Hospital Management System - SQL Project

Step 1: Analyze Requirements

Purpose: Manage patients, doctors, appointments, treatments.

Users: Admin, Doctors, Receptionists, Patients.

Entities: Department, Doctor, Patient, Appointment, Treatment.

Step 2: ER Diagram Design

Entities:

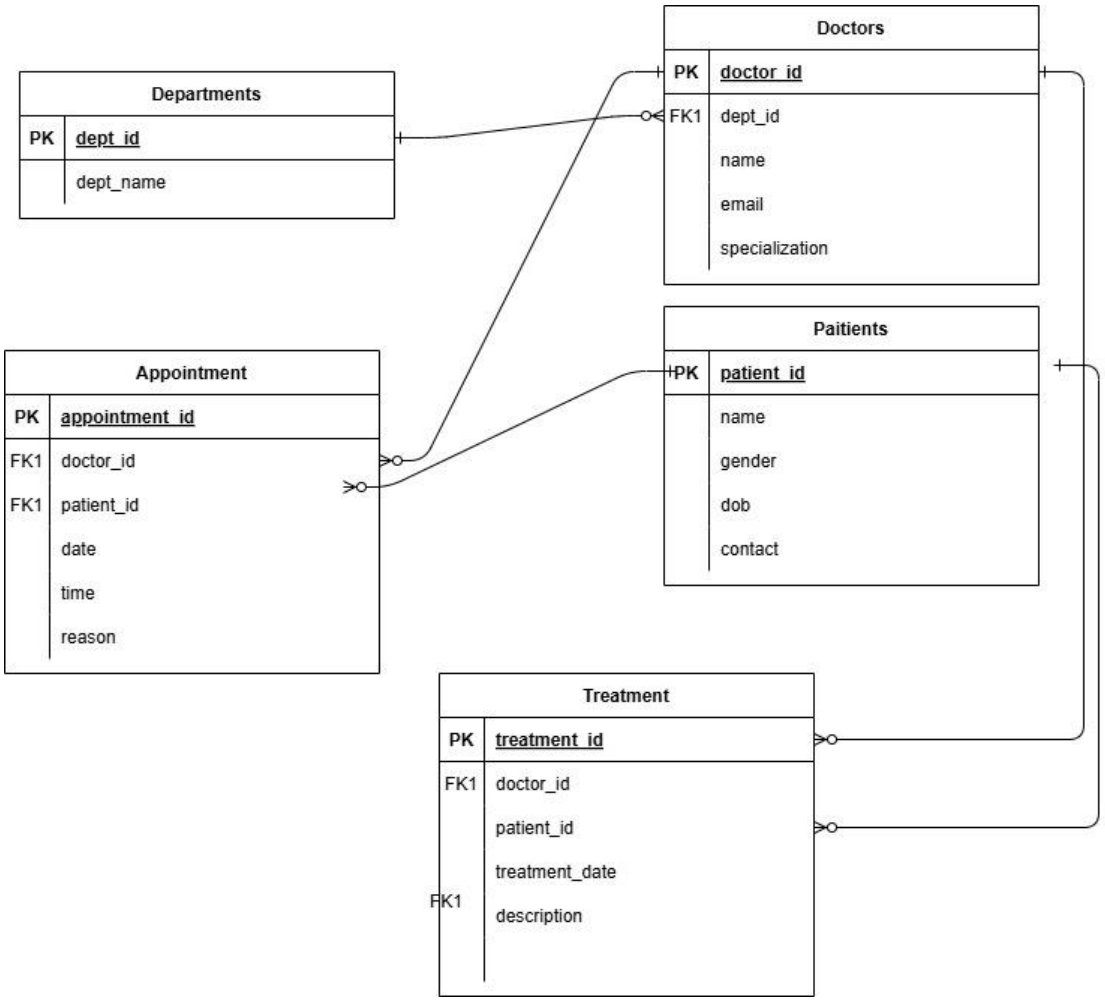
- Department(dept_id, dept_name)

-Doctor(doctor_id, name, specialization, email, dept_id)

-Patient(patient_id, name, gender, DOB, contact)

-Appointment(appointment_id, doctor_id, patient_id, date, time, reason)

-Treatment(treatment_id, patient_id, description, treatment_date, doctor_id)



Step 3: Normalization

1NF: Each table has atomic values (no lists, no repeating groups).
2NF: All non-key attributes depend on the full primary key.
3NF: No transitive dependencies (i.e., non-key attributes don't depend on other non-key attributes).

Step 4: SQL Code (Schema)

Departments **--**

CREATE TABLE departments (

dept_id INT PRIMARY KEY AUTO_INCREMENT,

dept_name VARCHAR(100) NOT NULL

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Doctors --

CREATE TABLE doctors (

doctor_id INT PRIMARY KEY AUTO_INCREMENT,

name VARCHAR(100),

specialization VARCHAR(100),

email VARCHAR(100) UNIQUE,

dept_id INT,

FOREIGN KEY (dept_id) REFERENCES departments(dept_id)

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Patients --

CREATE TABLE patients (

patient_id INT PRIMARY KEY AUTO_INCREMENT,

name VARCHAR(100),

gender ENUM('Male', 'Female', 'Other'),

DOB DATE,

contact VARCHAR(20)

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Appointments --

CREATE TABLE appointments (

appointment_id INT PRIMARY KEY AUTO_INCREMENT,

doctor_id INT,

patient_id INT,

date DATE,

time TIME,

reason VARCHAR(255),

FOREIGN KEY (doctor_id) REFERENCES doctors(doctor_id),

FOREIGN KEY (patient_id) REFERENCES patients(patient_id)

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Treatments --

CREATE TABLE treatments (

treatment_id INT PRIMARY KEY AUTO_INCREMENT,

patient_id INT,

description TEXT,

treatment_date DATE,

doctor_id INT,

FOREIGN KEY (patient_id) REFERENCES patients(patient_id),

FOREIGN KEY (doctor_id) REFERENCES doctors(doctor_id)

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Step 5: Insert Sample Data

Departments --

INSERT INTO departments (dept_name) VALUES

('Cardiology'), ('Neurology'), ('Orthopedics'), ('Pediatrics');

Doctors --

INSERT INTO doctors (name, specialization, email, dept_id) VALUES

Dr. Ali Omar', 'Cardiologist', 'ali.omar@hospital.com', 1),')

Dr. Sara Nabil', 'Neurologist', 'sara.nabil@hospital.com', 2),')

Dr. Hani Fawzy', 'Orthopedic Surgeon', 'hani.fawzy@hospital.com', 3),')

Dr. Mona Salem', 'Pediatrician', 'mona.salem@hospital.com', 4);')

Patients --

INSERT INTO patients (name, gender, DOB, contact) VALUES

Ahmed Mohamed', 'Male', '1990-03-15', '0551234567'),')

Laila Youssef', 'Female', '1985-07-22', '0552345678'),')

Karim Adel', 'Male', '2000-11-01', '0553456789'),')

Noha Said', 'Female', '1995-04-10', '0554567890');')

Appointments --

INSERT INTO appointments (doctor_id, patient_id, date, time, reason) VALUES

Chest pain'),' ،'٠٩:٠٠:٠٠' ،'١٠-٠٥-٢٠٢٥' ،١ ،١)

Migraine'),' ،'١١:٠٠:٠٠' ،'١١-٠٥-٢٠٢٥' ،٢ ،٢)

Child fever');' ،'١٠:٣٠:٠٠' ،'١٢-٠٥-٢٠٢٥' ،٤ ،٤)

Treatments --

INSERT INTO treatments (patient_id, description, treatment_date, doctor_id) VALUES

Prescribed heart medication', '2025-05-10', 1),' ،١)

MRI scan and medication', '2025-05-11', 2),' ،٢)

Fever reducer prescribed', '2025-05-12', 4);' ،٤)

Step 6: SQL Queries

List all patients and their assigned doctor names .١ --

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SELECT p.name AS patient, d.name AS doctor
FROM appointments a
JOIN patients p ON a.patient_id = p.patient_id
JOIN doctors d ON a.doctor_id = d.doctor_id;
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-- ٢. Number of appointments per department
SELECT dept_name, COUNT(*) AS total_appointments
FROM appointments a
JOIN doctors d ON a.doctor_id = d.doctor_id
JOIN departments dp ON d.dept_id = dp.dept_id
GROUP BY dept_name;

-- ٣. Show all treatments given to a patient
SELECT p.name AS patient, t.description, t.treatment_date
FROM treatments t
JOIN patients p ON t.patient_id = p.patient_id
WHERE p.name = 'Ahmed Mohamed';

-- ٤. Upcoming appointments for a specific doctor
SELECT a.date, a.time, p.name AS patient
FROM appointments a
JOIN patients p ON a.patient_id = p.patient_id
WHERE a.doctor_id = 1
ORDER BY a.date, a.time;
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