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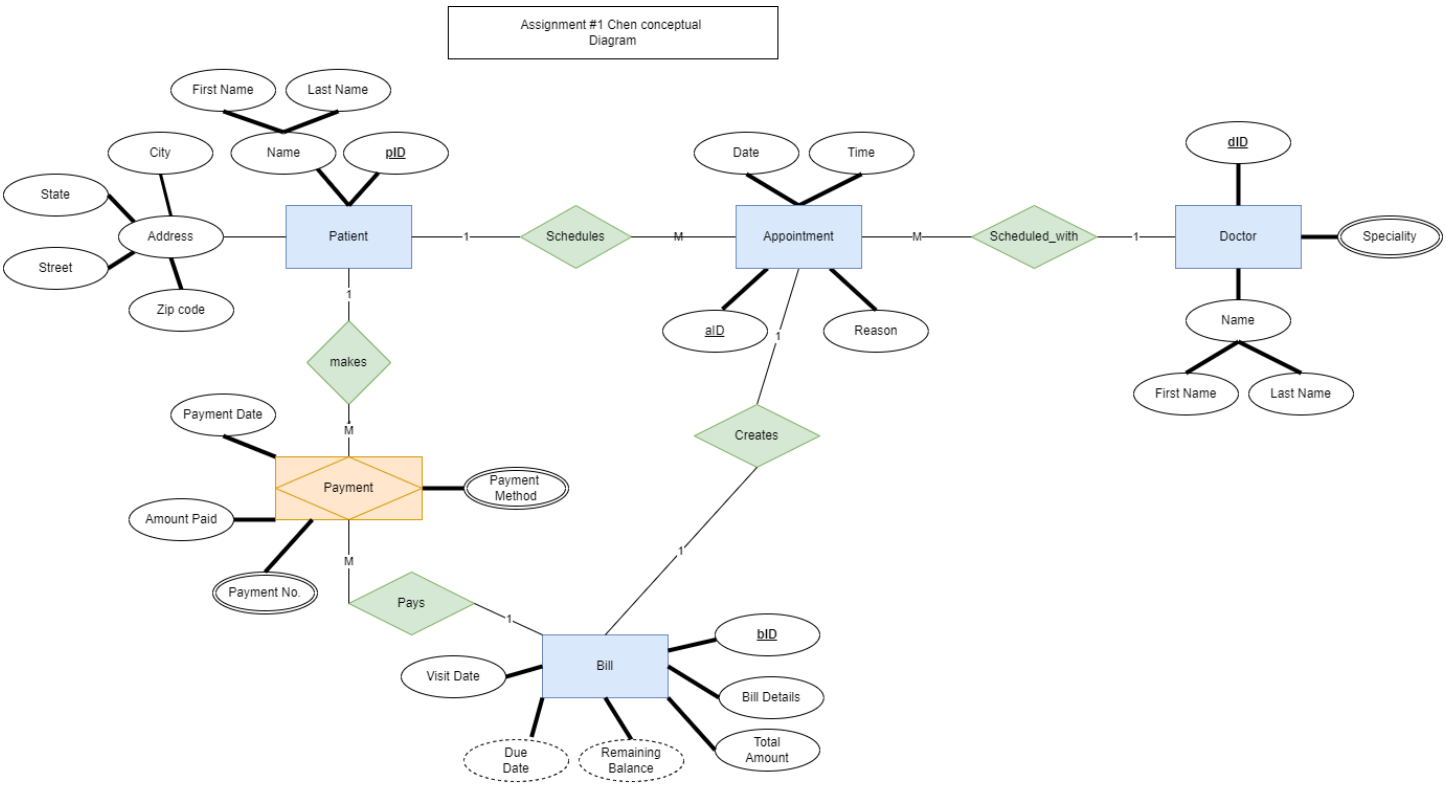
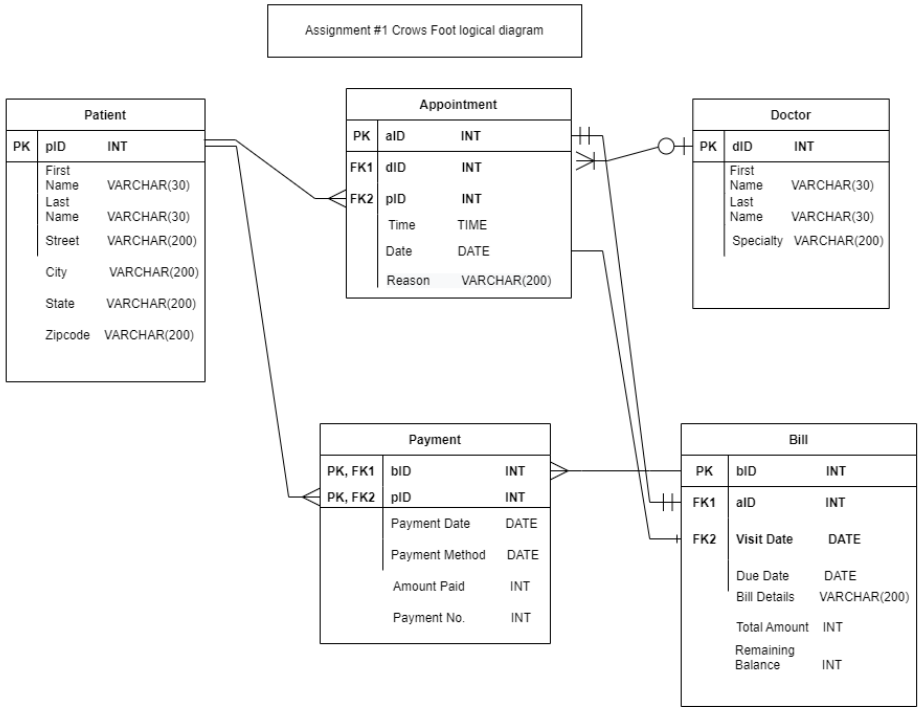

Assignment #1 Chen conceptual Diagram
First Name
Last Name
Name
City
pID
State
Address
Street
Zip code
Patient
1
Schedules
M
Date
Time
Appointment
M
Scheduled_with
1
dID
Doctor
Speciality
Name
First Name
Last Name
aID
Reason
1
makes
M
Payment Date
Payment
Payment Method
Amount Paid
Payment No.
M
Pays
1
Creates
1
bID
Visit Date
Bill
Bill Details
Total Amount
Due Date
Remaining Balance


Assignment #1 Crows Foot logical diagram
Patient
PK pID INT
First Name VARCHAR(30)
Last Name VARCHAR(30)
Street VARCHAR(200)
City VARCHAR(200)
State VARCHAR(200)
Zipcode VARCHAR(200)
Appointment
PK aID INT
FK1 dID INT
FK2 pID INT
Time TIME
Date DATE
Reason VARCHAR(200)
Doctor
PK dID INT
First Name VARCHAR(30)
Last Name VARCHAR(30)
Specialty VARCHAR(200)
Payment
PK, FK1 bID INT
PK, FK2 pID INT
Payment Date DATE
Payment Method DATE
Amount Paid INT
Payment No. INT
Bill
PK bID INT
FK1 aID INT
FK2 Visit Date DATE
Due Date DATE
Bill Details VARCHAR(200)
Total Amount INT
Remaining Balance INT

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# ERD Modeling

1. Identify entities
    a. Patient
    b. Doctor
    c. Appointment
    d. Bill
    e. Payment (associative entity)
2. Remove duplicate entities
    a. None
3. List the attributes of each entity
    a. Patient
        i. Patient ID, name(First, Las and address (City, State, Zip code)
    b. Doctor
        i. Doctor ID, name(First, Last) and specialty
    c. Appointment
        i. Appointment ID, Patient ID, Doctor ID, date, time, and reason
    d. Bill
        i. Bill ID, visit date, due date (25 days after visiting data), total amount, remaining balance, bill details (assume it is a general summary of treatments during the visit
    e. Payment (associative entity)
        i. Patient ID, Bill ID, payment date, amount paid, payment method (cash, card, check), Payment No.
4. Mark the primary keys
    a. PK are underlined in #3
5. Define the relationships
    a. Schedule (Patient, Appointment)
    b. Scheduled_with (Appointment, Doctor)
    c. Creates (Appointment, Bill)
    d. Makes (Patient, Payment)
    e. Pays (Payment, Bill)
6. Describe the cardinality and optionality of the relationships
    a. 1:M – A Patient (schedules) many appointments
    b. M:1 – Many appointments (scheduled_with) one and only one doctor
    c. 1:1 – An Appointment (creates) one Bill
    d. 1:M – A Patient (makes) multiple payments
    e. M:1 – Many payments (pays) a Bill
7. Remove redundant relationships
    a. None

Notes:

1. Patient and Doctor entity Name is a composite attribute so I split it into First and Last name since it is easier to look up in a query.
2. Patient entity Address is a composite attribute so I split it into City, State, Street and Zip code since it is easier to look up in a query.

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3. Appointment entity Appointment ID primary key was created for Bill tracking since an appointment generates the bill. If a patient sees Doctor A and Doctor B the same day (however, this would be rare), then this is where appointment ID can differentiate bills. Due to the ID attribute, Appointment is an entity.
4. Payment is an associative entity.
5. Payment associative entity Date is a foreign key for Bill entity Visit Date.
6. Bill entity Due Date is a derived attribute since it takes visit date and adds 25 days.
7. Bill entity Remaining Balance is a derived attribute since it will be deducing amount paid from payment.
8. Payment associative entity Payment method is a multivalued attribute since selection can be card, credit or cash or a combination.
9. Payment associative entity Payment No. is the nth number of payments. This is a derived attribute. This helps maintain the uniqueness of each bill. This is a foreign key for Bill entity.
10. Doctor Entity Specialty attribute is a multivalued attribute since specialty can be one or more specialties.

Assumptions:

1. There is no storage limitations.
2. There is no performance requirements.