

Practical 1

Task2

Design and ER Diagram and Relational Model for the following problem statement

Smart Healthcare Management System

Scenario:

A hospital wants to implement a Smart Healthcare Management System to manage its operations, patients, staff, and equipment efficiently. The system should cover the following aspects:

Entities and Attributes:

1. Patients

- Patient ID (Primary Key), Name, Age, Gender, Contact Information, Address, Medical History.

2. Doctors

- Doctor ID (Primary Key), Name, Specialty, Qualification, Contact Information, Work Schedule.

3. Appointments

- Appointment ID (Primary Key), Date, Time, Reason for Visit, Status (e.g., Scheduled, Completed, Canceled).

4. Medical Records

- Record ID (Primary Key), Patient ID (Foreign Key), Doctor ID (Foreign Key), Date of Record, Diagnosis, Prescribed Medication.

5. Medications

- Medication ID (Primary Key), Name, Manufacturer, Dosage, Expiry Date.

6. Hospital Departments

- Department ID (Primary Key), Name, Location, Head of Department.

7. Staff

- Staff ID (Primary Key), Name, Role (e.g., Nurse, Lab Technician, Admin), Contact Information, Assigned Department.

8. Lab Tests

- Test ID (Primary Key), Patient ID (Foreign Key), Doctor ID (Foreign Key), Test Type, Date, Results.

9. Rooms and Beds

- Room ID (Primary Key), Room Type (e.g., ICU, General), Bed Count, Availability Status.

10. Billing

- Bill ID (Primary Key), Patient ID (Foreign Key), Appointment ID (Foreign Key), Total Amount, Payment Status (Paid, Unpaid).

11. Equipment

- Equipment ID (Primary Key), Name, Type, Assigned Department, Maintenance Schedule.

Relationships to Model:

1. Patients can have multiple appointments with different doctors.
2. Each appointment is associated with a single medical record.
3. Doctors belong to a specific department but can serve patients from any department.
4. Patients may require lab tests ordered by doctors.
5. Hospital staff are assigned to specific departments and may manage equipment.
6. Each patient can be assigned to a specific room and bed during their stay.
7. Billing is associated with patient appointments, lab tests, and medication charges.

Innovative Aspects to Consider:

- Include an entity for wearable health devices that track patient vitals (e.g., heart rate, temperature).
- Add "Emergency Cases" to prioritize critical patients and allocate resources dynamically.
- Use "AI Predictions" as an entity that stores insights about patient health based on previous medical records and wearable device data.
- Track sustainability by including "Energy Consumption" of equipment and departments for eco-friendly initiatives.