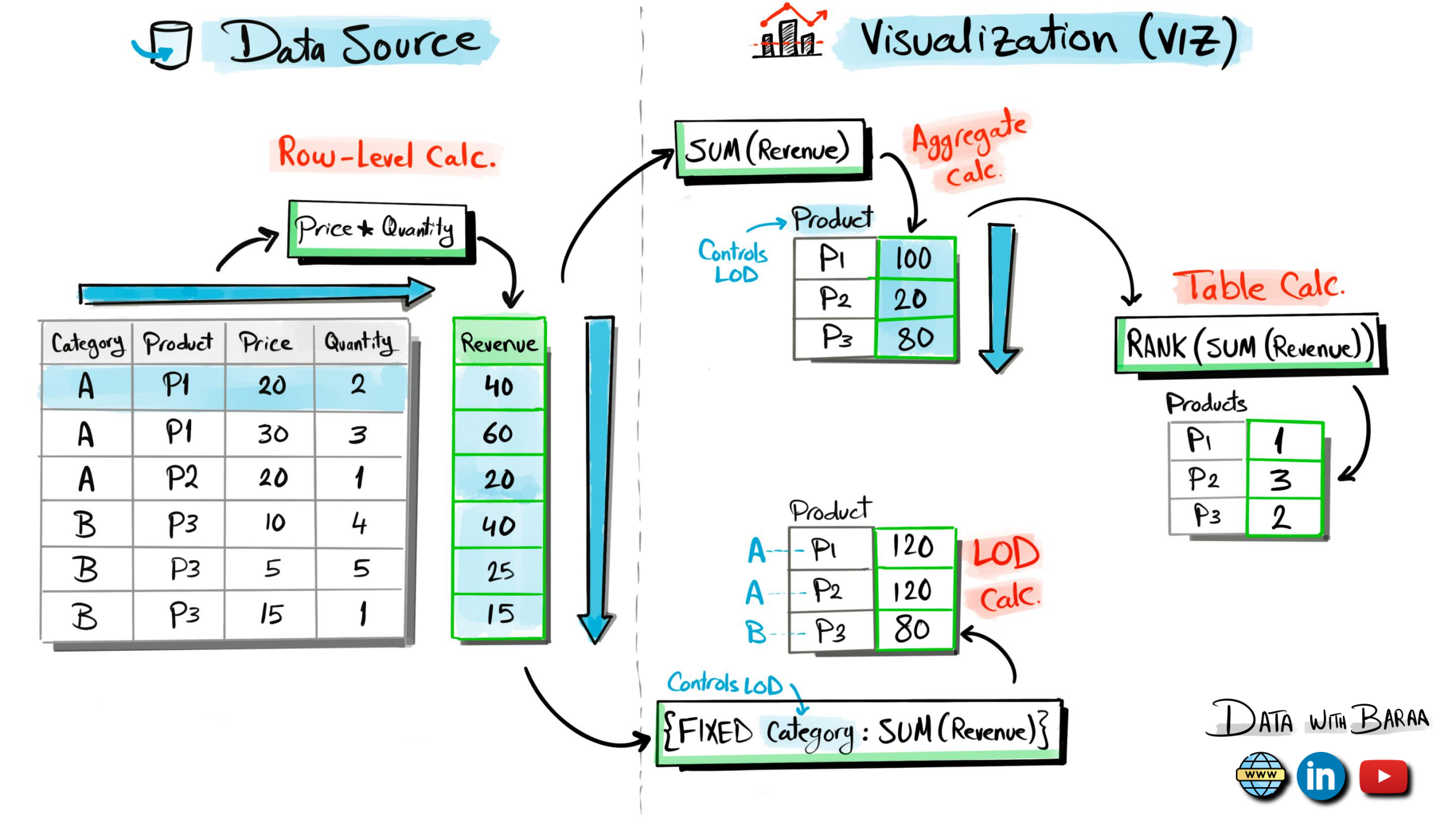
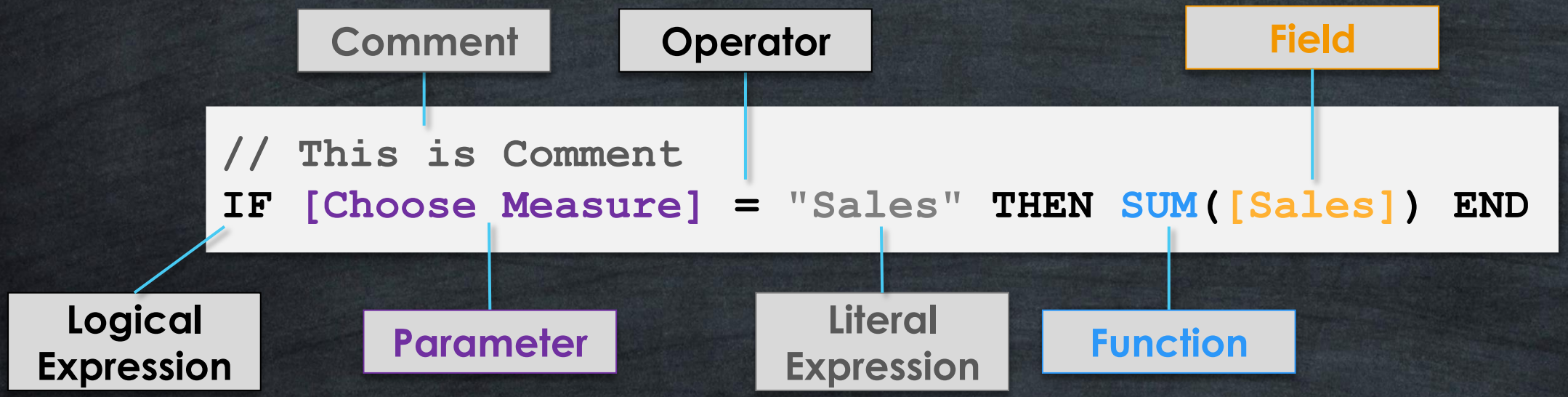

Data Source
Visualization (VIZ)
Row-Level Calc.
Price * Quantity
Category | Product | Price | Quantity
A | P1 | 20 | 2
A | P1 | 30 | 3
A | P2 | 20 | 1
B | P3 | 10 | 4
B | P3 | 5 | 5
B | P3 | 15 | 1
Revenue
40
60
20
40
25
15
SUM (Revenue)
Aggregate Calc.
Controls LOD
Product
P1 | 100
P2 | 20
P3 | 80
Table Calc.
RANK (SUM (Revenue))
Products
P1 | 1
P2 | 3
P3 | 2
Product
A P1 | 120
A P2 | 120
B P3 | 80
LOD Calc.
Controls LOD
{FIXED Category : SUM (Revenue)}
DATA WITH BARAA

Basic Components of Calculations



Order of Computation

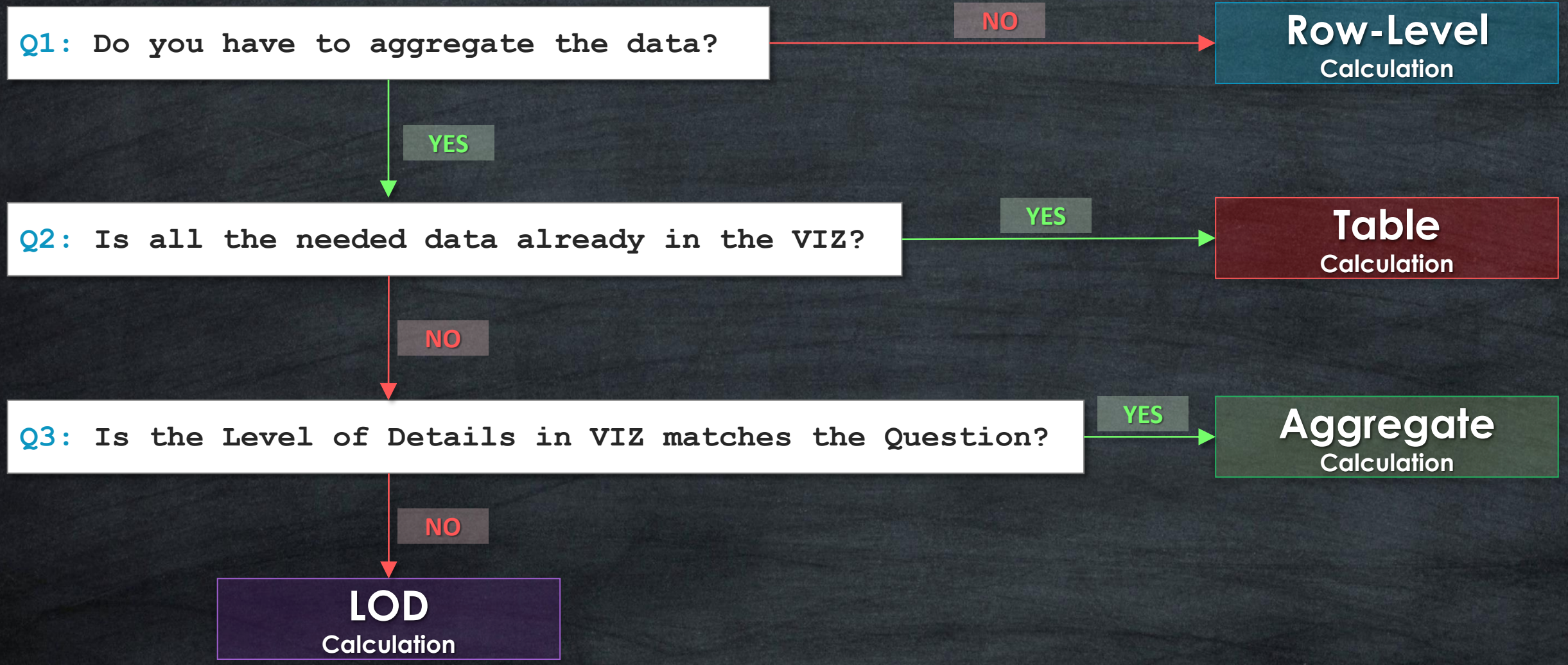

```
RANK(SUM([Quantity]*[Price]))
```

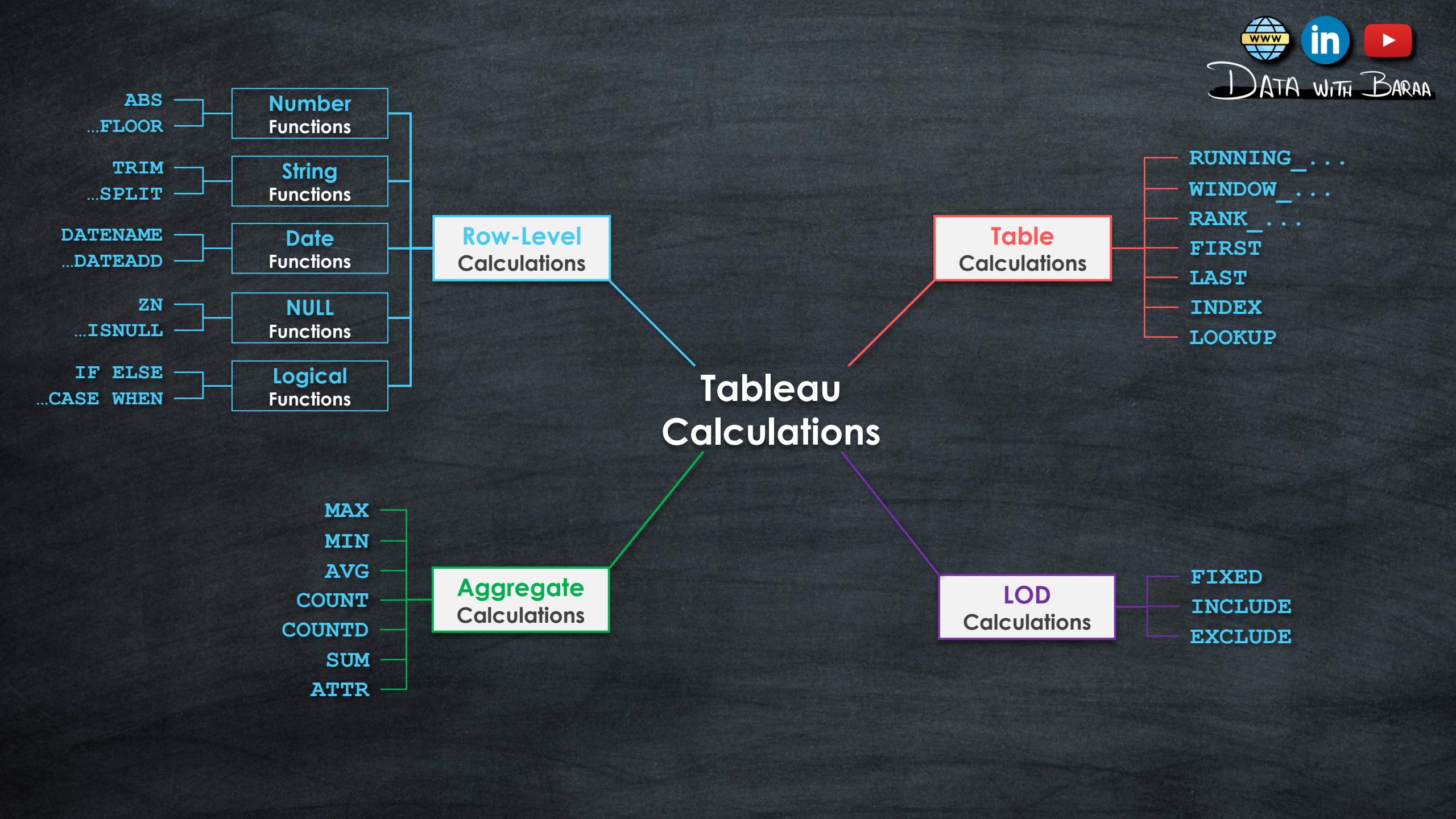
1. **Row-Level** Calculation
2. **Aggregate** Calculation
3. **Table** Calculation

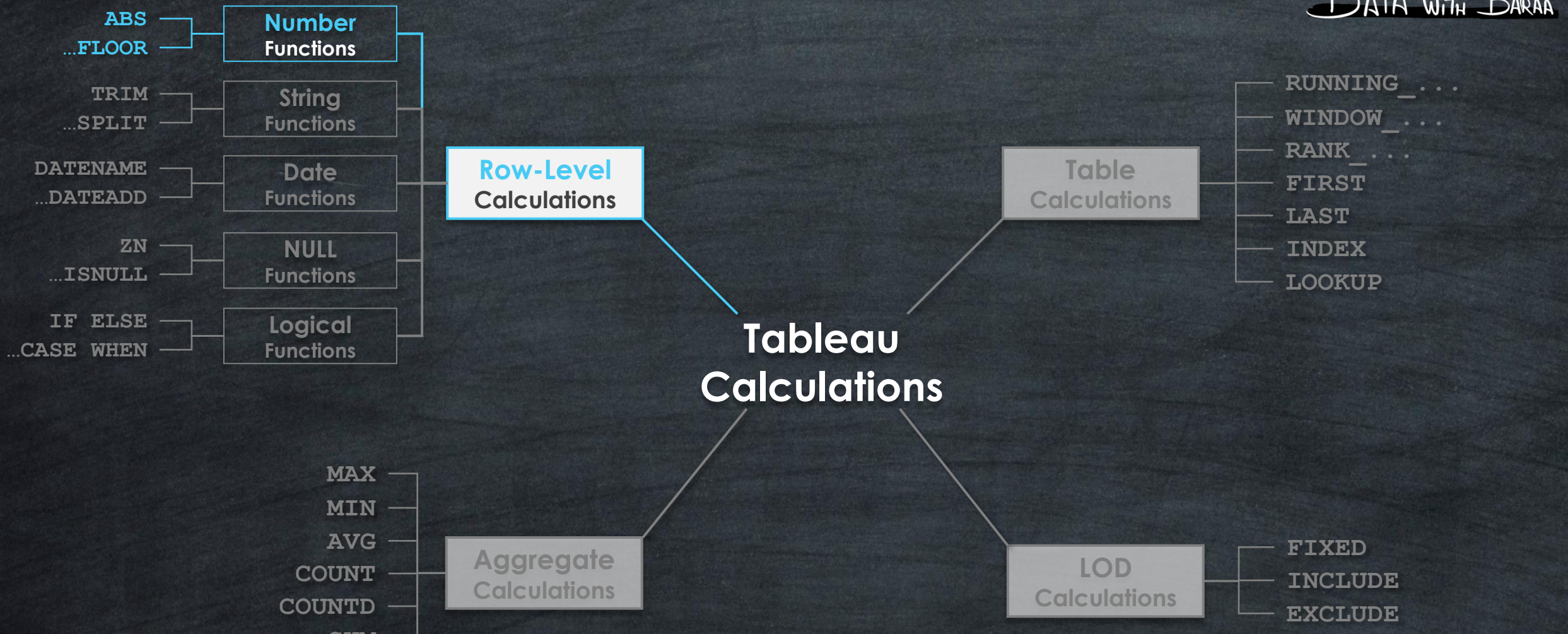
Row-Level Calculation	Aggregate Calculation	LOD Calculation	Table Calculation
`[Quantity]*[Price]`	`SUM([Revenue])`	`{FIXED [Category]:SUM([Revenue])}`	`RANK(SUM([Revenue]))`
Do Not Aggregate Data	Aggregate Data	Aggregate Data	Aggregate Data
Row Level	VIZ Level Of Details	Specific Level Of Details	VIZ Level Of Details
Calculated using Data in Data Source	Calculated using Data in Data Source	Calculated using Data in Data Source	Calculated using Data in VIZ
Pre-Calculated	Calculated in the Fly	Calculated in the Fly	Calculated in the Fly
Simple Calcuations	Simple Calcuations	Complex Calcuations	Complex Calcuations

Calculation Intro

Choose the Right Calculation Type




DATA WITH BARAA
Tableau Calculations
Row-Level Calculations
Number Functions
ABS
...FLOOR
String Functions
TRIM
...SPLIT
Date Functions
DATENAME
...DATEADD
NULL Functions
ZN
...ISNULL
Logical Functions
IF ELSE
...CASE WHEN
Table Calculations
RUNNING_...
WINDOW_...
RANK_...
FIRST
LAST
INDEX
LOOKUP
Aggregate Calculations
MAX
MIN
AVG
COUNT
COUNTD
SUM
ATTR
LOD Calculations
FIXED
INCLUDE
EXCLUDE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MAX
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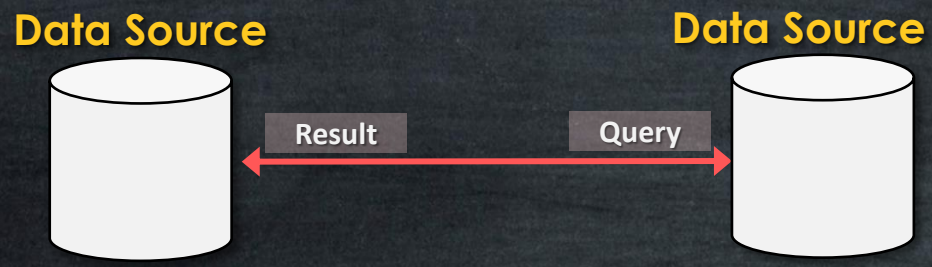
AVG
COUNT
COUNTD
SUM
ATTR
LOD Calculations
FIXED
INCLUDE
EXCLUDE

Row-Level Calculations

- Perform calculations at the row level individually
- Level of Details is the Data Source Rows
- Data will not be aggregated
- The calculations are performed on the data within the data source
- Calculation results will be stored in Data source and will not be calculated on the FLY



Number Functions
Use Cases

Main Purpose to is mainuplate Numerical Values

Simplify the numbers

- Functions to round the numbers to simplier form – `CEILING`, `FLOOR`, `ROUND`

NUMBER FUNCTIONS

CEILING, FLOOR, ROUND

DATA WITH BARAA

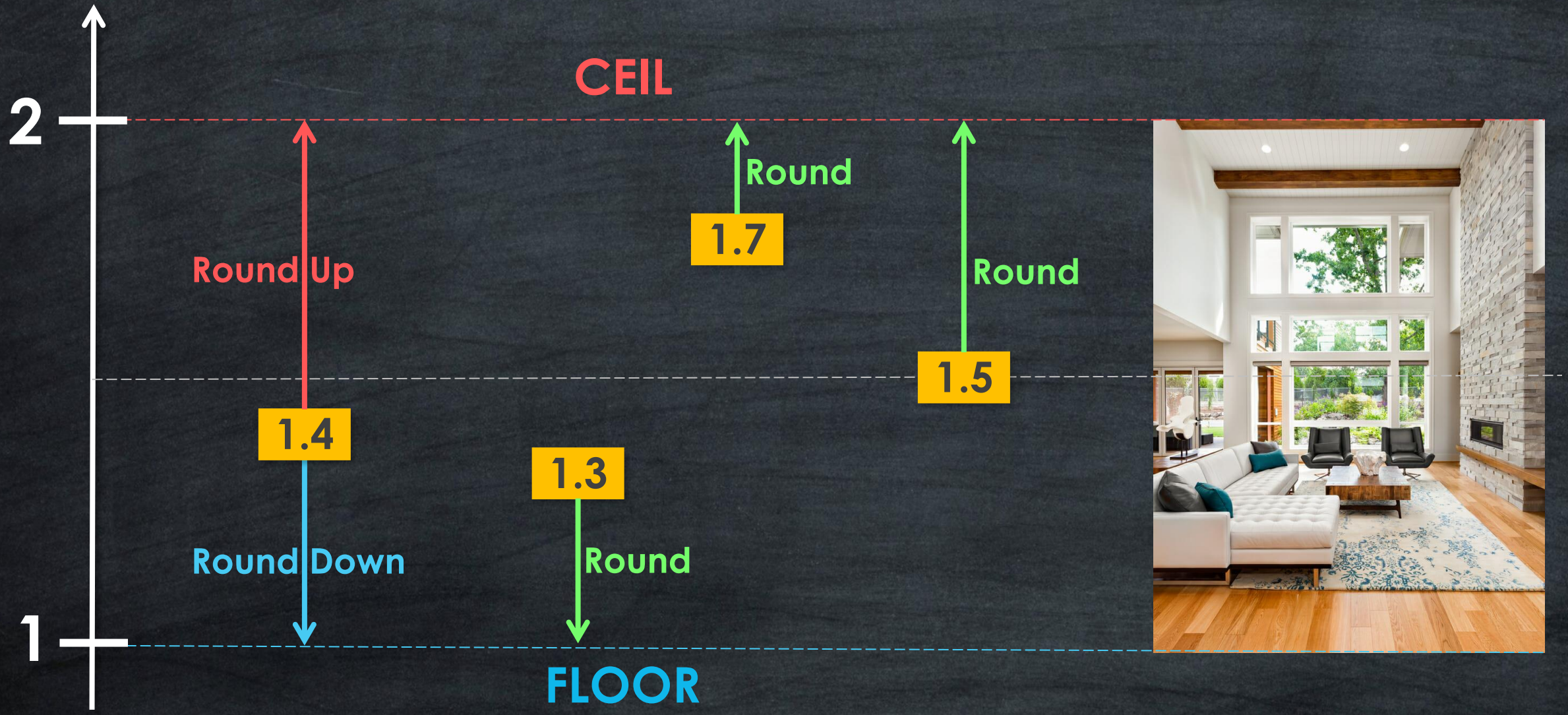
Sub C..	Sales - Decimals	Sales
Copiers	139,098.212	139,098
Machines	276,783.934	276,784
Tables	275,341.609	275,342
Bookcases	177,883.848	177,884
Chairs	400,898.015	400,898
Supplies	122,461.634	122,462
Phones	417,312.062	417,312
Storage	235,530.304	235,530
Accessories	185,790.794	185,791
Appliances	120,157.372	120,157
Binders	224,848.616	224,849
Furnishings	104,211.868	104,212
Envelopes	20,999.068	20,999
Paper	93,144.558	93,145
Art	31,210.714	31,211
Labels	14,442.388	14,442
Fasteners	4,354.200	4,354

The Purpose is to **Round**, **simplify** the numbers, and **hide details** in Visulizations.

NUMBER FUNCTIONS

CEILING, FLOOR, ROUND

DATA WITH BARAA



CEILING

Round up numbers

Syntax

```
CEILING(number)
```

Examples

`CEILING(1.2)`	→	2
`CEILING(1.8)`	→	2
`CEILING(1.5)`	→	2

FLOOR

Round Down numbers

Syntax

```
FLOOR(number)
```

Examples

`FLOOR(1.2)`	→	1
`FLOOR(1.8)`	→	1
`FLOOR(1.5)`	→	1

ROUND

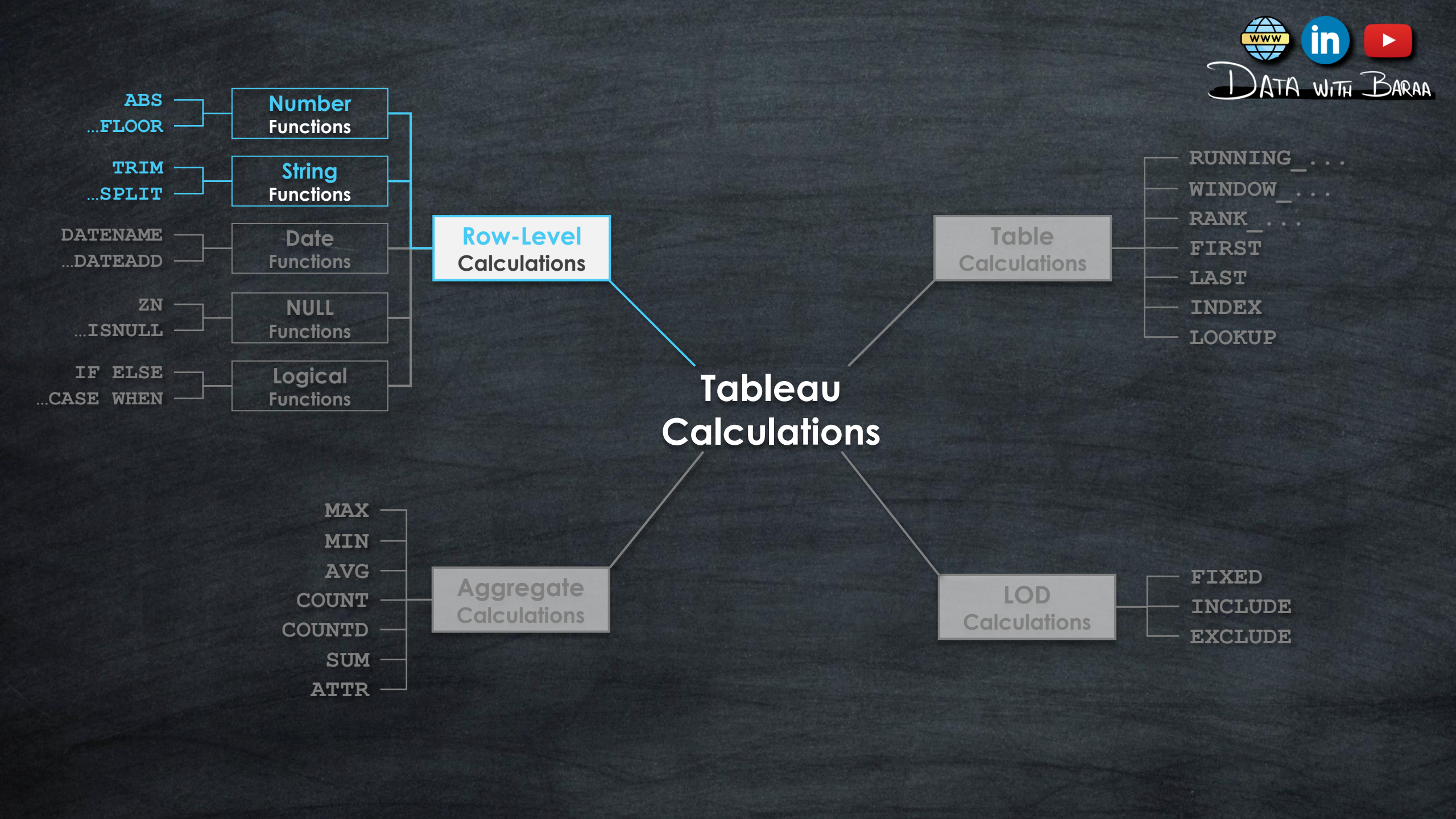
Round Numbers to nearest Integer

Syntax

```
ROUND(number,[decimal])
```

Examples

`ROUND(1.2)`	→	1
`ROUND(1.8)`	→	2
`ROUND(1.5)`	→	2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MAX
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LOD Calculations
FIXED
INCLUDE
EXCLUDE

String Functions
Use Cases

DATA WITH BARAA

Main Purpose to is Mainuplate Text Values

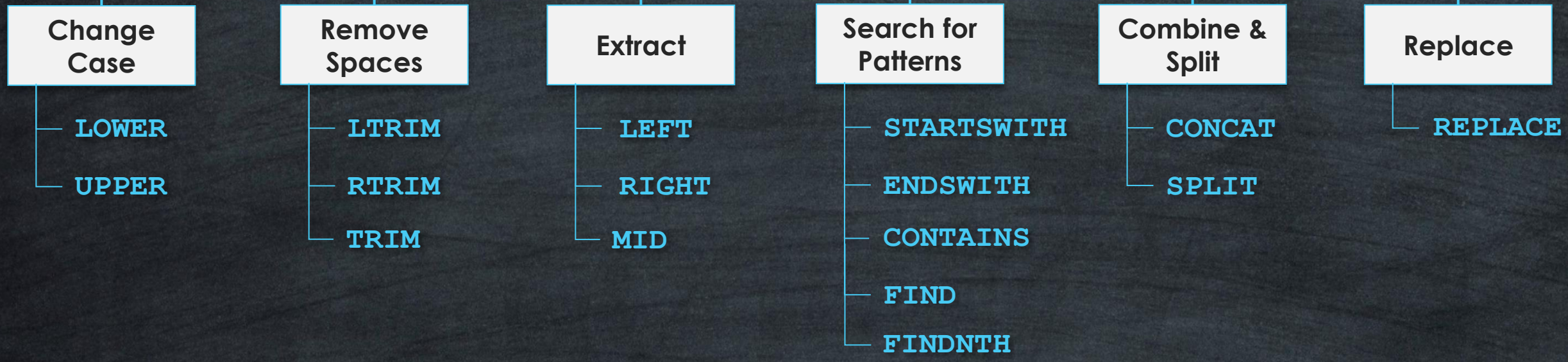
Data Cleaning

- Removing unwanted Characters - `REPLACE`
- Trimming Leading or trailing Spaces – `LTRIM,RTRIM,TRIM`

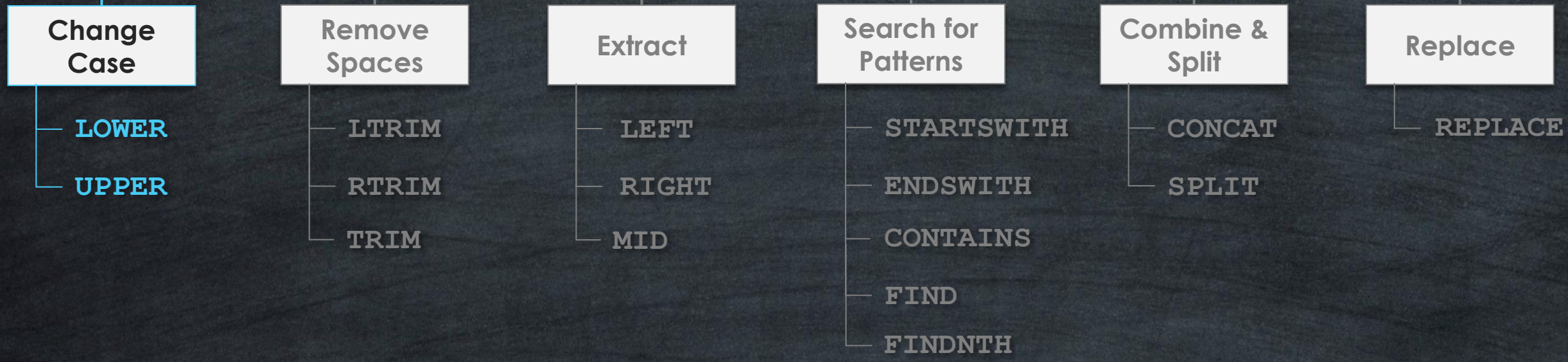
Data Transformation

- Data Extraction – `LEFT,RIGHT,MID`
- Spliting Data- `SPLIT`

String Functions
Use Cases

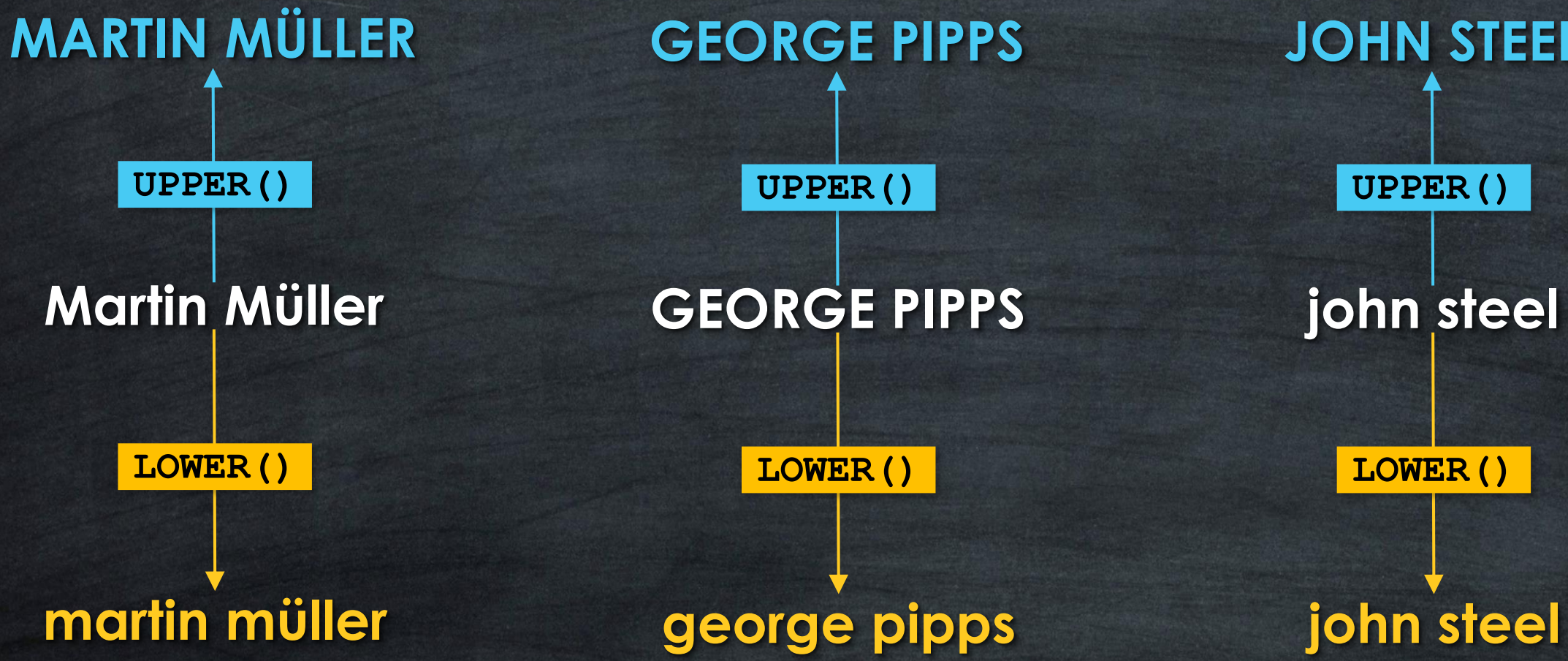


String Functions
Use Cases



STRING FUNCTIONS

LOWER & UPPER



UPPER

Convert characters to uppercase

Syntax

```
UPPER(string)  ➡  string
```

Example

```
UPPER("Maria")  ➡  "MARIA"
```

LOWER

Convert characters to lowercase

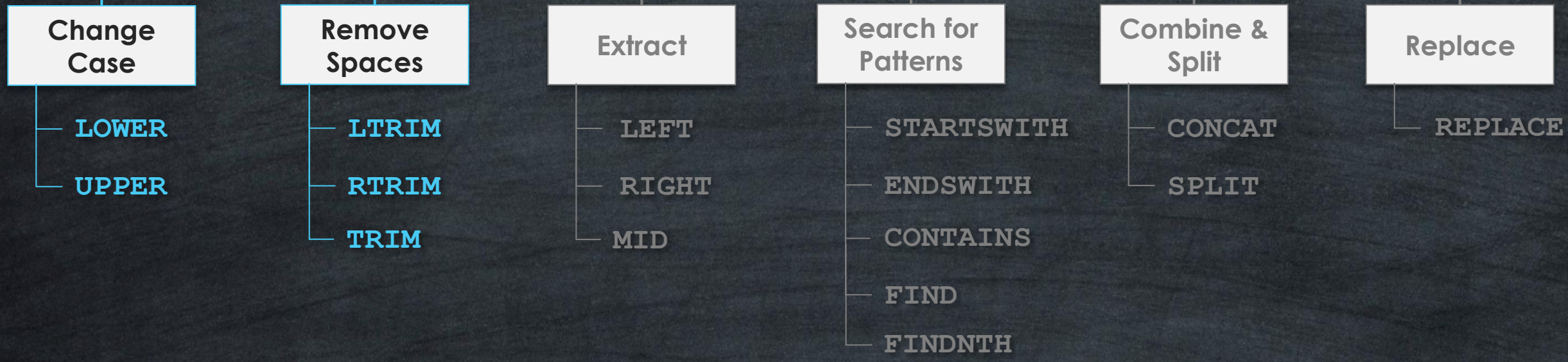
Syntax

```
LOWER(string)  ➡  string
```

Example

```
LOWER("Maria")  ➡  "maria"
```

String Functions
Use Cases



STRING FUNCTIONS

LTRIM, RTRIM, TRIM

DATA WITH BARAA

LTRIM()

RTRIM()

TRIM()

LTRIM + RTRIM

LTRIM

Remove any leading spaces

Syntax

```
LTRIM(string)
```

Example

```
LTRIM(" Maria ") → "Maria "
```

RTRIM

Remove any trailing spaces

Syntax

```
RTRIM(string)
```

Example

```
RTRIM(" Maria ") → " Maria"
```

TRIM

Remove both leading & trailing spaces

Syntax

```
TRIM(string)
```

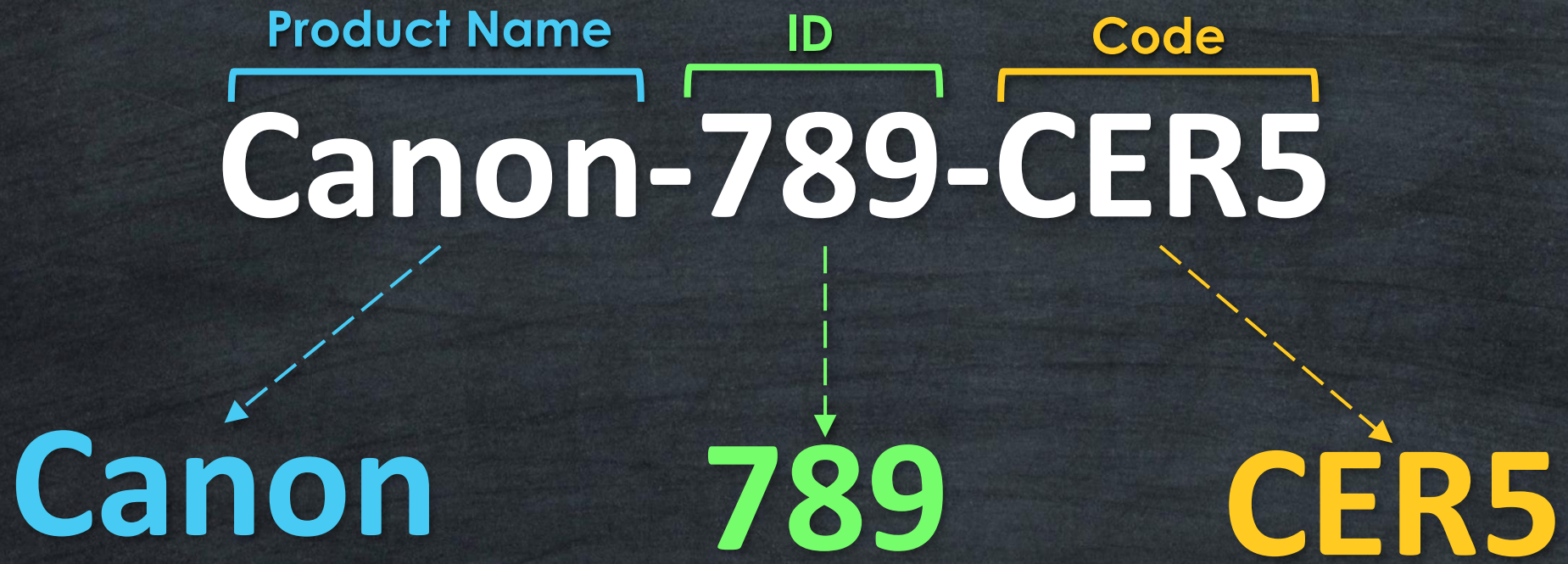
Example

```
TRIM(" Maria ") → "Maria"
```

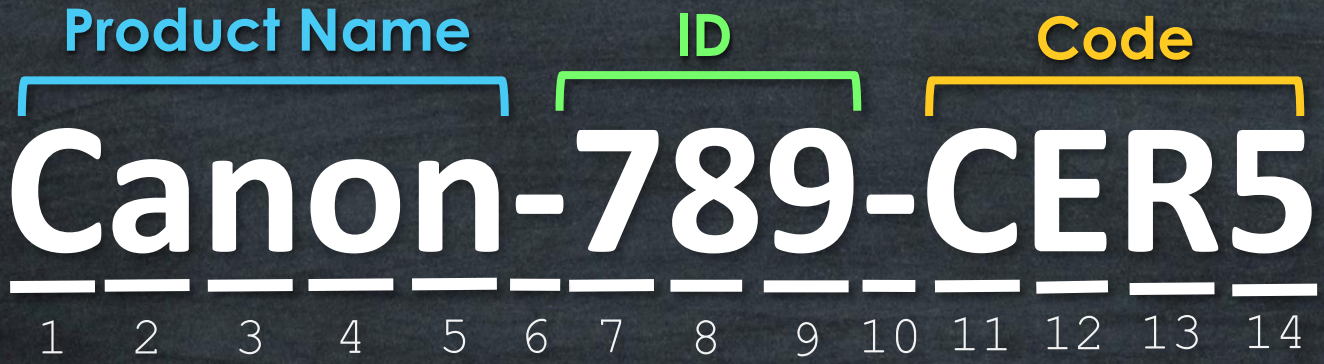
String Functions
Use Cases

STRING FUNCTIONS

LEFT, RIGHT, MID



LEFT

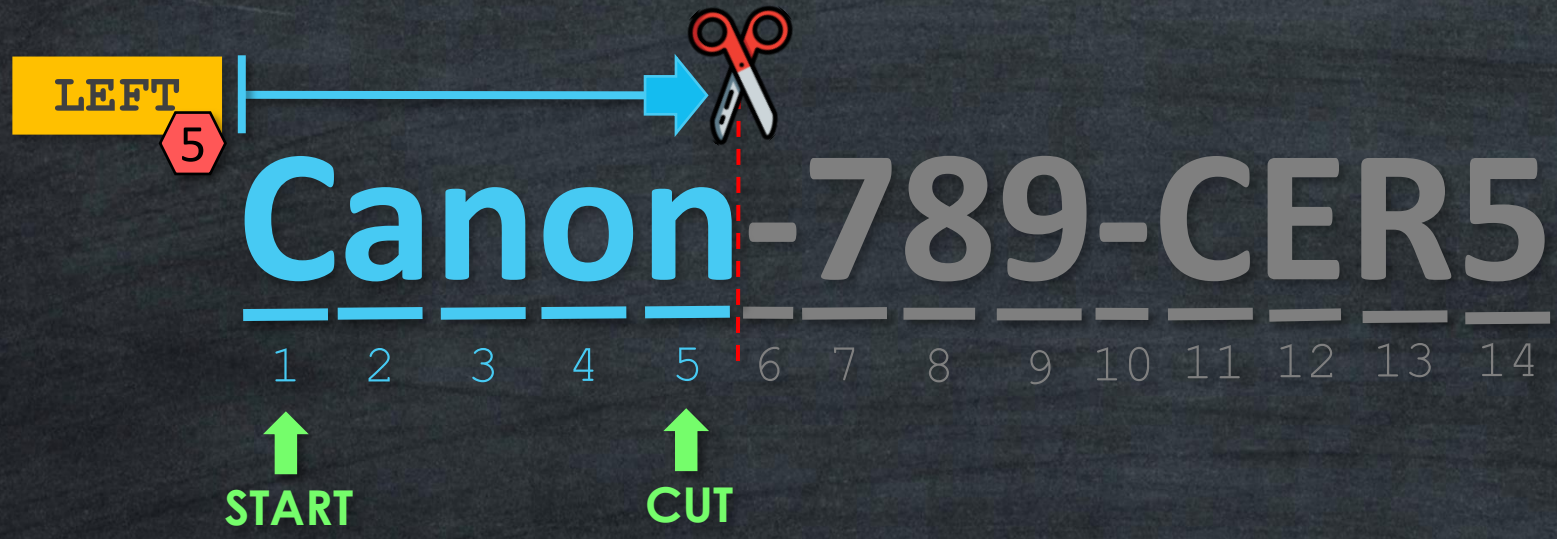


Results

Syntax `LEFT(string,num_chars)` → `string`

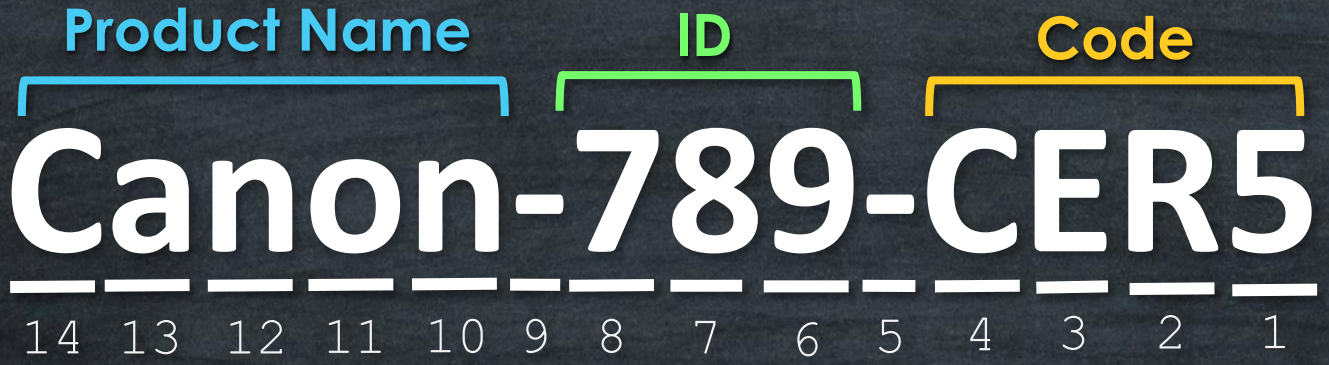
Examples `LEFT("Canon-789-CER5",5)`

LEFT



		Results
Syntax	`LEFT(string,num_chars)`	`string`
Examples	`LEFT("Canon-789-CER5",5)`	`"Canon"`

RIGHT

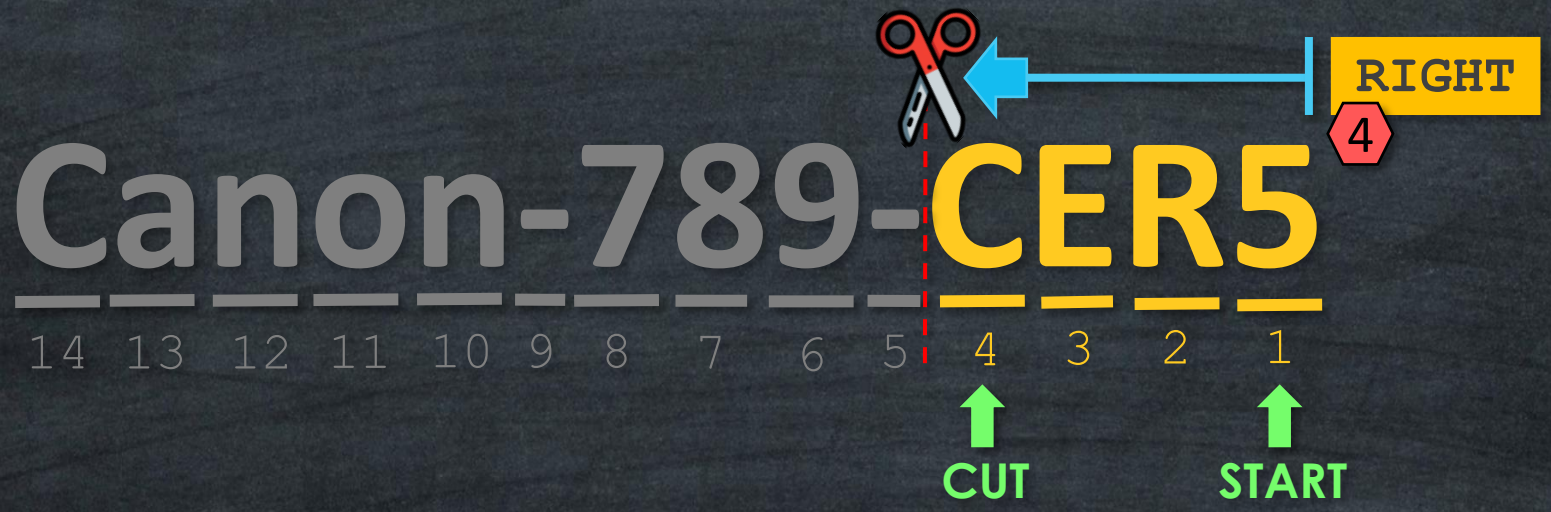


Results

Syntax `RIGHT(string,num_chars)` → `string`

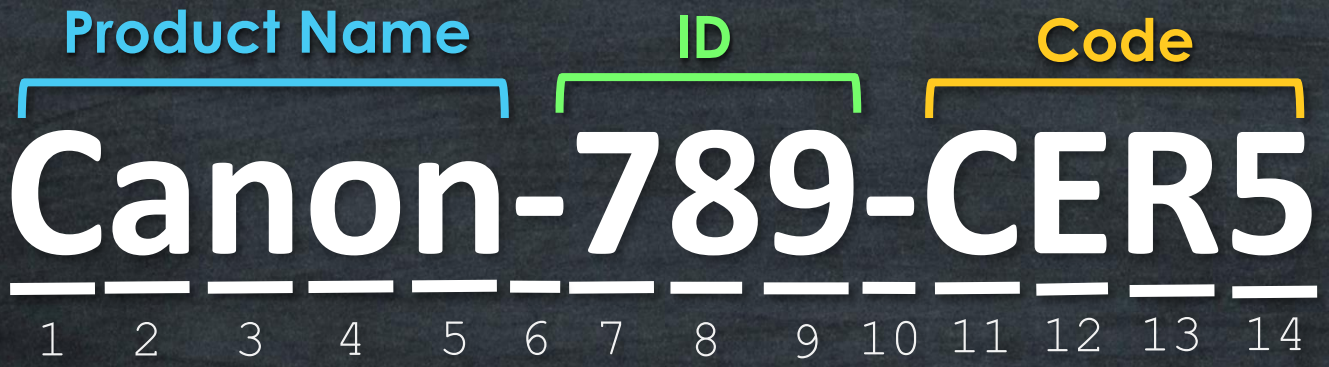
Examples `RIGHT("Canon-789-CER5",4)`

RIGHT



		Results
Syntax	`RIGHT(string,num_chars)`	`string`
Examples	`RIGHT("Canon-789-CER5",4)`	`"CER5"`

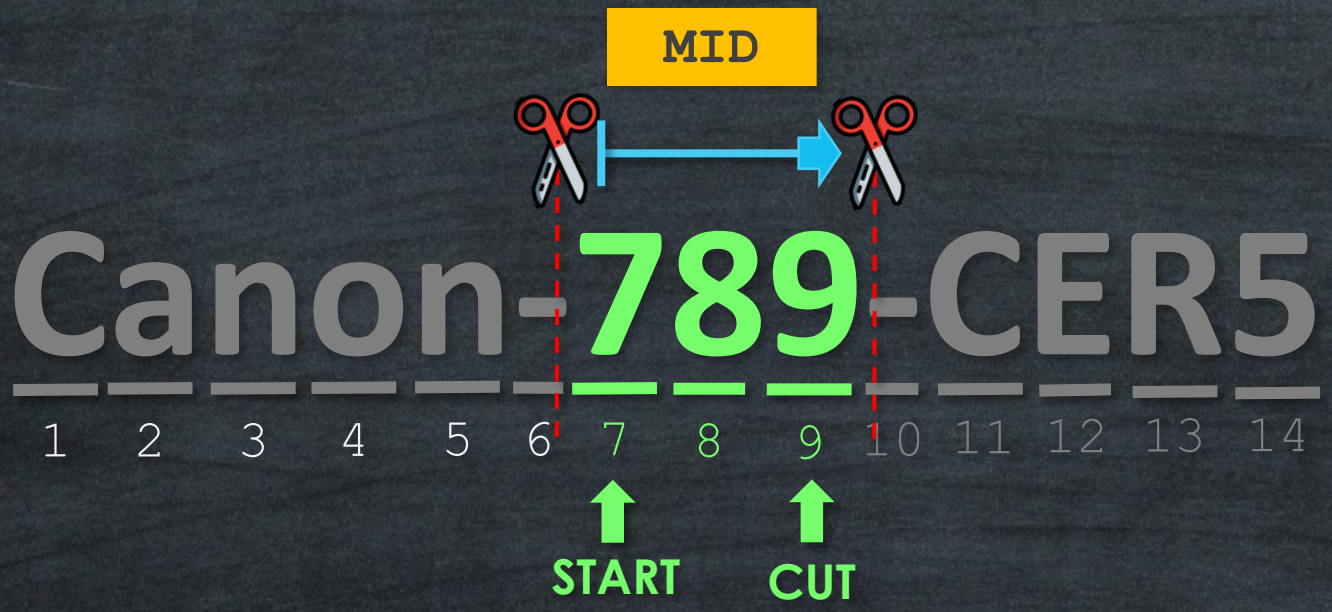
MID



Syntax `MID(string,start,[length])` → Results: `string`

Examples `MID("Canon-789-CER5",7,3)`

MID



		Results
Syntax	`MID(string,start,[length])`	`string`
Examples	`MID("Canon-789-CER5",7,3)`	`"789"`

STRING FUNCTIONS

LEFT, RIGHT, MID

USE CASES

DATA WITH BARAA

#1 Use Case | Extracting File Extensions

`Document.txt` → RIGHT → `txt`

#2 Use Case | Extracting Area Code

`(123) 456-7890` → MID → `123`

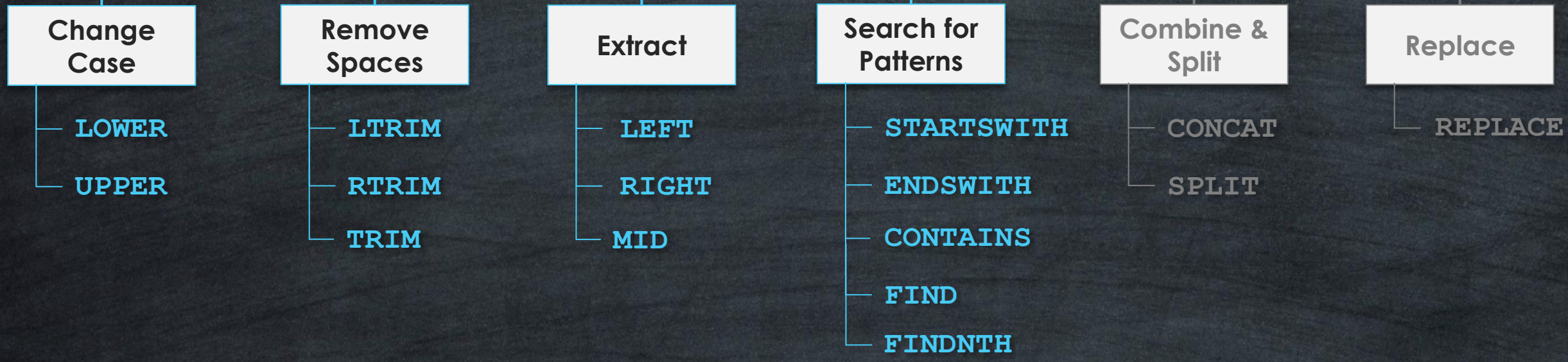
#3 Use Case | Extracting TLD from URL

`https://Datawithbaraa.com` → RIGHT → `com`

#4 Use Case | Extracting protocoll from URL

`https://Datawithbaraa.com` → LEFT → `https`

String Functions
Use Cases



Search Functions

1# GROUP

Return whether the Substring exists or not

Functions

- STARTSWITH
- ENDSWTIH
- CONTAINS

Result TRUE FALSE

```
CONTAINS("Canon-789-CER5","-")
```

→ TRUE

2# GROUP

Return the Position of Substring

Functions

- FIND
- FINDNTH

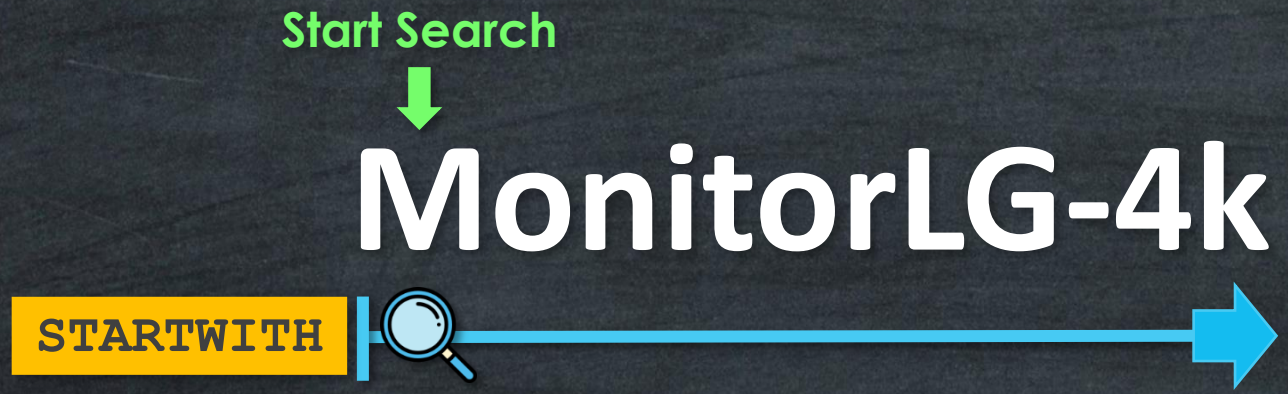
Result Number

```
FIND("Canon-789-CER5","-")
```

→ 6

STRING FUNCTIONS

STARTSWITH



Results

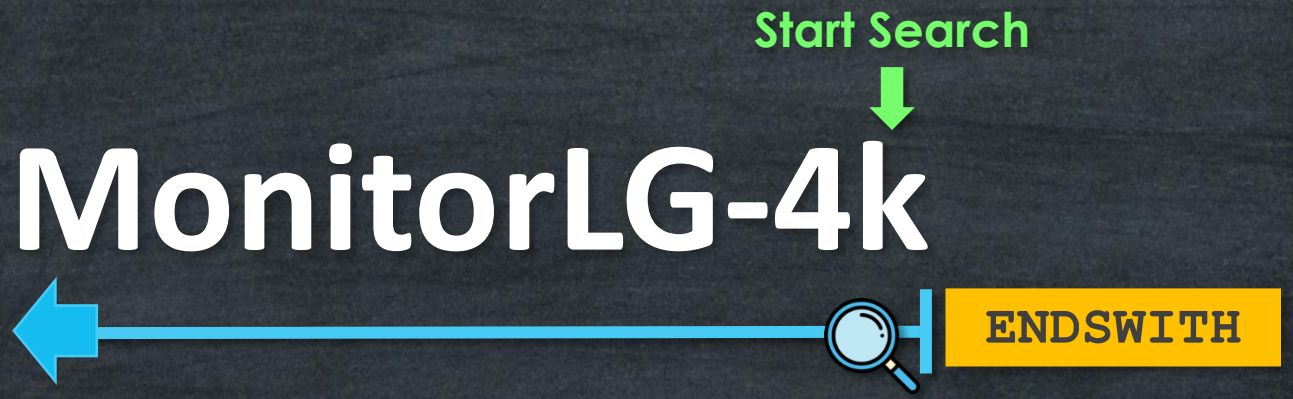
Syntax `STARTWITH(string,substring)` → `TRUE | FALSE`

Examples

`STARTWITH("MonitorLG-4k","Monitor")` → `TRUE`

`STARTWITH("MonitorLG-4k","LG")` → `FALSE`

ENDSWITH



Syntax

```
ENDSWITH(string,substring)
```

Results

```
TRUE | FALSE
```

Examples

```
ENDSWITH("MonitorLG-4k","4k")
```

```
TRUE
```

```
ENDSWITH("MonitorLG-4k","LG")
```

```
FALSE
```

CONTAINS

Search Everywhere

MonitorLG-4k

		Results
Syntax	`CONTAINS(string,substring)`	TRUE | FALSE
Examples	`CONTAINS("MonitorLG-4k","Monitor")`	TRUE
	`CONTAINS("MonitorLG-4k","LG")`	TRUE
	`CONTAINS("MonitorLG-4k","4G")`	FALSE

Search Functions

1# GROUP

Return whether the Substring exists or not

Functions

- STARTSWITH
- ENDSWTIH
- CONTAINS

Result TRUE FALSE

```
CONTAINS("Canon-789-CER5","-")
```

→ TRUE

2# GROUP

Return the Position of Substring

Functions

- FIND
- FINDNTH

Result Number

```
FIND("Canon-789-CER5","-")
```

→ 6

STRING FUNCTIONS

FIND

Returns the position of **First** occurrence

Example

```
FIND("Canon-789-CER5","-")
```

→ 6

FINDNTH

Returns the position of **Nth** occurrence

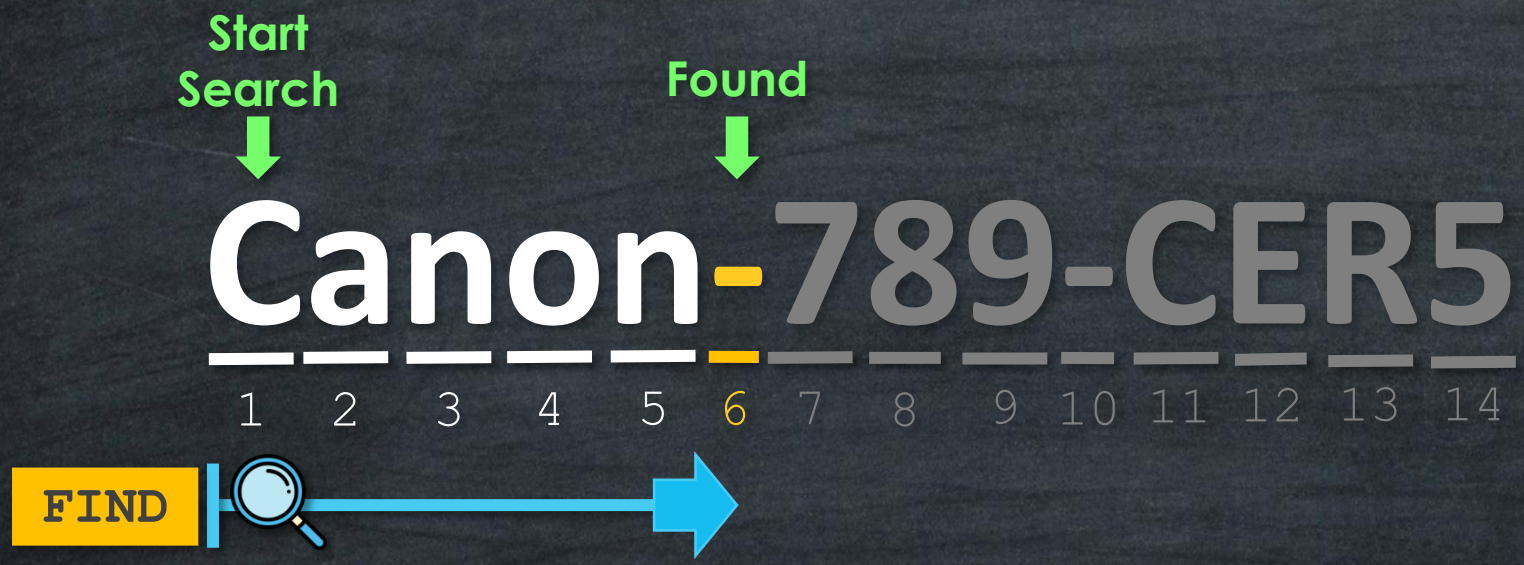
Example

```
FINDNTH("Canon-789-CER5","-",2)
```

→ 10

STRING FUNCTIONS

FIND



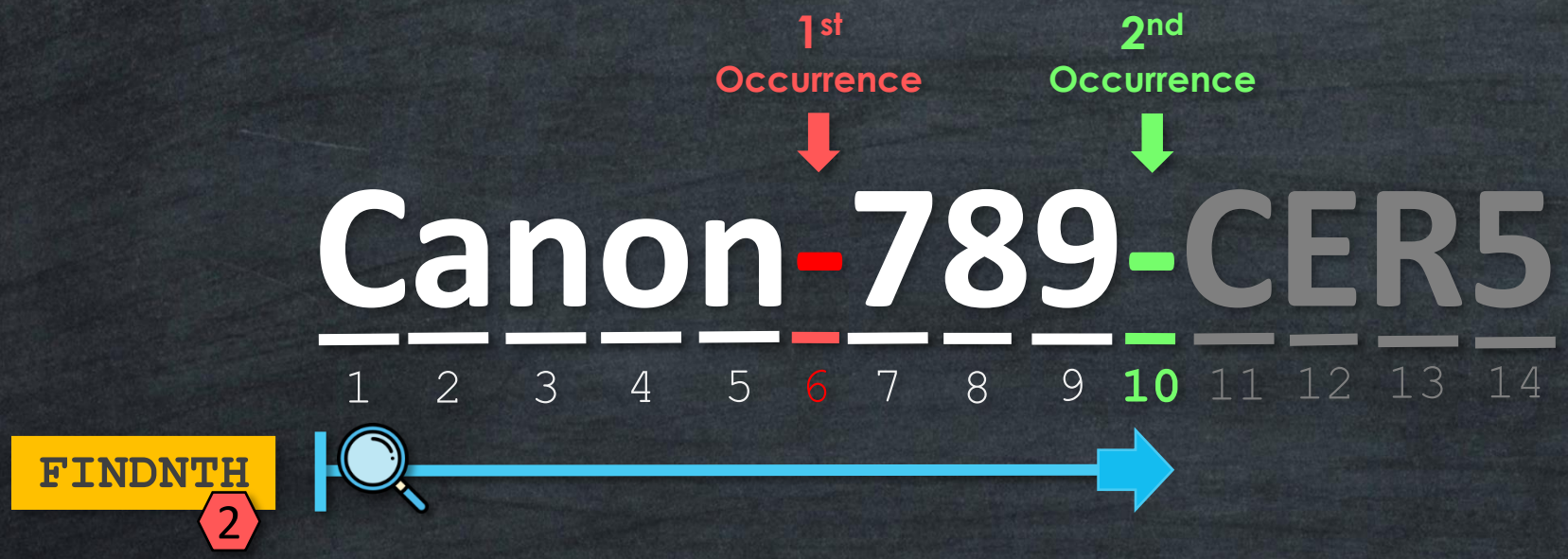
		Results
Syntax	`FIND(string,substring,[start])`	Number
Examples	`FIND("Canon-789-CER5","-")`	6

STRING FUNCTIONS

FIND

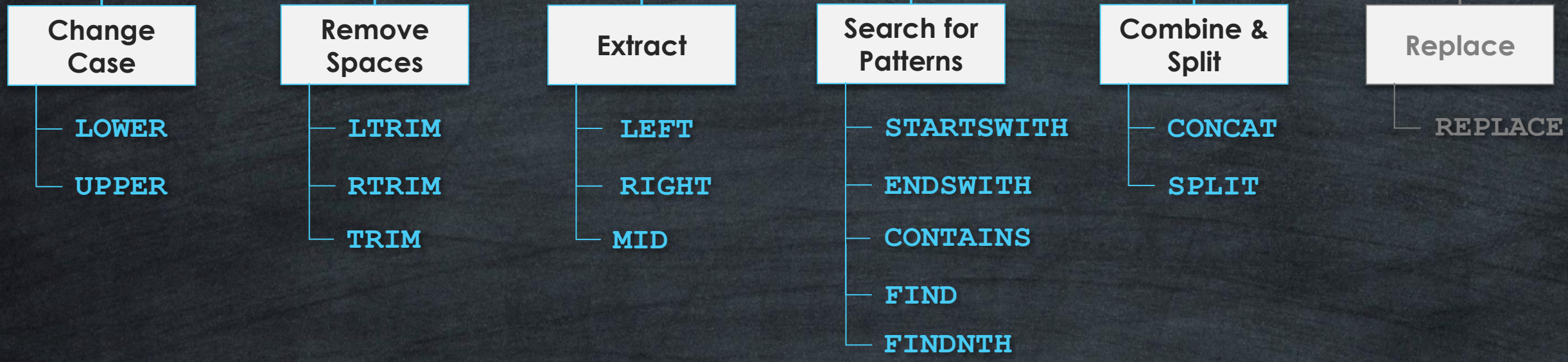
		Results
Syntax	`FIND(string,substring,[start])`	Number
Examples	`FIND("Canon-789-CER5","-")`	6
	`FIND("Canon-789-CER5","-",7)`	10

FINDNTH



		Results
Syntax	`FINDNTH(string,substring,occurrence)`	Number
Examples	`FINDNTH("Canon-789-CER5","-",2)`	10

String Functions
Use Cases



STRING FUNCTIONS

CONCAT(+)

DATA WITH BARAA

First Name: Michael + Last Name: Scott → Full Name: MichaelScott

First Name: Michael + Space: ␣ + Last Name: Scott → Full Name: Michael Scott

Examples

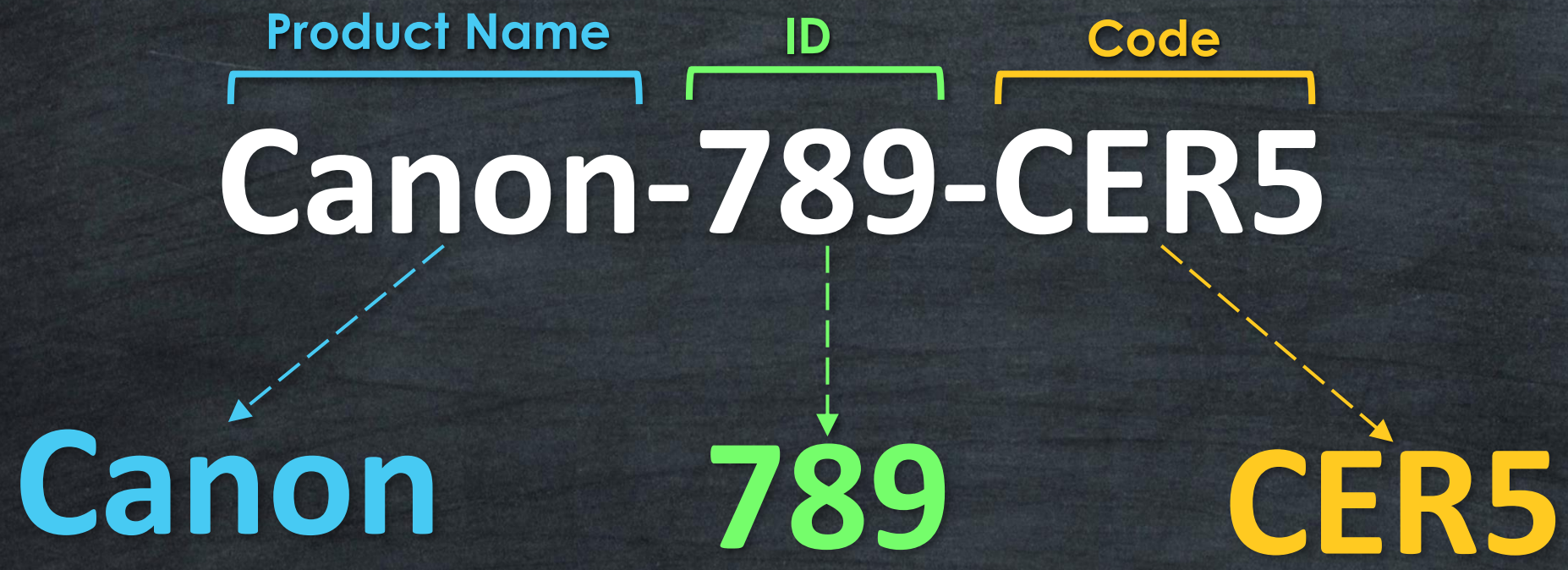
```
"Michael" + " " + "scott"
```

→

```
"Michael scott"
```

STRING FUNCTIONS

SPLIT

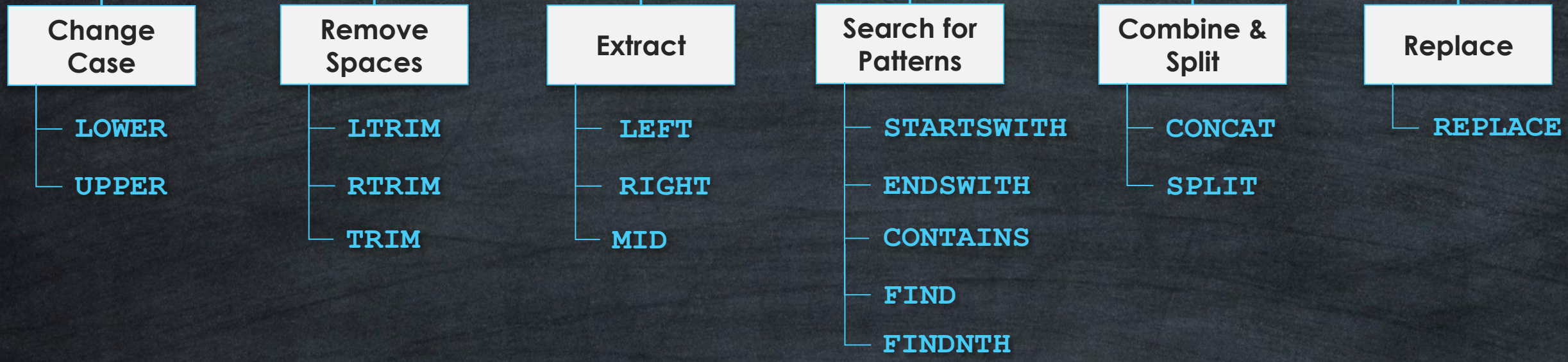


STRING FUNCTIONS

SPLIT

		Results
Syntax	`SPLIT(string,delimiter,token number)`	String
Example	`SPLIT("Canon-789-CER5","-",1)`	"Canon"
	`SPLIT("Canon-789-CER5","-",2)`	"789"
	`SPLIT("Canon-789-CER5","-",3)`	"CER5"

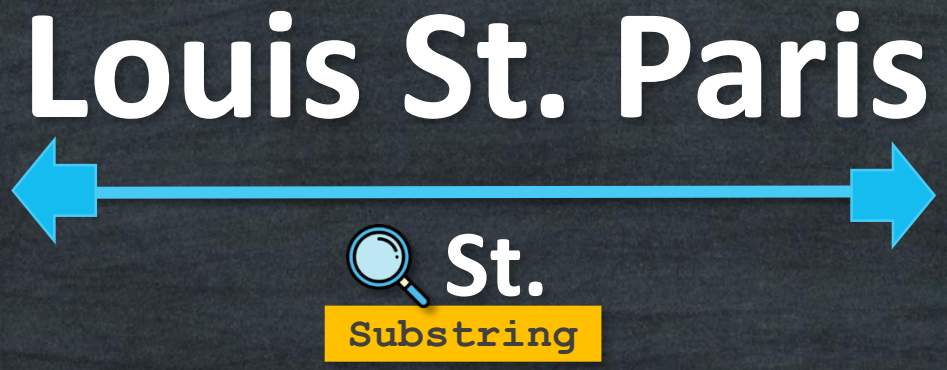
String Functions
Use Cases



STRING FUNCTIONS

REPLACE

DATA WITH BARAA



Syntax `REPLACE(string,substring,replacement)`

Example `REPLACE("Louis St. Paris","St.","Street")`

Results

`String`

STRING FUNCTIONS

REPLACE

Results

Syntax `REPLACE(string,substring,replacement)` → `String`

Example `REPLACE("Louis St. Paris","St.","Street")`

STRING FUNCTIONS

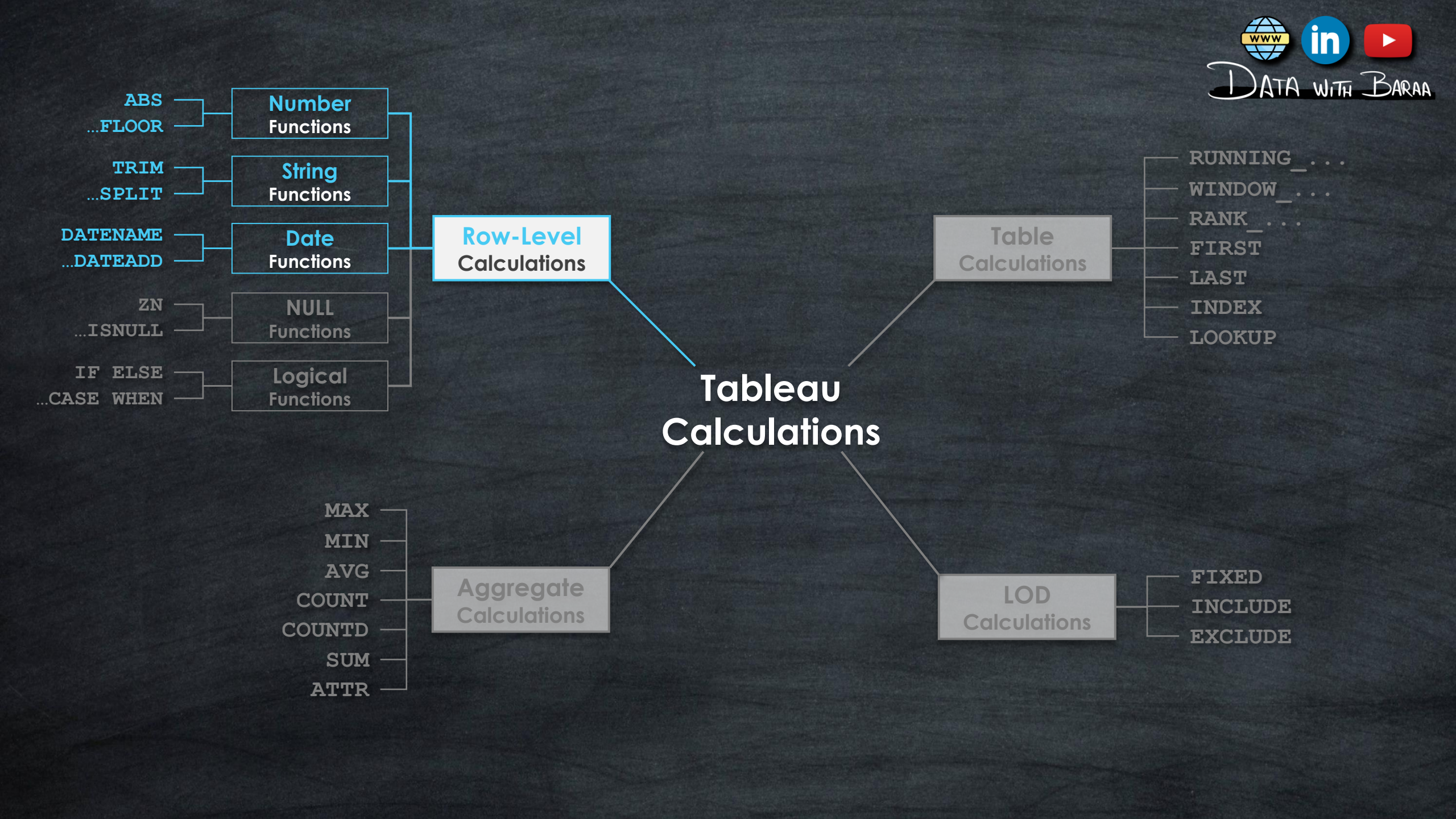
REPLACE

Results

Syntax `REPLACE(string,substring,replacement)` → `String`

Example `REPLACE("Louis St. Paris","St.","Street")` → `"Louis Street Paris"`

`REPLACE("Ann Paris","St.","Street")` → `"Ann Paris"`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FIXED
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EXCLUDE

Date Functions
Use Cases

DATA WITH BARAA

Main Purpose to is Mainuplate Date Values

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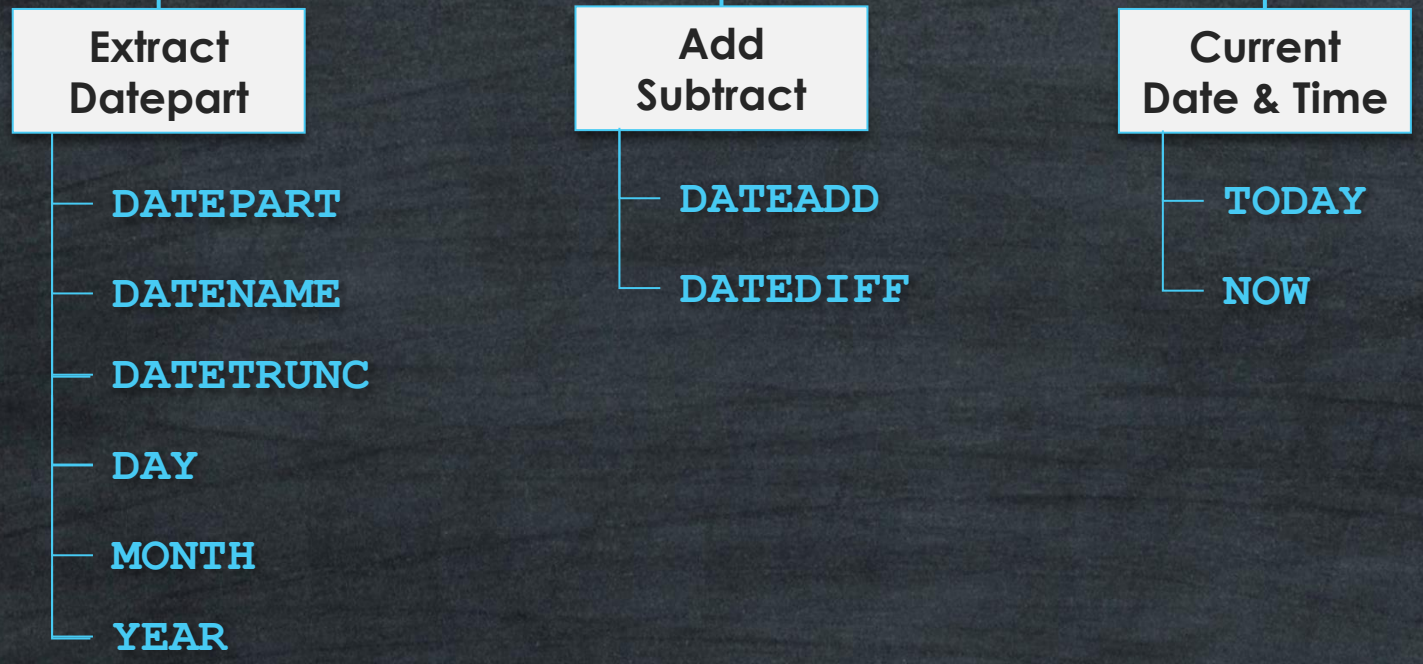
- Removing unwanted Characters - `REPLACE`
- Trimming Leading or trailing Spaces – `LTRIM,RTRIM,TRIM`

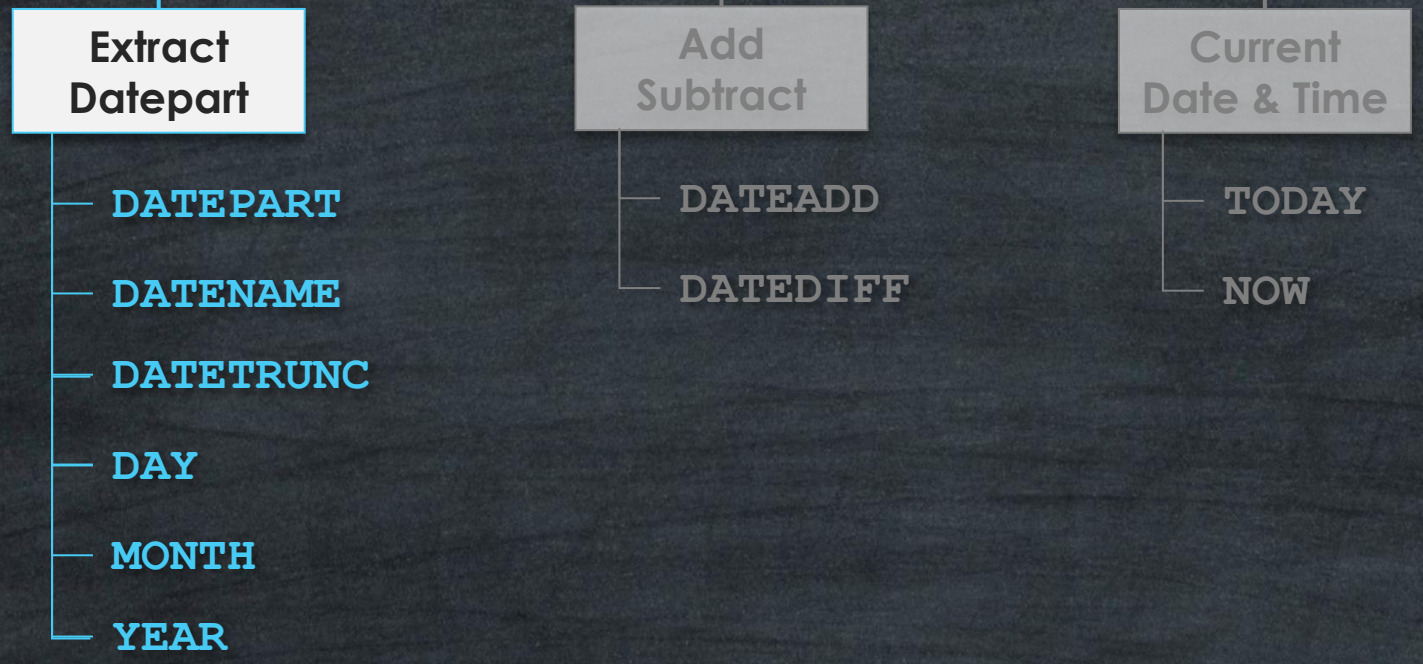
Data Transformation

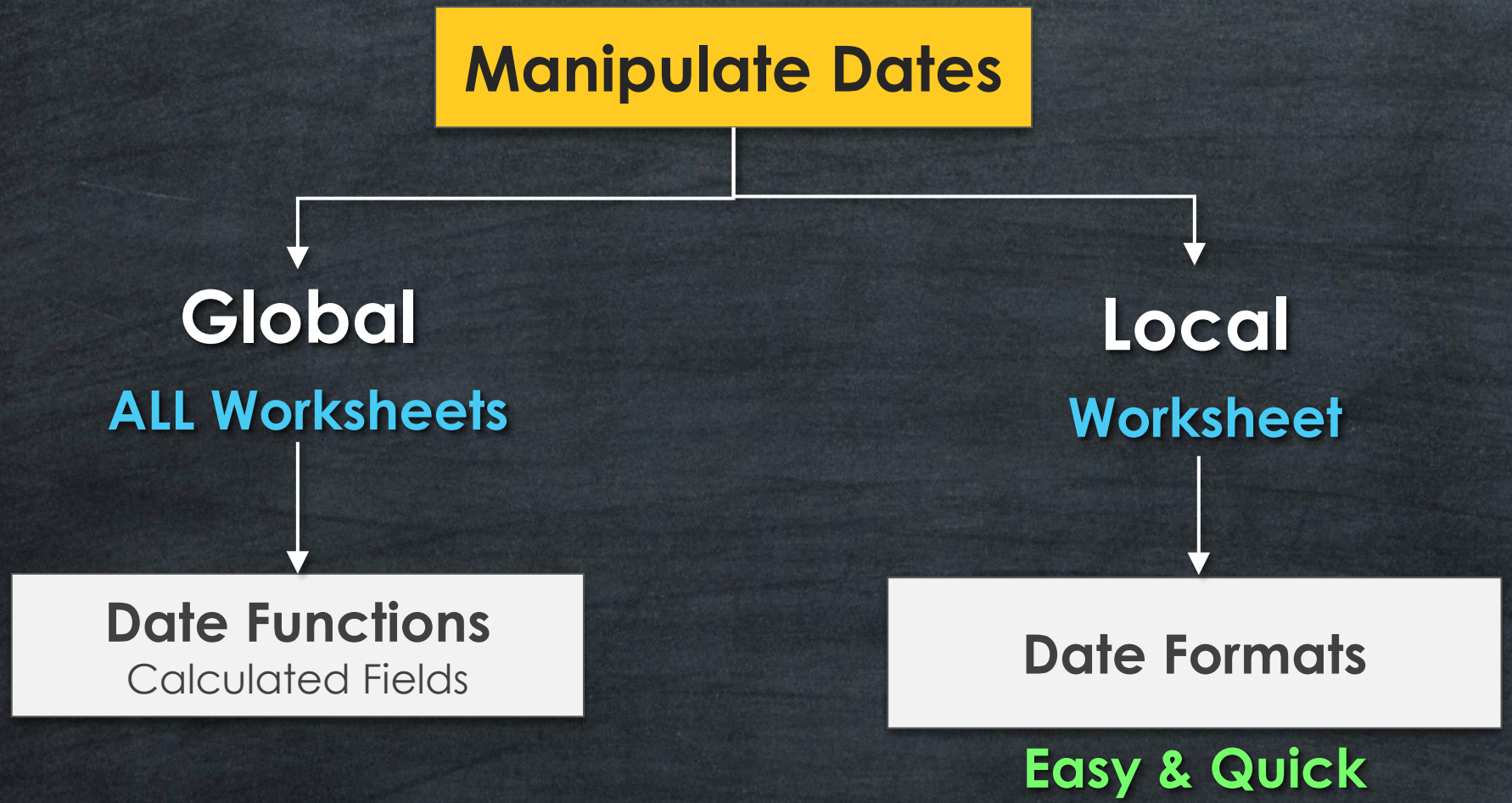
- Data Extraction – `LEFT,RIGHT,MID`
- Spliting Data- `SPLIT`

Date Functions
Use Cases

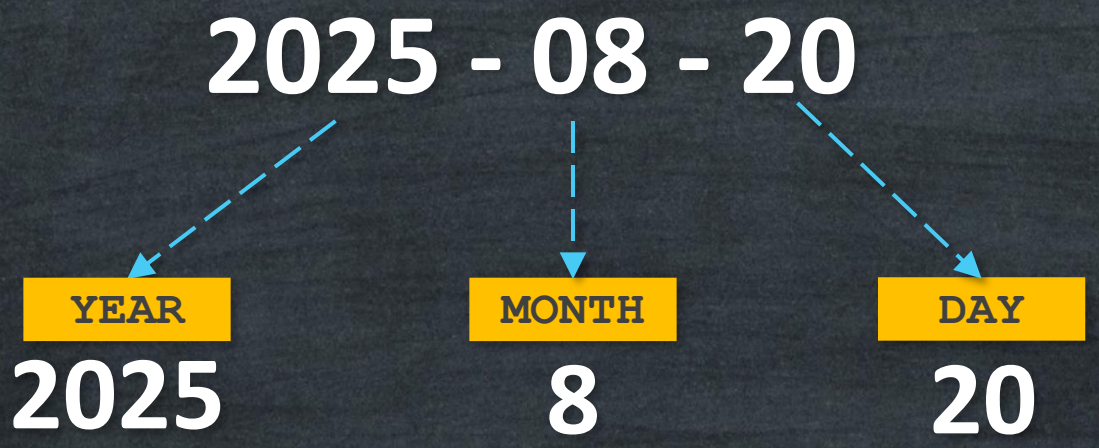


Date Functions
Use Cases




Manipulate Dates
Global
ALL Worksheets
Date Functions
Calculated Fields
Local
Worksheet
Date Formats
Easy & Quick

DATEPART



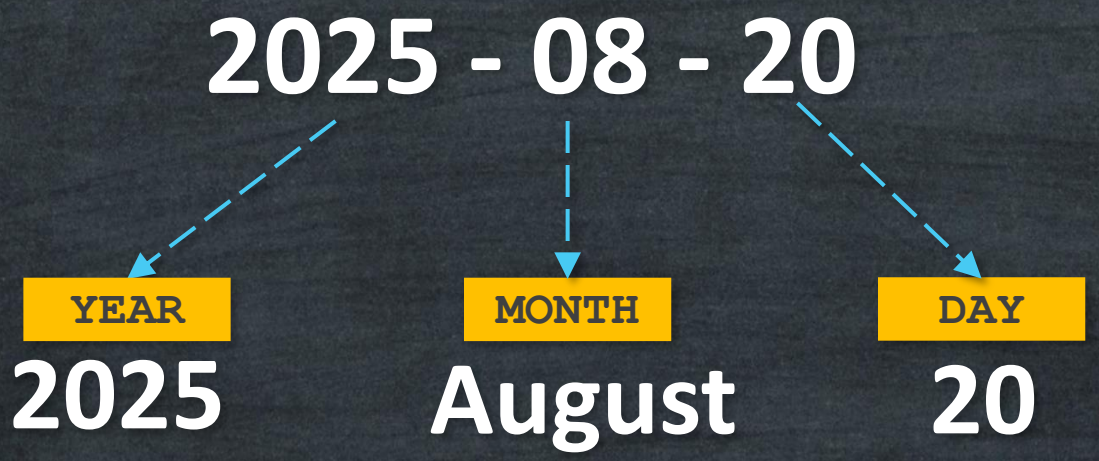
Syntax

```
DATEPART(date_part,date)  →  Number
```

Examples

```
DATEPART('day',#2025-08-20#)  →  20
DATEPART('month',#2025-08-20#)  →  8
DATEPART('year',#2025-08-20#)  →  2025
```

DATENAME



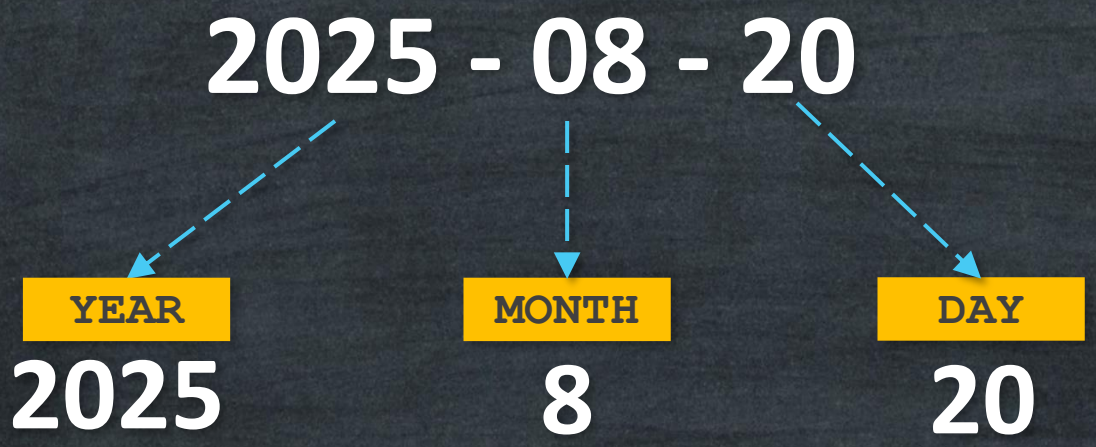
Syntax

```
DATENAME(date_part,date)  →  String
```

Examples

```
DATENAME('year',#2025-08-20#)   →  '2025'
DATENAME('month',#2025-08-20#)  →  'August'
DATENAME('day',#2025-08-20#)    →  '20'
```

DAY, MONTH, YEAR



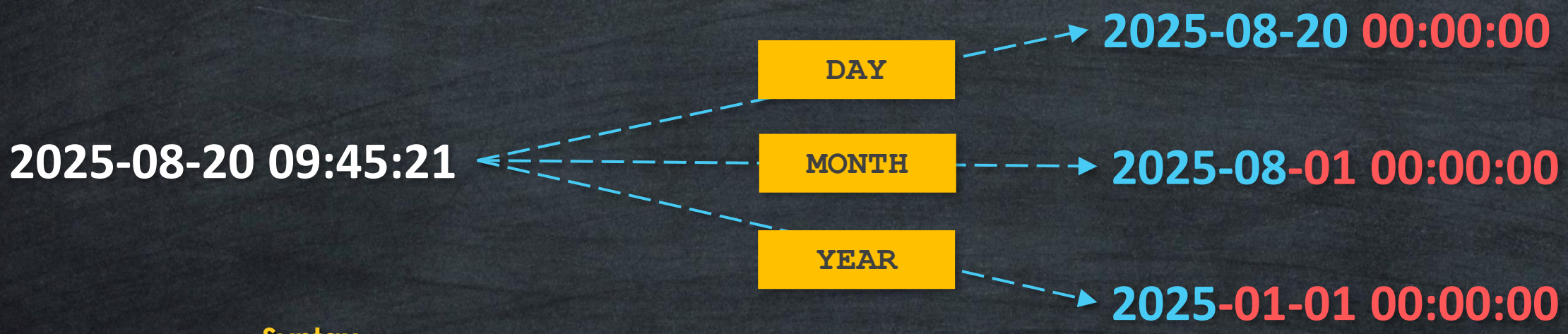
Syntax

```
DAY(date)   MONTH(date)   YEAR(date)  ➡  Number
```

Examples	Results
DAY(#2025-08-20#)	20
MONTH(#2025-08-20#)	8
YEAR(#2025-08-20#)	2025

DATE FUNCTIONS

DATETRUNC



Syntax

```
DATETRUNC(date_part,date)  ➡  DATE & TIME
```

Examples

```
DATETRUNC('day',#2025-08-20 09:45:21#)    ➡  2025-08-20 00:00:00
DATETRUNC('month',#2025-08-20 09:45:21#)  ➡  2025-08-01 00:00:00
DATETRUNC('year',#2025-08-20 09:45:21#)   ➡  2025-01-01 00:00:00
```

DATE FUNCTIONS

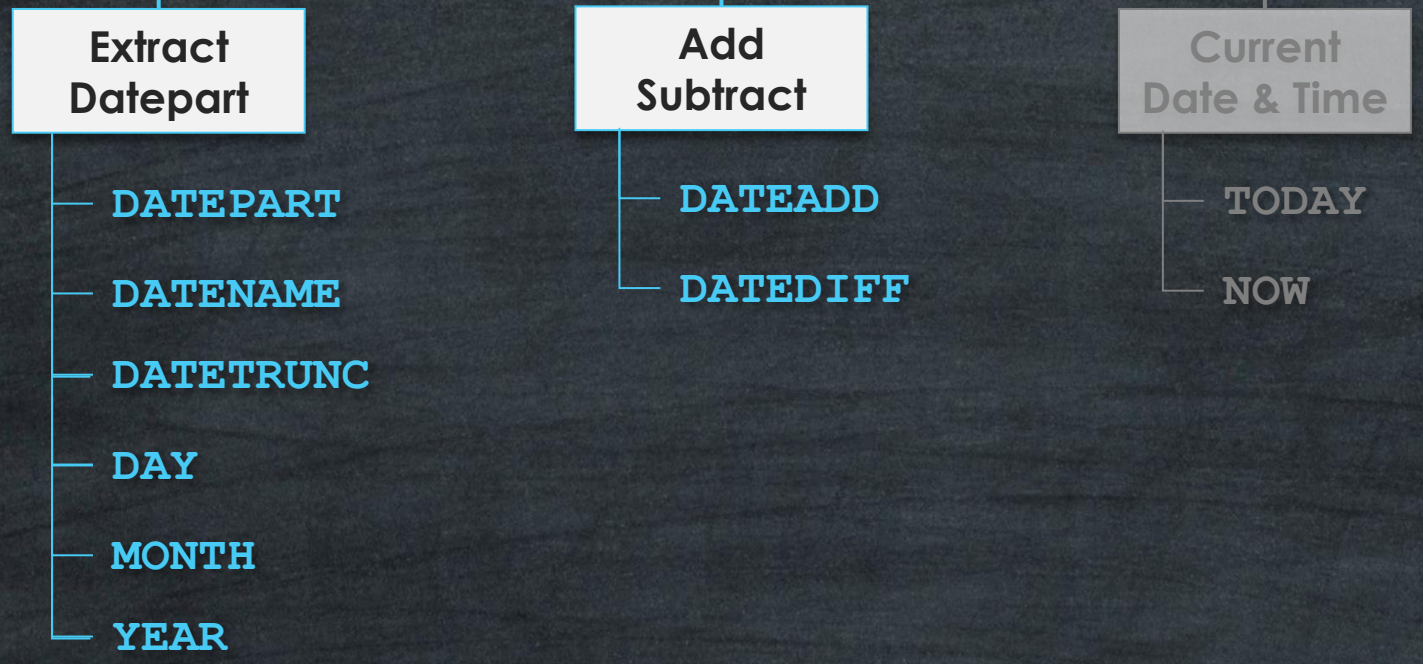
All Functions

DATA WITH BARAA

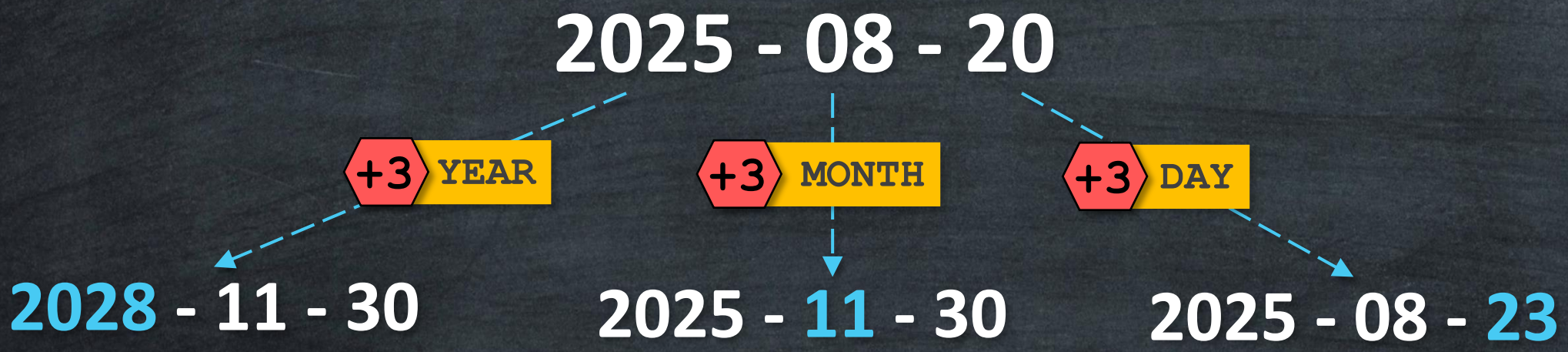
2025-08-20 09:45:21

	Number	String	Date & Time
date_part	DATEPART	DATENMAME	DATETRUNC
year	2025	2025	2025-01-01 00:00:00
quarter	3	3	2025-07-01 00:00:00
month	8	August	2025-08-01 00:00:00
day	20	20	2025-08-20 00:00:00
weekday	4	Wednesday	2025-08-20 00:00:00
hour	9	9	2025-08-20 09:00:00
minute	45	45	2025-08-20 09:45:00
second	21	21	2025-08-20 09:45:21

Date Functions
Use Cases



DATEADD



Syntax

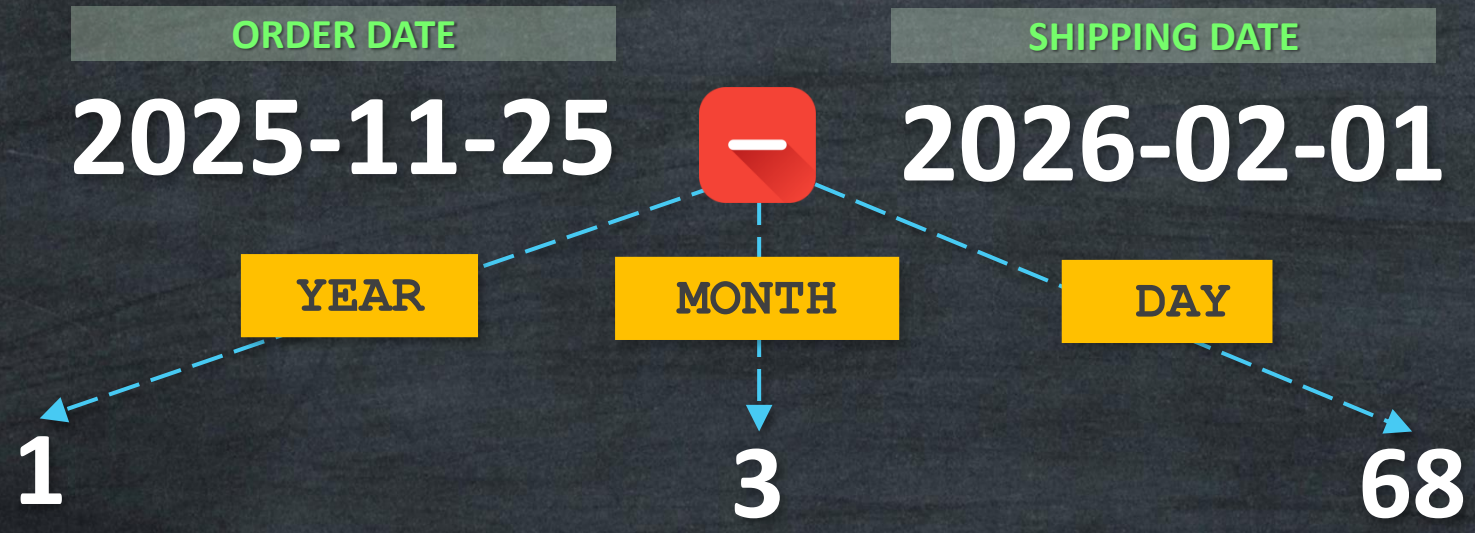
```
DATEADD(date_part,interval,date)  →  Date
```

Examples

```
DATEADD("Year", 3, #2025-08-20#)   →  2028-08-20
DATEADD("Year", -3, #2025-08-20#)  →  2022-08-20
DATEADD("day", -3, #2025-08-20#)   →  2025-08-17
```

DATE FUNCTIONS

DATEDIFF



Syntax

```
DATEDIFF(date_part,start_Date,end_date)
```

→ Number

Examples

```
DATEDIFF('year',#2025-11-25#, #2026-02-01#)
```

→ 1

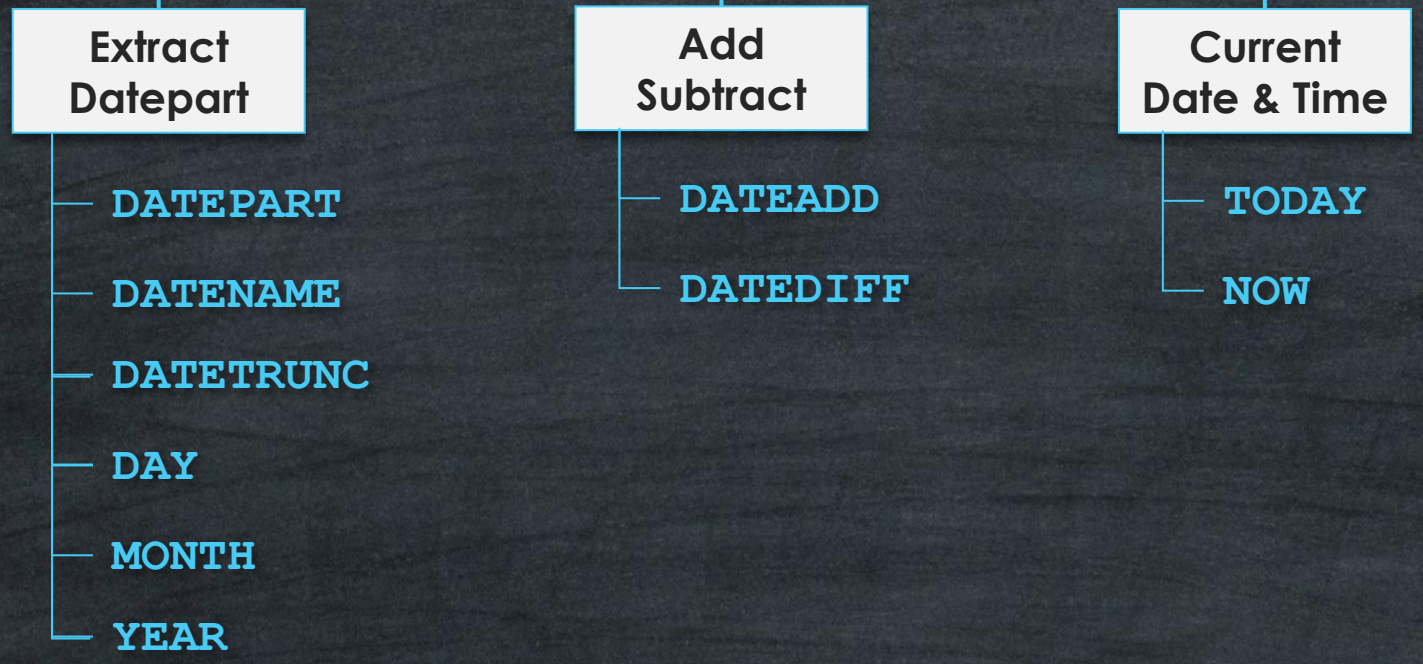
```
DATEDIFF('month',#2025-11-25#, #2026-02-01#)
```

→ 3

```
DATEDIFF('day',#2025-11-25#, #2026-02-01#)
```

→ 68

Date Functions
Use Cases



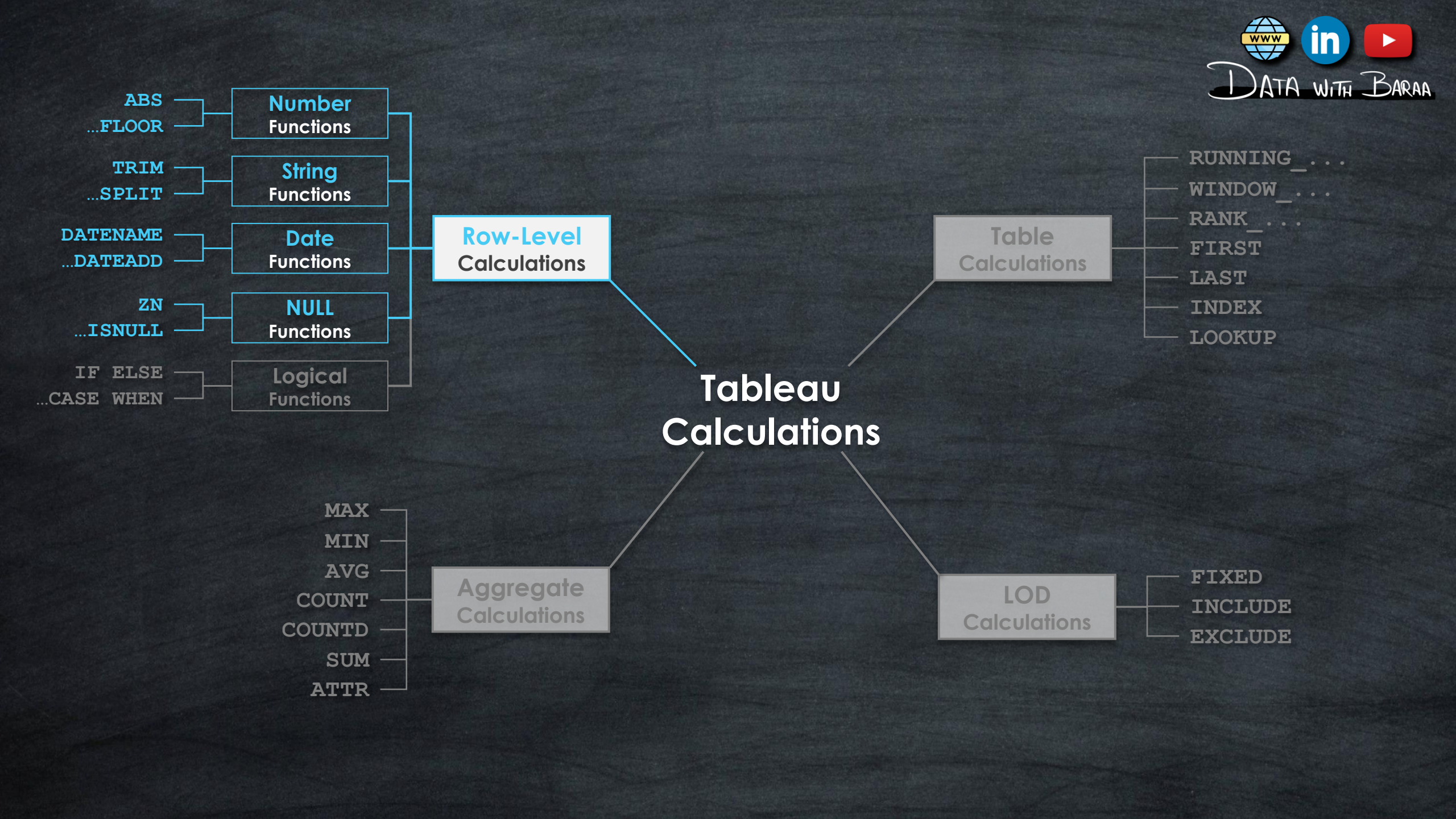
TODAY, NOW

DATE

```
TODAY()  ➡  2023-05-30
```

DATE & TIME

```
NOW()  ➡  2023-05-30 18:10:40
```


DATA WITH BARAA
Tableau Calculations
Row-Level Calculations
Number Functions
ABS
...FLOOR
String Functions
TRIM
...SPLIT
Date Functions
DATENAME
...DATEADD
NULL Functions
ZN
...ISNULL
Logical Functions
IF ELSE
...CASE WHEN
Table Calculations
RUNNING_...
WINDOW_...
RANK_...
FIRST
LAST
INDEX
LOOKUP
Aggregate Calculations
MAX
MIN
AVG
COUNT
COUNTD
SUM
ATTR
LOD Calculations
FIXED
INCLUDE
EXCLUDE

NULL Functions
Use Cases

DATA WITH BARAA

Main Purpose is to Handle Missing Values (NULLs)

Calculation Accuracy

- Null Values can affect calculations and aggregations.

Data Quality and Completness

- Identifiy data gaps, data entry, and data collection issues.

NULL FUNCTIONS

ZN, IFNULL, ISNULL

DATA WITH BARAA

ZN – Replace **NULL** values with **Zero**

IFNULL – Replace **NULL** with **Specific Value**

ISNULL – Return **TRUE** if value is **NULL**, and **FALSE** otherwise

			Number	Any type, depends on Input		TRUE	FALSE
Customer	Sales	Country	ZN([Sales])	IFNULL([Sales], 0)	IFNULL([Country], "N/A")	ISNULL([Country])	
John	1800	*NULL*	1800	1800	N/A	TRUE	
Maria	*NULL*	USA	0	0	USA	FALSE	
Martin	350	*NULL*	350	350	N/A	TRUE	
Georg	250	France	250	250	France	FALSE	

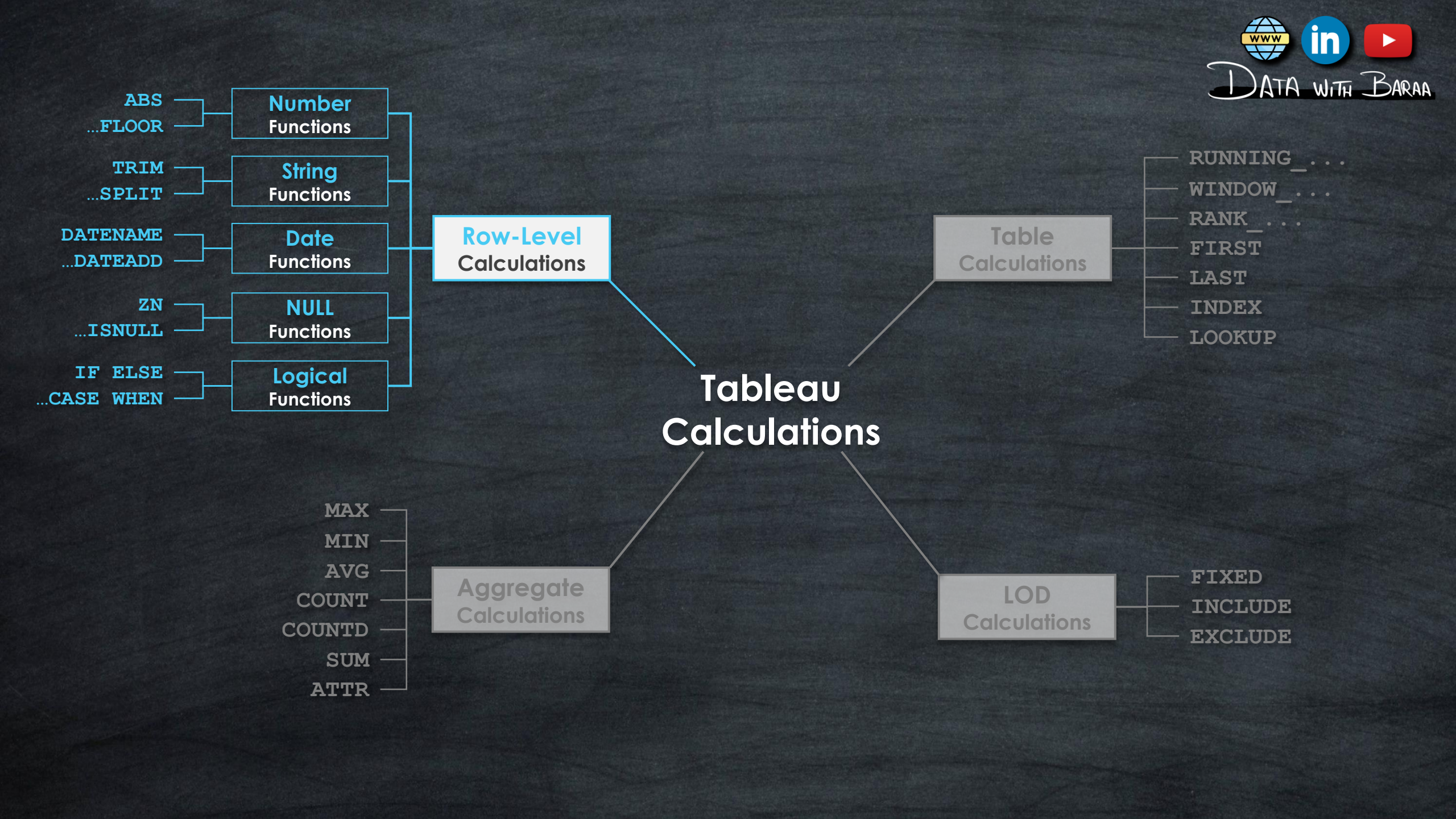


Tableau Calculations
Row-Level Calculations
Number Functions
ABS
...FLOOR
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MIN
AVG
COUNT
COUNTD
SUM
ATTR
LOD Calculations
FIXED
INCLUDE
EXCLUDE
DATA WITH BARAA

Logical Functions
Use Cases

DATA WITH BARAA

Main Purpose is to make logical decisions based on conditions

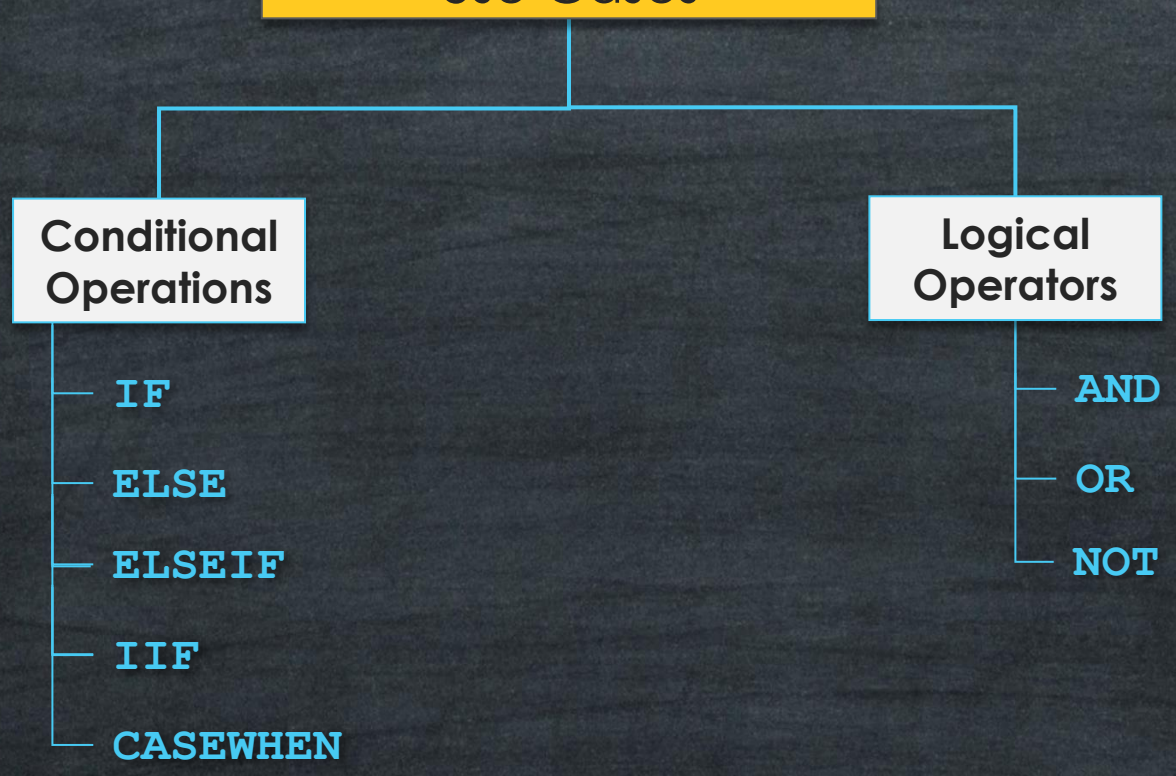
Calculation Accuracy

- Null Values can affect calculations and aggregations.

Data Quality and Completness

- Identifiy data gaps, data entry, and data collection issues.

Logical Functions
Use Cases



Logical Functions
Use Cases

LOGICAL FUNCTIONS

IF

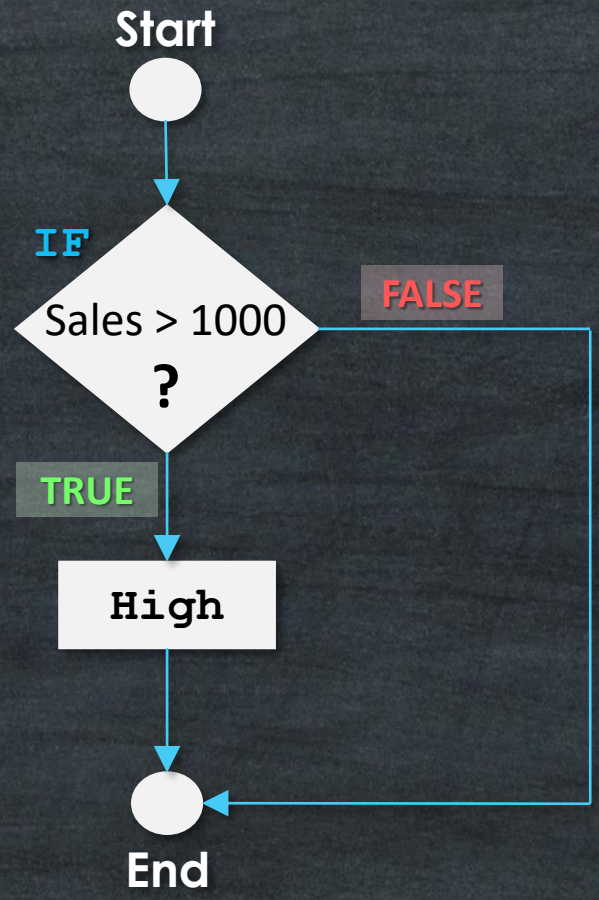
DATA WITH BARAA

```
[SALES] = 1200
```

```
IF [SALES] > 1000
   THEN "HIGH"
```

TRUE

```
END
```



LOGICAL FUNCTIONS

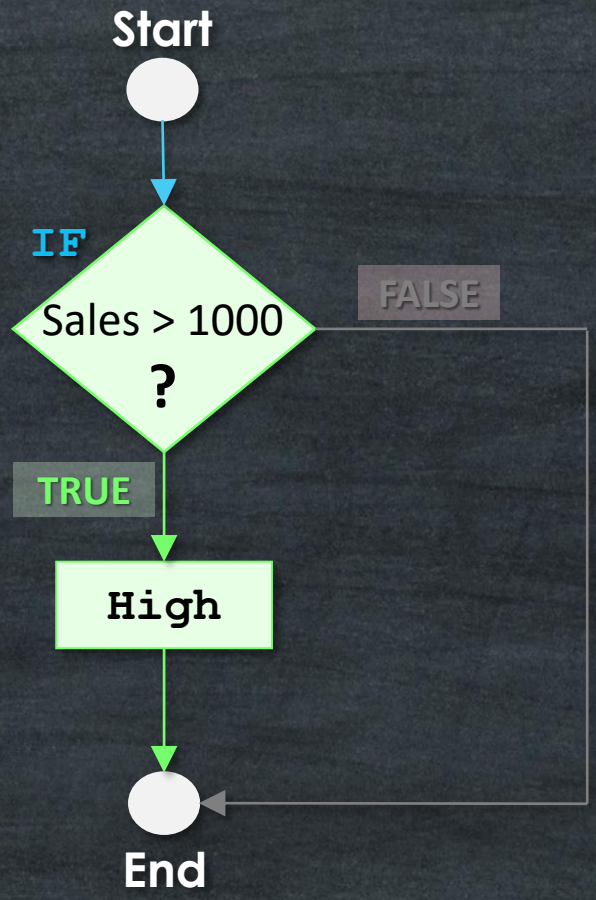
IF

[SALES] = 1200 → High

```
IF [SALES] > 1000
   THEN "HIGH"
```

TRUE

```
END
```



LOGICAL FUNCTIONS

IF

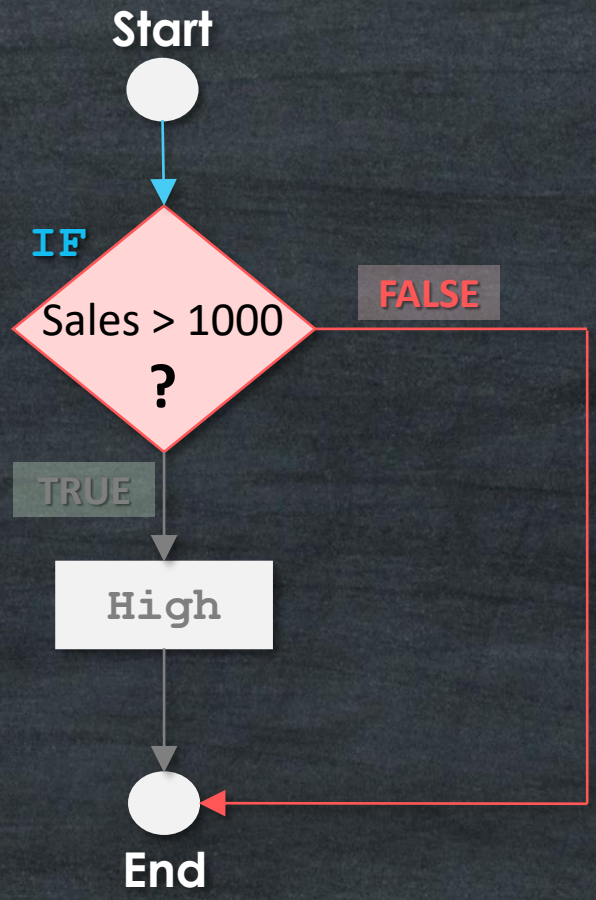

```
[SALES] = 700
```

➡ *NULL*

```
IF [SALES] > 1000
   THEN "HIGH"
```

FALSE

```
END
```



IF, ELSE

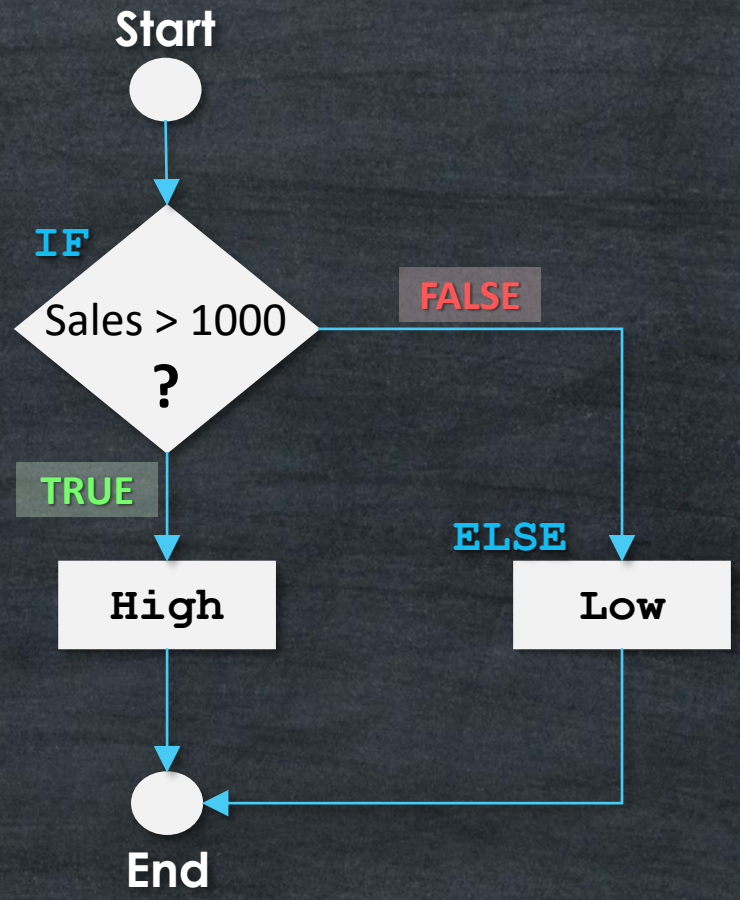
[SALES] = 1200

```
IF [SALES] > 1000
   THEN "HIGH"

ELSE "LOW"

END
```

TRUE



LOGICAL FUNCTIONS

IF, ELSE

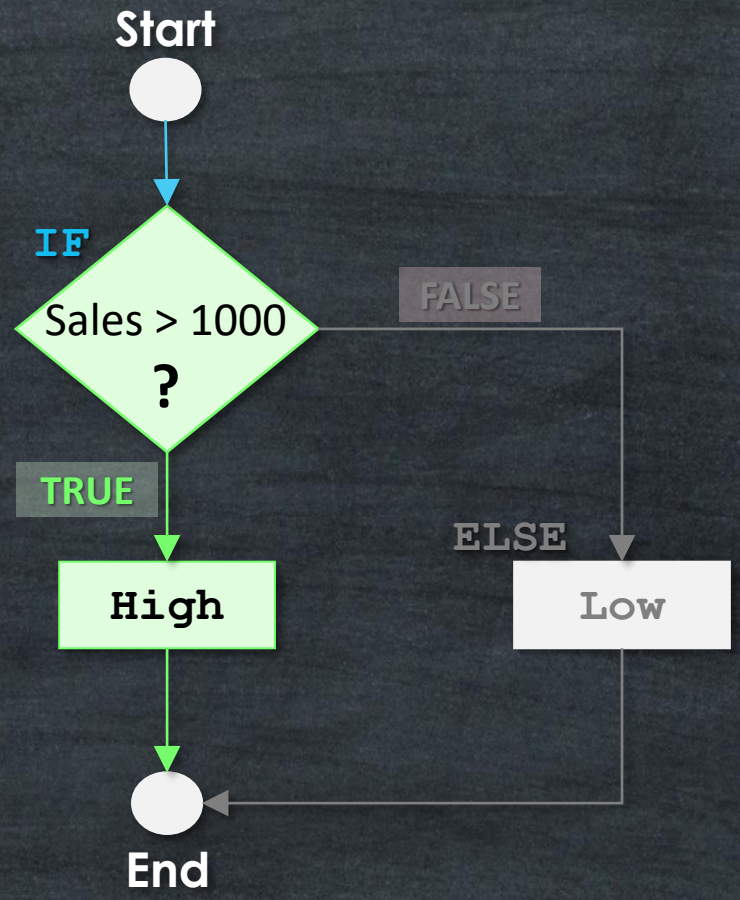
DATA WITH BARAA

```
[SALES] = 1200
```

➡ High

```
IF [SALES] > 1000
  THEN "HIGH"
ELSE "LOW"
END
```

TRUE



LOGICAL FUNCTIONS

IF, ELSE

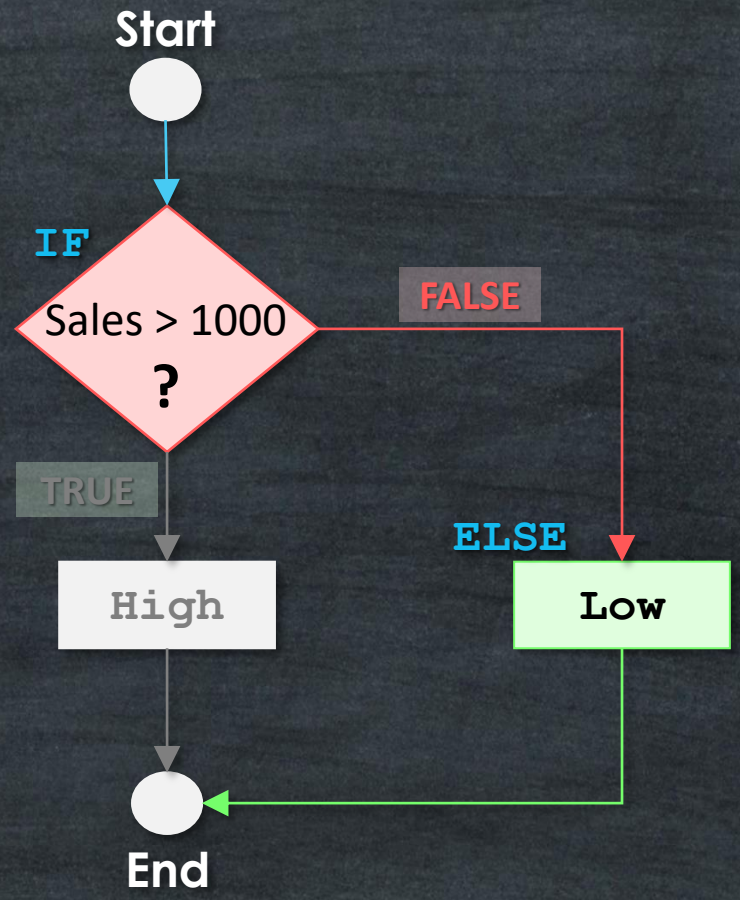
DATA WITH BARAA

[SALES] = 700 → LOW

```
IF [SALES] > 1000
   THEN "HIGH"
ELSE "LOW"

END
```

FALSE



LOGICAL FUNCTIONS

IF, ELSE, ELSEIF

DATA WITH BARAA

```
[SALES] = 1200
```

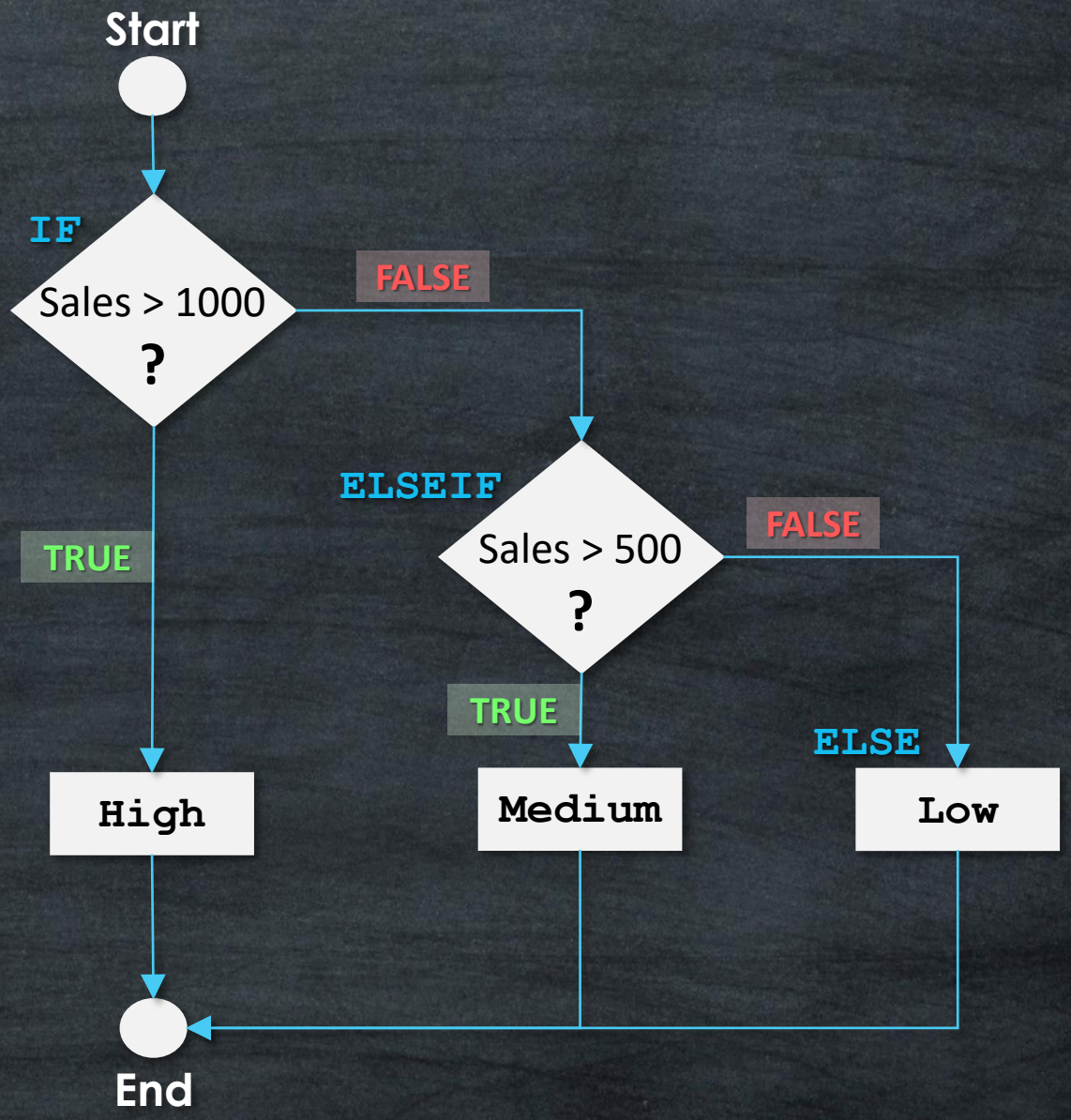
```
IF [SALES] > 1000
   THEN "HIGH"

ELSEIF [SALES] > 500
   THEN "MEDIUM"

ELSE "LOW"

END
```

TRUE



LOGICAL FUNCTIONS

IF, ELSE, ELSEIF

DATA WITH BARAA

[SALES] = 1200 ➡ HIGH

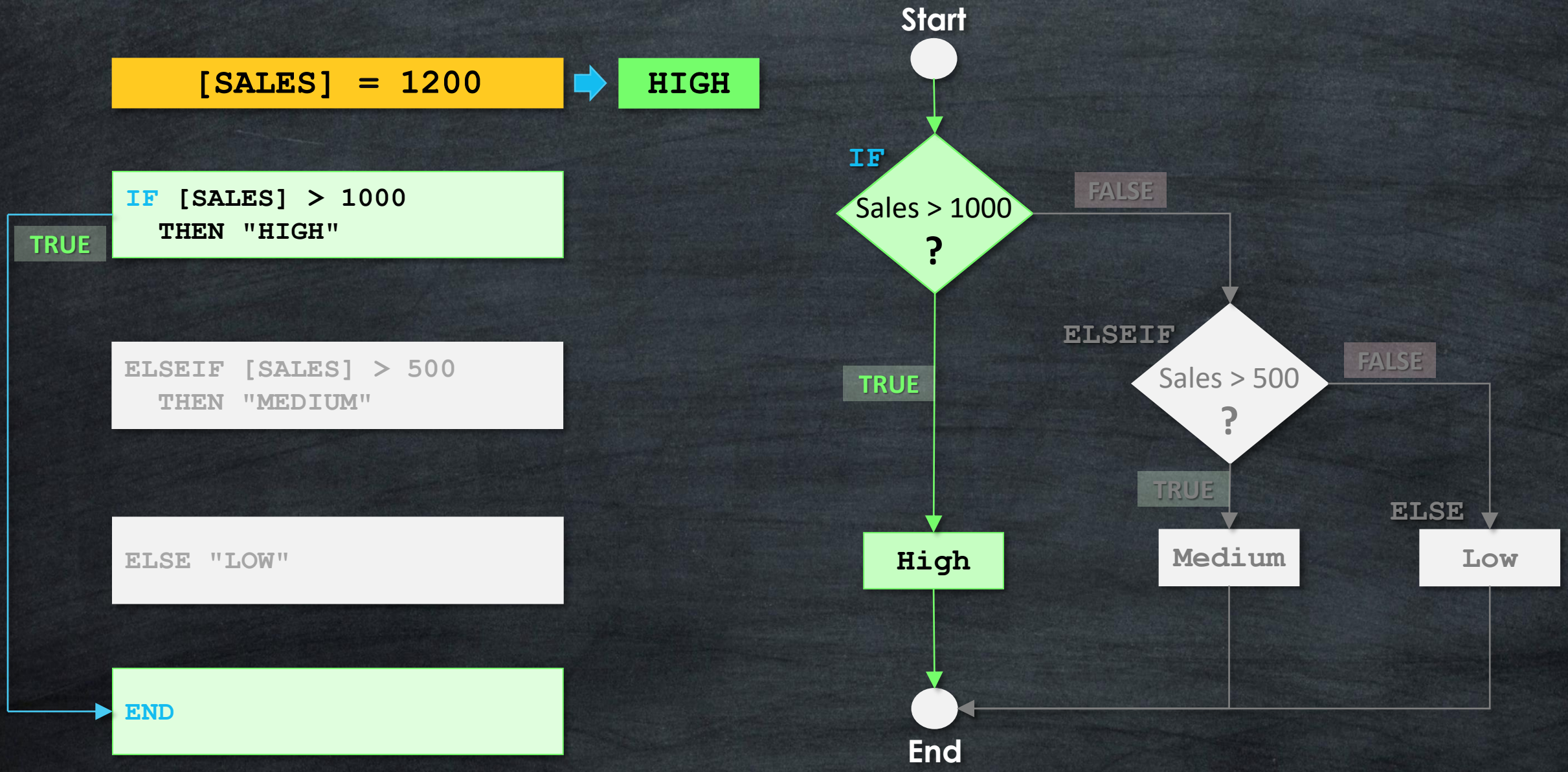
```
IF [SALES] > 1000
   THEN "HIGH"

ELSEIF [SALES] > 500
   THEN "MEDIUM"

ELSE "LOW"

END
```

TRUE



LOGICAL FUNCTIONS

IF, ELSE, ELSEIF

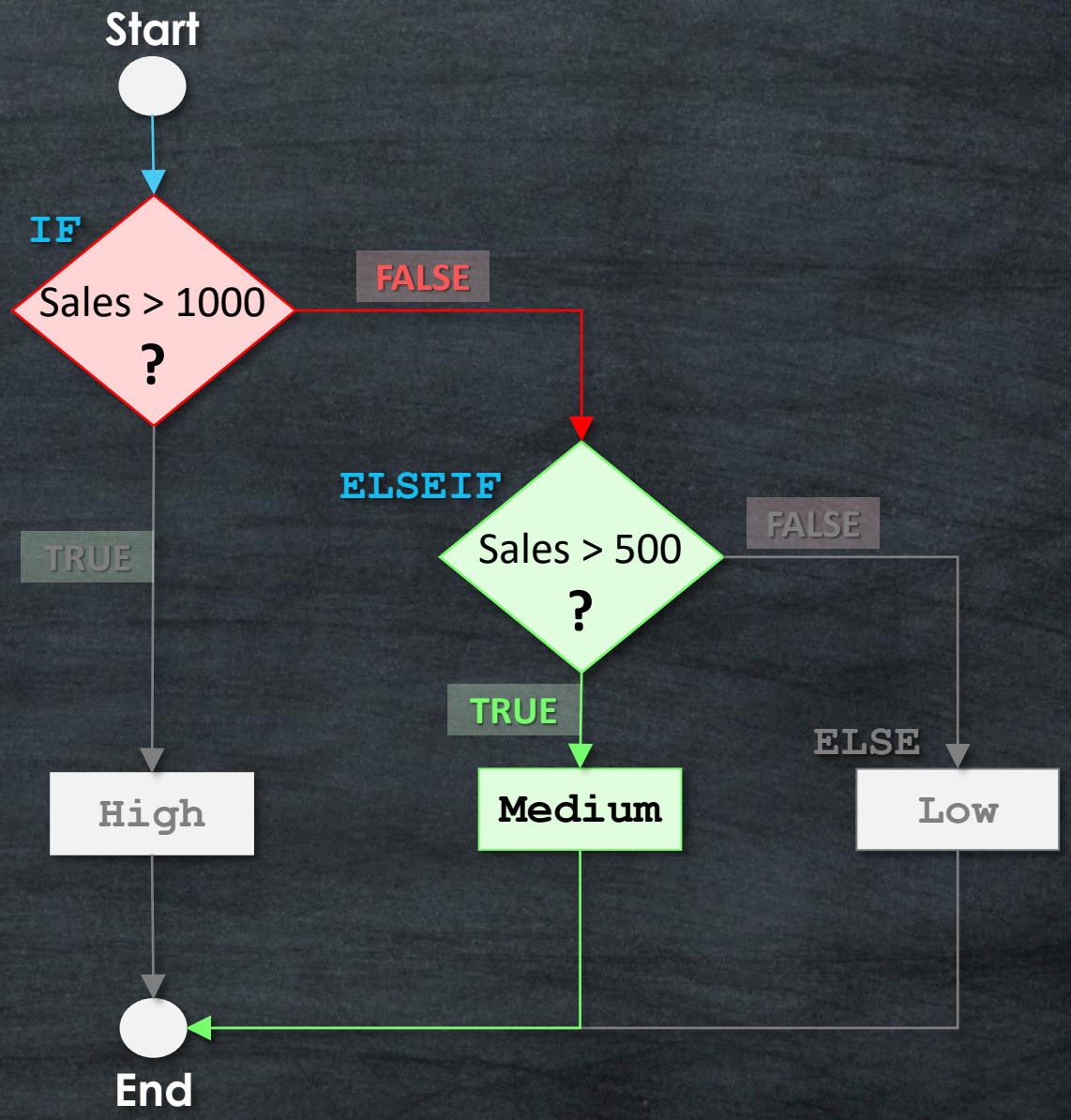
DATA WITH BARAA

[SALES] = 700 ➡ MEDIUM

```
IF [SALES] > 1000
   THEN "HIGH"
ELSEIF [SALES] > 500
   THEN "MEDIUM"
ELSE "LOW"
END
```

FALSE

TRUE



LOGICAL FUNCTIONS

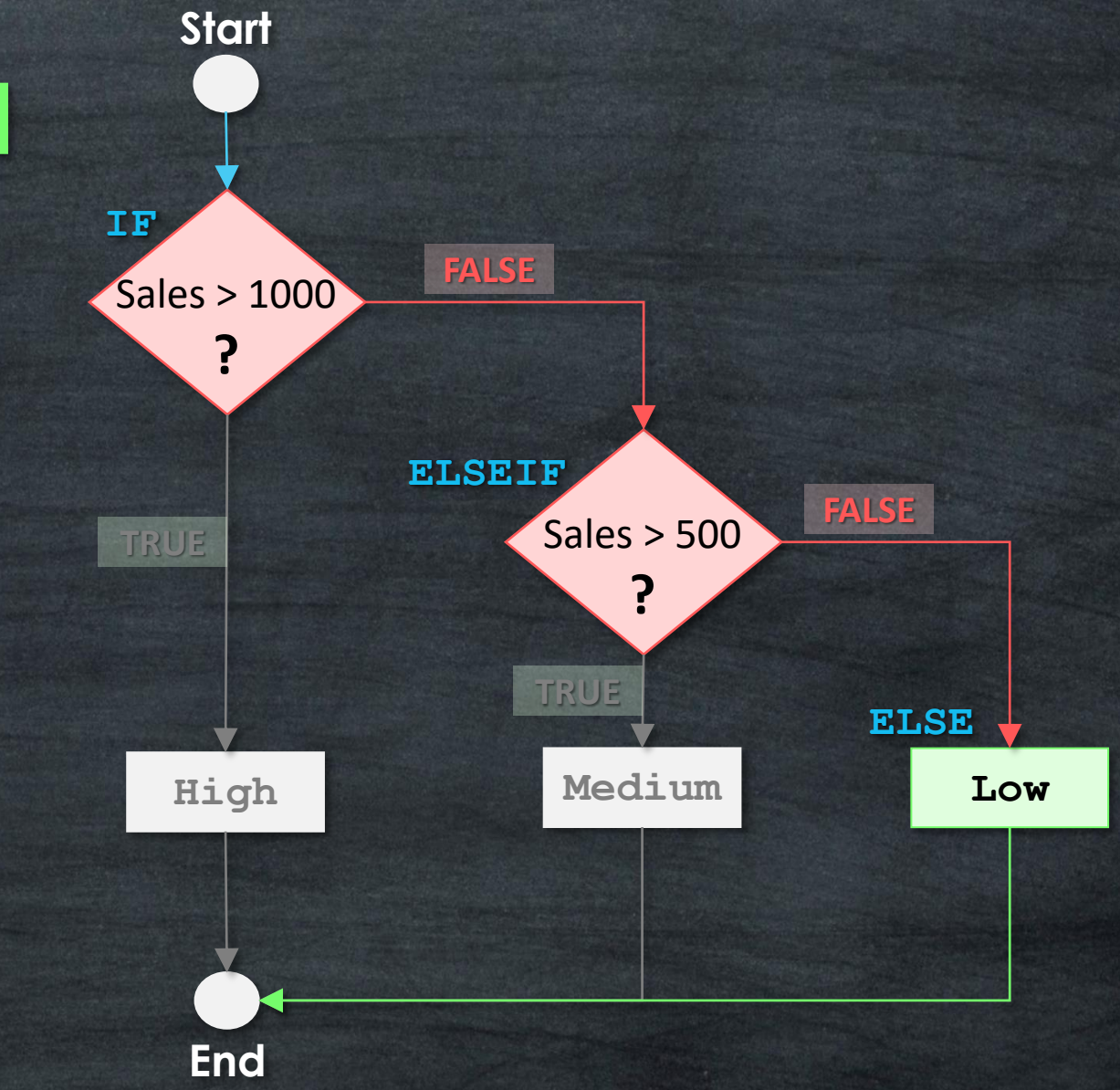
IF, ELSE, ELSEIF

DATA WITH BARAA

[SALES] = 350 → LOW

```
IF [SALES] > 1000
   THEN "HIGH"
FALSE
ELSEIF [SALES] > 500
   THEN "MEDIUM"
FALSE
ELSE "LOW"

END
```



CASE WHEN


```
[Country] = "Germany"
```

→ DE

```
CASE [Country]
WHEN "Germany" THEN "DE"
WHEN "France" THEN "FR"
WHEN "USA" THEN "US"
ELSE "n/a"
END
```

TRUE

CASE WHEN


```
[Country] = "France"
```

→ FR

```
CASE [Country]
WHEN "Germany" THEN "DE"
WHEN "France" THEN "FR"
WHEN "USA" THEN "US"
ELSE "n/a"
END
```

FALSE

TRUE

CASE WHEN


```
[Country] = "Spain"
```

→ n/a

```
CASE [Country]
```

FALSE

```
WHEN "Germany" THEN "DE"
```

FALSE

```
WHEN "France" THEN "FR"
```

FALSE

```
WHEN "USA" THEN "US"
```

```
ELSE "n/a"
```

```
END
```

IF, ELSEIF

```
IF [SALES] > 1000
    THEN "HIGH"
ELSEIF [SALES] > 500
    THEN "MEDIUM"
ELSE "LOW"
END
```

Supports Multiple Conditions

Evalulte Multiple Fields

Supports Any Data Type

No Limitations

IIF

```
IIF([Sales] > 1000, "HIGH", "LOW")
```

Supports Only One Conditions

Evalulte Multiple Fields

Supports Any Data Type

Easy to Write

CASE WHEN

```
CASE [Country]
WHEN "Germany" THEN "DE"
WHEN "France" THEN "FR"
ELSE "U/A"
END
```

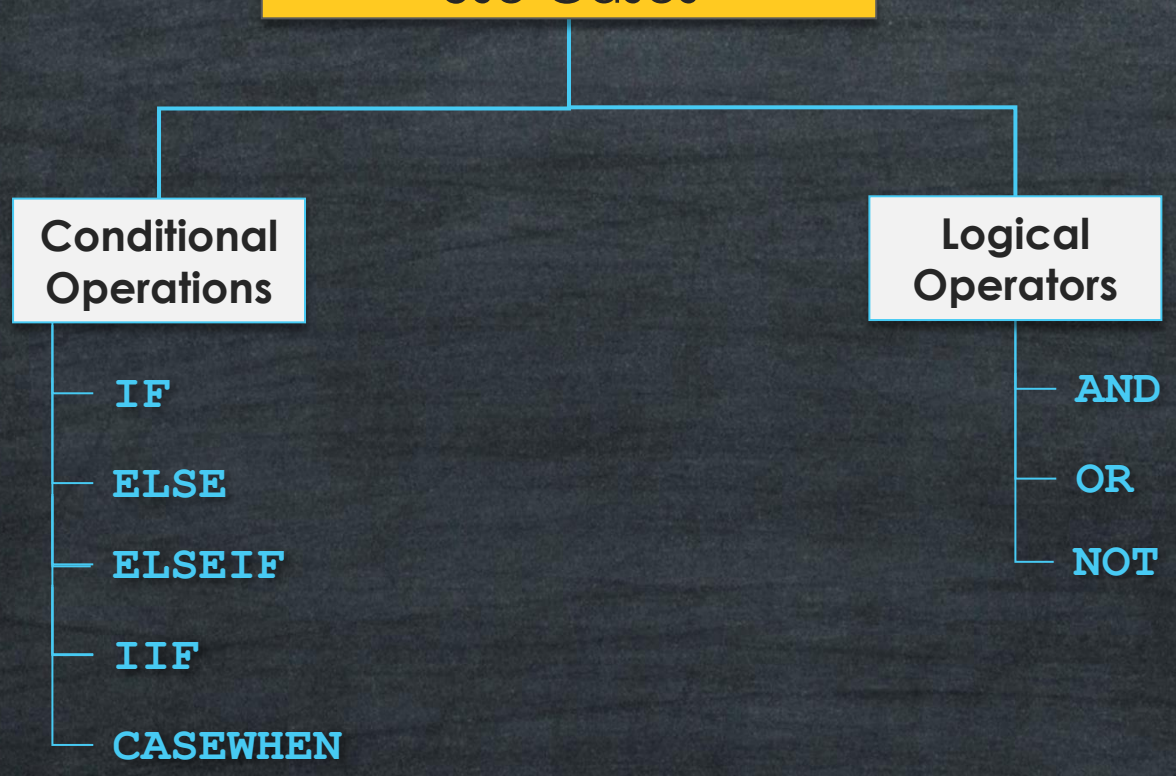
Supports Multiple Conditions

Evalulte Only One Dimension

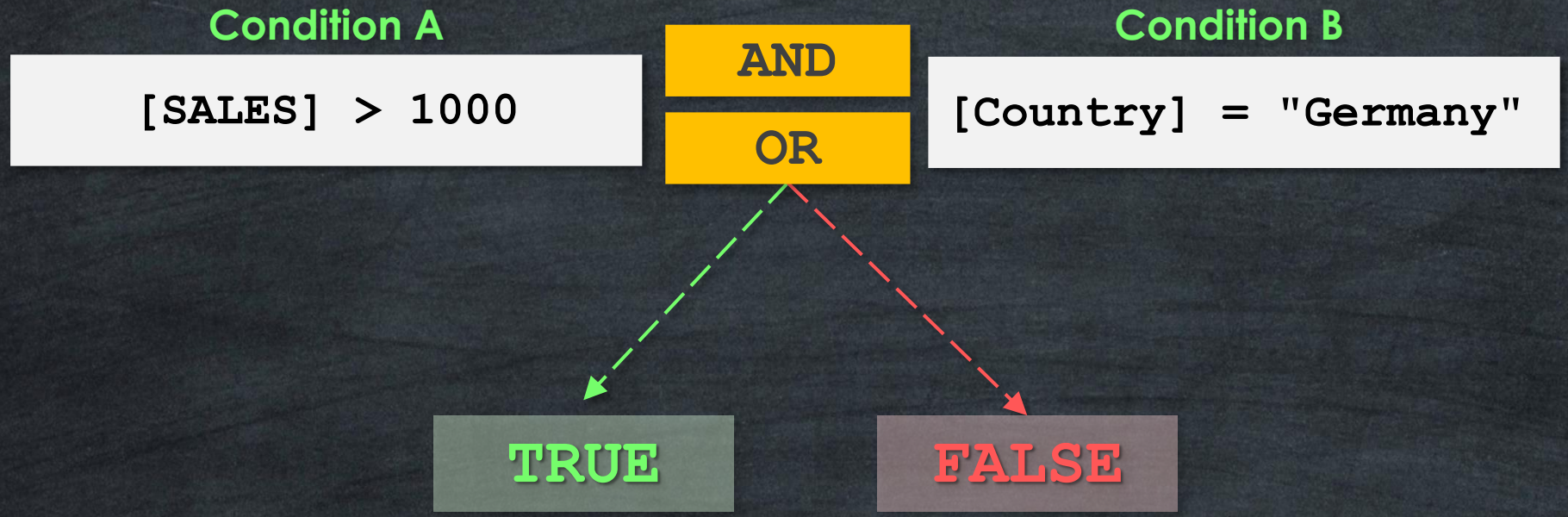
Supports Only Strings

Easy to Write & Read

Logical Functions
Use Cases



AND, OR



AND/OR logical operators are used to **combine** multiple conditions

AND, OR

AND Syntax

```
IF [SALES] > 1000 AND [Country] = "Germany"
   THEN "HIGH"
END
```

OR Syntax

```
IF [SALES] > 1000 OR [Country] = "Germany"
   THEN "HIGH"
END
```

LOGICAL FUNCTIONS

AND, OR

DATA WITH BARAA

AND - Returns TRUE if both conditions are TRUE, and FALSE otherwise

OR - Returns TRUE if at least one condition is TRUE, and FALSE otherwise

Customer	Sales	Country	Condition A [Sales] > 1000	Condition B [Country] = "Germany"	A AND B	A OR B
John	1800	Germany	TRUE	TRUE	TRUE	TRUE
Maria	1250	USA	TRUE	FALSE	FALSE	TRUE
Martin	350	Germany	FALSE	TRUE	FALSE	TRUE
Georg	400	France	FALSE	FALSE	FALSE	FALSE

NOT

NOT – Reverse Logical Operator:

- Return TRUE if the condition is FALSE
- Return FALSE if the condition is TRUE

Customer	Sales	Country	Condition A [Sales] > 1000	NOT A
John	1800	Germany	TRUE	FALSE
Maria	1250	USA	TRUE	FALSE
Martin	350	Germany	FALSE	TRUE
Georg	400	France	FALSE	TRUE

NOT Syntax

```
IF NOT [Sales] > 1000
    THEN "Low"
END
```

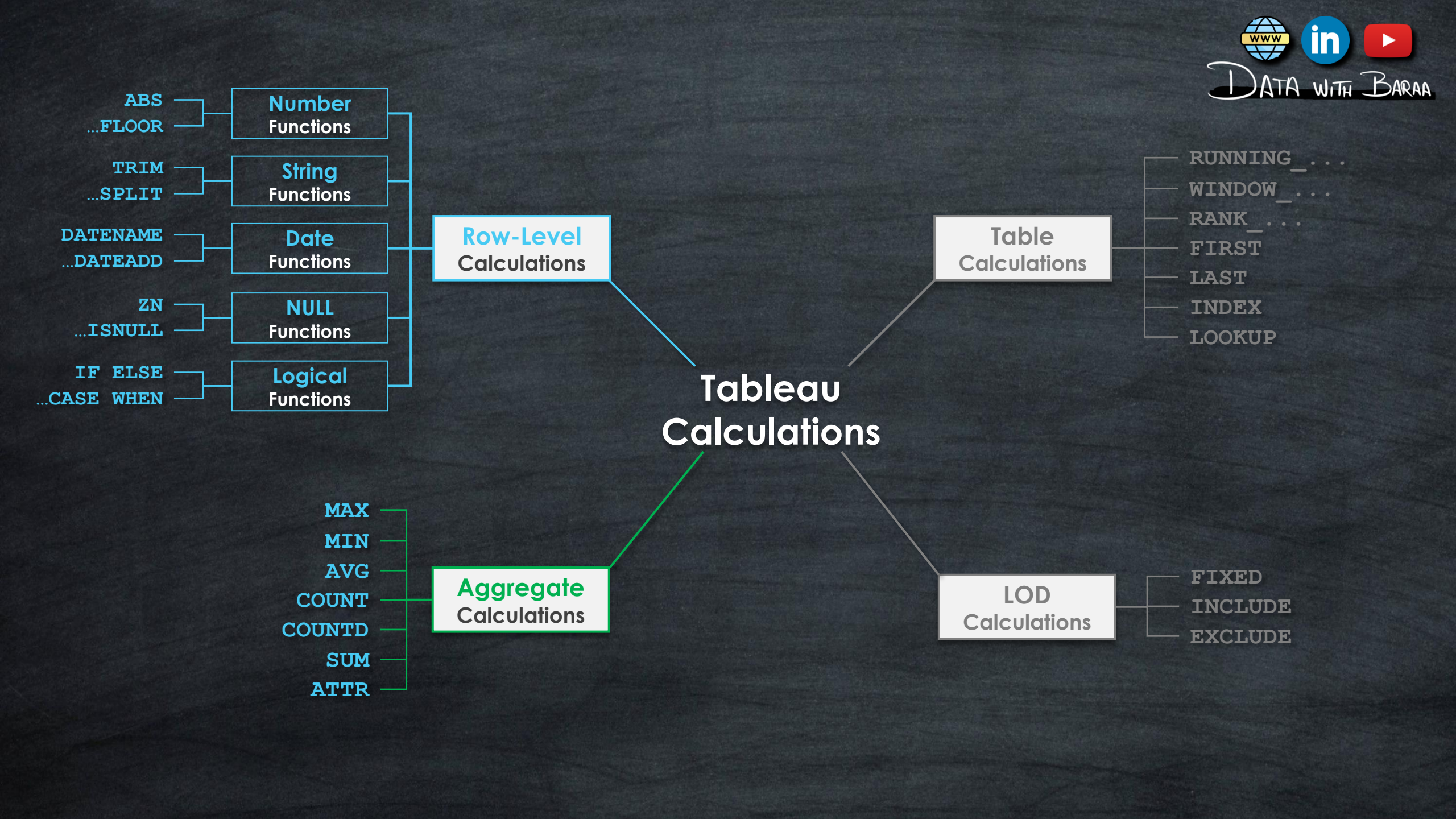


Tableau Calculations
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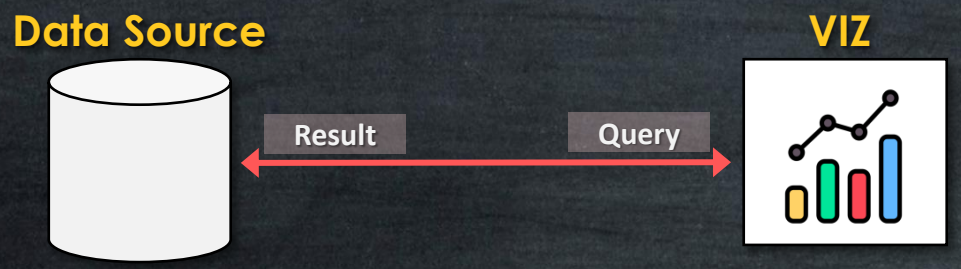
WINDOW_...
RANK_...
FIRST
LAST
INDEX
LOOKUP
LOD Calculations
FIXED
INCLUDE
EXCLUDE
DATA WITH BARAA

Aggregate
Calculations

- Aggregate the rows at the dimension level used in the VIZ
- Level of Details is the Visualization | VIZ LOD
- The calculations are performed on the data within the data source
- Results will be calculated on the FLY



Aggregate Functions
Use Cases

Aggregate Calculations

Aggregate the data at the visualization level of details (VIZ LOD)

Order ID	Product	Customer	Sales
1	P-1	John	5
2	P-1	John	15
3	P-1	John	20
4	P-2	John	15
5	P-2	Maria	30
6	P-2	Maria	5
7	P-3	John	25
8	P-3	Maria	20
9	P-4	Maria	10
10	P-4	Maria	5

Data Source

```
SUM([Sales])
```

Product	Sales
P-1	40
P-2	50
P-3	45
P-4	15

View

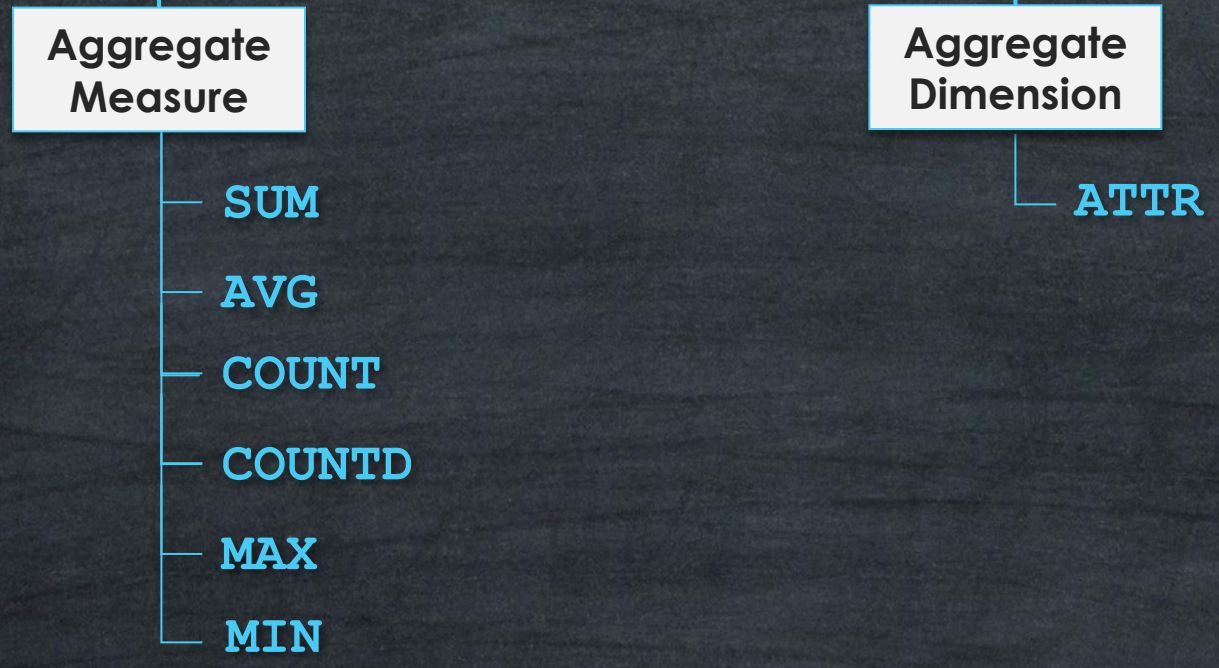
Aggregate Calculations

Data with Baraa

Aggregate the data at the visualization level of details (VIZ LOD)

		Syntax
SUM	Returns the total sum of all values	SUM([Sales])
AVG	Returns the average of all values	AVG([Sales])
COUNT	Counts the number of values	COUNT([Sales])
COUNTD	Counts the number of unique values	COUNTD([Sales])
MAX	Returns the maximum value	MAX([Sales])
MIN	Returns the minimum value	MIN([Sales])

Aggregate Functions
Use Cases



Aggregate Calculations

DATA WITH BARAA

Aggregate Dimension's values?

Order ID	Product	Customer	Sales
1	P-1	John	5
2	P-1	John	15
3	P-1	John	20
4	P-2	John	15
5	P-2	Maria	30
6	P-2	Maria	5
7	P-3	John	25
8	P-3	Maria	20
9	P-4	Maria	10
10	P-4	Maria	5

Data Source

```
SUM([Sales])
```

Product	Sales
P-1	40
P-2	50
P-3	45
P-4	15

View

Attribute – ATTR()

Attribute Function ATTR () aggregates the values of Dimensions

- If all values are same, then it returns single value
- If there are multiple values, then it returns Asterisk *

Order ID	Product	Customer	Sales
1	P-1	John	5
2	P-1	John	15
3	P-1	John	20
4	P-2	John	15
5	P-2	Maria	30
6	P-2	Maria	5
7	P-3	John	25
8	P-3	Maria	20
9	P-4	Maria	10
10	P-4	Maria	5

Data Source

```
ATTR([Customer])
```

Product	Customer
P-1	John
P-2	*
P-3	*
P-4	Maria

View

Attribute – ATTR()

SUM() aggregate Measures

ATTR() aggregate Dimensions

Dimensions			Measure
Order ID	Product	Customer	Sales
1	P-1	John	5
2	P-1	John	15
3	P-1	John	20
4	P-2	John	15
5	P-2	Maria	30
6	P-2	Maria	5
7	P-3	John	25
8	P-3	Maria	20
9	P-4	Maria	10
10	P-4	Maria	5

Data Source

`ATTR([Customer])`

`SUM([Sales])`

Aggregate Dimensions

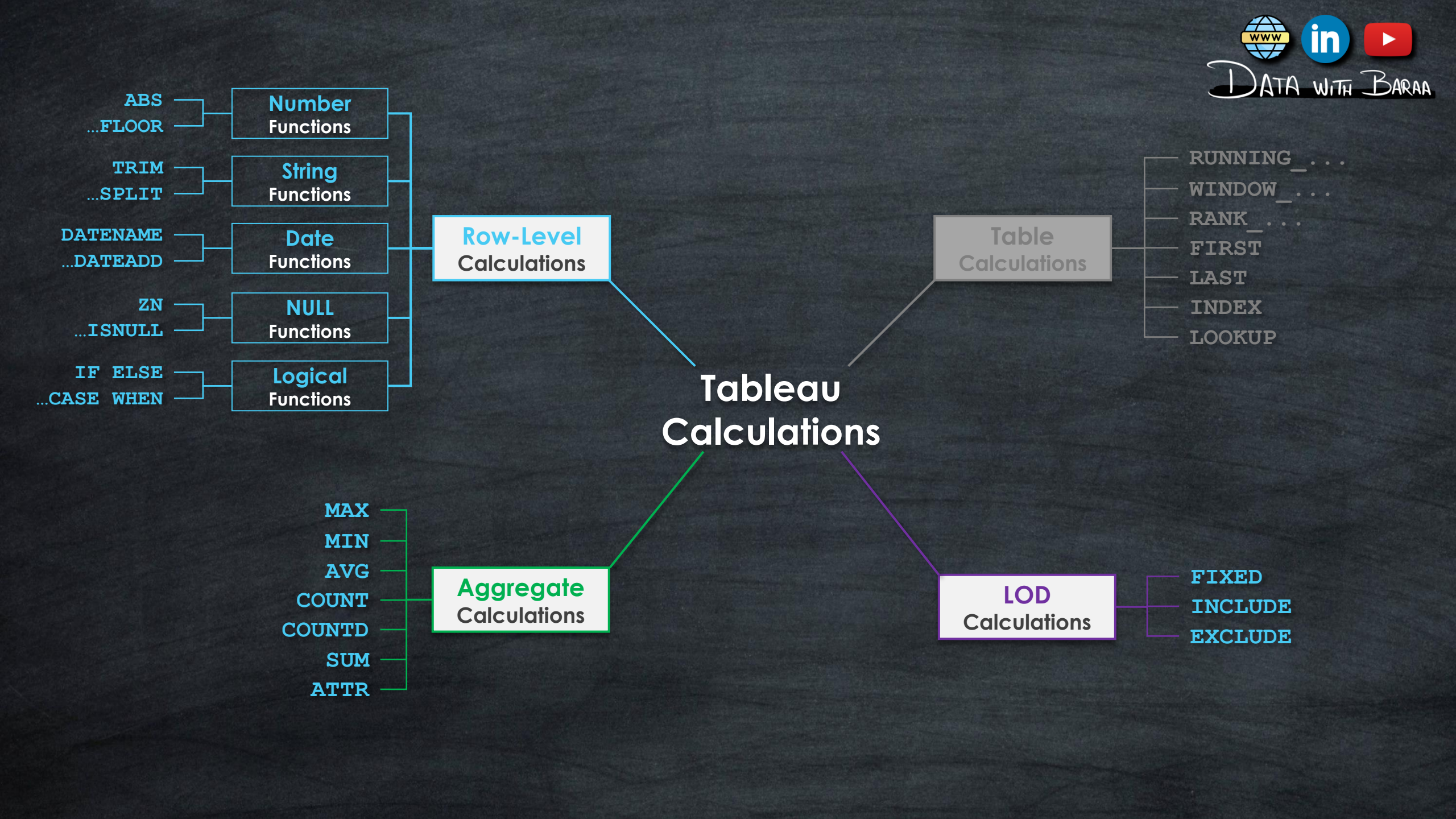
Product	Customer
P-1	John
P-2	*
P-3	*
P-4	Maria

View

Aggregate Measures

Product	Sales
P-1	40
P-2	50
P-3	45
P-4	15

View


Data with Baraa
Tableau Calculations
Row-Level Calculations
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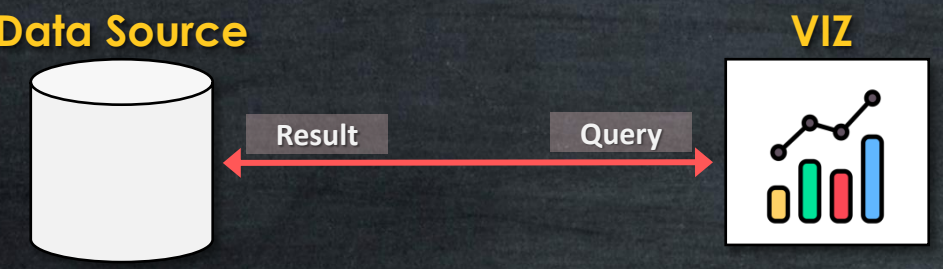
LOD Calculations
FIXED
INCLUDE
EXCLUDE

LOD
Calculations

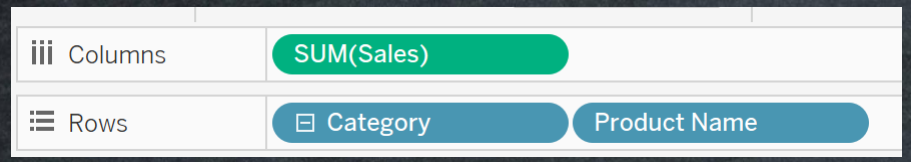
- Aggregate the rows at the dimension level used in the calculation
- Level of Details is the LOD Expression
- The calculations are performed on the data within the data source
- Results will be calculated on the FLY



Level Of Details (LOD)

DATA WITH BARAA

View



Syntax

```
{ FIXED [Category], [Product Name] : SUM([Sales]) }
```

Scoping FIXED | INCLUDE | EXCLUDE

List of Dimensions

Aggregation

Examples

```
{ EXCLUDE [Category] : SUM([Sales]) }
```

```
{ FIXED : SUM([Sales]) }
```

```
{ INCLUDE [Customer ID] : AVG([Sales]) }
```

Level Of Details (LOD)

DATA WITH BARAA

Syntax

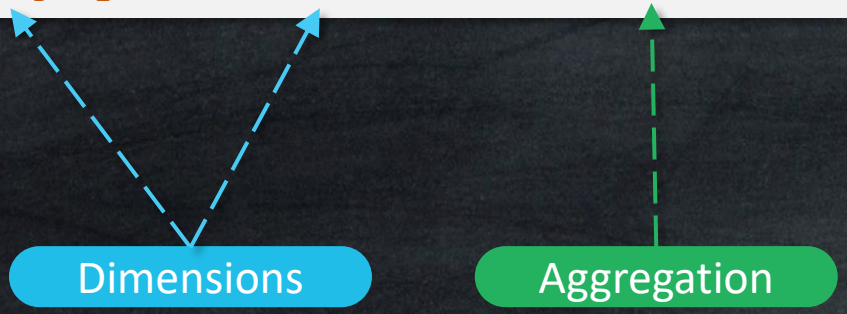
```
{ FIXED|INCLUDE|EXCLUDE <List of Dimensions> : <Aggregation> }
```

LOD Expression

```
{ FIXED : SUM([Sales])}
```

```
{ FIXED [Category] : SUM([Sales])}
```

```
{ FIXED [Category],[Product Name] : SUM([Sales])}
```



View

SUM(Sales)

Category | SUM(Sales)

Category | Product Name | SUM(Sales)

Level 1

Level 2

Level 3

Level 4

Level 5

No Dimensions

Category

Country

Product Name

Order ID

Low

High

Level of Details (Granularity)

Total Sales = 6.506

Category	
Accessories	2.377
Monitor	4.129

Country	
France	172
Germany	2.774
USA	3.560

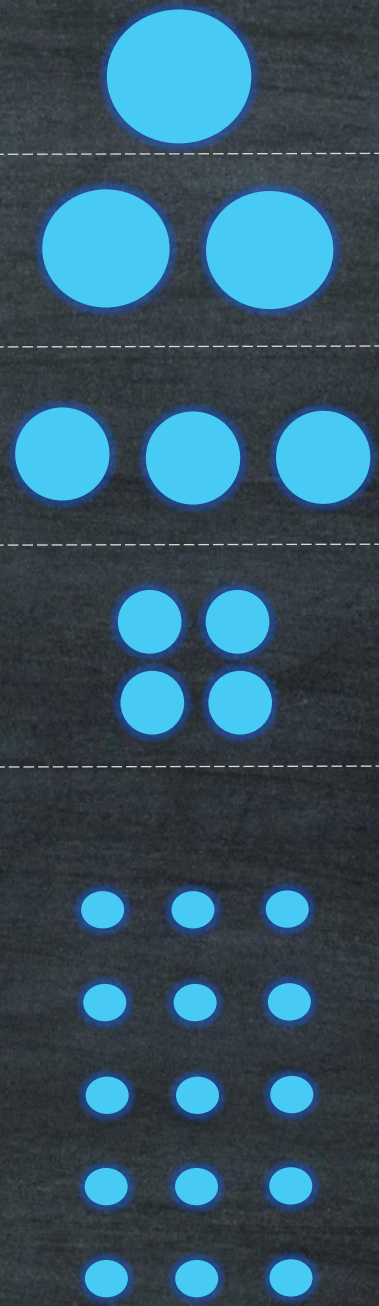
Product Name	
Cherry USB Mouse	672
LG FULL HD Monitor	3.182
Logitech Keyboard K120	1.705
Samsung FHD Monitor	948

Order ID	
1	216
2	1.691
3	40
4	501
5	164
6	430
7	91
8	375
9	525
10	56
11	221
12	1.491
13	41
14	451
15	214

High

Low

Level of Aggregations



DATA WITH BARAA

Level 1

Level 2

Level 3

Level 4

Level 5

Total Sales = 6.506

Category	
Accessories	2.377
Monitor	4.129

Country	
France	172
Germany	2.774
USA	3.560

Product Name	
Cherry USB Mouse	672
LG FULL HD Monitor	3.182
Logitech Keyboard K120	1.705
Samsung FHD Monitor	948

Order ID	
1	216
2	1.691
3	40
4	501
5	164
6	430
7	91
8	375
9	525
10	56
11	221
12	1.491
13	41
14	451
15	214

Lowest level of Details
Highest Level of Aggregation

Highest level of Details
Lowest Level of Aggregation

Exclude/Fixed LOD

Current View LOD

Include/Fixed LOD

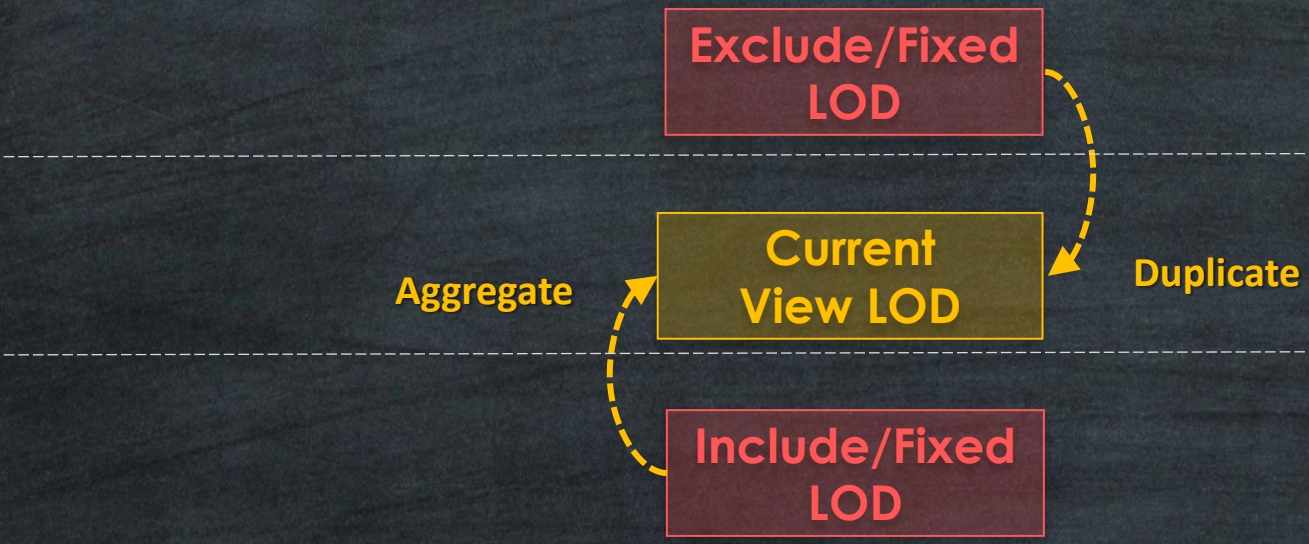
Aggregate

Duplicate

DATA WITH BARAA

Lowest level of Details

IF Level of details in LOD-Expression Lower than LOD in VIZ ➡ Duplicate Results



IF Level of details in LOD-Expression Higher than LOD in VIZ ➡ Aggregate Results

Highest level of Details

LOD (VIZ)

View 1

Category	Country	Sales

View 2

Product	Category	Country	Sales

LOD (Expression)

```
FIXED [Category] : SUM([Sales])
```

Category	Sales

Category	Sales

LOD (VIZ)

LOD (Expression)

`EXCLUDE [Category] : SUM ([Sales])`

View 1

Category	Country	Sales

-1 DIM

Category	Country	Sales

View 2

Product	Category	Country	Sales

-1 DIM

Product	Category	Country	Sales

LOD (VIZ)

LOD (Expression)

INCLUDE [Customer] : SUM([Sales])

View 1

Category	Country	Sales

+1 DIM

Customer

Category	Country	Sales

View 2

Product	Category	Country	Sales

+1 DIM

Customer

Product	Category	Country	Sales

LOD (VIZ)

View 1

Category	Country	Sales

LOD (Expression)

FIXED

Category	Sales

EXCLUDE

-1 DIM

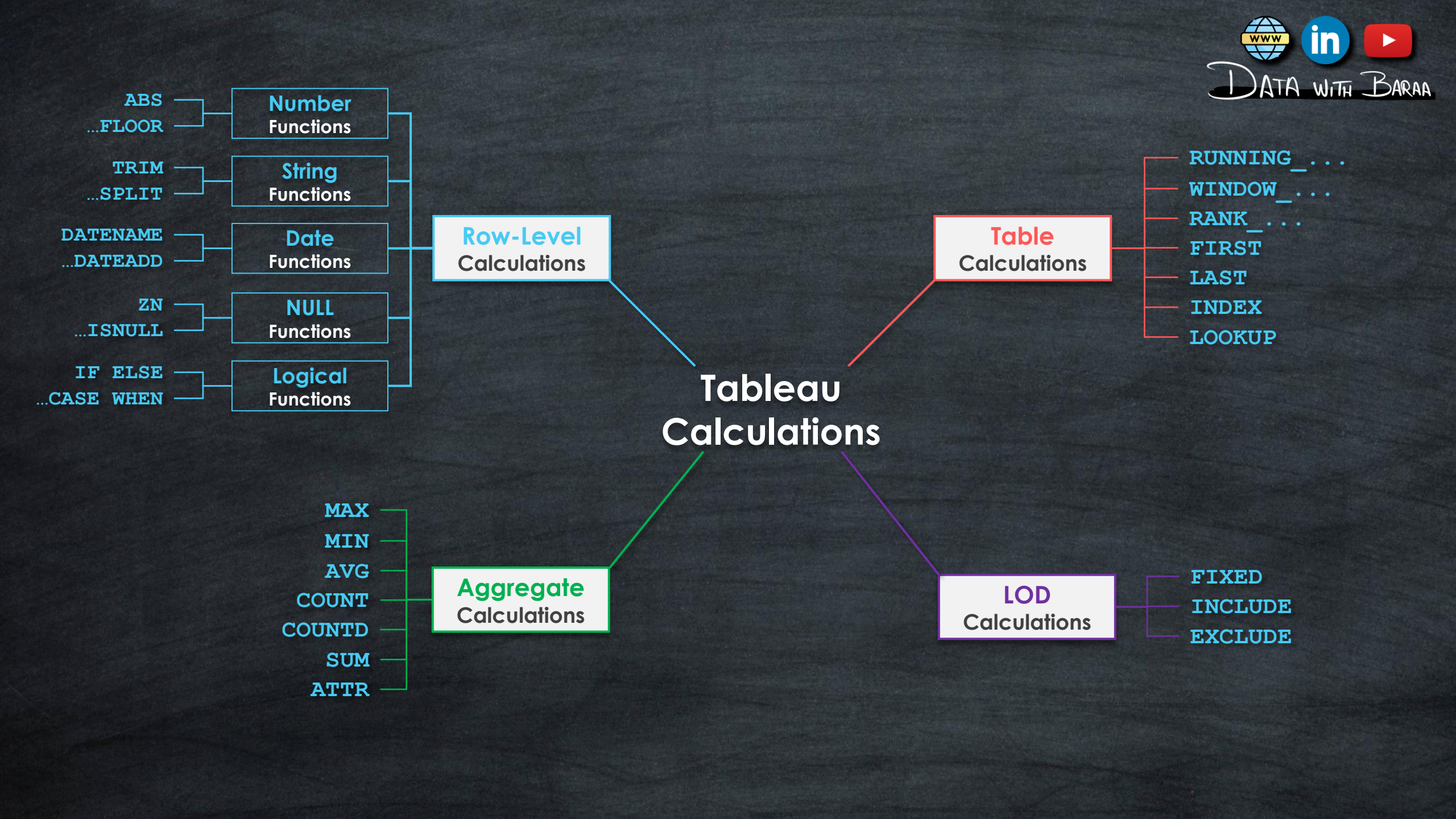
Category	Country	Sales

INCLUDE

+1 DIM

Customer

Category	Country	Sales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ATTR
LOD Calculations
FIXED
INCLUDE
EXCLUDE

Table
Calculations

- Table Calculations are calculated after the aggregation
- Aggregate the Aggregation!
- Level of Details is the Visualization | VIZ LOD
- The calculations are performed on the data displayed in the Visualization
- Results will be calculated on the FLY

Scope

Table

Quarter ..	Month ..	Order Date 2020	2021	2022
Q1	Jan	2.118	2.040	5.520
	Feb	3.962	6.713	9.729
	Mar	6.628	20.854	22.765
Q2	Apr	8.867	23.219	28.864
	May	13.036	30.600	30.941
	Jun	16.190	32.553	33.996
Q3	Jul	18.960	35.067	50.233
	Aug	22.642	37.932	57.142
	Sept	24.394	40.337	58.414
Q4	Oct	26.961	43.248	60.893
	Nov	30.307	45.931	69.838
	Dec	31.167	52.359	74.770

Pane

Quarter ..	Month ..	Order Date 2020	2021	2022
Q1	Jan	2.118	2.040	5.520
	Feb	3.962	6.713	9.729
	Mar	6.628	20.854	22.765
Q2	Apr	8.867	23.219	28.864
	May	13.036	30.600	30.941
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Q3	Jul	18.960	35.067	50.233
	Aug	22.642	37.932	57.142
	Sept	24.394	40.337	58.414
Q4	Oct	26.961	43.248	60.893
	Nov	30.307	45.931	69.838
	Dec	31.167	52.359	74.770

Cell

Quarter ..	Month ..	Order Date 2020	2021	2022
Q1	Jan	2.118	2.040	5.520
	Feb	3.962	6.713	9.729
	Mar	6.628	20.854	22.765
Q2	Apr	8.867	23.219	28.864
	May	13.036	30.600	30.941
	Jun	16.190	32.553	33.996
Q3	Jul	18.960	35.067	50.233
	Aug	22.642	37.932	57.142
	Sept	24.394	40.337	58.414
Q4	Oct	26.961	43.248	60.893
	Nov	30.307	45.931	69.838
	Dec	31.167	52.359	74.770

Direction

Down

Quarter ..	Month ..	Order Date 2020	2021	2022
Q1	Jan	2.118	2.040	5.520
	Feb	3.962	6.713	9.729
	Mar	6.628	20.854	22.765
Q2	Apr	8.867	23.219	28.864
	May	13.036	30.600	30.941
	Jun	16.190	32.553	33.996
Q3	Jul	18.960	35.067	50.233
	Aug	22.642	37.932	57.142
	Sept	24.394	40.337	58.414
Q4	Oct	26.961	43.248	60.893
	Nov	30.307	45.931	69.838
	Dec	31.167	52.359	74.770

Across

Quarter ..	Month ..	Order Date 2020	2021	2022
Q1	Jan	2.118	2.040	5.520
	Feb	3.962	6.713	9.729
	Mar	6.628	20.854	22.765
Q2	Apr	8.867	23.219	28.864
	May	13.036	30.600	30.941
	Jun	16.190	32.553	33.996
Q3	Jul	18.960	35.067	50.233
	Aug	22.642	37.932	57.142
	Sept	24.394	40.337	58.414
Q4	Oct	26.961	43.248	60.893
	Nov	30.307	45.931	69.838
	Dec	31.167	52.359	74.770

Down then Across

Quarter ..	Month ..	Order Date 2020	2021	2022
Q1	Jan	2.118	2.040	5.520
	Feb	3.962	6.713	9.729
	Mar	6.628	20.854	22.765
Q2	Apr	8.867	23.219	28.864
	May	13.036	30.600	30.941
	Jun	16.190	32.553	33.996
Q3	Jul	18.960	35.067	50.233
	Aug	22.642	37.932	57.142
	Sept	24.394	40.337	58.414
Q4	Oct	26.961	43.248	60.893
	Nov	30.307	45.931	69.838
	Dec	31.167	52.359	74.770

Across then Down

Quarter ..	Month ..	Order Date 2020	2021	2022
Q1	Jan	2.118	2.040	5.520
	Feb	3.962	6.713	9.729
	Mar	6.628	20.854	22.765
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	May	13.036	30.600	30.941
	Jun	16.190	32.553	33.996
Q3	Jul	18.960	35.067	50.233
	Aug	22.642	37.932	57.142
	Sept	24.394	40.337	58.414
Q4	Oct	26.961	43.248	60.893
	Nov	30.307	45.931	69.838
	Dec	31.167	52.359	74.770

Methods to Create
Table Calculations

DATA WITH BARAA

Quick Table Calculations

- Running Total
- Difference
- Percent Difference
- Percent of Total
- Rank
- Percentile
- Moving Average
- YTD Total
- Compound Growth Rate
- Year Over Year Growth
- YTD Growth

Table Calculation Types

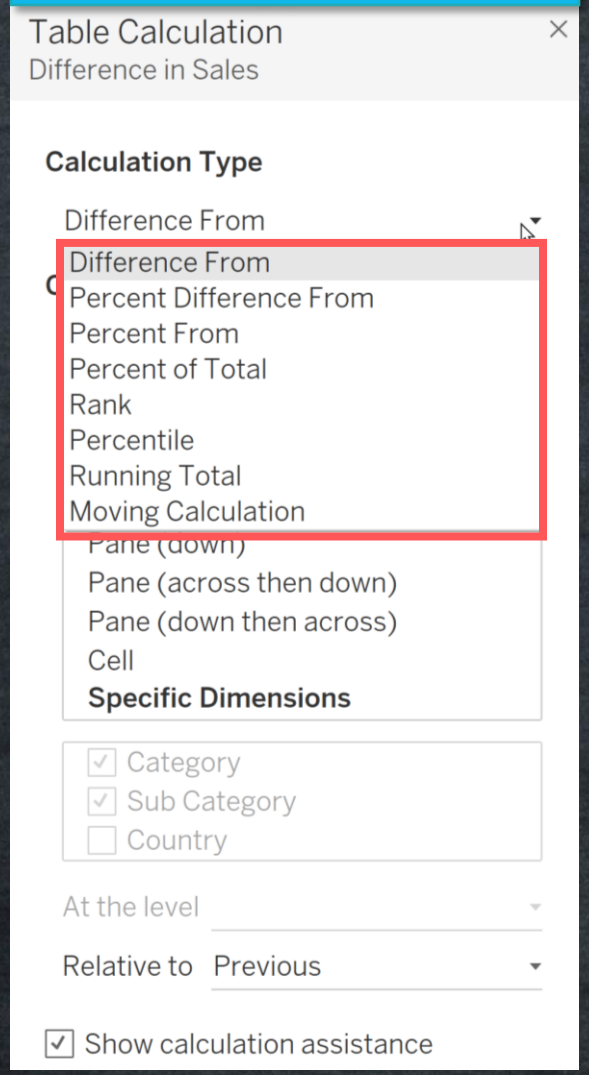
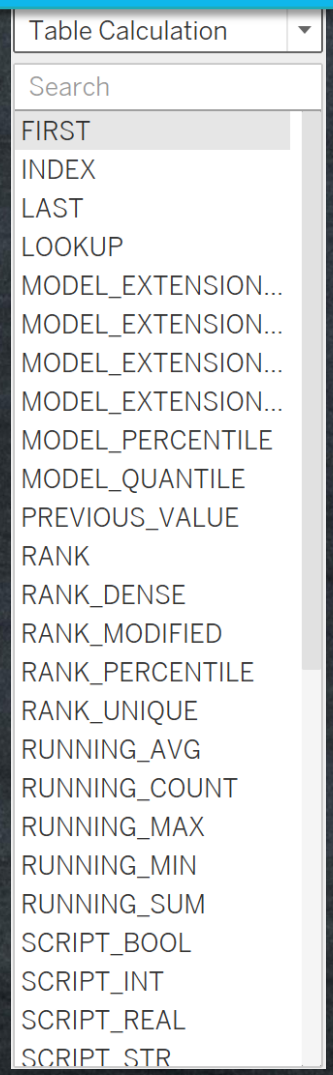


Table Calculation Functions



Running Total

Add each value to the sum of all previous values

Running Total

DATA WITH BARAA

Current Running Total = Sales Value

Current Row

Month ..	Running S..	Sales
Jan		2.067
Feb		
Mar		
Apr		
May		
Jun		
Jul		
Aug		
Sept		
Oct		
Nov		
Dec		

Sales Value

Running Total

DATA WITH BARAA

Current Running Total = Previous Running Total + Sales Value

Previous Running Value

Month ..	Running S..	Sales
Jan	2.067	2.067
Feb		523
Mar		
Apr		
May		
Jun		
Jul		
Aug		
Sept		
Oct		
Nov		
Dec		

Current Row

Sales Value

2590 = 2067 + 523

Running Total

Previous Running Value

Month ..	Running S..	Sales
Jan	2.067	2.067
Feb	2.590	523
Mar		6.422
Apr		
May		
Jun		
Jul		
Aug		
Sept		
Oct		
Nov		
Dec		

Current Row

Sales Value

Current Running Total = Previous Running Total + Sales Value

9013 = 2590 + 6422

Running Total

DATA WITH BARAA

Current Running Total = Previous Running Total + Sales Value

Month ..	Running S..	Sales
Jan	2.067	2.067
Feb	2.590	523
Mar	9.013	6.422
Apr	11.624	2.611
May	11.923	299
Jun	12.165	242
Jul	12.935	769
Aug	16.930	3.996
Sept		107
Oct	17.703	666
Nov	23.247	5.544
Dec		2.798

Previous Running Value

Current Row

Sales Value

26045= 23247+ 2798

Difference

Quarter ..	Month ..	2020
Q1	Jan	2.118
	Feb	1.844
	Mar	2.666
Q2	Apr	2.240
Current Row	May	4.169
	Jun	3.154
Q3	Jul	2.770
	Aug	3.682
	Sept	1.752
Q4	Oct	2.567
	Nov	3.346
	Dec	860

Previous

Current

```
Difference = Current - Previous
1929 = 4169 - 2240
```

Difference

Quarter ..	Month ..	2020
Q1	Jan	2.118
	Feb	1.844
	Mar	2.666
Q2	Apr	2.240
Current Row	May	4.169
	Jun	3.154
Q3	Jul	2.770
	Aug	3.682
	Sept	1.752
Q4	Oct	2.567
	Nov	3.346
	Dec	860

Current

Next

```
Difference = Current - Next
1015 = 4169 - 3154
```

Difference

Quarter ..	Month ..	2020
Q1	Jan	2.118
	Feb	1.844
	Mar	2.666
Q2	Apr	2.240
Current Row	May	4.169
	Jun	3.154
Q3	Jul	2.770
	Aug	3.682
	Sept	1.752
Q4	Oct	2.567
	Nov	3.346
	Dec	860

First

Current

```
Difference = Current - First
2051 = 4169 - 2118
```

Difference

Quarter ..	Month ..	2020
Q1	Jan	2.118
	Feb	1.844
	Mar	2.666
Q2	Apr	2.240
Current Row	May	4.169
	Jun	3.154
Q3	Jul	2.770
	Aug	3.682
	Sept	1.752
Q4	Oct	2.567
	Nov	3.346
	Dec	860

Current

Last

```
Difference = Current - Last
3309 = 4169 - 860
```

Difference

Quarter ..	Month ..	2020
Q1	Jan	2.118
	Feb	1.844
	Mar	2.666
Q2	Apr	2.240
Current Row	May	4.169
	Jun	3.154
Q3	Jul	2.770
	Aug	3.682
	Sept	1.752
Q4	Oct	2.567
	Nov	3.346
	Dec	860

First

Previous

Current

Next

Last