1. Consider the following relation and functional dependencies

R(A, B, C, D)

FDs = { C- > A, C -> D, C -> C, AB -> C }

Decompose the given relation R(A, B, C, D) using 3NF.

(1)

C -> A

C -> D

C -> C

AB -> C

(2)

C -> AD

AB -> C

(3)

The Fc is:

AB -> CD

To convert into 3NF, put the left-hand-side (LHS) and the right-hand-side (RHS) of each FD in Fc together in one relation. Doing so, we get ABCD.

Based on the decomposed relations (above), discuss to show that they are in 3NF

(1) Does this satisfy lossless-join decomposition?
    a. Yes, as there is only one functional dependency.
(2) Does this satisfy dependency preservation?
    a. Yes, the dependencies can be checked without joining tables.

Consider the following relation and functional dependencies

R(A, B, C, D)

FDs = { C- > A, C -> D, C -> C, AB -> C }

Decompose the given relation R using BCNF

(1)

C -> A

C -> D

C -> C

AB -> C

(2)

C -> ACD

AB -> ABC

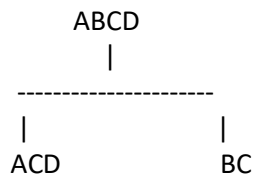
(3)

C -> ACD

AB -> ABCD

C -> ACD is not a trivial FD.

C + (ABCD – ACD) = BC



R(ABCDE) becomes ACD // BC

2. Consider the following relation and functional dependencies

R(A, B, C, D)

FDs = (A -> ABC, C -> D, A -> C, D -> D)

Decompose the given relation R using 3NF

(1)

A -> ABC

C -> D

A -> C

D -> D

(2)

A -> ABC

C -> D

(3)

The Fc is:

A -> BC

C -> D

(4)

ABC // CD

R1(ABC), R2(CD)

Based on the decomposed relations (above), discuss to show that they are in 3NF

(3) Does this satisfy lossless-join decomposition?
    a. Yes, as R1 ∩ R2 = {C} and C -> D (C is super key of R2)
(4) Does this satisfy dependency preservation?
    a. Yes, the dependencies can be checked without joining tables.

Consider the following relation and functional dependencies

R(A, B, C, D)

FDs = (A -> ABC, C -> D, A -> C, D -> D)

Decompose the given relation R using BCNF

(1)

A -> ABC

C -> D

A -> C

D -> D

(2)

A -> ABC

C -> CD

A -> AC

D -> D

(3)

A -> ABCD

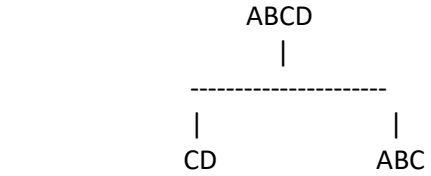
C -> CD

D -> D

(4)

A is a super key, C->CD is a non-trivial FD, and D->D is a trivial FD

C + (ABCD – CD) = ABC



R(ABCDE) becomes CD // ABC