

# CS586/486 Introduction to Databases

Fall 2015 Quarter

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## Assignment 4 ER Diagrams – Revision 1

**Remember: The first midterm is Tuesday, 3 November, on material through PHP.**

Due: Thursday, 29 October 2015 at the beginning of class

You may do this assignment individually or you may work with one partner. That is, this assignment is to be completed by individuals or by teams of two students. You should only talk to the instructor, the TA and your partner about this assignment. You may also post questions to the Piazza discussion list.

Please turn in your completed assignments on paper. Put your last name, first name, the assignment number in that order in the first line of your assignment. List last name and first name for your partner, if you have one, on the second line of your assignment. (If you are working with a partner, turn in **one** assignment paper.)

### **Part I: Creating ER Diagrams**

Question 1 (25 points): Consider the following scenario.

- There are television series, which have names, networks and production companies, and are identified by the name and network.
- A television series has one or more seasons, which are identified by the number of the season. A season also has the number of episodes and the year the season starts. No season can exist without a corresponding series.
- A season has one or more episodes, identified by episode number, which is unique within the season. Each episode also has a title and a length. No episode can exist without a corresponding season.
- An actor is identified by name and birth date, and also has a nationality.
- A writer is also identified by name and birth date, and has a talent agency that represents him or her.

- An actor can appear as a “regular” on a television series or a guest star on an episode.
- An episode has one or more writers. A writer can write one or more episodes.

Draw an ER diagram that represents this scenario. You can use conventional notation (rectangles, diamonds, ovals) or UML notation. Be sure to mark the key attributes and include cardinality constraints on relationships.

For Questions 2-5 you should modify your ER diagram from Question 1 to handle the following changes in the scenario. Do each scenario as a separate change from the original diagram. You only need to show the parts of the diagram that change.

Question 2 (10 points): An episode can be the continuation of a previous episode.

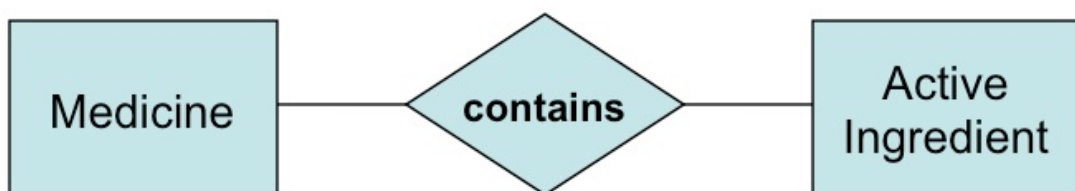
Question 3 (10 points): A television series can be a spin-off of another series.

Question 4 (10 points): An actor plays a particular character in a television series or episode.

Question 5 (10 points): An episode can be the pilot episode for a series. A series can have at most one pilot episode.

## Part II: Cardinality Constraints

Questions 6-8 concern the ER diagram below, representing medicines that contain active ingredients. For each different condition, show the ER diagram with the correct cardinality constraints. Show both maximum and minimum bounds.



Question 6 (5 points): A medicine has up to four active ingredients (and may have none), and every active ingredient is used in at least one medicine.

Question 7 (5 points): Every medicine has exactly one active ingredient, and an ingredient is never used in more than five medicines.

Question 8 (5 points): A medicine has at least one active ingredient, and an

ingredient can be used in any number of medicines.

### **Part III: Attributes versus Entities**

Questions 9-12 all concern a student entity (with studentID, name and email). Each student also has faculty advisor (with name and department) who was first assigned in a particular academic quarter (for example, Fall 2013).

Question 9 (5 points): Give an ER diagram that represents advisor information only using attributes.

Question 10 (5 points): Give an ER diagram that represents advisor information using a relationship and relationship attributes.

Question 11 (5 points): Give an ER diagram that represents advisor information using a 3-way relationship.

Question 12 (5 points): Suppose a student can have multiple advisors (possibly with different assigned dates). Which of your ER diagrams in Questions 9-11 could represent this situation (possibly with a change of cardinality constraints)?