

Hospital Management System Project

Step1

1. System Purpose

A system to manage hospital operations including patient info, doctor info, appointments, treatments, rooms, departments , Admissions.

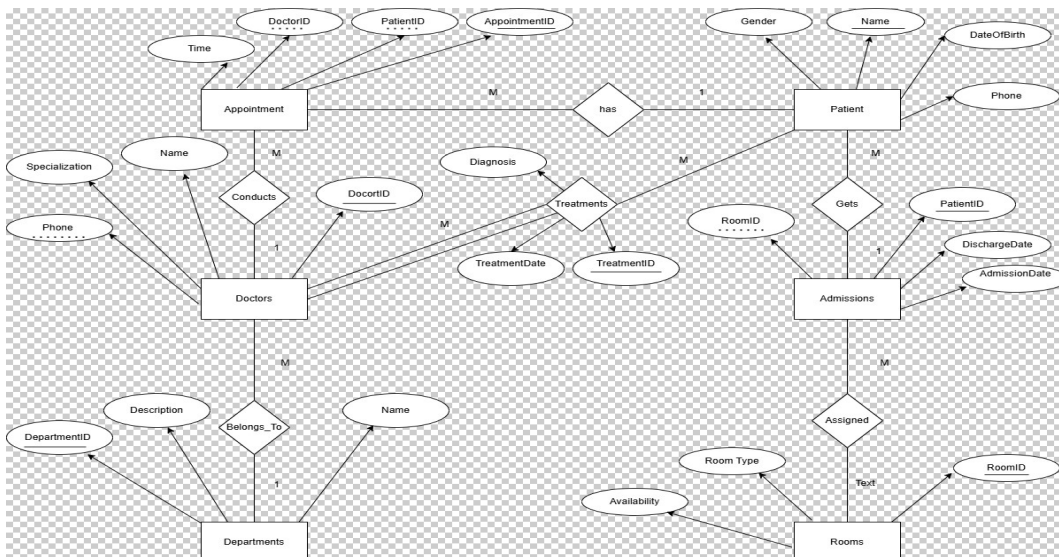
2. System Users

Admin, Doctor.

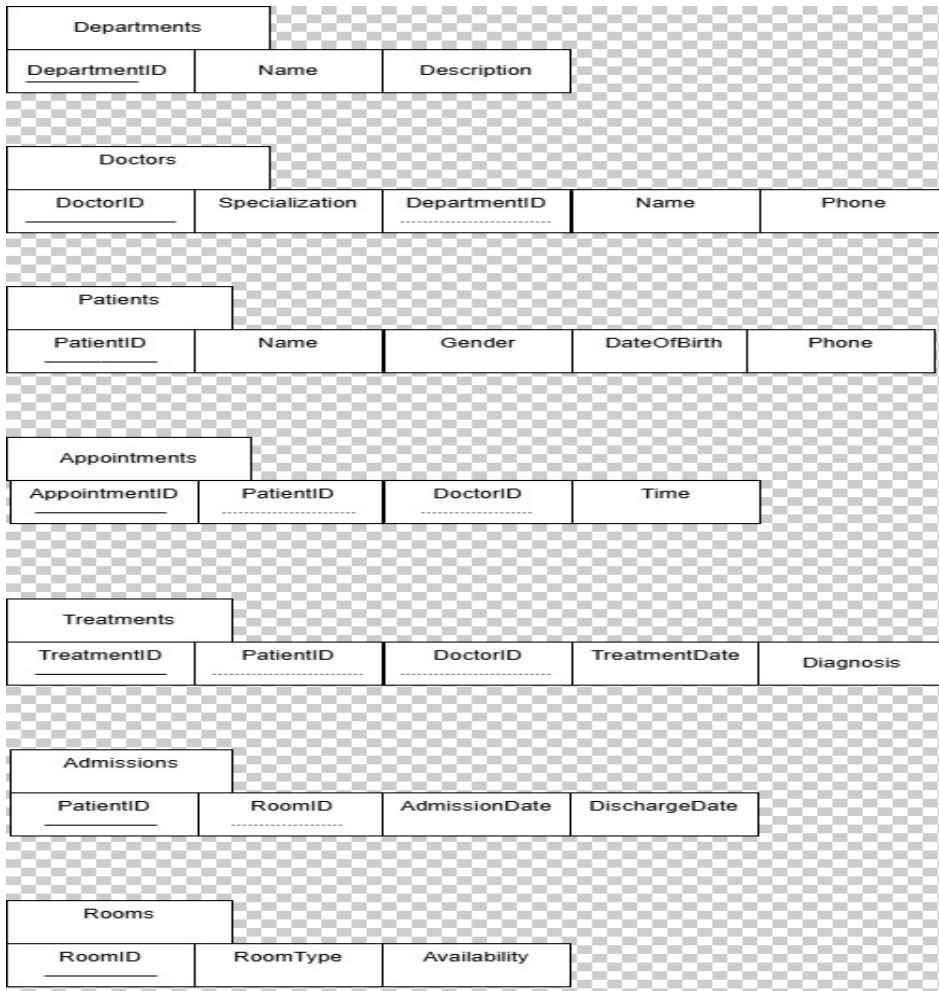
3. Entities and Attributes

Patients	Doctors	Departments	Appointments	Rooms	Admissions
patient_id PK	doctor_id PK	department_id PK	appointment_id PK	room_id PK	admissionDate
first_name	first_name	Name	patient_id	room_type	patientID
last_name	last_name	Description	doctor_id	availability	patientID
gender	specialization		Time		roomID
birth_date	phone				dischargeDate
phone					

Step2- ERD Diagram



2. Mapping Tables



3. Normalization

1: UN-NORMALIZED FORM (UNF)

Let's assume a preliminary un-normalized table like this:

Problems:

patient_id	patient_name	doctor_name	department	room_number	diagnosis	prescription
1	Ali Hassan	Dr. Hany, Dr. Salma	Cardiology, Neurology	101, 102	Hypertension, Migraine	MedA, MedB

2: FIRST NORMAL FORM (1NF)

patient_id	patient_name	doctor_name	department	room_number	diagnosis	prescription
1	Ali Hassan	Dr. Hany	Cardiology	101	Hypertension	MedA
1	Ali Hassan	Dr. Salma	Neurology	102	Migraine	MedB

3: SECOND NORMAL FORM (2NF)

Patients:

patient_name	Patient_id
Ali Hassan	1

Doctors:

doctor_name	department
Dr. Hany	Cardiology
Dr. Salma	Neurology

Rooms:

room_number	room_type
101	Single
102	Single

Appointments:

Doctor_name	Patient_id	appointment_id
Dr. Hany	1	1
Dr. Salma	1	2

Treatments:

treatment_id	appointment_id	Diagnosis	Prescription
1	1	Hypertension	MedA
2	2	Migraine	MedB

4: THIRD NORMAL FORM (3NF)

Patients:

patient_id	patient_name
1	Ali Hassan

Doctors:

doctor_id	doctor_name	department
1	Dr. Hany	Cardiology
2	Dr. Salma	Neurology

Departments:

department_id	name
1	Cardiology
2	Neurology

Appointments:

doctor_id	patient_id	appointment_id
1	1	1
2	1	2

Treatments:

treatment_id	appointment_id	Diagnosis	Prescription
1	1	Hypertension	MedA
2	2	Migraine	MedB

Rooms:

room_number	room_type
101	Single
102	Single

Step 4 – Write SQL Code

```
CREATE TABLE Departments (  
    DepartmentID INT PRIMARY KEY,  
    Name VARCHAR(100),  
    Description VARCHAR(255)  
);
```

```
mysql> CREATE TABLE Departments (  
->     DepartmentID INT PRIMARY KEY,  
->     Name VARCHAR(100),  
->     Description VARCHAR(255)  
-> );  
Query OK, 0 rows affected (0.414 sec)
```

```
CREATE TABLE Doctors (  
    DoctorID INT PRIMARY KEY,  
    Name VARCHAR(100),  
    Specialization VARCHAR(100),  
    Phone VARCHAR(20),  
    DepartmentID INT,  
    FOREIGN KEY (DepartmentID) REFERENCES Departments(DepartmentID)  
);
```

```
mysql>  
mysql> CREATE TABLE Doctors (  
->     DoctorID INT PRIMARY KEY,  
->     Name VARCHAR(100),  
->     Specialization VARCHAR(100),  
->     Phone VARCHAR(20),  
->     DepartmentID INT,  
->     FOREIGN KEY (DepartmentID) REFERENCES Departments(DepartmentID)  
-> );  
Query OK, 0 rows affected (0.896 sec)
```

```
CREATE TABLE Patients (  
    PatientID INT PRIMARY KEY,  
    Name VARCHAR(100),  
    Gender VARCHAR(10),  
    BirthDate DATE,  
    Phone VARCHAR(20)  
);
```

```
mysql>  
mysql> CREATE TABLE Patients (  
->     PatientID INT PRIMARY KEY,  
->     Name VARCHAR(100),  
->     Gender VARCHAR(10),  
->     BirthDate DATE,  
->     Phone VARCHAR(20)  
-> );  
Query OK, 0 rows affected (0.328 sec)
```

```
CREATE TABLE Rooms (  
    RoomID INT PRIMARY KEY,
```

```
RoomType VARCHAR(50),
Availability VARCHAR(10)
);
```

```
mysql>
mysql> CREATE TABLE Rooms (
->     RoomID INT PRIMARY KEY,
->     RoomType VARCHAR(50),
->     Availability VARCHAR(10)
-> );
Query OK, 0 rows affected (0.295 sec)
```

```
CREATE TABLE Appointments (
AppointmentID INT PRIMARY KEY,
PatientID INT,
DoctorID INT,
Date DATE,
Time TIME,
FOREIGN KEY (PatientID) REFERENCES Patients(PatientID),
FOREIGN KEY (DoctorID) REFERENCES Doctors(DoctorID)
);
```

```
mysql>
mysql> CREATE TABLE Appointments (
->     AppointmentID INT PRIMARY KEY,
->     PatientID INT,
->     DoctorID INT,
->     Date DATE,
->     Time TIME,
->     FOREIGN KEY (PatientID) REFERENCES Patients(PatientID),
->     FOREIGN KEY (DoctorID) REFERENCES Doctors(DoctorID)
-> );
Query OK, 0 rows affected (0.690 sec)
```

```
CREATE TABLE Admissions (
AdmissionID INT PRIMARY KEY,
PatientID INT,
RoomID INT,
AdmissionDate DATE,
DischargeDate DATE,
FOREIGN KEY (PatientID) REFERENCES Patients(PatientID),
FOREIGN KEY (RoomID) REFERENCES Rooms(RoomID)
);
```

```
mysql>
mysql> CREATE TABLE Admissions (
  ->     AdmissionID INT PRIMARY KEY,
  ->     PatientID INT,
  ->     RoomID INT,
  ->     AdmissionDate DATE,
  ->     DischargeDate DATE,
  ->     FOREIGN KEY (PatientID) REFERENCES Patients(PatientID),
  ->     FOREIGN KEY (RoomID) REFERENCES Rooms(RoomID)
  -> );
Query OK, 0 rows affected (0.443 sec)
```

Step 5 – Insert Sample Data

```
INSERT INTO Departments VALUES
(1, 'Cardiology', 'Heart treatment department'),
(2, 'Neurology', 'Brain and nerves department'),
(3, 'Orthopedics', 'Bone treatment department'),
(4, 'Dermatology', 'Skin treatment department'),
(5, 'Pediatrics', 'Children health department'),
(6, 'Oncology', 'Cancer treatment department'),
(7, 'Ophthalmology', 'Eye treatment department'),
(8, 'Psychiatry', 'Mental health department'),
(9, 'ENT', 'Ear, Nose, and Throat department'),
(10, 'Urology', 'Urinary system department');
```

```
mysql> INSERT INTO Departments VALUES
  -> (1, 'Cardiology', 'Heart treatment department'),
  -> (2, 'Neurology', 'Brain and nerves department'),
  -> (3, 'Orthopedics', 'Bone treatment department'),
  -> (4, 'Dermatology', 'Skin treatment department'),
  -> (5, 'Pediatrics', 'Children health department'),
  -> (6, 'Oncology', 'Cancer treatment department'),
  -> (7, 'Ophthalmology', 'Eye treatment department'),
  -> (8, 'Psychiatry', 'Mental health department'),
  -> (9, 'ENT', 'Ear, Nose, and Throat department'),
  -> (10, 'Urology', 'Urinary system department');
Query OK, 10 rows affected (0.150 sec)
Records: 10  Duplicates: 0  Warnings: 0
```

```
INSERT INTO Doctors VALUES
(1, 'Dr. Ahmed Ali', 'Cardiology', '01012345678', 1),
(2, 'Dr. Sara Nabil', 'Neurology', '01098765432', 2),
(3, 'Dr. Mona Samir', 'Orthopedics', '01123456789', 3),
(4, 'Dr. Karim Youssef', 'Dermatology', '01022334455', 4),
(5, 'Dr. Yara Sameh', 'Pediatrics', '01155667788', 5),
(6, 'Dr. Amr Mahmoud', 'Oncology', '01211223344', 6),
(7, 'Dr. Dina Ehab', 'Ophthalmology', '01099887766', 7),
(8, 'Dr. Nader Fathy', 'Psychiatry', '01144332211', 8),
(9, 'Dr. Laila Sherif', 'ENT', '01234567890', 9),
(10, 'Dr. Wael Gamal', 'Urology', '01066778899', 10);
```



```
mysql> INSERT INTO Doctors VALUES
-> (1, 'Dr. Ahmed Ali', 'Cardiology', '01012345678', 1),
-> (2, 'Dr. Sara Nabil', 'Neurology', '01098765432', 2),
-> (3, 'Dr. Mona Samir', 'Orthopedics', '01123456789', 3),
-> (4, 'Dr. Karim Youssef', 'Dermatology', '01022334455', 4),
-> (5, 'Dr. Yara Sameh', 'Pediatrics', '01155667788', 5),
-> (6, 'Dr. Amr Mahmoud', 'Oncology', '01211223344', 6),
-> (7, 'Dr. Dina Ehab', 'Ophthalmology', '01099887766', 7),
-> (8, 'Dr. Nader Fathy', 'Psychiatry', '01144332211', 8),
-> (9, 'Dr. Laila Sherif', 'ENT', '01234567890', 9),
-> (10, 'Dr. Wael Gamal', 'Urology', '01066778899', 10);
```

Query OK, 10 rows affected (0.143 sec)

Records: 10 Duplicates: 0 Warnings: 0

```
INSERT INTO Patients VALUES
```

```
(1, 'Mohamed Yasser', 'Male', '1995-05-10', '01055551234'),
(2, 'Noura Adel', 'Female', '1988-11-20', '01066662345'),
(3, 'Hany Essam', 'Male', '2000-03-15', '01177773456'),
(4, 'Salma Hany', 'Female', '1993-02-22', '01099991111'),
(5, 'Omar Sherif', 'Male', '1985-06-30', '01188882222'),
(6, 'Aya Nader', 'Female', '1999-09-09', '01033334444'),
(7, 'Mostafa Saeed', 'Male', '1978-12-05', '01222225555'),
(8, 'Reem Tamer', 'Female', '2002-07-19', '01011112222'),
(9, 'Khaled Fathy', 'Male', '1990-04-17', '01166667777'),
(10, 'Lina Mostafa', 'Female', '1996-01-01', '01211113333');
```

```
mysql> INSERT INTO Patients VALUES
```

```
-> (1, 'Mohamed Yasser', 'Male', '1995-05-10', '01055551234'),
-> (2, 'Noura Adel', 'Female', '1988-11-20', '01066662345'),
-> (3, 'Hany Essam', 'Male', '2000-03-15', '01177773456'),
-> (4, 'Salma Hany', 'Female', '1993-02-22', '01099991111'),
-> (5, 'Omar Sherif', 'Male', '1985-06-30', '01188882222'),
-> (6, 'Aya Nader', 'Female', '1999-09-09', '01033334444'),
-> (7, 'Mostafa Saeed', 'Male', '1978-12-05', '01222225555'),
-> (8, 'Reem Tamer', 'Female', '2002-07-19', '01011112222'),
-> (9, 'Khaled Fathy', 'Male', '1990-04-17', '01166667777'),
-> (10, 'Lina Mostafa', 'Female', '1996-01-01', '01211113333');
```

Query OK, 10 rows affected (0.141 sec)

Records: 10 Duplicates: 0 Warnings: 0

```
INSERT INTO Rooms VALUES
```

```
(1, 'ICU', 'Available'),
(2, 'General', 'Occupied'),
(3, 'ICU', 'Occupied'),
(4, 'General', 'Available'),
(5, 'ICU', 'Available'),
(6, 'General', 'Occupied'),
(7, 'ICU', 'Available'),
```



```
(8, 'General', 'Occupied'),  
(9, 'ICU', 'Available'),  
(10, 'General', 'Available');
```

```
mysql> INSERT INTO Rooms VALUES
```

```
-> (1, 'ICU', 'Available'),  
-> (2, 'General', 'Occupied'),  
-> (3, 'ICU', 'Occupied'),  
-> (4, 'General', 'Available'),  
-> (5, 'ICU', 'Available'),  
-> (6, 'General', 'Occupied'),  
-> (7, 'ICU', 'Available'),  
-> (8, 'General', 'Occupied'),  
-> (9, 'ICU', 'Available'),  
-> (10, 'General', 'Available');
```

```
Query OK, 10 rows affected (0.087 sec)
```

```
Records: 10 Duplicates: 0 Warnings: 0
```

```
INSERT INTO Appointments VALUES
```

```
(1, 1, 1, '2025-05-14', '09:00:00'),  
(2, 2, 2, '2025-05-15', '11:30:00'),  
(3, 3, 3, '2025-05-16', '10:00:00'),  
(4, 4, 4, '2025-05-17', '12:00:00'),  
(5, 5, 5, '2025-05-18', '13:30:00'),  
(6, 6, 6, '2025-05-19', '15:00:00'),  
(7, 7, 7, '2025-05-20', '10:30:00'),  
(8, 8, 8, '2025-05-21', '11:00:00'),  
(9, 9, 9, '2025-05-22', '14:00:00'),  
(10, 10, 10, '2025-05-23', '16:00:00');
```

```
mysql> INSERT INTO Appointments VALUES
```

```
-> (1, 1, 1, '2025-05-14', '09:00:00'),  
-> (2, 2, 2, '2025-05-15', '11:30:00'),  
-> (3, 3, 3, '2025-05-16', '10:00:00'),  
-> (4, 4, 4, '2025-05-17', '12:00:00'),  
-> (5, 5, 5, '2025-05-18', '13:30:00'),  
-> (6, 6, 6, '2025-05-19', '15:00:00'),  
-> (7, 7, 7, '2025-05-20', '10:30:00'),  
-> (8, 8, 8, '2025-05-21', '11:00:00'),  
-> (9, 9, 9, '2025-05-22', '14:00:00'),  
-> (10, 10, 10, '2025-05-23', '16:00:00');
```

```
Query OK, 10 rows affected (0.136 sec)
```

```
Records: 10 Duplicates: 0 Warnings: 0
```

```
INSERT INTO Admissions VALUES
```

```
(1, 1, 1, '2025-05-10', NULL),  
(2, 2, 2, '2025-05-08', '2025-05-13'),  
(3, 3, 3, '2025-05-12', NULL),
```

```
(4, 4, 4, '2025-05-09', '2025-05-11'),
(5, 5, 5, '2025-05-13', NULL),
(6, 6, 6, '2025-05-14', NULL),
(7, 7, 7, '2025-05-15', NULL),
(8, 8, 8, '2025-05-11', '2025-05-12'),
(9, 9, 9, '2025-05-10', NULL),
(10, 10, 10, '2025-05-16', NULL);
```

```
mysql> INSERT INTO Admissions VALUES
-> (1, 1, 1, '2025-05-10', NULL),
-> (2, 2, 2, '2025-05-08', '2025-05-13'),
-> (3, 3, 3, '2025-05-12', NULL),
-> (4, 4, 4, '2025-05-09', '2025-05-11'),
-> (5, 5, 5, '2025-05-13', NULL),
-> (6, 6, 6, '2025-05-14', NULL),
-> (7, 7, 7, '2025-05-15', NULL),
-> (8, 8, 8, '2025-05-11', '2025-05-12'),
-> (9, 9, 9, '2025-05-10', NULL),
-> (10, 10, 10, '2025-05-16', NULL);
```

```
Query OK, 10 rows affected (0.061 sec)
Records: 10  Duplicates: 0  Warnings: 0
```

Step 6 – Make SQL Queries

```
SELECT *
FROM Patients;
```

```
mysql> SELECT * FROM Patients;
```

PatientID	Name	Gender	BirthDate	Phone
1	Mohamed Yasser	Male	1995-05-10	01055551234
2	Noura Adel	Female	1988-11-20	01066662345
3	Hany Essam	Male	2000-03-15	01177773456
4	Salma Hany	Female	1993-02-22	01099991111
5	Omar Sherif	Male	1985-06-30	01188882222
6	Aya Nader	Female	1999-09-09	01033334444
7	Mostafa Saeed	Male	1978-12-05	01222225555
8	Reem Tamer	Female	2002-07-19	01011112222
9	Khaled Fathy	Male	1990-04-17	01166667777
10	Lina Mostafa	Female	1996-01-01	01211113333

```
10 rows in set (0.005 sec)
```

```
SELECT *
FROM Rooms
WHERE Availability = 'Available';
```

```
mysql> SELECT * FROM Rooms WHERE Availability = 'Available';
```

RoomID	RoomType	Availability
1	ICU	Available
4	General	Available
5	ICU	Available
7	ICU	Available
9	ICU	Available
10	General	Available

```
6 rows in set (0.010 sec)
```

```
SELECT A.Date, A.Time, P.Name
```

```

FROM Appointments A
JOIN Patients P ON A.PatientID = P.PatientID
WHERE A.DoctorID = 1;

```

```

mysql> SELECT A.Date, A.Time, P.Name
-> FROM Appointments A
-> JOIN Patients P ON A.PatientID = P.PatientID
-> WHERE A.DoctorID = 1;
+-----+-----+-----+
| Date      | Time      | Name      |
+-----+-----+-----+
| 2025-05-14 | 09:00:00  | Mohamed Yasser |
+-----+-----+-----+
1 row in set (0.006 sec)

```

```

SELECT COUNT(*)
FROM Admissions
WHERE DischargeDate IS NULL;

```

```

mysql> SELECT COUNT(*) FROM Admissions WHERE DischargeDate IS NULL;
+-----+
| COUNT(*) |
+-----+
|          7 |
+-----+
1 row in set (0.047 sec)

```

```

SELECT P.Name
FROM Admissions A
JOIN Patients P ON A.PatientID = P.PatientID
JOIN Rooms R ON A.RoomID = R.RoomID
WHERE R.RoomType = 'ICU';

```

```

mysql>
mysql> SELECT P.Name
-> FROM Admissions A
-> JOIN Patients P ON A.PatientID = P.PatientID
-> JOIN Rooms R ON A.RoomID = R.RoomID
-> WHERE R.RoomType = 'ICU';
+-----+
| Name      |
+-----+
| Mohamed Yasser |
| Hany Essam   |
| Omar Sherif  |
| Mostafa Saeed |
| Khaled Fathy |
+-----+
5 rows in set (0.006 sec)

```