

Stevens Institute of Technology
Department of Computer Science
CS442: Database Management System
Fall 2016

Handout 8. Final exam – sample questions (December 7, 2016)

1. 3NF VS. BCNF

Consider the following relation schema $R(A,B,C,D,E,F,G,H,I,J)$ and the set of functional dependencies $F = \{A \rightarrow DE, IJ \rightarrow H, I \rightarrow A, J \rightarrow FG, G \rightarrow BC\}$.

- (a) Is R in BCNF? Justify your answer.
- (b) Is R in 3NF? Justify your answer.

2. BCNF decomposition

Consider a relation schema $R(A,B,C,D,E)$ with the FDs: $\{C \rightarrow E, D \rightarrow BC, E \rightarrow D, B \rightarrow A, A \rightarrow D\}$. Suppose you decompose R into relations $S(C,D,E)$ and $T(A,B,D)$. Is this a lossless join decomposition? Justify your answer.

3. Dependency-preserving decomposition

Consider the relational schema $R(A,B,C,D,E,F)$ with the following functional dependencies: $AC \rightarrow F, B \rightarrow D, AB \rightarrow CEF, ACE \rightarrow B$, and $AEF \rightarrow BC$.

- (1) Decompose the relational schema into schemas that satisfy BCNF.
- (2) Does the result of your decomposition preserve dependencies? Justify your answer.