University Of Asia Pacific

Department of Computer Science And Engineering

Course Title : Database Systems Lab

Course Code : CSE 212

Project Name : Hospital Management System

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Hospital Management System

In the rapidly evolving landscape of healthcare, efficient data management is essential for delivering high-quality patient care and maintaining operational excellence. This project, titled Hospital Management Database System, aims to design and implement a structured and relational database that manages the core activities and entities within a hospital environment.

1) Project Overview :

The system integrates activities like patient histories, doctor calendars, appointments, billing, pharmacy stock, and staff management into a single platform. It streamlines workflows and provides real-time feedback, improving workflow and service quality.

2) Requirement for the System :

Mechanical processes are time-consuming, error-ridden, and unable to fill current needs. This process anticipates these issues by mechanizing procedures, reducing mistakes, and making available immediate access to precise, well-organized information.

3) Unique Characteristics :

The system provides a centralized, scalable, and extensible platform. It is data accuracy and consistency guaranteed with a simple-to-use design that can be applied to hospitals of any size.

4) Target Users of the System :

The solution enables different hospital personnel administrators, doctors, nurses, lab technicians, pharmacists, and billing staff providing them with role-based, secure access to streamline workflows, increase accountability, and facilitate collaboration.

Table and Entitites :

1. Department

- Department_ID (PK)
- Department_Name, Department_Head, Number_of_Staffs,
- Number_of_Beds, Email, Phone
- Primary Entity: Contains information about departments, including head, staff/beds count, and contact details.

2. Doctor

- Doctor_ID (PK)
- Doctor_Name, Gender, Specialist, Email, Salary
- Primary Entity: Stores doctor details such as name, specialization, gender, contact info and salary.

3. Staff

- Staff_ID (PK)
- Staff_Name, Gender, Phone, Email, Role
- Primary Entity: Contains records of hospital staff including roles and contact information.

4. Patient

- Patient_ID (PK)
- Patient_Name, Date_of_Birth, Gender,
- Blood_Group, Phone, Medical_History
- Primary Entity: Holds patient personal and medical background information.

5. Appointment

- Appointment_ID (PK)

- Patient_ID, Doctor_ID, Appointment_time,

- Appointment_Date, Status

- Foreign Key: Patient_ID references Patient (Patient_ID)

- Foreign Key: Doctor_ID references Doctor (Doctor_ID)

- Primary Entity: Tracks scheduled appointments between patients and doctors.

6. LabTest

- Lab_Technician_ID, Test_ID (PK)

- Patient_ID, Test_Name, Test_Type,

- Test_Date, Result, Cost

- Foreign Key: Patient_ID references Patient (Patient_ID)

- Primary Entity: Logs lab tests taken by patients along with result and cost.

7. Surgery

- Surgery_ID (PK)

- Patient_ID, Doctor_ID, Surgery_Type,

- Surgery_Date, Duration, Operating_Room, Outcome

- Foreign Key: Patient_ID references Patient (Patient_ID)

- Foreign Key: Doctor_ID references Doctor (Doctor_ID)

- Primary Entity: Records surgeries performed including surgeon, patient, and outcome.

8. Ward

- Ward_ID (PK)

- Ward_Name, Ward_Type, Department_ID,

- Number_of_Beds, Occupied_Beds, Floor, Status

- Foreign Key: Department_ID references Department (Department_ID)

- Primary Entity: Holds ward info including capacity, floor, type, and status.

9. MedicineStore

- Medicine_ID (PK)

- Medicine_Name, Manufacturer, Expiry_Date,

- Price, Category, Suggested_By, Stock_Quantity

- Foreign Key: Suggested_By references Doctor (Doctor_Name)

- Primary Entity: Stores medicine inventory with supplier info and stock quantity.

10. Vaccination

- Vaccine_ID (PK)

- Staff_ID, Patient_ID, Vaccine_Name,

- Dose_Number, Given_Date, Next_Date

- Foreign Key: Staff_ID references Staff (Staff_ID)

- Foreign Key: Patient_ID references Patient (Patient_ID)

- Primary Entity: Tracks vaccination history for patients and staff.

11. Billing

- Receipt_ID (Unique)

- Patient_ID, Total_Amount, Discount,

- Payment_Method, Payment_Status

- Foreign Key: Patient_ID references Patient (Patient_ID)

- Primary Entity: Manages billing details including payment method and status.

12. HospitalAsset

- Department_ID, Asset_ID (PK)

- Asset_Name, Category, Purchased_Date,

- Cost, Location

- Foreign Key: Department_ID references Department (Department_ID)

- Primary Entity: Tracks hospital assets by department, including cost and location.

ER Diagram :

The ER diagram illustrates the key elements and relationships in the hospital system. It shows how different entities are related, which helps in maintaining smooth data flow, proper record keeping, and efficient management of hospital operations.

If there is any problem to show the picture then click the below :

https://lucid.app/lucidchart/348133dd-8e71-47e1-8a29-
0c13e49ca59e/edit?viewport_loc=-1936%2C-
449%2C3505%2C1534%2C0_0&invitationId=inv_1f3579e3-dd66-4a0c-9f65-
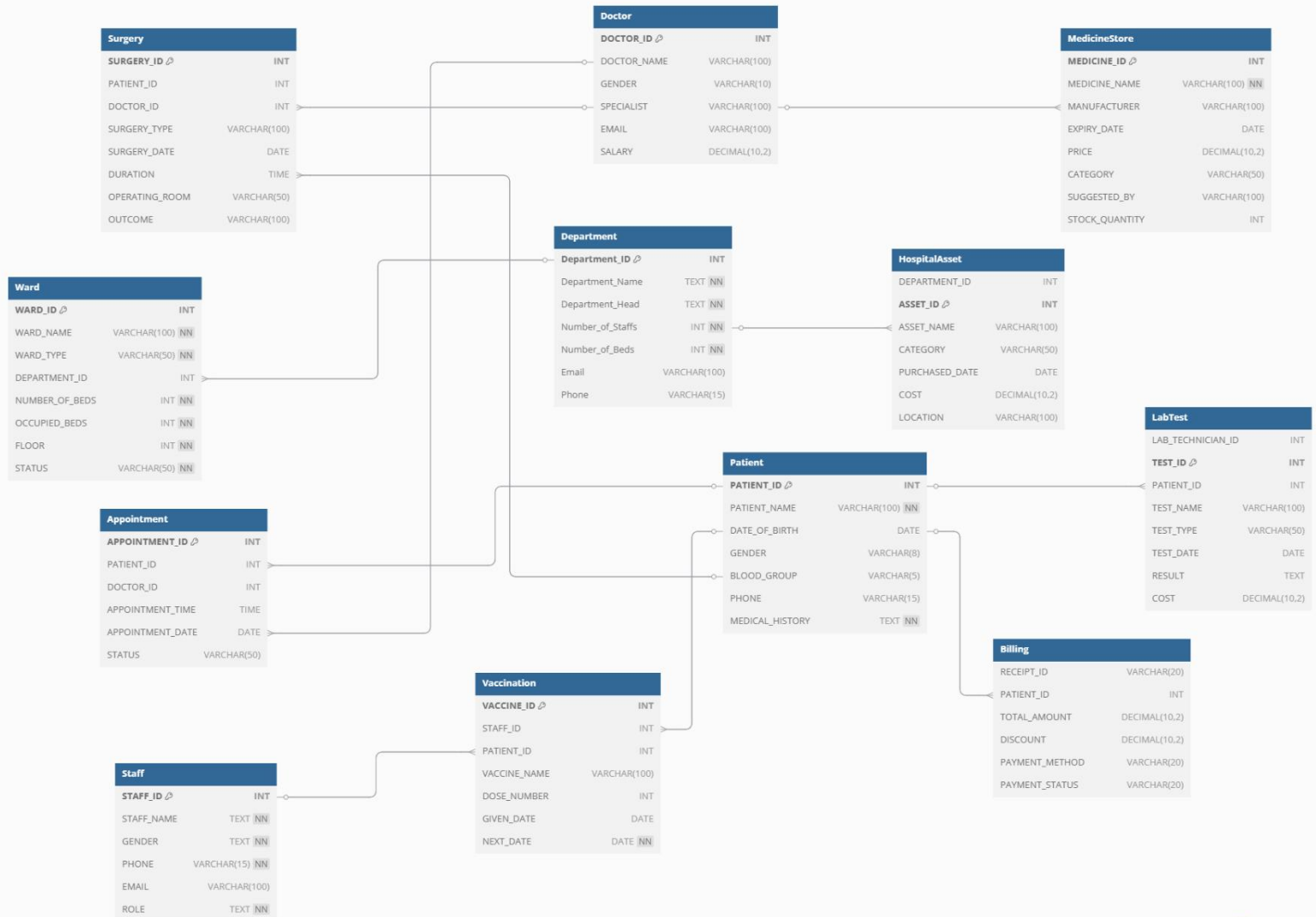02dee8b99dac
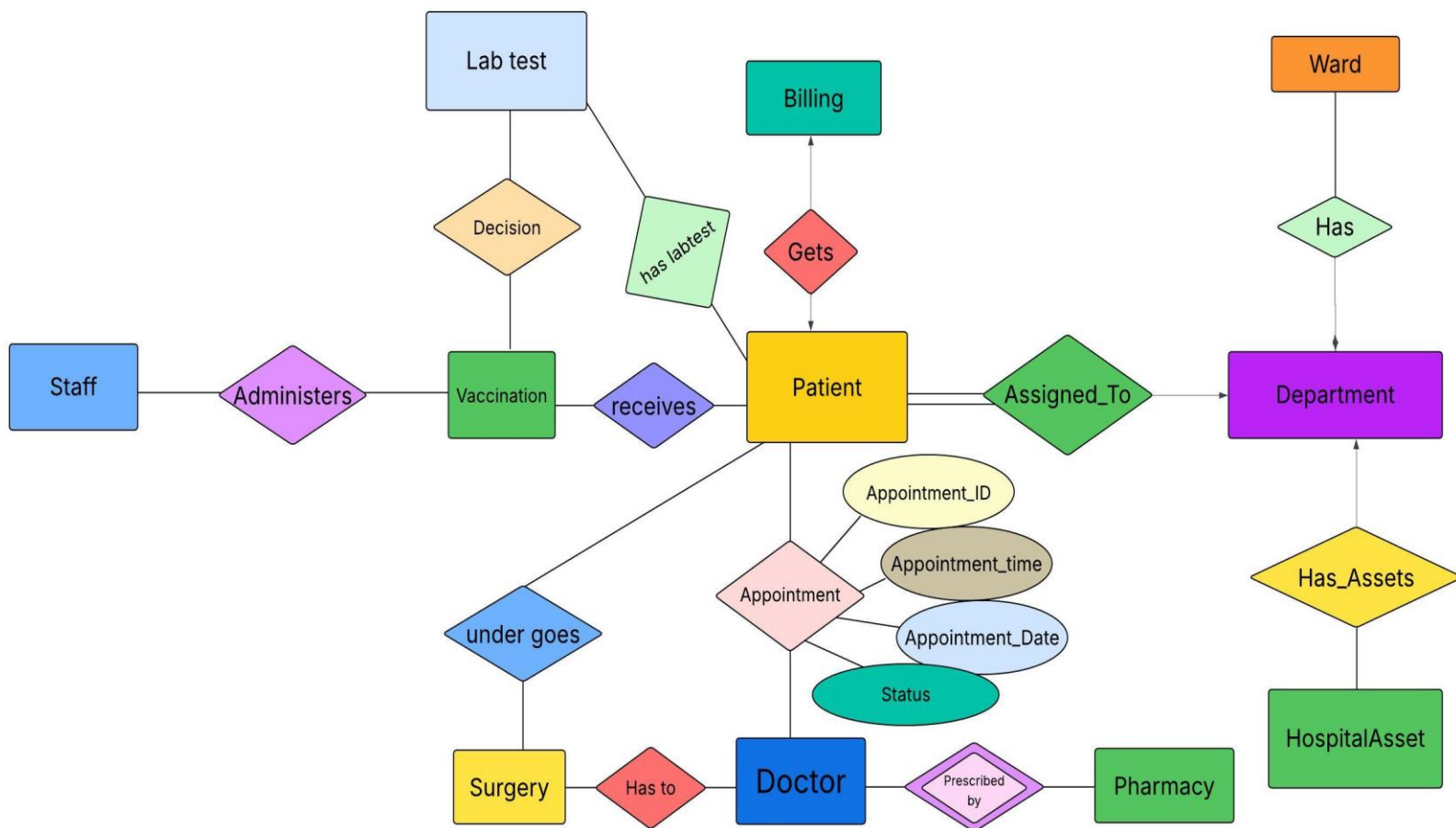
Schema Diagram :

The schema diagram offers the database structure showing all entities, attributes, and relationships. It defines how data is stored, arranged, and connected for ease of hospital system functionality.

If there is any problem to show the picture then click the below :

https://dbdiagram.io/d/Schema-Diagram-681e2cd25b2fc4582ff1a15e

SQL Queries :

Here are the all queries and output for this project.

I) Department :

1) Retrieve all details of departments in the hospital.

Query :

SELECT * FROM Department;

Department_ID	Department_Name	Department_Head	Number_of_Staffs	Number_of_Beds	Email	Phone
1001	Cardiology	Prof. Dr. Salima Akter	50	100	cardiology392@gmail.com	01923678910
1002	Neurology	Prof. Dr. Rezaul Karim	50	70	neurology246@gmail.com	01739895922
1003	Orthopedics	Prof. Dr. Ahsan Habib	10	1000	Orthopedics883@gmail.com	01344499850
1004	Gynecology	Prof. Dr. Mithu Rahman	35	70	gynecology302@gmail.com	01737568910
1005	General Surgery	Prof. Dr. Kamrul Islam	20	60	surgery406@gmail.com	01523458910
1006	Hematology	Prof. Dr. Mahbuba Sultana	35	70	hematology888@gmail.com	01924044910
1007	Plastic Surgery	Prof. Dr. Tanvir Ahmed	15	50	plasticsurgery122@gmail.com	01347896891
1008	Dental Surgery	Prof. Dr. Shirin Jahan	45	50	dentalunit763@gmail.com	01553678910
1009	Oncology	Prof. Dr. Nazmul Huda	25	70	oncology999@gmail.com	01553367891
1010	Rehabilitation Medicine	Prof. Dr. Nusrat Amin	25	60	rehabcenter222@gmail.com	01323678910
1011	Biomedical Engineering	Prof. Dr. Imran Kabir	30	20	biomedical193@gmail.com	01623678910
1012	Psychiatric	Prof. Dr. Sujan Chowdhury	66	70	psychiatric555@gmail.com	01923878910
1013	Radiology	Prof. Dr. Munira Khatun	16	90	radiology639@gmail.com	01923688910
1014	ENT (Ear, Nose, Throat)	Prof. Dr. Abdul Hamid	56	70	ent54@gmail.com	01623677910
1015	Medical Education	Prof. Dr. Lubna Rahman	36	50	medicaledu44@gmail.com	01623678710

2) List all departments and sort them alphabetically by department name.

Query :

SELECT * FROM Department ORDER BY Department_Name ASC;

Department_ID	Department_Name	Department_Head	Number_of_Staffs	Number_of_Beds	Email	Phone
1011	Biomedical Engineering	Prof. Dr. Imran Kabir	30	20	biomedical193@gmail.com	01623678910
1001	Cardiology	Prof. Dr. Salima Akter	50	100	cardiology392@gmail.com	01923678910
1008	Dental Surgery	Prof. Dr. Shirin Jahan	45	50	dentalunit763@gmail.com	01553678910
1014	ENT (Ear, Nose, Throat)	Prof. Dr. Abdul Hamid	56	70	ent54@gmail.com	01623677910
1005	General Surgery	Prof. Dr. Kamrul Islam	20	60	surgery406@gmail.com	01523458910
1004	Gynecology	Prof. Dr. Mithu Rahman	35	70	gynecology302@gmail.com	01737568910
1006	Hematology	Prof. Dr. Mahbuba Sultana	35	70	hematology888@gmail.com	01924044910
1015	Medical Education	Prof. Dr. Lubna Rahman	36	50	medicaledu44@gmail.com	01623678710
1002	Neurology	Prof. Dr. Rezaul Karim	50	70	neurology246@gmail.com	01739895922
1009	Oncology	Prof. Dr. Nazmul Huda	25	70	oncology999@gmail.com	01553367891
1003	Orthopedics	Prof. Dr. Ahsan Habib	10	1000	Orthopedics883@gmail.com	01344499850
1007	Plastic Surgery	Prof. Dr. Tanvir Ahmed	15	50	plasticsurgery122@gmail.com	01347896891
1012	Psychiatric	Prof. Dr. Sujan Chowdhury	66	70	psychiatric555@gmail.com	01923878910
1013	Radiology	Prof. Dr. Munira Khatun	16	90	radiology639@gmail.com	01923688910
1010	Rehabilitation Medicine	Prof. Dr. Nusrat Amin	25	60	rehabcenter222@gmail.com	01323678910

3) Show the names of departments whose IDs exist in the department table.

Query :

SELECT Department_Name FROM Department

WHERE Department_ID IN (

   SELECT Department_ID FROM Department

);

II) Doctor :

4) Find the details of the doctor with Doctor ID 100136.

Query :

SELECT * FROM Doctor WHERE Doctor_ID = 100136;

5) Reduce the salary of the doctor with Doctor ID 100140 by 4500.

Query :

SET SQL_SAFE_UPDATES=0;

UPDATE Doctor

SET Salary = Salary - 4500

WHERE Doctor_ID = 100140;

6) Display the updated information of the doctor with Doctor ID 100140.

Query :

SELECT * FROM Doctor WHERE Doctor_ID = 100140;

Doctor_ID	Doctor_Name	Gender	Specialist	Email	Salary
100140	Dr. Swsti Biswas	Female	Gynecologist	swsti@hospital.com	154500.00

7) Retrieve the complete list of doctors and their details.

Query :

SELECT * FROM Doctor;

Doctor_ID	Doctor_Name	Gender	Specialist	Email	Salary
100131	Dr. Sadikul Islam	Male	Cardiothoracic Surgeon	sadikul@hospital.com	210000.00
100132	Dr. Ayesha Rahman	Female	Neurosurgeon	ayesha@hospital.com	190000.00
100133	Dr. Proma Das Krity	Female	Orthopedic Surgeon	proma@hospital.com	190000.00
100134	Dr. Athina Nahar Tulona	Female	Dermatologist	athina@hospital.com	110000.00
100135	Dr. Labiba Chowdhury	Female	ENT Specialist	labiba@hospital.com	105000.00
100136	Dr. Nehal Ahmed	Male	General Surgeon	nehal@hospital.com	125000.00
100137	Dr. Farzana Akhter	Female	Pediatrician	farzana@hospital.com	115000.00
100138	Dr. Puja Bairagi	Female	Urologist	puja@hospital.com	140000.00
100139	Dr. Shah Iqra	Female	Oncologist	shah@hospital.com	190000.00
100140	Dr. Swsti Biswas	Female	Gynecologist	swsti@hospital.com	158000.00
100141	Dr. Mariam Akhter Jahan	Female	Pathologist	mariam@hospital.com	190000.00
100142	Dr. Jafrin Khan	Female	Endocrinologist	jafrin@hospital.com	120000.00
100143	Dr. Shuvom Biswas	Male	Gastroenterologist	shuvom@hospital.com	145000.00
100144	Dr. Grace Barikder	Female	Hematologist	grace@hospital.com	125000.00
100145	Dr. Shihab Shariar	Male	Psychiatrist	shihab@hospital.com	117000.00
100146	Dr. Najifa Anjum	Female	Pulmonologist	nafisa@hospital.com	155000.00
100147	Dr. Sarjil Mridha	Male	General Surgeon	sarjil@hospital.com	146000.00
100148	Dr. Sakib Mahmud	Male	General Surgeon	sakib@hospital.com	132000.00
100149	Dr. Marufa Akher	Female	Radiology	marufa@hospital.com	178000.00
100150	Dr. Taposhee Mostafa	Female	Psychiatrist	taposhee@hospital.com	125000.00
100151	Dr. Ononna Aminul	Female	Plastic Surgeon	ononna@hospital.com	130000.00

III) Staff :

8) Delete the staff member whose email is 'lily.staff@hospital.com'.

Query :

DELETE FROM Staff

WHERE Email = 'lily.staff@hospital.com';

Staff_Id	Staff_Name	Gender	Phone	Email	Role
2001	Rafiqul Islam	Male	01710012345	rafiqul.staff@hospital.com	Receptionist
2002	Shahriar Hossain Saad	Male	01820045678	saad.staff@hospital.com	Nurse
2003	Sabuj Das	Male	01530098765	sabuj.staff@hospital.com	Pharmacist
2004	Joynove Mim	Female	01340076543	mim.staff@hospital.com	Nurse
2005	Shakib Ahmed	Male	01712345678	shakib.staff@hospital.com	Nurse
2006	Hemel Rahman	Male	01711011122	hemel.staff@hospital.com	Nurse
2007	Jannatul Ferdous	Female	01650011223	jannatul.staff@hospital.com	Lab Assistant
2008	Maliha Rahman	Female	01460066789	maliha.staff@hospital.com	Security Guard
2009	Athia Enam	Female	01970055678	athia.staff@hospital.com	Nurse
2010	Sabbir Hossain	Male	01780088990	sabbir.staff@hospital.com	Electrician
2011	Tania Jahan	Female	01890044332	tania.staff@hospital.com	Receptionist
2012	Fatema Akter	Female	01310044321	fatema.staff@hospital.com	Nurse
2013	Rakib Hossain	Male	01510011234	rakib.staff@hospital.com	Accountant
2014	Nushra Noor	Female	01920022145	nushra.staff@hospital.com	Nurse
2015	Evan Haque	Male	01330099887	evan.staff@hospital.com	Lab Assistant
2016	Rumana Akhter	Female	01722033145	rumana.staff@hospital.com	Nurse
2017	Faisal Hossain	Male	01823456789	faisal.staff@hospital.com	Security Guard
2018	Rimpi Sultana	Female	01760077654	rimpi.staff@hospital.com	Pharmacist
2019	Shahana Sathi	Female	01810033456	shahana.staff@hospital.com	Nurse
2020	Sadia Anjum	Female	01822011234	sadia.staff@hospital.com	Maintenance Worker
2021	Nayem Khan	Male	01934567890	nayem.staff@hospital.com	Nurse
2022	Kaniz Fatema	Female	01990022134	kaniz.staff@hospital.com	Cleaner
2023	Tanvir Hasan	Male	01430077678	tanvir.staff@hospital.com	Maintenance Worker
2024	Jannatul Islam Easha	Female	01680022145	easha.staff@hospital.com	Cafeteria Manager
2025	Sumaiya Sultana	Female	01670022998	sumaiya.staff@hospital.com	Nurse
2027	Meherun Nisa	Female	01460066789	meherun.staff@hospital.com	Security Guard

9) Show all staff members currently in the system.

Query :

SELECT * FROM Staff;

10) List all staff members whose names have 'a' as the second character.

Query :

SELECT * FROM Staff WHERE Staff_Name like '_a%';

Staff_Id	Staff_Name	Gender	Phone	Email	Role
2001	Rafiqul Islam	Male	01710012345	rafiqul.staff@hospital.com	Receptionist
2003	Sabuj Das	Male	01530098765	sabuj.staff@hospital.com	Pharmacist
2007	Jannatul Ferdous	Female	01650011223	jannatul.staff@hospital.com	Lab Assistant
2008	Maliha Rahman	Female	01460066789	maliha.staff@hospital.com	Security Guard
2010	Sabbir Hossain	Male	01780088990	sabbir.staff@hospital.com	Electrician
2011	Tania Jahan	Female	01890044332	tania.staff@hospital.com	Receptionist
2012	Fatema Akter	Female	01310044321	fatema.staff@hospital.com	Nurse
2013	Rakib Hossain	Male	01510011234	rakib.staff@hospital.com	Accountant
2017	Faisal Hossain	Male	01823456789	faisal.staff@hospital.com	Security Guard
2020	Sadia Anjum	Female	01822011234	sadia.staff@hospital.com	Maintenance Worker
2021	Nayem Khan	Male	01934567890	nayem.staff@hospital.com	Nurse
2022	Kaniz Fatema	Female	01990022134	kaniz.staff@hospital.com	Cleaner
2023	Tanvir Hasan	Male	01430077678	tanvir.staff@hospital.com	Maintenance Worker
2024	Jannatul Islam Easha	Female	01680022145	easha.staff@hospital.com	Cafeteria Manager

IV) Patient :

11) Retrieve all available information about each patient stored in the system.

Query :

SELECT * FROM Patient;

Patient_ID	Patient_Name	Date_of_Birth	Gender	Blood_Group	Phone	Medical_History
3001	Turzo Saha	1980-05-12	Male	A+	01711001234	Hypertension & Diabetes
3002	Sharmin Akter	1992-07-20	Female	O-	01822003456	Asthma since childhood
3003	Shahriar Shanto	1975-03-18	Male	B+	01533005678	Heart Disease
3004	Tanjila Jannat	1988-11-09	Female	AB+	01344007890	Migraine
3005	Sunandan Das	2000-01-01	Male	A-	01655001230	Fractured leg (2022)
3006	Sumaiya Sultana	1995-06-15	Female	O+	01966003456	Anemia
3007	Nabil Hossain	1982-08-22	Male	B-	01777009876	Lung Cancer
3008	Ritu Islam	1999-04-11	Female	A+	01899001234	Polycystic Ovary Syndrome
3009	Abdullah Hossain	1978-02-19	Male	O+	01366007845	Kidney Stone History
3010	Farzana Haque	1996-10-05	Female	AB-	01755448796	Brain Tumor
3011	Saila Wasif	1984-07-23	Male	B+	01566778899	High Cholesterol
3012	Sanjida Monika	1990-12-02	Female	A+	01911223344	Sinusitis
3013	Arpon Chowdhury	1983-09-09	Male	AB+	01877665544	Cancer & Migraine
3014	Lubaba Sadia	1997-03-30	Female	O-	01644332211	Gallbladder Surgery (2021)
3015	Sajjad Arnob	2001-08-08	Male	A+	01733445566	Food Allergy
3016	Tania Khatun	1986-04-14	Female	B-	01999887766	Diabetes
3017	Rafiq Ahmed	1973-01-25	Male	A-	01722334455	High Blood Pressure
3018	Fariha Ahmed	1993-11-17	Female	AB+	01881234567	Anxiety Disorder
3019	Anamika Rani Dhar	1989-06-10	Female	O+	01333322110	Osteoarthritis (2019)
3020	Samira Chowdhury	1994-05-27	Female	B+	01944556677	Asthma & Hypertension

12) Find out how many female patients with the blood group AB+ were born after January 1, 1980.

Query :

SELECT Blood_Group, COUNT(*) AS Female_AB_Pos_Count FROM Patient

WHERE Blood_Group = 'AB+'

 AND Gender = 'Female'

 AND Date_of_Birth > '1980-01-01'

GROUP BY Blood_Group;

Blood_Group	Female_AB_Pos_Count
AB+	2

V) Appointment :

13) Find the appointment(s) with the earliest appointment date.

Query :

SELECT * FROM Appointment

WHERE Appointment_Date = (

SELECT MIN(Appointment_Date)

FROM Appointment);

Appointment_ID	Patient_ID	Doctor_ID	Appointment_time	Appointment_Date	Status
101	3001	100131	09:00:00	2025-05-02	Scheduled
102	3002	100132	09:30:00	2025-05-02	Cancelled
103	3003	100133	10:00:00	2025-05-02	Rescheduled
104	3004	100134	10:30:00	2025-05-02	Completed
105	3005	100135	11:00:00	2025-05-02	Scheduled
106	3006	100136	11:30:00	2025-05-02	No Show
107	3007	100137	12:00:00	2025-05-02	Completed
108	3008	100138	12:30:00	2025-05-02	Cancelled
109	3009	100139	13:00:00	2025-05-02	Scheduled
110	3010	100140	13:30:00	2025-05-02	Rescheduled
111	3011	100141	14:00:00	2025-05-02	Completed
112	3012	100142	14:30:00	2025-05-02	Scheduled
113	3013	100143	15:00:00	2025-05-02	Cancelled
114	3014	100144	15:30:00	2025-05-02	No Show
115	3015	100145	16:00:00	2025-05-02	Scheduled
116	3016	100146	16:30:00	2025-05-02	Completed
117	3017	100147	17:00:00	2025-05-02	Scheduled
118	3018	100148	17:30:00	2025-05-02	Rescheduled
119	3019	100149	18:00:00	2025-05-02	Completed
120	3020	100150	18:30:00	2025-05-02	No Show

14) Display all appointments recorded in the system.

Query :

SELECT * FROM Appointment;

Appointment_ID	Patient_ID	Doctor_ID	Appointment_time	Appointment_Date	Status
101	3001	100131	09:00:00	2025-05-02	Scheduled
102	3002	100132	09:30:00	2025-05-02	Cancelled
103	3003	100133	10:00:00	2025-05-02	Rescheduled
104	3004	100134	10:30:00	2025-05-02	Completed
105	3005	100135	11:00:00	2025-05-02	Scheduled
106	3006	100136	11:30:00	2025-05-02	No Show
107	3007	100137	12:00:00	2025-05-02	Completed
108	3008	100138	12:30:00	2025-05-02	Cancelled
109	3009	100139	13:00:00	2025-05-02	Scheduled
110	3010	100140	13:30:00	2025-05-02	Rescheduled
111	3011	100141	14:00:00	2025-05-02	Completed
112	3012	100142	14:30:00	2025-05-02	Scheduled
113	3013	100143	15:00:00	2025-05-02	Cancelled
114	3014	100144	15:30:00	2025-05-02	No Show
115	3015	100145	16:00:00	2025-05-02	Scheduled
116	3016	100146	16:30:00	2025-05-02	Completed
117	3017	100147	17:00:00	2025-05-02	Scheduled
118	3018	100148	17:30:00	2025-05-02	Rescheduled
119	3019	100149	18:00:00	2025-05-02	Completed
120	3020	100150	18:30:00	2025-05-02	No Show
121	3001	100151	09:00:00	2025-05-03	Cancelled

VI) LabTest:

15) List all unique dates on which lab tests were performed.

Query :

SELECT DISTINCT Test_Date from LabTest;

16) Identify all lab tests that do not have the word "Blood" in their names.

Query :

SELECT * FROM LabTest

WHERE Test_Name NOT LIKE '%Blood%';

Lab_Technician_ID	Test_ID	Patient_ID	Test_Name	Test_Type	Test_Date	Result	Cost
203	5003	3003	Urinalysis	Urine Test	2025-05-01	Normal	250.00
204	5004	3004	X-Ray Chest	Imaging	2025-05-01	Mild infection	1200.00
205	5005	3005	Lipid Profile	Blood Test	2025-02-01	Borderline High	750.00
206	5006	3006	Thyroid Panel	Blood Test	2025-05-21	Normal	650.00
207	5007	3007	MRI Brain	Imaging	2025-05-01	No Abnormalities	5000.00
208	5008	3008	Liver Function Test	Blood Test	2025-09-01	Slightly Elevated ALT	850.00
209	5009	3009	CT Abdomen	Imaging	2025-06-24	Appendicitis Suspected	4500.00
210	5010	3010	HIV Test	Blood Test	2025-01-01	Negative	1000.00
211	5011	3011	COVID-19 PCR	Swab Test	2025-08-21	Negative	1500.00
212	5012	3012	Hemoglobin A1c	Blood Test	2025-05-15	6.2%	400.00
213	5013	3013	Vitamin D	Blood Test	2025-10-01	Deficient	700.00
214	5014	3014	Electrolyte Panel	Blood Test	2025-10-01	Sodium Low	600.00
215	5015	3015	ECG	Cardiac Test	2025-05-01	Normal Sinus Rhythm	350.00

17) Display the complete details of every lab test recorded in the database.

Query :

SELECT * FROM LabTest;

Lab_Technician_ID	Test_ID	Patient_ID	Test_Name	Test_Type	Test_Date	Result	Cost
201	5001	3001	Complete Blood Count	Blood Test	2025-05-01	Normal	500.00
202	5002	3002	Blood Glucose	Blood Test	2025-05-01	High	300.00
203	5003	3003	Urinalysis	Urine Test	2025-05-01	Normal	250.00
204	5004	3004	X-Ray Chest	Imaging	2025-05-01	Mild infection	1200.00
205	5005	3005	Lipid Profile	Blood Test	2025-05-01	Borderline High	750.00
206	5006	3006	Thyroid Panel	Blood Test	2025-05-01	Normal	650.00
207	5007	3007	MRI Brain	Imaging	2025-05-01	No Abnormalities	5000.00
208	5008	3008	Liver Function Test	Blood Test	2025-05-01	Slightly Elevated ALT	850.00
209	5009	3009	CT Abdomen	Imaging	2025-05-01	Appendicitis Suspected	4500.00
210	5010	3010	HIV Test	Blood Test	2025-05-01	Negative	1000.00
211	5011	3011	COVID-19 PCR	Swab Test	2025-05-01	Negative	1500.00
212	5012	3012	Hemoglobin A1c	Blood Test	2025-05-01	6.2%	400.00
213	5013	3013	Vitamin D	Blood Test	2025-05-01	Deficient	700.00
214	5014	3014	Electrolyte Panel	Blood Test	2025-05-01	Sodium Low	600.00
215	5015	3015	ECG	Cardiac Test	2025-05-01	Normal Sinus Rhythm	350.00

VII) Surgery :

18) Update all surgeries with an outcome of 'Recovery' to 'Improving'.

Query :

SET SQL_SAFE_UPDATES=0;

UPDATE Surgery

SET Outcome = 'Improving'

WHERE Outcome = 'Recovery';

Surgery_ID	Patient_ID	Doctor_ID	Surgery_Type	Surgery_Date	Duration	Operating_Room	Outcome
6001	3001	100131	Appendectomy	2025-04-10	01:30:00	OR-1	Successful
6002	3002	100132	Cataract Surgery	2025-04-11	00:45:00	OR-2	Successful
6003	3003	100133	Gallbladder Removal	2025-04-12	01:15:00	OR-3	Complications
6004	3004	100134	Tonsillectomy	2025-04-13	00:40:00	OR-4	Successful
6005	3005	100135	Hernia Repair	2025-04-14	01:00:00	OR-1	Successful
6006	3006	100136	Cesarean Section	2025-04-15	01:20:00	OR-2	Successful
6007	3007	100137	Knee Replacement	2025-04-16	02:30:00	OR-3	Improving
6008	3008	100138	Hip Replacement	2025-04-17	02:15:00	OR-4	Successful
6009	3009	100139	Coronary Bypass	2025-04-18	03:00:00	OR-5	Stable
6010	3010	100140	Spinal Fusion	2025-04-19	02:45:00	OR-6	Successful
6011	3011	100141	Hysterectomy	2025-04-20	01:50:00	OR-1	Successful
6012	3012	100142	Prostate Surgery	2025-04-21	01:40:00	OR-2	Stable
6013	3013	100143	Thyroidectomy	2025-04-22	01:25:00	OR-3	Complications
6014	3014	100144	Skin Grafting	2025-04-23	01:10:00	OR-4	Successful
6015	3015	100145	Lung Resection	2025-04-24	02:00:00	OR-5	Successful
6016	3016	100146	Kidney Transplant	2025-04-25	03:30:00	OR-6	Stable
6017	3017	100147	Liver Biopsy	2025-04-26	00:50:00	OR-1	Successful
6018	3018	100148	Mastectomy	2025-04-27	02:10:00	OR-2	Improving
6019	3019	100149	Arthroscopy	2025-04-28	01:00:00	OR-3	Successful
6020	3020	100150	Colonoscopy	2025-04-29	00:40:00	OR-4	Successful
6021	3001	100151	Laparoscopy	2025-04-30	01:05:00	OR-5	Successful

19) Show the first three surgeries that had a successful outcome.

Query :

SELECT * FROM Surgery

WHERE Outcome = 'Successful'

LIMIT 3;

Surgery_ID	Patient_ID	Doctor_ID	Surgery_Type	Surgery_Date	Duration	Operating_Room	Outcome
6001	3001	100131	Appendectomy	2025-04-10	01:30:00	OR-1	Successful
6002	3002	100132	Cataract Surgery	2025-04-11	00:45:00	OR-2	Successful
6004	3004	100134	Tonsillectomy	2025-04-13	00:40:00	OR-4	Successful

20) Retrieve all surgeries and their respective details.

Query :

SELECT * FROM Surgery;

Surgery_ID	Patient_ID	Doctor_ID	Surgery_Type	Surgery_Date	Duration	Operating_Room	Outcome
6001	3001	100131	Appendectomy	2025-04-10	01:30:00	OR-1	Successful
6002	3002	100132	Cataract Surgery	2025-04-11	00:45:00	OR-2	Successful
6003	3003	100133	Gallbladder Removal	2025-04-12	01:15:00	OR-3	Complications
6004	3004	100134	Tonsillectomy	2025-04-13	00:40:00	OR-4	Successful
6005	3005	100135	Hernia Repair	2025-04-14	01:00:00	OR-1	Successful
6006	3006	100136	Cesarean Section	2025-04-15	01:20:00	OR-2	Successful
6007	3007	100137	Knee Replacement	2025-04-16	02:30:00	OR-3	Recovery
6008	3008	100138	Hip Replacement	2025-04-17	02:15:00	OR-4	Successful
6009	3009	100139	Coronary Bypass	2025-04-18	03:00:00	OR-5	Stable
6010	3010	100140	Spinal Fusion	2025-04-19	02:45:00	OR-6	Successful
6011	3011	100141	Hysterectomy	2025-04-20	01:50:00	OR-1	Successful
6012	3012	100142	Prostate Surgery	2025-04-21	01:40:00	OR-2	Stable
6013	3013	100143	Thyroidectomy	2025-04-22	01:25:00	OR-3	Complications
6014	3014	100144	Skin Grafting	2025-04-23	01:10:00	OR-4	Successful
6015	3015	100145	Lung Resection	2025-04-24	02:00:00	OR-5	Successful
6016	3016	100146	Kidney Transplant	2025-04-25	03:30:00	OR-6	Stable
6017	3017	100147	Liver Biopsy	2025-04-26	00:50:00	OR-1	Successful
6018	3018	100148	Mastectomy	2025-04-27	02:10:00	OR-2	Recovery
6019	3019	100149	Arthroscopy	2025-04-28	01:00:00	OR-3	Successful
6020	3020	100150	Colonoscopy	2025-04-29	00:40:00	OR-4	Successful
6021	3001	100151	Laparoscopy	2025-04-30	01:05:00	OR-5	Successful

VIII) Ward :

21) Remove the "Status" column from the Ward table.

Query :

ALTER TABLE WARD

DROP COLUMN Status;

Ward_ID	Ward_Name	Ward_Type	Department_ID	Number_of_Beds	Occupied_Beds	Floor
6001	General Ward A	General	1001	30	25	1
6002	ICU Ward A	ICU	1001	10	8	2
6003	Pediatric Ward A	Pediatric	1002	20	15	1
6004	Maternity Ward A	Maternity	1004	25	18	3
6005	Surgical Ward A	Surgical	1005	15	12	2
6006	General Ward B	General	1003	28	20	1
6007	ICU Ward B	ICU	1001	12	9	2
6008	Pediatric Ward B	Pediatric	1002	18	14	1
6009	Maternity Ward B	Maternity	1004	22	16	3
6010	Gynecology Ward	Gynecology	1004	17	15	2
6011	Isolation Ward	Isolation	1003	8	5	4
6012	Pathology Ward	Pathology	1005	10	6	4
6013	Cardiac Ward	Cardiac	1001	14	12	3
6014	Neurosurgery	Neurosurgery	1002	16	13	3
6015	Psychiatric Ward	Psychiatric	1012	20	17	4
6016	Emergency Ward	Emergency	1001	12	11	1
6017	Orthopedic Ward	Orthopedic	1003	18	16	2
6018	Oncology Ward	Oncology	1009	30	28	1
6019	ICU Ward C	ICU	1001	10	7	2
6020	Gastroenterology Ward	Gastroenterology	1002	12	10	1

22) Display all information about hospital wards.

Query :

SELECT * FROM WARD;

Ward_ID	Ward_Name	Ward_Type	Department_ID	Number_of_Beds	Occupied_Beds	Floor	Status
6001	General Ward A	General	1001	30	25	1	Active
6002	ICU Ward A	ICU	1001	10	8	2	Active
6003	Pediatric Ward A	Pediatric	1002	20	15	1	Active
6004	Maternity Ward A	Maternity	1004	25	18	3	Active
6005	Surgical Ward A	Surgical	1005	15	12	2	Under Maintenance
6006	General Ward B	General	1003	28	20	1	Active
6007	ICU Ward B	ICU	1001	12	9	2	Active
6008	Pediatric Ward B	Pediatric	1002	18	14	1	Active
6009	Maternity Ward B	Maternity	1004	22	16	3	Active
6010	Gynecology Ward	Gynecology	1004	17	15	2	Active
6011	Isolation Ward	Isolation	1003	8	5	4	Active
6012	Pathology Ward	Pathology	1005	10	6	4	Active
6013	Cardiac Ward	Cardiac	1001	14	12	3	Active
6014	Neurosurgery	Neurosurgery	1002	16	13	3	Active
6015	Psychiatric Ward	Psychiatric	1012	20	17	4	Inactive
6016	Emergency Ward	Emergency	1001	12	11	1	Active
6017	Orthopedic Ward	Orthopedic	1003	18	16	2	Active
6018	Oncology Ward	Oncology	1009	30	28	1	Active
6019	ICU Ward C	ICU	1001	10	7	2	Under Maintenance
6020	Gastroenterology Ward	Gastroenterology	1002	12	10	1	Active

23) Show each ward's name, number of beds, occupied beds, and remaining available beds.

Query :

SELECT Ward_Name,

Number_of_Beds,

Occupied_Beds,

(Number_of_Beds - Occupied_Beds) AS Remaining_Available_Beds

FROM Ward;

Ward_Name	Number_of_Beds	Occupied_Beds	Remaining_Available_Beds
Pediatric Ward A	20	15	5
Maternity Ward A	25	18	7
Surgical Ward A	15	12	3
General Ward B	28	20	8
ICU Ward B	12	9	3
Pediatric Ward B	18	14	4
Maternity Ward B	22	16	6
Gynecology Ward	17	15	2
Isolation Ward	8	5	3
Pathology Ward	10	6	4
Cardiac Ward	14	12	2
Neurosurgery	16	13	3
Psychiatric Ward	20	17	3
Emergency Ward	12	11	1
Orthopedic Ward	18	16	2
Oncology Ward	30	28	2
ICU Ward C	10	7	3
Gastroenterology Ward	12	10	2

IX) MedicineStore :

24) Display all records from the MedicineStore table.

Query :

SELECT * FROM MedicineStore;

Medicine_ID	Medicine_Name	Manufacturer	Expiry_Date	Price	Category	Suggested_By	Stock_Quantity
7001	Paracetamol	NeuroMed	2026-05-01	62.00	Painkiller	Dr. Ayesha Rahman	200
7002	Amoxicillin	CholCare Inc	2025-08-10	75.60	Antibiotic	Dr. Mariam Akhter Jahan	150
7003	Omeprazole	StomachCare	2026-04-01	90.30	Antacid	Dr. Sadikul Islam	100
7004	Ibuprofen	CalmMed Co.	2025-10-20	36.70	Anti-inflammatory	Dr. Proma Das Krity	180
7005	Cetirizine	DailyCure Ltd	2025-09-01	23.80	Antihistamine	Dr. Ayesha Rahman	90
7006	Metformin	Pharma House	2026-01-20	60.20	Diabetes	Dr. Mariam Akhter Jahan	130
7007	Amlodipine	CardioMed	2026-06-30	42.10	Blood Pressure	Dr. Sadikul Islam	110
7008	Atorvastatin	RapidMed	2025-07-12	68.90	Cholesterol	Dr. Proma Das Krity	95
7009	Salbutamol	ClearAllergy Inc	2025-08-31	31.90	Asthma	Dr. Shah Iqra	85
7010	Ranitidine	DiabetRelief	2026-11-11	52.00	Ulcer	Dr. Sadikul Islam	140
7011	Azithromycin	Healz Ltd	2025-10-15	135.75	Antibiotic	Dr. Shah Iqra	160
7012	Losartan	NutriCare	2027-01-01	75.00	Hypertension	Dr. Sadikul Islam	125
7013	Insulin	Apex Pharma	2026-12-31	150.00	Diabetes	Dr. Ayesha Rahman	70
7014	Diazepam	SugarFree Pharma	2027-03-22	40.00	Sedative	Dr. Shihab Shariar	60
7015	Loratadine	Medico Trust	2025-11-30	322.50	Antihistamine	Dr. Athina Nahar Tulona	100
7016	Multivitamins	PressureCare	2026-02-28	39.25	Supplement	Dr. Grace Barikder	300
7017	Clopidogrel	BreatheEasy Ltd	2025-12-05	37.45	Blood Thinner	Dr. Shah Iqra	85
7018	Phenytoin	HeartShield Ltd	2026-09-15	46.75	Anti-epileptic	Dr. Ayesha Rahman	70
7019	Cefuroxime	BioticMed	2026-10-10	89.50	Antibiotic	Dr. Mariam Akhter Jahan	90
7020	Levetiracetam	NeuroHeal	2026-08-01	78.00	Anti-seizure	Dr. Ayesha Rahman	60

25) Rename the MedicineStore table to Pharmacy.

Query :

ALTER TABLE MedicineStore

RENAME TO Pharmacy;

26) Change the column name from "Suggested_By" to "Prescribed_By" in the Pharmacy table.

Query :

ALTER TABLE Pharmacy

RENAME COLUMN Suggested_By TO Prescribed_By;

Medicine_ID	Medicine_Name	Manufacturer	Expiry_Date	Price	Category	Prescribed_By	Stock_Quantity
7001	Paracetamol	NeuroMed	2026-05-01	62.00	Painkiller	Dr. Ayesha Rahman	200
7002	Amoxicillin	CholCare Inc	2025-08-10	75.60	Antibiotic	Dr. Mariam Akhter Jahan	150
7003	Omeprazole	StomachCare	2026-04-01	90.30	Antacid	Dr. Sadikul Islam	100
7004	Ibuprofen	CalmMed Co.	2025-10-20	36.70	Anti-inflammatory	Dr. Proma Das Krity	180
7005	Cetirizine	DailyCure Ltd	2025-09-01	23.80	Antihistamine	Dr. Ayesha Rahman	90
7006	Metformin	Pharma House	2026-01-20	60.20	Diabetes	Dr. Mariam Akhter Jahan	130
7007	Amlodipine	CardioMed	2026-06-30	42.10	Blood Pressure	Dr. Sadikul Islam	110
7008	Atorvastatin	RapidMed	2025-07-12	68.90	Cholesterol	Dr. Proma Das Krity	95
7009	Salbutamol	ClearAllergy Inc	2025-08-31	31.90	Asthma	Dr. Shah Iqra	85
7010	Ranitidine	DiabetRelief	2026-11-11	52.00	Ulcer	Dr. Sadikul Islam	140
7011	Azithromycin	Healz Ltd	2025-10-15	135.75	Antibiotic	Dr. Shah Iqra	160
7012	Losartan	NutriCare	2027-01-01	75.00	Hypertension	Dr. Sadikul Islam	125
7013	Insulin	Apex Pharma	2026-12-31	150.00	Diabetes	Dr. Ayesha Rahman	70
7014	Diazepam	SugarFree Pharma	2027-03-22	40.00	Sedative	Dr. Shihab Shariar	60
7015	Loratadine	Medico Trust	2025-11-30	322.50	Antihistamine	Dr. Athina Nahar Tulona	100
7016	Multivitamins	PressureCare	2026-02-28	39.25	Supplement	Dr. Grace Barikder	300
7017	Clopidogrel	BreatheEasy Ltd	2025-12-05	37.45	Blood Thinner	Dr. Shah Iqra	85
7018	Phenytoin	HeartShield Ltd	2026-09-15	46.75	Anti-epileptic	Dr. Ayesha Rahman	70
7019	Cefuroxime	BioticMed	2026-10-10	89.50	Antibiotic	Dr. Mariam Akhter Jahan	90
7020	Levetiracetam	NeuroHeal	2026-08-01	78.00	Anti-seizure	Dr. Ayesha Rahman	60

27) Find the doctor who has prescribed the most medications and display the number of prescriptions.

Query :

SELECT Prescribed_By, COUNT(*) AS Total_Prescription

FROM Pharmacy

GROUP BY Prescribed_By

ORDER BY Total_Prescription DESC

LIMIT 1;

Prescribed_By	Total_Prescription
Dr. Ayesha Rahman	5

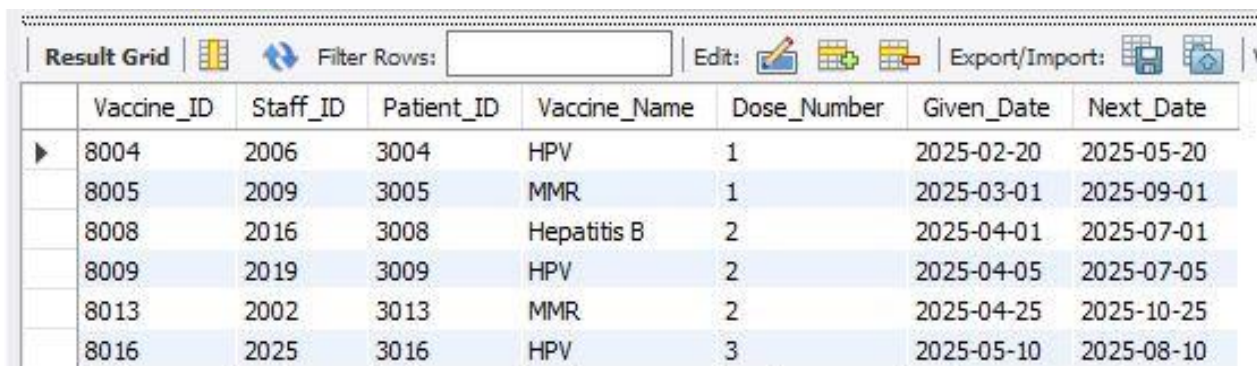**28)** Retrieve all records from the Pharmacy table.

Query :

SELECT * FROM Pharmacy;

X) Vaccination :

29) List all upcoming vaccinations for Hepatitis B, HPV, or MMR.

Query :

SELECT * FROM Vaccination

WHERE Vaccine_Name IN ('Hepatitis B', 'HPV', 'MMR')

  AND Next_Date >= CURRENT_DATE;

Vaccine_ID	Staff_ID	Patient_ID	Vaccine_Name	Dose_Number	Given_Date	Next_Date
8004	2006	3004	HPV	1	2025-02-20	2025-05-20
8005	2009	3005	MMR	1	2025-03-01	2025-09-01
8008	2016	3008	Hepatitis B	2	2025-04-01	2025-07-01
8009	2019	3009	HPV	2	2025-04-05	2025-07-05
8013	2002	3013	MMR	2	2025-04-25	2025-10-25
8016	2025	3016	HPV	3	2025-05-10	2025-08-10

30) Display all vaccination records in the system.

Query :

SELECT * FROM Vaccination;

Vaccine_ID	Staff_ID	Patient_ID	Vaccine_Name	Dose_Number	Given_Date	Next_Date
8001	2002	3001	COVID-19	1	2025-01-01	2025-02-01
8002	2004	3002	Hepatitis B	1	2025-01-15	2025-02-15
8003	2006	3003	Influenza	2	2025-02-01	2025-08-01
8004	2006	3004	HPV	1	2025-02-20	2025-05-20
8005	2009	3005	MMR	1	2025-03-01	2025-09-01
8006	2012	3006	COVID-19	1	2025-03-10	2025-04-10
8007	2014	3007	Tetanus	2	2025-03-15	2035-03-15
8008	2016	3008	Hepatitis B	2	2025-04-01	2025-07-01
8009	2019	3009	HPV	2	2025-04-05	2025-07-05
8010	2021	3010	Influenza	1	2025-04-10	2025-10-10
8011	2025	3011	COVID-19	2	2025-04-15	2025-05-15
8012	2004	3012	Chickenpox	1	2025-04-20	2025-10-20
8013	2002	3013	MMR	2	2025-04-25	2025-10-25
8014	2012	3014	Tetanus	1	2025-05-01	2035-05-01
8015	2016	3015	Hepatitis A	1	2025-05-05	2025-11-05
8016	2025	3016	HPV	3	2025-05-10	2025-08-10

XI) Billing :

31) Determine which billing entries fall between the Receipt_IDs 'AS9010F' and 'AS9014F' and label them as either "To Be Deleted" or "Keep".

Query :

SELECT

  Receipt_ID,

  CASE

    WHEN Receipt_ID BETWEEN 'AS9010F' AND 'AS9014F' THEN 'To Be Deleted'

    ELSE 'Keep'

  END AS Deletion_Status

FROM Billing;

32) Retrieve all billing records including their full details.

Query :

SELECT * FROM Billing;

33) Count how many patients have billing records with total amounts between 1000 and 2100.

Query :

SELECT COUNT(Patient_ID) FROM Billing WHERE Total_Amount>1000 AND Total_Amount<2100;
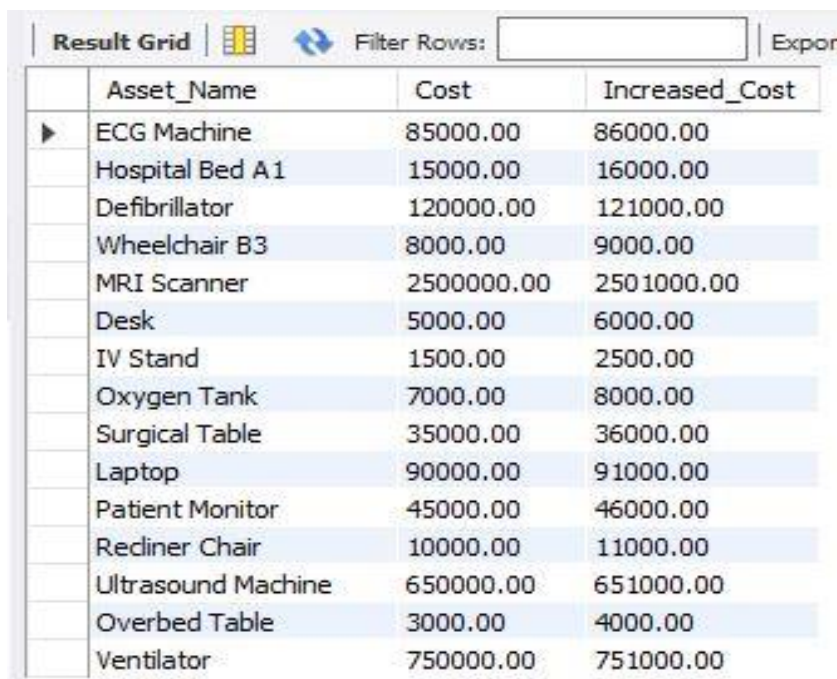
	COUNT(Patient_ID)
▶	8

XII) HospitalAsset :

34) Show each asset's name, original cost, and the cost increased by 1000.

Query :

SELECT Asset_Name, Cost, Cost + 1000 AS Increased_Cost FROM HospitalAsset;

Asset_Name	Cost	Increased_Cost
ECG Machine	85000.00	86000.00
Hospital Bed A1	15000.00	16000.00
Defibrillator	120000.00	121000.00
Wheelchair B3	8000.00	9000.00
MRI Scanner	2500000.00	2501000.00
Desk	5000.00	6000.00
IV Stand	1500.00	2500.00
Oxygen Tank	7000.00	8000.00
Surgical Table	35000.00	36000.00
Laptop	90000.00	91000.00
Patient Monitor	45000.00	46000.00
Recliner Chair	10000.00	11000.00
Ultrasound Machine	650000.00	651000.00
Overbed Table	3000.00	4000.00
Ventilator	750000.00	751000.00

35) Find hospital assets that belong to the same category as the "MRI Scanner" and are located in the same place as the "Ventilator".

Query :

SELECT * FROM HospitalAsset

WHERE Category = (

   SELECT Category

   FROM HospitalAsset

   WHERE Asset_Name = 'MRI Scanner'

   LIMIT 3

)

AND Location = (

   SELECT Location

   FROM HospitalAsset

   WHERE Asset_Name = 'Ventilator'

   LIMIT 2

);

	Department_ID	Asset_ID	Asset_Name	Category	Purchased_Date	Cost	Location
▶	1008	121008	Oxygen Tank	Equipment	2022-06-10	7000.00	ICU
	1015	121015	Ventilator	Equipment	2023-08-15	750000.00	ICU

36) Retrieve all records of hospital assets.

Query :

SELECT * FROM HospitalAsset;

Department_ID	Asset_ID	Asset_Name	Category	Purchased_Date	Cost	Location
1001	121001	ECG Machine	Equipment	2023-07-01	85000.00	Room 101
1002	121002	Hospital Bed A1	Furniture	2020-06-15	15000.00	Ward A
1003	121003	Defibrillator	Equipment	2024-08-01	120000.00	ER
1004	121004	Wheelchair B3	Equipment	2019-05-20	8000.00	Reception
1005	121005	MRI Scanner	Equipment	2018-09-01	2500000.00	Radiology
1006	121006	Desk	Furniture	2023-05-25	5000.00	Admin Office
1007	121007	IV Stand	Equipment	2021-05-30	1500.00	Ward B
1008	121008	Oxygen Tank	Equipment	2022-06-10	7000.00	ICU
1009	121009	Surgical Table	Furniture	2017-05-01	35000.00	OR 2
1010	121010	Laptop	Equipment	2024-01-01	90000.00	Nurses Station
1011	121011	Patient Monitor	Equipment	2020-06-20	45000.00	Room 202
1012	121012	Recliner Chair	Furniture	2023-06-02	10000.00	Waiting Room
1013	121013	Ultrasound Machine	Equipment	2019-07-10	650000.00	Imaging Room
1014	121014	Overbed Table	Furniture	2020-07-10	3000.00	Ward C
1015	121015	Ventilator	Equipment	2023-08-15	750000.00	ICU

Conclusion :

Apart from enhancing day-to-day business in hospitals, the solution functions as a robust instrument for learning and research, allowing medical professionals and innovators to leverage real-world data to create healthcare solutions. Its versatility makes it invaluable in humanitarian and public health settings, where effective patient handling and accurate reporting can be the difference between life and death in adverse conditions. Built with future development in mind, the platform's scalable nature allows future integration of future technologies like telemedicine, AI-driven diagnostics, and advanced analytics, making it a foundation for ongoing improvement in patient care and hospital management.

Here is the GitHub Link where the entire project is uploaded:

https://github.com/AyeshaRahman06/Hospital-Management-System-DBMS-.git