A Hospital Management Project Report submitted
for Database Management System (UCS310)
by

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Problem Statement

Developing a hospital management system in order to effectively manage most aspects of hospitals such as booking appointments, managing patient records and keeping medical history.

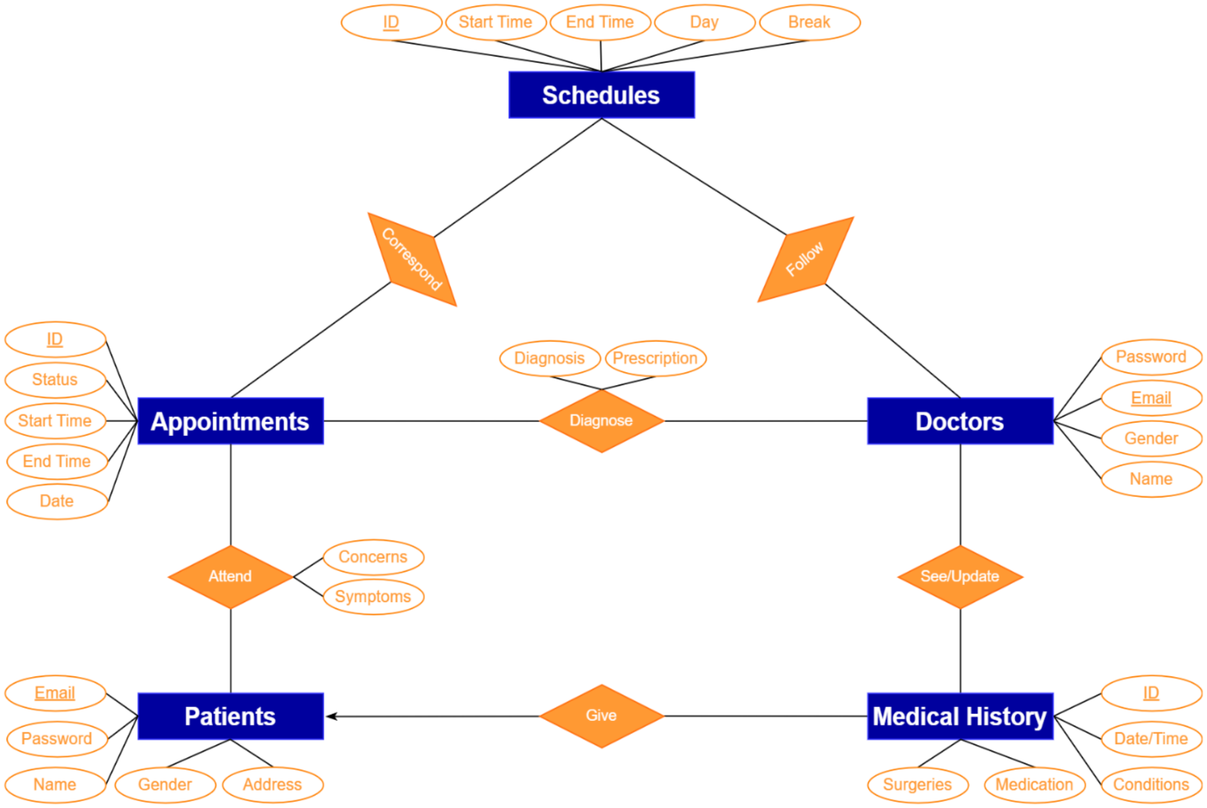
Overview

Organizations such as hospitals have to deal with a lot of patients regularly and hence a lot of data. Hence it is very important for a hospital to have a DBMS with a frontend that easily allows patients to book appointments and allows doctors or administrators to manage patient data.

Functional Requirements

1. Separate interfaces for patients and doctors. Patients and doctors should have separate logins.
2. Allow patients to book appointments and give previous medical history.
3. Allow patients to view/update/cancel already booked appointments if necessary.
4. Allow doctors to cancel appointments.
5. Cancelled appointments should create free slots for other patients.
6. The system should avoid clash of appointments.
7. The system should take into consideration hospital and doctor schedules and allow appointments only when a doctor is not already busy or does not have a break.
8. Doctors should be able access patient history and profile, and add to patient history.
9. Doctors should be able to give diagnosis and prescriptions.
10. Patients should be able to see complete diagnosis, prescriptions and medical history.

ER Diagram



Relational Schemas

1. Patient

Email	Password	Name	Address

2. Doctor

Email	Gender	Password	ID	Name	Salary

3. Medical History

Surgery	Medication	Condition	Date/Time	**Email**

4. Appointment

ID	Date	Start	End	Status

5. Schedules

ID	Start	End	Holidays	Breaks

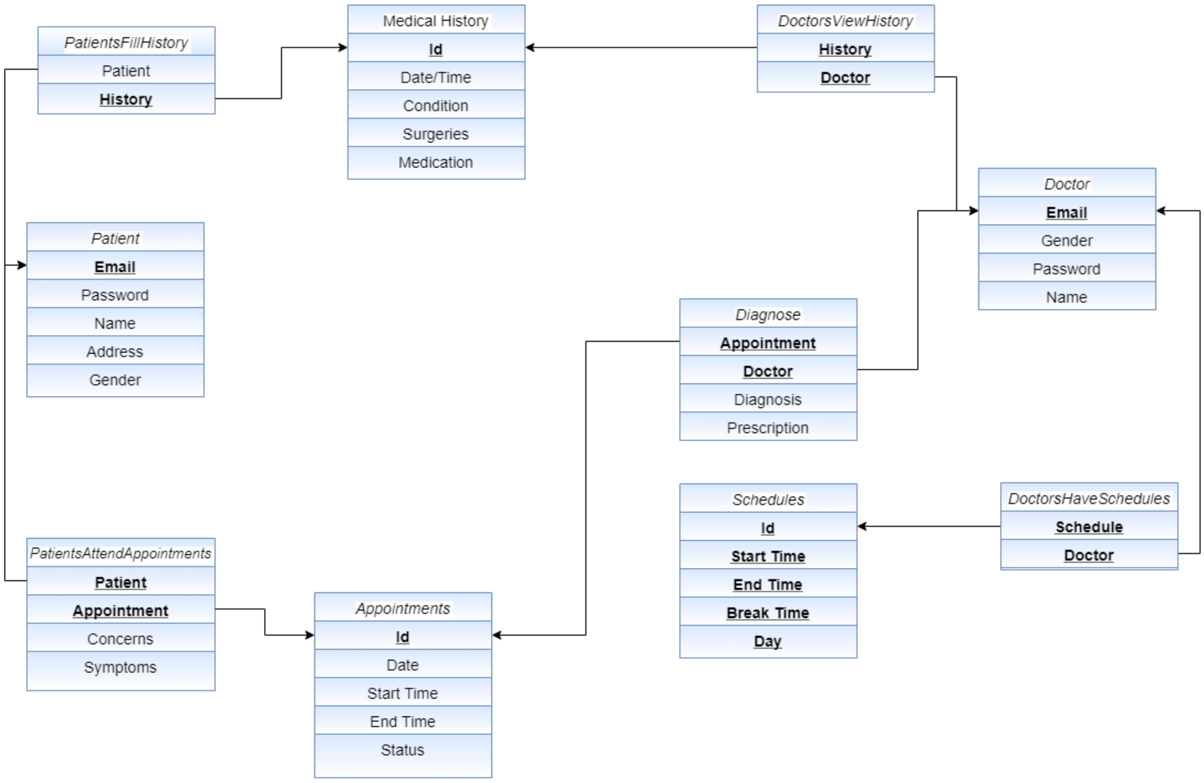
6. Diagnose

Appt ID	Doctor	Diagnosis	Prescription

7. EmpDetails

Designation	NumOfEmp

Normalized Relational Schemas



Functional Dependencies and Normalization

1. **Patient**:

   R = (Email, Password, Name, Address, Gender)

   FDs:

   a. Email -> Password

   b. Email -> Name

   c. Email -> Address

   d. Email -> Gender

   Table is in 1NF since all attributes are atomic.

   Table is in 2NF since there is no partial dependency.

   Table is in 3NF due to absence of any transitive dependency.

2. **Medical History:**
   R = (ID, Date, Conditions, Surgeries, Medication)
   FDs:
   a. ID -> Password
   b. ID -> Date
   c. ID -> Conditions
   d. ID -> Surgeries
   e. ID -> Medication

   Table is in 1NF since all attributes are atomic.

   Table is in 2NF since there is no partial dependency.

   Table is in 3NF due to absence of any transitive dependency.

3. **Doctor:**
   R = (Email, Gender, Password, Name,Salary)
   FDs:
   a. Email -> Gender
   b. Email -> Password
   c. Email -> Name
   d. Email -> Salary

   Table is in 1NF since all attributes are atomic.

   Table is in 2NF since there is no partial dependency.

   Table is in 3NF due to absence of any transitive dependency.

4. **Appointment:**
   R = (ID, Date, Start time, End time, Status)
   FDs:
   a. ID -> Date
   b. ID -> Start time
   c. ID -> End time
   d. ID -> Status

   Table is in 1NF since all attributes are atomic.

   Table is in 2NF since there is no partial dependency.

Table is in 3NF due to absence of any transitive dependency.

5. **PatientsAttendAppointments:**
   R = (Patient, Appointment, Concerns, Symptoms)
   FDs:
   a. (Patient, Appointment) -> Concerns
   b. (Patient, Appointment) -> Symptoms

   Table is in 1NF since all attributes are atomic.

   Table is in 2NF since there is no partial dependency.

   Table is in 3NF due to absence of any transitive dependency.

6. **Schedule:**
   R = (ID, Start time, End time, Break time, Day)

   Table is in 1NF since all attributes are atomic.

   Table is in 2NF since there is no partial dependency.

   It also has atomic attributes and it doesn't have any transitive dependency, hence it is in 3NF.

7. **PatientsFillHistory:**
   R = (Patient, History)
   FDs:
   a. History -> Patient

   Table is in 1NF since all attributes are atomic.

   Table is in 2NF since there is no partial dependency.

   Table is in 3NF due to absence of any transitive dependency.

8. **Diagnose:**
   R = (Appointment, Doctor, Diagnosis, Prescription)
   FDs:
   a. (Appointment, Doctor) -> Diagnosis
   b. (Appointment, Doctor) -> Prescription

Table is in 1NF since all attributes are atomic.

Table is in 2NF since there is no partial dependency.

Table is in 3NF due to absence of any transitive dependency.

9. **DoctorsHaveSchedules:**
   R = (<u>Schedule</u>, <u>Doctor</u>)
   Since entire table is the key, it does not have partial and transitive dependencies. It also has atomic attributes.
   Hence it is in 3NF.

10. **DoctorViewsHistory:**
    R = (<u>History</u>, <u>Doctor</u>)
    Since entire table is the key, it does not have partial and transitive dependencies. It also has atomic attributes.
    Hence it is in 3NF.

PL/SQL Code to Implement Project Functionalities

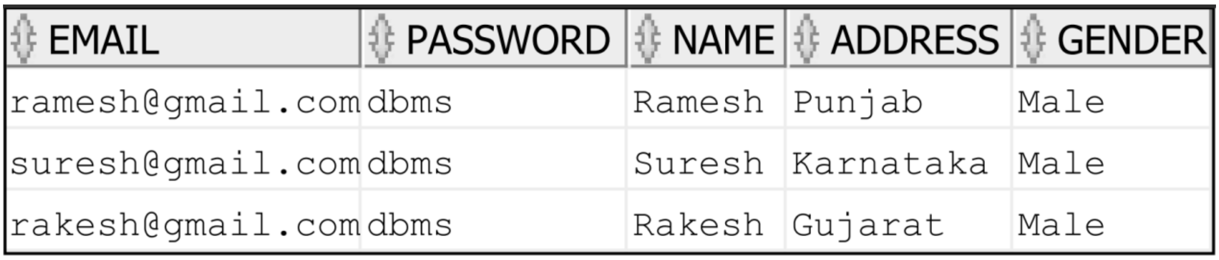
```
CREATE TABLE Patient(
Email varchar(50) PRIMARY KEY,
Password varchar(30) NOT NULL,
Name varchar(50) NOT NULL,
Address varchar(60) NOT NULL,
Gender varchar(20) NOT NULL
);

CREATE TABLE MedicalHistory(
ID int PRIMARY KEY,
Ddate date NOT NULL,
Conditions varchar(100) NOT NULL,
Surgeries varchar(100) NOT NULL,
Medication varchar(100) NOT NULL
);

CREATE TABLE Doctor(
Email varchar(50) PRIMARY KEY,
Gender varchar(20) NOT NULL,
Password varchar(30) NOT NULL,
Name varchar(50) NOT NULL,
Salary int NOT NULL
);

CREATE TABLE Appointment(
ID int PRIMARY KEY,
Ddate date NOT NULL,
Starttime varchar(15) NOT NULL,
Endtime varchar(15) NOT NULL,
Status varchar(15) NOT NULL
);

CREATE TABLE PatientsAttendAppointments(
Patient varchar(50) NOT NULL,
Appt int NOT NULL,
Concerns varchar(40) NOT NULL,
Symptoms varchar(40) NOT NULL,
FOREIGN KEY (patient) REFERENCES Patient (Email) ON DELETE CASCADE,
FOREIGN KEY (appt) REFERENCES Appointment (ID) ON DELETE CASCADE,
PRIMARY KEY (Patient, Appt)
);

CREATE TABLE Schedule(
ID int PRIMARY KEY,
Starttime varchar(15) NOT NULL,
Endtime varchar(15) NOT NULL,
Breaktime varchar(15) NOT NULL,
Day varchar(20) NOT NULL
);

CREATE TABLE PatientsFillHistory(
Patient varchar(50) NOT NULL,
History int NOT NULL,
FOREIGN KEY (Patient) REFERENCES Patient (Email) ON DELETE CASCADE,
FOREIGN KEY (History) REFERENCES MedicalHistory (ID) ON DELETE
CASCADE,
PRIMARY KEY (History)
);

CREATE TABLE Diagnose(
Appt int NOT NULL,
Doctor varchar(50) NOT NULL,
Diagnosis varchar(40) NOT NULL,
Prescription varchar(50) NOT NULL,
FOREIGN KEY (Appt) REFERENCES Appointment (ID) ON DELETE CASCADE,
FOREIGN KEY (Doctor) REFERENCES Doctor (Email) ON DELETE CASCADE,
PRIMARY KEY (Appt, Doctor)
);

CREATE TABLE DocsHaveSchedules(
Sched int NOT NULL,
Doctor varchar(50) NOT NULL,
FOREIGN KEY (Sched) REFERENCES Schedule (ID) ON DELETE CASCADE,
FOREIGN KEY (Doctor) REFERENCES Doctor (Email) ON DELETE CASCADE,
PRIMARY KEY (Sched, Doctor)
);

CREATE TABLE DoctorViewsHistory(
History int NOT NULL,
Doctor varchar(50) NOT NULL,
FOREIGN KEY (Doctor) REFERENCES Doctor (Email) ON DELETE CASCADE,
FOREIGN KEY (History) REFERENCES MedicalHistory (ID) ON DELETE
CASCADE,
PRIMARY KEY (History, Doctor)
);

CREATE TABLE EmpDetails(
Deignation varchar(20),
NumOfEmp int
);

CREATE TRIGGER FORMER_EMP
    AFTER DELETE ON Doctor
    FOR EACH ROW
    UPDATE EmpDetails SET NumOfEmp = NumOfEmp - 1;

CREATE TRIGGER FORMER_EMP1
    AFTER INSERT ON Doctor
    FOR EACH ROW
    UPDATE EmpDetails SET NumOfEmp = NumOfEmp + 1;

INSERT INTO Patient(Email, Password, Name, Address, Gender)
VALUES('ramesh@gmail.com','dbms','Ramesh','Punjab','Male');
```

```
INSERT INTO Patient(Email, Password, Name, Address, Gender)
VALUES('suresh@gmail.com','dbms','Suresh','Karnataka','Male');
INSERT INTO Patient(Email, Password, Name, Address, Gender)
VALUES('rakesh@gmail.com','dbms','Rakesh','Gujarat','Male');

INSERT INTO MedicalHistory(ID, Ddate, Conditions, Surgeries, Medication)
VALUES(1,'20-04-22','Pain in abdomen','Heart Surgery','Crocin');
INSERT INTO MedicalHistory(ID, Ddate, Conditions, Surgeries, Medication)
VALUES(2,'22-04-22','Frequent Indigestion','none','none');
INSERT INTO MedicalHistory(ID, Ddate, Conditions, Surgeries, Medication)
VALUES(3,'25-04-22','Body Pain','none','Iodex');

INSERT INTO Doctor(Email, Gender, Password, Name, Salary)
VALUES('doc1@gmail.com','Male','dbms','Samar',90000);
INSERT INTO Doctor(Email, Gender, Password, Name, Salary)
VALUES('doc2@gmail.com','Male','dbms','Sahil',80000);
INSERT INTO Doctor(Email, Gender, Password, Name, Salary)
VALUES('doc3@gmail.com','Female','dbms','Akriti',75000);
INSERT INTO Doctor(Email, Gender, Password, Name, Salary)
VALUES('doc4@gmail.com','Female','dbms','Japnoor',85000);
INSERT INTO Appointment(ID, Ddate, Starttime, Endtime, Status) VALUES(1,'18-
04-22','09:00','10:00','Done');
INSERT INTO Appointment(ID, Ddate, Starttime, Endtime, Status) VALUES(2,'20-
04-22','10:00','11:00','Done');
INSERT INTO Appointment(ID, Ddate, Starttime, Endtime, Status) VALUES(3,'23-
04-22','14:00','15:00','Done');

INSERT INTO PatientsAttendAppointments(Patient, Appt, Concerns, Symptoms)
VALUES('ramesh@gmail.com',1,'none','itchy throat');
INSERT INTO PatientsAttendAppointments(Patient, Appt, Concerns, Symptoms)
VALUES('suresh@gmail.com',2,'infection','fever');
INSERT INTO PatientsAttendAppointments(Patient, Appt, Concerns, Symptoms)
VALUES('rakesh@gmail.com',3,'nausea','fever');

INSERT INTO Schedule(ID, Starttime, Endtime, Breaktime, Day)
VALUES(001,'09:00','17:00','12:00','Tuesday');
INSERT INTO Schedule(ID, Starttime, Endtime, Breaktime, Day)
VALUES(002,'09:00','17:00','12:00','Friday');
INSERT INTO Schedule(ID, Starttime, Endtime, Breaktime, Day)
VALUES(003,'09:00','17:00','12:00','Saturday');
INSERT INTO Schedule(ID, Starttime, Endtime, Breaktime, Day)
VALUES(004,'09:00','17:00','12:00','Sunday');
```

```
INSERT INTO Schedule(ID, Starttime, Endtime, Breaktime, Day)
VALUES(005,'09:00','17:00','12:00','Wednesday');
INSERT INTO Schedule(ID, Starttime, Endtime, Breaktime, Day)
VALUES(006,'09:00','17:00','12:00','Friday');

INSERT INTO PatientsFillHistory(Patient, History)
VALUES('ramesh@gmail.com',1);
INSERT INTO PatientsFillHistory(Patient, History) VALUES('suresh@gmail.com',2);
INSERT INTO PatientsFillHistory(Patient, History) VALUES('rakesh@gmail.com',3);

INSERT INTO Diagnose(Appt, Doctor, Diagnosis, Prescription)
VALUES(1,'doc1@gmail.com','Bloating','Ibuprofen as needed');
INSERT INTO Diagnose(Appt, Doctor, Diagnosis, Prescription)
VALUES(2,'doc2@gmail.com','Muscle soreness','Stretch morning/night');
INSERT INTO Diagnose(Appt, Doctor, Diagnosis, Prescription)
VALUES(3,'doc2@gmail.com','Vitamin Deficiency','Good Diet');

INSERT INTO DocsHaveSchedules(Sched, Doctor)
VALUES(001,'doc1@gmail.com');
INSERT INTO DocsHaveSchedules(Sched, Doctor)
VALUES(002,'doc1@gmail.com');
INSERT INTO DocsHaveSchedules(Sched, Doctor)
VALUES(003,'doc2@gmail.com');
INSERT INTO DocsHaveSchedules(Sched, Doctor)
VALUES(004,'doc3@gmail.com');
INSERT INTO DocsHaveSchedules(Sched, Doctor)
VALUES(005,'doc4@gmail.com');

INSERT INTO DoctorViewsHistory(History, Doctor)
VALUES(1,'doc1@gmail.com');
INSERT INTO DoctorViewsHistory(History, Doctor)
VALUES(2,'doc1@gmail.com');
INSERT INTO DoctorViewsHistory(History, Doctor)
VALUES(3,'doc2@gmail.com');
INSERT INTO DoctorViewsHistory(History, Doctor)
VALUES(3,'doc3@gmail.com');

INSERT INTO EmpDetails(Deignation, NumOfEmp) VALUES('Doctor',4);
```

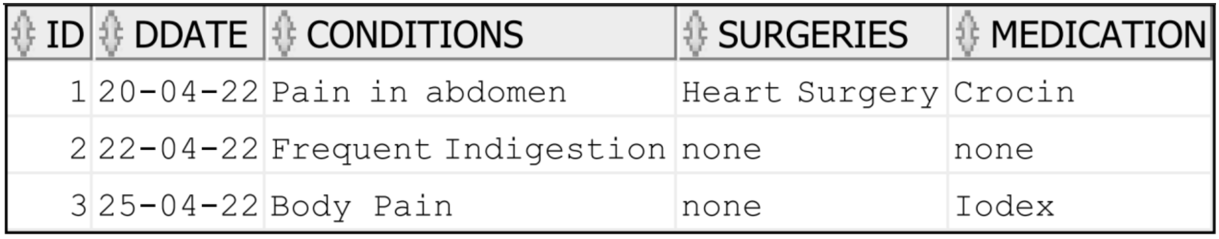
Screenshots

Patient Table:



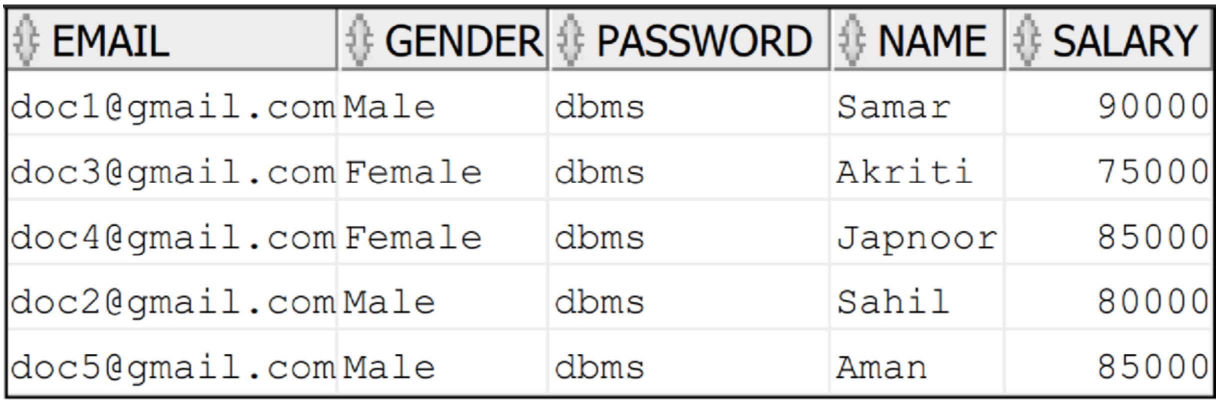
EMAIL	PASSWORD	NAME	ADDRESS	GENDER
ramesh@gmail.com	dbms	Ramesh	Punjab	Male
suresh@gmail.com	dbms	Suresh	Karnataka	Male
rakesh@gmail.com	dbms	Rakesh	Gujarat	Male

MedicalHistory Table:



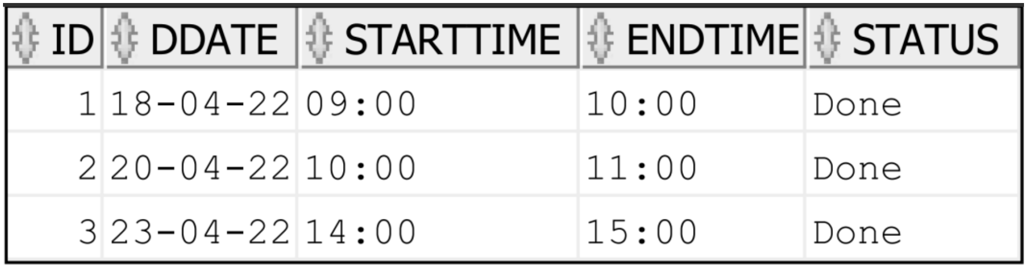
ID	DDATE	CONDITIONS	SURGERIES	MEDICATION
1	20-04-22	Pain in abdomen	Heart Surgery	Crocin
2	22-04-22	Frequent Indigestion	none	none
3	25-04-22	Body Pain	none	Iodex

Doctor Table:



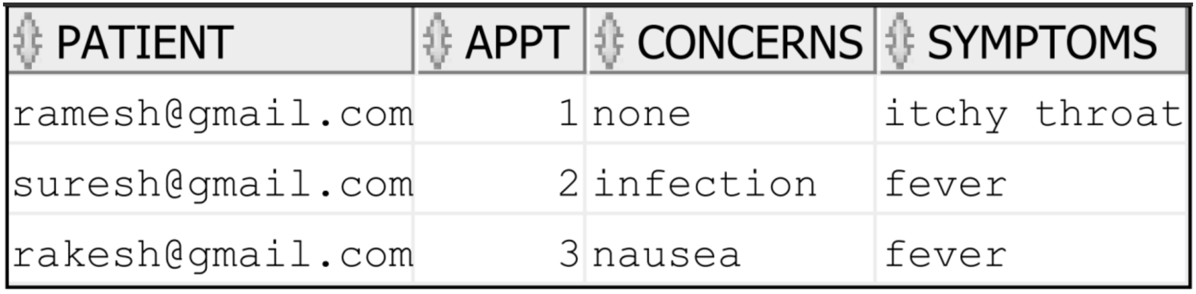
EMAIL	GENDER	PASSWORD	NAME	SALARY
doc1@gmail.com	Male	dbms	Samar	90000
doc3@gmail.com	Female	dbms	Akriti	75000
doc4@gmail.com	Female	dbms	Japnoor	85000
doc2@gmail.com	Male	dbms	Sahil	80000
doc5@gmail.com	Male	dbms	Aman	85000

Appointment Table:



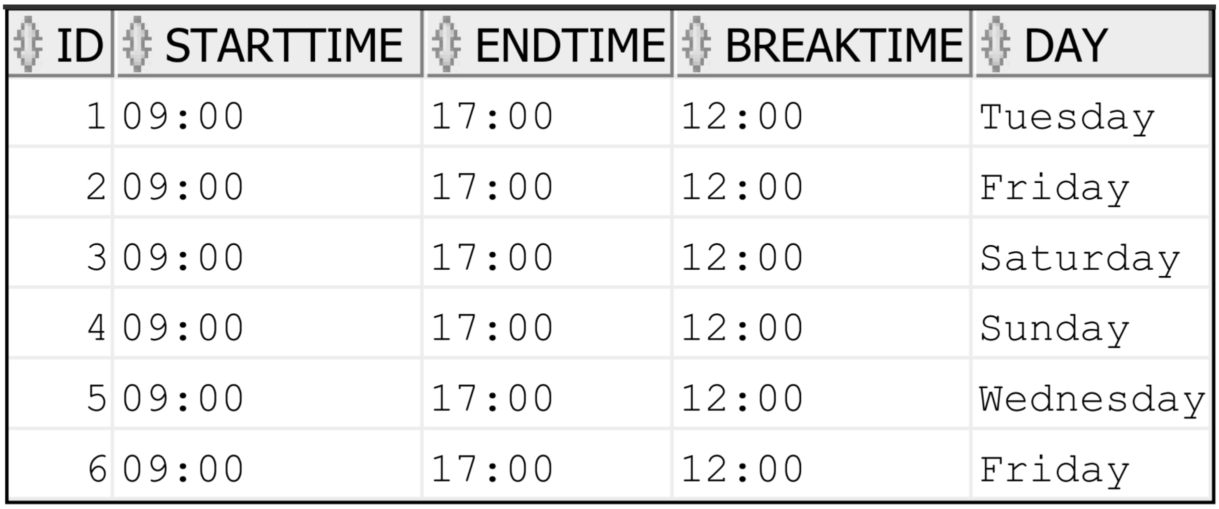
ID	DDATE	STARTTIME	ENDTIME	STATUS
1	18-04-22	09:00	10:00	Done
2	20-04-22	10:00	11:00	Done
3	23-04-22	14:00	15:00	Done

PatientsAttendAppointments Table:



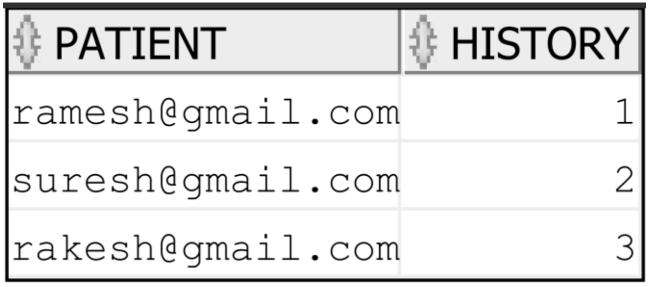
PATIENT	APPT	CONCERNS	SYMPTOMS
ramesh@gmail.com	1	none	itchy throat
suresh@gmail.com	2	infection	fever
rakesh@gmail.com	3	nausea	fever

Schedule Table:



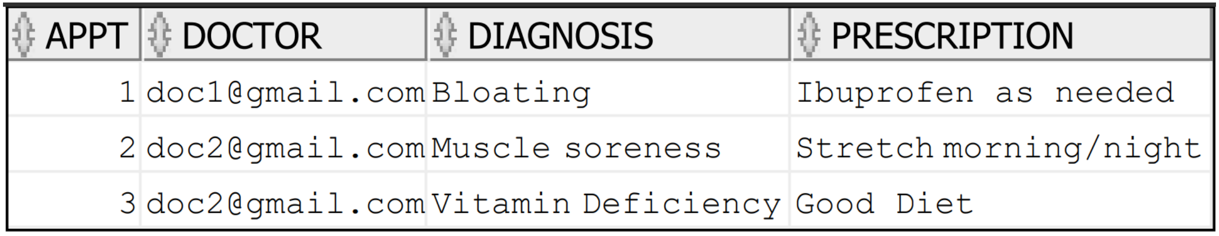
ID	STARTTIME	ENDTIME	BREAKTIME	DAY
1	09:00	17:00	12:00	Tuesday
2	09:00	17:00	12:00	Friday
3	09:00	17:00	12:00	Saturday
4	09:00	17:00	12:00	Sunday
5	09:00	17:00	12:00	Wednesday
6	09:00	17:00	12:00	Friday

PatientsFillHistory Table:



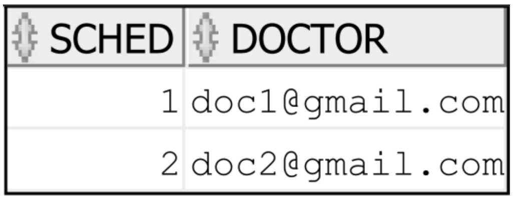
PATIENT	HISTORY
ramesh@gmail.com	1
suresh@gmail.com	2
rakesh@gmail.com	3

Diagnose Table:



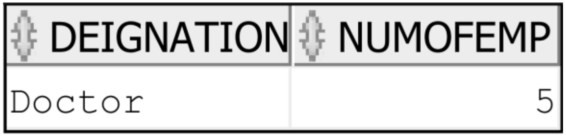
APPT	DOCTOR	DIAGNOSIS	PRESCRIPTION
1	doc1@gmail.com	Bloating	Ibuprofen as needed
2	doc2@gmail.com	Muscle soreness	Stretch morning/night
3	doc2@gmail.com	Vitamin Deficiency	Good Diet

DocsHaveSchedules Table:



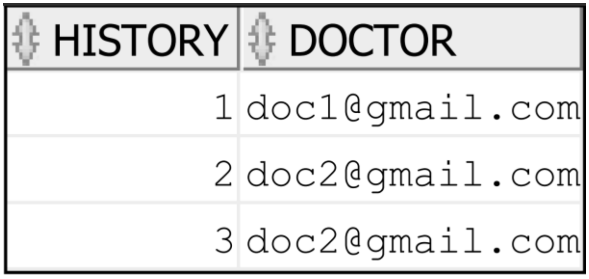
SCHED	DOCTOR
1	doc1@gmail.com
2	doc2@gmail.com

EmpDetails Table:



DEIGNATION	NUMOFEMP
Doctor	5

DoctorViewsHistory Table:



HISTORY	DOCTOR
1	doc1@gmail.com
2	doc2@gmail.com
3	doc2@gmail.com