COMP 306: Database Management Systems
Spring 2023 - PS Week #2

Question 1. (This question is from a previous year's quiz.) You are given the task of designing a database for a travel agency called TRAVEL-BEST. Read the following description and draw its ER diagram.

In TRAVEL-BEST, there are two types of customers: individual customers and corporate customers. A customer must be either an individual customer or corporate customer; no other customer types are allowed. For both types of customers, TRAVEL-BEST keeps track of their customer ID (unique), customer name, phone number, and address. In addition:

- Corporate customers have an account number and several staff members, where each staff member has a name and a phone number.
- Individual customers have a cell phone number and name. Plus, each individual customer may have saved several credit cards, but a credit card is saved by at most one customer. Each credit card has a name, expiration date, and a unique card number. (Hint: Make credit card a weak entity.)

A customer can make several reservations. Each reservation is made by at most one customer. A reservation has a reservation date, a reservation platform (could be web, mobile, phone, etc.) and a unique reservation ID.

A reservation contains several flights. The same flight can be contained in multiple reservations. A flight has an origin, a destination, and a unique flight number.

Finally, individual customers rate flights. (Important: Corporate customers do not rate flights!) An individual customer can rate many flights and a flight can be rated by many individual customers. The rating value must be stored in the database.

Question 2. (This question is from a previous year's midterm.) You are given the task of designing a database for a library. Read the following description and draw its ER diagram.

- The library contains many books. Each book has a unique ISBN. Furthermore, each book has a title, price, front cover type, and number of pages.
- Books are written by authors. An author may write several books, and a book may be written by multiple co-authors. An author has a name and a unique ID number.
- The library has two types of customers: registered customers and visiting customers. Every customer must be registered or visiting, and a customer may exist as both. (For example, John may be a visiting customer at first but then he may decide to register.) For both types of customers, we store their ID number (unique), name, and e-mail address. A customer may have multiple e-mail addresses. In addition, for registered customers we store their registration date, and for visiting customers we store their address and phone number.
- Both types of customers can buy books. A customer can buy several books but a book cannot be bought by multiple customers. When a customer buys a book, we want to store the date of purchase and the payment method (cash, credit card, check, ..). A customer must use a single payment method for one book purchase, i.e., they cannot pay half by cash and other half by credit card.
- Registered customers can borrow books, but visiting customers cannot. The borrowing date and return date should be stored in the database.

Question 3. You are given the task of designing a database for a car dealership. You spoke with the owner of the dealership and the owner told you the following. Read the notes and draw an appropriate ER diagram for the dealership.

- Our dealership sells vehicles. We must store each vehicle's model, price, and unique vehicle identification number (vin). According to our records, a vehicle must belong to exactly one of 3 categories: car, truck, or SUV. For cars, we must keep track of their engine size; for trucks, we must keep track of their tonnage; and for SUVs, we must keep track of their number of seats.
- Our dealership employs several full-time salespeople. Each salesperson has a unique ID and a (not necessarily unique) name.
- Salespeople sell vehicles to customers. In each sale, only one salesperson and one customer can be involved, but multiple vehicles can be sold in a single sale. For example, salesperson Ali can sell vehicles X and Y to customer Ahmet. But two salespeople (Ali and Veli) cannot sell to Ahmet, and similarly, Ali cannot sell a vehicle to two customers (Ahmet and Ayşe). The date of the sale must be recorded in the database.
- In our database, there can exist unsold vehicles and there can exist salespeople who have never sold any vehicles. But there cannot exist customers who have never bought a vehicle from us.
- For each customer in our database, we store their social security number (unique), name, and address. The address of a customer consists of three parts: state, city, and street address.