

Practice Problems on Entity Relationship Diagram

Before you draw the ER Diagram for the question, do the following tasks first and then finally draw the neat and concise ER diagram with specified constraints followed in the tasks mentioned.

Tasks:

- i) Identify the potential entities
- ii) Determine the appropriate matching attributes of each entity
- iii) Fix the relationships between entities.
- iv) Analyse the Cardinality of Relationships
- v) Find the Weak Entities if any
- vi) Identify the Participation Types and denote accordingly
- vii) Draw the perfect ER Diagram matching with all the above constraints.
- viii) Convert the ERD to Tables with necessary keys and constraints.

Scenario 1

The organizers of the EX2024 international multi-conference need to keep track of a large collection of workshops associated with the event. Initial requirements analysis brings out the following information about what needs to be recorded.

- Each workshop has a name, and happens on a particular date | or dates, as some workshops last more than one day.
- There are several participants, each of which may sign up to one or more workshops.
- For each participant, it is important to record their name, email address, and the workshops which they wish to attend.
- There are a number of meeting rooms at the conference venue, each of a fixed capacity. Meetings rooms are identified by a floor and room number.
- Every workshop needs an allocated meeting room; where a workshop lasts for two days, it will use the same room on both days.

Draw an entity-relationship (ER) diagram that represents this information.

Scenario 2

Professor Smith would like to assign m projects to n students in a database class. Each project can be described by its name, description, deadline and status (completed or in progress); each student has a student id, a name, and an email. Students can work in groups of several persons on one of the m projects. Different groups will take different projects (assume more projects than students, so some projects will have no students assigned) and each student participates in exactly one group. After the project for a group is finished, a grade for the project is determined and given to all students in the group. Assume each group is identified by a unique group name. In the following, you are asked to help Dr. Smith design a database system to facilitate the assignment and grading of the projects.

Draw an E-R diagram for the system, in particular, use arrows or thick lines to represent constraints appropriately. Write down your assumptions if you need to make any.

Scenario 3

Create an Entity-Relationship diagram for the following database. Make sure you list all the relevant attributes, underline the keys. For each relationship, mark the participation constraints clearly (one-to-one, one-to-many or many-to-many).

You are creating a database for storing information for a Netflix like service. The database stores movies with id, title, filename and TV shows with id, title. TVShows have episodes. Each episode has a corresponding TV show, a season id, an episode id, title, filename. Some episodes have a next episode (i.e. the episode that will automatically start showing once the user finishes watching the current episode!). The database also stores users; each user has an id, username, and password. Users may watch zero or more movies, zero or more TV show episodes. For each movie or episode, the database stores a watch time value for each user, indicating how many minutes the user watched that movie or show. Finally, the database stores which movie appears similar to which other movie for a given user (to be able to make recommendations).

Scenario 4

Alice has a large DVD movie collection. Her friends like to borrow her DVD's, and she needs a way to keep track of who has what. She maintains a list of friends, identified by unique FID's (friend identifiers) and a list of DVD's, identified by DVDID's (DVD identifiers). With each friend is the name and the all-important telephone numbers which she can call to get the DVD back. With each DVD is the star actor name and title. Whenever a friend borrows a DVD, Alice will enter that fact into her database along with the date borrowed. Whenever the DVD gets returned, that fact, too, gets noted along with the date returned. Alice wants to keep a complete history of her friends' borrowing habits so that she can ask favors of the heavy borrowers (or perhaps refuse to make further loans to those who habitually don't return them quickly).

Draw an E/R diagram for the data set described above. Make sure to indicate all cardinality constraints specified above.