CSCI 4380 Database Systems

Lab 3

Functional Dependencies and Data Normalization

This homework will focus on the concepts of Functional Dependencies and their use in normalizing a relational schema.

It is due on Tuesday February 4 at 12:00pm (noon) and should be submitted electronically on the class Submitty site. You may work in groups of up to three (3) students. Late days are not permitted for labs.

1. Assume the existence of a relation $R(a, b, c, d, e, f)$ with functional dependencies $ef \rightarrow c$, $bc \rightarrow d$, $de \rightarrow ab$, and $f \rightarrow c$.
   (a) (2 points) Compute $f, b+$

   (b) (4 points) What functional dependencies can we infer from the computed closure (use only singleton right-hand sides)?

   (c) (3 points) Are any of the inferred functional dependencies part of a minimal basis? Why or why not?

   (d) (2 points) Find the key(s) of R

(e) (3 points) Is $bc \rightarrow d$ a violation of Third Normal Form (3NF)? Why or why not?

(f) (6 points) Decompose R into 3NF