

1. What is a database? What is a schema? Compare and contrast.

A database is the collection of information, or data, typically stored electronically in tables.¹ This can be anything from product and purchase information on a retail website to migratory location data of various animals. A database is managed by a DBMS, or database management system, and often has applications that are built to create and manipulate the data. All of this together is often referred to as a database, though technically the database is the collection of data.

A schema, on the other hand, is the blueprint for the database, mapping out the table names, fields, data types, and relationships between them.² Modern schemas often use visual representations of databases to show how all of these elements are designed and related.

A database and a schema are closely related and are usually interconnected. Both are necessary for a large collection of data to be usable, but both are different parts of the whole. The database itself is the data, or information, held in the tables, and the schema is the design of the tables, the structure and accessibility that makes the data usable by the applications built to interact with it. Without a schema, we may have to access data by specifying a line and a location in a single large collection of data. If we want to pull a customer's name, for example, from millions of records without a schema, we'd have to know the exact record ahead of time, the location by character within that record that the name is stored, etc. With a schema, though, we can just look at the 'customer' table and pull the value for 'full_name' that matches the particular customer_id we're wanting.

7. What are ten different data types MySQL provides:

There are three main data types in MySQL: string, numeric, and date/time³. Some of the common string types are:

CHAR(size)	A fixed length string, which can contain letters, numbers, or special characters. The size parameter sets the fixed length of the column in characters, from 0 to 255.
VARCHAR(size)	A variable length string, which can also contain letters, numbers, or special characters. The size parameter in this case sets the maximum column length in characters, and can be from 0 to 65,535.
ENUM(val1, val2, etc.)	A string object that can only have a value that exists in a list of possible values. Up to 65,535 values can be specified in an ENUM list. An example of this would be eye_color with the values "blue", "green", "grey", "brown", and "hazel".

LONGTEXT A string meant for large blocks of string data, which can hold up to 4,294,967,295 letter, number, or special characters.

Some of the common numeric types are:

INT(size) INT is a medium integer, signed (positive or negative) range is from negative 2147483648 to 2147483647. Unsigned (positive only) range is from 0 to 4294967295. The size parameter, in this case, specifies the maximum width to display, which can be as high as 255.

FLOAT(size, d) A floating point number, which is a positive or negative number with a decimal point⁴, is so called because the decimal can “float” to any position necessary. The size parameter, in this case, specifies the total number of digits, while the d parameter sets the number of digits after the decimal point.

BOOL A Boolean value, though instead of a ‘true’ or ‘false’ value, it sets the value of 0 to false and everything else to true.

Some of the common date/time types are:

DATE A date value in the format YYYY-MM-DD. The supported range for DATE is 1000-01-01 to 9999-12-31.

DATETIME(fsp) A combination of date and time, in the 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. You can add DEFAULT and ON UPDATE to the column definition to have it populate the current date and time.

YEAR A simpler type to only hold a four-digit year. Value range is from 1901-2155, and also 0000.

1. <https://www.oracle.com/database/what-is-database/>
2. <https://www.ibm.com/topics/database-schema>
3. https://www.w3schools.com/mysql/mysql_datatypes.asp
4. <https://www.freecodecamp.org/news/floating-point-definition/>

