CSC2008: Database System

Tutorial 1

1. Consider the instance of the Students relation shown in the table below. Please give an example of an attribute (or a set of attributes) that you can deduce is (or is not) a candidate key.

SID	Name	Login	Age	GPA
S210111	Alvin	alvin@sit	19	3.5
S210112	Donny	donny@sit	18	4.1
S210113	Eric	rric@uog	20	2.9
S210114	Alvin	alvin@uog	21	3.8
S210115	Lisa	lisa@digipen	18	4.0
S210116	Kate	kate@sit	19	3.6

2. Consider the airline use case where you need to store information of flights, aircraft, and employee (and their certifications).

FOUR (4) given relations:
Flights(flno: integer, from: string, to: string, distance: integer,
departs: time, arrives: time)
Aircraft(aid: integer, aname: string, cruisingrange: integer)
Certified(eid: integer, aid: integer)
Employees(eid: integer, ename: string, salary: integer)

Note that the Employees relation is used to store information for all employees. An employee is a pilot if he/she is certified to fly an aircraft. Please write the following queries in **SQL**.

a) Find the eids of the pilots certified for some Boeing aircraft.

b) Find the names of the pilots certified for some Boeing aircraft.

c) Find the eids of the employees who are certified for the largest number of aircraft.

d) Find the eids of the employees who make the second highest salary.

3. At a university, a database stores the information about the professors (identified by NRIC) and courses (identified by cid). Professors teach courses; each of the following situations concerns the Teaches relationship set. For each of the cases below, draw an ER diagram that describes it. Assume that there are no other constraints. Please also translate the above ER diagrams into relational model by writing the relation schemas and the SQL statement to create the relations.
   a. Professors can teach the same course in several semesters, and each offering must be recorded.

   b. Professors can teach the same course in several semesters, and only the most recent such offering needs to be recorded. (Assume this condition applies in all subsequent questions.)

   c. Every professor teaches exactly one course.

   d. Suppose certain courses can be taught by a team of professors jointly. It is possible that no professor in a team can teach the course. Model this situation and introduce entity and relationship sets if needed.

4. Given a relation with schema R(A, B, C, D) and a set of FDs: BC -> D, D -> A, A -> B. Please list out all the super-keys and candidate keys.