Window to Success

Mastering SQL Server Window Functions

Daniel Hutmacher

```sql
UPDATE x
SET x.[From]=x._prev_to
FROM (
    SELECT *, LAG([To], 1) OVER (
            PARTITION BY Location_ID
            ORDER BY [From]
        ) AS _prev_to
    FROM DW.Location_Timeframes
    ) AS x
WHERE _prev_to>[From];
```

Monkey
sees T-SQL window function

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MVP
Microsoft®
Most Valuable Professional

Fundamentals

```sql
SELECT *
FROM DW.Locations;
```

	Location_ID	Location_Name
1	53300	Malmö-Sturup Flygplats
2	66420	Kalmar flygplats
3	72420	Göteborg-Landvetter Flygplats
4	78400	Visby Flygplats
5	86480	Nyköpings Flygplats
6	97200	Stockholm-Bromma Flygplats
7	97390	Arlanda
8	97400	Stockholm-Arlanda Flygplats
9	98210	Stockholm-Observatoriekullen
10	134110	Östersund-Frösön Flygplats
11	140480	Umeå Flygplats
12	162860	Luleå-Kallax Flygplats
13	180940	Kiruna Flygplats

Fundamentals

```
SELECT *, (SELECT COUNT(*)+1
           FROM DW.Locations
           WHERE Location_Name<loc.Location_Name
              OR Location_Name=loc.Location_Name)
FROM DW.Locations AS loc;
```

Fundamentals

```sql
SELECT *, (SELECT COUNT(*)+1
           FROM DW.Locations
           WHERE Location_Name<loc.Location_Name
              OR Location_Name=loc.Location_Name AND Location_ID<loc.Location_ID)
FROM DW.Locations AS loc;
```

Fundamentals

```sql
SELECT *, (SELECT COUNT(*)+1
           FROM DW.Locations
           WHERE Location_Name<loc.Location_Name
              OR Location_Name=loc.Location_Name AND Location_ID<loc.Location_ID)
FROM DW.Locations AS loc;
```

Fundamentals

```sql
SELECT *, (SELECT COUNT(*)+1
           FROM DW.Locations
           WHERE Location_Name<loc.Location_Name
              OR Location_Name=loc.Location_Name AND Location_ID<loc.Location_ID)
FROM DW.Locations AS loc;
```

Row numbers

```
SELECT *, ROW_NUMBER() OVER (ORDER BY Location_Name)
FROM DW.Locations;
```

	Location_ID	Location_Name
1	53300	Malmö-Sturup Flygplats
2	66420	Kalmar flygplats
3	72420	Göteborg-Landvetter Flygplats
4	78400	Visby Flygplats
5	86480	Nyköpings Flygplats
6	97200	Stockholm-Bromma Flygplats
7	97390	Arlanda
8	97400	Stockholm-Arlanda Flygplats
9	98210	Stockholm-Observatoriekullen
10	134110	Östersund-Frösön Flygplats
11	140480	Umeå Flygplats
12	162860	Luleå-Kallax Flygplats
13	180940	Kiruna Flygplats

Row numbers

```sql
SELECT *, ROW_NUMBER() OVER (ORDER BY Location_Name)
FROM DW.Locations;
```

	Location_ID	Location_Name
1	97390	Arlanda
2	72420	Göteborg-Landvetter Flygplats
3	66420	Kalmar flygplats
4	180940	Kiruna Flygplats
5	162860	Luleå-Kallax Flygplats
6	53300	Malmö-Sturup Flygplats
7	86480	Nyköpings Flygplats
8	97400	Stockholm-Arlanda Flygplats
9	97200	Stockholm-Bromma Flygplats
10	98210	Stockholm-Observatoriekullen
11	140480	Umeå Flygplats
12	78400	Visby Flygplats
13	134110	Östersund-Frösön Flygplats

Row numbers

```sql
SELECT *, ROW_NUMBER() OVER (ORDER BY Location_Name)
FROM DW.Locations;
```

	Location_ID	Location_Name	Segment1002
1	97390	Arlanda	1
2	72420	Göteborg-Landvetter Flygplats	0
3	66420	Kalmar flygplats	0
4	180940	Kiruna Flygplats	0
5	162860	Luleå-Kallax Flygplats	0
6	53300	Malmö-Sturup Flygplats	0
7	86480	Nyköpings Flygplats	0
8	97400	Stockholm-Arlanda Flygplats	0
9	97200	Stockholm-Bromma Flygplats	0
10	98210	Stockholm-Observatoriekullen	0
11	140480	Umeå Flygplats	0
12	78400	Visby Flygplats	0
13	134110	Östersund-Frösön Flygplats	0

Row numbers

```
SELECT *, ROW_NUMBER() OVER (ORDER BY Location_Name)
FROM DW.Locations;
```

	Location_ID	Location_Name	Segment1002	(No column name)
1	97390	Arlanda	1	1
2	72420	Göteborg-Landvetter Flygplats	0	2
3	66420	Kalmar flygplats	0	3
4	180940	Kiruna Flygplats	0	4
5	162860	Luleå-Kallax Flygplats	0	5
6	53300	Malmö-Sturup Flygplats	0	6
7	86480	Nyköpings Flygplats	0	7
8	97400	Stockholm-Arlanda Flygplats	0	8
9	97200	Stockholm-Bromma Flygplats	0	9
10	98210	Stockholm-Observatoriekullen	0	10
11	140480	Umeå Flygplats	0	11
12	78400	Visby Flygplats	0	12
13	134110	Östersund-Frösön Flygplats	0	13

Row numbers

```sql
SELECT *, ROW_NUMBER() OVER (ORDER BY 0)
FROM DW.Locations;
```

```
Msg 5309, Level 16, State 1, Line 1
Windowed functions, aggregates and NEXT VALUE FOR
functions do not support constants as ORDER BY
clause expressions.
```

Row numbers

```sql
SELECT *, ROW_NUMBER() OVER (ORDER BY NULL)
FROM DW.Locations;
```

```
Msg 5309, Level 16, State 1, Line 1
Windowed functions, aggregates and NEXT VALUE FOR
functions do not support constants as ORDER BY
clause expressions.
```

Row numbers

```
SELECT *, ROW_NUMBER() OVER (ORDER BY (SELECT NULL))
FROM DW.Locations;
```

	Location_ID	Location_Name	Segment1002	(No column name)
1	53300	Malmö-Sturup Flygplats	1	1
2	66420	Kalmar flygplats	0	2
3	72420	Göteborg-Landvetter Flygplats	0	3
4	78400	Visby Flygplats	0	4
5	86480	Nyköpings Flygplats	0	5
6	97200	Stockholm-Bromma Flygplats	0	6
7	97390	Arlanda	0	7
8	97400	Stockholm-Arlanda Flygplats	0	8
9	98210	Stockholm-Observatoriekullen	0	9
10	134110	Östersund-Frösön Flygplats	0	10
11	140480	Umeå Flygplats	0	11
12	162860	Luleå-Kallax Flygplats	0	12
13	180940	Kiruna Flygplats	0	13

Lead and Lag

```
SELECT *, LEAD(Location_Name, 1) OVER (ORDER BY Location_Name)
FROM DW.Locations;
```

	Location_ID	Location_Name	(No column name)
1	97390	Arlanda	Göteborg-Landvetter Flygplats
2	72420	Göteborg-Landvetter Flygplats	Kalmar flygplats
3	66420	Kalmar flygplats	Kiruna Flygplats
4	180940	Kiruna Flygplats	Luleå-Kallax Flygplats
5	162860	Luleå-Kallax Flygplats	Malmö-Sturup Flygplats
6	53300	Malmö-Sturup Flygplats	Nyköpings Flygplats
7	86480	Nyköpings Flygplats	Stockholm-Arlanda Flygplats
8	97400	Stockholm-Arlanda Flygplats	Stockholm-Bromma Flygplats
9	97200	Stockholm-Bromma Flygplats	Stockholm-Observatoriekullen
10	98210	Stockholm-Observatoriekullen	Umeå Flygplats
11	140480	Umeå Flygplats	Visby Flygplats
12	78400	Visby Flygplats	Östersund-Frösön Flygplats
13	134110	Östersund-Frösön Flygplats	NULL

Lead and Lag

```
SELECT *, LEAD(Location_Name, 1) OVER (ORDER BY Location_Name)
FROM DW.Locations;
```

The return expression

	Location_ID	Location_Name	(No column name)
1	97390	Arlanda	Göteborg-Landvetter Flygplats
2	72420	Göteborg-Landvetter Flygplats	Kalmar flygplats
3	66420	Kalmar flygplats	Kiruna Flygplats
4	180940	Kiruna Flygplats	Luleå-Kallax Flygplats
5	162860	Luleå-Kallax Flygplats	Malmö-Sturup Flygplats
6	53300	Malmö-Sturup Flygplats	Nyköpings Flygplats
7	86480	Nyköpings Flygplats	Stockholm-Arlanda Flygplats
8	97400	Stockholm-Arlanda Flygplats	Stockholm-Bromma Flygplats
9	97200	Stockholm-Bromma Flygplats	Stockholm-Observatoriekullen
10	98210	Stockholm-Observatoriekullen	Umeå Flygplats
11	140480	Umeå Flygplats	Visby Flygplats
12	78400	Visby Flygplats	Östersund-Frösön Flygplats
13	134110	Östersund-Frösön Flygplats	NULL

Lead and Lag

```
SELECT *, LEAD(Location_Name, 1) OVER (ORDER BY Location_Name)
FROM DW.Locations;
```

The return expression

The number of rows ahead

	Location_ID	Location_Name	(No column name)
1	97390	Arlanda	Göteborg-Landvetter Flygplats
2	72420	Göteborg-Landvetter Flygplats	Kalmar flygplats
3	66420	Kalmar flygplats	Kiruna Flygplats
4	180940	Kiruna Flygplats	Luleå-Kallax Flygplats
5	162860	Luleå-Kallax Flygplats	Malmö-Sturup Flygplats
6	53300	Malmö-Sturup Flygplats	Nyköpings Flygplats
7	86480	Nyköpings Flygplats	Stockholm-Arlanda Flygplats
8	97400	Stockholm-Arlanda Flygplats	Stockholm-Bromma Flygplats
9	97200	Stockholm-Bromma Flygplats	Stockholm-Observatoriekullen
10	98210	Stockholm-Observatoriekullen	Umeå Flygplats
11	140480	Umeå Flygplats	Visby Flygplats
12	78400	Visby Flygplats	Östersund-Frösön Flygplats
13	134110	Östersund-Frösön Flygplats	NULL

Lead and Lag

```
SELECT *, LEAD(Location_Name, 1) OVER (ORDER BY Location_Name)
FROM DW.Locations;
```

The return expression

The number of rows ahead

The row order

	Location_ID	Location_Name	(No column name)
	97390	Arlanda	Göteborg-Landvetter Flygplats
2	72420	Göteborg-Landvetter Flygplats	Kalmar flygplats
3	66420	Kalmar flygplats	Kiruna Flygplats
4	180940	Kiruna Flygplats	Luleå-Kallax Flygplats
5	162860	Luleå-Kallax Flygplats	Malmö-Sturup Flygplats
6	53300	Malmö-Sturup Flygplats	Nyköpings Flygplats
7	86480	Nyköpings Flygplats	Stockholm-Arlanda Flygplats
8	97400	Stockholm-Arlanda Flygplats	Stockholm-Bromma Flygplats
9	97200	Stockholm-Bromma Flygplats	Stockholm-Observatoriekullen
10	98210	Stockholm-Observatoriekullen	Umeå Flygplats
11	140480	Umeå Flygplats	Visby Flygplats
12	78400	Visby Flygplats	Östersund-Frösön Flygplats
13	134110	Östersund-Frösön Flygplats	NULL

Lead and Lag

```sql
SELECT *, LEAD(Location_Name, 1) OVER (ORDER BY Location_Name)
FROM DW.Locations;
```

	Location_ID	Location_Name	(No column name)
1	97390	Arlanda	Göteborg-Landvetter Flygplats
2	72420	Göteborg-Landvetter Flygplats	Kalmar flygplats
3	66420	Kalmar flygplats	Kiruna Flygplats
4	180940	Kiruna Flygplats	Luleå-Kallax Flygplats
5	162860	Luleå-Kallax Flygplats	Malmö-Sturup Flygplats
6	53300	Malmö-Sturup Flygplats	Nyköpings Flygplats
7	86480	Nyköpings Flygplats	Stockholm-Arlanda Flygplats
8	97400	Stockholm-Arlanda Flygplats	Stockholm-Bromma Flygplats
9	97200	Stockholm-Bromma Flygplats	Stockholm-Observatoriekullen
10	98210	Stockholm-Observatoriekullen	Umeå Flygplats
11	140480	Umeå Flygplats	Visby Flygplats
12	78400	Visby Flygplats	Östersund-Frösön Flygplats
13	134110	Östersund-Frösön Flygplats	NULL

Lead and Lag

```
SELECT *, LEAD(Location_Name, 1) OVER (ORDER BY Location_Name)
FROM DW.Locations;
```

	Location_ID	Location_Name	(No column name)
1	97390	Arlanda	Göteborg-Landvetter Flygplats
2	72420	Göteborg-Landvetter Flygplats	Kalmar flygplats
3	66420	Kalmar flygplats	Kiruna Flygplats
4	180940	Kiruna Flygplats	Luleå-Kallax Flygplats
5	162860	Luleå-Kallax Flygplats	Malmö-Sturup Flygplats
6	53300	Malmö-Sturup Flygplats	Nyköpings Flygplats
7	86480	Nyköpings Flygplats	Stockholm-Arlanda Flygplats
8	97400	Stockholm-Arlanda Flygplats	Stockholm-Bromma Flygplats
9	97200	Stockholm-Bromma Flygplats	Stockholm-Observatoriekullen
10	98210	Stockholm-Observatoriekullen	Umeå Flygplats
11	140480	Umeå Flygplats	Visby Flygplats
12	78400	Visby Flygplats	Östersund-Frösön Flygplats
13	134110	Östersund-Frösön Flygplats	NULL

Lead and Lag

```sql
SELECT *, LAG(Location_Name, 1) OVER (ORDER BY Location_Name)
FROM DW.Locations;
```

	Location_ID	Location_Name	(No column name)
1	97390	Arlanda	NULL
2	72420	Göteborg-Landvetter Flygplats	Arlanda
3	66420	Kalmar flygplats	Göteborg-Landvetter Flygplats
4	180940	Kiruna Flygplats	Kalmar flygplats
5	162860	Luleå-Kallax Flygplats	Kiruna Flygplats
6	53300	Malmö-Sturup Flygplats	Luleå-Kallax Flygplats
7	86480	Nyköpings Flygplats	Malmö-Sturup Flygplats
8	97400	Stockholm-Arlanda Flygplats	Nyköpings Flygplats
9	97200	Stockholm-Bromma Flygplats	Stockholm-Arlanda Flygplats
10	98210	Stockholm-Observatoriekullen	Stockholm-Bromma Flygplats
11	140480	Umeå Flygplats	Stockholm-Observatoriekullen
12	78400	Visby Flygplats	Umeå Flygplats
13	134110	Östersund-Frösön Flygplats	Visby Flygplats

- `OVER (ORDER BY expression)` defines the row order.
- `ROW_NUMBER()` keeps a row number count, starting at 1.
- `LAG(expression, n)` returns the *expression* at *n* rows *lagging* (before the current row)
- `LEAD(expression, n)` returns the *expression* as *n* rows *leading* (ahead of the current row)

Were you leading or were you lagging?

Whiplash (2014)

Partitioning your window

```sql
SELECT *, ROW_NUMBER() OVER (
        PARTITION BY Metric_ID
        ORDER BY [Timestamp])
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality
1	2025-01-01 00:00:00	97400	1	-3.8000	G
2	2025-01-01 01:00:00	97400	1	-3.1000	G
3	2025-01-01 02:00:00	97400	1	-2.6000	G
4	2025-01-01 03:00:00	97400	1	-2.4000	G
5	2025-01-01 04:00:00	97400	1	-2.4000	G
6	2025-01-01 05:00:00	97400	1	-2.6000	G
7	2025-01-01 06:00:00	97400	1	-2.6000	G
8	2025-01-01 07:00:00	97400	1	-2.8000	G
9	2025-01-01 08:00:00	97400	1	-2.5000	G
10	2025-01-01 09:00:00	97400	1	-2.2000	G
11	2025-01-01 10:00:00	97400	1	-2.0000	G
12	2025-01-01 11:00:00	97400	1	-2.0000	G
13	2025-01-01 12:00:00	97400	1	-1.7000	G
14	2025-01-01 13:00:00	97400	1	-1.9000	G
15	2025-01-01 14:00:00	97400	1	-2.1000	G
16	2025-01-01 15:00:00	97400	1	-2.3000	G
17	2025-01-01 16:00:00	97400	1	-2.6000	G
18	2025-01-01 17:00:00	97400	1	-3.1000	G
19	2025-01-01 18:00:00	97400	1	-2.7000	G
20	2025-01-01 19:00:00	97400	1	-2.9000	G
21	2025-01-01 20:00:00	97400	1	-3.4000	G
22	2025-01-01 21:00:00	97400	1	-4.2000	G
23	2025-01-01 22:00:00	97400	1	-6.3000	G
24	2025-01-01 23:00:00	97400	1	-6.9000	G
25	2025-01-01 00:00:00	97400	2	5.0000	G
26	2025-01-01 01:00:00	97400	2	4.0000	G
27	2025-01-01 02:00:00	97400	2	3.0000	G
28	2025-01-01 03:00:00	97400	2	3.0000	G
29	2025-01-01 04:00:00	97400	2	3.0000	G
30	2025-01-01 05:00:00	97400	2	2.0000	G
31	2025-01-01 06:00:00	97400	2	3.0000	G
32	2025-01-01 07:00:00	97400	2	2.0000	G
33	2025-01-01 08:00:00	97400	2	2.0000	G
34	2025-01-01 09:00:00	97400	2	2.0000	G
35	2025-01-01 10:00:00	97400	2	2.0000	G
36	2025-01-01 11:00:00	97400	2	3.0000	G
37	2025-01-01 12:00:00	97400	2	3.0000	G
38	2025-01-01 13:00:00	97400	2	3.0000	G
39	2025-01-01 14:00:00	97400	2	4.0000	G
40	2025-01-01 15:00:00	97400	2	4.0000	G
41	2025-01-01 16:00:00	97400	2	4.0000	G
42	2025-01-01 17:00:00	97400	2	3.0000	G
43	2025-01-01 18:00:00	97400	2	3.0000	G
44	2025-01-01 19:00:00	97400	2	4.0000	G
45	2025-01-01 20:00:00	97400	2	4.0000	G
46	2025-01-01 21:00:00	97400	2	3.0000	G
47	2025-01-01 22:00:00	97400	2	3.0000	G
48	2025-01-01 23:00:00	97400	2	2.0000	G
49	2025-01-01 00:00:00	97400	3	70.00...	G
50	2025-01-01 01:00:00	97400	3	70.00...	G
51	2025-01-01 02:00:00	97400	3	30.00...	G
52	2025-01-01 03:00:00	97400	3	20.00...	G
53	2025-01-01 04:00:00	97400	3	10.00...	G

Fundamentals

Partitioning your window

```sql
SELECT *, ROW_NUMBER() OVER (
        PARTITION BY Metric_ID
        ORDER BY [Timestamp])
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
--ORDER BY Metric_ID
```

1

A
Z

	Timestamp	Location_ID	Metric_ID	Value	Quality
1	2025-01-01 00:00:00	97400	1	-3.8000	G
2	2025-01-01 01:00:00	97400	1	-3.1000	G
3	2025-01-01 02:00:00	97400	1	-2.6000	G
4	2025-01-01 03:00:00	97400	1	-2.4000	G
5	2025-01-01 04:00:00	97400	1	-2.4000	G
6	2025-01-01 05:00:00	97400	1	-2.6000	G
7	2025-01-01 06:00:00	97400	1	-2.6000	G
8	2025-01-01 07:00:00	97400	1	-2.8000	G
9	2025-01-01 08:00:00	97400	1	-2.5000	G
10	2025-01-01 09:00:00	97400	1	-2.2000	G
11	2025-01-01 10:00:00	97400	1	-2.0000	G
12	2025-01-01 11:00:00	97400	1	-2.0000	G
13	2025-01-01 12:00:00	97400	1	-1.7000	G
14	2025-01-01 13:00:00	97400	1	-1.9000	G
15	2025-01-01 14:00:00	97400	1	-2.1000	G
16	2025-01-01 15:00:00	97400	1	-2.3000	G
17	2025-01-01 16:00:00	97400	1	-2.6000	G
18	2025-01-01 17:00:00	97400	1	-3.1000	G
19	2025-01-01 18:00:00	97400	1	-2.7000	G
20	2025-01-01 19:00:00	97400	1	-2.9000	G
21	2025-01-01 20:00:00	97400	1	-3.4000	G
22	2025-01-01 21:00:00	97400	1	-4.2000	G
23	2025-01-01 22:00:00	97400	1	-6.3000	G
24	2025-01-01 23:00:00	97400	1	-6.9000	G
25	2025-01-01 00:00:00	97400	2	5.0000	G
26	2025-01-01 01:00:00	97400	2	4.0000	G
27	2025-01-01 02:00:00	97400	2	3.0000	G
28	2025-01-01 03:00:00	97400	2	3.0000	G
29	2025-01-01 04:00:00	97400	2	3.0000	G
30	2025-01-01 05:00:00	97400	2	2.0000	G
31	2025-01-01 06:00:00	97400	2	3.0000	G
32	2025-01-01 07:00:00	97400	2	2.0000	G
33	2025-01-01 08:00:00	97400	2	2.0000	G
34	2025-01-01 09:00:00	97400	2	2.0000	G
35	2025-01-01 10:00:00	97400	2	2.0000	G
36	2025-01-01 11:00:00	97400	2	3.0000	G
37	2025-01-01 12:00:00	97400	2	3.0000	G
38	2025-01-01 13:00:00	97400	2	3.0000	G
39	2025-01-01 14:00:00	97400	2	4.0000	G
40	2025-01-01 15:00:00	97400	2	4.0000	G
41	2025-01-01 16:00:00	97400	2	4.0000	G
42	2025-01-01 17:00:00	97400	2	3.0000	G
43	2025-01-01 18:00:00	97400	2	3.0000	G
44	2025-01-01 19:00:00	97400	2	4.0000	G
45	2025-01-01 20:00:00	97400	2	4.0000	G
46	2025-01-01 21:00:00	97400	2	3.0000	G
47	2025-01-01 22:00:00	97400	2	3.0000	G
48	2025-01-01 23:00:00	97400	2	2.0000	G
49	2025-01-01 00:00:00	97400	3	70.00...	G
50	2025-01-01 01:00:00	97400	3	70.00...	G
51	2025-01-01 02:00:00	97400	3	30.00...	G
52	2025-01-01 03:00:00	97400	3	20.00...	G
53	2025-01-01 04:00:00	97400	3	10.00...	G

Fundamentals

Partitioning your window

```
SELECT *, ROW_NUMBER() OVER (
        PARTITION BY Metric_ID
        ORDER BY [Timestamp])
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
--ORDER BY Metric_ID, [Timestamp]
```

2 A Z

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	Timestamp	Location_ID	Metric_ID	Value	Quality
1	2025-01-01 00:00:00	97400	1	-3.8000	G
2	2025-01-01 01:00:00	97400	1	-3.1000	G
3	2025-01-01 02:00:00	97400	1	-2.6000	G
4	2025-01-01 03:00:00	97400	1	-2.4000	G
5	2025-01-01 04:00:00	97400	1	-2.4000	G
6	2025-01-01 05:00:00	97400	1	-2.6000	G
7	2025-01-01 06:00:00	97400	1	-2.6000	G
8	2025-01-01 07:00:00	97400	1	-2.8000	G
9	2025-01-01 08:00:00	97400	1	-2.5000	G
10	2025-01-01 09:00:00	97400	1	-2.2000	G
11	2025-01-01 10:00:00	97400	1	-2.0000	G
12	2025-01-01 11:00:00	97400	1	-2.0000	G
13	2025-01-01 12:00:00	97400	1	-1.7000	G
14	2025-01-01 13:00:00	97400	1	-1.9000	G
15	2025-01-01 14:00:00	97400	1	-2.1000	G
16	2025-01-01 15:00:00	97400	1	-2.3000	G
17	2025-01-01 16:00:00	97400	1	-2.6000	G
18	2025-01-01 17:00:00	97400	1	-3.1000	G
19	2025-01-01 18:00:00	97400	1	-2.7000	G
20	2025-01-01 19:00:00	97400	1	-2.9000	G
21	2025-01-01 20:00:00	97400	1	-3.4000	G
22	2025-01-01 21:00:00	97400	1	-4.2000	G
23	2025-01-01 22:00:00	97400	1	-6.3000	G
24	2025-01-01 23:00:00	97400	1	-6.9000	G
25	2025-01-01 00:00:00	97400	2	5.0000	G
26	2025-01-01 01:00:00	97400	2	4.0000	G
27	2025-01-01 02:00:00	97400	2	3.0000	G
28	2025-01-01 03:00:00	97400	2	3.0000	G
29	2025-01-01 04:00:00	97400	2	3.0000	G
30	2025-01-01 05:00:00	97400	2	2.0000	G
31	2025-01-01 06:00:00	97400	2	3.0000	G
32	2025-01-01 07:00:00	97400	2	2.0000	G
33	2025-01-01 08:00:00	97400	2	2.0000	G
34	2025-01-01 09:00:00	97400	2	2.0000	G
35	2025-01-01 10:00:00	97400	2	2.0000	G
36	2025-01-01 11:00:00	97400	2	3.0000	G
37	2025-01-01 12:00:00	97400	2	3.0000	G
38	2025-01-01 13:00:00	97400	2	3.0000	G
39	2025-01-01 14:00:00	97400	2	4.0000	G
40	2025-01-01 15:00:00	97400	2	4.0000	G
41	2025-01-01 16:00:00	97400	2	4.0000	G
42	2025-01-01 17:00:00	97400	2	3.0000	G
43	2025-01-01 18:00:00	97400	2	3.0000	G
44	2025-01-01 19:00:00	97400	2	4.0000	G
45	2025-01-01 20:00:00	97400	2	4.0000	G
46	2025-01-01 21:00:00	97400	2	3.0000	G
47	2025-01-01 22:00:00	97400	2	3.0000	G
48	2025-01-01 23:00:00	97400	2	2.0000	G
49	2025-01-01 00:00:00	97400	3	70.00...	G
50	2025-01-01 01:00:00	97400	3	70.00...	G
51	2025-01-01 02:00:00	97400	3	30.00...	G
52	2025-01-01 03:00:00	97400	3	20.00...	G
53	2025-01-01 04:00:00	97400	3	10.00...	G

Fundamentals

Partitioning your window

```
SELECT *, ROW_NUMBER() OVER (
        PARTITION BY Metric_ID
        ORDER BY [Timestamp])
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
--ORDER BY Metric_ID, [Timestamp]
```

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	Timestamp	Location_ID	Metric_ID	Value	Quality	Segment1003
1	2025-01-01 00:00:00	97400	1	-3.8000	G	1
2	2025-01-01 01:00:00	97400	1	-3.1000	G	0
3	2025-01-01 02:00:00	97400	1	-2.6000	G	0
4	2025-01-01 03:00:00	97400	1	-2.4000	G	0
5	2025-01-01 04:00:00	97400	1	-2.4000	G	0
6	2025-01-01 05:00:00	97400	1	-2.6000	G	0
7	2025-01-01 06:00:00	97400	1	-2.6000	G	0
8	2025-01-01 07:00:00	97400	1	-2.8000	G	0
9	2025-01-01 08:00:00	97400	1	-2.5000	G	0
10	2025-01-01 09:00:00	97400	1	-2.2000	G	0
11	2025-01-01 10:00:00	97400	1	-2.0000	G	0
12	2025-01-01 11:00:00	97400	1	-2.0000	G	0
13	2025-01-01 12:00:00	97400	1	-1.7000	G	0
14	2025-01-01 13:00:00	97400	1	-1.9000	G	0
15	2025-01-01 14:00:00	97400	1	-2.1000	G	0
16	2025-01-01 15:00:00	97400	1	-2.3000	G	0
17	2025-01-01 16:00:00	97400	1	-2.6000	G	0
18	2025-01-01 17:00:00	97400	1	-3.1000	G	0
19	2025-01-01 18:00:00	97400	1	-2.7000	G	0
20	2025-01-01 19:00:00	97400	1	-2.9000	G	0
21	2025-01-01 20:00:00	97400	1	-3.4000	G	0
22	2025-01-01 21:00:00	97400	1	-4.2000	G	0
23	2025-01-01 22:00:00	97400	1	-6.3000	G	0
24	2025-01-01 23:00:00	97400	1	-6.9000	G	0
25	2025-01-01 00:00:00	97400	2	5.0000	G	1
26	2025-01-01 01:00:00	97400	2	4.0000	G	0
27	2025-01-01 02:00:00	97400	2	3.0000	G	0
28	2025-01-01 03:00:00	97400	2	3.0000	G	0
29	2025-01-01 04:00:00	97400	2	3.0000	G	0
30	2025-01-01 05:00:00	97400	2	2.0000	G	0
31	2025-01-01 06:00:00	97400	2	3.0000	G	0
32	2025-01-01 07:00:00	97400	2	2.0000	G	0
33	2025-01-01 08:00:00	97400	2	2.0000	G	0
34	2025-01-01 09:00:00	97400	2	2.0000	G	0
35	2025-01-01 10:00:00	97400	2	2.0000	G	0
36	2025-01-01 11:00:00	97400	2	3.0000	G	0
37	2025-01-01 12:00:00	97400	2	3.0000	G	0
38	2025-01-01 13:00:00	97400	2	3.0000	G	0
39	2025-01-01 14:00:00	97400	2	4.0000	G	0
40	2025-01-01 15:00:00	97400	2	4.0000	G	0
41	2025-01-01 16:00:00	97400	2	4.0000	G	0
42	2025-01-01 17:00:00	97400	2	3.0000	G	0
43	2025-01-01 18:00:00	97400	2	3.0000	G	0
44	2025-01-01 19:00:00	97400	2	4.0000	G	0
45	2025-01-01 20:00:00	97400	2	4.0000	G	0
46	2025-01-01 21:00:00	97400	2	3.0000	G	0
47	2025-01-01 22:00:00	97400	2	3.0000	G	0
48	2025-01-01 23:00:00	97400	2	2.0000	G	0
49	2025-01-01 00:00:00	97400	3	70.00...	G	1
50	2025-01-01 01:00:00	97400	3	70.00...	G	0
51	2025-01-01 02:00:00	97400	3	30.00...	G	0
52	2025-01-01 03:00:00	97400	3	20.00...	G	0
53	2025-01-01 04:00:00	97400	3	10.00...	G	0

Fundamentals

Partitioning your window

```
SELECT *, ROW_NUMBER() OVER (
        PARTITION BY Metric_ID
        ORDER BY [Timestamp])
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
--ORDER BY Metric_ID, [Timestamp]
```

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1 A Z

	Timestamp	Location_ID	Metric_ID	Value	Quality	Segment1003	(No column name)
1	2025-01-01 00:00:00	97400	1	-3.8000	G	1	1
2	2025-01-01 01:00:00	97400	1	-3.1000	G	0	2
3	2025-01-01 02:00:00	97400	1	-2.6000	G	0	3
4	2025-01-01 03:00:00	97400	1	-2.4000	G	0	4
5	2025-01-01 04:00:00	97400	1	-2.4000	G	0	5
6	2025-01-01 05:00:00	97400	1	-2.6000	G	0	6
7	2025-01-01 06:00:00	97400	1	-2.6000	G	0	7
8	2025-01-01 07:00:00	97400	1	-2.8000	G	0	8
9	2025-01-01 08:00:00	97400	1	-2.5000	G	0	9
10	2025-01-01 09:00:00	97400	1	-2.2000	G	0	10
11	2025-01-01 10:00:00	97400	1	-2.0000	G	0	11
12	2025-01-01 11:00:00	97400	1	-2.0000	G	0	12
13	2025-01-01 12:00:00	97400	1	-1.7000	G	0	13
14	2025-01-01 13:00:00	97400	1	-1.9000	G	0	14
15	2025-01-01 14:00:00	97400	1	-2.1000	G	0	15
16	2025-01-01 15:00:00	97400	1	-2.3000	G	0	16
17	2025-01-01 16:00:00	97400	1	-2.6000	G	0	17
18	2025-01-01 17:00:00	97400	1	-3.1000	G	0	18
19	2025-01-01 18:00:00	97400	1	-2.7000	G	0	19
20	2025-01-01 19:00:00	97400	1	-2.9000	G	0	20
21	2025-01-01 20:00:00	97400	1	-3.4000	G	0	21
22	2025-01-01 21:00:00	97400	1	-4.2000	G	0	22
23	2025-01-01 22:00:00	97400	1	-6.3000	G	0	23
24	2025-01-01 23:00:00	97400	1	-6.9000	G	0	24
25	2025-01-01 00:00:00	97400	2	5.0000	G	1	1
26	2025-01-01 01:00:00	97400	2	4.0000	G	0	2
27	2025-01-01 02:00:00	97400	2	3.0000	G	0	3
28	2025-01-01 03:00:00	97400	2	3.0000	G	0	4
29	2025-01-01 04:00:00	97400	2	3.0000	G	0	5
30	2025-01-01 05:00:00	97400	2	2.0000	G	0	6
31	2025-01-01 06:00:00	97400	2	3.0000	G	0	7
32	2025-01-01 07:00:00	97400	2	2.0000	G	0	8
33	2025-01-01 08:00:00	97400	2	2.0000	G	0	9
34	2025-01-01 09:00:00	97400	2	2.0000	G	0	10
35	2025-01-01 10:00:00	97400	2	2.0000	G	0	11
36	2025-01-01 11:00:00	97400	2	3.0000	G	0	12
37	2025-01-01 12:00:00	97400	2	3.0000	G	0	13
38	2025-01-01 13:00:00	97400	2	3.0000	G	0	14
39	2025-01-01 14:00:00	97400	2	4.0000	G	0	15
40	2025-01-01 15:00:00	97400	2	4.0000	G	0	16
41	2025-01-01 16:00:00	97400	2	4.0000	G	0	17
42	2025-01-01 17:00:00	97400	2	3.0000	G	0	18
43	2025-01-01 18:00:00	97400	2	3.0000	G	0	19
44	2025-01-01 19:00:00	97400	2	4.0000	G	0	20
45	2025-01-01 20:00:00	97400	2	4.0000	G	0	21
46	2025-01-01 21:00:00	97400	2	3.0000	G	0	22
47	2025-01-01 22:00:00	97400	2	3.0000	G	0	23
48	2025-01-01 23:00:00	97400	2	2.0000	G	0	24
49	2025-01-01 00:00:00	97400	3	70.00...	G	1	1
50	2025-01-01 01:00:00	97400	3	70.00...	G	0	2
51	2025-01-01 02:00:00	97400	3	30.00...	G	0	3
52	2025-01-01 03:00:00	97400	3	20.00...	G	0	4
53	2025-01-01 04:00:00	97400	3	10.00...	G	0	5

- `PARTITION BY` defines logical isolated segments for a window function, rather than running it on the entire data stream.
- The execution plan operator Segment is used to partition the data.

Aggregate window functions

Aggregations

Aggregate window functions

```
SELECT *,
       COUNT(*) OVER () AS _count
       MIN([Value]) OVER () AS _min,
       MAX([Value]) OVER () AS _max,
       SUM([Value]) OVER () AS _sum
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
--ORDER BY Metric_ID, [Timestamp]
```

No PARTITION BY, no ORDER BY

	Timestamp	Location_ID	Metric_ID	Value	Quality	count	min	max	sum
1	2025-01-01 00:00:00	97400	1	-3.8000	G	96	-6.9000	996.1000	27992.8000
2	2025-01-01 01:00:00	97400	1	-3.1000	G	96	-6.9000	996.1000	27992.8000
3	2025-01-01 02:00:00	97400	1	-2.6000	G	96	-6.9000	996.1000	27992.8000
4	2025-01-01 03:00:00	97400	1	-2.4000	G	96	-6.9000	996.1000	27992.8000
5	2025-01-01 04:00:00	97400	1	-2.4000	G	96	-6.9000	996.1000	27992.8000
6	2025-01-01 05:00:00	97400	1	-2.6000	G	96	-6.9000	996.1000	27992.8000
7	2025-01-01 06:00:00	97400	1	-2.6000	G	96	-6.9000	996.1000	27992.8000
8	2025-01-01 07:00:00	97400	1	-2.8000	G	96	-6.9000	996.1000	27992.8000
9	2025-01-01 08:00:00	97400	1	-2.5000	G	96	-6.9000	996.1000	27992.8000
10	2025-01-01 09:00:00	97400	1	-2.2000	G	96	-6.9000	996.1000	27992.8000
11	2025-01-01 10:00:00	97400	1	-2.0000	G	96	-6.9000	996.1000	27992.8000
12	2025-01-01 11:00:00	97400	1	-2.0000	G	96	-6.9000	996.1000	27992.8000
13	2025-01-01 12:00:00	97400	1	-1.7000	G	96	-6.9000	996.1000	27992.8000
14	2025-01-01 13:00:00	97400	1	-1.9000	G	96	-6.9000	996.1000	27992.8000
15	2025-01-01 14:00:00	97400	1	-2.1000	G	96	-6.9000	996.1000	27992.8000
16	2025-01-01 15:00:00	97400	1	-2.3000	G	96	-6.9000	996.1000	27992.8000
17	2025-01-01 16:00:00	97400	1	-2.6000	G	96	-6.9000	996.1000	27992.8000
18	2025-01-01 17:00:00	97400	1	-3.1000	G	96	-6.9000	996.1000	27992.8000
19	2025-01-01 18:00:00	97400	1	-2.7000	G	96	-6.9000	996.1000	27992.8000
20	2025-01-01 19:00:00	97400	1	-2.9000	G	96	-6.9000	996.1000	27992.8000
21	2025-01-01 20:00:00	97400	1	-3.4000	G	96	-6.9000	996.1000	27992.8000
22	2025-01-01 21:00:00	97400	1	-4.2000	G	96	-6.9000	996.1000	27992.8000
23	2025-01-01 22:00:00	97400	1	-6.3000	G	96	-6.9000	996.1000	27992.8000
24	2025-01-01 23:00:00	97400	1	-6.9000	G	96	-6.9000	996.1000	27992.8000
25	2025-01-01 00:00:00	97400	2	5.0000	G	96	-6.9000	996.1000	27992.8000
26	2025-01-01 01:00:00	97400	2	4.0000	G	96	-6.9000	996.1000	27992.8000
27	2025-01-01 02:00:00	97400	2	3.0000	G	96	-6.9000	996.1000	27992.8000
28	2025-01-01 03:00:00	97400	2	3.0000	G	96	-6.9000	996.1000	27992.8000
29	2025-01-01 04:00:00	97400	2	3.0000	G	96	-6.9000	996.1000	27992.8000
30	2025-01-01 05:00:00	97400	2	2.0000	G	96	-6.9000	996.1000	27992.8000
31	2025-01-01 06:00:00	97400	2	3.0000	G	96	-6.9000	996.1000	27992.8000
32	2025-01-01 07:00:00	97400	2	2.0000	G	96	-6.9000	996.1000	27992.8000
33	2025-01-01 08:00:00	97400	2	2.0000	G	96	-6.9000	996.1000	27992.8000
34	2025-01-01 09:00:00	97400	2	2.0000	G	96	-6.9000	996.1000	27992.8000
35	2025-01-01 10:00:00	97400	2	2.0000	G	96	-6.9000	996.1000	27992.8000
36	2025-01-01 11:00:00	97400	2	3.0000	G	96	-6.9000	996.1000	27992.8000
37	2025-01-01 12:00:00	97400	2	3.0000	G	96	-6.9000	996.1000	27992.8000
38	2025-01-01 13:00:00	97400	2	3.0000	G	96	-6.9000	996.1000	27992.8000
39	2025-01-01 14:00:00	97400	2	4.0000	G	96	-6.9000	996.1000	27992.8000
40	2025-01-01 15:00:00	97400	2	4.0000	G	96	-6.9000	996.1000	27992.8000
41	2025-01-01 16:00:00	97400	2	4.0000	G	96	-6.9000	996.1000	27992.8000
42	2025-01-01 17:00:00	97400	2	3.0000	G	96	-6.9000	996.1000	27992.8000
43	2025-01-01 18:00:00	97400	2	3.0000	G	96	-6.9000	996.1000	27992.8000
44	2025-01-01 19:00:00	97400	2	4.0000	G	96	-6.9000	996.1000	27992.8000
45	2025-01-01 20:00:00	97400	2	4.0000	G	96	-6.9000	996.1000	27992.8000
46	2025-01-01 21:00:00	97400	2	3.0000	G	96	-6.9000	996.1000	27992.8000
47	2025-01-01 22:00:00	97400	2	3.0000	G	96	-6.9000	996.1000	27992.8000
48	2025-01-01 23:00:00	97400	2	2.0000	G	96	-6.9000	996.1000	27992.8000
49	2025-01-01 00:00:00	97400	3	70.00...	G	96	-6.9000	996.1000	27992.8000
50	2025-01-01 01:00:00	97400	3	70.00...	G	96	-6.9000	996.1000	27992.8000
51	2025-01-01 02:00:00	97400	3	30.00...	G	96	-6.9000	996.1000	27992.8000
52	2025-01-01 03:00:00	97400	3	20.00...	G	96	-6.9000	996.1000	27992.8000
53	2025-01-01 04:00:00	97400	3	10.00...	G	96	-6.9000	996.1000	27992.8000

Aggregations

Aggregate window functions

```sql
SELECT *,
       COUNT(*) OVER (PARTITION BY Metric_ID) AS _count,
       MIN([Value]) OVER (PARTITION BY Metric_ID) AS _min,
       MAX([Value]) OVER (PARTITION BY Metric_ID) AS _max,
       SUM([Value]) OVER (PARTITION BY Metric_ID) AS _sum
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
--ORDER BY Metric_ID, [Timestamp]
```

PARTITION BY,
but no ORDER BY

	Timestamp	Location_ID	Metric_ID	Value	Quality	count	min	max	sum
1	2025-01-01 00:00:00	97400	1	-3.8000	G	24	-6.9000	-1.7000	-71.1000
2	2025-01-01 01:00:00	97400	1	-3.1000	G	24	-6.9000	-1.7000	-71.1000
3	2025-01-01 02:00:00	97400	1	-2.6000	G	24	-6.9000	-1.7000	-71.1000
4	2025-01-01 03:00:00	97400	1	-2.4000	G	24	-6.9000	-1.7000	-71.1000
5	2025-01-01 04:00:00	97400	1	-2.4000	G	24	-6.9000	-1.7000	-71.1000
6	2025-01-01 05:00:00	97400	1	-2.6000	G	24	-6.9000	-1.7000	-71.1000
7	2025-01-01 06:00:00	97400	1	-2.6000	G	24	-6.9000	-1.7000	-71.1000
8	2025-01-01 07:00:00	97400	1	-2.8000	G	24	-6.9000	-1.7000	-71.1000
9	2025-01-01 08:00:00	97400	1	-2.5000	G	24	-6.9000	-1.7000	-71.1000
10	2025-01-01 09:00:00	97400	1	-2.2000	G	24	-6.9000	-1.7000	-71.1000
11	2025-01-01 10:00:00	97400	1	-2.0000	G	24	-6.9000	-1.7000	-71.1000
12	2025-01-01 11:00:00	97400	1	-2.0000	G	24	-6.9000	-1.7000	-71.1000
13	2025-01-01 12:00:00	97400	1	-1.7000	G	24	-6.9000	-1.7000	-71.1000
14	2025-01-01 13:00:00	97400	1	-1.9000	G	24	-6.9000	-1.7000	-71.1000
15	2025-01-01 14:00:00	97400	1	-2.1000	G	24	-6.9000	-1.7000	-71.1000
16	2025-01-01 15:00:00	97400	1	-2.3000	G	24	-6.9000	-1.7000	-71.1000
17	2025-01-01 16:00:00	97400	1	-2.6000	G	24	-6.9000	-1.7000	-71.1000
18	2025-01-01 17:00:00	97400	1	-3.1000	G	24	-6.9000	-1.7000	-71.1000
19	2025-01-01 18:00:00	97400	1	-2.7000	G	24	-6.9000	-1.7000	-71.1000
20	2025-01-01 19:00:00	97400	1	-2.9000	G	24	-6.9000	-1.7000	-71.1000
21	2025-01-01 20:00:00	97400	1	-3.4000	G	24	-6.9000	-1.7000	-71.1000
22	2025-01-01 21:00:00	97400	1	-4.2000	G	24	-6.9000	-1.7000	-71.1000
23	2025-01-01 22:00:00	97400	1	-6.3000	G	24	-6.9000	-1.7000	-71.1000
24	2025-01-01 23:00:00	97400	1	-6.9000	G	24	-6.9000	-1.7000	-71.1000
25	2025-01-01 00:00:00	97400	2	5.0000	G	24	2.0000	5.0000	74.0000
26	2025-01-01 01:00:00	97400	2	4.0000	G	24	2.0000	5.0000	74.0000
27	2025-01-01 02:00:00	97400	2	3.0000	G	24	2.0000	5.0000	74.0000
28	2025-01-01 03:00:00	97400	2	3.0000	G	24	2.0000	5.0000	74.0000
29	2025-01-01 04:00:00	97400	2	3.0000	G	24	2.0000	5.0000	74.0000
30	2025-01-01 05:00:00	97400	2	2.0000	G	24	2.0000	5.0000	74.0000
31	2025-01-01 06:00:00	97400	2	3.0000	G	24	2.0000	5.0000	74.0000
32	2025-01-01 07:00:00	97400	2	2.0000	G	24	2.0000	5.0000	74.0000
33	2025-01-01 08:00:00	97400	2	2.0000	G	24	2.0000	5.0000	74.0000
34	2025-01-01 09:00:00	97400	2	2.0000	G	24	2.0000	5.0000	74.0000
35	2025-01-01 10:00:00	97400	2	2.0000	G	24	2.0000	5.0000	74.0000
36	2025-01-01 11:00:00	97400	2	3.0000	G	24	2.0000	5.0000	74.0000
37	2025-01-01 12:00:00	97400	2	3.0000	G	24	2.0000	5.0000	74.0000
38	2025-01-01 13:00:00	97400	2	3.0000	G	24	2.0000	5.0000	74.0000
39	2025-01-01 14:00:00	97400	2	4.0000	G	24	2.0000	5.0000	74.0000
40	2025-01-01 15:00:00	97400	2	4.0000	G	24	2.0000	5.0000	74.0000
41	2025-01-01 16:00:00	97400	2	4.0000	G	24	2.0000	5.0000	74.0000
42	2025-01-01 17:00:00	97400	2	3.0000	G	24	2.0000	5.0000	74.0000
43	2025-01-01 18:00:00	97400	2	3.0000	G	24	2.0000	5.0000	74.0000
44	2025-01-01 19:00:00	97400	2	4.0000	G	24	2.0000	5.0000	74.0000
45	2025-01-01 20:00:00	97400	2	4.0000	G	24	2.0000	5.0000	74.0000
46	2025-01-01 21:00:00	97400	2	3.0000	G	24	2.0000	5.0000	74.0000
47	2025-01-01 22:00:00	97400	2	3.0000	G	24	2.0000	5.0000	74.0000
48	2025-01-01 23:00:00	97400	2	2.0000	G	24	2.0000	5.0000	74.0000
49	2025-01-01 00:00:00	97400	3	70.00...	G	24	0.0000	350.0...	4270.0000
50	2025-01-01 01:00:00	97400	3	70.00...	G	24	0.0000	350.0...	4270.0000
51	2025-01-01 02:00:00	97400	3	30.00...	G	24	0.0000	350.0...	4270.0000
52	2025-01-01 03:00:00	97400	3	20.00...	G	24	0.0000	350.0...	4270.0000
53	2025-01-01 04:00:00	97400	3	10.00...	G	24	0.0000	350.0...	4270.0000

Window frames

Window frames

```sql
SELECT *, SUM([Value]) OVER (
            PARTITION BY Metric_ID
            ORDER BY [Timestamp]
            ROWS UNBOUNDED PRECEDING
        ) AS _running_total
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_running_total
1	2025-01-01 00:00:00	97400	1	-3.8000	G	-3.8000
2	2025-01-01 01:00:00	97400	1	-3.1000	G	-6.9000
3	2025-01-01 02:00:00	97400	1	-2.6000	G	-9.5000
4	2025-01-01 03:00:00	97400	1	-2.4000	G	-11.9000
5	2025-01-01 04:00:00	97400	1	-2.4000	G	-14.3000
6	2025-01-01 05:00:00	97400	1	-2.6000	G	-16.9000
7	2025-01-01 06:00:00	97400	1	-2.6000	G	-19.5000
8	2025-01-01 07:00:00	97400	1	-2.8000	G	-22.3000
9	2025-01-01 08:00:00	97400	1	-2.5000	G	-24.8000
10	2025-01-01 09:00:00	97400	1	-2.2000	G	-27.0000
11	2025-01-01 10:00:00	97400	1	-2.0000	G	-29.0000
12	2025-01-01 11:00:00	97400	1	-2.0000	G	-31.0000
13	2025-01-01 12:00:00	97400	1	-1.7000	G	-32.7000
14	2025-01-01 13:00:00	97400	1	-1.9000	G	-34.6000
15	2025-01-01 14:00:00	97400	1	-2.1000	G	-36.7000
16	2025-01-01 15:00:00	97400	1	-2.3000	G	-39.0000
17	2025-01-01 16:00:00	97400	1	-2.6000	G	-41.6000
18	2025-01-01 17:00:00	97400	1	-3.1000	G	-44.7000
19	2025-01-01 18:00:00	97400	1	-2.7000	G	-47.4000
20	2025-01-01 19:00:00	97400	1	-2.9000	G	-50.3000
21	2025-01-01 20:00:00	97400	1	-3.4000	G	-53.7000
22	2025-01-01 21:00:00	97400	1	-4.2000	G	-57.9000
23	2025-01-01 22:00:00	97400	1	-6.3000	G	-64.2000
24	2025-01-01 23:00:00	97400	1	-6.9000	G	-71.1000
25	2025-01-01 00:00:00	97400	2	5.0000	G	5.0000
26	2025-01-01 01:00:00	97400	2	4.0000	G	9.0000
27	2025-01-01 02:00:00	97400	2	3.0000	G	12.0000
28	2025-01-01 03:00:00	97400	2	3.0000	G	15.0000
29	2025-01-01 04:00:00	97400	2	3.0000	G	18.0000
30	2025-01-01 05:00:00	97400	2	2.0000	G	20.0000
31	2025-01-01 06:00:00	97400	2	3.0000	G	23.0000
32	2025-01-01 07:00:00	97400	2	2.0000	G	25.0000
33	2025-01-01 08:00:00	97400	2	2.0000	G	27.0000
34	2025-01-01 09:00:00	97400	2	2.0000	G	29.0000
35	2025-01-01 10:00:00	97400	2	2.0000	G	31.0000
36	2025-01-01 11:00:00	97400	2	3.0000	G	34.0000
37	2025-01-01 12:00:00	97400	2	3.0000	G	37.0000
38	2025-01-01 13:00:00	97400	2	3.0000	G	40.0000
39	2025-01-01 14:00:00	97400	2	4.0000	G	44.0000
40	2025-01-01 15:00:00	97400	2	4.0000	G	48.0000
41	2025-01-01 16:00:00	97400	2	4.0000	G	52.0000
42	2025-01-01 17:00:00	97400	2	3.0000	G	55.0000
43	2025-01-01 18:00:00	97400	2	3.0000	G	58.0000
44	2025-01-01 19:00:00	97400	2	4.0000	G	62.0000
45	2025-01-01 20:00:00	97400	2	4.0000	G	66.0000
46	2025-01-01 21:00:00	97400	2	3.0000	G	69.0000
47	2025-01-01 22:00:00	97400	2	3.0000	G	72.0000
48	2025-01-01 23:00:00	97400	2	2.0000	G	74.0000
49	2025-01-01 00:00:00	97400	3	70.00...	G	70.0000
50	2025-01-01 01:00:00	97400	3	70.00...	G	140.0000
51	2025-01-01 02:00:00	97400	3	30.00...	G	170.0000
52	2025-01-01 03:00:00	97400	3	20.00...	G	190.0000
53	2025-01-01 04:00:00	97400	3	10.00...	G	200.0000

Window frames

```sql
SELECT *, SUM([Value]) OVER (
            PARTITION BY Metric_ID
            ORDER BY [Timestamp]
            ROWS BETWEEN UNBOUNDED PRECEDING AND CURRENT ROW
        ) AS _running_total
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_running_total
1	2025-01-01 00:00:00	97400	1	-3.8000	G	-3.8000
2	2025-01-01 01:00:00	97400	1	-3.1000	G	-6.9000
3	2025-01-01 02:00:00	97400	1	-2.6000	G	-9.5000
4	2025-01-01 03:00:00	97400	1	-2.4000	G	-11.9000
5	2025-01-01 04:00:00	97400	1	-2.4000	G	-14.3000
6	2025-01-01 05:00:00	97400	1	-2.6000	G	-16.9000
7	2025-01-01 06:00:00	97400	1	-2.6000	G	-19.5000
8	2025-01-01 07:00:00	97400	1	-2.8000	G	-22.3000
9	2025-01-01 08:00:00	97400	1	-2.5000	G	-24.8000
10	2025-01-01 09:00:00	97400	1	-2.2000	G	-27.0000
11	2025-01-01 10:00:00	97400	1	-2.0000	G	-29.0000
12	2025-01-01 11:00:00	97400	1	-2.0000	G	-31.0000
13	2025-01-01 12:00:00	97400	1	-1.7000	G	-32.7000
14	2025-01-01 13:00:00	97400	1	-1.9000	G	-34.6000
15	2025-01-01 14:00:00	97400	1	-2.1000	G	-36.7000
16	2025-01-01 15:00:00	97400	1	-2.3000	G	-39.0000
17	2025-01-01 16:00:00	97400	1	-2.6000	G	-41.6000
18	2025-01-01 17:00:00	97400	1	-3.1000	G	-44.7000
19	2025-01-01 18:00:00	97400	1	-2.7000	G	-47.4000
20	2025-01-01 19:00:00	97400	1	-2.9000	G	-50.3000
21	2025-01-01 20:00:00	97400	1	-3.4000	G	-53.7000
22	2025-01-01 21:00:00	97400	1	-4.2000	G	-57.9000
23	2025-01-01 22:00:00	97400	1	-6.3000	G	-64.2000
24	2025-01-01 23:00:00	97400	1	-6.9000	G	-71.1000
25	2025-01-01 00:00:00	97400	2	5.0000	G	5.0000
26	2025-01-01 01:00:00	97400	2	4.0000	G	9.0000
27	2025-01-01 02:00:00	97400	2	3.0000	G	12.0000
28	2025-01-01 03:00:00	97400	2	3.0000	G	15.0000
29	2025-01-01 04:00:00	97400	2	3.0000	G	18.0000
30	2025-01-01 05:00:00	97400	2	2.0000	G	20.0000
31	2025-01-01 06:00:00	97400	2	3.0000	G	23.0000
32	2025-01-01 07:00:00	97400	2	2.0000	G	25.0000
33	2025-01-01 08:00:00	97400	2	2.0000	G	27.0000
34	2025-01-01 09:00:00	97400	2	2.0000	G	29.0000
35	2025-01-01 10:00:00	97400	2	2.0000	G	31.0000
36	2025-01-01 11:00:00	97400	2	3.0000	G	34.0000
37	2025-01-01 12:00:00	97400	2	3.0000	G	37.0000
38	2025-01-01 13:00:00	97400	2	3.0000	G	40.0000
39	2025-01-01 14:00:00	97400	2	4.0000	G	44.0000
40	2025-01-01 15:00:00	97400	2	4.0000	G	48.0000
41	2025-01-01 16:00:00	97400	2	4.0000	G	52.0000
42	2025-01-01 17:00:00	97400	2	3.0000	G	55.0000
43	2025-01-01 18:00:00	97400	2	3.0000	G	58.0000
44	2025-01-01 19:00:00	97400	2	4.0000	G	62.0000
45	2025-01-01 20:00:00	97400	2	4.0000	G	66.0000
46	2025-01-01 21:00:00	97400	2	3.0000	G	69.0000
47	2025-01-01 22:00:00	97400	2	3.0000	G	72.0000
48	2025-01-01 23:00:00	97400	2	2.0000	G	74.0000
49	2025-01-01 00:00:00	97400	3	70.00...	G	70.0000
50	2025-01-01 01:00:00	97400	3	70.00...	G	140.0000
51	2025-01-01 02:00:00	97400	3	30.00...	G	170.0000
52	2025-01-01 03:00:00	97400	3	20.00...	G	190.0000
53	2025-01-01 04:00:00	97400	3	10.00...	G	200.0000

Window frames

```sql
SELECT *, SUM([Value]) OVER (
            PARTITION BY Metric_ID
            ORDER BY [Timestamp]
            ROWS BETWEEN UNBOUNDED PRECEDING AND CURRENT ROW
        ) AS _running_total
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_running_total
1	2025-01-01 00:00:00	97400	1	-3.8000	G	-3.8000
2	2025-01-01 01:00:00	97400	1	-3.1000	G	-6.9000
3	2025-01-01 02:00:00	97400	1	-2.6000	G	-9.5000
4	2025-01-01 03:00:00	97400	1	-2.4000	G	-11.9000
5	2025-01-01 04:00:00	97400	1	-2.4000	G	-14.3000
6	2025-01-01 05:00:00	97400	1	-2.6000	G	-16.9000
7	2025-01-01 06:00:00	97400	1	-2.6000	G	-19.5000
8	2025-01-01 07:00:00	97400	1	-2.8000	G	-22.3000
9	2025-01-01 08:00:00	97400	1	-2.5000	G	-24.8000
10	2025-01-01 09:00:00	97400	1	-2.2000	G	-27.0000
11	2025-01-01 10:00:00	97400	1	-2.0000	G	-29.0000
12	2025-01-01 11:00:00	97400	1	-2.0000	G	-31.0000
13	2025-01-01 12:00:00	97400	1	-1.7000	G	-32.7000
14	2025-01-01 13:00:00	97400	1	-1.9000	G	-34.6000
15	2025-01-01 14:00:00	97400	1	-2.1000	G	-36.7000
16	2025-01-01 15:00:00	97400	1	-2.3000	G	-39.0000
17	2025-01-01 16:00:00	97400	1	-2.6000	G	-41.6000
18	2025-01-01 17:00:00	97400	1	-3.1000	G	-44.7000
19	2025-01-01 18:00:00	97400	1	-2.7000	G	-47.4000
20	2025-01-01 19:00:00	97400	1	-2.9000	G	-50.3000
21	2025-01-01 20:00:00	97400	1	-3.4000	G	-53.7000
22	2025-01-01 21:00:00	97400	1	-4.2000	G	-57.9000
23	2025-01-01 22:00:00	97400	1	-6.3000	G	-64.2000
24	2025-01-01 23:00:00	97400	1	-6.9000	G	-71.1000
25	2025-01-01 00:00:00	97400	2	5.0000	G	5.0000
26	2025-01-01 01:00:00	97400	2	4.0000	G	9.0000
27	2025-01-01 02:00:00	97400	2	3.0000	G	12.0000
28	2025-01-01 03:00:00	97400	2	3.0000	G	15.0000
29	2025-01-01 04:00:00	97400	2	3.0000	G	18.0000
30	2025-01-01 05:00:00	97400	2	2.0000	G	20.0000
31	2025-01-01 06:00:00	97400	2	3.0000	G	23.0000
32	2025-01-01 07:00:00	97400	2	2.0000	G	25.0000
33	2025-01-01 08:00:00	97400	2	2.0000	G	27.0000
34	2025-01-01 09:00:00	97400	2	2.0000	G	29.0000
35	2025-01-01 10:00:00	97400	2	2.0000	G	31.0000
36	2025-01-01 11:00:00	97400	2	3.0000	G	34.0000
37	2025-01-01 12:00:00	97400	2	3.0000	G	37.0000
38	2025-01-01 13:00:00	97400	2	3.0000	G	40.0000
39	2025-01-01 14:00:00	97400	2	4.0000	G	44.0000
40	2025-01-01 15:00:00	97400	2	4.0000	G	48.0000
41	2025-01-01 16:00:00	97400	2	4.0000	G	52.0000
42	2025-01-01 17:00:00	97400	2	3.0000	G	55.0000
43	2025-01-01 18:00:00	97400	2	3.0000	G	58.0000
44	2025-01-01 19:00:00	97400	2	4.0000	G	62.0000
45	2025-01-01 20:00:00	97400	2	4.0000	G	66.0000
46	2025-01-01 21:00:00	97400	2	3.0000	G	69.0000
47	2025-01-01 22:00:00	97400	2	3.0000	G	72.0000
48	2025-01-01 23:00:00	97400	2	2.0000	G	74.0000
49	2025-01-01 00:00:00	97400	3	70.00...	G	70.0000
50	2025-01-01 01:00:00	97400	3	70.00...	G	140.0000
51	2025-01-01 02:00:00	97400	3	30.00...	G	170.0000
52	2025-01-01 03:00:00	97400	3	20.00...	G	190.0000
53	2025-01-01 04:00:00	97400	3	10.00...	G	200.0000

Window frames

```sql
SELECT *, SUM([Value]) OVER (
            PARTITION BY Metric_ID
            ORDER BY [Timestamp]
            ROWS BETWEEN UNBOUNDED PRECEDING AND CURRENT ROW
        ) AS _running_total
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_running_total
1	2025-01-01 00:00:00	97400	1	-3.8000	G	-3.8000
2	2025-01-01 01:00:00	97400	1	-3.1000	G	-6.9000
3	2025-01-01 02:00:00	97400	1	-2.6000	G	-9.5000
4	2025-01-01 03:00:00	97400	1	-2.4000	G	-11.9000
5	2025-01-01 04:00:00	97400	1	-2.4000	G	-14.3000
6	2025-01-01 05:00:00	97400	1	-2.6000	G	-16.9000
7	2025-01-01 06:00:00	97400	1	-2.6000	G	-19.5000
8	2025-01-01 07:00:00	97400	1	-2.8000	G	-22.3000
9	2025-01-01 08:00:00	97400	1	-2.5000	G	-24.8000
10	2025-01-01 09:00:00	97400	1	-2.2000	G	-27.0000
11	2025-01-01 10:00:00	97400	1	-2.0000	G	-29.0000
12	2025-01-01 11:00:00	97400	1	-2.0000	G	-31.0000
13	2025-01-01 12:00:00	97400	1	-1.7000	G	-32.7000
14	2025-01-01 13:00:00	97400	1	-1.9000	G	-34.6000
15	2025-01-01 14:00:00	97400	1	-2.1000	G	-36.7000
16	2025-01-01 15:00:00	97400	1	-2.3000		-39.0000
17	2025-01-01 16:00:00	97400	1	-2.6000	G	-41.6000
18	2025-01-01 17:00:00	97400	1	-3.1000	G	-44.7000
19	2025-01-01 18:00:00	97400	1	-2.7000	G	-47.4000
20	2025-01-01 19:00:00	97400	1	-2.9000	G	-50.3000
21	2025-01-01 20:00:00	97400	1	-3.4000	G	-53.7000
22	2025-01-01 21:00:00	97400	1	-4.2000	G	-57.9000
23	2025-01-01 22:00:00	97400	1	-6.3000	G	-64.2000
24	2025-01-01 23:00:00	97400	1	-6.9000	G	-71.1000
25	2025-01-01 00:00:00	97400	2	5.0000	G	5.0000
26	2025-01-01 01:00:00	97400	2	4.0000	G	9.0000
27	2025-01-01 02:00:00	97400	2	3.0000	G	12.0000
28	2025-01-01 03:00:00	97400	2	3.0000	G	15.0000
29	2025-01-01 04:00:00	97400	2	3.0000	G	18.0000
30	2025-01-01 05:00:00	97400	2	2.0000	G	20.0000
31	2025-01-01 06:00:00	97400	2	3.0000	G	23.0000
32	2025-01-01 07:00:00	97400	2	2.0000	G	25.0000
33	2025-01-01 08:00:00	97400	2	2.0000	G	27.0000
34	2025-01-01 09:00:00	97400	2	2.0000	G	29.0000
35	2025-01-01 10:00:00	97400	2	2.0000	G	31.0000
36	2025-01-01 11:00:00	97400	2	3.0000	G	34.0000
37	2025-01-01 12:00:00	97400	2	3.0000	G	37.0000
38	2025-01-01 13:00:00	97400	2	3.0000	G	40.0000
39	2025-01-01 14:00:00	97400	2	4.0000	G	44.0000
40	2025-01-01 15:00:00	97400	2	4.0000	G	48.0000
41	2025-01-01 16:00:00	97400	2	4.0000	G	52.0000
42	2025-01-01 17:00:00	97400	2	3.0000	G	55.0000
43	2025-01-01 18:00:00	97400	2	3.0000	G	58.0000
44	2025-01-01 19:00:00	97400	2	4.0000	G	62.0000
45	2025-01-01 20:00:00	97400	2	4.0000	G	66.0000
46	2025-01-01 21:00:00	97400	2	3.0000	G	69.0000
47	2025-01-01 22:00:00	97400	2	3.0000	G	72.0000
48	2025-01-01 23:00:00	97400	2	2.0000	G	74.0000
49	2025-01-01 00:00:00	97400	3	70.00...	G	70.0000
50	2025-01-01 01:00:00	97400	3	70.00...	G	140.0000
51	2025-01-01 02:00:00	97400	3	30.00...	G	170.0000
52	2025-01-01 03:00:00	97400	3	20.00...	G	190.0000
53	2025-01-01 04:00:00	97400	3	10.00...	G	200.0000

Window frames

```sql
SELECT *, SUM([Value]) OVER (
            PARTITION BY Metric_ID
            ORDER BY [Timestamp]
            ROWS BETWEEN UNBOUNDED PRECEDING AND CURRENT ROW
        ) AS _running_total
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_running_total
1	2025-01-01 00:00:00	97400	1	-3.8000	G	-3.8000
2	2025-01-01 01:00:00	97400	1	-3.1000	G	-6.9000
3	2025-01-01 02:00:00	97400	1	-2.6000	G	-9.5000
4	2025-01-01 03:00:00	97400	1	-2.4000	G	-11.9000
5	2025-01-01 04:00:00	97400	1	-2.4000	G	-14.3000
6	2025-01-01 05:00:00	97400	1	-2.6000	G	-16.9000
7	2025-01-01 06:00:00	97400	1	-2.6000	G	-19.5000
8	2025-01-01 07:00:00	97400	1	-2.8000	G	-22.3000
9	2025-01-01 08:00:00	97400	1	-2.5000	G	-24.8000
10	2025-01-01 09:00:00	97400	1	-2.2000	G	-27.0000
11	2025-01-01 10:00:00	97400	1	-2.0000	G	-29.0000
12	2025-01-01 11:00:00	97400	1	-2.0000	G	-31.0000
13	2025-01-01 12:00:00	97400	1	-1.7000	G	-32.7000
14	2025-01-01 13:00:00	97400	1	-1.9000	G	-34.6000
15	2025-01-01 14:00:00	97400	1	-2.1000	G	-36.7000
16	2025-01-01 15:00:00	97400	1	-2.3000	G	-39.0000
17	2025-01-01 16:00:00	97400	1	-2.6000		-41.6000
18	2025-01-01 17:00:00	97400	1	-3.1000	G	-44.7000
19	2025-01-01 18:00:00	97400	1	-2.7000	G	-47.4000
20	2025-01-01 19:00:00	97400	1	-2.9000	G	-50.3000
21	2025-01-01 20:00:00	97400	1	-3.4000	G	-53.7000
22	2025-01-01 21:00:00	97400	1	-4.2000	G	-57.9000
23	2025-01-01 22:00:00	97400	1	-6.3000	G	-64.2000
24	2025-01-01 23:00:00	97400	1	-6.9000	G	-71.1000
25	2025-01-01 00:00:00	97400	2	5.0000	G	5.0000
26	2025-01-01 01:00:00	97400	2	4.0000	G	9.0000
27	2025-01-01 02:00:00	97400	2	3.0000	G	12.0000
28	2025-01-01 03:00:00	97400	2	3.0000	G	15.0000
29	2025-01-01 04:00:00	97400	2	3.0000	G	18.0000
30	2025-01-01 05:00:00	97400	2	2.0000	G	20.0000
31	2025-01-01 06:00:00	97400	2	3.0000	G	23.0000
32	2025-01-01 07:00:00	97400	2	2.0000	G	25.0000
33	2025-01-01 08:00:00	97400	2	2.0000	G	27.0000
34	2025-01-01 09:00:00	97400	2	2.0000	G	29.0000
35	2025-01-01 10:00:00	97400	2	2.0000	G	31.0000
36	2025-01-01 11:00:00	97400	2	3.0000	G	34.0000
37	2025-01-01 12:00:00	97400	2	3.0000	G	37.0000
38	2025-01-01 13:00:00	97400	2	3.0000	G	40.0000
39	2025-01-01 14:00:00	97400	2	4.0000	G	44.0000
40	2025-01-01 15:00:00	97400	2	4.0000	G	48.0000
41	2025-01-01 16:00:00	97400	2	4.0000	G	52.0000
42	2025-01-01 17:00:00	97400	2	3.0000	G	55.0000
43	2025-01-01 18:00:00	97400	2	3.0000	G	58.0000
44	2025-01-01 19:00:00	97400	2	4.0000	G	62.0000
45	2025-01-01 20:00:00	97400	2	4.0000	G	66.0000
46	2025-01-01 21:00:00	97400	2	3.0000	G	69.0000
47	2025-01-01 22:00:00	97400	2	3.0000	G	72.0000
48	2025-01-01 23:00:00	97400	2	2.0000	G	74.0000
49	2025-01-01 00:00:00	97400	3	70.00...	G	70.0000
50	2025-01-01 01:00:00	97400	3	70.00...	G	140.0000
51	2025-01-01 02:00:00	97400	3	30.00...	G	170.0000
52	2025-01-01 03:00:00	97400	3	20.00...	G	190.0000
53	2025-01-01 04:00:00	97400	3	10.00...	G	200.0000

Window frames

```sql
SELECT *, SUM([Value]) OVER (
            PARTITION BY Metric_ID
            ORDER BY [Timestamp]
            ROWS BETWEEN 3 PRECEDING AND CURRENT ROW
        ) AS _running_total
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_running_total
1	2025-01-01 00:00:00	97400	1	-3.8000	G	-3.8000
2	2025-01-01 01:00:00	97400	1	-3.1000	G	-6.9000
3	2025-01-01 02:00:00	97400	1	-2.6000	G	-9.5000
4	2025-01-01 03:00:00	97400	1	-2.4000	G	-11.9000
5	2025-01-01 04:00:00	97400	1	-2.4000	G	-10.5000
6	2025-01-01 05:00:00	97400	1	-2.6000	G	-10.0000
7	2025-01-01 06:00:00	97400	1	-2.6000	G	-10.0000
8	2025-01-01 07:00:00	97400	1	-2.8000	G	-10.4000
9	2025-01-01 08:00:00	97400	1	-2.5000	G	-10.5000
10	2025-01-01 09:00:00	97400	1	-2.2000	G	-10.1000
11	2025-01-01 10:00:00	97400	1	-2.0000	G	-9.5000
12	2025-01-01 11:00:00	97400	1	-2.0000	G	-8.7000
13	2025-01-01 12:00:00	97400	1	-1.7000	G	-7.9000
14	2025-01-01 13:00:00	97400	1	-1.9000	G	-7.6000
15	2025-01-01 14:00:00	97400	1	-2.1000	G	-7.7000
16	2025-01-01 15:00:00	97400	1	-2.3000	G	-8.0000
17	2025-01-01 16:00:00	97400	1	-2.6000	G	-8.9000
18	2025-01-01 17:00:00	97400	1	-3.1000	G	-10.1000
19	2025-01-01 18:00:00	97400	1	-2.7000	G	-10.7000
20	2025-01-01 19:00:00	97400	1	-2.9000	G	-11.3000
21	2025-01-01 20:00:00	97400	1	-3.4000	G	-12.1000
22	2025-01-01 21:00:00	97400	1	-4.2000	G	-13.2000
23	2025-01-01 22:00:00	97400	1	-6.3000	G	-16.8000
24	2025-01-01 23:00:00	97400	1	-6.9000	G	-20.8000
25	2025-01-01 00:00:00	97400	2	5.0000	G	5.0000
26	2025-01-01 01:00:00	97400	2	4.0000	G	9.0000
27	2025-01-01 02:00:00	97400	2	3.0000	G	12.0000
28	2025-01-01 03:00:00	97400	2	3.0000	G	15.0000
29	2025-01-01 04:00:00	97400	2	3.0000	G	13.0000
30	2025-01-01 05:00:00	97400	2	2.0000	G	11.0000
31	2025-01-01 06:00:00	97400	2	3.0000	G	11.0000
32	2025-01-01 07:00:00	97400	2	2.0000	G	10.0000
33	2025-01-01 08:00:00	97400	2	2.0000	G	9.0000
34	2025-01-01 09:00:00	97400	2	2.0000	G	9.0000
35	2025-01-01 10:00:00	97400	2	2.0000	G	8.0000
36	2025-01-01 11:00:00	97400	2	3.0000	G	9.0000
37	2025-01-01 12:00:00	97400	2	3.0000	G	10.0000
38	2025-01-01 13:00:00	97400	2	3.0000	G	11.0000
39	2025-01-01 14:00:00	97400	2	4.0000	G	13.0000
40	2025-01-01 15:00:00	97400	2	4.0000	G	14.0000
41	2025-01-01 16:00:00	97400	2	4.0000	G	15.0000
42	2025-01-01 17:00:00	97400	2	3.0000	G	15.0000
43	2025-01-01 18:00:00	97400	2	3.0000	G	14.0000
44	2025-01-01 19:00:00	97400	2	4.0000	G	14.0000
45	2025-01-01 20:00:00	97400	2	4.0000	G	14.0000
46	2025-01-01 21:00:00	97400	2	3.0000	G	14.0000
47	2025-01-01 22:00:00	97400	2	3.0000	G	14.0000
48	2025-01-01 23:00:00	97400	2	2.0000	G	12.0000
49	2025-01-01 00:00:00	97400	3	70.00...	G	70.0000
50	2025-01-01 01:00:00	97400	3	70.00...	G	140.0000
51	2025-01-01 02:00:00	97400	3	30.00...	G	170.0000
52	2025-01-01 03:00:00	97400	3	20.00...	G	190.0000
53	2025-01-01 04:00:00	97400	3	10.00...	G	130.0000

Window frames

```sql
SELECT *, SUM([Value]) OVER (
            PARTITION BY Metric_ID
            ORDER BY [Timestamp]
            ROWS BETWEEN 3 PRECEDING AND CURRENT ROW
        ) AS _running_total
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_running_total
1	2025-01-01 00:00:00	97400	1	-3.8000	G	-3.8000
2	2025-01-01 01:00:00	97400	1	-3.1000	G	-6.9000
3	2025-01-01 02:00:00	97400	1	-2.6000	G	-9.5000
4	2025-01-01 03:00:00	97400	1	-2.4000	G	-11.9000
5	2025-01-01 04:00:00	97400	1	-2.4000	G	-10.5000
6	2025-01-01 05:00:00	97400	1	-2.6000	G	-10.0000
7	2025-01-01 06:00:00	97400	1	-2.6000	G	-10.0000
8	2025-01-01 07:00:00	97400	1	-2.8000	G	-10.4000
9	2025-01-01 08:00:00	97400	1	-2.5000	G	-10.5000
10	2025-01-01 09:00:00	97400	1	-2.2000	G	-10.1000
11	2025-01-01 10:00:00	97400	1	-2.0000	G	-9.5000
12	2025-01-01 11:00:00	97400	1	-2.0000	G	-8.7000
13	2025-01-01 12:00:00	97400	1	-1.7000	G	-7.9000
14	2025-01-01 13:00:00	97400	1	-1.9000	G	-7.6000
15	2025-01-01 14:00:00	97400	1	-2.1000	G	-7.7000
16	2025-01-01 15:00:00	97400	1	-2.3000		-8.0000
17	2025-01-01 16:00:00	97400	1	-2.6000	G	-8.9000
18	2025-01-01 17:00:00	97400	1	-3.1000	G	-10.1000
19	2025-01-01 18:00:00	97400	1	-2.7000	G	-10.7000
20	2025-01-01 19:00:00	97400	1	-2.9000	G	-11.3000
21	2025-01-01 20:00:00	97400	1	-3.4000	G	-12.1000
22	2025-01-01 21:00:00	97400	1	-4.2000	G	-13.2000
23	2025-01-01 22:00:00	97400	1	-6.3000	G	-16.8000
24	2025-01-01 23:00:00	97400	1	-6.9000	G	-20.8000
25	2025-01-01 00:00:00	97400	2	5.0000	G	5.0000
26	2025-01-01 01:00:00	97400	2	4.0000	G	9.0000
27	2025-01-01 02:00:00	97400	2	3.0000	G	12.0000
28	2025-01-01 03:00:00	97400	2	3.0000	G	15.0000
29	2025-01-01 04:00:00	97400	2	3.0000	G	13.0000
30	2025-01-01 05:00:00	97400	2	2.0000	G	11.0000
31	2025-01-01 06:00:00	97400	2	3.0000	G	11.0000
32	2025-01-01 07:00:00	97400	2	2.0000	G	10.0000
33	2025-01-01 08:00:00	97400	2	2.0000	G	9.0000
34	2025-01-01 09:00:00	97400	2	2.0000	G	9.0000
35	2025-01-01 10:00:00	97400	2	2.0000	G	8.0000
36	2025-01-01 11:00:00	97400	2	3.0000	G	9.0000
37	2025-01-01 12:00:00	97400	2	3.0000	G	10.0000
38	2025-01-01 13:00:00	97400	2	3.0000	G	11.0000
39	2025-01-01 14:00:00	97400	2	4.0000	G	13.0000
40	2025-01-01 15:00:00	97400	2	4.0000	G	14.0000
41	2025-01-01 16:00:00	97400	2	4.0000	G	15.0000
42	2025-01-01 17:00:00	97400	2	3.0000	G	15.0000
43	2025-01-01 18:00:00	97400	2	3.0000	G	14.0000
44	2025-01-01 19:00:00	97400	2	4.0000	G	14.0000
45	2025-01-01 20:00:00	97400	2	4.0000	G	14.0000
46	2025-01-01 21:00:00	97400	2	3.0000	G	14.0000
47	2025-01-01 22:00:00	97400	2	3.0000	G	14.0000
48	2025-01-01 23:00:00	97400	2	2.0000	G	12.0000
49	2025-01-01 00:00:00	97400	3	70.00...	G	70.0000
50	2025-01-01 01:00:00	97400	3	70.00...	G	140.0000
51	2025-01-01 02:00:00	97400	3	30.00...	G	170.0000
52	2025-01-01 03:00:00	97400	3	20.00...	G	190.0000
53	2025-01-01 04:00:00	97400	3	10.00...	G	130.0000

Window frames

```sql
SELECT *, SUM([Value]) OVER (
            PARTITION BY Metric_ID
            ORDER BY [Timestamp]
            ROWS BETWEEN 3 PRECEDING AND CURRENT ROW
        ) AS _running_total
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_running_total
1	2025-01-01 00:00:00	97400	1	-3.8000	G	-3.8000
2	2025-01-01 01:00:00	97400	1	-3.1000	G	-6.9000
3	2025-01-01 02:00:00	97400	1	-2.6000	G	-9.5000
4	2025-01-01 03:00:00	97400	1	-2.4000	G	-11.9000
5	2025-01-01 04:00:00	97400	1	-2.4000	G	-10.5000
6	2025-01-01 05:00:00	97400	1	-2.6000	G	-10.0000
7	2025-01-01 06:00:00	97400	1	-2.6000	G	-10.0000
8	2025-01-01 07:00:00	97400	1	-2.8000	G	-10.4000
9	2025-01-01 08:00:00	97400	1	-2.5000	G	-10.5000
10	2025-01-01 09:00:00	97400	1	-2.2000	G	-10.1000
11	2025-01-01 10:00:00	97400	1	-2.0000	G	-9.5000
12	2025-01-01 11:00:00	97400	1	-2.0000	G	-8.7000
13	2025-01-01 12:00:00	97400	1	-1.7000	G	-7.9000
14	2025-01-01 13:00:00	97400	1	-1.9000	G	-7.6000
15	2025-01-01 14:00:00	97400	1	-2.1000	G	-7.7000
16	2025-01-01 15:00:00	97400	1	-2.3000	G	-8.0000
17	2025-01-01 16:00:00	97400	1	-2.6000		-8.9000
18	2025-01-01 17:00:00	97400	1	-3.1000	G	-10.1000
19	2025-01-01 18:00:00	97400	1	-2.7000	G	-10.7000
20	2025-01-01 19:00:00	97400	1	-2.9000	G	-11.3000
21	2025-01-01 20:00:00	97400	1	-3.4000	G	-12.1000
22	2025-01-01 21:00:00	97400	1	-4.2000	G	-13.2000
23	2025-01-01 22:00:00	97400	1	-6.3000	G	-16.8000
24	2025-01-01 23:00:00	97400	1	-6.9000	G	-20.8000
25	2025-01-01 00:00:00	97400	2	5.0000	G	5.0000
26	2025-01-01 01:00:00	97400	2	4.0000	G	9.0000
27	2025-01-01 02:00:00	97400	2	3.0000	G	12.0000
28	2025-01-01 03:00:00	97400	2	3.0000	G	15.0000
29	2025-01-01 04:00:00	97400	2	3.0000	G	13.0000
30	2025-01-01 05:00:00	97400	2	2.0000	G	11.0000
31	2025-01-01 06:00:00	97400	2	3.0000	G	11.0000
32	2025-01-01 07:00:00	97400	2	2.0000	G	10.0000
33	2025-01-01 08:00:00	97400	2	2.0000	G	9.0000
34	2025-01-01 09:00:00	97400	2	2.0000	G	9.0000
35	2025-01-01 10:00:00	97400	2	2.0000	G	8.0000
36	2025-01-01 11:00:00	97400	2	3.0000	G	9.0000
37	2025-01-01 12:00:00	97400	2	3.0000	G	10.0000
38	2025-01-01 13:00:00	97400	2	3.0000	G	11.0000
39	2025-01-01 14:00:00	97400	2	4.0000	G	13.0000
40	2025-01-01 15:00:00	97400	2	4.0000	G	14.0000
41	2025-01-01 16:00:00	97400	2	4.0000	G	15.0000
42	2025-01-01 17:00:00	97400	2	3.0000	G	15.0000
43	2025-01-01 18:00:00	97400	2	3.0000	G	14.0000
44	2025-01-01 19:00:00	97400	2	4.0000	G	14.0000
45	2025-01-01 20:00:00	97400	2	4.0000	G	14.0000
46	2025-01-01 21:00:00	97400	2	3.0000	G	14.0000
47	2025-01-01 22:00:00	97400	2	3.0000	G	14.0000
48	2025-01-01 23:00:00	97400	2	2.0000	G	12.0000
49	2025-01-01 00:00:00	97400	3	70.00...	G	70.0000
50	2025-01-01 01:00:00	97400	3	70.00...	G	140.0000
51	2025-01-01 02:00:00	97400	3	30.00...	G	170.0000
52	2025-01-01 03:00:00	97400	3	20.00...	G	190.0000
53	2025-01-01 04:00:00	97400	3	10.00...	G	130.0000

Window frames

```sql
SELECT *, SUM([Value]) OVER (
            PARTITION BY Metric_ID
            ORDER BY [Timestamp]
            ROWS BETWEEN 3 PRECEDING AND 2 FOLLOWING
        ) AS _running_total
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_running_total
1	2025-01-01 00:00:00	97400	1	-3.8000	G	-9.5000
2	2025-01-01 01:00:00	97400	1	-3.1000	G	-11.9000
3	2025-01-01 02:00:00	97400	1	-2.6000	G	-14.3000
4	2025-01-01 03:00:00	97400	1	-2.4000	G	-16.9000
5	2025-01-01 04:00:00	97400	1	-2.4000	G	-15.7000
6	2025-01-01 05:00:00	97400	1	-2.6000	G	-15.4000
7	2025-01-01 06:00:00	97400	1	-2.6000	G	-15.3000
8	2025-01-01 07:00:00	97400	1	-2.8000	G	-15.1000
9	2025-01-01 08:00:00	97400	1	-2.5000	G	-14.7000
10	2025-01-01 09:00:00	97400	1	-2.2000	G	-14.1000
11	2025-01-01 10:00:00	97400	1	-2.0000	G	-13.2000
12	2025-01-01 11:00:00	97400	1	-2.0000	G	-12.3000
13	2025-01-01 12:00:00	97400	1	-1.7000	G	-11.9000
14	2025-01-01 13:00:00	97400	1	-1.9000	G	-12.0000
15	2025-01-01 14:00:00	97400	1	-2.1000		-12.6000
16	2025-01-01 15:00:00	97400	1	-2.3000	G	-13.7000
17	2025-01-01 16:00:00	97400	1	-2.6000	G	-14.7000
18	2025-01-01 17:00:00	97400	1	-3.1000	G	-15.7000
19	2025-01-01 18:00:00	97400	1	-2.7000	G	-17.0000
20	2025-01-01 19:00:00	97400	1	-2.9000	G	-18.9000
21	2025-01-01 20:00:00	97400	1	-3.4000	G	-22.6000
22	2025-01-01 21:00:00	97400	1	-4.2000	G	-26.4000
23	2025-01-01 22:00:00	97400	1	-6.3000	G	-23.7000
24	2025-01-01 23:00:00	97400	1	-6.9000	G	-20.8000
25	2025-01-01 00:00:00	97400	2	5.0000	G	12.0000
26	2025-01-01 01:00:00	97400	2	4.0000	G	15.0000
27	2025-01-01 02:00:00	97400	2	3.0000	G	18.0000
28	2025-01-01 03:00:00	97400	2	3.0000	G	20.0000
29	2025-01-01 04:00:00	97400	2	3.0000	G	18.0000
30	2025-01-01 05:00:00	97400	2	2.0000	G	16.0000
31	2025-01-01 06:00:00	97400	2	3.0000	G	15.0000
32	2025-01-01 07:00:00	97400	2	2.0000	G	14.0000
33	2025-01-01 08:00:00	97400	2	2.0000	G	13.0000
34	2025-01-01 09:00:00	97400	2	2.0000	G	14.0000
35	2025-01-01 10:00:00	97400	2	2.0000	G	14.0000
36	2025-01-01 11:00:00	97400	2	3.0000	G	15.0000
37	2025-01-01 12:00:00	97400	2	3.0000	G	17.0000
38	2025-01-01 13:00:00	97400	2	3.0000	G	19.0000
39	2025-01-01 14:00:00	97400	2	4.0000	G	21.0000
40	2025-01-01 15:00:00	97400	2	4.0000	G	21.0000
41	2025-01-01 16:00:00	97400	2	4.0000	G	21.0000
42	2025-01-01 17:00:00	97400	2	3.0000	G	22.0000
43	2025-01-01 18:00:00	97400	2	3.0000	G	22.0000
44	2025-01-01 19:00:00	97400	2	4.0000	G	21.0000
45	2025-01-01 20:00:00	97400	2	4.0000	G	20.0000
46	2025-01-01 21:00:00	97400	2	3.0000	G	19.0000
47	2025-01-01 22:00:00	97400	2	3.0000	G	16.0000
48	2025-01-01 23:00:00	97400	2	2.0000	G	12.0000
49	2025-01-01 00:00:00	97400	3	70.00...	G	170.0000
50	2025-01-01 01:00:00	97400	3	70.00...	G	190.0000
51	2025-01-01 02:00:00	97400	3	30.00...	G	200.0000
52	2025-01-01 03:00:00	97400	3	20.00...	G	550.0000
53	2025-01-01 04:00:00	97400	3	10.00...	G	480.0000

Window frames

```sql
SELECT *, SUM([Value]) OVER (
            PARTITION BY Metric_ID
            ORDER BY [Timestamp]
            ROWS BETWEEN 3 PRECEDING AND 2 FOLLOWING
        ) AS _running_total
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_running_total
1	2025-01-01 00:00:00	97400	1	-3.8000	G	-9.5000
2	2025-01-01 01:00:00	97400	1	-3.1000	G	-11.9000
3	2025-01-01 02:00:00	97400	1	-2.6000	G	-14.3000
4	2025-01-01 03:00:00	97400	1	-2.4000	G	-16.9000
5	2025-01-01 04:00:00	97400	1	-2.4000	G	-15.7000
6	2025-01-01 05:00:00	97400	1	-2.6000	G	-15.4000
7	2025-01-01 06:00:00	97400	1	-2.6000	G	-15.3000
8	2025-01-01 07:00:00	97400	1	-2.8000	G	-15.1000
9	2025-01-01 08:00:00	97400	1	-2.5000	G	-14.7000
10	2025-01-01 09:00:00	97400	1	-2.2000	G	-14.1000
11	2025-01-01 10:00:00	97400	1	-2.0000	G	-13.2000
12	2025-01-01 11:00:00	97400	1	-2.0000	G	-12.3000
13	2025-01-01 12:00:00	97400	1	-1.7000	G	-11.9000
14	2025-01-01 13:00:00	97400	1	-1.9000	G	-12.0000
15	2025-01-01 14:00:00	97400	1	-2.1000	G	-12.6000
16	2025-01-01 15:00:00	97400	1	-2.3000		-13.7000
17	2025-01-01 16:00:00	97400	1	-2.6000	G	-14.7000
18	2025-01-01 17:00:00	97400	1	-3.1000	G	-15.7000
19	2025-01-01 18:00:00	97400	1	-2.7000	G	-17.0000
20	2025-01-01 19:00:00	97400	1	-2.9000	G	-18.9000
21	2025-01-01 20:00:00	97400	1	-3.4000	G	-22.6000
22	2025-01-01 21:00:00	97400	1	-4.2000	G	-26.4000
23	2025-01-01 22:00:00	97400	1	-6.3000	G	-23.7000
24	2025-01-01 23:00:00	97400	1	-6.9000	G	-20.8000
25	2025-01-01 00:00:00	97400	2	5.0000	G	12.0000
26	2025-01-01 01:00:00	97400	2	4.0000	G	15.0000
27	2025-01-01 02:00:00	97400	2	3.0000	G	18.0000
28	2025-01-01 03:00:00	97400	2	3.0000	G	20.0000
29	2025-01-01 04:00:00	97400	2	3.0000	G	18.0000
30	2025-01-01 05:00:00	97400	2	2.0000	G	16.0000
31	2025-01-01 06:00:00	97400	2	3.0000	G	15.0000
32	2025-01-01 07:00:00	97400	2	2.0000	G	14.0000
33	2025-01-01 08:00:00	97400	2	2.0000	G	13.0000
34	2025-01-01 09:00:00	97400	2	2.0000	G	14.0000
35	2025-01-01 10:00:00	97400	2	2.0000	G	14.0000
36	2025-01-01 11:00:00	97400	2	3.0000	G	15.0000
37	2025-01-01 12:00:00	97400	2	3.0000	G	17.0000
38	2025-01-01 13:00:00	97400	2	3.0000	G	19.0000
39	2025-01-01 14:00:00	97400	2	4.0000	G	21.0000
40	2025-01-01 15:00:00	97400	2	4.0000	G	21.0000
41	2025-01-01 16:00:00	97400	2	4.0000	G	21.0000
42	2025-01-01 17:00:00	97400	2	3.0000	G	22.0000
43	2025-01-01 18:00:00	97400	2	3.0000	G	22.0000
44	2025-01-01 19:00:00	97400	2	4.0000	G	21.0000
45	2025-01-01 20:00:00	97400	2	4.0000	G	20.0000
46	2025-01-01 21:00:00	97400	2	3.0000	G	19.0000
47	2025-01-01 22:00:00	97400	2	3.0000	G	16.0000
48	2025-01-01 23:00:00	97400	2	2.0000	G	12.0000
49	2025-01-01 00:00:00	97400	3	70.00...	G	170.0000
50	2025-01-01 01:00:00	97400	3	70.00...	G	190.0000
51	2025-01-01 02:00:00	97400	3	30.00...	G	200.0000
52	2025-01-01 03:00:00	97400	3	20.00...	G	550.0000
53	2025-01-01 04:00:00	97400	3	10.00...	G	480.0000

Window frames

```sql
SELECT *, SUM([Value]) OVER (
            PARTITION BY Metric_ID
            ORDER BY [Timestamp]
            ROWS BETWEEN 3 PRECEDING AND 2 FOLLOWING
        ) AS _running_total
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_running_total
1	2025-01-01 00:00:00	97400	1	-3.8000	G	-9.5000
2	2025-01-01 01:00:00	97400	1	-3.1000	G	-11.9000
3	2025-01-01 02:00:00	97400	1	-2.6000	G	-14.3000
4	2025-01-01 03:00:00	97400	1	-2.4000	G	-16.9000
5	2025-01-01 04:00:00	97400	1	-2.4000	G	-15.7000
6	2025-01-01 05:00:00	97400	1	-2.6000	G	-15.4000
7	2025-01-01 06:00:00	97400	1	-2.6000	G	-15.3000
8	2025-01-01 07:00:00	97400	1	-2.8000	G	-15.1000
9	2025-01-01 08:00:00	97400	1	-2.5000	G	-14.7000
10	2025-01-01 09:00:00	97400	1	-2.2000	G	-14.1000
11	2025-01-01 10:00:00	97400	1	-2.0000	G	-13.2000
12	2025-01-01 11:00:00	97400	1	-2.0000	G	-12.3000
13	2025-01-01 12:00:00	97400	1	-1.7000	G	-11.9000
14	2025-01-01 13:00:00	97400	1	-1.9000	G	-12.0000
15	2025-01-01 14:00:00	97400	1	-2.1000	G	-12.6000
16	2025-01-01 15:00:00	97400	1	-2.3000	G	-13.7000
17	2025-01-01 16:00:00	97400	1	-2.6000		-14.7000
18	2025-01-01 17:00:00	97400	1	-3.1000	G	-15.7000
19	2025-01-01 18:00:00	97400	1	-2.7000	G	-17.0000
20	2025-01-01 19:00:00	97400	1	-2.9000	G	-18.9000
21	2025-01-01 20:00:00	97400	1	-3.4000	G	-22.6000
22	2025-01-01 21:00:00	97400	1	-4.2000	G	-26.4000
23	2025-01-01 22:00:00	97400	1	-6.3000	G	-23.7000
24	2025-01-01 23:00:00	97400	1	-6.9000	G	-20.8000
25	2025-01-01 00:00:00	97400	2	5.0000	G	12.0000
26	2025-01-01 01:00:00	97400	2	4.0000	G	15.0000
27	2025-01-01 02:00:00	97400	2	3.0000	G	18.0000
28	2025-01-01 03:00:00	97400	2	3.0000	G	20.0000
29	2025-01-01 04:00:00	97400	2	3.0000	G	18.0000
30	2025-01-01 05:00:00	97400	2	2.0000	G	16.0000
31	2025-01-01 06:00:00	97400	2	3.0000	G	15.0000
32	2025-01-01 07:00:00	97400	2	2.0000	G	14.0000
33	2025-01-01 08:00:00	97400	2	2.0000	G	13.0000
34	2025-01-01 09:00:00	97400	2	2.0000	G	14.0000
35	2025-01-01 10:00:00	97400	2	2.0000	G	14.0000
36	2025-01-01 11:00:00	97400	2	3.0000	G	15.0000
37	2025-01-01 12:00:00	97400	2	3.0000	G	17.0000
38	2025-01-01 13:00:00	97400	2	3.0000	G	19.0000
39	2025-01-01 14:00:00	97400	2	4.0000	G	21.0000
40	2025-01-01 15:00:00	97400	2	4.0000	G	21.0000
41	2025-01-01 16:00:00	97400	2	4.0000	G	21.0000
42	2025-01-01 17:00:00	97400	2	3.0000	G	22.0000
43	2025-01-01 18:00:00	97400	2	3.0000	G	22.0000
44	2025-01-01 19:00:00	97400	2	4.0000	G	21.0000
45	2025-01-01 20:00:00	97400	2	4.0000	G	20.0000
46	2025-01-01 21:00:00	97400	2	3.0000	G	19.0000
47	2025-01-01 22:00:00	97400	2	3.0000	G	16.0000
48	2025-01-01 23:00:00	97400	2	2.0000	G	12.0000
49	2025-01-01 00:00:00	97400	3	70.00...	G	170.0000
50	2025-01-01 01:00:00	97400	3	70.00...	G	190.0000
51	2025-01-01 02:00:00	97400	3	30.00...	G	200.0000
52	2025-01-01 03:00:00	97400	3	20.00...	G	550.0000
53	2025-01-01 04:00:00	97400	3	10.00...	G	480.0000

Window frames

```sql
SELECT *, SUM([Value]) OVER (
            PARTITION BY Metric_ID
            ORDER BY [Timestamp]
         -- RANGE UNBOUNDED PRECEDING
        ) AS _running_total
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_running_total
1	2025-01-01 00:00:00	97400	1	-3.8000	G	-3.8000
2	2025-01-01 01:00:00	97400	1	-3.1000	G	-6.9000
3	2025-01-01 02:00:00	97400	1	-2.6000	G	-9.5000
4	2025-01-01 03:00:00	97400	1	-2.4000	G	-11.9000
5	2025-01-01 04:00:00	97400	1	-2.4000	G	-14.3000
6	2025-01-01 05:00:00	97400	1	-2.6000	G	-16.9000
7	2025-01-01 06:00:00	97400	1	-2.6000	G	-19.5000
8	2025-01-01 07:00:00	97400	1	-2.8000	G	-22.3000
9	2025-01-01 08:00:00	97400	1	-2.5000	G	-24.8000
10	2025-01-01 09:00:00	97400	1	-2.2000	G	-27.0000
11	2025-01-01 10:00:00	97400	1	-2.0000	G	-29.0000
12	2025-01-01 11:00:00	97400	1	-2.0000	G	-31.0000
13	2025-01-01 12:00:00	97400	1	-1.7000	G	-32.7000
14	2025-01-01 13:00:00	97400	1	-1.9000	G	-34.6000
15	2025-01-01 14:00:00	97400	1	-2.1000	G	-36.7000
16	2025-01-01 15:00:00	97400	1	-2.3000	G	-39.0000
17	2025-01-01 16:00:00	97400	1	-2.6000	G	-41.6000
18	2025-01-01 17:00:00	97400	1	-3.1000	G	-44.7000
19	2025-01-01 18:00:00	97400	1	-2.7000	G	-47.4000
20	2025-01-01 19:00:00	97400	1	-2.9000	G	-50.3000
21	2025-01-01 20:00:00	97400	1	-3.4000	G	-53.7000
22	2025-01-01 21:00:00	97400	1	-4.2000	G	-57.9000
23	2025-01-01 22:00:00	97400	1	-6.3000	G	-64.2000
24	2025-01-01 23:00:00	97400	1	-6.9000	G	-71.1000
25	2025-01-01 00:00:00	97400	2	5.0000	G	5.0000
26	2025-01-01 01:00:00	97400	2	4.0000	G	9.0000
27	2025-01-01 02:00:00	97400	2	3.0000	G	12.0000
28	2025-01-01 03:00:00	97400	2	3.0000	G	15.0000
29	2025-01-01 04:00:00	97400	2	3.0000	G	18.0000
30	2025-01-01 05:00:00	97400	2	2.0000	G	20.0000
31	2025-01-01 06:00:00	97400	2	3.0000	G	23.0000
32	2025-01-01 07:00:00	97400	2	2.0000	G	25.0000
33	2025-01-01 08:00:00	97400	2	2.0000	G	27.0000
34	2025-01-01 09:00:00	97400	2	2.0000	G	29.0000
35	2025-01-01 10:00:00	97400	2	2.0000	G	31.0000
36	2025-01-01 11:00:00	97400	2	3.0000	G	34.0000
37	2025-01-01 12:00:00	97400	2	3.0000	G	37.0000
38	2025-01-01 13:00:00	97400	2	3.0000	G	40.0000
39	2025-01-01 14:00:00	97400	2	4.0000	G	44.0000
40	2025-01-01 15:00:00	97400	2	4.0000	G	48.0000
41	2025-01-01 16:00:00	97400	2	4.0000	G	52.0000
42	2025-01-01 17:00:00	97400	2	3.0000	G	55.0000
43	2025-01-01 18:00:00	97400	2	3.0000	G	58.0000
44	2025-01-01 19:00:00	97400	2	4.0000	G	62.0000
45	2025-01-01 20:00:00	97400	2	4.0000	G	66.0000
46	2025-01-01 21:00:00	97400	2	3.0000	G	69.0000
47	2025-01-01 22:00:00	97400	2	3.0000	G	72.0000
48	2025-01-01 23:00:00	97400	2	2.0000	G	74.0000
49	2025-01-01 00:00:00	97400	3	70.00...	G	70.0000
50	2025-01-01 01:00:00	97400	3	70.00...	G	140.0000
51	2025-01-01 02:00:00	97400	3	30.00...	G	170.0000
52	2025-01-01 03:00:00	97400	3	20.00...	G	190.0000
53	2025-01-01 04:00:00	97400	3	10.00...	G	200.0000

Window frames

```sql
SELECT *, SUM([Value]) OVER (
            PARTITION BY Metric_ID
            ORDER BY [Timestamp]
         -- RANGE UNBOUNDED PRECEDING
        ) AS _running_total
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
```

Warning: omitting the "window frame" defaults the function to RANGE UNBOUNDED PRECEDING.

	Timestamp	Location_ID	Metric_ID	Value	Quality	_running_total
1	2025-01-01 00:00:00	97400	1	-3.8000	G	-3.8000
2	2025-01-01 01:00:00	97400	1	-3.1000	G	-6.9000
3	2025-01-01 02:00:00	97400	1	-2.6000	G	-9.5000
4	2025-01-01 03:00:00	97400	1	-2.4000	G	-11.9000
5	2025-01-01 04:00:00	97400	1	-2.4000	G	-14.3000
6	2025-01-01 05:00:00	97400	1	-2.6000	G	-16.9000
7	2025-01-01 06:00:00	97400	1	-2.6000	G	-19.5000
8	2025-01-01 07:00:00	97400	1	-2.8000	G	-22.3000
9	2025-01-01 08:00:00	97400	1	-2.5000	G	-24.8000
10	2025-01-01 09:00:00	97400	1	-2.2000	G	-27.0000
11	2025-01-01 10:00:00	97400	1	-2.0000	G	-29.0000
12	2025-01-01 11:00:00	97400	1	-2.0000	G	-31.0000
13	2025-01-01 12:00:00	97400	1	-1.7000	G	-32.7000
14	2025-01-01 13:00:00	97400	1	-1.9000	G	-34.6000
15	2025-01-01 14:00:00	97400	1	-2.1000	G	-36.7000
16	2025-01-01 15:00:00	97400	1	-2.3000	G	-39.0000
17	2025-01-01 16:00:00	97400	1	-2.6000	G	-41.6000
18	2025-01-01 17:00:00	97400	1	-3.1000	G	-44.7000
19	2025-01-01 18:00:00	97400	1	-2.7000	G	-47.4000
20	2025-01-01 19:00:00	97400	1	-2.9000	G	-50.3000
21	2025-01-01 20:00:00	97400	1	-3.4000	G	-53.7000
22	2025-01-01 21:00:00	97400	1	-4.2000	G	-57.9000
23	2025-01-01 22:00:00	97400	1	-6.3000	G	-64.2000
24	2025-01-01 23:00:00	97400	1	-6.9000	G	-71.1000
25	2025-01-01 00:00:00	97400	2	5.0000	G	5.0000
26	2025-01-01 01:00:00	97400	2	4.0000	G	9.0000
27	2025-01-01 02:00:00	97400	2	3.0000	G	12.0000
28	2025-01-01 03:00:00	97400	2	3.0000	G	15.0000
29	2025-01-01 04:00:00	97400	2	3.0000	G	18.0000
30	2025-01-01 05:00:00	97400	2	2.0000	G	20.0000
31	2025-01-01 06:00:00	97400	2	3.0000	G	23.0000
32	2025-01-01 07:00:00	97400	2	2.0000	G	25.0000
33	2025-01-01 08:00:00	97400	2	2.0000	G	27.0000
34	2025-01-01 09:00:00	97400	2	2.0000	G	29.0000
35	2025-01-01 10:00:00	97400	2	2.0000	G	31.0000
36	2025-01-01 11:00:00	97400	2	3.0000	G	34.0000
37	2025-01-01 12:00:00	97400	2	3.0000	G	37.0000
38	2025-01-01 13:00:00	97400	2	3.0000	G	40.0000
39	2025-01-01 14:00:00	97400	2	4.0000	G	44.0000
40	2025-01-01 15:00:00	97400	2	4.0000	G	48.0000
41	2025-01-01 16:00:00	97400	2	4.0000	G	52.0000
42	2025-01-01 17:00:00	97400	2	3.0000	G	55.0000
43	2025-01-01 18:00:00	97400	2	3.0000	G	58.0000
44	2025-01-01 19:00:00	97400	2	4.0000	G	62.0000
45	2025-01-01 20:00:00	97400	2	4.0000	G	66.0000
46	2025-01-01 21:00:00	97400	2	3.0000	G	69.0000
47	2025-01-01 22:00:00	97400	2	3.0000	G	72.0000
48	2025-01-01 23:00:00	97400	2	2.0000	G	74.0000
49	2025-01-01 00:00:00	97400	3	70.00...	G	70.0000
50	2025-01-01 01:00:00	97400	3	70.00...	G	140.0000
51	2025-01-01 02:00:00	97400	3	30.00...	G	170.0000
52	2025-01-01 03:00:00	97400	3	20.00...	G	190.0000
53	2025-01-01 04:00:00	97400	3	10.00...	G	200.0000

Window frames

```sql
SELECT *, SUM([Value]) OVER (
            PARTITION BY Metric_ID
            ORDER BY [Timestamp]
          -- RANGE UNBOUNDED PRECEDING
        ) AS _running_total
FROM DW.Measurements
WHERE Location_ID=97400
  AND [Timestamp]>='2025-01-01'
  AND [Timestamp]< '2025-01-02';
```

RANGE, as opposed to ROWS, is a bit niche, and beyond the scope of this presentation.

	Timestamp	Location_ID	Metric_ID	Value	Quality	_running_total
1	2025-01-01 00:00:00	97400	1	-3.8000	G	-3.8000
2	2025-01-01 01:00:00	97400	1	-3.1000	G	-6.9000
3	2025-01-01 02:00:00	97400	1	-2.6000	G	-9.5000
4	2025-01-01 03:00:00	97400	1	-2.4000	G	-11.9000
5	2025-01-01 04:00:00	97400	1	-2.4000	G	-14.3000
6	2025-01-01 05:00:00	97400	1	-2.6000	G	-16.9000
7	2025-01-01 06:00:00	97400	1	-2.6000	G	-19.5000
8	2025-01-01 07:00:00	97400	1	-2.8000	G	-22.3000
9	2025-01-01 08:00:00	97400	1	-2.5000	G	-24.8000
10	2025-01-01 09:00:00	97400	1	-2.2000	G	-27.0000
11	2025-01-01 10:00:00	97400	1	-2.0000	G	-29.0000
12	2025-01-01 11:00:00	97400	1	-2.0000	G	-31.0000
13	2025-01-01 12:00:00	97400	1	-1.7000	G	-32.7000
14	2025-01-01 13:00:00	97400	1	-1.9000	G	-34.6000
15	2025-01-01 14:00:00	97400	1	-2.1000	G	-36.7000
16	2025-01-01 15:00:00	97400	1	-2.3000	G	-39.0000
17	2025-01-01 16:00:00	97400	1	-2.6000	G	-41.6000
18	2025-01-01 17:00:00	97400	1	-3.1000	G	-44.7000
19	2025-01-01 18:00:00	97400	1	-2.7000	G	-47.4000
20	2025-01-01 19:00:00	97400	1	-2.9000	G	-50.3000
21	2025-01-01 20:00:00	97400	1	-3.4000	G	-53.7000
22	2025-01-01 21:00:00	97400	1	-4.2000	G	-57.9000
23	2025-01-01 22:00:00	97400	1	-6.3000	G	-64.2000
24	2025-01-01 23:00:00	97400	1	-6.9000	G	-71.1000
25	2025-01-01 00:00:00	97400	2	5.0000	G	5.0000
26	2025-01-01 01:00:00	97400	2	4.0000	G	9.0000
27	2025-01-01 02:00:00	97400	2	3.0000	G	12.0000
28	2025-01-01 03:00:00	97400	2	3.0000	G	15.0000
29	2025-01-01 04:00:00	97400	2	3.0000	G	18.0000
30	2025-01-01 05:00:00	97400	2	2.0000	G	20.0000
31	2025-01-01 06:00:00	97400	2	3.0000	G	23.0000
32	2025-01-01 07:00:00	97400	2	2.0000	G	25.0000
33	2025-01-01 08:00:00	97400	2	2.0000	G	27.0000
34	2025-01-01 09:00:00	97400	2	2.0000	G	29.0000
35	2025-01-01 10:00:00	97400	2	2.0000	G	31.0000
36	2025-01-01 11:00:00	97400	2	3.0000	G	34.0000
37	2025-01-01 12:00:00	97400	2	3.0000	G	37.0000
38	2025-01-01 13:00:00	97400	2	3.0000	G	40.0000
39	2025-01-01 14:00:00	97400	2	4.0000	G	44.0000
40	2025-01-01 15:00:00	97400	2	4.0000	G	48.0000
41	2025-01-01 16:00:00	97400	2	4.0000	G	52.0000
42	2025-01-01 17:00:00	97400	2	3.0000	G	55.0000
43	2025-01-01 18:00:00	97400	2	3.0000	G	58.0000
44	2025-01-01 19:00:00	97400	2	4.0000	G	62.0000
45	2025-01-01 20:00:00	97400	2	4.0000	G	66.0000
46	2025-01-01 21:00:00	97400	2	3.0000	G	69.0000
47	2025-01-01 22:00:00	97400	2	3.0000	G	72.0000
48	2025-01-01 23:00:00	97400	2	2.0000	G	74.0000
49	2025-01-01 00:00:00	97400	3	70.00...	G	70.0000
50	2025-01-01 01:00:00	97400	3	70.00...	G	140.0000
51	2025-01-01 02:00:00	97400	3	30.00...	G	170.0000
52	2025-01-01 03:00:00	97400	3	20.00...	G	190.0000
53	2025-01-01 04:00:00	97400	3	10.00...	G	200.0000

Window frames

Quiz

Window frames

Quiz

Window frames

Quiz

```
ROWS BETWEEN UNBOUNDED
PRECEDING AND CURRENT ROW
```

Window frames

Quiz

```
ROWS BETWEEN UNBOUNDED
PRECEDING AND CURRENT ROW
```

Window frames

Quiz

```
ROWS BETWEEN UNBOUNDED
PRECEDING AND CURRENT ROW
```

```
ROWS BETWEEN x PRECEDING
        AND y PRECEDING
```

Window frames

Quiz

```
ROWS BETWEEN UNBOUNDED
PRECEDING AND CURRENT ROW
```

```
ROWS BETWEEN x PRECEDING
        AND y PRECEDING
```

Window frames

Quiz

```
ROWS BETWEEN UNBOUNDED
PRECEDING AND CURRENT ROW
```

```
ROWS BETWEEN x PRECEDING
         AND y PRECEDING
```

```
ROWS BETWEEN x PRECEDING
         AND y FOLLOWING
```

Window frames

Quiz

```
ROWS BETWEEN UNBOUNDED
PRECEDING AND CURRENT ROW
```

```
ROWS BETWEEN x PRECEDING
         AND y PRECEDING
```

```
ROWS BETWEEN x PRECEDING
         AND y FOLLOWING
```

Window frames

Quiz

```
ROWS BETWEEN UNBOUNDED
PRECEDING AND CURRENT ROW
```

```
ROWS BETWEEN x PRECEDING
        AND y PRECEDING
```

```
ROWS BETWEEN x PRECEDING
        AND y FOLLOWING
```

```
ROWS BETWEEN CURRENT ROW
        AND y FOLLOWING
```

Window frames

Quiz

```
ROWS BETWEEN UNBOUNDED
PRECEDING AND CURRENT ROW
```

```
ROWS BETWEEN x PRECEDING
        AND y PRECEDING
```

```
ROWS BETWEEN x PRECEDING
        AND y FOLLOWING
```

```
ROWS BETWEEN CURRENT ROW
        AND y FOLLOWING
```

Window frames

Quiz

```
ROWS BETWEEN UNBOUNDED
PRECEDING AND CURRENT ROW
```

```
ROWS BETWEEN x PRECEDING
        AND y PRECEDING
```

```
ROWS BETWEEN x PRECEDING
        AND y FOLLOWING
```

```
ROWS BETWEEN CURRENT ROW
        AND y FOLLOWING
```

```
ROWS BETWEEN CURRENT ROW
 AND UNBOUNDED FOLLOWING
```

We need an ordered window aggregate
to interpolate the missing temperatures.
What is that?
It's way to numerically express how hot or cold it is,
but that's not important right now.

Window aggregate aggregates

Window aggregate functions

Daily average

```sql
SELECT m.Metric_ID,
       dt.[Date],
       AVG(m.[Value]) AS [Daily avg]
FROM DW.Measurements AS m
CROSS APPLY (
    VALUES (DATETRUNC(day, [Timestamp]))
    ) AS dt([Date])
WHERE m.Location_ID=97400
  AND m.[Timestamp]>='2025-01-01'
  AND m.[Timestamp]<'2025-02-01'
GROUP BY m.Metric_ID,
         dt.[Date];
```

Window aggregate functions

Daily average

```sql
SELECT m.Metric_ID,
       dt.[Date],
       AVG(m.[Value]) AS [Daily avg]

FROM DW.Measurements AS m
CROSS APPLY (VALUES (
    DATETRUNC(day, [Timestamp])
    )) AS dt([Date])

WHERE m.Location_ID=97400
  AND m.[Timestamp]>='2025-01-01'
  AND m.[Timestamp]<'2025-02-01'
GROUP BY m.Metric_ID,
         dt.[Date];
```

3-day moving average*

```sql
SELECT m.Metric_ID,
       dt.[Date],
       AVG(AVG(m.[Value])) OVER (
            PARTITION BY m.Metric_ID
            ORDER BY dt.[Date]
            ROWS BETWEEN 2 PRECEDING AND CURRENT ROW
        ) AS [3 day moving average]

FROM DW.Measurements AS m
CROSS APPLY (
    VALUES (DATETRUNC(day, m.[Timestamp]))
    ) AS dt([Date])

WHERE m.Location_ID=97400
  AND m.[Timestamp]>='2025-01-01'
  AND m.[Timestamp]<'2025-02-01'
GROUP BY m.Metric_ID,
         dt.[Date];
```

Window aggregate functions

Timestamp	Value	DATETRUNC(day, Timestamp)
2025-01-01 00:00	-3,80	2025-01-01
2025-01-01 06:00	-2,60	
2025-01-01 07:00	-2,80	
2025-01-01 08:00	-2,50	
2025-01-01 09:00	-2,20	
2025-01-01 10:00	-2,00	
2025-01-01 11:00	-2,00	
2025-01-01 12:00	-1,70	
2025-01-01 13:00	-1,90	
2025-01-01 18:00	-2,70	
2025-01-01 19:00	-2,90	
2025-01-01 20:00	-3,40	
2025-01-01 21:00	-4,20	
2025-01-01 22:00	-6,30	
2025-01-01 23:00	-6,90	
2025-01-02 00:00	-7,70	2025-01-02
2025-01-02 01:00	-8,30	
2025-01-02 02:00	-9,00	
2025-01-02 03:00	-9,10	
2025-01-02 07:00	-11,10	
2025-01-02 08:00	-10,30	
2025-01-02 09:00	-10,50	
2025-01-02 10:00	-9,50	
2025-01-02 11:00	-8,40	
2025-01-02 12:00	-7,30	
2025-01-02 13:00	-6,90	
2025-01-02 14:00	-7,50	
2025-01-02 15:00	-8,20	
2025-01-02 22:00	-9,70	
2025-01-02 23:00	-9,30	
2025-01-03 00:00	-9,20	2025-01-03
2025-01-03 07:00	-10,70	
2025-01-03 08:00	-11,60	
2025-01-03 09:00	-12,90	
2025-01-03 10:00	-12,70	
2025-01-03 11:00	-12,90	
2025-01-03 12:00	-13,20	
2025-01-03 13:00	-12,30	
2025-01-03 14:00	-11,90	
2025-01-03 21:00	-11,50	
2025-01-03 22:00	-11,20	
2025-01-03 23:00	-11,00	

Window aggregate functions

Timestamp	Value	DATETRUNC(day, Timestamp)	AVG(Value)
2025-01-01 00:00	-3,80	2025-01-01	-3,19
2025-01-01 06:00	-2,60		
2025-01-01 07:00	-2,80		
2025-01-01 08:00	-2,50		
2025-01-01 09:00	-2,20		
2025-01-01 10:00	-2,00		
2025-01-01 11:00	-2,00		
2025-01-01 12:00	-1,70		
2025-01-01 13:00	-1,90		
2025-01-01 18:00	-2,70		
2025-01-01 19:00	-2,90		
2025-01-01 20:00	-3,40		
2025-01-01 21:00	-4,20		
2025-01-01 22:00	-6,30		
2025-01-01 23:00	-6,90		
2025-01-02 00:00	-7,70	2025-01-02	-8,85
2025-01-02 01:00	-8,30		
2025-01-02 02:00	-9,00		
2025-01-02 03:00	-9,10		
2025-01-02 07:00	-11,10		
2025-01-02 08:00	-10,30		
2025-01-02 09:00	-10,50		
2025-01-02 10:00	-9,50		
2025-01-02 11:00	-8,40		
2025-01-02 12:00	-7,30		
2025-01-02 13:00	-6,90		
2025-01-02 14:00	-7,50		
2025-01-02 15:00	-8,20		
2025-01-02 22:00	-9,70		
2025-01-02 23:00	-9,30		
2025-01-03 00:00	-9,20	2025-01-03	-11,76
2025-01-03 07:00	-10,70		
2025-01-03 08:00	-11,60		
2025-01-03 09:00	-12,90		
2025-01-03 10:00	-12,70		
2025-01-03 11:00	-12,90		
2025-01-03 12:00	-13,20		
2025-01-03 13:00	-12,30		
2025-01-03 14:00	-11,90		
2025-01-03 21:00	-11,50		
2025-01-03 22:00	-11,20		
2025-01-03 23:00	-11,00		

Window aggregate functions

Timestamp	Value	DATETRUNC(day, Timestamp)	AVG(Value)	AVG(AVG(Value)) OVER (…)
2025-01-01 00:00	-3,80	2025-01-01	-3,19	-7,94
2025-01-01 06:00	-2,60			
2025-01-01 07:00	-2,80			
2025-01-01 08:00	-2,50			
2025-01-01 09:00	-2,20			
2025-01-01 10:00	-2,00			
2025-01-01 11:00	-2,00			
2025-01-01 12:00	-1,70			
2025-01-01 13:00	-1,90			
2025-01-01 18:00	-2,70			
2025-01-01 19:00	-2,90			
2025-01-01 20:00	-3,40			
2025-01-01 21:00	-4,20			
2025-01-01 22:00	-6,30			
2025-01-01 23:00	-6,90			
2025-01-02 00:00	-7,70	2025-01-02	-8,85	
2025-01-02 01:00	-8,30			
2025-01-02 02:00	-9,00			
2025-01-02 03:00	-9,10			
2025-01-02 07:00	-11,10			
2025-01-02 08:00	-10,30			
2025-01-02 09:00	-10,50			
2025-01-02 10:00	-9,50			
2025-01-02 11:00	-8,40			
2025-01-02 12:00	-7,30			
2025-01-02 13:00	-6,90			
2025-01-02 14:00	-7,50			
2025-01-02 15:00	-8,20			
2025-01-02 22:00	-9,70			
2025-01-02 23:00	-9,30			
2025-01-03 00:00	-9,20	2025-01-03	-11,76	
2025-01-03 07:00	-10,70			
2025-01-03 08:00	-11,60			
2025-01-03 09:00	-12,90			
2025-01-03 10:00	-12,70			
2025-01-03 11:00	-12,90			
2025-01-03 12:00	-13,20			
2025-01-03 13:00	-12,30			
2025-01-03 14:00	-11,90			
2025-01-03 21:00	-11,50			
2025-01-03 22:00	-11,20			
2025-01-03 23:00	-11,00			

Window aggregate functions

Timestamp	Value	DATETRUNC(day, Timestamp)	AVG(Value)	AVG(AVG(Value)) OVER (…)	SUM(Value)
2025-01-01 00:00	-3,80	2025-01-01	-3,19	-7,94	-47,90
2025-01-01 06:00	-2,60				
2025-01-01 07:00	-2,80				
2025-01-01 08:00	-2,50				
2025-01-01 09:00	-2,20				
2025-01-01 10:00	-2,00				
2025-01-01 11:00	-2,00				
2025-01-01 12:00	-1,70				
2025-01-01 13:00	-1,90				
2025-01-01 18:00	-2,70				
2025-01-01 19:00	-2,90				
2025-01-01 20:00	-3,40				
2025-01-01 21:00	-4,20				
2025-01-01 22:00	-6,30				
2025-01-01 23:00	-6,90				
2025-01-02 00:00	-7,70	2025-01-02	-8,85		-132,80
2025-01-02 01:00	-8,30				
2025-01-02 02:00	-9,00				
2025-01-02 03:00	-9,10				
2025-01-02 07:00	-11,10				
2025-01-02 08:00	-10,30				
2025-01-02 09:00	-10,50				
2025-01-02 10:00	-9,50				
2025-01-02 11:00	-8,40				
2025-01-02 12:00	-7,30				
2025-01-02 13:00	-6,90				
2025-01-02 14:00	-7,50				
2025-01-02 15:00	-8,20				
2025-01-02 22:00	-9,70				
2025-01-02 23:00	-9,30				
2025-01-03 00:00	-9,20	2025-01-03	-11,76		-141,10
2025-01-03 07:00	-10,70				
2025-01-03 08:00	-11,60				
2025-01-03 09:00	-12,90				
2025-01-03 10:00	-12,70				
2025-01-03 11:00	-12,90				
2025-01-03 12:00	-13,20				
2025-01-03 13:00	-12,30				
2025-01-03 14:00	-11,90				
2025-01-03 21:00	-11,50				
2025-01-03 22:00	-11,20				
2025-01-03 23:00	-11,00				

Window aggregate functions

Timestamp	Value	DATETRUNC(day, Timestamp)	AVG(Value)	AVG(AVG(Value)) OVER (…)	SUM(Value)	COUNT(*)
2025-01-01 00:00	-3,80	2025-01-01	-3,19		-47,90	15
2025-01-01 06:00	-2,60					
2025-01-01 07:00	-2,80					
2025-01-01 08:00	-2,50					
2025-01-01 09:00	-2,20					
2025-01-01 10:00	-2,00					
2025-01-01 11:00	-2,00					
2025-01-01 12:00	-1,70					
2025-01-01 13:00	-1,90					
2025-01-01 18:00	-2,70					
2025-01-01 19:00	-2,90					
2025-01-01 20:00	-3,40					
2025-01-01 21:00	-4,20					
2025-01-01 22:00	-6,30					
2025-01-01 23:00	-6,90					
2025-01-02 00:00	-7,70	2025-01-02	-8,85	-7,94	-132,80	15
2025-01-02 01:00	-8,30					
2025-01-02 02:00	-9,00					
2025-01-02 03:00	-9,10					
2025-01-02 07:00	-11,10					
2025-01-02 08:00	-10,30					
2025-01-02 09:00	-10,50					
2025-01-02 10:00	-9,50					
2025-01-02 11:00	-8,40					
2025-01-02 12:00	-7,30					
2025-01-02 13:00	-6,90					
2025-01-02 14:00	-7,50					
2025-01-02 15:00	-8,20					
2025-01-02 22:00	-9,70					
2025-01-02 23:00	-9,30					
2025-01-03 00:00	-9,20	2025-01-03	-11,76		-141,10	12
2025-01-03 07:00	-10,70					
2025-01-03 08:00	-11,60					
2025-01-03 09:00	-12,90					
2025-01-03 10:00	-12,70					
2025-01-03 11:00	-12,90					
2025-01-03 12:00	-13,20					
2025-01-03 13:00	-12,30					
2025-01-03 14:00	-11,90					
2025-01-03 21:00	-11,50					
2025-01-03 22:00	-11,20					
2025-01-03 23:00	-11,00					

Window aggregate functions

Timestamp	Value	DATETRUNC(day, Timestamp)	AVG(Value)	AVG(AVG(Value)) OVER (…)	SUM(Value)	COUNT(*)	SUM(SUM(Value)) OVER (…) / SUM(COUNT(*)) OVER (…)
2025-01-01 00:00	-3,80	2025-01-01	-3,19	-7,94	-47,90	15	-7,66
2025-01-01 06:00	-2,60						
2025-01-01 07:00	-2,80						
2025-01-01 08:00	-2,50						
2025-01-01 09:00	-2,20						
2025-01-01 10:00	-2,00						
2025-01-01 11:00	-2,00						
2025-01-01 12:00	-1,70						
2025-01-01 13:00	-1,90						
2025-01-01 18:00	-2,70						
2025-01-01 19:00	-2,90						
2025-01-01 20:00	-3,40						
2025-01-01 21:00	-4,20						
2025-01-01 22:00	-6,30						
2025-01-01 23:00	-6,90						
2025-01-02 00:00	-7,70	2025-01-02	-8,85		-132,80	15	
2025-01-02 01:00	-8,30						
2025-01-02 02:00	-9,00						
2025-01-02 03:00	-9,10						
2025-01-02 07:00	-11,10						
2025-01-02 08:00	-10,30						
2025-01-02 09:00	-10,50						
2025-01-02 10:00	-9,50						
2025-01-02 11:00	-8,40						
2025-01-02 12:00	-7,30						
2025-01-02 13:00	-6,90						
2025-01-02 14:00	-7,50						
2025-01-02 15:00	-8,20						
2025-01-02 22:00	-9,70						
2025-01-02 23:00	-9,30						
2025-01-03 00:00	-9,20	2025-01-03	-11,76		-141,10	12	
2025-01-03 07:00	-10,70						
2025-01-03 08:00	-11,60						
2025-01-03 09:00	-12,90						
2025-01-03 10:00	-12,70						
2025-01-03 11:00	-12,90						
2025-01-03 12:00	-13,20						
2025-01-03 13:00	-12,30						
2025-01-03 14:00	-11,90						
2025-01-03 21:00	-11,50						
2025-01-03 22:00	-11,20						
2025-01-03 23:00	-11,00						

Window aggregate functions

Returns the 3-day average *of the daily average*.

```
--- Unweighted 3-day running total
AVG(AVG(m.[Value])) OVER (
     PARTITION BY m.Metric_ID
     ORDER BY dt.[Date]
     ROWS BETWEEN 2 PRECEDING AND CURRENT ROW
 ) AS [3 day moving average]
```

```
--- The 3-day running total...
SUM(SUM(m.[Value])) OVER (
   PARTITION BY m.Metric_ID
   ORDER BY dt.[Date]
   ROWS BETWEEN 2 PRECEDING AND CURRENT ROW
)
--- ... divided by...
/
--- ... the 3-day running count.
SUM(COUNT(m.[Value])) OVER (
    PARTITION BY m.Metric_ID
    ORDER BY dt.[Date]
    ROWS BETWEEN 2 PRECEDING AND CURRENT ROW
) AS [3 day moving average]
```

Returns the 3-day average of all hourly values, i.e. the *weighted* average per day.

Window aggregate function
Aggregate function

Useful patterns

Problems you can (elegantly) solve with window functions

Problems you can (elegantly) solve with window functions

Problems you can (elegantly) solve with window functions

Problems you can (elegantly) solve with window functions

Problems you can (elegantly) solve with window functions

Problems you can (elegantly) solve with window functions

Problems you can (elegantly) solve with window functions

You get used to it. I don't even see the code anymore.

All I see is partitions, gaps-and-islands, overlaps, duplicates...

First/last rows

```
SELECT *

FROM DW.Measurements
WHERE Location_ID=97200
  AND Metric_ID=1
  AND [Timestamp]>='2025-01-01';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality
1	2025-01-01 00:00:00	97200	1	-0.8000	G
2	2025-01-01 01:00:00	97200	1	0.0000	G
3	2025-01-01 02:00:00	97200	1	0.6000	G
4	2025-01-01 03:00:00	97200	1	0.3000	G
5	2025-01-01 04:00:00	97200	1	0.2000	G
6	2025-01-01 05:00:00	97200	1	0.2000	G
7	2025-01-01 06:00:00	97200	1	0.0000	G
8	2025-01-01 07:00:00	97200	1	-0.4000	G
9	2025-01-01 08:00:00	97200	1	-1.2000	G
10	2025-01-01 09:00:00	97200	1	-1.4000	G
11	2025-01-01 10:00:00	97200	1	-1.2000	G
12	2025-01-01 11:00:00	97200	1	-1.0000	G
13	2025-01-01 12:00:00	97200	1	-0.8000	G
14	2025-01-01 13:00:00	97200	1	-0.7000	G
15	2025-01-01 14:00:00	97200	1	-0.7000	G
16	2025-01-01 15:00:00	97200	1	-0.7000	G
17	2025-01-01 16:00:00	97200	1	-1.0000	G
18	2025-01-01 17:00:00	97200	1	-1.5000	G
19	2025-01-01 18:00:00	97200	1	-2.0000	G
721	2025-01-31 08:00:00	97200	1	1.7000	G
722	2025-01-31 09:00:00	97200	1	1.9000	G
723	2025-01-31 10:00:00	97200	1	1.8000	G
724	2025-01-31 11:00:00	97200	1	1.7000	G
725	2025-01-31 12:00:00	97200	1	2.3000	G
726	2025-01-31 13:00:00	97200	1	1.3000	G
727	2025-01-31 14:00:00	97200	1	1.2000	G
728	2025-01-31 15:00:00	97200	1	0.9000	G
729	2025-01-31 16:00:00	97200	1	0.2000	G
730	2025-01-31 17:00:00	97200	1	0.0000	G
731	2025-01-31 18:00:00	97200	1	0.6000	G
732	2025-01-31 19:00:00	97200	1	0.2000	G
733	2025-01-31 20:00:00	97200	1	-0.5000	G
734	2025-01-31 21:00:00	97200	1	-0.4000	G
735	2025-01-31 22:00:00	97200	1	-0.4000	G
736	2025-01-31 23:00:00	97200	1	-0.8000	G
737	2025-02-01 00:00:00	97200	1	-0.7000	G
738	2025-02-01 01:00:00	97200	1	-0.4000	G
739	2025-02-01 02:00:00	97200	1	-0.5000	G
740	2025-02-01 03:00:00	97200	1	-0.7000	G
741	2025-02-01 04:00:00	97200	1	-0.9000	G
742	2025-02-01 05:00:00	97200	1	-1.1000	G
743	2025-02-01 06:00:00	97200	1	-1.1000	G

First/last rows

```sql
SELECT *,
       LAG(0, 1, 1) OVER (ORDER BY [Timestamp]) AS _first

FROM DW.Measurements
WHERE Location_ID=97200
  AND Metric_ID=1
  AND [Timestamp]>='2025-01-01';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_first
1	2025-01-01 00:00:00	97200	1	-0.8000	G	1
2	2025-01-01 01:00:00	97200	1	0.0000	G	0
3	2025-01-01 02:00:00	97200	1	0.6000	G	0
4	2025-01-01 03:00:00	97200	1	0.3000	G	0
5	2025-01-01 04:00:00	97200	1	0.2000	G	0
6	2025-01-01 05:00:00	97200	1	0.2000	G	0
7	2025-01-01 06:00:00	97200	1	0.0000	G	0
8	2025-01-01 07:00:00	97200	1	-0.4000	G	0
9	2025-01-01 08:00:00	97200	1	-1.2000	G	0
10	2025-01-01 09:00:00	97200	1	-1.4000	G	0
11	2025-01-01 10:00:00	97200	1	-1.2000	G	0
12	2025-01-01 11:00:00	97200	1	-1.0000	G	0
13	2025-01-01 12:00:00	97200	1	-0.8000	G	0
14	2025-01-01 13:00:00	97200	1	-0.7000	G	0
15	2025-01-01 14:00:00	97200	1	-0.7000	G	0
16	2025-01-01 15:00:00	97200	1	-0.7000	G	0
17	2025-01-01 16:00:00	97200	1	-1.0000	G	0
18	2025-01-01 17:00:00	97200	1	-1.5000	G	0
19	2025-01-01 18:00:00	97200	1	-2.0000	G	0
721	2025-01-31 08:00:00	97200	1	1.7000	G	0
722	2025-01-31 09:00:00	97200	1	1.9000	G	0
723	2025-01-31 10:00:00	97200	1	1.8000	G	0
724	2025-01-31 11:00:00	97200	1	1.7000	G	0
725	2025-01-31 12:00:00	97200	1	2.3000	G	0
726	2025-01-31 13:00:00	97200	1	1.3000	G	0
727	2025-01-31 14:00:00	97200	1	1.2000	G	0
728	2025-01-31 15:00:00	97200	1	0.9000	G	0
729	2025-01-31 16:00:00	97200	1	0.2000	G	0
730	2025-01-31 17:00:00	97200	1	0.0000	G	0
731	2025-01-31 18:00:00	97200	1	0.6000	G	0
732	2025-01-31 19:00:00	97200	1	0.2000	G	0
733	2025-01-31 20:00:00	97200	1	-0.5000	G	0
734	2025-01-31 21:00:00	97200	1	-0.4000	G	0
735	2025-01-31 22:00:00	97200	1	-0.4000	G	0
736	2025-01-31 23:00:00	97200	1	-0.8000	G	0
737	2025-02-01 00:00:00	97200	1	-0.7000	G	0
738	2025-02-01 01:00:00	97200	1	-0.4000	G	0
739	2025-02-01 02:00:00	97200	1	-0.5000	G	0
740	2025-02-01 03:00:00	97200	1	-0.7000	G	0
741	2025-02-01 04:00:00	97200	1	-0.9000	G	0
742	2025-02-01 05:00:00	97200	1	-1.1000	G	0
743	2025-02-01 06:00:00	97200	1	-1.1000	G	0

First/last rows

```
SELECT *,
       LAG(0, 1, 1) OVER (ORDER BY [Timestamp]) AS _first

FROM DW    asurements
    _ID=97200
  AND Metric_ID=1
  AND [Timestamp]>='2025-01-01';
```

Fetch this expression

	Timestamp	Location_ID	Metric_ID	Value	Quality	_first
1	2025-01-01 00:00:00	97200	1	-0.8000	G	1
2	2025-01-01 01:00:00	97200	1	0.0000	G	0
3	2025-01-01 02:00:00	97200	1	0.6000	G	0
4	2025-01-01 03:00:00	97200	1	0.3000	G	0
5	2025-01-01 04:00:00	97200	1	0.2000	G	0
6	2025-01-01 05:00:00	97200	1	0.2000	G	0
7	2025-01-01 06:00:00	97200	1	0.0000	G	0
8	2025-01-01 07:00:00	97200	1	-0.4000	G	0
9	2025-01-01 08:00:00	97200	1	-1.2000	G	0
10	2025-01-01 09:00:00	97200	1	-1.4000	G	0
11	2025-01-01 10:00:00	97200	1	-1.2000	G	0
12	2025-01-01 11:00:00	97200	1	-1.0000	G	0
13	2025-01-01 12:00:00	97200	1	-0.8000	G	0
14	2025-01-01 13:00:00	97200	1	-0.7000	G	0
15	2025-01-01 14:00:00	97200	1	-0.7000	G	0
16	2025-01-01 15:00:00	97200	1	-0.7000	G	0
17	2025-01-01 16:00:00	97200	1	-1.0000	G	0
18	2025-01-01 17:00:00	97200	1	-1.5000	G	0
19	2025-01-01 18:00:00	97200	1	-2.0000	G	0
721	2025-01-31 08:00:00	97200	1	1.7000	G	0
722	2025-01-31 09:00:00	97200	1	1.9000	G	0
723	2025-01-31 10:00:00	97200	1	1.8000	G	0
724	2025-01-31 11:00:00	97200	1	1.7000	G	0
725	2025-01-31 12:00:00	97200	1	2.3000	G	0
726	2025-01-31 13:00:00	97200	1	1.3000	G	0
727	2025-01-31 14:00:00	97200	1	1.2000	G	0
728	2025-01-31 15:00:00	97200	1	0.9000	G	0
729	2025-01-31 16:00:00	97200	1	0.2000	G	0
730	2025-01-31 17:00:00	97200	1	0.0000	G	0
731	2025-01-31 18:00:00	97200	1	0.6000	G	0
732	2025-01-31 19:00:00	97200	1	0.2000	G	0
733	2025-01-31 20:00:00	97200	1	-0.5000	G	0
734	2025-01-31 21:00:00	97200	1	-0.4000	G	0
735	2025-01-31 22:00:00	97200	1	-0.4000	G	0
736	2025-01-31 23:00:00	97200	1	-0.8000	G	0
737	2025-02-01 00:00:00	97200	1	-0.7000	G	0
738	2025-02-01 01:00:00	97200	1	-0.4000	G	0
739	2025-02-01 02:00:00	97200	1	-0.5000	G	0
740	2025-02-01 03:00:00	97200	1	-0.7000	G	0
741	2025-02-01 04:00:00	97200	1	-0.9000	G	0
742	2025-02-01 05:00:00	97200	1	-1.1000	G	0
743	2025-02-01 06:00:00	97200	1	-1.1000	G	0

First/last rows

```
SELECT *,
       LAG(0, 1, 1) OVER (ORDER BY [Timestamp]) AS _first

FROM DW[illegible]asuremen[illegible]
[illegible]
  AND Metric_ID=1
  AND [Timestamp]>='2025-01-01';
```

Fetch this expression

from (1) row prior

	Timestamp	Location_ID	Metric_ID	Value	Quality	_first
1	2025-01-01 00:00:00	97200	1	-0.8000	G	1
2	2025-01-01 01:00:00	97200	1	0.0000	G	0
3	2025-01-01 02:00:00	97200	1	0.6000	G	0
4	2025-01-01 03:00:00	97200	1	0.3000	G	0
5	2025-01-01 04:00:00	97200	1	0.2000	G	0
6	2025-01-01 05:00:00	97200	1	0.2000	G	0
7	2025-01-01 06:00:00	97200	1	0.0000	G	0
8	2025-01-01 07:00:00	97200	1	-0.4000	G	0
9	2025-01-01 08:00:00	97200	1	-1.2000	G	0
10	2025-01-01 09:00:00	97200	1	-1.4000	G	0
11	2025-01-01 10:00:00	97200	1	-1.2000	G	0
12	2025-01-01 11:00:00	97200	1	-1.0000	G	0
13	2025-01-01 12:00:00	97200	1	-0.8000	G	0
14	2025-01-01 13:00:00	97200	1	-0.7000	G	0
15	2025-01-01 14:00:00	97200	1	-0.7000	G	0
16	2025-01-01 15:00:00	97200	1	-0.7000	G	0
17	2025-01-01 16:00:00	97200	1	-1.0000	G	0
18	2025-01-01 17:00:00	97200	1	-1.5000	G	0
19	2025-01-01 18:00:00	97200	1	-2.0000	G	0
721	2025-01-31 08:00:00	97200	1	1.7000	G	0
722	2025-01-31 09:00:00	97200	1	1.9000	G	0
723	2025-01-31 10:00:00	97200	1	1.8000	G	0
724	2025-01-31 11:00:00	97200	1	1.7000	G	0
725	2025-01-31 12:00:00	97200	1	2.3000	G	0
726	2025-01-31 13:00:00	97200	1	1.3000	G	0
727	2025-01-31 14:00:00	97200	1	1.2000	G	0
728	2025-01-31 15:00:00	97200	1	0.9000	G	0
729	2025-01-31 16:00:00	97200	1	0.2000	G	0
730	2025-01-31 17:00:00	97200	1	0.0000	G	0
731	2025-01-31 18:00:00	97200	1	0.6000	G	0
732	2025-01-31 19:00:00	97200	1	0.2000	G	0
733	2025-01-31 20:00:00	97200	1	-0.5000	G	0
734	2025-01-31 21:00:00	97200	1	-0.4000	G	0
735	2025-01-31 22:00:00	97200	1	-0.4000	G	0
736	2025-01-31 23:00:00	97200	1	-0.8000	G	0
737	2025-02-01 00:00:00	97200	1	-0.7000	G	0
738	2025-02-01 01:00:00	97200	1	-0.4000	G	0
739	2025-02-01 02:00:00	97200	1	-0.5000	G	0
740	2025-02-01 03:00:00	97200	1	-0.7000	G	0
741	2025-02-01 04:00:00	97200	1	-0.9000	G	0
742	2025-02-01 05:00:00	97200	1	-1.1000	G	0
743	2025-02-01 06:00:00	97200	1	-1.1000	G	0

First/last rows

```
SELECT *,
       LAG(0, 1, 1) OVER (ORDER BY [Timestamp]) AS _first

FROM DW[illegible]asuremen[illegible]
[illegible]
  AND Metric_ID=1
  AND [Timestamp]>='2025-01-01';
```

Return this if there is no previous row

Fetch this expression

from (1) row prior

	Timestamp	Location_ID	Metric_ID	Value	Quality	_first
1	2025-01-01 00:00:00	97200	1	-0.8000	G	1
2	2025-01-01 01:00:00	97200	1	0.0000	G	0
3	2025-01-01 02:00:00	97200	1	0.6000	G	0
4	2025-01-01 03:00:00	97200	1	0.3000	G	0
5	2025-01-01 04:00:00	97200	1	0.2000	G	0
6	2025-01-01 05:00:00	97200	1	0.2000	G	0
7	2025-01-01 06:00:00	97200	1	0.0000	G	0
8	2025-01-01 07:00:00	97200	1	-0.4000	G	0
9	2025-01-01 08:00:00	97200	1	-1.2000	G	0
10	2025-01-01 09:00:00	97200	1	-1.4000	G	0
11	2025-01-01 10:00:00	97200	1	-1.2000	G	0
12	2025-01-01 11:00:00	97200	1	-1.0000	G	0
13	2025-01-01 12:00:00	97200	1	-0.8000	G	0
14	2025-01-01 13:00:00	97200	1	-0.7000	G	0
15	2025-01-01 14:00:00	97200	1	-0.7000	G	0
16	2025-01-01 15:00:00	97200	1	-0.7000	G	0
17	2025-01-01 16:00:00	97200	1	-1.0000	G	0
18	2025-01-01 17:00:00	97200	1	-1.5000	G	0
19	2025-01-01 18:00:00	97200	1	-2.0000	G	0
721	2025-01-31 08:00:00	97200	1	1.7000	G	0
722	2025-01-31 09:00:00	97200	1	1.9000	G	0
723	2025-01-31 10:00:00	97200	1	1.8000	G	0
724	2025-01-31 11:00:00	97200	1	1.7000	G	0
725	2025-01-31 12:00:00	97200	1	2.3000	G	0
726	2025-01-31 13:00:00	97200	1	1.3000	G	0
727	2025-01-31 14:00:00	97200	1	1.2000	G	0
728	2025-01-31 15:00:00	97200	1	0.9000	G	0
729	2025-01-31 16:00:00	97200	1	0.2000	G	0
730	2025-01-31 17:00:00	97200	1	0.0000	G	0
731	2025-01-31 18:00:00	97200	1	0.6000	G	0
732	2025-01-31 19:00:00	97200	1	0.2000	G	0
733	2025-01-31 20:00:00	97200	1	-0.5000	G	0
734	2025-01-31 21:00:00	97200	1	-0.4000	G	0
735	2025-01-31 22:00:00	97200	1	-0.4000	G	0
736	2025-01-31 23:00:00	97200	1	-0.8000	G	0
737	2025-02-01 00:00:00	97200	1	-0.7000	G	0
738	2025-02-01 01:00:00	97200	1	-0.4000	G	0
739	2025-02-01 02:00:00	97200	1	-0.5000	G	0
740	2025-02-01 03:00:00	97200	1	-0.7000	G	0
741	2025-02-01 04:00:00	97200	1	-0.9000	G	0
742	2025-02-01 05:00:00	97200	1	-1.1000	G	0
743	2025-02-01 06:00:00	97200	1	-1.1000	G	0

First/last rows

```sql
SELECT *,
       LAG(0, 1, 1) OVER (ORDER BY [Timestamp]) AS _first,
       LEAD(0, 1, 1) OVER (ORDER BY [Timestamp]) AS _last
FROM DW.Measurements
WHERE Location_ID=97200
  AND Metric_ID=1
  AND [Timestamp]>='2025-01-01';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_first	_last
1	2025-01-01 00:00:00	97200	1	-0.8000	G	1	0
2	2025-01-01 01:00:00	97200	1	0.0000	G	0	0
3	2025-01-01 02:00:00	97200	1	0.6000	G	0	0
4	2025-01-01 03:00:00	97200	1	0.3000	G	0	0
5	2025-01-01 04:00:00	97200	1	0.2000	G	0	0
6	2025-01-01 05:00:00	97200	1	0.2000	G	0	0
7	2025-01-01 06:00:00	97200	1	0.0000	G	0	0
8	2025-01-01 07:00:00	97200	1	-0.4000	G	0	0
9	2025-01-01 08:00:00	97200	1	-1.2000	G	0	0
10	2025-01-01 09:00:00	97200	1	-1.4000	G	0	0
11	2025-01-01 10:00:00	97200	1	-1.2000	G	0	0
12	2025-01-01 11:00:00	97200	1	-1.0000	G	0	0
13	2025-01-01 12:00:00	97200	1	-0.8000	G	0	0
14	2025-01-01 13:00:00	97200	1	-0.7000	G	0	0
15	2025-01-01 14:00:00	97200	1	-0.7000	G	0	0
16	2025-01-01 15:00:00	97200	1	-0.7000	G	0	0
17	2025-01-01 16:00:00	97200	1	-1.0000	G	0	0
18	2025-01-01 17:00:00	97200	1	-1.5000	G	0	0
19	2025-01-01 18:00:00	97200	1	-2.0000	G	0	0
721	2025-01-31 08:00:00	97200	1	1.7000	G	0	0
722	2025-01-31 09:00:00	97200	1	1.9000	G	0	0
723	2025-01-31 10:00:00	97200	1	1.8000	G	0	0
724	2025-01-31 11:00:00	97200	1	1.7000	G	0	0
725	2025-01-31 12:00:00	97200	1	2.3000	G	0	0
726	2025-01-31 13:00:00	97200	1	1.3000	G	0	0
727	2025-01-31 14:00:00	97200	1	1.2000	G	0	0
728	2025-01-31 15:00:00	97200	1	0.9000	G	0	0
729	2025-01-31 16:00:00	97200	1	0.2000	G	0	0
730	2025-01-31 17:00:00	97200	1	0.0000	G	0	0
731	2025-01-31 18:00:00	97200	1	0.6000	G	0	0
732	2025-01-31 19:00:00	97200	1	0.2000	G	0	0
733	2025-01-31 20:00:00	97200	1	-0.5000	G	0	0
734	2025-01-31 21:00:00	97200	1	-0.4000	G	0	0
735	2025-01-31 22:00:00	97200	1	-0.4000	G	0	0
736	2025-01-31 23:00:00	97200	1	-0.8000	G	0	0
737	2025-02-01 00:00:00	97200	1	-0.7000	G	0	0
738	2025-02-01 01:00:00	97200	1	-0.4000	G	0	0
739	2025-02-01 02:00:00	97200	1	-0.5000	G	0	0
740	2025-02-01 03:00:00	97200	1	-0.7000	G	0	0
741	2025-02-01 04:00:00	97200	1	-0.9000	G	0	0
742	2025-02-01 05:00:00	97200	1	-1.1000	G	0	0
743	2025-02-01 06:00:00	97200	1	-1.1000	G	0	1

Finding duplicates

```
SELECT *
FROM DW.Measurements
WHERE Location_ID=97200
  AND Metric_ID=1
  AND [Timestamp]>='2025-01-01';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality
41	2025-01-02 16:00:00	97200	1	-4.8000	G
42	2025-01-02 17:00:00	97200	1	-5.2000	G
43	2025-01-02 18:00:00	97200	1	-5.4000	G
44	2025-01-02 19:00:00	97200	1	-5.8000	G
45	2025-01-02 20:00:00	97200	1	-5.9000	G
46	2025-01-02 21:00:00	97200	1	-6.5000	G
47	2025-01-02 22:00:00	97200	1	-8.3000	G
48	2025-01-02 23:00:00	97200	1	-6.7000	G
49	2025-01-03 00:00:00	97200	1	-7.0000	G
50	2025-01-03 01:00:00	97200	1	-6.0000	G
51	2025-01-03 02:00:00	97200	1	-6.2000	M
52	2025-01-03 03:00:00	97200	1	-6.5000	M
53	2025-01-03 03:00:00	97200	1	-6.4500	M
54	2025-01-03 04:00:00	97200	1	-6.7000	M
55	2025-01-03 05:00:00	97200	1	-7.0000	M
56	2025-01-03 06:00:00	97200	1	-7.2000	G
57	2025-01-03 07:00:00	97200	1	-8.5000	G
58	2025-01-03 08:00:00	97200	1	-11.1000	G
59	2025-01-03 09:00:00	97200	1	-10.5000	G
60	2025-01-03 10:00:00	97200	1	-11.1000	G
61	2025-01-03 11:00:00	97200	1	-9.5000	G
62	2025-01-03 12:00:00	97200	1	-10.5000	G
63	2025-01-03 13:00:00	97200	1	-9.1000	G
64	2025-01-03 14:00:00	97200	1	-9.7000	G
65	2025-01-03 15:00:00	97200	1	-10.7000	G
66	2025-01-03 16:00:00	97200	1	-10.3000	G
67	2025-01-03 17:00:00	97200	1	-11.0000	G
68	2025-01-03 18:00:00	97200	1	-10.4000	G
69	2025-01-03 19:00:00	97200	1	-10.0000	G
70	2025-01-03 20:00:00	97200	1	-10.3000	G
71	2025-01-03 21:00:00	97200	1	-10.5000	G
72	2025-01-03 22:00:00	97200	1	-10.0000	G
73	2025-01-03 23:00:00	97200	1	-9.3000	G
74	2025-01-04 00:00:00	97200	1	-8.9000	G
75	2025-01-04 01:00:00	97200	1	-8.0000	G
76	2025-01-04 02:00:00	97200	1	-7.8000	G
77	2025-01-04 03:00:00	97200	1	-8.1000	G
78	2025-01-04 04:00:00	97200	1	-7.7000	G
79	2025-01-04 05:00:00	97200	1	-7.1000	G
80	2025-01-04 06:00:00	97200	1	-6.7000	G
81	2025-01-04 07:00:00	97200	1	-6.9000	G
82	2025-01-04 08:00:00	97200	1	-6.4000	G
83	2025-01-04 09:00:00	97200	1	-6.0000	G

Finding duplicates

```sql
SELECT *, ROW_NUMBER() OVER (
            PARTITION BY Location_ID, Metric_ID, [Timestamp]
            ORDER BY (SELECT NULL)
        ) AS _duplicate
FROM DW.Measurements
WHERE Location_ID=97200
  AND Metric_ID=1
  AND [Timestamp]>='2025-01-01';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_duplicate
41	2025-01-02 16:00:00	97200	1	-4.8000	G	1
42	2025-01-02 17:00:00	97200	1	-5.2000	G	1
43	2025-01-02 18:00:00	97200	1	-5.4000	G	1
44	2025-01-02 19:00:00	97200	1	-5.8000	G	1
45	2025-01-02 20:00:00	97200	1	-5.9000	G	1
46	2025-01-02 21:00:00	97200	1	-6.5000	G	1
47	2025-01-02 22:00:00	97200	1	-8.3000	G	1
48	2025-01-02 23:00:00	97200	1	-6.7000	G	1
49	2025-01-03 00:00:00	97200	1	-7.0000	G	1
50	2025-01-03 01:00:00	97200	1	-6.0000	G	1
51	2025-01-03 02:00:00	97200	1	-6.2000	M	1
52	2025-01-03 03:00:00	97200	1	-6.5000	M	1
53	2025-01-03 03:00:00	97200	1	-6.4500	M	2
54	2025-01-03 04:00:00	97200	1	-6.7000	M	1
55	2025-01-03 05:00:00	97200	1	-7.0000	M	1
56	2025-01-03 06:00:00	97200	1	-7.2000	G	1
57	2025-01-03 07:00:00	97200	1	-8.5000	G	1
58	2025-01-03 08:00:00	97200	1	-11.1000	G	1
59	2025-01-03 09:00:00	97200	1	-10.5000	G	1
60	2025-01-03 10:00:00	97200	1	-11.1000	G	1
61	2025-01-03 11:00:00	97200	1	-9.5000	G	1
62	2025-01-03 12:00:00	97200	1	-10.5000	G	1
63	2025-01-03 13:00:00	97200	1	-9.1000	G	1
64	2025-01-03 14:00:00	97200	1	-9.7000	G	1
65	2025-01-03 15:00:00	97200	1	-10.7000	G	1
66	2025-01-03 16:00:00	97200	1	-10.3000	G	1
67	2025-01-03 17:00:00	97200	1	-11.0000	G	1
68	2025-01-03 18:00:00	97200	1	-10.4000	G	1
69	2025-01-03 19:00:00	97200	1	-10.0000	G	1
70	2025-01-03 20:00:00	97200	1	-10.3000	G	1
71	2025-01-03 21:00:00	97200	1	-10.5000	G	1
72	2025-01-03 22:00:00	97200	1	-10.0000	G	1
73	2025-01-03 23:00:00	97200	1	-9.3000	G	1
74	2025-01-04 00:00:00	97200	1	-8.9000	G	1
75	2025-01-04 01:00:00	97200	1	-8.0000	G	1
76	2025-01-04 02:00:00	97200	1	-7.8000	G	1
77	2025-01-04 03:00:00	97200	1	-8.1000	G	1
78	2025-01-04 04:00:00	97200	1	-7.7000	G	1
79	2025-01-04 05:00:00	97200	1	-7.1000	G	1
80	2025-01-04 06:00:00	97200	1	-6.7000	G	1
81	2025-01-04 07:00:00	97200	1	-6.9000	G	1
82	2025-01-04 08:00:00	97200	1	-6.4000	G	1
83	2025-01-04 09:00:00	97200	1	-6.0000	G	1

Finding duplicates

```
SELECT *, ROW_NUMBER() OVER (
            PARTITION BY Location_ID, Metric_ID, [Ti
            ORDER BY (SELECT NULL)
         ) AS _duplicate
FROM DW.Measurements
WHERE Location_ID=97200
  AND Metric_ID=1
  AND [Timestamp]>='2025-01-01';
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_duplicate
41	2025-01-02 16:00:00	97200	1	-4.8000	G	1
42	2025-01-02 17:00:00	97200	1	-5.2000	G	1
43	2025-01-02 18:00:00	97200	1	-5.4000	G	1
44	2025-01-02 19:00:00	97200	1	-5.8000	G	1
45	2025-01-02 20:00:00	97200	1	-5.9000	G	1
46	2025-01-02 21:00:00	97200	1	-6.5000	G	1
47	2025-01-02 22:00:00	97200	1	-8.3000	G	1
48	2025-01-02 23:00:00	97200	1	-6.7000	G	1
49	2025-01-03 00:00:00	97200	1	-7.0000	G	1
50	2025-01-03 01:00:00	97200	1	-6.0000	G	1
51	2025-01-03 02:00:00	97200	1	-6.2000	M	1
54	2025-01-03 04:00:00	97200	1	-6.7000	M	1
55	2025-01-03 05:00:00	97200	1	-7.0000	M	1
56	2025-01-03 06:00:00	97200	1	-7.2000	G	1
57	2025-01-03 07:00:00	97200	1	-8.5000	G	1
58	2025-01-03 08:00:00	97200	1	-11.1000	G	1
59	2025-01-03 09:00:00	97200	1	-10.5000	G	1
60	2025-01-03 10:00:00	97200	1	-11.1000	G	1
61	2025-01-03 11:00:00	97200	1	-9.5000	G	1
62	2025-01-03 12:00:00	97200	1	-10.5000	G	1
63	2025-01-03 13:00:00	97200	1	-9.1000	G	1
64	2025-01-03 14:00:00	97200	1	-9.7000	G	1
65	2025-01-03 15:00:00	97200	1	-10.7000	G	1
66	2025-01-03 16:00:00	97200	1	-10.3000	G	1
67	2025-01-03 17:00:00	97200	1	-11.0000	G	1
68	2025-01-03 18:00:00	97200	1	-10.4000	G	1
69	2025-01-03 19:00:00	97200	1	-10.0000	G	1
70	2025-01-03 20:00:00	97200	1	-10.3000	G	1
71	2025-01-03 21:00:00	97200	1	-10.5000	G	1
72	2025-01-03 22:00:00	97200	1	-10.0000	G	1
73	2025-01-03 23:00:00	97200	1	-9.3000	G	1
74	2025-01-04 00:00:00	97200	1	-8.9000	G	1
75	2025-01-04 01:00:00	97200	1	-8.0000	G	1
76	2025-01-04 02:00:00	97200	1	-7.8000	G	1
77	2025-01-04 03:00:00	97200	1	-8.1000	G	1
78	2025-01-04 04:00:00	97200	1	-7.7000	G	1
79	2025-01-04 05:00:00	97200	1	-7.1000	G	1
80	2025-01-04 06:00:00	97200	1	-6.7000	G	1
81	2025-01-04 07:00:00	97200	1	-6.9000	G	1
82	2025-01-04 08:00:00	97200	1	-6.4000	G	1
83	2025-01-04 09:00:00	97200	1	-6.0000	G	1

2025-01-03 03:00:00	97200	1	-6.5000	M	1
2025-01-03 03:00:00	97200	1	-6.4500	M	2

Finding duplicates

```sql
SELECT *
FROM (
    SELECT *, ROW_NUMBER() OVER (
                PARTITION BY Location_ID, Metric_ID, [Timestamp]
                ORDER BY (SELECT NULL)
            ) AS _duplicate
    FROM DW.Measurements
    WHERE Location_ID=97200
      AND Metric_ID=1
      AND [Timestamp]>='2025-01-01'
    ) AS x
WHERE _duplicate>1;
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_duplicate
41	2025-01-02 16:00:00	97200	1	-4.8000	G	1
42	2025-01-02 17:00:00	97200	1	-5.2000	G	1
43	2025-01-02 18:00:00	97200	1	-5.4000	G	1
44	2025-01-02 19:00:00	97200	1	-5.8000	G	1
45	2025-01-02 20:00:00	97200	1	-5.9000	G	1
46	2025-01-02 21:00:00	97200	1	-6.5000	G	1
47	2025-01-02 22:00:00	97200	1	-8.3000	G	1
48	2025-01-02 23:00:00	97200	1	-6.7000	G	1
49	2025-01-03 00:00:00	97200	1	-7.0000	G	1
50	2025-01-03 01:00:00	97200	1	-6.0000	G	1
51	2025-01-03 02:00:00	97200	1	-6.2000	M	1
52	2025-01-03 03:00:00	97200	1	-6.5000	M	1
53	2025-01-03 03:00:00	97200	1	-6.4500	M	2
54	2025-01-03 04:00:00	97200	1	-6.7000	M	1
55	2025-01-03 05:00:00	97200	1	-7.0000	M	1
56	2025-01-03 06:00:00	97200	1	-7.2000	G	1
57	2025-01-03 07:00:00	97200	1	-8.5000	G	1

	Timestamp	Location_ID	Metric_ID	Value	Quality	_duplicate
1	2025-01-03 03:00:00	97200	1	-6.4500	M	2
2	2025-01-22 15:00:00	97200	1	2.9500	M	2
3	2025-01-24 09:00:00	97200	1	2.6200	M	2

	Timestamp	Location_ID	Metric_ID	Value	Quality	_duplicate
63	2025-01-03 13:00:00	97200	1	-9.1000	G	1
64	2025-01-03 14:00:00	97200	1	-9.7000	G	1
65	2025-01-03 15:00:00	97200	1	-10.7000	G	1
66	2025-01-03 16:00:00	97200	1	-10.3000	G	1
67	2025-01-03 17:00:00	97200	1	-11.0000	G	1
68	2025-01-03 18:00:00	97200	1	-10.4000	G	1
69	2025-01-03 19:00:00	97200	1	-10.0000	G	1
70	2025-01-03 20:00:00	97200	1	-10.3000	G	1
71	2025-01-03 21:00:00	97200	1	-10.5000	G	1
72	2025-01-03 22:00:00	97200	1	-10.0000	G	1
73	2025-01-03 23:00:00	97200	1	-9.3000	G	1
74	2025-01-04 00:00:00	97200	1	-8.9000	G	1
75	2025-01-04 01:00:00	97200	1	-8.0000	G	1
76	2025-01-04 02:00:00	97200	1	-7.8000	G	1
77	2025-01-04 03:00:00	97200	1	-8.1000	G	1
78	2025-01-04 04:00:00	97200	1	-7.7000	G	1
79	2025-01-04 05:00:00	97200	1	-7.1000	G	1
80	2025-01-04 06:00:00	97200	1	-6.7000	G	1
81	2025-01-04 07:00:00	97200	1	-6.9000	G	1
82	2025-01-04 08:00:00	97200	1	-6.4000	G	1
83	2025-01-04 09:00:00	97200	1	-6.0000	G	1

Deleting duplicates

```sql
DELETE x
FROM (
    SELECT *, ROW_NUMBER() OVER (
                PARTITION BY Location_ID, Metric_ID, [Timestamp]
                ORDER BY (SELECT NULL)
            ) AS _duplicate
    FROM DW.Measurements
    WHERE Location_ID=97200
      AND Metric_ID=1
      AND [Timestamp]>='2025-01-01'
    ) AS x
WHERE _duplicate>1;
```

	Timestamp	Location_ID	Metric_ID	Value	Quality	_duplicate
41	2025-01-02 16:00:00	97200	1	-4.8000	G	1
42	2025-01-02 17:00:00	97200	1	-5.2000	G	1
43	2025-01-02 18:00:00	97200	1	-5.4000	G	1
44	2025-01-02 19:00:00	97200	1	-5.8000	G	1
45	2025-01-02 20:00:00	97200	1	-5.9000	G	1
46	2025-01-02 21:00:00	97200	1	-6.5000	G	1
47	2025-01-02 22:00:00	97200	1	-8.3000	G	1
48	2025-01-02 23:00:00	97200	1	-6.7000	G	1
49	2025-01-03 00:00:00	97200	1	-7.0000	G	1
50	2025-01-03 01:00:00	97200	1	-6.0000	G	1
51	2025-01-03 02:00:00	97200	1	-6.2000	M	1
52	2025-01-03 03:00:00	97200	1	-6.5000	M	1
53	2025-01-03 03:00:00	97200	1	-6.4500	M	2
54	2025-01-03 04:00:00	97200	1	-6.7000	M	1
55	2025-01-03 05:00:00	97200	1	-7.0000	M	1
56	2025-01-03 06:00:00	97200	1	-7.2000	G	1
57	2025-01-03 07:00:00	97200	1	-8.5000	G	1

	Timestamp	Location_ID	Metric_ID	Value	Quality	_duplicate
1	~~2025-01-03 03:00:00~~	~~97200~~	~~1~~	~~-6.4500~~	~~M~~	~~2~~
2	~~2025-01-22 15:00:00~~	~~97200~~	~~1~~	~~2.9500~~	~~M~~	~~2~~
3	~~2025-01-24 09:00:00~~	~~97200~~	~~1~~	~~2.6200~~	~~M~~	~~2~~

63	2025-01-03 13:00:00	97200	1	-9.1000	G	1
64	2025-01-03 14:00:00	97200	1	-9.7000	G	1
65	2025-01-03 15:00:00	97200	1	-10.7000	G	1
66	2025-01-03 16:00:00	97200	1	-10.3000	G	1
67	2025-01-03 17:00:00	97200	1	-11.0000	G	1
68	2025-01-03 18:00:00	97200	1	-10.4000	G	1
69	2025-01-03 19:00:00	97200	1	-10.0000	G	1
70	2025-01-03 20:00:00	97200	1	-10.3000	G	1
71	2025-01-03 21:00:00	97200	1	-10.5000	G	1
72	2025-01-03 22:00:00	97200	1	-10.0000	G	1
73	2025-01-03 23:00:00	97200	1	-9.3000	G	1
74	2025-01-04 00:00:00	97200	1	-8.9000	G	1
75	2025-01-04 01:00:00	97200	1	-8.0000	G	1
76	2025-01-04 02:00:00	97200	1	-7.8000	G	1
77	2025-01-04 03:00:00	97200	1	-8.1000	G	1
78	2025-01-04 04:00:00	97200	1	-7.7000	G	1
79	2025-01-04 05:00:00	97200	1	-7.1000	G	1
80	2025-01-04 06:00:00	97200	1	-6.7000	G	1
81	2025-01-04 07:00:00	97200	1	-6.9000	G	1
82	2025-01-04 08:00:00	97200	1	-6.4000	G	1
83	2025-01-04 09:00:00	97200	1	-6.0000	G	1

Finding overlaps in series

```
SELECT *
FROM DW.Location_Timeframes;
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	Location_ID	From	To	Altitude	Lat	Long
1	140480	1962-01-01 00:00:00	1963-01-01 00:00:00	7.00	63.794700	20.291800
2	140480	1963-01-01 00:00:00	1964-01-01 00:00:00	7.00	63.794700	20.291800
3	140480	1964-01-01 00:00:00	1965-01-01 00:00:00	7.00	63.794700	20.291800
4	140480	1965-01-01 00:00:00	1966-01-01 00:00:00	7.00	63.794700	20.291800
5	140480	1966-01-01 00:00:00	1967-01-01 00:00:00	7.00	63.794700	20.291800
6	140480	1967-01-01 00:00:00	1968-01-01 00:00:00	7.00	63.794700	20.291800
7	140480	1968-01-01 00:00:00	1969-01-01 00:00:00	7.00	63.794700	20.291800
8	140480	1969-01-01 00:00:00	1970-01-01 00:00:00	7.00	63.794700	20.291800
9	140480	1970-01-01 00:00:00	1971-01-01 00:00:00	7.00	63.794700	20.291800
10	140480	1971-01-01 00:00:00	1972-01-01 00:00:00	7.00	63.794700	20.291800
11	140480	1972-01-01 00:00:00	1973-01-01 00:00:00	7.00	63.794700	20.291800
12	140480	1973-01-01 00:00:00	1974-01-01 00:00:00	7.00	63.794700	20.291800
13	140480	1974-01-01 00:00:00	1975-01-01 00:00:00	7.00	63.794700	20.291800
14	140480	1975-01-01 00:00:00	1976-01-01 00:00:00	7.00	63.794700	20.291800
15	140480	1976-01-01 00:00:00	1977-01-01 00:00:00	7.00	63.794700	20.291800
16	140480	1977-01-01 00:00:00	1978-01-01 00:00:00	7.00	63.794700	20.291800
17	140480	1978-01-01 00:00:00	1979-01-01 00:00:00	7.00	63.794700	20.291800
18	140480	1979-01-01 00:00:00	1980-01-01 00:00:00	7.00	63.794700	20.291800
19	140480	1980-01-01 00:00:00	1981-01-01 00:00:00	7.00	63.794700	20.291800
20	140480	1981-01-01 00:00:00	1981-07-07 00:00:00	7.00	63.794700	20.291800
21	140480	1981-07-01 00:00:00	1982-01-01 00:00:00	7.31	63.793100	20.280000
22	140480	1982-01-01 00:00:00	1983-01-01 00:00:00	7.31	63.793100	20.280000
23	140480	1983-01-01 00:00:00	1984-01-01 00:00:00	7.31	63.793100	20.280000
24	140480	1984-01-01 00:00:00	1985-01-01 00:00:00	7.31	63.793100	20.280000
25	140480	1985-01-01 00:00:00	1986-01-01 00:00:00	7.31	63.793100	20.280000
26	140480	1986-01-01 00:00:00	1987-01-01 00:00:00	7.31	63.793100	20.280000
27	140480	1987-01-01 00:00:00	1988-01-01 00:00:00	7.31	63.793100	20.280000
28	140480	1988-01-01 00:00:00	1989-01-01 00:00:00	7.31	63.793100	20.280000
29	140480	1989-01-01 00:00:00	1990-01-01 00:00:00	7.31	63.793100	20.280000
30	140480	1990-01-01 00:00:00	1991-01-01 00:00:00	7.31	63.793100	20.280000
31	140480	1991-01-01 00:00:00	1992-01-01 00:00:00	7.31	63.793100	20.280000
32	140480	1992-01-01 00:00:00	1993-01-01 00:00:00	7.31	63.793100	20.280000
33	140480	1993-01-01 00:00:00	1994-01-01 00:00:00	7.31	63.793100	20.280000
34	140480	1994-01-01 00:00:00	1995-01-01 00:00:00	7.31	63.793100	20.280000
35	140480	1995-01-01 00:00:00	1996-01-01 00:00:00	7.31	63.793100	20.280000
36	140480	1996-01-01 00:00:00	1997-01-01 00:00:00	7.31	63.793100	20.280000
37	140480	1997-01-01 00:00:00	1998-01-01 00:00:00	7.31	63.793100	20.280000
38	140480	1998-01-01 00:00:00	1999-01-01 00:00:00	7.31	63.793100	20.280000
39	140480	1999-01-01 00:00:00	2000-01-01 00:00:00	7.31	63.793100	20.280000
40	140480	2000-01-01 00:00:00	2001-01-01 00:00:00	7.31	63.793100	20.280000
41	140480	2001-01-01 00:00:00	2002-01-01 00:00:00	7.31	63.793100	20.280000
42	140480	2002-01-01 00:00:00	2003-01-01 00:00:00	7.31	63.793100	20.280000
43	140480	2003-01-01 00:00:00	2004-01-01 00:00:00	7.31	63.793100	20.280000
44	140480	2004-01-01 00:00:00	2005-01-01 00:00:00	7.31	63.793100	20.280000

Finding overlaps in series

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SELECT *, LAG([To], 1) OVER (
        PARTITION BY Location_ID
        ORDER BY [From]
    ) AS _prev_to
FROM DW.Location_Timeframes
) AS x;
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	Location_ID	From	To	Altitude	Lat	Long	_prev_to
1	140480	1962-01-01 00:00:00	1963-01-01 00:00:00	7.00	63.794700	20.291800	NULL
2	140480	1963-01-01 00:00:00	1964-01-01 00:00:00	7.00	63.794700	20.291800	1963-01-01 00:00:00
3	140480	1964-01-01 00:00:00	1965-01-01 00:00:00	7.00	63.794700	20.291800	1964-01-01 00:00:00
4	140480	1965-01-01 00:00:00	1966-01-01 00:00:00	7.00	63.794700	20.291800	1965-01-01 00:00:00
5	140480	1966-01-01 00:00:00	1967-01-01 00:00:00	7.00	63.794700	20.291800	1966-01-01 00:00:00
6	140480	1967-01-01 00:00:00	1968-01-01 00:00:00	7.00	63.794700	20.291800	1967-01-01 00:00:00
7	140480	1968-01-01 00:00:00	1969-01-01 00:00:00	7.00	63.794700	20.291800	1968-01-01 00:00:00
8	140480	1969-01-01 00:00:00	1970-01-01 00:00:00	7.00	63.794700	20.291800	1969-01-01 00:00:00
9	140480	1970-01-01 00:00:00	1971-01-01 00:00:00	7.00	63.794700	20.291800	1970-01-01 00:00:00
10	140480	1971-01-01 00:00:00	1972-01-01 00:00:00	7.00	63.794700	20.291800	1971-01-01 00:00:00
11	140480	1972-01-01 00:00:00	1973-01-01 00:00:00	7.00	63.794700	20.291800	1972-01-01 00:00:00
12	140480	1973-01-01 00:00:00	1974-01-01 00:00:00	7.00	63.794700	20.291800	1973-01-01 00:00:00
13	140480	1974-01-01 00:00:00	1975-01-01 00:00:00	7.00	63.794700	20.291800	1974-01-01 00:00:00
14	140480	1975-01-01 00:00:00	1976-01-01 00:00:00	7.00	63.794700	20.291800	1975-01-01 00:00:00
15	140480	1976-01-01 00:00:00	1977-01-01 00:00:00	7.00	63.794700	20.291800	1976-01-01 00:00:00
16	140480	1977-01-01 00:00:00	1978-01-01 00:00:00	7.00	63.794700	20.291800	1977-01-01 00:00:00
17	140480	1978-01-01 00:00:00	1979-01-01 00:00:00	7.00	63.794700	20.291800	1978-01-01 00:00:00
18	140480	1979-01-01 00:00:00	1980-01-01 00:00:00	7.00	63.794700	20.291800	1979-01-01 00:00:00
19	140480	1980-01-01 00:00:00	1981-01-01 00:00:00	7.00	63.794700	20.291800	1980-01-01 00:00:00
20	140480	1981-01-01 00:00:00	1981-07-07 00:00:00	7.00	63.794700	20.291800	1981-01-01 00:00:00
21	140480	1981-07-01 00:00:00	1982-01-01 00:00:00	7.31	63.793100	20.280000	1981-07-07 00:00:00
22	140480	1982-01-01 00:00:00	1983-01-01 00:00:00	7.31	63.793100	20.280000	1982-01-01 00:00:00
23	140480	1983-01-01 00:00:00	1984-01-01 00:00:00	7.31	63.793100	20.280000	1983-01-01 00:00:00
24	140480	1984-01-01 00:00:00	1985-01-01 00:00:00	7.31	63.793100	20.280000	1984-01-01 00:00:00
25	140480	1985-01-01 00:00:00	1986-01-01 00:00:00	7.31	63.793100	20.280000	1985-01-01 00:00:00
26	140480	1986-01-01 00:00:00	1987-01-01 00:00:00	7.31	63.793100	20.280000	1986-01-01 00:00:00
27	140480	1987-01-01 00:00:00	1988-01-01 00:00:00	7.31	63.793100	20.280000	1987-01-01 00:00:00
28	140480	1988-01-01 00:00:00	1989-01-01 00:00:00	7.31	63.793100	20.280000	1988-01-01 00:00:00
29	140480	1989-01-01 00:00:00	1990-01-01 00:00:00	7.31	63.793100	20.280000	1989-01-01 00:00:00
30	140480	1990-01-01 00:00:00	1991-01-01 00:00:00	7.31	63.793100	20.280000	1990-01-01 00:00:00
31	140480	1991-01-01 00:00:00	1992-01-01 00:00:00	7.31	63.793100	20.280000	1991-01-01 00:00:00
32	140480	1992-01-01 00:00:00	1993-01-01 00:00:00	7.31	63.793100	20.280000	1992-01-01 00:00:00
33	140480	1993-01-01 00:00:00	1994-01-01 00:00:00	7.31	63.793100	20.280000	1993-01-01 00:00:00
34	140480	1994-01-01 00:00:00	1995-01-01 00:00:00	7.31	63.793100	20.280000	1994-01-01 00:00:00
35	140480	1995-01-01 00:00:00	1996-01-01 00:00:00	7.31	63.793100	20.280000	1995-01-01 00:00:00
36	140480	1996-01-01 00:00:00	1997-01-01 00:00:00	7.31	63.793100	20.280000	1996-01-01 00:00:00
37	140480	1997-01-01 00:00:00	1998-01-01 00:00:00	7.31	63.793100	20.280000	1997-01-01 00:00:00
38	140480	1998-01-01 00:00:00	1999-01-01 00:00:00	7.31	63.793100	20.280000	1998-01-01 00:00:00
39	140480	1999-01-01 00:00:00	2000-01-01 00:00:00	7.31	63.793100	20.280000	1999-01-01 00:00:00
40	140480	2000-01-01 00:00:00	2001-01-01 00:00:00	7.31	63.793100	20.280000	2000-01-01 00:00:00
41	140480	2001-01-01 00:00:00	2002-01-01 00:00:00	7.31	63.793100	20.280000	2001-01-01 00:00:00
42	140480	2002-01-01 00:00:00	2003-01-01 00:00:00	7.31	63.793100	20.280000	2002-01-01 00:00:00
43	140480	2003-01-01 00:00:00	2004-01-01 00:00:00	7.31	63.793100	20.280000	2003-01-01 00:00:00
44	140480	2004-01-01 00:00:00	2005-01-01 00:00:00	7.31	63.793100	20.280000	2004-01-01 00:00:00

Finding overlaps in series

```
SELECT *
FROM (
    SELECT *, LAG([To], 1) OVER (
            PARTITION BY Location_ID
            ORDER BY [From]
        ) AS _prev_to
    FROM DW.Location_Timeframes
    ) AS x
WHERE _prev_to>[From];
```

	Location_ID	From	To	Altitude	Lat	Long	_prev_to
1	140480	1962-01-01 00:00:00	1963-01-01 00:00:00	7.00	63.794700	20.291800	NULL
2	140480	1963-01-01 00:00:00	1964-01-01 00:00:00	7.00	63.794700	20.291800	1963-01-01 00:00:00
3	140480	1964-01-01 00:00:00	1965-01-01 00:00:00	7.00	63.794700	20.291800	1964-01-01 00:00:00
4	140480	1965-01-01 00:00:00	1966-01-01 00:00:00	7.00	63.794700	20.291800	1965-01-01 00:00:00
5	140480	1966-01-01 00:00:00	1967-01-01 00:00:00	7.00	63.794700	20.291800	1966-01-01 00:00:00
6	140480	1967-01-01 00:00:00	1968-01-01 00:00:00	7.00	63.794700	20.291800	1967-01-01 00:00:00
7	140480	1968-01-01 00:00:00	1969-01-01 00:00:00	7.00	63.794700	20.291800	1968-01-01 00:00:00
8	140480	1969-01-01 00:00:00	1970-01-01 00:00:00	7.00	63.794700	20.291800	1969-01-01 00:00:00
9	140480	1970-01-01 00:00:00	1971-01-01 00:00:00	7.00	63.794700	20.291800	1970-01-01 00:00:00
10	140480	1971-01-01 00:00:00	1972-01-01 00:00:00	7.00	63.794700	20.291800	1971-01-01 00:00:00
11	140480	1972-01-01 00:00:00	1973-01-01 00:00:00	7.00	63.794700	20.291800	1972-01-01 00:00:00
12	140480	1973-01-01 00:00:00	1974-01-01 00:00:00	7.00	63.794700	20.291800	1973-01-01 00:00:00
13	140480	1974-01-01 00:00:00	1975-01-01 00:00:00	7.00	63.794700	20.291800	1974-01-01 00:00:00
14	140480	1975-01-01 00:00:00	1976-01-01 00:00:00	7.00	63.794700	20.291800	1975-01-01 00:00:00
15	140480	1976-01-01 00:00:00	1977-01-01 00:00:00	7.00	63.794700	20.291800	1976-01-01 00:00:00
16	140480	1977-01-01 00:00:00	1978-01-01 00:00:00	7.00	63.794700	20.291800	1977-01-01 00:00:00
17	140480	1978-01-01 00:00:00	1979-01-01 00:00:00	7.00	63.794700	20.291800	1978-01-01 00:00:00
18	140480	1979-01-01 00:00:00	1980-01-01 00:00:00	7.00	63.794700	20.291800	1979-01-01 00:00:00
19	140480	1980-01-01 00:00:00	1981-01-01 00:00:00	7.00	63.794700	20.291800	1980-01-01 00:00:00
20	140480	1981-01-01 00:00:00	1981-07-07 00:00:00	7.00	63.794700	20.291800	1981-01-01 00:00:00
21	140480	1981-07-01 00:00:00	1982-01-01 00:00:00	7.31	63.793100	20.280000	1981-07-07 00:00:00
22	140480	1982-01-01 00:00:00	1983-01-01 00:00:00	7.31	63.793100	20.280000	1982-01-01 00:00:00
23	140480	1983-01-01 00:00:00	1984-01-01 00:00:00	7.31	63.793100	20.280000	1983-01-01 00:00:00
24	140480	1984-01-01 00:00:00	1985-01-01 00:00:00	7.31	63.793100	20.280000	1984-01-01 00:00:00
25	140480	1985-01-01 00:00:00	1986-01-01 00:00:00	7.31	63.793100	20.280000	1985-01-01 00:00:00
26	140480	1986-01-01 00:00:00	1987-01-01 00:00:00	7.31	63.793100	20.280000	1986-01-01 00:00:00
27	140480	1987-01-01 00:00:00	1988-01-01 00:00:00	7.31	63.793100	20.280000	1987-01-01 00:00:00
28	140480	1988-01-01 00:00:00	1989-01-01 00:00:00	7.31	63.793100	20.280000	1988-01-01 00:00:00
29	140480	1989-01-01 00:00:00	1990-01-01 00:00:00	7.31	63.793100	20.280000	1989-01-01 00:00:00
30	140480	1990-01-01 00:00:00	1991-01-01 00:00:00	7.31	63.793100	20.280000	1990-01-01 00:00:00
31	140480	1991-01-01 00:00:00	1992-01-01 00:00:00	7.31	63.793100	20.280000	1991-01-01 00:00:00
32	140480	1992-01-01 00:00:00	1993-01-01 00:00:00	7.31	63.793100	20.280000	1992-01-01 00:00:00
33	140480	1993-01-01 00:00:00	1994-01-01 00:00:00	7.31	63.793100	20.280000	1993-01-01 00:00:00
34	140480	1994-01-01 00:00:00	1995-01-01 00:00:00	7.31	63.793100	20.280000	1994-01-01 00:00:00
35	140480	1995-01-01 00:00:00	1996-01-01 00:00:00	7.31	63.793100	20.280000	1995-01-01 00:00:00
36	140480	1996-01-01 00:00:00	1997-01-01 00:00:00	7.31	63.793100	20.280000	1996-01-01 00:00:00
37	140480	1997-01-01 00:00:00	1998-01-01 00:00:00	7.31	63.793100	20.280000	1997-01-01 00:00:00
38	140480	1998-01-01 00:00:00	1999-01-01 00:00:00	7.31	63.793100	20.280000	1998-01-01 00:00:00
39	140480	1999-01-01 00:00:00	2000-01-01 00:00:00	7.31	63.793100	20.280000	1999-01-01 00:00:00
40	140480	2000-01-01 00:00:00	2001-01-01 00:00:00	7.31	63.793100	20.280000	2000-01-01 00:00:00
41	140480	2001-01-01 00:00:00	2002-01-01 00:00:00	7.31	63.793100	20.280000	2001-01-01 00:00:00
42	140480	2002-01-01 00:00:00	2003-01-01 00:00:00	7.31	63.793100	20.280000	2002-01-01 00:00:00
43	140480	2003-01-01 00:00:00	2004-01-01 00:00:00	7.31	63.793100	20.280000	2003-01-01 00:00:00
44	140480	2004-01-01 00:00:00	2005-01-01 00:00:00	7.31	63.793100	20.280000	2004-01-01 00:00:00

Fixing overlaps in series

```
UPDATE x
SET x.[From]=x._prev_to
FROM (
    SELECT *, LAG([To], 1) OVER (
            PARTITION BY Location_ID
            ORDER BY [From]
        ) AS _prev_to
    FROM DW.Location_Timeframes
    ) AS x
WHERE _prev_to>[From];
```

	Location_ID	From	To	Altitude	Lat	Long	_prev_to
1	140480	1962-01-01 00:00:00	1963-01-01 00:00:00	7.00	63.794700	20.291800	NULL
2	140480	1963-01-01 00:00:00	1964-01-01 00:00:00	7.00	63.794700	20.291800	1963-01-01 00:00:00
3	140480	1964-01-01 00:00:00	1965-01-01 00:00:00	7.00	63.794700	20.291800	1964-01-01 00:00:00
4	140480	1965-01-01 00:00:00	1966-01-01 00:00:00	7.00	63.794700	20.291800	1965-01-01 00:00:00
5	140480	1966-01-01 00:00:00	1967-01-01 00:00:00	7.00	63.794700	20.291800	1966-01-01 00:00:00
6	140480	1967-01-01 00:00:00	1968-01-01 00:00:00	7.00	63.794700	20.291800	1967-01-01 00:00:00
7	140480	1968-01-01 00:00:00	1969-01-01 00:00:00	7.00	63.794700	20.291800	1968-01-01 00:00:00
8	140480	1969-01-01 00:00:00	1970-01-01 00:00:00	7.00	63.794700	20.291800	1969-01-01 00:00:00
9	140480	1970-01-01 00:00:00	1971-01-01 00:00:00	7.00	63.794700	20.291800	1970-01-01 00:00:00
10	140480	1971-01-01 00:00:00	1972-01-01 00:00:00	7.00	63.794700	20.291800	1971-01-01 00:00:00
11	140480	1972-01-01 00:00:00	1973-01-01 00:00:00	7.00	63.794700	20.291800	1972-01-01 00:00:00
12	140480	1973-01-01 00:00:00	1974-01-01 00:00:00	7.00	63.794700	20.291800	1973-01-01 00:00:00
13	140480	1974-01-01 00:00:00	1975-01-01 00:00:00	7.00	63.794700	20.291800	1974-01-01 00:00:00
14	140480	1975-01-01 00:00:00	1976-01-01 00:00:00	7.00	63.794700	20.291800	1975-01-01 00:00:00
15	140480	1976-01-01 00:00:00	1977-01-01 00:00:00	7.00	63.794700	20.291800	1976-01-01 00:00:00
16	140480	1977-01-01 00:00:00	1978-01-01 00:00:00	7.00	63.794700	20.291800	1977-01-01 00:00:00
17	140480	1978-01-01 00:00:00	1979-01-01 00:00:00	7.00	63.794700	20.291800	1978-01-01 00:00:00
18	140480	1979-01-01 00:00:00	1980-01-01 00:00:00	7.00	63.794700	20.291800	1979-01-01 00:00:00
19	140480	1980-01-01 00:00:00	1981-01-01 00:00:00	7.00	63.794700	20.291800	1980-01-01 00:00:00
20	140480	1981-01-01 00:00:00	1981-07-07 00:00:00	7.00	63.794700	20.291800	1981-01-01 00:00:00
21	140480	1981-07-01 00:00:00	1982-01-01 00:00:00	7.31	63.793100	20.280000	1981-07-07 00:00:00
22	140480	1982-01-01 00:00	1983-01-01 00:00:00	7.31	63.793100	20.280000	2-01-01 00:00:00
23	140480	1983-01-01 00:00	1984-01-01 00:00:00	7.31	63.793100	20.280	1983-01-01 00:00:00
24	140480	1984-01-01 00:00:00	1-01-01 00:00:00	7.31	63.793100	20	1984-01-01 00:00:00
25	140480	1985-01-01 00:00:00	1986- 00:00:00	7.31	63.793	280000	1985-01-01 00:00:00
26	140480	1986-01-01 00:00:00	1987-01-01			280000	1986-01-01 00:00:00
27	140480	1987-01-01 00:00:00	1988-01-01 00:00:00	7.31	63.793100	20.280000	1987-01-01 00:00:00
28	140480	1988-01-01 00:00:00	1989-01-01 00:00:00	7.31	63.793100	20.280000	1988-01-01 00:00:00
29	140480	1989-01-01 00:00:00	1990-01-01 00:00:00	7.31	63.793100	20.280000	1989-01-01 00:00:00
30	140480	1990-01-01 00:00:00	1991-01-01 00:00:00	7.31	63.793100	20.280000	1990-01-01 00:00:00
31	140480	1991-01-01 00:00:00	1992-01-01 00:00:00	7.31	63.793100	20.280000	1991-01-01 00:00:00
32	140480	1992-01-01 00:00:00	1993-01-01 00:00:00	7.31	63.793100	20.280000	1992-01-01 00:00:00
33	140480	1993-01-01 00:00:00	1994-01-01 00:00:00	7.31	63.793100	20.280000	1993-01-01 00:00:00
34	140480	1994-01-01 00:00:00	1995-01-01 00:00:00	7.31	63.793100	20.280000	1994-01-01 00:00:00
35	140480	1995-01-01 00:00:00	1996-01-01 00:00:00	7.31	63.793100	20.280000	1995-01-01 00:00:00
36	140480	1996-01-01 00:00:00	1997-01-01 00:00:00	7.31	63.793100	20.280000	1996-01-01 00:00:00
37	140480	1997-01-01 00:00:00	1998-01-01 00:00:00	7.31	63.793100	20.280000	1997-01-01 00:00:00
38	140480	1998-01-01 00:00:00	1999-01-01 00:00:00	7.31	63.793100	20.280000	1998-01-01 00:00:00
39	140480	1999-01-01 00:00:00	2000-01-01 00:00:00	7.31	63.793100	20.280000	1999-01-01 00:00:00
40	140480	2000-01-01 00:00:00	2001-01-01 00:00:00	7.31	63.793100	20.280000	2000-01-01 00:00:00
41	140480	2001-01-01 00:00:00	2002-01-01 00:00:00	7.31	63.793100	20.280000	2001-01-01 00:00:00
42	140480	2002-01-01 00:00:00	2003-01-01 00:00:00	7.31	63.793100	20.280000	2002-01-01 00:00:00
43	140480	2003-01-01 00:00:00	2004-01-01 00:00:00	7.31	63.793100	20.280000	2003-01-01 00:00:00
44	140480	2004-01-01 00:00:00	2005-01-01 00:00:00	7.31	63.793100	20.280000	2004-01-01 00:00:00

Finding gaps in series

```
SELECT *
FROM DW.Location_Timeframes;
```

	Location_ID	From	To	Altitude	Lat	Long
1	53300	1972-12-01 00:00:00	1973-01-01 00:00:00	72.00	55.539000	13.366500
2	53300	1973-01-01 00:00:00	1974-01-01 00:00:00	72.00	55.539000	13.366500
3	53300	1974-01-01 00:00:00	1975-01-01 00:00:00	72.00	55.539000	13.366500
4	53300	1975-01-01 00:00:00	1976-01-01 00:00:00	72.00	55.539000	13.366500
5	53300	1976-01-01 00:00:00	1977-01-01 00:00:00	72.00	55.539000	13.366500
6	53300	1977-01-01 00:00:00	1978-01-01 00:00:00	72.00	55.539000	13.366500
7	53300	1978-01-01 00:00:00	1979-01-01 00:00:00	72.00	55.539000	13.366500
8	53300	1979-01-01 00:00:00	1980-01-01 00:00:00	72.00	55.539000	13.366500
9	53300	1980-01-01 00:00:00	1981-01-01 00:00:00	72.00	55.539000	13.366500
10	53300	1981-01-01 00:00:00	1982-01-01 00:00:00	72.00	55.539000	13.366500
11	53300	1982-01-01 00:00:00	1983-01-01 00:00:00	72.00	55.539000	13.366500
12	53300	1983-01-01 00:00:00	1984-01-01 00:00:00	72.00	55.539000	13.366500
13	53300	1984-01-01 00:00:00	1985-01-01 00:00:00	72.00	55.539000	13.366500
14	53300	1985-01-01 00:00:00	1986-01-01 00:00:00	72.00	55.539000	13.366500
15	53300	1986-01-01 00:00:00	1987-01-01 00:00:00	72.00	55.539000	13.366500
16	53300	1987-01-01 00:00:00	1988-01-01 00:00:00	72.00	55.539000	13.366500
17	53300	1988-01-01 00:00:00	1989-01-01 00:00:00	72.00	55.539000	13.366500
18	53300	1989-01-01 00:00:00	1990-01-01 00:00:00	72.00	55.539000	13.366500
19	53300	1990-01-01 00:00:00	1991-01-01 00:00:00	72.00	55.539000	13.366500
20	53300	1991-01-01 00:00:00	1992-01-01 00:00:00	72.00	55.539000	13.366500
21	53300	1992-01-01 00:00:00	1993-01-01 00:00:00	72.00	55.539000	13.366500
22	53300	1993-01-01 00:00:00	1994-01-01 00:00:00	72.00	55.539000	13.366500
23	53300	1994-01-01 00:00:00	1995-01-01 00:00:00	72.00	55.539000	13.366500
24	53300	1995-01-01 00:00:00	1996-01-01 00:00:00	72.00	55.539000	13.366500
25	53300	1996-01-01 00:00:00	1997-01-01 00:00:00	72.00	55.539000	13.366500
26	53300	1997-01-01 00:00:00	1997-11-01 00:00:00	72.00	55.539000	13.366500
27	53300	2008-01-01 00:00:00	2009-01-01 00:00:00	72.00	55.523100	13.378700
28	53300	2009-01-01 00:00:00	2010-01-01 00:00:00	72.00	55.523100	13.378700
29	53300	2010-01-01 00:00:00	2011-01-01 00:00:00	72.00	55.523100	13.378700
30	53300	2011-01-01 00:00:00	2012-01-01 00:00:00	72.00	55.523100	13.378700
31	53300	2012-01-01 00:00:00	2013-01-01 00:00:00	72.00	55.523100	13.378700
32	53300	2013-01-01 00:00:00	2014-01-01 00:00:00	72.00	55.523100	13.378700
33	53300	2014-01-01 00:00:00	2015-01-01 00:00:00	72.00	55.523100	13.378700
34	53300	2015-01-01 00:00:00	2016-01-01 00:00:00	72.00	55.523100	13.378700
35	53300	2016-01-01 00:00:00	2017-01-01 00:00:00	72.00	55.523100	13.378700
36	53300	2017-01-01 00:00:00	2018-01-01 00:00:00	72.00	55.523100	13.378700
37	53300	2018-01-01 00:00:00	2019-01-01 00:00:00	72.00	55.523100	13.378700
38	53300	2019-01-01 00:00:00	2020-01-01 00:00:00	72.00	55.523100	13.378700
39	53300	2020-01-01 00:00:00	2021-01-01 00:00:00	72.00	55.523100	13.378700
40	53300	2021-01-01 00:00:00	2022-01-01 00:00:00	72.00	55.523100	13.378700
41	53300	2022-01-01 00:00:00	2023-01-01 00:00:00	72.00	55.523100	13.378700
42	53300	2023-01-01 00:00:00	2024-01-01 00:00:00	72.00	55.523100	13.378700
43	53300	2024-01-01 00:00:00	2025-01-01 00:00:00	72.00	55.523100	13.378700
44	53300	2025-01-01 00:00:00	2025-05-01 00:00:00	72.00	55.523100	13.378700

Finding gaps in series

```
SELECT *, (CASE
    WHEN LAG([To], 1) OVER (
        PARTITION BY Location_ID
        ORDER BY [From]
    )<[From] THEN 1 ELSE 0 END) AS _has_gap
FROM DW.Location_Timeframes;
```

	Location_ID	From	To	Altitude	Lat	Long	_has_gap
1	53300	1972-12-01 00:00:00	1973-01-01 00:00:00	72.00	55.539000	13.366500	0
2	53300	1973-01-01 00:00:00	1974-01-01 00:00:00	72.00	55.539000	13.366500	0
3	53300	1974-01-01 00:00:00	1975-01-01 00:00:00	72.00	55.539000	13.366500	0
4	53300	1975-01-01 00:00:00	1976-01-01 00:00:00	72.00	55.539000	13.366500	0
5	53300	1976-01-01 00:00:00	1977-01-01 00:00:00	72.00	55.539000	13.366500	0
6	53300	1977-01-01 00:00:00	1978-01-01 00:00:00	72.00	55.539000	13.366500	0
7	53300	1978-01-01 00:00:00	1979-01-01 00:00:00	72.00	55.539000	13.366500	0
8	53300	1979-01-01 00:00:00	1980-01-01 00:00:00	72.00	55.539000	13.366500	0
9	53300	1980-01-01 00:00:00	1981-01-01 00:00:00	72.00	55.539000	13.366500	0
10	53300	1981-01-01 00:00:00	1982-01-01 00:00:00	72.00	55.539000	13.366500	0
11	53300	1982-01-01 00:00:00	1983-01-01 00:00:00	72.00	55.539000	13.366500	0
12	53300	1983-01-01 00:00:00	1984-01-01 00:00:00	72.00	55.539000	13.366500	0
13	53300	1984-01-01 00:00:00	1985-01-01 00:00:00	72.00	55.539000	13.366500	0
14	53300	1985-01-01 00:00:00	1986-01-01 00:00:00	72.00	55.539000	13.366500	0
15	53300	1986-01-01 00:00:00	1987-01-01 00:00:00	72.00	55.539000	13.366500	0
16	53300	1987-01-01 00:00:00	1988-01-01 00:00:00	72.00	55.539000	13.366500	0
17	53300	1988-01-01 00:00:00	1989-01-01 00:00:00	72.00	55.539000	13.366500	0
18	53300	1989-01-01 00:00:00	1990-01-01 00:00:00	72.00	55.539000	13.366500	0
19	53300	1990-01-01 00:00:00	1991-01-01 00:00:00	72.00	55.539000	13.366500	0
20	53300	1991-01-01 00:00:00	1992-01-01 00:00:00	72.00	55.539000	13.366500	0
21	53300	1992-01-01 00:00:00	1993-01-01 00:00:00	72.00	55.539000	13.366500	0
22	53300	1993-01-01 00:00:00	1994-01-01 00:00:00	72.00	55.539000	13.366500	0
23	53300	1994-01-01 00:00:00	1995-01-01 00:00:00	72.00	55.539000	13.366500	0
24	53300	1995-01-01 00:00:00	1996-01-01 00:00:00	72.00	55.539000	13.366500	0
25	53300	1996-01-01 00:00:00	1997-01-01 00:00:00	72.00	55.539000	13.366500	0
26	53300	1997-01-01 00:00:00	1997-11-01 00:00:00	72.00	55.539000	13.366500	0
27	53300	2008-01-01 00:00:00	2009-01-01 00:00:00	72.00	55.523100	13.378700	1
28	53300	2009-01-01 00:00:00	2010-01-01 00:00:00	72.00	55.523100	13.378700	0
29	53300	2010-01-01 00:00:00	2011-01-01 00:00:00	72.00	55.523100	13.378700	0
30	53300	2011-01-01 00:00:00	2012-01-01 00:00:00	72.00	55.523100	13.378700	0
31	53300	2012-01-01 00:00:00	2013-01-01 00:00:00	72.00	55.523100	13.378700	0
32	53300	2013-01-01 00:00:00	2014-01-01 00:00:00	72.00	55.523100	13.378700	0
33	53300	2014-01-01 00:00:00	2015-01-01 00:00:00	72.00	55.523100	13.378700	0
34	53300	2015-01-01 00:00:00	2016-01-01 00:00:00	72.00	55.523100	13.378700	0
35	53300	2016-01-01 00:00:00	2017-01-01 00:00:00	72.00	55.523100	13.378700	0
36	53300	2017-01-01 00:00:00	2018-01-01 00:00:00	72.00	55.523100	13.378700	0
37	53300	2018-01-01 00:00:00	2019-01-01 00:00:00	72.00	55.523100	13.378700	0
38	53300	2019-01-01 00:00:00	2020-01-01 00:00:00	72.00	55.523100	13.378700	0
39	53300	2020-01-01 00:00:00	2021-01-01 00:00:00	72.00	55.523100	13.378700	0
40	53300	2021-01-01 00:00:00	2022-01-01 00:00:00	72.00	55.523100	13.378700	0
41	53300	2022-01-01 00:00:00	2023-01-01 00:00:00	72.00	55.523100	13.378700	0
42	53300	2023-01-01 00:00:00	2024-01-01 00:00:00	72.00	55.523100	13.378700	0
43	53300	2024-01-01 00:00:00	2025-01-01 00:00:00	72.00	55.523100	13.378700	0
44	53300	2025-01-01 00:00:00	2025-05-01 00:00:00	72.00	55.523100	13.378700	0

Gaps → islands

```sql
SELECT *, SUM(_has_gap) OVER (
        PARTITION BY Location_ID
        ORDER BY [From]
        ROWS UNBOUNDED PRECEDING
    ) AS _group_no
FROM (
    SELECT *, (CASE
        WHEN LAG([To], 1) OVER (
            PARTITION BY Location_ID
            ORDER BY [From]
        )<[From] THEN 1 ELSE 0 END) AS _has_gap
    FROM DW.Location_Timeframes
) AS x;
```

	Location_ID	From	To	Altitude	Lat	Long	_has_gap	_group_no
1	53300	1972-12-01 00:00:00	1973-01-01 00:00:00	72.00	55.539000	13.366500	0	0
2	53300	1973-01-01 00:00:00	1974-01-01 00:00:00	72.00	55.539000	13.366500	0	0
3	53300	1974-01-01 00:00:00	1975-01-01 00:00:00	72.00	55.539000	13.366500	0	0
4	53300	1975-01-01 00:00:00	1976-01-01 00:00:00	72.00	55.539000	13.366500	0	0
5	53300	1976-01-01 00:00:00	1977-01-01 00:00:00	72.00	55.539000	13.366500	0	0
6	53300	1977-01-01 00:00:00	1978-01-01 00:00:00	72.00	55.539000	13.366500	0	0
7	53300	1978-01-01 00:00:00	1979-01-01 00:00:00	72.00	55.539000	13.366500	0	0
8	53300	1979-01-01 00:00:00	1980-01-01 00:00:00	72.00	55.539000	13.366500	0	0
9	53300	1980-01-01 00:00:00	1981-01-01 00:00:00	72.00	55.539000	13.366500	0	0
10	53300	1981-01-01 00:00:00	1982-01-01 00:00:00	72.00	55.539000	13.366500	0	0
11	53300	1982-01-01 00:00:00	1983-01-01 00:00:00	72.00	55.539000	13.366500	0	0
12	53300	1983-01-01 00:00:00	1984-01-01 00:00:00	72.00	55.539000	13.366500	0	0
13	53300	1984-01-01 00:00:00	1985-01-01 00:00:00	72.00	55.539000	13.366500	0	0
14	53300	1985-01-01 00:00:00	1986-01-01 00:00:00	72.00	55.539000	13.366500	0	0
15	53300	1986-01-01 00:00:00	1987-01-01 00:00:00	72.00	55.539000	13.366500	0	0
16	53300	1987-01-01 00:00:00	1988-01-01 00:00:00	72.00	55.539000	13.366500	0	0
17	53300	1988-01-01 00:00:00	1989-01-01 00:00:00	72.00	55.539000	13.366500	0	0
18	53300	1989-01-01 00:00:00	1990-01-01 00:00:00	72.00	55.539000	13.366500	0	0
19	53300	1990-01-01 00:00:00	1991-01-01 00:00:00	72.00	55.539000	13.366500	0	0
20	53300	1991-01-01 00:00:00	1992-01-01 00:00:00	72.00	55.539000	13.366500	0	0
21	53300	1992-01-01 00:00:00	1993-01-01 00:00:00	72.00	55.539000	13.366500	0	0
22	53300	1993-01-01 00:00:00	1994-01-01 00:00:00	72.00	55.539000	13.366500	0	0
23	53300	1994-01-01 00:00:00	1995-01-01 00:00:00	72.00	55.539000	13.366500	0	0
24	53300	1995-01-01 00:00:00	1996-01-01 00:00:00	72.00	55.539000	13.366500	0	0
25	53300	1996-01-01 00:00:00	1997-01-01 00:00:00	72.00	55.539000	13.366500	0	0
26	53300	1997-01-01 00:00:00	1997-11-01 00:00:00	72.00	55.539000	13.366500	0	0
27	53300	2008-01-01 00:00:00	2009-01-01 00:00:00	72.00	55.523100	13.378700	1	1
28	53300	2009-01-01 00:00:00	2010-01-01 00:00:00	72.00	55.523100	13.378700	0	1
29	53300	2010-01-01 00:00:00	2011-01-01 00:00:00	72.00	55.523100	13.378700	0	1
30	53300	2011-01-01 00:00:00	2012-01-01 00:00:00	72.00	55.523100	13.378700	0	1
31	53300	2012-01-01 00:00:00	2013-01-01 00:00:00	72.00	55.523100	13.378700	0	1
32	53300	2013-01-01 00:00:00	2014-01-01 00:00:00	72.00	55.523100	13.378700	0	1
33	53300	2014-01-01 00:00:00	2015-01-01 00:00:00	72.00	55.523100	13.378700	0	1
34	53300	2015-01-01 00:00:00	2016-01-01 00:00:00	72.00	55.523100	13.378700	0	1
35	53300	2016-01-01 00:00:00	2017-01-01 00:00:00	72.00	55.523100	13.378700	0	1
36	53300	2017-01-01 00:00:00	2018-01-01 00:00:00	72.00	55.523100	13.378700	0	1
37	53300	2018-01-01 00:00:00	2019-01-01 00:00:00	72.00	55.523100	13.378700	0	1
38	53300	2019-01-01 00:00:00	2020-01-01 00:00:00	72.00	55.523100	13.378700	0	1
39	53300	2020-01-01 00:00:00	2021-01-01 00:00:00	72.00	55.523100	13.378700	0	1
40	53300	2021-01-01 00:00:00	2022-01-01 00:00:00	72.00	55.523100	13.378700	0	1
41	53300	2022-01-01 00:00:00	2023-01-01 00:00:00	72.00	55.523100	13.378700	0	1
42	53300	2023-01-01 00:00:00	2024-01-01 00:00:00	72.00	55.523100	13.378700	0	1
43	53300	2024-01-01 00:00:00	2025-01-01 00:00:00	72.00	55.523100	13.378700	0	1
44	53300	2025-01-01 00:00:00	2025-05-01 00:00:00	72.00	55.523100	13.378700	0	1

Gaps → islands

```sql
SELECT Location_ID, _group_no, MIN([From]), MAX([To])
FROM (
    SELECT *, SUM(_has_gap) OVER (
            PARTITION BY Location_ID
            ORDER BY [From]
            ROWS UNBOUNDED PRECEDING
        ) AS _group_no
    FROM (
        SELECT *, (CASE
            WHEN LAG([To], 1) OVER (
                PARTITION BY Location_ID
                ORDER BY [From]
            )<[From] THEN 1 ELSE 0 END) AS _has_gap
        FROM DW.Location_Timeframes
    ) AS x
) AS y
GROUP BY Location_ID, _group_no;
```

	Location_ID	From	To	Altitude	Lat	Long	_has_gap	_group_no
1	53300	1972-12-01 00:00:00	1973-01-01 00:00:00	72.00	55.539000	13.366500	0	0
2	53300	1973-01-01 00:00:00	1974-01-01 00:00:00	72.00	55.539000	13.366500	0	0
3	53300	1974-01-01 00:00:00	1975-01-01 00:00:00	72.00	55.539000	13.366500	0	0
4	53300	1975-01-01 00:00:00	1976-01-01 00:00:00	72.00	55.539000	13.366500	0	0
5	53300	1976-01-01 00:00:00	1977-01-01 00:00:00	72.00	55.539000	13.366500	0	0
6	53300	1977-01-01 00:00:00	1978-01-01 00:00:00	72.00	55.539000	13.366500	0	0
7	53300	1978-01-01 00:00:00	1979-01-01 00:00:00	72.00	55.539000	13.366500	0	0
8	53300	1979-01-01 00:00:00	1980-01-01 00:00:00	72.00	55.539000	13.366500	0	0
9	53300	1980-01-01 00:00:00	1981-01-01 00:00:00	72.00	55.539000	13.366500	0	0
10	53300	1981-01-01 00:00:00	1982-01-01 00:00:00	72.00	55.539000	13.366500	0	0
11	53300	1982-01-01 00:00:00	1983-01-01 00:00:00	72.00	55.539000	13.366500	0	0
12	53300	1983-01-01 00:00:00	1984-01-01 00:00:00	72.00	55.539000	13.366500	0	0
13	53300	1984-01-01 00:00:00	1985-01-01 00:00:00	72.00	55.539000	13.366500	0	0
14	53300	1985-01-01 00:00:00	1986-01-01 00:00:00	72.00	55.539000	13.366500	0	0
15	53300	1986-01-01 00:00:00	1987-01-01 00:00:00	72.00	55.539000	13.366500	0	0
16	53300	1987-01-01 00:00:00	1988-01-01 00:00:00	72.00	55.539000	13.366500	0	0
17								
18								
19								
20								
21								
22	53300	1993-01-01 00:00:00	1994-01-01 00:00:00	72.00	55.539000	13.366500	0	0
23	53300	1994-01-01 00:00:00	1995-01-01 00:00:00	72.00	55.539000	13.366500	0	0
24	53300	1995-01-01 00:00:00	1996-01-01 00:00:00	72.00	55.539000	13.366500	0	0
25	53300	1996-01-01 00:00:00	1997-01-01 00:00:00	72.00	55.539000	13.366500	0	0
26	53300	1997-01-01 00:00:00	1997-11-01 00:00:00	72.00	55.539000	13.366500	0	0
27	53300	2008-01-01 00:00:00	2009-01-01 00:00:00	72.00	55.523100	13.378700	1	1
28	53300	2009-01-01 00:00:00	2010-01-01 00:00:00	72.00	55.523100	13.378700	0	1
29	53300	2010-01-01 00:00:00	2011-01-01 00:00:00	72.00	55.523100	13.378700	0	1
30	53300	2011-01-01 00:00:00	2012-01-01 00:00:00	72.00	55.523100	13.378700	0	1
31	53300	2012-01-01 00:00:00	2013-01-01 00:00:00	72.00	55.523100	13.378700	0	1
32	53300	2013-01-01 00:00:00	2014-01-01 00:00:00	72.00	55.523100	13.378700	0	1
33	53300	2014-01-01 00:00:00	2015-01-01 00:00:00	72.00	55.523100	13.378700	0	1
34	53300	2015-01-01 00:00:00	2016-01-01 00:00:00	72.00	55.523100	13.378700	0	1
35	53300	2016-01-01 00:00:00	2017-01-01 00:00:00	72.00	55.523100	13.378700	0	1
36	53300	2017-01-01 00:00:00	2018-01-01 00:00:00	72.00	55.523100	13.378700	0	1
37	53300	2018-01-01 00:00:00	2019-01-01 00:00:00	72.00	55.523100	13.378700	0	1
38	53300	2019-01-01 00:00:00	2020-01-01 00:00:00	72.00	55.523100	13.378700	0	1
39	53300	2020-01-01 00:00:00	2021-01-01 00:00:00	72.00	55.523100	13.378700	0	1
40	53300	2021-01-01 00:00:00	2022-01-01 00:00:00	72.00	55.523100	13.378700	0	1
41	53300	2022-01-01 00:00:00	2023-01-01 00:00:00	72.00	55.523100	13.378700	0	1
42	53300	2023-01-01 00:00:00	2024-01-01 00:00:00	72.00	55.523100	13.378700	0	1
43	53300	2024-01-01 00:00:00	2025-01-01 00:00:00	72.00	55.523100	13.378700	0	1
44	53300	2025-01-01 00:00:00	2025-05-01 00:00:00	72.00	55.523100	13.378700	0	1

	Location_ID	_group_no	(No column name)	(No column name)
1	53300	0	1972-12-01 00:00:00	1997-11-01 00:00:00
2	53300	1	2008-01-01 00:00:00	2025-05-01 00:00:00

- Nesting window functions and/or window aggregates can be incredibly powerful, especially for data series.
- You can `UPDATE` or `DELETE` rows in a subquery or common table expression that you made using window functions.
- But there's so much more.

Even more patterns

How to index for window functions

```
COUNT(*) OVER (PARTITION BY a)
```

```
CREATE INDEX ( ? );
```

How to index for window functions

```
COUNT(*) OVER (PARTITION BY a)
```

➡ `CREATE INDEX (a);`

```
ROW_NUMBER() OVER (PARTITION BY a ORDER BY b)
```

How to index for window functions

```
COUNT(*) OVER (PARTITION BY a)                    ➡ CREATE INDEX (a);
ROW_NUMBER() OVER (PARTITION BY a ORDER BY b)     ➡ CREATE INDEX (a, b);
SUM(c) OVER (PARTITION BY a ORDER BY b)
```

How to index for window functions

```
COUNT(*) OVER (PARTITION BY a)                    ➡ CREATE INDEX (a);
ROW_NUMBER() OVER (PARTITION BY a ORDER BY b)     ➡ CREATE INDEX (a, b);
SUM(c) OVER (PARTITION BY a ORDER BY b)           ➡ CREATE INDEX (a, b) INCLUDE (c);
COUNT(*) OVER ()
```

How to index for window functions

`COUNT(*) OVER (PARTITION BY a)`	➡ `CREATE INDEX (a);`
`ROW_NUMBER() OVER (PARTITION BY a ORDER BY b)`	➡ `CREATE INDEX (a, b);`
`SUM(c) OVER (PARTITION BY a ORDER BY b)`	➡ `CREATE INDEX (a, b) INCLUDE (c);`
`COUNT(*) OVER ()`	❌
`LEAD(c, 1) OVER (PARTITION BY a ORDER BY b)`	

How to index for window functions

`COUNT(*) OVER (PARTITION BY a)`	➡ `CREATE INDEX (a);`
`ROW_NUMBER() OVER (PARTITION BY a ORDER BY b)`	➡ `CREATE INDEX (a, b);`
`SUM(c) OVER (PARTITION BY a ORDER BY b)`	➡ `CREATE INDEX (a, b) INCLUDE (c);`
`COUNT(*) OVER ()`	❌
`LEAD(c, 1) OVER (PARTITION BY a ORDER BY b)`	➡ `CREATE INDEX (a, b) INCLUDE (c);`

```
AVG(SUM(c)) OVER (PARTITION BY a ORDER BY b)
… GROUP BY a, b
```

How to index for window functions

`COUNT(*) OVER (PARTITION BY a)`	➡ `CREATE INDEX (a);`
`ROW_NUMBER() OVER (PARTITION BY a ORDER BY b)`	➡ `CREATE INDEX (a, b);`
`SUM(c) OVER (PARTITION BY a ORDER BY b)`	➡ `CREATE INDEX (a, b) INCLUDE (c);`
`COUNT(*) OVER ()`	✖
`LEAD(c, 1) OVER (PARTITION BY a ORDER BY b)`	➡ `CREATE INDEX (a, b) INCLUDE (c);`
`AVG(SUM(c)) OVER (PARTITION BY a ORDER BY b)` `… GROUP BY a, b`	➡ `CREATE INDEX (a, b) INCLUDE (c);`

A windowed COUNT DISTINCT?

```
SELECT *
FROM DW.Location_Timeframes;
```

	Location_ID	From	To	Altitude	Lat	Long
1	53300	1972-12-01 00:00:00	1973-01-01 00:00:00	72.00	55.539000	13.366500
2	53300	1973-01-01 00:00:00	1974-01-01 00:00:00	72.00	55.539000	13.366500
3	53300	1974-01-01 00:00:00	1975-01-01 00:00:00	72.00	55.539000	13.366500
4	53300	1975-01-01 00:00:00	1976-01-01 00:00:00	72.00	55.539000	13.366500
5	53300	1976-01-01 00:00:00	1977-01-01 00:00:00	72.00	55.539000	13.366500
6	53300	1977-01-01 00:00:00	1978-01-01 00:00:00	72.00	55.539000	13.366500
7	53300	1978-01-01 00:00:00	1979-01-01 00:00:00	72.00	55.539000	13.366500
8	53300	1979-01-01 00:00:00	1980-01-01 00:00:00	72.00	55.539000	13.366500
9	53300	1980-01-01 00:00:00	1981-01-01 00:00:00	72.00	55.539000	13.366500
10	53300	1981-01-01 00:00:00	1982-01-01 00:00:00	72.00	55.539000	13.366500
39	53300	2020-01-01 00:00:00	2021-01-01 00:00:00	72.00	55.523100	13.378700
40	53300	2021-01-01 00:00:00	2022-01-01 00:00:00	72.00	55.523100	13.378700
41	53300	2022-01-01 00:00:00	2023-01-01 00:00:00	72.00	55.523100	13.378700
42	53300	2023-01-01 00:00:00	2024-01-01 00:00:00	72.00	55.523100	13.378700
43	53300	2024-01-01 00:00:00	2025-01-01 00:00:00	72.00	55.523100	13.378700
44	53300	2025-01-01 00:00:00	2025-05-01 00:00:00	72.00	55.523100	13.378700
45	66420	1944-01-01 00:00:00	1945-01-01 00:00:00	6.00	56.678300	16.292000
46	66420	1945-01-01 00:00:00	1946-01-01 00:00:00	6.00	56.678300	16.292000
47	66420	1946-01-01 00:00:00	1947-01-01 00:00:00	6.00	56.678300	16.292000
48	66420	1947-01-01 00:00:00	1948-01-01 00:00:00	6.00	56.678300	16.292000
49	66420	1948-01-01 00:00:00	1949-01-01 00:00:00	6.00	56.678300	16.292000
50	66420	1949-01-01 00:00:00	1950-01-01 00:00:00	6.00	56.678300	16.292000
107	66420	2022-01-01 00:00:00	2023-01-01 00:00:00	6.00	56.678400	16.292200
108	66420	2023-01-01 00:00:00	2024-01-01 00:00:00	6.00	56.678400	16.292200
109	66420	2024-01-01 00:00:00	2025-01-01 00:00:00	6.00	56.678400	16.292200
110	66420	2025-01-01 00:00:00	2025-05-01 06:20:10	6.00	56.678400	16.292200
111	72420	1977-10-01 00:00:00	1978-01-01 00:00:00	154.00	57.667800	12.296300
112	72420	1978-01-01 00:00:00	1979-01-01 00:00:00	154.00	57.667800	12.296300
113	72420	1979-01-01 00:00:00	1980-01-01 00:00:00	154.00	57.667800	12.296300
114	72420	1980-01-01 00:00:00	1981-01-01 00:00:00	154.00	57.667800	12.296300
115	72420	1981-01-01 00:00:00	1982-01-01 00:00:00	154.00	57.667800	12.296300
116	72420	1982-01-01 00:00:00	1983-01-01 00:00:00	154.00	57.667800	12.296300
117	72420	1983-01-01 00:00:00	1984-01-01 00:00:00	154.00	57.667800	12.296300
118	72420	1984-01-01 00:00:00	1985-01-01 00:00:00	154.00	57.667800	12.296300
142	72420	2019-01-01 00:00:00	2020-01-01 00:00:00	154.00	57.676400	12.291900
143	72420	2020-01-01 00:00:00	2021-01-01 00:00:00	154.00	57.676400	12.291900
144	72420	2021-01-01 00:00:00	2022-01-01 00:00:00	154.00	57.676400	12.291900
145	72420	2022-01-01 00:00:00	2023-01-01 00:00:00	154.00	57.676400	12.291900
146	72420	2023-01-01 00:00:00	2024-01-01 00:00:00	154.00	57.676400	12.291900
147	72420	2024-01-01 00:00:00	2025-01-01 00:00:00	154.00	57.676400	12.291900
148	72420	2025-01-01 00:00:00	2025-05-01 00:00:00	154.00	57.676400	12.291900
149	78400	1945-10-01 00:00:00	1946-01-01 00:00:00	41.05	57.667800	18.351600
150	78400	1946-01-01 00:00:00	1947-01-01 00:00:00	41.05	57.667800	18.351600
151	78400	1947-01-01 00:00:00	1948-01-01 00:00:00	41.05	57.667800	18.351600
152	78400	1948-01-01 00:00:00	1949-01-01 00:00:00	41.05	57.667800	18.351600
153	78400	1949-01-01 00:00:00	1950-01-01 00:00:00	41.05	57.667800	18.351600
154	78400	1950-01-01 00:00:00	1951-01-01 00:00:00	41.05	57.667800	18.351600

A windowed COUNT DISTINCT?

```
SELECT *,
       COUNT(DISTINCT Location_ID)
           OVER () AS _distinct_count
FROM DW.Location_Timeframes;
```

	Location_ID	From	To	Altitude	Lat	Long
1	53300	1972-12-01 00:00:00	1973-01-01 00:00:00	72.00	55.539000	13.366500
2	53300	1973-01-01 00:00:00	1974-01-01 00:00:00	72.00	55.539000	13.366500
3	53300	1974-01-01 00:00:00	1975-01-01 00:00:00	72.00	55.539000	13.366500
4	53300	1975-01-01 00:00:00	1976-01-01 00:00:00	72.00	55.539000	13.366500
5	53300	1976-01-01 00:00:00	1977-01-01 00:00:00	72.00	55.539000	13.366500
6	53300	1977-01-01 00:00:00	1978-01-01 00:00:00	72.00	55.539000	13.366500
7	53300	1978-01-01 00:00:00	1979-01-01 00:00:00	72.00	55.539000	13.366500
8	53300	1979-01-01 00:00:00	1980-01-01 00:00:00	72.00	55.539000	13.366500
9	53300	1980-01-01 00:00:00	1981-01-01 00:00:00	72.00	55.539000	13.366500
10	53300	1981-01-01 00:00:00	1982-01-01 00:00:00	72.00	55.539000	13.366500
39	53300	2020-01-01 00:00:00	2021-01-01 00:00:00	72.00	55.523100	13.378700
40	53300	2021-01-01 00:00:00	2022-01-01 00:00:00	72.00	55.523100	13.378700
41	53300	2022-01-01 00:00:00	2023-01-01 00:00:00	72.00	55.523100	13.378700
42	53300	2023-01-01 00:00:00	2024-01-01 00:00:00	72.00	55.523100	13.378700
43	53300	2024-01-01 00:00:00	2025-01-01 00:00:00	72.00	55.523100	13.378700
44	53300	2025-01-01 00:00:00	2025-05-01 00:00:00	72.00	55.523100	13.378700
45	66420	1944-01-01 00:00:00	1945-01-01 00:00:00	6.00	56.678300	16.292000
46	66420	1945-01-01 00:00:00	1946-01-01 00:00:00	6.00	56.678300	16.292000
47	66420	1946-01-01 00:00:00	1947-01-01 00:00:00	6.00	56.678300	16.292000
48	66420	1947-01-01 00:00:00	1948-01-01 00:00:00	6.00	56.678300	16.292000
49	66420	1948-01-01 00:00:00	1949-01-01 00:00:00	6.00	56.678300	16.292000
50	66420	1949-01-01 00:00:00	1950-01-01 00:00:00	6.00	56.678300	16.292000
107	66420	2022-01-01 00:00:00	2023-01-01 00:00:00	6.00	56.678400	16.292200
108	66420	2023-01-01 00:00:00	2024-01-01 00:00:00	6.00	56.678400	16.292200
109	66420	2024-01-01 00:00:00	2025-01-01 00:00:00	6.00	56.678400	16.292200
110	66420	2025-01-01 00:00:00	2025-05-01 06:20:10	6.00	56.678400	16.292200
111	72420	1977-10-01 00:00:00	1978-01-01 00:00:00	154.00	57.667800	12.296300
112	72420	1978-01-01 00:00:00	1979-01-01 00:00:00	154.00	57.667800	12.296300
113	72420	1979-01-01 00:00:00	1980-01-01 00:00:00	154.00	57.667800	12.296300
114	72420	1980-01-01 00:00:00	1981-01-01 00:00:00	154.00	57.667800	12.296300
115	72420	1981-01-01 00:00:00	1982-01-01 00:00:00	154.00	57.667800	12.296300
116	72420	1982-01-01 00:00:00	1983-01-01 00:00:00	154.00	57.667800	12.296300
117	72420	1983-01-01 00:00:00	1984-01-01 00:00:00	154.00	57.667800	12.296300
118	72420	1984-01-01 00:00:00	1985-01-01 00:00:00	154.00	57.667800	12.296300
142	72420	2019-01-01 00:00:00	2020-01-01 00:00:00	154.00	57.676400	12.291900
143	72420	2020-01-01 00:00:00	2021-01-01 00:00:00	154.00	57.676400	12.291900
144	72420	2021-01-01 00:00:00	2022-01-01 00:00:00	154.00	57.676400	12.291900
145	72420	2022-01-01 00:00:00	2023-01-01 00:00:00	154.00	57.676400	12.291900
146	72420	2023-01-01 00:00:00	2024-01-01 00:00:00	154.00	57.676400	12.291900
147	72420	2024-01-01 00:00:00	2025-01-01 00:00:00	154.00	57.676400	12.291900
148	72420	2025-01-01 00:00:00	2025-05-01 00:00:00	154.00	57.676400	12.291900
149	78400	1945-10-01 00:00:00	1946-01-01 00:00:00	41.05	57.667800	18.351600
150	78400	1946-01-01 00:00:00	1947-01-01 00:00:00	41.05	57.667800	18.351600
151	78400	1947-01-01 00:00:00	1948-01-01 00:00:00	41.05	57.667800	18.351600
152	78400	1948-01-01 00:00:00	1949-01-01 00:00:00	41.05	57.667800	18.351600
153	78400	1949-01-01 00:00:00	1950-01-01 00:00:00	41.05	57.667800	18.351600
154	78400	1950-01-01 00:00:00	1951-01-01 00:00:00	41.05	57.667800	18.351600

A windowed COUNT DISTINCT?

```
SELECT *,
       COUNT(DISTINCT Location_ID)
           OVER () AS _distinct_count
FROM DW.Location_Timeframes;
```

```
Msg 10759, Level 15, State 1, Line 2
Use of DISTINCT is not allowed with the OVER clause.
```

	Location_ID	From	To	Altitude	Lat	Long
1	53300	1972-12-01 00:00:00	1973-01-01 00:00:00	72.00	55.539000	13.366500
2	53300	1973-01-01 00:00:00	1974-01-01 00:00:00	72.00	55.539000	13.366500
3	53300	1974-01-01 00:00:00	1975-01-01 00:00:00	72.00	55.539000	13.366500
4	53300	1975-01-01 00:00:00	1976-01-01 00:00:00	72.00	55.539000	13.366500
5	53300	1976-01-01 00:00:00	1977-01-01 00:00:00	72.00	55.539000	13.366500
6	53300	1977-01-01 00:00:00	1978-01-01 00:00:00	72.00	55.539000	13.366500
7	53300	1978-01-01 00:00:00	1979-01-01 00:00:00	72.00	55.539000	13.366500
8	53300	1979-01-01 00:00:00	1980-01-01 00:00:00	72.00	55.539000	13.366500
9	53300	1980-01-01 00:00:00	1981-01-01 00:00:00	72.00	55.539000	13.366500
10	53300	1981-01-01 00:00:00	1982-01-01 00:00:00	72.00	55.539000	13.366500
39	53300	2020-01-01 00:00:00	2021-01-01 00:00:00	72.00	55.523100	13.378700
40	53300	2021-01-01 00:00:00	2022-01-01 00:00:00	72.00	55.523100	13.378700
41	53300	2022-01-01 00:00:00	2023-01-01 00:00:00	72.00	55.523100	13.378700
42	53300	2023-01-01 00:00:00	2024-01-01 00:00:00	72.00	55.523100	13.378700
43	53300	2024-01-01 00:00:00	2025-01-01 00:00:00	72.00	55.523100	13.378700
44	53300	2025-01-01 00:00:00	2025-05-01 00:00:00	72.00	55.523100	13.378700
45	66420	1944-01-01 00:00:00	1945-01-01 00:00:00	6.00	56.678300	16.292000
46	66420	1945-01-01 00:00:00	1946-01-01 00:00:00	6.00	56.678300	16.292000
47	66420	1946-01-01 00:00:00	1947-01-01 00:00:00	6.00	56.678300	16.292000
48	66420	1947-01-01 00:00:00	1948-01-01 00:00:00	6.00	56.678300	16.292000
49	66420	1948-01-01 00:00:00	1949-01-01 00:00:00	6.00	56.678300	16.292000
50	66420	1949-01-01 00:00:00	1950-01-01 00:00:00	6.00	56.678300	16.292000
107	66420	2022-01-01 00:00:00	2023-01-01 00:00:00	6.00	56.678400	16.292200
108	66420	2023-01-01 00:00:00	2024-01-01 00:00:00	6.00	56.678400	16.292200
109	66420	2024-01-01 00:00:00	2025-01-01 00:00:00	6.00	56.678400	16.292200
110	66420	2025-01-01 00:00:00	2025-05-01 06:20:10	6.00	56.678400	16.292200
111	72420	1977-10-01 00:00:00	1978-01-01 00:00:00	154.00	57.667800	12.296300
112	72420	1978-01-01 00:00:00	1979-01-01 00:00:00	154.00	57.667800	12.296300
113	72420	1979-01-01 00:00:00	1980-01-01 00:00:00	154.00	57.667800	12.296300
114	72420	1980-01-01 00:00:00	1981-01-01 00:00:00	154.00	57.667800	12.296300
115	72420	1981-01-01 00:00:00	1982-01-01 00:00:00	154.00	57.667800	12.296300
116	72420	1982-01-01 00:00:00	1983-01-01 00:00:00	154.00	57.667800	12.296300
117	72420	1983-01-01 00:00:00	1984-01-01 00:00:00	154.00	57.667800	12.296300
118	72420	1984-01-01 00:00:00	1985-01-01 00:00:00	154.00	57.667800	12.296300
142	72420	2019-01-01 00:00:00	2020-01-01 00:00:00	154.00	57.676400	12.291900
143	72420	2020-01-01 00:00:00	2021-01-01 00:00:00	154.00	57.676400	12.291900
144	72420	2021-01-01 00:00:00	2022-01-01 00:00:00	154.00	57.676400	12.291900
145	72420	2022-01-01 00:00:00	2023-01-01 00:00:00	154.00	57.676400	12.291900
146	72420	2023-01-01 00:00:00	2024-01-01 00:00:00	154.00	57.676400	12.291900
147	72420	2024-01-01 00:00:00	2025-01-01 00:00:00	154.00	57.676400	12.291900
148	72420	2025-01-01 00:00:00	2025-05-01 00:00:00	154.00	57.676400	12.291900
149	78400	1945-10-01 00:00:00	1946-01-01 00:00:00	41.05	57.667800	18.351600
150	78400	1946-01-01 00:00:00	1947-01-01 00:00:00	41.05	57.667800	18.351600
151	78400	1947-01-01 00:00:00	1948-01-01 00:00:00	41.05	57.667800	18.351600
152	78400	1948-01-01 00:00:00	1949-01-01 00:00:00	41.05	57.667800	18.351600
153	78400	1949-01-01 00:00:00	1950-01-01 00:00:00	41.05	57.667800	18.351600
154	78400	1950-01-01 00:00:00	1951-01-01 00:00:00	41.05	57.667800	18.351600

Rank vs. Dense Rank

```
SELECT *,
       --- Rank: 1, 45, 111, ...
       RANK() OVER (
           ORDER BY Location_ID) AS _rank,
FROM DW.Location_Timeframes;
```

	Location_ID	From	To	Altitude	Lat	Long	_rank
1	53300	1972-12-01 00:00:00	1973-01-01 00:00:00	72.00	55.539000	13.366500	1
2	53300	1973-01-01 00:00:00	1974-01-01 00:00:00	72.00	55.539000	13.366500	1
3	53300	1974-01-01 00:00:00	1975-01-01 00:00:00	72.00	55.539000	13.366500	1
4	53300	1975-01-01 00:00:00	1976-01-01 00:00:00	72.00	55.539000	13.366500	1
5	53300	1976-01-01 00:00:00	1977-01-01 00:00:00	72.00	55.539000	13.366500	1
6	53300	1977-01-01 00:00:00	1978-01-01 00:00:00	72.00	55.539000	13.366500	1
7	53300	1978-01-01 00:00:00	1979-01-01 00:00:00	72.00	55.539000	13.366500	1
8	53300	1979-01-01 00:00:00	1980-01-01 00:00:00	72.00	55.539000	13.366500	1
9	53300	1980-01-01 00:00:00	1981-01-01 00:00:00	72.00	55.539000	13.366500	1
10	53300	1981-01-01 00:00:00	1982-01-01 00:00:00	72.00	55.539000	13.366500	1
39	53300	2020-01-01 00:00:00	2021-01-01 00:00:00	72.00	55.523100	13.378700	1
40	53300	2021-01-01 00:00:00	2022-01-01 00:00:00	72.00	55.523100	13.378700	1
41	53300	2022-01-01 00:00:00	2023-01-01 00:00:00	72.00	55.523100	13.378700	1
42	53300	2023-01-01 00:00:00	2024-01-01 00:00:00	72.00	55.523100	13.378700	1
43	53300	2024-01-01 00:00:00	2025-01-01 00:00:00	72.00	55.523100	13.378700	1
44	53300	2025-01-01 00:00:00	2025-05-01 00:00:00	72.00	55.523100	13.378700	1
45	66420	1944-01-01 00:00:00	1945-01-01 00:00:00	6.00	56.678300	16.292000	45
46	66420	1945-01-01 00:00:00	1946-01-01 00:00:00	6.00	56.678300	16.292000	45
47	66420	1946-01-01 00:00:00	1947-01-01 00:00:00	6.00	56.678300	16.292000	45
48	66420	1947-01-01 00:00:00	1948-01-01 00:00:00	6.00	56.678300	16.292000	45
49	66420	1948-01-01 00:00:00	1949-01-01 00:00:00	6.00	56.678300	16.292000	45
50	66420	1949-01-01 00:00:00	1950-01-01 00:00:00	6.00	56.678300	16.292000	45
107	66420	2022-01-01 00:00:00	2023-01-01 00:00:00	6.00	56.678400	16.292200	45
108	66420	2023-01-01 00:00:00	2024-01-01 00:00:00	6.00	56.678400	16.292200	45
109	66420	2024-01-01 00:00:00	2025-01-01 00:00:00	6.00	56.678400	16.292200	45
110	66420	2025-01-01 00:00:00	2025-05-01 06:20:10	6.00	56.678400	16.292200	45
111	72420	1977-10-01 00:00:00	1978-01-01 00:00:00	154.00	57.667800	12.296300	111
112	72420	1978-01-01 00:00:00	1979-01-01 00:00:00	154.00	57.667800	12.296300	111
113	72420	1979-01-01 00:00:00	1980-01-01 00:00:00	154.00	57.667800	12.296300	111
114	72420	1980-01-01 00:00:00	1981-01-01 00:00:00	154.00	57.667800	12.296300	111
115	72420	1981-01-01 00:00:00	1982-01-01 00:00:00	154.00	57.667800	12.296300	111
116	72420	1982-01-01 00:00:00	1983-01-01 00:00:00	154.00	57.667800	12.296300	111
117	72420	1983-01-01 00:00:00	1984-01-01 00:00:00	154.00	57.667800	12.296300	111
118	72420	1984-01-01 00:00:00	1985-01-01 00:00:00	154.00	57.667800	12.296300	111
142	72420	2019-01-01 00:00:00	2020-01-01 00:00:00	154.00	57.676400	12.291900	111
143	72420	2020-01-01 00:00:00	2021-01-01 00:00:00	154.00	57.676400	12.291900	111
144	72420	2021-01-01 00:00:00	2022-01-01 00:00:00	154.00	57.676400	12.291900	111
145	72420	2022-01-01 00:00:00	2023-01-01 00:00:00	154.00	57.676400	12.291900	111
146	72420	2023-01-01 00:00:00	2024-01-01 00:00:00	154.00	57.676400	12.291900	111
147	72420	2024-01-01 00:00:00	2025-01-01 00:00:00	154.00	57.676400	12.291900	111
148	72420	2025-01-01 00:00:00	2025-05-01 00:00:00	154.00	57.676400	12.291900	111
149	78400	1945-10-01 00:00:00	1946-01-01 00:00:00	41.05	57.667800	18.351600	149
150	78400	1946-01-01 00:00:00	1947-01-01 00:00:00	41.05	57.667800	18.351600	149
151	78400	1947-01-01 00:00:00	1948-01-01 00:00:00	41.05	57.667800	18.351600	149
152	78400	1948-01-01 00:00:00	1949-01-01 00:00:00	41.05	57.667800	18.351600	149
153	78400	1949-01-01 00:00:00	1950-01-01 00:00:00	41.05	57.667800	18.351600	149
154	78400	1950-01-01 00:00:00	1951-01-01 00:00:00	41.05	57.667800	18.351600	149

Rank vs. Dense Rank

```sql
SELECT *,
        --- Rank: 1, 45, 111, ...
        RANK() OVER (
            ORDER BY Location_ID) AS _rank,
        --- Dense rank: 1, 2, 3, ...
        DENSE_RANK() OVER (
            ORDER BY Location_ID) AS _dense_rank
FROM DW.Location_Timeframes;
```

	Location_ID	From	To	Altitude	Lat	Long	_rank	_dense_rank
1	53300	1972-12-01 00:00:00	1973-01-01 00:00:00	72.00	55.539000	13.366500	1	1
2	53300	1973-01-01 00:00:00	1974-01-01 00:00:00	72.00	55.539000	13.366500	1	1
3	53300	1974-01-01 00:00:00	1975-01-01 00:00:00	72.00	55.539000	13.366500	1	1
4	53300	1975-01-01 00:00:00	1976-01-01 00:00:00	72.00	55.539000	13.366500	1	1
5	53300	1976-01-01 00:00:00	1977-01-01 00:00:00	72.00	55.539000	13.366500	1	1
6	53300	1977-01-01 00:00:00	1978-01-01 00:00:00	72.00	55.539000	13.366500	1	1
7	53300	1978-01-01 00:00:00	1979-01-01 00:00:00	72.00	55.539000	13.366500	1	1
8	53300	1979-01-01 00:00:00	1980-01-01 00:00:00	72.00	55.539000	13.366500	1	1
9	53300	1980-01-01 00:00:00	1981-01-01 00:00:00	72.00	55.539000	13.366500	1	1
10	53300	1981-01-01 00:00:00	1982-01-01 00:00:00	72.00	55.539000	13.366500	1	1
39	53300	2020-01-01 00:00:00	2021-01-01 00:00:00	72.00	55.523100	13.378700	1	1
40	53300	2021-01-01 00:00:00	2022-01-01 00:00:00	72.00	55.523100	13.378700	1	1
41	53300	2022-01-01 00:00:00	2023-01-01 00:00:00	72.00	55.523100	13.378700	1	1
42	53300	2023-01-01 00:00:00	2024-01-01 00:00:00	72.00	55.523100	13.378700	1	1
43	53300	2024-01-01 00:00:00	2025-01-01 00:00:00	72.00	55.523100	13.378700	1	1
44	53300	2025-01-01 00:00:00	2025-05-01 00:00:00	72.00	55.523100	13.378700	1	1
45	66420	1944-01-01 00:00:00	1945-01-01 00:00:00	6.00	56.678300	16.292000	45	2
46	66420	1945-01-01 00:00:00	1946-01-01 00:00:00	6.00	56.678300	16.292000	45	2
47	66420	1946-01-01 00:00:00	1947-01-01 00:00:00	6.00	56.678300	16.292000	45	2
48	66420	1947-01-01 00:00:00	1948-01-01 00:00:00	6.00	56.678300	16.292000	45	2
49	66420	1948-01-01 00:00:00	1949-01-01 00:00:00	6.00	56.678300	16.292000	45	2
50	66420	1949-01-01 00:00:00	1950-01-01 00:00:00	6.00	56.678300	16.292000	45	2
107	66420	2022-01-01 00:00:00	2023-01-01 00:00:00	6.00	56.678400	16.292200	45	2
108	66420	2023-01-01 00:00:00	2024-01-01 00:00:00	6.00	56.678400	16.292200	45	2
109	66420	2024-01-01 00:00:00	2025-01-01 00:00:00	6.00	56.678400	16.292200	45	2
110	66420	2025-01-01 00:00:00	2025-05-01 06:20:10	6.00	56.678400	16.292200	45	2
111	72420	1977-10-01 00:00:00	1978-01-01 00:00:00	154.00	57.667800	12.296300	111	3
112	72420	1978-01-01 00:00:00	1979-01-01 00:00:00	154.00	57.667800	12.296300	111	3
113	72420	1979-01-01 00:00:00	1980-01-01 00:00:00	154.00	57.667800	12.296300	111	3
114	72420	1980-01-01 00:00:00	1981-01-01 00:00:00	154.00	57.667800	12.296300	111	3
115	72420	1981-01-01 00:00:00	1982-01-01 00:00:00	154.00	57.667800	12.296300	111	3
116	72420	1982-01-01 00:00:00	1983-01-01 00:00:00	154.00	57.667800	12.296300	111	3
117	72420	1983-01-01 00:00:00	1984-01-01 00:00:00	154.00	57.667800	12.296300	111	3
118	72420	1984-01-01 00:00:00	1985-01-01 00:00:00	154.00	57.667800	12.296300	111	3
142	72420	2019-01-01 00:00:00	2020-01-01 00:00:00	154.00	57.676400	12.291900	111	3
143	72420	2020-01-01 00:00:00	2021-01-01 00:00:00	154.00	57.676400	12.291900	111	3
144	72420	2021-01-01 00:00:00	2022-01-01 00:00:00	154.00	57.676400	12.291900	111	3
145	72420	2022-01-01 00:00:00	2023-01-01 00:00:00	154.00	57.676400	12.291900	111	3
146	72420	2023-01-01 00:00:00	2024-01-01 00:00:00	154.00	57.676400	12.291900	111	3
147	72420	2024-01-01 00:00:00	2025-01-01 00:00:00	154.00	57.676400	12.291900	111	3
148	72420	2025-01-01 00:00:00	2025-05-01 00:00:00	154.00	57.676400	12.291900	111	3
149	78400	1945-10-01 00:00:00	1946-01-01 00:00:00	41.05	57.667800	18.351600	149	4
150	78400	1946-01-01 00:00:00	1947-01-01 00:00:00	41.05	57.667800	18.351600	149	4
151	78400	1947-01-01 00:00:00	1948-01-01 00:00:00	41.05	57.667800	18.351600	149	4
152	78400	1948-01-01 00:00:00	1949-01-01 00:00:00	41.05	57.667800	18.351600	149	4
153	78400	1949-01-01 00:00:00	1950-01-01 00:00:00	41.05	57.667800	18.351600	149	4
154	78400	1950-01-01 00:00:00	1951-01-01 00:00:00	41.05	57.667800	18.351600	149	4

A windowed COUNT DISTINCT!

```sql
SELECT *,
       --- The highest dense rank is the distinct count.
       MAX(_dense_rank) OVER () AS _distinct_count
FROM (
    SELECT *,
           --- Rank: 1, 45, 111, ...
           RANK() OVER (
               ORDER BY Location_ID) AS _rank,
           --- Dense rank: 1, 2, 3, ...
           DENSE_RANK() OVER (
               ORDER BY Location_ID) AS _dense_rank
    FROM DW.Location_Timeframes
) AS x;
```

	Location_ID	From	To	Altitude	Lat	Long	_rank	_dense_rank	_distinct_count
1	53300	1972-12-01 00:00:00	1973-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
2	53300	1973-01-01 00:00:00	1974-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
3	53300	1974-01-01 00:00:00	1975-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
4	53300	1975-01-01 00:00:00	1976-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
5	53300	1976-01-01 00:00:00	1977-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
6	53300	1977-01-01 00:00:00	1978-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
7	53300	1978-01-01 00:00:00	1979-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
8	53300	1979-01-01 00:00:00	1980-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
9	53300	1980-01-01 00:00:00	1981-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
10	53300	1981-01-01 00:00:00	1982-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
39	53300	2020-01-01 00:00:00	2021-01-01 00:00:00	72.00	55.523100	13.378700	1	1	13
40	53300	2021-01-01 00:00:00	2022-01-01 00:00:00	72.00	55.523100	13.378700	1	1	13
41	53300	2022-01-01 00:00:00	2023-01-01 00:00:00	72.00	55.523100	13.378700	1	1	13
42	53300	2023-01-01 00:00:00	2024-01-01 00:00:00	72.00	55.523100	13.378700	1	1	13
43	53300	2024-01-01 00:00:00	2025-01-01 00:00:00	72.00	55.523100	13.378700	1	1	13
44	53300	2025-01-01 00:00:00	2025-05-01 00:00:00	72.00	55.523100	13.378700	1	1	13
45	66420	1944-01-01 00:00:00	1945-01-01 00:00:00	6.00	56.678300	16.292000	45	2	13
46	66420	1945-01-01 00:00:00	1946-01-01 00:00:00	6.00	56.678300	16.292000	45	2	13
47	66420	1946-01-01 00:00:00	1947-01-01 00:00:00	6.00	56.678300	16.292000	45	2	13
48	66420	1947-01-01 00:00:00	1948-01-01 00:00:00	6.00	56.678300	16.292000	45	2	13
49	66420	1948-01-01 00:00:00	1949-01-01 00:00:00	6.00	56.678300	16.292000	45	2	13
50	66420	1949-01-01 00:00:00	1950-01-01 00:00:00	6.00	56.678300	16.292000	45	2	13
107	66420	2022-01-01 00:00:00	2023-01-01 00:00:00	6.00	56.678400	16.292200	45	2	13
108	66420	2023-01-01 00:00:00	2024-01-01 00:00:00	6.00	56.678400	16.292200	45	2	13
109	66420	2024-01-01 00:00:00	2025-01-01 00:00:00	6.00	56.678400	16.292200	45	2	13
110	66420	2025-01-01 00:00:00	2025-05-01 06:20:10	6.00	56.678400	16.292200	45	2	13
111	72420	1977-10-01 00:00:00	1978-01-01 00:00:00	154.00	57.667800	12.296300	111	3	13
112	72420	1978-01-01 00:00:00	1979-01-01 00:00:00	154.00	57.667800	12.296300	111	3	13
113	72420	1979-01-01 00:00:00	1980-01-01 00:00:00	154.00	57.667800	12.296300	111	3	13
114	72420	1980-01-01 00:00:00	1981-01-01 00:00:00	154.00	57.667800	12.296300	111	3	13
115	72420	1981-01-01 00:00:00	1982-01-01 00:00:00	154.00	57.667800	12.296300	111	3	13
116	72420	1982-01-01 00:00:00	1983-01-01 00:00:00	154.00	57.667800	12.296300	111	3	13
117	72420	1983-01-01 00:00:00	1984-01-01 00:00:00	154.00	57.667800	12.296300	111	3	13
118	72420	1984-01-01 00:00:00	1985-01-01 00:00:00	154.00	57.667800	12.296300	111	3	13
142	72420	2019-01-01 00:00:00	2020-01-01 00:00:00	154.00	57.676400	12.291900	111	3	13
143	72420	2020-01-01 00:00:00	2021-01-01 00:00:00	154.00	57.676400	12.291900	111	3	13
144	72420	2021-01-01 00:00:00	2022-01-01 00:00:00	154.00	57.676400	12.291900	111	3	13
145	72420	2022-01-01 00:00:00	2023-01-01 00:00:00	154.00	57.676400	12.291900	111	3	13
146	72420	2023-01-01 00:00:00	2024-01-01 00:00:00	154.00	57.676400	12.291900	111	3	13
147	72420	2024-01-01 00:00:00	2025-01-01 00:00:00	154.00	57.676400	12.291900	111	3	13
148	72420	2025-01-01 00:00:00	2025-05-01 00:00:00	154.00	57.676400	12.291900	111	3	13
149	78400	1945-10-01 00:00:00	1946-01-01 00:00:00	41.05	57.667800	18.351600	149	4	13
150	78400	1946-01-01 00:00:00	1947-01-01 00:00:00	41.05	57.667800	18.351600	149	4	13
151	78400	1947-01-01 00:00:00	1948-01-01 00:00:00	41.05	57.667800	18.351600	149	4	13
152	78400	1948-01-01 00:00:00	1949-01-01 00:00:00	41.05	57.667800	18.351600	149	4	13
153	78400	1949-01-01 00:00:00	1950-01-01 00:00:00	41.05	57.667800	18.351600	149	4	13
154	78400	1950-01-01 00:00:00	1951-01-01 00:00:00	41.05	57.667800	18.351600	149	4	13

Named windows

```sql
SELECT *,
       --- The highest dense rank is the distinct count.
       MAX(_dense_rank) OVER () AS _distinct_count
FROM (
    SELECT *,
           --- Rank: 1, 45, 111, ...
           RANK() OVER by_location AS _rank,

           --- Dense rank: 1, 2, 3, ...
           DENSE_RANK() OVER by_location AS _dense_rank

    FROM DW.Location_Timeframes
    WINDOW by_location AS (
        ORDER BY Location_ID
    )
) AS x;
```

	Location_ID	From	To	Altitude	Lat	Long	_rank	_dense_rank	_distinct_count
1	53300	1972-12-01 00:00:00	1973-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
2	53300	1973-01-01 00:00:00	1974-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
3	53300	1974-01-01 00:00:00	1975-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
4	53300	1975-01-01 00:00:00	1976-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
5	53300	1976-01-01 00:00:00	1977-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
6	53300	1977-01-01 00:00:00	1978-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
7	53300	1978-01-01 00:00:00	1979-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
8	53300	1979-01-01 00:00:00	1980-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
9	53300	1980-01-01 00:00:00	1981-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
10	53300	1981-01-01 00:00:00	1982-01-01 00:00:00	72.00	55.539000	13.366500	1	1	13
39	53300	2020-01-01 00:00:00	2021-01-01 00:00:00	72.00	55.523100	13.378700	1	1	13
40	53300	2021-01-01 00:00:00	2022-01-01 00:00:00	72.00	55.523100	13.378700	1	1	13
41	53300	2022-01-01 00:00:00	2023-01-01 00:00:00	72.00	55.523100	13.378700	1	1	13
42	53300	2023-01-01 00:00:00	2024-01-01 00:00:00	72.00	55.523100	13.378700	1	1	13
43	53300	2024-01-01 00:00:00	2025-01-01 00:00:00	72.00	55.523100	13.378700	1	1	13
44	53300	2025-01-01 00:00:00	2025-05-01 00:00:00	72.00	55.523100	13.378700	1	1	13
45	66420	1944-01-01 00:00:00	1945-01-01 00:00:00	6.00	56.678300	16.292000	45	2	13
46	66420	1945-01-01 00:00:00	1946-01-01 00:00:00	6.00	56.678300	16.292000	45	2	13
47	66420	1946-01-01 00:00:00	1947-01-01 00:00:00	6.00	56.678300	16.292000	45	2	13
48	66420	1947-01-01 00:00:00	1948-01-01 00:00:00	6.00	56.678300	16.292000	45	2	13
49	66420	1948-01-01 00:00:00	1949-01-01 00:00:00	6.00	56.678300	16.292000	45	2	13
50	66420	1949-01-01 00:00:00	1950-01-01 00:00:00	6.00	56.678300	16.292000	45	2	13
107	66420	2022-01-01 00:00:00	2023-01-01 00:00:00	6.00	56.678400	16.292200	45	2	13
108	66420	2023-01-01 00:00:00	2024-01-01 00:00:00	6.00	56.678400	16.292200	45	2	13
109	66420	2024-01-01 00:00:00	2025-01-01 00:00:00	6.00	56.678400	16.292200	45	2	13
110	66420	2025-01-01 00:00:00	2025-05-01 06:20:10	6.00	56.678400	16.292200	45	2	13
111	72420	1977-10-01 00:00:00	1978-01-01 00:00:00	154.00	57.667800	12.296300	111	3	13
112	72420	1978-01-01 00:00:00	1979-01-01 00:00:00	154.00	57.667800	12.296300	111	3	13
113	72420	1979-01-01 00:00:00	1980-01-01 00:00:00	154.00	57.667800	12.296300	111	3	13
114	72420	1980-01-01 00:00:00	1981-01-01 00:00:00	154.00	57.667800	12.296300	111	3	13
115	72420	1981-01-01 00:00:00	1982-01-01 00:00:00	154.00	57.667800	12.296300	111	3	13
116	72420	1982-01-01 00:00:00	1983-01-01 00:00:00	154.00	57.667800	12.296300	111	3	13
117	72420	1983-01-01 00:00:00	1984-01-01 00:00:00	154.00	57.667800	12.296300	111	3	13
118	72420	1984-01-01 00:00:00	1985-01-01 00:00:00	154.00	57.667800	12.296300	111	3	13
142	72420	2019-01-01 00:00:00	2020-01-01 00:00:00	154.00	57.676400	12.291900	111	3	13
143	72420	2020-01-01 00:00:00	2021-01-01 00:00:00	154.00	57.676400	12.291900	111	3	13
144	72420	2021-01-01 00:00:00	2022-01-01 00:00:00	154.00	57.676400	12.291900	111	3	13
145	72420	2022-01-01 00:00:00	2023-01-01 00:00:00	154.00	57.676400	12.291900	111	3	13
146	72420	2023-01-01 00:00:00	2024-01-01 00:00:00	154.00	57.676400	12.291900	111	3	13
147	72420	2024-01-01 00:00:00	2025-01-01 00:00:00	154.00	57.676400	12.291900	111	3	13
148	72420	2025-01-01 00:00:00	2025-05-01 00:00:00	154.00	57.676400	12.291900	111	3	13
149	78400	1945-10-01 00:00:00	1946-01-01 00:00:00	41.05	57.667800	18.351600	149	4	13
150	78400	1946-01-01 00:00:00	1947-01-01 00:00:00	41.05	57.667800	18.351600	149	4	13
151	78400	1947-01-01 00:00:00	1948-01-01 00:00:00	41.05	57.667800	18.351600	149	4	13
152	78400	1948-01-01 00:00:00	1949-01-01 00:00:00	41.05	57.667800	18.351600	149	4	13
153	78400	1949-01-01 00:00:00	1950-01-01 00:00:00	41.05	57.667800	18.351600	149	4	13
154	78400	1950-01-01 00:00:00	1951-01-01 00:00:00	41.05	57.667800	18.351600	149	4	13

Available in SQL Server 2022 and newer

- Index for (partitioning columns, ordering columns) and `INCLUDE` lookup values or metrics.
- If you don't have a window function for it, try nesting other window functions.
- Use the `WINDOW` clause to make your code more readable and to avoid typos.

Questions?

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Presentation: github.com/sqlsunday/presentations
Weather dataset: sqlsunday.com/download