

Q.1) Pictown Records has decided to store information about musicians who perform on its albums (as well as other company data) in a database. The company has wisely chosen to hire you as a database designer (at your usual consulting fee of 2500/day).

- Each musician that records at Pictown has an AADHAR NO., a name, an address, and a phone number. Poorly paid musicians often share the same address, and no address has more than one phone.
- Each instrument used in songs recorded at Pictown has a unique identification number, a name (e.g., guitar, synthesizer, flute) and a musical key (e.g., C, B-flat, E-flat).
- Each album recorded on the Pictown label has a unique identification number, a title, a copyright date, a format (e.g., CD or MC), and an album identifier.
- Each song recorded at Pictown has a title and an author.
- Each musician may play several instruments, and a given instrument may be played by several musicians.
- Each album has a number of songs on it, but no song may appear on more than one album.
- Each song is performed by one or more musicians, and a musician may perform a number of songs.
- Each album has exactly one musician who acts as its producer. A musician may produce several albums, of course.

Draw an ER diagram that captures this information

Q.2) Draw an ER diagram that encodes the following business rules. Clearly mark all key and participation constraints. Chefs work at restaurants. A chef is uniquely identified by an SSN, and is also described by a name and a cuisine in which she specialized. A restaurant is uniquely identified by a combination of name and city. Each chef works in at least one restaurant, and each restaurant must have at least one chef working at it. Some chefs own restaurants, and if a chef owns a restaurant - she is its sole owner.

Q.3) Suppose you are given the following requirements for a simple database for the National Hockey League (NHL):

- The NHL has many teams,
- Each team has a name, a city, a coach, a captain, and a set of players,
- Each player belongs to only one team,
- Each player has a name, a position (such as left wing or goalie), a skill level, and a set of injury records,
- A team captain is also a player,
- A game is played between two teams (referred to as host_team and guest_team) and has a date (such as May 11th, 1999) and a score (such as 4 to 2).

Construct a clean and concise ER diagram

Q.4 Computer Sciences Department frequent fliers have been complaining Pune Airport officials about the poor organization at the airport. As a result, the officials decided that all information related to the airport should be organized using a DBMS, and you have been hired to design the database. Your first task is to organize the information about all the airplanes stationed and maintained at the airport. The relevant information is as follows:

1. Every airplane has a registration number, and each airplane is of a specific model.
2. The airport accommodates a number of airplane models, and each model is identified by a model number (e.g., DC-10) and has a capacity and a weight.
3. A number of technicians work at the airport. You need to store the name, AADHAR NO., address, phone number, and salary of each technician.
4. Each technician is an expert on one or more plane model(s), and his or her expertise may overlap with that of other technicians. This information about technicians must also be recorded.

5. Traffic controllers must have an annual medical examination. For each traffic controller, you must store the date of the most recent exam.
6. All airport employees (including technicians) belong to a union. You must store the union membership number of each employee. You can assume that each employee is uniquely identified by a social security number.
7. The airport has a number of tests that are used periodically to ensure that airplanes are still airworthy. Each test has a Indian Aviation Administration (IAA) test number, a name, and a maximum possible score.
8. The FAA requires the airport to keep track of each time a given airplane is tested by a given technician using a given test. For each testing event, the information needed is the date, the number of hours the technician spent doing the test, and the score the airplane received on the test.

Draw an ER diagram for the airport database. Be sure to indicate the various attributes of each entity and relationship set; also specify the key and participation constraints for each relationship set. Specify any necessary overlap and covering constraints as well (in English).