

Conceptual Design: The Entity-Relationship Model

Class Exercises

Databases 2018-2019

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Class exercises. Selected exercises from Exercise Sheet 1.

11) The Federal Aviation Regulations needs to implement a relational database that meets the following requirements:

Airports are identified by a code. We also need to register its name and the country in which they are located. At each airport operates at least one airline and at most ten, but an airline can operate in several airports. They are identified by their name. Flights are identified by the flight number and a date. A flight is not scheduled twice daily but a specific flight number can be scheduled at different dates. Each flight has associated a fix number of seats, a departure airport, an arrival airport and it is operated by a specific airline. Flight tickets contain the passenger's passport number, the seat, the price, the flight number and the date.

7) The city museum needs to manage the guided tours and we must implement a relational database that meets the following requirements:

Groups can book any of the guided tours offered by the city museum. Each group of visitors have to indicate the tour, date and the number of people in the group. The museum will assign a reservation number and one of the museum guides who is available to cover the requested tour. We must know the name of all the guides (we assume that 2 guides do not have the same name), and the languages that they speak.

A tour is identified by a reference. In addition, we need to register the length of the tour, the museum rooms that are visited as well as the order in which they are visited. Each room has assigned a unique code and a name. Each museum guide covers at least one and at most three tours. All tours have assigned at least one guide.

12) The library of the university needs to implement a relational database that meets the following requirements:

The library allows to access to research articles published in several international journals. Each article has associated a DOI (Digital Object Identifier), a title, a set of keywords, the authors and the journal in which the article has been published.

Each article has associated at most 4 authors. Each author is identified by a name. We also need to register the email address and the affiliation of the authors. Both, the email address and the affiliation associated to an author in different articles can be different.

The journals are identified by the ISSN (International Standard Serial Number). A journal publishes different volumes periodically. Each volume has associated a unique number and the month and the year in which it has been published. Different journals can publish volumes that have associated the same number, month and year. We also need to store in the database the volume of the journal in which it has been published.

Finally, each journal is published by a publishing house that has associated a name that identifies it. The publisher can publish several journals.

4) The economic crisis has led to health managers to decide to look closely at the pharmaceutical expenditure of the citizens. As consequence, a new system for managing prescriptions is required and we have to design the new database. The main requirements of the health system are the following ones.

Patients are identified by their social security number. We will also need to store the name, address and age of each patient.

Doctors are identified by their collegiate member number and we also require knowing their names and years on active service. They may be specialists, general practitioners or E.R. doctors. E.R. doctors work in a hospital that we need to know. Regarding the specialists we will register their speciality. In the case of general practitioners, we need to store the health center in which they see their patients and the surgery start time. Health centers are identified by a unique code. The address of each of them is also known. All patients have assigned a specific general practitioner.

Any doctor can write a prescription for a patient. The management system will need to have certain information contained in the prescriptions: the name of the patient who the medicine has been prescribed, the prescription bar code, the date on which the prescription was made, the prescribed dose, the doctor collegiate member number and the pharmacy where the medicine was dispensed.

Each medicine is identified by its bar code and the following information associated with it have to be stored: trade name, composition, price and the pharmaceutical company that markets it. Medicines are dispensed in pharmacies and we assume that all the pharmacies dispense all the medicines. We must register pharmacy license number, address and phone number.