

Set theory for SQL Joins

JOINING DATA IN SQL

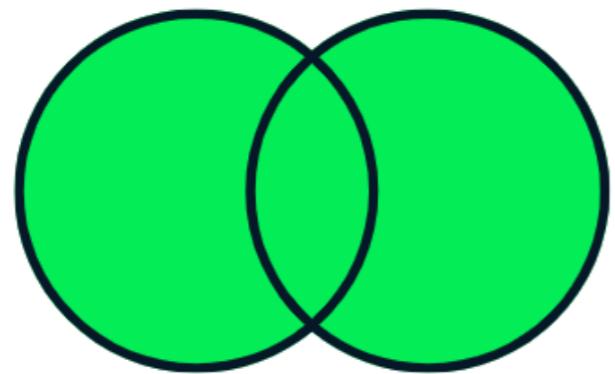


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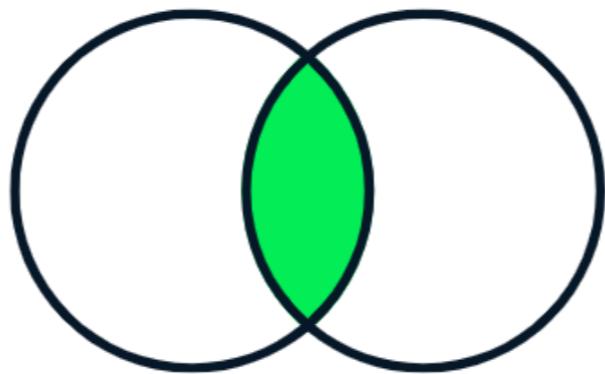
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Venn diagrams and set theory

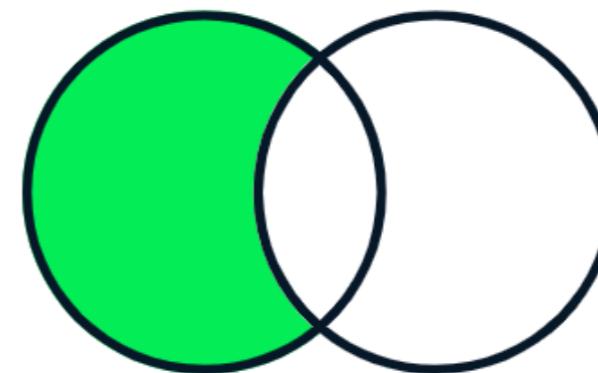
UNION
UNION ALL



INTERSECT



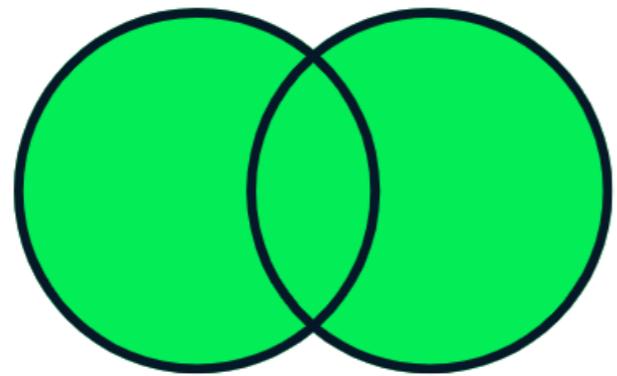
EXCEPT



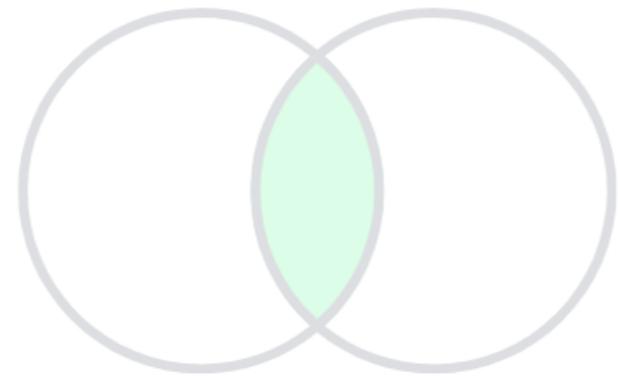
Venn diagrams and set theory

UNION

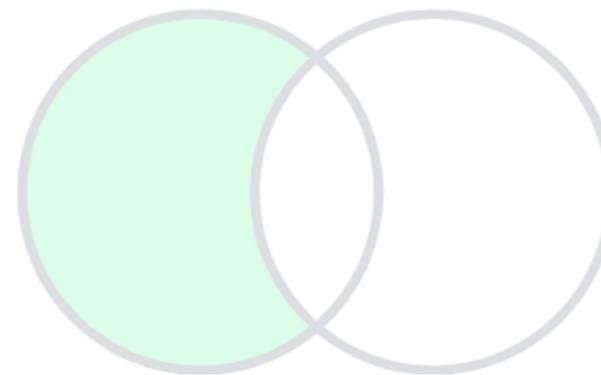
UNION ALL



INTERSECT

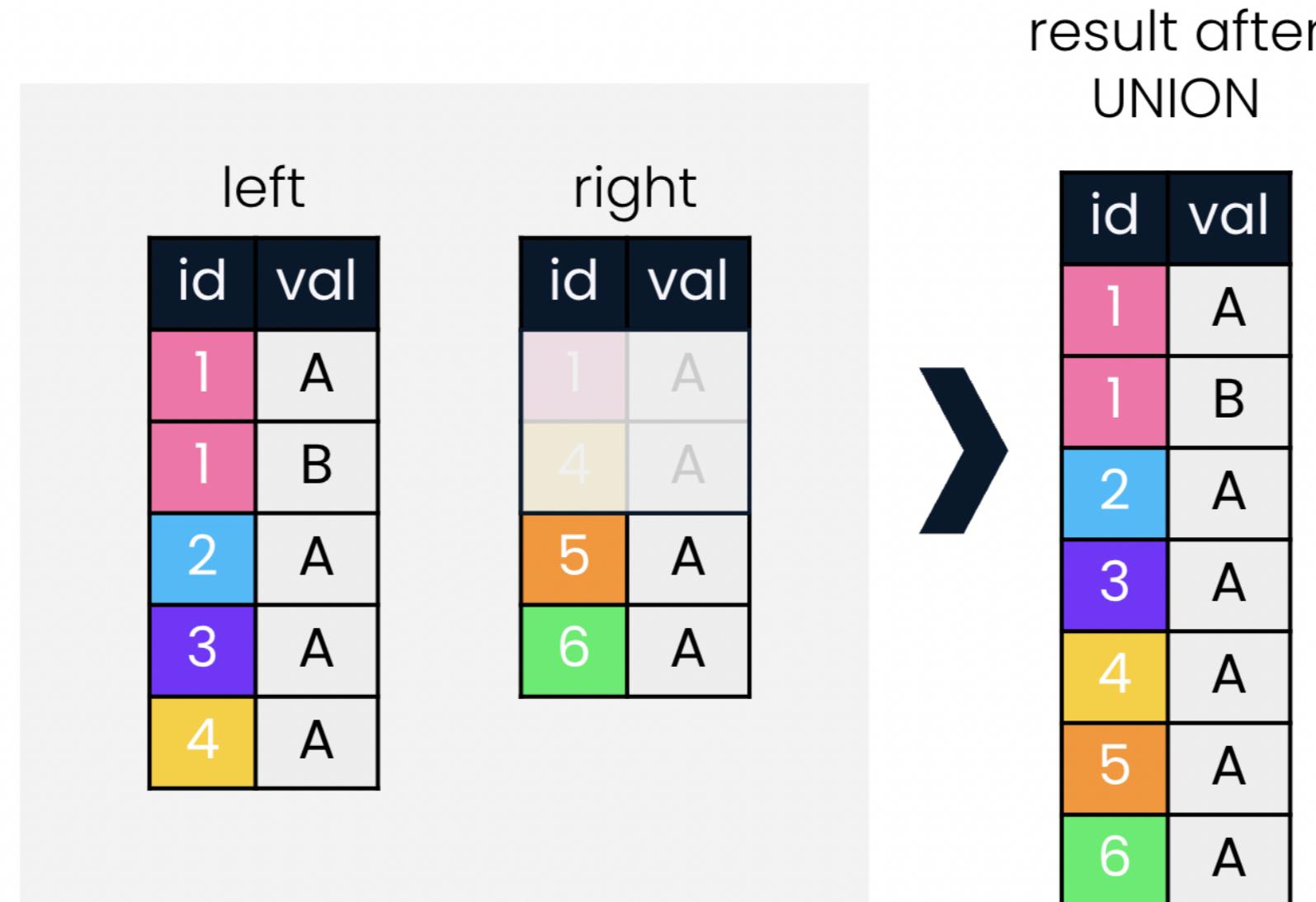


EXCEPT



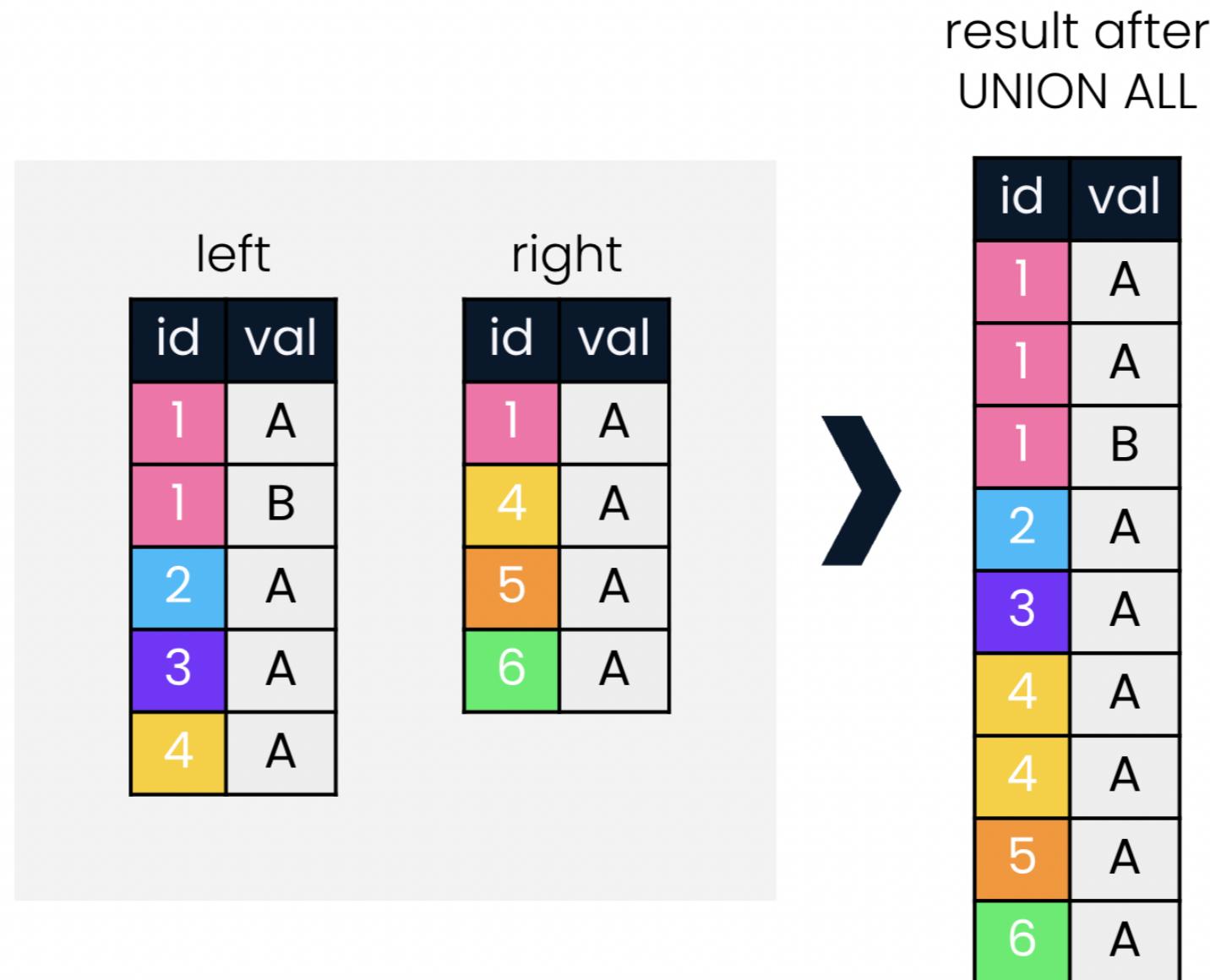
UNION diagram

- UNION takes two tables as input, and returns all records from both tables



UNION ALL diagram

- UNION ALL takes two tables and returns all records from both tables, including duplicates



UNION and UNION ALL syntax

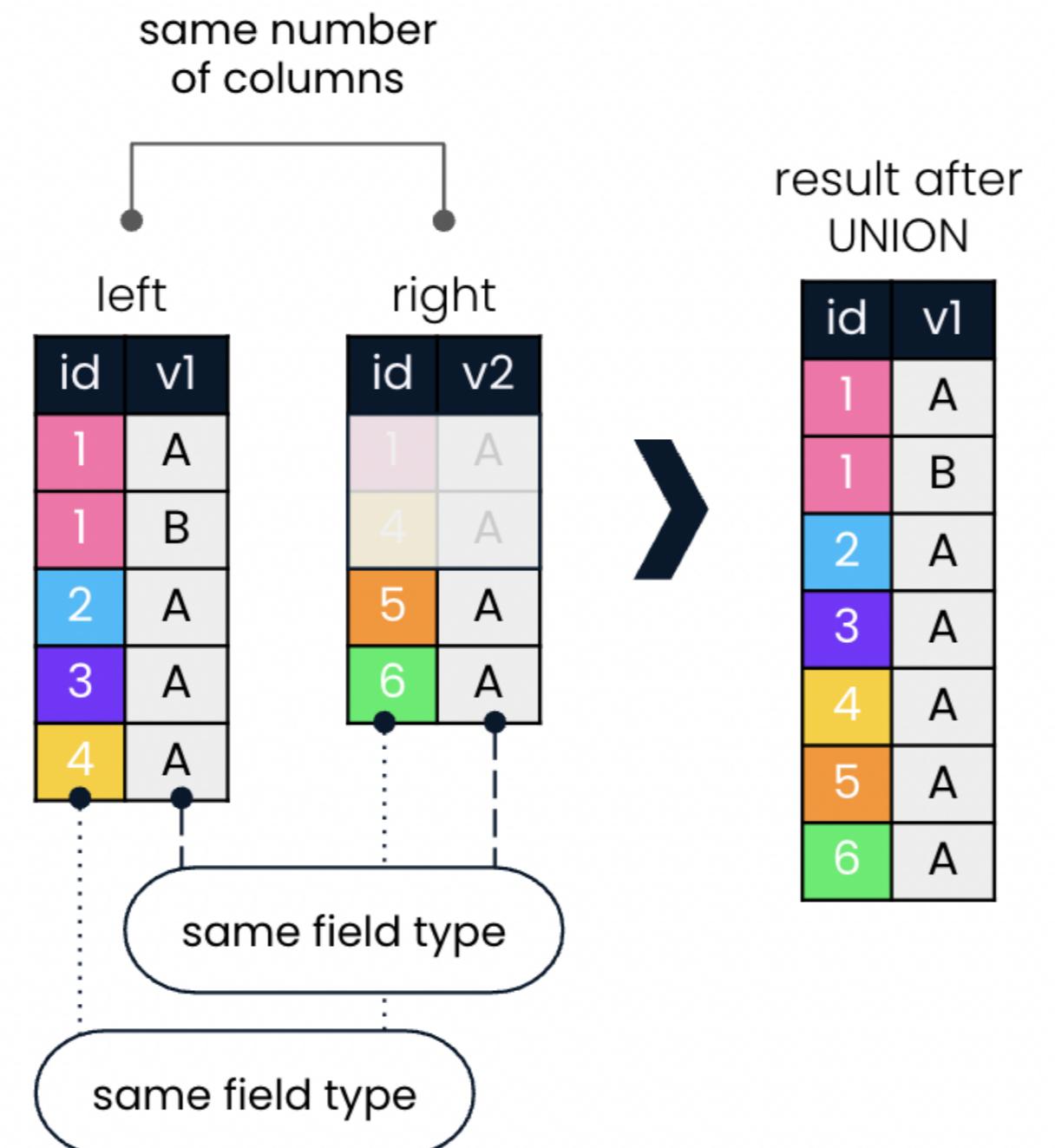
UNION syntax

```
SELECT *
FROM left_table
UNION
SELECT *
FROM right_table;
```

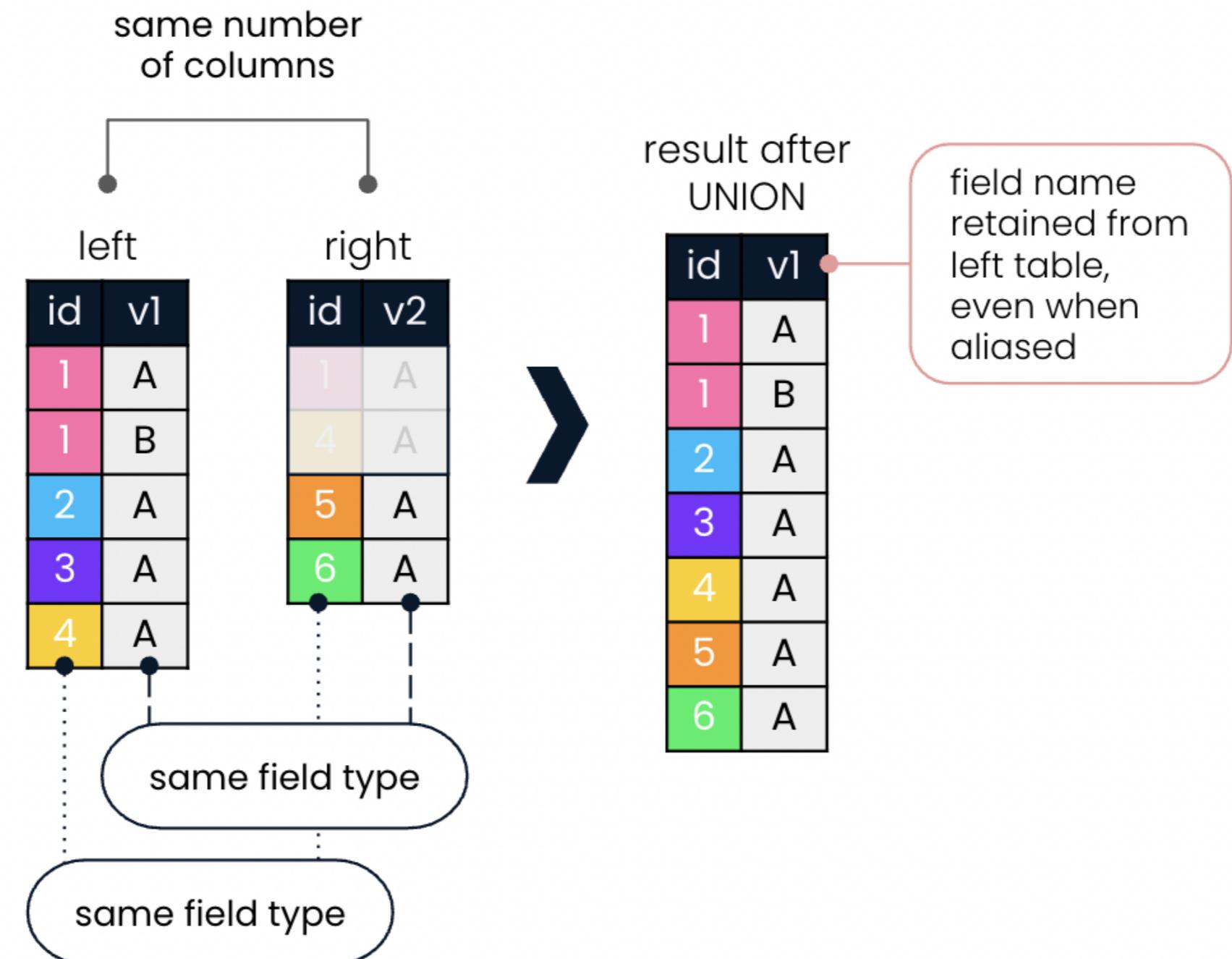
UNION ALL syntax

```
SELECT *
FROM left_table
UNION ALL
SELECT *
FROM right_table;
```

UNION and UNION ALL syntax



UNION and UNION ALL syntax



To the monarchs table

```
SELECT *  
FROM monarchs;
```

country	continent	monarch
Brunei	Asia	Hassanal Bolkiah
Oman	Asia	Haitham bin Tarik
Norway	Europe	Harald V
United Kingdom	Europe	Charles III

Prime ministers, meet the monarchs

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

After the UNION

leader	country
Anthony Albanese	Australia
Hassanal Bolkiah	Brunei
Mostafa Madbouly	Egypt
Narendra Modi	India
Christopher Luxon	New Zealand
Harald V	Norway
Jonas Gahr Støre	Norway
Haitham bin Tarik	Oman
Shehzad Sharif	Pakistan
Luís Montenegro	Portugal

UNION ALL with the leaders

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

UNION ALL result

leader	country
Anthony Albanese	Australia
Hassanal Bolkiah	Brunei
Hassanal Bolkiah	Brunei
Mostafa Madbouly	Egypt
Narendra Modi	India
Christopher Luxon	New Zealand
Harald V	Norway
Jonas Gahr Støre	Norway
Haitham bin Tarik	Oman
Haitham bin Tarik	Oman

Let's practice!

JOINING DATA IN SQL

At the INTERSECT

JOINING DATA IN SQL

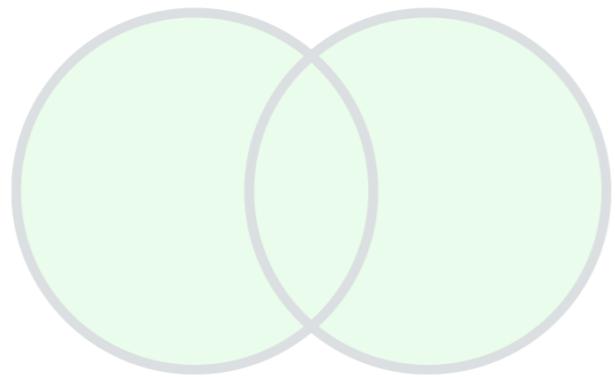
SQL

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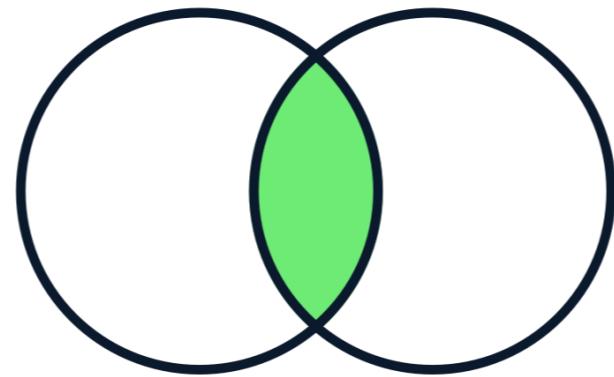
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INTERSECT Venn diagram

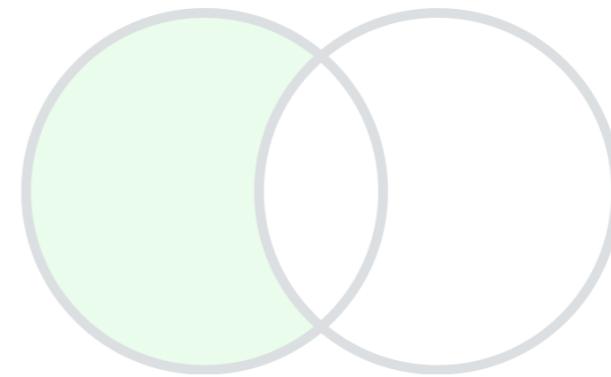
UNION



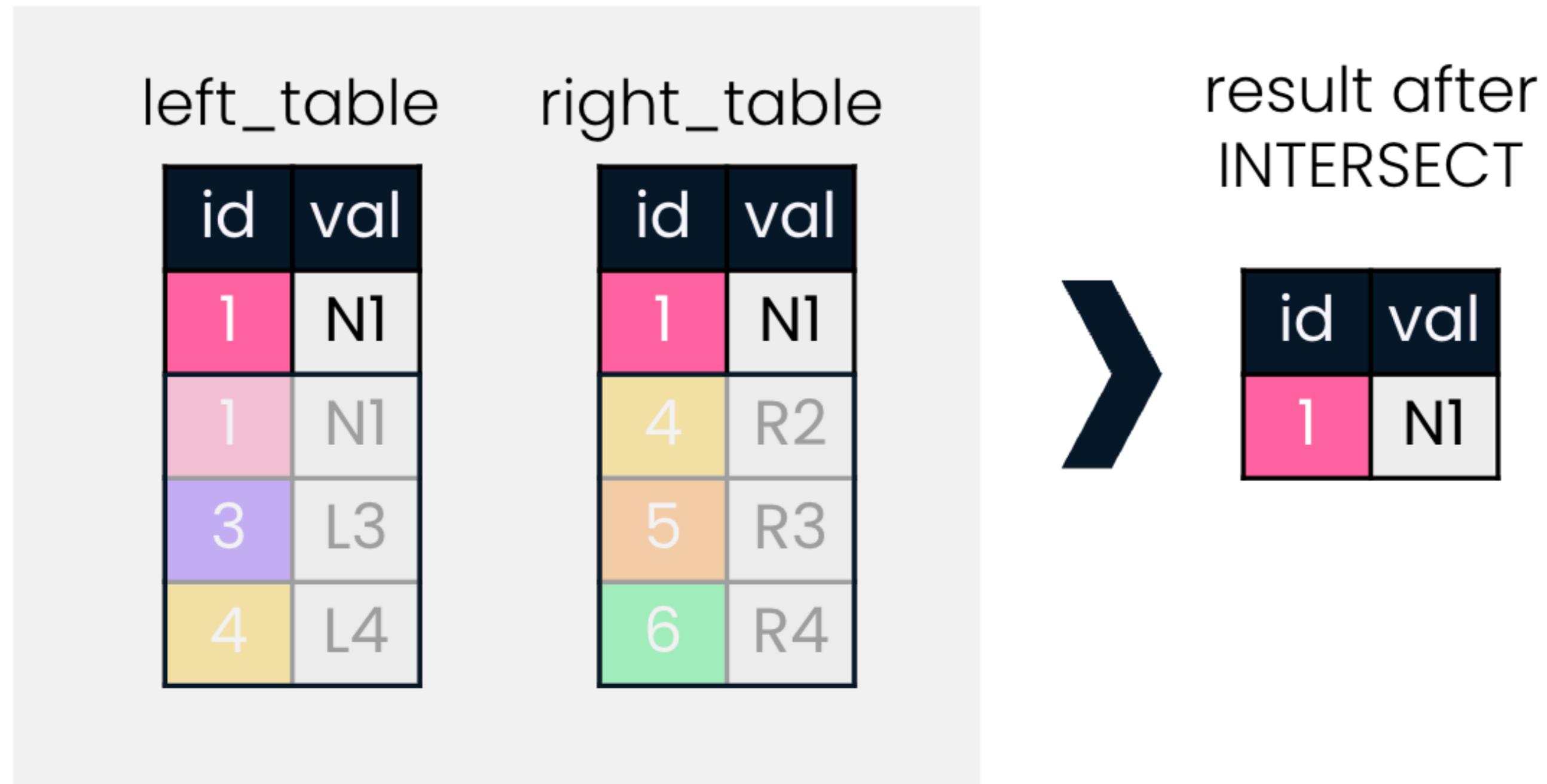
INTERSECT



EXCEPT



INTERSECT diagram



INTERSECT syntax

```
SELECT id, val  
FROM left_table  
INTERSECT  
SELECT id, val  
FROM right_table;
```

INTERSECT vs. INNER JOIN on two columns

INTERSECT syntax

```
SELECT *  
FROM left_table  
INTERSECT  
SELECT *  
FROM right_table;
```

INNER JOIN syntax

```
SELECT *  
FROM left_table  
INNER JOIN right_table  
ON left.id = right.id  
AND left.val = right.val
```

left_table		right_table	
id	val	id	val
1	N1	1	N1
1	N1	4	R2
3	L3	5	R3
4	L4	6	R4

result after
INTERSECT

id	val
1	N1

left_table		right_table	
id	val	id	val
1	N1	1	N1
1	N1	4	R2
3	L3	5	R3
4	L4	6	R4

result after
INNER JOIN

id	val
1	N1
1	N1

Countries with prime ministers and presidents

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

intersect_country
Egypt
Portugal
Pakistan
India

INTERSECT on two fields

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

country	leader
United States	Donald Trump
United Kingdom	Theresa May

Countries with prime ministers and monarchs

```
SELECT country, prime_minister AS leader  
FROM prime_ministers  
INTERSECT  
SELECT country, monarch  
FROM monarchs;
```

country	leader
Brunei	Hassanal Bolkiah
Oman	Haitham bin Tarik

Let's practice!

JOINING DATA IN SQL

EXCEPT

JOINING DATA IN SQL

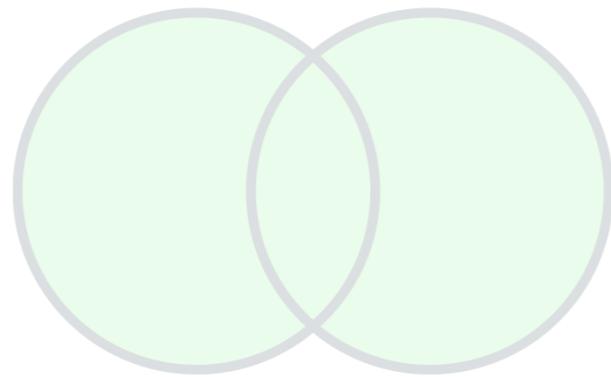
SQL

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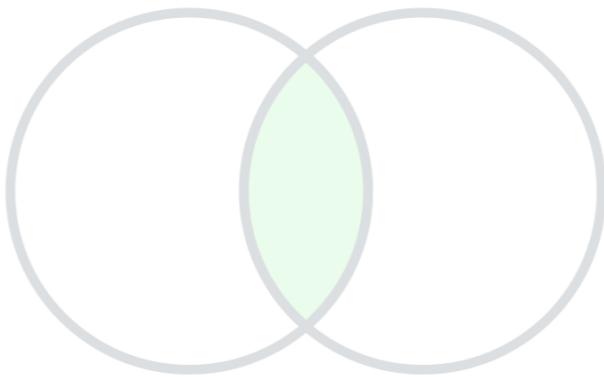
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EXCEPT Venn diagram

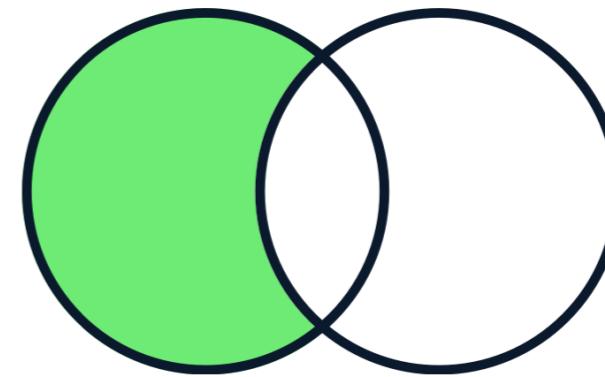
UNION



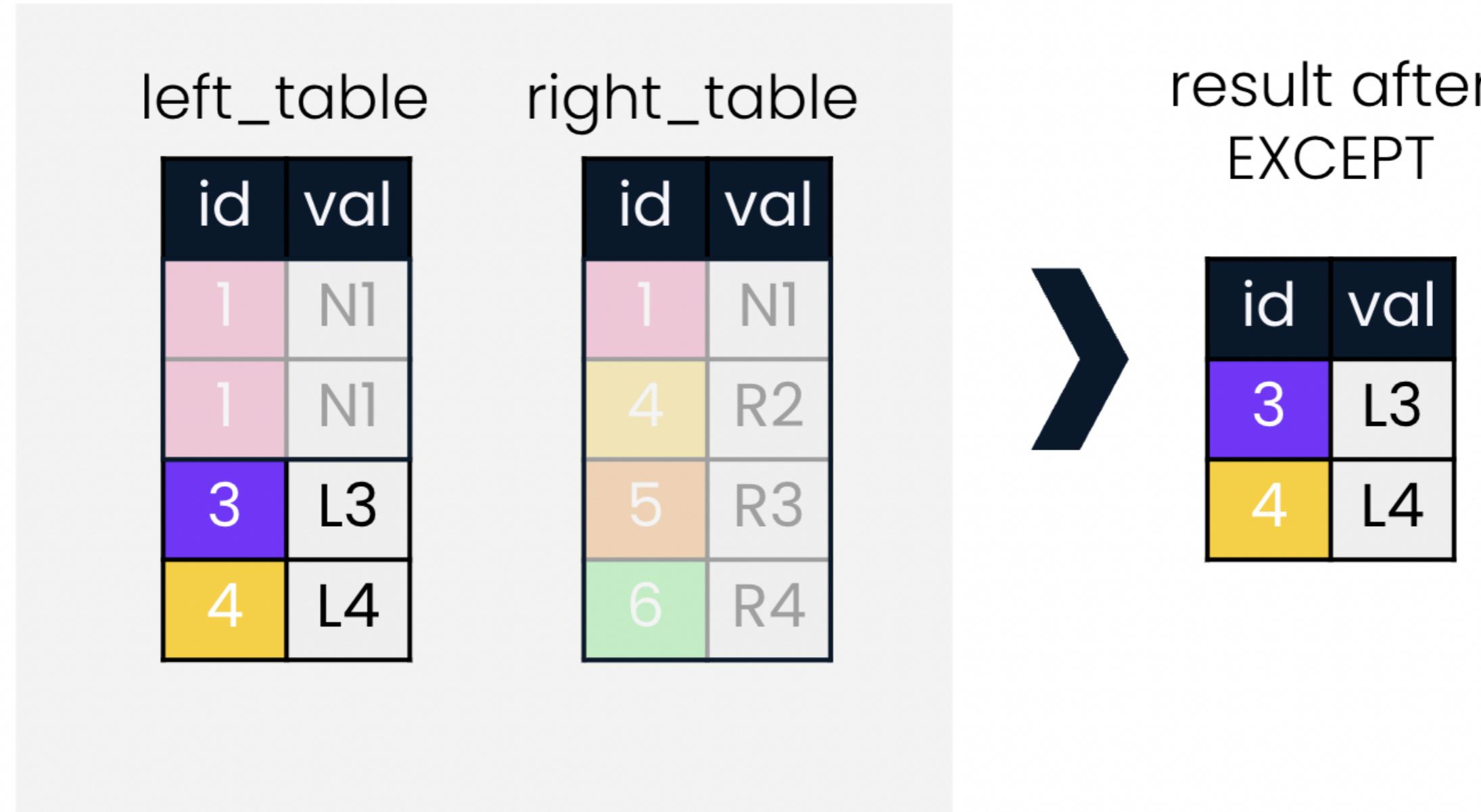
INTERSECT



EXCEPT



EXCEPT diagram



EXCEPT syntax

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

monarch	country
Harald V	Norway
Charles III	United Kingdom
Willem-Alexander	Netherlands

Let's practice!

JOINING DATA IN SQL