

M E T U
DEPARTMENT OF COMPUTER ENGINEERING

CENG 302 - Database Management Systems

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Date due : May 5, 2009 (due class hour)

NAME : _____

SURNAME : _____

HOMEWORK NO 3

Q1) Suppose we decompose the scheme $R=(A, B, C, D, E)$ into R_1 and R_2 . The following functional dependencies hold on R

$A \rightarrow BC$

$CD \rightarrow E$

$B \rightarrow D$

$E \rightarrow A$

For each of the below decompositions write whether it is lossless or not, and if it is not lossless give an example where $R_1 \text{ Join } R_2 \not\equiv R$

a) $R_1 = (A, B, C)$

$R_2 = (A, D, E)$

b) $R_1 = (A, B, C)$

$R_2 = (C, D, E)$

Q2) Consider the following generalized transitivity rule: if $Z \subseteq Y$, then $X \rightarrow Y$ and $Z \rightarrow W$ entail $X \rightarrow W$. Prove this rule via a series of steps using Armstrong's axioms.

Q3) Consider the relation schema $R = ABCDEF$ and the functional dependency set F on R :

$F = \{ C \rightarrow A, D \rightarrow EF, CD \rightarrow B, E \rightarrow D, EF \rightarrow B \}$

Find the candidate keys of R .

Q4) Consider the relation schema $S = ABCDEF$ and the functional dependency set F on S :

$F = \{ A \rightarrow BCE, D \rightarrow F, B \rightarrow C \}$

Perform a lossless-join decomposition of S into a set of BCNF relations. Is your decomposition dependency preserving too?