DBMS Course
Exercise Set: E-R Modeling

Design Problem 1. Give an E-R diagram for a database that keeps information about IPL cricket league, including, team, players and their fans.

1. For each team, keep information about owner(s), name, team id, inception, players, team colors, team captain (by year).
2. For each player, his name, and player details.
3. For each match played, its venue, date, teams playing, the roster of teams.
4. Scoreboard of each match, player of the match.
5. Fan: name of fan, his/her favorite teams, favorite players etc..

Record for each player the history of teams on which they have played, including start date and end date for each such team.
For each entity and relationship, identify the key(s). Include arrows where appropriate to indicate multiplicity of a relationship. Map the E-R diagram to a relational database.

Design Problem 2. Give an E-R diagram for a bank database that keeps information about customers and their accounts. Information about customers includes their name, address, mobile phone, Aadhar and PAN numbers. Accounts have numbers and types (e.g., savings, fixed deposits, recurring deposits) and balances. Depending on the types of accounts, there are interest rates, penalty rates if and where applicable, etc.. You may allow for accounts with single customer, or joint customers.
For each entity and relationship, identify the key(s). Include arrows where appropriate to indicate multiplicity of a relationship. Map the E-R diagram to a relational database.

Design Problem 3. Design an E-R diagram for an Indian Railways Reservation System like database. This database should keep information about trains, reservation by passengers and customer information.

1. Each train is identified by a train number. For each train, a code identifies the number of times in the week it runs. The rake of the train (number of bogies and of type general, SL, 3A, 2A, 1A, CC etc., pantry car or not) needs to be stored.
2. Train details, such as days of running, rake etc., keep changing. Design how you wish to store this information, it can be on a daily basis, or from date/to date basis, etc..
3. Keep the timetable information of each train using from date/to date attributes to keep accurate information if the the timetable of the train changes over time. For time table information of trains spanning multiple days to reach destination, for each station, keep arrival and departure times, and in addition the day of arrival/departure by keeping +n, where, n=1 or 2 (typically) indicating the time is +n days from the date and time of departure from starting station.
4. You may design to keep track of reservation quota system (or add it later).
5. Keep track of each reservable berth, of each class, to keep track of reservations and cancellations.
6. Keep track of customer information (for logging in purposes and reservation purposes).

Specify keys of entities and relationships. Map the E-R diagram to a relational database.