Requirements

1. **Prescriptions**: Most of the medicines in pharmacy will be given only if you have a valid prescription. A prescription can be either signed paper from a doctor/nurse or it can be a computer order(through an electronic medical record system). Once it is on the record, pharmacy can legally sell the medicines.
2. **Orders**: One prescription can mention multiple refills mentioned for medicines with it (up to 12 months of medicine). The refill quantity is the maximum that a patient is allowed to purchase. The patient can choose to purchase less. Each order will have a payment associated with it. There can be multiple payments in case the patient is insured. A part of payment will be covered by the insurance company and the rest by patient.
3. **Medicines (stock)**: The medicines may be either over the counter (don't need prescription), Rx (to be sold with prescriptions only) or restricted/addictive (require pre-authorization from insurance company, pharmacy may verify the authorization with insurance company). In case of restricted medicine, only limited quantities can be sold to customer (not more than 2-3 months worth in total orders for a prescription). Each medicine has a batch number, manufacturer and expiry date. Once a medicine has expired, it has to be disposed off safely. It will no longer be available for sale. If the expiry date is before the patient's recommended dose(patient is buying for a month, medicine expires in less than a month), it can't be sold as well. Medicine can be disposed off by either incinerating it or handing over to a company licensed to dispose medicine.
4. ~~**Notifications**: Once a patient has submitted a prescription for refilling, it takes 20-30 minutes for order to be ready. When it is ready, a notification can be sent. Email/Phone number of patient + preferences have to be collected the first time they visit the pharmacy and be associate with that customer. Notification is also sent if a customer bought hasn't completed the medicines in the prescription (purchased for first month in a 2 prescription, then didn't come back after one month).~~
5. **Medication Synchronization**: a patient can choose to pick up their medication for whole month on a specific day. This saves them time as the medicines will be kept ready in advance. However, customer needs a credit card on the record for this to work. The number of medicines won't be allowed to exceed the amount specified in prescription.
6. ~~**Risk Identification**: Customers who purchase sensitive/restricted medicines are automatically added to MTM (medication therapy management) system and if they do not complete medication or do not return for future doses, notifications can be sent to them and their doctor (data obtained from prescription) can be contacted.~~

7. **Patient Records**: Once a patient has purchased medicines, their SSN is recorded in the database along with name, billing address, delivery address, phone number are kept on the record. They can optionally add a credit card/debit card to allow medication synchronization.

Based on these, we can have following entities:

1. **Customer**: customer has first name, middle name, last name, billing address (composite), address, SSN, gender. Optionally, they can have an email or phone number on the record along with an alert notification preference. A customer can add a credit/debit card, have prescriptions associated with them, notifications that are generated for them.
2. **Employees**: Employees have same attributes as customers. Additionally, they have a salary (hourly amount), position (Pharmacist, CPhT (Certified Pharmacy Technician), cashier), work start date, work end date. CPhTs work directly under a Pharmacist. They usually dispense medicine to customers. Pharmacists need a state license in all states to work at a pharmacy. This will be required to be stored as an attribute (can assume that it is a number like SSN). A PharmD student can also work temporarily as a clerk for 1-2 years at a pharmacy to get experience.
3. **Third Parties**: They can be relatives of customers or other entities like a medicine disposal company, insurance company, doctor/hospital or supplier. They will have address, a system generated ID, contact name, phone and email.
4. **Prescriptions**: a prescription has patient name, doctor name, address, medicines along with quantity. Each prescription is given a unique ID by the system.
5. **Medicines/Stock**: Each medicine has a batch number, expiry date, price and type. It can be prescription, non-prescription (over the counter) or controlled (limited quantity).
6. **Order**: each order is tied to a prescription. There can be multiple orders for a single prescription but overall quantity of sold medicine has to be less than or equal to that in the prescription.
7. **Payment**: Payments are stored separately from each order as one order can have multiple payments. (one from insurance, one from customer. Or even a customer paying through 2 different methods for same order)
8. ~~**Audit Trail**: When a medicine expires, it has to be safely disposed. The method of disposal (handed over to a certified third party for disposal or incineration), batch number, quantity and date has to be recorded.~~
9. ~~**Notification**: Each notification will be generated for a specific patient and prescription. It can either be a pickup reminder, refill reminder (if a patient is about to run out of medicines based on what they purchased).~~
10. ~~**MTM Records**: A patient purchasing restricted drugs is automatically entered into Risk Identification database. If they do not~~

~~return for refill or do not complete medication course, alerts can be generated for the concerned doctor (third party) or hospital.~~

ER Diagram