Project Report

Health Centre System

By

Aldotilak Chattarnas Vijay

1.Executive Summary

Introduction:

The healthcare industry has become even more vital in today's world, especially in the years following the COVID pandemic. From birth to the end of life, every individual relies on healthcare services at various stages. With continuous advancements in medical technologies, equipment, and patient care standards, the need for an efficient and reliable data management system has grown significantly.

A well-structured database management system plays a critical role in maintaining essential records such as patient details, physician information, department structures, medical procedures, and nursing support. These data elements must be interconnected and easily retrievable to support timely decision-making and ensure smooth healthcare operations.

To address these requirements and streamline the complexity of healthcare system, I developed a relational database system designed specifically for a healthcare environment. This system ensures proper data organization, relationship mapping, and efficient retrieval of information whenever needed.

Database Components:

The database consists of the following core entities:

- **Physician** – Stores details such as physician ID, name, qualifications, department ID, and date of joining.
- **Patient** – Includes patient ID, first name, surname, address, gender, phone number, and assigned checkup physician ID.
- **Nurse** – Contains nurse ID, name, position, and date of joining.
- **Department** – Maintains department ID and department name.
- **Medical Analysis Report** – Stores identification details, prescriptions, patient ID, and physician ID.
- **Medical Procedure** – Includes physician ID, patient ID, procedure name, and the associated cost.

Each table is interconnected using primary and foreign keys to accurately represent real-world relationships within a healthcare system.

Conclusion:

SQL enables the efficient creation, retrieval, updating, and deletion (CRUD) of records across all components of the database. By executing structured queries, healthcare data can be accessed, analysed, and managed seamlessly, ensuring accuracy, consistency, and reliability. This relational database system ultimately supports smoother healthcare workflows and enhances overall data management within the organization.

2.Problem Statement

Healthcare facilities face major challenges in managing patient records, physician information, departmental structures, and treatment histories. The absence of a centralized system results in:

- Fragmented data across multiple sources
- Delays in retrieving patient or treatment information
- Difficulty in ensuring data accuracy and consistency
- Poor coordination between physicians, nurses, and departments
- Inefficient tracking of procedures and medical reports

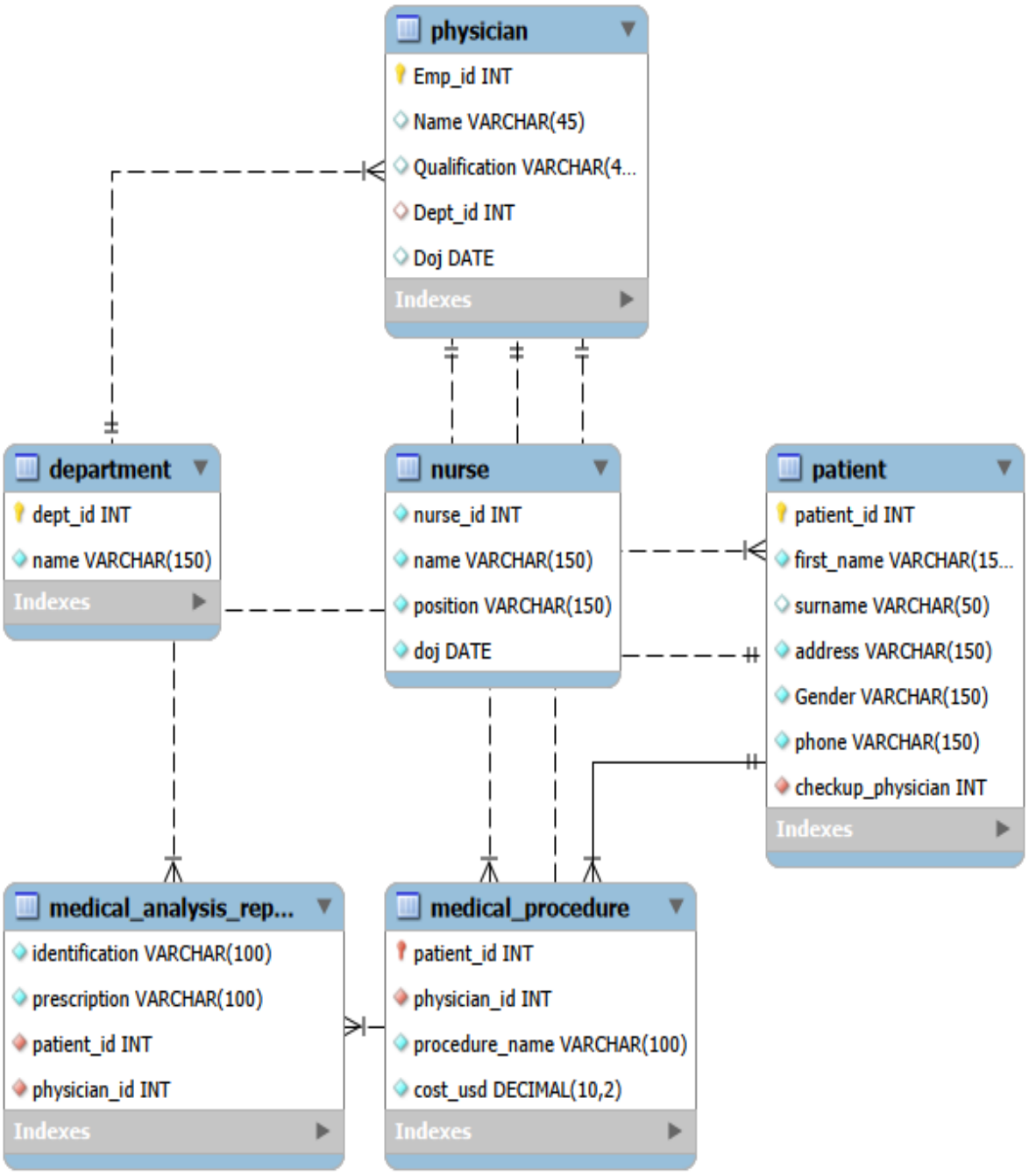
A unified database system is essential to overcome these challenges and provide seamless data management.

3.Project Objective

The main objectives of this project are:

- To design a relational database model for a healthcare management system
- To define core entities and their relationships using an ER diagram
- To implement SQL queries for CRUD operations
- To ensure fast and reliable retrieval of patient and medical records
- To provide structured documentation for future reference or enhancements

4.Entity-Relationship Diagram



5. Table Structure & Attributes

1.Physician

- emp_id int primary key,
- name varchar (150) not null,
- Qualification varchar (150) not null,
- dept_id int not null,
- doj date not null,
- foreign key (dept_id) references department (dept_id).

2. Department

- dept_id int primary key,
- name varchar (150) not null.

3.Patient

- patient_id INT Primary key auto_increment,
- name varchar (150) not null,
- address varchar (150) not null,
- Gender varchar (150) not null,
- phone varchar (150) not null,
- checkup_physician int not null,
- FOREIGN KEY (checkup_physician) REFERENCES Physician(emp_id).

4. Nurse

- nurse_id INT NOT NULL,
- name VARCHAR (150) NOT NULL,
- position VARCHAR (150) NOT NULL,
- doj date not null).

5.Medical Analysis Report

- identification varchar (100) not null,
- prescription varchar (100) not null,
- patient_id int not null,
- physician_id int not null,
- foreign key (patient_id) references patient(patient_id),
- foreign key (physician_id) references physician(emp_id).

6. Medical Procedure

- patient_id int primary key not null,

- physician_id int not null,
- procedure_name varchar (100) not null,
- cost_usd decimal (10,2) not null,
- foreign key (patient_id) references patient(patient_id),
- foreign key (physician_id) references physician(emp_id).

6. Table Values

1.Physician

Insert into physician(emp_id,name,qualification,dept_id,doj)

values

(1,'Dr. Noah','MBBS_MS-ENT',5,'1996-02-22'),

(2,'Dr. John','MBBS',1,'2002-10-12'),

(3,'Dr. Oliva','MD',2,'2000-08-25'),

(4,'Dr. Emma','MS',8,'1999-07-06'),

(5,'Dr. Alex','MBBS',12,'1999-11-05'),

(6,'Dr. Divya','MCh',11,'2005-02-12'),

(7,'Dr. Ramya','DM',7,'2012-10-17'),

(8,'Dr.Arjun','DM',4,'2015-04-18'),

(9,'Dr. Aarav','MBBS',6,'2003-03-11'),

(10,'Dr.Sophia','MD',3,'2005-01-29'),

(11,'Dr.Mike','MBBS',10,'1998-08-10'),

(12,'Dr. Samuel','MBBS',9,'2007-11-04'),

(13,'Dr. Richard','MS',3,'2006-10-27'),

(14,'Dr. Dave','MD',2,'2000-02-05'),

(15,'Dr. Monika','MBBS',11,'2008-05-09'),

(16,'Dr.Jenifer','MD',1,'2001-03-12'),

(17,'Dr. Thomas','MBBS',7,'2004-08-15'),

(18,'Dr. Paul','MCh',8,'2012-09-17'),

(19,'Dr. David','MBBS',9,'2014-09-11'),

(20,'Dr. Joseph','MS',12,'2010-05-20');

2.Department

insert into department(dept_id,name)

values

(1,'General Surgery'),

(2,'Cardiology'),

(3,'Neurology'),

(4,'Pulmonology'),

(5,'ENT'),

(6,'Orthopedics'),

(7,'Gastroenterology'),

(8,'Nephrology'),

(9,'Oncology'),

(10,'Psychiatry'),

(11,'Gynecology'),

(12,'Urology');

3.Patient

insert into patient (Patient_id,name,address,Gender,phone,checkup_physician)

values

(1, 'Rahul Mehta', '1420 Maple St, Dallas, TX', 'Male', '+1-469-221-7834',4),

(2, 'Ethan Wright', '58 Lakeview Dr, Orlando, FL', 'Male', '+1-321-555-1274',9),

(3, 'Aarav Kapoor', '230 Willow Ln, Seattle, WA', 'Male', '+1-206-914-6632',5),

(4, 'Chloe Turner', '790 Redwood Ave, Fresno, CA', 'Female', '+1-559-884-2109',7),

(5, 'Ishika Desai', '912 Park Blvd, Phoenix, AZ', 'Female', '+1-602-423-9088',1),

(6, 'Logan Adams', '445 Creekside Rd, Denver, CO', 'Male', '+1-303-772-1190',12),

(7, 'Maya Bansal', '77 Spring St, Newark, NJ', 'Female', '+1-973-314-5222',11),

(8, 'Sebastian Miller', '101 Harbor Dr, San Diego, CA', 'Male', '+1-619-855-3371',2),

(9, 'Anika Reddy', '209 Garden Ave, Portland, OR', 'Female', '+1-503-319-9872',5),

(10, 'Noah Reed', '312 Pinecrest Ln, Atlanta, GA', 'Male', '+1-678-910-4521',3),

(11, 'Kabir Sinha', '880 Hilltop Rd, Charlotte, NC', 'Male', '+1-704-221-7644',8),

(12, 'Liam Parker', '672 Beacon St, Boston, MA', 'Male', '+1-617-561-7725',6),

(13, 'Sara Khan', '933 Oakridge Cir, Chicago, IL', 'Female', '+1-312-744-9100',10),

(14, 'Harper Collins', '540 Meadow Ln, Columbus, OH', 'Female', '+1-614-319-5783',1),

(15, 'Vikram Joshi', '120 Brookside Dr, Detroit, MI', 'Male', '+1-313-882-9912',9),

(16, 'Ava Mitchell', '660 Valley View St, Miami, FL', 'Female', '+1-786-557-4420',4),

(17, 'Rohan Nair', '77 Westwood Ave, Houston, TX', 'Male', '+1-713-991-2342',8),

(18, 'Zoey Bennett', '304 Sunset Blvd, Los Angeles, CA', 'Female', '+1-424-563-7781',10),

(19, 'Dev Malhotra', '25 Highland Rd, Kansas City, MO', 'Male', '+1-816-990-4411',1),

(20, 'Ella Howard', '98 Riverside Dr, Sacramento, CA', 'Female', '+1-530-211-6629',3),

(21, 'Krish Patel', '482 Sycamore St, Memphis, TN', 'Male', '+1-901-761-2301',5),

(22, 'Natalie Brooks', '211 Aspen Ct, Omaha, NE', 'Female', '+1-402-665-5524',4),

(23, 'Tanish Arora', '903 Ridgewood Ln, Salt Lake City, UT', 'Male', '+1-385-220-8473',2),

(24, 'Madison Clark', '341 Elmwood Ave, Buffalo, NY', 'Female', '+1-716-298-5527',9),

(25, 'Dhruv Mishra', '889 Glen Dr, Minneapolis, MN', 'Male', '+1-612-490-7764',12),

(26, 'Lily Foster', '640 Orchard Rd, Boise, ID', 'Female', '+1-208-665-1983',11),

(27, 'Ayaan Gupta', '755 Birchwood St, Tulsa, OK', 'Male', '+1-918-740-6532',6),

(28, 'Scarlett Rivera', '441 Maple Grove Rd, Richmond, VA', 'Female', '+1-804-992-8104',10),

(29, 'Nikhil Raj', '522 Hillcrest Ave, Louisville, KY', 'Male', '+1-502-882-2118',7),

(30, 'Victoria Price', '12 Meadowbrook Dr, Raleigh, NC', 'Female', '+1-919-442-9915',7),

(31, 'Yash Menon', '333 Autumn St, Milwaukee, WI', 'Male', '+1-414-661-2050',4),

(32, 'Grace Edwards', '210 Woodland Ave, Tampa, FL', 'Female', '+1-813-512-8832',6),

(33, 'Siddharth Verma', '867 Forest Ln, Indianapolis, IN', 'Male', '+1-317-441-6003',5),

(34, 'Aria Moore', '708 Lakefront Cir, Cleveland, OH', 'Female', '+1-216-740-5521',5),

(35, 'Imran Sheikh', '661 Cedar St, Pittsburgh, PA', 'Male', '+1-412-991-7134',1),

(36, 'Hazel Simmons', '555 Harbor Park Rd, Seattle, WA', 'Female', '+1-206-557-4408',1),

(37, 'Farhan Qureshi', '902 Creek Dr, St. Louis, MO', 'Male', '+1-314-773-5644',6),

(38, 'Bella Knight', '199 Rosewood Ave, Denver, CO', 'Female', '+1-720-660-2994',8),

(39, 'Jayant Chawla', '111 Kingsway St, Phoenix, AZ', 'Male', '+1-480-712-6650',6),

(40, 'Aaliyah Barnes', '392 Prospect Rd, Las Vegas, NV', 'Female', '+1-702-903-4420',2),

(41, 'Parth Shukla', '288 Sunset View Rd, Austin, TX', 'Male', '+1-512-641-2201',3),

(42, 'Julia Evans', '90 Lexington Rd, Philadelphia, PA', 'Female', '+1-215-772-8834',2),

(43, 'Rudra Chatterjee', '732 Bridgeway Dr, San Jose, CA', 'Male', '+1-408-212-9982',5),

(44, 'Paisley Scott', '478 Sunrise Blvd, Honolulu, HI', 'Female', '+1-808-993-5518',7),

(45, 'Aman Sehgal', '50 Highland Park St, Portland, ME', 'Male', '+1-207-990-2240',4),

(46, 'Leah Cooper', '643 Crestwood Ln, Chicago, IL', 'Female', '+1-872-210-4418',9),

(47, 'Vivaan Garg', '870 Greenfield Rd, Nashville, TN', 'Male', '+1-629-212-4477',8),

(48, 'Stella Morris', '501 North Point Ave, San Francisco, CA', 'Female', '+1-415-553-9912',7),

(49, 'Kunal Bhatt', '282 Cedarwood Ln, New York, NY', 'Male', '+1-917-662-5511',7),

(50, 'Zoe Murphy', '144 Parkland Dr, Orlando, FL', 'Female', '+1-407-305-6627',1);

4.Nurse

insert into nurse (nurse_id,name,position,doj)

values

(1, 'Aditi Sharma', 'Registered Nurse', '1998-04-12'),

(2, 'Sophia Johnson', 'Assistant Nurse', '2005-11-23'),

(3, 'Priya Nair', 'Staff Nurse', '2001-07-09'),

(4, 'Olivia Brown', 'Head Nurse', '2010-02-14'),

(5, 'Kavya Reddy', 'Nurse Anesthetist', '2003-09-28'),

(6, 'Mia Anderson', 'Supervisor Nurse', '2012-06-05'),

(7, 'Ananya Gupta', 'Cardiac Care Unit Nurse', '1999-12-03'),

(8, 'Emma Davis', 'Registered Nurse', '2008-08-19'),

(9, 'Harper Walker', 'Staff Nurse', '2006-03-22'),

(10, 'Lakshmi Iyer', 'Assistant Nurse', '1997-10-17'),

(11, 'Sneha Patil', 'Head Nurse', '2013-05-30'),

(12, 'Evelyn Martin', 'Registered Nurse', '2000-11-08'),

(13, 'Riya Mehra', 'Supervisor Nurse', '2004-04-26'),

(14, 'Saanvi Verma', 'Staff Nurse', '1996-12-15'),

(15, 'Aisha Khan', 'Nurse Anesthetist', '2009-07-01'),

(16, 'Charlotte Thomas', 'Cardiac Care Unit Nurse', '2002-01-20'),

(17, 'Nisha Pillai', 'Assistant Nurse', '2014-09-11'),

(18, 'Amelia White', 'Registered Nurse', '1998-03-06'),

(19, 'Meera Joshi', 'Supervisor Nurse', '2007-05-13'),

(20, 'Isabella Taylor', 'Head Nurse', '2011-08-29'),

(21, 'Pooja Sinha', 'Staff Nurse', '1999-06-18'),

(22, 'Chloe Allen', 'Cardiac Care Unit Nurse', '2005-02-10'),

(23, 'Neha Kulkarni', 'Registered Nurse', '2001-09-24'),

(24, 'Radhika Desai', 'Assistant Nurse', '2003-12-07'),

(25, 'Lily Green', 'Nurse Anesthetist', '2000-01-30'),

(26, 'Aaradhya Menon', 'Staff Nurse', '1997-05-21'),

(27, 'Stella Gonzalez', 'Supervisor Nurse', '2015-03-12'),

(28, 'Shruti Rao', 'Registered Nurse', '2012-11-02'),

(29, 'Nandini Shetty', 'Assistant Nurse', '1996-08-25'),

(30, 'Lucy Nelson', 'Cardiac Care Unit Nurse', '2004-10-14'),

(31, 'Myra Fernandez', 'Head Nurse', '2009-01-18'),

(32, 'Tanvi Nair', 'Registered Nurse', '2013-07-27');

5.Medical Analysis Report

insert into medical_analysis_report(identification,prescription,patient_id,physician_id)

values

('COPD', 'Bronchodilators', 1, 8),

('Tumor Screening', 'Follow-up Tests', 2, 19),

('Sinusitis', 'Antibiotics', 3, 1),

('Gastritis', 'Antacids', 4, 7),

('Abdominal Pain', 'Buscopan', 5, 2),

('Kidney Stones', 'ibuprofen', 6, 5),

('PCOS', 'Hormonal Therapy', 7, 6),

('Hypertension', 'Beta Blockers', 8, 3),

('Sinusitis', 'Antibiotics', 9, 1),

('Migraine', 'Analgesics', 10, 10),

('Kidney Infection', 'Cefalexin', 11, 18),

('Joint Pain', 'Calcium Supplements', 12, 9),

('Anxiety', 'SSRIs', 13, 11),

('Abdominal Pain', 'Omeprazole', 14, 16),

('Tumor Screening', 'Follow-up Tests', 15, 12),

('Asthma', 'Singulair', 16, 8),

('Kidney Infection', 'Antibiotics', 17, 4),

('Anxiety', 'SSRIs', 18, 11),

('IBS', 'rifaximin', 19, 2),

('Migraine', 'Analgesics', 20, 13),

('Epistaxis', 'LET', 21, 1),

('Asthma', 'Inhaler', 22, 8),

('Hypertension', 'Beta Blockers', 23, 3),

('Tumor Screening', 'Follow-up Tests', 24, 19),

('Kidney Stones', 'Pain Reliever', 25, 20),

('PCOS', 'Hormonal Therapy', 26, 15),

('Joint Pain', 'Calcium Supplements', 27, 9),

('Anxiety', 'SSRIs', 28, 11),

('Diarrhea', 'Alosetron', 29, 17),

('Gastritis', 'Antacids', 30, 17),

('Wheezing', 'Albuterol', 31, 8),

('Joint Pain', 'Calcium Supplements', 32, 9),

('Otosclerosis', 'Bisphosphonates', 33, 1),

('CAD', 'Aspirin', 34, 14),

('Viral Fever', 'Paracetamol', 35, 2),

('Abdominal Pain', 'Painkillers', 36, 16),

('Arthritis', 'Naproxen', 37, 9),

('Prostate Infection', 'Ciprofloxacin', 38, 18),

('Joint Pain', 'Calcium Supplements', 39, 9),

('Arrhythmia', 'Beta blockers', 40, 3),

('Migraine', 'Analgesics', 41, 10),

('Hypertension', 'Beta Blockers', 42, 14),

('Anosmia', 'Corticosteroids', 43, 1),

('Gastritis', 'Antacids', 44, 7),

('Asthma', 'Inhaler', 45, 8),

('Tumor Screening', 'Follow-up Tests', 46, 19),

('Kidney Infection', 'Antibiotics', 47, 4),

('Constipation', 'Lubiprostone', 48, 17),

('Diarrhea', 'Alosetron', 49, 7),

('Abdominal Pain', 'Painkillers', 50, 2);

6. Medical Procedure

insert into medical__procedure(patient_id,physician_id,procedure_name,cost_usd)

values

(1,8,'Spirometry',360.00),

(2,19,'CT Scan',700.00),

(3,1,'Nasal Endoscopy',400.00),

(4,7,'Biopsy',1500.00),

(5,2,'Ultra Sound',900.00),

(6,5,'CT Scan',1000.00),

(7,6,'Ultra Sound',800.00),

(8,3,'Blood pressure test',200.00),

(9,1,'Nasal Endoscopy',400.00),

(10,10,'MRI',500.00),

(11,18,'Urine test',100.00),

(12,9,'X-Ray',350.00),

(13,11,'GAD-7',450.00),

(14,16,'Endoscopy',840.00),

(15,12,'CT Scan',700.00),

(16,8,'Nasal Endoscopy',400.00),

(17,4,'Urine test',100.00),

(18,11,'GAD-7',450.00),

(19,2,'Blood Test',250.00),

(20,13,'MRI',500.00),

(21,1,'Blood Test',250.00),

(22,8,'Nasal Endoscopy',400.00),

(23,3,'Blood pressure test',200.00),

(24,19,'CT Scan',700.00),

(25,20,'Urine test',100.00),

(26,15,'Ultra Sound',800.00),

(27,9,'X-Ray',350.00),

(28,11,'GAD-7',450.00),

(29,17,'Stool Test',250.00),

(30,19,'Endoscopy',840.00),

(31,8,'Nasal Endoscopy',400.00),

(32,9,'X-Ray',350.00),

(33,1,'X-Ray',550.00),

(34,14,'ECG',600.00),

(35,2,'Blood Test',250.00),

(36,16,'Endoscopy',840.00),

(37,9,'X-Ray',350.00),

(38,18,'DRE',500.00),

(39,9,'ECG',600.00),

(40,3,'ECG',600.00),

(41,10,'MRI',500.00),

(42,14,'CT Scan',1000.00),

(43,1,'UPSIT',40.00),

(44,7,'Endoscopy',840.00),

(45,8,'Nasal Endoscopy',400.00),

(46,19,'CT Scan',1000.00),

(47,4,'Urine test',100.00),

(48,17,'Abdominal X-Ray',350.00),

(49,7,'Stool test',250.00),

(50,2,'X-Ray',250.00);

7. Normalization

To ensure data integrity and eliminate redundancy, the database was normalized to:

- **1NF** – Each cell contains atomic values and each row is unique.
- **2NF** – No partial dependencies; tables structured by unique identifiers
- **3NF** – Non-key attributes depend only on the primary key and no transitive dependencies

This ensures efficient storage and reliable data retrieval.

8. SQL Queries

1.Retrieve all patients first name in alphabetical order.

```
select  first_name from patient

order by first_name;
```

first_name
Aaliyah
Aarav
Aman
Anika
Aria
Ava
Ayaan
Bella
Chloe
Dev
Dhruv
Ella
Ethan
Farhan
Grace
Harper
Hazel
Imran
Ishika
Jayant
Julia
Kabir
Krish
Kunal
Leah

2.Get patient names and phone numbers.

```
select first_name,surname,phone

from patient;
```

first_name	surname	phone
Rahul	Mehta	+1-469-221-7834
Ethan	Wright	+1-321-555-1274
Aarav	Kapoor	+1-206-914-6632
Chloe	Turner	+1-559-884-2109
Ishika	Desai	+1-602-423-9088
Logan	Adams	+1-303-772-1190
Maya	Bansal	+1-973-314-5222
Sebastian	Miller	+1-619-855-3371
Anika	Reddy	+1-503-319-9872
Noah	Reed	+1-678-910-4521
Kabir	Sinha	+1-704-221-7644
Liam	Parker	+1-617-561-7725
Sara	Khan	+1-312-744-9100
Harper	Collins	+1-614-319-5783
Vikram	Joshi	+1-313-882-9912
Ava	Mitchell	+1-786-557-4420
Rohan	Nair	+1-713-991-2342
Zoey	Bennett	+1-424-563-7781
Dev	Malhotra	+1-816-990-4411
Ella	Howard	+1-530-211-6629
Krish	Patel	+1-901-761-2301
Natalie	Brooks	+1-402-665-5524
Tanish	Arora	+1-385-220-8473
Madison	Clark	+1-716-298-5527
Dhruv	Mishra	+1-612-490-7764

3.List all physicians whose qualification is MD.

```
select * from physician

where Qualification = 'MD';
```

Emp_id	Name	Qualification	Dept_id	Doj
3	Dr.Oliva	MD	2	2000-08-25
10	Dr.Sophia	MD	3	2005-01-29
14	Dr.Dave	MD	2	2000-02-05
16	Dr.Jenifer	MD	1	2001-03-12
NULL	NULL	NULL	NULL	NULL

4.Show all medical procedures with cost lesser than $500.

```
select * from medical_procedure

where cost_usd < 500;
```

patient_id	physician_id	procedure_name	cost_usd
1	8	Spirometry	360.00
3	1	Nasal Endoscopy	400.00
8	3	Blood pressure test	200.00
9	1	Nasal Endoscopy	400.00
11	18	Urine test	100.00
12	9	X-Ray	350.00
13	11	GAD-7	450.00
16	8	Nasal Endoscopy	400.00
17	4	Urine test	100.00
18	11	GAD-7	450.00
19	2	Blood Test	250.00
21	1	Blood Test	250.00
22	8	Nasal Endoscopy	400.00
23	3	Blood pressure test	200.00
25	20	Urine test	100.00
27	9	X-Ray	350.00
28	11	GAD-7	450.00
29	17	Stool Test	250.00
31	8	Nasal Endoscopy	400.00
32	9	X-Ray	350.00
35	2	Blood Test	250.00
37	9	X-Ray	350.00
43	1	UPSIT	40.00
45	8	Nasal Endoscopy	400.00
47	4	Urine test	100.00

5.Find all nurses who joined after 2005.

```
select * from nurse

where doj > '2005-12-31';
```

nurse_id	name	position	doj
4	Olivia	Head Nurse	2010-02-14
6	Mia	Supervisor Nurse	2012-06-05
8	Emma	Registered Nurse	2008-08-19
9	Harper	Staff Nurse	2006-03-22
11	Sneha	Head Nurse	2013-05-30
15	Aisha	Nurse Anesthetist	2009-07-01
17	Nisha	Assistant Nurse	2014-09-11
19	Meera	Supervisor Nurse	2007-05-13
20	Isabella	Head Nurse	2011-08-29
27	Stella	Supervisor Nurse	2015-03-12
28	Shruti	Registered Nurse	2012-11-02
31	Myra	Head Nurse	2009-01-18
32	Tanvi	Registered Nurse	2013-07-27

6.Count number of patients whose name starts with C

```
select count(*) as 'Total_patient' from patient
```

group by first_name having first_name like 'C%';

Total_patient
1

7.Get all physicians along with their department name.

select p.name as physcian, d.name as department from physician p

join department d on p.Emp_id=d.dept_id;

physcian	department
Dr.Noah	General Surgery
Dr.John	Cardiology
Dr.Oliva	Neurology
Dr.Emma	Pulmonology
Dr.Alex	ENT
Dr.Divya	Orthopedics
Dr.Ramya	Gastroenterology
Dr.Arjun	Nephrology
Dr.Aarav	Oncology
Dr.Sophia	Psychiatry
Dr.Mike	Gynecology
Dr.Samuel	Urology

8.Retrieve all procedures done for each patient.

select p.first_name, p.surname, mp.procedure_name from patient p

join medical_procedure mp on p.patient_id=mp.patient_id;

first_name	surname	procedure_name
Rahul	Mehta	Spirometry
Ethan	Wright	CT Scan
Aarav	Kapoor	Nasal Endoscopy
Chloe	Turner	Biopsy
Ishika	Desai	Ultra Sound
Logan	Adams	CT Scan
Maya	Bansal	Ultra Sound
Sebastian	Miller	Blood pressure test
Anika	Reddy	Nasal Endoscopy
Noah	Reed	MRI
Kabir	Sinha	Urine test
Liam	Parker	X-Ray
Sara	Khan	GAD-7
Harper	Collins	Endoscopy
Vikram	Joshi	CT Scan
Ava	Mitchell	Nasal Endoscopy
Rohan	Nair	Urine test
Zoey	Bennett	GAD-7
Dev	Malhotra	Blood Test
Ella	Howard	MRI
Krish	Patel	Blood Test
Natalie	Brooks	Nasal Endoscopy
Tanish	Arora	Blood pressure test
Madison	Clark	CT Scan
Dhruv	Mishra	Urine test

9.List of medical analysis reports with patient name.

```
 select mar.identification,mar.prescription,p.first_name,p.surname
from medical_analysis_report mar
 join patient p on mar.patient_id=p.patient_id;
```

identification	prescription	first_name	surname
COPD	Bronchodilators	Rahul	Mehta
Tumor Screening	Follow-up Tests	Ethan	Wright
Sinusitis	Antibiotics	Aarav	Kapoor
Gastritis	Antacids	Chloe	Turner
Abdominal Pain	Buscopan	Ishika	Desai
Kidney Stones	ibuprofen	Logan	Adams
PCOS	Hormonal Therapy	Maya	Bansal
Hypertension	Beta Blockers	Sebastian	Miller
Sinusitis	Antibiotics	Anika	Reddy
Migraine	Analgesics	Noah	Reed
Kidney Infection	Cefalexin	Kabir	Sinha
Joint Pain	Calcium Suppleme...	Liam	Parker
Anxiety	SSRIs	Sara	Khan
Abdominal Pain	Omeprazole	Harper	Collins
Tumor Screening	Follow-up Tests	Vikram	Joshi
Asthma	Singulair	Ava	Mitchell
Kidney Infection	Antibiotics	Rohan	Nair
Anxiety	SSRIs	Zoey	Bennett
IBS	rifaximin	Dev	Malhotra
Migraine	Analgesics	Ella	Howard
Epistaxis	LET	Krish	Patel
Asthma	Inhaler	Natalie	Brooks
Hypertension	Beta Blockers	Tanish	Arora
Tumor Screening	Follow-up Tests	Madison	Clark
Kidney Stones	Pain Reliever	Dhruv	Mishra

10.Show each department with total number of physicians.

```
select d.name, count(ph.emp_id) as Total_physicians
from department d
left join physician ph on d.dept_id=ph.Emp_id
group by d.name;
```

name	Total_physicians
General Surgery	1
Cardiology	1
Neurology	1
Pulmonology	1
ENT	1
Orthopedics	1
Gastroenterology	1
Nephrology	1
Oncology	1
Psychiatry	1
Gynecology	1
Urology	1

11.Get each patient's assigned department (through checkup physician).

```
select p.first_name,p.surname,d.name as department
from patient p
left join physician ph on p.checkup_physician=ph.Emp_id
left join department d on ph.dept_id=d.dept_id;
```

first_name	surname	department
Rahul	Mehta	Nephrology
Ethan	Wright	Orthopedics
Aarav	Kapoor	Urology
Chloe	Turner	Gastroenterology
Ishika	Desai	ENT
Logan	Adams	Oncology
Maya	Bansal	Psychiatry
Sebastian	Miller	General Surgery
Anika	Reddy	Urology
Noah	Reed	Cardiology
Kabir	Sinha	Pulmonology
Liam	Parker	Gynecology
Sara	Khan	Neurology
Harper	Collins	ENT
Vikram	Joshi	Orthopedics
Ava	Mitchell	Nephrology
Rohan	Nair	Pulmonology
Zoey	Bennett	Neurology
Dev	Malhotra	ENT
Ella	Howard	Cardiology
Krish	Patel	Urology
Natalie	Brooks	Nephrology
Tanish	Arora	General Surgery
Madison	Clark	Orthopedics
Dhruv	Mishra	Oncology

12.Find the most expensive procedure each physician performed.

```
select physician_id,procedure_name,cost_usd
from medical_procedure
where (physician_id,cost_usd) in (select physician_id, max(cost_usd)
from medical_procedure group by physician_id);
```

physician_id	procedure_name	cost_usd
7	Biopsy	1500.00
2	Ultra Sound	900.00
5	CT Scan	1000.00
6	Ultra Sound	800.00
10	MRI	500.00
11	GAD-7	450.00
16	Endoscopy	840.00
12	CT Scan	700.00
8	Nasal Endoscopy	400.00
4	Urine test	100.00
11	GAD-7	450.00
13	MRI	500.00
8	Nasal Endoscopy	400.00
20	Urine test	100.00
15	Ultra Sound	800.00
11	GAD-7	450.00
8	Nasal Endoscopy	400.00
1	X-Ray	550.00
16	Endoscopy	840.00
18	DRE	500.00
9	ECG	600.00
3	ECG	600.00
10	MRI	500.00
14	CT Scan	1000.00
8	Nasal Endoscopy	400.00

13.Get patients whose procedure cost is above average.

```
select procedure_name, cost_usd, patient_id, physician_id
 from medical_procedure
where cost_usd > (select avg(cost_usd)
 from medical_procedure);
```

procedure_name	cost_usd	patient_id	physician_id
CT Scan	700.00	2	19
Biopsy	1500.00	4	7
Ultra Sound	900.00	5	2
CT Scan	1000.00	6	5
Ultra Sound	800.00	7	6
Endoscopy	840.00	14	16
CT Scan	700.00	15	12
CT Scan	700.00	24	19
Ultra Sound	800.00	26	15
Endoscopy	840.00	30	19
X-Ray	550.00	33	1
ECG	600.00	34	14
Endoscopy	840.00	36	16
ECG	600.00	39	9
ECG	600.00	40	3
CT Scan	1000.00	42	14
Endoscopy	840.00	44	7
CT Scan	1000.00	46	19
NULL	NULL	NULL	NULL

14.Show patients with procedure details and department of the physician who performed it.

select p.first_name, p.surname, mp.procedure_name,mp.cost_usd, ph.name as physician_name,d.name as department

from medical_procedure mp

join patient p on mp.patient_id=p.patient_id

join physician ph on mp.physician_id=ph.emp_id join department d on ph.dept_id=d.dept_id;

first_name	surname	procedure_name	cost_usd	physician_name	department
Ishika	Desai	Ultra Sound	900.00	Dr.John	General Surgery
Dev	Malhotra	Blood Test	250.00	Dr.John	General Surgery
Imran	Sheikh	Blood Test	250.00	Dr.John	General Surgery
Zoe	Murphy	X-Ray	250.00	Dr.John	General Surgery
Harper	Collins	Endoscopy	840.00	Dr.Jenifer	General Surgery
Hazel	Simmons	Endoscopy	840.00	Dr.Jenifer	General Surgery
Sebastian	Miller	Blood pressure test	200.00	Dr.Oliva	Cardiology
Tanish	Arora	Blood pressure test	200.00	Dr.Oliva	Cardiology
Aaliyah	Barnes	ECG	600.00	Dr.Oliva	Cardiology
Aria	Moore	ECG	600.00	Dr.Dave	Cardiology
Julia	Evans	CT Scan	1000.00	Dr.Dave	Cardiology
Noah	Reed	MRI	500.00	Dr.Sophia	Neurology
Parth	Shukla	MRI	500.00	Dr.Sophia	Neurology
Ella	Howard	MRI	500.00	Dr.Richard	Neurology
Rahul	Mehta	Spirometry	360.00	Dr.Arjun	Pulmonology
Ava	Mitchell	Nasal Endoscopy	400.00	Dr.Arjun	Pulmonology
Natalie	Brooks	Nasal Endoscopy	400.00	Dr.Arjun	Pulmonology
Yash	Menon	Nasal Endoscopy	400.00	Dr.Arjun	Pulmonology
Aman	Sehgal	Nasal Endoscopy	400.00	Dr.Arjun	Pulmonology
Aarav	Kapoor	Nasal Endoscopy	400.00	Dr.Noah	ENT
Anika	Reddy	Nasal Endoscopy	400.00	Dr.Noah	ENT
Krish	Patel	Blood Test	250.00	Dr.Noah	ENT
Siddharth	Verma	X-Ray	550.00	Dr.Noah	ENT
Rudran	Chatter...	UPSIT	40.00	Dr.Noah	ENT
Liam	Parker	X-Ray	350.00	Dr.Aarav	Orthopedics

15.List each department with total patients treated under it (via physicians).

```
select d.name as Department, count(distinct p.patient_id) as total_patients
from patient p
 join physician ph on p.checkup_physician=ph.emp_id
join department d on ph.Dept_id=d.dept_id group by d.name;
```

Department	total_patients
Cardiology	3
ENT	6
Gastroenterology	6
General Surgery	4
Gynecology	5
Nephrology	5
Neurology	3
Oncology	2
Orthopedics	4
Psychiatry	2
Pulmonology	4
Urology	6

16.Find physicians who joined earlier than other physicians in the same department.

select ph1.name as senior_physician, ph2.name as junior_physician, d.name as department

from physician ph1 join physician ph2 on ph1.Dept_id=ph2.Dept_id and ph1.Doj < ph2.Doj

join department d on d.Dept_id=ph1.dept_id;

senior_physician	junior_physician	department
Dr.Emma	Dr.Paul	Nephrology
Dr.Alex	Dr.Joseph	Urology
Dr.Divya	Dr.Monika	Gynecology
Dr.Sophia	Dr.Richard	Neurology
Dr.Samuel	Dr.David	Oncology
Dr.Dave	Dr.Oliva	Cardiology
Dr.Jenifer	Dr.John	General Surgery
Dr.Thomas	Dr.Ramya	Gastroenterology

17.Find patients who spent the most on procedures (TOP 5)

select p.first_name,p.surname,sum(mp.cost_usd)

from patient p

join medical_procedure mp on p.patient_id=mp.patient_id

group by p.patient_id

order by cost_usd desc

limit 5;

first_name	surname	sum(mp.cost_usd)
Chloe	Turner	1500.00
Julia	Evans	1000.00
Leah	Cooper	1000.00
Logan	Adams	1000.00
Ishika	Desai	900.00

18.Rank physicians by number of procedures performed. (TOP 5)

select ph.name , count(mp.patient_id) as total_procedures

from physician ph

join medical_procedure mp on mp.physician_id=ph.Emp_id

group by ph.Emp_id

order by 2 desc

limit 5;

name	total_procedures
Dr.Noah	5
Dr.Aarav	5
Dr.Arjun	5
Dr.John	4
Dr.David	4

19.Find the rank of each department based on total number of procedures performed.

with dept_procedure as (

select d.dept_id, d.name as Department_name, count(mp.patient_id) as total_procedure

from department d

join physician p on d.dept_id=p.Dept_id

join medical_procedure mp on p.Emp_id=mp.physician_id

group by d.dept_id,d.name)

select department_name,total_procedure,

rank() over (order by total_procedure desc) as dept_rank

from dept_procedure;

department_name	total_procedure	dept_rank
General Surgery	6	1
Cardiology	5	2
Pulmonology	5	2
ENT	5	2
Orthopedics	5	2
Gastroenterology	5	2
Oncology	5	2
Nephrology	4	8
Neurology	3	9
Psychiatry	3	9
Gynecology	2	11
Urology	2	11

20.Count the number of distinct patients treated by each physician, then rank all physicians by patient volume.

```
with physician_rank as ( select physician_id, count(distinct patient_id) as
total_patients from medical_procedure

group by physician_id )

select physician_id, total_patients, dense_rank() over ( order by total_patients desc)
as rank_by_patient_volume

from physician_rank;
```

physician_id	total_patients	rank_by_patient_volume
1	5	1
8	5	1
9	5	1
2	4	2
19	4	2
3	3	3
7	3	3
11	3	3
4	2	4
10	2	4
14	2	4
16	2	4
17	2	4
18	2	4
5	1	5
6	1	5
12	1	5
13	1	5
15	1	5
20	1	5

9.Conclusion

The Healthcare Management Database System provides an efficient, organized, and scalable solution for managing patient records, physician and nurse data, medical procedures, and departmental information.

Through SQL queries, the system ensures seamless data retrieval, improved accuracy, and a structured workflow contributing to smoother hospital operations and future digitalization initiatives.