Entity-Relationship Diagram Exercises

These exercises provide you with opportunities to understand ER diagrams more deeply. I highly recommend that you complete these exercises because I believe doing so will make it easier for you to learn to write SQL queries, but you are not required to do so to pass the course.

Whenever you are asked to make your own ER diagrams, use the program ERDPlus, at https://erdplus.com/. Refer to videos in the course for demonstrations of using ERDPlus.

Answers to all exercises are provided in a separate document included with the course materials.

Exercise 1a. Make an ER diagram that describes the following data and relationships:

- A health care organization keeps track of its doctors and outpatient locations.
- For each doctor it keeps track of the DoctorID (unique), DoctorName, and DoctorYearofMDGraduation (year graduated from medical school).
- For each output location it keeps track of the OLID (Outpatient Location ID; unique) and OLName (Outpatient Location Name).
- Each doctor works at exactly one outpatient location and each outpatient location must have at least one doctor working at it, but can have many doctors working at it.

Exercise 1b. Make an ER diagram that describes the same data and relationships as in Exercise 1a, modified to reflect the following changes:

- Each doctor works at either one outpatient location or at no outpatient locations (because the doctor works only in the main hospital instead), and each outpatient location can have between none (if the location is used to treat rehab and minor health issues only) and many doctors working at it.

Exercise 1c. Make an ER diagram that describes the same data and relationships as in Exercise 1a, modified to reflect the following changes:

- Each doctor works at between one and many outpatient locations, and each outpatient location must have at least one but can have many doctors working at it.

Exercise 1d. Make an ER diagram that describes the same data and relationships as in Exercise 1a, modified to reflect the following changes:

- Each doctor works at between 2 and 4 outpatient locations and each outpatient location has between 3 and 10 doctors working at it.

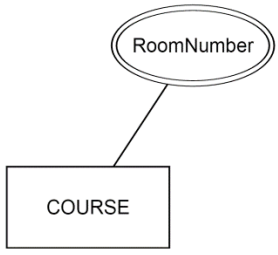
Exercise 2. Make an ER diagram that describes the following data and relationships:

- A health care organization keeps track of outpatient locations and examination rooms within the outpatient locations
- For each outpatient location, the health care organization keeps track of the OLID (Outpatient Location ID; unique) and OLName (Outpatient Location Name)
- For each examination room the health care organization keeps track of the ERoomNumber (unique within its outpatient center, but an examination room in different outpatient locations can have the same ERoomNumber) and ERoomSize
- Each outpatient location must have at least one, but can have many, examination rooms, and each examination room is located in one outpatient location

Hint: To depict the relationship between ERoomNumber and the other data in this exercise in ERDPlus, you may need to use the "Identifying" option when defining the relationship.

Note for Exercises 3-5:

"Multivalued" attributes are used when an entity can have multiple values for the same attribute. Multivalued attributes are depicted by a double line around the oval of an attribute. For example, if a course could have multiple room numbers because the location of the course changes over a semester or year, you would depict the attribute like this:



Exercise 3. Investco Scout is an investment research company. Create the ER diagram for the Investco Scout Funds Database, which is supposed to contain the following information:

- It will keep track of investment companies, the mutual funds they manage, and securities contained in the mutual funds.

- For each investment company, Investco Scout will keep track of a unique investment company identifier, a unique investment company name, and the names of the investment company's multiple locations.
- For each mutual fund, Investco Scout will keep track of a unique mutual fund identifier, the mutual fund name, and the mutual fund inception date.
- For each security, Investco Scout will keep track of a unique security identifier, as well as the security name and type.
- Investment companies can manage multiple mutual funds. Investco Scout will not keep track of investment companies that do not manage any mutual funds. A mutual fund is managed by one investment company.
- A mutual fund contains one or many securities. A security can be included in many mutual funds. Investco Scout will keep track of securities that are not included in any mutual funds.
- For each instance of a security included in a mutual fund, Investco Scout will keep track of the amount included.

Exercise 4. Snooty Fashions is an exclusive custom fashion design business. Create the ER diagram for the Snooty Fashions Operations Database based on the following data collection requirements:

- For each designer, the database must keep track of a unique designer identifier, unique SSN, and a name (which is composed of a first and a last name).
- For each customer, the database must keep track of a unique customer identifier, his/her name (which is composed of a first and a last name), and multiple phone numbers.
- For each tailoring technician, the database must keep track of a unique SSN and a name (which is composed of a first and a last name).
- For each outfit, the database must keep track of a unique outfit identifier, the outfit's planned date of completion, and its price.
- For each fashion show, the database must keep track of a unique show identifier, as well as the date and location of the show.
- Each designer designs many outfits. Each outfit has only one designer.
- Each outfit is sold (in advance) to exactly one customer. Customers can buy one or many outfits (Snooty Fashions will not keep track of customers who have not made any purchases yet).
- Each tailoring technician must work on at least one outfit, but can work on many. Each outfit has at least one tailoring technician working on it, but can have many tailoring technicians working on it.
- Snooty Fashions will keep track of the date when a tailoring technician started working on a particular outfit.
- Each designer can participate in a number of fashion shows, but does not have to participate in any. Each fashion show can feature one or two Snooty Fashions designers (Snooty Fashions will not keep track of fashion shows that do not feature Snooty Fashions designers).

Exercise 5. ExoProtect is an insurance company. Describe in words what data need to be collected by ExoProtect's database and how those data relate to each other, based on this ER diagram: