Structured Query Language

SQL

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Structured Query Language

SQL

Pronounced as “SEQUEL”

(part of IBM project: SYSTEM R, 1974)

A computer language that you
use to interact with a DB

A powerful language relatively easy to learn

The SQL Language

- A tool for organizing, managing, and retrieving data stored by a computer database
- Supports a small but very powerful set of statements for manipulating, managing, and protecting data stored in a database
- Not itself a DBMS, nor is it a stand-alone product
- Database language for RDBMS such as Oracle, Sybase, Informix, IBM DB2, SQL Server, MySQL, Openingres,...
- Almost every DBMS supports SQL or a dialect of the language. Currently SQL products are available for every kind of computer and for every operating system

The SQL Language

- Structured Query Language: why this name??
  - When you need to retrieve data from a DB, you use SQL language to make the request
  - The DBMS processes the SQL request, retrieves the requested data, and returns it to you
  - This process of requesting data from a DB and receiving back the results is called a DB query – hence the name Structured Query language

The SQL Language

- Not a particularly structured language, especially when compared to highly structured language such as C, or java
- Data sublanguage, consisting of about 40 statements specialized for database management task
- SQL plays many different roles
  - SQL is an interactive query language
  - SQL is a DB programming language
  - SQL is a DB administration language
  - SQL is a client/server language
  - SQL is an Internet data access language
  - SQL is a distributed data language
  - SQL is a DB gateway language

SQL - Parts

- **Data Definition Language (DDL):** set of commands that create objects in the database
  - Tables, Specifying integrity constraints, Indexes, Views, Triggers, assertions, System Catalog
- **Data Manipulation Language (DML):** set of commands that determine which values are present in the tables at any given time in the database
  - Querying and Updating tables
  - Transaction Control
  - Interactive SQL, Embedded SQL, Dynamic SQL, SQL APIs
- **Data Control Language (DCL):** set of commands that determine whether a user is permitted to perform a particular action in the database
  - Authorization

Standardization of SQL
(Source - Wikipedia)

Year	Name	Alias	Comments
1986	SQL-86	SQL-87	First formalized by ANSI.
1989	SQL-89	FIPS 127-1	Minor revision that added integrity constraints, adopted as FIPS 127-1.
1992	SQL-92	SQL2, FIPS 127-2	Major revision (ISO 9075), *Entry Level* SQL-92 adopted as FIPS 127-2.
1999	SQL:1999	SQL3	Added regular expression matching, recursive queries (e.g. transitive closure), triggers, support for procedural and control-of-flow statements, non-scalar types (arrays), and some object-oriented features (e.g. structured types). Support for embedding SQL in Java (SQL/OLB) and vice versa (SQL/JRT).
2003	SQL:2003		Introduced XML-related features (SQL/XML), *window functions*, standardized sequences, and columns with auto-generated values (including identity-columns).
2006	SQL:2006		ISO/IEC 9075-14:2006 defines ways that SQL can be used with XML. It defines ways of importing and storing XML data in an SQL database, manipulating it within the database, and publishing both XML and conventional SQL-data in XML form. In addition, it lets applications integrate queries into their SQL code with XQuery, the XML Query Language published by the World Wide Web Consortium (W3C), to concurrently access ordinary SQL-data and XML documents.[
2008	SQL:2008		Legalizes ORDER BY outside cursor definitions. Adds INSTEAD OF triggers, TRUNCATE statement, FETCH clause.
2011	SQL:2011		Adds temporal data (PERIOD FOR) (more information at: Temporal database#History). Enhancements for *window functions* and FETCH clause.
2016	SQL:2016		Adds row pattern matching, polymorphic table functions, JSON.
2019	SQL:2019		Adds Part 15, multidimensional arrays (MDarray type and operators).