B461 Assignment 4: Functional Dependencies and Normal Forms (Due November 10)

November 3, 2009

- 1. Prove or disprove the following inference rules for functional dependencies.
 - (a) $\{A \to C, B \to D\}$ implies $AB \to C$
 - (b) $\{BC \to D, C \to A\}$ implies $BA \to D$
 - (c) $\{A \to CE, BE \to D, E \to A\}$ implies $E \to C$
 - (d) $\{B \to C, D \subseteq C\}$ implies $B \to D$
- 2. Consider the following two sets of FD's. $F = \{A \to C, AC \to D, E \to AD, E \to H\}$ and $G = \{A \to CD, E \to AH\}$ Check if they are equivalent.
- 3. Given the relation R = {A, B, C, D, E, F, G H, I, J } and the set of functional dependencies $F = \{AB \rightarrow C, A \rightarrow DE, B \rightarrow F, F \rightarrow GH, D \rightarrow IJ\}$:
 - (a) Give a key for R?
 - (b) Decompose R into *BCNF*. Is the decomposition lossless? Is it dependency preserving?