Purdue University
Computer Science Department
CS44800 Homework 2
Fall 2019

Due: **September 17, 2019, 11:59 pm**
Reference: **Fundamentals of Database Systems by Elmasri & Navathe, 7th Edition**
Total Points: **3 points**

Provide enough detail to support your answers. If possible, use bullets to organize the ideas in your answer.

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 and database schema in the Figure 5.7 in the Textbook (7th Edition). The figures are also shown in slides 5-31 and slides 5-37 respectively. Discuss all integrity constraints violated by each operation (including the tables affected), if any, and the different ways to enforce the constraints (without modifying the operation) with some relevant explanation(s). For example, the operation Delete the PROJECT tuple with Pname = 'ProductX' violates a referential integrity constraint with **WORKS_ON**. Possible ways to enforce the operation are: (i) reject the delete; (ii) delete cascade (delete all tuples in WORKS_ON that correspond to Pname = 'ProductX').

(a) Delete the WORKS_ON tuples with Essn = '999887777'.
(b) Modify the Super_ssn attribute of the EMPLOYEE tuple with Ssn = '999887777' to NULL.
(c) Insert tuple <'555123456', Phil, 'M', 2000-12-01, 'Son'> into Dependent.
(d) Delete the DEPT_LOCATIONS tuples where Dnumber < 3.

Question 2. (1.0 point)

Database design often involves decisions about the storage of attributes. For example, the **SSN** can be subdivided in groups and stored in multiple attributes for security/validation purpose (validate the last four digits). Another example is the **address**, which can be stored as a single attribute or split in multiple attributes (City, State, ZIP, Street Address).

(a) Discuss specific scenarios where it is useful to store the address as one attribute (i.e., a text field) or multiple attributes (i.e., separate fields for city, state, zip, number). Explain your answer.

(b) Discuss at least 2 additional scenarios of information that can benefit of such decisions (split in multiple attributes)? You need to use other examples i.e. other than "Address" and "SSN". Explain you answer.

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) Retrieve employee names (Fname, Minit, Lname) with more than 3 dependents and who work more than 30 hours.
(b) Modify location from Departments that have less than 5 employees to 'Lafayette'
(c) Delete all dependent of employee whose supervisor does not belong to the same Department.
(d) Retrieve the employee (Fname, Minit, Lname) with the highest salary in each Department.