

Construct Entity Relationship Diagram (ERD)

Exercise 1 : A database is to be made to store information about a catalogue of CDs. Information to be stored about each CD includes their titles, prices, genre, and a list of tracks. Each CD will also have an artist, and each artist may produce several CDs. Tracks will have a title and a running time (in seconds). Artists have names associated with them and it should be possible to search the database by artist names. Finally, in order to search the catalogue by title, each CD will have a number of keywords, which are the words in the title of the CD.

Design an ERD for this application. Note any unspecified requirements, and make appropriate assumptions to make the specification complete.

Exercise 2 : A Country Bus Company owns a number of busses. Each bus is allocated to a particular route, although some routes may have several busses. Each route passes through a number of towns. One or more drivers are allocated to each stage of a route, which corresponds to a journey through some or all of the towns on a route. Some of the towns have a garage where busses are kept and each of the busses are identified by the registration number and can carry different numbers of passengers, since the vehicles vary in size and can be single or double-decked. Each route is identified by a route number and information is available on the average number of passengers carried per day for each route. Drivers have an employee number, name, address, and sometimes a telephone number.

(?) Design an ERD for this application. Note any unspecified requirements, and make appropriate assumptions to make the specification complete.

Exercise 3 : Design an ER schema for keeping track of information about vote taken in the U.S. House of Representatives during the current two-year congressional session. The database needs to keep track of each U.S. **STATE**'s Name (e.g., 'Texas', 'New York', 'Connecticut') and include the **Region** of the state (whose domain is {'Northeast', 'Midwest', 'Southeast', 'Southwest', 'West'}). Each **CONGRESS_PERSON** in the House of Representatives is described by his or her **Name**, plus the **District**

represented, the **Start_date** when the congressperson was first elected, and the political **Party** to which he or she belongs (whose domain is “‘Republican’, ‘Democrat’, ‘Independent’, ‘Other’”). The database keeps track of each **BILL** (i.e., proposed law), including the **Bill_name**, the **Date_of_vote** on the bill, whether the bill **Passed_or_failed** (whose domain is {‘Yes’, ‘No’}, and the **Sponsor** (the congressperson(s) who sponsored-that is, proposed-the bill). The database keeps track of how each congressperson voted on each bill (domain of Vote attribute is {‘Yes’, ‘No’, ‘Abstain’, ‘Absent’}).

(?) Design an ERD for this application. Note any unspecified requirements, and make appropriate assumptions to make the specification complete.

Exercise 4: Consider the following set of requirements for a university database that is used to keep track of students' transcripts.

(a) The university keeps track of each student's name, student number, social security number, current address and phone, permanent address and phone, birthdate, sex, class (freshman, sophomore, ..., graduate), major department, minor department (if any), and degree program (B.A., B.S., ..., Ph.D.). Some user applications need to refer to the city, state, and zip of the student's permanent address, and to the student's last name. Both social security number and student number have unique values for each student.

(b) Each department is described by a name, department code, office number, office phone, and college. Both name and code have unique values for each department.

(c) Each course has a course name, description, course number, number of semester hours, level, and offering department. The value of course number is unique for each course.

(d) Each section has an instructor, semester, year, course, and section number. The section number distinguishes different sections of the same course that are taught during the same semester/year; its values are 1, 2, 3, ...; up to the number of sections taught during each semester.

(e) A grade report has a student, section, letter grade, and numeric grade (0, 1, 2, 3, 4 for F, D, C, B, A, respectively).

(?) Design an ERD for this application. Note any unspecified requirements, and make appropriate assumptions to make the specification complete.