Summary Queries

September 28, 29, 2022

Summary Queries Examples

- What is the total quota for all salespeople?
- What are the smallest and largest assigned quota?
- How many salespeople have exceeded their quota?
- What is the size of the average order?
- What is the size of the average order for each sales office?
- How many salespeople are assigned to each sales office?

Summary Queries (Column Functions)

- These column functions offer different kinds of summary data:
  - SUM() computes the total of a column.
  - AVG() computes the average value in a column.
  - MIN() finds the smallest value in a column.
  - MAX() finds the largest value in a column.
  - COUNT() counts the number of values in a column. (NULL values are not counted.)
  - COUNT(*) counts rows of query results
- The argument to a column function can be a simple column name or it can be a SQL expression:

```
SELECT AVG(100 * (SALES/QUOTA))
  FROM SALESREPS;
```

Summary Queries (Column Functions)

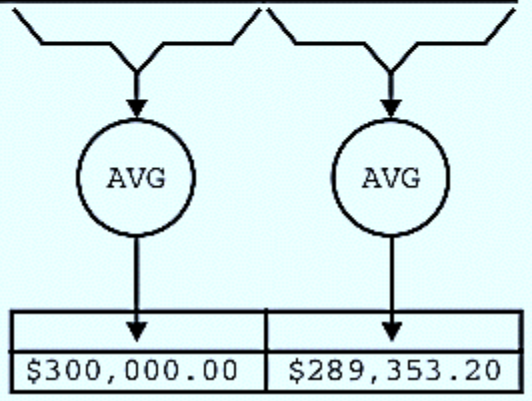
- What are the average quota and average sales of our salespeople?

SALESREPS Table

EMPL_NUM	NAME	MANAGER	QUOTA	SALES
105	Bill Adams	104	$350,000.00	$367,911.00
109	Mary Jones	106	$300,000.00	$392,725.00
102	Sue Smith	108	$350,000.00	$474,050.00
106	Sam Clark	NULL	$275,000.00	$299,912.00
104	Bob Smith	106	$200,000.00	$142,594.00
101	Dan Roberts	104	$300,000.00	$305,673.00
110	Tom Snyder	101	NULL	$75,985.00
108	Larry Fitch	106	$350,000.00	$361,865.00
103	Paul Cruz	104	$275,000.00	$286,775.00
107	Nancy Angelli	108	$300,000.00	$186,042.00

```
SELECT AVG(QUOTA), AVG(SALES)
  FROM SALESREPS;
```

AVG(QUOTA)	AVG(SALES)
$300,000.00	$289,353.20



Summary Queries Examples

- Calculate the average price of products from manufacturer ACI.

```
SELECT AVG(PRICE)
  FROM PRODUCTS
 WHERE MFR_ID = 'ACI';
```

- What are the smallest and largest assigned quotas?

```
SELECT MIN(QUOTA), MAX(QUOTA)
  FROM SALESREPS ;
```

Summary Queries Examples

- What is the best sales performance of any salesperson?

```
SELECT MAX(100 * (SALES/QUOTA))
  FROM SALESREPS;
```

- When using MIN() and MAX() with string data, the comparison of two strings depends on the character set being used.

A comparison of the ASCII and EBCDIC collating sequences of a list of strings, from smallest to largest:

ASCII	EBCDIC
1234ABC	acme mfg.
5678ABC	zeta corp.
ACME MFG.	Acme Mfg.
Acme Mfg.	ACME MFG.
ZETA CORP.	Zeta Corp.
Zeta Corp.	ZETA CORP.
acme mfg.	1234ABC
zeta corp.	5678ABC

Summary Queries Examples

- How many customers are there?

```
SELECT COUNT(CUST_NUM)
  FROM CUSTOMERS;
```

```
 COUNT(CUST_NUM)
----------------
              21
```

- How many orders for more than $25,000 are on the books?

```
SELECT COUNT(AMOUNT)
  FROM ORDERS
 WHERE AMOUNT > 25000.00;
```

```
 COUNT(AMOUNT)
---------------
             4
```

```
COUNT(*)
--------
       4
```

```
SELECT COUNT(ORDER_NUM)
  FROM ORDERS
 WHERE AMOUNT > 25000.00;
```

```
SELECT COUNT(*)
  FROM ORDERS
 WHERE AMOUNT > 25000.00;
```

Complex Summary Query

- Find the average order amount, total order amount, average order amount as a percentage of the customer's credit limit, and average order amount as a percentage of the salesperson's quota.

```
SELECT AVG(AMOUNT), SUM(AMOUNT), (100 * AVG(AMOUNT/CREDIT_LIMIT)),
       (100 * AVG(AMOUNT/QUOTA))
  FROM ORDERS, CUSTOMERS, SALESREPS
 WHERE CUST = CUST_NUM
   AND REP = EMPL_NUM;
```

NULL Values and Column Functions

```
SELECT COUNT(*), COUNT(SALES), COUNT(QUOTA)
  FROM SALESREPS;
```

COUNT(*)	COUNT(SALES)	COUNT(QUOTA)
10	10	9

```
SELECT SUM(SALES), SUM(QUOTA), (SUM(SALES) - SUM(QUOTA)), SUM(SALES-QUOTA)
  FROM SALESREPS;
```

SUM(SALES)	SUM(QUOTA)	(SUM(SALES)-SUM(QUOTA))	SUM(SALES-QUOTA)
$2,893,532.00	$2,700,000.00	$193,532.00	$117,547.00

Duplicate Row Elimination

- How many different titles are held by salespeople?

```
SELECT COUNT(DISTINCT TITLE)
   FROM SALESREPS;
```

```
 COUNT(DISTINCT TITLE)
----------------------
                     3
```

- How many sales offices have salespeople who are over quota?

```
SELECT COUNT(DISTINCT REP_OFFICE)
   FROM SALESREPS
  WHERE SALES > QUOTA;
```

Grouped Queries (GROUP BY Clause)

- What is average order size?

```
SELECT AVG(AMOUNT)
  FROM ORDERS;
```

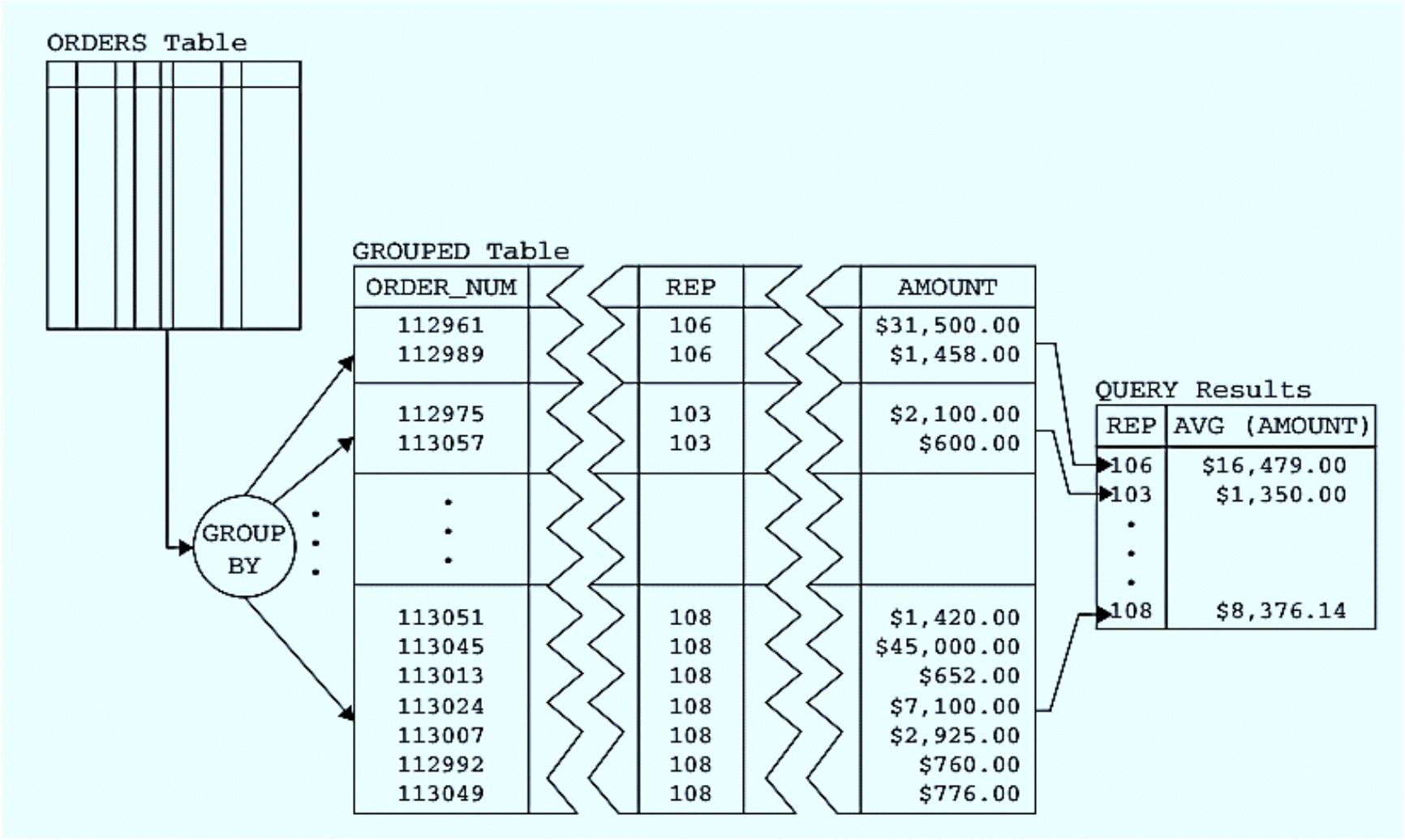
```
AVG(AMOUNT)
-----------
   $8,256.37
```

- What is average order size for each salesperson?

```
SELECT REP, AVG(AMOUNT)
  FROM ORDERS
 GROUP BY REP;
```

REP	AVG(AMOUNT)
101	$8,876.00
102	$5,694.00
103	$1,350.00
105	$7,865.40
106	$16,479.00
107	$11,477.33
108	$8,376.14
109	$3,552.50
110	$11,566.00

Grouped Queries – How It Works



Grouped Queries - Examples

- How many salespeople are assigned to each office?

```
SELECT REP_OFFICE, COUNT(*)
  FROM SALESREPS
 GROUP BY REP_OFFICE;
```

- Calculate the total orders for each customer of each salesperson.

```
SELECT REP, CUST, SUM(AMOUNT)
  FROM ORDERS
 GROUP BY REP, CUST;
```

REP	CUST	SUM(AMOUNT)
101	2102	$3,978.00
101	2108	$150.00
101	2113	$22,500.00
102	2106	$4,026.00
102	2114	$15,000.00
102	2120	$3,750.00
103	2111	$2,700.00
105	2103	$35,582.00
105	2111	$3,745.00
.		
.		

Limitation with Grouped Queries

- Calculate the total orders for each salesperson.

```
SELECT EMPL_NUM, NAME, SUM(AMOUNT)
  FROM ORDERS, SALESREPS
 WHERE REP = EMPL_NUM
 GROUP BY EMPL_NUM;
```

```
Error: "NAME" not a GROUP BY expression
```

Null Values in Grouping Columns

```
SELECT HAIR, EYES, COUNT(*)
FROM PEOPLE
GROUP
BY HAIR, EYES
```

NAME	HAIR	EYES
Cincly	Brown	Blue
Louise	NULL	Blue
Harry	NULL	Blue
Samantha	NULL	NULL
Joanne	NULL	NULL
George	Brown	NULL
Mary	Brown	NULL
Paula	Brown	NULL
Kevin	Brown	NULL
Joel	Brown	Brown
Susan	Blonde	Blue
Marie	Blonde	Blue

HAIR	EYES	COUNT(*)
Brown	Blue	1
NULL	Blue	2
NULL	NULL	2
Brown	NULL	4
Brown	Brown	1
Blonde	Blue	2

Group Search Condition (HAVING Clause)

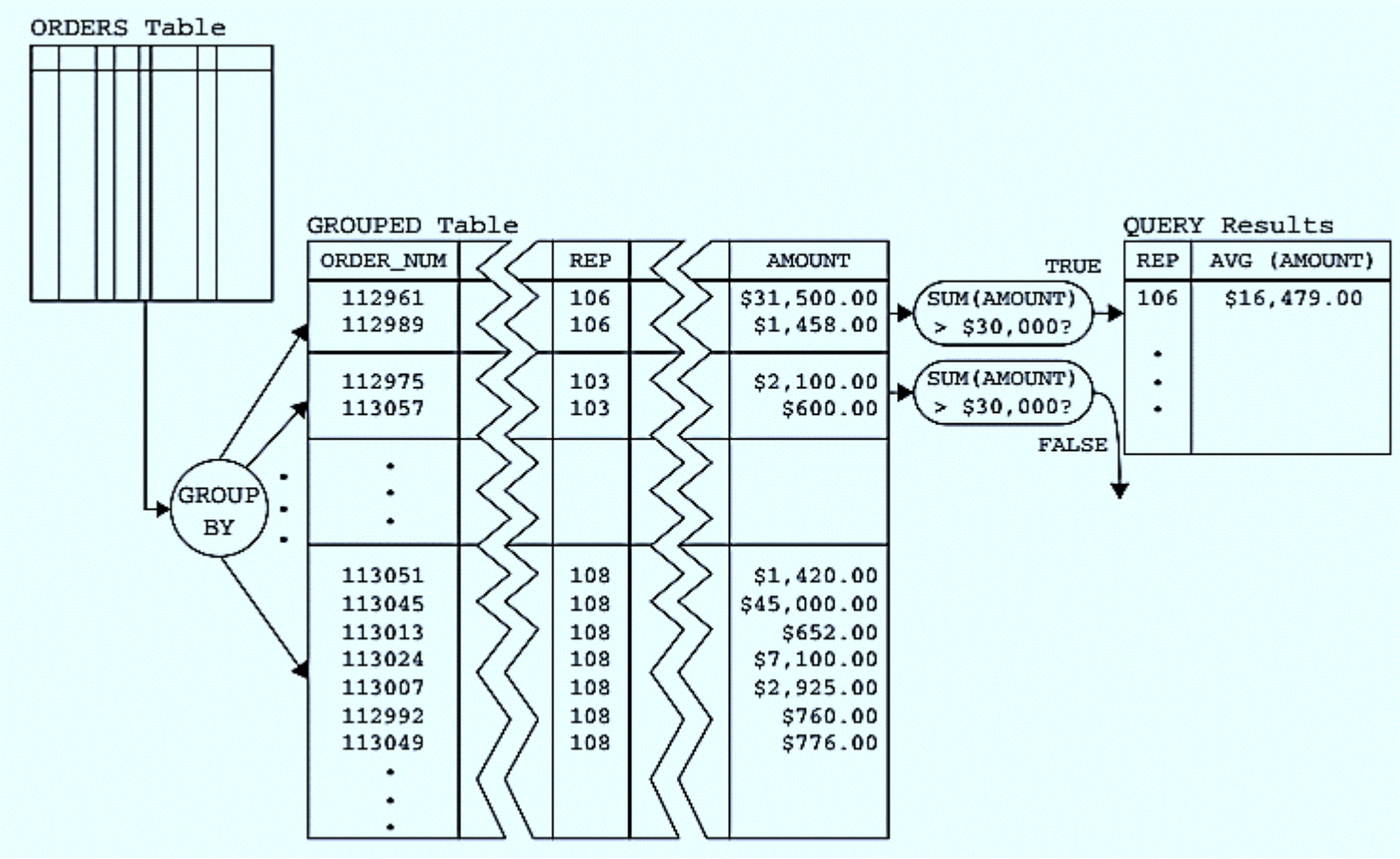
- What is average order size for each salesperson whose orders total more than $30,000?

```
SELECT REP, AVG(AMOUNT)
  FROM ORDERS
 GROUP BY REP
HAVING SUM(AMOUNT) > 30000.00;
```

REP	AVG(AMOUNT)
105	$7,865.40
106	$16,479.00
107	$11,477.33
108	$8,376.14

HAVING Clause – How It Works

- What is average order size for each salesperson whose orders total more than $30,000?



Group Search Condition (HAVING Clause)

- For each office with 2 or more people, compute the total quota and total sales for all salespeople who work in the office.

```
SELECT CITY, SUM(QUOTA), SUM(SALESREPS.SALES)
  FROM OFFICES, SALESREPS
 WHERE OFFICE = REP_OFFICE
 GROUP BY CITY
HAVING COUNT(*) >= 2;
```

CITY	SUM(QUOTA)	SUM(SALESREPS.SALES)
Chicago	$775,000.00	$735,042.00
Los Angeles	$700,000.00	$835,915.00
New York	$575,000.00	$692,637.00