

Database Programming Homework #2: EER Diagrams

1. Subtype discriminators were left off the figures a, b and c, included on this homework assignment. Please recall that a subtype discriminator is the attribute along which subclasses are classified. It is NOT the “d” or “o” of the disjointedness constraint. It is NOT the single or double lines of the completeness constraint. It is the actual attribute that you use to determine what your subtypes will be. (see slides or review videos if necessary because it’s not in your book.) Add subtype discriminators for each figure. If necessary, create a new attribute for the discriminator. Do not draw a new diagram. Just write what the subtype discriminator is. For figure d the subtype discriminator is residential_or_outpatient. For Figure e, the subtype discriminator is mfg_or_purch. For d and e: do you think that there is a different set of circumstances that might require a different subtype discriminator? Here is an example of what that question means: If I were creating an EER diagram of my students, if I were interested in knowing how many dorms to build, I might choose as my subtype discriminator an attribute such as “dorming status” which would have values of “dorming” or “commuting”. But if I were interested in setting up services for undergrads and grads, I would choose as my subtype discriminator an attribute such as “grad status” which would have as its values “G” or “UG”. So think of a situation for d and also for e, where you might use a different subtype discriminator. Write the scenario, and then also write what subtype discriminator you would use. SEE NOTE ON SHOWING SUBTYPE DISCRIMINATORS AT THE END OF THE ASSIGNMENT.

2. Consider the following two cases. For each case, . would you consider creating a supertype/subtype relationship for this problem? Why or why not?
 - a. A university classifies its students into four categories: freshman, sophomore, junior and senior. The university wants to record the following data for all students: Student ID, Class Standing, Dorming Status, Major . There are no unique attributes for any of the four classes of students. There is a relationship (named Registers) with another entity Course. All student register the same way for courses. There are no other entities or relationships at this time. The university may want to generate some statistics on the students by Major.
 - b. A university classifies its students into four categories: freshman, sophomore, junior and senior. The university wants to record the following data for all students: Student ID, Class Standing, Dorming Status, Major . If a student is a senior, the university also wants to store the student’s graduation date. The university also maintains information about the different dorms, and also keeps track of which students are dorming in which dorms.

3. Oversell, Inc. has three levels of personal customers: silver, gold and platinum. Customers are identified by a CustomerID. Oversell also stores the customer name, address and balance. Platinum and Gold customers are preferred customers, and they get a special lower interest rate on their credit card balance. Platinum customers also has access to a personal customer service representative, who can serve several platinum customers. The company maintains information about the customer service rep (Employee ID number, Employee name, and the last date of contact between a specific platinum customer and the customer service rep.) In addition, Oversell, Inc. has business customers. These customers get an extended line of credit. Some customers maintain both a personal and a business account with Oversell Inc. Develop an EER model segment to represent Oversell’s customer structure. Remember to include a subtype discriminators, completeness and disjointedness constraints, and all relevant PKs, FKs and associative entities, if any. SEE NOTE ON SHOWING SUBTYPE DISCRIMINATORS AT THE END OF THE ASSIGNMENT.

4. Draw an EER Diagram to capture the following scenario:

An international school of technology has hired you to create a database management system to assist in scheduling classes. After several interviews with the president, you have come up with the following list of entities, attributes, and initial business rules:

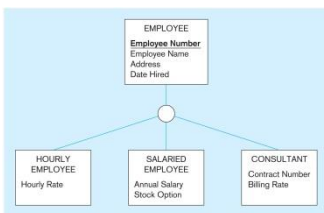
- Room is identified by Building ID and Room No and also has a Capacity. A room can be either a lab or a classroom. If it is a classroom, it has an additional attribute called Board Type.
- Media is identified by MType ID and has attributes of Media Type and Type Description. Note: Here we are tracking type of media, not the individual piece of equipment. Tracking of equipment is outside of the scope of this project.
- Computer is identified by CType ID and has attributes Computer Type, Type Description, Disk Capacity, and Processor Speed. Please note: As with Media Type, we are tracking only the type of computer, not an individual computer. You can think of this as a class of computers.
- Instructor has identifier Emp ID and has attributes Name, Rank, and Office Phone.
- Timeslot has identifier TSIS and has attributes Day Of Week, Start Time, and End Time.
- Course has identifier Course ID and has attributes Course Description and Credits. Courses can have one, none, or many prerequisites. Courses also have one or more sections.
- Section has identifier Section ID and attribute Enrollment Limit

After some further discussions, you have come up with some additional business rules to help you create the initial design:

- An instructor teaches one, none, or many sections of a course in a given semester.
- An instructor specifies preferred time slots.
- Scheduling data are kept for each semester, uniquely identified by semester and year.
- A room can be scheduled for one section or no section during one time slot in a given semester of a given year. However, one room can participate in many schedules, one schedule, or no schedules; one time slot can participate in many schedules, one schedule, or no schedules; one section can participate in many schedules, one schedule, or no schedules. Hint: Can you associate this to anything that you have seen before?
- A room can have one type of media, several types of media, or no media.
- Instructors are trained to use one, none, or many types of media.
- A lab has one or more computer types. However, a classroom does not have any computers.
- A room cannot be both a classroom and a lab. There also are no other room types to be incorporated into the system.

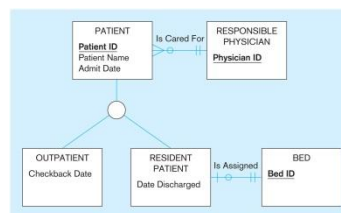
5. Complete the [Chicago Mental Health Services EER diagram](#)

Problem 1-a

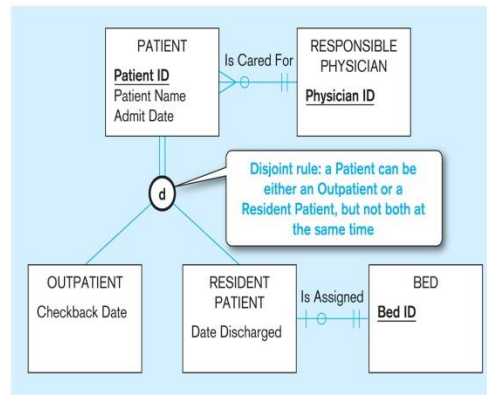
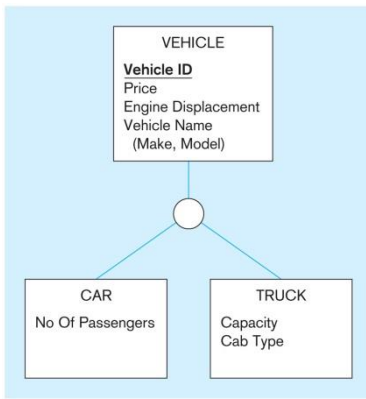


Problem #1-c:

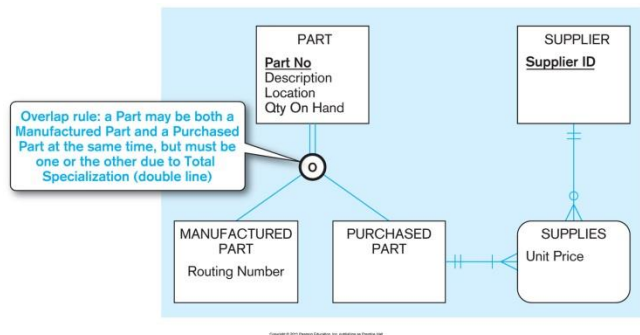
Problem 1-b:



Problem 1-d:



Problem 1-e:



Note about showing subtype discriminators:

Subtype discriminators are best shown as below. Show the attribute that determines the classes (in this case, EmployeeType), and then on the different branches you can show the values of that attribute that classify an instance into one of those classes. So, for instance, in Problem 3 above, you can put “Gold” and “Platinum” on the branch that leads to the “Preferred” class of customer.

