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CS443 - Database Management Systems

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<div align="center">Lab 1</div>

1) Answer the following questions:

    a) Just by observing the tables below, what would you choose the primary key of each table?

    b) Based on the explanation of the attributes given on pages 2 – 5 write down all the foreign keys. For example, if you think that Rep_Office is a foreign key in the Salesreps table, you should write:

        Rep_Office is a foreign key in the Salesreps table because it refers to the primary key (office attribute) of the offices table.

    Do the same for every foreign key that you find in the entire database.

a)

    Empl_Nnum is the primary key for the Salesreps Table.
    Office is the primary key for the Office Table.
    Cust_Num is the primary key for the Customers Table.
    Order_Nnum is the primary key for the Orders Table.
    Mfr_Id and Product_Id make up the composite primary key for the Products Table.

b)
<u>Salesreps</u>

    Rep_Office is a foreign key in the Salesreps table because it refers to the primary key (Office attribute) of the Offices table.

    Manager is a foreign key in the Salesreps table because it refers to the primary key (Empl_Num attribute) of the Salesreps table.

<u>Offices</u>

    Mgr is a foreign key in the Offices table because it refers to the primary key (Empl_Num attribute) of the Salesreps table.

<u>Customers</u>

    Cust_Rep is a foreign key in the Customers table because it refers to the primary key (Empl_Num attribute) of the Salesreps table.

Orders

       Cust is a foreign key in the Orders table because it refers to the primary key (Cust_Num attribute) of the Customers table.

       Rep is a foreign key in the Orders table because it refers to the primary key (Empl_Num attribute) of the Salesreps table.

       Mfr and Product is a composite foreign key in the Orders table because it refers to the composite primary key (Mfr_Id and Product_Id attributes) of the Products table.

Products

       The products table does not have any foreign keys referring to any other primary key.

2) It is true that in the office table "Office" by itself is a primary key. Suppose we do not want "office ID" to be primary key or be part of a "Composite Primary key" and we prefer "City" to the primary key or part of the Primary Key. What assumption(s) do you need to make to make city to be the primary key or part of the primary key? Note that you can add additional column to the table that may not exist. Hint: Some cities like "San Marcos" may exist in more than one state.

- Assumptions that need to be made when making "city" the primary key or part of the primary key is that multiple states may have the same city name. Due to the fact that multiple states may have the same name, we would have to add an additional column and have that column contain either "state" or "zipcode" or both making "city" part of a composite primary key in order to use "city" as a primary key.

3) What is the difference between primary key and candidate key? How many primary key(s) can a table have? How many Foreign keys a table can have? How many candidate keys a table can have?

- The difference between a primary key and a candidate key is that a primary key is the column or combination of columns that uniquely identifies each row of a table. There can only be one primary key per table. However, a candidate key also uniquely identifies each row of a table, but there can be multiple candidate keys per table. So they both can uniquely identify each row of a table, but the main difference is that there can only be one primary key, whereas there can be multiple candidate keys.

4) Suppose you have a city table with the following attribute:
- State, City name, Zip code, Population, Region

    o Is there any problem of choosing Population as primary key? Explain.
    o Is there any problem of choosing Zip code as a primary key? Explain.

- Assume that we are only considering cities and states in the US.

- There is a problem of choosing Population as primary key because, though may be rare, some cities in different states may have the same number when it comes to their population. Primary keys need to be unique and a good identifier for that row within the table, having population as the primary key may lead to confusion when looking or analyzing the table.

- There is no problem choosing Zip code as a primary key because there will never be a state and city with a zip code that is the exact same as a different state and city. Each state and city has a unique zip code within the US making it a unique identification and a great primary key.