Instructor: Hao-Hua Chu

Fall Semester, 2007

Assignment 2: Relational Model & Relational Algebra

Deadline: At the end of the class, Oct 29 (Mon), 2007
This is an individual assignment, that is, no group submissions are allowed.

Cheating Policy: If you are caught cheating, your grade is 0.
Late Policy: We will not accept any assignment submissions.

Questions

1. Translate the ER diagram from Assignment 1.1 and Assignment 1.2 into relational model and show the SQL statement needed to create the relation, using only key or null constrains. Please also specify the constrain cannot be captured in the table.

2. Consider the following relations containing airline flight information:

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 describes pilots and other kinds of employees as well; every pilot is certified for some aircraft (otherwise, he or she would not qualify as a pilot), and only pilots are certified to fly. Write the following queries in relational algebra:

a. Find the *eids* of pilots certified for some Boeing aircraft.
b. Find the *names* of pilots certified for some Boeing aircraft.
c. Identify the flights that can be piloted by every pilot whose salary is more than $100,000.
d. Find the names of pilots who can operate planes with a range greater than 3,000 miles but are not certified on any Boeing aircraft.
e. Find the *eids* of employees who are certified for exactly three aircraft.

3. Consider the following schema:

Suppliers (*sid:* **integer**, *sname:* **string**, *address:* **string**)
Parts (*pid:* **integer**, *pname:* **string**, *color:* **string**)
Catalog (*sid:* **integer**, *pid:* **integer**, *cost:* **real**)

The key fields are underlined, and the domain of each field is listed after the field name. Therefore *sid* is the key for Suppliers, *pid* is the key for Parts, and *sid* and *pid* together form the key for Catalog. The Catalog relation lists the prices charged for parts by Suppliers. Write the following queries in relational algebra:

a. Find the *name*s of suppliers who supply some red part.
b. Find the *sid*s of suppliers who supply some red or green part.
c. Find the *sid*s of suppliers who supply some red part or are at 221 Packer Street.
d. Find the *sid*s of suppliers who supply some red part and some green part.
e. Find the *sid*s of suppliers who supply every red or green part.
f. Find the *sid*s of suppliers who supply every red part or supply every green part.
g. Find pairs of *sid*s such that the supplier with the first *sid* charges more for some
   part than the supplier with the second *sid*.
h. Find the *pid*s of parts supplied by at least two different suppliers.
i. Find the *pid*s of the most expensive parts supplied by suppliers named Yosemite Sham.

Submission

Hand in PAPER PRINTOUT that contains your answers to the two questions. Please include your name and ID.