Chapter 3 Review Questions
Due: October 8, 2020 @ 11.59pm

1. What is an entity type? What is an entity set? Explain the differences among an entity, an entity type, and an entity set.
   The entity type is a collection of the entity having similar attributes. Entity Set is a collection of entities of the same entity type.
2. When is the concept of a weak entity used in data modeling?
The concept of weak entity is used in data modeling when there are many attributes or when entity types do not have key attributes of their own.
3. Composite and multivalued attributes can be nested to any number of levels. Suppose we want to design an attribute for a STUDENT entity type to keep track of previous college education. Such an attribute will have one entry for each college previously attended, and each such entry will be com- posed of college name, start and end dates, degree entries (degrees awarded at that college, if any), and transcript entries (courses completed at that college, if any). Each degree entry contains the degree name and the month and year the degree was awarded, and each transcript entry contains a course name, semester, year, and grade. Design an attribute to hold this information. Use the conventions in Figure 3.5.
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{ PreviousEducation ( CollegeName, StartDate, EndDate,{ Degree
(DegreeName, Month, Year) },{ Transcript (CourseName, Semester,
Year, Grade) } ) }
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4. Consider the ER diagram in Figure 3.21, which shows a simplified schema for an airline reservations system. Extract from the ER diagram the requirements and constraints that produced this schema. Try to be as precise as possible in your requirements and constraints specification.

(1) The database represents each AIRPORT, keeping its unique AirportCode, the AIRPORT Name, and the City and State in which the AIRPORT is located.

(2) Each airline FLIGHT has a unique number, the Airline for the FLIGHT, and the Weekdays on which the FLIGHT is scheduled (for example, every day of the week except Sunday can be coded as X7).

(3) A FLIGHT is composed of one or more FLIGHT LEGs (for example, flight number CO1223 from New York to Los Angeles may have two FLIGHT LEGs: leg 1 from New York to Houston and leg 2 from Houston to Los Angeles). Each FLIGHT LEG has a DEPARTURE AIRPORT and Scheduled Departure Time, and an ARRIVAL AIRPORT and Scheduled Arrival Time.

(4) A LEG INSTANCE is an instance of a FLIGHT LEG on a specific Date (for example, CO1223 leg 1 on July 30, 1989). The actual Departure and Arrival AIRPORTs and Times are recorded for each flight leg after the flight leg has been concluded. The Number of available seats and the AIRPLANE used in the LEG INSTANCE are also kept.

5. Which combinations of attributes have to be unique for each individual SECTION entity in the UNIVERSITY database shown in Figure 3.20 to enforce each of the following miniworld constraints:

    a. During a particular semester and year, only one section can use a particular classroom at a particular DaysTime value.
       (SecID,Sem,Year,DaysTime,CRoom)

    b. During a particular semester and year, an instructor can teach only one section at a particular DaysTime value.
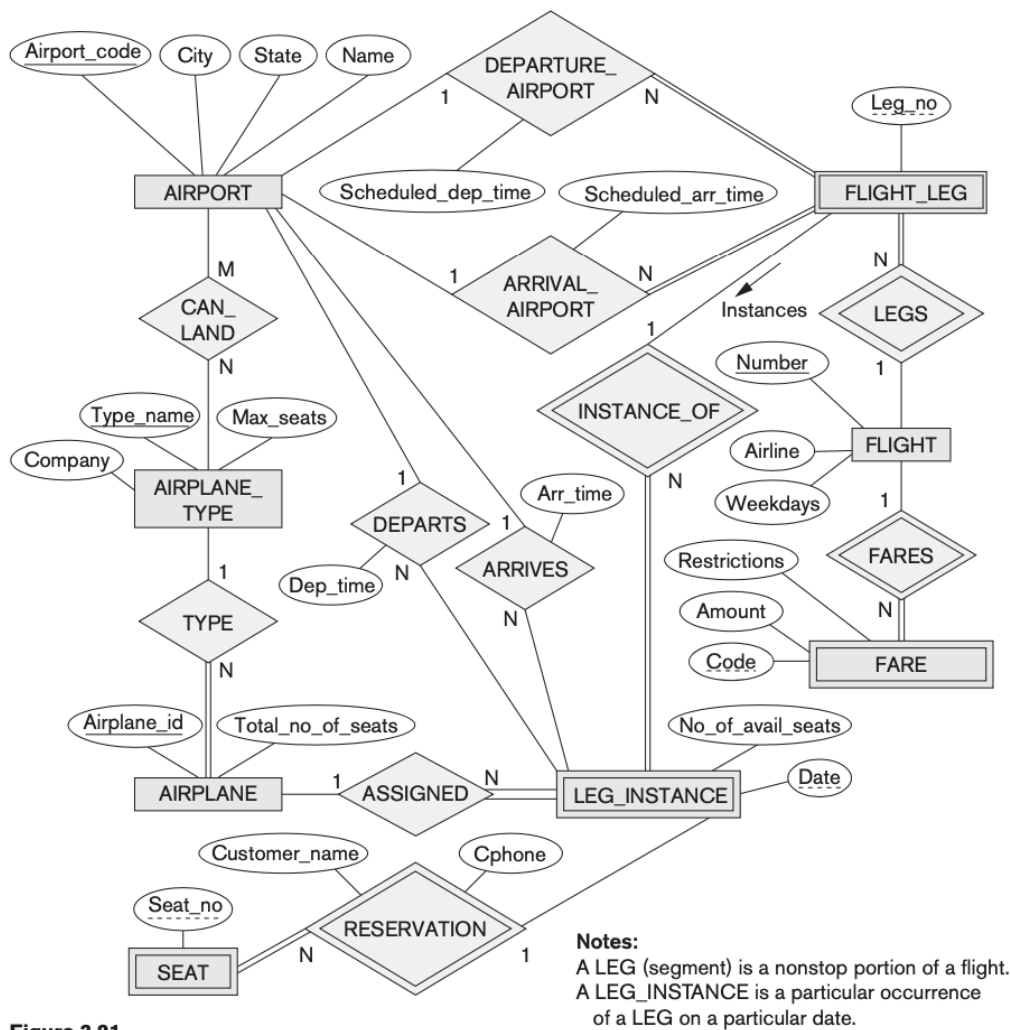   (SecID,Sem,Year,DaysTime)

Figure 3.21
An ER diagram for an AIRLINE database schema.