff users, focusing on user-friendly design.
* **Week 8:** Comprehensive system testing, debugging, and final adjustments.
* **Week 9:** Project deployment, documentation completion, and preparation for final presentation.
* **Final Week:** Submission of the completed project, along with the final report and demonstration.

**6. References:**

* <https://www.capterra.com/sem-compare/medical-scheduling-software/?utm_source=ps-google&utm_medium=ppc&utm_campaign=:1:CAP:2:COM:3:All:4:INTL:5:BAU:6:SOF:7:Desktop:8:BR:9:Medical_Scheduling&network=g&gclid=CjwKCAiAtNK8BhBBEiwA8wVt97NWG67TsoNH2AvMBm7cDQVJAyutWp4Q5rZpU64w8fNx6WTHriliAhoCV2AQAvD_BwE>