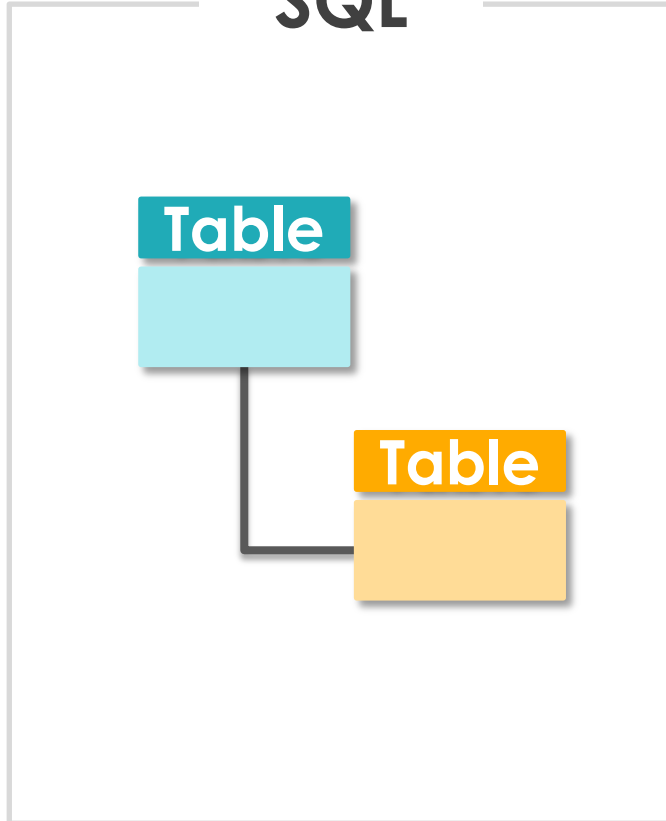
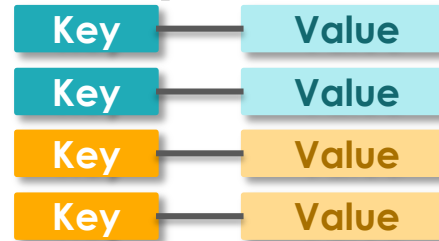


SQL

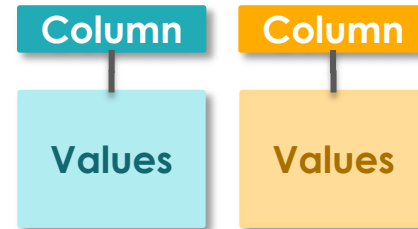


No SQL

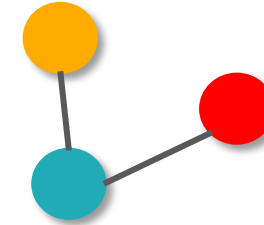
Key-Value



Column Store

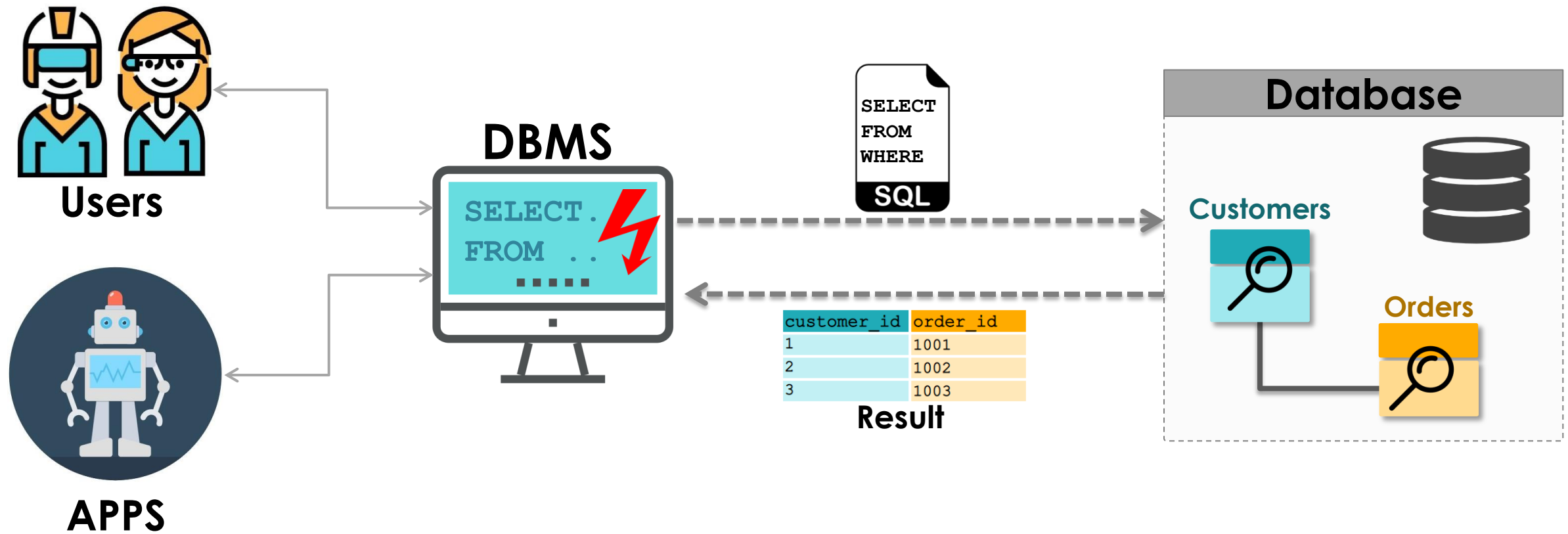


Graph Store



Document





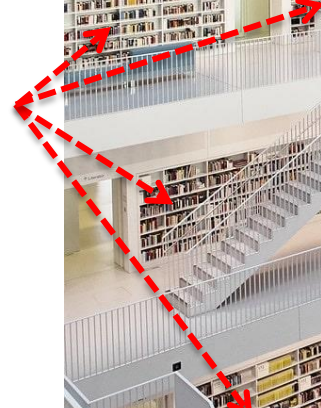


Book = Table

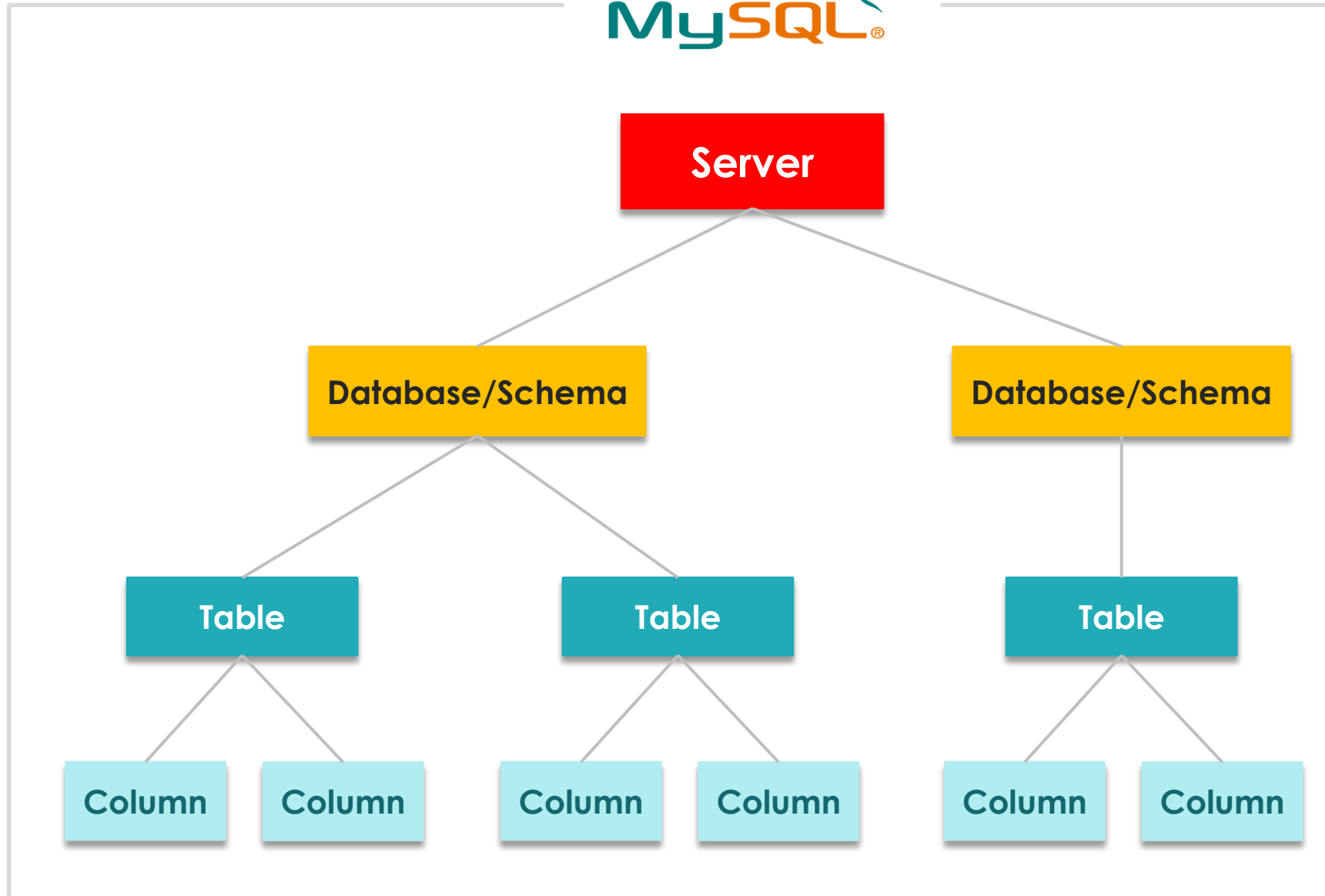
Library = Database

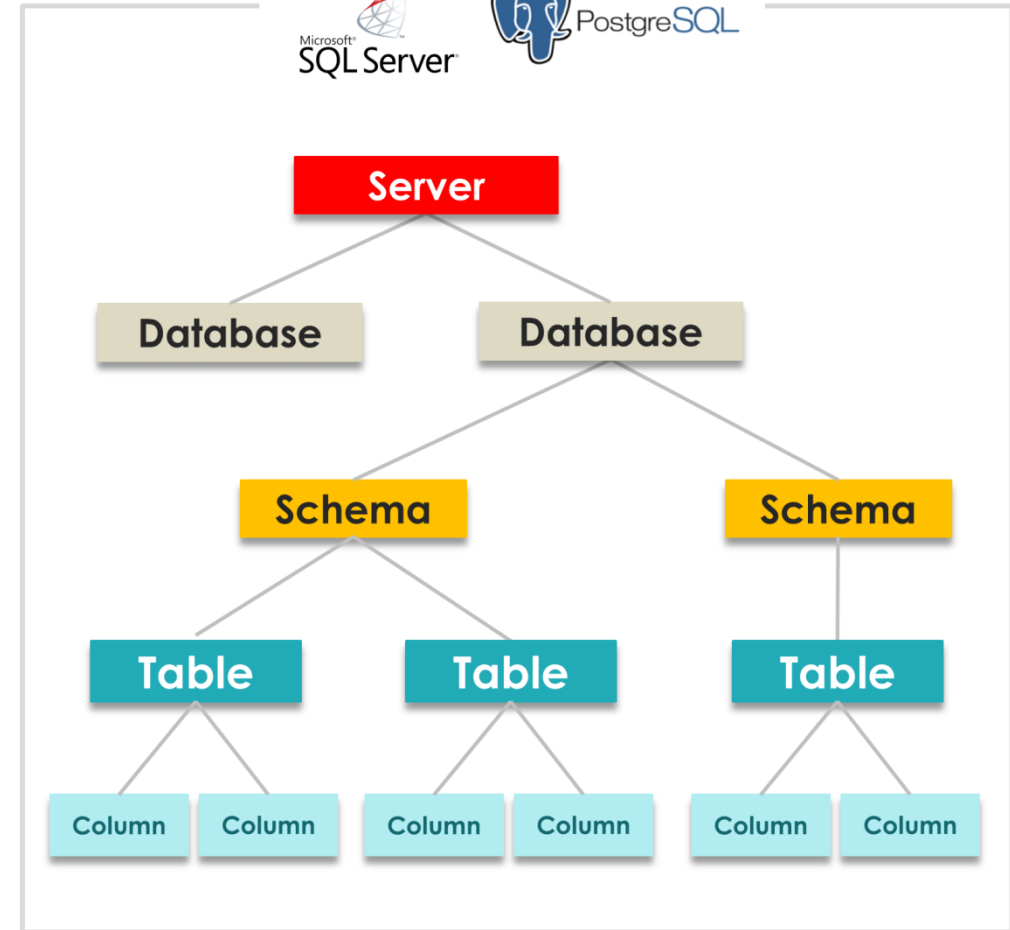
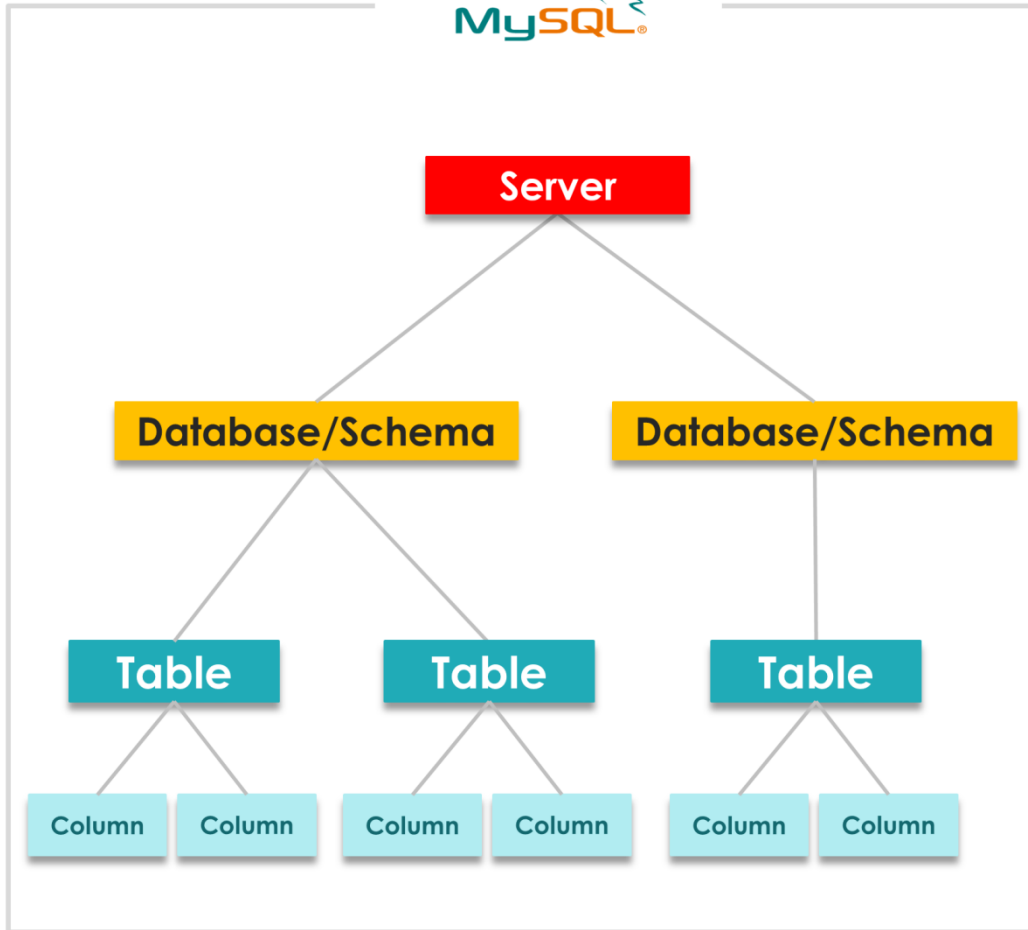


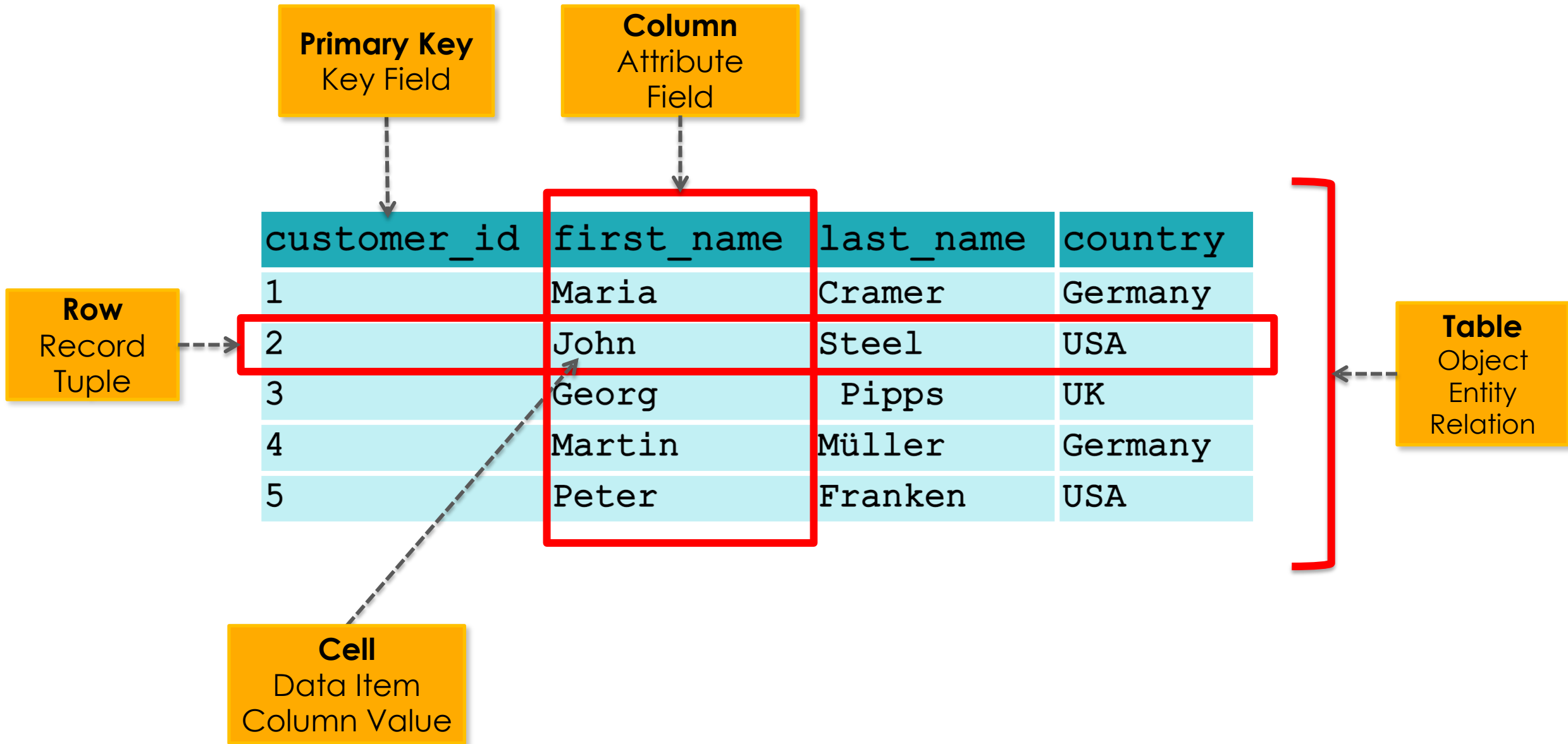
Category = Schema



Public Library Stuttgart







SQL Command Types



DDL
Data Definition Language

CREATE

DROP

ALTER



DQL
Data Query Language

SELECT



DML
Data Manipulation Language

INSERT

DELETE

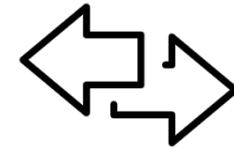
UPDATE



DCL
Data Control Language

GRANT

REVOKE



TCL
Transaction Control Language

COMMIT

ROLLBACK

SAVEPOINT

```
-- Select customer data
```

```
SELECT first_name, last_name
```

```
FROM customers
```

```
WHERE country = 'Italy`
```

```
AND score < 500
```


SQL Statement/Query

-- Select customer data

```
SELECT first_name, last_name
```

```
FROM customers
```

```
WHERE country = 'Italy`
```

```
AND score < 500
```

Comment

```
-- Select customer data
```

```
SELECT first_name, last_name
```

```
FROM customers
```

```
WHERE country = 'Italy`
```

```
AND score < 500
```

-- Select customer data

```
SELECT first_name, last_name
```

```
FROM customers
```

```
WHERE country = 'Italy`  
      AND score < 500
```

Clauses



-- Select customer data

SELECT first_name, last_name

FROM customers

WHERE country = 'Italy'

AND score < 500

Keywords



-- Select customer data

SELECT first_name, last_name

FROM customers

WHERE country = 'Italy'

AND score < 500

Identifiers



-- Select customer data

```
SELECT first_name, last_name
```

```
FROM customers
```

```
WHERE country = 'Italy`  
      AND score < 500
```

Operators



SQL Statement/Query

Comment

```
-- Select customer data
```

Clauses

```
SELECT first_name, last_name
```

Keywords

```
FROM customers
```

```
WHERE country = 'Italy'  
AND score < 500
```

Operators

Identifiers

SELECT Statement

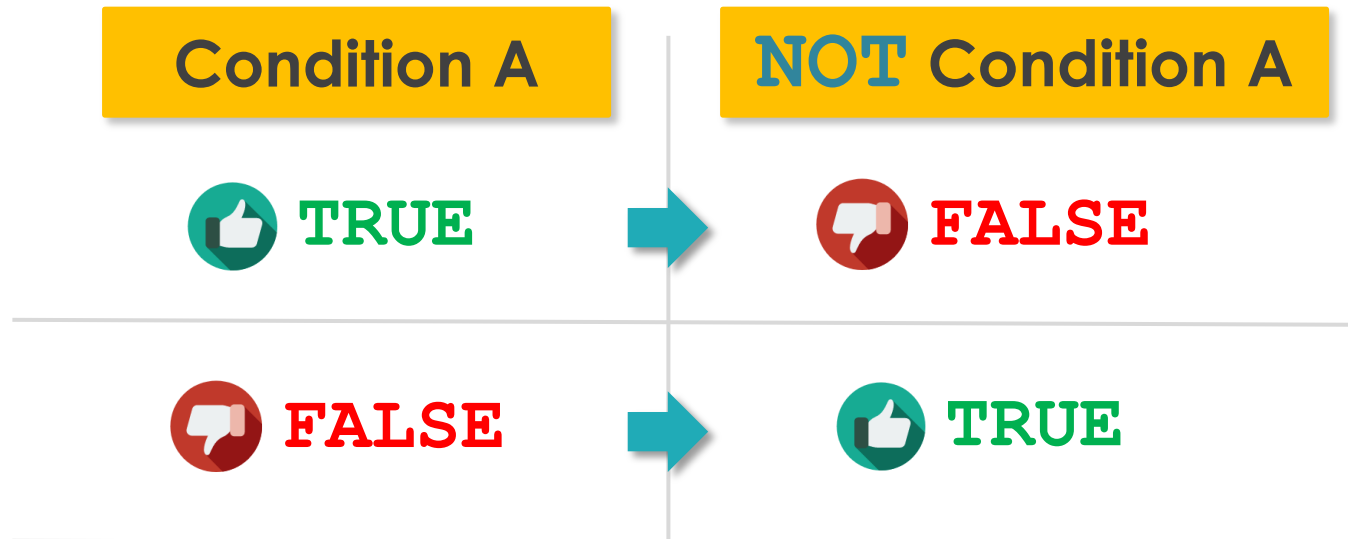


Logical Operators AND OR



Condition A	Condition B	A AND B	A OR B
TRUE	TRUE	TRUE	TRUE
TRUE	FALSE	FALSE	TRUE
FALSE	TRUE	FALSE	TRUE
FALSE	FALSE	FALSE	FALSE

Logical Operators NOT



WHERE Operators

Comparison Operators

=	Equal
!= or <>	Not equal
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to

Logical Operators

AND	Return True if both conditions are True
OR	Return True if one of conditions is True
NOT	Reverse the result of any Boolean operator
IN	Return True if a value is in a set of values
BETWEEN	Return True if a value falls within a specific range
LIKE	Return True if a value matches a pattern

WHERE Operators



Comparison Operators

=	Equal
!=	Not Equal
<>	Not Equal
>	Greater than
<	Less than
=>	Greater than or equal to
<=	Less than or equal to

Logical Operators













AND	Return True if both conditions are true
OR	Return True if one of conditions is true
NOT	Reverse the result of any Boolean operator
IN	Return True if a value is in a set of values
BETWEEN	Return True if a value falls within a specific range
LIKE	Return True if a value matches a pattern

Logical Operators AND OR















Condition A	Condition B	A AND B	A OR B
TRUE	TRUE	TRUE	TRUE
TRUE	FALSE	FALSE	TRUE
FALSE	TRUE	FALSE	TRUE
FALSE	FALSE	FALSE	FALSE

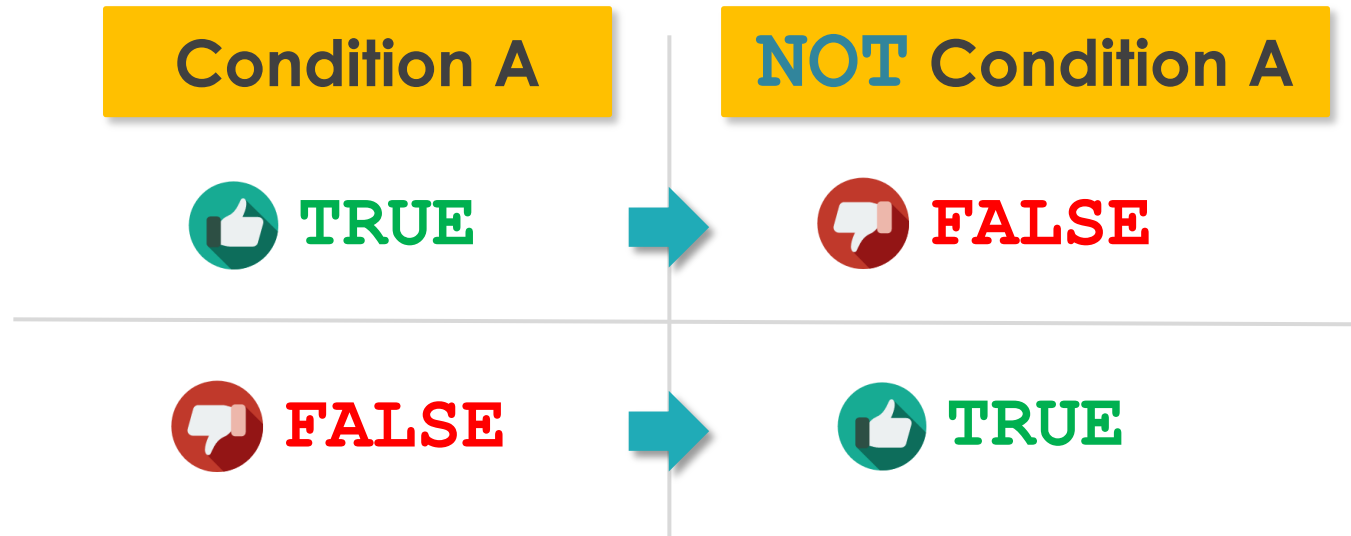
AND - Return True only if both conditions are true

Condition A	Condition B	A AND B
 TRUE	 TRUE	 TRUE
 TRUE	 FALSE	 FALSE
 FALSE	 TRUE	 FALSE
 FALSE	 FALSE	 FALSE

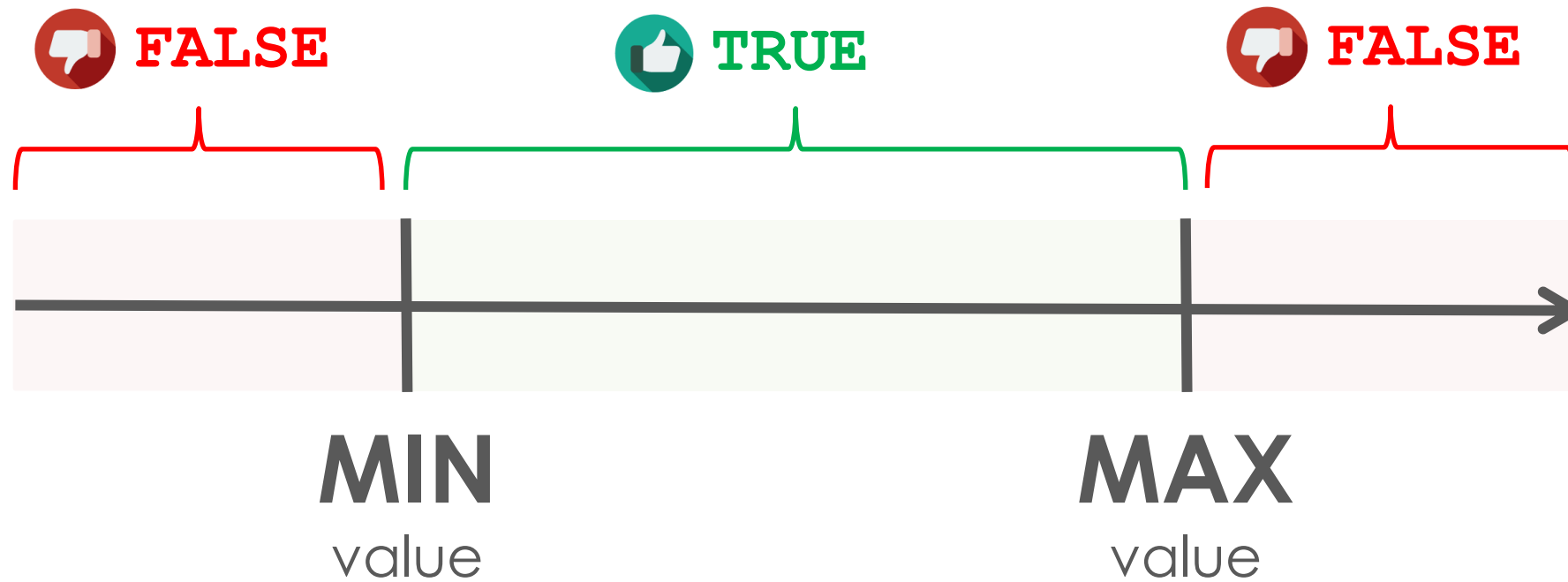
OR- Return True if one of conditions is true

Condition A	Condition B	A OR B
 TRUE	 TRUE	 TRUE
 TRUE	 FALSE	 TRUE
 FALSE	 TRUE	 TRUE
 FALSE	 FALSE	 FALSE

NOT - Reverse the result of any Boolean operator



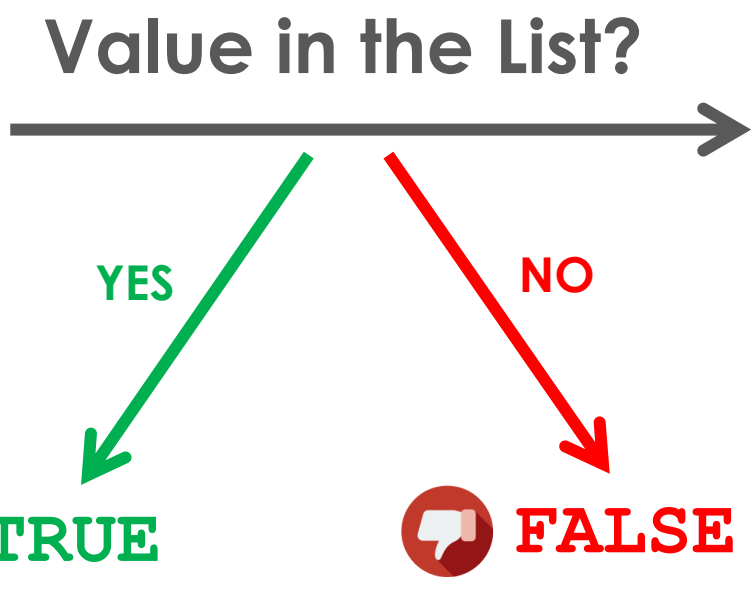
BETWEEN- Return True if a value falls within a specific range



IN - Return True if a value is in a list of values


Customers

customer_id	first_name	last_name	country	score
1	Maria	Cramer	Germany	350
2	John	Steel	USA	900
3	Georg	Pipps	UK	750
4	Martin	Müller	Germany	500
5	Peter	Franken	USA	NULL



Checklist

Value 1
Value 2
Value 3
...
Value N



LIKE - Return True if a value matches a **pattern**

- Percent % matches anything
- Underscore _ matches exactly one character

	<u>Pattern</u>
Find names <u>begins</u> with 'M'	M%
Find names <u>ends</u> with 'n'	%n
Find names <u>containing</u> the 'r'	%r%
Find names <u>containing</u> the 'r' at 3d position	__r%

Find names begins with 'M'

Pattern **M**%

Maria

Maria

John

John

Georg

Georg

Martin

Martin

Peter

Peter

Find names ends with 'n'

Pattern % **n**

Maria

Mari **a**

John

Joh **n**

Georg

Geor **g**

Martin

Marti **n**

Peter

Pete **r**

Find names containing the 'r'

Pattern % **r** %

Maria

Ma **r** ia

John

John

Georg

Geo **r** g

Martin

Ma **r** tin

Peter

Pete **r**

Find names containing the 'r' at 3d position

Pattern **r** %

Maria

Ma**r**ia

John

Jo**h**n

Georg

Ge**o**rg

Martin

Ma**r**tin

Peter

Pe**t**er

SQL JOINS



Customers

customer_id	first_name	last_name	country	score
1	Maria	Cramer	Germany	350
2	John	Steel	USA	900
3	Georg	Pipps	UK	750
4	Martin	Müller	Germany	500
5	Peter	Franken	USA	NULL

Join Key

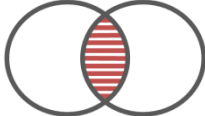
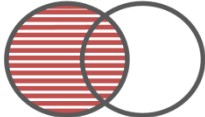
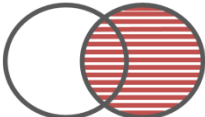



customer_id

Orders

order_id	customer_id	order_date	quantity
1001	1	2021-01-21	250
1002	2	2021-04-05	1150
1003	3	2021-06-18	500
1004	6	2021-08-31	750

Join Type

-  INNER Join
-  LEFT Join
-  RIGHT Join
-  FULL Join

INNER JOIN

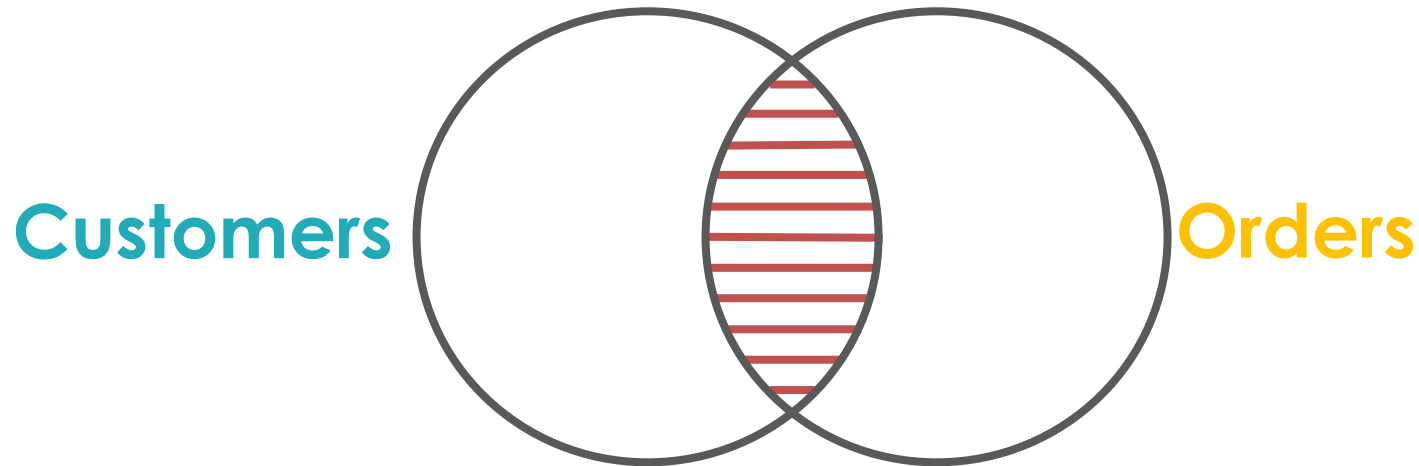


LEFT Table

Only matching Rows

RIGHT Table

Only matching Rows



LEFT JOIN

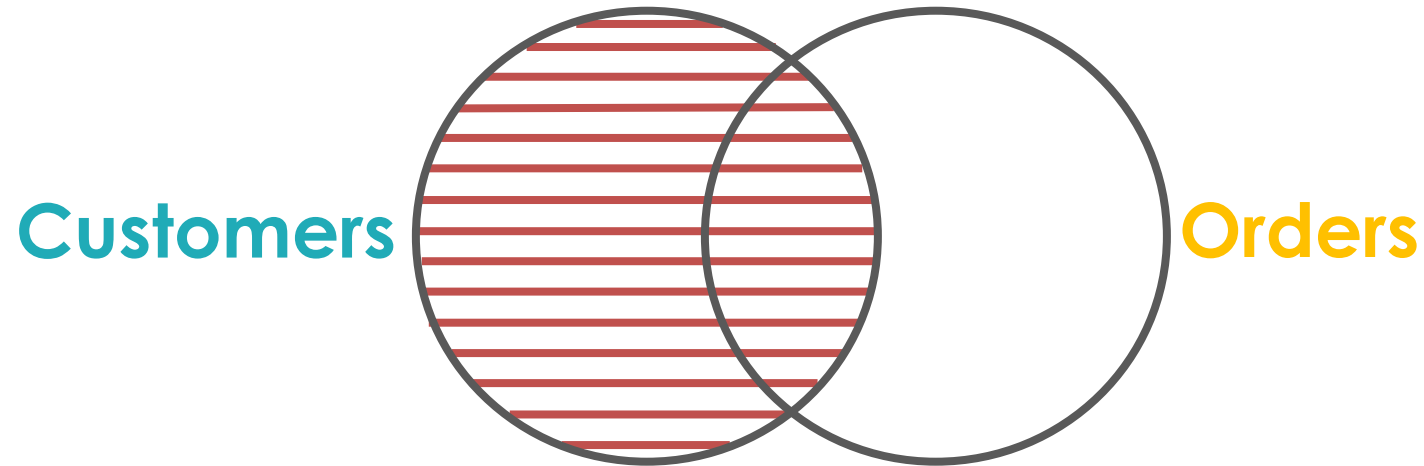


LEFT Table

Return ALL Rows

RIGHT Table

Only matching Rows



RIGHT JOIN

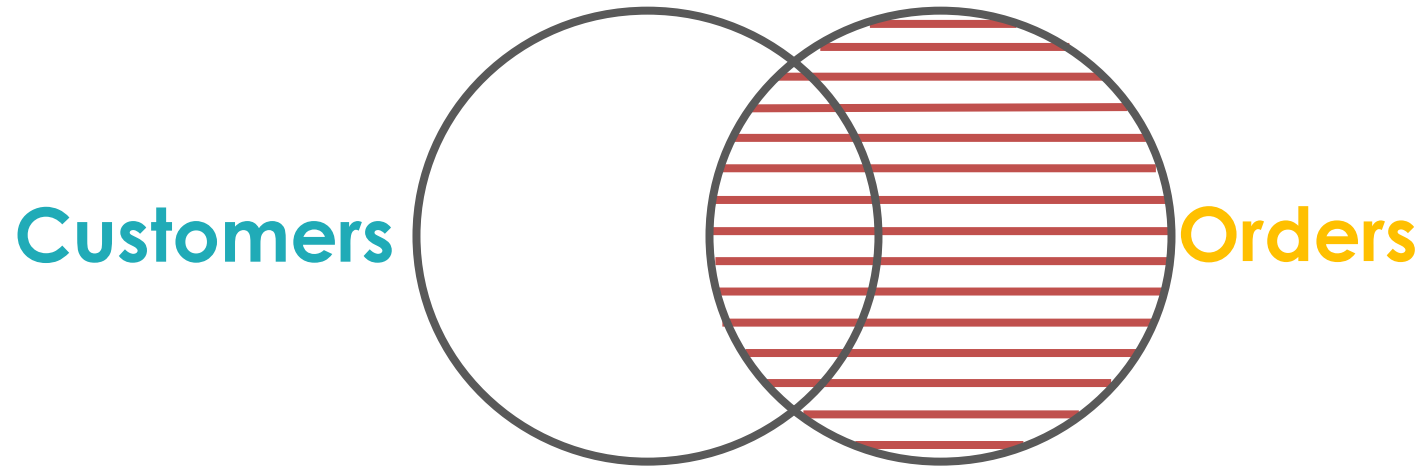


LEFT Table

Only matching Rows

RIGHT Table

Return ALL Rows



FULL JOIN



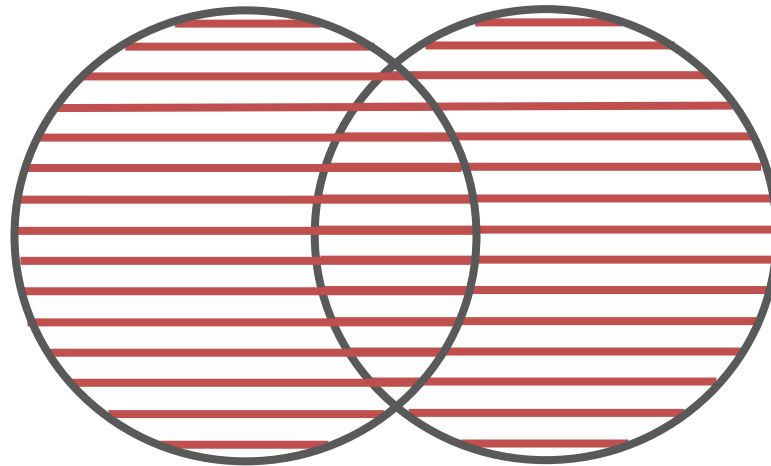
LEFT Table

Return ALL Rows

RIGHT Table

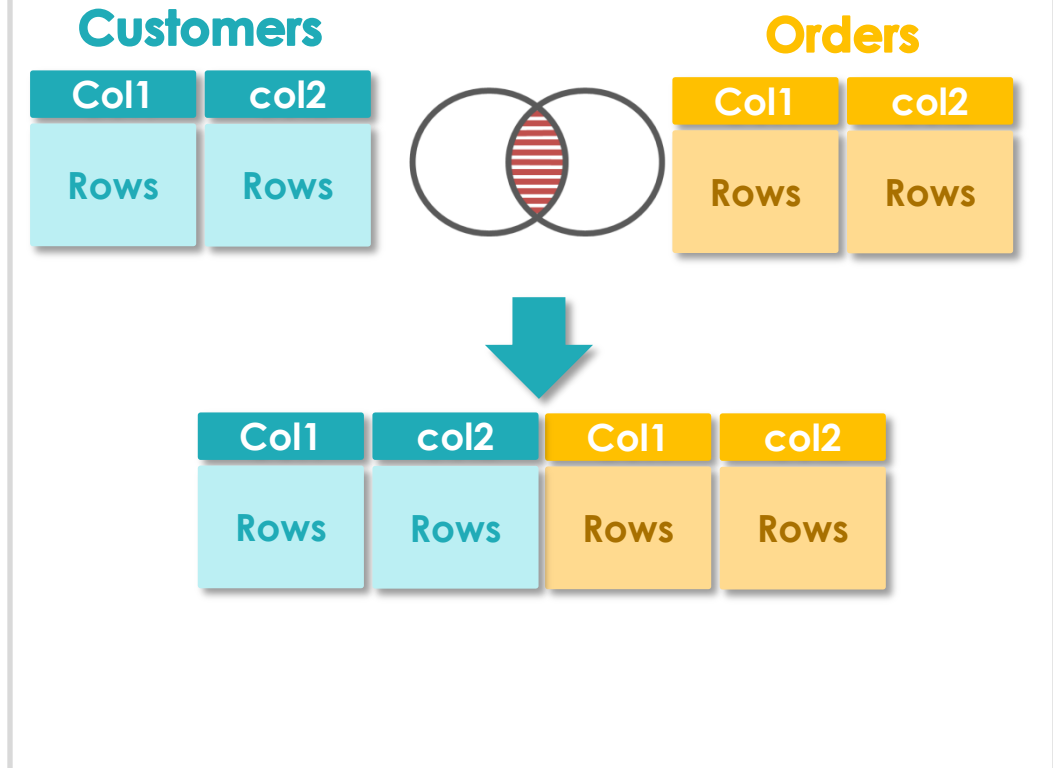
Return ALL Rows

Customers

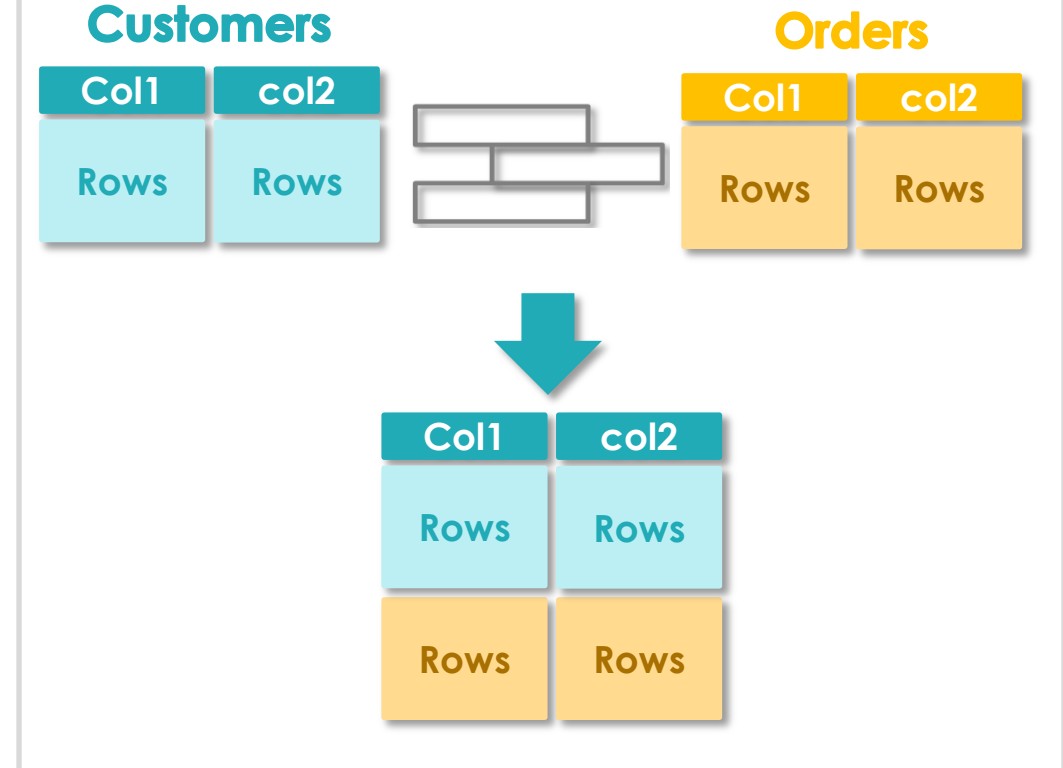


Orders

JOINS



UNION



SQL Aggregate Functions

COUNT ()

Returns the number of rows in a result set

SUM ()

Returns the sum of values

AVG ()

Returns the average of values

MAX ()

Returns the maximum value

MIN ()

Returns the minimum value

SQL String Functions

CONCAT ()

Returns a string by concatenating two or more string values.

LOWER ()

Converts a string to lowercase.

UPPER ()

Converts a string to uppercase.

TRIM ()

Remove leading and trailing spaces from a string.

LENGTH ()

Returns the length of a string

SUBSTRING ()

Returns a substring from string.

SQL Date Functions

NOW ()

Returns the current date and time.

DAY ()

Returns the day of the month (0-31).

MONTH ()

Returns the month from the date passed (1-12).

YEAR ()

Returns the year.

DATE_ADD ()

Adds a specified time value (or interval) to a date value.

DATE_SUB ()

Subtracts a specified time value (or interval) from a date value.

DATEDIFF ()

Returns the number of days between two dates

Subqueries

Customers

customer_id	first_name	last_name	country	score
1	Maria	Cramer	Germany	350
2	John	Steel	USA	900
3	Georg	Pipps	UK	750
4	Martin	Müller	Germany	500
5	Peter	Franken	USA	NULL



Query

Customers

customer_id	first_name	last_name	country	score
1	Maria	Cramer	Germany	350
2	John	Steel	USA	900
3	Georg	Pipps	UK	750
4	Martin	Müller	Germany	500
5	Peter	Franken	USA	NULL



Query 1

Result

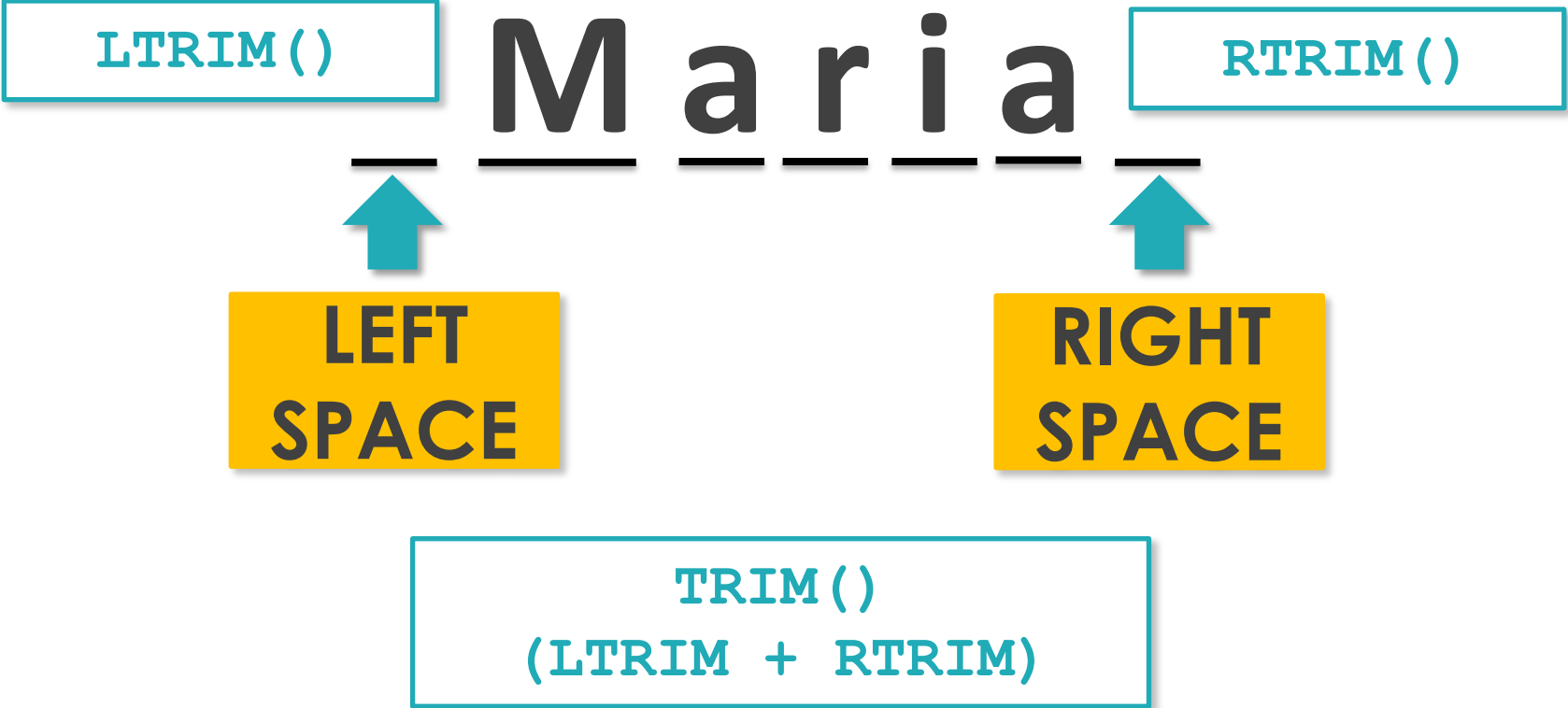


Query 2



(Subquery)

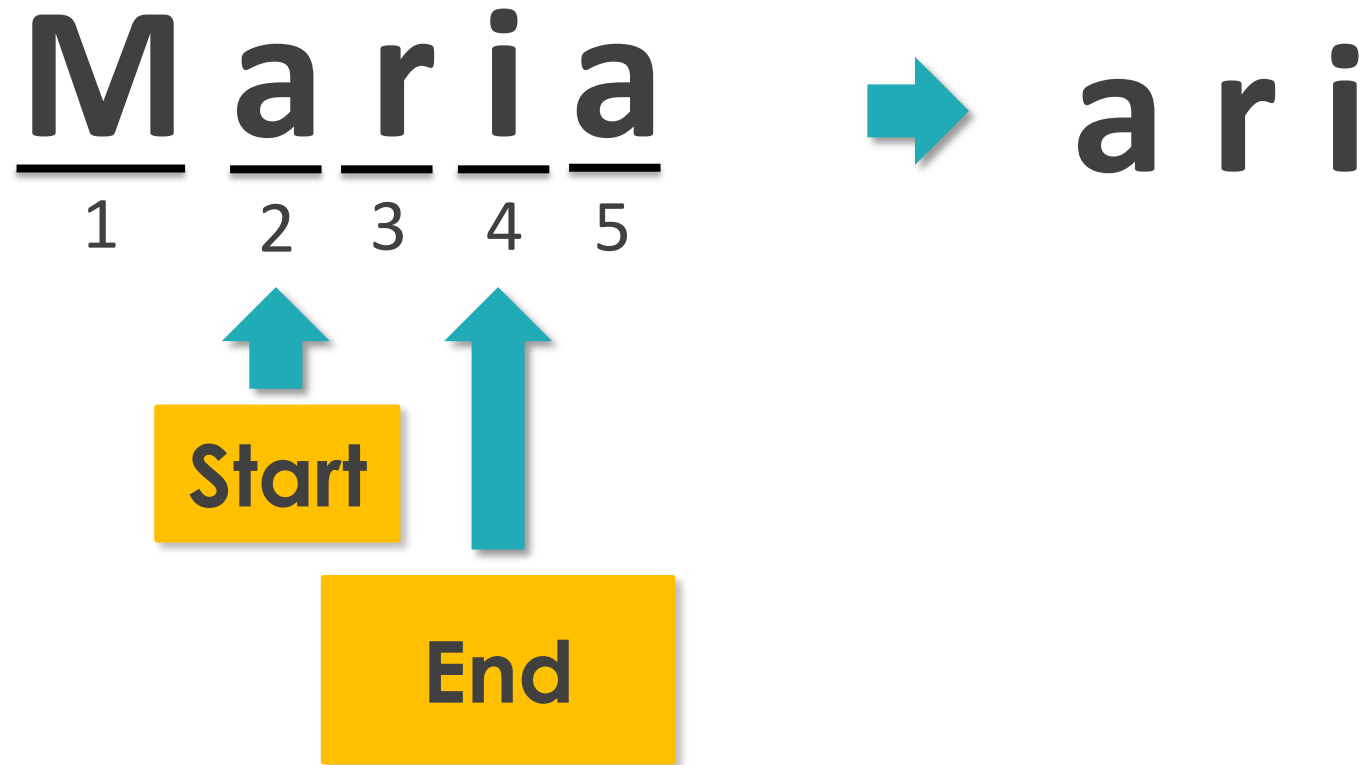
TRIM



SUBSTRING

SUBSTRING (Column , Start , Length)

SUBSTRING ('Maria' , 2 , 3)



COLUMN Definition

Column Name

Could be
Anything

Data Type

INT

VARCHAR

DATE

CHAR

...

Constraints

PRIMARY KEY

NOT NULL

UNIQUE

DEFAULT

...