

Project Proposal

We would like to build an Android app that manages medication information and reminders for its users. This will include the following features:

- A simple UI that allows the user to enter medication information, including name, dose, and time(s) to take it.
- Automatic import of general information about the drug, including drug interactions, side effects, and warnings.
- Specific pill images connected with the drug name, for example, pills for children vs. adults
- Customizable reminders
 - Daily reminders to take medicine
 - Monthly reminders to refill medicine
 - Scheduled reminders for doctor appointments/tests
 - Customized design for elderly patients, with "read-out-loud" reminder, instead of simple alarm feature
- Daily checklist, with alerts if the user misses something
- Possible interaction with pharmacies, such as texting for a refill
 - At least store phone number of local pharmacy to call from app.

We feel this would be a useful application for people who have to manage several medications. Forgetting to take a daily medication or refill a prescription can have detrimental health effects, and this app could be a simple way to help users stay healthy.

We found some apps that have similar functions, but none that accomplish everything we hope to with our app. A summary of these apps is below:

	Remind To Take Medicine	Remind To Refill	Drug Database	Prescription Info	Contact Pharmacy	Checklist
Pill Reminder	Y	N	N	N	N	N
Dosecast	Y	Y	Y	N	N	N
Medisafe	Y	Y	N	N	N	N
Medicine Time!	Y	N	N	N	N	N
Med Helper	Y	Y	N	N	Y	Y

For ease of development, we are planning to make this app for Android smartphones. Our initial thoughts for the database structure are listed in the next section, and some sample SQL and its output are included as separate files.

We discussed this proposal with Dr. Yang, who approved the initial concept. Some concerns brought up were:

- Inexperience developing smartphone apps
 - Discussed app vs. website, but we felt having it directly on a smartphone would be more convenient and work better for the goals we want to accomplish
 - We're currently researching Android app development
- Plausibility of interaction with pharmacies
 - Limitations to how much we can interact with private information
 - Some pharmacies (e.g. Target) allow refills via text, which could be utilized.
 - Otherwise, we can store their numbers for calling from the app.
- Where drug information would come from
 - Online databases: rxlist.com, MedlinePlus.gov, drugs.com...

Our Current Progress

1. Basic Android app set up, being able to interact on smart phones



2. Extracting raw data from online databases (Interaction and Toxicity Table)

3. Setting up local database, but will try to implement a server database interaction if time permits

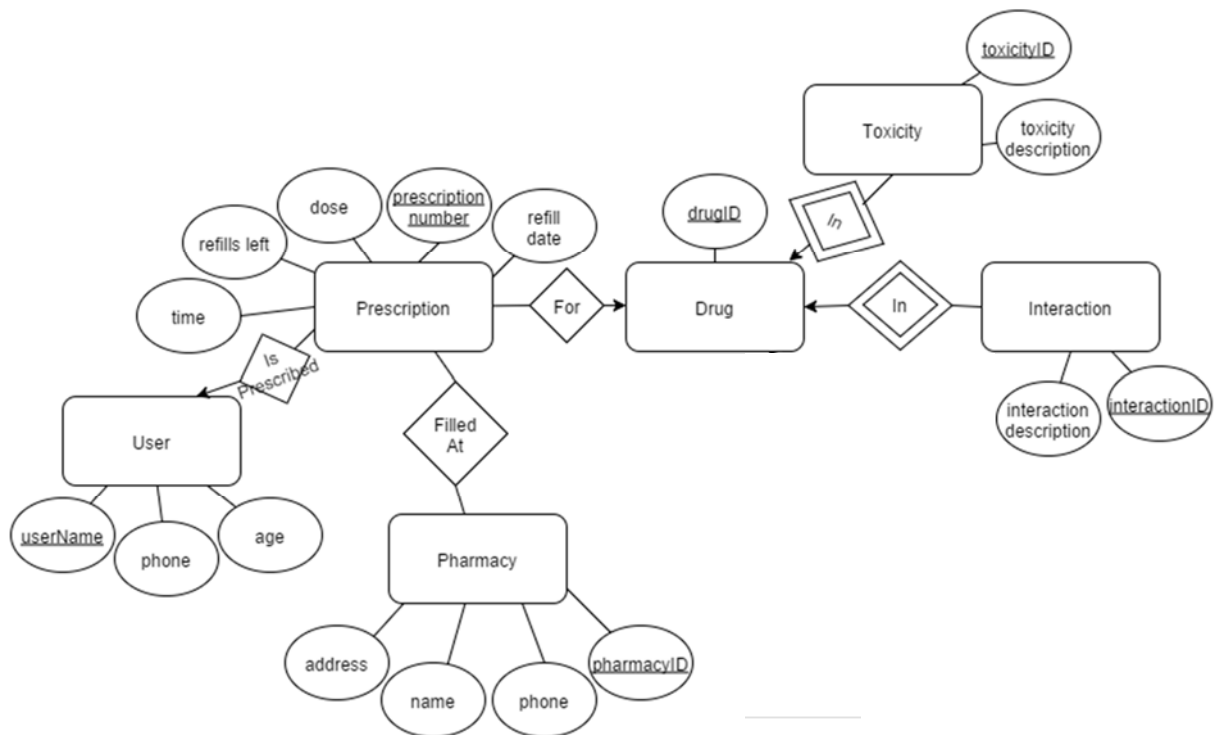
4. Modifying E/R diagram and SQL design

5. Connecting local database with the app

Important Schedule

1. Being able to access and update database using server
2. Importing pill images database(optional, if we can find the database and time permits)
3. Setting up text reminders and voice reminders(optional)
4. Adding Generic Name and Product Name of drugs
5. Modifying app's database design

Database Design



(all pointers in the diagram means many-to-one relationship)

1. The user has unique user name (the name which he/she registers in the app). Users can choose to link the account with their Google/Facebook account, instead of creating a new one. We also request phone number and age from each user.
2. Users are given a prescription for a specific drug. A user can have multiple prescriptions. Prescription holds the personal information associated with the drug and specific user. The prescription number is unique for the specific user using the specific type of drug. We also add refill date and refills left (how many refills remain for the given prescription before a doctor needs to prescribe more) as Prescription attributes to remind the user. Moreover, "dose" and "time" save more detailed information of how much dose to take at what particular time, for example, once per morning.

3. Drugs are stored as generic information which are not associated with personal information. The name of the drug is unique. We create two other tables (Toxicity and Interaction) to store more information associated with drugs. Because the two tables all borrow Drug table's key (drugID), they are weak entity sets.
4. Prescriptions are filled at pharmacies. Pharmacies may have same name but we specify that their Pharmacy ID is unique. We also request each pharmacy's phone number and address.

E/R Diagram

p.s. in the schema below, some design has been changed in last minute; please refer to our SQL design

User(userName, userPhone, age)

Prescription(prescriptionNumber, dose, refillDate, refillsLeft, time)

Pharmacy(pharmacyID, pharmacyName, pharmacyPhone, address)

Drug(drugID)

Toxicity(drugID, toxicityID, toxicityDescription)

Interaction(drugID, interactionID, interactionDescription)

UserIsPrescribedPrescription(userName, prescriptionNumber)

PrescriptionForDrug(prescriptionNumber, drugID)

PrescriptionFilledAtPharmacy(prescriptionNumber, pharmacyID)

(Further modification:

1. merge *UserIsPrescribedPrescription* and *PrescriptionForDrug* and *PrescriptionFilledAtPharmacy* into *Prescription*
2. merge *Toxicity* and *Interaction* and into *Drug*

)

Users(userName, userPhone, age)

Prescription(prescriptionNumber, dose, refillDate, refillsLeft, time, userName, drugID, pharmacyID)

Pharmacy(pharmacyID, pharmacyName, pharmacyPhone, address)

Drug(drugID, toxicityID, interactionID, toxicityDescription, interactionDescription)

i.e., all relations are in BCNF