



Written Assignment #1 CAS CS 460

Due: 09/27 at 23:59 on gradescope.

Problem 1: ER-Model. [45pts]

Assume that you have been asked to create a database for a medical clinic. In this database you want to store information about Doctors, Patients, Tests, and Visits. For each doctor, we need to store a doctor id, name, specialty, and medical school that got her/his degree. For a patient, we need to store name, patient id, insurance, and a doctor that is the primary physician for this patient. For a test, we store the test name, test id, date of test, and the result. For a visit, we need to store the visit id, the check in and check out days, the patient associated with the visit and the doctor, who can be any doctor, not necessarily the primary physician. We assume that the doctor ids, patient ids, visit ids, and test ids are unique. Make sure that your design allows the same patient to have many visits on different dates and to have the same test many times.

Complete the following tasks:

1. Create the E-R diagram.
2. List the primary keys, candidate keys, weak entities (if any), partial keys (if any), total participation and any key constraints.
3. Turn the E-R diagram into tables (relational model schema). Provide the SQL CREATE TABLE statement for each table in the relational schema.

Problem 2: ER-Model and Relational Model. [55pts]

Suppose that you need to design a database for an airport. The relevant information that must be stored is:

- Every airplane has a registration number, and each airplane is of specific model.
- The airport accommodates a number of airplane models, and each model is identified by a model number (e.g. A-320, B-767) and has a capacity and a weight.
- A number of technicians work at the airport. You need to store the name, SSN, address, phone number, and salary of each technician.
- Each technician is an expert on one or more plane model(s).
- Traffic controllers work also at the airport. We need to store name, SSN, address, and



phone number.

- Traffic controllers must have an annual medical examination. For each traffic controller, you must store the date of the most recent exam.
 - The airport has a number of tests that are used periodically to ensure that airplanes are still airworthy. Each test has a Federal Aviation Administration (FAA) test number, a name, and a maximum possible score.
 - The FAA requires the airport to keep track of each time a given airplane is tested by a given technician using a given test. For each testing event, the information needed is the date, the number of hours the technician spent doing the test, and the score the airplane received on the test.
1. Give an E/R diagram for this database. List the primary keys, candidate keys, weak entities (if any), partial keys (if any), total participation and any key constraints.
 2. Turn the E-R diagram into tables (relational model schema). Indicate primary and candidate keys and foreign keys. Give the SQL statements to create the corresponding relations in a relational DBMS.