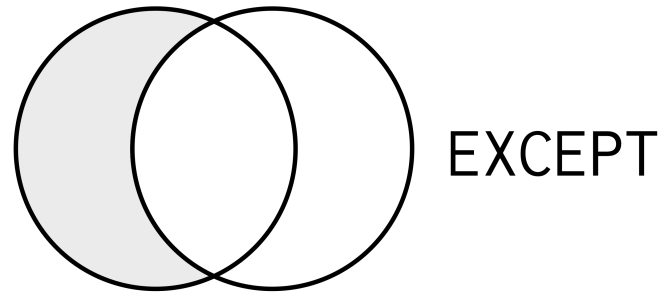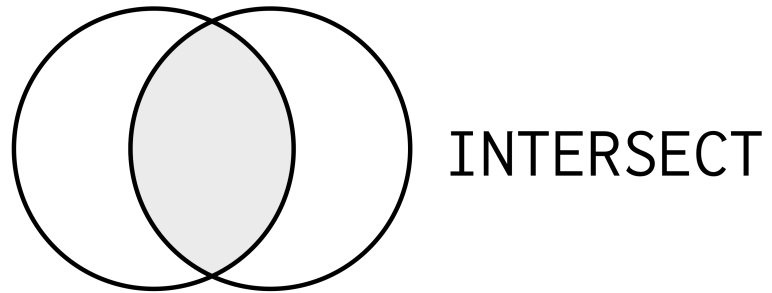# State of the UNION

JOINING DATA IN SQL

Chester Ismay
Data Science Evangelist, DataRobot

Set Theory Venn Diagrams

UNION

UNION ALL

INTERSECT

EXCEPT
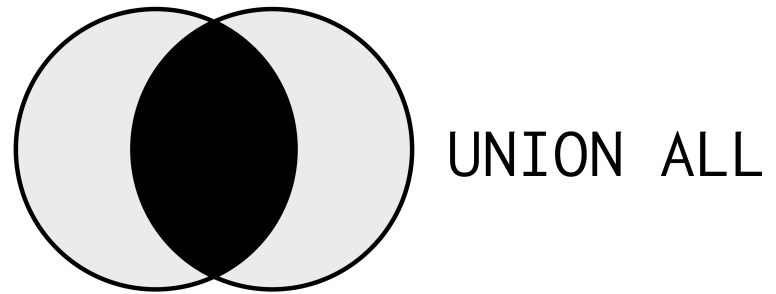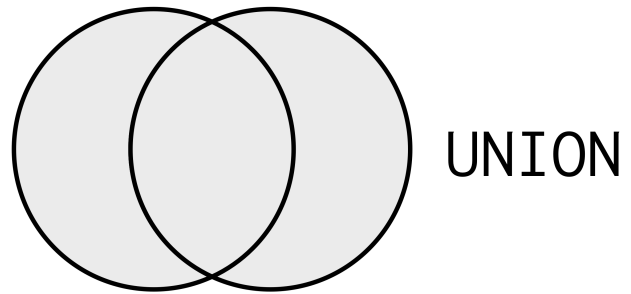
left_one   right_one

id   id
1   1
2   4
3   5
4   6
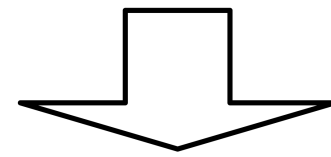
UNION

id
1
2
3
4
5
6

left_one   right_one

id   id

id
1
2
3
4

id
1
4
5
6

UNION ALL

id
1
1
2
3
4
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

```
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

INTERSECTional data science

JOINING DATA IN SQL

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INTERSECT diagram and SQL code

left_one

id
1
2
3
4

right_one

id
1
4
5
6

```
SELECT id
FROM left_one
INTERSECT
SELECT id
FROM right_one;
```

INTERSECT

id
1
4

Prime minister and president countries

```
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

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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     |
+-----------+-----------+
```
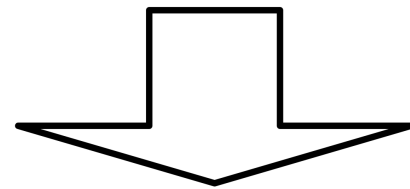
left_one

right_one

id

1
2
3
4

id

1
4
5
6

EXCEPT

id

2
3

Let's practice!

JOINING DATA IN SQL

Semi-joins and Anti-joins

JOINING DATA IN SQL

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DataCamp

Building up to a semi-join

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

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

Another step towards the semi-join

```
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      |
+-------------------------+----------+-------------+
```
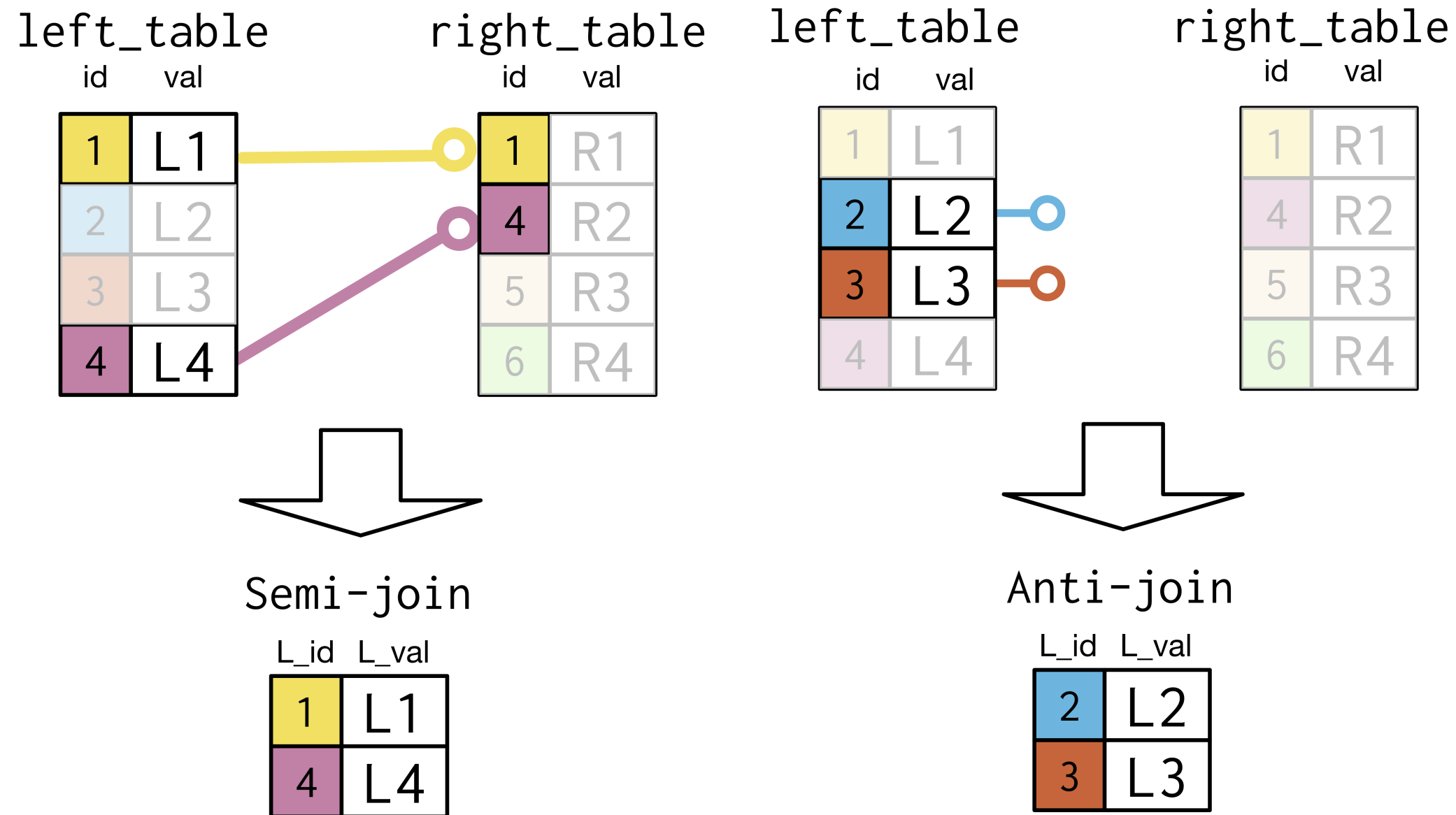
An anti-join

```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