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# Oracle Day 01

## - 数据库

RDBMS (关系型数据库管理系统)

- Oracle (Oracle) Mysql (Oracle) SQL Server (MS) DB2 (IBM)

大型

大型

## - SQL

关系型模型

### 一 关系及对象

一对关系的操作



一对数据一致性、完整性约束



关系：二维表

Relation →	
ID	CONTRY_NAME
1	UK
2	US
3	JP

Row → tuple  
column (attribute)

SQL ↗

Structured Query Language.

Table - 数据存储基本单

View

Sequence

序列数

Create Database Object



Table



View



PL/SQL Procedure



PL/SQL Function



PL/SQL Package



Type



Trigger



Synonym



Program unit





元

## 数据完整性约束

- Entity (PK)
- Referential (FK)
- Column (datatype)
- User-defined (custom)

PK: 唯一  
FK: 所有能引 (PK, UNIQUE) 中值

或 null

What is Oracle?

= company  
= database  
and so on

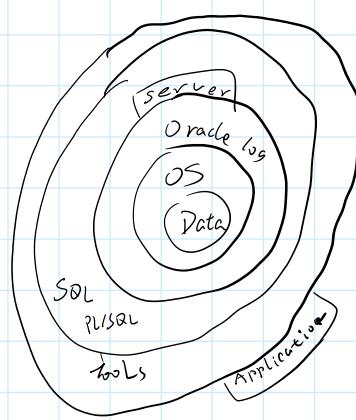
Oracle 7  
Oracle 10g  
Oracle 11g

正式开始



Oracle — 用户表  
— 数据字典

洋葱模型



机器  
汇编  
高级编程语言  
SQL

SQL: 结构化查询语言

汇编  
高级编程语言  
SQL  
4th generation language

PL/SQL: 第三代语言 过程化

SQL \*PLUS: 一个工具 client 工具。

建立连接

> sqlplus username/password

> select last\_name from s\_emp;  
/

Buffer → SQL> ?

会显示最近执行的 SQL 语句

用 / 再次执行。

SQL 语句

Select 查

INSERT、UPDATE、DELETE (DML 数据操作语句)

CREATE、ALTER、DROP、RENAME、TRUNCATE (DDL)

COMMIT、ROLLBACK、SAVEPOINT Transaction Control

Grant

Chapter 3

\* SELECT

SELECT 列名1, 列名2... FROM 表名 ;

分号是SQL PLUS中  
用结束的标志。

\* SQL 要求：

- 最好多行

- 缩进 ↗ notice

- 缩写 の 禁止

- 大小写 不敏感

- 所有命令 输入 到 Buffer

\* \*：代表所有列。

\* 列名中逗号的顺序 即输出的顺序。

\* 日期和字符串 常无显示

\* 数字靠右

\* 可以查询的时候使用 数值计算

+ - × ÷  
X ÷ 优先级 行 + 0.1.2.

计算顺序 左 → 右

用括号 可以改变

Alias 给列取别名：

Column AS + 别名

> \* select last\_name, salary\*12 as total  
from s.emp

↓  
也可简写 as

别名里有 宽格 式有 特殊符 需要大小写敏感，用双引号 3起来

连接：用 "||"

~~select~~ s: select first\_name||last\_name name  
from s\_emp

SQL plus里，column name format a20

（字符串操作），让name列显示为字符串。

|| 还可以用半连接符

select first\_name||''||last\_name name  
from s\_emp  
↑  
字符串用单引号引起来： ''

Oracle中的空值。

NULL

select first\_name||''||last\_name, commission\_pct name  
from s\_emp

FIRST_NAME  ' '  LAST_NAME	NAME
Carmen Velasquez	-
LaDoris Ngao	-
Midori Nagayama	-
Mark Quick-To-See	-
Audrey Ropeburn	-
Molly Urguhart	-
Roberta Menchu	-
Ben Biri	-
Antoinette Catchpole	-
Marta Havel	-
Colin Magee	10
Henry Giljum	12.5
Yasmine Sedeghi	10
Mai Nguyen	15
Andre Dumas	17.5
Elena Maduro	- → NULL
George Smith	-
Akira Nozaki	-
Vikram Patel	-
Chad Newman	-
Alexander Markarian	-
Eddie Chang	-
Radha Patel	-
Bela Dancs	-
Cultivo Schubert	-

final

select last\_name, title, salary \* 12 \* (1 + commission\_pct / 100) total  
from s\_emp

包含参与运算，得到还是空值

LAST_NAME	TITLE	TOTAL
Velasquez	President	-
Ngao	VP, Operations	-
Nagayama	VP, Sales	-
Quick-To-See	VP, Finance	-
Ropeburn	VP, Administration	-
Urguhart	Warehouse Manager	-
Menchu	Warehouse Manager	-
Biri	Warehouse Manager	-
Catchpole	Warehouse Manager	-
Havel	Warehouse Manager	-
Magee	Sales Representative	18480
Giljum	Sales Representative	20115
Sedeghi	Sales Representative	19998
Nguyen	Sales Representative	21045
Dumas	Sales Representative	20445
Maduro	Stock Clerk	-
Smith	Stock Clerk	-
Nozaki	Stock Clerk	-
Patel	Stock Clerk	-

第一节课后作业

NVL 函数，将 NULL 值与指定的值替换。  
日期、字符串、数字。

与被查询的类型要一致.

```
select last_name,title,salary*12*(1+NVL(commission_pct,0)/100) total  
from s_emp
```

LAST_NAME	TITLE	TOTAL
Velasquez	President	30000
Ngao	VP, Operations	17400
Nagayama	VP, Sales	16800
Quick-To-See	VP, Finance	17400
Ropeburn	VP, Administration	18600
Urguhart	Warehouse Manager	14400
Menchu	Warehouse Manager	15000
Biri	Warehouse Manager	13200
Catchpole	Warehouse Manager	15600
Havel	Warehouse Manager	15684
Magee	Sales Representative	18480
Giljum	Sales Representative	20115
Sedeghi	Sales Representative	19998
Nguyen	Sales Representative	21045
Dumas	Sales Representative	20445
Maduro	Stock Clerk	16800
Smith	Stock Clerk	11280
Nozaki	Stock Clerk	14400
Patel	Stock Clerk	9540
Newman	Stock Clerk	9000
Markarian	Stock Clerk	10200
Chang	Stock Clerk	9600
Patel	Stock Clerk	9540

\* 有重复行时，使用

```
select name  
from s_dept
```

NAME
Administration
Finance
Operations
Sales

Download CSV  
12 rows selected.

使用 DISTINCT :

select DISTINCT name  
from s\_dept



NAME
Sales
Administration
Finance
Operations

Download CSV  
4 rows selected.

当 DISTINCT 后跟多个列名

当 DISTINCT

select DISTINCT dept\_id,title  
from s\_emp

后跟多个列名

是后面的组合不重复

DEPT_ID	TITLE
41	VP, Operations
41	Warehouse Manager
42	Warehouse Manager
41	Stock Clerk
50	VP, Administration
35	Sales Representative
43	Warehouse Manager
31	Sales Representative
10	VP, Finance
45	Stock Clerk
34	Sales Representative
31	VP, Sales
44	Warehouse Manager
32	Sales Representative
33	Sales Representative
42	Stock Clerk
44	Stock Clerk
50	President
45	Warehouse Manager
43	Stock Clerk
34	Stock Clerk

Download CSV

若想只上 title 不重复

关系型数据库是完成不了的。

1st 范式 行和列数只能得一个结果

DISTINCT?

a

b

1

3



2

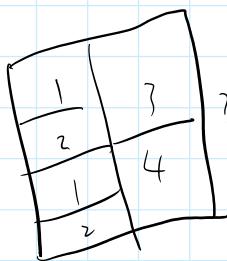
3

1

4

2

4



1 4  
2 4

DISTINCT 紧跟 SELECT 后，对所有列进行限制。  
(在没有出现函数的情况下)

易错点

SQL\*PLUS 工具的一些常用命令：

> DESCRIBE s\_dept 获取表的信息。

简写：desc

Data Type

NUMBER(p,s) 数字  
NUMBER(p) p: 有几位数  
s: 小数点后取值位数

VARCHAR2(p) 字符  
ORACLE 自己定义的

VARCHAR(p) → 变长字符串

CHAR(p) → 定长字符串



时间：DATE：  
年月日、小时、分钟都存储起来。



继续。SQL plus 命令：

> SAVE filename：将缓冲区的命令存在文件中。

> START filename：运行 SQL 脚本。



/ 代表执行

也用 @ 也可以，  
@ filename

> EXIT 退出SQL \*PLUS

## Lesson 2

### 排序 和 WHERE 语句

#### 1. ORDER BY Column

```
select last_name, salary  
from s_emp  
order by salary asc
```

↑  
默认

ASC : 升序

DESC : 降序

```
select last_name, salary  
from s_emp  
order by salary desc
```



LAST_NAME	SALARY
Velasquez	2500
Ropeburn	1550
Nguyen	1525
Sedeghi	1515
Giljum	1490
Quick-To-See	1450
Ngao	1450
Dumas	1450
Magee	1400
Nagayama	1400
Maduro	1400
Havel	1307
Collier	1200

LAST_NAME	SALARY
Newman	750
Patel	795
Patel	795
Chang	800
Markarian	850
Dancs	860
Smith	940
Biri	1100
Schwartz	1100
Nozaki	1200
Urguhart	1200
Menchu	1250



排序时，NULL值被认为是最大的

Velasquez	-
Schwartz	-
Nagayama	-
Quick-To-See	-
Ropeburn	-
Urguhart	-
Menchu	-
Biri	-
Catchpole	-
Havel	-
Ngao	-
Dancs	-
Patel	-
Chang	-
Markarian	-
Maduro	-
Smith	-
Nozaki	-
Patel	-
Newman	-
Dumas	17.5
Nguyen	15
Giljum	12.5
Sedeghi	10
Magee	10

Download CSV

```
select last_name, commission_pct
from s_emp
order by commission_pct
```



LAST_NAME	COMMISSION_PCT
Sedeghi	10
Magee	10
Giljum	12.5
Nguyen	15
Dumas	17.5
Urguhart	-
Menchu	-
Biri	-
Catchpole	-
Havel	-
Maduro	-

ORDER BY

以什么为依据？

```
select last_name||' '|first_name name,salary
from s_emp
order by name
```

```
select last_name||' '|first_name name,salary
from s_emp
order by salary*12
```

NAME	SALARY
Biri Ben	1100
Catchpole Antoinette	1300
Chang Eddie	800
Dancs Bela	860
Dumas Andre	1450
Giljum Henry	1490
Havel Marta	1307
Maduro Elena	1400
Magee Colin	1400
Markarian Alexander	850
Menchu Roberta	1250
Nagayama Midori	1400
...	...

```
select last_name||' '|first_name name,salary
from s_emp
order by 1
```

Order by 以什么为依据：

1) 列名

2) 列的别名

3) 表达式

4) SELECT 后面跟的编译

NAME	SALARY
Biri Ben	1100
Catchpole Antoinette	1300
Chang Eddie	800
Dancs Bela	860
Dumas Andre	1450
Giljum Henry	1490
Havel Marta	1307
Maduro Elena	1400
Magee Colin	1400
Markarian Alexander	850
Menchu Roberta	1250

WHERE 語句

```
select last_name||' '|first_name name,salary,dept_id
from s_emp
where dept_id=41
```

NAME	SALARY	DEPT_ID
Ngao LaDoris	1450	41
Urguhart Molly	1200	41
Maduro Elena	1400	41
Smith George	940	41

```
select last_name||' '||first_name name,salary,dept_id  
from s_emp  
where dept_id=41
```

带限位符的字符串和日期，要用单引号引起来，  
而且在单引号中区分大小写。

Urguhart Molly	1200	41
Maduro Elena	1400	41
Smith George	940	41
Download CSV		
4 rows selected.		

```
select last_name||' '||first_name name,salary,dept_id  
from s_emp  
where last_name='smith'
```

```
select last_name||' '||first_name name,salary,dept_id  
from s_emp  
where last_name='Smith'
```

no data found

NAME	SALARY	DEPT_ID
Smith George	940	41
Download CSV		

条件限位符用操作符：

= < > <= >= <>

```
select last_name||' '||first_name name,salary,dept_id  
from s_emp  
where last_name<>'Smith'  
order by name
```

↓ 不等于

Patel Vikram	795	42
Quick-To-See Mark	1450	10
Ropeburn Audry	1550	50
Schwartz Sylvie	1100	45
Sedeghi Yasmin	1515	33
Urguhart Molly	1200	41
Velasquez Carmen	2500	50

Download CSV

\* BETWEEN ... AND ... 在 x 和之间

- 前面是小值，

后面的是大值。

```
select last_name||' '||first_name name,salary,dept_id  
from s_emp  
where salary between 1000 and 1500  
order by salary
```

no data found

```
select last_name||' '||first_name name,salary,dept_id  
from s_emp  
where salary between 1500 and 1000  
order by salary
```

NAME	SALARY	DEPT_ID
Schwartz Sylvie	1100	45
Biri Ben	1100	43
Nozaki Akira	1200	42
Urguhart Molly	1200	41
Menchu Roberta	1250	42
Catchpole Antoinette	1300	44
Havel Marta	1307	45
Nagayama Midori	1400	31
Magee Colin	1400	31
Maduro Elena	1400	41
Dumas Andre	1450	35
Ngao LaDoris	1450	41
Quick-To-See Mark	1450	10
Giljum Henry	1490	32

Download CSV  
14 rows selected.

```
select last_name||' '|first_name name,salary,dept_id
from s_emp
where salary between 1100 and 1490
order by salary
```

between  $a$  和  $b$  之间  
 $a$  和  $b$  都能取到。



NAME	SALARY	DEPT_ID
Schwartz Sylvie	1100	45
Biri Ben	1100	43
Nozaki Akira	1200	42
Urguhart Molly	1200	41
Menchu Roberta	1250	42
Catchpole Antoinette	1300	44
Havel Marta	1307	45
Nagayama Midori	1400	31
Magee Colin	1400	31
Maduro Elena	1400	41
Dumas Andre	1450	35
Ngao LaDoris	1450	41
Quick-To-See Mark	1450	10
Giljum Henry	1490	32

[Download CSV](#)

## \* IN (list) 在 list 中任意匹配一个

```
select last_name||' '|first_name name,salary,dept_id
from s_emp
where dept_id in (41,43,45)
order by salary
```



NAME	SALARY	DEPT_ID
Newman Chad	750	43
Markarian Alexander	850	43
Dancs Bela	860	45
Smith George	940	41
Biri Ben	1100	43
Schwartz Sylvie	1100	45
Urguhart Molly	1200	41
Havel Marta	1307	45
Maduro Elena	1400	41
Ngao LaDoris	1450	41

[Download CSV](#)

## \* LIKE 模糊查询 ...

通配符: % None or Many characters

NAME	SALARY	DEPT_ID
Smith George	940	41
Schwartz Sylvie	1100	45
Sedeghi Yasmin	1515	33

[Download CSV](#)

3 rows selected.

```
select last_name||' '|first_name name,salary,dept_id
from s_emp
where last_name like 'S%'
```



通配符: \_ , 匹配一个字符  
 (一个字符是任意的)

```
select last_name||' '|first_name name,salary,dept_id
from s_emp
where dept_id like '4_'
order by salary
```



```
select last_name||' '|first_name name,salary,dept_id,start_date
from s_emp
where start_date like '%91'
order by salary
```

NAME	SALARY	DEPT_ID
Newman Chad	750	43
Patel Vikram	795	42
Chang Eddie	800	44
Markarian Alexander	850	43
Dancs Bela	860	45
Smith George	940	41

where start\_date like '%91'  
order by salary



NAME	SALARY	DEPT_ID	START_DATE
Newman Chad	750	43	21-JUL-91
Patel Vikram	795	42	06-AUG-91
Markarian Alexander	850	43	26-MAY-91
Dancs Bela	860	45	17-MAR-91
Schwartz Sylvie	1100	45	09-MAY-91
Urguhart Molly	1200	41	18-JAN-91
Nozaki Akira	1200	42	09-FEB-91
Havel Marta	1307	45	27-FEB-91
Nagayama Midori	1400	31	17-JUN-91
Dumas Andre	1450	35	09-OCT-91
Sedeghi Yasmin	1515	33	18-FEB-91

[Download CSV](#)

NAME	SALARY	DEPT_ID	START_DATE
Dancs Bela	860	45	
Smith George	940	41	
Biri Ben	1100	43	
Schwartz Sylvie	1100	45	
Nozaki Akira	1200	42	
Urguhart Molly	1200	41	
Menchu Roberta	1250	42	

☒ escape 转义字符.

select last\_name||' '|first\_name name,salary,dept\_id,start\_date  
from s\_emp  
where last\_name like '\\_a%' escape '\'  
order by salary

↑ ↑  
转义字符  
%不再代表某单个

no data found

select last\_name||' '|first\_name name,salary,dept\_id,start\_date  
from s\_emp  
where last\_name like '\_a'%  
order by salary

NAME	SALARY	DEPT_ID	START_DATE
Patel Radha	795	34	17-OCT-90
Patel Vikram	795	42	06-AUG-91
Markarian Alexander	850	43	26-MAY-91
Dancs Bela	860	45	17-MAR-91
Catchpole Antoinette	1300	44	09-FEB-92
Havel Marta	1307	45	27-FEB-91
Magee Colin	1400	31	14-MAY-90
Nagayama Midori	1400	31	17-JUN-91
Maduro Elena	1400	41	07-FEB-92

[Download CSV](#)  
9 rows selected.

select last\_name||' '|first\_name name,salary,dept\_id,start\_date,commission\_pct  
from s\_emp  
where commission\_pct is null  
order by salary

NAME	SALARY	DEPT_ID	START_DATE	COMMISSION_PCT
Newman Chad	750	43	21-JUL-91	-
Patel Radha	795	34	17-OCT-90	-
Patel Vikram	795	42	06-AUG-91	-
Chang Eddie	800	44	30-NOV-90	-
Markarian Alexander	850	43	26-MAY-91	-
Dancs Bela	860	45	17-MAR-91	-
Smith George	940	41	08-MAR-90	-
Biri Ben	1100	43	07-APR-90	-
Schwartz Sylvie	1100	45	09-MAY-91	-
Nozaki Akira	1200	42	09-FEB-91	-
Hirschman Molly	1200	41	18-JAN-91	-

\* 反向:

!= <> ~~&~~ ~ 不等

```
select last_name ||' '| first_name name,salary,dept_id,start_date,commission_pct
from s_emp
where dept_id ^= 41
order by salary
```

```
select last_name ||' '| first_name name,salary,dept_id,start_date,commission_pct
from s_emp
where dept_id != 41
order by salary
```

```
select last_name ||' '| first_name name,salary,dept_id,start_date,commission_pct
from s_emp
where dept_id <= 41
order by salary
```

\* NOT IN

\* NOT LIKE

\* ~~IS~~ NOT NULL

\* NOT BETWEEN

# 多条件查询

AND OR

AND 优先级比 OR 高,

操作符  
/ And  
/ Or

```
select last_name ||' '| first_name name,salary,dept_id,start_date,commission_pct
from s_emp
```

```
select last_name ||' '| first_name name,salary,dept_id,start_date,commission_pct  
from s.emp  
where salary >= 1000  
and dept_id = 44  
or dept_id = 42  
order by salary
```

salary  $\geq 1000$   
dept\_id = 44  
dept\_id = 42

NAME	SALARY	DEPT_ID	START_DATE	COMMISSION_PCT
Patel Vikram	795	42	06-AUG-91	-
Nozaki Akira	1200	42	09-FEB-91	-
Menchu Roberta	1250	42	14-MAY-90	-
Catchpole Antoinette	1300	44	09-FEB-92	-

Download CSV  
4 rows selected.

○ 先 WHERE 后 ORDER BY.

Lesson 3 下次课再见。

nn