

State of the UNION

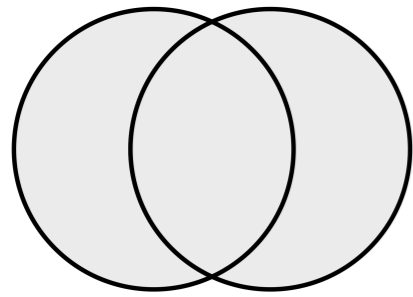
JOINING DATA IN SQL



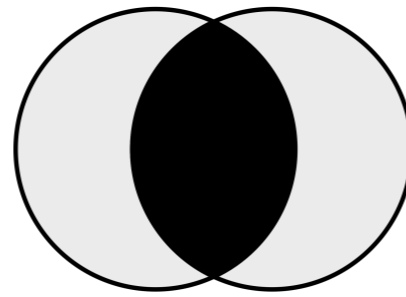
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Data Science Evangelist, DataRobot

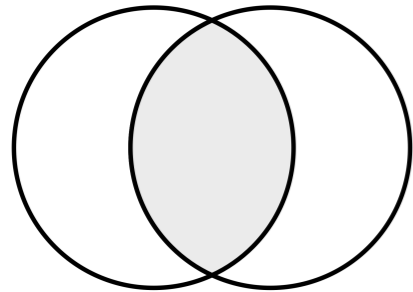
Set Theory Venn Diagrams



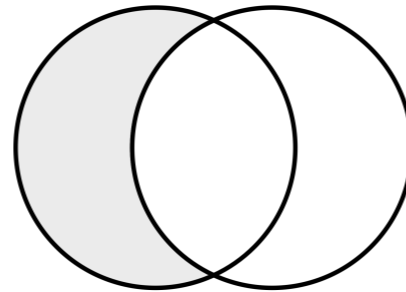
UNION



UNION ALL

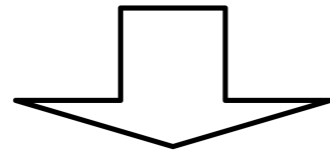
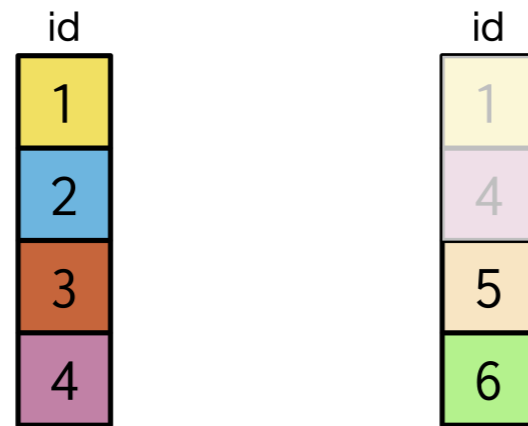


INTERSECT

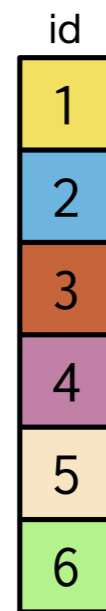


EXCEPT

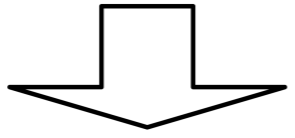
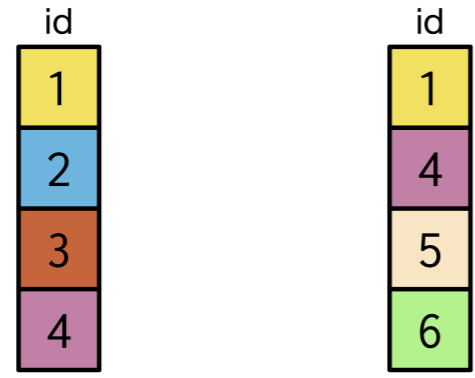
left_one right_one



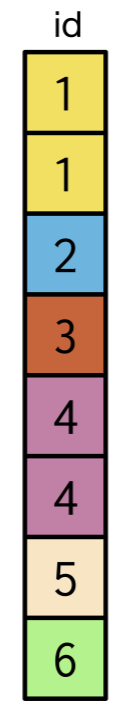
UNION



left_one right_one



UNION ALL



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

```
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

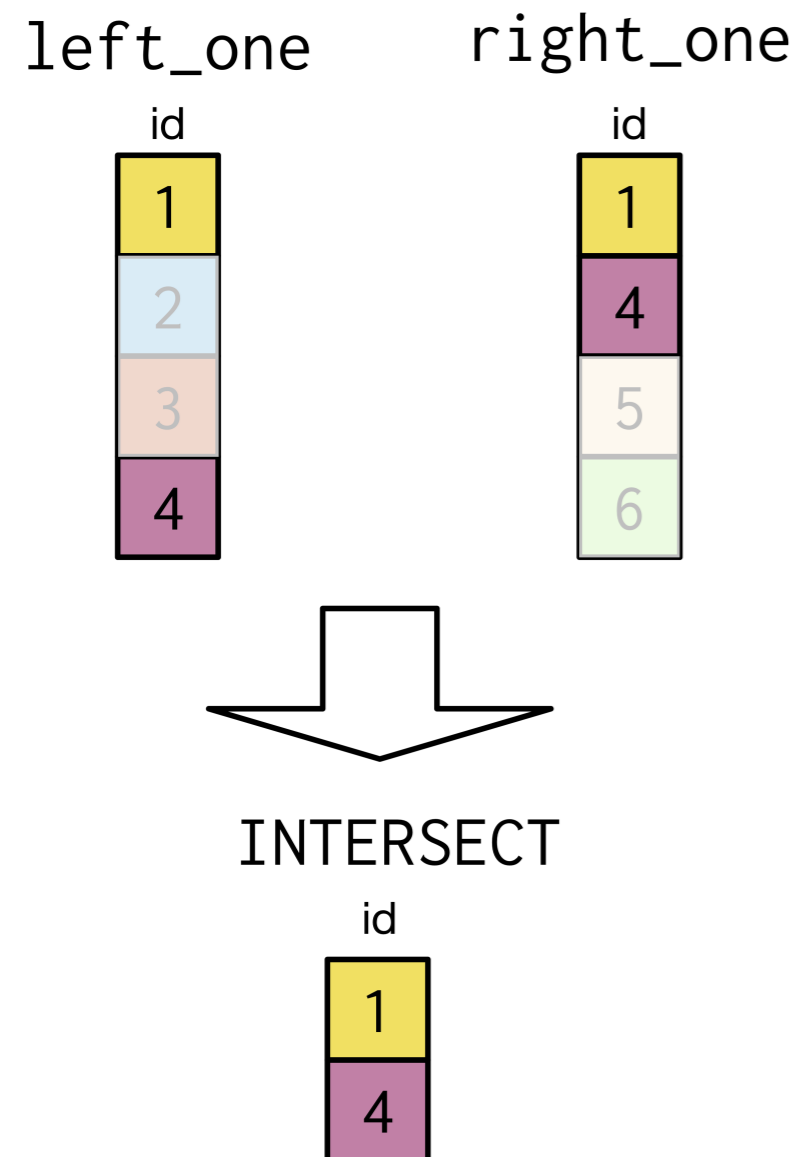
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Chester Ismay

Data Science Evangelist, DataRobot

INTERSECT diagram and SQL code



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

Prime minister and president countries

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

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

INTERSECT on two fields

```
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

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

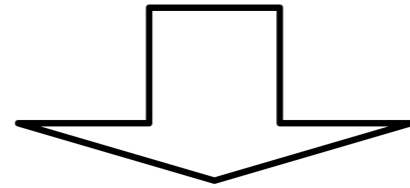
```
+-----+-----+
| monarch | country |
+-----+-----+
| Harald V | Norway  |
| Felipe VI | Spain   |
+-----+-----+
```


left_one

id
1
2
3
4

right_one

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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Building up to a semi-join

```
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)

```
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

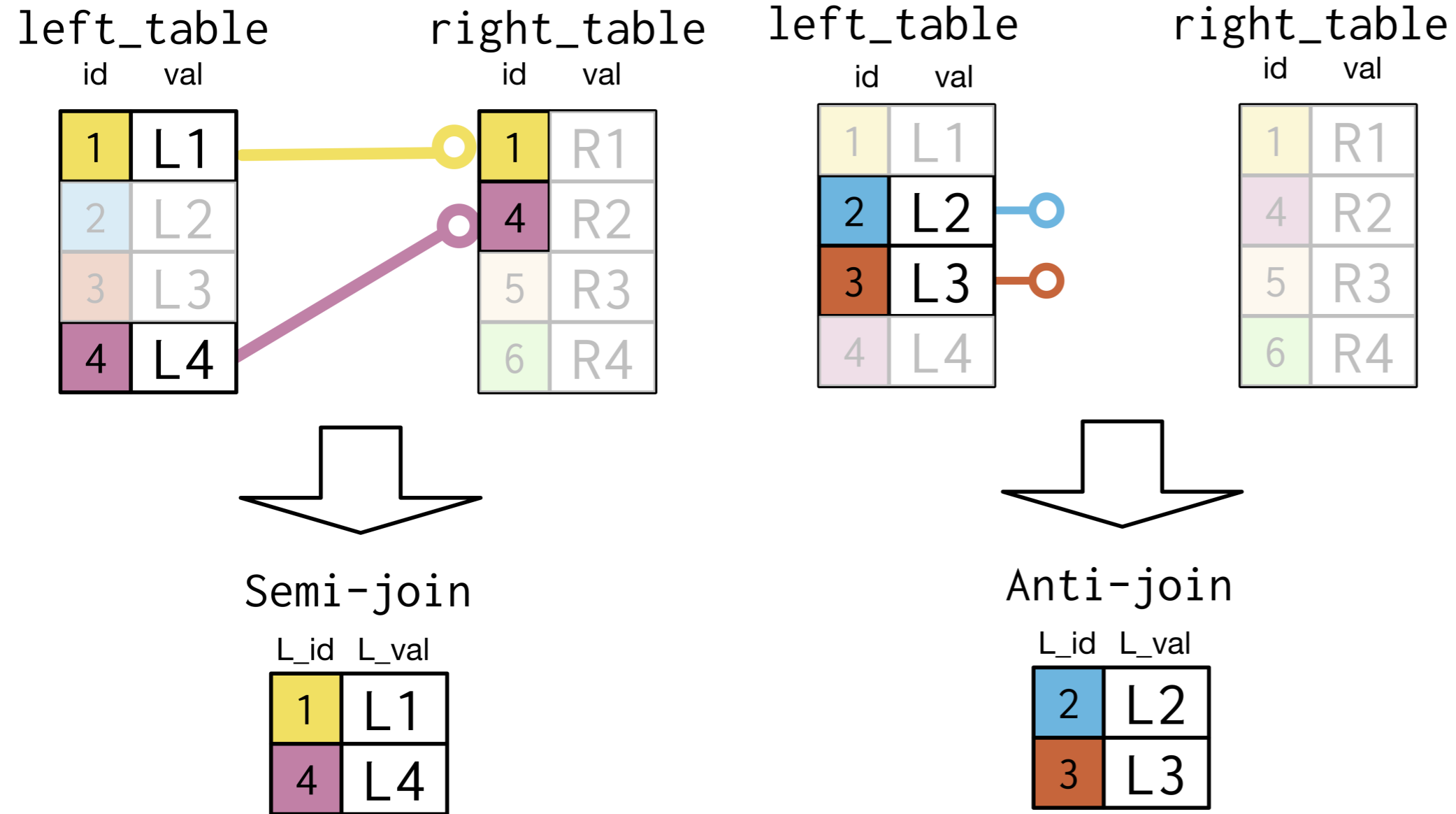
```
SELECT president, country, continent
FROM presidents
WHERE ___ LIKE '___'
      AND country ___ IN
      (SELECT name
       FROM states
       WHERE indep_year < 1800);
```

```
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