Project Title: Hospital Management System Database

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Table of Contents

Section I: Product Summary

There is a hospital named First Choice Hospital and they focus on treating people with all kinds of illnesses. They are a hospital that treat their patients, employees, and partners as family. They need a database to keep their Employees', patients', and hospital's general data. The hospital decides to use EDB database to manage their data. When a Hospital is registered with EDB they are able see their Employees' data such as their name, date of birth, address, experience, department(s), role(s), and seniority level such as a intern, supervisor, manager, medical student, head of department, medical director, etc. When a patient uses First Choice Hospital they either login as returning patient or new patient. If they are a new patient, a receptionist creates a Patient Profile for them. If they are a returning patient they are able to log in with the patient_id.

EDB Database makes sure all their patients' and employees' data is organized and structured for any new changes the company wants to add. EDB also ensures that any data saved is secure for both Employees and Patients. For example, only an Employee that is a Doctor can prescribe medication to a Patient and save it to the system because this requires a permission only a Doctor ca n give.

Also an Employee who is Director can make changes to a Department with the Director

Permissions. Only a Manager and a Director can hire and remove employees from a department. These permissions ensure that any important decisions made at First Choice Hospital are made by an Employee who has these required permissions.

Section II: Use Cases

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1) Steve Wilson is the president of First Choice hospital and he is looking for a database management system. He decides to use EDB database and decides to register his hospital with EDB. Steve enters the hospital's name, president, address, phone number(s), and directors. At this step Steve can set up root admin permissions for his directors for each department which is the highest level of permissions in the EDB database. Steve knows that Directors have root admin privileges and can give admin permissions to supervisors and managers for certain departments in First Choice Hospital.
2) Lesly Otrega was assigned by Steve as the Director from the emergency department. As the director, Lesly can hire employees, remove employees, and promote employees to become managers or supervisors.
3) John is a new patient with First Choice Hospital and is registered as a patient by the receptionist. John's information like his first name, last name, phone number, emergency contacts, address, date of birth, and medical insurance are inserted into EDB and a profile is created for him. John is also assigned a Doctor for each of his appointments.
4) Jane is a manager of the emergency department. As manager Joe can hire and register new employees such as receptionists, janitors, nurses, and doctors.

5) Jessica is a Doctor in the emergency department besides attending patients with Procedures, she has permissions to prescribe patients to medications.
6) Bob is a returning patient to First Choice Hospital, he is able to update his emergency contact or any of his personal information on his Patient Profile and reach out to his Doctor for any questions. Bob also has a medical record of all his appointments and procedures over the years.

Section III: Database Requirements

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1) Hospital:
    a) A Hospital shall create one Account
    b) A Hospital shall have many Departments
    c) A Hospital shall have many Employees
    d) A Hospital shall have many Patients
    e) A Hospital shall have many Addresses
    f) A Hospital shall have many phone numbers
    g) A Hospital has many Health Insurance

2) Account
    a) An Account belongs to one and only on Hospital

3) Employee
    a) An Employee belongs to only one Hospital
    b) An Employee shall have only one Profile
    c) An Employee shall have at least one Permission
    d) An Employee shall work for at least one Department
    e) An Employee shall have atleast one Health Insurance
    f) An Employee shall have at least one address
    g) An Employee will have one seniority level
    h) An Employee is a Doctor
    i) An Employee is a Nurse
    j) An Employee is a Director
    k) An Employee should have at least one Phone Number

4) Patient
    a) A Patient shall have only one Profile
    b) A Patient belongs to one or many Hospitals
    c) A Patient shall have at least one phone numbers
    d) A Patient shall have at least one Emergency Contact
    e) A Patient shall have at least one Address
    f) A Patient shall have one or many Appointments
    g) A Patient shall have at least one Doctor

h) A Patient shall have at least one Nurse
i) A Patient shall have at least one Procedures
j) A Patient shall have one to many Health Insurance
k) A Patient shall have only one Medical Record
l) A Patient shall have only one Room
m) A Patient shall need at least one medical prescription

5) Address
   a) An Address shall belong to one Hospital
   b) An Address shall belong to many Employee
   ~~c)~~ An Address belongs many Patients

6) Department
   a) A Department belongs to only one Hospitals
   b) A Department shall have many Employees

7) Phone Number
   a) A phone number belongs to one Hospital
   b) A phone number belongs to many Employees
   c) A phone number belongs to many Patient

8) Emergency Contact
   a) Belongs to many Patients

9) Procedures
   a) A Procedures shall have many Patients
   b) A Procedure shall have belong to many Doctors
   c) A Procedure shall belong to many Nurses
   d) A shall have many appointments

10) Doctors
   a) A Doctor shall have only one Employee Profile
   b) A Doctor shall have at least one Permission
   c) A Doctor shall have at least one Patient
   d) A Doctor shall have at least one Appointment
   e) A Doctor shall have at least one Procedures
   f) A Doctor shall have at least one Room

11) Nurses
   a) A Nurse is an Employee
   b) A Nurse shall have many Patients
   c) A Nurse shall have one Employee Profile
   d) A Nurse shall have at least one Permission
   e) A Nurse shall have at least one Procedure
   g) A Nurse shall have at least one Appointment
   h) A Nurse shall have at least one room

12) Director
   a) A director shall direct at least one departments
   b) A director shall work for only one hospital
   c) A director is a Employee
   d) A director shall have at least one permission
   e) A director has only one employee profile

12) Profiles
   a) A Profile shall belong to only one Patient(check,)
   b) A Profile shall belong to only one Employee(check,)
   c) A Profile is a Employee Profile
   d) A Profile is a Patient Profile

13) Health Insurance
   a) Health Insurance belongs to many Patients
   b) Health Insurance belongs to many Employees
   c) Health Insurance shall belong to many Hospitals

14) Medical Records
   a) A Medical Record shall one Patients

15) Room
   a) A Room shall have many Patients
   b) A Room shall have many Appointments
   c) A Room shall have many Nurses
   d) A Room shall have many Doctor (add)

16) Appointments
   a) An Appointment shall belong to only one Patient
   b) An Appointment shall belong to only one Room
   c) An Appointment shall have at least one Procedure involved
   d) An Appointment shall have at least one Doctor
   e) An Appointment shall have at least one Nurse

17) Medical Prescription
   a) A medical prescription shall belong to many patients
   b) A medical prescription shall require only one doctor permission

18) Permissions
   a) An Permission shall belong to many Employees

19) Seniority Level
   a) A seniority level belongs to many Employees

Section IV: Main Entities, Attributes and Keys

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1. Hospital (Strong)
    a. hospital_id: key, numeric
    b. name: alphanumeric
    c. account: weak key, numeric
    d. directors: weak key, numeric (don’t need)
    e. departments: weak key, numeric
    f. employees: weak key, numeric
    g. patients: weak key, numeric
    h. addresses: weak key, numeric
    i. phone numbers: weak key, numeric
2. Account (Weak)
    a. account_id: key, numeric
    b. date: multivalue, timestame
3. Employee (Weak)
    a. employee_id: key, numeric
    b. hospital: weak key, numeric
    c. type: alphanumeric
    d. first_name: alphanumeric
    e. middle_name: alphanumeric
    f. last_name: alphanumeric

g. date_of_birth: alphanumeric
h. address: weak, numeric
i. profile: weak, numeric
j. permission: weak, numeric
k. department: weak, numeric
l. health insurance: weak, numeric
m. seniority_level: weak, numeric
n. phone_number: weak, numeric

4. Patient (Weak)
    a. patient_id: key, numeric
    b. first_name: alphanumeric
    c. middle_name: alphanumeric
    d. last_name: alphanumeric
    e. patient_profile: weak, numeric
    f. hospitals: weak, numeric(own Table)
    g. phone number: weak, numeric(Own Table)
    h. emergency contact: weak, numeric(do)
    i. addresses: weak, numeric
    j. appointment(fix)
    k. doctor: weak, numeric (do)
    l. nurse
5. Address(Strong)

   a. address_id: key, numeric
   b. street_address: alphanumeric
   c. state: alphanumeric
   d. city: alphanumeric
   e. zip_code: numeric
   f. employee(review): weak, numeric
   g. patients: weak, numeric

6. Department(Strong)
   a. department_id: key, numeric
   b. name: alphanumeric
   c. hospital: weak, numeric
   d. employees: weak, numeric
7. Phone Number (Strong)
   a. phone_number_id: key, numeric
   b. number: composite, alphanumeric
   c. hospital : weak, numeric
   d. employee: weak, numeric
   e. patient: weak, numeric
8. Emergency Contact (Strong)
   a. emergency_contact_id: key, numeric
   b. first_name: alphanumeric
   c. middle_name: alphanumeric

   d. last_name: alphanumeric
   e. relationship: alphanumeric
   f. patient: weak, numeric

9. Procedures (Strong)
   a. procedure_id: key, numeric
   b. type: alphanumeric
   c. description: alphanumeric
   d. patient: weak, numeric(table)
   e. doctor: weak, numeric(table)
   f. nurse: weak, numeric(table)
   g. appointment: weak, numeric(table)
10. Doctors (Weak)
   a. doctor_id: key, numeric
   b. first_name: alphanumeric
   c. middle_name: alphanumeric
   d. last_name: alphanumeric
   e. hospital: weak, numeric
   f. employee_profile: weak, numeric
   g. permission: weak, numeric
   h. patient: weak, numeric
   i. appointment: weak, numeric
   j. procedure: weak, numeric

11. Nurses (Weak)
    a. nurse_id: key, numeric
    b. first_name: alphanumeric
    c. middle_name: alphanumeric
    d. last_name: alphanumeric
    e. hospital: weak, numeric
    f. patient: weak, numeric
    g. employee_profile: weak, numeric
12. Director(Weak)
    a. director_id: key, numeric
    b. first_name: alphanumeric
    c. middle_name: alphanumeric
    d. last_name: alphanumeric
    e. phone_number: weak, numeric
    f. address: weak, numeric
    g. permissions: weak, numeric
13. Profiles(Weak)
    a. profile_id: key, numeric
    b. type: alphanumeric
14. Employee Profile(Weak)
    a. employee_profile_id: weak
15. Patient Profile

a. patient_profile_id: weak

16. Health Insurance(Strong)
    a. health_insurance_id: key, numeric
    b. name: alphanumeric
    c. type: alphanumeric
17. Medical Records(Strong)
    a. Medical_record_id: key, numeric
    b. patient: weak, numeric
    c. description: alphanumeric
18. Room (Strong)
    a. room_id: key, numeric
    b. room_number: numeric
    c. patient: weak, numeric(no need)
    d. appointment: weak, numeric
19. Appointment (Weak)
    a. appointment_id: key, numeric
    b. date: multivalue, timestamp
    c. description: alphanumeric
    d. procedure: weak, numeric
    e. patient: weak, numeric
20. Medical Prescription (Strong)
    a. medical_prescription: key, numeric

b. title: alphanumeric

c. date: multivalue, timestamp

d. description: alphanumeric

e. type: alphanumeric

21. Seniority Level (Strong)

a. role_id: key, numeric

b. title: alphanumeric

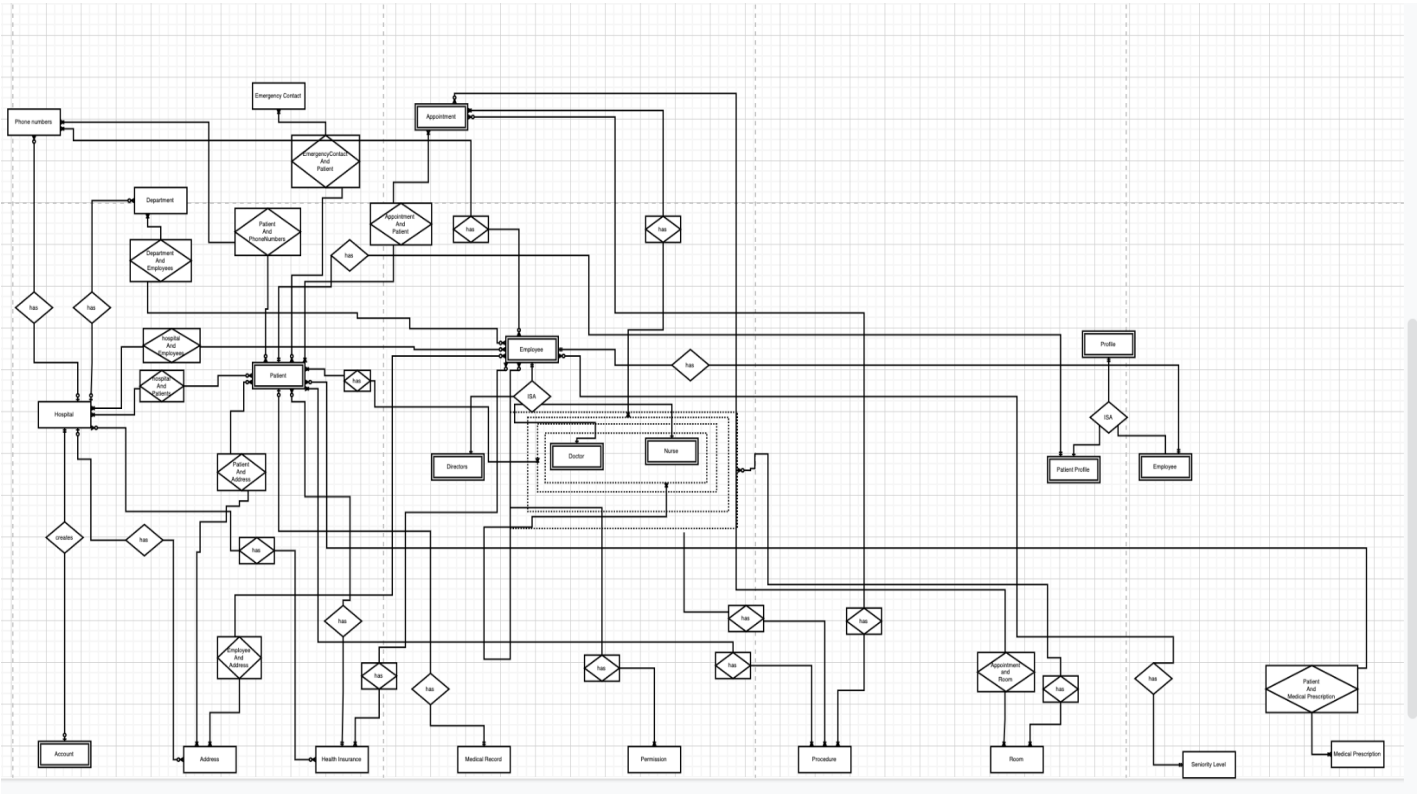
c. date: multivalue, timestamp

d. description: alphanumeric

e. permission: weak, numeric

f. employee: weak, numeric

Section V: ERD



Section VI: Database Model/EER

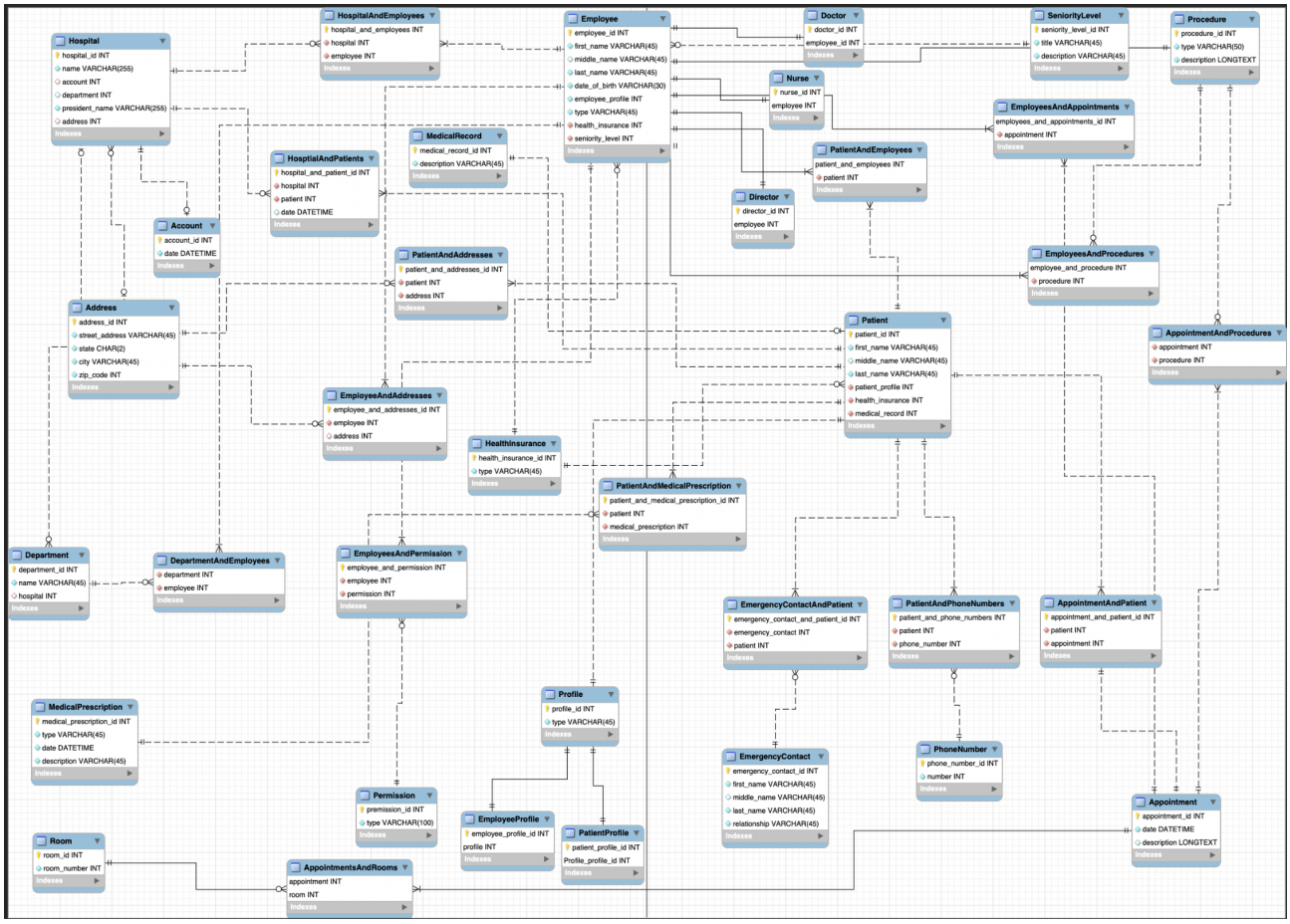


Table	FK	On Delete	On Update	Comment
Account	none	none	none	None becauseAccount will be referenced by one Hospital
Address	none	none	none	None because Address will be referenced by a middle table
Appointment	none	none	none	None because Appointment will be referenced by middle table
AppointmentAndPatient	patient	Cascade	Cascade	If a patient is deleted or updated from the root table Patient. Then the middle table should be cascade as well
AppointmentAndPatient	appointment	Cascade	Cascade	If an Appointment is deleted/updated from the root table Appointment. Then the middle table should be cascade.
AppointmentAnsProcedures	appointment	Cascade	Cascade	If an Appointment is deleted/updated it should be reflected on the middle table
AppointmentAnsProcedures	procedure	Cascade	Cascade	If a Procedure is deleted/updated it should be reflected in the middle table
AppointmentsAndRooms	appointment	Cascade	Cascade	If an Appointment is deleted/updated it should reflect the middle table because if anyone looks up a Room the updated Room with Appointment should be reflected
AppointmentsAndRooms	room	Cascade	Cascade	If a room is deleted or updated the appointment should get effected
Department	hospital	Cascade	Cascade	A department is unique to only one hospital therefore, if a hospital is deleted/updated the Department should go along with it.
DepartmentAndEmployees	department	Cascade	Cascade	This table is part of the many to many relationship and if a

				department is deleted/updated the employees working there should get effected(fix this)
DepartmentAndEmployees	employee	Cascade	Cascade	If a customer is deleted/updated that row should be deleted/updated
Director	employee	Cascade	Cascade	A Director is a child of Employee table and if the parent table Employee gets updated/deleted with the same employee fk, then the director table should get effected
Doctor	employee	Cascade	Cascade	A Doctor is a child of Employee table so it is part of the Employee table
EmergencyContact	none	none	none	Emergency contact has a many-to-many relationship
EmergencyContactAndPatient	patient	Cascade	No Action	If a patient is updated then it should reflect in the middle table. But if a patient is deleted then the emergency contact should remain because it could be used for another patient
EmergencyContactAndPatient	emergency_contact	Cascade	Cascade	If an emergency contact is updated/deleted it should effect the rest of the EmergencyContactAndPatient table
Employee	health_insurance	Cascade	Cascade	If a healthInsurance is deleted the Employee should have a value of set null because we dont want to delete him, this needs to be fixed
Employee	seniority_level	Cascade	Cascade	If a seniority level gets updated or deleted it should effect the employee
EmployeeAndAddresses	employee	Cascade	No Action	If an employee gets deleted we want to keep the address is this

				table because other employees may live there. But if there is an update it should effect this table
EmployeeAndAddresses	address	Cascade	Cascade	If address is deleted then we want to make sure it is removed from the table
EmployeeProfile	profile	Cascade	Cascade	This is a child table of the Profile table so it should be on cascade for both
EmployeesAndAppointments	employees_and_appointments	Cascade	Cascade	If an appointment is removed or updated it should be updated on this table
EmployeesAndAppointments	employee	Cascade	Cascade	If an employee gets deleted/updated this table should be effected as well
EmployeesAndPermissions	employee	Cascade	Cascade	If an employee gets deleted/updated this table should be effected as well
EmployeesAndPermissions	permission	Cascade	Cascade	If a permission gets updated/deleted it should effect this table
HealthInsurace	none	none	none	Other tables will refer to this table's pk
Hospital	account	Cascade	Cascade	If an account gets deleted/updated it will effect the hospital table.
Hospital	address	Cascade	No Action	If a address gets deleted the Hospital can still exisit in our Hospital table
HospitalAndEmployees	hospital	Cascade	No Action	If a Hospital gets removed the employee should be removed as well, needs to be fixed
HospitalAndEmployees	employee	Cascade	Cascade	If an employee gets removed this middle table should get removed as well
HospitalAndEmplo	hospital	Cascade	No Action	If a hospital gets

yees				deleted/removed it should effect this middle table
HospitalAndInsurances	health_insurance	Cascade	Set Null	If a health insurance gets deleted it set it to null for the hospital because the hospital is Independent from the health insurace
HospitalAndInsurances	hospital	Cascade	Cascade	If a hospital gets deleted/removed it should directly effect this middle table
HospitalAndPatients	hospital	Cascade	No Action	If a hospital gets deleted/removed it should removed the patient from the table because they can still use the patient's data
HospitalAndPatients	patient	Cascade	No Action	If a patient is deleted/updated it has no direct impace on the hospital
MedicalPrescription	none	none	none	Other tables refer to this table's pk
Medical Record	none	none	none	Other tables refer to this table's pk
Nurse	employee	Cascade	Cascade	Nurse is a child table of employee
Patient	patient_profile	Cascade	Cascade	If the profile gets updated/deleted the patient goes along with it
Patient	health_insurance	Cascade	No Action	If the health insurance is removed it the patient does not have to be removed from the system
Patient	medical_record	Cascade	No Action	If a medical record is deleted/removed it does not have to affect the Patient
PatientAndAddresses	patient	Cascade	No Action	If the patient is removed it doesnt not need to remove the addresses

PatientAndAddresses	address	Cascade	No Action	If the address is removed it does not need to remove the patient
PatientAndEmployees	patient_and_employees	Cascade	Cascade	If the employee is removed/deleted it should remove it from this middle table
PatientAndEmployees	patient	Cascade	Cascade	If the patient is removed it should remove it on this table as well
PatientAndMedicalPrescription	patient	Cascade	No Action	If the patient is removed the medical record should stay in the system
PatientAndMedicalPrescription	medical_prescription	Cascade	Cascade	If the medical record is deleted the patient should be deleted from this table as well
PatientAndPhoneNumbers	patient	Cascade	No Action	If the patient is deleted, the phone number should be kept because it could be other people's number
PatientAndPhoneNumbers	phone_number	Cascade	No Action	If the phone number is deleted the patient should stay
Patient Profile	Profile_profile_id	No Action	No Action	This should be fixed it should delete the profile of either an employee or patient
Permission	none	none	none	Tables will refer to this table's pks
Phone Number	None	none	none	Tables will refer to this table's pks
Procedure	none	none	none	Tables will refer to this table's pks
Profile	none	none	none	Tables will refer to this table's pks
Room	none	none	none	Tables will refer to this table's pks
SeniorityLevel	none	none	none	Tables will refer to this table's pks

Section VII: Testing Table

Entity	SQLQuery	Pass/Fail	Error Description	Possible Solution
Hospital	Update	pass	none	none
Hospital	Delete	fail	None, but doesn't delete from Hospital table	none
Employee	Update	pass	none	none
Employee	Delete	pass	none	none
Address	Update	pass	none	none
Address	Delete	pass	none	none
Appointment	Update	pass	none	none
Appointment	Delete	pass	none	none
Department	Update	pass	none	none
Department	Delete	pass	none	none
HealthInsurance	Update	pass	none	none
HealthInsurance	Delete	pass	none	none
MedicalPrescription	Update	pass	none	none
MedicalPrescription	Delete	pass	none	none
MedicalRecord	Update	pass	none	none
MedicalRecord	Delete	pass	none	none
Patient	Update	pass	none	none
Patient	Delete	pass	none	none
Permission	Update	pass	none	none

Permission	Delete	pass	none	none
PhoneNumber	Update	pass	none	none
PhoneNumber	Delete	pass	none	none
Profile	Update	pass	none	none
Profile	Delete	pass	none	none
Room	Update	pass	none	none
Room	Delete	pass	none	none
SeniorityLevel	Update	pass	none	none
SeniorityLevel	Delete	pass	none	none