MySQL UNION

Summary: in this tutorial, you will learn how to use MySQL `UNION` operator to combine two or more result sets from multiple `SELECT` statements into a single result set.

MySQL UNION operator

MySQL `UNION` operator allows you to combine two or more result sets of queries into a single result set. The following illustrates the syntax of the `UNION` operator:

```
SELECT column_list
UNION [DISTINCT | ALL]
SELECT column_list
UNION [DISTINCT | ALL]
SELECT column_list
...
```

To combine result set of two or more queries using the `UNION` operator, these are the basic rules that you must follow:

- First, the number and the orders of columns that appear in all `SELECT` statements must be the same.
- Second, the data types of columns must be the same or compatible.

By default, the `UNION` operator removes duplicate rows even if you don't specify the `DISTINCT` operator explicitly.

Let's see the following sample tables: `t1` and `t2`:

```
DROP TABLE IF EXISTS t1;
DROP TABLE IF EXISTS t2;

CREATE TABLE t1 (
    id INT PRIMARY KEY
);

CREATE TABLE t2 (
    id INT PRIMARY KEY
);

INSERT INTO t1 VALUES (1),(2),(3);
INSERT INTO t2 VALUES (2),(3),(4);
```

The following statement combines result sets returned from `t1` and `t2` tables:

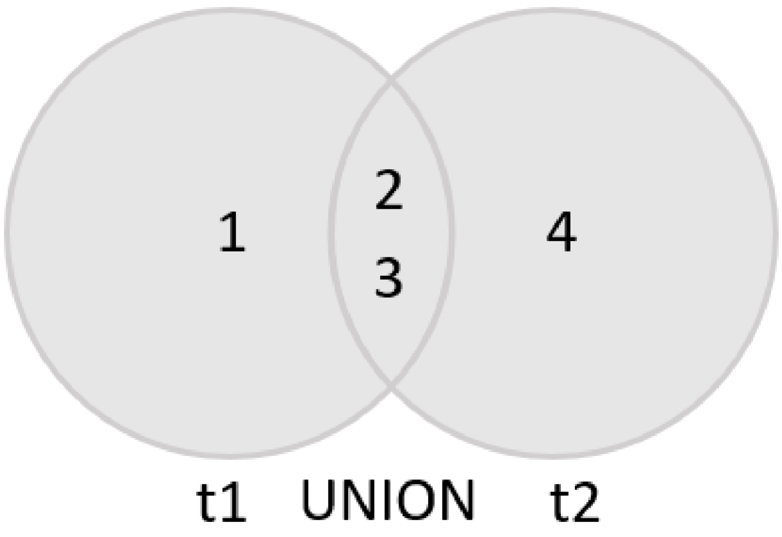
```
SELECT id
FROM t1
UNION
SELECT id
FROM t2;
```

The final result set contains the distinct values from separate result sets returned by the queries:

```
+----+
| id |
+----+
|  1 |
|  2 |
|  3 |
|  4 |
+----+
4 rows in set (0.00 sec)
```

Because the rows with value 2 and 3 are duplicates, the `UNION` removed them and kept only unique values.

The following Venn diagram illustrates the union of two result sets that come from `t1` and `t2` tables:



If you use the `UNION ALL` explicitly, the duplicate rows, if available, remain in the result. Because `UNION ALL` does not need to handle duplicates, it performs faster than `UNION DISTINCT` .

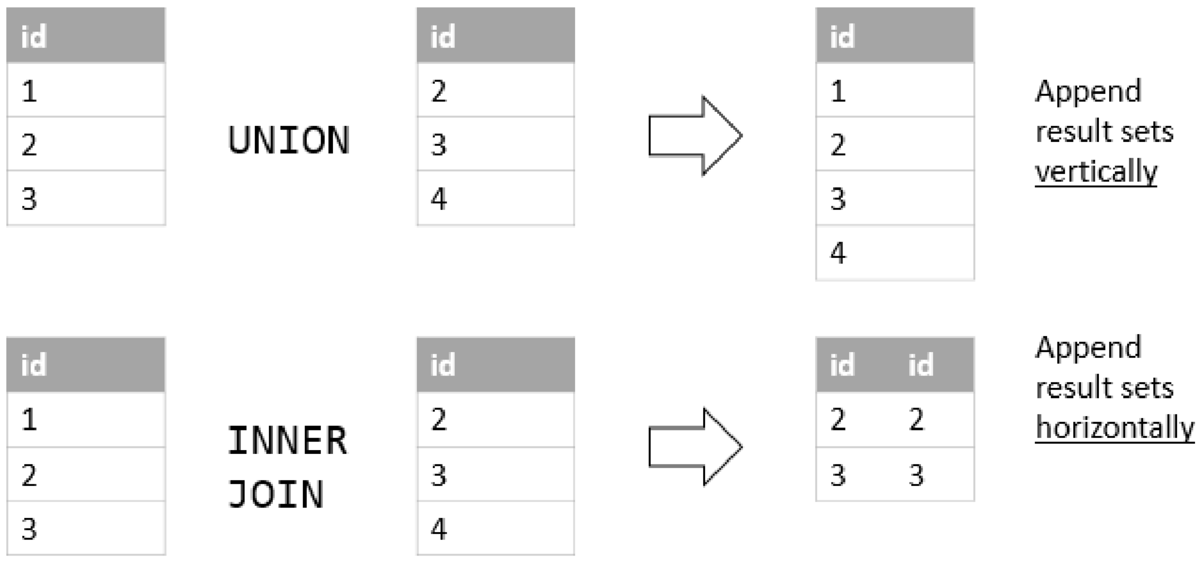
```
SELECT id
FROM t1
UNION ALL
SELECT id
FROM t2;
```

```
+----+
| id |
+----+
|  1 |
|  2 |
|  3 |
|  2 |
|  3 |
|  4 |
+----+
6 rows in set (0.00 sec)
```

As you can see, the duplicates appear in the combined result set because of the `UNION ALL` operation.

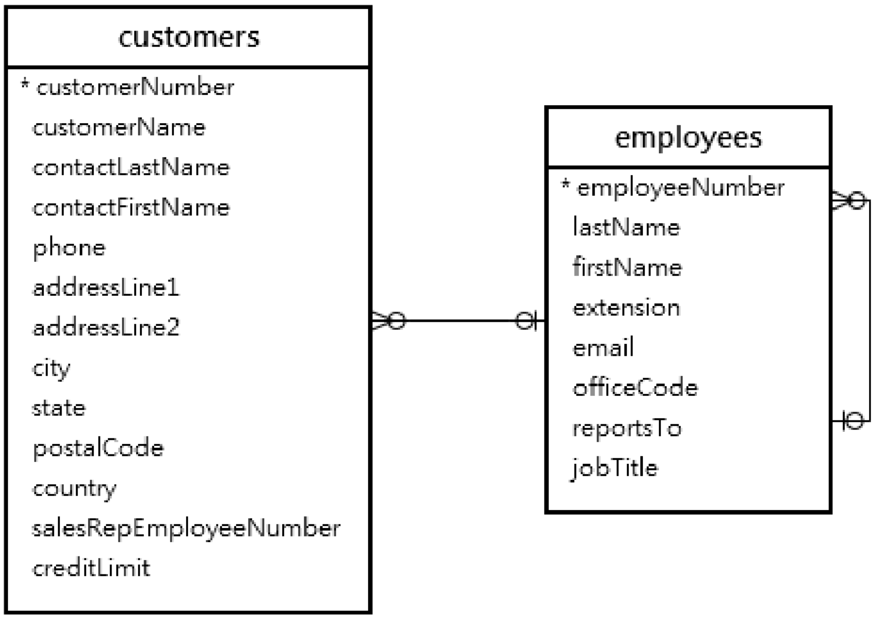
UNION vs. JOIN

A `JOIN` combines result sets horizontally, a `UNION` appends result set vertically. The following picture illustrates the difference between `UNION` and `JOIN`:


id
1
2
3
UNION
id
2
3
4
id
1
2
3
4
Append result sets vertically
id
1
2
3
INNER JOIN
id
2
3
4
id id
2 2
3 3
Append result sets horizontally

MySQL UNION and column alias examples

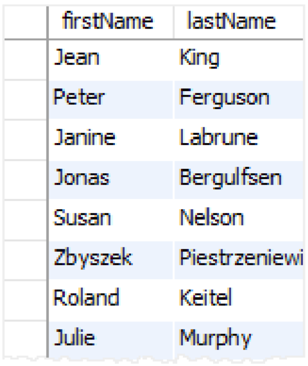
We'll use the `customers` and `employees` tables in the sample database for the demonstration:



Suppose that you want to combine the first name and last name of employees and customers into a single result set, you can use the `UNION` operator as follows:

```
SELECT
    firstName,
    lastName
FROM
    employees
```

```
UNION
SELECT
    contactFirstName,
    contactLastName
FROM
    customers;
```

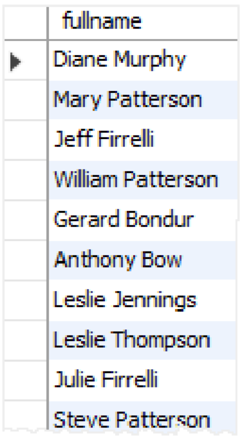


firstName	lastName
Jean	King
Peter	Ferguson
Janine	Labrune
Jonas	Bergulfsen
Susan	Nelson
Zbyszek	Piestrzeniewi
Roland	Keitel
Julie	Murphy

As you can see from the output, the MySQL `UNION` uses the column names of the first `SELECT` statement for the column headings of the output.

If you want to use other column headings, you need to use column aliases explicitly in the first `SELECT` statement as shown in the following example:

```
SELECT
    CONCAT(firstName,' ',lastName) fullname
FROM
    employees
UNION SELECT
    CONCAT(contactFirstName,' ',contactLastName)
FROM
    customers;
```



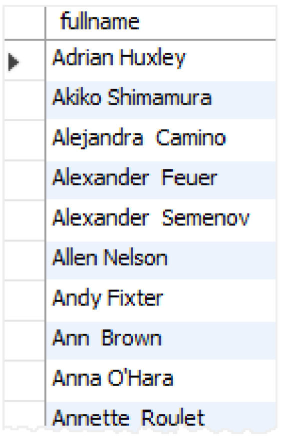
fullname
Diane Murphy
Mary Patterson
Jeff Firrelli
William Patterson
Gerard Bondur
Anthony Bow
Leslie Jennings
Leslie Thompson
Julie Firrelli
Steve Patterson

This example uses the column heading of the first query for the output. It uses the `CONCAT()` function to concatenate first name, space, and last name into a full name.

MySQL UNION and ORDER BY

If you want to sort the result set of a union, you use an `ORDER BY` clause in the last `SELECT` statement as shown in the following example:

```
SELECT
    concat(firstName,' ',lastName) fullname
FROM
    employees
UNION SELECT
    concat(contactFirstName,' ',contactLastName)
FROM
    customers
ORDER BY fullname;
```



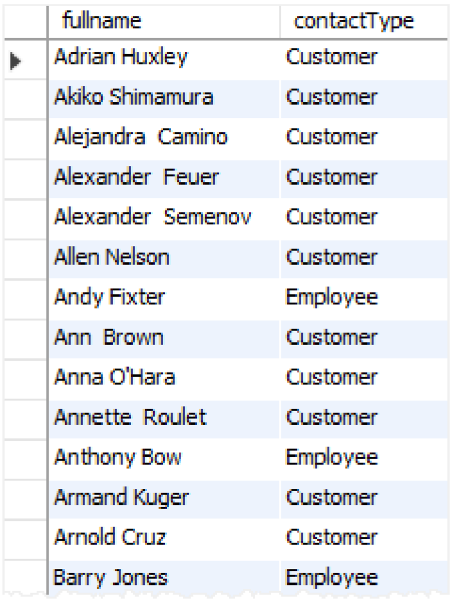
```
fullname
Adrian Huxley
Akiko Shimamura
Alejandra  Camino
Alexander  Feuer
Alexander  Semenov
Allen Nelson
Andy Fixter
Ann  Brown
Anna O'Hara
Annette  Roulet
```

Notice that if you place the `ORDER BY` clause in each `SELECT` statement, it will not affect the order of the rows in the final result set.

To differentiate between employees and customers, you can add a column as shown in the following query:

```
SELECT
    CONCAT(firstName, ' ', lastName) fullname,
    'Employee' as contactType
FROM
    employees
```

```
UNION SELECT
    CONCAT(contactFirstName, ' ', contactLastName),
    'Customer' as contactType
FROM
    customers
ORDER BY
    fullname
```



	fullname	contactType
▶	Adrian Huxley	Customer
	Akiko Shimamura	Customer
	Alejandra Camino	Customer
	Alexander Feuer	Customer
	Alexander Semenov	Customer
	Allen Nelson	Customer
	Andy Fixter	Employee
	Ann Brown	Customer
	Anna O'Hara	Customer
	Annette Roulet	Customer
	Anthony Bow	Employee
	Armand Kuger	Customer
	Arnold Cruz	Customer
	Barry Jones	Employee

MySQL also provides you with an alternative option to sort a result set based on column position using `ORDER BY` clause as follows:

```
SELECT
    CONCAT(firstName,' ',lastName) fullname
FROM
    employees
UNION SELECT
    CONCAT(contactFirstName,' ',contactLastName)
FROM
    customers
ORDER BY 1;
```

However, it is not a good practice to sort the result set by column position.

In this tutorial, you have learned how to use MySQL `UNION` statement to combine data from multiple queries into a single result set.