CS 589 Principles of Database Systems
Quiz 8 December 3, 2008 Suggested Answers

1. (10 points) Consider the following Datalog program.

   Ancestor-of(x,z) :- Ancestor-of(x,y), Parent-of(y,z).
   Not-related(x,y) :- Person(x), Person(y), ¬ Ancestor-of(x,y).
   Ancestor-of(x,y) :- Parent-of(x,y).

   with existing database relations:

   Person(id)
   Parent-of(id1, id2)

   Show how this program can be stratified by indicating which rules are in each strata.

   Strata 1: Rules 1 and 3, because all rules with Ancestor-of in the head must be in the same strata
   Strata 2: Rule 2, because Ancestor-of must be computed in an earlier strata since it is used negatively in Rule 2.

   Note, there are no other stratifications for this program.

2. Consider the following Datalog program.

   Happy(x) :- Person(x, n, 21).
   Happy(x) :- Person(x, n, a), Works-with(x, y), Happy(y).
   Happy(x) :- Person(x, n, a), Works-for(x, y), Happy(y).

   with existing database tables:

   Person(id, name, age)
   Works-for(id1, id2)
   Works-with(id1, id2)

   a. (10 points) What does this program compute?
      It computes happy people, where happy people are defined to be: anyone who is 21 years of age or anyone who works with someone who is happy or anyone who works for someone who is happy.

   b. (5 points) What is the maximum number of strata that you need for this program? Explain your answer briefly.

      The maximum number of strata that you need for this program is 1. Since all three rules have the Happy predicate in their head, they must all be in the same strata. Thus, all rules in this program are all in strata 1.

      There are no other stratifications for this program.