Business School
UNIVERSITY OF COLORADO DENVER

Information Systems Program

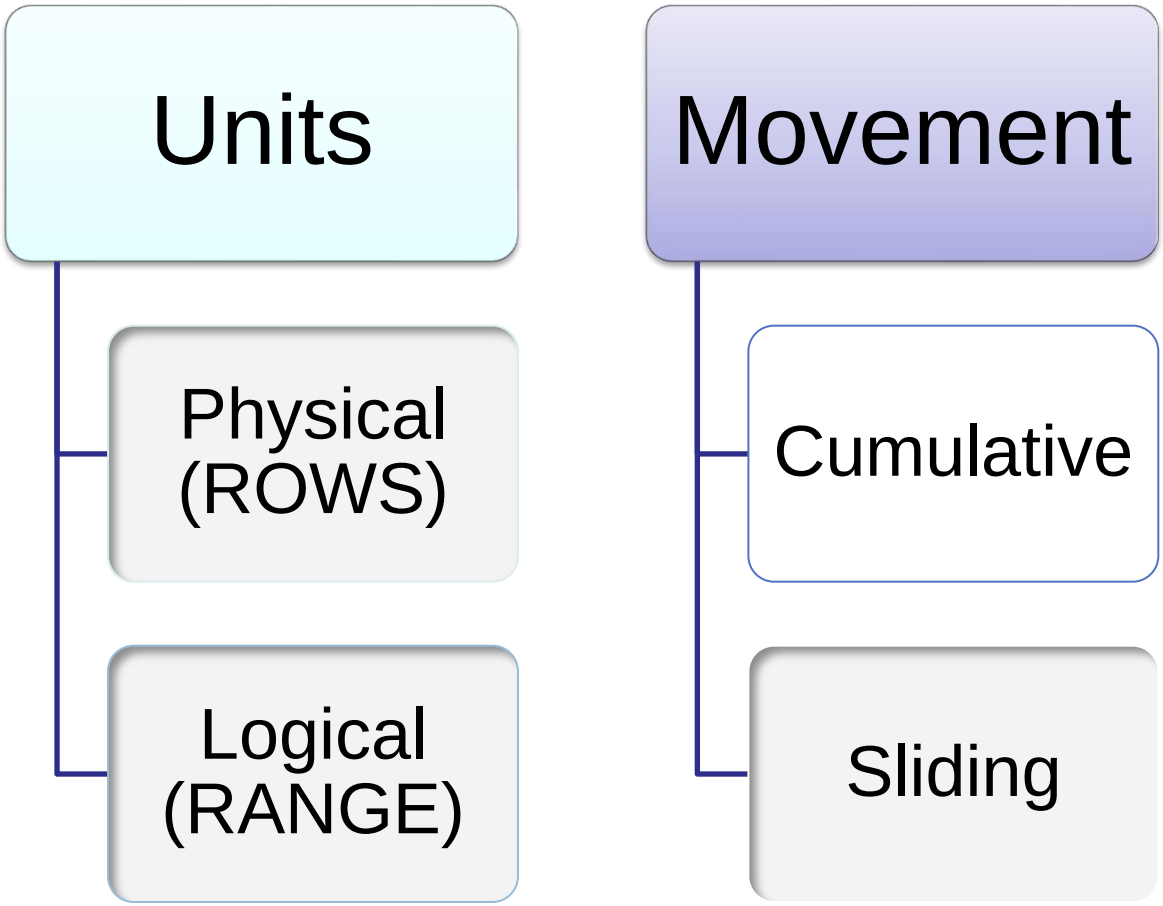
Module 3
SQL Analytic Functions

Lesson 4: Window Comparisons II

Lesson Objectives

- Understand concepts and syntax for sliding window comparisons
- Write SELECT statements for sliding window comparisons
- Reflect about the importance of window comparisons

Window Concepts Review



Logical Window Examples

- Partial example 1

```
ORDER BY TimeYear
RANGE UNBOUNDED PRECEDING
```

- Partial example 2

```
ORDER BY HireDate
RANGE 90 PRECEDING
```

- Partial example 3

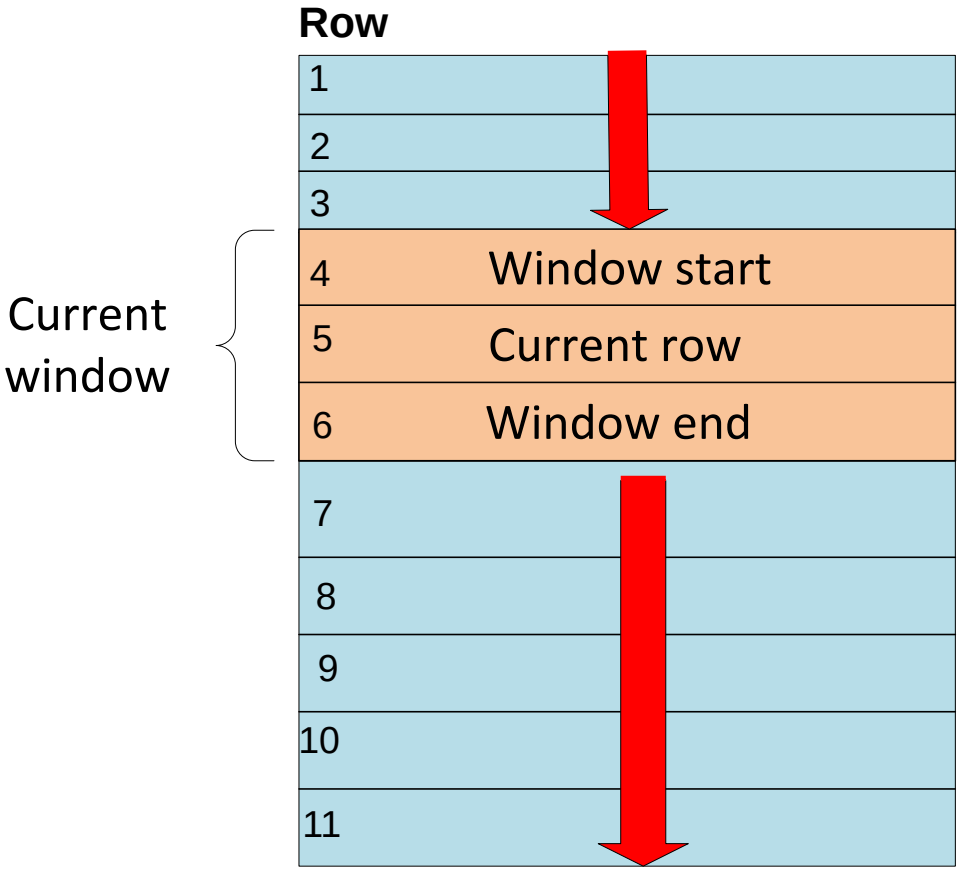
```
ORDER BY ShipDate
RANGE BETWEEN 365 PRECEDING AND 365 FOLLOWING
```

- Partial example 4

```
ORDER BY ShipDate
RANGE BETWEEN INTERVAL '1' YEAR PRECEDING AND
              INTERVAL '1' YEAR FOLLOWING
```


Sliding, Centered Physical Window

```
ROWS BETWEEN 1 PRECEDING AND 1 FOLLOWING
```



Window Boundaries

Current Row	Window Start	Window End
1	1	2
2	1	3
3	2	4
4	3	5
5	4	6
6	5	7
7	6	8
8	7	9
9	8	10
10	9	11
11	10	11

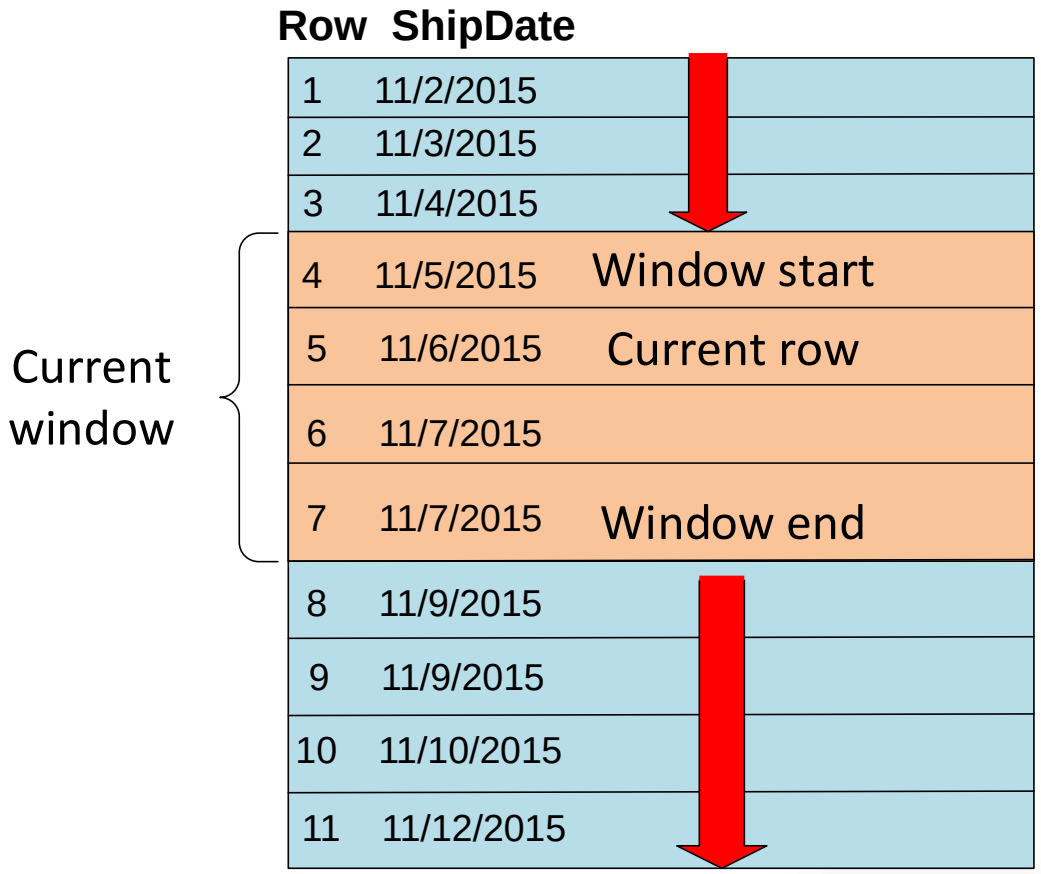
Sliding Physical Window Example

- Moving average of sum of sales by zip code and year
- Centered physical window of 3 rows
- No partitioning

```
SELECT StoreZip, TimeYear, SUM(SalesDollar) AS SumSales,
  AVG(SUM(SalesDollar)) OVER
    (ORDER BY StoreZip, TimeYear
    ROWS BETWEEN 1 PRECEDING AND 1 FOLLOWING) AS CenterMovAvgSumSales
 FROM SSStore, SSTimeDim, SSSales
 WHERE SSSales.StoreID = SSStore.StoreId
   AND SSSales.TimeNo = SSTimeDim.TimeNo
 GROUP BY StoreZip, TimeYear;
```


Sliding, Centered Logical Window

```
RANGE BETWEEN 1 PRECEDING AND 1 FOLLOWING
```



Window Boundaries

Current Row	Window Start	Window End
1	1	2
2	1	3
3	2	4
4	3	5
5	4	7
6	5	7
7	5	7
8	8	10
9	8	10
10	8	10
11	11	11

Sliding Logical Window Example

- Moving average of sum of dollar sales by year
- Centered logical window of 3 years
- No partitioning

```
SELECT TimeYear, SUM(SalesDollar) AS SumSales,
  AVG(SUM(SalesDollar)) OVER
    (ORDER BY TimeYear
    RANGE BETWEEN 1 PRECEDING AND 1 FOLLOWING) AS CenterMovAvgSumSales
 FROM SSStore, SSTimeDim, SSSales
 WHERE SSSales.StoreID = SSStore.StoreId
   AND SSSales.TimeNo = SSTimeDim.TimeNo
 GROUP BY TimeYear;
```


Additional Problems I

- Example 3
  - Moving average of sum of sales by year and item brand
  - Partition by year
  - Centered window on 2 preceding and 2 following rows
  - Only include brands with more than 5 sales in a year
  - Show year, item brand, count, sum of sales, and average sum of sales in the result
- Example 4
  - Moving average of sum of 2020 dollar sales by month
  - Centered window on 3 preceding and 3 following months
  - Show month, sum of sales, and average of sum of sales

Additional Problems II

- Example 5
  - Moving average sum of dollar sales by store zip and sales date
  - Partition by store zip
  - Centered logical window on 3 previous months and 3 next months
  - Display store zip, sales date, sum of sales, and average sum of sales
  - Try window variations for other intervals and no interval
- Date reconstruction
  - Combine SSTimeDim columns into a complete sales date
  - to_date(to_char(TimeDay,'FM00‘) || to_char(TimeMonth,'FM00‘) || to_char(TimeYear), 'DDMMYYYY'))

Summary

- Sliding window aggregates for common business intelligence applications
- Syntax for specifications of logical sliding windows
- Examples for physical and logical sliding windows