

SQL References

SQL Examples

SQL Data Types for MySQL, SQL Server, and MS Access

[◀ Previous](#)[Next ▶](#)

The data type of a column defines what value the column can hold: integer, character, money, date and time, binary, and so on.

SQL Data Types

Each column in a database table is required to have a name and a data type.

An SQL developer must decide what type of data that will be stored inside each column when creating a table. The data type is a guideline for SQL to understand what type of data is expected inside of each column, and it also identifies how SQL will interact with the stored data.

Note: Data types might have different names in different database. And even if the name is the same, the size and other details may be different!

Always check the documentation!

COLOR
PICKER



HOW
TO

MySQL Data Types

(Version 8.0)

In MySQL there are three main data types: string, numeric, and date and time.

String data types:

Data type	Description
CHAR(size)	A FIXED length string (can contain letters, numbers, and special characters). The <i>size</i> parameter specifies the column length in characters - can be from 0 to 255. Default is 1
VARCHAR(size)	A VARIABLE length string (can contain letters, numbers, and special characters). The <i>size</i> parameter specifies the maximum column length in characters - can be from 0 to 65535
BINARY(size)	Equal to CHAR(), but stores binary byte strings. The <i>size</i> parameter specifies the column length in bytes. Default is 1
VARBINARY(size)	Equal to VARCHAR(), but stores binary byte strings. The <i>size</i> parameter specifies the maximum column length in bytes.
TINYBLOB	For BLOBs (Binary Large OBjects). Max length: 255 bytes

Tabs
 Dropdown
 Accordion
 Side
 Navigational
 Top
 Navigational
 Modal
 Boxes
 Progress
 Bars
 Parallax
 Login
 Form
 HTML
 Includes
 Google
 Maps
 Range
 Sliders
 Tooltips
 Slideshow
 Filter
 List
 Sort
 List

SHARE



CERTIFIC

HTML
 CSS
 JavaScript
 SQL
 Python
 PHP

TINYTEXT	Holds a string with a maximum length of 255 characters	jQuery Bootstrap XML
TEXT(size)	Holds a string with a maximum length of 65,535 bytes	Read More
BLOB(size)	For BLOBs (Binary Large OBjects). Holds up to 65,535 bytes of data	
MEDIUMTEXT	Holds a string with a maximum length of 16,777,215 characters	
MEDIUMBLOB	For BLOBs (Binary Large OBjects). Holds up to 16,777,215 bytes of data	
LONGTEXT	Holds a string with a maximum length of 4,294,967,295 characters	
LONGBLOB	For BLOBs (Binary Large OBjects). Holds up to 4,294,967,295 bytes of data	
ENUM(val1, val2, val3, ...)	A string object that can have only one value, chosen from a list of possible values. You can list up to 65535 values in an ENUM list. If a value is inserted that is not in the list, a blank value will be inserted. The values are sorted in the order you enter them	
SET(val1, val2, val3, ...)	A string object that can have 0 or more values, chosen from a list of possible values. You can list up to 64 values in a SET list	

Numeric data types:

Data type	Description
BIT(<i>size</i>)	A bit-value type. The number of bits per value is specified in <i>size</i> . The <i>size</i> parameter can hold a value from 1 to 64. The default value for <i>size</i> is 1.
TINYINT(<i>size</i>)	A very small integer. Signed range is from -128 to 127. Unsigned range is from 0 to 255. The <i>size</i> parameter specifies the maximum display width (which is 255)
BOOL	Zero is considered as false, nonzero values are considered as true.
BOOLEAN	Equal to BOOL
SMALLINT(<i>size</i>)	A small integer. Signed range is from -32768 to 32767. Unsigned range is from 0 to 65535. The <i>size</i> parameter specifies the maximum display width (which is 255)
MEDIUMINT(<i>size</i>)	A medium integer. Signed range is from -8388608 to 8388607. Unsigned range is from 0 to 16777215. The <i>size</i> parameter specifies the maximum display width (which is 255)
INT(<i>size</i>)	A medium integer. Signed range is from -2147483648 to 2147483647. Unsigned range is from 0 to 4294967295. The <i>size</i> parameter specifies the maximum display width (which is 255)

INTEGER(<i>size</i>)	Equal to INT(<i>size</i>)
BIGINT(<i>size</i>)	A large integer. Signed range is from -9223372036854775808 to 9223372036854775807. Unsigned range is from 0 to 18446744073709551615. The <i>size</i> parameter specifies the maximum display width (which is 255)
FLOAT(<i>size, d</i>)	A floating point number. The total number of digits is specified in <i>size</i> . The number of digits after the decimal point is specified in the <i>d</i> parameter. This syntax is deprecated in MySQL 8.0.17, and it will be removed in future MySQL versions
FLOAT(<i>p</i>)	A floating point number. MySQL uses the <i>p</i> value to determine whether to use FLOAT or DOUBLE for the resulting data type. If <i>p</i> is from 0 to 24, the data type becomes FLOAT(). If <i>p</i> is from 25 to 53, the data type becomes DOUBLE()
DOUBLE(<i>size, d</i>)	A normal-size floating point number. The total number of digits is specified in <i>size</i> . The number of digits after the decimal point is specified in the <i>d</i> parameter
DOUBLE PRECISION(<i>size, d</i>)	
DECIMAL(<i>size, d</i>)	An exact fixed-point number. The total number of

	digits is specified in <i>size</i> . The number of digits after the decimal point is specified in the <i>d</i> parameter. The maximum number for <i>size</i> is 65. The maximum number for <i>d</i> is 30. The default value for <i>size</i> is 10. The default value for <i>d</i> is 0.
DEC(<i>size</i> , <i>d</i>)	Equal to DECIMAL(<i>size</i> , <i>d</i>)

Note: All the numeric data types may have an extra option: UNSIGNED or ZEROFILL. If you add the UNSIGNED option, MySQL disallows negative values for the column. If you add the ZEROFILL option, MySQL automatically also adds the UNSIGNED attribute to the column.

Date and Time data types:

Data type	Description
DATE	A date. Format: YYYY-MM-DD. The supported range is from '1000-01-01' to '9999-12-31'
DATETIME(<i>fsp</i>)	A date and time combination. Format: YYYY-MM-DD hh:mm:ss. The supported range is from '1000-01-01 00:00:00' to '9999-12-31 23:59:59'. Adding DEFAULT and ON UPDATE in the column definition to get automatic initialization and updating to the current date and time
TIMESTAMP(<i>fsp</i>)	A timestamp. TIMESTAMP values are stored as the number of seconds since the Unix epoch ('1970-01-01

	00:00:00' UTC). Format: YYYY-MM-DD hh:mm:ss. The supported range is from '1970-01-01 00:00:01' UTC to '2038-01-09 03:14:07' UTC. Automatic initialization and updating to the current date and time can be specified using DEFAULT CURRENT_TIMESTAMP and ON UPDATE CURRENT_TIMESTAMP in the column definition
TIME(<i>fsp</i>)	A time. Format: hh:mm:ss. The supported range is from '-838:59:59' to '838:59:59'
YEAR	A year in four-digit format. Values allowed in four-digit format: 1901 to 2155, and 0000. MySQL 8.0 does not support year in two-digit format.

SQL Server Data Types

String data types:

Data type	Description	Max size	
char(n)	Fixed width character string	8,000 characters	
varchar(n)	Variable width character string	8,000 characters	
varchar(max)	Variable width	1,073,741,824 characters	

	character string		
text	Variable width character string	2GB of text data	
nchar	Fixed width Unicode string	4,000 characters	
nvarchar	Variable width Unicode string	4,000 characters	
nvarchar(max)	Variable width Unicode string	536,870,912 characters	
ntext	Variable width Unicode string	2GB of text data	
binary(n)	Fixed width binary string	8,000 bytes	
varbinary	Variable width binary string	8,000 bytes	
varbinary(max)	Variable width binary string	2GB	
image	Variable width binary string	2GB	

Numeric data types:

Data type	Description	Storage
tinyint	Small integer	1 byte
smallint	Medium integer	2 bytes
int	Large integer	4 bytes
bigint	Very large integer	8 bytes
decimal(p,s)	Precision and scale	p bytes
float(p,s)	Precision and scale	p bytes
real	Double precision floating point	4 bytes
double	Double precision floating point	8 bytes
money	Currency	8 bytes
smallmoney	Currency	4 bytes

bit	Integer that can be 0, 1, or NULL	
tinyint	Allows whole numbers from 0 to 255	1 b
smallint	Allows whole numbers between -32,768 and 32,767	2 b
int	Allows whole numbers between -2,147,483,648 and 2,147,483,647	4 b
bigint	Allows whole numbers between -9,223,372,036,854,775,808 and 9,223,372,036,854,775,807	8 b
decimal(p,s)	Fixed precision and scale numbers. Allows numbers from $-10^{38} + 1$ to $10^{38} - 1$. The p parameter indicates the maximum total number of digits that can be stored (both to the left and to the right of the decimal point). p must be a value from 1 to 38. Default is 18.	5-1 bytes
numeric(p,s)	Fixed precision and scale numbers. Allows numbers from $-10^{38} + 1$ to $10^{38} - 1$. The p parameter indicates	5-1 bytes

	the maximum total number of digits that can be stored (both to the left and to the right of the decimal point). p must be a value from 1 to 38. Default is 18.	
	The s parameter indicates the maximum number of digits stored to the right of the decimal point. s must be a value from 0 to p. Default value is 0	
smallmoney	Monetary data from -214,748.3648 to 214,748.3647	4 bytes
money	Monetary data from -922,337,203,685,477.5808 to 922,337,203,685,477.5807	8 bytes
float(n)	Floating precision number data from -1.79E + 308 to 1.79E + 308. The n parameter indicates whether the field should hold 4 or 8 bytes. float(24) holds a 4-byte field and float(53) holds an 8-byte field. Default value of n is 53.	4 or 8 bytes
real	Floating precision number data from -3.40E + 38 to 3.40E + 38	4 bytes

Date and Time data types:

Data type	Description	Storage
datetime	From January 1, 1753 to December 31, 9999.	8 bytes

		1753 to December 31, 9999 with an accuracy of 3.33 milliseconds	
datetime2	From January 1, 0001 to December 31, 9999 with an accuracy of 100 nanoseconds	6-8 bytes	
smalldatetime	From January 1, 1900 to June 6, 2079 with an accuracy of 1 minute	4 bytes	
date	Store a date only. From January 1, 0001 to December 31, 9999	3 bytes	
time	Store a time only to an accuracy of 100 nanoseconds	3-5 bytes	
datetimeoffset	The same as datetime2 with the addition of a time zone offset	8-10 bytes	
timestamp	Stores a unique number that gets updated every time a row gets created or modified. The timestamp value is based upon an internal clock and does not correspond to real time. Each table may have only one timestamp variable		

Other data types:

Data type	Description
sql_variant	Stores up to 8,000 bytes of data of various data types, except text, ntext, and timestamp
uniqueidentifier	Stores a globally unique identifier (GUID)
xml	Stores XML formatted data. Maximum 2GB
cursor	Stores a reference to a cursor used for database operations
table	Stores a result-set for later processing

Microsoft Access Data Types

Data type	Description	Storage
Text	Use for text or combinations of text and numbers. 255 characters maximum	
Memo	Memo is used for larger amounts of text. Stores up to 65,536 characters. Note: You cannot sort a memo field. However, they are searchable	
Byte	Allows whole numbers from 0 to 255	1 byte

Integer	Allows whole numbers between -32,768 and 32,767	2 bytes
Long	Allows whole numbers between -2,147,483,648 and 2,147,483,647	4 bytes
Single	Single precision floating-point. Will handle most decimals	4 bytes
Double	Double precision floating-point. Will handle most decimals	8 bytes
Currency	Use for currency. Holds up to 15 digits of whole dollars, plus 4 decimal places. Tip: You can choose which country's currency to use	8 bytes
AutoNumber	AutoNumber fields automatically give each record its own number, usually starting at 1	4 bytes
Date/Time	Use for dates and times	8 bytes
Yes/No	A logical field can be displayed as Yes/No, True/False, or On/Off. In code, use the constants True and False (equivalent to -1 and 0). Note: Null values are not allowed in Yes/No fields	1 bit
Ole Object	Can store pictures, audio, video, or other BLOBs (Binary Large)	up to 1GB

	OBjects)
Hyperlink	Contain links to other files, including web pages
Lookup Wizard	Let you type a list of options, which can then be chosen from a drop-down list 4 bytes

[◀ Previous](#)[Next ▶](#)[REPORT ERROR](#)[PRINT PAGE](#)[FORUM](#)[ABOUT](#)

Top Tutorials	Top References	Top Examples	Web Certificates
HTML Tutorial	HTML Reference	HTML Examples	HTML Certificate
CSS Tutorial	CSS Reference	CSS Examples	CSS Certificate
JavaScript Tutorial	JavaScript Reference	JavaScript Examples	JavaScript Certificate
How To Tutorial	SQL Reference	How To Examples	SQL Certificate
SQL Tutorial	Python Reference	SQL Examples	Python Certificate
Python Tutorial	W3.CSS Reference	Python Examples	jQuery Certificate
W3.CSS Tutorial	Bootstrap Reference	W3.CSS Examples	PHP Certificate
Bootstrap Tutorial	PHP Reference	Bootstrap Examples	Bootstrap Certificate
PHP Tutorial	HTML Colors	PHP Examples	XML Certificate
jQuery Tutorial	jQuery Reference	jQuery Examples	Get Certified »
Java Tutorial	Java Reference	Java Examples	
C++ Tutorial	Angular Reference	XML Examples	

W3Schools is optimized for learning, testing, and training. Examples might be simplified to improve reading and basic understanding. Tutorials, references, and examples are constantly reviewed to avoid errors, but we cannot warrant full correctness of all content. While using this site, you agree to have read and accepted our terms of use, cookie and privacy policy. Copyright 1999-2019 by Refsnes Data. All Rights Reserved.

Powered by W3.CSS.

