
Computer Science 3743

Database Systems

Midterm Exam I

Instructor: Prof. Weining Zhang
Total points: 100

Semester: Spring, 2000
Time: 75 minutes

1. [10] Based on the current tuples in the following table, find all candidate keys of the table.

A	B	C	D	E
a_1	b_1	c_1	d_1	e_4
a_1	b_1	c_2	d_2	e_3
a_1	b_2	c_3	d_1	e_1
a_1	b_2	c_4	d_2	e_2

2. [10] Give an example that a constraint has to be defined as a column constraint. Give another example that a constraint has to be defined as a table constraint.
3. [20] Use Oracle Data Definition Language to create the following three tables:

Doctors(Dr_id, Name, Specialty, Telephone, Years_of_experience)
Patients(Patient_id, Name, Sex, Address, Age, Doctor_id)
Records(Dr_id, Patient_id, Date, Diagnosis)

The primary key of each table is underlined. The Dr_id in the Patients table is used to indicate the primary physician of a patient. Each tuple in the Record table indicates that a doctor has seen a patient on the given date. Choose an appropriate data type for each attribute. Define appropriate foreign keys.

4. Consider the tables in Question 3. For each question below, write a relational algebra expression AND an SQL query. You need to consider efficiency when you write your relational algebra expressions.
- (a) [20] Find the name of each doctor as well as the names of the doctor's patients who are over 60.
- (b) [20] Find the names of those male patients who have not seen a doctor.

5. [20] Consider the tables in Question 3. The following query finds the Dr_ids of those doctors who are the primary physician of at least one patient. This is a correlated nested query. Give two SQL queries that are equivalent to the following query but one is an unnested query and the other is an uncorrelated nested query.

```
select Dr_id from Doctors d where exists
    (select * from Patients where Doctor_id = d.Dr_id)
```

Request

Please return the exam sheet with your answers.