7. KEYS ANS THEIR USE

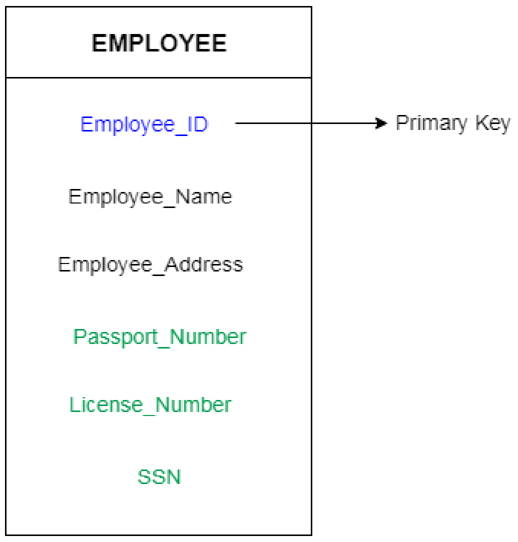
Key: An attribute or set of attributes whose values uniquely identify each entity in an entity set is called a key for that entity set.

Primary Key: It is a minimum super key.

It is ***a unique identifier for the table***(a column or a column combination with the property that at any given time no two rows of the table contain the same value in that column or column combination).

1. Primary key

- It is the first key which is used to identify one and only one instance of an entity uniquely. An entity can contain multiple keys as we saw in PERSON table. The key which is most suitable from those lists become a primary key.
- In the EMPLOYEE table, ID can be primary key since it is unique for each employee. In the EMPLOYEE table, we can even select License_Number and Passport_Number as primary key since they are also unique.
- For each entity, selection of the primary key is based on requirement and developers.

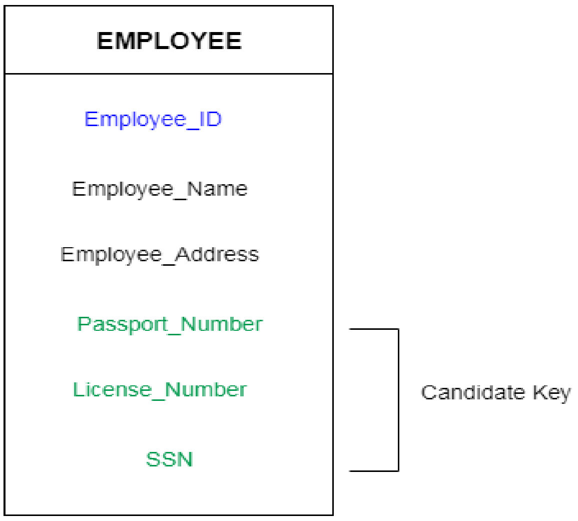


2.**Candidate Key:** There may be two or more attributes or combinations of attributes that uniquely identify an instance of an entity set. These attributes or combinations of attributes are called candidate keys.

2. Candidate key

- A candidate key is an attribute or set of an attribute which can uniquely identify a tuple.
- The remaining attributes except for primary key are considered as a candidate key. The candidate keys are as strong as the primary key.

For example: In the EMPLOYEE table, id is best suited for the primary key. Rest of the attributes like SSN, Passport_Number, and License_Number, etc. are considered as a candidate key.



3.Super Key: If we add additional attributes to a key, the resulting combination would still uniquely identify an instance of the entity set. Such augmented keys are called super keys.

3. Super Key

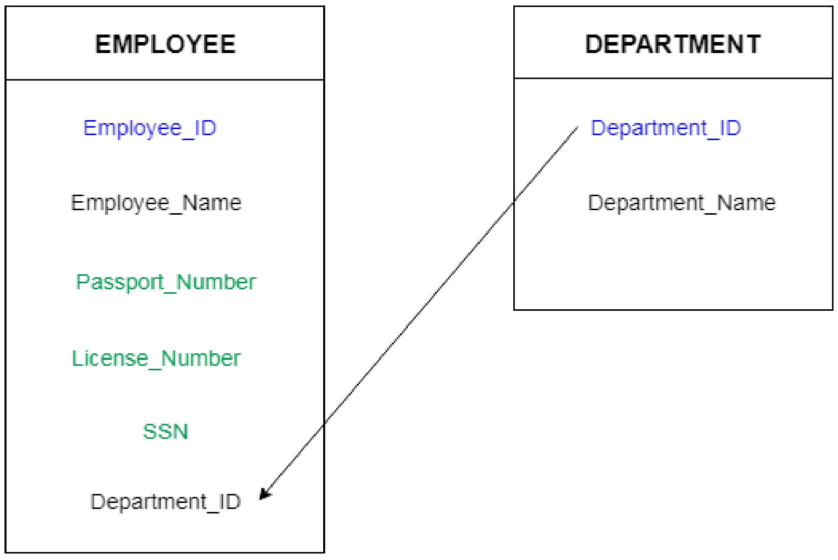
Super key is a set of an attribute which can uniquely identify a tuple. Super key is a superset of a candidate key.

- **For example:** In the above EMPLOYEE table, for (EMPLOEE_ID, EMPLOYEE_NAME) the name of two employees can be the same, but their EMPLYEE_ID can't be the same. Hence, this combination can also be a key.
- The super key would be EMPLOYEE-ID, (EMPLOYEE_ID, EMPLOYEE-NAME), etc.

4. Foreign Key: A foreign key is a field (or collection of fields) in one table that uniquely identifies a row of another table. In simpler words, the foreign key is defined in a second table, but it refers to the primary key in the first table.

4. Foreign key

- Foreign keys are the column of the table which is used to point to the primary key of another table.
- In a company, every employee works in a specific department, and employee and department are two different entities. So we can't store the information of the department in the employee table. That's why we link these two tables through the primary key of one table.
- We add the primary key of the DEPARTMENT table, Department_Id as a new attribute in the EMPLOYEE table.
- Now in the EMPLOYEE table, Department_Id is the foreign key, and both the tables are related.



5. Secondary Key: A secondary key is an attribute or combination of attributes that may not be a candidate key, but that classifies the entity set on a particular characteristic.

- Any key consisting of a single attribute is called a **simple key,** while that consisting of a combination of attributes is called a **composite key**.

7.1 RELATIONAL INTEGRITY CONSTRAINTS

- Relational Integrity constraints in DBMS are referred to conditions which must be present for a valid relation. These Relational constraints in DBMS are derived from the rules in the mini-world that the database represents.
- There are many types of Integrity Constraints in DBMS. Constraints on the Relational database management system is mostly divided into three main categories are:

- Domain Constraints
- Key Constraints
- Referential Integrity Constraints

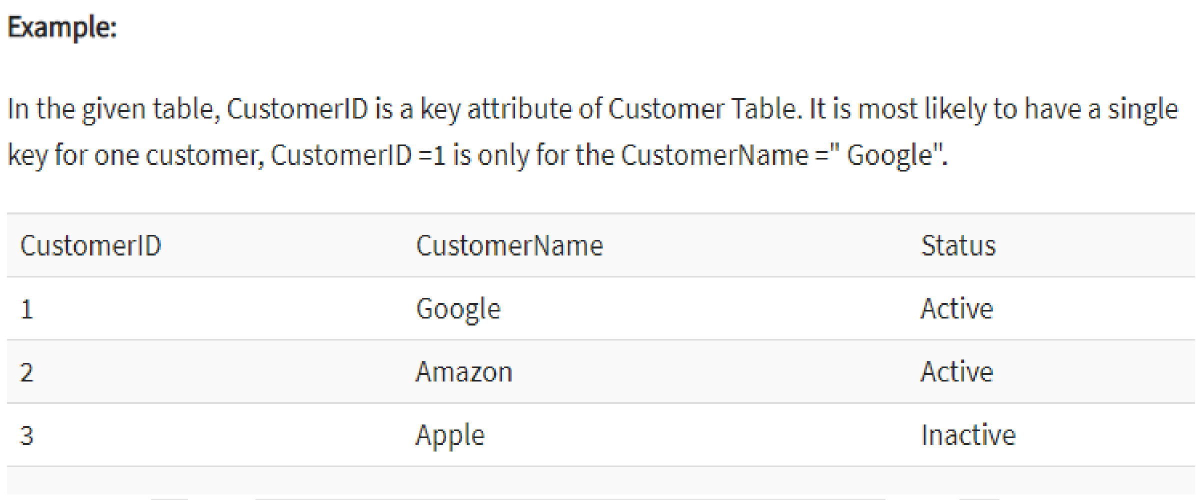
Domain Constraints

Attributes have specific values in real-world **scenario**. For example, age can only be a positive integer

- Domain constraints specify that within each tuple, and the value of each attribute must be unique. This is specified as data types which include standard data types integers, real numbers, characters, Booleans, variable length strings, etc.

Key Constraints

- An attribute that can uniquely identify a tuple in a relation is called the key of the table. The value of the attribute for different tuples in the relation has to be unique.



Example:

In the given table, CustomerID is a key attribute of Customer Table. It is most likely to have a single key for one customer, CustomerID =1 is only for the CustomerName =" Google".

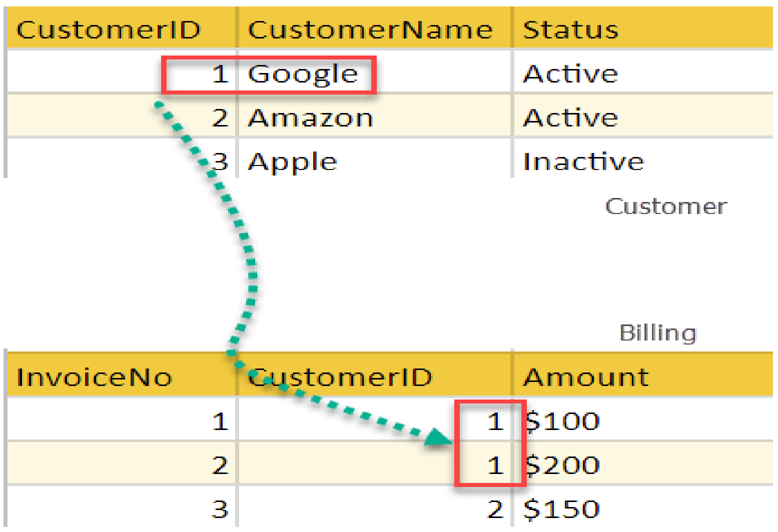
CustomerID	CustomerName	Status
1	Google	Active
2	Amazon	Active
3	Apple	Inactive

Referential Integrity Constraints

- Referential Integrity can be defined as an integrity constraint that specifies that the value (or existence) of an attribute in one relation depend on the value (or existence) of an attribute in the same or another relation.
- Referential Integrity constraints in DBMS are based on the concept of Foreign Keys.

- A foreign key is an important attribute of a relation which should be referred to in other relationships. A foreign key is a key attribute of a relation that can be referred in other relation.
- Referential integrity constraint states that if a relation refers to a key attribute of a different or same relation, then that key element must exist.

Example:



CustomerID	CustomerName	Status
1	Google	Active
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Customer

Billing

InvoiceNo	CustomerID	Amount
1	1	$100
2	1	$200
3	2	$150

In the above example, we have 2 relations, Customer and Billing.

Tuple for CustomerID =1 is referenced twice in the relation Billing. So we know CustomerName=Google has billing amount $300