

## Introduction to Databases

### **Assignment 1:** **Modeling with the E-R and the Relational Model** **Due: February 11, 2019, 23:59**

#### **Case**

You have been hired by the Venerable International Network of Oenology (**VINO**) and have to assist in computerizing the management of information about its members' data, as well as the information they collect about several wines. This oenological organization is quite large and hence has many **members** of the same *name*. To distinguish among members, they issue membership cards, each with a unique *member number*. The *contact details* of members are also book-kept so as to facilitate the mailing of event announcements by post and/or email and calls for meetings.

Once a *week*, VINO organizes a *tasting session*. In those sessions, several *bottles* are offered for tasting, and each *member* records their *evaluation* for each bottle they taste (outstanding, good, mediocre, bad). Such evaluation will differ between one taster and another for the same wine. Besides, the actual quality and therefore the evaluation will vary among bottles of a given wine. Any bottle opened during a tasting session is consumed during that session. **Wines** are identified by their *name* (e.g., "Agiorgitiko"), *appellation* (e.g., "Corinth"), and *vintage* (e.g., 1993). Other data of interest about a wine is the *alcohol degree* (e.g., 13.5), and its *country* of origin (e.g., "Montenegro"), and grape variety (e.g., "Merlot"). At any given time, there will be several **bottles** of the *same wine* in the cellar. For each such wine, the bottles are *numbered*. For instance, the cellar may store 15 bottles numbered 1 to 15 of a Georgian wine of the Saperavi variety from 1991 named Kindzmarauli. Furthermore, VINO may also record wines for which it does not currently own bottles. Any bottle is either available *in the cellar*, or has been tasted and drunk.

1. Design an entity-relationship schema that captures the constraints expressed in the above description. Draw the corresponding E-R diagram. Remember to declare the necessary integrity and participation constraints. Indicate in English the constraints that cannot be captured, if any. Follow the following steps:
  - a. Identify entity sets.
  - b. Identify relationship sets and link them to the entity sets they relate to.
  - c. Indicate attributes of entity and relationship sets.
  - d. Indicate the (combinations of) attributes that form keys.
  - e. Indicate the participation constraints.
2. Translate your E-R diagram into a relational schema. Give the SQL DDL statements to create this schema, along with the necessary integrity constraints. Indicate in English the constraints that cannot be captured, if there are any.

#### *Hints:*

1. The font style (**bold**, *italic*, **both**) in names above is chosen on purpose to tell you something. You may find it useful to think what it means, just as a starting point.
2. Do not make your design more complex than necessary. For example, a relationship should be defined between as few entities as possible: If it can be between 2 entities only, there is no reason to make it be between 3.
3. Consider carefully whether an entity in your design is weak.

#### **Submission Format**

Submit a single pdf file in blackboard, named after your group number and with "A1" appended.