

# SQL

A programming language (pronounced either “S-Q-L” or “sequel”) designed to manage database data.

## What is SQL?

The Structured Query Language (SQL) is a language designed specifically for communicating with databases. Today SQL is the industry-wide standard language used by most database systems.

Databases allow collections of data to be stored in an organized manner – in the same way that data can be stored in an organized way inside files within a filing cabinet. Most modern DataBase Management Systems (DBMSs) store data in related tables, so are called Relational DBMS (RDBMS). The data stored inside databases can be examined and manipulated by SQL commands.

SQL commands are known as “queries” and utilize special keywords that can be used both to add data to a database, or extract details of data contained within a database. There are not many keywords so SQL is simple to understand but, despite its apparent simplicity, is a powerful language. Clever use of its language components enable complex sophisticated database operations to be performed.

### The evolution of SQL

The model for the basis of SQL was defined back in 1970 by Dr. E. F. Todd, a researcher for IBM, in a paper entitled “A Relational Model of Data for Large Shared Data Banks”. This article generated a great deal of interest in the feasibility of producing a practical commercial application of such a system.

IBM really began to develop these ideas in 1974 when they started the System/R project which eventually created the Structured English Query Language (SEQUEL). This was rewritten in 1976 to include multi-table and multi-user features and was renamed SQL in 1978. During this time other software companies had begun working on database systems based upon the SQL model. Most notable of these were Oracle, Sybase and Ingres (from the University of California’s Berkeley Ingres project). The first to be released commercially was Oracle in 1979. IBM released improved database products named SQL/DS in 1982 and DB2 in 1983.

Modern versions of Oracle, Sybase, Ingres and DB2 DBMS are available today and are in widespread use around the world.

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## Standardization of SQL

In order to clarify the precise nature of SQL, so it could be implemented universally, each aspect of the language was defined in 1989 by the American National Standards Institute (ANSI) in a standard specification known as SQL-89. This was expanded three years later with publication of the SQL-92 specification by a joint committee of ANSI and the International Standards Organization (ISO). A third standard specification, SQL-99, was introduced in 1999 to address issues of advanced SQL syntax and has been subsequently updated with the SQL:2008 standard. Some DBMS vendors have added proprietary features to the ANSI-defined SQL standard. These extended versions even have their own names, such as PL-SQL and Transact-SQL. The examples given in this book mostly use standard ANSI-SQL so they can be applied to any DBMS.

## Forms of SQL query

There are a number of ways that SQL queries may be sent to a database to deposit or extract data:

- Directly input through an integral SQL-client application that is part of the DBMS package – this is the most straightforward method and is used in this book to demonstrate SQL features
- Input through a third-party SQL-client application – this method communicates with the database via an intermediate software “driver”. On Windows systems these are typically Open DataBase Connectivity (ODBC) data source drivers
- From a script – often found on web servers to dynamically communicate with a database using a scripting language such as PERL or PHP
- From an Integrated Development Environment (IDE) – programmers using IDEs, such as Microsoft Visual Basic, can build programs that incorporate SQL queries to a database

The next two pages outline how to execute SQL queries using a variety of popular software.

### Hot tip



“ISO” is not an acronym but is derived from the Greek word “isos” meaning equal – as in “isometric”.

### Don't forget



Learning standard ANSI-SQL enables you to interact with every major database that exists.