🏥 Hospital Management System (HMS) Database Project

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📘 Project Overview

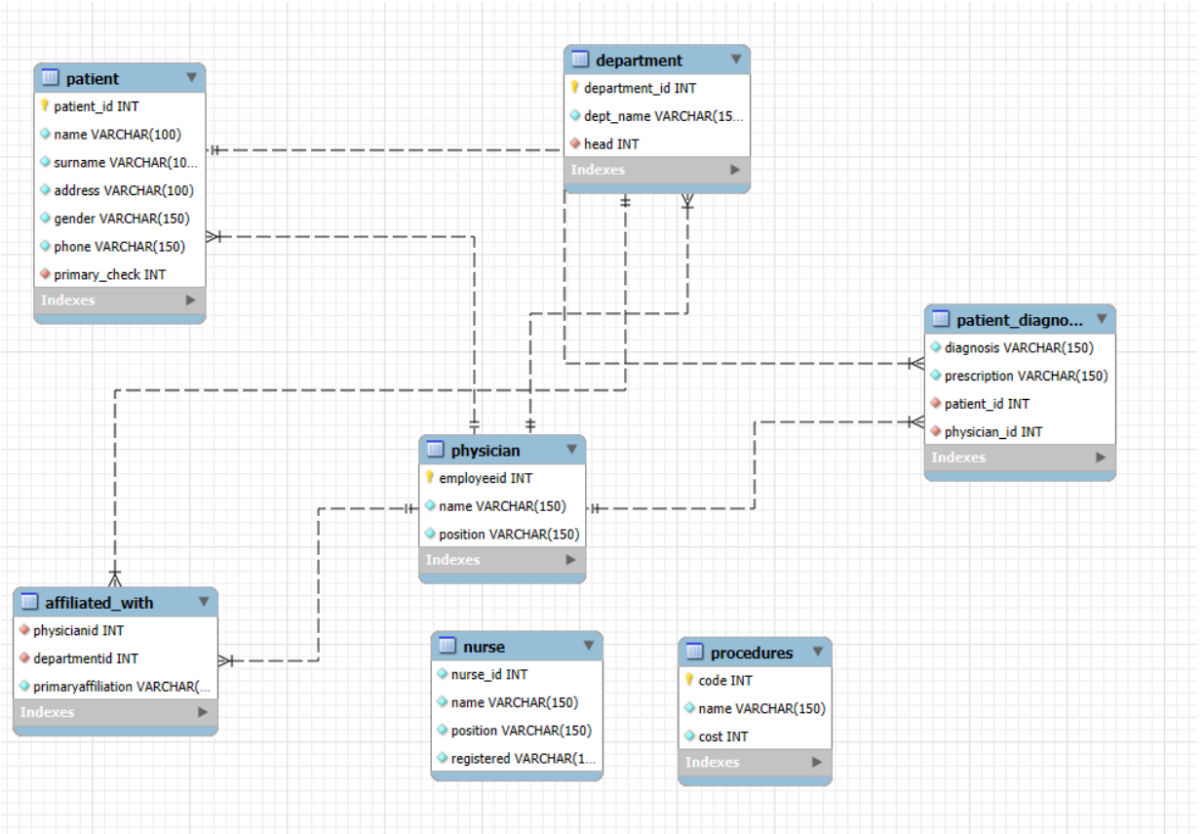
This project presents a SQL-based Hospital Management System (HMS) designed to simulate real-world hospital operations. It includes relational tables for physicians, nurses, patients, departments, procedures, and diagnoses. The system supports data insertion, retrieval, updates, and complex queries to manage hospital workflows efficiently.

🧩 Part 1: Database Design & Schema

🔹 Main Tables

1. **Physician** – Stores doctor information (ID, name, position).
2. **Department** – Contains department details and references the head physician.
3. **Affiliated_with** – Maps physicians to departments.
4. **Nurse** – Stores nurse details, including registration status.
5. **Patient** – Contains patient personal info and primary physician reference.
6. **Patient_Diagnosis** – Records diagnoses and prescriptions.
7. **Procedures** – Lists medical procedures and their costs.

📊 ERD / Schema Diagram



🗒️ Part 2: Table Creation & Data Insertion

🔹 Description

Tables were created using `CREATE TABLE` statements with appropriate constraints (PRIMARY KEY, FOREIGN KEY). Sample data was inserted using `INSERT INTO` statements to simulate realistic hospital records.

employeeid	name	position
2	Dr. Farhana Akter	Attending Physician
3	Dr. Mahmudul Hasan	Surgical Attending Physician
4	Dr. Shafiqul Islam	Senior Attending Physician
5	Dr. Khaled Hossain	Head Chief of Pulmonology
6	Dr. Nusrat Jahan	Surgical Attending Physician
7	Dr. Rashed Karim	Surgical Attending Physician
8	Dr. Tania Rahman	Resident
9	Dr. Arif Chowdhury	Attending Psychiatrist
10	Dr. Mst. Jahanara Begum	Senior Attending Nephrologist
11	Dr. Rakibul Alam	Resident
12	Dr. Tamanna Sultana	Senior Attending Gynecologist
13	Dr. Nazmul Haque	Cardiologist
14	Dr. Fahim Rahman	Assistant Intensivist
15	Dr. Laila Khatun	Senior ENT Surgeon
16	Dr. Sajib Ahmed	Junior Resident
17	Dr. Shahnaz Parvin	Assistant Orthopedic Surgeon
18	Dr. Kamrul Hasan	Head Chief of Gastroenterol...
19	Dr. Anika Islam	Assistant Neuro Surgeon
20	Dr. Mehedi Hasan	Junior Intensivist
21	Dr. Shahidul Alam	Head Chief of Orthopedics

physician 1 ×

🔍 Part 3: SQL Queries

🔹 Description

This section demonstrates SQL queries for CRUD operations and relational data retrieval using JOINs and subqueries.

🧪 Sample Queries

- Retrieve physician names in alphabetical order.
- Get the full names of male patients.
- Find nurses who are department heads and registered.

- Calculate the average cost of medical procedures.
- Find the second-highest cost procedure.
- Retrieve patients with their primary physician and diagnosis.

```
1 •  SELECT P.NAME AS DOCTOR_NAME, D.DEPT_NAME
2    FROM PHYSICIAN P
3    INNER JOIN DEPARTMENT D
4    ON P.EMPLOYEEID = D.HEAD;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

DOCTOR_NAME	DEPT_NAME
Dr. Shafiqul Islam	General Medicine
Dr. Rashed Karim	Surgery
Dr. Arif Chowdhury	Psychiatry
Dr. Nazmul Haque	Cardiology
Dr. Mst. Jahanara Begum	Nephrology
Dr. Habibur Rahman	Urology
Dr. Aminul Islam	Neurology
Dr. Humayun Kabir	Physiotherapy
Dr. Laila Khatun	ENT
Dr. Khaled Hossain	Pulmonology
Dr. Kamrul Hasan	Gastroenterology
Dr. Tamanna Sultana	Gynecology
Dr. Sumaiya Akter	Neonatal
Dr. Sadia Yasmin	Critical care
Dr. Shahidul Alam	Orthopedics

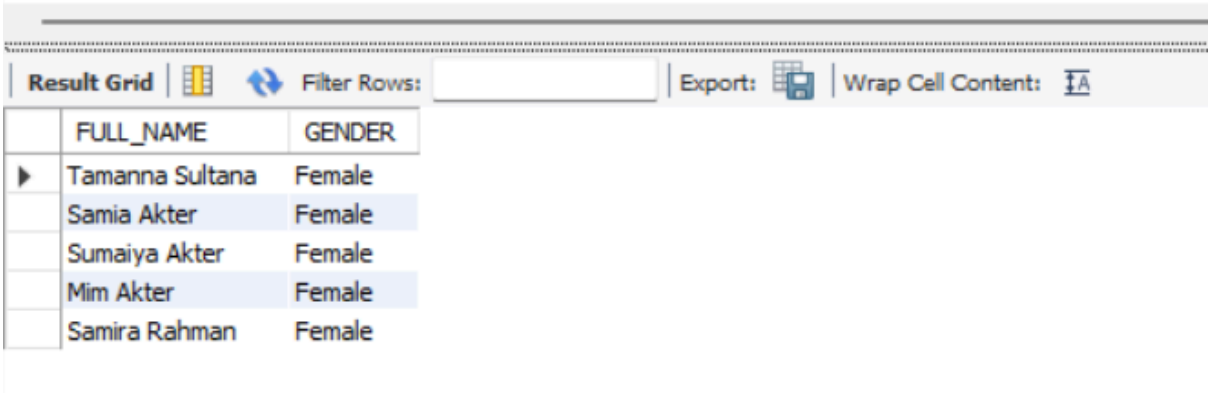
🔧 Part 4: Data Retrieval & Manipulation

🔹 Description

This section highlights how data is accessed and modified:

- View all patient details.
- Join tables to show physician-patient relationships.
- Use `WHERE`, `LIKE`, and aggregate functions.
- Update patient names and drop columns.

```
1 •  SELECT CONCAT(NAME,' ',SURNAME) AS FULL_NAME, GENDER
2    FROM PATIENT
3    WHERE CONCAT(NAME,' ',SURNAME) LIKE '__M%';
```



FULL_NAME	GENDER
Tamanna Sultana	Female
Samia Akter	Female
Sumaiya Akter	Female
Mim Akter	Female
Samira Rahman	Female

🧠 Part 5: Advanced Queries (Subqueries & Aggregates)

🔹 Description

Advanced SQL techniques are used to extract meaningful insights:

- Subqueries to find patients with chronic pain.
- Compare the average costs of procedures.
- Identify physicians with multiple affiliations.

```sql
SELECT NAME, COST
FROM PROCEDURES
WHERE COST IN (SELECT MAX(COST) FROM PROCEDURES);
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

NAME	COST
Fluoroscopy - Upper GI Series	7000

✅ Part 6: Conclusion

🔹 Summary

The HMS database project showcases how SQL can be used to build and manage a hospital system. It covers schema design, data operations, and analytical queries to reflect real-world healthcare data management.

🎓 Learning Outcomes

- Design normalised relational schemas.
- Implement foreign key relationships.
- Write complex queries using JOINs, subqueries, and aggregates.
- Model hospital workflows through database logic.
