

DATA BASE KEYS

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A key is an attribute or group of attributes that uniquely identifies a tuple (row) in a table.

- ✚ Keys play an important role in preserving a **database's integrity** and dependability by imposing unique limitations on the data and creating linkages across tables.

DATABASE KEY TYPES:



- Super Key
- Candidate Key
- Primary Key
- Foreign Key
- Alternate Key
- Surrogate key
- Composite Key

1. Super Key

A Super key is a **column combination** that **uniquely identifies any row** in a relational database management system (RDBMS) table.

Here are some examples of super keys:

- *In a table of students, the combination of student ID and student name is a super key.*
- *In a table of employees, the combination of employee ID and employee name is a super key.*
- *In a table of products, the combination of product ID and product name is a super key.*

2. Candidate Key

It is the smallest collection of characteristics that may be used to uniquely identify a tuple (row) in the database.

To put it another way,

- ✚ In general, **any column or combination of columns that can uniquely identify a row in a table is a candidate key.**

Here are some of the important properties of candidate keys:

- *Uniqueness: A candidate key must be unique for each row in the table.*
- *Non-null: A candidate key cannot be null.*
- *Minimality: A candidate key cannot be reduced to a smaller set of attributes that still uniquely identifies each row in the table.*

3. Primary Key

A primary key is a **tuple's unique identifier in a table**. A table can only have one primary key, and it **cannot include null values**.

- ✚ Primary keys are an important concept in database design. They help to ensure the **uniqueness and integrity of data** in a database.

Here are some of the benefits of using primary keys:

****Uniqueness:** Primary keys ensure that each row in a table is unique. This makes it easier to identify and access specific rows of data.*

****Integrity:** Primary keys help to maintain the integrity of data in a database. By preventing duplicate data and ensuring that each row has a unique identifier, primary keys help to keep data accurate and consistent.*

****Relationships:** Primary keys can be used to establish relationships between tables in a database. This allows you to link data from different tables together, which can be useful for queries and reporting.*

4. Foreign Key

A foreign key is a field or column in one table that **references the primary key of another table.**

- ✚ Foreign keys are used to establish relationships between tables in a database

To put it another way,

- ✚ **A Foreign key is a primary key from one table that is used to connect to another.**

- ✚ Foreign keys are an important tool for database design.

- ✚ By using foreign keys, you can help to ensure the **accuracy, consistency, and integrity of your data.**

Here are some of the benefits of using foreign keys:

****Accuracy:** Foreign keys help to ensure the accuracy of data in a database by preventing duplicate data and ensuring that the values in a foreign key are always present and match the values in the primary key of the referenced table.*

****Consistency:** Foreign keys help to maintain the consistency of data in a database by preventing changes to the values in a primary key from being propagated to the values in the foreign key.*

****Relationships:** Foreign keys can be used to establish relationships between tables in a database. This allows you to link data from different tables together, which can be useful for queries and reporting.*

5. Alternate Key

An alternate key is a **candidate key that is not used as the primary key**.

- ✚ It can be useful for establishing relationships between tables or for creating unique indexes on tables

To put it another way,

- ✚ **A candidate key that is not utilized as the primary key is known as an alternative key.**

Here are some examples of how alternate keys can be used to improve database design:

- **To prevent duplicate data:** Alternate keys can be used to prevent duplicate data in a table.

- **To maintain data integrity:** Alternate keys can be used to maintain data integrity in a table.
- **To establish relationships between tables:** Alternate keys can be used to establish relationships between tables.
- **To improve performance:** Alternate keys can be used to improve the performance of queries.

6. Surrogate Key

A surrogate key is a **unique identifier** for a row in a database that is not derived from any other data in the database.

- ✚ Surrogate keys are often used as primary keys in databases because they are **guaranteed to be unique and they do not change over time**.
- ✚ Surrogate keys are also known as **synthetic keys, artificial keys, or technical keys**

The following are some of the benefits of employing surrogate keys

- * Surrogate keys are guaranteed to be unique, which can aid in the prevention of **duplicate data**.
- * Surrogate keys do not change over time, which can help to preserve **data consistency**.
- * Surrogate keys can be used to construct unique indexes, which can enhance **query performance**.

7. Composite Key

A composite key is a **primary key that is composed of two or more attributes**. When a single attribute is not enough to uniquely identify a row in a table, a composite key can be used.

To put it another way,

- ✚ **A composite key is a main key composed of two or more characteristics.**
- ✚ When a single characteristic is insufficient to uniquely identify a tuple in a table, a **composite key can be used**.

Here are some more advantages of using composite keys:

- **Uniqueness:** Composite keys are guaranteed to be unique, which can help to prevent duplicate data.
- **Consistency:** Composite keys do not change over time, which can help to maintain the consistency of data.
- **Performance:** Composite keys can be used to create unique indexes, which can improve the performance of queries.
- **Meaningfulness:** Composite keys can be meaningful, which can make them easier to use in queries and reports.