SQL HANDBOOK

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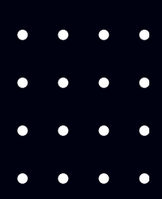


What is SQL?

SQL, or Structured Query Language, is a language designed to allow both technical and non-technical users query, manipulate, and transform data from a relational database. And due to its simplicity, SQL databases provide safe and scalable storage for millions of websites and mobile applications.

Install

1. To upgrade a previous version of SQL Server to SQL Server 2022 Express software, click this link, download and run SQLEXPR_x64_ENU.exe.
2. Note: If you do not have a required prerequisite, a box appears and indicates what is missing. Click OK, install the missing prerequisite, and then restart the procedure.
3. In the SQL Server Installation Center window, click Installation.
4. In the right pane, click Upgrade from a previous version of SQL Server.
5. If required, in the Product Key window, enter the product key.
6. Read the license terms agreement, and select the I accept the license terms check box.
7. In the Product Updates window, a progress bar indicates the updates check.
8. In the Upgrade Rules window, a report indicates the status of prerequisite components. If any prerequisite fails, exit the installation and fix the issue before you continue. For more information, click the Failed cell. You can ignore any warnings at this stage.
9. In the Select Instance window, you see the names of the SQL Server instances currently installed. In the Instance to upgrade list, select the instance used by Metasys software, which is typically MSSQLSERVER. You cannot rename the database instance during an upgrade. Click Next. The upgrade skips the Select Features, and the Feature Rules windows, as you cannot select these options.

10. In the Upgrade Progress window, you see the installation progress bar. This part of the procedure can take over 15 minutes to complete. When the Complete window appears, you see a status update for each component you installed, and an install successful message.
11. To enable communication protocols for the databases, start SQL Server Configuration Manager.
12. Expand Sql Server Network Configuration, and select Protocols for MSSQLSERVER.
13. In the right pane, complete the following steps:
14. Right-click Named Pipes and select Enable. Click OK to the warning message.
15. Right-click TCP/IP and select Enable. Click OK to the warning message.
16. Close the Sql Server Configuration Manager

Concepts

Record

A row that holds the data on a single observation or entity.

Field

A column that stores a specific piece of information for all records in the table.

Table

A two-dimensional structure composed of fields (columns) and records (rows).

- Fields (columns) are defined during table creation.
- There is no limit to the number of records (rows) in a table.

Relational database

A collection of related tables that store data in a structured format, with relationships established between them.

Unique identifiers

A set of unique values, often integers, used to identify individual records within a table. These are also known as Primary Keys.

Foreign Key

A field (or collection of fields) in one table that uniquely identifies a row in another table. The foreign key establishes and enforces a link between the data in two tables.

Query

A request for data or information from a database. Queries are written in SQL and can retrieve, insert, update, or delete data.

Data Types

Data types in SQL define the kind of data that can be stored in a field.

Numeric

INT

Stores integer numbers. Common variants include TINYINT, SMALLINT, MEDIUMINT, INT, and BIGINT, which differ in the range of values they can store.

Decimal

Stores fixed-point numbers with precision p (total number of digits) and scale s (number of digits after the decimal point). Often used for financial data.

Float and Double

Stores fixed-point numbers with precision p (total number of digits) and scale s (number of digits after the decimal point). Often used for financial data.

Character

Stores fixed-length strings. If the data is shorter than n characters, it is padded with spaces. Suitable for fields like postal codes or fixed-length codes.

Char

Stores variable-length strings, where n defines the maximum length. It uses only the space required for the actual data, plus a small overhead for length information.

Varchar

Stores large amounts of text data. Variants include TINYTEXT, TEXT, MEDIUMTEXT, and LONGTEXT, depending on the maximum storage capacity needed.

Text

Date and Time

Date

Stores date values in the format: YYYY-MM-DD

Time

Stores time values in the format: HH:MM:SS

Datetime

Stores both date and time in the format YYYY-MM-DD HH:MM:SS.

Timestamp

Similar to DATETIME, but often used for tracking changes in records. It typically stores the date and time in UTC (Coordinated Universal Time).

Year

Stores a year value, usually in a two-digit or four-digit format.

Table

Table names should be:

- In lowercase.
- Without spaces, use underscore (_) instead.
- Refer to a collective group, or to be plural.
- Different from other field names.
- Different from other table names.

Queries

Create

We can create an empty database:
CREATE DABATASE prueba_db

Insert

We add a record into a database table:
INSERT INTO student (id, name, age) VALUES (‘1’, ‘Kevin’, 25);

Select

How to show the records of a table:
*SELECT * FROM student;*

Count

Makes available the possibility of choosing only certain lines of a database record:
SELECT COUNT(1) FROM student;

Where

Combination of conditions:
*SELECT * FROM student WHERE name = ‘Jack’ AND age = 22.*

Delate

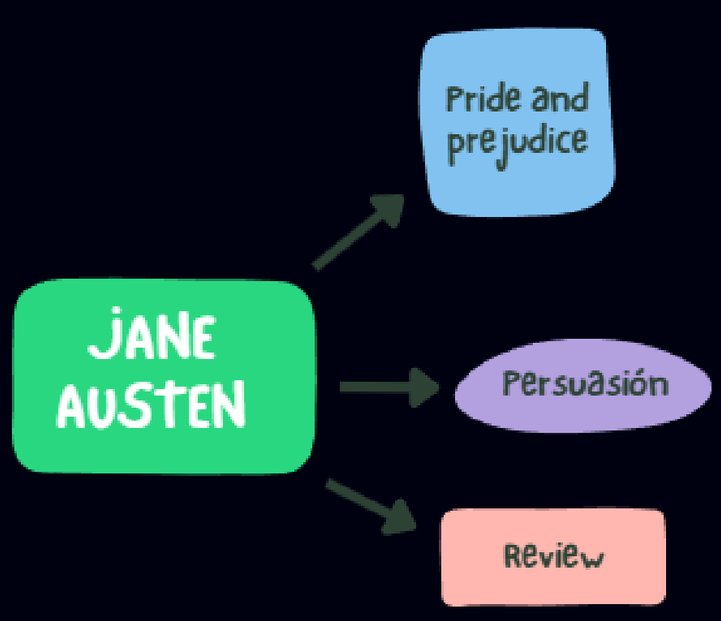
Depending on the condition we are going to specify, it will remove the elements from the table:
DELETE FROM student WHERE age = 26

Null

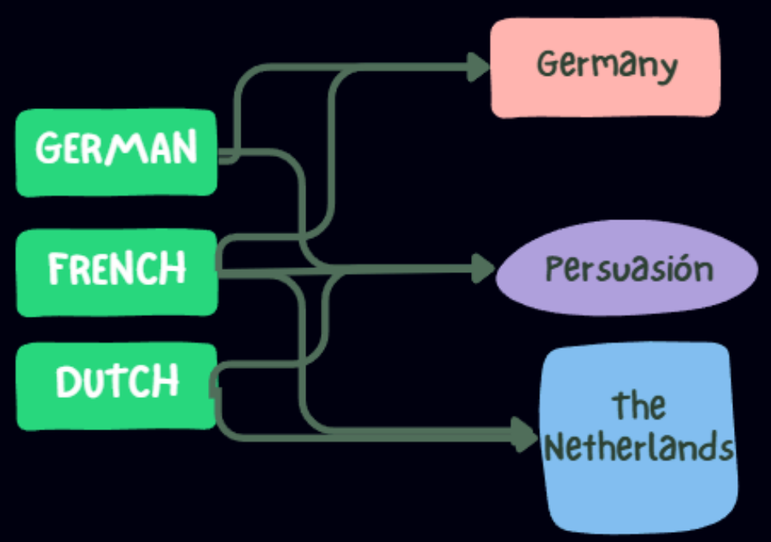
Allows you to differentiate empty cells in a table:
SELECT name, age FROM student WHERE age IS NULL;

Relations

One to many relationships



Many to many relationships



One to One relationships

INNER JOIN

LEFT_TABLE

id	left_val
1	L1
2	L2
3	L3
4	L4

Rigth_table

id	right_val
1	R1
4	R2
5	R3
6	R4

Result after

id	left_val	right_val
1	L1	R1
4	L4	R2

Normalization

Normalization is a data design process that organizes a database to avoid redundancy and inconsistent dependencies, making it easier to manage and maintain the data.

Keys

- **Primary key:** is a field that uniquely identifies the data records in that table.
- **Foreign key:** is a field that relates to the primary key in another table.
- **A composite key: i**s just like a primary key, but it has multiple fields instead of one field.

Normal forms

- **First form**: There is a Primary Key for identification. There are not duplicate fields or records; each field only has one value for each record.
- **Second form: I**s in 1NF, very non-primary-key attribute is fully functionally dependent on the primary key.
- **Third form**: Is in 2NF, have no transitive partial dependency.

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Thank you