

# ER Diagrams and design

(1)

18-Jan-2028 -  
19-04:40-AM

## SQL Case Study: Database Design - Database Design for Healthcare System. for Healthcare Records

### Key Requirements:

- Doctor & Patient are Two main entities.

\* 1. Patient Information.

- PatientID, Name, DOB: Date of Birth.
- Contact-details, Insurance Info.

\* 2. Doctors Information.

DoctorID, Name, Speciality, ContactDetails.

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3. Medical History: HistoryID,  
PatientID, Diagnosis, Allergies, Medications

4. Encounters: EncounterID, PatientID, DoctorID,  
Date, Type (Appointment, Admission, Discharge).

5. Diagnostic Tests: TestID, PatientID,  
Test-Type, Result, Test Date.

6. Prescription: PresID, PatientID, DoctorID,  
Medication, Dosage, Dispensedetails,  
Dto

7. Procedures : <sup>(2)</sup> Procedure ID, PatientID,  
DoctorID, Procedure\_Name, Procedure\_Date.

## \* Relationships

### Patient

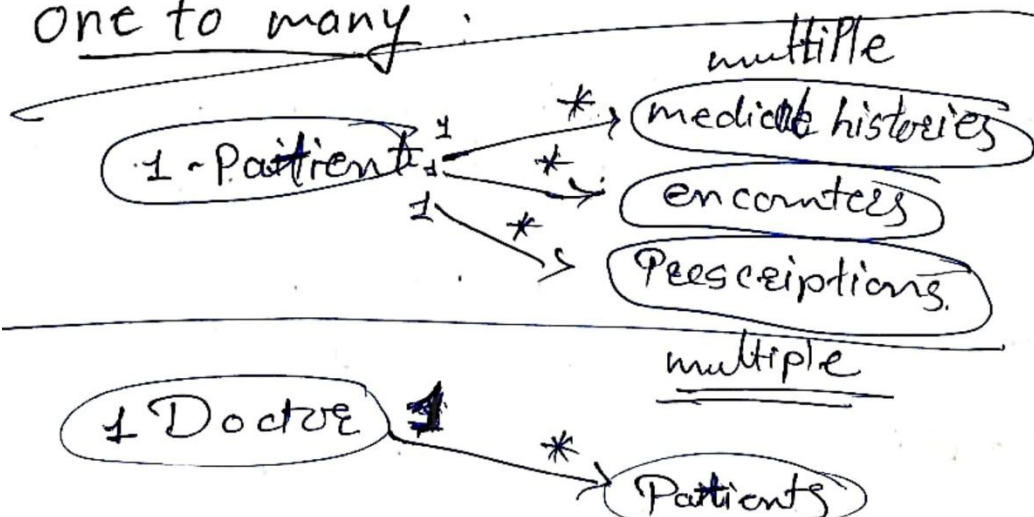
↳ can have -

1 - multiple : medical histories  
: encounters  
& prescriptions.  
: Doctors

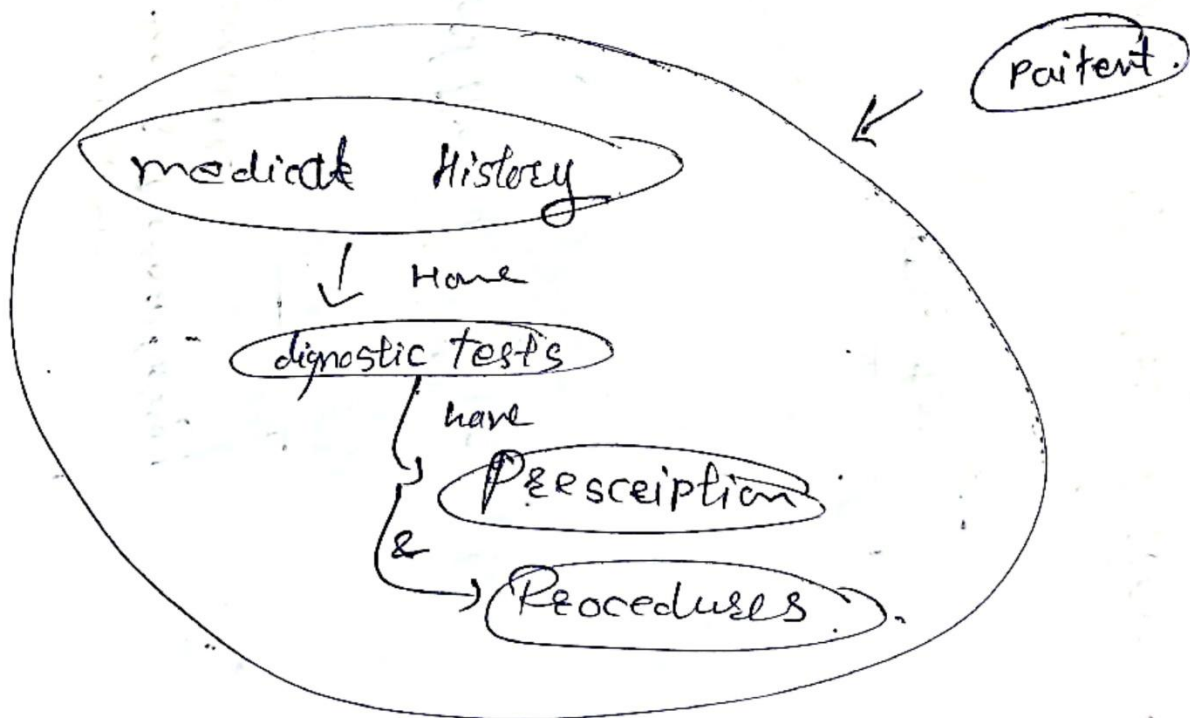
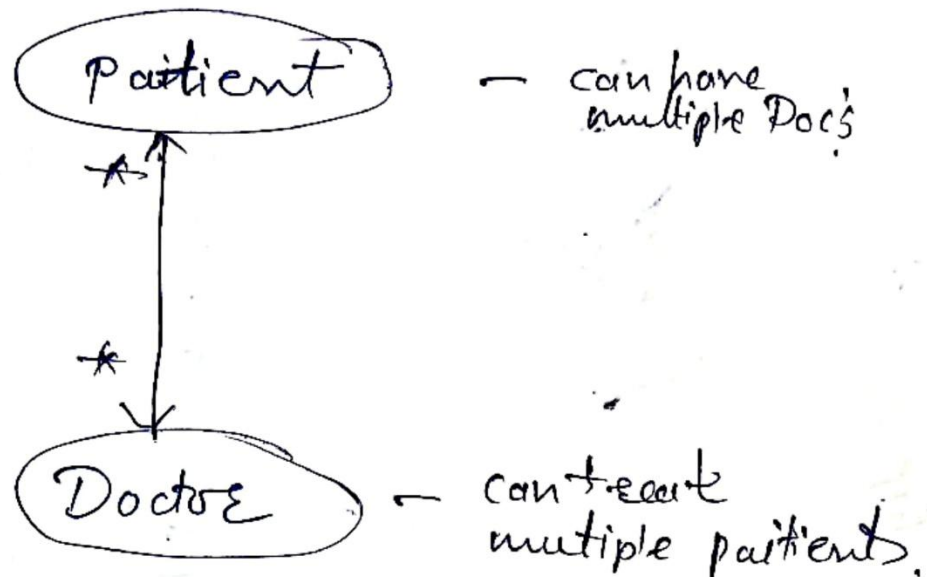
### Doctor :

↳ can have :  
can treat multiple patients.

one to many :



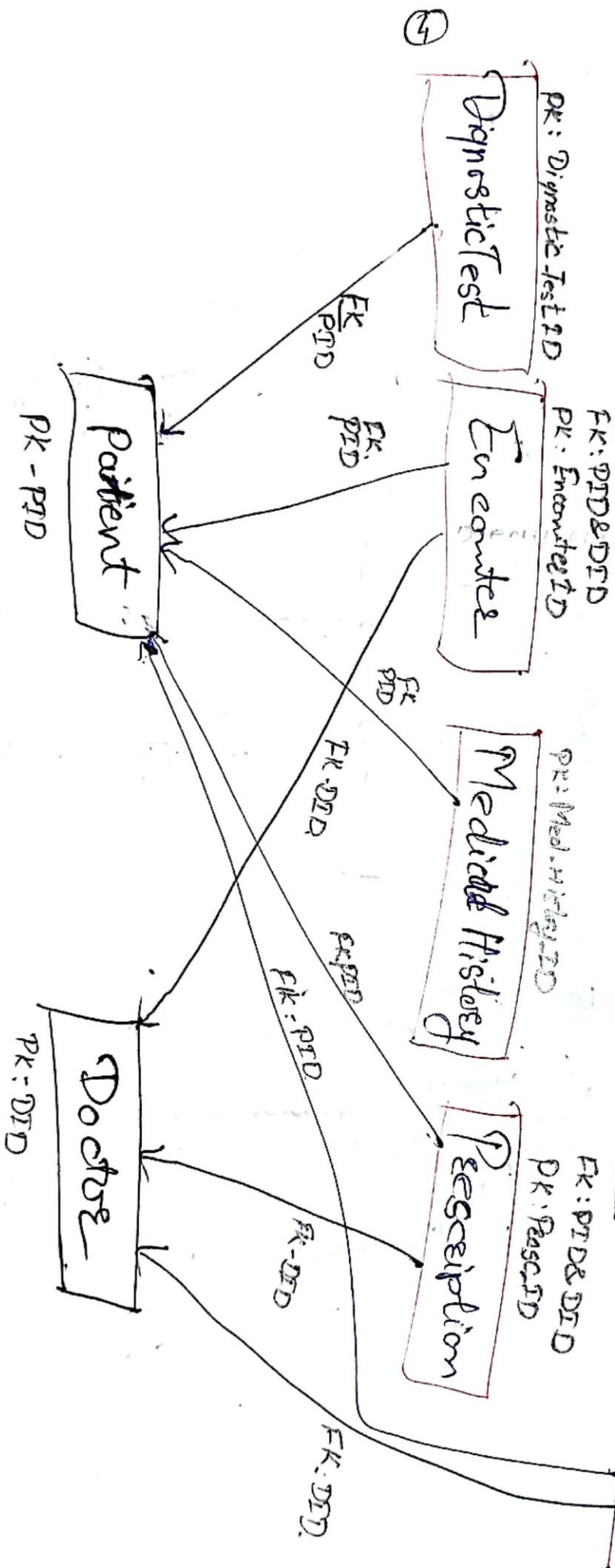
# Many To Many <sup>(3)</sup>



# ER Diagram

FK - Foreign key  
 PID - Patient ID  
 DID - Doctor ID  
 PK - Primary key

Entities: 1: Patient 2: Doctor  
 3: Diagnostic Test 4: Encounter 5: Medical History  
 6: Prescription 7: Procedures



diag: ER diag. Healthcare Database System.



## CONSTRAINTS :

(5)

PK: Primary Key - In each table. ID.

FK: Foreign Key: PID & Did wherever Required.

## Entity class diagrams.

PK: Primary Key  
FK: Foreign Key  
NN: NOT NULL

### 1. Patient :

Patient	
PatientID	PK, AI
Name	NN
DOB	N
Gender	NN
Contact Details	NN
Insurance Info	

### 2. Doctor

Doctor	
DoctorID	PK, AI
Name	NN
Speciality	NN
Contact Details	NN

### 3. Medical History

Medical History	
HistoryID	PK: AI
PatientID	FK: Patient
Diagnosis	NN
Allergies	
Medications	

### 4. Encounter Records

Encounter	
EncounterID	PK - AI
PatientID	FK - Patient
DoctorID	FK - Doctor Table
Date	NN
Type	NN

## 5. Diagnostic Test.

DiagnosticTest.	
TestID	PK, AI
PatientID	FK-Patient.
TestType	NN
Result.	NN
TestDate.	NN

## 6. Procedure

Procedure	
Procedure-ID	PK, AI
PatientID	FK-Patient
DoctorID	FK-Doctor.
ProcedureName	NN
ProcedureDate	NN.

## 7. Prescriptions

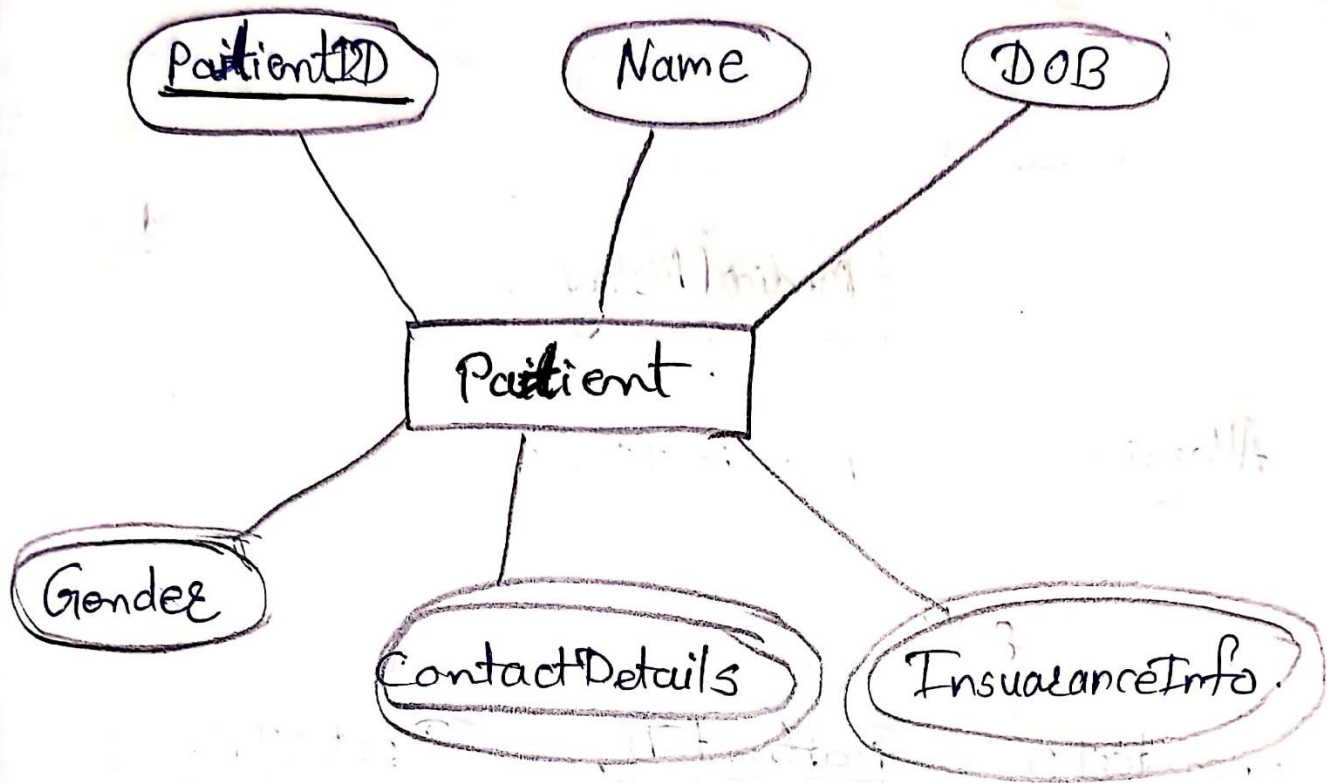
Prescriptions.	
Prescription ID	PK, AI
PatientID	FK-Patient
DoctorID	FK-Doctor
Medication.	NN
Dosage	NN.
DispenseDetails.	
Date.	NN.



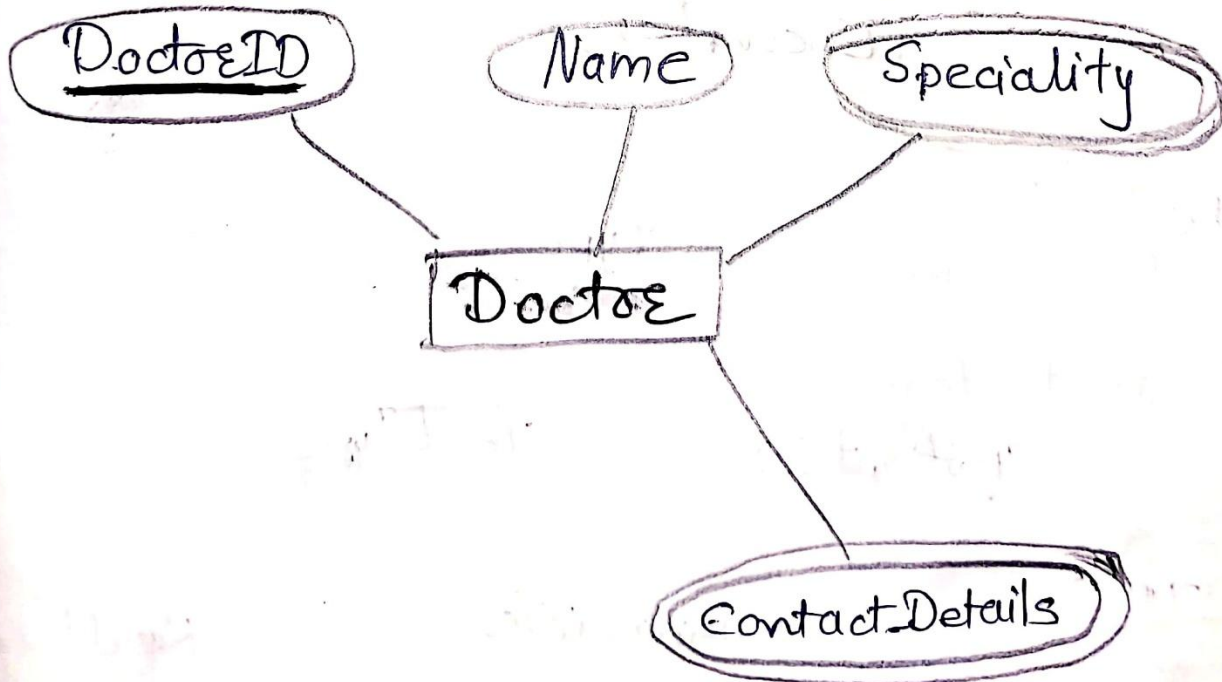
# ER. Model.

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1: Patient

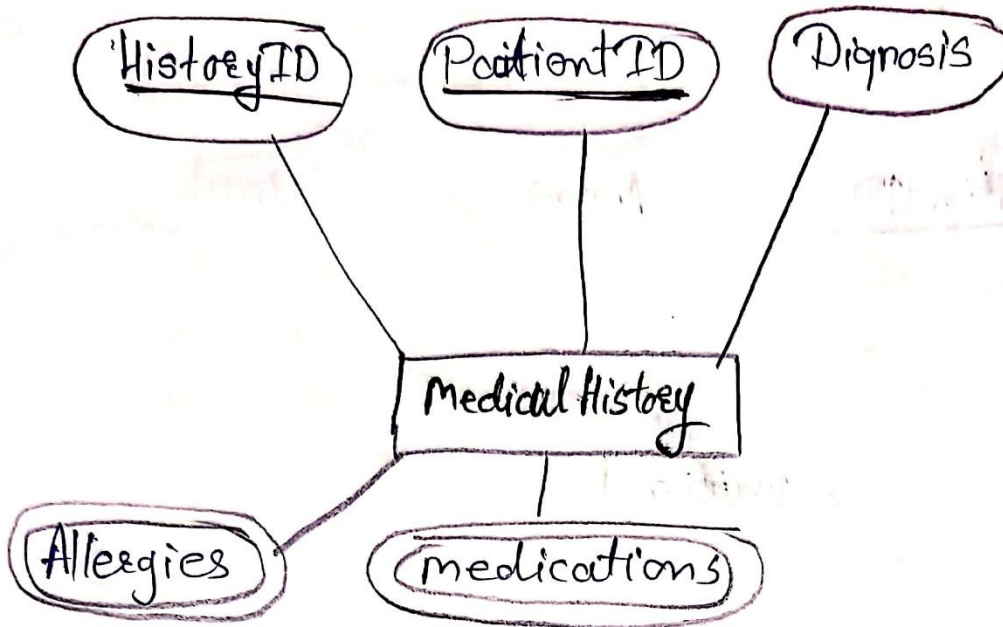


2: Doctor

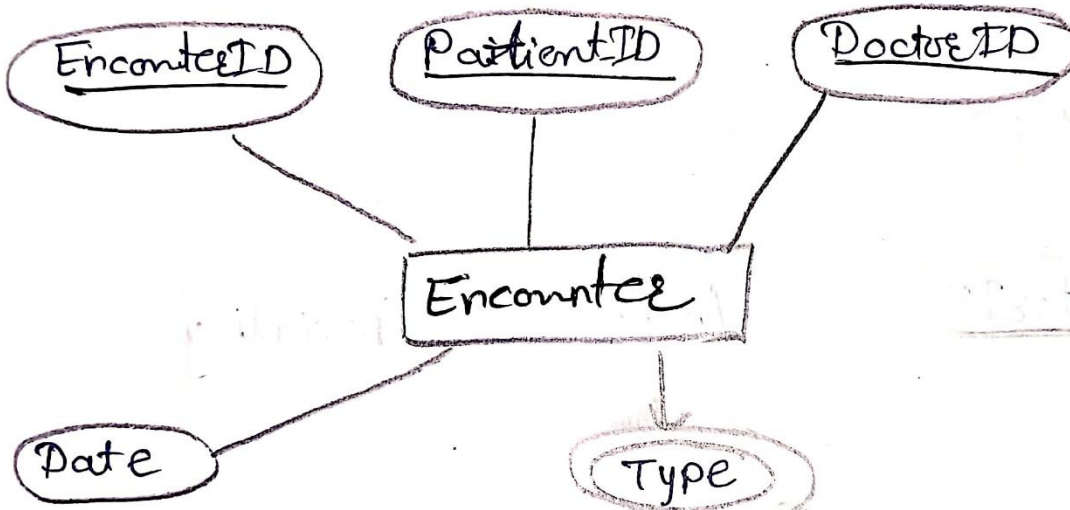


### 3. Medical History

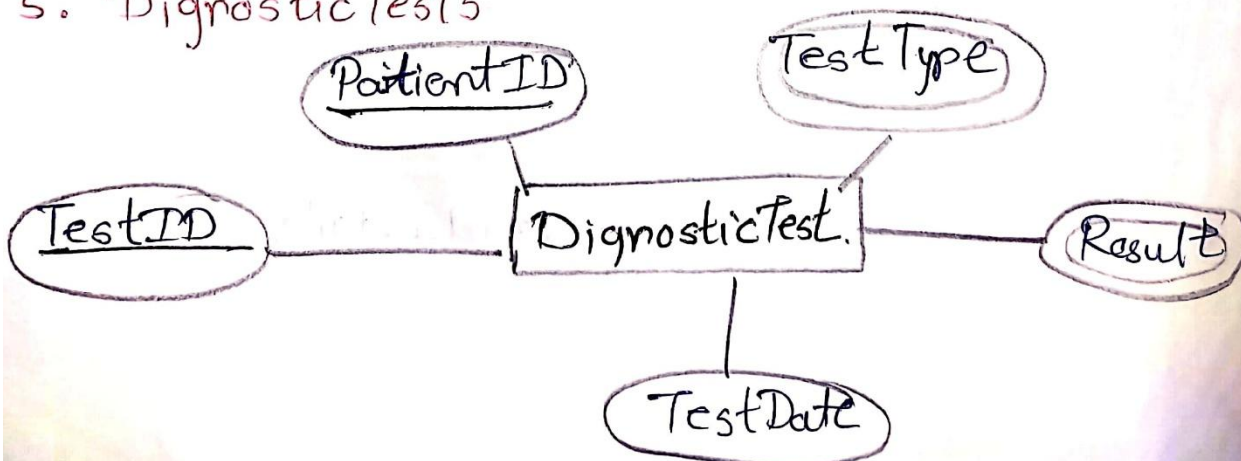
⑧



### 4. Encounter Records



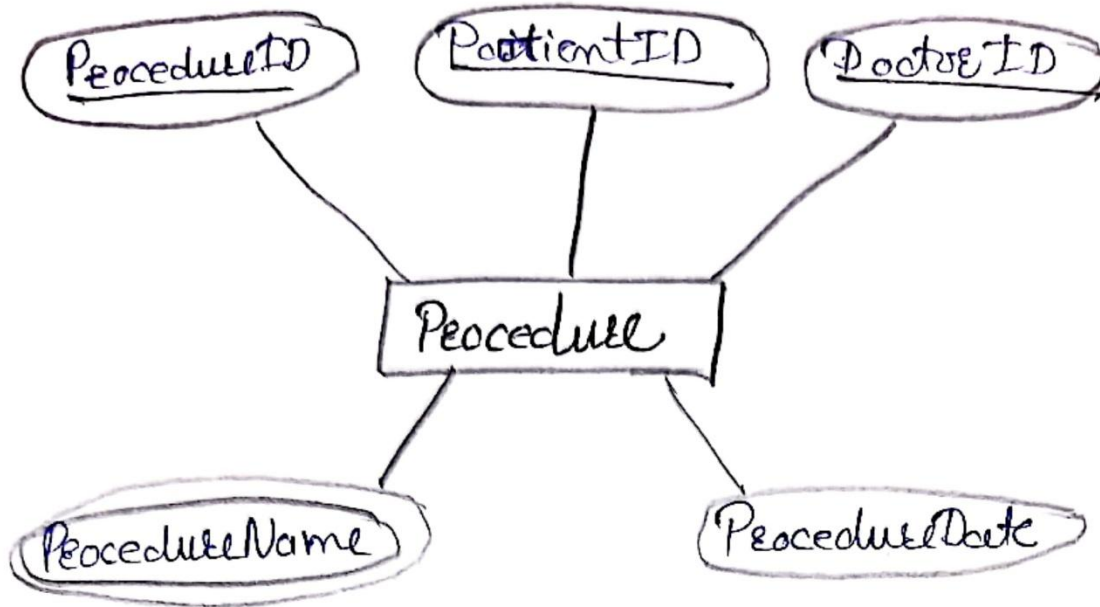
### 5. Diagnostic Tests



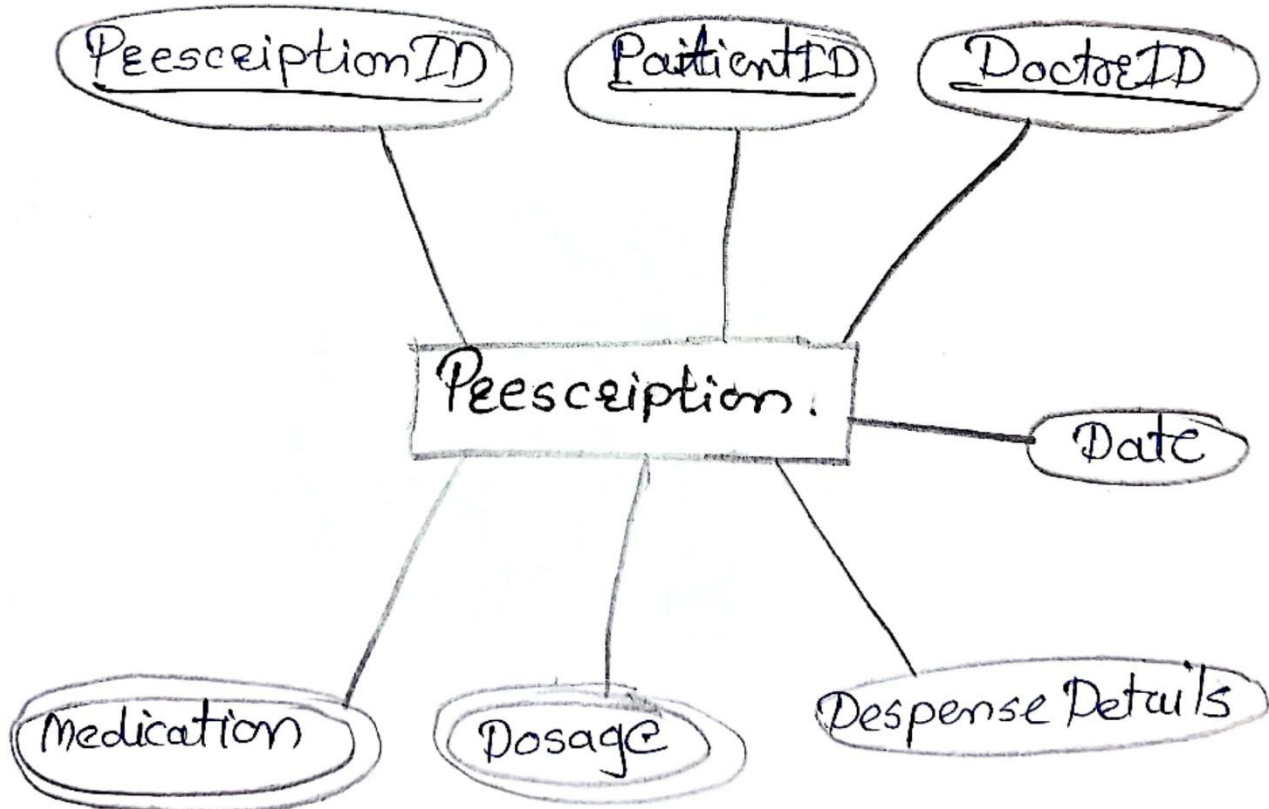


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## 6. Procedure



## 7. Prescription



# Schema and Table creation

```
mysql> show databases;
```

Database
assignment5
attendance
crud_example
fb_sql
information_schema
library_system
my_db
mysql
performance_schema
students
sys
training
world

13 rows in set (0.00 sec)

```
mysql> create database helthcare_system;
Query OK, 1 row affected (0.01 sec)
```

```
mysql> use helthcare_system;
Database changed
```

```
mysql> CREATE TABLE Patients (
    ->     PatientID INT AUTO_INCREMENT PRIMARY KEY,
    ->     Name VARCHAR(100) NOT NULL,
    ->     DOB DATE NOT NULL,
    ->     Gender ENUM('Male', 'Female', 'Other') NOT NULL,
    ->     ContactDetails VARCHAR(255) NOT NULL,
    ->     InsuranceInfo VARCHAR(255)
    -> );
```

Query OK, 0 rows affected (0.02 sec)

```
mysql> desc patients;
```

Field	Type	Null	Key	Default	Extra
PatientID	int	NO	PRI	NULL	auto_increment
Name	varchar(100)	NO		NULL	
DOB	date	NO		NULL	
Gender	enum('Male', 'Female', 'Other')	NO		NULL	
ContactDetails	varchar(255)	NO		NULL	
InsuranceInfo	varchar(255)	YES		NULL	

6 rows in set (0.02 sec)

```
mysql> CREATE TABLE Doctors (
    ->     DoctorID INT AUTO_INCREMENT PRIMARY KEY,
    ->     Name VARCHAR(100) NOT NULL,
    ->     Specialty VARCHAR(100) NOT NULL,
    ->     ContactDetails VARCHAR(255) NOT NULL
    -> );
```

Query OK, 0 rows affected (0.04 sec)

```
mysql> desc doctors;
```

Field	Type	Null	Key	Default	Extra
DoctorID	int	NO	PRI	NULL	auto_increment
Name	varchar(100)	NO		NULL	
Specialty	varchar(100)	NO		NULL	
ContactDetails	varchar(255)	NO		NULL	

```
4 rows in set (0.00 sec)
```

```
mysql> CREATE TABLE MedicalHistory (  
->     HistoryID INT AUTO_INCREMENT PRIMARY KEY,  
->     PatientID INT NOT NULL,  
->     Diagnosis VARCHAR(255) NOT NULL,  
->     Allergies VARCHAR(255),  
->     Medications VARCHAR(255),  
->     FOREIGN KEY (PatientID) REFERENCES Patients(PatientID)  
-> );
```

```
Query OK, 0 rows affected (0.06 sec)
```

```
mysql> desc medicalhistory;
```

Field	Type	Null	Key	Default	Extra
HistoryID	int	NO	PRI	NULL	auto_increment
PatientID	int	NO	MUL	NULL	
Diagnosis	varchar(255)	NO		NULL	
Allergies	varchar(255)	YES		NULL	
Medications	varchar(255)	YES		NULL	

```
5 rows in set (0.00 sec)
```

```
mysql> CREATE TABLE EncounterRecords (  
->     EncounterID INT AUTO_INCREMENT PRIMARY KEY,  
->     PatientID INT NOT NULL,  
->     DoctorID INT NOT NULL,  
->     Date DATE NOT NULL,  
->     Type ENUM('Appointment', 'Admission', 'Discharge') NOT NULL,  
->     FOREIGN KEY (PatientID) REFERENCES Patients(PatientID),  
->     FOREIGN KEY (DoctorID) REFERENCES Doctors(DoctorID)  
-> );
```

```
Query OK, 0 rows affected (0.04 sec)
```

```
mysql> desc EncounterRecords ;
```

Field	Type	Null	Key	Default	Extra
EncounterID	int	NO	PRI	NULL	auto_increment
PatientID	int	NO	MUL	NULL	
DoctorID	int	NO	MUL	NULL	
Date	date	NO		NULL	
Type	enum('Appointment', 'Admission', 'Discharge')	NO		NULL	

```
5 rows in set (0.01 sec)
```



```
mysql> CREATE TABLE DiagnosticTests (
->     TestID INT AUTO_INCREMENT PRIMARY KEY,
->     PatientID INT NOT NULL,
->     TestType VARCHAR(100) NOT NULL,
->     Result VARCHAR(255) NOT NULL,
->     TestDate DATE NOT NULL,
->     FOREIGN KEY (PatientID) REFERENCES Patients(PatientID)
-> );
```

Query OK, 0 rows affected (0.06 sec)

```
mysql> desc DiagnosticTests ;
```

Field	Type	Null	Key	Default	Extra
TestID	int	NO	PRI	NULL	auto_increment
PatientID	int	NO	MUL	NULL	
TestType	varchar(100)	NO		NULL	
Result	varchar(255)	NO		NULL	
TestDate	date	NO		NULL	

5 rows in set (0.00 sec)

```
mysql> CREATE TABLE Prescriptions (
->     PrescriptionID INT AUTO_INCREMENT PRIMARY KEY,
->     PatientID INT NOT NULL,
->     DoctorID INT NOT NULL,
->     Medication VARCHAR(100) NOT NULL,
->     Dosage VARCHAR(100) NOT NULL,
->     DispenseDetails VARCHAR(255),
->     Date DATE NOT NULL,
->     FOREIGN KEY (PatientID) REFERENCES Patients(PatientID),
->     FOREIGN KEY (DoctorID) REFERENCES Doctors(DoctorID)
-> );
```

Query OK, 0 rows affected (0.07 sec)

```
mysql> desc Prescriptions ;
```

Field	Type	Null	Key	Default	Extra
PrescriptionID	int	NO	PRI	NULL	auto_increment
PatientID	int	NO	MUL	NULL	
DoctorID	int	NO	MUL	NULL	
Medication	varchar(100)	NO		NULL	
Dosage	varchar(100)	NO		NULL	
DispenseDetails	varchar(255)	YES		NULL	
Date	date	NO		NULL	

7 rows in set (0.00 sec)

```
mysql> CREATE TABLE Procedures (
->     ProcedureID INT AUTO_INCREMENT PRIMARY KEY,
->     PatientID INT NOT NULL,
->     DoctorID INT NOT NULL,
->     ProcedureName VARCHAR(100) NOT NULL,
->     ProcedureDate DATE NOT NULL,
->     FOREIGN KEY (PatientID) REFERENCES Patients(PatientID),
->     FOREIGN KEY (DoctorID) REFERENCES Doctors(DoctorID)
-> );
```

Query OK, 0 rows affected (0.06 sec)

```
mysql> desc Procedures ;
```

Field	Type	Null	Key	Default	Extra
ProcedureID	int	NO	PRI	NULL	auto_increment
PatientID	int	NO	MUL	NULL	
DoctorID	int	NO	MUL	NULL	
ProcedureName	varchar(100)	NO		NULL	
ProcedureDate	date	NO		NULL	

5 rows in set (0.01 sec)

## Data Inserted into table

```
mysql> table patients;
```

PatientID	Name	DOB	Gender	ContactDetails	InsuranceInfo
1	Bhagvat Mutthe	2002-10-11	Male	9876543210	Policy123
2	Pravin Kale	2002-05-15	Male	9876543211	Policy124
3	Ajay Palhhal	2001-07-20	Male	9876543212	Policy125
4	Ankush Pawar	2001-03-10	Male	9876543213	Policy126
5	Amol Pawar	2003-01-25	Male	9876543214	Policy127
6	Ranjit Kale	2000-09-12	Male	9876543215	Policy128
7	Shubham Wagh	1996-08-05	Male	9876543216	Policy129
8	Mithali Patil	2002-11-24	Female	9876543217	Policy130
9	Trupti Patil	2004-04-18	Female	9876543218	Policy131
10	Rohini Nikam	2002-12-01	Female	9876543219	Policy132

10 rows in set (0.00 sec)

```
mysql> table doctors;;
```

DoctorID	Name	Specialty	ContactDetails
1	Dr. Rajesh Sharma	Cardiology	9876543220
2	Dr. Priya Mehta	Orthopedics	9876543221
3	Dr. Amit Joshi	General Medicine	9876543222
4	Dr. Kavita Desai	Pediatrics	9876543223
5	Dr. Ramesh Rao	Neurology	9876543224

5 rows in set (0.00 sec)

ERROR:

No query specified

```
mysql> table MedicalHistory ; table EncounterRecords ; table DiagnosticTests  
; table Prescriptions ; table Procedures ;
```

HistoryID	PatientID	Diagnosis	Allergies	Medications
1	1	Hypertension	None	Atenolol
2	2	Diabetes	Peanuts	Metformin
3	3	Asthma	Dust	Albuterol
4	4	Anemia	None	Iron Supplements
5	5	Migraine	None	Paracetamol
6	6	Arthritis	None	Ibuprofen
7	7	Hyperthyroidism	None	Methimazole
8	8	Vitamin D Deficiency	None	Vitamin D Capsules
9	9	Chronic Back Pain	None	Diclofenac
10	10	Seasonal Allergies	Pollen	Cetirizine

10 rows in set (0.00 sec)



EncounterID	PatientID	DoctorID	Date	Type
1	1	1	2025-01-01	Appointment
2	2	2	2025-01-02	Admission
3	3	3	2025-01-03	Appointment
4	4	4	2025-01-04	Appointment
5	5	5	2025-01-05	Admission
6	6	1	2025-01-06	Appointment
7	7	2	2025-01-07	Discharge
8	8	3	2025-01-08	Appointment
9	9	4	2025-01-09	Admission
10	10	5	2025-01-10	Appointment

10 rows in set (0.00 sec)

TestID	PatientID	TestType	Result	TestDate
1	1	Blood Test	Normal	2025-01-01
2	2	X-Ray	Fracture Detected	2025-01-02
3	3	MRI	No Abnormalities	2025-01-03
4	4	ECG	Irregular Heartbeat	2025-01-04
5	5	CT Scan	Migraine Indicators	2025-01-05
6	6	Bone Density	Osteoporosis Detected	2025-01-06
7	7	Thyroid Panel	Elevated TSH	2025-01-07
8	8	Vitamin D Test	Deficiency Detected	2025-01-08
9	9	Liver Function Test	Normal	2025-01-09
10	10	Allergy Test	Pollen Allergy	2025-01-10

10 rows in set (0.00 sec)

PrescriptionID	PatientID	DoctorID	Medication	Dosage	DispenseDetails	Date
1	1	1	Atenolol	50 mg daily	30 Tablets	2025-01-01
2	2	2	Metformin	500 mg twice daily	60 Tablets	2025-01-02
3	3	3	Albuterol	2 puffs as needed	1 Inhaler	2025-01-03
4	4	4	Iron Supplements	1 tablet daily	30 Tablets	2025-01-04
5	5	5	Paracetamol	500 mg as needed	20 Tablets	2025-01-05
6	6	1	Ibuprofen	400 mg twice daily	30 Tablets	2025-01-06
7	7	2	Methimazole	5 mg daily	30 Tablets	2025-01-07
8	8	3	Vitamin D Capsules	1 capsule weekly	4 Capsules	2025-01-08
9	9	4	Diclofenac	50 mg daily	30 Tablets	2025-01-09
10	10	5	Cetirizine	10 mg as needed	10 Tablets	2025-01-10

10 rows in set (0.00 sec)

ProcedureID	PatientID	DoctorID	ProcedureName	ProcedureDate
1	1	1	Angioplasty	2025-01-15
2	2	2	Fracture Repair	2025-01-16
3	3	3	Lung Function Test	2025-01-17
4	4	4	Blood Transfusion	2025-01-18
5	5	5	Migraine Therapy	2025-01-19
6	6	1	Knee Surgery	2025-01-20
7	7	2	Thyroidectomy	2025-01-21
8	8	3	Vitamin D Injection	2025-01-22
9	9	4	Back Surgery	2025-01-23
10	10	5	Allergy Testing	2025-01-24

10 rows in set (0.00 sec)