

Group Functions

Group Functions

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Objectives

Define and give an example of the seven group functions:

- SUM,
- AVG,
- COUNT,
- MIN,
- MAX,
- STDDEV,
- VARIANCE

Construct and execute a SQL query using group functions

Construct and execute group functions that operate only with numeric data types



Purpose

What if you were writing an article for the school newspaper and, to make a point, you wanted to know the average age of the students at your school?

What would you have to do to get this information?

You could ask each student their age in years, months, and days, add up all of these numbers, and then divide by the number of students in your school.

That would be one way -- a very slow and difficult way -- to find this information.

What if you needed to know this immediately so that you could meet a 3:00 p.m. deadline?

• You might have a problem!

What if each student's date of birth was in a school database in the STUDENT table?

• It would be so easy then!

In this lesson, you are going to learn about the power of group functions in SQL.



roup Function

GROUP Functions

In SQL, the following group functions can operate on a whole table or on a specific grouping of rows.

Each function returns one result.

AVG COUNT MAX MIN **VARIANCE** SUM **STDDEV**



GROUP Functions List

MIN

 Used with columns that store any data type to return the minimum value.



 Used with columns that store any data type to return the maximum value.

24000 17000
17000
9000
6000
4200
5800
3500
3100
2600
2500
• • •
7000
4400

SALARY

DEPT_ID

1 SELECT MAX(salary), MIN(salary) FROM employees;						
Results	Explain	Describe	Save	d SQL	History	
	MAX(SALARY)				MIN(SALARY)	
24000				2500		



GROUP Functions List

SUM

 Used with columns that store numeric data to find the total or sum of values.

AVG:

 Used with columns that store numeric data to compute the average.

24000
17000
17000
9000
6000
4200
5800
3500
3100
2600
2500
•••
7000
4400

SALARY

DEPT_ID

1 SELECT SUM(salary), AVG(salary) FROM employees;							
*							
Results	Explain	Describe	Save	d SQL	History		
	SUM(SALARY)				AVG(SALARY)		
175500				8775			



Functions

GROUP Functions List

COUNT

• Returns the number of rows.

VARIANCE

- Used with columns that store numeric data to calculate the spread of data around the mean.
- For example, if the average grade for the class on the last test was 82% and the student's scores ranged from 40% to 100%, the variance of scores would be greater than if the student's scores ranged from 78% to 88%.

STDDEV:

- Similar to variance, standard deviation measures the spread of data.
- For two sets of data with approximately the same mean, the greater the spread, the greater the standard deviation



Group Functions

GROUP Functions SELECT Clause

```
SELECT column, group_function(column),
...
FROM table
WHERE condition
GROUP BY column;
```

Group functions cannot be used in the WHERE clause:

```
SELECT last_name, first_name
FROM employees
WHERE salary = MIN(salary);
```



ORA-00934: group function is not allowed here

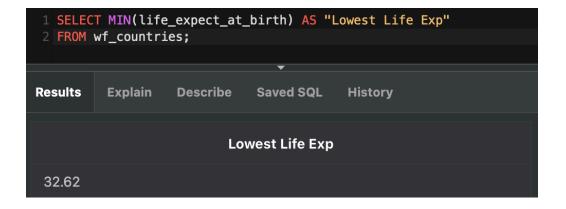
Group Functions operate on sets of rows to give one result per group

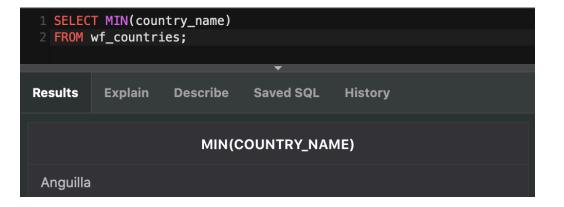


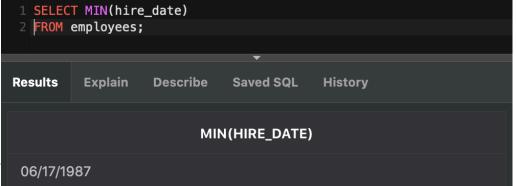
GROUP Function examples



 Used with columns that store any data type to return the minimum value.







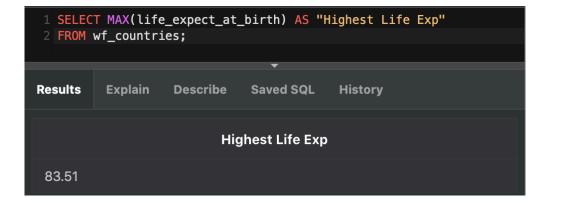


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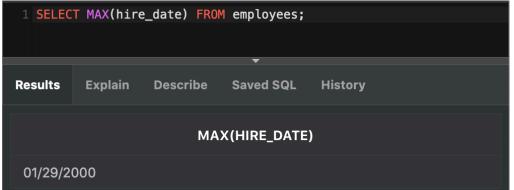
GROUP Function examples



 Used with columns that store any data type to return the maximum value.





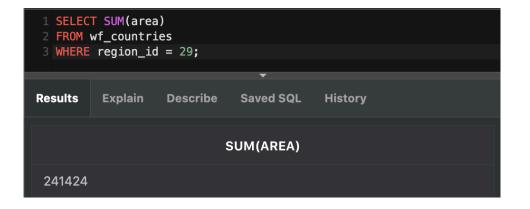




GROUP Function examples



 Used with columns that store numeric data to find the total or sum of values.







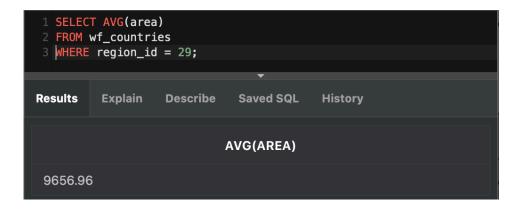


roup Functions

GROUP Function examples



 Used with columns that store numeric data to compute the average.









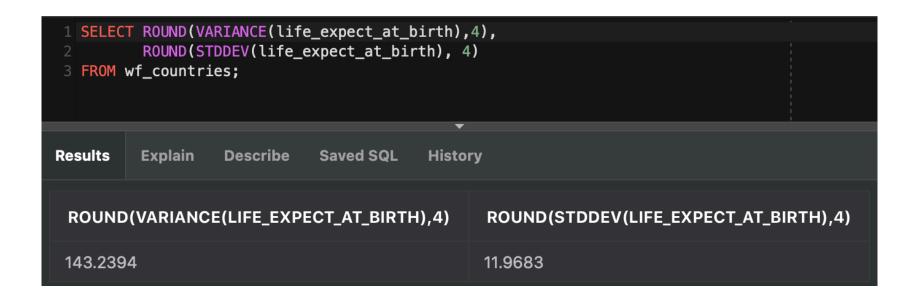
GROUP Function examples

VARIANCE:

• Used with columns that store numeric data to calculate the spread of data around the mean.

STDDEV:

• Similar to variance, standard deviation measures the spread of data.



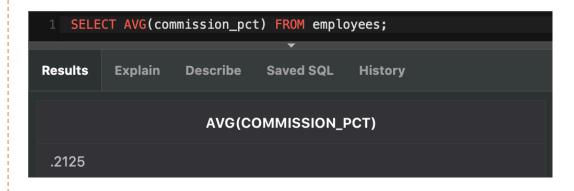




Froup Function

GROUP Function and NULL

- Group functions ignore NULL values.
- In the example,
 - the null values were <u>not used</u> to find the **average** commission_pct.



LAST_NAME	COMMISSION_PCT
King	-
Kochhar	-
De Haan	-
Whalen	-
Higgins	-
Gietz	-
Zlotkey	.2
Abel	.3
Taylor	.2
Grant	.15
Mourgos	-
•••	•••





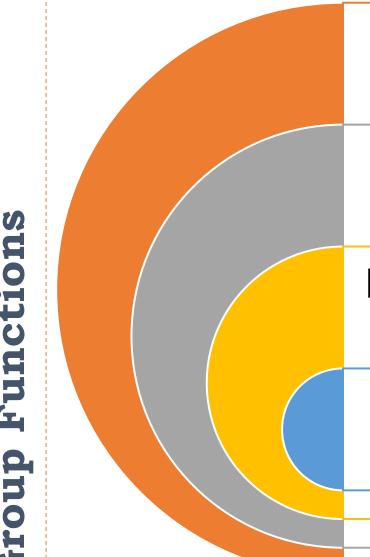
More Than One Group Function

```
SELECT MAX(salary),
          MIN(salary),
          MIN(employee_id)
4 FROM employees
5 WHERE department_id = 60;
Results
         Explain
                   Describe
                              Saved SQL
                                          History
   MAX(SALARY)
                        MIN(SALARY)
                                             MIN(EMPLOYEE_ID)
 9000
                      4200
                                          103
```



DEHB

Rules for Group Functions



Group functions ignore null values.

Group functions cannot be used in the WHERE clause.

MIN, MAX and COUNT can be used with any data type;

SUM, AVG, STDDEV, and VARIANCE can be used only with numeric data types.

