

Part 4 常见SQL连接模式 (new)

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4.1 叠加行集 (Union & Union all)

如果需要显示EMP表中部门ID等于10的信息
以及DEPT表中各个部门的名称和编号

ENAME_AND_DNAME	DEPTNO
-----	-----
CLARK	10
KING	10
MILLER	10

ACCOUNTING	10
RESEARCH	20
SALES	30
OPERATIONS	40

```
1 select ename as ename_and_dname, deptno
2   from emp
3  where deptno = 10
4  union all
5  select '-----', null
6   from t1
7  union all
8  select dname, deptno
9   from dept
```



4.1 疊加行集 (Union & Union all)

select deptno		select deptno, dname
from dept		from dept
union all		union
select ename		select deptno
from emp		from emp



select deptno
from emp
union
select deptno
from dept

DEPTNO

10
20
30
40

select distinct deptno
from (
select deptno
from emp
union all
select deptno
from dept
)

DEPTNO

10
20
30
40



4.2 查找只存在于一张表的数据（差）

DEPT表中DEPTNO=40的数据并不存在于EMP表中，怎么把它找出来？

Oracle

```
1 select deptno from dept
2 minus
3 select deptno from emp
```

MySQL and SQL Server

```
1 select deptno
2 from dept
3 where deptno not in (select deptno from emp)
```

DB2 and PostgreSQL

```
1 select deptno from dept
2 except
3 select deptno from emp
```

如果DEPTNO不是主键

```
1 select distinct deptno
2 from dept
3 where deptno not in (select deptno from emp)
```



4.2 查找只存在于一张表的数据 (MySQL)

```
select deptno
  from dept
 where deptno in ( 10,50,null )
```

DEPTNO

10

```
select deptno
  from dept
 where deptno not in ( 10,50,null )
```

(no rows)

```
select deptno
  from dept
 where (deptno=10 or deptno=50 or deptno=null)
```

DEPTNO

10

```
select deptno
  from dept
 where not (deptno=10 or deptno=50 or deptno=null)
```

(no rows)

(false or false or null)
(false or null)
null



4.3 从一个表检索另一个表不相关的行（外连接）

DEPTNO	DNAME	LOC
40	OPERATIONS	BOSTON

DB2, MySQL, PostgreSQL, SQL Server, Oracle

```
1 select d.*
2   from dept d left outer join emp e
3     on (d.deptno = e.deptno)
4  where e.deptno is null
```

Oracle

```
1 select d.*
2   from dept d, emp e
3  where d.deptno = e.deptno (+)
4     and e.deptno is null
```



```
select e.ename, e.deptno as emp_deptno, d.*
from dept d left join emp e
on (d.deptno = e.deptno)
```

ENAME	EMP_DEPTNO	DEPTNO	DNAME	LOC
-----	-----	-----	-----	-----
SMITH	20	20	RESEARCH	DALLAS
ALLEN	30	30	SALES	CHICAGO
WARD	30	30	SALES	CHICAGO
JONES	20	20	RESEARCH	DALLAS
MARTIN	30	30	SALES	CHICAGO
BLAKE	30	30	SALES	CHICAGO
CLARK	10	10	ACCOUNTING	NEW YORK
SCOTT	20	20	RESEARCH	DALLAS
KING	10	10	ACCOUNTING	NEW YORK
TURNER	30	30	SALES	CHICAGO
ADAMS	20	20	RESEARCH	DALLAS
JAMES	30	30	SALES	CHICAGO
FORD	20	20	RESEARCH	DALLAS
MILLER	10	10	ACCOUNTING	NEW YORK
		40	OPERATIONS	BOSTON



4.4 确定两个表是否有相同的数据

- 问题：想知道两个表是否有相同的数据

```
create view V
as
select * from emp where deptno != 10
union all
select * from emp where ename = 'WARD'
```

希望返回如下结果集

EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO	CNT
----	-----	-----	----	-----	----	-----	----	---
7521	WARD	SALESMAN	7698	22-FEB-1981	1250	500	30	1
7521	WARD	SALESMAN	7698	22-FEB-1981	1250	500	30	2
7782	CLARK	MANAGER	7839	09-JUN-1981	2450		10	1
7839	KING	PRESIDENT		17-NOV-1981	5000		10	1
7934	MILLER	CLERK	7782	23-JAN-1982	1300		10	1



Oracle

```
1 (  
2  select empno,ename,job,mgr,hiredate,sal,comm,deptno,  
3         count(*) as cnt  
4  from V  
5  group by empno,ename,job,mgr,hiredate,sal,comm,deptno  
6  minus  
7  select empno,ename,job,mgr,hiredate,sal,comm,deptno,  
8         count(*) as cnt  
9  from emp  
10 group by empno,ename,job,mgr,hiredate,sal,comm,deptno  
11 )  
12 union all  
13 (  
14 select empno,ename,job,mgr,hiredate,sal,comm,deptno,  
15        count(*) as cnt  
16  from emp  
17  group by empno,ename,job,mgr,hiredate,sal,comm,deptno  
18  minus  
19  select empno,ename,job,mgr,hiredate,sal,comm,deptno,  
20         count(*) as cnt  
21  from v  
22  group by empno,ename,job,mgr,hiredate,sal,comm,deptno  
23 )
```



MySQL and SQL Server

```
1 select *
2 from (
3 select e.empno,e.ename,e.job,e.mgr,e.hiredate,
4      e.sal,e.comm,e.deptno, count(*) as cnt
5 from emp e
6 group by empno,ename,job,mgr,hiredate,
7      sal,comm,deptno
8 ) e
9 where not exists (
10 select null
11 from (
12 select v.empno,v.ename,v.job,v.mgr,v.hiredate,
13      v.sal,v.comm,v.deptno, count(*) as cnt
14 from v
15 group by empno,ename,job,mgr,hiredate,
16      sal,comm,deptno
17 ) v
18 where v.empno = e.empno
19 and v.ename = e.ename
20 and v.job = e.job
21 and v.mgr = e.mgr
22 and v.hiredate = e.hiredate
23 and v.sal = e.sal
24 and v.deptno = e.deptno
25 and v.cnt = e.cnt
26 and coalesce(v.comm,0) = coalesce(e.comm,0)
27 )
```

28 union all

```
29 select *
30 from (
31 select v.empno,v.ename,v.job,v.mgr,v.hiredate,
32      v.sal,v.comm,v.deptno, count(*) as cnt
33 from v
34 group by empno,ename,job,mgr,hiredate,
35      sal,comm,deptno
36 ) v
37 where not exists (
38 select null
39 from (
40 select e.empno,e.ename,e.job,e.mgr,e.hiredate,
41      e.sal,e.comm,e.deptno, count(*) as cnt
42 from emp e
43 group by empno,ename,job,mgr,hiredate,
44      sal,comm,deptno
45 ) e
46 where v.empno = e.empno
47 and v.ename = e.ename
48 and v.job = e.job
49 and v.mgr = e.mgr
50 and v.hiredate = e.hiredate
51 and v.sal = e.sal
52 and v.deptno = e.deptno
53 and v.cnt = e.cnt
54 and coalesce(v.comm,0) = coalesce(e.comm,0))
```



4.5 从多个表中返回缺失值（全外连接）

DEPTNO	DNAME	ENAME	FULL OUTER JOIN
-----	-----	-----	
10	ACCOUNTING	CLARK	1 select d.deptno,d.dname,e.ename
10	ACCOUNTING	KING	2 from dept d full outer join emp e
10	ACCOUNTING	MILLER	3 on (d.deptno=e.deptno)
20	RESEARCH	ADAMS	
20	RESEARCH	FORD	union
20	RESEARCH	JONES	
20	RESEARCH	SCOTT	1 select d.deptno,d.dname,e.ename
20	RESEARCH	SMITH	2 from dept d right outer join emp e
30	SALES	ALLEN	3 on (d.deptno=e.deptno)
30	SALES	BLAKE	4 union
30	SALES	JAMES	5 select d.deptno,d.dname,e.ename
30	SALES	MARTIN	6 from dept d left outer join emp e
30	SALES	TURNER	7 on (d.deptno=e.deptno)
30	SALES	WARD	
40	OPERATIONS		
		YODA	



4.6 连接和聚合函数的使用

考虑新增一张bonus表, 注意, 存在重复记录

```
select * from emp_bonus
```

EMPNO	RECEIVED	TYPE
-----	-----	-----
7934	17-MAR-2005	1
7934	15-FEB-2005	2
7839	15-FEB-2005	3
7782	15-FEB-2005	1

```
select e.empno,  
       e.ename,  
       e.sal,  
       e.deptno,  
       e.sal*case when eb.type = 1 then .1  
                  when eb.type = 2 then .2  
                  else .3  
              end as bonus  
from emp e, emp_bonus eb  
where e.empno = eb.empno  
       and e.deptno = 10
```

EMPNO	ENAME	SAL	DEPTNO	BONUS
-----	-----	-----	-----	-----
7934	MILLER	1300	10	130
7934	MILLER	1300	10	260
7839	KING	5000	10	1500
7782	CLARK	2450	10	245



1

```

select deptno,
       sum(sal) as total_sal,
       sum(bonus) as total_bonus
from (
select e.empno,
       e.ename,
       e.sal,
       e.deptno,
       e.sal*case when eb.type = 1 then .1
                  when eb.type = 2 then .2
                  else .3
                  end as bonus
from emp e, emp_bonus eb
where e.empno = eb.empno
and e.deptno = 10
) x
group by deptno

```

DEPTNO	TOTAL_SAL	TOTAL_BONUS
10	10050	2135



2

```

select sum(sal) from emp where deptno=10

```

```

SUM(SAL)
-----
      8750

```

3

```

select e.ename,
       e.sal
from emp e, emp_bonus eb
where e.empno = eb.empno
and e.deptno = 10

```

ENAME	SAL
CLARK	2450
KING	5000
MILLER	1300
MILLER	1300



Perform a sum of only the **DISTINCT** salaries:

```
1 select deptno,  
2     sum(distinct sal) as total_sal,  
3     sum(bonus) as total_bonus  
4 from (  
5 select e.empno,  
6     e.ename,  
7     e.sal,  
8     e.deptno,  
9     e.sal*case when eb.type = 1 then .1  
10            when eb.type = 2 then .2  
11            else .3  
12            end as bonus  
13 from emp e, emp_bonus eb  
14 where e.empno = eb.empno  
15 and e.deptno = 10  
16 ) x  
17 group by deptno
```

但是这个查询中，部门为10的所有人都有奖金



思考题

- 接4.6, 修改了一个条件, 不是所有员工都有奖金
- 请计算出部门编号为10的员工的工资总额和奖金总额

```
select * from emp_bonus
```

EMPNO	RECEIVED	TYPE
-----	-----	-----
7934	17-MAR-2005	1
7934	15-FEB-2005	2

错误的示范



```
select deptno,  
       sum(sal) as total_sal,  
       sum(bonus) as total_bonus  
from (  
  select e.empno,  
         e.ename,  
         e.sal,  
         e.deptno,  
         e.sal*case when eb.type = 1 then .1  
                    when eb.type = 2 then .2  
                    else .3 end as bonus  
  from emp e, emp_bonus eb  
 where e.empno = eb.empno  
    and e.deptno = 10  
 )  
group by deptno
```

DEPTNO	TOTAL_SAL	TOTAL_BONUS
-----	-----	-----
10	2600	390



End

下一模块，物理存储，再见！

