



Business School  
UNIVERSITY OF COLORADO DENVER

Information Systems Program

# Module 2

## SQL Subtotal Operators

### Lesson 3: SQL ROLLUP Operator



# Lesson Objectives

- Write SQL SELECT statements using the ROLLUP operator
- Use the UNION operator to demonstrate understanding of the ROLLUP operator
- Perform calculations to demonstrate understanding of the ROLLUP operator
- Reflect on the importance of the ROLLUP operator



# ROLLUP Operator Characteristics



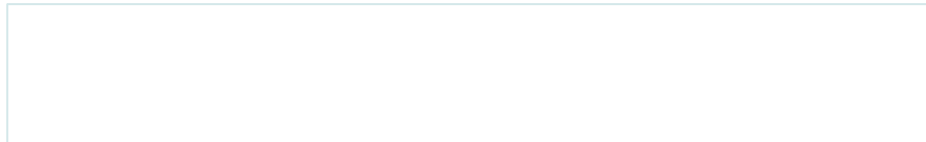
**Partial set of subtotals**



**Appropriate for hierarchical dimensions**



**Order dependent, coarsest to finest**



# ROLLUP/GROUP BY Comparison

SELECT Year, Month, SUM(Sales)  
GROUP BY ROLLUP(Year, Month)

Year	Month	SUM(Sales)
2016	Jan	100
2016	Feb	75
2016	Mar	150
2017	Jan	100
2017	Feb	200
2017	Mar	50
2016	-	325
2017	-	350
-	-	675

SELECT Year, Month, SUM(Sales)  
GROUP BY Year, Month

Year	Month	SUM(Sales)
2016	Jan	100
2016	Feb	75
2016	Mar	150
2017	Jan	100
2017	Feb	200
2017	Mar	50



# ROLLUP Example

- Summarize (SUM, COUNT, and MIN) store sales for USA and Canada between 2016 and 2017 by year and month
- Generate partial subtotals for year and month

```
SELECT TimeYear, TimeMonth, SUM(SalesDollar) AS SumSales,  
       MIN(SalesDollar) AS MinSales, COUNT(*) AS RowCount  
FROM SSSales, SSStore, SSTimeDim  
WHERE SSSales.StoreId = SSStore.StoreId  
      AND SSSales.TimeNo = SSTimeDim.TimeNo  
      AND (StoreNation = 'USA' OR StoreNation = 'Canada')  
      AND TimeYear BETWEEN 2016 AND 2017  
GROUP BY ROLLUP(TimeYear, TimeMonth)  
ORDER BY TimeYear, TimeMonth;
```



# ROLLUP Calculations

- Two grouping columns
  - $N$  distinct values in outer most column
  - Maximum subtotal rows:  $N + 1$
- Three grouping columns
  - ROLLUP (Col1, Col2, Col3) where Col1 has  $N$  distinct values, Col2 has  $M$  distinct values
  - Maximum subtotal rows:  $N \times M + N + 1$
- $k+1$  subtotal groups for  $k$  columns



# SELECT Statement without ROLLUP

```
SELECT TimeYear, TimeMonth,  
       SUM(SalesDollar) AS SumSales  
       ...  
GROUP BY TimeYear, TimeMonth  
UNION  
SELECT TimeYear, NULL, SUM(SalesDollar) AS  
       SumSales  
       ...  
GROUP BY TimeYear  
UNION  
SELECT NULL, NULL, SUM(SalesDollar) AS SumSales
```



# Additional ROLLUP Problems

- SELECT statement with ROLLUP operator
  - Sum store sales for USA and Canada in 2016 and 2017 by year, quarter, and month
  - Sort in a convenient order
  - Partial set of subtotals
- Equivalent SELECT statement without ROLLUP operator
- Documents in module 2 for lesson examples and additional practice problems





# Summary

- Support subtotal computations common in pivot tables
- ROLLUP operator for partial subtotals
- Appropriate for hierarchical dimensions
- Not primitive operator but strong advantages over UNION operations

