

# Set theory for SQL Joins

JOINING DATA IN SQL

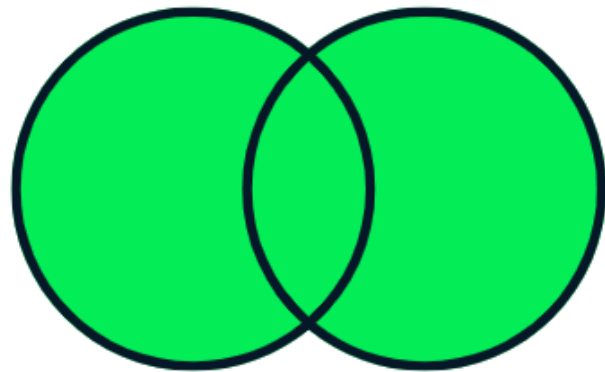


**Maham Faisal Khan**

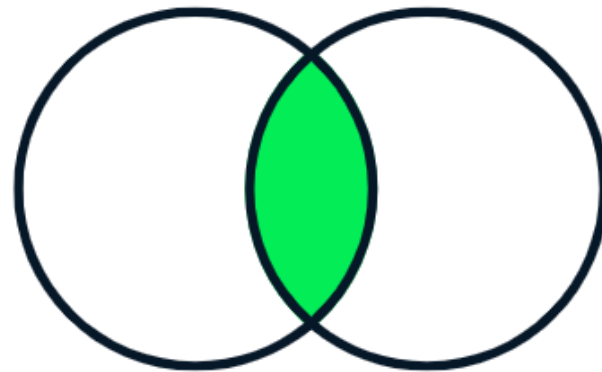
Senior Content Developer, DataCamp

# Venn diagrams and set theory

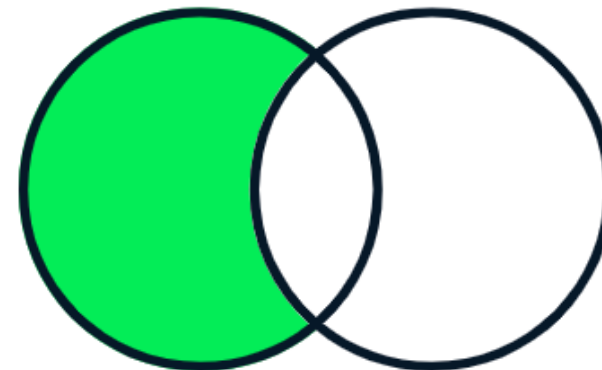
UNION  
UNION ALL



INTERSECT

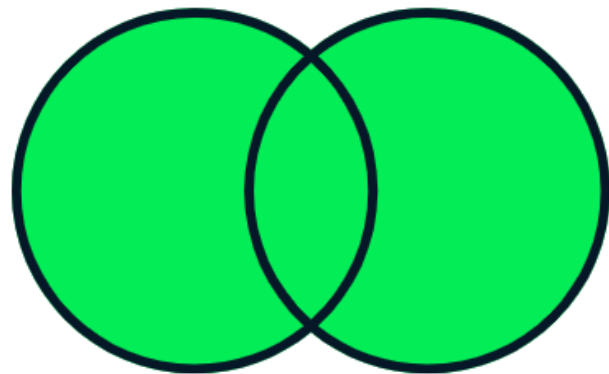


EXCEPT

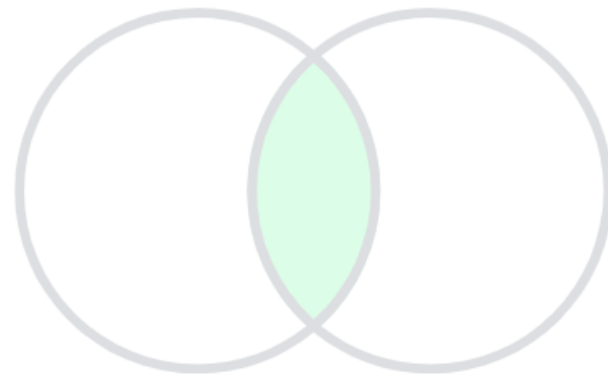


# Venn diagrams and set theory

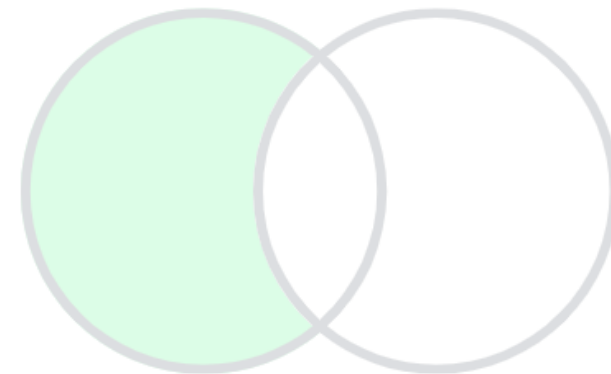
UNION  
UNION ALL



INTERSECT

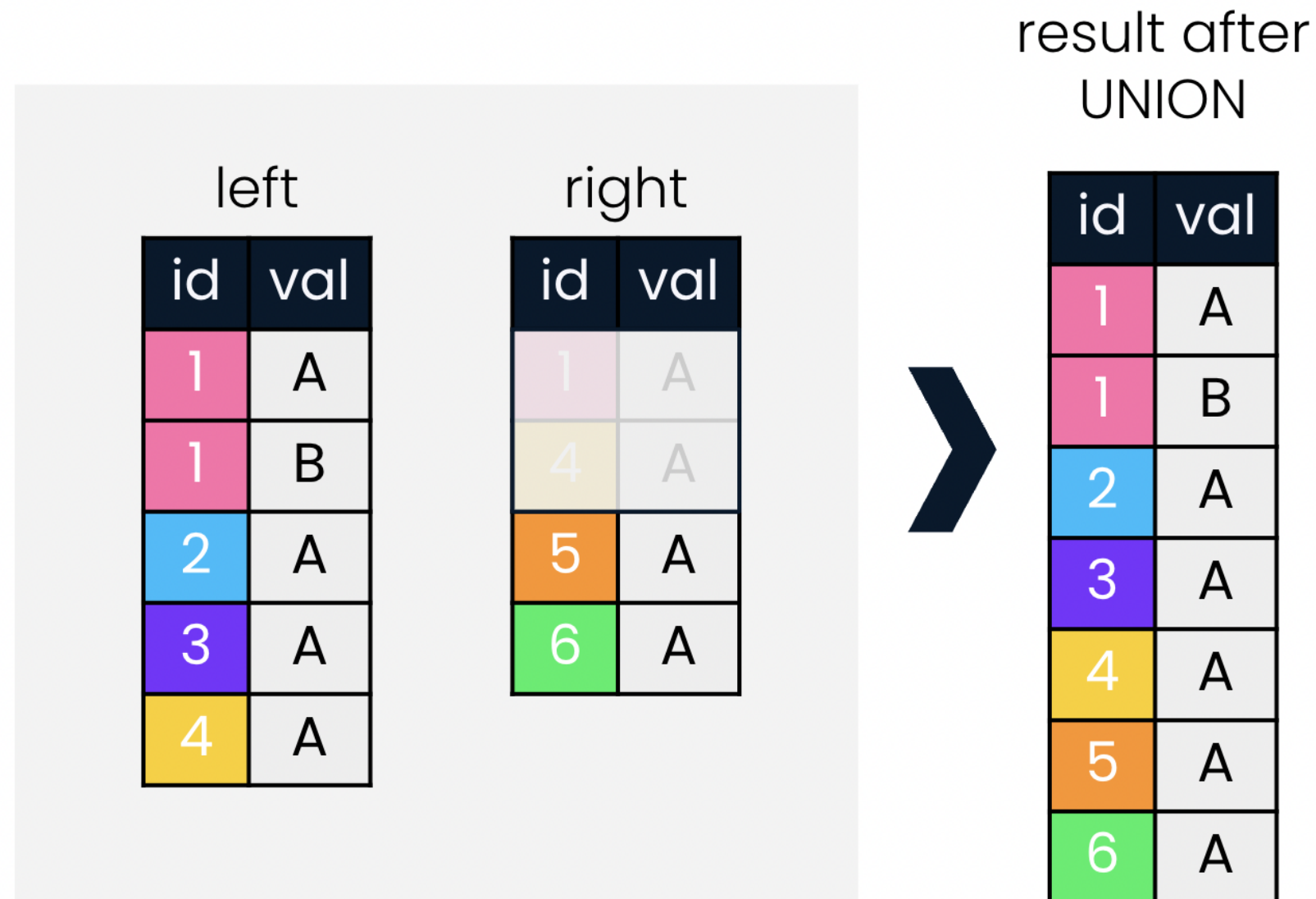


EXCEPT



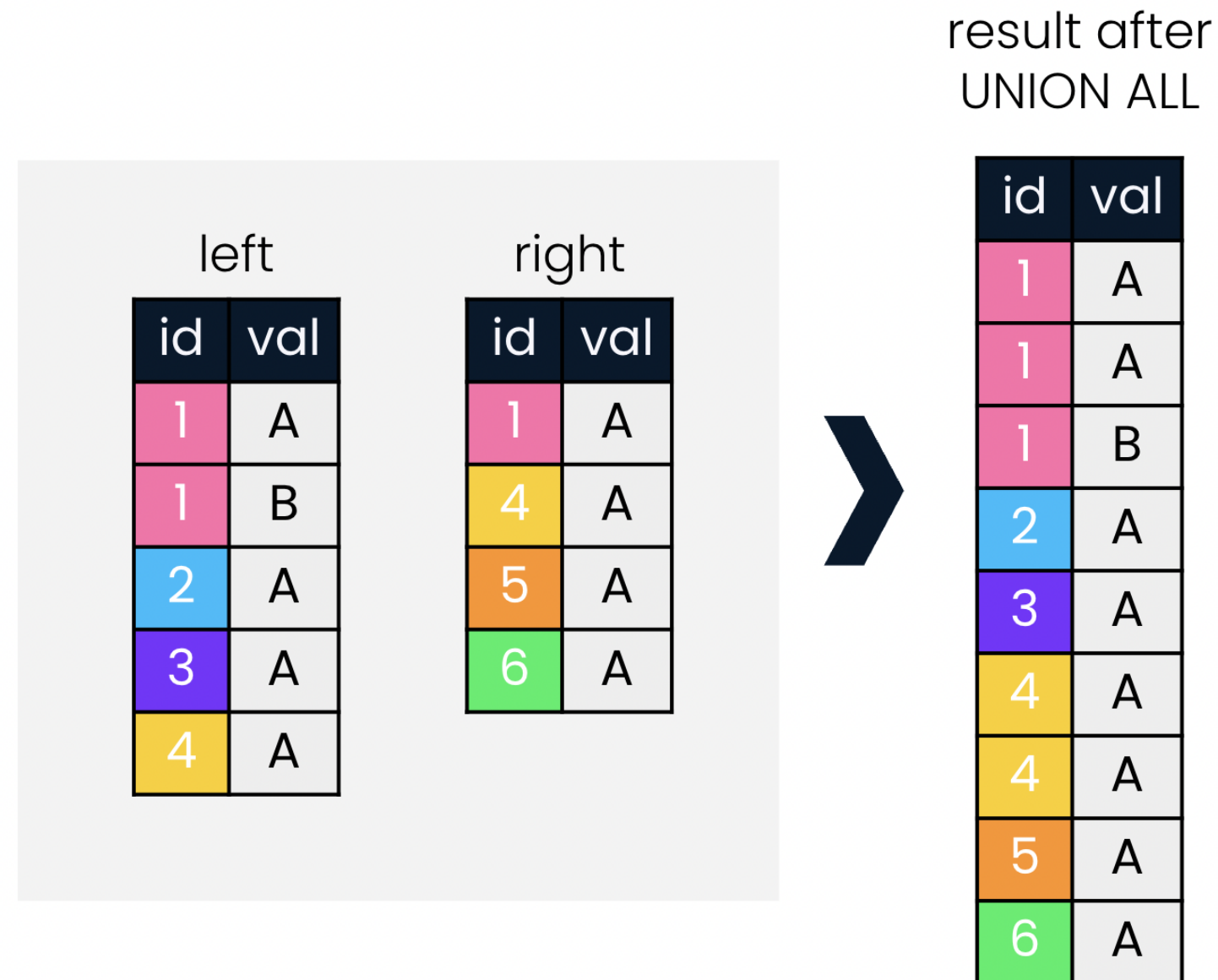
# UNION diagram

- **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

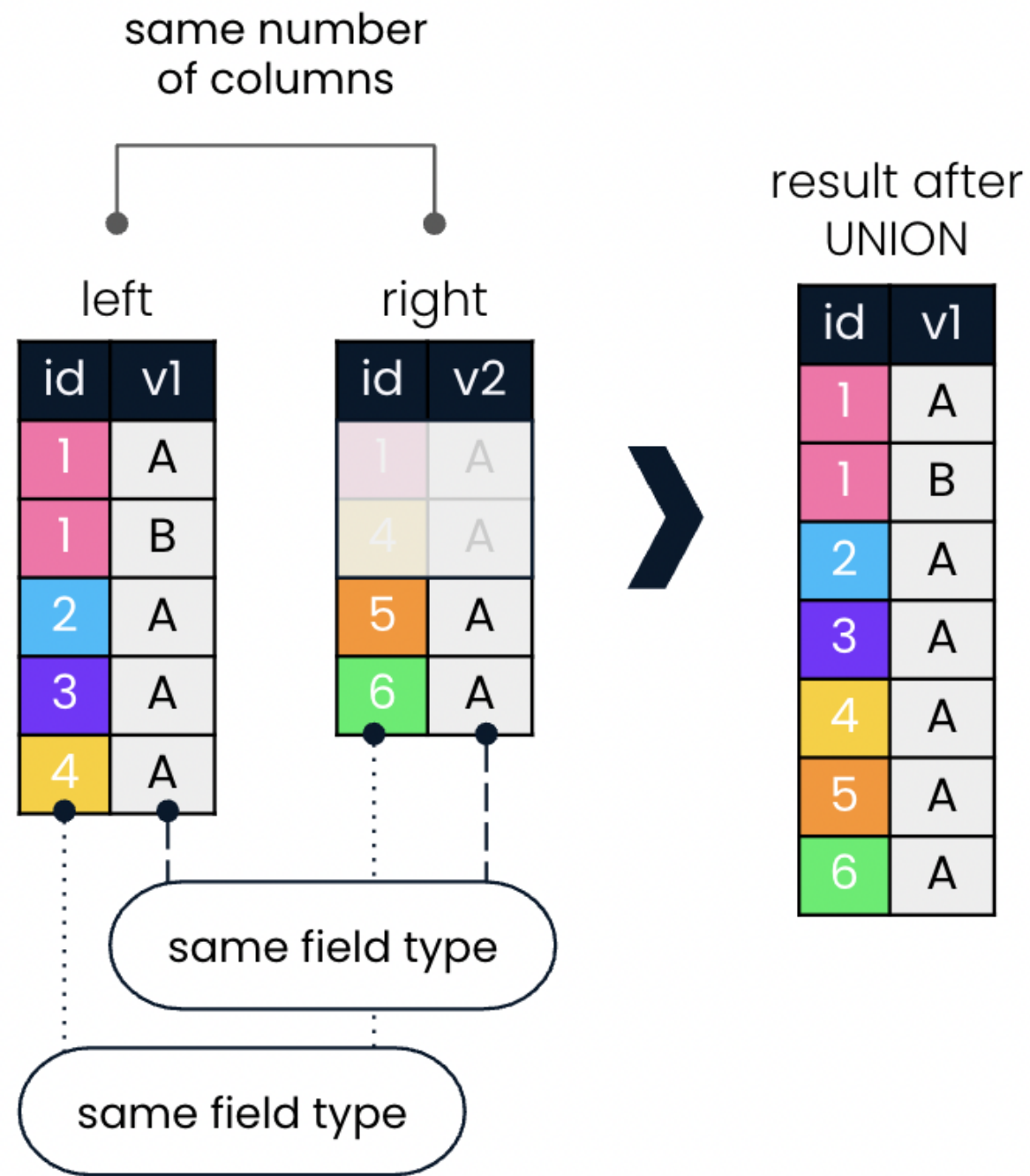
## UNION syntax

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

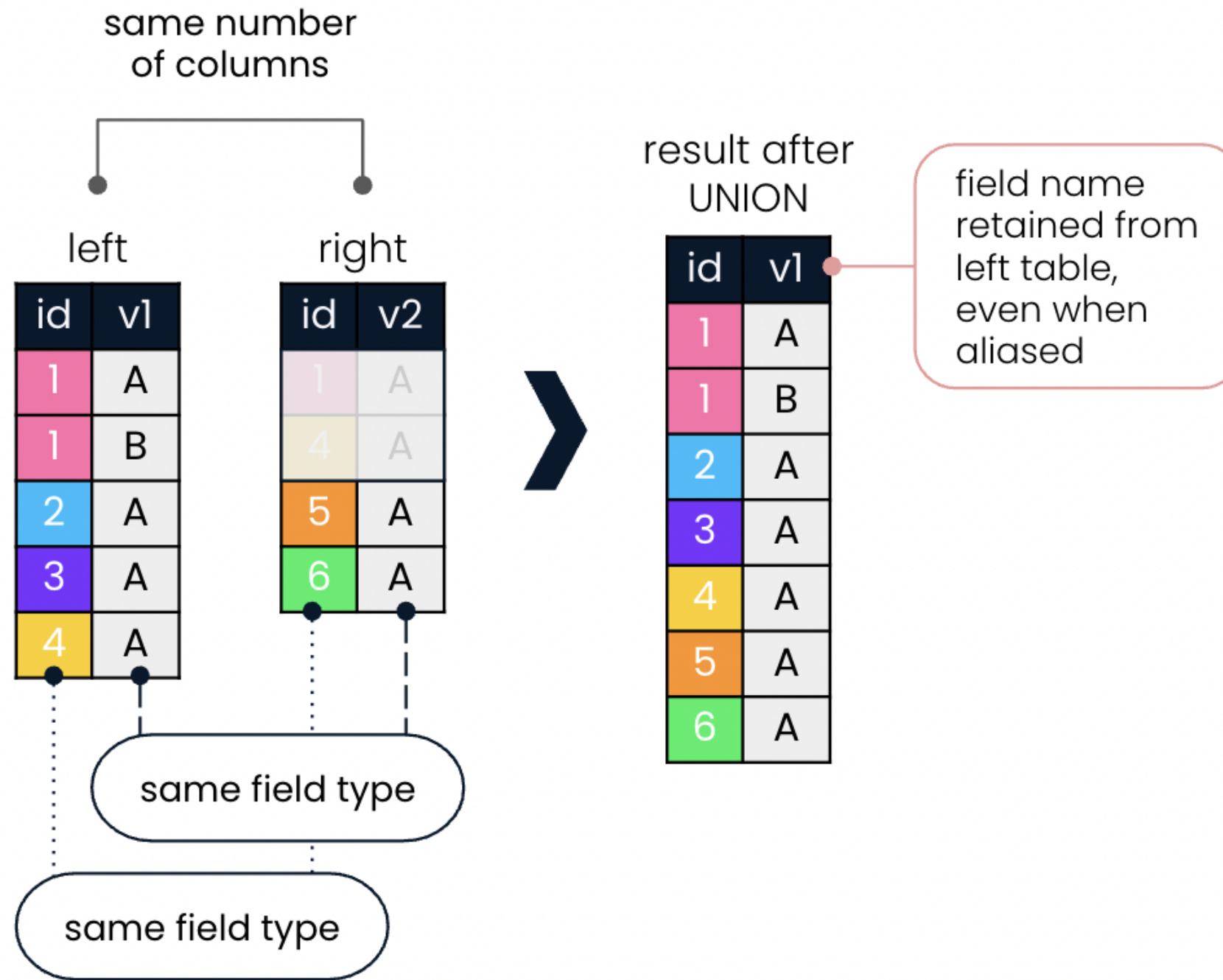
## UNION ALL syntax

```
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

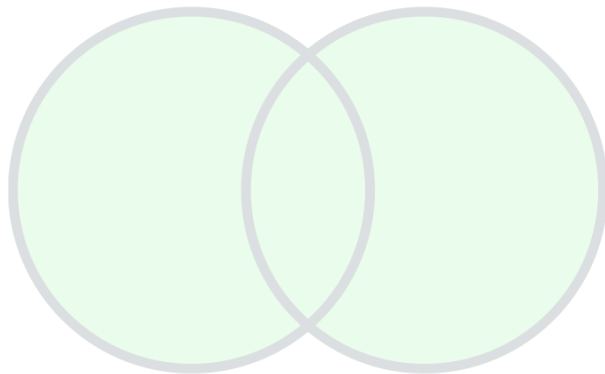


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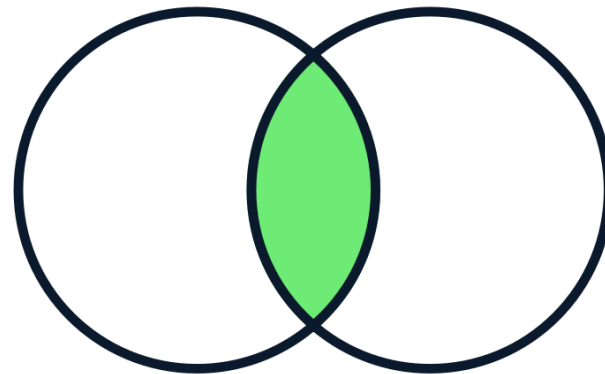
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# INTERSECT Venn diagram

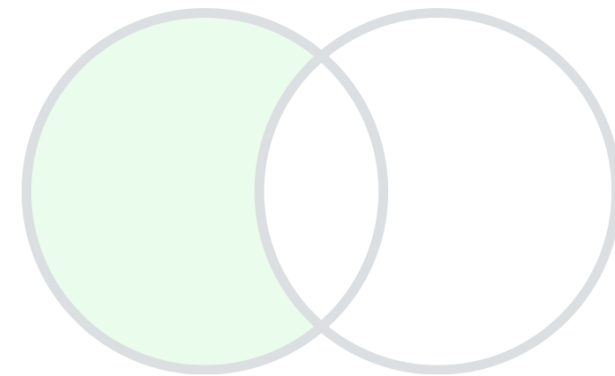
UNION



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;
```

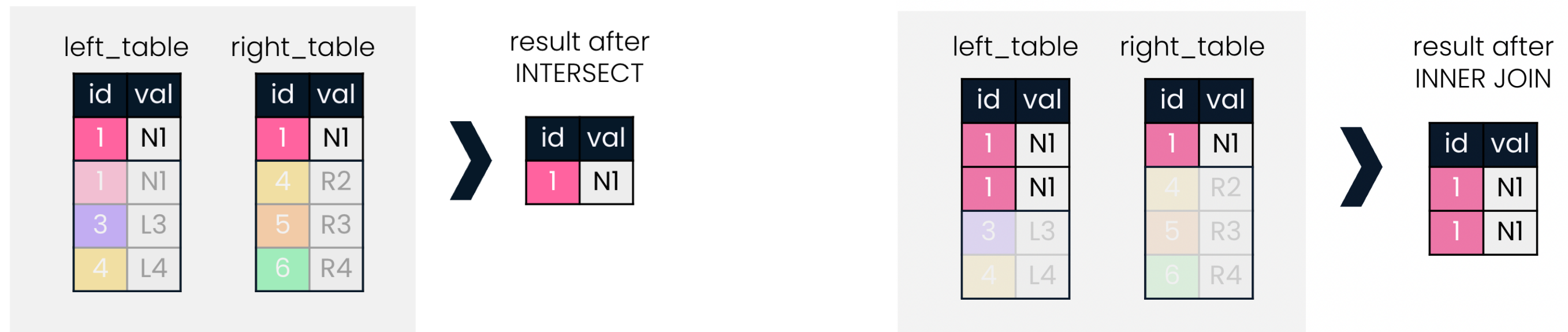
# INTERSECT vs. INNER JOIN on two columns

## 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



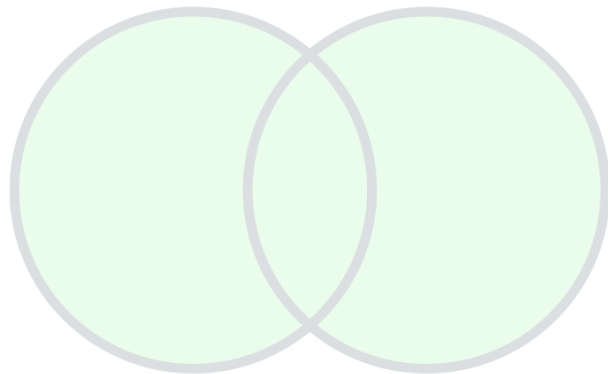
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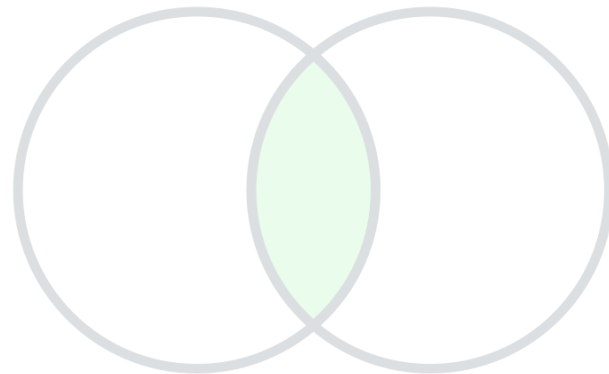


# EXCEPT Venn diagram

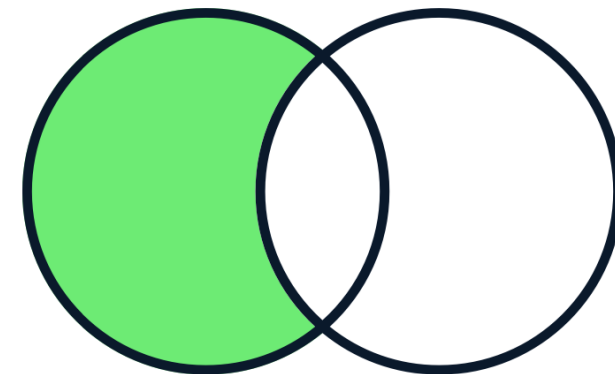
UNION



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