Database Technologies

1. Explain in detail about Foreign Key constraints with examples.

Foreign keys link data in one table to the data in another table. A foreign key column in a table points to a column with unique values in another table (often the primary key column) to create a way of cross-referencing the two tables. If a column is assigned a foreign key, each row of that column *must* contain a value that exists in the 'foreign' column it references. The referenced (i.e. "foreign") column must contain only unique values – often it is the primary key of its table.

The FOREIGN KEY constraint is used to prevent actions that would destroy links between tables. A FOREIGN KEY is a field (or collection of fields) in one table, that refers to the PRIMARY KEY in another table.

The table with the foreign key is called the child table, and the table with the primary key is called the referenced or parent table.

Look at the following two tables:

Persons Table

Person ID	Last Name	First Name	Age
1	Hansen	Ola	30
2	Svendson	Tove	23
3	Pettersen	Kari	20

Orders Table

OrderID	OrderNumber	PersonID
1	55678	3
2	67984	4
3	54321	2
4	24562	3

Notice that the "PersonID" column in the "Orders" table points to the "PersonID" column in the "Persons" table.The "PersonID" column in the "Persons" table is the PRIMARY KEY in the "Persons" table. The "PersonID" column in the "Orders" table is a FOREIGN KEY in the "Orders" table.

The FOREIGN KEY constraint prevents invalid data from being inserted into the foreign key column, because it has to be one of the values contained in the parent table.

SQL FOREIGN KEY on CREATE TABLE

The following SQL creates a FOREIGN KEY on the "PersonID" column when the "Orders" table is created:

MySQL:

Create TABLE Orders(OrderID int Not Null, OrderNumber int Not Null, PersonId int, Primary Key(OrderID) Foreign Key (PersonId, References Person(PersonId)))

2. **Create a Voter table, which includes Voter id, voter name, location and age. Set the voter id as primary key and no voter information should be include under age 18. Fix the constraint on it refer location as foreign key from location table.**

Create TABLE **Voter** (VoterID int Not Null Unique, VoterName Varchar(50) Not Null, Location int Not Null, Age int Not Null Check (Age>=18),Primary Key(VoterID), Foreign Key Location References Location(Location)))

VoterID	VoterName	Location	Age
101	Jennifer	947710-1591	18
102	Lawrence	167897-1145	32
106	Kathey	879756-7611	20

3. **What is meant by candidate key? Give an example.**

A **candidate key** is a part of a key known as **Super Key** (*discussed in the previous section*), where the super key is the super set of all those attributes that can uniquely identify a table. A candidate key is a subset of a super key set where the key which contains no redundant attribute is none other than a **Candidate Key**. In order to select the candidate keys from the set of super key, we need to look at the super key set.

The role of a candidate key is to identify a table row or column uniquely. Also, the value of a candidate key cannot be Null. The description of a candidate key is "no redundant attributes" and being a "minimal representation of a tuple," according to the Experts.Let's look at the same example took while discussing Super Key to understand the working of a candidate key.

We have an **EMPLOYEE_DETAIL** table where we have the following attributes:

Emp_SSN: The SSN number is stored in this field.

Emp_Id: An attribute that stores the value of the employee identification number.

Emp_name: An attribute that stores the name of the employee holding the specified employee id.

Emp_email: An attribute that stores the email id of the specified employees.

The **EMPLOYEE_DETAIL** table is given below that will help you understand better:

Emp_SSN	Emp_Id	Emp_name	Emp_email
11051	01	John	john@email.com
19801	02	Merry	merry@email.com
19801	03	Riddle	riddle@email.com
41201	04	Cary	cary@email.com

Candidate Keys :

Emp_SSN

Emp_Id

Emp_email

Therefore, these are the three attributes obtained that can identify the other non-prime attributes of the table. All these are the candidate keys and from which we can pick the most appropriate attribute that can easily identify all records of the table, which will be described as the Primary key.

4. What is super key? Give an example.

We can define a super key as a set of those keys that identify a row or a tuple uniquely. The word super denotes the superiority of a key. Thus, a super key is the superset of a key known as a **Candidate key** (discussed in the next section). It means a candidate key is obtained from a super key only.

The role of the super key is simply to identify the tuples of the specified table in the database. It is the superset where the candidate key is a part of the super key only. So, all those attributes in a table that is capable of identifying the other attributes of the table in a unique manner are all super keys.

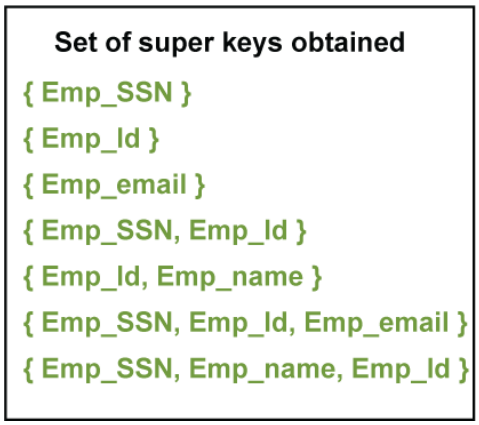
Examples of Super Key

Let's consider an **EMPLOYEE_DETAIL** table example where we have the following attribute:

Emp_SSN: The SSN number is stored in this field.
Emp_Id: An attribute that stores the value of the employee identification number.
Emp_name: An attribute that stores the name of the employee holding the specified employee id.
Emp_email: An attribute that stores the email id of the specified employees.
The **EMPLOYEE_DETAIL** table is given below that will help you understand better:

Emp_SSN	Emp_Id	Emp_name	Emp_email
11051	01	John	john@email.com
19801	02	Merry	merry@email.com
19801	03	Riddle	riddle@email.com
41201	04	Cary	cary@email.com

So, from the above table, we conclude the following set of the super keys:



These all are the set of super keys which, together or combining with other prime attributes, can identify a table uniquely.

Just like, if we set Super key on Emp_SSN, it will be able to identify all other tuples of the table very easily. Similarly, if we set the Super key on (Emp_Id, Emp_name}, we can easily get the value or details of the other remaining attributes of the employee. So, in this way, we can create and search out the super keys from a table.