

State of the UNION

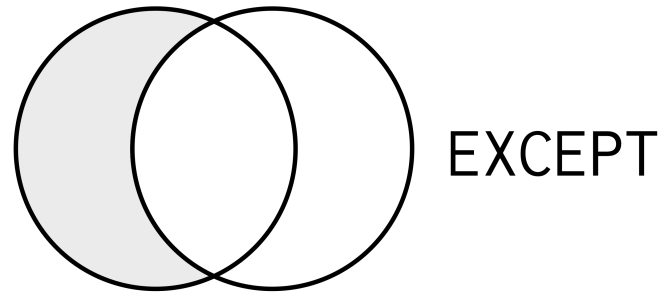
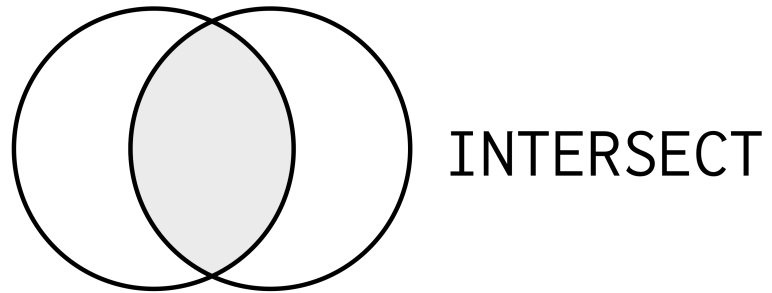
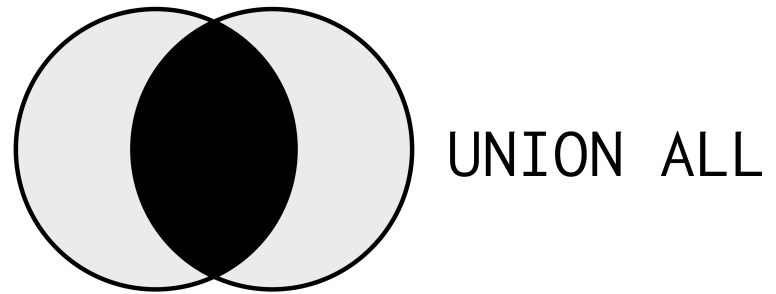
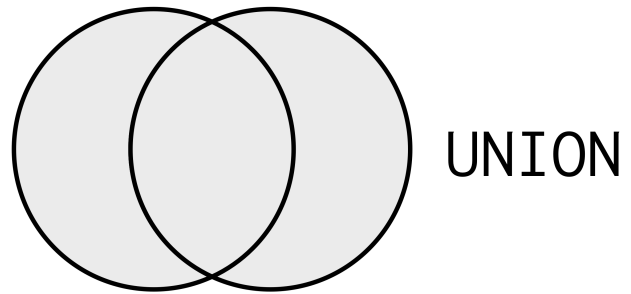
JOINING DATA IN SQL



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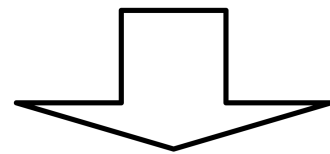
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Set Theory Venn Diagrams



left_one right_one

id	id
1	1
2	4
3	5
4	6

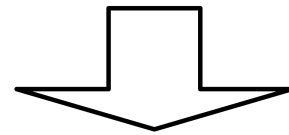


UNION

id
1
2
3
4
5
6

left_one right_one

id	id
1	1
2	4
3	5
4	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

```
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



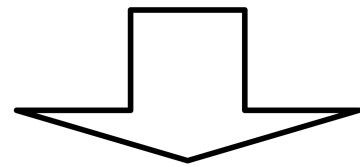
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INTERSECT diagram and SQL code

left_one right_one

id	id
1	1
2	4
3	5
4	6



INTERSECT

id
1
4

```
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;
```

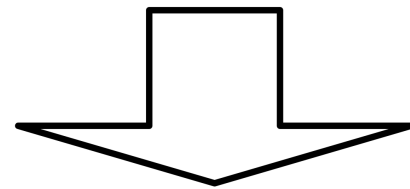
```
+-----+-----+
| monarch | country |
+-----+-----+
| Harald V | Norway  |
| Felipe VI | Spain   |
+-----+-----+
```


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

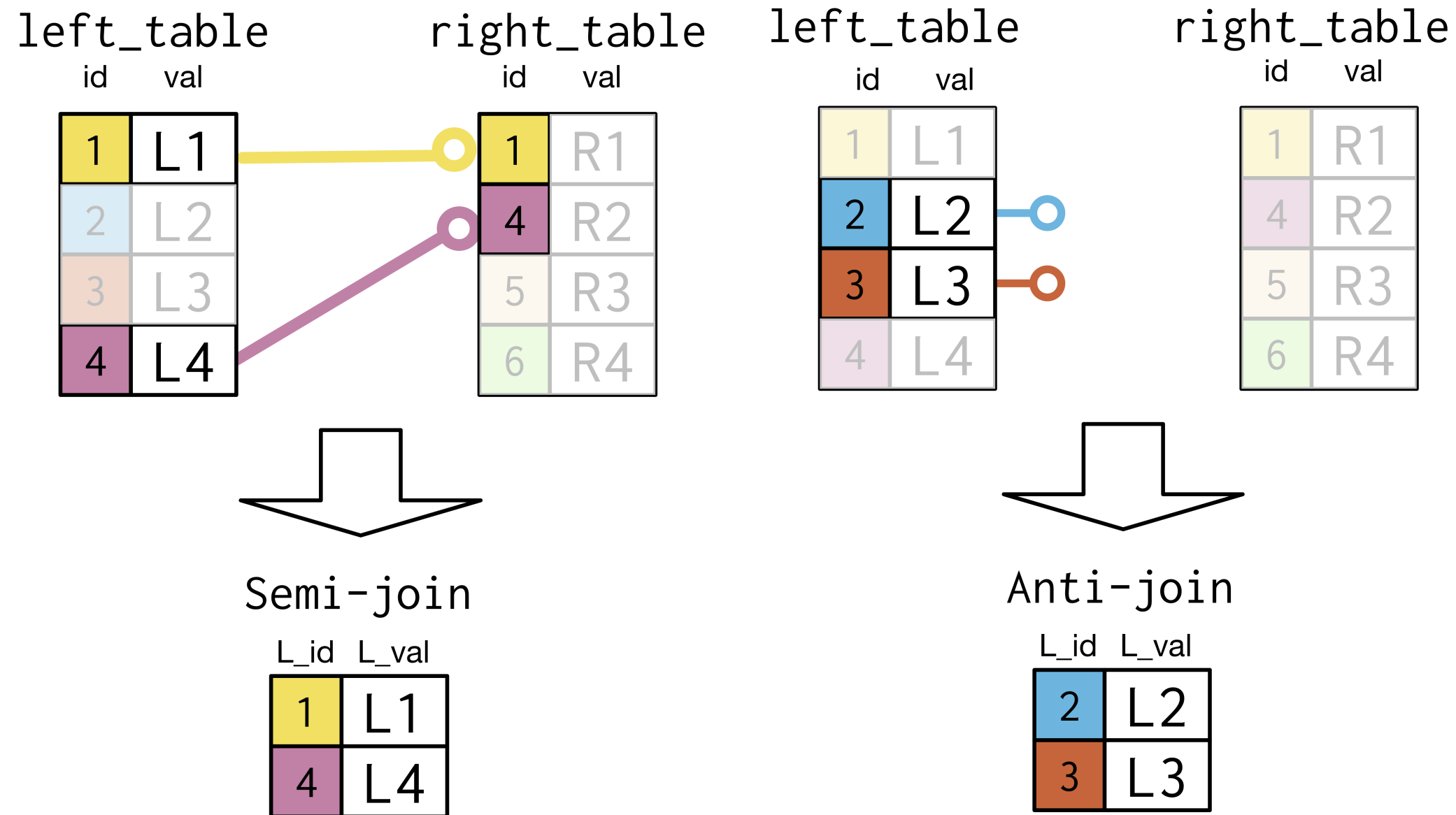
```
SELECT president, country, continent
FROM presidents
WHERE ___ LIKE '___'
      AND country ___ IN
      (SELECT name
       FROM states
       WHERE indep_year < 1800);
```

```
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