SQL LANGUAGE

The sql language (structured query language) is a standard ansi-iso language that is used for the manipulation and querying of a relational database. This language uses sentences structured in a very similar way to the english language. It is currently used by most existing dbms (database management system) (for example, microsoft sql server, mysql, mariadb, postgresol, oracle database etc.) even if in various versions, called dialects. The basic functions are however present and available in the same way in all versions.

the sql language is divided into four sublanguages that allow you to manage different aspects of a database. 1) DDL (Data Definition Language) is the language for the definition of data: it contains instructions that allow the creation of a database, the definition of tables, their modification and deletion, as well as the management of attributes (addition, removal, modification etc.).

2) DML (Data Manipulation Language) is the language for data manipulation: it contains instructions that allow the insertion, modification and deletion of data within tables, as well as the querying of tables.

3) DCL (Data Control Language): all the commands that make it possible to manage access permissions to database resources belong to this section of SQL.

4) QL-Query Language: it represents the core of almost all database-related activities, as the commands belonging to this section of SQL allow the querying, grouping, counting and obtaining customized reports of the data present in the various database tables

One of the fundamental characteristics of SQL is its declarative nature. This means that you specify what you want to obtain from the data, and not how to obtain it. The database management system (DBMS) is responsible for finding the most efficient way to execute the query and return the desired result. For example, instead of writing a loop to iterate through data to find data that matches a pattern, in SQL you write a query that describes the pattern, and the DBMS takes care of the rest.

SQL is an ISO/ANSI standard language. This means that there is a standard defined at the relational level. Although there are specific SQL dialects for each DBMS (such as MySQL, PostgreSQL, Oracle, SQL Server, etc.), the core of the language is common and allows you to write queries that work (with minimal modifications) on different databases.

SQL, unlike languages such as c# and java, is not case-sensitive: statements can be written equivalently using uppercase or lowercase letters. Usually, however, the convention is to write all keywords in the language in uppercase. The identifiers used for table and attribute names must, instead, respect the following rules:

• must be less than or equal to 18 characters;

- must be composed of alphanumeric characters and cannot have a number as the first character;
- cannot contain symbols, except the underscore (_).

• statements are separated by a semicolon (;), although this can be omitted where implicit, and can also be written by occupying multiple lines.

in fact, a statement is often divided into multiple lines to allow the logical separation of the various sections and improve readability.

SQL offers powerful commands to manipulate data within the database:

- SELECT: To query the database and retrieve specific data based on search criteria.
- INSERT: To add new data (rows) to tables.
- UPDATE: To modify existing data in tables.
- DELETE: To remove data (rows) from tables.

SQL also allows you to define the structure of the database itself:

- CREATE DATABASE: To create new databases.
- CREATE TABLE: To create new tables within a database, specifying columns, data types, primary keys, etc.

• ALTER TABLE: To modify the structure of an existing table (add/remove columns, change data types, etc.).

- DROP TABLE: To delete tables.
- DROP DATABASE: To delete databases.

SQL includes commands to manage data access and security:

• GRANT: To grant permissions to users (e.g. permission to read, write, modify data).

• REVOKE: To revoke granted permissions.

SQL operates on sets of data. SQL queries do not process data row by row, but work on groups of rows (sets). This allows you to perform complex operations on large amounts of data efficiently. Compared to other programming languages, SQL syntax is relatively simpler and more intuitive, especially for query operations (SELECT). This makes SQL accessible to non-IT people, such as data analysts, marketers, etc. However, mastering advanced SQL and query optimization may require more in-depth knowledge. Relational database management systems (DBMS) are highly optimized to execute SQL queries efficiently. They use indexing, query optimization, and caching techniques to ensure high performance even with large volumes of data. SQL is

used in a wide range of applications, from simple websites and desktop applications to complex enterprise systems, data warehousing systems, and data analytics. It is an essential language for any professional who works with data.