Why we have Keys in DB?

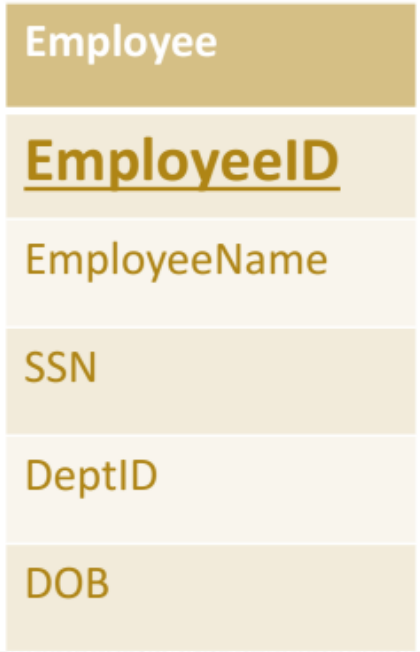
- A Key is an attribute or a set of attributes in a relation that identifies a tuple (record) in a relation.
- The keys are defined in a table to access or sequence the stored data quickly and smoothly.
- They are also used to create relationship between different tables.

Types of Keys in Database

1. *Primary Key*
2. *Candidate Key*
3. *Alternate Key*
4. *Super Key*
5. *Composite Key*
6. *Foreign Key*
7. *Unique Key*

Primary Key

- Which is ***Unique & Can't be have NULL Value***
- Is the column you choose to maintain uniqueness in a table at row level.
- Here in ***Employee*** table we can choose either ***EmployeeID*** or ***SSN*** column for a PK.
- EmployeeID is preferable choice because SSN is a secure (PII) value.
- Primary key is the minimal super keys. In the ER diagram primary key is represented by underlining the primary key attribute.
- Ideally a primary key is composed of only a single attribute.
- But it is possible to have a primary key composed of more than one attribute



To define a field as primary key, following conditions had to be met :

- No two rows can have the same primary key value.
- Every row must have a primary key value.
- The primary key field cannot be null.
- Value in a primary key column can never be modified or updated, if any foreign key refers to that primary key

Candidate Key

- Are individual columns in a table that qualifies for uniqueness of each row/tuple.
- Here in ***Employee*** table ***EmployeeID*** & ***SSN*** are eligible for a ***Primary Key*** and thus are ***Candidate keys***.
- Candidate Keys are super keys for which no proper subset is a super key. ***In other words candidate keys are minimal super keys***.

Employee
EmployeeID
EmployeeName
SSN
DeptID
DOB

Alternate Key

- Candidate column other the Primary column, like if ***EmployeeID*** is set for a PK then ***SSN*** would be the Alternate key.

Employee
EmployeeID
EmployeeName
SSN
DeptID
DOB

Super Key

- If you add any other Column / Attribute to a Primary Key then it become a Super Key, like ***EmployeeID*** + ***EmployeeName*** is a Super Key.
- Super key stands for superset of a key.
- ***A Super Key is a set of one or more attributes that are taken collectively and can identify all other attributes uniquely.***

Employee
EmployeeID
EmployeeName
SSN
DeptID
DOB

Composite Key

- If a table do have a single column that qualifies for a Candidate key, then you have to select 2 or more columns to make a row unique.
- Like if there is no EmployeeID or SSN columns, then you can make ***EmployeeName*** + ***DateOfBirth*** (DOB) as ***Composite Primary Key***. But still there can be a narrow chance of duplicate rows.

Employee
EmployeeID
EmployeeName
SSN
DeptID
DOB

Foreign Key

- Here in below tables ***DeptID*** of ***Department*** table is Primary Key where as ***DeptID*** of ***Employee*** is an ***Foreign key***.
- It means it has referred to another table. This concept is also know as ***Referential Integrity***.

Employee
EmployeeID
EmployeeName
SSN
DeptID
DOB

Department
DeptID
DeptName

Unique Key

- ***Unique key*** is same as primary with the difference being the existence of null.

- Unique key field allows one value as NULL value.

Employee
EmployeeID
EmployeeName
SSN
EmailID
DOB