Retrieving Data from Multiple Tables

Database Fundamentals

Welcome to Retrieving Data from Multiple Tables.

What you will learn

At the core of the lesson

You will learn how to do the following:

- Combine the results of two queries into a single output by using the UNION operator.
- Retrieve data by joining tables.

Key terms:

- Set operators
- UNION
- JOINs
- Qualified column name

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In this module, you will learn how to do the following:

- Combine the results of two queries into a single output by using the UNION operator.
- Retrieve data by joining tables.

Set operators

Before learning about retrieving data by using `JOIN`, you'll discuss set operators.

Set operators

Set operators are used to combine the results of multiple queries into a single result set.

You can use different tables to compare or unite the results into one result set. Queries that contain set operations are referred to as compound queries.

The table lists the common set operations and their description.

Set Operator	Use
UNION	Used to combine two or more result sets into a single set (**without duplicates**)
UNION ALL	Used to combine two or more result sets into a single set (**including duplicates**)
INTERSECT	Used to combine two result sets and return the data that is **common in both of the result sets**
MINUS	Used to combine two result sets and **return the data from the first result set** that is **not present in the second result set**

With set operations, the results of multiple queries can be combined into a single result set. You can use different tables to compare or unite the results into one result set.

Queries that contain set operations are referred to as compound queries.

UNION operator example

```
SELECT Name FROM country
UNION
SELECT Name FROM city;
```

UNION operator

This query returns all the distinct country and city names in the database in one result set.

```
SELECT Name FROM city
UNION ALL
SELECT Name FROM Country;
```

UNION ALL operator

This query returns all the country and city names in the database, including duplicates, in one result set. For example, if there is a city called Armenia (in Colombia) and a country called Armenia in the database, the result set will show Armenia twice.

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You can use the UNION operator to combine the results of two or more SELECT statements into a single result set. Using UNION without the ALL operator will remove duplicate rows from the resulting set. The keyword ALL lists duplicate rows and displays them in the result set.

JOINs

Now you will move on to JOINs.

JOIN clauses defined

`JOIN` clauses (inner, left, right, and full) are used to combine rows from two or more tables.

There are four types of `JOIN` clauses:

JOIN Clauses	Use
`INNER JOIN`	Return the rows that **match in both tables**.
`LEFT JOIN`	Return all rows from the **left** table.
`RIGHT JOIN`	Return all rows from the **right** table.
`FULL JOIN`	Return **all the rows** from both tables.

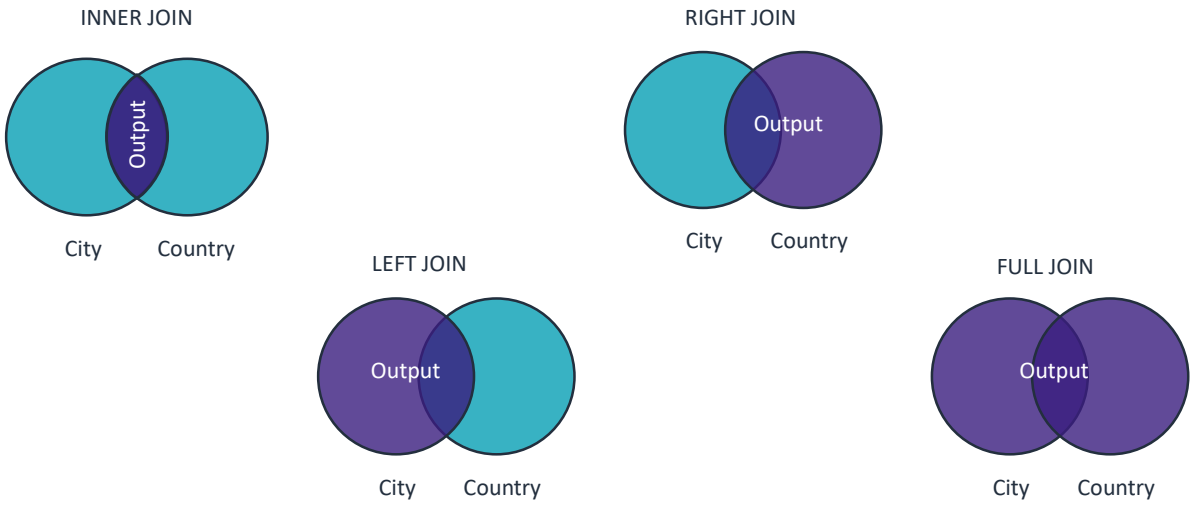
`JOIN` clauses (inner, left, right, and full joins) are used to combine rows from two or more tables.

There are four types of `JOIN` clauses:

- Inner joins return the rows that match in both tables.
- Left joins return the rows that match in both tables and the rows from the left table that do not have a match.
- Right joins return the rows that match in both tables and rows from the right table that do not have a match.
- Full joins return the rows that match in both tables and the rows from the left and right tables that do not have a match.

Each table must have related columns between them when combining tables.

How JOIN clauses work



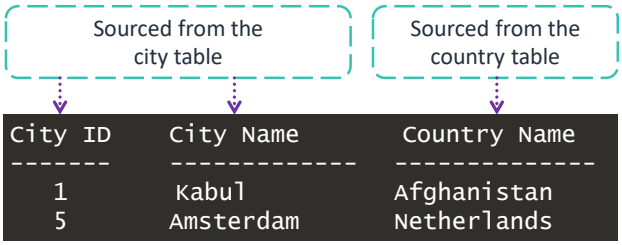
Queries can link two or more tables through the use of `JOIN`s. The diagram on the slide shows the output of the `JOIN` types by using Venn diagrams and illustrates the following:

- `INNER JOIN:` This `JOIN` returns only the overlapping data between the two tables.
- `LEFT JOIN:` This `JOIN` returns the overlapping data between the two tables and the non-matching data from the left table.
- `RIGHT JOIN:` This `JOIN` is the opposite of `LEFT JOIN`. It returns the overlapping data between the two tables and the non-matching data from the right table.
- `FULL JOIN:` This `JOIN` returns the overlapping data between the two tables and the non-matching data from both the left and right tables.

The critical thing to remember is that `JOIN`s are clauses in SQL that link two tables together. A `JOIN` is usually based on the key or common value that defines the relationship between those two tables.

INNER JOIN example

```
SELECT ci.ID AS ‘City ID’, ci.Name AS ‘City Name’, co.Name AS ‘Country Name’
FROM city ci
JOIN country co
ON ci.CountryCode=co.Code
```



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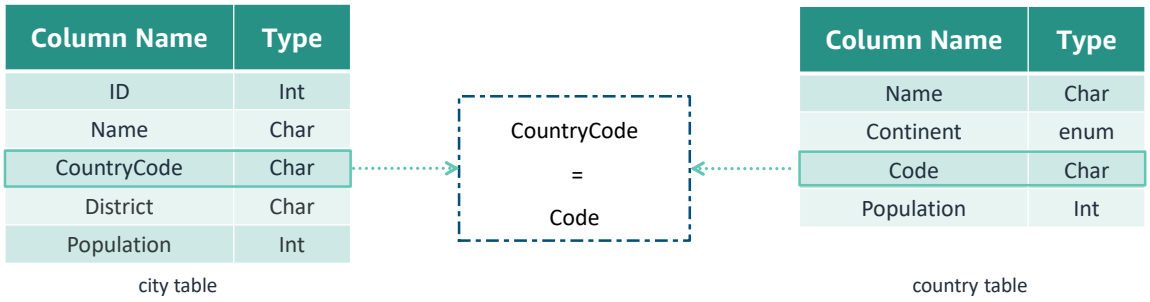
The `JOIN` clause could be used to combine the records from the city and country table. The column names pulled from each do not need to match. For example, the `JOIN` column name is called "CountryCode" in the city table and "Code" in the country table.

In this example, the query displays the ID, name, and country name of each city in the city table.

How the INNER JOIN example works

In the example, the `CountryCode` and `Code` columns are the commonality between the two tables city and country.



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To combine tables, each table must have related columns between them.

In the example, the `CountryCode` and `Code` columns are the commonality between the city and country tables. The two tables are joined together by combining rows whose `CountryCode` value in the city table is equal to the `Code` value in the country table.

Qualified column names

Column Name	Type
ID	Int
Name	Char
CountryCode	Char
District	Char
Population	Int

city table

Qualified column names

Column Name	Type
Name	Char
Continent	enum
Code	Char
Population	Int

country table

```
SELECT ci.ID AS 'City ID', ci.Name AS 'City Name', co.Name AS 'Country Name'
FROM city ci
JOIN country co
ON ci.CountryCode=co.Code
```


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You'll notice in this example that both tables include the Name column. When developing queries, columns with the same name in two different tables can create confusion. To avoid this confusion, use a qualifier with the column name to identify the source table.

A qualifier for a column name can be a table name, an alias name, a synonym, or a correlating name. To use a qualified column name, use the following format:

`Table or alias name.column name`

Group activity: Using the JOIN function

In this group activity:

- AnyCompany Publishing House is examining their country table.

To do:

- Team up with a few other learners, and discuss how to query the country table so that it uses at least two different `JOIN` clauses.
- Afterward, as a group, create sample outputs and query samples, and be ready to explain your group findings to the class.
- During this activity, feel free to annotate your findings to begin your discussion with your group.

Hint: Review slides 6–14 for information about the `JOIN` clause.

Time: 20 mins

Column	Type
Code	Character
Name	Character
Continent	Character
Region	Character
SurfaceArea	Float
IndepYear	Integer
Population	Integer
LifeExpectancy	Float
GNP	Float
GNPOld	Float
LocalName	Character
Capital	Character
Code2	Character

country

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Break into small groups, and work through the following activity.

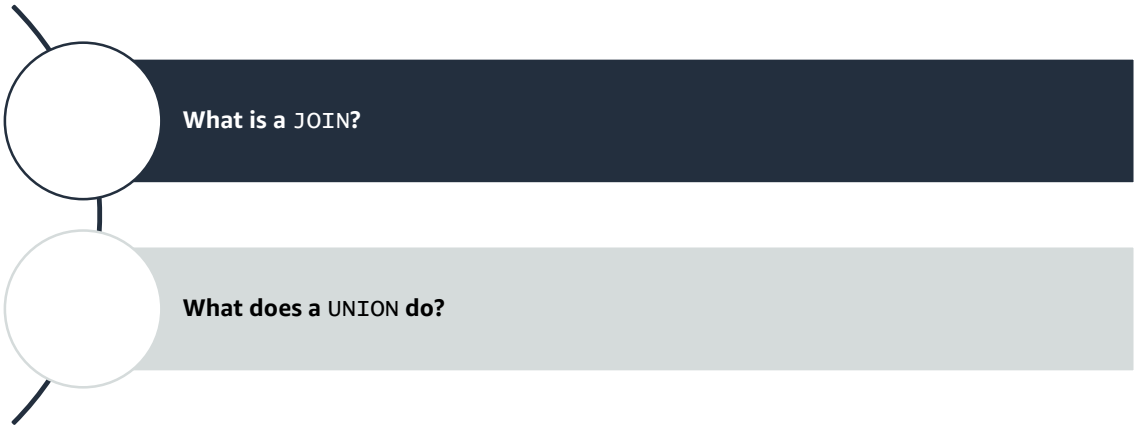
In this activity, AnyCompany Publishing House is examining their country table.

Feel free to annotate your findings to begin your discussion.

To do:

- Team up with a few other learners, and discuss how to query the country table so that it uses at least two different `JOIN` clauses.
- Review the information in the section about `JOIN` clauses.
- Afterward, create a list and query samples. Be ready to explain your group findings to the class.

Checkpoint questions



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1. What is a JOIN?

   You can use a JOIN to combine data from two or more tables.

2. What does a UNION do?

   A UNION operation combines the results of two queries into one result.

Key takeaways

- You can use the UNION operator to combine two or more SELECT statements. This process outputs a single result set.
- You can use a SELF JOIN to join a table to itself by using either LEFT JOIN or INNER JOIN.

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This module includes the following key takeaways:

- You can use the UNION operator to combine two or more SELECT statements. This process outputs a single result set.
- You can use a SELF JOIN to join a table to itself by using either a LEFT JOIN or an INNER JOIN.

Thank you

Thank you for completing this module.