COMP-SCI 470: Introduction to Database Management Systems

1. Identification of the relations (entity types).
   - Pharmacy - contains information of drugs, doctors, patients, etc.
   - Pharmacy_company - contains information of each drug, formula, product name
   - Doctors - contains information of personal info and experience
   - Patients - contains personal information along with prescription
   - Prescription - contains information about prescription distributed
   - Drug - contains information of the formula of the drug
   - Selling_products
   - supervisor - contains information of each supervisor that manages each contract of the pharmacies
   - Contract - contains information for the contracts between pharmaceutical companies and pharmacies

2. Identification of relationship types and their participation and cardinality constraints.

- Each Patient **has** a doctor
  - Each patient is prescribed a drug by a doctor(1:*)(Mandatory)

- Doctors **prescribe** patients
  - Each doctor must have at least one patient(1:*)(Mandatory)
  - Each doctor can prescribe one or more prescriptions to patients(*:*)(Mandatory)

- Each drug produced by pharmaceutical companies
  - Each drug must have a trade name and formula(1:1)

- Pharmaceutical companies **contract** with pharmacies
  - Each pharmaceutical company can contract with multiple pharmacies(1:*)(mandatory)

Pharmacies **sell** prescriptions drugs for doctors to prescribe
  - Each pharmacy can contract with multiple pharmaceutical companies(1:*)(Mandatory)
  - Each pharmacy has different prices for drugs(1:1)

3. Identification of attributes and association of attributes with entity or relationship types.

Example = Primary key

Patient: **ssn**, name, age, address, doctor_ssn
Doctor: **ssn**, name, specialty, year_expertise
Drug: **trade_name**, formula, **pharmaceutical_name**
Pharmaceutical Company: **name**, phone
Pharmacy: **name**, phone, address
Prescriptions: **patient_ssn, doctor_ssn, pharm_co_name, trade_name**, date, quantity
Sells: **pharm_co_name, trade_name, pharmacy_name**, price
Contract: **pharm_co_name, pharmacy_name**, start_date, end_date

4. Determination of candidate and primary key attributes of entity types.

Entities	PrimaryKey	CandidateKey/alternate key	Foreign key
Patient	SSN	-	-
Doctor	SSN	-	-
Prescription	patient_ssn	-	patient_ssn references patient
Pharmacy	Name	-	-
Pharmaceutical_company	Name	-	-
Drug	patient_ssn,doctor_ssn, pharm_co_name, trade_name	-	patient_ssn referents patient doctor_ssn references doctor pharm_co_name references pharmaceutical company
Sells	pharm_co_name, trade_name, pharmacy_name	-	pharm_co_name references pharmaceutical company pharmacy_name references pharmacy trade_name references drugs

Contract	pharm_co_name, pharmacy_name	-	pharm_co_name references pharmaceutical company pharmacy_name references pharmacy

5. Determination of specialization/generalization and categorization relationships, whenever it is appropriate.
Specialization: I could not find any relevant specialization
Aggregation: I could not find any relevant Aggregation
Categorization relationships: could be a person depending on ssn to group doctor and patient
Medication: drugs and prescription
Business: pharmacy and pharmaceutical company, however it is too broad to expand in database

6. Enhanced Entity-Relationship (EER) diagram to reflect the requirements.
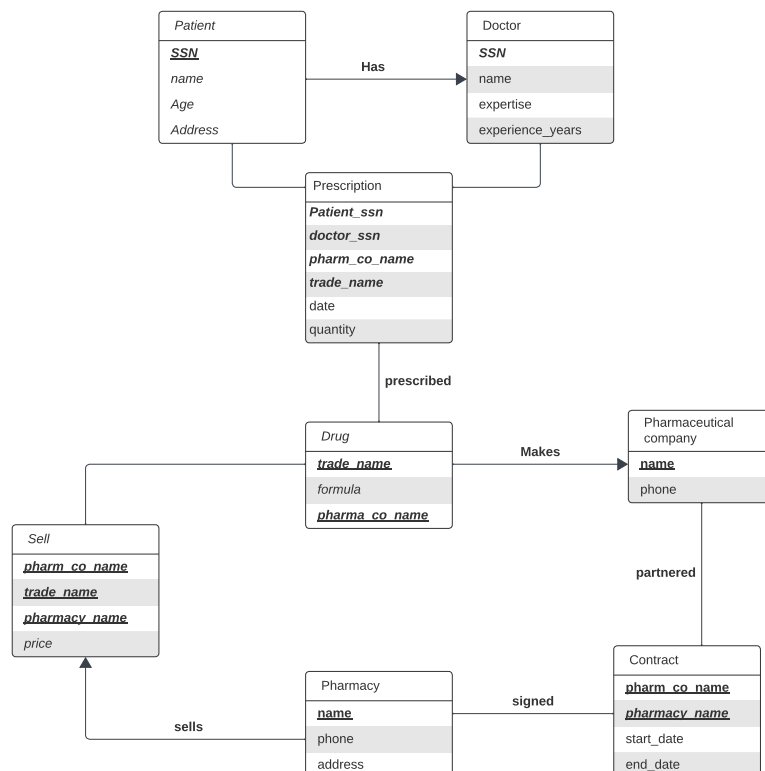
It didn't let me put constraints
Patient—>doctor(1:*)
doctor—>patient(1:*)
prescription—>doctor(1:*)
doctor—>prescription(*:*)
prescription—>patient(1:*)
patient—>prescription(1:*)
Drug—>prescription(1:*)
prescription—>drug(0:*)
drug—>pharmaceutical_co(*:1)
Pharmaceutical_co—>drug(1:*)
drug—>sell(1:*)
sell—>drug(1:*)
pharmacy—>sell(1:*)
pharmacy—>contract(*:*)
contract—>pharmacy(1:*)
pharmaceutical_company—contract(1:*)
contract—pharmaceutical_company(1:*)