How to Start MySql Server

Download latest version of XAMPP From <a href="https://www.apachefriends.org/download.html">https://www.apachefriends.org/download.html</a>

Install XAMPP and open XAMPP Control Panel

From Control panel you need to start two services apache, mysql

Now open browser and enter URL <a href="http://localhost/phpmyadmin/">http://localhost/phpmyadmin/</a> or press admin button from XAMPP control panel.

Now you are connected with MySql server home page

# **MySQL Tutorial**

MySQL is a widely used relational database management system (RDBMS).

MySQL is free and open-source.

MySQL is ideal for both small and large applications.

### Introduction to MySQL

MySQL is a very popular open-source relational database management system (RDBMS).

### What is MySQL?

- MySQL is a relational database management system
- MySQL is open-source
- MySQL is free
- MySQL is ideal for both small and large applications
- MySQL is very fast, reliable, scalable, and easy to use
- MySQL is cross-platform
- MySQL is compliant with the ANSI SQL standard
- MySQL was first released in 1995
- MySQL is developed, distributed, and supported by Oracle Corporation
- MySQL is named after co-founder Monty Widenius's daughter: My

### Who Uses MySQL?

- Huge websites like Facebook, Twitter, Airbnb, Booking.com, Uber, GitHub, YouTube, etc.
- Content Management Systems like WordPress, Drupal, Joomla!, Contao, etc.
- A very large number of web developers around the world

#### Show Data On Your Web Site

To build a web site that shows data from a database, you will need:

- An RDBMS database program (like MySQL)
- A server-side scripting language, like PHP
- To use SQL to get the data you want
- To use HTML / CSS to style the page

### **MySQL RDBMS**

#### What is RDBMS?

RDBMS stands for Relational Database Management System.

RDBMS is a program used to maintain a relational database.

RDBMS is the basis for all modern database systems such as MySQL, Microsoft SQL Server, Oracle, and Microsoft Access.

RDBMS uses <u>SQL queries</u> to access the data in the database.

#### What is a Database Table?

A table is a collection of related data entries, and it consists of columns and rows.

A column holds specific information about every record in the table.

A record (or row) is each individual entry that exists in a table.

Look at a selection from the Northwind "Customers" table:

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden

The columns in the "Customers" table above are: CustomerID, CustomerName, ContactName, Address, City, PostalCode and Country. The table has 5 records (rows).

### What is a Relational Database?

A relational database defines database relationships in the form of tables. The tables are related to each other - based on data common to each.

Look at the following three tables "Customers", "Orders", and "Shippers" from the Northwind database:

#### Customers Table

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden

The relationship between the "Customers" table and the "Orders" table is the CustomerID column:

#### Orders Table

OrderID	CustomerID	EmployeeID	OrderDate	ShipperID
10278	5	8	1996-08-12	2
10280	5	2	1996-08-14	1
10308	2	7	1996-09-18	3
10355	4	6	1996-11-15	1
10365	3	3	1996-11-27	2
10383	4	8	1996-12-16	3
10384	5	3	1996-12-16	3

The relationship between the "Orders" table and the "Shippers" table is the ShipperID column:

### Shippers Table

ShipperID	ShipperName	Phone
1	Speedy Express	(503) 555-9831
2	United Package	(503) 555-3199
3	Federal Shipping	(503) 555-9931

### MySQL SQL

### What is SQL? (Structured Query Language)

SQL is the standard language for dealing with Relational Databases.

SQL is used to insert, search, update, and delete database records.

### How to Use SQL

The following SQL statement selects all the records in the "Customers" table:

#### **SELECT** \* **FROM** Customers;

### Keep in Mind That...

• SQL keywords are NOT case sensitive: select is the same as SELECT

In this tutorial we will write all SQL keywords in upper-case.

#### Semicolon after SQL Statements?

Some database systems require a semicolon at the end of each SQL statement.

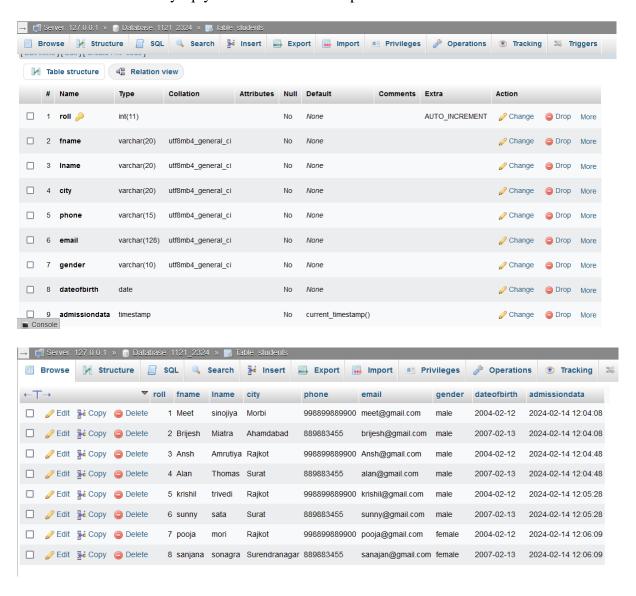
Semicolon is the standard way to separate each SQL statement in database systems that allow more than one SQL statement to be executed in the same call to the server.

In this tutorial, we will use semicolon at the end of each SQL statement.

#### Some of The Most Important SQL Commands

- SELECT extracts data from a database
- UPDATE updates data in a database
- DELETE deletes data from a database
- INSERT INTO inserts new data into a database
- CREATE DATABASE creates a new database
- ALTER DATABASE modifies a database
- CREATE TABLE creates a new table
- ALTER TABLE modifies a table
- DROP TABLE deletes a table
- CREATE INDEX creates an index (search key)
- DROP INDEX deletes an index

Before continue with MySql you need to create sample database and add some data in it.



### **MySQL SELECT Statement**

### The MySQL SELECT Statement

The SELECT statement is used to select data from a database.

The data returned is stored in a result table, called the result-set.

### **SELECT Syntax**

SELECT column1, column2, ... FROM table\_name;

Here, column1, column2, ... are the field names of the table you want to select data from. If you want to select all the fields available in the table, use the following syntax:

```
SELECT * FROM table_name;
```

SELECT roll, fname, Iname, city from students

SELECT \* from students;

### The MySQL SELECT DISTINCT Statement

The SELECT DISTINCT statement is used to return only distinct (different) values.

Inside a table, a column often contains many duplicate values; and sometimes you only want to list the different (distinct) values.

SELECT DISTINCT Syntax

SELECT DISTINCT column1, column2, ... FROM table\_name;

SELECT city from students;

SELECT DISTINCT city from students;

SELECT count(DISTINCT city) from students;

SELECT roll, fname, lname, dateofbirth from students

### **MySQL WHERE Clause**

### The MySQL WHERE Clause

The WHERE clause is used to filter records.

It is used to extract only those records that fulfill a specified condition.

```
WHERE Syntax
```

SELECT column1, column2, ... FROM table\_nameWHERE condition;

SELECT roll, fname, lname, dateofbirth from students WHERE roll = 1;

SELECT roll, fname, lname, dateofbirth from students WHERE roll > 5;

SELECT roll, fname, lname, dateofbirth from students WHERE not roll > 5;

Note: The WHERE clause is not only used in SELECT statements, it is also used in UPDATE, DELETE, etc.!

SELECT \* from students WHERE city = 'rajkot'

SELECT \* from students WHERE not city = 'rajkot';

SELECT \* from students WHERE city <> "rajkot";

Text Fields vs. Numeric Fields

SQL requires single quotes around text values (most database systems will also allow double quotes).

However, numeric fields should not be enclosed in quotes:

SELECT \* from students WHERE not city = rajkot;

SELECT \* from students WHERE roll BETWEEN 1 and 5

### MySQL AND, OR and NOT Operators

### The MySQL AND, OR and NOT Operators

The where clause can be combined with AND, OR, and NOT operators.

The AND and OR operators are used to filter records based on more than one condition:

- The AND operator displays a record if all the conditions separated by AND are TRUE.
- The OR operator displays a record if any of the conditions separated by OR is TRUE.
- The NOT operator displays a record if the condition(s) is NOT TRUE.

```
AND Syntax

SELECT column1, column2, ... FROM table_name WHERE condition1 AND condition2 AND condition3 ...;

SELECT * from students WHERE roll = 1

SELECT * from students WHERE roll = 1 and city = 'Rajkot';

OR Syntax

SELECT column1, column2, ... FROM table_name WHERE condition1 OR condition2 OR condition3 ...;

SELECT * from students WHERE city = 'surat' or city = 'Rajkot';

NOT Syntax

SELECT column1, column2, ... FROM table_name WHERE NOT condition;

SELECT * from students WHERE not (city = 'surat' or city = 'Rajkot');
```

#### Combining AND, OR and NOT

You can also combine the AND, OR and NOT operators.

```
SELECT * from students WHERE roll = 1 and (city = 'surat' or city = 'Rajkot' or city = 'morbi');
```

SELECT \* from students WHERE roll = 1 or roll = 5 and city = 'Rajkot';

### **MySQL ORDER BY Keyword**

### The MySQL ORDER BY Keyword

The ORDER BY keyword is used to sort the result-set in ascending or descending order.

The ORDER BY keyword sorts the records in ascending order by default. To sort the records in descending order, use the DESC keyword.

#### ORDER BY Syntax

SELECT column1, column2, ...
FROM table\_name
ORDER BY column1, column2, ... ASC|DESC;

**SELECT \* FROM students** 

SELECT \* FROM students ORDER by fname

#### ORDER BY DESC Example

SELECT \* FROM students ORDER by fname desc

### ORDER BY Several Columns Example

SELECT \* FROM students ORDER by fname, city

SELECT \* FROM students ORDER by fname, city desc

SELECT \* FROM students ORDER by fname asc, city desc

### **MySQL INSERT INTO Statement**

The MySQL INSERT INTO Statement

The INSERT INTO statement is used to insert new records in a table.

**INSERT INTO Syntax** 

It is possible to write the INSERT INTO statement in two ways:

1. Specify both the column names and the values to be inserted:

```
INSERT INTO table_name (column1, column2, column3, ...)
VALUES (value1, value2, value3, ...);
```

INSERT into students (fname, Iname, city, phone, email, gender, dateofbirth) values ('demo', 'text', 'example', '9900009900', 'demo@example.com', 'male', '2001-02-01')

2. If you are adding values for all the columns of the table, you do not need to specify the column names in the SQL query. However, make sure the order of the values is in the same order as the columns in the table. Here, the INSERT INTO syntax would be as follows:

```
INSERT INTO table_name
VALUES (value1, value2, value3, ...);
```

INSERT into students values ('demo', 'text', 'example', '9900009900', 'demo@example.com', 'male', '2001-02-01')

```
#1136 - Column count doesn't match value count at row 1
```

INSERT into students values (null,'demo', 'text', 'example', '9900009900', 'demo@example.com', 'male', '2001-02-01', null)

#### Did you notice that we did not insert any number into the CustomerID field?

The CustomerID column is an <u>auto-increment</u> field and will be generated automatically when a new record is inserted into the table.

Insert Data Only in Specified Columns

It is also possible to only insert data in specific columns.

INSERT into students (fname, lname, city) VALUES ('another', 'example', 'of insert')

### **MySQL NULL Values**

#### What is a NULL Value?

A field with a NULL value is a field with no value.

If a field in a table is optional, it is possible to insert a new record or update a record without adding a value to this field. Then, the field will be saved with a NULL value.

**Note:** A NULL value is different from a zero value or a field that contains spaces. A field with a NULL value is one that has been left blank during record creation!

If you allow to NULL values in your table first you need to modify column to accept NULL values.

Go to structure section of our table then select specific column to allow null values click on change and select null check box and click save.

INSERT into students (fname, lname, city) VALUES ('another', 'example', 'of insert')

#### How to Test for NULL Values?

It is not possible to test for NULL values with comparison operators, such as =, <, or <>.

We will have to use the IS NULL and IS NOT NULL operators instead.

```
IS NULL Syntax

SELECT column_names

FROM table_name

WHERE column_name IS NULL;

IS NOT NULL Syntax

SELECT column_names

FROM table_name

WHERE column_name IS NOT NULL;

SELECT * from students WHERE gender = 'NULL'

SELECT * from students WHERE gender = NULL;

SELECT * from students WHERE gender = ";

SELECT * from students WHERE gender is null;

SELECT * from students WHERE gender is not null;
```

### **MySQL UPDATE Statement**

### The MySQL UPDATE Statement

The UPDATE statement is used to modify the existing records in a table.

**UPDATE Syntax** 

UPDATE table\_name SET column1 = value1, column2 = value2, ... WHERE condition;

**Note:** Be careful when updating records in a table! Notice the WHERE clause in the UPDATE statement. The WHERE clause specifies which record(s) that should be updated. If you omit the WHERE clause, all records in the table will be updated!

UPDATE students set city = 'bhuj' WHERE roll = 1

UPDATE students set phone = '9090908080' WHERE roll = 1

UPDATE students set city = 'Gandhinagar'

#### **UPDATE** Multiple Records

It is the WHERE clause that determines how many records will be updated.

UPDATE students set city = 'rajkot' WHERE roll >= 1 and roll <= 5

UPDATE students set city = 'ahamdabad' WHERE roll >= 6 and roll <= 10;

### Update Warning!

Be careful when updating records. If you omit the WHERE clause, ALL records will be updated!

UPDATE students set fname = 'KRISHIL', city = 'baroda', phone = '9998889990' WHERE roll = 5

### **MySQL LIMIT Clause**

### The MySQL LIMIT Clause

The LIMIT clause is used to specify the number of records to return.

The LIMIT clause is useful on large tables with thousands of records. Returning a large number of records can impact performance.

```
SELECT column_name(s) FROM table_name WHERE condition LIMIT number;

SELECT * FROM students

SELECT * FROM students LIMIT 5;

SELECT * FROM students where city = 'rajkot' LIMIT 5;

SELECT * FROM students LIMIT 5 OFFSET 5;

SELECT * FROM students LIMIT 5 OFFSET 10;

MySQL provides a way to handle this: by using OFFSET.

The SQL query below says "return only 3 records, start on record 4 (OFFSET 3)":

SELECT * FROM Customers LIMIT 3 OFFSET 3;

SELECT * FROM students LIMIT 5 OFFSET 10;

SELECT * FROM Students LIMIT 5 OFFSET 10;

SELECT * FROM students LIMIT 5 OFFSET 10;
```

### MySQL MIN() and MAX() Functions

### MySQL MIN() and MAX() Functions

The MIN() function returns the smallest value of the selected column.

The MAX() function returns the largest value of the selected column.

#### MIN() Syntax

SELECT MIN(column\_name)

FROM table\_name

WHERE condition;

### MAX() Syntax

SELECT MAX(column\_name)

FROM table\_name

WHERE condition;

SELECT max(dateofbirth) FROM students

SELECT min(dateofbirth) FROM students;

SELECT max(roll) FROM students

SELECT min(roll) FROM students

# MySQL COUNT(), AVG() and SUM() Functions

MySQL COUNT(), AVG() and SUM() Functions

The COUNT () function returns the number of rows that matches a specified criterion.

COUNT() Syntax
SELECT COUNT(column\_name)
FROM table\_name
WHERE condition;

The AVG() function returns the average value of a numeric column.

AVG() Syntax

SELECT AVG(column\_name)

FROM table\_name

WHERE condition;

The SUM() function returns the total sum of a numeric column.

SUM() Syntax

SELECT SUM(column\_name)

FROM table\_name

WHERE condition;

SELECT COUNT(roll) FROM students

SELECT COUNT(roll) FROM students WHERE city = 'rajkot';

SELECT COUNT(roll) FROM students WHERE not city = 'rajkot';

SELECT sum(roll) FROM students

SELECT sum(roll) FROM students;

SELECT sum(roll) FROM students;

### **MySQL LIKE Operator**

### The MySQL LIKE Operator

The LIKE operator is used in a where clause to search for a specified pattern in a column.

There are two wildcards often used in conjunction with the LIKE operator:

- The percent sign (%) represents zero, one, or multiple characters
- The underscore sign (\_) represents one, single character

The percent sign and the underscore can also be used in combinations!

```
SELECT * from students WHERE fname like 'a%';

SELECT * from students WHERE fname like '%a%';

SELECT * from students WHERE fname like '%a';

SELECT * from students WHERE fname like '_a%';

LIKE Syntax

SELECT column1, column2, ... FROM table_name WHERE columnN LIKE pattern;

Tip: You can also combine any number of conditions using AND or OR operators.

SELECT * from students WHERE fname like 'a_%';

SELECT * from students WHERE fname like 's%a';
```

Here are some examples showing different LIKE operators with '%' and '\_' wildcards:

### LIKE Operator Description

WHERE CustomerName LIKE 'a%'	Finds any values that start with "a"
WHERE CustomerName LIKE '%a'	Finds any values that end with "a"
WHERE CustomerName LIKE '% or%'	Finds any values that have "or" in any position
WHERE CustomerName LIKE '_r%'	Finds any values that have "r" in the second position
WHERE CustomerName LIKE 'a_%'	Finds any values that start with "a" and are at least 2 characters in length
WHERE CustomerName LIKE 'a%'	Finds any values that start with "a" and are at least 3 characters in length
WHERE ContactName LIKE 'a%o'	Finds any values that start with "a" and ends with "o"

### **MySQL Wildcards**

### MySQL Wildcard Characters

A wildcard character is used to substitute one or more characters in a string.

Wildcard characters are used with the  $\[ \]$  operator. The LIKE operator is used in a WHERE clause to search for a specified pattern in a column.

### Wildcard Characters in MySQL

Symbo	l Description	Example
%	Represents zero or more characters	s bl% finds bl, black, blue, and blob
_	Represents a single character	h_t finds hot, hat, and hit

The wildcards can also be used in combinations!

Here are some examples showing different LIKE operators with '%' and '\_' wildcards:

LIKE Operator	Description
WHERE CustomerName LIKE 'a%'	Finds any values that starts with "a"
WHERE CustomerName LIKE '%a'	Finds any values that ends with "a"
WHERE CustomerName LIKE '% or%'	Finds any values that have "or" in any position
WHERE CustomerName LIKE '_r%'	Finds any values that have "r" in the second position
WHERE CustomerName LIKE 'a_%_%'	Finds any values that starts with "a" and are at least 3 characters in length
WHERE ContactName LIKE 'a%o'	Finds any values that starts with "a" and ends with "o"

### **MySQL IN Operator**

### The MySQL IN Operator

The IN operator allows you to specify multiple values in a WHERE clause.

The IN operator is a shorthand for multiple or conditions.

```
IN Syntax
```

```
SELECT column_name(s) FROM table_name WHERE column_name IN (value1, value2, ...);
```

or:

```
SELECT column name(s) FROM table name WHERE column name IN (SELECT STATEMENT);
```

```
SELECT * from students WHERE city = 'rajkot' or city = 'ahamdabad' or city = 'bhuj'
```

SELECT \* from students WHERE city in ('rajkot', 'ahamdabad', 'baroda')

### **IN Operator Examples**

The following SQL statement selects all customers that are located in "Germany", "France" or "UK":

```
SELECT * FROM Customers WHERE Country IN ('Germany', 'France', 'UK');
```

SELECT \* from students WHERE city in ('rajkot', 'ahamdabad', 'baroda')

SELECT \* from students WHERE city not in('rajkot', 'ahamdabad', 'baroda');

# **MySQL BETWEEN Operator**

### The MySQL BETWEEN Operator

The BETWEEN operator selects values within a given range. The values can be numbers, text, or dates.

The BETWEEN operator is inclusive: begin and end values are included.

BETWEEN Syntax

SELECT column\_name(s) FROM table\_name WHERE column\_name BETWEEN value1 AND value2;

SELECT \* FROM students WHERE roll BETWEEN 1 and 5

SELECT \* FROM students WHERE roll not BETWEEN 1 and 5;

BETWEEN Text Values Example

SELECT \* FROM students WHERE fname BETWEEN 'ansh' and 'krishil'

SELECT \* FROM students WHERE dateofbirth BETWEEN '2000-01-01' and '2005-12-31'

SELECT \* FROM students WHERE dateofbirth not BETWEEN '2000-01-01' and '2005-12-31';

### **MySQL DELETE Statement**

The MySQL DELETE Statement

The DELETE statement is used to delete existing records in a table.

**DELETE Syntax** 

DELETE FROM table\_name WHERE condition;

**Note:** Be careful when deleting records in a table! Notice the WHERE clause in the DELETE statement. The WHERE clause specifies which record(s) should be deleted. If you omit the WHERE clause, all records in the table will be deleted!

If you try delete query on your table and you need to data back must create shadow copy of your current table to prevent any data loss

CREATE TABLE studentsBackup as SELECT \* FROM students

SQL DELETE Example

DELETE from students WHERE Roll = 1

DELETE from students WHERE city = 'gandhinagar'

DELETE from students WHERE roll > 5

**DELETE from students** 

Restore data from backup table

INSERT into students SELECT \* from studentsbackup

Delete from students (empty students table)

INSERT into students (fname, lname, city, phone, email, gender, dateofbirth) values ('demo', 'text', 'example', '9900009900', 'demo@example.com', 'male', '2001-02-01')

Notice the roll number started from where we leave before delete

Select \* from students

If you need to reset whole table with data and data structure then you need to run truncate table

**TRUNCATE TABLE students** 

INSERT into students (fname, Iname, city, phone, email, gender, dateofbirth) values ('demo', 'text', 'example', '9900009900', 'demo@example.com', 'male', '2001-02-01')

Select \* from students