

SQL Learning

W3schools

https://www.w3schools.com/sql/sql_intro.asp

What is SQL?

- Structured Query Language
- Access and manipulate database

What can SQL do?

SQL can execute queries against a database

SQL can retrieve data from a database

SQL can insert records in a database

SQL can update records in a database

SQL can delete records from a database

SQL can create new databases

SQL can create new tables in a database

SQL can create stored procedures in a database

SQL can create views in a database

SQL can set permissions on tables, procedures, and views

RDBMS

- Relational Database Management System

Select column

- Select **everything** from **Customers database**

```
SELECT * FROM Customers;
```

Your Database:

Tablename	Records
<u>Customers</u>	91
<u>Categories</u>	8
<u>Employees</u>	10
<u>OrderDetails</u>	518
<u>Orders</u>	196
<u>Products</u>	77
<u>Shippers</u>	3
<u>Suppliers</u>	29

[Restore Database](#)

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden
6	Blauer See Delikatessen	Hanna Moos	Forsterstr. 57	Mannheim	68306	Germany
7	Blondel père et fils	Frédérique Citeaux	24, place Kléber	Strasbourg	67000	France
8	Bólido Comidas preparadas	Martín Sommer	C/ Araquil, 67	Madrid	28023	Spain
9	Bon app'	Laurence Lebihans	12, rue des Bouchers	Marseille	13008	France
10	Bottom-Dollar Marketse	Elizabeth Lincoln	23 Tswassen Blvd.	Tswassen	T2F 8M4	Canada
11	B's Beverages	Victoria Ashworth	Fauntleroy Circus	London	EC2 5NT	UK
12	Cactus Comidas para llevar	Patricia Simpson	Cerrito 333	Buenos Aires	1010	Argentina

SQL Syntax

Database table

- Column and rows

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden

Most common SQL command

SELECT - extracts data from a database

UPDATE - updates data in a database

DELETE - deletes data from a database

INSERT INTO - inserts new data into a database

CREATE DATABASE - creates a new database

ALTER DATABASE - modifies a database

CREATE TABLE - creates a new table

ALTER TABLE - modifies a table

DROP TABLE - deletes a table

CREATE INDEX - creates an index (search key)

DROP INDEX - deletes an index

SELECT

```
SELECT column1, column2, ...
FROM table_name;
```

- Select column from table

```
SELECT * FROM table_name;
```

- Select all column from table

Select column

```
SELECT CustomerName, City FROM Customers;
```

CustomerName	City
Alfreds Futterkiste	Berlin
Ana Trujillo Emparedados y helados	México D.F.
Antonio Moreno Taquería	México D.F.
Around the Horn	London
Berglunds snabbköp	Luleå
Blauer See Delikatessen	Mannheim
Blondel père et fils	Strasbourg
Bólido Comidas preparadas	Madrid
Bon app'	Marseille

SELECT DISTINCT Statement

```
SELECT DISTINCT column1, column2, ...
FROM table_name;
```

- SELECT DISTINCT return only distinct (different) values

```
SELECT Country FROM Customers;
```

Number of Records: 91

Country
Germany
Mexico
Mexico
UK
Sweden
Germany
France
Spain
France
Canada

SELECT DISTINCT Country FROM Customers;

Number of Records: 21

Country
Germany
Mexico
UK
Sweden
France
Spain
Canada
Argentina

```
SELECT COUNT(DISTINCT Country) FROM Customers;
```

- Count

Number of Records: 1

COUNT(DISTINCT Country)

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Where

- WHERE clause is used to filter records

```
SELECT column1, column2, ...
FROM table_name
WHERE condition;
```

- Filter string

```
#Filter Country = Mexico
SELECT * FROM Customers
WHERE Country='Mexico';
```

Operators

Operator	Description	Example
=	Equal	Try it
>	Greater than	Try it
<	Less than	Try it
>=	Greater than or equal	Try it
<=	Less than or equal	Try it
<>	Not equal. Note: In some versions of SQL this operator may be written as !=	Try it
BETWEEN	Between a certain range	Try it
LIKE	Search for a pattern	Try it
IN	To specify multiple possible values for a column	Try it

And Or Not (Combine with where)

- Filter base on more than one conditions
- same logic as python
- And = everything need to be true
- or = one need to be true
- not = reverse and

And syntax

```
SELECT column1, column2, ...
FROM table_name
WHERE condition1 AND condition2 AND condition3 ...;
```

Example

```
SELECT * FROM Customers
```

```
WHERE Country='Germany' AND City='Berlin';
```

Number of Records: 1

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany

OR syntax

```
SELECT column1, column2, ...
FROM table_name
WHERE condition1 OR condition2 OR condition3 ...;
```

Example

```
SELECT * FROM Customers
WHERE City='Berlin' OR City='München';
```

Result:

Number of Records: 2

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
25	Frankenversand	Peter Franken	Berliner Platz 43	München	80805	Germany

Not Syntax

```
SELECT column1, column2, ...
FROM table_name
WHERE NOT condition;
```

Example

```
SELECT * FROM Customers
```

```
WHERE NOT Country='Germany';
```

Number of Records: 80

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden
7	Blondel père et fils	Frédérique Citeaux	24, place Kléber	Strasbourg	67000	France
8	Bólido Comidas preparadas	Martín Sommer	C/ Araquil, 67	Madrid	28023	Spain
9	Bon app'	Laurence Lebihans	12, rue des Bouchers	Marseille	13008	France

Combination

```
SELECT * FROM Customers
WHERE Country='Germany' AND (City='Berlin' OR City='München');
```

Result:

Number of Records: 2

CustomerID	CustomerName	ContactName	Address	City	PostalCode
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209
25	Frankenversand	Peter Franken	Berliner Platz 43	München	80805

ORDER BY

```
SELECT column1, column2, ...
FROM table_name
ORDER BY column1, column2, ... ASC|DESC;
```

```
SELECT * FROM Customers
ORDER BY Country;
```

Result:

Number of Records: 91

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
12	Cactus Comidas para llevar	Patricia Simpson	Cerrito 333	Buenos Aires	1010	Argentina
54	Océano Atlántico Ltda.	Yvonne Moncada	Ing. Gustavo Moncada 8585 Piso 20-A	Buenos Aires	1010	Argentina
64	Rancho grande	Sergio Gutiérrez	Av. del Libertador 900	Buenos Aires	1010	Argentina
20	Ernst Handel	Roland Mendel	Kirchgasse 6	Graz	8010	Austria
59	Piccolo und mehr	Georg Pippes	Geislweg 14	Salzburg	5020	Austria
50	Maison Dewey	Catherine Dewey	Rue Joseph-Bens 532	Bruxelles	B-1180	Belgium
76	Suprêmes délices	Pascale Cartrain	Boulevard Tirou, 255	Charleroi	B-6000	Belgium
15	Comércio Mineiro	Pedro Afonso	Av. dos Lusíadas, 23	São Paulo	05432-043	Brazil

- Alphabetical order

ORDER BY DESC

```
SELECT * FROM Customers
ORDER BY Country DESC;
```

Number of Records: 91						
CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
33	GROSELLA-Restaurante	Manuel Pereira	5 ^a Ave. Los Palos Grandes	Caracas	1081	Venezuela
35	HILARIÓN-Abastos	Carlos Hernández	Carrera 22 con Ave. Carlos Soublette #8-35	San Cristóbal	5022	Venezuela
46	LILA-Supermercado	Carlos González	Carrera 52 con Ave. Bolívar #65-98 Llano Largo	Barquisimeto	3508	Venezuela
47	LINO-Delicatessen	Felipe Izquierdo	Ave. 5 de Mayo Porlamar	I. de Margarita	4980	Venezuela
32	Great Lakes Food Market	Howard Snyder	2732 Baker Blvd.	Eugene	97403	USA
36	Hungry Coyote Import Store	Yoshi Latimer	City Center Plaza 516 Main St.	Elgin	97827	USA
43	Lazy K Kountry Store	John Steel	12 Orchestra Terrace	Walla Walla	99362	USA
45	Let's Stop N Shop	Jaime Yorres	87 Polk St. Suite 5	San Francisco	94117	USA

- Reverse alphabetical order

INSERT INTO

insert new records in a table.

```
INSERT INTO table_name (column1, column2, column3, ...)
VALUES (value1, value2, value3, ...);
```

- Choose specific column and value

```
INSERT INTO table_name
VALUES (value1, value2, value3, ...);
```

- assign automatically

Example

```
INSERT INTO Customers (CustomerName, ContactName, Address, City,
PostalCode, Country)
VALUES ('Cardinal', 'Tom B. Erichsen', 'Skagen 21', 'Stavanger',
'4006', 'Norway');
```

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
89	White Clover Markets	Karl Jablonski	305 - 14th Ave. S. Suite 3B	Seattle	98128	USA
90	Wilman Kala	Matti Karttunen	Keskuskatu 45	Helsinki	21240	Finland
91	Wolski	Zbyszek	ul. Filtrowa 68	Walla	01-012	Poland
92	Cardinal	Tom B. Erichsen	Skagen 21	Stavanger	4006	Norway

Only in Specified Columns

```
INSERT INTO Customers (CustomerName, City, Country)
VALUES ('Cardinal', 'Stavanger', 'Norway');
```

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
89	White Clover Markets	Karl Jablonski	305 - 14th Ave. S. Suite 3B	Seattle	98128	USA
90	Wilman Kala	Matti Karttunen	Keskuskatu 45	Helsinki	21240	Finland
91	Wolski	Zbyszek	ul. Filtrowa 68	Walla	01-012	Poland
92	Cardinal	null	null	Stavanger	null	Norway

NULL Values

- null = a field with no value

Find null column

```
SELECT column_names
FROM table_name
WHERE column_name IS NULL;
```

Find non-null

```
SELECT column_names
FROM table_name
WHERE column_name IS NOT NULL;
```

UPDATE

modify the existing records in a table.

```
UPDATE table_name
SET column1 = value1, column2 = value2, ...
WHERE condition;
```

Update a single row

```
UPDATE Customers
SET ContactName = 'Alfred Schmidt', City= 'Frankfurt'
WHERE CustomerID = 1;
```

Result:

You have made changes to the database. Rows affected: 1

DELETE

- delete existing records

```
DELETE FROM table_name WHERE condition;
```

```
DELETE FROM Customers WHERE CustomerName='Alfreds Futterkiste';
```

- Delete Row where CustomerName = 'Alfreds Futterkiste'

Delete all rows and table

```
DELETE FROM table_name;
```

TOP, LIMIT, FETCH FIRST or ROWNUM

SELECT TOP

- Specify the number of records to return

```
SELECT TOP number|percent column_name(s)
FROM table_name
WHERE condition;
```

MySQL Syntax:

```
SELECT column_name(s)
FROM table_name
WHERE condition
LIMIT number;
```

Oracle 12 Syntax:

```
SELECT column_name(s)
FROM table_name
ORDER BY column_name(s)
FETCH FIRST number ROWS ONLY;
```

```
SELECT TOP 3 * FROM Customers;
```

- Select top 3 from customers

TOP PERCENT

```
SELECT TOP 50 PERCENT * FROM Customers;
```

MIN() and MAX()

- MIN() return the smallest value

```
SELECT MIN(column_name)
FROM table_name
WHERE condition;
```

- MAX() returns the largest value

```
SELECT MAX(column_name)
FROM table_name
WHERE condition;
```

Example

```
SELECT MIN(Price) AS SmallestPrice
FROM Products;
```

Number of Records: 1

SmallestPrice

2.5

COUNT(),AVG() and SUM()

COUNT()

```
SELECT COUNT(column_name)
FROM table_name
WHERE condition;
```

AVG()

```
SELECT AVG(column_name)
FROM table_name
WHERE condition;
```

SUM()

```
SELECT SUM(column_name)
FROM table_name
WHERE condition;
```

example

```
SELECT COUNT(ProductID)
FROM Products;
```

Number of Records: 1

COUNT(ProductID)

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- Count product id from products

LIKE Operator

LIKE

- use in a WHERE
- To search a **specified pattern**

```
SELECT column1, column2, ...
FROM table_name
WHERE columnN LIKE pattern;
```

Starting with a

```
SELECT * FROM Customers
WHERE CustomerName LIKE 'a%';
```

Number of Records: 4

CustomerID	CustomerName	ContactName	Address	City	PostalCode
1	Alfreds Futterkiste	Alfred Schmidt	Obere Str. 57	Frankfurt	12209
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023

End with a

```
SELECT * FROM Customers
WHERE CustomerName LIKE '%a';
```

r in second position

```
SELECT * FROM Customers
WHERE CustomerName LIKE '_r%';
```

not a

```
SELECT * FROM Customers
WHERE CustomerName NOT LIKE 'a%';
```

Wildcards

Symbol	Description	Example
*	Represents zero or more characters	bl* finds bl, black, blue, and blob
?	Represents a single character	h?t finds hot, hat, and hit
[]	Represents any single character within the brackets	h[oa]t finds hot and hat, but not hit
!	Represents any character not in the brackets	h[!oa]t finds hit, but not hot and hat
-	Represents any single character within the specified range	c[a-b]t finds cat and cbt
#	Represents any single numeric character	2#5 finds 205, 215, 225, 235, 245, 255, 265, 275, 285, and 295

IN

- IN operator > specify multiple values in a WHERE clause
- shorthand for multiple **OR** conditions

```
SELECT column_name(s)
FROM table_name
WHERE column_name IN (value1, value2, ...);
```

Or

```
SELECT column_name(s)
FROM table_name
```

```
WHERE column_name IN (SELECT STATEMENT);
```

Example

```
SELECT * FROM Customers
WHERE Country IN ('Germany', 'France', 'UK');
```

Result:

Number of Records: 29

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Alfred Schmidt	Obere Str. 57	Frankfurt	12209	Germany
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
6	Blauer See Delikatessen	Hanna Moos	Forsterstr. 57	Mannheim	68306	Germany
7	Blondel père et fils	Frédérique Citeaux	24, place Kléber	Strasbourg	67000	France
9	Bon app'	Laurence Lebihans	12, rue des Bouchers	Marseille	13008	France
11	B's Beverages	Victoria Ashworth	Fauntleroy Circus	London	EC2 5NT	UK

Between

- selects values within a given range
 - numbers, text or dates
 - begin and end values

```
SELECT column_name(s)
FROM table_name
WHERE column_name BETWEEN value1 AND value2;
```

Example

```
SELECT * FROM Products
WHERE Price BETWEEN 10 AND 20;
```

```
SELECT * FROM Products
```

```
WHERE ProductName BETWEEN 'Carnarvon Tigers' AND 'Mozzarella di
Giovanni'
ORDER BY ProductName;
```

Aliases

- give a table, column a temporary name
- Make column names more readable

```
SELECT column_name AS alias_name
FROM table_name;
```

```
SELECT column_name(s)
FROM table_name AS alias_name;
```