Tutorial 8 (SC2207-CZ2007)

SQL

Classroom Exercise

1. The relational database schema for a Car-insurance company is given below.

person (driver-id, name, address)

car (license, year, model)

accident (report-number, location, date)

owns (driver-id, license)

participated (report-number, driver-id, license, damageamount)

employee (person-name, street, city)

works (person-name, company-name, salary)

company (company-name, city)

manages (person-name, manager-name)

(i) Modify the database so that Mark now lives in "Newstreet, Newtown" (i.e. the street changes to Newstreet and city changes to Newtown for Mark).

(ii) Give all employees of "FaceMatch" a 10 percent salary raise.

(iii) Give all managers of "FaceMatch" a 10 percent salary raise.

2. Consider the relation schema: STUDENT (name, ssn, majorcode, gpa).

Suppose the following view is defined on it: STUDENT-NO-GPA(name, ssn, majorcode).

(i) Is it possible to insert a tuple ('X', 123, 'CMSC') into the view? If yes, what should be the result of it? If not, why not?

(ii) Now consider the following view.

```
CREATE VIEW MAJOR-AVG AS
SELECT majorcode, avg(gpa) AS avggpa
FROM STUDENT
GROUP BY majorcode;
```

Is it possible now to insert a tuple ('CMSC', 3.2) into this view? If yes, what should be the result of it? If not, why not?

3. Consider the following schema of a product database:

Parts(pid: integer, pname: string, color: string)

Suppliers(sid: integer, sname: string, address: string)

Catalog(sid: integer, pid:integer, price: real)

The Catalog records that some Supplier sid supplies Part pid at a given price. Formulate each of the following integrity constraints as an SQL assertion.

(i) No Supplier may supply red and green Parts.

(ii) For all Parts, no other Supplier has a lower price than the Supplier with "sid" = 1.

4. Consider the relation R (A, B, C, D, E). Write one or more CREATE TRIGGER statement(s) in SQL99 that can be used to impose an FD constraint AB➔C.

5. An airline stores information about its flights and ticket sales in a relational database with the following schema (primary keys are underlined):

FLIGHT (FLIGHTNO, DAY, MONTH, YEAR, NUMSEATS, PRICE)

PASSENGERS (PASSENGERID, NAME, ADDRESS)

BOOKING (BREF, FLIGHTNO, DAY, MONTH, YEAR, PASSENGER)

The (FLIGHTNO, DAY, MONTH, YEAR) attribute of BOOKING is a foreign key into the FLIGHT relation. Also, PASSENGER attribute of BOOKING is a foreign key into the PASSENGERS relation. You can assume the number of seats for a flight must be between 50 and 200. When details of a new flight are added to the database, a default price of 2000 SGD is used unless another price is given.

When there are fewer than 20 seats remaining on a flight on a particular day then the airline's policy is to set the price of remaining seats on that flight to 4000 SGD. Write a trigger to implement this policy. You may assume that bookings cannot be cancelled.

6. A database system used by a university's examinations office has the following relations:

Exams (course, examDate, examTime)

Students (studentId, name)

registeredFor (student, course, examDate)

Attribute course is a six-character course code. A course cannot have more than one exam on the same date, and that exam will either be in the morning ('AM') or in the afternoon ('PM'). Attribute examDate is a date (e.g. '2014-12-18') and examTime is either 'AM' or 'PM'.

If a clash occurs for a student, special arrangements will be made for the student to sit the exam at another time on the same date. For example, if the clash is with another 'AM' exam, then a special exam will be arranged for that student in the afternoon ('PM'), and vice versa.

Write a trigger in SQL99 that, when a student registers for an exam that is at the same time on the same date as another exam for which they are already registered, adds a row to relation SpecialExams(student, course, examDate, examTime). Here, examTime should be the time of the specially arranged exam ('AM' or 'PM').

A row should be added to the registeredFor relation even when the student will sit a special exam.

Critical Thinking Exercise

7. The following schema relates to holiday chalets that government employees may rent:

EMPLOYEE (emp-id, name, category, salary, age)

CHALET (chalet-id, location, price-per-day)

RENTAL (emp-id, chalet-id, start-date, no-of-days)

Note: Examples of category are Division I, Division II, etc.

Consider the view defined over the above schema:

```
CREATE VIEW X-VIEW
AS SELECT AVG (PRICE)
FROM CHALET C, RENTAL R,
WHERE C.CHALET-ID = R.CHALET-ID
AND NO-OF-DAYS > 7
GROUP BY LOCATION;
```

Describe what this view shows and give three reasons why it is generally considered not updatable.

8. Consider the following schema containing bank account information.

Primary Keys are in bold.

CUSTOMERS (**customer_name**, address)

ACCOUNTS (**account_number**, balance)

ACCOUNT_OWNERS (**customer_name**, **account_number**)

Write an assertion such that for every customer at least one of the following conditions holds true:

- He (or she) is owner of at most 5 accounts
- The sum of the balance of various accounts he (or she) owns is greater than $50,000.

9. Consider a database with the following two tables with obvious meanings:

course(course_id, course_name, no_credit),

registration(student_id, course_id, grade).

Note that the underlined attributes are keys of the tables. Write the triggers for imposing the following foreign key constraint specified in the CREATE TABLE statement for registration:

FOREIGN KEY (course id) REFERENCES course ON DELETE CASCADE.