CS1555 Recitation 11

Objective: to practice normalization, finding canonical forms, checking for lossless decompositions, and decomposing relations into BCNF.

**Part 1:**

For each of the following relations R and sets of functional dependencies F, do the following:

1. Find the canonical cover (minimal cover) of F.
2. Using the canonical cover, find the keys of the R.

**1.** Consider the following set of functional dependencies F on a relation R (A, B, C, D, E):

A → BC

A → D

B → C

C → D

DE → C

BC → D

**2.** Consider the following set of functional dependencies F on relation R (A, B, C, D, E, H):

A → C

AC → D

E → AD

E → H

A → CD

E → AH

**Part 2:**

1. Consider the following set of functional dependencies F on relation R (A, B, C, D, E, H):

A → C

AC → D

E → AD

E → H

A → CD

E → AH

The key for R is *EB* and the following set of functional dependencies constitutes the canonical cover:

A → C, E → A, E → H, A → D

1. Using Synthesis Method, construct a set of 3NF relations.
2. Using Universal Method, decompose R into a set of BCNF relations.
3. Consider the following set of functional dependencies F on relation R (A, B, C, D, E):

A → BC

A → D

B → C

C → D

DE → C

BC → D

The key for R is *AE* and the following set of functional dependencies constitutes the canonical cover:

A → B, B → C, C → D, DE → C

1. Using Synthesis Method, construct a set of 3NF relations.
2. Using Universal Method, decompose R into a set of BCNF relations.

**Part 3:**

Assume that R is decomposed into:

R1 (A, B), F1 = {A → B}

R2 (B, C), F2 = {B → C}

R3 (C, D, E), F3 = {C → D, DE → C)

Is this decomposition a lossless-join decomposition? Use the table method.