Structural Database Rules

Account Signup Use Case
1. The program will ask the user to create an account when it first open
2. The user will specific either a pharmacist account, a technician account, or none of these account
3. The program will ask for the location of the pharmacy verification system file
4. The program will ask if it's ok to pull data from the pharmacy verification system

From this use case, there are entities such as the program, pharmacy verification system, and the user. From current stand point, only the account is interacting with the database. An account is needed for the database to continue.

Rule #1:

An account is a pharmacist account, a technician account, or none of these.

Automatic Prescription Data Extraction Use Case
1. When a written, electronic, or any other prescription is billed for a medication
2. The program detects a prescription was billed, it will automatically pull only the necessary data from the pharmacy.

There is a lot of datapoints in this use case. There is the pharmacy, the prescription, the drug, and the patient that each prescription is associated. Even though each prescription will have patient's name on it, I will make it into an entity, because there would might be other information that's not on a prescription (e.g. patient address, date of birth, allergies…).

The program will track what prescription is billed as well as the drug is associated with. Since each account can bill prescriptions, the following rule can be created:

Rule#2:

A prescription is billed by a pharmacy. A pharmacy can bill one or more prescription.

This rule indicates that a prescription is billed only thru a pharmacy. This is true in modern day pharmacy, without getting into all the exceptions, a prescription is generally billed from a pharmacy once it is received. The pharmacy itself can bill many prescriptions, but it's not a requirement. There might be some days when all the doctor offices are close or simply if there are no prescriptions to bill. Thus, it's not mandatory that a pharmacy have to bill.

Rule#3:

A pharmacy is associate with one or more accounts. An Account is associated with a pharmacy.

A pharmacy can have multiple accounts, because multiple different staffs can create their own accounts within the pharmacy. It is mandatory to have at least one account, since the program will not proceed until an account is made. Each account is associated with one pharmacy since the user that made the account works for that pharmacy. Thus, an account can only exist if there is a pharmacy.

Rule #4

Each Prescription can be associated with a drug. Each drug is associated with one or more prescription.

Legally a prescription should only contain 1 item. But it doesn't have to be a drug, since sometimes doctors can write for other stuff (tests, directions, equipments…etc). A drug is on one or more prescriptions since doctors can write the same drug for patients.

Rule #5
A pharmacy can have to one or more patient. A patient can belong to one or more pharmacy.

This is true in the real world, a pharmacy can have more many patients if it's established many years ago. A pharmacy can also have no patient if it just open. A patient can choose which pharmacy they want to participate in. They can have multiple pharmacies or just one pharmacy.

Rule#6
A prescription has one patient. A patient can have one or more prescriptions.

Since there is a patient entity and a prescription entity, it's natural that these two should share a relationship. Depending on the state law, most prescriptions belongs to one patient. A prescription would not be valid if there is no patients at all, so it's a requirement that a prescription has a patient name on them. However, a patient can have multiple prescription since a patient can be on multiple drugs or no drug at all. The patient can solely exist but the doctor have not prescribed anything yet.

Rule #7
A prescriber can prescribe one or more prescription. A prescription is prescribed from a prescriber.

A prescriber would describe anyone that has prescription privileges.A prescriber can prescribe multiple prescription, one or more for each condition. A prescriber does not have to prescribe, sometimes we can store prescriber's information in anticipation of their prescriptions. Only prescriptions from valid prescriber would be consider legal, so it's a mandatory requirement. When a prescription is prescribed from a prescriber, it's consider to be signed by that prescriber. Thus, a prescription would not need to be signed by more than one prescriber.

Rule #8
A prescriber has one or more patient appointment. A patient is appointed to one or more prescriber.

For our purposes, a prescriber would have to care for at least one patient thus would have a patient appointment. They would not be prescribers if they do not provider care for anyone. A patient is under the care of at least one prescriber and would have appointments with them. They would not be patients themselves if they are not under a prescriber's care. Of course, they can have multiple prescriber appointment multiple conditions.

Rule #9
A patient has a payment method. A payment Method belongs to one or more patient.

A patient will have a payment method, even though if it's not insurance. A patient does not have to have insurance, patients without insurance often pay cash. But when a patient does have insurance, it usually one active insurance. There are instances where a patient will have a secondary insurance to pick up the rest of the cost, but for this program, I would only be interested in their primary insurance. A primary insurance insures one or more patients. I made it into mandatory on both side, because a patient has to have a payment method, a pharmacy does not give out free drugs. If the pharmacy might not have any patient on a particular insurance yet, then it will default to 'CASH' method.

Rule #10
A pharmacist verifies one or more prescription. A prescription is verified by a pharmacist

This rule was made to assign a pharmacist to a particular prescription. A pharmacist's job is to verify or sign off on prescription to validate that everything is accurate and correct. They can verify more than one prescription, thus I made it to mandatory plural. A prescription should definitely be verified by a pharmacist. Even though a prescription can be verified by more than one pharmacist, I will still make it into singular, because it would be a waste of resources for multiple pharmacist verifying the same prescription.

Automatic Inventory Data Extraction Use Case
1. Whenever a drug is stocked/de-stocked from the pharmacy as incoming inventory or outgoing inventory <u>and</u> the medication already exist inside the database
2. The program detects a change in inventory, and add/subtracted from its inventory as well

This use case involves drug and the pharmacy.

Rule# 11
A Pharmacy stocks one or more drug. A drug can be stock by one or more pharmacy.

A proper pharmacy should have more than one drug in their inventory. Also, it should be a mandatory that a pharmacy has drug, because it would not be a proper pharmacy if there is no drug in the pharmacy at all. On the flip, a drug can be stock by one or more pharmacies. Multiple pharmacies can have the same drug in their inventory. A drug can also be in no pharmacies, because it's on backorder.
I choose the word 'Stock', because when the pharmacy receives drug, it stocks it's inventory, when it takes drug out of the pharmacy, it de-stocks it's inventory.

Automatic Medication Pick Up Use Case
1. Whenever a medication is marked as picked up in the pharmacy verification system
2. The program detects a picked up has been made and will deduct that quantity from the drug inventor, quantity dispense, and records the date that it was picked up into the database.

Rule#12
A prescription can be picked up by someone. A person can pick up multiple prescription.

The drug and the person is the entity here. Usually in a pharmacy only 1 person is needed to pick up a drug, even though a group of can show up. But for simplicity sake, only 1 person is needed to the pick up of a drug. A drug can be picked up or else it would be returned to the inventory. In the person's perspective, he/she can pick up multiple drug if he/she chooses to.

Automatic Drug Fill Par Level Use Case

1. User defines the percentage of billed medication should be filled
2. User defines the percentage of billed medication should be saved as reserve
3. User defines over how many days the rest of the unfilled billed medication should be filled
4. The program will determines how much of the current drug inventory level can be used to fill the billed drugs today
5. The program will determines how much of the current inventory should be saved as reserves
6. The program determines how much of drug will be filled in the future
7. The program determines how much of the drug needs to be purchase to sustain the target fill rate for the future

      The steps here are all mathematical operations done by the program. The end result of these math operations can change, thus does not need to be stored. They only need to be derived from our inputs.

Automatic Drug Price Tracking

1. Whenever a drug price is updated, the program will automatically record the new price, the old price, and the date that it was updated.

Rule #13
A drug can have one or more price change. A price change is associated with a drug.

The entity here is drug and price change. A drug can have a price change, it is optional because a drug can stay the same price forever. Also, a drug's price can change more than once, because multiple vendor may have different prices and they can try to lower their prices to compete with each other. Conversely, a price change must be associated with a drug (mandatory). There will be no price change if there is no drug in the first place. It is also a singular relation, because only one price change needs to happen to a drug at one point in time.