Normalization questions

1. Find the canonical cover:

B🡪E

C🡪F

E🡪D

DF🡪A

The original keys: B, C

R1(B, E)

R2(C, F)

R3(E, D)

R4(D, F, A)

R5(B, C) – add the original key

R1, R2, R3, R4, and R5 are in 3NF and in BCNF.

2. Find the canonical cover:

A🡪B

B🡪D

B🡪C

The original key: A

Using B🡪D to decompose R, we get:

R1(A,B,C) in 1NF

R2(B,D) is already in BCNF

Using B🡪C to decompose R1, we get:

R11(A,B) in BCNF

R12(B,C) is already in BCNF

Group the relations with the same key:

R1(B,C,D)

R2(A,B)

R1, R2 are in BCNF form.

3.

R(patient\_id, dob, name, ssn, prescription\_id, prescription\_date, doctor\_id, medication\_price, address, city, state, phone\_no, pharmacy\_address)

R1 includes FD1, FD2

R2 includes FD3

R3 includes FD4

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Patient\_id | dob | name | ssn | prescription\_id | prescription\_date | doctor\_id | medication\_price | address | city | state | phone\_no | pharmacy\_address |
| R1 | K | K | K | K | K | K | K | K | U 🡪K | U  🡪K | U 🡪K | U  🡪K | U  🡪K |
| R2 | U | U | U | U | U | U | K | U | K | K | K | K | U |
| R3 | K | U  🡪K | U  🡪K | U  🡪K | K | U  🡪K | U  🡪K | U  🡪K | U | U | U | U | K |

We have a row with all known values, so the decomposition is lossless. All the FDs have been reserved. So the decomposition is good.

ER questions

1. see the E-R pdf file.

2. DOCTER(licenseNumber, licenseState, FirstName, LastName, specialty, yearOfExperience, has, prescribe, dosage, refill)

PK (licenseNumber, has)

FK (prescribe) 🡪 MEDICATION (prescribe)

PATIENT(SSN, FirstName, LastName, DateOfBirth, address, PCP\_licenseNumber, PCP\_licenseState, has)

PK (FirstName, LastName, DateOfBirth)

FK(PCP\_licenseNumber) 🡪 DOCTER(licenseNumber)

FK(PCP\_licenseState) 🡪 DOCTER(licenseState)

FK (has) 🡪 DOCTOR(has)

PHARMACEUTICAL(PCM\_registrationID, name, phone)

PK (PCM\_registrationID)

PHARMACY(name, pharmacy\_license\_ID, and address, fulfill, manufacture)

PK (pharmacy\_license\_ID, fulfill, manufacture)

UN (name)

FK (manufacture) 🡪 MANUFACTURE (manufacture)

MEDICATION(barcodeNumber, name, formula, pharmaceutical\_manufacturer\_PCM\_registrationID, generics, brandName, patient, doctor, dosage, fulfill, date, price, prescribe, manufacture)

PK (barcodeNumber, prescribe, manufacture)

FK (patient) 🡪 PATIENT(FirstName, LastName)

FK (doctor) 🡪 DOCTOR(FirstName, LastName)

FK (fulfill) 🡪 PHARMACY (fulfill)

FK (manufacture) 🡪 MANUFACTURE (manufacture)

CHECK (formula IS NOT NULL)

MANUFACTURE (manufacture)

PK (manufacture)