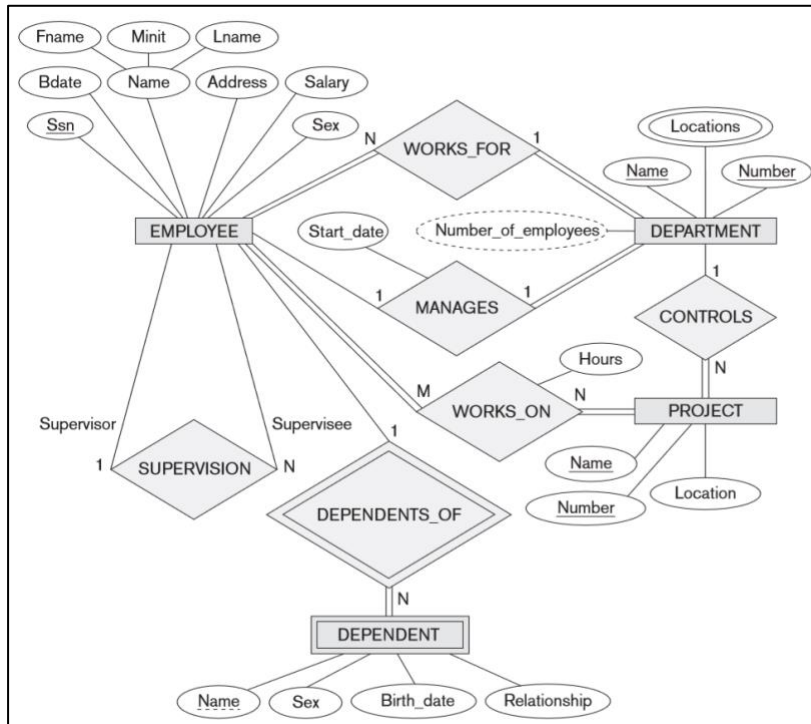# ENTITY RELATIONSHIP DIAGRAMS

(ELMASRI & NAVATHE: CHAPTER 3: 3.2)

Question 2.1 - Using the above ER schema diagram for the COMPANY database, provide one example for each of the following:

Component	Example
Strong entity	
Weak entity	
Primary Key	
Partial Key	
Composite attribute	
Derived attribute	
Multivalued attribute	
1-1 relationship	
1-N relationship	
M-N relationship	

Question 2.2 - Underline or circle the (strong) entities which will be created if an ER diagram was to be made based on the UoD below:

A bank, identified by its code, name and head office address, can have several branches. Each branch within a given bank has a branch number (unique only for each bank) and address. One branch can have several accounts, each identified by an AC number. Every account has a type, current balance, a unique account number, and one or more account holders. A branch can also have several loans, each given by a unique loan number, type, amount and one or more loan holders. The name, address, phones and unique id of all customers of the bank are recorded and maintained.

Question 2.3 - Draw an ER diagram for the following application. Specify key attributes of each entity type and structural constraints on each relationship type. Note any unspecified requirements and make appropriate assumptions to make the specification complete.

(Elmasri & Navathe: Chapter 3: Exercise 3.16)

Consider the following set of requirements for a university database that is used to keep track of students' transcripts.
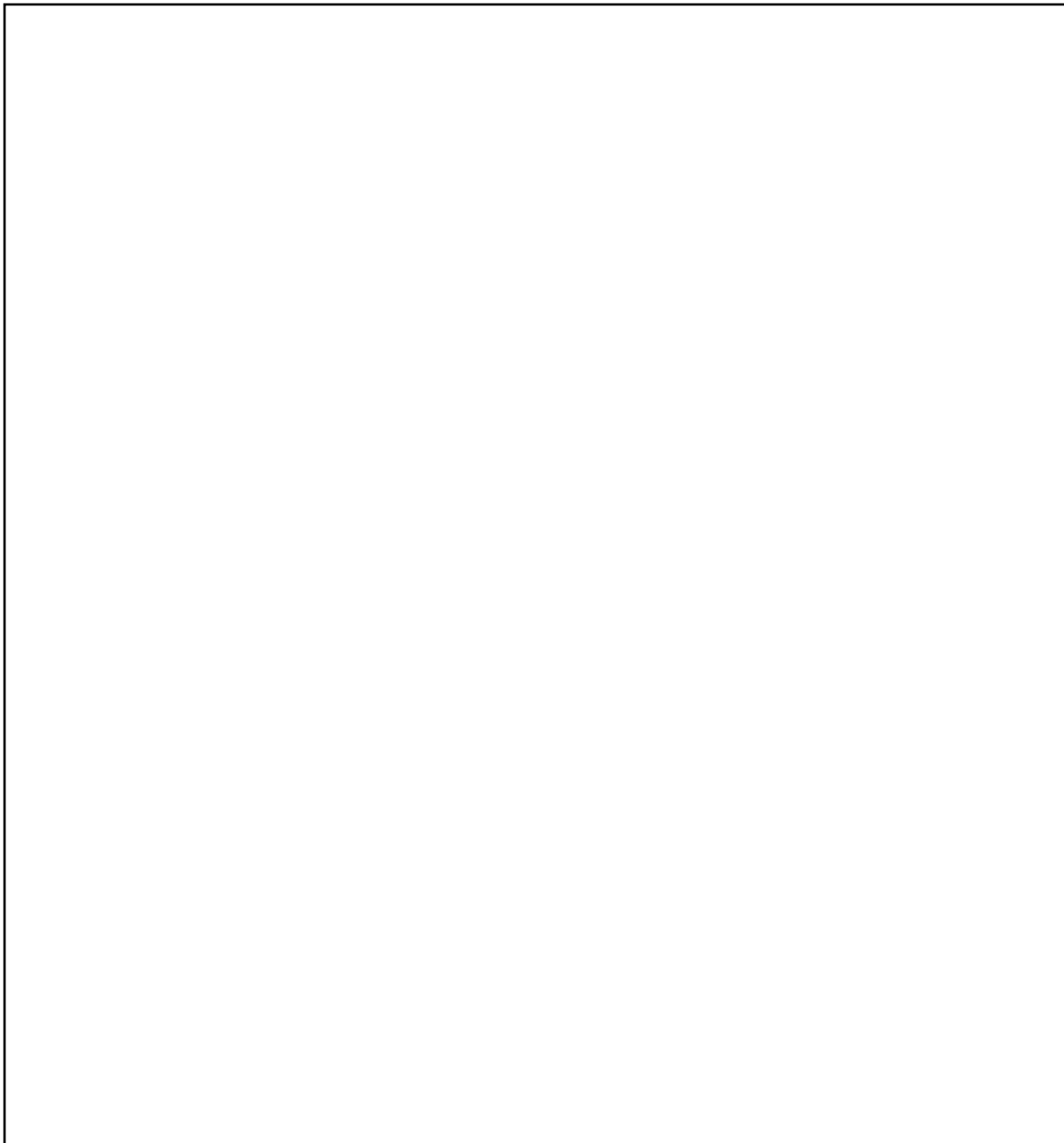
a. The university keeps track of each student's name, student number, social security number, current address and phone, permanent address and phone, birthdate, sex, class (freshman, sophomore, ..., graduate), major department, minor department (if any), and degree program (B.A., B.S., ..., Ph.D.). Some user applications need to refer to the city, state, and zip of the student's permanent address, and to the student's last name. Both social security number and student number have unique values for each student.

b. Each department is described by a name, department code, office number, office phone, and college. Both name and code have unique values for each department.

c. Each course has a course name, description, course number, number of semester hours, level, and offering department. The value of course number is unique for each course.

d. Each section has an instructor, semester, year, course, and section number. The section number distinguishes different sections of the same course that are taught during the same semester/year; its values are 1, 2, 3, ...; up to the number of sections taught during each semester.

e. A grade report has a student, section, letter grade, and numeric grade (0, 1, 2, 3, 4 for F, D, C, B, A, respectively).
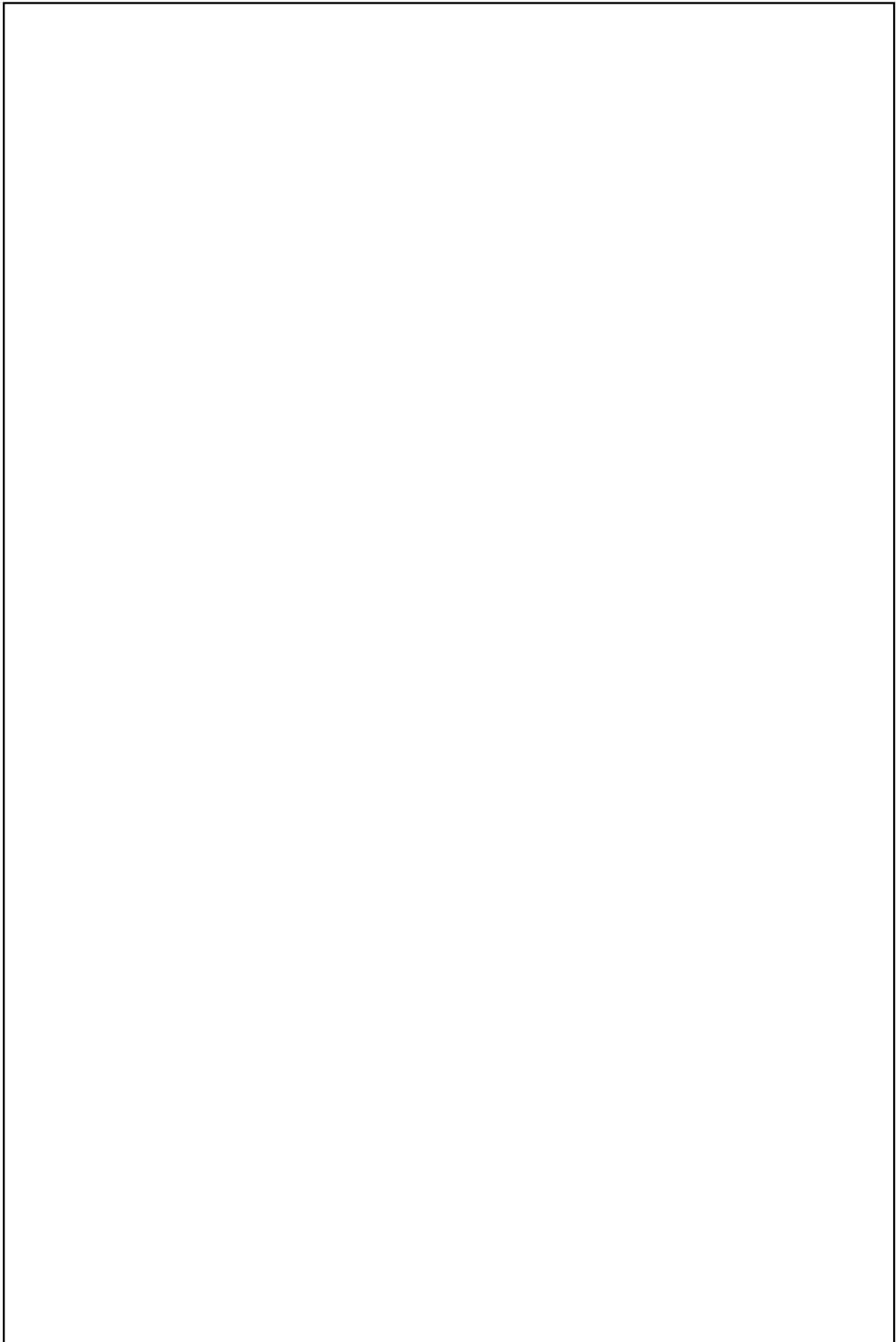
ADVANCED QUESTIONS

Question 2.4 - Draw an ER diagram for the following application. Specify key attributes of each entity type and structural constraints on each relationship type. Note any unspecified requirements and make appropriate assumptions to make the specification complete.
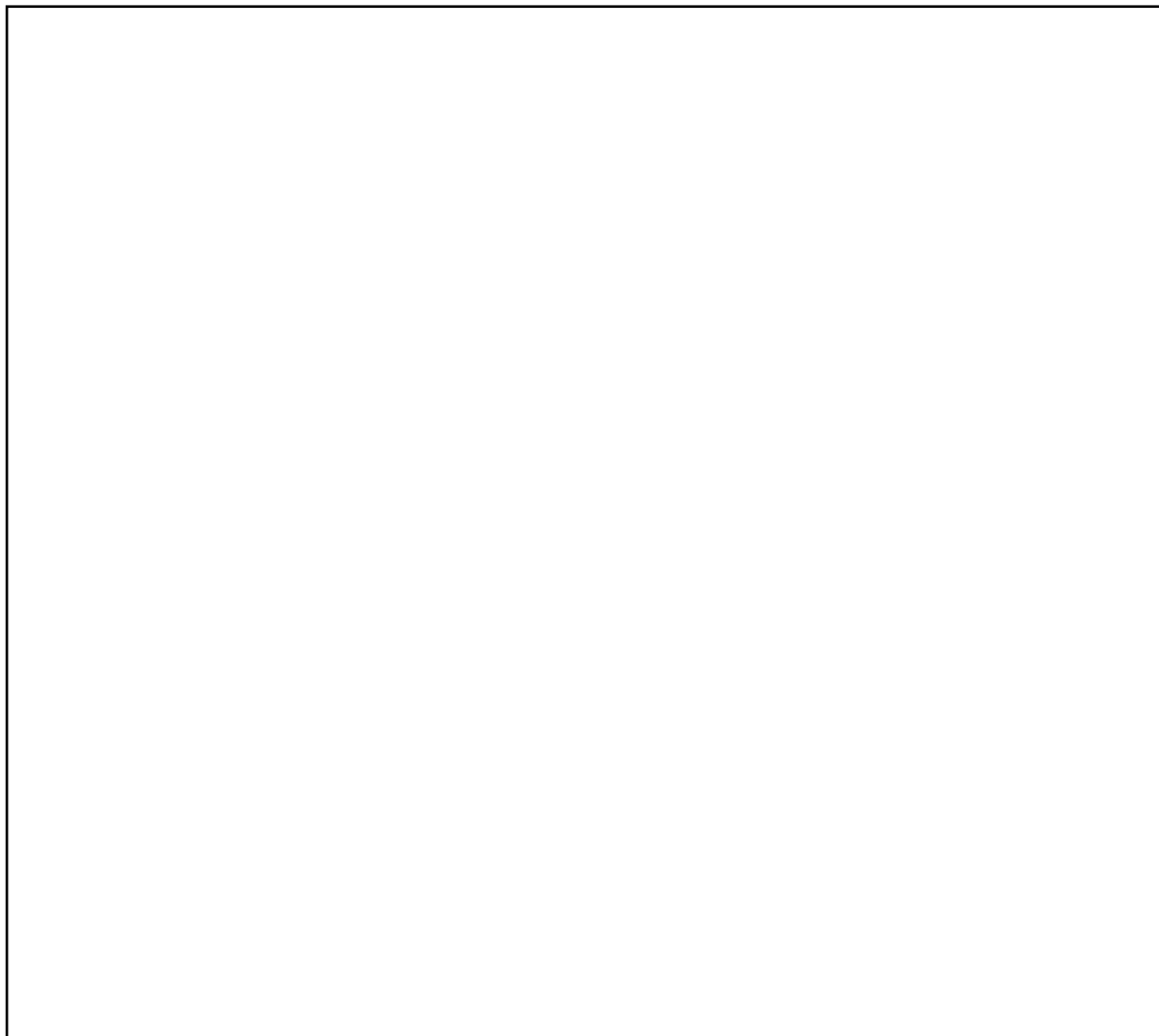
A patient is identified by patient id and Doctors are identified by medical license no. There are two kinds of doctors, GPs and Specialists. For specialists, their area of specialization is also recorded. Doctors work in clinics. One clinic may have several doctors. Clinics are identified by registration number. A patient makes an appointment (date/time) to consult with the doctor. A patient may see the same doctor several times, even on the same date. For each appointment, the doctor's fee is recorded.

Question 2.5 - Draw an ER diagram for the following application. Specify key attributes of each entity type and structural constraints on each relationship type. Note any unspecified requirements and make appropriate assumptions to make the specification complete.

To register, organizers must provide their organization name (unique), address, telephone(s), fax, email and web address, name of a contact person, and his/her telephone.

One organizer may organize multiple shows. Each show is described by a unique name (e.g EKKA2013), its start and end dates, target audience (in terms of age group), preferred area (Brisbane suburb), and number of expected attendees. There are three different kinds of shows – Sports, Entertainment and Trade. For sporting shows it is also required to keep data on whether it is a local, state, national or international show, and the list of main competitions being held (e.g. swimming, tennis, etc.). Entertainment shows are generally classified into family, dance & theatre and food & wine. Every entertainment show also carries a rating. Trade shows may cover more than one trade area and are hence further described through the list of trade areas (e.g. Apparel, Pharmaceutical, agricultural etc.), e.g EKKA is an Industrial and Agricultural trade show.

DISCUSSION QUESTIONS
(Elmasri & Navathe: Chapter 3)

Discuss the naming conventions used for ER diagrams.