

Introduction To SQL

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- SQL stands for Structure Query Language.
- SQL is non-procedural in nature. The SQL Standard Specifies data definition, data manipulation and other associated facilities of a DBMS that supports the relational data model.
- SQL is a Comprehensive Language for Controlling and interacting with a database management System.
- This Language was named as the Structured English Query Language (SEQUEL) the name later was shortened to Structure query Language (SQL).

Roles of SQL $\Rightarrow$

- It is an interactive Language because the user gains access to the data by issuing desired query. This provides a convenient, easy to use tool for ad-hoc database queries.
- It is a database programming language because SQL Commands can easily be embedded into application programs to access the data from a database.
- It is a database administration language because the database administrator uses SQL to define the database structure and control

access to the stored data.

- It is a Client/Server Language because it can be used to access remote (over a network) database.
- It is a distributed database Language because SQL helps in distribution of data across many connected Computer System.

Advantages of SQL! ⇒

- 1) Standard Independent Language ⇒ The universal rules of the SQL have been established by ANSI and ISO. Therefore, the SQL is an Open Language implying it is not owned or controlled by any single company.
- 2) Speed ⇒ The intense competition among database vendors has resulted in faster, more robust database management systems that work at lower cost per transaction.
- 3) Easy to learn and use ⇒ SQL statements resemble simple English sentences, making SQL easy to learn and understand.
- 4) Less programming ⇒ SQL allows extraction, manipulation and organisation of data with less programming as compared to traditional methods.

MYSQL/SQL Data Types

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Data types are used to represent the nature of the data that can be stored in the database table.

Data types mainly classified into three categories for every database

- 1) String Data types.
- 2) Numeric Data types.
- 3) Date and time Data types.

1) MySQL String Data types $\Rightarrow$

a) Char(size) $\Rightarrow$ It is used to specify a fixed length string that can contain numbers, letters, and special characters. Its size can be 0 to 255 characters. Default is 1.

b) Varchar(size) $\Rightarrow$ It is used to specify a variable length string that can contain numbers, letters and special characters. Its size can be from 0 to 65535 characters.

c) Text(size) $\Rightarrow$ It holds a string that can contain a maximum length of 255 characters.

d) Binary(size) $\Rightarrow$ It is equal to Char() but stores binary byte strings. Its

Size parameter specifies the Column length in the byte. Default is 1.

e) **Varbinary (size)** $\Rightarrow$ It is equal to Varchar() but Stores binary byte strings. Its size parameter specifies the maximum Column length in bytes.

f) **Tinytext** $\Rightarrow$ It hold a string with maximum length of 255 characters.

g) **mediumtext** $\Rightarrow$ It hold a string with maximum length of 16,777,215.

h) **Longtext** $\Rightarrow$ It hold a string with a maximum length of 4,294,967,295 characters.

2) **MySQL Numeric datatypes** $\Rightarrow$

a) **Bit (size)** $\Rightarrow$ It is used for a bit-value type. The number of bits per value is specified in size. Its size can be 1 to 64. the default value is 1.

b) **Int (size)** $\Rightarrow$ It is used for the integer value. Its signed range varies from -2147483648 to 2147483647 and unsigned range varies from 0 to 4294967295. the size parameter specifies the max display width that is 255.

c) **Integer(size)** $\Rightarrow$ It is equal to **int(size)**.

d) **float(size, d)** $\Rightarrow$ It is used to specify a floating point number. Its size parameter specifies the total number of digits. The number of digits after the decimal point is specified by d parameter.

e) **Float(P)**

(f) **Double(size, d)**

g) **Decimal(size, d)**

h) **Bool**

3) **MySQL Date and time datatypes.**

a) **Date** $\Rightarrow$ It is used to specify date format **YYYY-MM-DD**. Its supported range is from '1000-01-01' to '9999-12-31'

b) **Datetime(fsp)** $\Rightarrow$ It is used to specify date and time combination. Its format is **YYYY-MM-DD hh:mm:ss**

c) **Time(fsp)** $\Rightarrow$ It is used to specify the time format. Its format is **hh:mm:ss**.

d) **Year** $\Rightarrow$ It is used to specify a year in four-digit format. Values allowed in four digit format from **1901 to 2155, and 0000**.

SQL Server Data types $\Rightarrow$

1) SQL Server String Datatype $\Rightarrow$

"Aman"

- a) **Char(n)** $\Rightarrow$ It is a fixed width character string datatype. Its size can be up to 8000 characters.
- b) **Varchar(n)** $\Rightarrow$ It is a variable width character string datatype. Its size can be up to 8000 characters.
- c) **VarChar(max)** $\Rightarrow$ It is a variable width character string datatype. Its size can be up to 1,073,741,824 characters.
- d) **Text** $\Rightarrow$ It is a variable width character string datatype. Its size can be up to 2GB of text data.
- e) **nchar** $\Rightarrow$ It is a fixed width Unicode string datatype. Its size can be up to 4000 characters.
- f) **nvarchar** $\Rightarrow$ It is a variable width Unicode string datatype. Its size can be up to 4000 characters.
- g) **ntext** $\Rightarrow$ It is a variable width unicode string datatype. Its size can be up to 2GB of text data.

b) **binary(n)** $\Rightarrow$ It is a fixed width Binary String data type. Its size can be up to 8000 bytes.

i) **Varbinary** $\Rightarrow$ It is a variable width Binary String data type. Its size can be up to 8000 bytes.

j) **image** $\Rightarrow$ It is also a variable width Binary String data type. Its size can be up to 2 GB.

2) **SQL Server Number Data types** $\Rightarrow$

a) **bit** $\Rightarrow$ It is an integer that can be 0, 1 or null.

b) **tinyint** $\Rightarrow$ It allows whole number from 0 to 255.

c) **Smallint** $\Rightarrow$ It allows whole number between -32,768 to 32,767.

d) **int** $\Rightarrow$ It allows whole number between -2,147,483,648 and 2,147,483,647.

e) **bigint** $\Rightarrow$

f) **float(n)** $\Rightarrow$ 12.56

g) **real** $\Rightarrow$ It is a floating precision number data from $-3.40E+38$ to $3.40E+38$.

3) SQL Server Date and time Data type $\Rightarrow$

- a) **datetime** $\Rightarrow$ It is used to specify date and time combination. It supports range from January 1, 1753, to December 31, 9999 with an accuracy of 3.33 milliseconds.
- b) **datetime2** $\Rightarrow$ It is used to specify date and time combination. It supports range from January 1, 0001 to December 31, 9999 with an accuracy of 100 nanoseconds.
- c) **date** $\Rightarrow$ It is used to store date only. It supports range from January 1, 0001 to December 31, 9999.
- d) **time** $\Rightarrow$ It stores time only to an accuracy of 100 nanoseconds.
- e) **timestamp** $\Rightarrow$ It stores a unique number when a new row gets created or modified the time stamp value is based upon an internal clock and does not correspond to real time.
Each table may contain only one-time stamp variable.