Week 4: ER Homework

7.23.d Use the problem description and ERD to fill in the table (min, max) values below.

List the names of all relationship types, and specify the (min, max) constraint on each participation of an entity type in a relationship type. Justify your choices.

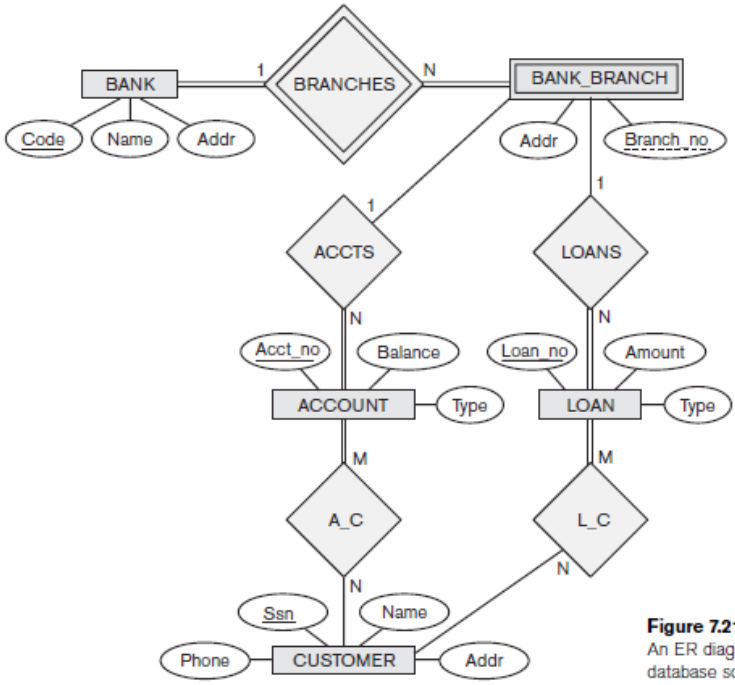


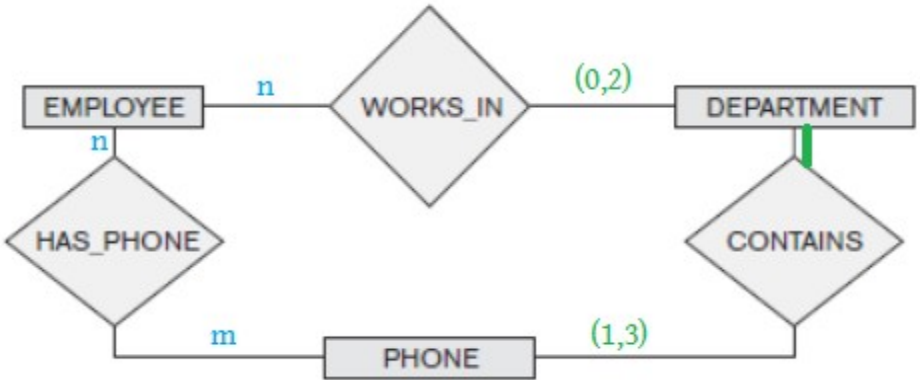
Figure 7.21
An ER diagram for a BANK database schema.

	min	max	
1. a bank has	**1**	**N**	**bank branch(es)**
2. a bank branch has	**1**	**1**	**bank(s)**
3. a bank branch has	**0**	**N**	**loan(s)**
4. a loan has	**1**	**1**	**bank branch(es)**
5. an account has	**1**	**N**	**customer(s)**
6. a customer has	**0**	**M**	**account(s)**

7.24 a. Label the cardinality and participation constraints that are explicitly given in the requirements description directly on the diagram.

b. Label the remaining cardinalities in a different color and state the assumptions that you must make to complete the diagram.

Consider the ER diagram in Figure 7.22. Assume that an employee may work in up to two departments or may not be assigned to any department. Assume that each department must have one and may have up to three phone numbers. Supply (min, max) constraints on this diagram. *State clearly any additional assumptions you make.* Under what conditions would the relationship HAS_PHONE be redundant in this example?



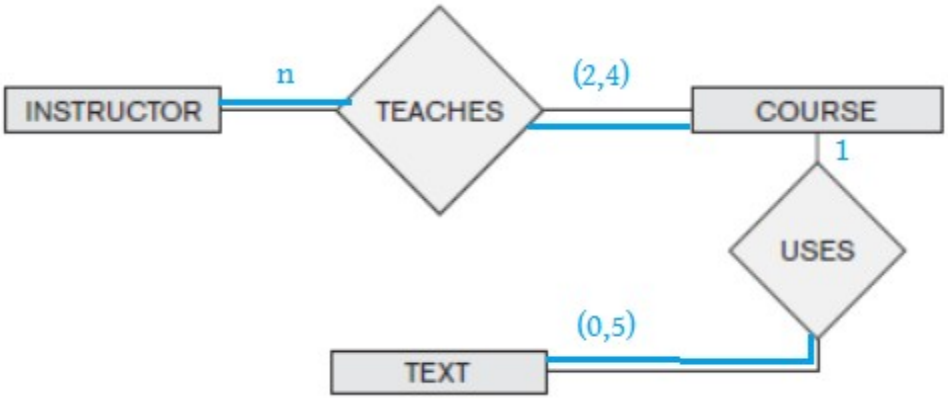
Phone can become redundant if it belongs to an employee in a department, meaning that the phone also belongs to that department and can be related back to the data set twice.

Assumptions- Each Department can have n employees

Each employee can have m phones and each phone can have n employees

7.25 Work the same way as 7.24 above.

Consider the ER diagram in Figure 7.23. Assume that a course may or may not use a textbook, but that a text by definition is a book that is used in some course. A course may not use more than five books. Instructors teach from two to four courses. Supply (min, max) constraints on this diagram. *State clearly any additional assumptions you make.* If we add the relationship ADOPTS, to indicate the textbook(s) that an instructor uses for a course, should it be a binary relationship between INSTRUCTOR and TEXT, or a ternary relationship between all three entity types? What (min, max) constraints would you put on it? Why?



Assumptions- A course must be taught by a teacher

If 'Adopts' was added, it would be a binary relationship. In this case, a text must have at least one teacher, but a teacher can have multiple texts.

7.28 Mark T, F, or M for each item in the table on the right. A statement is true (T) if it describes every possible database state allowed by the schema. A statement is false (F) if it can never be true for any database state that conforms to the schema. A statement should be marked maybe (M) if it is possible to have a database state that makes it true (but it may not be true for all database states.)

a.	**T**
b.	**M**
c.	**M**
d.	**T**
e.	**F**
f.	**F**
g.	**F**
h.	**M**
i.	**M**
j.	**M**
k.	**M**
l.	**M**
m.	**M**

a. There are no actors in this database that have been in no movies.
b. There are some actors who have acted in more than ten movies.
c. Some actors have done a lead role in multiple movies.
d. A movie can have only a maximum of two lead actors.
e. Every director has been an actor in some movie.
f. No producer has ever been an actor.
g. A producer cannot be an actor in some other movie.
h. There are movies with more than a dozen actors.
i. Some producers have been a director as well.
j. Most movies have one director and one producer.
k. Some movies have one director but several producers.
l. There are some actors who have done a lead role, directed a movie, and produced some movie.
m. No movie has a director who also acted in that movie.

for a MOVIES
a.