

Set theory for SQL Joins

JOINING DATA IN SQL

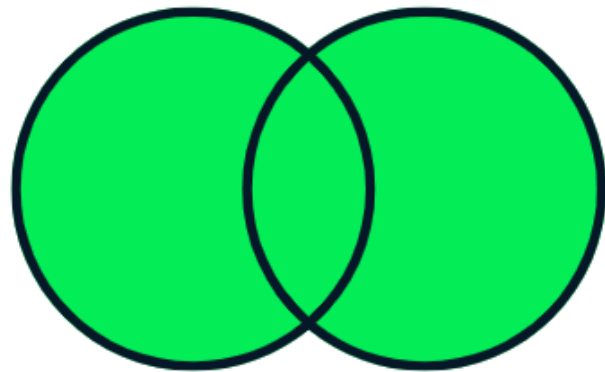


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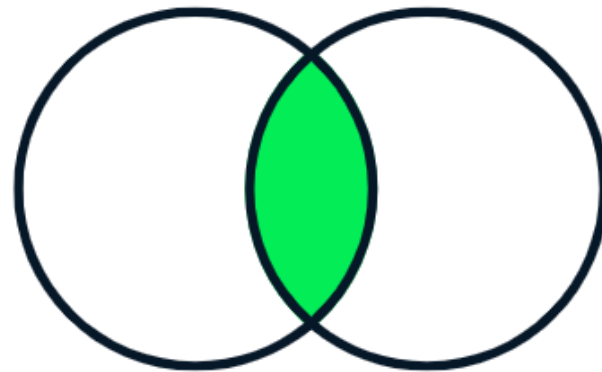
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Venn diagrams and set theory

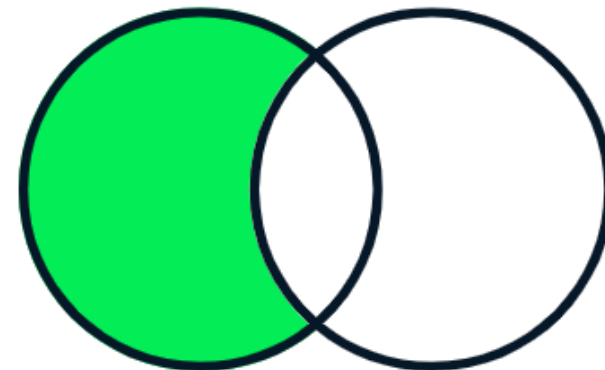
UNION
UNION ALL



INTERSECT

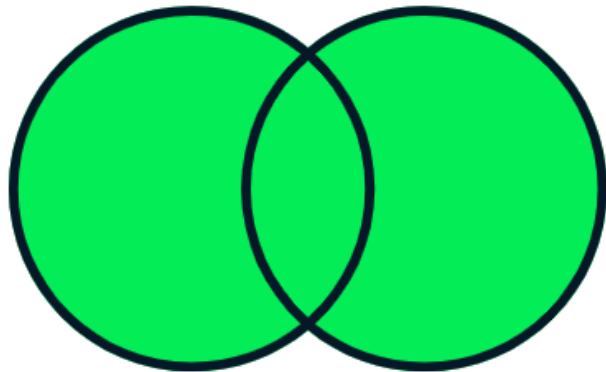


EXCEPT

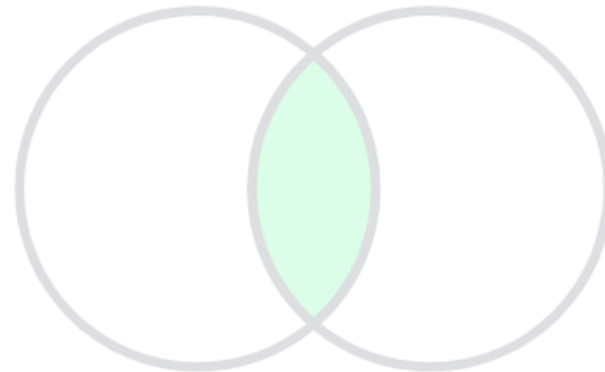


Venn diagrams and set theory

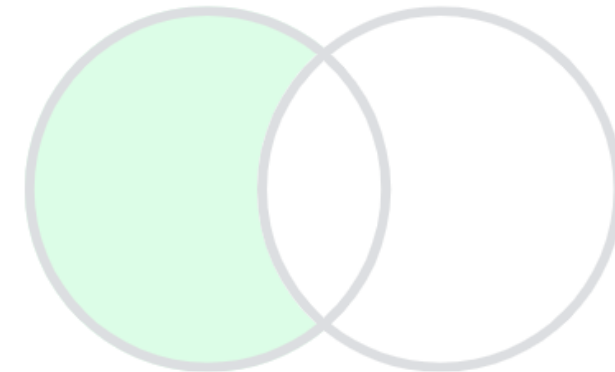
UNION
UNION ALL



INTERSECT

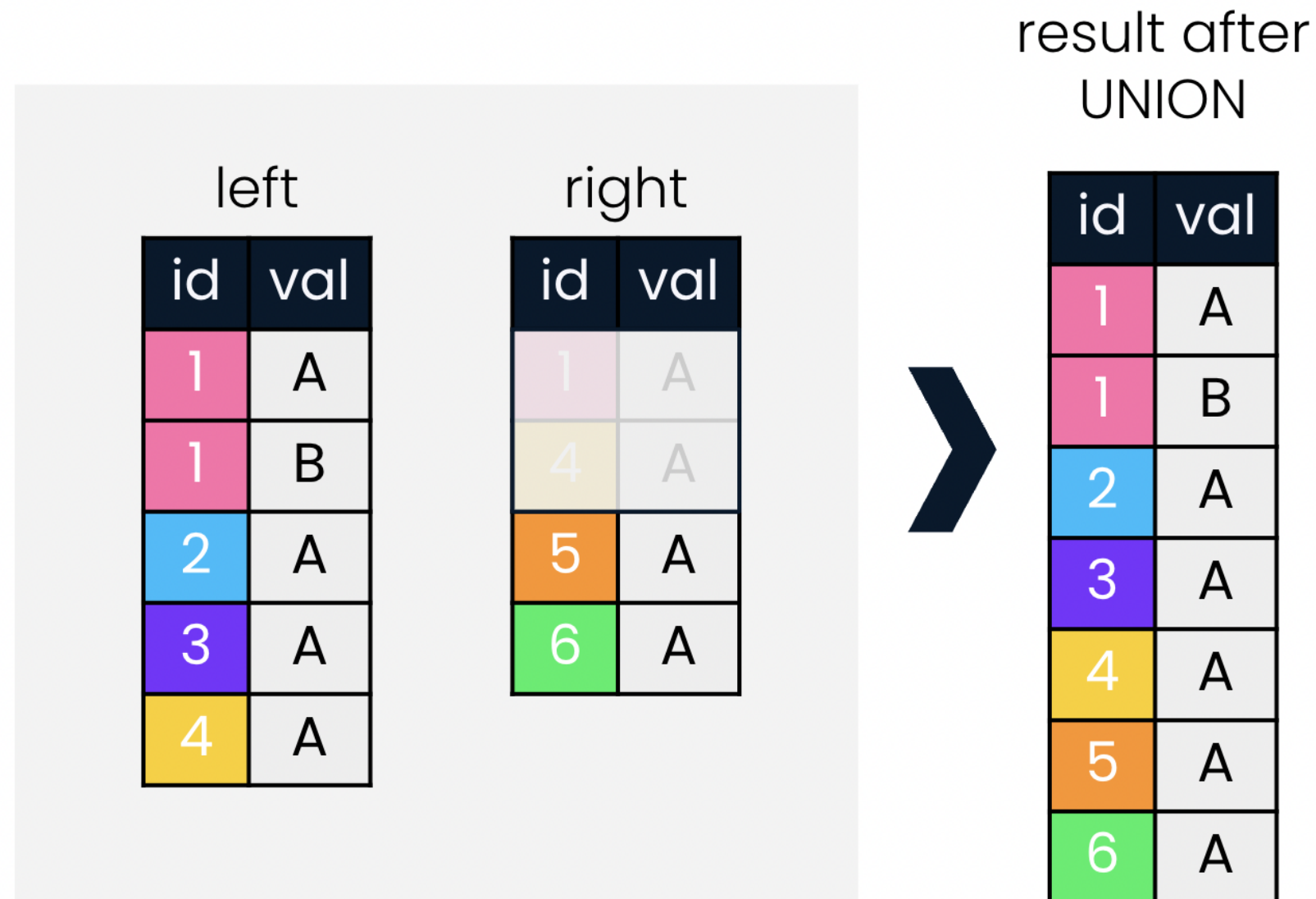


EXCEPT



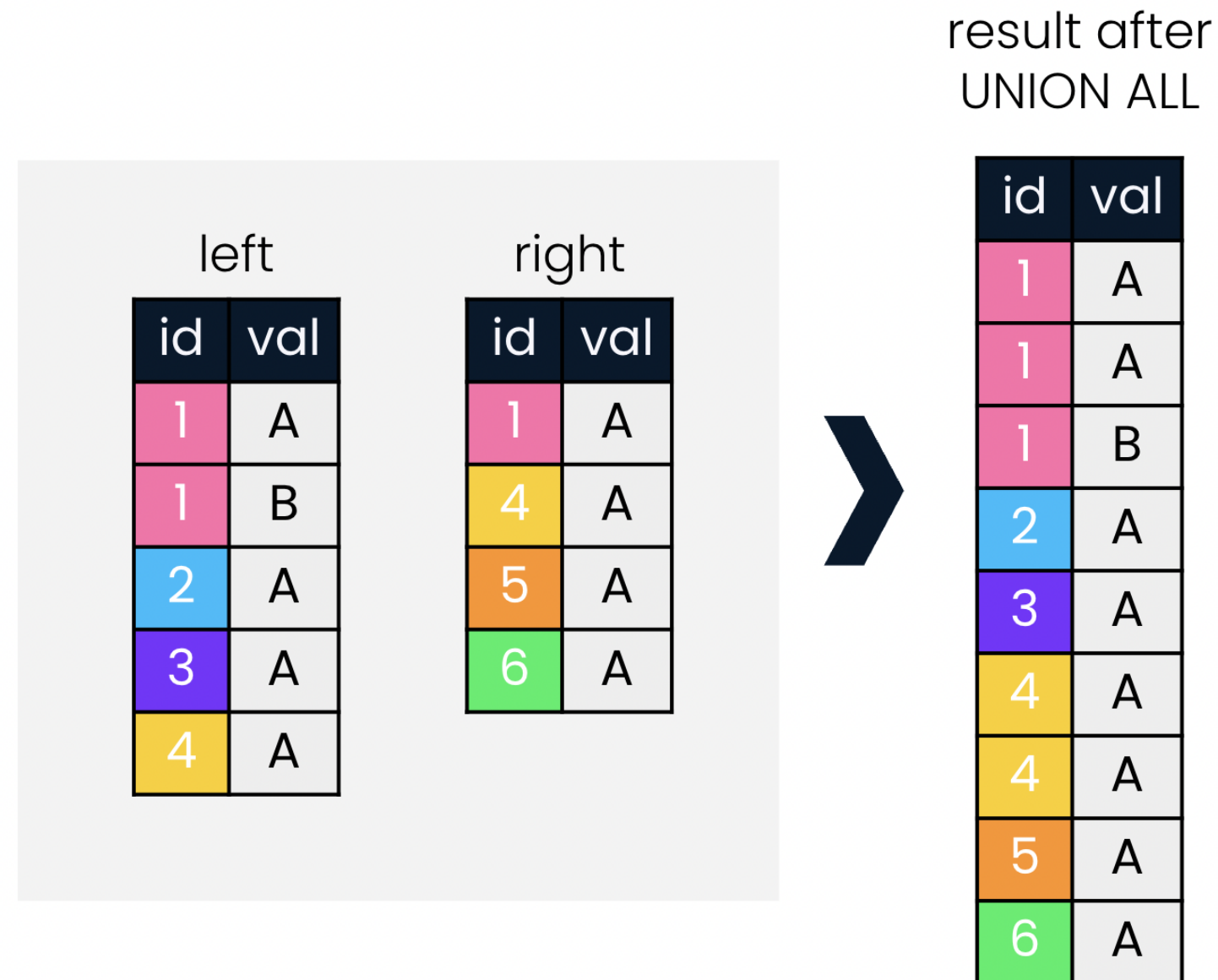
UNION diagram

- **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

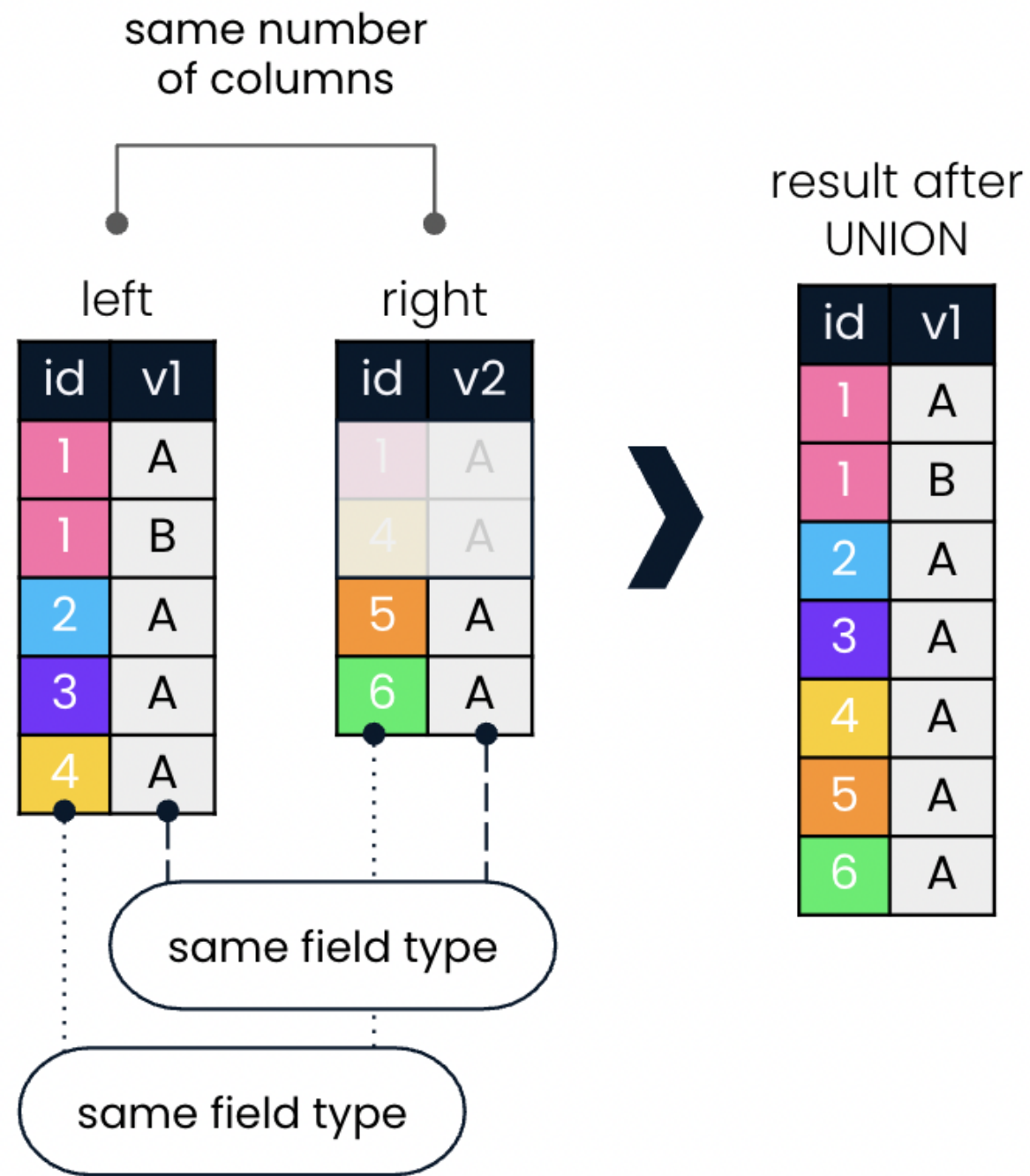
UNION syntax

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

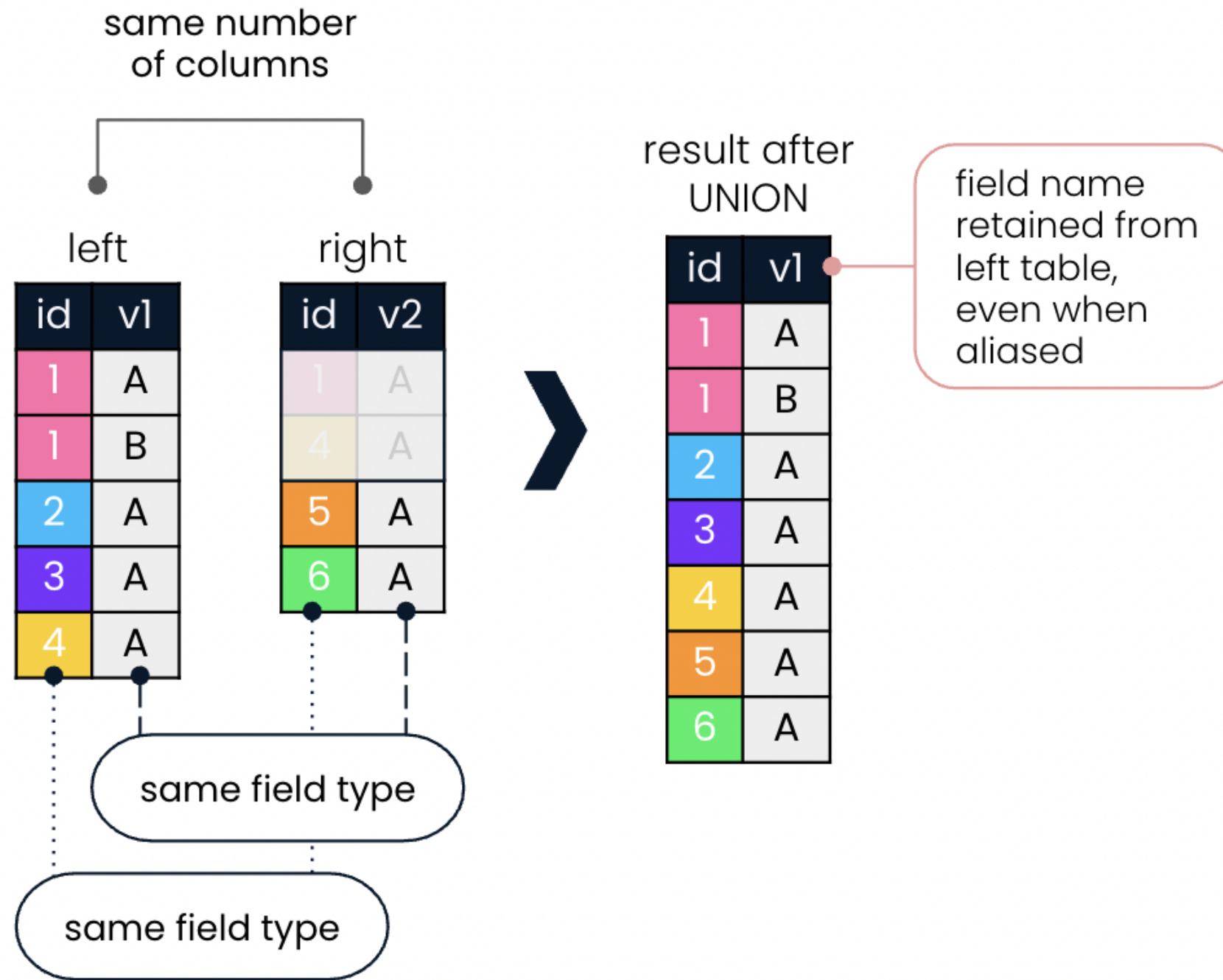
UNION ALL syntax

```
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	Elizabeth II

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
Scott Morrison	Australia
Hassanal Bolkiah	Brunei
Mostafa Madbouly	Egypt
Narendra Modi	India
Jacinda Ardern	New Zealand
Harald V	Norway
Jonas Gahr Støre	Norway
Haitham bin Tarik	Oman
Shehbaz Sharif	Pakistan
António Costa	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
-----	-----
Scott Morrison	Australia
Hassanal Bolkiah	Brunei
Hassanal Bolkiah	Brunei
Mostafa Madbouly	Egypt
Narendra Modi	India
Jacinda Ardern	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

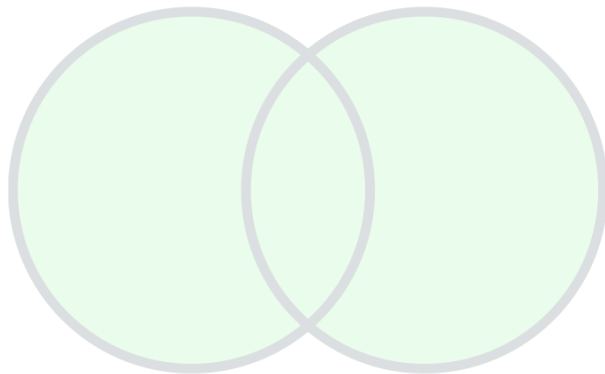


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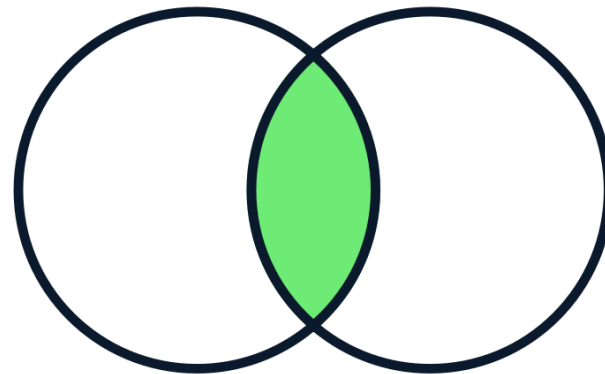
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INTERSECT Venn diagram

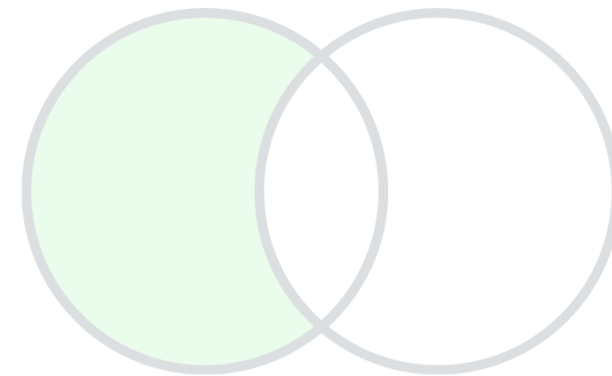
UNION



INTERSECT



EXCEPT



INTERSECT diagram

left_table

id	val
1	N1
1	N1
3	L3
4	L4

right_table

id	val
1	N1
4	R2
5	R3
6	R4



result after
INTERSECT

id	val
1	N1

INTERSECT syntax

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

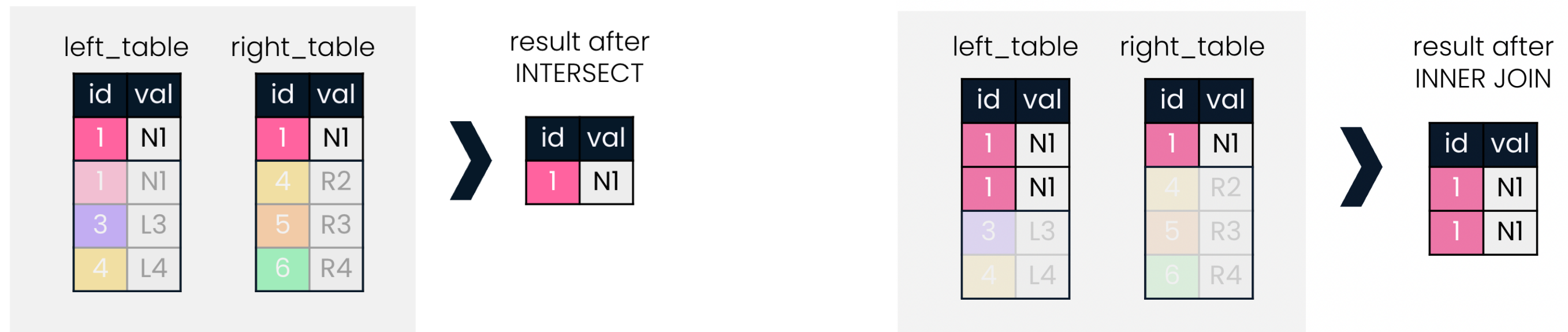
INTERSECT vs. INNER JOIN on two columns

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
```



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
----- -----
----- -----

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

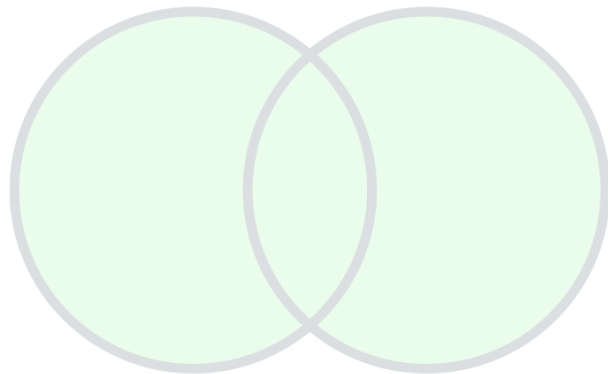


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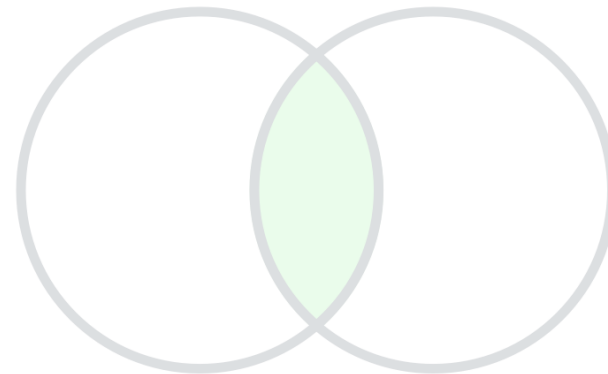
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EXCEPT Venn diagram

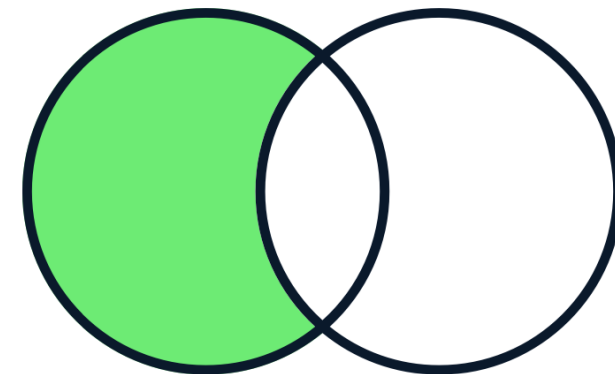
UNION



INTERSECT



EXCEPT



EXCEPT diagram

left_table

id	val
1	N1
1	N1
3	L3
4	L4

right_table

id	val
1	N1
4	R2
5	R3
6	R4



result after
EXCEPT

id	val
3	L3
4	L4

EXCEPT syntax

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

----- -----	
monarch country	
----- -----	
Harald V Norway	
Elizabeth II United Kingdom	
Willem-Alexander Netherlands	
----- -----	

Let's practice!

JOINING DATA IN SQL