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CS44800 Homework 2

Question 1. (1.0 point)  
Suppose that each of the following operations is applied directly to the database state shown in  
the Figure 5.6 in the Textbook (7th Edition). The figure 5.6 is shown in the slides 5-31. Discuss  
all integrity constraints violated by each operation, if any, and the different ways to enforce the  
constraints. For example, the operation Delete the PROJECT tuple with Pname = ‘ProductX’  
violates a referential integrity constraint with WORKS\_ON. The ways to enforce the operation  
are: (i) reject the delete; (ii) delete all tuples in WORKS\_ON for Pno = 1.

(a) Delete the WORKS\_ON tuples with Essn = ‘333445555’.

* No constraints violated

(b) Modify the Super\_ssn attribute of the EMPLOYEE tuple with Ssn = ‘999887777’ to ‘943775543’.

* Violates referential integrity because there is no EMPLOYEE relation with SSN = ‘943775543’
  + Reject the deletion
  + Insert a new EMPLOYEE tuple with SSN = ‘943775543’

(c) Insert tuple <‘ProductX’, 4, ‘Bellaire’, 2> into PROJECT.

* Violates referential integrity because DNUM = 2 and there is no tuple in DEPARTMENT relation with DNUMBER = 2
  + Reject insertion of PROJECT tuple
  + Change value of DNUM in the new PROJECT tuple to an existing DNUMBER value in DEPARTMENT relation
  + Insert new DEPARTMENT tuple with DNUMBER = 2

(d) Delete the DEPARTMENT tuples where Dnumber < 2

* No constraints violated

Question 2. (1.0 point)  
Database design often involves decisions about the storage of attributes. For example, the  
address can be stored as a single attribute or split in multiple attributes (City, State, ZIP, Street  
Address). Discuss specific scenarios where is useful store the address in one attribute or multiple attributes. Explain your answer.

* It would be useful to store the address in one attribute when you wish to store where a student or employee lives
* It would be useful to store the address in multiple attributes so that you can easily find everyone within the same city, state, or ZIP

Discuss specific scenarios of other attributes that can benefit of such decisions (split in multiple  
attributes)? Explain you answer.

* Splitting a phone number between area code and the individuals number would be good for keeping track of those within the same area
* Splitting someone's first name and last name in order to allow for easier search as most names are searched by last name
* Splitting dates that homework is due in order to organize them by year, or month that they are due

Question 3. (1.0 point)  
Write SQL statements to do the following on the database schema shown in Figure 5.6 in the  
Textbook (7th Edition).

(a) Insert a new project, <‘Product ABC’, 4, ‘Houston’, 1>, in the database.

* INSERT INTO PROJECT VALUES (‘Product ABC’, 4, ‘Houston’, 1)

(b) Modify location from Department 1 to ‘Bellaire’

* UPDATE DEPT\_LOCATIONS
* SET Dlocation = ‘Bellaire’
* WHERE Dnumber = 1

(c) Delete all dependent of employee whose salary is greater than 35000.

* DELETE Essn
* FROM DEPENDENT
* WHERE Salary > 35000

(d) Retrieve the name of employees (Fname, Minit, Lname) whose salary is greater than any  
employee working in Department 5.

* SELECT Fname, Minit, Lname
* FROM EMPLOYEE
* WHERE Salary > ANY(SELECT Salary FROM EMPLOYEES GROUP\_BY Dno)