

Database Systems - November 23th 2009

Name	
Surname	
Student Number	

2. Design a database for the management of the following activities of a language school.
- Language courses are identified by both a code and their start date. The course language, the price, and the level (e.g., beginners, intermediate, advanced) of the course are known for each course.
 - Language courses consist of many lessons. Each lesson is identified by a code, which is unique for each course, and it is characterized by the date of the lesson itself, the starting and ending times, the minimum and maximum numbers of participants.
 - Lessons take place in the school rooms. For each lesson, the room where it takes place has to be recorded in the database. Rooms are identified by an alphanumeric code and can be divided into classrooms and laboratories. Classrooms are characterized by their maximum capacity, floor number, and number of blackboards. Laboratories are characterized by their name, number of personal computers, and the type of audio system.
 - The language experts working at the school are characterized by their Social Security Number, name, surname, email address, phone number, and the list of qualifications they have obtained. For each qualification obtained by a language expert, the institute where the qualification has been obtained, the date, and the mark are known. Each language expert is assigned to at least a course, and a course can be assigned to many language experts.
 - Language experts are responsible for laboratories. The database records all the time periods when the language experts have been in charge for the laboratories. A laboratory can be in responsibility of different language experts at the same time, and a language expert can be responsible for different laboratories at the same time.
 - People enrolled at the language school are identified by a serial number and characterized by name, address, phone number, and email address (if available). For each person, the list of subscribed courses and the list of attended lessons are known. A lesson can be attended by many people.
 - The school organizes exams for people to obtain language certificates. Each exam is identified by a unique code and it is characterized by the certificate type, the institution providing the certificate (e.g., Oxford, Cambridge, etc.) The database records all the exam subscriptions by people enrolled at courses at the language school. Each exam subscription is characterized by the subscribed person, the exam, and the date of the exam. A person can take at most an exam per day, whereas the same exam can be taken/subscribed by the same person on different days.
- (a) (10 points) Design an E-R conceptual schema for the above database.
- (b) (6 points) Design a normalized relational schema for the above database.