

SQL

Structured Query Language

SQL Agenda

Introduction to SQL

Querying Data

Sorting Data

Filtering Data

Group By

Aggregate Functions

Data Definition Language (DDL)

Constraints

Data Manipulation Language (DML)

Joining Multiple Tables

Conditional Expressions

Filtering Data Part 2

Subquery

Using SET Operators

Introduction to SQL

What is SQL?

SQL stands for Structured Query Language

SQL lets you access and manipulate databases

American National Standards Institute (ANSI) 1986

International Organization for Standardization (ISO) 1987

Standards

Why is it important to have standards?

Mutual understanding

Facilitate communication

Business interaction

ANSI / ISO

SQL is Standard... But

SQL is an ANSI/ISO Standard

DBMS Extensions

What Can SQL Do?

— — —

- Create new databases, tables, stored procedures, views
- Insert records
- Retrieve data
- Update records
- Delete records
- Set permissions on tables, procedures, and views

Syntax

```
-- get employees who joined company in 2000
SELECT clause { SELECT
                  first_name
FROM clause { FROM
               employees
WHERE clause { WHERE
                YEAR(hire_date) = 2000
                Predicate
```

Comment

Syntax

— — —

- SQL Statements
 - `SELECT * FROM Customers;`
- Not case sensitive
 - `SELECT * FROM`
 - `Select * From`
 - `Select * from`
- Semicolon after SQL Statements
 - Some database systems require it
 - We will use it

Common SQL Commands

— — —

- `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
- `DROP INDEX` - deletes an index

Literals

— — —

'John'

'1990-01-01'

'50'

200

-5

6.0221415E23

Comments

-- --

```
/* select employees whose salary is less than 3,000 */
```

```
-- employees with low salary
```

Querying data

Select Statement

-- --

SELECT

select_list

FROM

table_name;

Try it...



Lets go to SQL Tryit Editor

(https://www.w3schools.com/sql/trysql.asp?filename=trysql_select_all)

What piece of data do you want to filter down to?

How do you think you could do that?

Sorting Data

Order By Clause

SELECT

column1, column2

FROM

table_name

ORDER BY column1 **ASC** ,

column2 **DESC**;

Try it...

Sorting Data

Filtering Data

Where Clause

SELECT column1, column2, ...

FROM table_name

WHERE condition

SQL Comparison Operators

= Equal to

<> != Not equal to

< Less than

> Greater than

<= Less than or equal to

>= Greater than or equal to

SQL Logical Operators

— — —

AND	Return true if both expressions are true
OR	Return true if either expression is true
NOT	Reverse the result of any other Boolean operator.
IN	Return true if the operand is equal to one of the value in a list
BETWEEN	Return true if the operand is within a range
LIKE	Return true if the operand matches a pattern
IS NULL	Return true if the operand is null

Try it...

Filtering Data

Grouping Data

Grouping Data

— — —

GROUP BY - combine rows into groups and apply an aggregate function to each group.

HAVING - specify a condition for filtering groups summarized by the GROUP BY clause.

GROUPING SETS - generate multiple grouping sets.

ROLLUP - generate multiple grouping sets considering the hierarchy of the input columns.

CUBE - generate multiple grouping sets for all possible combination of the input columns.

Try it...

— — —

Grouping Data

Aggregate Functions

Aggregate Functions

AVG - calculate the average value of a set.

COUNT - return the number of items in a set.

SUM - return the sum all or distinct items of a set.

MAX - find the maximum value in a set.

MIN - find the minimum value in a set.

Try it...

— — —

Aggregate Functions

Wild Characters

Wildcard Characters

— — —

% Represents zero or more characters

_ Represents a single character

Try it...

— — —

Wildcard Characters