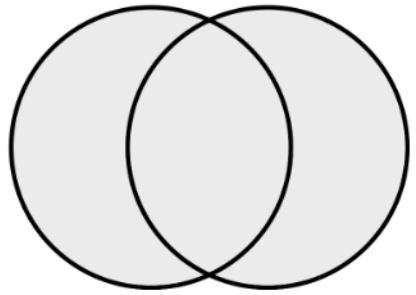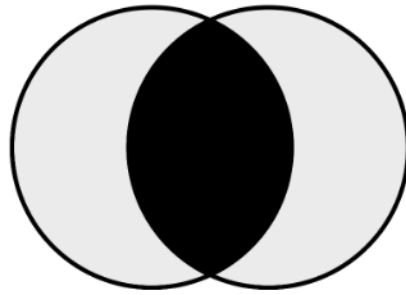# State of the UNION

JOINING DATA IN SQL

SQL

Chester Ismay
Data Science Evangelist, DataRobot
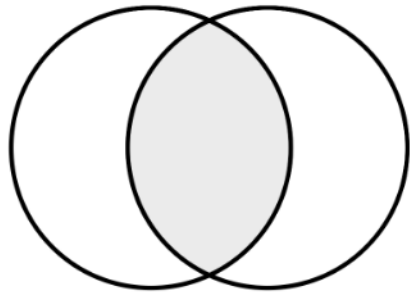
Set Theory Venn Diagrams

UNION

UNION ALL

INTERSECT
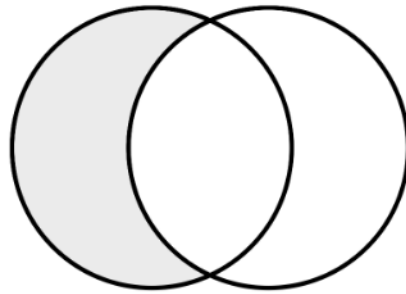
EXCEPT

left_one   right_one

id   id
1   1
2   4
3   5
4   6

⬇
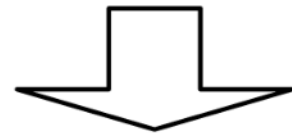
UNION

id
1
2
3
4
5
6

monarchs table

```
SELECT *
FROM monarchs;
```

```
+------------+-------------+----------------------------+
| country    | continent   | monarch                    |
|------------+-------------+----------------------------|
| Brunei     | Asia        | Hassanal Bolkiah           |
| Oman       | Asia        | Qaboos bin Said al Said    |
| Norway     | Europe      | Harald V                   |
| Spain      | Europe      | Felipe VI                  |
+------------+-------------+----------------------------+
```

All prime ministers and monarchs

```sql
SELECT prime_minister AS leader, country
FROM prime_ministers
UNION
SELECT monarch, country
FROM monarchs
ORDER BY country;
```

Resulting table from UNION

```
+-----------------------+----------+
| leader                | country  |
|-----------------------+----------|
| Malcolm Turnbull      | Australia |
| Hassanal Bolkiah      | Brunei   |
| Sherif Ismail         | Egypt    |
| Jack Guy Lafontant    | Haiti    |
| Narendra Modi         | India    |
| Harald V              | Norway   |
| Erna Solberg          | Norway   |
| Qaboos bin Said al Said | Oman   |
| Antonio Costa         | Portugal |
| Mariano Rajoy         | Spain    |
| Felipe VI             | Spain    |
| Nguyen Xuan Phuc      | Vietnam  |
+-----------------------+----------+
```

UNION ALL with leaders

```sql
SELECT prime_minister AS leader, country
FROM prime_ministers
UNION ALL
SELECT monarch, country
FROM monarchs
ORDER BY country
LIMIT 10;
```

```
+-------------------------+----------+
| leader                  | country  |
|-------------------------+----------|
| Malcolm Turnbull        | Australia |
| Hassanal Bolkiah        | Brunei   |
| Hassanal Bolkiah        | Brunei   |
| Sherif Ismail           | Egypt    |
| Jack Guy Lafontant      | Haiti    |
| Narendra Modi           | India    |
| Erna Solberg            | Norway   |
| Harald V                | Norway   |
| Qaboos bin Said al Said | Oman     |
| Qaboos bin Said al Said | Oman     |
+-------------------------+----------+
```

Let's practice!

JOINING DATA IN SQL

INTERSECT diagram and SQL code

left_one

id

1
2
3
4

right_one

id

1
4
5
6
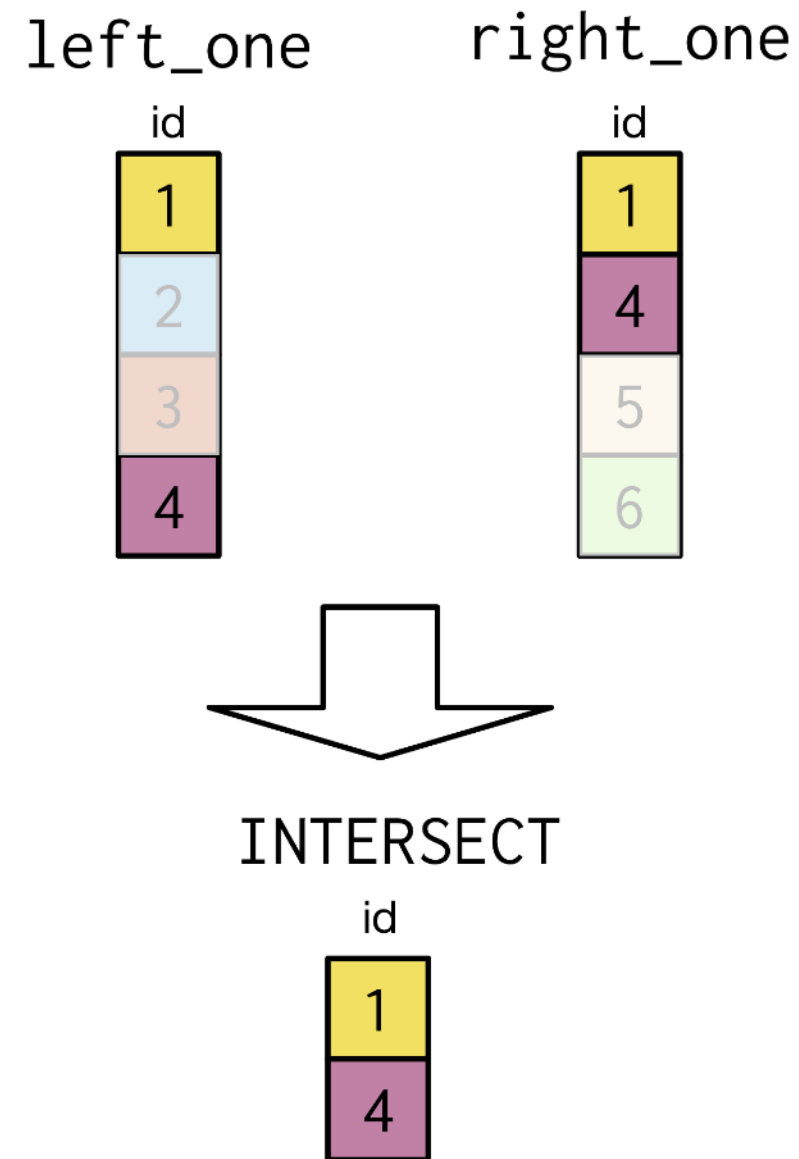
```sql
SELECT id
FROM left_one
INTERSECT
SELECT id
FROM right_one;
```

INTERSECT

id

1
4

Prime minister and president countries

```sql
SELECT country
FROM prime_ministers
INTERSECT
SELECT country
FROM presidents;
```

```
+-----------+
| country   |
|-----------|
| Portugal  |
| Vietnam   |
| Haiti     |
| Egypt     |
+-----------+
```

INTERSECT on two fields

```sql
SELECT country, prime_minister AS leader
FROM prime_ministers
INTERSECT
SELECT country, president
FROM presidents;
```

```
+-----------+----------+
| country   | leader   |
|-----------+----------|
+-----------+----------+
```

Let's practice!

JOINING DATA IN SQL

EXCEPTional

JOINING DATA IN SQL

SQL

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Monarchs that aren't prime ministers

```sql
SELECT monarch, country
FROM monarchs
EXCEPT
SELECT prime_minister, country
FROM prime_ministers;
```

```
+-----------+-----------+
| monarch   | country   |
|-----------+-----------|
| Harald V  | Norway    |
| Felipe VI | Spain     |
+-----------+-----------+
```

Let's practice!

JOINING DATA IN SQL

Semi-joins and Anti-joins

JOINING DATA IN SQL

SQL

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Building up to a semi-join

```sql
SELECT name
FROM states
WHERE indep_year < 1800;
```

```
+----------+
| name     |
|----------|
| Portugal |
| Spain    |
+----------+
```

Another step towards the semi-join

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

```
+-------------------------+------------+-----------------+
| president               | country    | continent       |
|-------------------------+------------+-----------------|
| Abdel Fattah el-Sisi    | Egypt      | Africa          |
| Marcelo Rebelo de Sousa | Portugal   | Europe          |
| Jovenel Moise           | Haiti      | North America   |
| Jose Mujica             | Uruguay    | South America   |
| Ellen Johnson Sirleaf   | Liberia    | Africa          |
| Michelle Bachelet       | Chile      | South America   |
| Tran Dai Quang          | Vietnam    | Asia            |
+-------------------------+------------+-----------------+
```

Finish the semi-join (an intro to subqueries)

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

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

An anti-join

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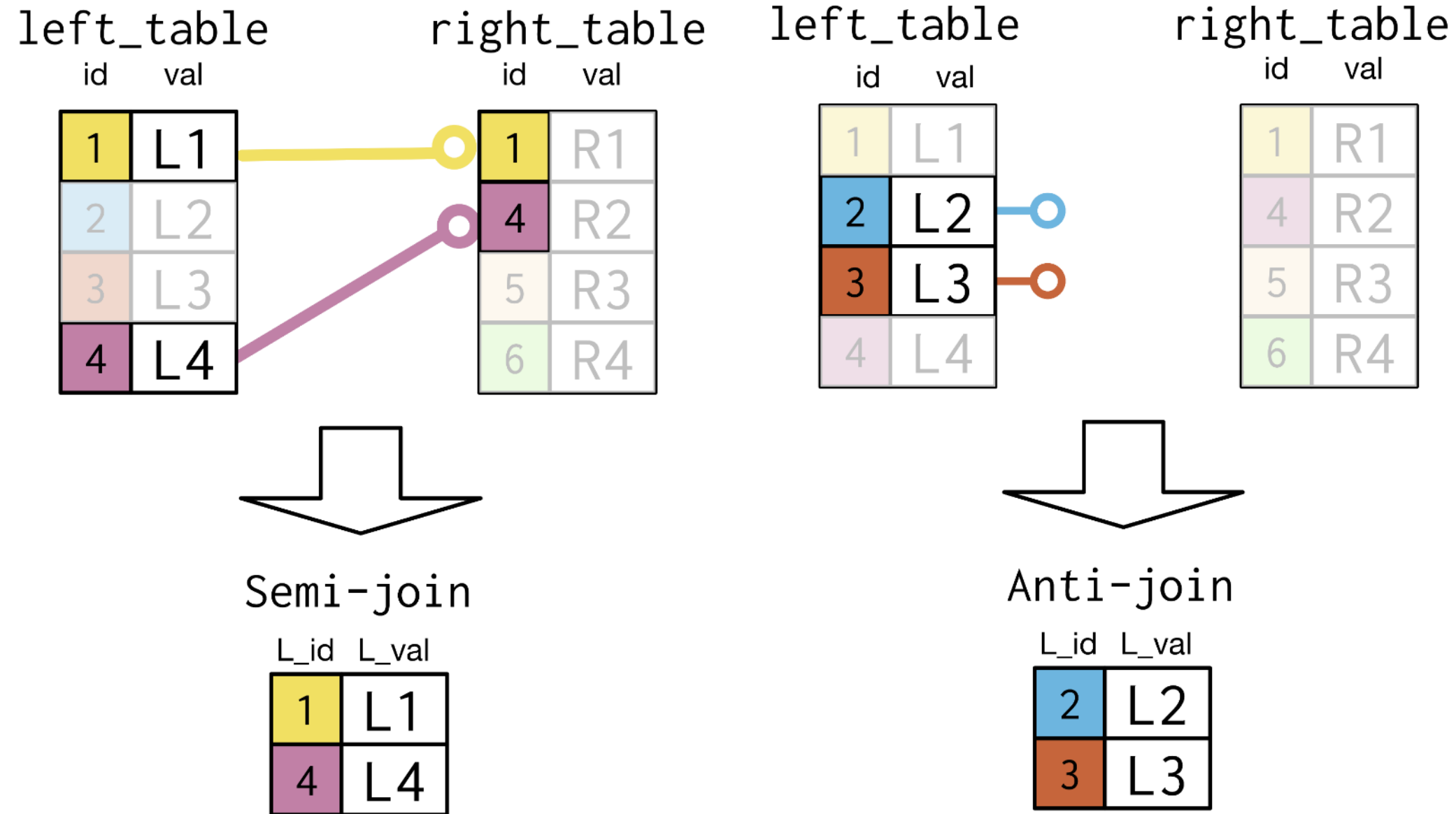
```sql
SELECT president, country, continent
FROM presidents
WHERE continent LIKE '%America'
    AND country NOT IN
        (SELECT name
         FROM states
         WHERE indep_year < 1800);
```

The result of the anti-join

```
+---------------------+------------+-----------------+
| president           | country    | continent       |
|---------------------+------------+-----------------|
| Jovenel Moise       | Haiti      | North America   |
| Jose Mujica         | Uruguay    | South America   |
| Michelle Bachelet   | Chile      | South America   |
+---------------------+------------+-----------------+
```

Semi-join and anti-join diagrams

Let's practice!

JOINING DATA IN SQL