



# **SQL:**

## **Advanced Aggregation (Rollup, Cube, Grouping Sets)**



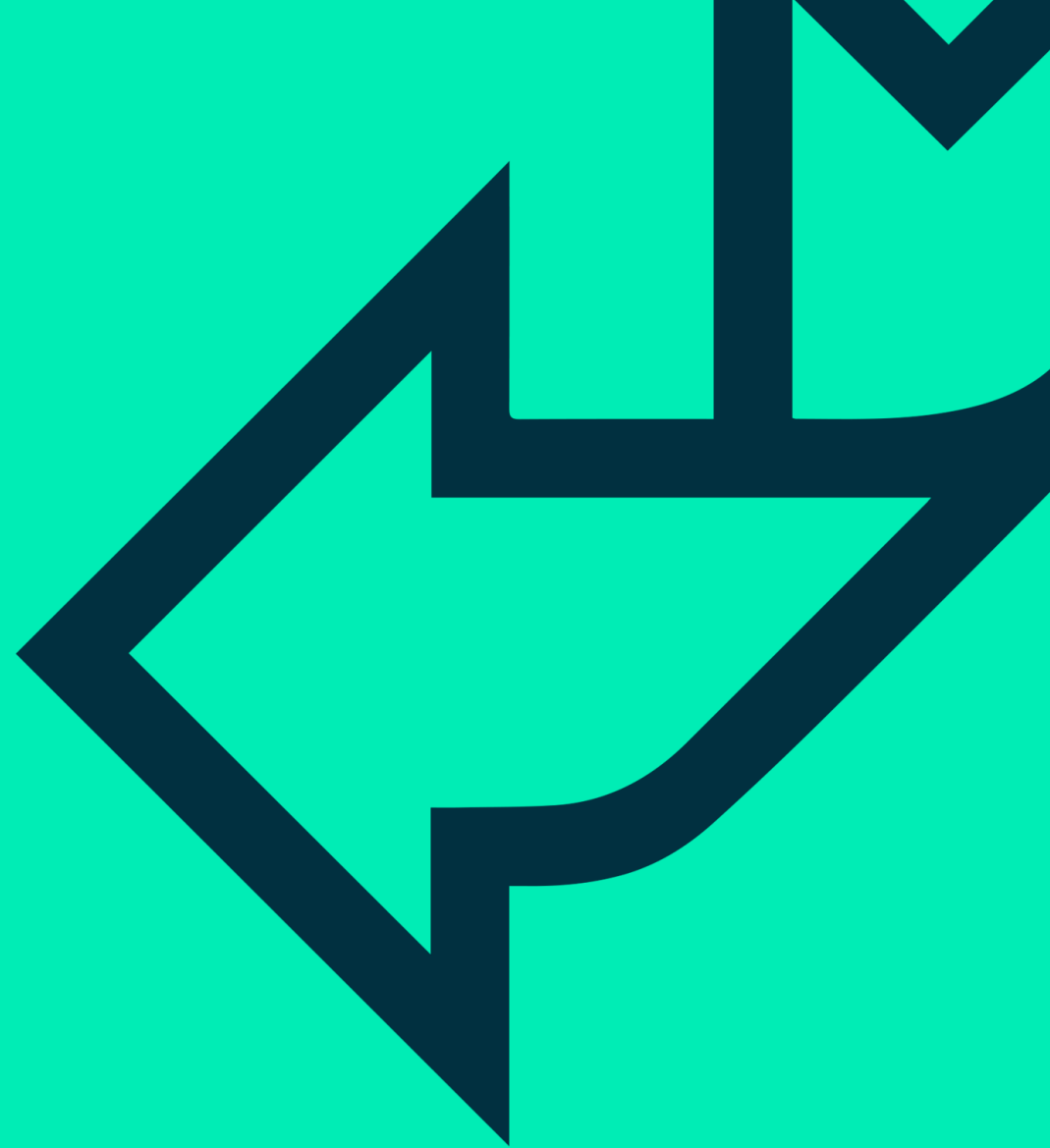


# SQL

## Lesson Objectives and Contents

Advanced aggregation

- Rollup
- Cube
- Grouping Sets



# Rollup

- Adds additional grouped rows progressively for each level named in GROUP BY clause.
- Lower levels are summarised and shown as NULL.

```
SELECT Category, Quarter, SUM(Sales) AS TotalSales
FROM SalesSource
GROUP BY Category, Quarter
WITH ROLLUP
```

Category	Subcategory	Quarter	Sales
Accessories	Tyres	Q1	230
Accessories	Tyres	Q2	250
Accessories	Tyres	Q3	275
Accessories	Lights	Q1	1000
Accessories	Lights	Q2	1200
Bikes	Road Bikes	Q1	90
Bikes	Road Bikes	Q2	82
Bikes	Mountain Bikes	Q1	120
Bikes	Mountain Bikes	Q2	124
Bikes	Touring Bikes	Q1	102
Bikes	Touring Bikes	Q2	99



Category	Quarter	Sales
Accessories	Q1	1230
Accessories	Q2	1450
Accessories	Q3	275
Accessories	NULL	2955
Bikes	Q1	312
Bikes	Q2	305
Bikes	NULL	617
NULL	NULL	3572

# Cube

- Adds additional grouped rows for combinations of levels named in GROUP BY clause.
- Grouped levels are shown as NULL.

```
SELECT Category, Quarter, SUM(Sales) AS Sales  
FROM SalesSource  
GROUP BY Category, Quarter  
WITH CUBE
```

Category	Subcategory	Quarter	Sales
Accessories	Tyres	Q1	230
Accessories	Tyres	Q2	250
Accessories	Tyres	Q3	275
Accessories	Lights	Q1	1000
Accessories	Lights	Q2	1200
Bikes	Road Bikes	Q1	90
Bikes	Road Bikes	Q2	82
Bikes	Mountain Bikes	Q1	120
Bikes	Mountain Bikes	Q2	124
Bikes	Touring Bikes	Q1	102
Bikes	Touring Bikes	Q2	99



Category	Quarter	Sales
Accessories	Q1	1230
Accessories	Q2	1450
Accessories	Q3	275
Accessories	NULL	2955
Bikes	Q1	312
Bikes	Q2	305
Bikes	NULL	617
NULL	NULL	3572
NULL	Q1	1542
NULL	Q2	1755
NULL	Q3	275

# Grouping Sets

- Allows for 1 or more grouping sets to be added.
- Each grouping set may have 0 or more columns.

```
SELECT Category, Quarter, SUM(Sales) AS Sales
FROM SalesSource
GROUP BY
  GROUPING SETS ( (Category) , (Quarter) , () )
```

Category	Subcategory	Quarter	Sales
Accessories	Tyres	Q1	230
Accessories	Tyres	Q2	250
Accessories	Tyres	Q3	275
Accessories	Lights	Q1	1000
Accessories	Lights	Q2	1200
Bikes	Road Bikes	Q1	90
Bikes	Road Bikes	Q2	82
Bikes	Mountain Bikes	Q1	120
Bikes	Mountain Bikes	Q2	124
Bikes	Touring Bikes	Q1	102
Bikes	Touring Bikes	Q2	99



(Category) —

() —

(Quarter) —

Category	Quarter	Sales
Accessories	NULL	2955
Bikes	NULL	617
NULL	NULL	3572
NULL	Q1	1542
NULL	Q2	1755
NULL	Q3	275

# Grouping

- Aggregate function that shows aggregated rows when using rollup, cube and grouping sets.
- Parameter is the column name that is grouped or not in this row.
- Result: 1 = grouped, 0 = not grouped.

```
SELECT Category, Grouping(Category) AS GC, Quarter, Grouping(Quarter) AS GQ,  
SUM(Sales) AS Sales  
FROM SalesSource  
GROUP BY Category, Quarter  
WITH CUBE
```

Category	Subcategory	Quarter	Sales
Accessories	Tyres	Q1	230
Accessories	Tyres	Q2	250
Accessories	Tyres	Q3	275
Accessories	Lights	Q1	1000
Accessories	Lights	Q2	1200
Bikes	Road Bikes	Q1	90
Bikes	Road Bikes	Q2	82
Bikes	Mountain Bikes	Q1	120
Bikes	Mountain Bikes	Q2	124
Bikes	Touring Bikes	Q1	102
Bikes	Touring Bikes	Q2	99



Category	GC	Quarter	GQ	Sales
Accessories	0	Q1	0	1230
Bikes	0	Q1	0	312
NULL	1	Q1	0	1542
Accessories	0	Q2	0	1450
Bikes	0	Q2	0	305
NULL	1	Q2	0	1755
Accessories	0	Q3	0	275
NULL	1	Q3	0	275
NULL	1	NULL	1	3572
Accessories	0	NULL	1	2955
Bikes	0	NULL	1	617

# Grouping\_ID

- Aggregate function that shows aggregated rows when using rollup, cube and grouping sets.
- Parameter is the column name that is grouped or not in this row.
- Binary digit assigned to each parameter column.

```
SELECT Category, Quarter, SUM(Sales) AS Sales, Grouping_ID(category, Quarter)  
AS G_ID  
FROM SalesSource  
GROUP BY Category, Quarter  
WITH CUBE
```

Category	Subcategory	Quarter	Sales
Accessories	Tyres	Q1	230
Accessories	Tyres	Q2	250
Accessories	Tyres	Q3	275
Accessories	Lights	Q1	1000
Accessories	Lights	Q2	1200
Bikes	Road Bikes	Q1	90
Bikes	Road Bikes	Q2	82
Bikes	Mountain Bikes	Q1	120
Bikes	Mountain Bikes	Q2	124
Bikes	Touring Bikes	Q1	102
Bikes	Touring Bikes	Q2	99



Category	Quarter	Sales	G_ID
Accessories	Q1	1230	0
Bikes	Q1	312	0
NULL	Q1	1542	2
Accessories	Q2	1450	0
Bikes	Q2	305	0
NULL	Q2	1755	2
Accessories	Q3	275	0
NULL	Q3	275	2
NULL	NULL	3572	3
Accessories	NULL	2955	1
Bikes	NULL	617	1



# PRACTICE ROLLUP, CUBE, GROUPING SETS

**Practice with the Northwind database.**

**Observe and discuss the different result sets in each case.**

## **USE Northwind**

```
SELECT SupplierID, CategoryID, SUM(UnitsInStock) FROM  
Products
```

```
GROUP BY SupplierID, CategoryID
```

### **-- rollup**

```
SELECT SupplierID, CategoryID, SUM(UnitsInStock) FROM  
Products
```

```
GROUP BY SupplierID, CategoryID
```

```
WITH ROLLUP
```





# PRACTICE ROLLUP, CUBE, GROUPING SETS

Observe and discuss the different result sets in each case.

## USE Northwind

### -- cube

```
SELECT SupplierID, CategoryID, SUM(UnitsInStock) FROM  
Products  
GROUP BY SupplierID, CategoryID  
WITH CUBE
```

### -- grouping sets - 1

```
SELECT SupplierID, CategoryID, SUM(UnitsInStock) FROM  
Products  
GROUP BY GROUPING SETS ((SupplierID), (CategoryID), ())
```

### -- grouping sets - 2

```
SELECT SupplierID, CategoryID, SUM(UnitsInStock) FROM  
Products  
GROUP BY GROUPING SETS ((SupplierID,CategoryID), ())
```