Database Management Systems

Database Structuring and Querying with SQL

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Basics of SQL

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Note: The SQL keywords are case-insensitive, however, they are often written in uppercase. In some setups, table and column names are case-sensitive.

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- **Authorization** – includes commands for specifying access rights to relations and views.

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"An SQL query goes into a bar, walks up to two tables and asks, 'May I join you?'." – Anonymous.

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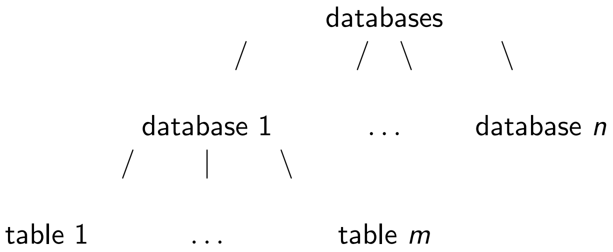
1999-2016: The versions SQL:1999, SQL:2003, SQL:2006, SQL:2008, SQL:2011 and SQL:2016 were published.

Standard conformance of SQL

Significant Features	**SQL:2008**	**SQL:2011**	**SQL:2016**
Truncation of table	Yes	Yes	Yes
INSTEAD OF trigger	Yes	Yes	Yes
XQuery regular expression	Yes	Yes	Yes
Partitioned JOIN	Yes	Yes	Yes
System-versioned tables	No	Yes	Yes
Time-sliced & sequenced queries	No	Yes	Yes
Temporal referential integrity	No	Yes	Yes
Temporal primary keys	No	Yes	Yes
Polymorphic table functions	No	No	Yes
Row pattern recognition	No	No	Yes
DECFLOAT data type	No	No	Yes
JSON data type	No	No	Yes

Data view through SQL

In practice, the databases (as a whole) comprises several separate database and each database consists of several tables.



Note: The MySQL Community Server can be downloaded from `https://dev.mysql.com/downloads/mysql`.

Principle structure of defining a table

A typical SQL query for defining a table appears as follows:

`create table` R `(`
$A_1 D_1, A_2 D_2, \ldots, A_k D_k$ `,`
$(IC_1), \ldots, (IC_n)$
`);`

Here, each A_i represents an attribute in the schema of relation R, each D_i denotes the data type of values in the domain of the corresponding attribute A_i, and IC_i symbolizes an integrity constraint. Some integrity constraints may also appear along with the data types.

Note: SQL is a freeform language.

The data types in SQL

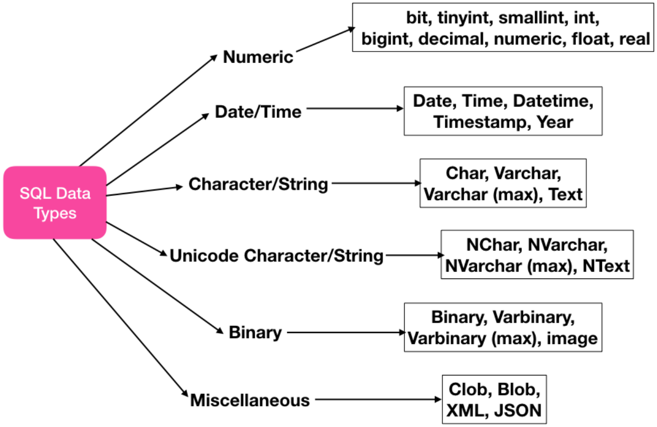

SQL Data Types
Numeric
bit, tinyint, smallint, int, bigint, decimal, numeric, float, real
Date/Time
Date, Time, Datetime, Timestamp, Year
Character/String
Char, Varchar, Varchar (max), Text
Unicode Character/String
NChar, NVarchar, NVarchar (max), NText
Binary
Binary, Varbinary, Varbinary (max), image
Miscellaneous
Clob, Blob, XML, JSON

Table creation with ease

Try this out!!!

SQLizer – Easily convert files into SQL databases

`https://sqlizer.io`

Deleting a table

A typical SQL query for deleting a table appears as follows:

```
drop table R;
```

Altering a table

A typical SQL query for altering a table by adding attributes appears as follows:

alter table R add A_i;

A typical SQL query for altering a table by deleting attributes appears as follows:

alter table R drop A_i;

Principle structure of manipulating a table

A typical SQL query for data manipulation appears as follows:

select $A_1, A_2, \ldots, A_m$
from $R_1, R_2, \ldots, R_n$
where P;

Here, each A_i represents an attribute, each R_i denotes a relation and P is a predicate.

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- The `select` clause corresponds to the projection operation of the relational algebra.
- The `from` clause corresponds to the Cartesian-product operation of the relational algebra.
- The `where` clause corresponds to the selection predicate of the relational algebra.

Understanding the concepts in a better way

Try this out!!!

RAT – Relational Algebra Translator

`http://www.slinfo.una.ac.cr/rat/rat.html`