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Reporting Aggregated Data Using the Group Functions

What Are Group Functions?

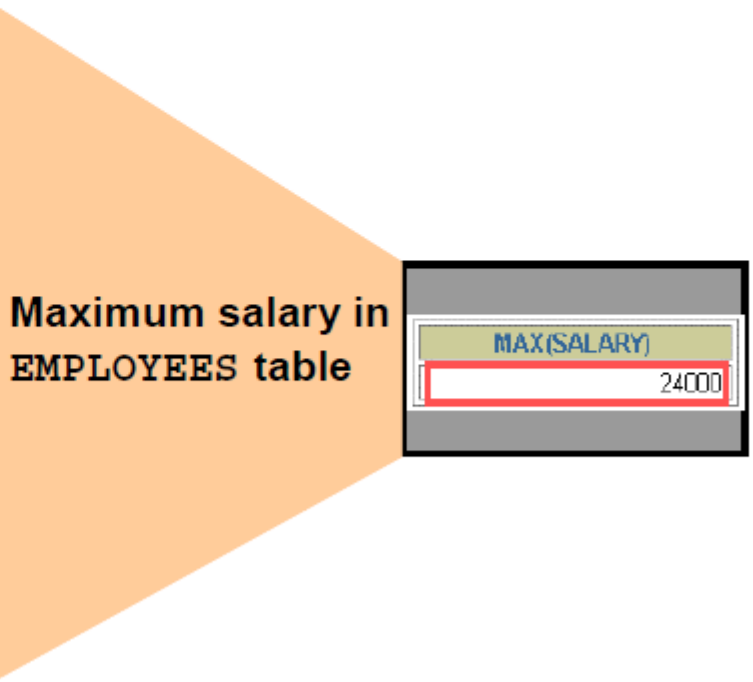
Group functions operate on sets of rows to give one result per group.

EMPLOYEES

DEPARTMENT_ID	SALARY
90	24000
90	17000
90	17000
60	9000
60	6000
60	4200
50	5800
50	3500
50	3100
50	2600
50	2500
80	10500
80	11000
80	8600
	7000
10	4400

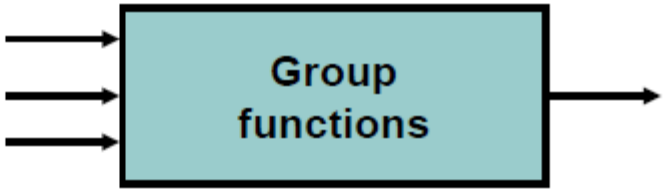
...

20 rows selected.



Types of Group Functions

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



Group Functions: Syntax

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

Using the AVG and SUM Functions

You can use AVG and SUM for numeric data.

```
SELECT  AVG(salary), MAX(salary),
        MIN(salary), SUM(salary)
FROM    employees
WHERE   job_id LIKE '%REP%';
```

AVG(SALARY)	MAX(SALARY)	MIN(SALARY)	SUM(SALARY)
8150	11000	6000	32600

Using the MIN and MAX Functions

You can use MIN and MAX for numeric, character, and date data types.

```
SELECT MIN(hire_date), MAX(hire_date)
FROM       employees;
```

MIN(HIRE_	MAX(HIRE_
17-JUN-87	29-JAN-00

Using the COUNT Function

COUNT(*) returns the number of rows in a table:

1

```
SELECT  COUNT(*)
FROM    employees
WHERE   department_id = 50;
```

COUNT(*)
5

COUNT(*expr*) returns the number of rows with non-null values for the *expr*:

2

```
SELECT  COUNT(commission_pct)
FROM    employees
WHERE   department_id = 80;
```

COUNT(COMMISSION_PCT)
3

Using the DISTINCT Keyword

- COUNT(DISTINCT *expr*) returns the number of distinct non-null values of the *expr*.
- To display the number of distinct department values in the EMPLOYEES table:

```
SELECT COUNT(DISTINCT department_id)
FROM   employees;
```

COUNT(DISTINCTDEPARTMENT_ID)
7

Group Functions and Null Values

Group functions ignore null values in the column:

1

```
SELECT AVG(commission_pct)
FROM   employees;
```

AVG(COMMISSION_PCT)
.2125

The NVL function forces group functions to include null values:

2

```
SELECT AVG(NVL(commission_pct, 0))
FROM   employees;
```

AVG(NVL(COMMISSION_PCT,0))
.0425

Creating Groups of Data

EMPLOYEES

DEPARTMENT_ID	SALARY
10	4400
20	13000
20	6000
50	5800
50	3500
50	3100
50	2500
50	2600
60	9000
60	6000
60	4200
80	10500
80	8600
80	11000
90	24000
90	17000

...

20 rows selected.

4400

9500

3500

6400

10033

Average salary in EMPLOYEES table for each department

DEPARTMENT_ID	AVG(SALARY)
10	4400
20	9500
50	3500
60	6400
80	10033.3333
90	19333.3333
110	10150
	7000

Creating Groups of Data: GROUP BY Clause Syntax

```
SELECT     column, group_function(column)
FROM       table
[WHERE     condition]
[GROUP BY group_by_expression]
[ORDER BY column];
```

You can divide rows in a table into smaller groups by using the GROUP BY clause.

Using the GROUP BY Clause

All columns in the SELECT list that are not in group functions must be in the GROUP BY clause.

```
SELECT    department_id, AVG(salary)
FROM      employees
GROUP BY department_id ;
```

DEPARTMENT_ID	AVG(SALARY)
10	4400
20	9500
50	3500
60	6400
80	10033.3333
90	19333.3333
110	10150
	7000

Restricting Group Results with the HAVING Clause

When you use the HAVING clause, the Oracle server restricts groups as follows:

1. Rows are grouped.
2. The group function is applied.
3. Groups matching the HAVING clause are displayed.

```
SELECT     column, group_function
FROM       table
[WHERE     condition]
[GROUP BY group_by_expression]
[HAVING    group_condition]
[ORDER BY column];
```

Using the HAVING Clause

```
SELECT    department_id, MAX(salary)
FROM      employees
GROUP BY  department_id
HAVING    MAX(salary)>10000 ;
```

DEPARTMENT_ID	MAX(SALARY)
20	13000
80	11000
90	24000
110	12000

Using the HAVING Clause

```
SELECT   job_id, SUM(salary) PAYROLL
FROM     employees
WHERE    job_id NOT LIKE '%REP%'
GROUP BY job_id
HAVING   SUM(salary) > 13000
ORDER BY SUM(salary);
```

JOB_ID	PAYROLL
IT_PROG	19200
AD_PRES	24000
AD_VP	34000

Nesting Group Functions

Display the maximum average salary:

```
SELECT   MAX(AVG(salary))
FROM     employees
GROUP BY department_id;
```

MAX(AVG(SALARY))
19333.3333