



**Hospital Management System**

**Introduction**

The Zenith Medical Center Management System is a database project designed to streamline and organize the operations of a hospital through a structured relational database. This system helps manage patient records, doctor information, staff roles, appointments, inpatients, consultations, medication details, billing, and feedback—all in one centralized platform. The aim of this project is to minimize manual effort, reduce errors, ensure data integrity, and provide quick access to important medical and administrative information. The system is scalable, secure, and can be extended with additional features in the future to support hospital digitalization.

**Objectives**

The main objectives of the Zenith Medical Management System are:

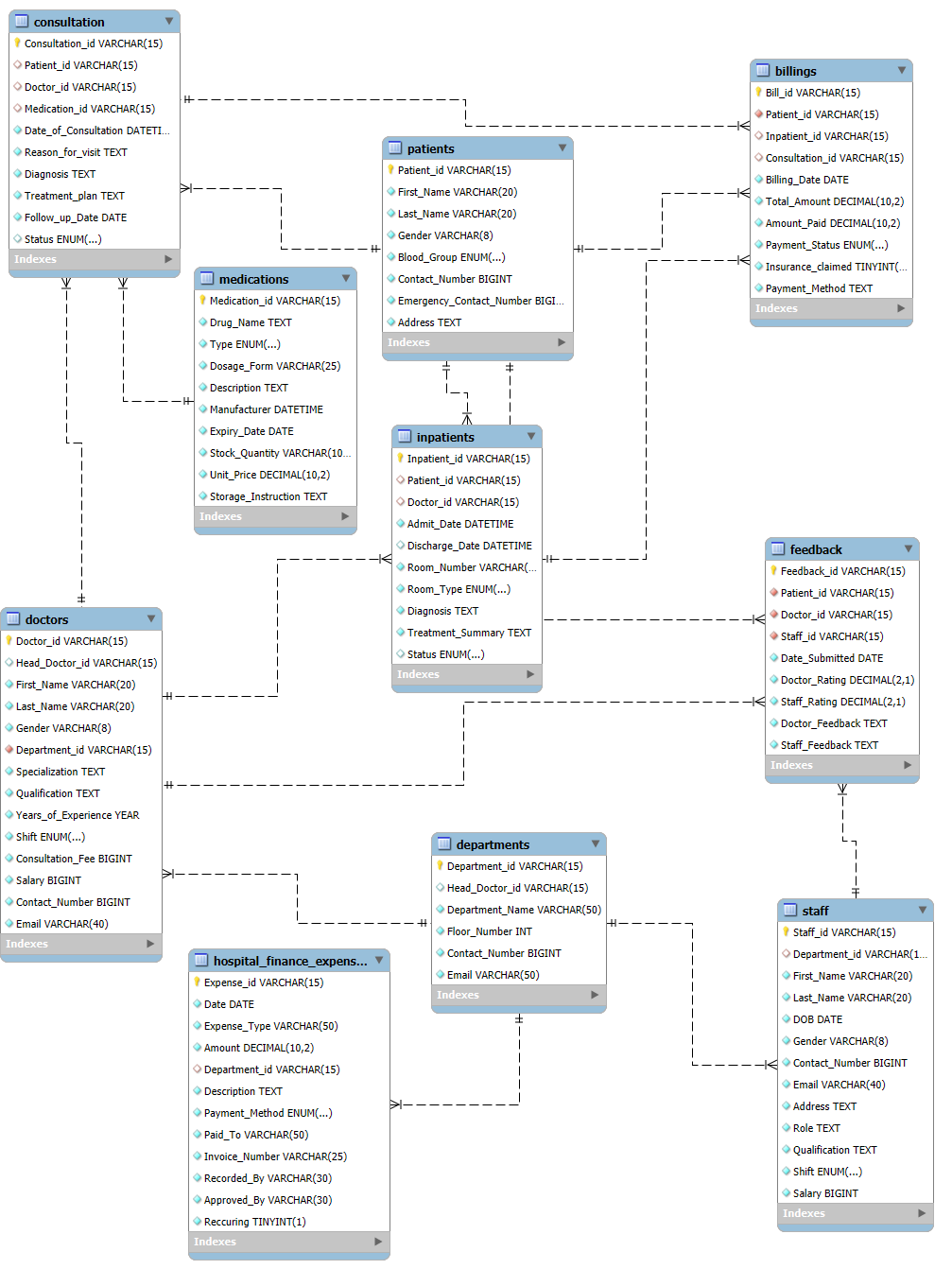
1. Efficient Data Management
2. Real-Time Information Access
3. Streamlined Consultation and Admission Tracking
4. Automated Billing Process
5. Role-Based Data Access
6. Medication and Inventory Monitoring
7. Feedback and Quality Improvement
8. Reduction in Manual Errors
9. Scalability and Integration

**Problem Statement**

In many hospitals, traditional methods of managing data—such as paper-based records or basic spreadsheets—often lead to inefficiencies, data duplication, and errors in patient care. These manual systems make it difficult to retrieve critical information quickly, manage billing accurately, or maintain a proper history of consultations and treatments. As the number of patients, staff, and services grows, so does the complexity of hospital operations.

There is a pressing need for an automated and structured database system that can streamline these operations, reduce manual workload, and ensure accurate and real-time access to information. The Zenith Medical Center Management System addresses these challenges by offering a centralized digital platform for managing all aspects of hospital administration.

**Entity Relationship Diagram**



**Flow Structure**

1. **Patients:** Stores personal, contact, and medical details of individuals receiving healthcare services.
2. **Doctors:** Contains information about all registered doctors including specialization, department, and shift details.
3. **Departments:** Represents various hospital departments along with contact info and their head doctor assignments.
4. **Consultation:** Records all doctor-patient consultation details including diagnosis, treatment plans, and follow-up dates.
5. **Inpatients:** Captures data for patients admitted into the hospital, including room info, diagnosis, and discharge details.
6. **Medications:** Holds data about prescribed drugs, their dosage, expiry, storage instructions, and stock details.
7. **Staff:** Stores personal and professional information of non-doctor staff like nurses, technicians, and admin roles.
8. **Hospital Finance Expenses:** Records all financial expenditures incurred by the hospital
9. **Billings:** Manages financial transactions for consultations and admissions, including payment status and method.
10. **Feedback:** Collects feedback and ratings from patients regarding doctors and staff performance.

**My SQL Schema Design**

# Create Database 🡪 Zenith\_Medical\_Center

CREATE DATABASE if not exists Zenith\_Medical\_Center;

# Use Zenith\_Medical\_Center Database

USE Zenith\_Medical\_Center;

**[RDBMS] Flow Structure: Create Tables in** Zenith\_Medical\_Center **Database**

CREATE TABLE Patients (

Patient\_id VARCHAR(15) PRIMARY KEY UNIQUE NOT NULL,

First\_Name VARCHAR(20) NOT NULL,

Last\_Name VARCHAR(20) NOT NULL,

Gender VARCHAR(8) NOT NULL,

Blood\_Group ENUM('A+', 'A-', 'B+', 'B-', 'AB+', 'AB-', 'O+', 'O-') NOT NULL,

Contact\_Number BIGINT UNIQUE NOT NULL,

Emergency\_Contact\_Number BIGINT UNIQUE NOT NULL,

Address TEXT NOT NULL

);

CREATE TABLE Doctors(

Doctor\_id varchar(15) Primary key unique not null,

Head\_Doctor\_id varchar(15) unique,

First\_Name varchar(20) not null,

Last\_Name varchar(20) not null,

Gender varchar(8) not null,

Department\_id varchar(15) not null,

foreign key (department\_id) references Departments(department\_id),

Specialization text not null,

Qualification text not null,

Years\_of\_Experience year not null,

Shift enum('Morning','Evening','Night')Default('Morning') not null,

Consultation\_Fee bigint not null,

Consultancy\_Fee bigint not null,

Contact\_Number bigint unique not null,

Email varchar(40) unique not null

);

CREATE TABLE Departments (

Department\_id VARCHAR(15) PRIMARY KEY,

Head\_Doctor\_id VARCHAR(15),

Department\_Name VARCHAR(50) NOT NULL,

Floor\_Number INT NOT NULL,

Contact\_Number BIGINT UNIQUE NOT NULL,

Email VARCHAR(50) UNIQUE NOT NULL

);

CREATE TABLE Consultation (

Consultation\_id varchar(15) Primary key unique not null,

Patient\_id varchar(15),

foreign key (Patient\_id) references Patients(Patient\_id),

Doctor\_id varchar(15),

foreign key (Doctor\_id) references Doctors(Doctor\_id),

Medication\_id varchar(15),

foreign key (Medication\_id) references Medications(Medication\_id),

Date\_of\_Consultation datetime not null,

Reason\_for\_visit text not null,

Diagnosis text not null,

Treatment\_plan text not null,

Follow\_up\_Date date not null,

Status enum('Scheduled','Completed','Cancelled')Default('Scheduled'));

CREATE TABLE Inpatients(

Inpatient\_id varchar(15) primary key unique not null,

Patient\_id varchar(15),

foreign key (Patient\_id) references Patients (Patient\_id),

Doctor\_id varchar(15),

foreign key (Doctor\_id) references Doctors (Doctor\_id),

Admit\_Date datetime not null,

Discharge\_Date datetime,

Room\_Number varchar(3)not null unique,

Room\_Type enum('General','Private','I.C.U')not null,

Diagnosis text not null,

Treatment\_Summary text not null,

Status enum('Admitted','Discharged','Transferred')default('Admitted'));

CREATE TABLE Medications (

Medication\_id VARCHAR(15) PRIMARY KEY UNIQUE NOT NULL,

Drug\_Name TEXT NOT NULL,

Type ENUM('Tablet', 'Syrup', 'Injection', 'Capsule') NOT NULL,

Dosage\_Form VARCHAR(25) NOT NULL,

Description TEXT NOT NULL,

Manufacturer DATETIME NOT NULL,

Expiry\_Date DATE NOT NULL,

Stock\_Quantity VARCHAR(100) NOT NULL,

Unit\_Price DECIMAL(10 , 2 ) NOT NULL,

Storage\_Instruction TEXT NOT NULL);

CREATE TABLE Staff(

Staff\_id varchar(15) primary key unique not null,

Department\_id varchar(15),

foreign key (Department\_id) references Departments (Department\_id),

First\_Name varchar(20) not null,

Last\_Name varchar(20) not null,

DOB date not null,

Gender varchar(8) not null,

Contact\_Number bigint unique not null,

Email varchar(40) unique not null,

Address text not null,

Role text not null,

Qualification text not null,

Shift enum('Morning','Eveining','Night')default('Morning') not null,

Salary bigint not null);

Create table Hospital\_Finance\_Expenses(

Expense\_id varchar(15) primary key unique not null,

Date date not null,

Expense\_Type varchar(50) not null,

Amount Decimal(10,2) not null,

Department\_id varchar(15),

foreign key (department\_id) references Departments (department\_id),

Description text not null,

Payment\_Method enum('Cash','Card','Bank Transfer') not null,

Paid\_To varchar(50) not null,

Invoice\_Number varchar(25) not null,

Recorded\_By varchar(30) not null,

Approved\_By varchar(30) not null,

Reccuring boolean not null

);

CREATE TABLE Billings(

Bill\_id varchar(15) primary key unique not null,

Patient\_id varchar(15) not null,

foreign key (Patient\_id) references Patients (Patient\_id),

Inpatient\_id varchar(15),

foreign key (Inpatient\_id) references Inpatients (Inpatient\_id),

Consultation\_id varchar(15),

foreign key (Consultation\_id) references Consultation (Consultation\_id),

Billing\_Date date not null,

Total\_Amount decimal(10,2) not null,

Amount\_Paid decimal(10,2) not null,

Payment\_Status enum ('Paid','Unpaid','Insurance')not null,

Insurance\_claimed Boolean not null,

Payment\_Method text not null );

CREATE TABLE Feedback(

Feedback\_id varchar(15) primary key not null unique,

Patient\_id varchar(15) not null,

foreign key (patient\_id) references patients (patient\_id),

Doctor\_id varchar(15) not null,

foreign key (Doctor\_id) references Doctors (Doctor\_id),

Staff\_id varchar(15) not null,

foreign key (Staff\_id) references Staff (Staff\_id),

Date\_Submitted date not null,

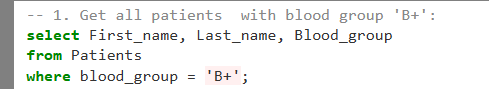
Doctor\_Rating decimal(2,1)check(Doctor\_Rating between 1 and 10) not null,

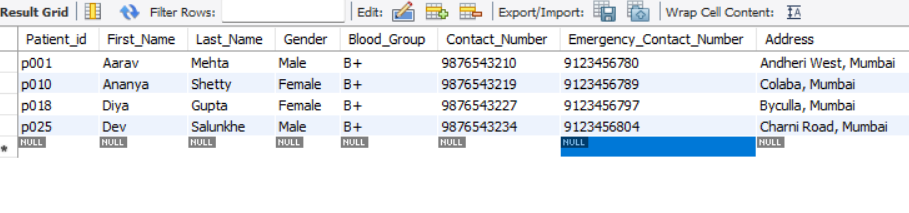
Staff\_Rating decimal(2,1) check (Staff\_rating between 1 and 10) not null,

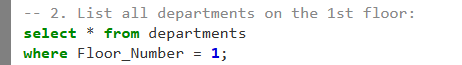
Doctor\_Feedback text not null,

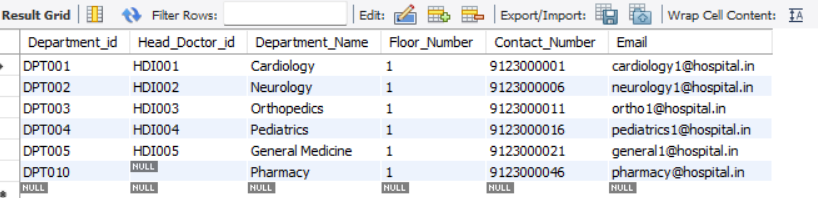
Staff\_Feedback text not null);

**Queries**

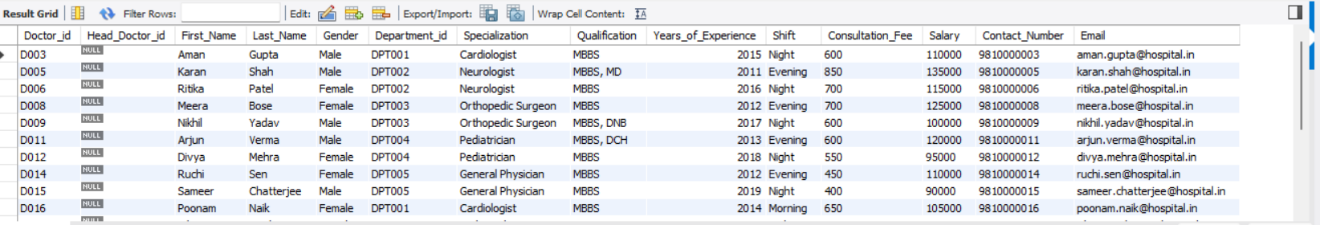




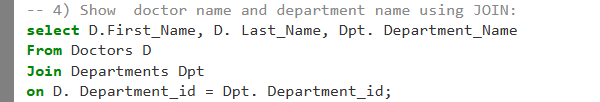


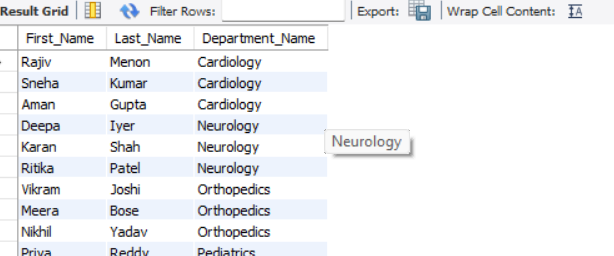


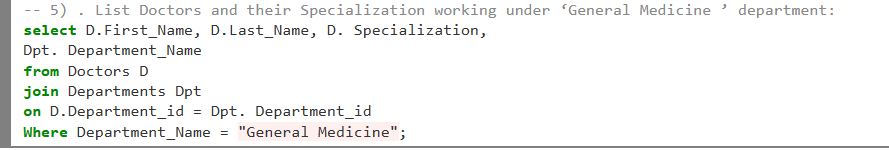


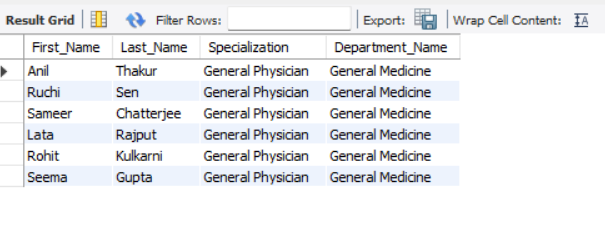


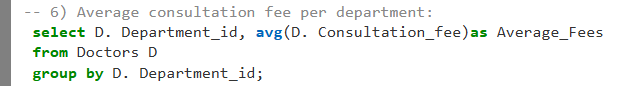
-- INTERMEDIATE QUERIES (4–16)

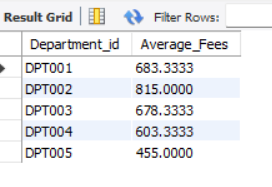


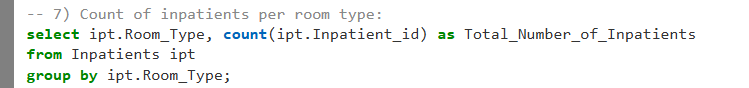


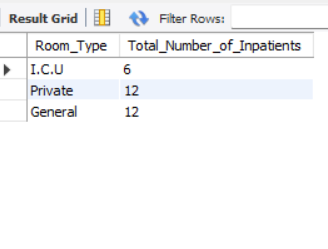


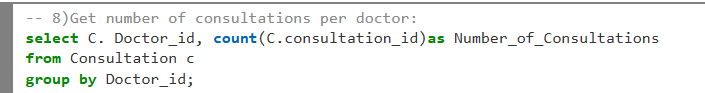


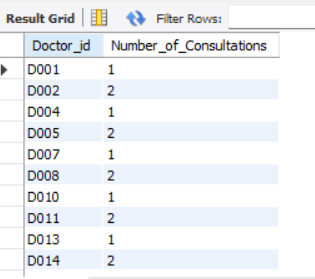


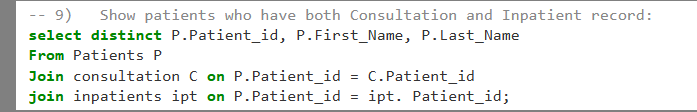


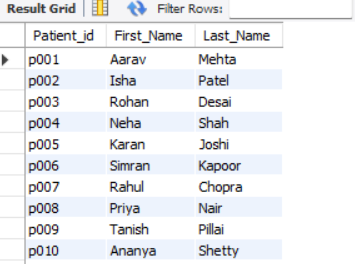


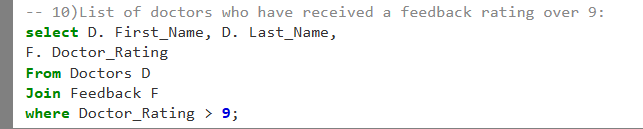


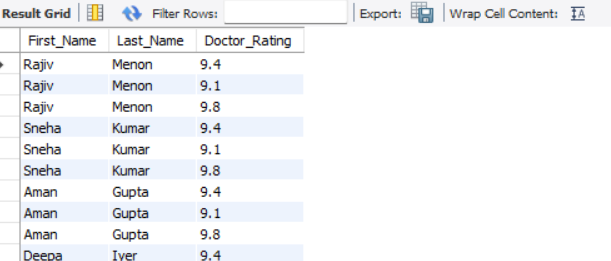


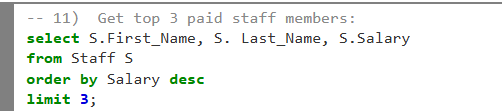


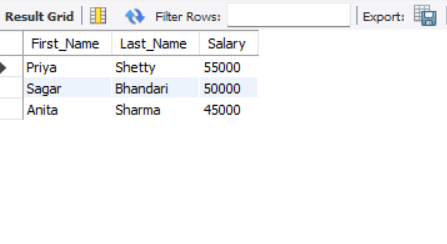


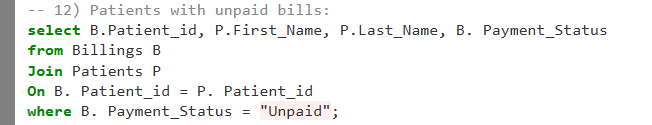


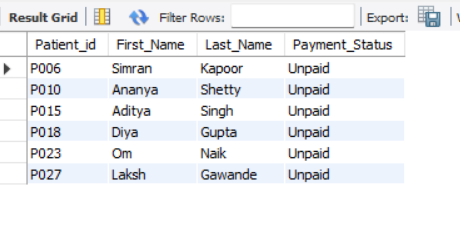


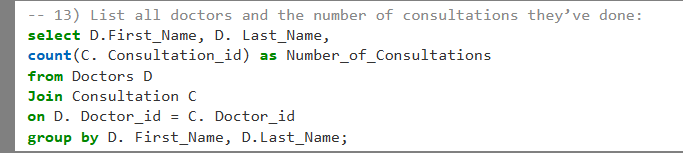


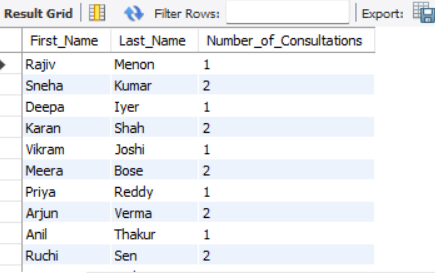


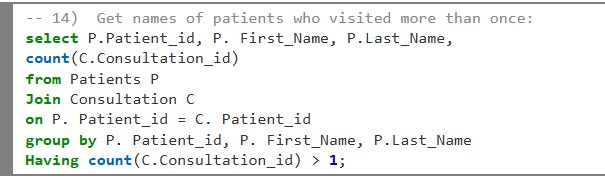


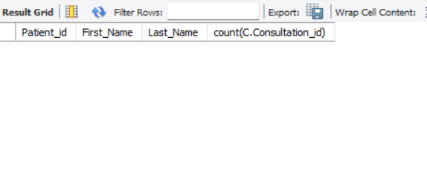


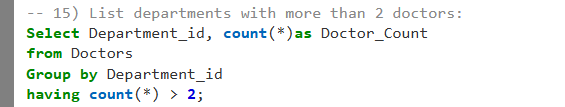


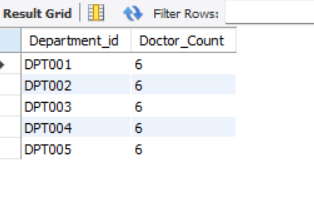












**Conclusion**

The Zenith Medical Center Management System provides a comprehensive and organized approach to handling hospital operations, from patient registrations and doctor consultations to billing, medication tracking, and feedback management. By replacing manual and error-prone methods with a structured database system, it ensures improved accuracy, efficiency, and accessibility of data across departments.

This system enhances hospital management by offering real-time data access, reducing administrative workload, and streamlining processes for doctors, staff, and patients alike. Moreover, the modular design of the database allows for easy scalability, making it adaptable to real-world hospital environments.

- THANK YOU--