# Introduction To Mysql

## REALIZED BY:

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## PLAN:

- What is MySQL?
- Installation of MySQL
- MySQL Data Types
- MySQL Constraints
- MySQL Commands
- MySQL  JOIN
- MySQL Functions

- **MySQL** is a Relational Database Management System or (RDBMS)
- **MySQL** is developed, distributed, and supported by Oracle Corporation
- **MySQL** is one of the most popular database management systems originally launched way back in 1995.

# Installation of MySQL: PHPMyAdmin, and MySQL Workbench

Workbensh → https://dev.mysql.com/downloads/workbench/

MySQL Workbench is a unified visual tool for database architects, developers, and DBAs.

PHPMyAdmin → https://www.educba.com/install-phpmyadmin/

PhpMyAdmin includes a graphical interface that allows users to easily view the structure of their databases, tables, and fields.

## MySQL DATA TYPES

- MySQL uses many different data types broken into three categories :
  - Numeric
  - Date and Time
  - String Types

| | |
|---|---|
| **Numeric Data Types** | **INT** − A normal-sized integer that can be signed or unsigned. |
| | **TINYINT** − A very small integer that can be signed or unsigned. |
| | **SMALLINT** − A small integer that can be signed or unsigned. |
| | **MEDIUMINT** − A medium-sized integer that can be signed or unsigned. |
| | **BIGINT** − A large integer that can be signed or unsigned. |
| | **FLOAT(M,D)** − A floating-point number that cannot be unsigned. You can define the display length (M) and the number of decimals (D). |
| | **DOUBLE(M,D)** − A double precision floating-point number that cannot be unsigned. You can define the display length (M) and the number of decimals (D). |
| | **DECIMAL(M,D)** − An unpacked floating-point number that cannot be unsigned |
| **Date and Time Data Types** | **DATE** − A date in YYYY-MM-DD format, between 1000-01-01 and 9999-12-31. |
| | **DATETIME** − A date and time combination in YYYY-MM-DD HH:MM:SS format, between 1000-01-01 00:00:00 and 9999-12-31 23:59:59. |
| | **TIMESTAMP** − A timestamp between midnight, January 1st, 1970 and sometime in 2037. |
| | **TIME** − Stores the time in a HH:MM:SS format. |
| | **YEAR(M)** − Stores a year in a 2-digit or a 4-digit format. If the length is specified as 2 (for example YEAR(2)), YEAR can be between 1970 to 2069 (70 to 69). |

| | |
|---|---|
| **String Types** | **CHAR(M)** – A fixed-length string between 1 and 255 characters in length (for example CHAR(5)), right-padded with spaces to the specified length when stored. Defining a length is not required, but the default is 1. |
| | **VARCHAR(M)** – A variable-length string between 1 and 255 characters in length. For example, VARCHAR(25). You must define a length when creating a VARCHAR field. |
| | **BLOB or TEXT** – A field with a maximum length of 65535 characters. BLOBs are "Binary Large Objects" and are used to store large amounts of binary data, such as images or other types of files. |
| | **TINYBLOB or TINYTEXT** – A BLOB or TEXT column with a maximum length of 255 characters. You do not specify a length with TINYBLOB or TINYTEXT. |
| | **MEDIUMBLOB or MEDIUMTEXT** – A BLOB or TEXT column with a maximum length of 16777215 characters. You do not specify a length with MEDIUMBLOB or MEDIUMTEXT. |
| | **LONGBLOB or LONGTEXT** – A BLOB or TEXT column with a maximum length of 4294967295 characters. You do not specify a length with LONGBLOB or LONGTEXT. |
| | **ENUM** – An enumeration, which is a fancy term for list. When defining an ENUM, you are creating a list of items from which the value must be selected (or it can be NULL). For example, if you wanted your field to contain "A" or "B" or "C", you would define your ENUM as ENUM ('A', 'B', 'C') |

## MySQL Constraints

As we know that constraint is a kind of limitation or restriction. Similarly, MySQL constraints are used to define some rules that limit the data that can go into a table. With the help of constraints, we can basically maintain the accuracy and integrity of the data inside the table.

Constraints are used to limit the type of data that can go into a table. This ensures the accuracy and reliability of the data in the table. If there is any violation between the constraint and the data action, the action is aborted.
Constraints can be column level or table level. Column level constraints apply to a column, and table level constraints apply to the whole table

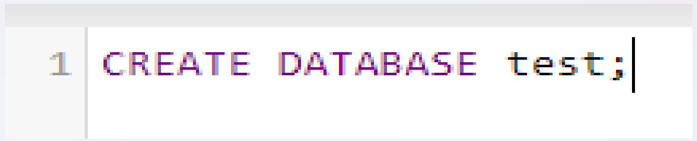
Constraints can be specified when the table is created with the CREATE TABLE statement, or after the table is created with the ALTER TABLE statement.

Followings are some most common MySQL constraints :

- NOT NULL : Ensures that a column cannot have a NULL value
- UNIQUE :Ensures that all values in a column are different
- PRIMARY KEY :Primary Constraint of a relational table, uniquely identifies each record in the table. In some tables, combination of more than on attributes is declared as primary key.
- FOREIGN KEY :Foreign Constraint is a non-key attribute whose value is derived from the primary key of another table. The relationship between two tables is established with the help of foreign key.
- CHECK :Ensures that the values in a column satisfies a specific condition

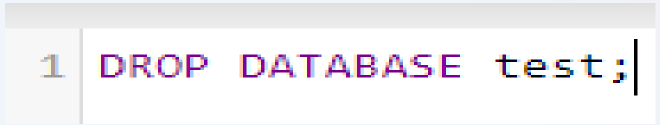
## MySQL Commands

- **Create a new SQL database**: CREATE DATABASE *databasename*;



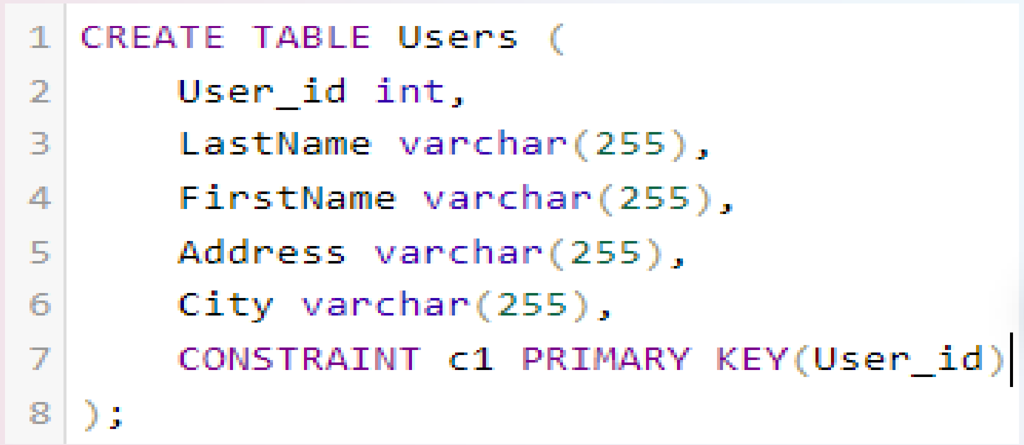
```
CREATE DATABASE test;
```

- **Drop an existing SQL database**: DROP DATABASE *databasename*;

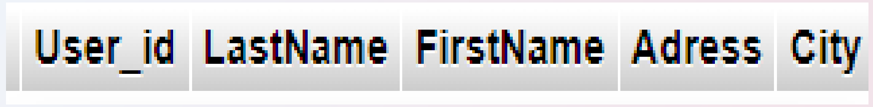


```
DROP DATABASE test;
```

- **create a new table in a database**: CREATE TABLE *table_name* (*column1 datatype,*
  *column2 datatype,*
  ....);

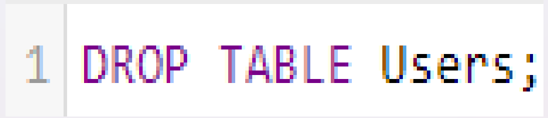


```
CREATE TABLE Users (
    User_id int,
    LastName varchar(255),
    FirstName varchar(255),
    Address varchar(255),
    City varchar(255),
    CONSTRAINT c1 PRIMARY KEY(User_id)
);
```



| User_id | LastName | FirstName | Adress | City |
|---|---|---|---|---|

- **Drop an existing table in a database**:DROP TABLE *table_name*;

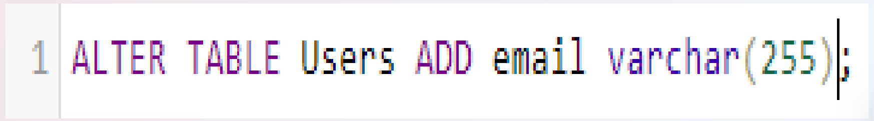


```
DROP TABLE Users;
```

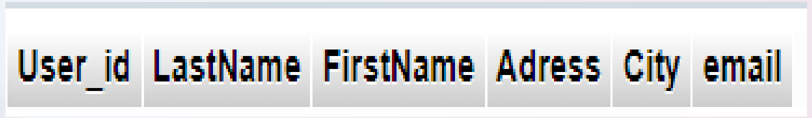
- **ALTER TABLE** command is used to add, delete or modify columns in an existing table.

ALTER TABLE command to add a **New Column** in an existing table:

ALTER TABLE *table_name* ADD *column_name* datatype;



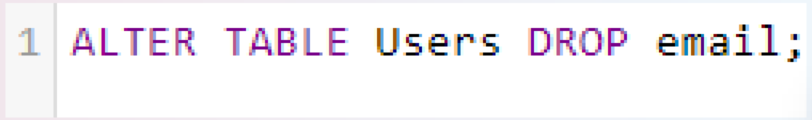
```
ALTER TABLE Users ADD email varchar(255);
```



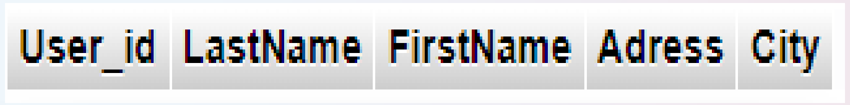
| User_id | LastName | FirstName | Adress | City | email |
|---|---|---|---|---|---|

ALTER TABLE command to **DROP COLUMN** in an existing table:

ALTER TABLE *table_name* DROP *column_name*;



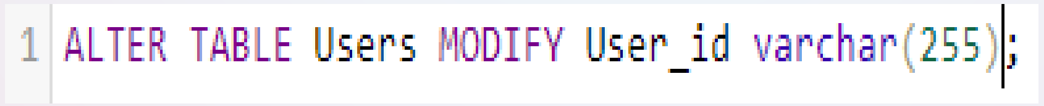
```
ALTER TABLE Users DROP email;
```



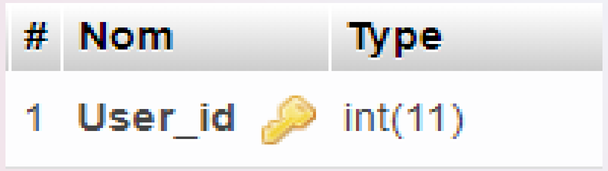
| User_id | LastName | FirstName | Adress | City |
|---|---|---|---|---|

ALTER TABLE command to **change** the **DATA TYPE** of a column in a table:

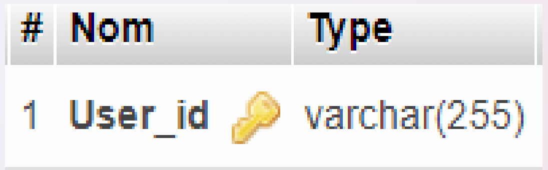
ALTER TABLE *table_name* MODIFY *column_name* datatype;



```
ALTER TABLE Users MODIFY User_id varchar(255);
```



| # | Nom | Type |
|---|---|---|
| 1 | User_id 🔑 | int(11) |

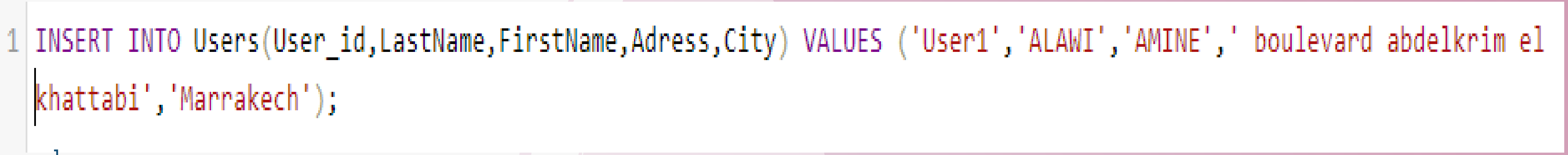


| # | Nom | Type |
|---|---|---|
| 1 | User_id 🔑 | varchar(255) |

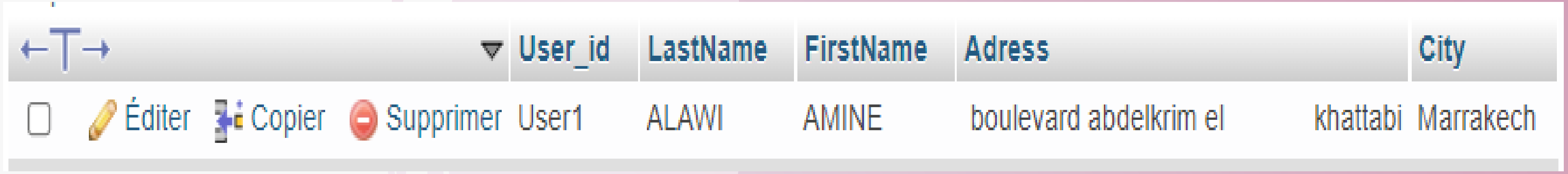
## ➢ MySQL - INSERT INTO

The MySQL **INSERT INTO** statement is used to insert a new record in a table. There are two ways of using INSERT INTO statement which are mentioned below.

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

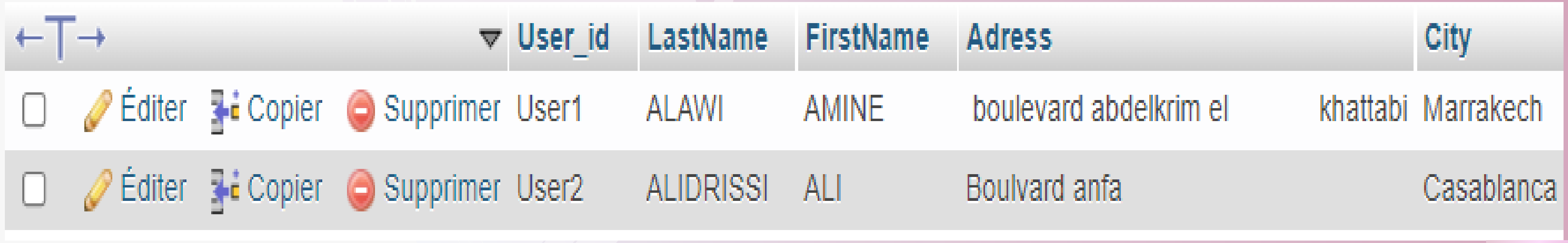


```sql
INSERT INTO Users(User_id,LastName,FirstName,Adress,City) VALUES ('User1','ALAWI','AMINE',' boulevard abdelkrim el
khattabi','Marrakech');
```



| | User_id | LastName | FirstName | Adress | City |
|---|---|---|---|---|---|
| ☐ Éditer Copier Supprimer | User1 | ALAWI | AMINE | boulevard abdelkrim el khattabi | Marrakech |

the same in insert user2



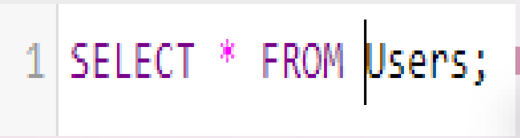
| | User_id | LastName | FirstName | Adress | City |
|---|---|---|---|---|---|
| ☐ Éditer Copier Supprimer | User1 | ALAWI | AMINE | boulevard abdelkrim el khattabi | Marrakech |
| ☐ Éditer Copier Supprimer | User2 | ALIDRISSI | ALI | Boulvard anfa | Casablanca |

## ➢ MySQL -SELECT Statement

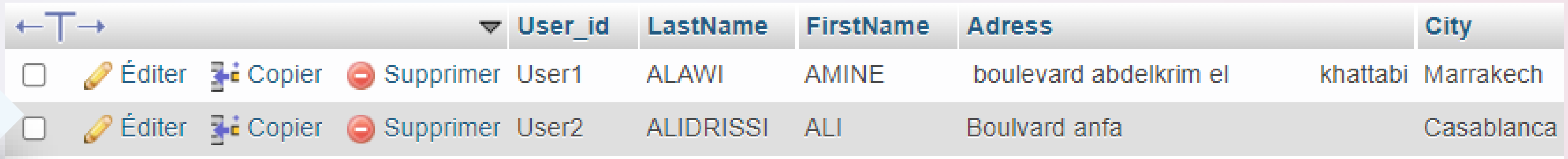
SELECT QUERY is used to fetch the data from the MySQL database. Databases store data for later retrieval. The purpose of MySQL Select is to return from the database tables, one or more rows that match a given criteria.

SELECT column1,column2,… FROM *table_name;*

The Star symbol is used to select all the columns in table



```
SELECT * FROM Users;
```



| | | | | User_id | LastName | FirstName | Adress | City |
|---|---|---|---|---|---|---|---|---|
| ☐ | Éditer | Copier | Supprimer | User1 | ALAWI | AMINE | boulevard abdelkrim el khattabi | Marrakech |
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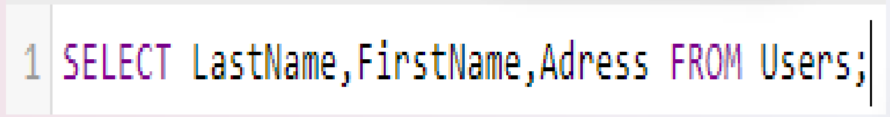
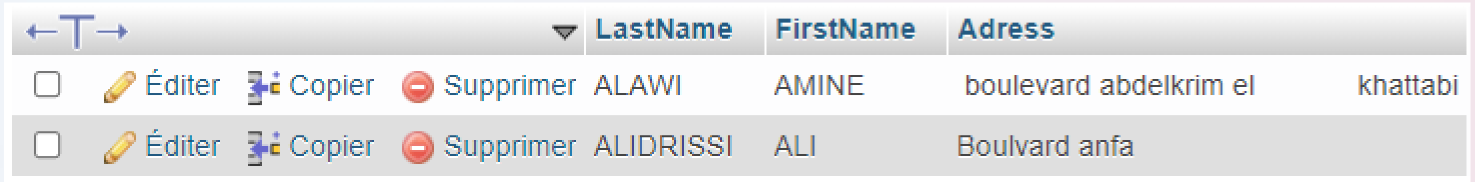


```
SELECT LastName,FirstName,Adress FROM Users;
```

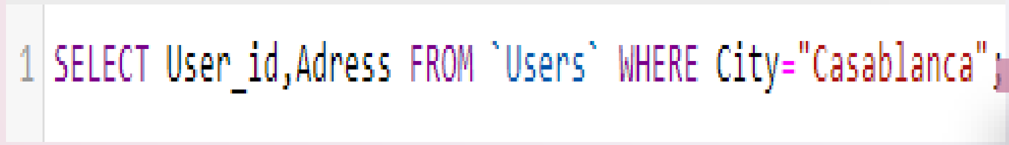


| | | | | LastName | FirstName | Adress |
|---|---|---|---|---|---|---|
| ☐ | Éditer | Copier | Supprimer | ALAWI | AMINE | boulevard abdelkrim el khattabi |
| ☐ | Éditer | Copier | Supprimer | ALIDRISSI | ALI | Boulvard anfa |

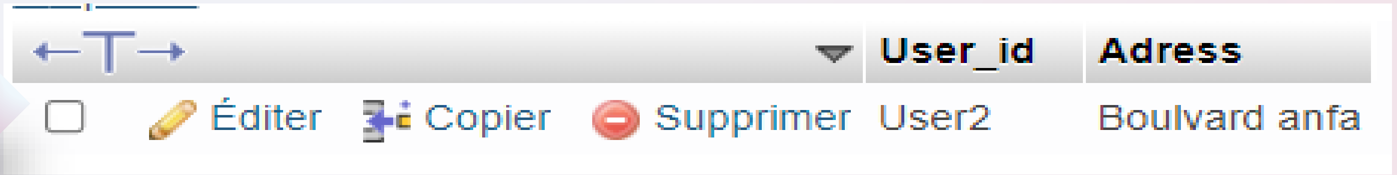
## ➢ MySQL WHERE Clause

The WHERE clause is used to filter records

SELECT *column1, column2...*FROM *table_name* WHERE condition;



```
SELECT User_id,Adress FROM `Users` WHERE City="Casablanca";
```

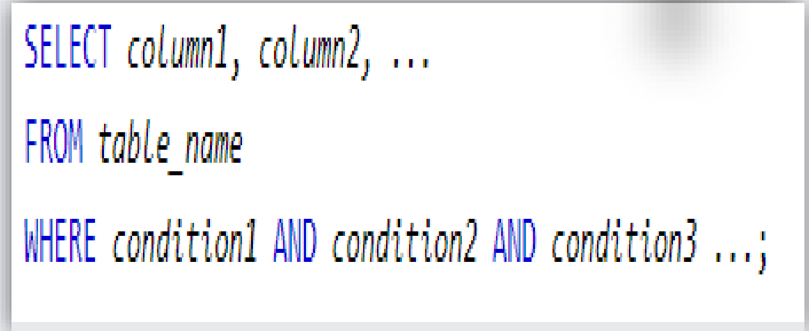


| | | | | User_id | Adress |
|---|---|---|---|---|---|
| ☐ | Éditer | Copier | Supprimer | User2 | Boulvard anfa |

## ➢ The MySQL AND, OR and NOT Operators

### AND Operator

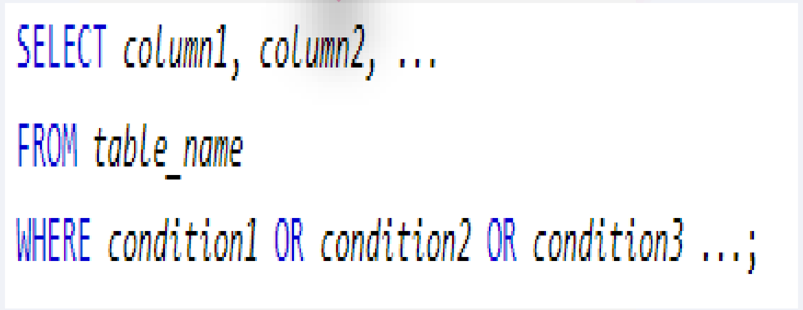
- The AND operator
- displays a record if
- all the
- conditions separated
- by AND
- are TRUE.



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

### NOT Operator

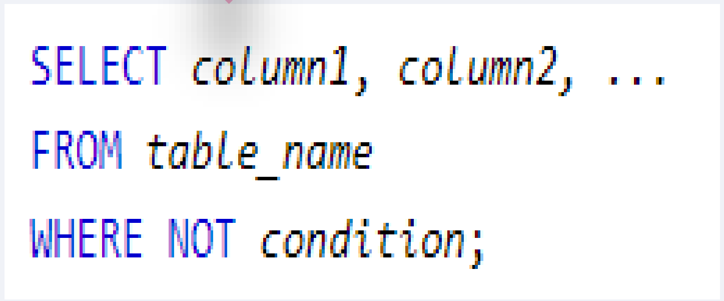
The NOT operator displays a record if the condition(s) is NOT TRUE.



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

### OR Operator

- The OR operator
- displays a record if
- any of the conditions
- separated by OR is TRUE.

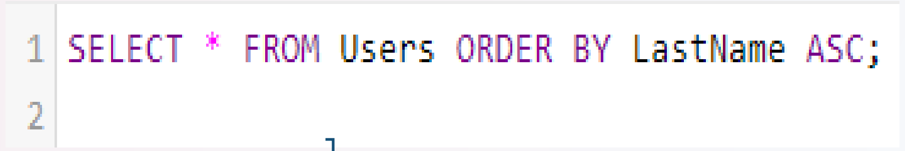


```
SELECT column1, column2, ...
FROM table_name
WHERE NOT condition;
```

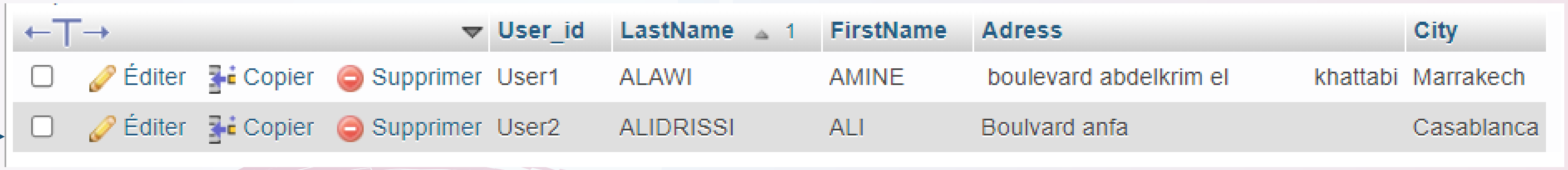
## ➢ The MySQL ORDER BY Keyword

The MySQL **ORDER BY** keyword is used to sort the result table in ascending or descending order. By default, ORDER BY keyword sorts the result in ascending order, however it can be specified using ASC keyword. To sort the result in descending order, DESC keyword is used.

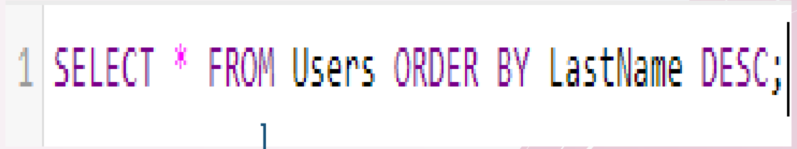
```
SELECT column1, column2, column3, ... FROM table_name ORDER BY column1, column2, ... ASC|DESC;
```



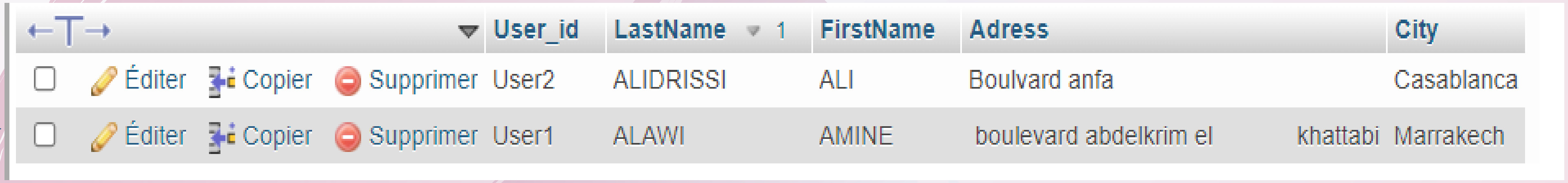
```
SELECT * FROM Users ORDER BY LastName ASC;
```



| | | | | User_id | LastName ▲ 1 | FirstName | Adress | City |
|---|---|---|---|---|---|---|---|---|
| ☐ | Éditer | Copier | Supprimer | User1 | ALAWI | AMINE | boulevard abdelkrim el khattabi | Marrakech |
| ☐ | Éditer | Copier | Supprimer | User2 | ALIDRISSI | ALI | Boulvard anfa | Casablanca |



```
SELECT * FROM Users ORDER BY LastName DESC;
```



| | | | | User_id | LastName ▼ 1 | FirstName | Adress | City |
|---|---|---|---|---|---|---|---|---|
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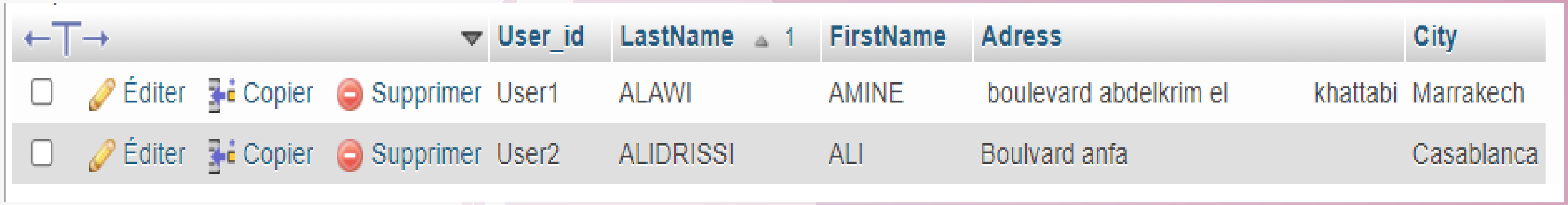
| ☐ | Éditer | Copier | Supprimer | User1 | ALAWI | AMINE | boulevard abdelkrim el khattabi | Marrakech |

## MySQL UPDATE Statement

The MySQL **UPDATE** statement is used to modify the existing records in a table. The MySQL WHERE clause can be used with the UPDATE statement to update the selected rows, otherwise all the rows will be assigned the updated value.

```
UPDATE table_name SET column1 = value1, column2 = value2, ... WHERE condition(s);
```



| | | | | User_id | LastName ▲ 1 | FirstName | Adress | City |
|---|---|---|---|---|---|---|---|---|
| ☐ | Éditer | Copier | Supprimer | User1 | ALAWI | AMINE | boulevard abdelkrim el khattabi | Marrakech |
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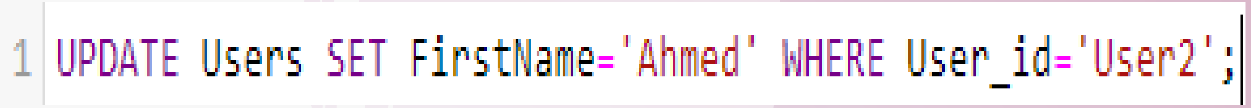
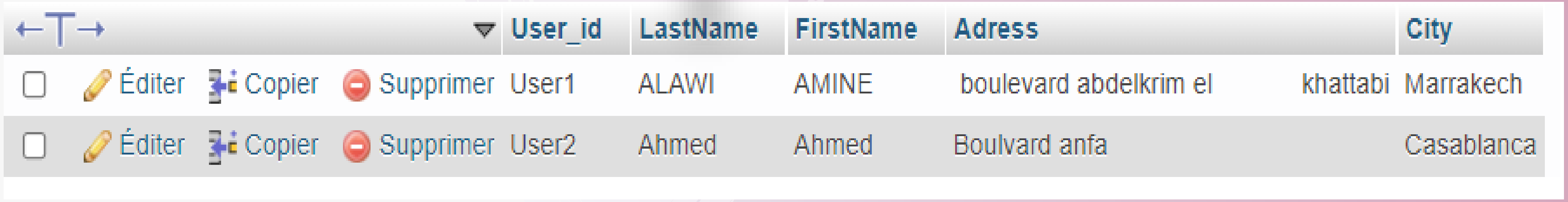


```
UPDATE Users SET FirstName='Ahmed' WHERE User_id='User2';
```

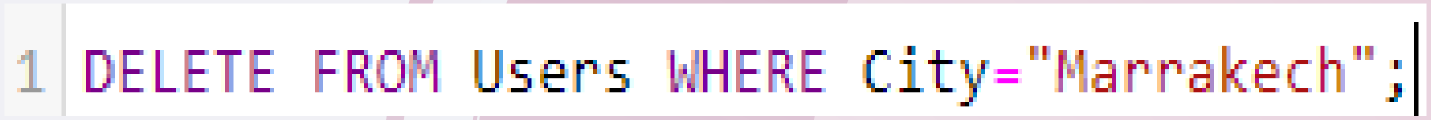


| | | | | User_id | LastName | FirstName | Adress | City |
|---|---|---|---|---|---|---|---|---|
| ☐ | Éditer | Copier | Supprimer | User1 | ALAWI | AMINE | boulevard abdelkrim el khattabi | Marrakech |
| ☐ | Éditer | Copier | Supprimer | User2 | Ahmed | Ahmed | Boulvard anfa | Casablanca |

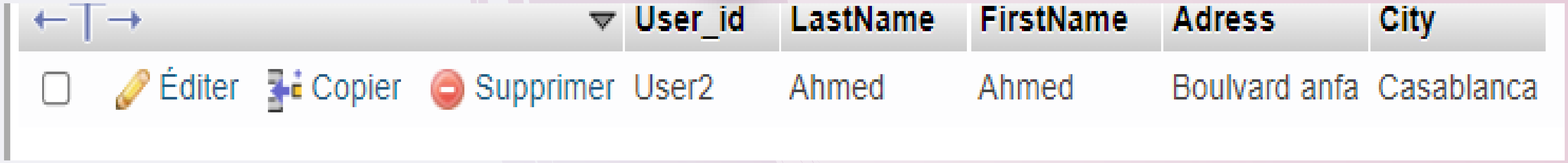
## MySQL DELETE Statement

The MySQL **DELETE** statement is used to delete the existing records from a table. The MySQL WHERE clause can be used with the DELETE statement to delete the selected rows, otherwise all records will be deleted.

DELETE FROM table_name WHERE condition(s);



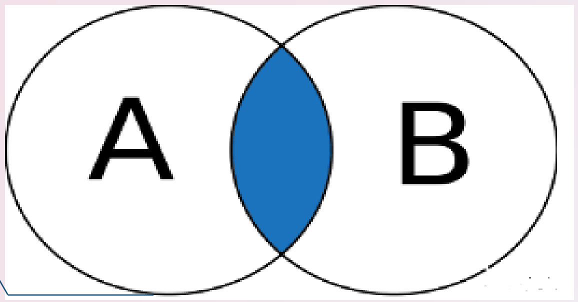
```
DELETE FROM Users WHERE City="Marrakech";
```



| | | | | User_id | LastName | FirstName | Adress | City |
|---|---|---|---|---|---|---|---|---|
| ☐ | Éditer | Copier | Supprimer | User2 | Ahmed | Ahmed | Boulvard anfa | Casablanca |

## MySQL JOIN

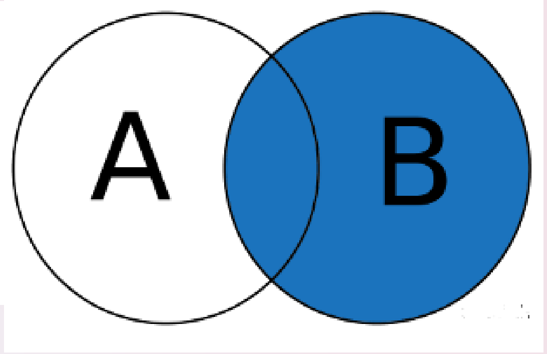
A JOIN clause is used to combine rows from two or more tables, based on a related column between them.



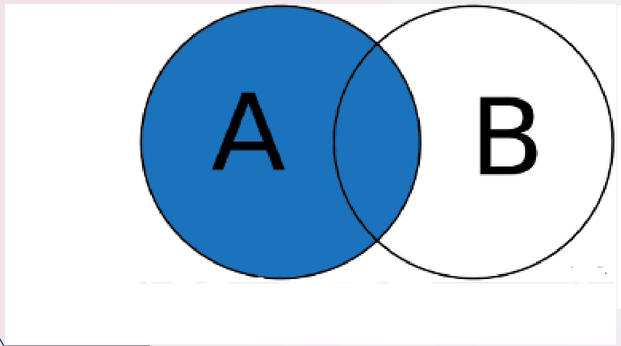
• INNER JOIN: Returns records that have matching values in both tables

```
SELECT column_name(s)
FROM tableA
INNER JOIN tableB
ON tableA.column_name = tableB.column_name;
```

• RIGHT JOIN: Returns all records from the right table, and the matched records from the left table



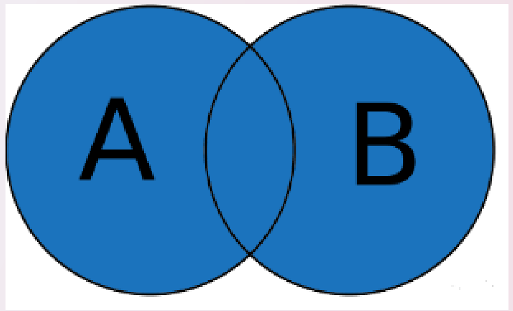
```
SELECT column_name(s)
FROM tableA
RIGHT JOIN tableB
ON tableA.column_name = tableB.column_name;
```



• LEFT JOIN: Returns all records from the left table, and the matched records from the right table

```
SELECT column_name(s)
FROM tableA
LEFT JOIN tableB
ON tableA.column_name = tableB.column_nam
```

• CROSS JOIN: Returns all records from both tables



```
SELECT column_name(s)
FROM tableA
CROSS JOIN tableB;
```

## MySQL Functions

MySQL has many built-in functions.
This reference contains string, numeric, date, and some advanced functions in MySQL.

## ➢ MySQL Aggregate Functions

An aggregate function performs a calculation on multiple values and returns a single value.

Before we move on to the implementation of the functions, it is important to understand what aggregate functions are. Aggregate Functions perform operations on multiple values of a column and return a single value. Examples of Aggregate functions are MIN(), MAX(), SUM(), COUNT(), AVG(), etc.

The generic syntax of aggregate functions is as follows:

```
function_name(column)
```

| Name | Description |
|---|---|
| AVG() | Return the average value of the argument |
| COUNT() | Return a count of the number of rows returned |
| COUNT(DISTINCT) | Return the count of a number of different values |
| GROUP_CONCAT() | Return a concatenated string |
| JSON_ARRAYAGG() | Return result set as a single JSON array |
| JSON_OBJECTAGG() | Return result set as a single JSON object |
| MAX() | Return the maximum value |
| MIN() | Return the minimum value |
| STDDEV_POP() | Return the population standard deviation |
| SUM() | Return the sum |
| VARIANCE() | Return the population standard variance |

## ➢ MySQL Comparison Functions

| Name | Description |
|---|---|
| > | Greater than operator |
| >= | Greater than or equal operator |
| < | Less than operator |
| <>, != | Not equal operator |
| <= | Less than or equal operator |
| <=> | NULL-safe equal to operator |
| = | Equal operator |
| BETWEEN ... AND ... | Whether a value is within a range of values |
| IN() | Whether a value is within a set of values |
| IS NOT | Test a value against a boolean |
| IS NOT NULL | NOT NULL value test |
| IS NULL | NULL value test |
| ISNULL() | Test whether the argument is NULL |
| LIKE | Simple pattern matching |
| NOT BETWEEN ... AND ... | Whether a value is not within a range of values |
| NOT IN() | Whether a value is not within a set of values |
| NOT LIKE | Negation of simple pattern matching |
| STRCMP() | Compare two strings |

## ➢ MySQL DATE functions

| | |
|---|---|
| DATEDIFF() | Return the number of days between two date values:<br>EXAMPLE:SELECT DATEDIFF("2017-06-25", "2017-06-15"); |
| DATE_ADD() | The DATE_ADD() function adds a time/date interval to a date and then returns the date.<br>EXAMPLE: Add 15 minutes to a date and return the date:<br>SELECT DATE_ADD("2017-06-15 09:34:21", INTERVAL 15 MINUTE); |
| DATE_FORMAT() | The DATE_FORMAT() function formats a date as specified.<br>DATE_FORMAT(*date*, *format*)<br>EXAMPLE: Format a date:<br>SELECT DATE_FORMAT("2017-06-15", "%M %d %Y"); |
| Extract() | The EXTRACT() function extracts a part from a given date.<br>EXTRACT(*part* FROM *date*)<br>EXAMPLE: SELECT EXTRACT(YEAR FROM "2017-06-15”) |
| SYSDATE() | The SYSDATE() function returns the current date and time.<br>EXAMPLE: SELECT SYSDATE(); |

# THANK YOU!

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