Project Goal

The goal of the project is to provide realistic practical experience in the **conceptual design, logical design, implementation, operation, and maintenance of a small relational database.**

Hospital Management System

The application is a Hospital Management System for a medium to large healthcare facility. Thes hospital has decided to redesign a major part of the database that supports clinical and administrative operations. The project manager overseeing the redesign isn't very technically inclined and has provided only a general overview of requirements. You are tasked with translating this into a complete database system.

We will focus on the following major aspects of hospital operations:

Entities and Attributes

- Patients:

Each patient has a unique ID, name, gender, age, contact information, and insurance details.

- Doctors:

Each doctor has a unique ID, name, specialization, contact info, and assigned department.

- Departments:

The hospital has several departments such as Cardiology, Neurology, Pediatrics, etc.

- Appointments:

Patients schedule appointments with doctors, with date, time, reason, and status.

- Medical Records:

Each patient has medical records detailing visits, diagnoses, treatments, and doctor notes.

- Treatments and Procedures:

Each treatment has a code, description, cost, and links to doctors and patients.

- Medications:

Includes drug name, dosage, manufacturer, and prescription requirements.

- Inventory:

Tracks supplies and medications by item code, quantity, supplier, and expiration date.

- Suppliers:

Suppliers of medical items, tracked by ID, contact info, and items provided.

- Billing:

Includes charges for appointments, treatments, medications, and insurance details.

Project Requirements

Entity-Relationship Model

Construct an E-R model capturing all entities above. Include primary keys and relevant attributes, and show relationships (e.g., a doctor may handle multiple patients, and a patient may have multiple appointments). Indicate cardinalities and constraints.

Relational Model

Convert your E-R diagram into a relational schema. Ensure referential integrity, appropriate data types, and constraints (e.g., NOT NULL, UNIQUE, CHECK, FOREIGN KEY). Implement your schema using MS Access, MySQL, Oracle Live SQL, or any other DBMS.

Populate Relations

Populate each table with at least 20 records that reflect realistic and diverse data. For example, include patients of varying ages, doctors with multiple specialties, and various departments.

Queries

1. Show patient visit trends over the past 3 years by year, month, and department. Further break this data down by gender and age group.
2. Identify medications supplied by a specific supplier that were used between two given dates, and list the patients who were prescribed those medications.
3. Find the top 2 departments by revenue generated in the past year.
4. Find the top 2 doctors by number of patients seen in the past year.
5. In what months are the highest number of surgeries conducted?
6. Identify the supplier whose items stayed in inventory the longest on average.

Add additional queries based on any extra data or business logic you decide to include.

Application Development: Interfaces

Different types of users (doctors, nurses, admin staff) will need access to the database through interfaces:

- Appointment Manager: For scheduling, updating, and canceling appointments.
- Medical Record System: For doctors to view and update patient history.
- Inventory System: For the admin to monitor supply levels and generate alerts.
- Billing Interface: To calculate charges, apply insurance, and generate invoices.

Use any of the following:
- Oracle tools
- Web applications (HTML/CSS + JavaScript/PHP/Python)
- Java Swing
- Visual Basic
- Any other technology you are comfortable with

Each interface should allow:

- Adding, updating, and deleting records with validation
- Navigation between records
- Cascade updates/deletes where foreign key constraints exist

1. Report generation based on milestone 1 query list