Quiz 2 for CSC 432: Database Management
100 points

28 October 1996, 10:15–11:05 AM

June 20, 2000

Instructions

If you finish early, please try to remain seated or move out discreetly so as not to disturb others.

This quiz is closed-book. However, a one-page crib sheet may be used. Crib sheets may not be shared. Collusion or cheating of any form is forbidden. You can be asked to explain your solutions verbally.

There are no trick questions in this quiz. If you think there is some ambiguity, please make and state additional assumptions, but be prepared to justify why those assumptions were necessary. If you are unable to produce a formal answer, give an English description for partial credit.

1   Normalization

Consider the following relational schema with the indicated functional dependencies.

Employee

eno	name	bdate	dep-no	dep-name

- eno $\longrightarrow$ name

- eno $\longrightarrow$ bdate

- eno $\longrightarrow$ dept-no

- dep-no $\longrightarrow$ dep-name

1. (20 points) Consider 1NF, 2NF, 3NF, and BCNF. Which of these normal forms does the above relational schema satisfy? Which of these normal forms does it not satisfy? Briefly explain your answers.

2. (10 points) Show an example anomaly that can arise from performing an operation on this relation. (Choose any operation.)

3. (20 points) Transform the relational schema into the next higher normal form. Does the abovementioned anomaly still arise?

2 SQL

Consider the *Dream Home* database. Suppose you need to rate the staff best to worst in terms of how many properties they manage and how many owners they deal with (a staff member deals with an owner when s/he manages the owner's property). Consider the following query:

> *List each staff member's* `lname` *along with the number of properties s/he manages, and the number of owners whose properties s/he manages.*

Running the query on the present database yields (the fact that **num_O** and **num_P** agree is just a coincidence).

lname	num_O	num_P
White	0	0
Beech	2	2
Ford	2	2
Howe	1	1
Brand	0	0
Lee	1	1

- (30 points) Give an SQL query for the above request. Use any operator (including the aggregates) discussed in class. There are points for elegance, but correctness is the main issue. State your assumptions about duplicates and NULLs.

- (10 points) Add clause(s) to avoid listing staff who manage no properties.

- (10 points) Add clause(s) to sort the result descending by the number of properties and, within that, descending by the number of owners.