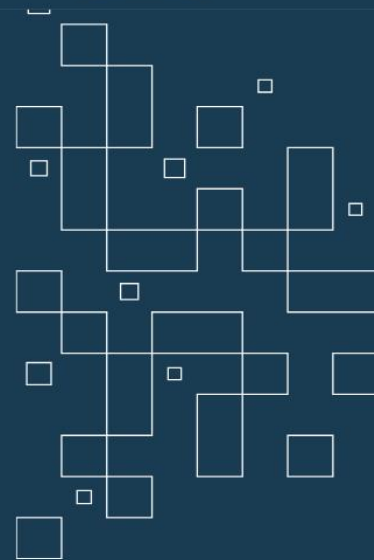




Final project

SYSTEM ANALYSIS PROJECT



Under the supervision of

Dr. Eman Abdel Rahim



20201491232	ابتسام حسن غانم الحلواني
20221440868	إيريني ماجد صبري
20201383007	أروى احمد محمد احمد
20201470332	فادي مالك ميخائيل
20201498752	سامر عادل كامل
20201448030	ناردين فيليب بولس زكاء
20201472663	سلمي فتحي محمد
20201371627	اسراء محمد عبد الهادي

Problem:

Patient Record Challenges: Difficulty in accessing comprehensive patient records, leading to delays in treatment and potential errors.

Appointment Scheduling Issues: Inefficient scheduling causing long waiting times for patients and potential overloading of certain doctors.

Inpatient Management Challenges: Inefficient allocation of hospital rooms, potential delays in admitting or discharging patients.

Objective and Information Requirements:

Objective:

Enhance patient care and streamline hospital operations.

Information Requirements:

- **Patient Information:** Full name, date of birth, gender, address, contact details.
- **Medical History:** Allergies, previous treatments, chronic conditions.
 - Appointment Details: Appointment date, time, Required specialization.
- **Doctor Information:** Name, specialization, contact details.
- **Treatment Records:** Details of procedures, medications prescribed, test results.
- **Admission Records:** Admission date, reason for admission.
- **Room Allocation:** Room number, type of room (e.g., private, shared), availability.
- **Patient Stay Details:** Daily updates on the patient's condition, administered treatments, meals.
- **Discharge Information:** Discharge date, reason for discharge.

Entity-Relationship Diagram Design:

1. Entities:

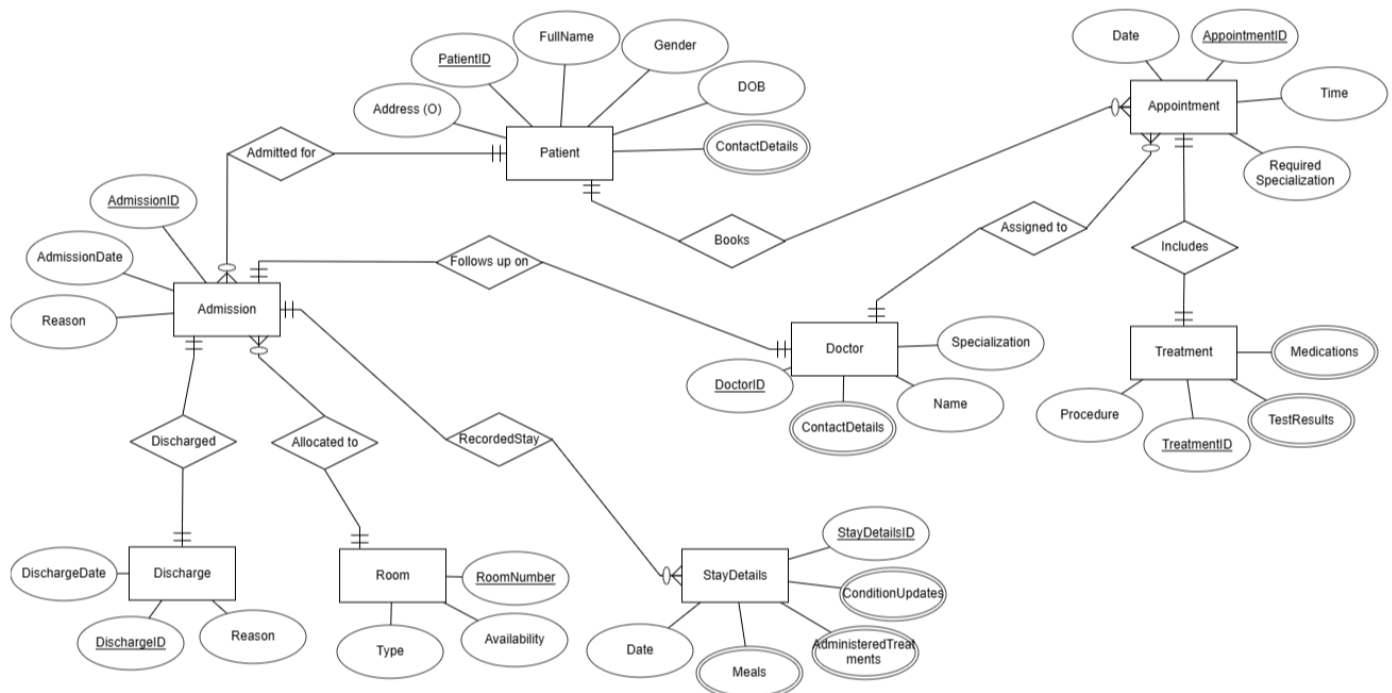
- **Patient** (PatientID, FullName, DOB, Gender, Address, ContactDetails)
- **Doctor** (DoctorID, Name, Specialization, ContactDetails)
- **Appointment** (AppointmentID, PatientID, DoctorID, Date, Time, RequiredSpecialization)
- **Treatment** (TreatmentID, AppointmentID, Procedure, Medications, TestResults)
- **Room** (RoomNumber, Type, Availability)
- **Admission** (AdmissionID, PatientID, DoctorID, RoomNumber, AdmissionDate, Reason)
- **StayDetails** (StayDetailsID, AdmissionID, Date, ConditionUpdates, AdministeredTreatments, Meals)
- **Discharge** (DischargeID, AdmissionID, DischargeDate, Reason)

2. Relationships:

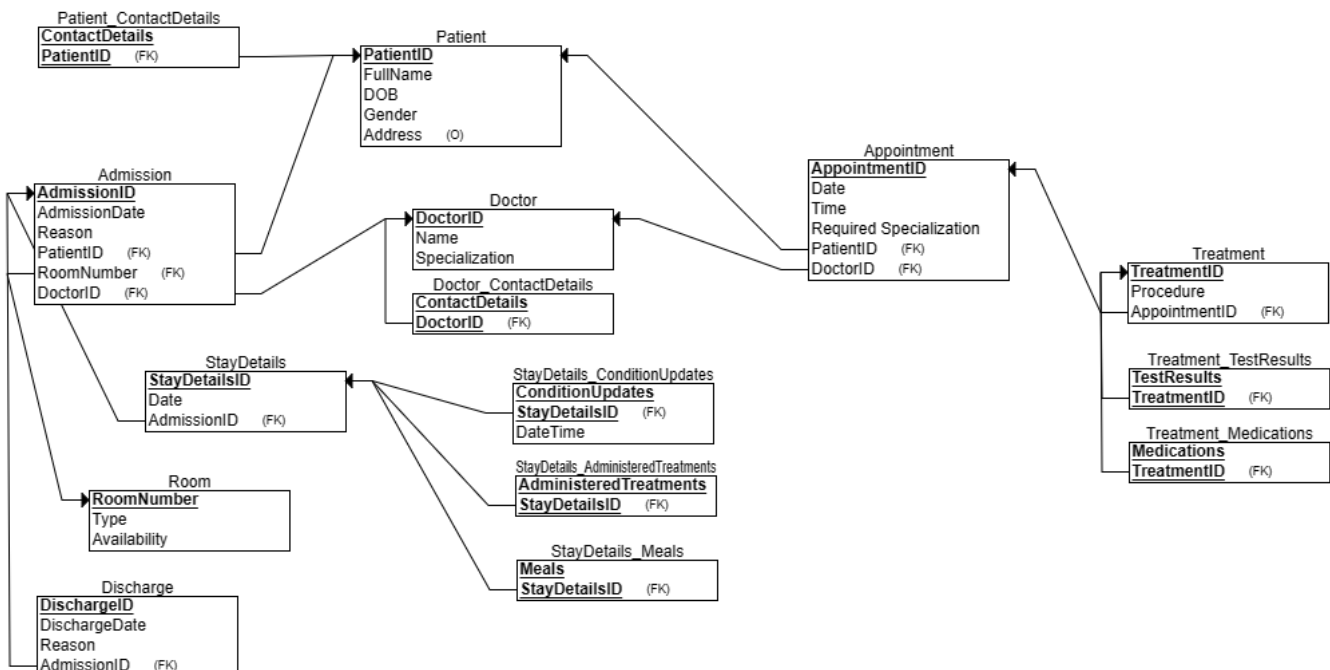
- **Patient-Appointment:** One-to-Many (A patient can have multiple appointments; an appointment is for one patient).
 - **Participation:**
 - Patient side: Mandatory (Each appointment must be associated with a patient).
 - Appointment side: Optional (A patient may not have appointments).
- **Doctor-Appointment:** One-to-Many (A doctor can have multiple appointments; an appointment is with one doctor).
 - **Participation:**
 - Doctor side: Mandatory (Each appointment is with one doctor).
 - Appointment side: Optional (A doctor may not have appointments).
- **Appointment-Treatment:** One-to-One (Each appointment corresponds to specific treatments).
 - **Participation:**
 - Appointment side: Mandatory (Each appointment corresponds to specific treatments).
 - Treatment side: Mandatory (Each treatment must be associated with an appointment).
- **Patient-Admission:** One-to-Many (A patient can have multiple admissions; an admission is for one patient).
 - **Participation:**
 - Patient side: Mandatory (Each admission is for one patient).
 - Admission side: Optional (A patient may not have admissions).
- **Room-Admission:** One-to-Many (A room can be associated with multiple admissions; an admission is for one room).
 - **Participation:**
 - Room side: Mandatory (Each admission is for one room).

- Admission side: Optional (A room may not be associated with admissions).
 - **Admission-StayDetails**: One-to-Many (An admission can have multiple stay details; a stay detail is for one admission).
 - **Participation:**
 - Admission side: Mandatory (Each stay detail is for one admission).
 - StayDetails side: Optional (An admission may not have stay details).
 - **Admission-Discharge**: One-to-One (Each admission corresponds to one discharge).
 - **Participation:**
 - Admission side: Mandatory (Each admission corresponds to one discharge).
 - Discharge side: Mandatory (Each discharge must be associated with an admission).
 - **Admission-Doctor Relationship**: One-to-One (the doctor who follows up on a patient's condition during their admission, Each admission corresponds to one doctor).
 - **Participation:**
 - Admission side: Mandatory (Each admission corresponds to one doctor).
 - Doctor side: Mandatory (Each doctor must be associated with an admission).
-

Entity Relationship Diagram (con't)



Relational database schema:



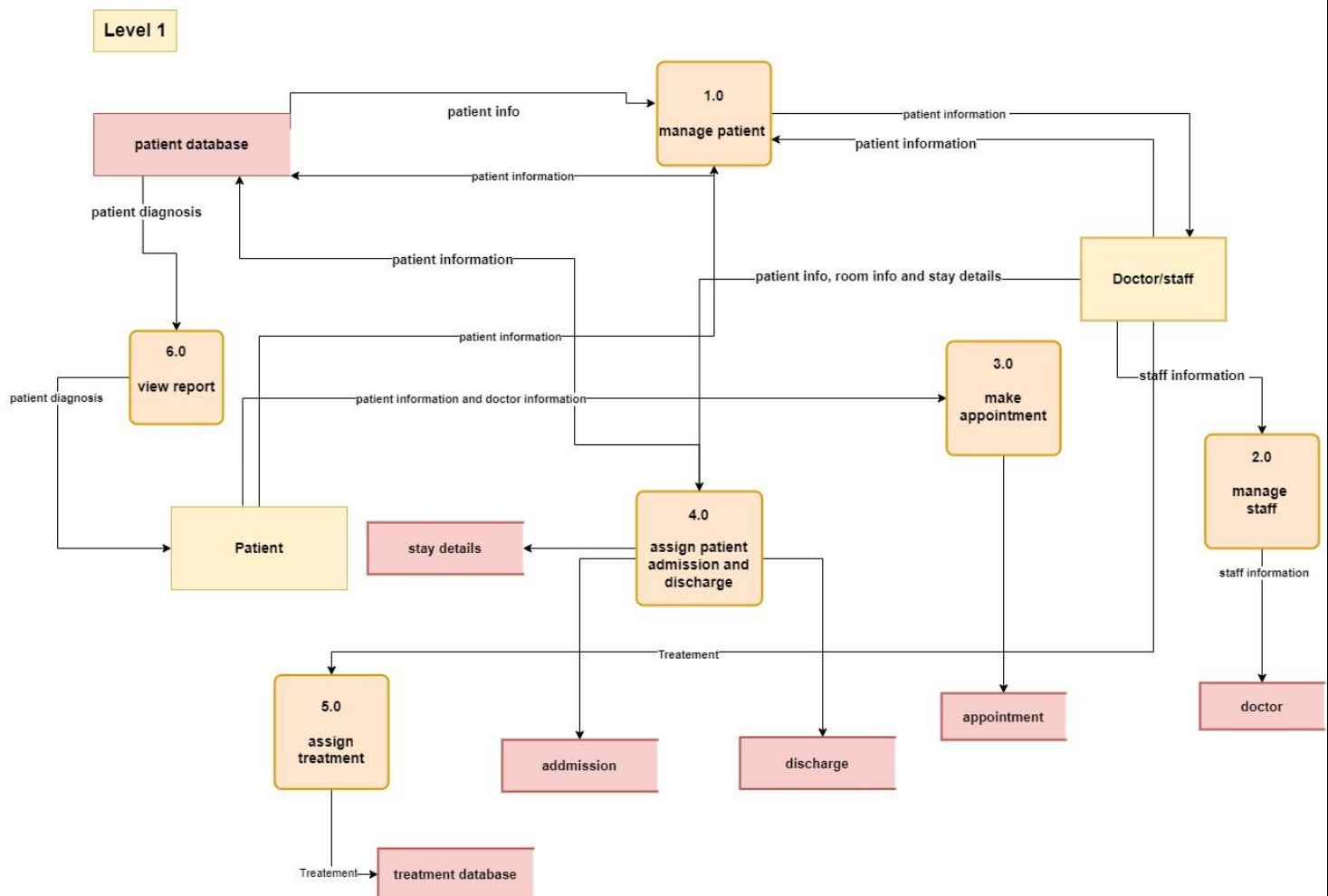
Data Flow Diagram (DFD):

Context Diagram:

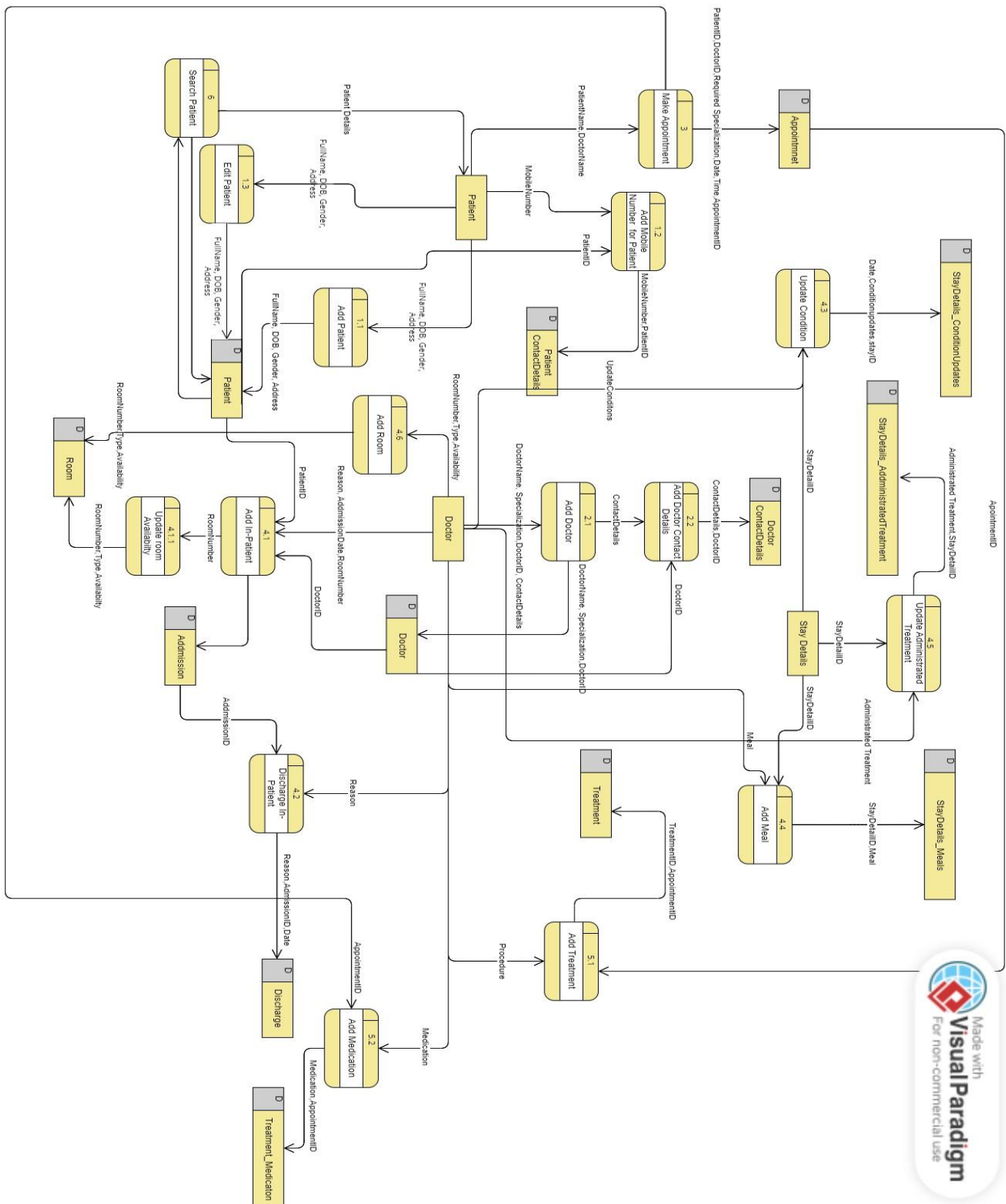
Context Level



Level 1:



Level 2:



Features:









Patient & Doctor:

- CRUD operations (create, read, update, delete)
- patient and doctor are human related values that will be in the system so we create an edit option for them because it might be changed
- you can detain (admit) the patient in a hospital room from patients page

Patients Information

Search for patients...

Search

ID	Full Name	Date of Birth	Gender	Address	Mobile Number	Action	Admission
29	hassan mohamed	Dec. 4, 2334	Male	dummy address 43124	4323423423423 +	  +	+
15	سامر حائل كامل ابراهيم	Jan. 2, 1999	Male	dummy address 43124dasds	No mobile numbers +	  +	+
36	xyz	Feb. 4, 2000	Male	dummy address	321312321312 +	  +	+
37	zyxx	Sept. 12, 2000	Female	dummy address 56ww	010321312321 , 321321312312321 +	  +	+



System Analysis Project



Add Patient Record

Full Name:

abcd

Date of Birth:

09/21/3333

Gender:

Female

Address:

dasdsa

Add Patient

Edit Patient

Full Name:

abcd

Date of Birth:

09/21/3333

Gender:

Female

Address:

dasdsa

Update

Multi valued mobile number

- there is an option to be more than one phone number for each patient/doctor

Add Number

Mobile Number

Add Number










Admission patient

- you can admit the patient from the patient page only
- from admission page you can discharge the patient or add staying details notes

Admission Information

Search for information...

Search

ID	Date	Reason	Patient	Room Number	Delete	Discharge	Stay Details
1	Dec. 14, 2023	injury	سامر عادل كامل ابراهيم	420			
3	Dec. 14, 2023	accident	hassan mohamed	425			
8	Dec. 15, 2023	injury	xyz	425			

Discharge patient (exit the hospital)

- from admission page only

Discharge Information

Search for information...

Search

ID	Date	Reason	Patient Name	Delete
1	Dec. 14, 2023	Death	سامر عادل كامل ابراهيم	
6	Dec. 15, 2023	recovered	hassan mohamed	
7	Dec. 15, 2023	finally dead	hassan mohamed	

Stay Details

- you can add stay details note from the admission page only
- “Administrated treatments” and “condition updates” and “meals” are multivalued attribute so it can be inserted more than once

Stay Details Information

[Home](#)

Search for information...

Search

ID	Date	Patient Name	Administered treatments	Condition updates	Meals	Actions
2	Dec. 15, 2023	سامر عادل كامل ابراهيم	+	+	+	
3	Dec. 15, 2023	سامر عادل كامل ابراهيم	+	+	+	
5	Dec. 15, 2023	xyz	+	+	+	

ID	Date	Patient Name	Administered treatments	Condition updates	Meals	Actions
2	Dec. 15, 2023	سامر عادل كامل ابراهيم	Dec 14, 2023 10:46 PM admin treatment 2	Dec 14, 2023 10:46 PM finally dead Dec 14, 2023 10:47 PM finally dead again	meal 4	
			Dec 14, 2023 10:46 PM dsad		meal 3	
			Dec 14, 2023 10:46 PM qweeqw			
			+	+	+	
3	Dec. 15, 2023	سامر عادل كامل ابراهيم	Dec 14, 2023 10:46 PM admin treatment 3 +	+	+	
5	Dec. 15, 2023	xyz	+	+	+	

Appointment

- you can admit the patient from the patient page only
- from admission page you can discharge the patient or add staying details notes

System Analysis Project



Appointment Information

Search for information...

Search

ID	Date	Time	Patient Name	Specialization	Delete	Add Treatment
3	Dec. 14, 2023	2:39 a.m.	سليم عادل كامل ابراهيم	Lol		
5	Dec. 14, 2023	2:42 a.m.	سليم عادل كامل ابراهيم	Oncology		
6	Dec. 14, 2023	2:42 a.m.	hassan mohamed	Oncology		

Add Appointment

Patient Name:

Doctor's Name:

Submit

Ibrahim

Ahmed

loay ibrahim

Mohame Ahmed Ibrahim

doctor x

Treatment

- you can add treatment from appointment page only
- medicine is multivalued so it can be inserted more than once from the plus sign

Treatments info

Search for information...

Search


ID	Procedure	Appointment	Medications	Delete	Add medications
5	procedure 2423	سليم عادل كامل ابراهيم Appointment	medicine 1 , medicine 2 , medicine 94234		
6	prof	سليم عادل كامل ابراهيم Appointment	medicine 2 , medicine 3 for treatment id number 6		
7	procedure 1234213	سليم عادل كامل ابراهيم Appointment	medicine 4		
8	lol 2	سليم عادل كامل ابراهيم Appointment	not medicine , medicine 4		
9	procedure 444	سليم عادل كامل ابراهيم Appointment	No medicines		
10	prof	سليم عادل كامل ابراهيم Appointment	No medicines		
11	procedure 2423	سليم عادل كامل ابراهيم Appointment	No medicines		

Room

Rooms Information

Search for rooms...

Search 


Room Number	Room Type	Room Available	Delete
425	double	False	
420	single	False	

Add Room

Room Number:

Room Type:

Availability:

Available 

Add Room 

Source code for sql For (insertion)

```
CREATE TABLE Patient
(
    PatientID INT NOT NULL,
    FullName VARCHAR(100) NOT NULL,
    DOB DATE NOT NULL,
    Gender CHAR(1) NOT NULL,
    Address VARCHAR(255),
    PRIMARY KEY (PatientID)
);

CREATE TABLE Doctor
(
    DoctorID INT NOT NULL,
    Name VARCHAR(100) NOT NULL,
    Specialization VARCHAR(255) NOT NULL,
    PRIMARY KEY (DoctorID)
);

CREATE TABLE Appointment
(
    AppointmentID INT NOT NULL,
    Date DATE NOT NULL,
    Time TIME NOT NULL,
    Required_Specialization VARCHAR(255) NOT NULL,
```


System Analysis Project



```
PatientID INT NOT NULL,  
DoctorID INT NOT NULL,  
PRIMARY KEY (AppointmentID),  
FOREIGN KEY (PatientID) REFERENCES  
Patient(PatientID),  
FOREIGN KEY (DoctorID) REFERENCES  
Doctor(DoctorID)  
);  
  
CREATE TABLE Treatment  
(  
TreatmentID INT NOT NULL,  
Proceduree VARCHAR(255) NOT NULL,  
AppointmentID INT NOT NULL,  
PRIMARY KEY (TreatmentID),  
FOREIGN KEY (AppointmentID) REFERENCES  
Appointment(AppointmentID)  
);
```

```
CREATE TABLE Room  
(  
RoomNumber INT NOT NULL,  
Type VARCHAR(50) NOT NULL,  
Availability BIT NOT NULL,  
PRIMARY KEY (RoomNumber)  
);
```

```
CREATE TABLE Admission  
(  
AdmissionID INT NOT NULL,
```

```
AdmissionDate  
DATE NOT NULL,  
Reason VARCHAR(255) NOT NULL,  
PatientID INT NOT NULL,  
RoomNumber INT NOT NULL,  
DoctorID INT NOT NULL,  
PRIMARY KEY (AdmissionID),  
FOREIGN KEY (PatientID) REFERENCES  
Patient(PatientID),  
FOREIGN KEY (RoomNumber) REFERENCES  
Room(RoomNumber),  
FOREIGN KEY (DoctorID) REFERENCES  
Doctor(DoctorID)  
);
```

```
CREATE TABLE StayDetails  
(  
StayDetailsID INT NOT NULL,  
Date DATE NOT NULL,  
AdmissionID INT NOT NULL,  
PRIMARY KEY (StayDetailsID),  
FOREIGN KEY (AdmissionID) REFERENCES  
Admission(AdmissionID)  
);
```

```
CREATE TABLE Discharge  
(  
DischargeID INT NOT NULL,  
DischargeDate DATE NOT NULL,  
Reason VARCHAR(255) NOT NULL,  
AdmissionID INT NOT NULL,
```

System Analysis Project



```
PRIMARY KEY (DischargeID),
FOREIGN KEY (AdmissionID) REFERENCES
Admission(AdmissionID)
);

CREATE TABLE Patient_ContactDetails
(
    ContactDetails VARCHAR(11) NOT NULL,
    PatientID INT NOT NULL,
    PRIMARY KEY (ContactDetails, PatientID),
    FOREIGN KEY (PatientID) REFERENCES
    Patient(PatientID)
);

CREATE TABLE Doctor_ContactDetails
(
    ContactDetails VARCHAR(11) NOT NULL,
    DoctorID INT NOT NULL,
    PRIMARY KEY (ContactDetails, DoctorID),
    FOREIGN KEY (DoctorID) REFERENCES
    Doctor(DoctorID)
);

CREATE TABLE Treatment_Medications
(
    Medications VARCHAR(225) NOT NULL,
    TreatmentID INT NOT NULL,
    PRIMARY KEY (Medications, TreatmentID),
    FOREIGN KEY (TreatmentID) REFERENCES
    Treatment(TreatmentID)
```

```
);

CREATE TABLE Treatment_TestResults
(
    TestResults VARCHAR(225) NOT NULL,
    TreatmentID INT NOT NULL,
    PRIMARY KEY (TestResults, TreatmentID),
    FOREIGN KEY (TreatmentID) REFERENCES
    Treatment(TreatmentID)
);

CREATE TABLE StayDetails_ConditionUpdates
(
    ConditionUpdates VARCHAR(255) NOT NULL,
    DateTime DATETIME NOT NULL,
    StayDetailsID INT NOT NULL,
    PRIMARY KEY (ConditionUpdates,
    StayDetailsID),
    FOREIGN KEY (StayDetailsID) REFERENCES
    StayDetails(StayDetailsID)
);

CREATE TABLE
StayDetails_AdministeredTreatments
(
    AdministeredTreatments VARCHAR(255) NOT
    NULL,
    StayDetailsID INT NOT NULL,
    PRIMARY KEY (AdministeredTreatments,
    StayDetailsID),
    FOREIGN KEY (StayDetailsID) REFERENCES
    StayDetails(StayDetailsID)
```

System Analysis Project



);

CREATE TABLE StayDetails_Meals

(

Meals VARCHAR(255) NOT NULL,

StayDetailsID INT NOT NULL,

PRIMARY KEY (Meals, StayDetailsID),

FOREIGN KEY (StayDetailsID) REFERENCES
StayDetails(StayDetailsID)

);

Source code for (insertion)

INSERT INTO Patient (PatientID, FullName, DOB,
Gender, Address)

VALUES

(1, 'John Doe', '1990-05-15', 'M', '123 Main
Street'),

(2, 'Jane Smith', '1985-08-22', 'F', '456 Oak
Avenue'),

(3, 'Bob Johnson', '1978-12-10', 'M', '789 Pine
Road'),

(4, 'Alice Brown', '1995-03-28', 'F', '101 Cedar
Lane'),

(5, 'Charlie Wilson', '1980-06-17', 'M', '202
Maple Drive');

INSERT INTO Doctor (DoctorID, Name,
Specialization)

VALUES

(1, 'Dr. Anderson', 'Cardiology'),

(2, 'Dr. Martinez', 'Orthopedics'),

(3, 'Dr. Davis', 'Pediatrics'),

(4, 'Dr. Lee', 'Dermatology'),

(5, 'Dr. Robinson', 'Neurology');

INSERT INTO Patient_ContactDetails
(ContactDetails, PatientID)

VALUES

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```
('01247859615', 1),  
( '01247411123', 2),  
( '01547823698', 3),  
( '01044789623', 4),  
( '01142578536', 5);
```

VALUES

```
(1, 'Cardiac Angiogram', 1),  
(2, 'Knee Replacement', 2),  
(3, 'Child Vaccination', 3);
```

```
INSERT INTO Doctor_ContactDetails  
(ContactDetails, DoctorID)
```

```
INSERT INTO Room (RoomNumber, Type,  
Availability)
```

VALUES

VALUES

```
('01245789665', 1),  
( '01547855236', 2),  
( '01547823665', 3),  
( '01044782235', 4),  
( '01044526987', 5);
```

```
(101, 'Single', 1),  
(102, 'Double', 1),  
(103, 'Single', 1),  
(104, 'Single', 1),  
(105, 'Double', 1);
```

```
INSERT INTO Appointment (AppointmentID,  
Date, Time, Required_Specialization, PatientID,  
DoctorID)
```

```
INSERT INTO Admission (AdmissionID,  
AdmissionDate, Reason, PatientID, RoomNumber,  
DoctorID)
```

VALUES

VALUES

```
(1, '2023-01-10', '10:00:00', 'Cardiology', 1, 1),  
(2, '2023-01-15', '14:30:00', 'Orthopedics', 2, 2),  
(3, '2023-02-01', '09:45:00', 'Pediatrics', 3, 3),  
(4, '2023-02-05', '11:15:00', 'Dermatology', 4,  
4),  
(5, '2023-02-20', '15:00:00', 'Neurology', 5, 5);
```

```
(1, '2023-01-11', 'Chest Pain', 1, 101, 1),  
(2, '2023-01-16', 'Joint Pain', 2, 102, 2),  
(3, '2023-02-02', 'Routine Checkup', 3, 103, 3),  
(4, '2023-02-06', 'Skin Condition', 4, 104, 4),  
(5, '2023-02-21', 'Neurological Issue', 5, 105, 5);
```

```
INSERT INTO Treatment (TreatmentID,  
Procedure, AppointmentID)
```

```
INSERT INTO StayDetails (StayDetailsID, Date,  
AdmissionID)
```

VALUES

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```
(11, '2023-01-11', 1),  
(12, '2023-01-16', 2),  
(13, '2023-02-02', 3),  
(14, '2023-02-06', 4),  
(15, '2023-02-21', 5);
```

```
INSERT INTO Discharge (DischargeID,  
DischargeDate, Reason, AdmissionID)
```

VALUES

```
(1, '2023-01-20', 'Recovered', 1),  
(2, '2023-01-25', 'Successful Surgery', 2),  
(3, '2023-02-10', 'Routine Discharge', 3),  
(4, '2023-02-14', 'Recovered', 4),  
(5, '2023-03-05', 'Stable Condition', 5);
```

```
INSERT INTO Treatment_Medications  
(Medications, TreatmentID)
```

VALUES

```
('Aspirin', 1),  
( 'Painkillers', 2),  
( 'Vaccine', 3);
```

```
INSERT INTO Treatment_TestResults  
(TestResults, TreatmentID)
```

VALUES

```
( 'Normal', 1),
```

```
( 'Successful', 2),
```

```
( 'Passed', 3);
```

```
INSERT INTO StayDetails_ConditionUpdates  
(ConditionUpdates, DateTime, StayDetailsID)
```

VALUES

```
( 'Stable', '2023-01-12', 11),  
( 'Improving', '2023-01-18', 12),  
( 'Healthy', '2023-02-03', 13),  
( 'Recovering', '2023-02-07', 14),  
( 'Stable', '2023-02-22', 15);
```

```
INSERT INTO  
StayDetails_AdministeredTreatments  
(AdministeredTreatments, StayDetailsID)
```

VALUES

```
( 'Medication A', 11),  
( 'Physical Therapy', 12),  
( 'Vitamin Injection', 13),  
( 'Biopsy Procedure', 14),  
( 'MRI Scan', 15);
```

```
INSERT INTO StayDetails_Meals (Meals,  
StayDetailsID)
```

VALUES

```
( 'Breakfast', 1),
```

System Analysis Project



('Lunch', 1),
('Dinner', 1),
('Breakfast', 2),
('Lunch', 2),
('Dinner', 2),
('Breakfast', 3),
('Lunch', 3),
('Dinner', 3),
('Breakfast', 4),
('Lunch', 4),
('Dinner', 4),
('Breakfast', 5),
('Lunch', 5),
('Dinner', 5);