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Homework 2

1. Identify PK, UN, FK, Specific Referential Integrity Constraint, NOT NULL

ASSUMPTIONS:

2. Pharmacy\_License\_ID – are unique (Each pharmacy in a chain must have its own license)

3. PHARMACEUTICAL\_CO- No two companies can have same name/phone #

4. PHARMACY- No two pharmacies can have the same Address/Phone

5. Manufacturer\_Registration is equivalent/synonymous/intersectable with PCM\_Registration

6. PRESCRIPTION(Patient) is equivalent/synonymous/intersectable with PATIENT(SSN)

7. PRESCRIPTION- A patient cannot have a prescription for the same drug from two or more doctors

7. SELL is a catalog of prices across all pharmacies and not a record of transactions.

PATIENT:

Primary Key: SSN

Unique Key:

Foreign Key: (PCP\_Lic\_No, PCP\_Lic\_State) → DOCTOR(Doctor\_Lic\_No, Doctor\_Lic\_State)

NOT NULL: DateofBirth

DOCTOR:

Primary Key: Doctor\_Lic\_No + Doctor\_Lic\_State (Composite)

Unique Key:

Foreign Key:

NOT NULL:

PHARMACEUTICAL\_CO:

Primary Key: PCM\_Registration

Unique Key: Name, Phone

Foreign Key:

NOT NULL: Name

PHARMACY:

Primary Key: Name

Unique Key: Pharmacy\_License\_ID, Address, Phone

Foreign Key:

NOT NULL: Pharmacy\_License\_ID

DRUG:

Primary Key: Name

Unique Key:

Foreign Key: Manufacturer\_Registration → PHARMACEUTICAL\_CO(PCM\_Registration)

NOT NULL: Formula

PRESCRIPTION: (Probably need to know all the attributes / not null)

Primary Key: Patient + Drug (Composite)

Unique Key:

Foreign Key: Patient → PATIENT(SSN)

Drug → DRUG(Name)

(Doctor\_Lic\_No, Doctor\_Lic\_State) →DOCTOR(Doctor\_Lic\_No,Doctor\_Lic\_State)

NOT NULL: Quantity, Date

SELL:

Primary Key: Store + Drug

Unique Key:

Foreign Key: Store → PHARMACY(Name)

Drug → DRUG(Name)

NOT NULL:

CONTRACT:

Primary Key: Store, Manufacturer\_Registration, StartDate, EndDate

Unique Key:

Foreign Key: Store → PHARMACY(Name)

Manufacturer\_Registration → PHARMACEUTICAL\_CO(PCM\_Registration)

NOT NULL:

2. Arity and Cardinality

A: π SSN(PATIENT)

Arity: 1

Cardinality: 8

B: π Patient(PRESCRIPTION)

Arity: 1

Cardinality: 25

C: PATIENT \* PRESCRIPTION

Arity: 13

Cardinality: 25

D: DOCTOR \* PRESCRIPTION

Arity: 11

Cardinality: 25

E: (σQuantity>5(PRESCRIPTION)) EQUI-JOIN PRESCRIPTION.Patient=PATIENT.SSN(PATIENT)

Arity: 14

Cardinality: Min: 0 Max: 25

3. Write the relational algebra expression in SEQUENCE

A. “Find all the drug stores that sell “Aspirin” for less than $2.75”

LOW\_PRICE ← σPrice < $2.75(SELL)

RSLT ← πStore(LOW\_PRICE)

B. “Find the names of all generic drugs whose formula was discovered by company “Bayer””

DRUG\_COMPANY ← DRUG EQUI-JOINDRUG.Manufacturer\_Registration = PHARMACEUTICAL\_CO.PCM\_Registration PHARMACEUTICAL\_CO

BAYER\_DRUG ← σPHARMACEUTICAL\_CO.Name = “Bayer”(DRUG\_COMPANY)

RSLT ← πDRUG.Name(BAYER\_DRUG)

4. Write the relational algebra expression in NESTING

A. “List all the pharmacies with active contracts in 2016”

πStore(σEndDate>2016(CONTRACT))

B. “Retrieve the names of all drugs that has been prescribed to a patient with first name “Michael” whose PCP has the same first name”

- Assuming that DOCTOR \* PATIENT \* PRESCRIPTION will intersect lic\_no and Lic\_state

πPRESCRIPTION.Drug(σDOCTOR.FirstName = “Michael” ^ PATIENT.FirstName = “Michael”(DOCTOR \* PATIENT \* PRESCRIPTION))