

Esame DMBD 25-02-2022

andrea.brunello

Exercise 1. Design an ER conceptual schema for the management of discographic data. The database has to deal with songs, composers, and singers. Each song is characterized by its title and the set of people involved in it. A song is uniquely identified by its name within a music album. Each music album is characterized by a name, a release date, and a genre. There cannot be two albums released in the same year with the same title. Nevertheless, albums released in different years may have the same name. For each composer, we would like to store its name and surname (that together univocally identify her/him), the birth date, the gender, and the nationality. For each singer, we are interested in its name and surname (that together univocally identify her/him), the birth date, the gender, and the nationality. In addition, we would like to keep track of her/his voice category (e.g., soprano, contralto, tenor, ...). Finally, we assume that a same person can be both a composer and a singer.

Build an ER schema that describes the above mentioned requirements, clearly explaining any assumptions you make. In particular, for each entity, identify its attributes, candidate keys, and carefully specify the constraints associated with each relation. Also, make sure to correctly specify generalization relationships, if any.

Exercise 2. Let us consider the following relational schema about ingredients used in recipes:

```
ingredient(name, origin, is_spicy)  
recipe(title, description, difficulty)  
used_in(ingredient_name, ingredient_origin, recipe)
```

Each ingredient is characterized by a name, an origin, and a boolean attribute that tracks whether it is spicy or not. Assume that there may be more than one ingredient with the same name (e.g., salt). However, we may uniquely identify an ingredient taking into account also its origin (e.g., salt from the Himalaya, salt from the Dead Sea). Each recipe has a description and a level of difficulty, and is univocally identified by its title. A recipe may include one or more ingredients, and an ingredient may be used, in general, in more than one recipe.

Define preliminary primary keys, other candidate keys (if any), and foreign keys (if any). Then, formulate an SQL query to compute the following data (exploiting aggregate functions only if they are strictly necessary):

The recipes that do not make use of any spicy ingredient, and that include at least two ingredients.