JOIN ON to Link Tables

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WHAT'S COVERED

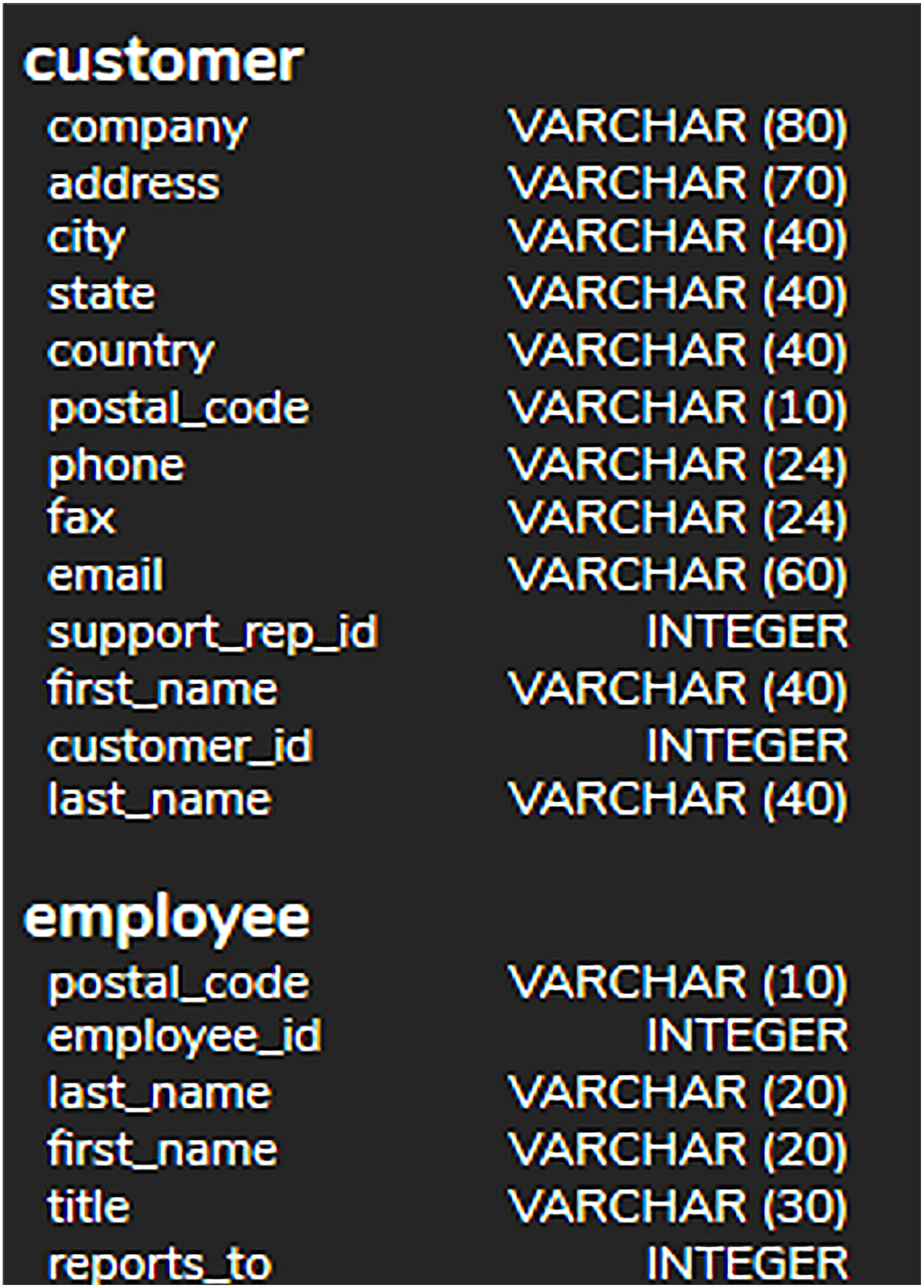
In this lesson, you will explore using the JOIN ON clause to link table data across two tables, in two parts. Specifically, this lesson will cover:

1. JOIN ON

By using JOIN ON, you can determine how rows from the participating tables are matched and combined. ON is usually associated with INNER JOIN, but in some cases, it can also be used with other JOIN types that you will learn about in upcoming lessons.

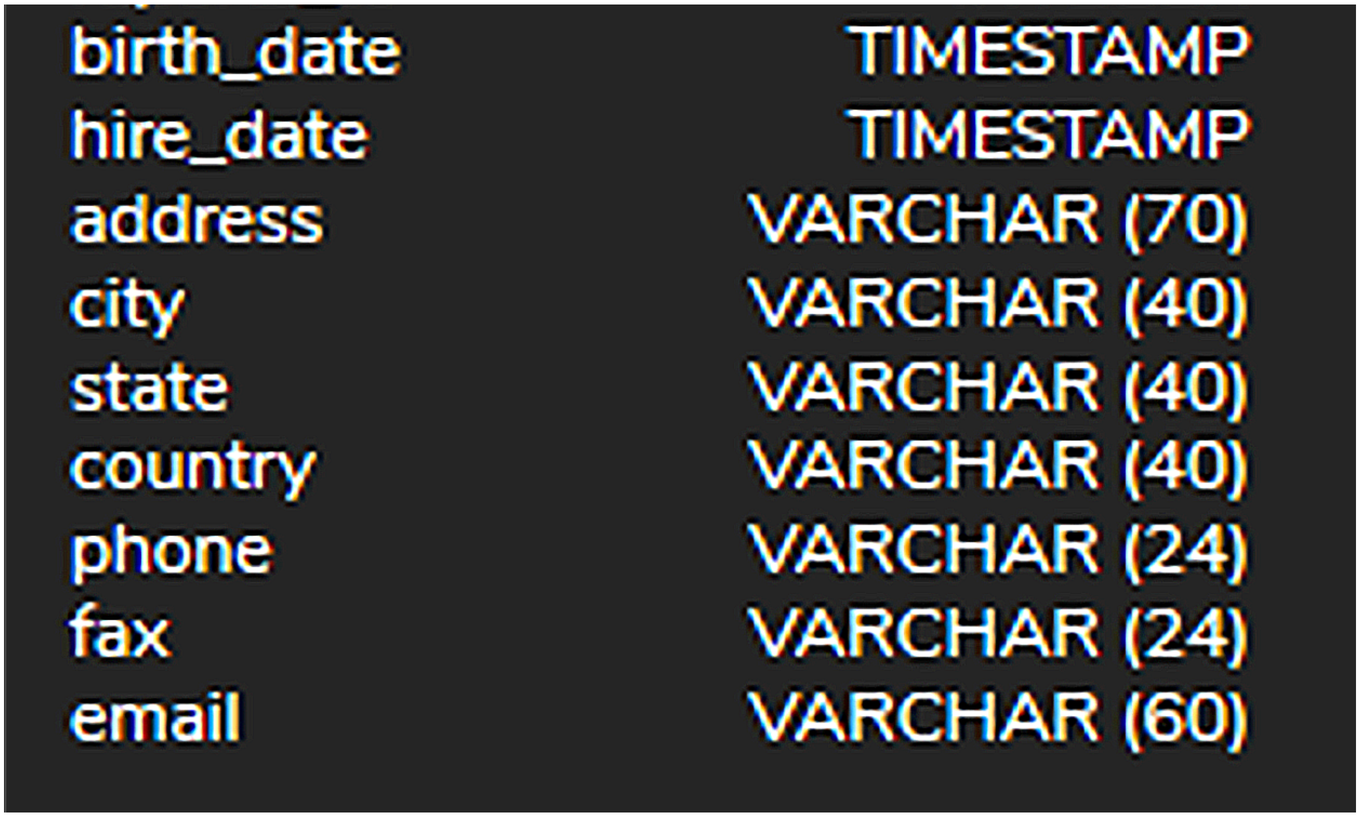
Specifying the columns to be used in the ON clause, you can join tables on the basis of those columns. This enables you to establish more complex relationships between tables than just columns with the same name. Specifying a JOIN condition explicitly enables you to work with tables that might have semantically related columns with different names. It's particularly useful when dealing with tables that don't share identical column names to join datasets based on specific criteria, such as matching IDs or dates. JOIN ON enables you to create comprehensive datasets and gain valuable insights from your relational database through precise and targeted data retrieval.

Table columns with relationships between them do not always have the same names. For example, if we look at the customer and employee tables, the customer table has a support_rep_id which references the employee_id of the employee table:



customer	
company	VARCHAR (80)
address	VARCHAR (70)
city	VARCHAR (40)
state	VARCHAR (40)
country	VARCHAR (40)
postal_code	VARCHAR (10)
phone	VARCHAR (24)
fax	VARCHAR (24)
email	VARCHAR (60)
support_rep_id	INTEGER
first_name	VARCHAR (40)
customer_id	INTEGER
last_name	VARCHAR (40)

employee	
postal_code	VARCHAR (10)
employee_id	INTEGER
last_name	VARCHAR (20)
first_name	VARCHAR (20)
title	VARCHAR (30)
reports_to	INTEGER



birth_date	TIMESTAMP
hire_date	TIMESTAMP
address	VARCHAR (70)
city	VARCHAR (40)
state	VARCHAR (40)
country	VARCHAR (40)
phone	VARCHAR (24)
fax	VARCHAR (24)
email	VARCHAR (60)

This makes sense because a support representative would be an employee, but it wouldn't make contextual sense to have employee_id as the column's name in the customer table. Since the column names are different, we could not use the USING clause. Rather, we must use the ON clause.

The structure of the statement looks like the following:

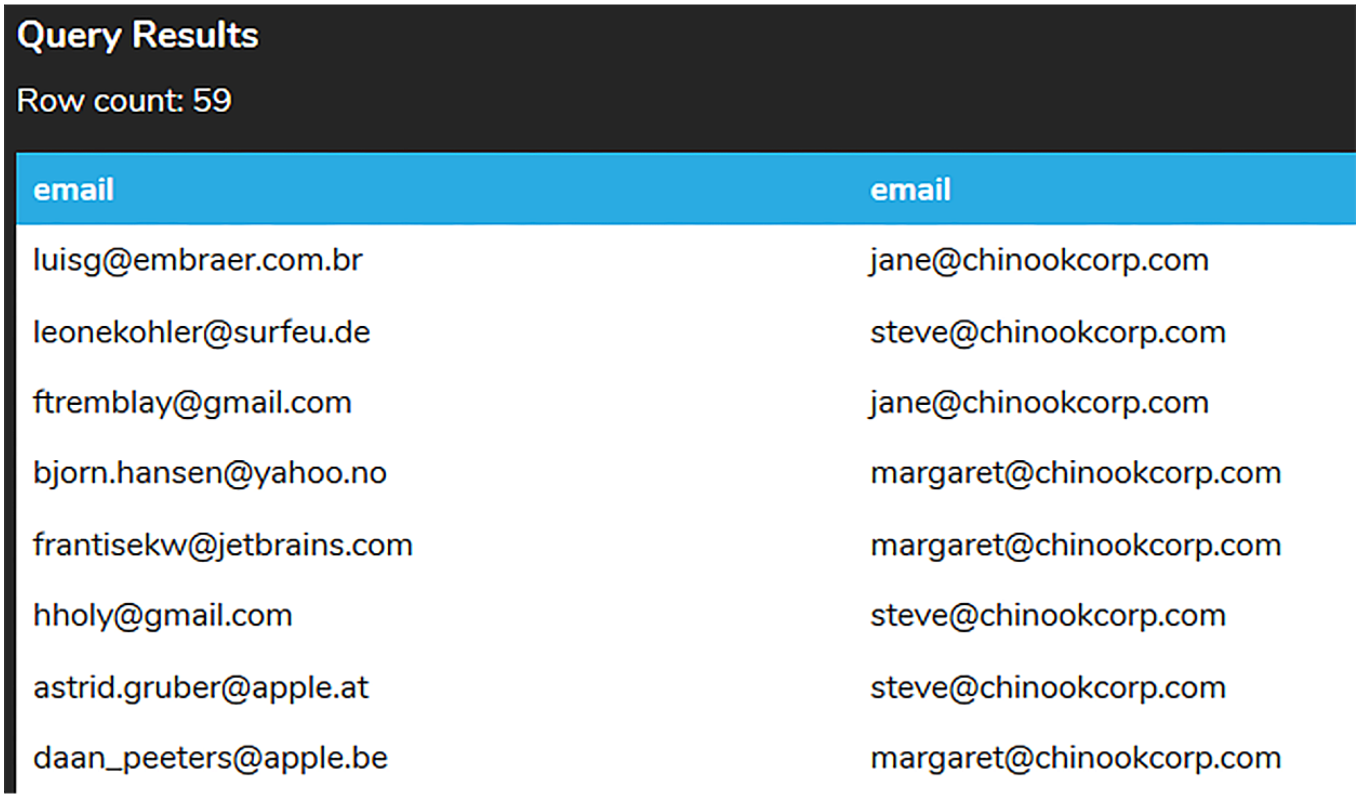
```
SELECT <columnlist>
FROM <table1>
INNER JOIN <table2> ON <table1column> = <table2column>
```

We can start the query by filling in the table and column names that we're joining:

```
SELECT <columnlist>
FROM customer
INNER JOIN employee ON support_rep_id = employee_id;
```

We then need to determine what columns we want to return as part of the query. We don't want to return all of the columns. For example, we may want to have all of the customer and respective employee emails so that the employees can send out an email to their customers. Since the email addresses are in an email column in both tables, we need to prefix the column with the table name, like this:

```
SELECT customer.email, employee.email
FROM customer
INNER JOIN employee ON support_rep_id = employee_id;
```


Query Results

Row count: 59

email	email
luisg@embraer.com.br	jane@chinookcorp.com
leonekohler@surfeu.de	steve@chinookcorp.com
ftremblay@gmail.com	jane@chinookcorp.com
bjorn.hansen@yahoo.no	margaret@chinookcorp.com
frantisekw@jetbrains.com	margaret@chinookcorp.com
hholy@gmail.com	steve@chinookcorp.com
astrid.gruber@apple.at	steve@chinookcorp.com
daan_peeters@apple.be	margaret@chinookcorp.com

2. USING vs. ON

The core difference between JOIN ON and JOIN USING in SQL lies in how they handle the specification of columns for the JOIN operation.

When you use JOIN ON, you can specify the conditions under which tables are joined. It involves specifying a comparison using one or more columns from the involved tables. With this approach, you can join tables based on any column with related data, even if they don't have the same name. The feature is particularly useful when there is a complex relationship between the columns or when the columns are named differently but represent the same data type.

With JOIN USING, you can specify a single column name common to both tables, simplifying the JOIN process. As a result, column names are not repeated in the result set. By doing this, you can create a more concise query syntax and a more easily readable code. JOIN USING, however, requires that the column with the specified name and data type exist in both tables. Despite simplifying the process for tables with the same column names, it might not be suitable for tables with more varied data or for joining based on more than one column. As a result, your choice of JOIN ON or JOIN USING will depend on the complexity of your JOIN condition and your query's requirements.

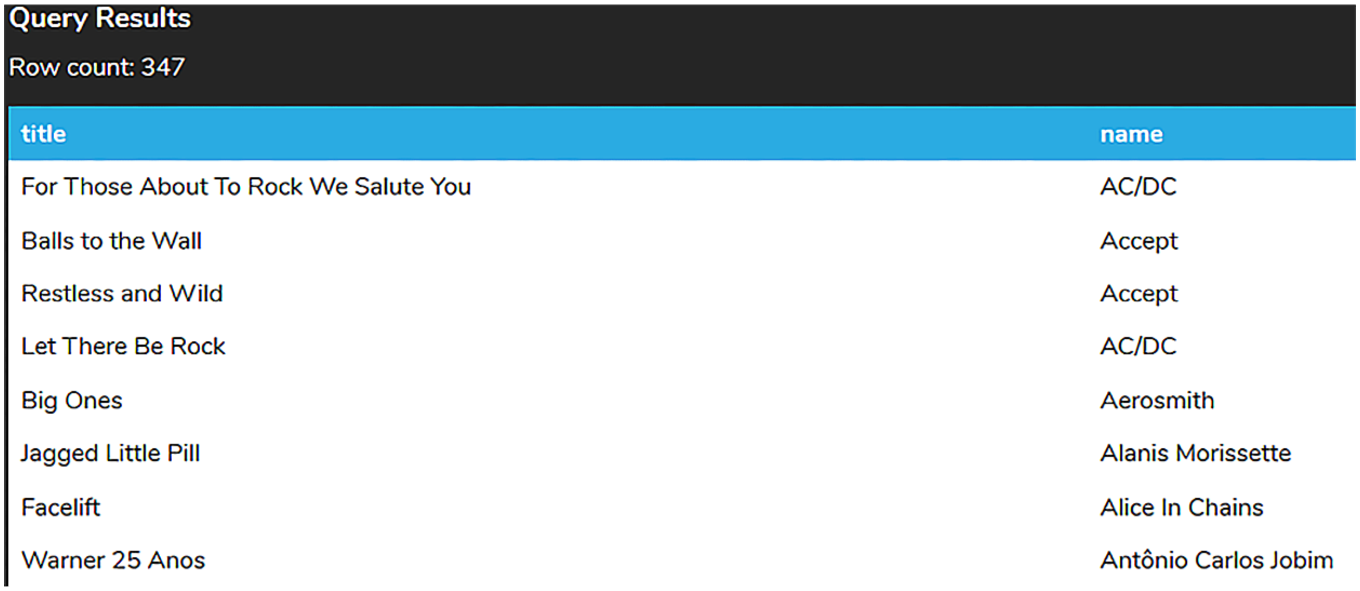
Although the ON clause exists primarily to handle situations where the column names between the tables do not match, it does also work if the columns match (and therefore, we could use the USING clause). Let's take a look at an example of the artist and album table with an INNER JOIN with the USING clause:

```
SELECT title, name
FROM album
INNER JOIN artist USING (artist_id);
```

We could convert this by removing the USING clause and adding the artist_id prefixed with the table name:

```
SELECT title, name
FROM album
INNER JOIN artist ON album.artist_id = artist.artist_id;
```

In both cases, the result set is the same:



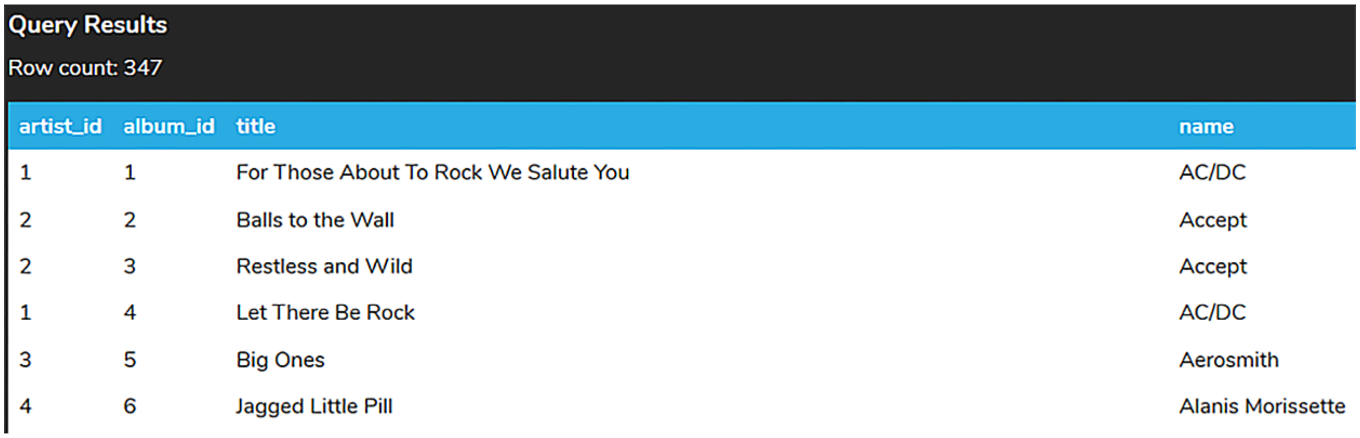
Query Results

Row count: 347

title	name
For Those About To Rock We Salute You	AC/DC
Balls to the Wall	Accept
Restless and Wild	Accept
Let There Be Rock	AC/DC
Big Ones	Aerosmith
Jagged Little Pill	Alanis Morissette
Facelift	Alice In Chains
Warner 25 Anos	Antônio Carlos Jobim

The only case where the result set will be different is if we use the * in the SELECT clause:

```
SELECT *
FROM album
INNER JOIN artist USING (artist_id);
```

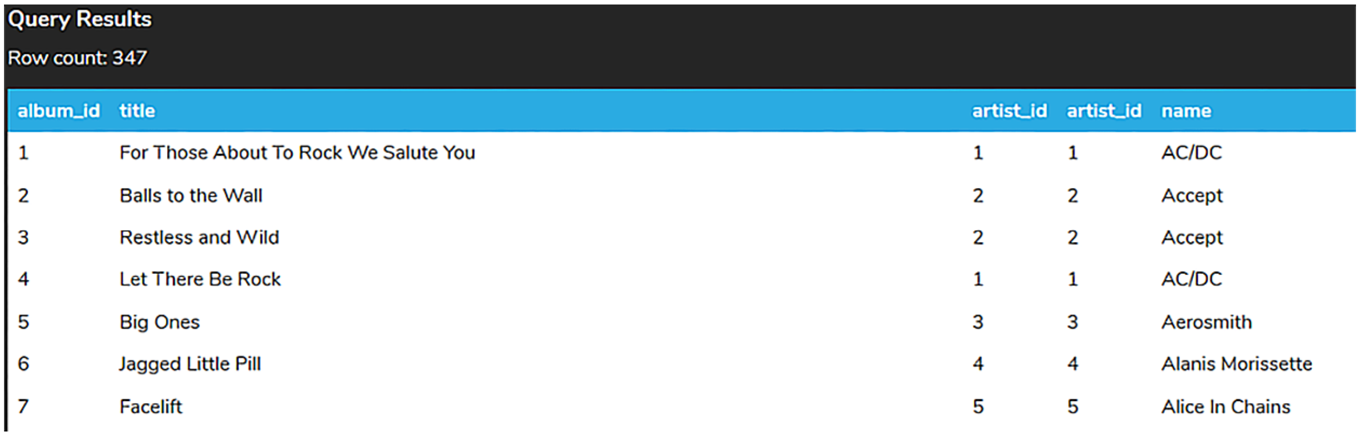


Query Results

Row count: 347

artist_id	album_id	title	name
1	1	For Those About To Rock We Salute You	AC/DC
2	2	Balls to the Wall	Accept
2	3	Restless and Wild	Accept
1	4	Let There Be Rock	AC/DC
3	5	Big Ones	Aerosmith
4	6	Jagged Little Pill	Alanis Morissette

```
SELECT *
FROM album
INNER JOIN artist ON album.artist_id = artist.artist_id;
```



Query Results

Row count: 347

album_id	title	artist_id	artist_id	name
1	For Those About To Rock We Salute You	1	1	AC/DC
2	Balls to the Wall	2	2	Accept
3	Restless and Wild	2	2	Accept
4	Let There Be Rock	1	1	AC/DC
5	Big Ones	3	3	Aerosmith
6	Jagged Little Pill	4	4	Alanis Morissette
7	Facelift	5	5	Alice In Chains

Notice that in the ON clause JOIN, the artist_id appears twice (one for each table), whereas artist_id only appears once in the USING clause. This is because the USING performs an equality JOIN and can only be used when the column names are identical. It is optional and not necessary to include the column twice. Other than that, they function the same.

WATCH

TRY IT

Your turn! Open the SQL tool by clicking on the LAUNCH DATABASE button below. Then, enter in one of the examples above and see how it works. Next, try your own choices for which columns you want the query to provide.

SUMMARY

In this lesson, you learned that columns and conditions are explicitly specified in **JOIN ON**, determining how the tables are joined. It provides flexibility by matching tables on any column with related data, even if the columns have different names. In cases where tables do not share identical column names or when relationships between them are complex, this method is ideal. In JOIN ON, you can fully control and customize the JOIN conditions according to your data and analysis.

JOIN USING simplifies the syntax of the JOIN and requires only the specification of one column name in both tables. Using this method eliminates column name repetition in the result set, resulting in cleaner and more concise code. Both tables must contain the same column name and data type for this to work. JOIN USING is well-suited for cases where tables have identical column names, making queries more readable and less prone to errors. You would choose between **ON vs. USING** based on the data complexity and the query's specific requirements.