Introduction to Databases

Homework no. 3: Database design

A renowned museum wants to design a database for managing the art works and the exhibitions located in its spaces.

- The museum consists of different buildings. Each building is identified by a code, unique within the museum, and is characterized by a name, an address, and a size (i.e., its volume in m^3). Buildings have many rooms. Each room is identified by a code, unique within its building, and is characterized by the number of seats and by the maximum number of standing people allowed. Furthermore, some rooms are equipped with a monitor to show multimedia content.
- Art works are identified by a code, unique within the museum, and are characterized by their title, author, and release date (if available). Among all art works, sculptures are a relevant type, and they are characterized by their main material.
- The museum employees are divided into operational workers and restorers. Each employee is characterized by their Social Security Number, name, family name, gender, and number of years of experience in the museum. For each operational worker, their role is known, whereas for the restorers, a list of specializations is given.
- The museum wants to keep track of the art work restorations. For each restoration, we know the time period (start and end dates), the overall cost, and a list of the restorers who have been involved. Notice that each restorer could be involved in multiple restorations, possibly on the same day and on different art works. Moreover, the same art work can have multiple restorations in different time periods, by the same restore or by different restorers.
- The museum organizes various exhibitions. Each exhibition is identified by an alphanumeric code, unique within the museum, and is characterized by a title and a description. Exhibitions can be permanent or temporary. Permanent exhibitions are characterized by an artistic period and the building in which they are located.
- For each temporary exhibition the list of exhibited art works is known as well as the operational workers who is in charge of supervising the exhibition. Each temporary exhibition can be set up in one or more buildings, which can vary over time for logistic reasons. Suppose that the set up of a temporary exhibition in a specific building remains unchanged at least for a whole day. However, within the same building, the same temporary exhibition can be set up multiple times in different periods. Suppose also that within the same building, multiple temporary exhibitions can be set up at the same time.

1. Describe the conceptual schema of a database for the above application by means of an ER diagram.
2. Derive a normalized relational logical schema for the same database.
3. Define referential integrity constraints for 3 relationships of your choice among those defined in the conceptual schema.