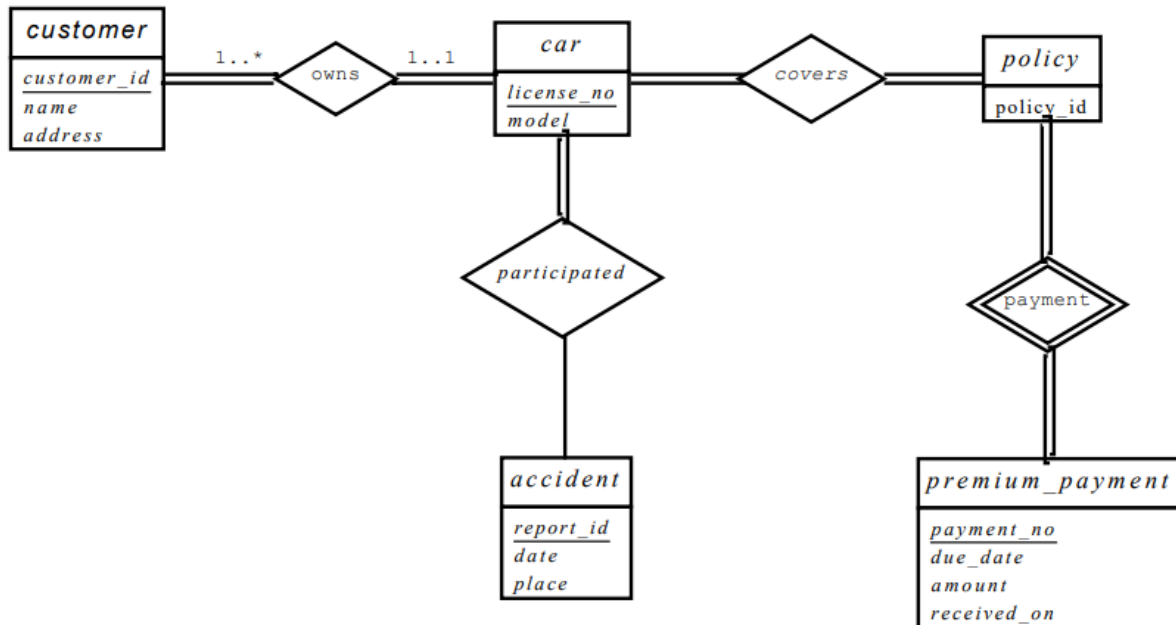


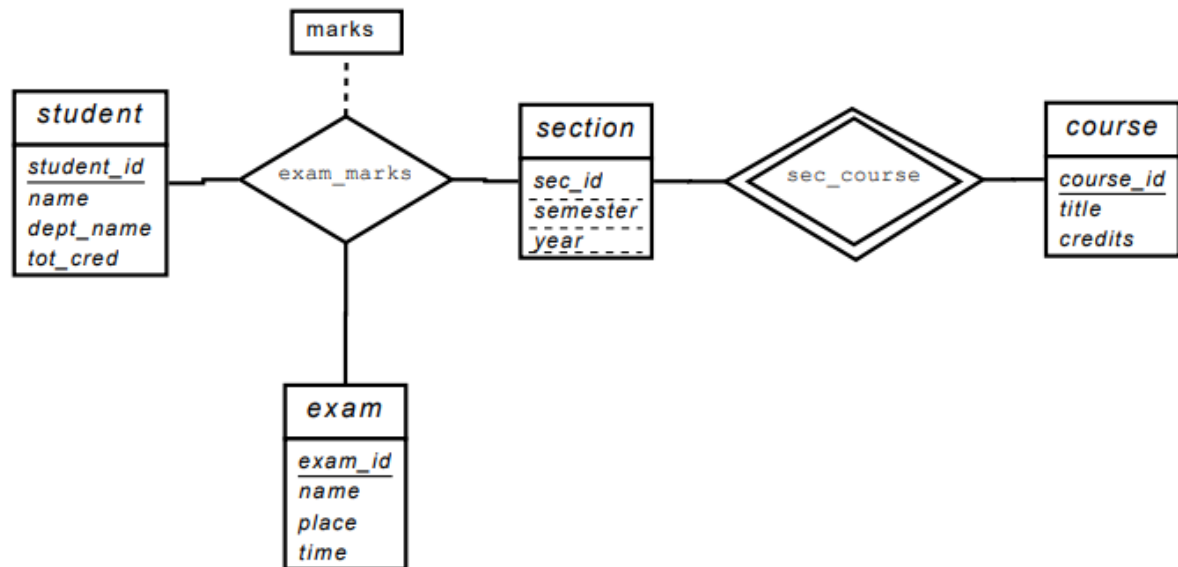
Tutorial Sheet on ERD

Q.1. Construct an E-R diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. Each insurance policy covers one or more cars, and has one or more premium payments associated with it. Each payment is for a particular period of time, and has an associated due date, and the date when the payment was received.

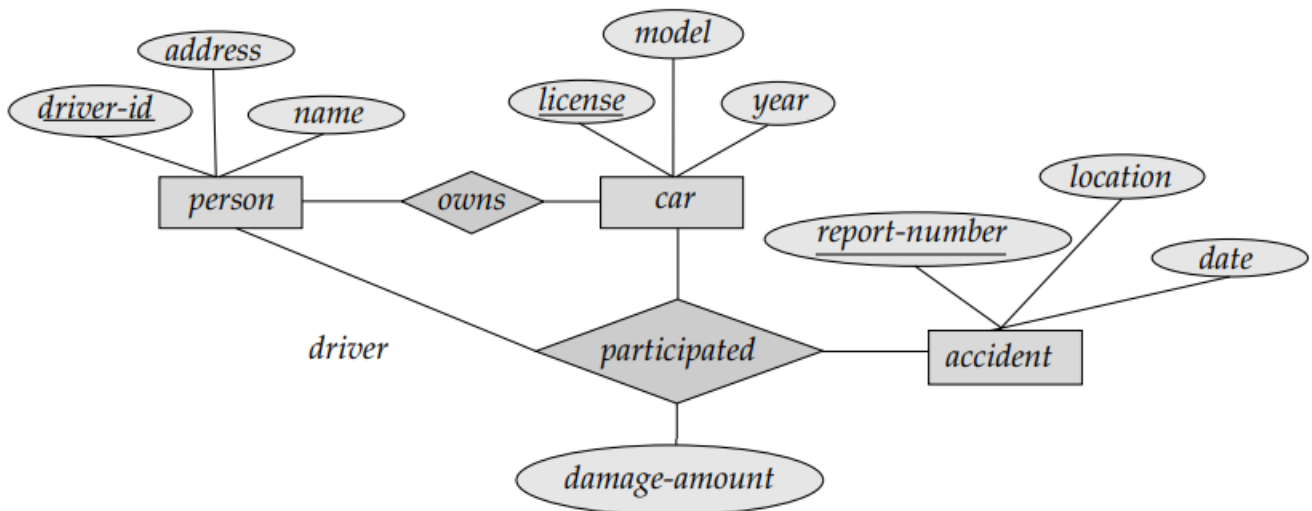


- ✚ Payments are modeled as weak entities since they are related to a specific policy. Note that the participation of accident in the relationship participated is not total, since it is possible that there is an accident report where the participating car is unknown.

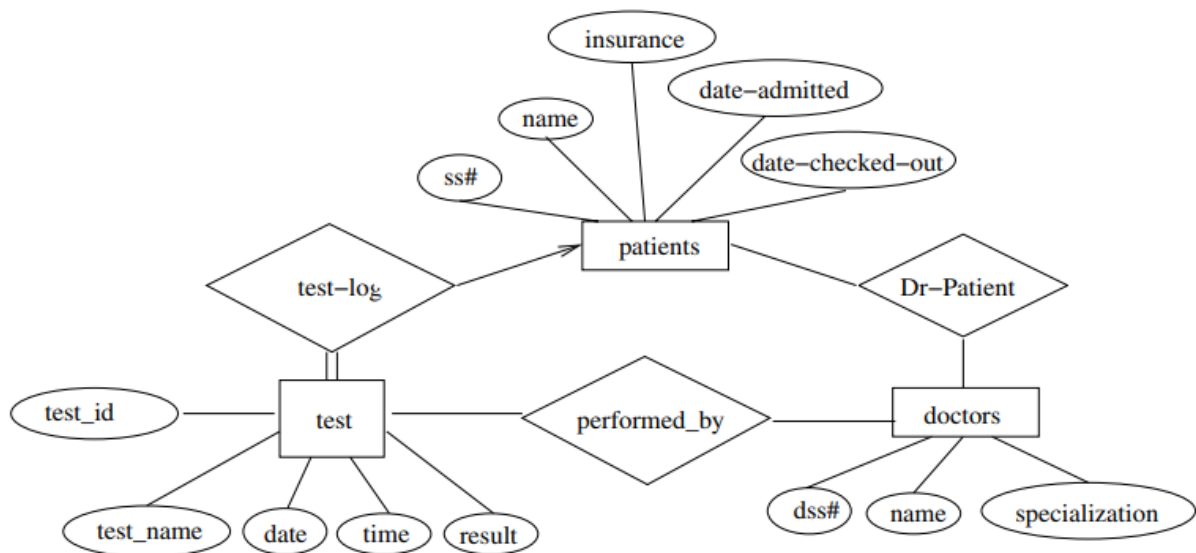
Q 2. Consider a database used to record the marks that students get in different exams of different course offerings (sections). Construct an E-R diagram that models exams as entities, and uses a ternary relationship, for the database.



Q3. Construct an E-R diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents.



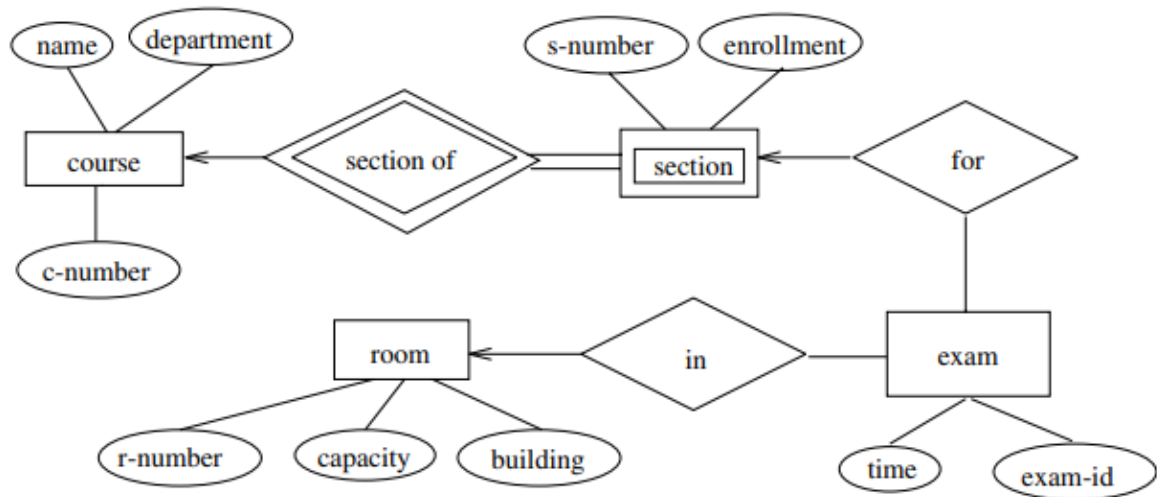
Q4. Construct an E-R diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted.



Q5. Consider a university database for the scheduling of classrooms for final exams. This database could be modeled as the single entity set exam, with attributes course-name, section-number, room-number, and time. Alternatively, one or more additional entity sets could be defined, along with relationship sets to replace some of the attributes of the exam entity set, as

- course with attributes name, department, and c-number
- section with attributes s-number and enrolment, and dependent as a weak entity set on course
- room with attributes r-number, capacity, and building.

Show an E-R diagram illustrating the use of all three additional entity sets listed.

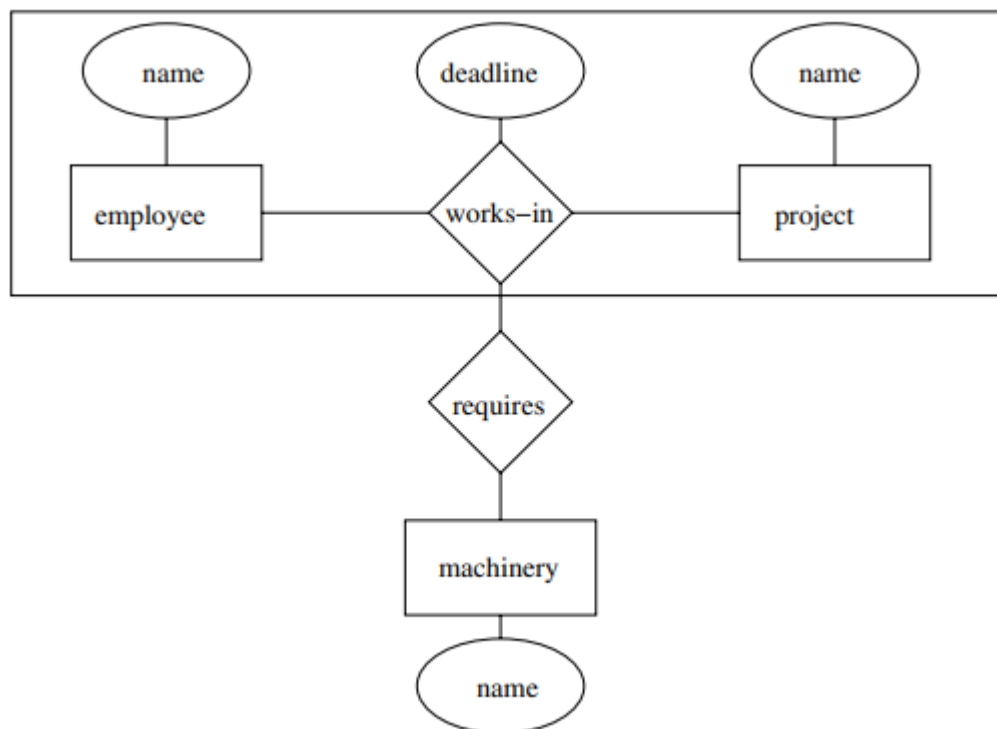


Q 6. Define the concept of aggregation. Give two examples of where this concept is useful.

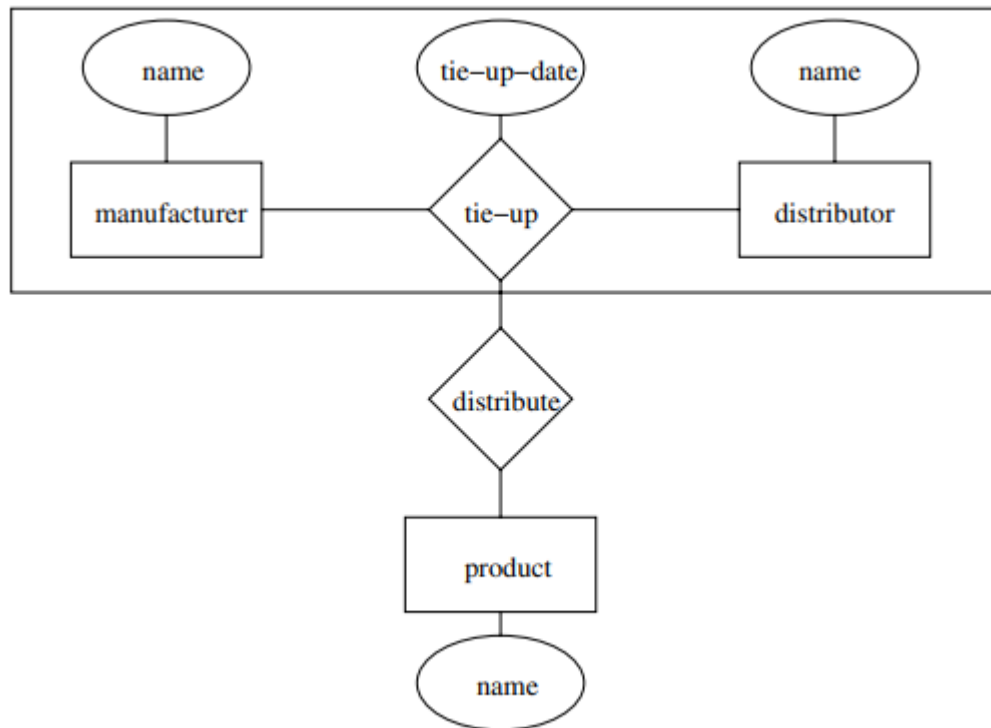
Aggregation is an abstraction through which relationships are treated as higher-level entities. Thus, the relationship between entities A and B is treated as if it were an entity C.

Some examples of this are:

a. Employees work for projects. An employee working for a particular project uses various machinery.



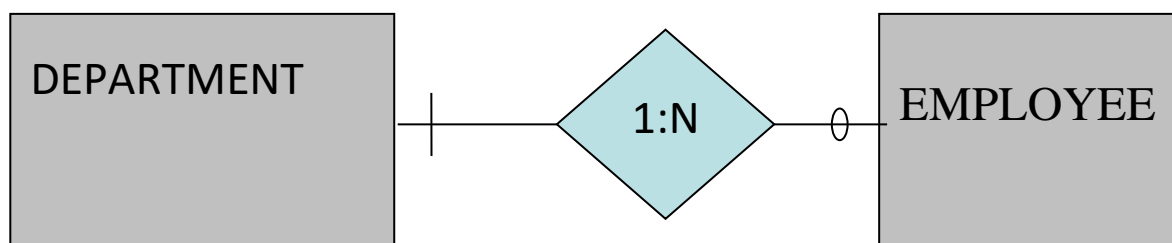
b. Manufacturers have tie-ups with distributors to distribute products. Each tie-up has specified for it the set of products which are to be distributed.



Q7. Define the terms **maximum cardinality** and **minimum cardinality**.

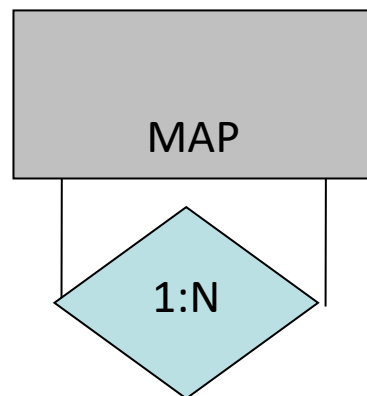
Maximum cardinality is the maximum number of instances of an entity that can participate in an instance of a relationship. Minimum is the least number of instances of an entity that can participate in an instance of a relationship.

Q8. Give an example E-R diagram for the entities DEPARTMENT and EMPLOYEE, which have a 1:N relationship. Assume that a DEPARTMENT does not need to have any EMPLOYEE but that every EMPLOYEE does have a DEPARTMENT.



Q9. Give an example of a recursive relationship and show it in an E-R diagram.

Maps that refer to each other. Say, for example, a map of the world has references to a map of the continents. A map of the continents has references to maps of countries. A map of a country has references to maps of state/provinces. A map of state/provinces has references to maps of cities. This is 1:N recursion of the entity MAP.



Q 10. We would like to design a database to maintain information about hospital staff, including doctors and nurses, and patients at the hospital. The information we need includes:

- Staff, including their names, addresses and social-security numbers.
- Patients, including their names, addresses, and the name of their insurance company.
- Patients are each assigned to a ward (room).
- Those staff who are nurses are assigned to zero or more wards. Each ward has at least one nurse assigned.
- Those staff who are doctors are assigned to zero or more patients. Patients may or may not have a doctor assigned, and they may have more than one doctor. Patients in the same ward may have different doctors but will always have the same nurse(s).

Note that there is no single right answer to this question, although some answers may be better than others.

Q11. 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 for the NHL database.

