ECE467 Database Design & Management
CSC423 Database Systems

Case Study: Drug Prescription Refill System

Develop a drug prescription refill system to assist a pharmacist in filling prescriptions. You need to specify the assumptions that are used in your design, if there is any.

A customer brings a prescription to a pharmacy to have it filled. The pharmacy assigns an number to each prescription and files it. Prescriptions expire one year after they are written but are held at a pharmacy for five years. A customer may have many active prescriptions. A prescription is a dated, written order for a drug compound issued for a customer by a physician. Information on a prescription must include a unique prescription number, a single specification of the compound, quantity, instructions, and others. Information about a physician/pharmacist includes the name, address, and license number. Information of a customer includes the name, address, tax number, date of birth, and telephone of the customer.

A compound is a particular form, size, and strength of a drug or combination of drugs produced by a particular manufacturer. Compounds may be purchased through distributors. The manufacturer and distributor has a unique company number, name, and address. There may be various compounds of a drug. A compound may have secondary ingredients besides the drugs, which are the primary ingredients. A compound may have a brand name assigned by the manufacturer, such as Tylenol, MetroGel 0.75%, or Retin-A Gel 0.025%. The strength is the concentration or amount of a drug in a given compound. Thus, the compound MetroGel 0.75% has a 0.75% concentration or metronidazole. In the case of pills, strength is the amount of the drug in the compound, expressed in grams.

The prescription must specify instructions the customer should follow in taking the compound, even if the instructions are simply "take as directed." If a prescription does not have instructions, the pharmacist may call the doctor and will typically add notes on the original prescription. The physician may optionally provide a diagnostic code for the purpose of the prescription. The pharmacist can use the diagnostic code to verify that the compound is being taken for an appropriate condition. For example, if a medication for high blood pressure was prescribed with a diagnostic code for low blood pressure, the pharmacist might check with the doctor. A prescription may optionally include a number of refills, diagnostic identifier, route of administration, and an indication to fill generically or as written. Each compound has default instructions and a route of administration, which the pharmacist might check against the specifications of the doctor. A physician may check one or two boxes on the prescription, either "fill generically" or "fill as written." Fill generically can save money by allowing a generic substitution for a specified compound. Fill as written indicated that the physician believes that a particular compound is needed and has an advantage over the generic compound. The prescription has an authorized number of refills, each of which must be tracked. For simplicity, this system can treat the first filling of the prescription as a refill. Each refill is handled by a pharmacist.

The system should assist with the following tasks:

- Manage information about customers and refill prescriptions.
- Verify that the drug is appropriate for the condition being treated.
- Track the number of refills left and expiration of the prescription.