The MySQL implementation of SQL has certain elements that play an important role in defining and querying a database.

**1)Literals:** These are the notations to represent/express a non-changing value.

We can use literals while declaring a variable or executing the queries.

The following are the types of literal.

i)**String Literal**: It is a sequence of characters or bytes that are enclosed in single or double

quotes.

Escape sequences also come in string like \0, \b, \n, \r, \t, \\ .

ii)**Numeric Literals:** These are used to specify the two types of values

🡪exact-value (integer, decimal and fraction)

🡪approximate-value (scientific form).

It can be positive or negative.

iii)**Date & Time Literals:** It can be represented either in the quoted strings or number

format, which depends on the exact value and some factors.

iv)**Boolean Literals:** these are ‘1’ and ‘0’ or ‘TRUE’ and ‘FALSE’ or ‘true’ and ‘false’ .

v)**NULL Literal:** It represented no data.

We can write it as ‘null’ or ‘Null’ .

Null should not be in that column which is restricted by ‘not null’ or

‘primary key’ or if it has 0 value.

We should use null when the actual value is not known or a value would

not be meaningful.

Any arithmetic expression containing a null value always evaluates to null.

**2)Data Types:** Data types are divided into three categories.

**i)Numeric:** MySQL uses all standard SQL numeric data types.

🡪INT: it contains 10 digits, if it is signed then the allowable range is

-2147483648 to 2147483647, if it is unsigned then that range

0 to 4294967295.

🡪TINYINT: it contains 3 digits, if it is signed then the allowable range

is -128 to 127, if it is unsigned then that range is 0 to 255.

🡪SMALLINT: it contains 5 digits, if it is signed then the allowable

range is -32768 to 32767, if it is unsigned then that range

is 0 to 65535.

🡪MEDIUMINT: it contains 9 digits, if it is signed then the allowable

range is -8388608 to 8388607, if it is unsigned then

that range is 0 to 16777215.

🡪BIGYINT: it can contain 20 digits, if it is signed then the allowable

range is -9223372036854775808 to

9223372036854775807, if it is unsigned then that range

is 0 to 18446744073709551615.

🡪FLOAT(M,D): in this, decimal precision can go to 24 places, we can

define ‘M’ & ‘D’ and, by default, M=10 & D=2

🡪DOUBLE(M,D): in this, decimal precision can go to 53 places, we can

define ‘M’ & ‘D’ and, by default, M=16 & D=4

**NOTE:** ‘M’ is the total no. of digits including decimal point and

numbers after decimal point.

‘D’ is the no. of digits after decimal point.

**ii)Date & Time Type:** these are as follows.

🡪DATE: its format is YYYY-DD-MM and range is 1000-01-01 to

9999-12-31.

🡪DATETIME: its format is YYYY-MM-DD HH:MM:SS, its range is

1000-01-01 00:00:00 to 9999-12-31 23:59:59.

🡪DATETIME: its format is YYYYMMDDHHMMSS, its range is

1000-01-01 00:00:00 to 9999-12-31 23:59:59.

🡪TIME: its format is HH:MM:SS.

🡪YEAR(M): if M=2 then its range is 1970 to 2069 and if M=4 then

its range is 1901 to 2155, by default, M=4.

**NOTE:** here ‘M’ is the length of digits, i.e., a year can be represented

in 2 digits or 4 digits format.

**iii)String:** most data is stored in string data type, these are as follows.

🡪CHAR(M): it can contain 255 characters.

🡪VARCHAR(M): it can also contain 255 characters.

🡪BLOB/TEXT: these can contain 65535 characters.

blob is case sensitive but text is not case sensitive.

🡪TINYBLOB/TINYTEXT: these can contain 65535 characters.

🡪MEDIUMBLOB/MEDIUMTEXT: these can contain 16777215

characters.

🡪LONGBLOB/LONGTEXT: these can contain 4294967295

characters.

🡪ENUM: using it, we create a list of values except which you can not

select any other thing.

**Field & Field Length:** A field is a data element that can store one type of information which is

composed of characters.

Number of characters that a field stores is called ‘field length’ or ‘field width’.

**Fixed Length Field:** It has fixed length, i.e., it occupies a fixed number of bytes for every element in

a field whether the bytes of elements are equal to the fixed number or not.

In this, some space is always wasted as all data elements do not use all the space.

**Variable Length Field:** It has varied field length, i.e., it occupies number of bytes equal to the bytes of

each element separately.

**CHAR vs VARCHAR:** the difference is that CHAR specifies a fixed length string and VARCHAR

Specifies a variable length string.

**3)Constraints:** These are used to specify rules for the data in a table.

It is of two types.

i)Column Level Constraints: these apply to a particular column.

ii)Table Level Constraints: these apply to the whole table.

The following constraints are commonly used in SQL.

i)NOT NULL: It ensures that a column cannot have a null value or it should not empty.

ii)UNIQUE: It ensures that all values in a column are different.

iii)PRIMARY KEY: It is the combination of ‘NOT NULL’ & ‘UNIQUE’.

iv)FOREIGN KEY: It prevent actions that can destroy links between tables.

v)CHECK: It ensures that the values in a column satisfy a specific condition or not.

vi)DEFAULT: It sets a default value for a column if no value is specified.

vii)CREATE INDEX: It is used to create indexes in a table and to speed up searches

and queries.

**4)Operators:** There are several types of operators.

i)Arithmetic Operators:

🡪 +: to add.

🡪 -: to subtract.

🡪 \*: to multiply.

🡪 /: to find quotient.

🡪 %: to find reminder.

ii)Comparison Operators:

🡪 >: to tell that left operand is greater.

🡪 <: to tell that right operand is greater.

🡪 ==: to tell that both operands are equal.

🡪 !=/<>: to tell that both operands are not equal.

🡪 >=: to tell that left operand is greater or equal to.

🡪 <=: to tell that right operand is greater or equal to.

🡪 !>: to tell that left operand is not greater.

🡪 !<: to tell that right operand is not greater.

iii)Logical Operators:

🡪 OR: to check that any one condition is true.

🡪 AND: to check that all conditions are true.

🡪 BETWEEN: to search middle value by min. and max. values.

🡪EXISTS: to search a row that satisfies a specified condition.

🡪IN: to check that a value is in a list of values.

🡪ALL: to check that a value is in another set of values.

🡪ANY: to check that a value is in a list according to the condition.

🡪UNIQUE: to search every row of a table for uniqueness.

🡪NOT: to reverse the meaning of the logical operator with which it

is used.

**5)Comments:** These are used to explain SQL statements or to prevent execution of SQL statements.

There are two ways to create a comment

1)Single Line Comment:

Syntax-1: #statement

Syntax-2: --statement

2)Multi Line Comment:

Syntax: /\*statements\*/