CS1555 Recitation 3

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

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):

$A \rightarrow BC$
$A \rightarrow D$
$B \rightarrow C$
$C \rightarrow D$
$DE \rightarrow C$
$BC \rightarrow D$

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

$A \rightarrow C$
$AC \rightarrow D$
$E \rightarrow AD$
$E \rightarrow H$
$A \rightarrow CD$
$E \rightarrow AH$

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

$A \rightarrow C$
$AC \rightarrow D$
$E \rightarrow AD$
$E \rightarrow H$
$A \rightarrow CD$
$E \rightarrow AH$

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

$A \rightarrow C, E \rightarrow A, E \rightarrow H, A \rightarrow D$

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 = $\{A \rightarrow B\}$, key (A)
R2 (B, C), F2 = $\{B \rightarrow C\}$, key (B)
R3 (C, D, E), F3 = $\{C \rightarrow D, DE \rightarrow C\}$, key (DE), (CE)
Is this decomposition a lossless-join decomposition? Use the table method.