Difference between Primary Key and Foreign Key

The major difference between primary key and foreign key is that the primary key is used to identify each entry in the table, whereas the foreign key is used to connect two tables.

Differentiate Between Primary Key and Foreign Key

Primary Key	Foreign Key
A relation can have only one primary key.	A relation can have more than one foreign key.
A primary key value cannot be null.	A foreign key allows null values.
A primary key is a combination of unique and not null constraints.	A foreign key can contain duplicate values.
A primary key value cannot be deleted from the parent table.	A foreign key can be deleted from the child's table.
Its constraints can be implicitly defined on the temporary tables.	Its constraint cannot be defined on the local and global temporary tables.
It uniquely identifies a record in the relational database table.	It refers to the field in a table that is the primary key of the same or another table.

What is a Key?

A key in DBMS or RDBMS is a constraint that ensures the uniqueness of data in the relation or table. RDBMS consists of various keys like candidate key, primary key, super key and foreign key. For a relation in RDBMS, it is necessary to have at least one candidate or primary key.

SQL Server has two types of keys: main and foreign. While they appear to be the same, they differ in functionality and behaviors.

Difference between Primary Key and Foreign Key with Example

Let us now understand the difference between foreign key and Primary Key with examples. Check out the tables provided in the image shown below:

STUDENT

STUD_NO	STUD_NAME	STUD_PHONE	STUD_COUNTRY	STUD_AGE
1	RAM	9716271721	India	20
2	RAM	9898291281	India	19
3	SUJIT	7898291981	India	18
4	SURESH		India	21

STUDENT_COURSE

STUD_NO	COURSE_NO	COURSE_NAME
1	C1	DBMS
2	C2	Computer Networks
1	C2	Computer Networks

In table 1(STUDENT), the key STUD_NO is the primary key, whereas the STUD_NAME, STUD_COUNT, and STUD_AG are candidate keys. Now, STUD_NO in table 2(STUDENT_COURSE), STUD_NO will be the foreign key for STUDENT relation.

What is a Primary Key?

A primary key is one of the candidate keys. Now after understanding the difference between the primary key and foreign key, we have to understand the candidate key and super key. A candidate key is the minimal set of attributes that can uniquely identify a row in a relation. The uniqueness of the table records is usually the focus of a primary key. And each row in the database is uniquely identified by a column or a collection of columns. It signifies that there should be no duplicate values for the same column across the table.

A candidate key is a subset of a super key. A super key can identify a relation uniquely and may not be the minimal set. Super key acts as a superset for the candidate key. All the candidate keys are also super keys, but vice versa is not true. A primary key is one of the candidate keys chosen by the administrator to identify row/ tuples uniquely.

What is a Foreign Key?

A foreign key refers to one or more relations in RDBMS. One of the major concerns of having a foreign key is data integrity between two different relations. A foreign key is the primary key of the same or a different relational instance.

The foreign key is usually used to establish a link or relationship between the two tables. The foreign key's principal purpose is to maintain data integrity between two independent instances of an entity simultaneously.