CS 405G: Introduction to database systems Assignment 4

Assigned: Nov. 5<sup>th</sup>, 2014 Due: Nov.12<sup>th</sup>, 2014

Reading assignment: Chapter 7.

**Submission instructions**: Please try to prepare the assignment in word document (handwritten homework is also acceptable). Print and bring them to class on the due date. Put the course number and your name at the top left corner of the first page of your homework. Please follow the rules in the course syllabus regarding late homework and plagiarism.

Problem (1) Consider the following proposed rule for functional dependencies: If  $\alpha \to \beta$  and  $\gamma \to \beta$ , then  $\alpha \to \gamma$ . Prove that this rule is *not* sound by showing a relation *r* that satisfies  $\alpha \to \beta$  and  $\gamma \to \beta$ , but does not satisfy  $\alpha \to \gamma$ .

Problem (2) Suppose that we are given the schema R = (A, B, C, D, E) and the following set F of functional dependencies holds

- a) Please compute B's closure B+.
- b) Please identify all candidate keys of the relation R using attribute closure.
- c) What is the highest norm form of relation R? Please explain why.
- d) Show that the following decomposition of R is a lossless decomposition (A, B, C) (A, D, E)
- e) Show the following decomposition of R is not a lossless decomposition
  - (A, B, C) (C, D, E)