

Primary keys

Efficient and consistent databases

Persons

ID	Name	Address
1	Johnson	Flemming st. Washington
2	Oliver	Kenwood
2	Johnson	Flemming st.

Inconsistent



- We are storing Johnson twice
 - Takes up more space
- What happens if someone changes the address of johnson?
 - Which johnson is the true johnson?
 - Where does he live?

Efficient and consistent databases

- Solution: Force the values of a column to be unique
- Which column to pick?
 - There can be multiple johnsons in the world, and multiple people can live on one adress. Not good picks.
- ID is a good pick as it is unique for each person

Persons

ID	Name	Address
1	Johnson	Flemming st.
2	Oliver	Kenwood
2	Johnson	Flemming st.

Primary key

- As the ID identifies each person it cannot be empty (NULL).
 - You don't have a social security number???
- We call a columns that are unique and cannot be NULL for **Primary keys**.

- Primary key columns are often marked by an underline

Persons

<u>ID</u>	Name	Address
1	Johnson	Flemming st.
2	Oliver	Kenwood

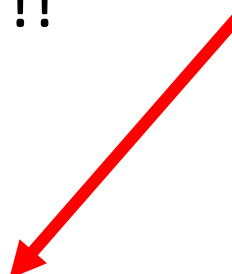
Primary key requirements

- Has to uniquely identify each entity (row)
- Cannot be empty (NULL)
- We call columns that uniquely identify each entity for a **Candidate key**
 - We can choose these candidate keys as primary keys
- Often we create numbers and assign them to each entity (social security number, car registration number, etc.)
 - These are called **surrogate keys**, or **Pseudo keys**

Primary key

- A primary key can consist of more than one column (combination of multiple columns). These are called **composite keys**
- If roomnumber is the primary key, we can only rent out a room once!!!

Room rental



<u>Roomnumber</u>	Date	Renter
1	10.10.2018	Robert
<u>2</u>	14.10.2018	Weird Al
3	14.10.2018	Aldrin
<u>2</u>	18.10.2018	Sam

Two red 'X' marks are placed to the right of the table, one next to the row with room number 2 on 14.10.2018 and another next to the row with room number 2 on 18.10.2018, indicating a violation of a primary key constraint on room number.

Primary key is a combination of roomnumber and date

Room rental



<u>Roomnumber</u>	<u>Date</u>	Renter
1	10.10.2018	Robert
<u>2</u>	<u>14.10.2018</u>	Weird Al
3	14.10.2018	Aldrin
<u>2</u>	<u>18.10.2018</u>	Sam

A green checkmark is placed to the right of the table, indicating that this table correctly implements a composite primary key on room number and date.

Primary key vs Unique


- It is possible to assign a column as Unique, meaning there can be no duplicate values in it. They can however contain NULL.

With Unique

ID	Name	Address
1	Johnson	Flemming st.
2	Oliver	Kenwood
3	Johan	Alta
NULL	Olaf	Sumeria
NULL	Egil	Oslo

With primary key

<u>ID</u>	Name	Address
1	Johnson	Flemming st.
2	Oliver	Kenwood
3	Johan	Alta
NULL	Olaf	Sumeria
NULL	Egil	Oslo



Create Primary key

- Primary keys can be defined when creating a table or added later
- Both of these do the same, but with the one on the right you give a name for the primary key, making deleting it afterwards easier.

```
CREATE TABLE People (  
    ID int,  
    LastName varchar(255),  
    FirstName varchar(255),  
    PRIMARY KEY (ID)  
);
```

```
CREATE TABLE People (  
    ID int,  
    LastName varchar(255),  
    FirstName varchar(255),  
    CONSTRAINT PK_people PRIMARY KEY (ID)  
);
```


Add primary key to existsing table

```
ALTER TABLE People  
ADD PRIMARY KEY (ID);
```

```
ALTER TABLE People  
ADD CONSTRAINT PK_people PRIMARY KEY (ID);
```

Removing primary key

- Remove primary keys with ALTER TABLE

```
ALTER TABLE people  
DROP PRIMARY KEY;
```

```
ALTER TABLE people  
DROP CONSTRAINT PK_people;
```