CS2102 Database Systems
AY 2013/14 Semester I
Tutorial #1 Conceptual Design and the ER Model

Design and draw an Entity-Relationship diagram that most correctly and most completely captures the constraints expressed in the description of the following two applications. For each step below, justify your choice by quoting the sentences in the text that support it.

a. Identify entity types
b. Identify relationship sets and link them to the entity types they relate
c. Indicate attributes of entity types and relationship sets
d. Indicate the combination of attributes that form keys
e. Indicate the participation constraints

APPLICATION 1

The Varsity International Network of Oenology (VINO) wants to computerize the management of the information about its members as well as to record the information they gather about various wines. The organization is sufficiently large so that there are several members with the same name. A card with a unique number is issued to identify each drinker. The contact address of each member is also recorded for the mailing of announcements and calls for meetings.

At most once a week, VINO organizes a tasting session. At each session, the attending members taste several bottles. Each member records for each bottle his or her evaluation of the quality (very good, good, average, mediocre, bad, very bad) of each wine that she or he tastes. The evaluation may differ for the same wine from one drinker to another. Actual quality and therefore evaluation also varies from one to another bottle of a given wine. Every bottle that is opened during the tasting session is finished during that session.

Each wine is identified by its name ("Parade D'Amour"), appellation ("Bordeaux") and vintage (1990). Other information of interest about the wine is the degree of alcohol (11.5), where and by whom it has been bottled ("Mis en Bouteille par Amblard-Larolphie Negociant-Eleveur a Saint Andrede Cubzac (Gironde) - France"), the certification of its *appellation* if available ("Appellation Bordeaux Controlee"), and the country it comes from (Produce of “France”).

Generally, there are or have been several bottles of the same wine in the cellar. For each wine, the bottles in the wine cellar of VINO are numbered. For instance the cellar has 20 bottles numbered 1 to 20 of a Semillon from 1996 named Rumbalara. For documentation purposes VINO may also want to record wines for which it does not own bottles.

The bottles are either available in the cellar, or they have been tasted (and drunk...).

APPLICATION 2

Students at the National University of Ngendipura (NUN) buy books for their studies. They also lend and borrow books from other students. Your company, Apasaja Pte. Ltd., is commissioned by NUN Students Association (NUNStA) to design and implement an online book exchange system for its students. Apasaja Pte. Ltd. designs a database application that records information about students, the books they own, and the books they borrow from other students.

The database records the name, email and faculty and department of each student. Each student is identified in the system by his/her email. The database also records the dates at which the student joined and graduated or left the university.

For each book, the database records the title, format, pages, language, authors, publisher, year and the ISBN-10 and ISBN-13. The International Standard Book Number, ISBN-10 or -13, is an industry standard for the unique identification of books.

Each book may have several copies. Each copy has exactly one owner and is numbered. For instance, a book ‘1449389678’ has three copies in the system, numbered as 1, 2, and 3. In other words, each copy is identified by its book ISBN and its copy number. For each copy, the database also records whether it is available for borrowing or not.

If a student borrows a copy of some book, a loan record is created to capture this information as well as the date at which copy is borrowed and the date at which it is returned.