SQL Window Functions

What is Window Functions

- Analytic functions or windowing functions, are a category of SQL functions that allow you to perform calculations across a set of table rows related to the current row.
- provide a way to perform complex calculations and aggregations on data within specific windows or partitions of a result set

What we can do with Windowing Functions

- **Partitioning Data**: Window functions can be used to **partition** or group rows of a result set into subsets based on one or more columns. This allows you to perform calculations within each partition separately.
- **Ordering Data**: You can also specify the order in which rows are processed within each partition. This order is crucial for functions like ranking or calculating running totals.
- **Aggregations:** Window functions can perform various aggregation operations (e.g., **SUM, AVG, MAX, MIN**) over the rows in a defined window. These functions calculate values based on the rows in the window.

What we can do with Windowing Functions

- **Ranking – Rank(),DENSE_RANK(), ROW_NUMBER()** assign a ranking to rows within a partition based on specified criteria, such as sorting by a column's values.
- **Running totals** : can calculate running totals or cumulative sums using window functions. This is often useful in financial or inventory analysis.
- **Lead and Lag** : 'Lead()' and 'LAG() allow you to access data from rows preceding or following the current row, making it easier to analyze trends and changes.

What we can do with Windowing Functions

- Percentiles and Quartiles: – can use NTILE() to divide data into specific quantiles, such as quartiles & percentiles.
- Performance : Window functions are typically more efficient than equivalent operations performed using self-joins or subqueries.

Syntax

```
<Window Function>(<expression>) OVER (
    [PARTITION BY <partition_column(s)>]
    [ORDER BY <ordering_column(s)>]
    [ROWS <window_frame_specification>]
)
```