CS2102 Tutorial 3: SQL 1

Wk 5, Sem 2, 2017/8

Only question 2 will be discussed.

1. Consider a relational database consisting of the following two tables.

   - Offices (officeId, building, level, roomNumber, area)
   - Employees (empId, name, officeId, managerId)

   The database satisfies the following constraints:

   - `officeId` is the primary key of `Offices`
   - {`building`, `level`, `roomNumber`} is a candidate key of `Offices`
   - `empId` is the primary key of `Employees`
   - The name of each employee must be a non-null value
   - Each employee must be assigned to exactly one office identified by `officeId`
   - Each employee may be managed by at most one manager
   - If an employee is managed by someone, the `empId` of his/her manager is recorded in `managerId`

   (a) Write SQL statements to create the database schema with appropriate attribute domains and constraints.

   (b) Suppose that the office with `officeId` = 123 needs to be renovated. Write a SQL statement to reassign the employees located in this office to another temporary office located at the room numbered 11 on level 5 at the building named *Tower1*.

   (c) Suppose that each employee must be assigned to at least one office. How would your solution in (a) change?

2. Consider the following relational database, where the primary key of each table is shown underlined.

   `Customers` (cname, area)
   `Restaurants` (rname, area)
   `Pizzas` (pizza)
   `Sells` (rname, pizza, price)
   `Likes` (cname, pizza)

   Customers indicates the name and location of each customer. **Restaurants** indicates the name and location of each restaurant. **Pizzas** indicates the pizzas of interest. **Sells** indicates the pizzas sold by restaurants and their prices. **Likes** indicates the pizzas that customers like.

   Assume the following additional constraints:

   - Sells.rname is a foreign key that references Restaurants
   - Sells.pizza is a foreign key that references Pizzas
   - Likes.cname is a foreign key that references Customers
   - Likes.pizza is a foreign key that references Pizzas

   Answer each of the following queries using SQL. Remove duplicate records from all query results.

   (a) Find pizzas that Alice likes but Bob does not like.

   (b) For each customer, find the pizzas sold by restaurants that are located in the same area as the customer's area. Exclude customers whose associated set of pizzas is empty.

   (c) For each customer, find the pizzas sold by restaurants that are located in the same area as the customer's area. Include customers whose associated set of pizzas is empty.

   (d) Find pizzas that are sold by at most one restaurant in each area; exclude pizzas that are not sold by any restaurant. Do not use any `UNIQUE` subquery in your answer.

   (e) Find all restaurant pairs $(R1, R2)$ such that the price of the most expensive pizza sold by $R1$ is higher than that for $R2$.

   (f) Find the most expensive pizzas and the restaurants that sell them (at the most expensive price). Do not use any aggregate function in your answer.