Subquerying with semi joins and anti joins

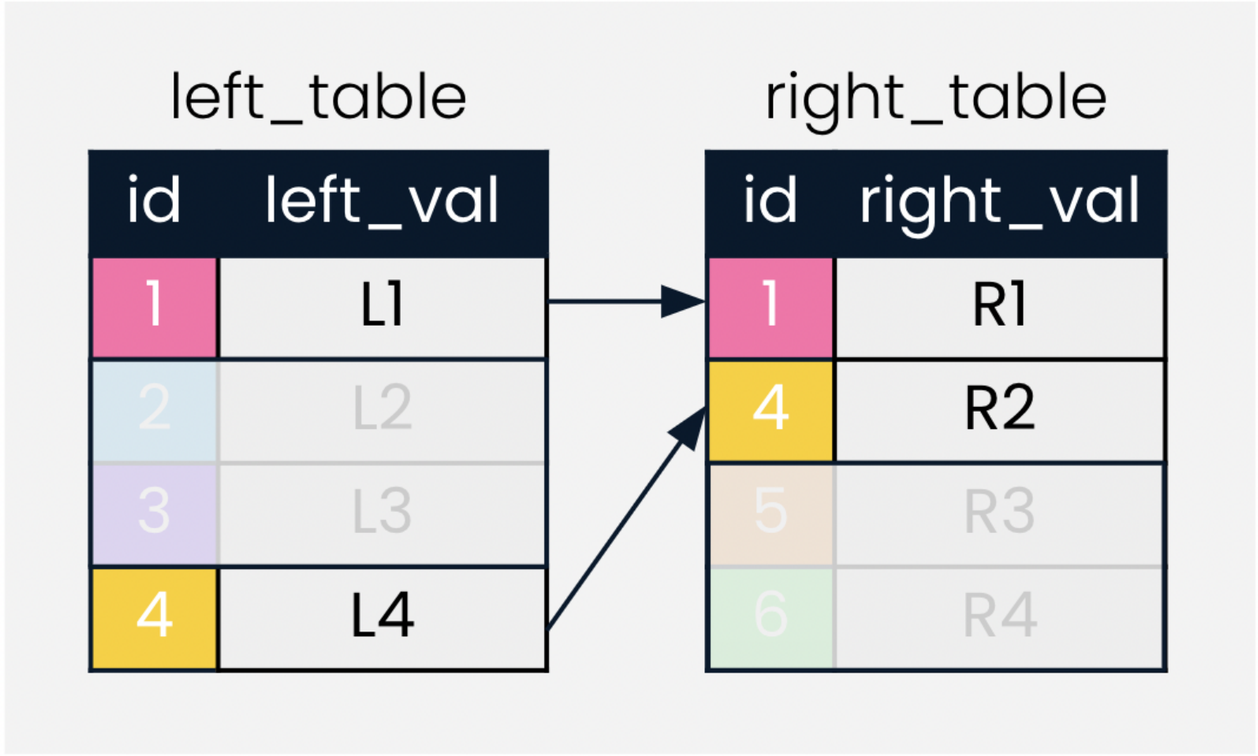
JOINING DATA IN SQL

Maham Faisal Khan
Senior Content Developer, DataCamp

datacamp

Calling all joins

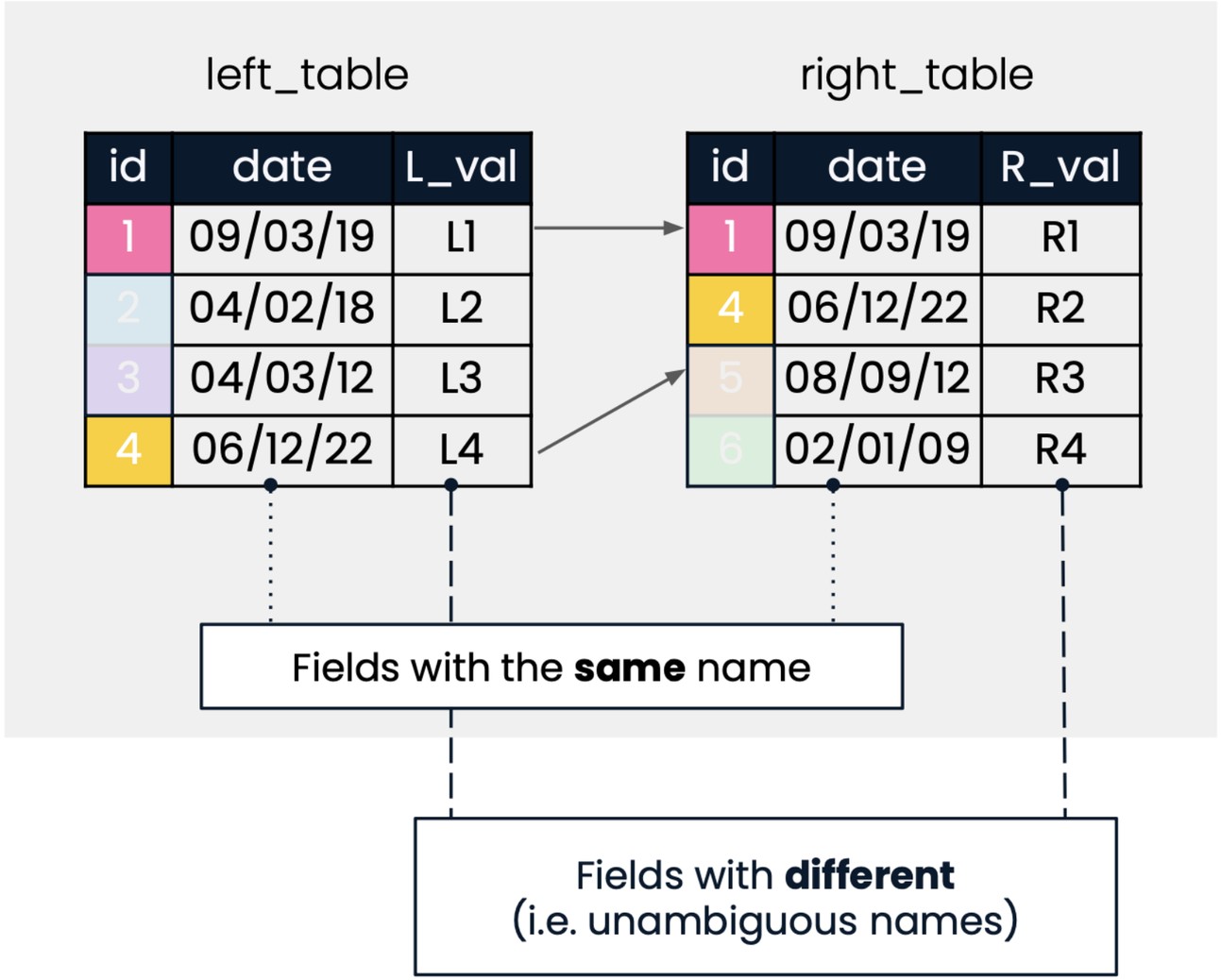
Diagram for an `INNER JOIN` on the `id` field

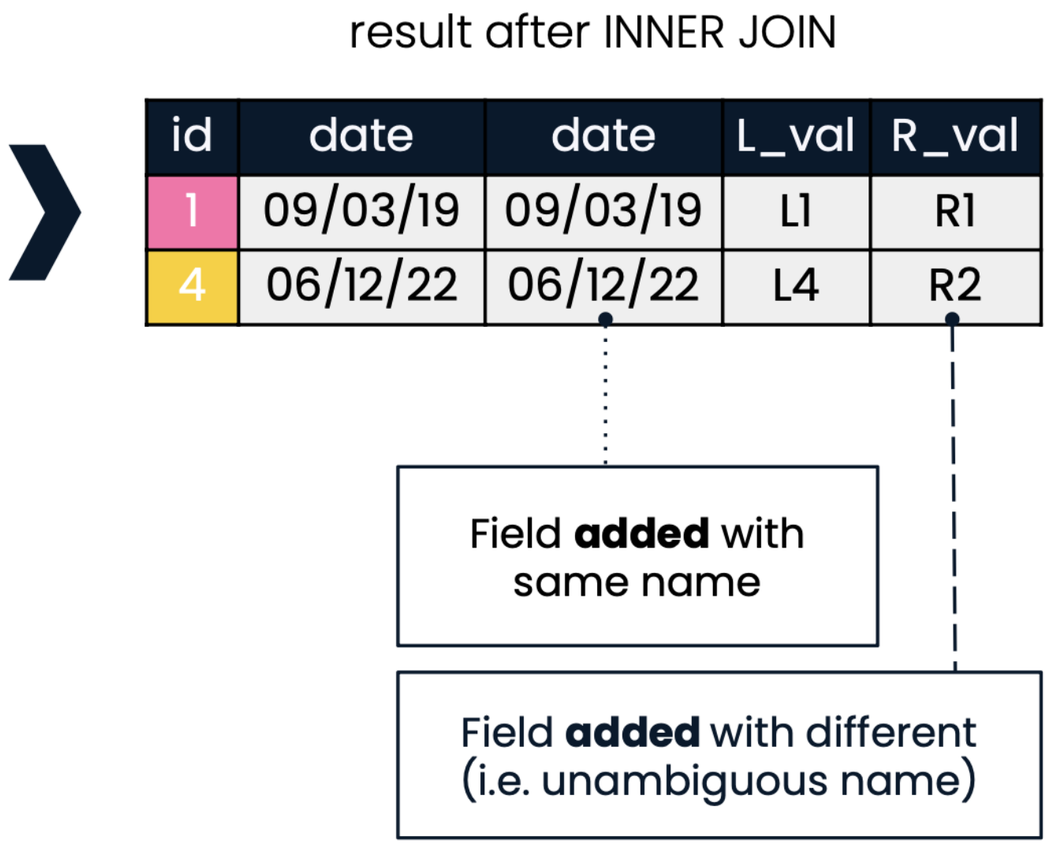


Additive joins

```
SELECT *
FROM left_table
INNER JOIN right_table
ON left_table.id = right_table.id;
```

Additive joins





Semi join

A **semi join** chooses records in the first table where a condition is met in the second table.

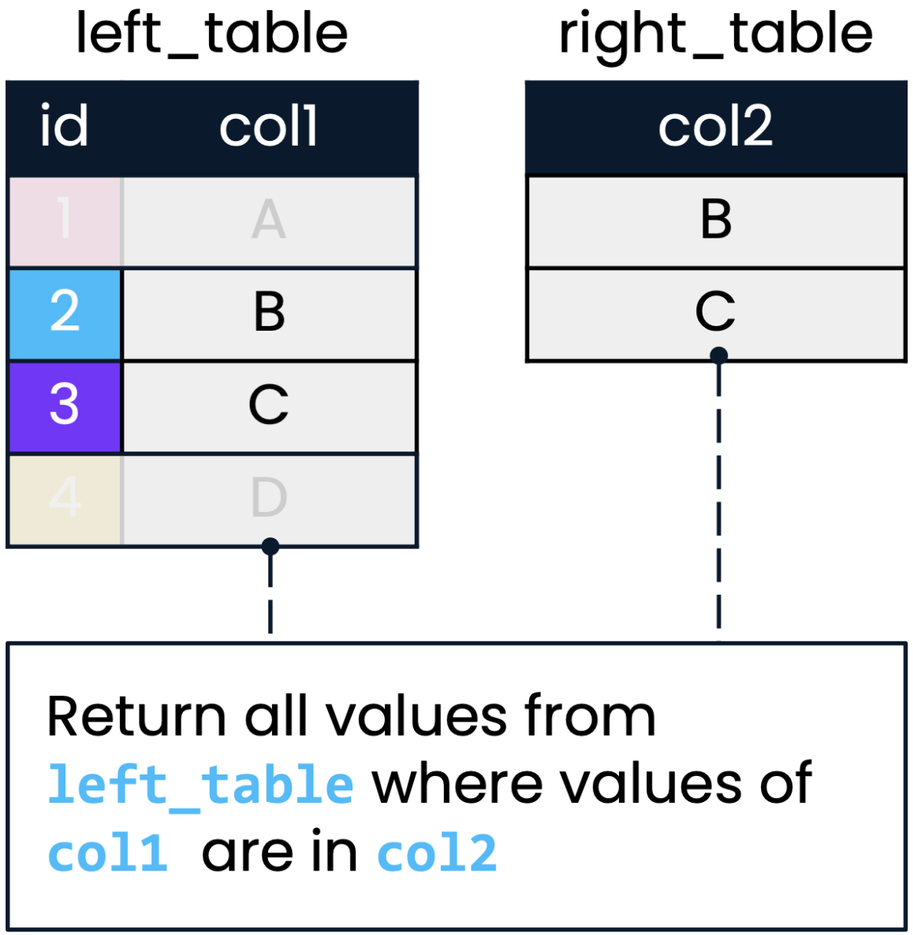
left_table

id	col1
1	A
2	B
3	C
4	D

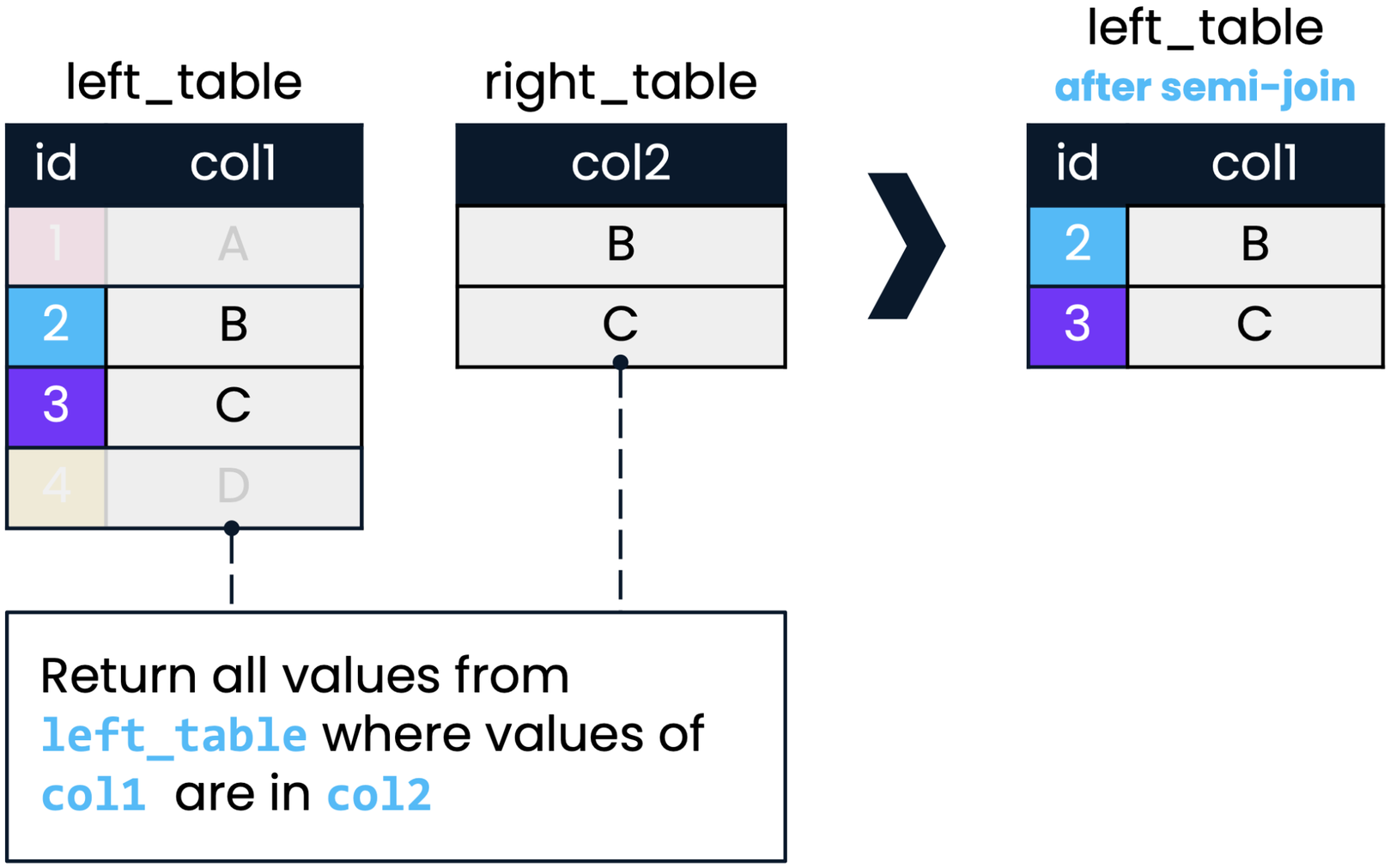
right_table

col2
B
C

Semi join


left_table
id
col1
1
A
2
B
3
C
4
D
right_table
col2
B
C
Return all values from left_table where values of col1 are in col2

Semi join


left_table
id
col1
1
A
2
B
3
C
4
D
right_table
col2
B
C
left_table
after semi-join
id
col1
2
B
3
C
Return all values from left_table where values of col1 are in col2

Kicking off our semi join

```
SELECT country, continent, president
FROM presidents;
```

```
| country  | continent     | president                |
| -------- | ------------- | ------------------------ |
| Egypt    | Africa        | Abdel Fattah el-Sisi     |
| Portugal | Europe        | Marcelo Rebelo de Sousa  |
| USA      | North America | Joe Biden                |
| Uruguay  | South America | Luis Lacalle Pou         |
| Pakistan | Asia          | Arif Alvi                |
| Chile    | South America | Gabriel Boric            |
| India    | Asia          | Ram Nath Kovind          |
```

Building on our semi join

```
SELECT country
FROM states
WHERE indep_year < 1800;
```

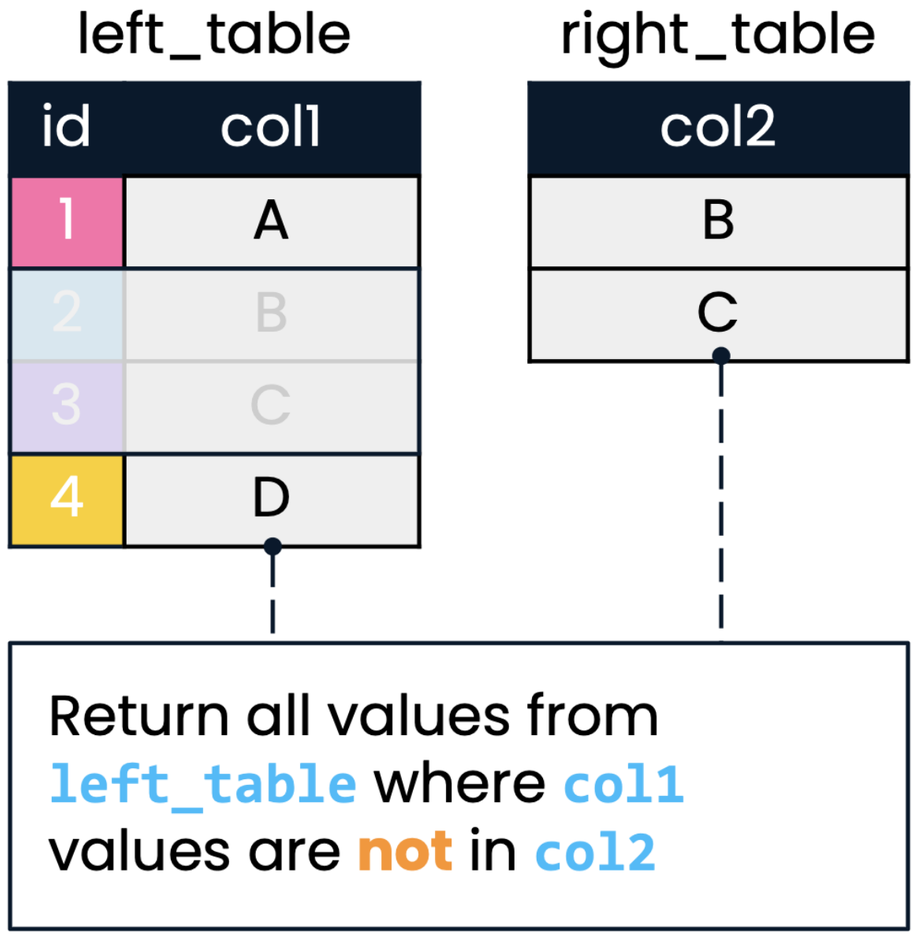
```
|----------|
| country  |
|----------|
| Portugal |
| Spain    |
|----------|
```

Finish the semi join (an intro to subqueries)

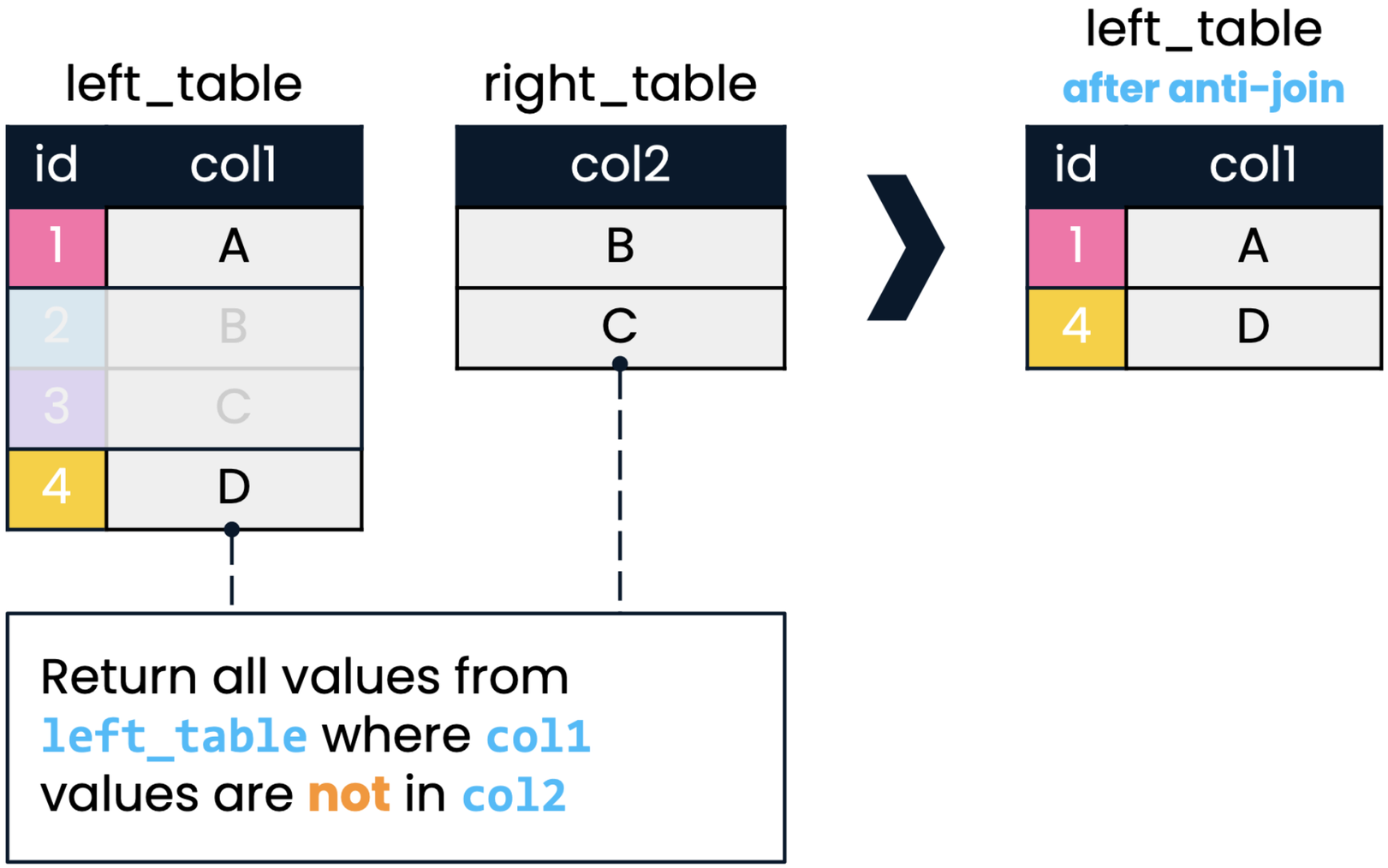
```
SELECT president, country, continent
FROM presidents
WHERE country IN
    (SELECT country
     FROM states
     WHERE indep_year < 1800);
```

```
|-------------------------|-----------|-------------|
| president               | country   | continent   |
|-------------------------|-----------|-------------|
| Marcelo Rebelo de Sousa | Portugal  | Europe      |
|-------------------------|-----------|-------------|
```

Anti join


left_table
id
col1
1
A
2
B
3
C
4
D
right_table
col2
B
C
Return all values from left_table where col1 values are not in col2

Anti join


left_table
id
col1
1
A
2
B
3
C
4
D
right_table
col2
B
C
left_table
after anti-join
id
col1
1
A
4
D
Return all values from left_table where col1 values are not in col2

An anti join with the presidents

```
SELECT country, president
FROM presidents
WHERE continent LIKE '%America'
    AND country NOT IN
        (SELECT country
         FROM states
         WHERE indep_year < 1800);
```

```
| country   |  president          |
| --------- | ------------------- |
| Uruguay   | Luis Lacalle Pou    |
| Chile     | Gabriel Boric       |
```

Let's practice!

JOINING DATA IN SQL

Subqueries inside WHERE and SELECT

JOINING DATA IN SQL

Maham Faisal Khan
Senior Content Developer, DataCamp

datacamp

Syntax for subqueries inside WHERE

- All semi joins and anti joins we have seen included a subequery in `WHERE`
- `WHERE` is the most common place for subqueries

Syntax for query using `WHERE IN` statement

```
SELECT *
FROM some_table
WHERE some_numeric_field IN (4, 8, 12);
```

Syntax for subqueries inside WHERE

```
SELECT *
FROM some_table
WHERE some_field IN
       (include subquery here);
```

Syntax for subqueries inside WHERE

```
SELECT *
FROM some_table
WHERE some_field IN
    (SELECT some_numeric_field
     FROM another_table
     WHERE field2 = some_condition);
```

Subqueries inside SELECT

```
SELECT DISTINCT continent
FROM states;
```

```
|---------------|
| continent     |
|---------------|
| Africa        |
| Asia          |
| Europe        |
| North America |
| Oceania       |
|---------------|
```

Subqueries inside SELECT

```
SELECT DISTINCT continent,
    (SELECT COUNT(*)
     FROM monarchs
     WHERE states.continent = monarch.continent) AS monarch_count
FROM states;
```

```
| continent     |   monarch_count |
|---------------|-----------------|
| Africa        |               0 |
| Asia          |               2 |
| Europe        |               2 |
| North America |               0 |
| Oceania       |               0 |
```

Let's practice!

JOINING DATA IN SQL

Subqueries inside FROM

JOINING DATA IN SQL

Maham Faisal Khan
Senior Content Developer, DataCamp

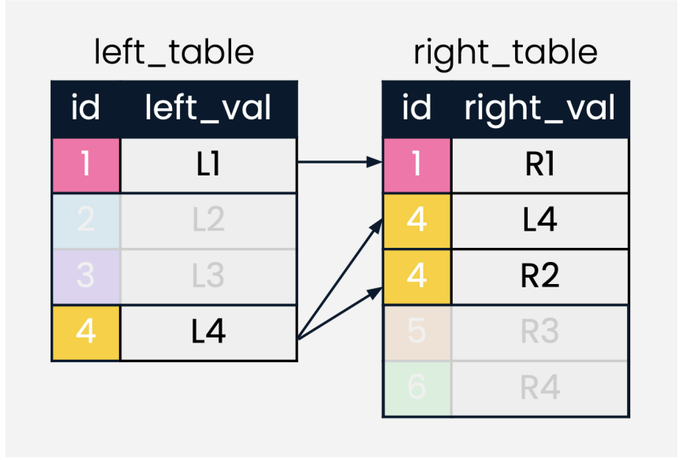
Subqueries inside FROM

```
SELECT continent, MAX(indep_year) AS most_recent
FROM states
GROUP BY continent;
```

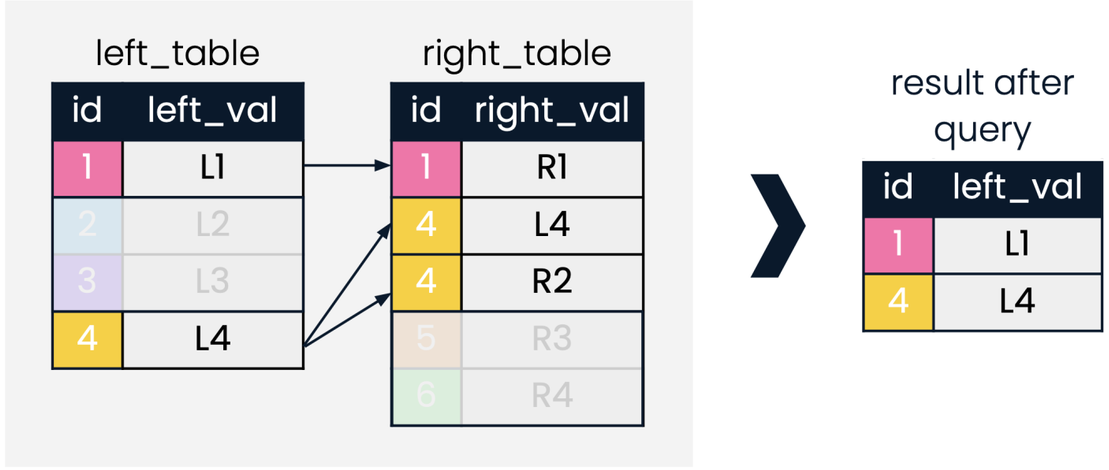
```
| continent     | most_recent  |
| --------------|------------- |
| Asia          |        1984  |
| Europe        |        1814  |
| Oceania       |        1901  |
| North America |        1776  |
| South America |        1818  |
```

Focusing on records inside monarchs

```
SELECT left_table.id, left_val
FROM left_table, right_table
WHERE left_table.id = right_table.id
```




```
SELECT DISTINCT left_table.id, left_val
FROM left_table, right_table
WHERE left_table.id = right_table.id
```



Finishing off the subquery

```
-- Query to return continents with monarchs and the year the most recent country gained independence
SELECT DISTINCT monarchs.continent, sub.most_recent
FROM monarchs,
    (SELECT
        continent,
        MAX(indep_year) AS most_recent
     FROM states
     GROUP BY continent) AS sub
WHERE monarchs.continent = sub.continent
ORDER BY continent;
```

```
| continent   | most_recent  |
|-------------|--------------|
| Asia        |         1984 |
| Europe      |         1814 |
```

Let's practice!

JOINING DATA IN SQL

The finish line

JOINING DATA IN SQL

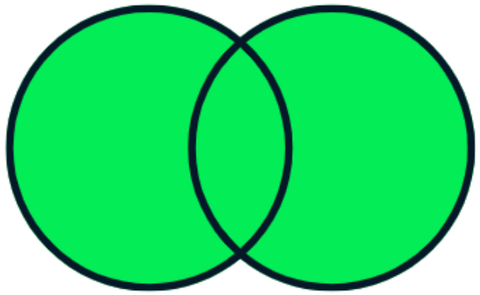
Maham Faisal Khan
Senior Content Developer, DataCamp

Types of joins

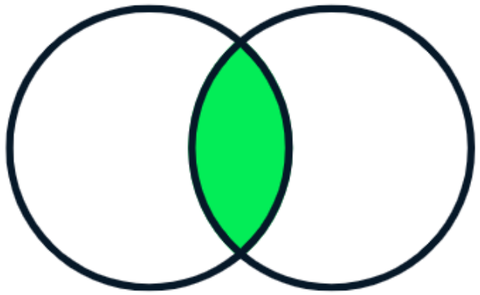
1. `INNER JOIN` , or just `JOIN`
2. Outer join
   - `LEFT JOIN`
   - `RIGHT JOIN`
   - `FULL JOIN`
3. `CROSS JOIN`
4. Semi join / anti join
5. Self join

Set operations

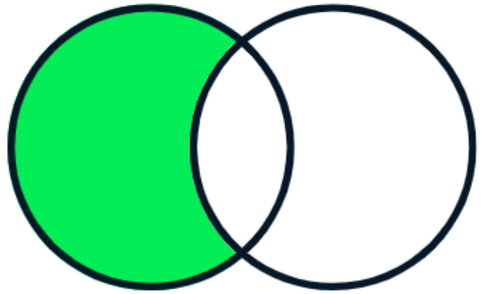
UNION
UNION ALL



INTERSECT



EXCEPT



Types of basic subqueries

- Subqueries inside `SELECT` clauses
- Subqueries inside `WHERE` clauses
- Subqueries inside `FROM` clauses

WHERE to from here?

- DataCamp's **Intermediate SQL** course
- Projects, practice exercises and competitions
- Workspace

The finish line!

JOINING DATA IN SQL