Solutions Review questions II (questions 6-9)

Question 6

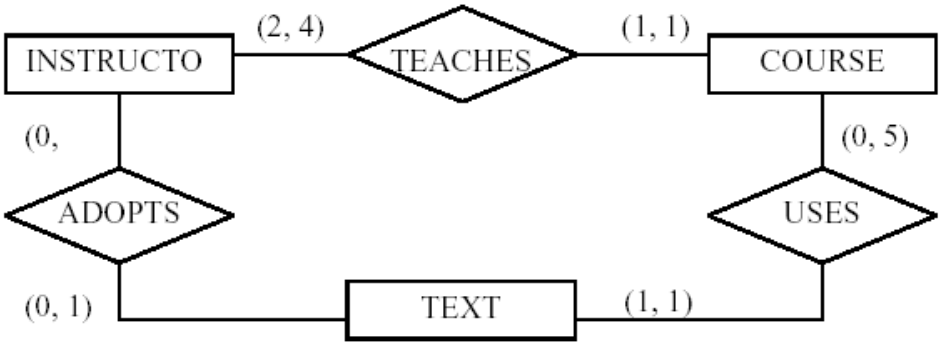
Answer:

Assume that a course may or may not use a textbook, but 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. If we add the relationship ADOPTS, to indicate the text book(s) that an instructor uses for a course, should it be a binary relationship between INSTRUCTOR and TEXT.

Assuming the following additional assumptions:

- Each course is taught by exactlty one instructor.
- Each textbook is used by one and only one course.
- An instructor does not have to adopt a textbook for all courses.
- If a text exists:
  - It is used in some course,
  - Hence it is adopted by some instructor who teaches that course.
- An instructor is considered to adopt a text if it is used in some course taught by that instructor.

Figure B



Question 7

Cardinality ratios often dictate the detailed design of a database. The cardinality ratio depends on the real-world meaning of the entities involved and is defined by the specific application. For the following binary relationships, suggest cardinality ratios based on the common-sense meaning of the entities. Clearly assumptions you make.

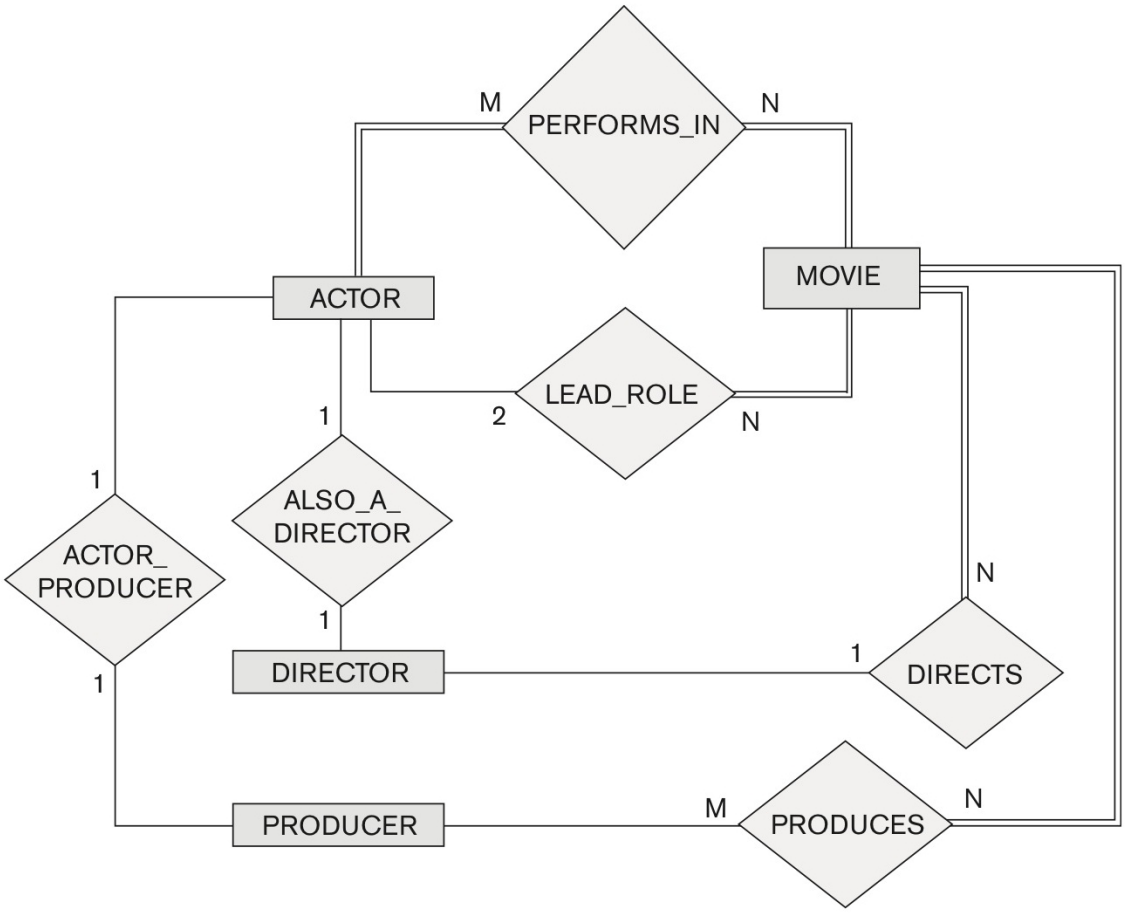
Answer:

Entity 1	Cardinality Ratio	Entity 2
STUDENT	1-many A student may have more than one social security card (legally with the same unique social security number), and every social security number belongs to a unique student.	SOCIAL_SECURITY_CARD
STUDENT	Many-many Generally students are taught by many teachers and a teacher teaches many students.	TEACHER
CLASSROOM	Many-many Don't forget that the wall is usually shared by adjacent rooms.	WALL
COUNTRY	1-1 Assuming a normal country under normal circumstances having one president at a time.	CURRENT_PRESIDENT

COURSE	Many-many A course may have many textbooks and a text book may be prescribed for different courses.	TEXTBOOK
STUDENT	Many-many One student may take several classes. Every class usually has several students.	CLASS
INSTRUCTOR	1-1 Assuming every instructor has only one office and it is not shared	OFFICE

Question 8

Assume that MOVIES is a populated database. ACTOR is used as a generic term and includes actresses. Given the constraints shown in the ER schema, respond to the following statements with True, False, or Maybe. Assign a response of Maybe to statements that, although not explicity shown to be True, cannot be proven False based on the schema as shown. Justify each answer.



Answer:

a. There are no actors in this database that have been in no movies. **T**

b. There are some actors who have acted in more than ten movies. **T**

c. Some actors have done a lead role in multiple movies. **T**

d. A movie can have only a maximum of two lead actors. **T**

e. Every director has been an actor in some movie. **F**

f. No producer has ever been an actor. **F**

(Ningún productor ha sido actor)

g. There are movies with more than a dozen actors. **X**

h. Some producers have been a director as well. **F**

i. Most movies have one director but several producers. **T**

j. There are some actors who have done a lead role, directed a movie, and produced a movie. **T**

Question 9

Given the ER schema for the movies database in Figure 3.25, draw instances for each entity: MOVIE, ACTOR, PRODUCER, DIRECTOR involved; make up instances of the relationships as they exist in reality for those movies.

Answer:

1. MOVIE: Misión imposible (1996-presente)
   Actor: Tom Cruise (lead_role) (and more)
   Producer: Tom Cruise (and more)
   Director: Brian De Palma

2. MOVIE: La guerra de los mundos (2005)
   Actor: Tom Cruise
   Producer: Kathleen Kenedy
   Director: Steven Spielberg

3. MOVIE: Kill Bill
   Actor: …… Quentin Tarantino
   Producer: Lawrence Bender
   Director: Quentin Tarantino