

Databases I. Practice 2 27.02.2019

Example 1

In an auction of paintings, all participants must be registered, recording their names, ID, addresses and contact phone numbers. The paintings come from several famous painters. Each painting has a detailed description. Each painter has one or more paintings to be auctioned. Participants may purchase one or more paintings, or may not purchase any painting.

Create an E-R diagram to represent auction, resolving all the N:M relationships.

Example 2

Peter is a database designer. He is going to develop an E-R diagram for a concert hall. Three entities have been identified as follows:

CONCERT	Each concert represents a performance of one or more compositions on a given date. Identifier is a Concert_ID. Each concert must be conducted by one conductor.
COMPOSITION	Compositions to be performed at each concert. Identifier is Composition_ID. Other attributes include name of composer, name of composition.
CONDUCTOR	Person who will conduct the concert. Identifier is Conductor_ID. Other attributes include name of conductor. A conductor may conduct more than one concert, or may not conduct any concert.

The initial E-R diagram is drawn as follows:



- Complete the E-R diagram to show the attributes and cardinalities.
- Resolve the E-R diagram to eliminate any N:M relationship.

Example 3

A private tennis club has ten courts that allow members to use. Booking from members is accepted within one week before the tennis court is used. In each booking, each member can reserve at most 3 tennis courts and the duration is a multiple of half-hour. Given that two entities are identified:

MEMBER	A member of the tennis club. Identifier is Member_ID. Other attributes are the name of member and contact phone.
COURT	A tennis court to be used by members. Identifier is Court_ID.

- Sketch an initial E-R diagram to show the relationship and cardinality between MEMBER and COURT.
- Redraw the E-R diagram to include an entity BOOKING with attributes including date and time of use and duration of booking.

Example 4

Create an ERD using the following requirements:

- An INVOICE is written by a SALESREP. Each sales representative can write many invoices, but each invoice is written by a single sales representative.
- The INVOICE is written for a single CUSTOMER. However, each customer can have many invoices.
- An INVOICE can include many detail lines (LINE), each of which describes one product bought by the customer.
- The product information is stored in a PRODUCT entity.
- The product's vendor information is found in a VENDOR entity.

Example 5

Automata, Inc., produces specialty vehicles by contract. The company operates several departments, each of which builds a particular vehicle, such as a limousine, a truck, a van, or an RV.

- Before a new vehicle is built, the department places an order with the purchasing department to request specific components. Automata's purchasing department is interested in creating a database to keep track of orders and to accelerate the process of delivering materials.
- The order received by the purchasing department may contain several different items. An inventory is maintained so the most frequently requested items are delivered almost immediately. When an order comes in, it is checked to determine whether the requested item is in inventory. If an item is not in inventory, it must be ordered from a supplier. Each item may have several suppliers.

Given that functional description of the processes at Automata's purchasing department, do the following:

- a. Identify all of the main entities. Draw the E-R diagram.
- b. Identify all of the relations and connectivities among entities.
- c. Identify the type of existence dependence in all the relationships.

Example 6

One dog lives in one and only one kennel (doghouse) and only one dog resides in each kennel (doghouse). However, there are stray dogs and dogs keeping in flats. Create ER model, then relational model to solve the problem. Indicate the participation in the relationship also.

Example 7

Some of the lions live in cage, but there are empty cages for later coming lions. We assume that only one lion can live in a cage. Create ER model and relational model for this problem. Indicate the participation in the relationship also.

Example 8

Many tourists take part in an excursion, but one tourist (at a time) is only taking part in one excursion. All tourists participate in at least 1 trip. Create ER model and relational model. Indicate the participation in the relationship too.

Example 9

Create an ER model and a relational model for modeling a hierarchy of music performers! The performers can be bands, solo singers and solo instrumentalist. Each artist is characterized by code, name, and genre. The bands are characterized by the number of members, the soloists by their voice (eg soprano, baritone) and the instrumentalist are characterized by their instruments. An instrumental musician can play on several instruments.

Example 10

Vehicles can be passenger vehicle and trucks, and passenger vehicles can be cars or buses. All vehicles are characterized by the registration number, the type and the mass. Additional feature of the passenger vehicles are the number of seats, and the type of fuel of cars, and in the case of buses the number of drivers. The load capacity of trucks is known too. Create an ER model and map it into a relational model.