Structured Query Language

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Schedule

SQL


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SQL*

INTRODUCTION TO SQL

Overview

SQL **(Structured Query Language)** is a domain-specific language used in programming and designed for managing data held in a relational database management system *(RDBMS)*, or for stream processing in a relational data stream management system (RDSMS). It is particularly useful in handling structured data where there are relations between different entities/variables of the data. SQL offers two main advantages over older read/write APIs like *ISAM or VSAM*: first, it introduced the concept of accessing many records with one single command; and second, it eliminates the need to specify how to reach a record,
e.g. with or without an index.

SQL was one of the first commercial languages for Edgar F. Codd's relational model. The model was described in his influential 1970 paper, "A Relational Model of Data for Large Shared Data Banks".Despite not entirely adhering to the relational model as described by Codd, it became the most widely used database language.

SQL became a standard of the American National Standards Institute (ANSI) in 1986, and of the **International Organization for Standardization (ISO)** in 1987.Since then, the standard has been revised to include a larger set of features. Despite the existence of such standards, most SQL code is not completely portable among different database systems without adjustments.

HISTORY

History of SQL

- SQL was initially developed at IBM by Donald D. Chamberlin and Raymond F. Boyce after learning about the relational model from Ted Codd in the early 1970s.
- In the late 1970s, Relational Software, Inc. (now Oracle Corporation) saw the potential of the concepts described by Codd, Chamberlin, and Boyce, and developed their own SQL-based RDBMS with aspirations of selling it to the U.S. Navy, Central Intelligence Agency, and other U.S. government agencies.
- In June 1979, Relational Software, Inc. introduced the first commercially available implementation of SQL, Oracle V2 (Version2) for VAX computers.
- By 1986, ANSI and ISO standard groups officially adopted the standard "Database Language SQL" language definition.
- New versions of the standard were published in
  1. 1989
  2. 1992
  3. 1996
  4. 1999
  5. 2003
  6. 2006
  7. 2008
  8. 2011
  9. and most recently, 2016.

DESIGN


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Items

SQL deviates in several ways from its theoretical foundation, the relational model and its tuple calculus. In that model, a table is a set of tuples, while in SQL, tables and query results are lists of rows: the same row may occur multiple times, and the order of rows can be employed in queries (e.g. in the LIMIT clause).
Critics argue that SQL should be replaced with a language that strictly returns to the original foundation: for example, see The Third Manifesto. However, no known proof exists that such uniqueness cannot be added to SQL itself, or at least a variation of SQL. In other words, it's quite possible that SQL can be "fixed" or at least improved in this regard such that the industry may not have to switch to a completely different query language to obtain uniqueness. Debate on this remains open.
[1] www.wikipedia.com

Other types of databases

Relational database ...

Network database ...

Distributed database ...

Hierarchical Databases. ...

Object-Oriented Model. ...

Graph Databases. ...

ER Model Databases

Tables


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Tables 1

My price table		
Couleur	Prix 1	Prix 2
Rouge	10.00	20.00
Vert	20.00	30.00
Bleu	30.00	40.00
Orange	60.00	90.00

My price table		
Couleur	Prix 1	Prix 2
Rouge	10.00	20.00
Vert	20.00	30.00
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Tables 2

My price table		
Couleur	Prix 1	Prix 2
Rouge	10.00	20.00
Vert	20.00	30.00
Bleu	30.00	40.00
Orange	60.00	90.00

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Figures


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Figure Example

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.[34]
2008	SQL:2008		Legalizes ORDER BY outside cursor definitions. Adds INSTEAD OF triggers, TRUNCATE statement,[35] FETCH clause.
2011	SQL:2011		Adds temporal data (PERIOD FOR)[36] (more information at: Temporal database#History). Enhancements for *window functions* and FETCH clause.[37]
2016	SQL:2016		Adds row pattern matching, polymorphic table functions, JSON.

Figure: Images from the Wikipedia.

Equations and Codes

Equation Example

Loss equation:

$$\frac{\partial}{\partial \theta_k} J(\theta) = \frac{\partial}{\partial \theta_k} \left[\frac{1}{m} \sum_{k=1}^{m} log(1 + e^{-y^{(i)} \theta^T x^{(i)}}) \right]$$

$$= \frac{1}{m} \sum_{k=1}^{m} \frac{1}{1 + e^{-y^{(i)} \theta^T x^{(i)}}} y^{(i)} x_k^{(i)}$$

$$= -\frac{1}{m} \sum_{k=1}^{m} h_\theta(-y^{(i)} x^{(i)}) y^{(i)} x_k^{(i)}$$

2

```
beginalgorithm[H]
initialization i = 0
while True do
    instructions  if i < 10 then
        print "instruction 1";
        print "instruction 2";
    else
        print "instruction 3";
    end
end
```