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* × *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