

# What are Window Functions?

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Window functions in SQL are a type of analytical function that perform calculations across a set of rows that are related to the current row, called a "window". A window function calculates a value for each row in the result set based on a subset of the rows that are defined by a window specification.

The window specification is defined using the OVER() clause in SQL, which specifies the partitioning and ordering of the rows that the window function will operate on. The partitioning divides the rows into groups based on a specific column or expression, while the ordering defines the order in which the rows are processed within each group.

```
SELECT branch, AVG(marks)
FROM marks
GROUP BY branch
```

student_id	name	branch	marks
1	Nitish	EEE	82
2	Rishabh	EEE	91
3	Anukant	EEE	69
4	Rupesh	EEE	55
5	Shubham	CSE	78
6	Ved	CSE	43
7	Deepak	CSE	98
8	Arpan	CSE	95

1	Nitish	EEE	82
2	Rishabh	EEE	91
3	Anukant	EEE	69
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5	Shubham	CSE	78
6	Ved	CSE	43
7	Deepak	CSE	98
8	Arpan	CSE	95

branch	AVG(marks)
CSE	78.5000
EEE	74.2500

```
SELECT *,
AVG(marks) OVER(PARTITION BY branch)
FROM marks
```

student_id	name	branch	marks	AVG(marks) OVER(PARTITION BY branch)
5	Shubham	CSE	78	78.5000
6	Ved	CSE	43	78.5000
7	Deepak	CSE	98	78.5000
8	Arpan	CSE	95	78.5000
1	Nitish	EEE	82	74.2500
2	Rishabh	EEE	91	74.2500
3	Anukant	EEE	69	74.2500
4	Rupesh	EEE	55	74.2500

# Aggregate Function with OVER()

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Find all the students who have marks higher than the avg marks of their respective branch

# RANK/DENSE\_RANK/ROW\_NUMBER

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1. Find top 2 most paying customers of each month
2. Create roll no from branch and marks

mark	<u>rank</u>	<u>dense_rank</u>	row-number
95	1	1	
95	1	1	
89	3	2	

# FIRST\_VALUE/LAST VALUE/NTH\_VALUE

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1. Find the branch toppers
2. FRAME Clause
3. Find the last guy of each branch
4. Alternate way of writing Window functions
5. Find the 2nd last guy of each branch, 5th topper of each branch

# Frames

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A frame in a window function is a subset of rows within the partition that determines the scope of the window function calculation. The frame is defined using a combination of two clauses in the window function: **ROWS** and **BETWEEN**.

The ROWS clause specifies how many rows should be included in the frame relative to the current row. For example, ROWS 3 PRECEDING means that the frame includes the current row and the three rows that precede it in the partition.

The BETWEEN clause specifies the boundaries of the frame.

## Examples

- **ROWS BETWEEN UNBOUNDED PRECEDING AND CURRENT ROW** means that the frame includes all rows from the beginning of the partition up to and including the current row.
- **ROWS BETWEEN 1 PRECEDING AND 1 FOLLOWING**: the frame includes the current row and the row immediately before and after it.
- **ROWS BETWEEN UNBOUNDED PRECEDING AND UNBOUNDED FOLLOWING**: the frame includes all rows in the partition.
- **ROWS BETWEEN 3 PRECEDING AND 2 FOLLOWING**: the frame includes the current row and the three rows before it and the two rows after it.

name	branch	marks
1	Nitish	EEE 82
2	Rishabh	EEE 91
3	Anukant	EEE 69
4	Rupesh	EEE 55
5	Shubham	CSE 78
6	Ved	CSE 43
7	Deepak	CSE 98
8	Arpan	CSE 95

Handwritten annotations: The 'branch' column is circled. The 'marks' column is annotated with '1st' and '2nd' with arrows pointing to the first and second rows of the first partition. The 'marks' column is also annotated with '1st' and '2nd' with arrows pointing to the first and second rows of the second partition. The 'marks' column is also annotated with '1st' and '2nd' with arrows pointing to the first and second rows of the third partition. The 'marks' column is also annotated with '1st' and '2nd' with arrows pointing to the first and second rows of the fourth partition.

# LEAD & LAG

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Find the MoM revenue growth of Zomato