

Homework 2 for CSC 742: Database Management

Collaborative Work

You may form teams of 1 - 4 members (of students in this class) to cooperate on this problem set. After discussing the problem, please write up your answers individually. Indicate the names of the other members in your team, if any.

1 ER Design (40 points)

Consider the following information about a university database:

- Professors have an SSN, a name, an age, a rank, and a research specialty.
- Projects have a project number, a sponsor name (e.g., NSF), a starting date, an ending date, and a budget.
- Graduate students have an SSN, a name, an age, and a degree program (e.g., MS, MCS, PhD).
- Each project is managed by one professor (known as the project's principal investigator).
- Each project is worked on by one or more professors (known as the project's co-investigators).
- Professors can manage and/or work on multiple projects.
- Each project is worked on by one or more graduate students (known as the project's research assistant).
- When graduate students work on a project, a professor must supervise their work on the project. Graduate students can work on multiple projects, in which case they will have a (potentially different) supervisor for each one.
- Departments have a department number, a department name, and a main office.
- Departments have a professor (known as the chairman) who runs the department.
- Professors work in one or more departments, and for each department that they work in, a time percentage is associated with their job.
- Graduate students have one major department in which they are working on their degree.
- Each graduate student has another, more senior student (known as a student advisor) who advises him or her on what courses to take.

Design and draw an ER diagram that captures the information about the university. Use only the basic ER model here, that is, entities, relationships, and attributes. Be sure to indicate any key, cardinality, and participation constraints.

2 Constraints (20 points)

Consider the constraints of Figure 7.7 over the database of Figure 7.6. With cascade, show the changes of the database resulting from the following operations.

2.1 (10 points) Update project number 1 to 99.

2.2 (10 points) Delete Franklin Wong from the Employee relation.

Independent Work

You must solve this problem set individually without any assistance from anyone. Mastery of the predicate calculus, and the ability to convert from English to the predicate calculus, is essential for success in this course.

3 Constraints and Operations(40 points)

Problem 7.19 a, h, j, k from Elmasri & Navathe. (10 points each item)