Database

Schema, DDL and DML

Which part of this page does come from a database?

Nurhadi - Aldo

@nurhadi_aldo

Akun Resmi Relawan Nurhadi - Aldo
Bersama Nurhadi - Aldo Menuju
Indonesia Tronjal Tronjol Maha Asyik
email : dildoforindonesia@gmail.com
#NurhadiAldo

indonesia

Joined December 2018

Can you see any Data?

- Nurhadi - Aldo
- @nurhadi_aldo
- Akun Resmi Relawan Nurhadi - Aldo Bersama Nurhadi - Aldo Menuju Indonesia Tronjal Tronjol Maha Asyik email: dildoforindonesia@gmail.com
- Indonesia
- Joined December 2018

Define the Model

Account		Account#1
Display Name		Nurhadi - Aldo
Username		@nurhadi_aldo
Bio		Akun Resmi Relawan ...
Location		Indonesia
Join Date		20/12/2018

Database Relationship

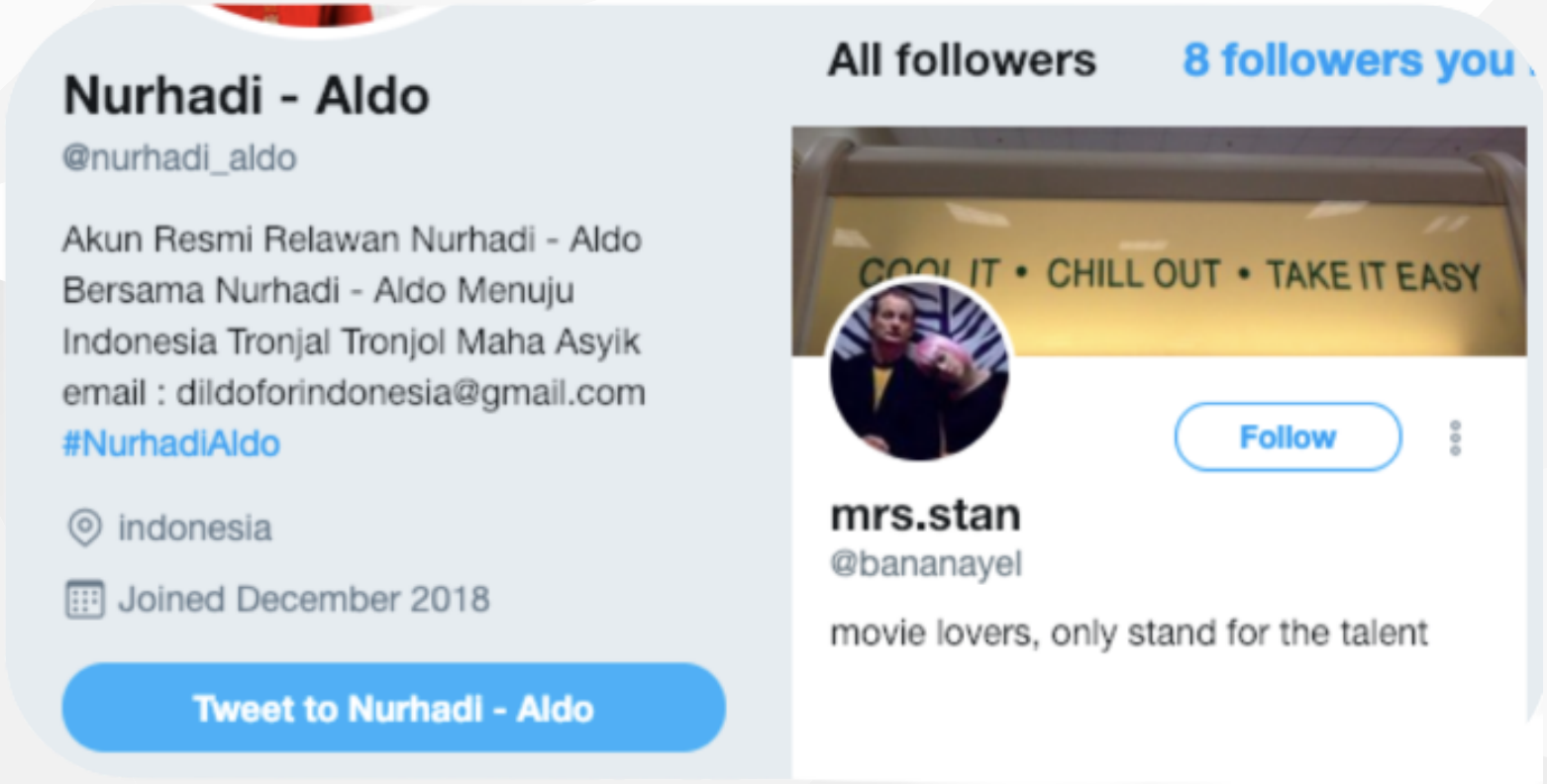
One to One Relationship

One user only have **one profile picture**

One to Many Relationship

One user can have **many tweets**

Many to Many Relationship



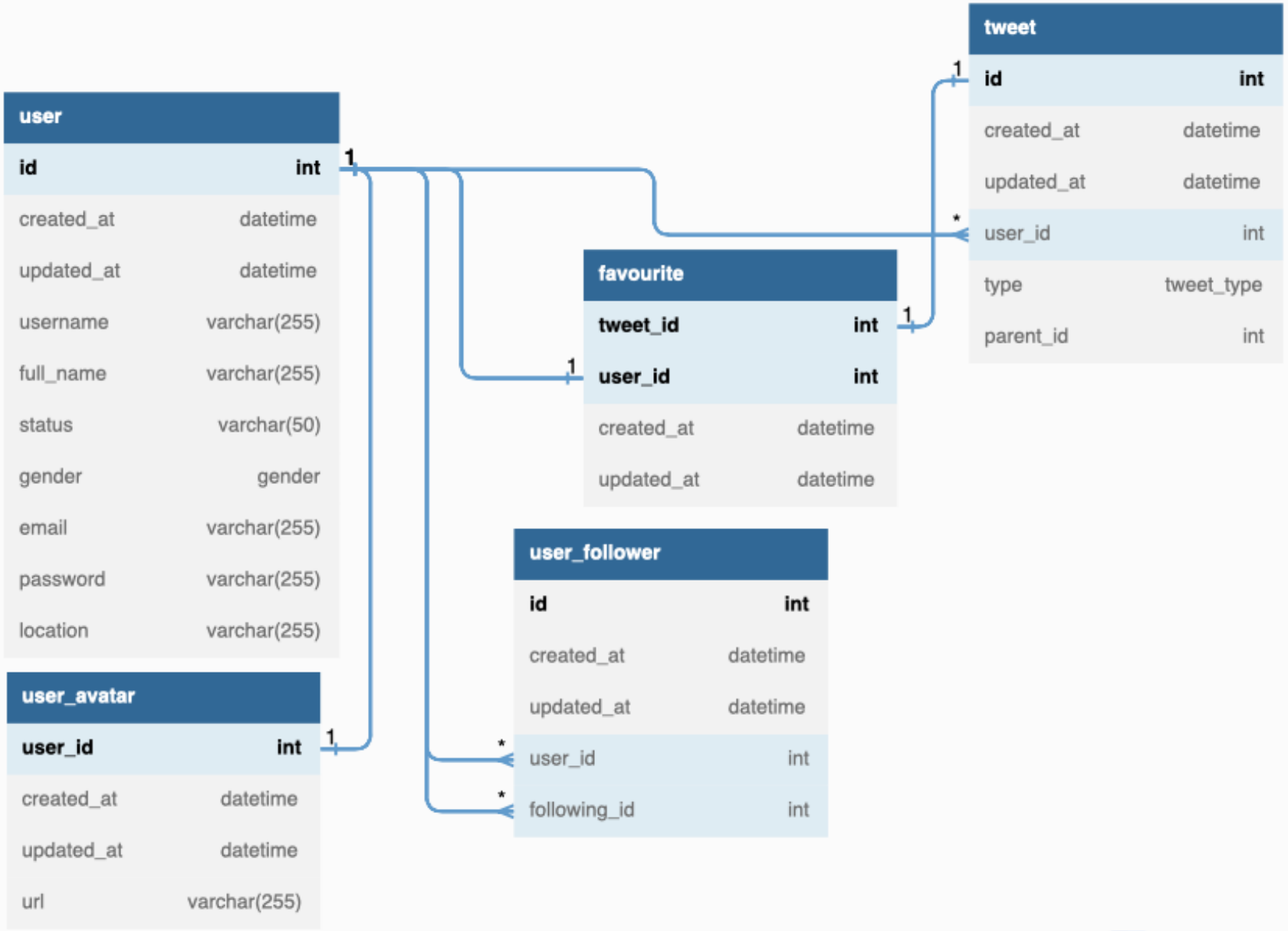
One user can have **many followers** and **one user** also can have **many following**.

How to Implement?

We will use the online tools to create database schema

https://dbdiagram.io/

Database Design as a Code



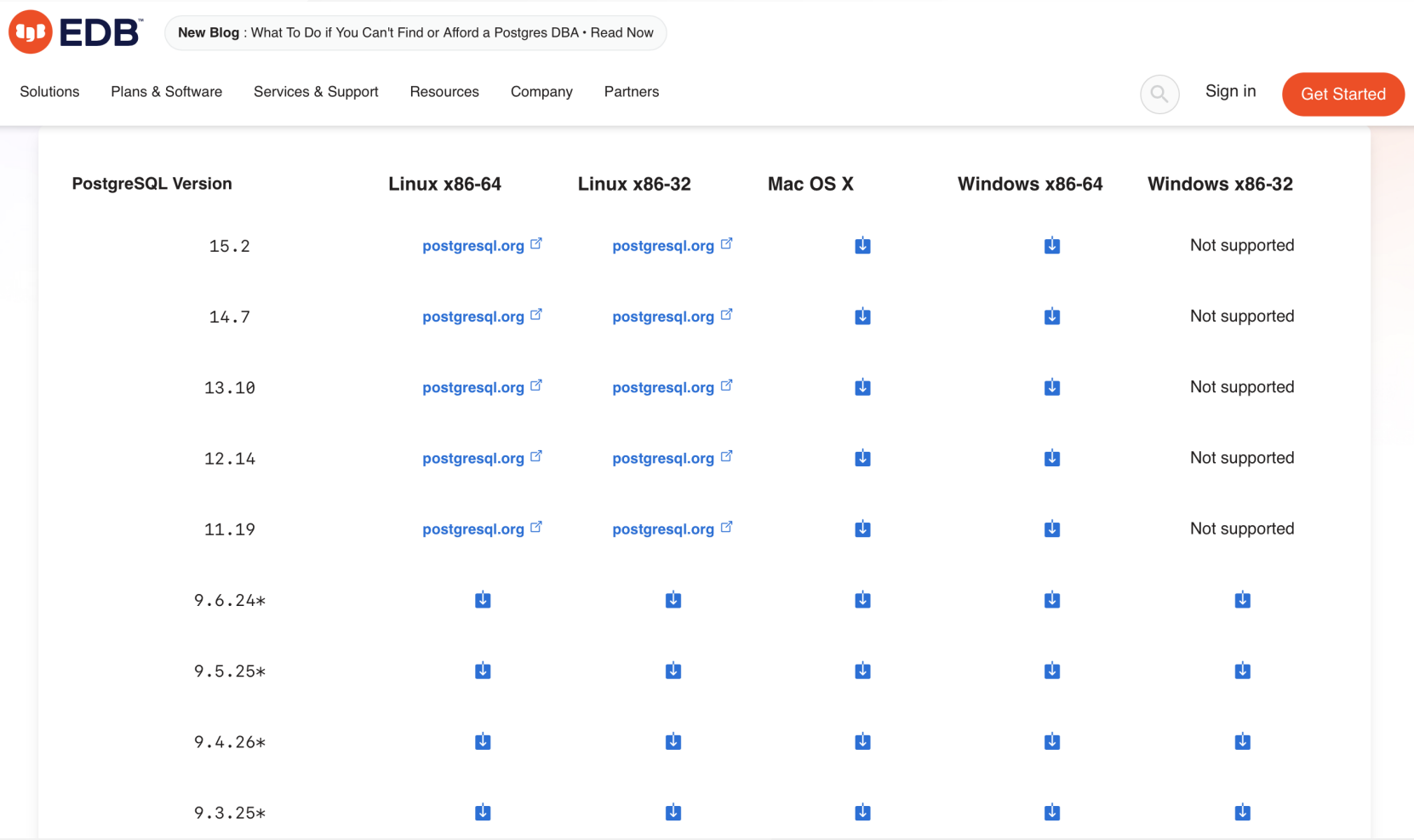
dbdiagram.io

Relational Database Management System

RDBMS

Tools that use based on ***Relational Database Model***

Example : MySQL, PostgreSQL, Oracle, etc.



Install PostgreSQL

From the official page here.

SQL Command


DDL
DML
DCL
Data Definition Language
Data Manipulation Language
Data Control Language

DDL Statement

```
CREATE DATABASE <DATABASE_NAME>;

CREATE TABLE <TABLE_NAME> (
    column1 <datatype(length)> <column_constraint>,
    column2 <datatype(length)> <column_constraint>,
    ...
    table_constraints
);

DROP TABLE <TABLE_NAME>;

ALTER TABLE <TABLE_NAME> RENAME TO <NEW_TABLE_NAME>;
```

Create Table

```sql
CREATE TABLE users (
    id SERIAL PRIMARY KEY,
    username VARCHAR(255) NOT NULL,
    password VARCHAR(255) NOT NULL
)
```

```sql
CREATE TABLE roles (
    id SERIAL PRIMARY KEY,
    name VARCHAR(255) UNIQUE NOT NULL
)
```

```sql
CREATE TABLE user_role (
    user_id INT NOT NULL,
    role_id INT NOT NULL,
    PRIMARY KEY (user_id, role_id),
    FOREIGN KEY (user_id) REFERENCES users (id),
    FOREIGN KEY (role_id) REFERENCES roles (id)
)
```

Modify Table

```
ALTER TABLE users ADD email VARCHAR(255);
ALTER TABLE users ADD phone_number INT;
```

```
ALTER TABLE users ALTER COLUMN phone_number TYPE VARCHAR(255);
```

Data Manipulation Language (DML)

Commands used to **manipulate** data in tables from a database.

Statement Operation :

- `INSERT`
- `SELECT`
- `UPDATE`
- `DELETE`

INSERT

Input data to table `users`.

```
INSERT INTO users (username, password, email, phone_number) VALUES
('maverick', 'mypassword', 'maverick@mail.local', '2387232');
```

Or, with returning data from modified row.

```
INSERT INTO users (username, password, email, phone_number) VALUES
('maverick', 'mypassword', 'maverick@mail.local', '2387232')
RETURNING id;
```

SELECT

Get all data from `users` table.

```
SELECT * FROM users;
```

id	username	password	email	phone_number
1	maverick	mypassword	maverick@mail.local	2387232

Cont...

Displays the **username** and **password** in the **users** table whose **id** is 1.

```
SELECT username, password FROM users WHERE id = 1;
```

username	password
maverick	mypassword

Cont...

Displays the **username** and **password** in the **user** table whose **email** is not empty.

```
SELECT username, password FROM users WHERE email IS NOT NULL;
```

username	password
maverick	mypassword

UPDATE

Update data into the **users** table whose **id** is 1.

```
UPDATE users SET email = 'test@email.local', phone_number = '128722'
WHERE id = 1
RETURNING id, username, email, phone_number;
```

id	username	email	phone_number
1	maverick	test@email.local	128722

DELETE

Delete data from the **users** table whoose **id** is 1.

```
DELETE FROM users
WHERE id = 1
RETURNING *;
```

DML Statement

- `LIKE` / `BETWEEN`
- `AND` / `OR`
- `ORDER BY`
- `LIMIT`

LIKE / BETWEEN

Show data **username** and **email** from `users` table that **username** contains the letter **M** on first letter.

```
SELECT username, password FROM users
WHERE username LIKE 'M%';
```

Show data **username** and **email** from `users` table that **id** between 1 and 4.

```
SELECT username, password FROM users
WHERE id BETWEEN 1 AND 4;
```

AND / OR

Show data **username** and **email** from `users` table that **username** contains the letter **M** on first letter or **id** between 1 and 4.

```
SELECT username, password FROM users
WHERE username LIKE 'M%' OR
id BETWEEN 1 AND 4;
```

ORDER BY

Show data **username** and **email** from `users` table that **username** contains the letter **M** on first letter or **id** between 1 and 4 and sort the **id** by descending order.

```
SELECT username, password FROM users
WHERE username LIKE 'M%' OR
id BETWEEN 1 AND 4 ORDER BY id DESC;
```

LIMIT

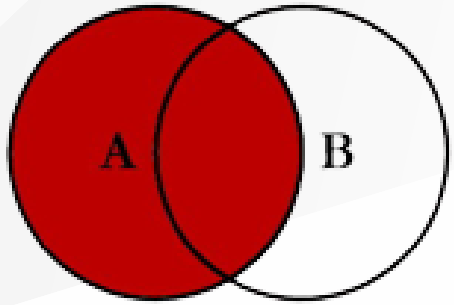
Show data **username** and **email** from `users` table that **username** contains the letter **M** on first letter or **id** between 1 and 4 and sort the **id** by descending order max 2 data.

```
SELECT username, password FROM users
WHERE username LIKE 'M%' OR
id BETWEEN 1 AND 4 ORDER BY id DESC
LIMIT 2;
```

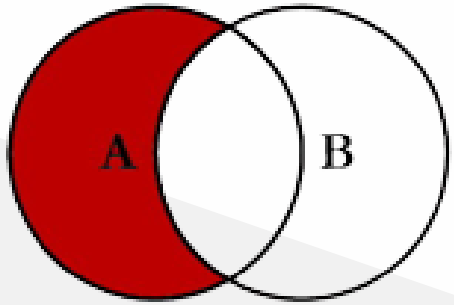
JOIN

A clause to combine **records**
from two or more tables

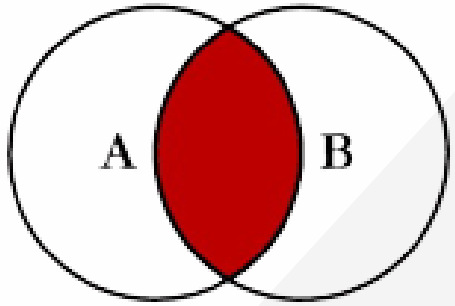
SQL JOINS



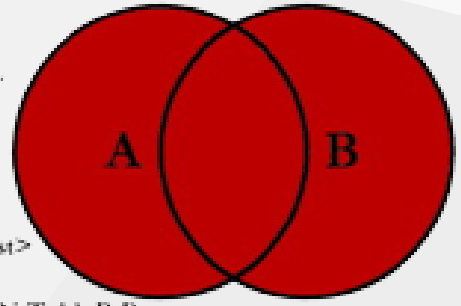

```
SELECT <select_list>
FROM TableA A
LEFT JOIN TableB B
ON A.Key = B.Key
```



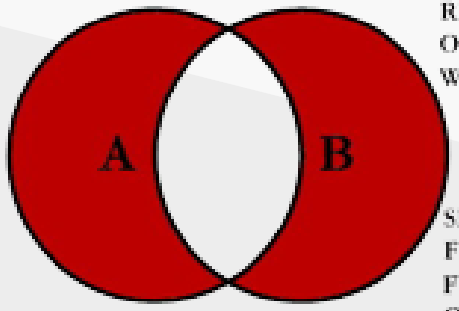

```
SELECT <select_list>
FROM TableA A
LEFT JOIN TableB B
ON A.Key = B.Key
WHERE B.Key IS NULL
```



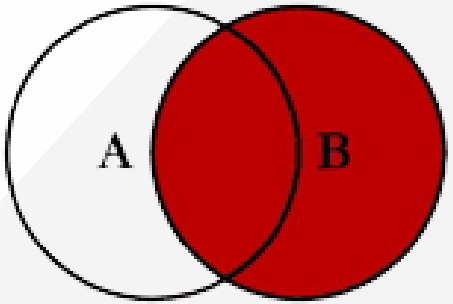

```
SELECT <select_list>
FROM TableA A
INNER JOIN TableB B
ON A.Key = B.Key
```



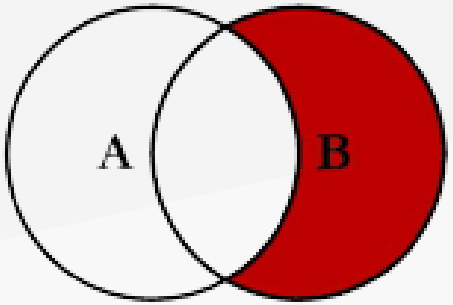

```
SELECT <select_list>
FROM TableA A
FULL OUTER JOIN TableB B
ON A.Key = B.Key
```




```
SELECT <select_list>
FROM TableA A
FULL OUTER JOIN TableB B
ON A.Key = B.Key
WHERE A.Key IS NULL
OR B.Key IS NULL
```




```
SELECT <select_list>
FROM TableA A
RIGHT JOIN TableB B
ON A.Key = B.Key
```




```
SELECT <select_list>
FROM TableA A
RIGHT JOIN TableB B
ON A.Key = B.Key
WHERE A.Key IS NULL
```

AGGREGATE

Function in which the values of multiple rows are grouped together to form a value.

- MIN : `SELECT MIN(id) AS id FROM users`
- MAX : `SELECT MIN(id) AS id FROM users`
- SUM : `SELECT SUM(favourite_count) FROM tweet WHERE user_id = 1`
- AVG : `SELECT AVG(favourite_count) FROM tweet WHERE user_id = 1`
- COUNT : `SELECT COUNT(*) FROM users;`
- HAVING : `SELECT user_id FROM tweet GROUP BY user_id HAVING SUM(favourite_count) > 2`

SUB QUERY

Sub Query or Inner query or Nested Query is query inside another query.

A sub query can be used to return data which will be used into main query as requirements to further limit the data to be retrieved.

Sub query can be used with `INSERT`, `SELECT`, `UPDATE` and `DELETE` statements with the operator likes `=`, `<`, `>`, `<=`, `>=`, `IN`, `BETWEEN`, etc.

Rules

- Must be enclosed in brackets.
- A subquery can only have **one column** in the `SELECT` clause, except for several columns in the main query for the subquery to compare the selected columns.
- Subqueries that return more than one row can only be used with some operator values, such as the IN operator.
- A `SELECT` list **cannot include** references to the values it evaluates to `BLOB`, `ARRAY`, `CLOB`, or `NCLOB`.
- A subquery cannot be immediately enclosed in a set function.

SUBQUERY - Example

Show data `user` table whose `user_id` is in the `tweets` table.

```
SELECT * FROM users WHERE id IN
(
    SELECT user_id FROM tweet GROUP BY id
);
```

Show the data `users` table whose total number of `favorite_count` per user is more than 5 in the tweets table.

```
SELECT * FROM users WHERE id IN
(
    SELECT user_id FROM tweets GROUP BY user_id HAVING
    SUM(favourite_count) > 5
);
```

Task

1. Make a summary of the database material that has been explained
2. Create database schema using dbdiagram.io to manage `Car Rental` and then create DDL from the that database schema.