

Using the functional dependencies convert each of the following into 3NF using the steps discussed in class. Make sure you show each normal form (1NF, 2NF and 3NF) and explain why they are in that form. You may add fields if they will clarify or simplify your relations, but you must include notes on what they are and why you chose to add them.

1. horse(horseId, horseName, dob, sire, dam,
(raceId, raceName, postPosition, finalStanding, dollars, (winPurse, placePurse, showPurse))

FDs

horseId \rightarrow horseName, dob, sire, dam (sire and dam are also horseIds)

raceId \rightarrow raceName, winPurse, placePurse, showPurse

horseId, raceId \rightarrow postPosition, finalStanding, dollars

a) 1NF

horse(horseID, horseName, dob, sire, dam, raceId, raceName, postposition, finalStanding, dollars, winPurse, placePurse, showPurse)

b) 2NF

H1(horseId, horseName, dob, sire, dam)

H2(raceName, winPurse, placePurse, showPurse)

H3(horseID, raceId, postPosition, finalStanding, dollars)

c) 3NF

H1(horseId, horseName, dob, sire, dam)

2. library(libraryId, name, street, city, state, zip, phone,
(bookIsbn, title, publisher, pubDate, pages, (authorId, fname, lname),
totalCopies, numOnShelf))

FDs

libraryId \rightarrow name, street, city, state, zip, phone

bookIsbn \rightarrow title, publisher, pubDate, pages

authorId \rightarrow fname, lname

libraryId, bookIsbn \rightarrow totalCopies, numOnShelf

a) 1NF

library(libraryID, name, street, city, state, zip, phone, bookISBN, title, publisher, pubDate, pages, authorId, fname, lname, totalCopies, numOnShelf)

b) 2NF

L1(libraryID, name, street, city, state, zip, phone)

L2(bookIsbn, title, publisher, pubDate, pages)

L3(title, authorID, fname, lname)

L4(libraryID, bookIsbn, totalCopies, numOnShelf)

c)3NF

L1(libraryID, name, street, city, state, zip, phone)

L2(bookISBN, title, publisher, pubDate, pages)

L3(title, authorID, fname, lname)

L4(libraryID, bookISBN, totalCopies, numOnShelf)

3. disease(id, commonName, scientificName, (symptom, description),(drug, drugName, generic
(sideEffect, sDescription, severity)), contagiousPeriod, lethality)

FDs

id → commonName, scientificName, contagiousPeriod, lethality

symptom → description

drug → drugName, generic

sideEffect → sDescription,

drug, sideEffect → severity

a) 1NF

disease(id, commonName, scientificName, symptom, description, drug, drugName, generic
sideEffect, sDescription, severity, contagiousPeriod, lethality)

b) 2NF

D1(id, commonName, scientificName, contagiousPeriod, lethality)

D2(description)

D3(id, drugName, generic)

D4(sDescription)

D5(id, drug, sideEffect, severity)

c)3NF

D1(id, commonName, scientificName, contagiousPeriod, lethality)

D2(description)

D3(id, drugName, generic)

D4(sDescription)

D5(id, drug, sideEffect, severity)