

1. 通过查询选修课程C++的学生的人数，其中成绩合格的学生人数，不合格的学生人数，讨论NULL值的特殊含义。

```
use school
select count(*)
from choices inner join courses on choices.cid = courses.cid
where cname = 'C++'

select count(*)
from choices inner join courses on choices.cid = courses.cid
where cname = 'C++' and score >= 60

select count(*)
from choices inner join courses on choices.cid = courses.cid
where cname = 'C++' and score < 60
```

The screenshot shows a SQL IDE window titled '1.sql - (local).Sch...-B2V7J46\guzy0 (54)'. It contains three SQL queries, each preceded by a checkbox icon. The first query is selected, and its results are displayed in a table below the queries. The table has two columns: '无列名' (unnamed) and a numeric column. The results are:

无列名	
1	6031

The second query is also selected, and its results are displayed in a table below the first one:

无列名	
1	4817

The third query is also selected, and its results are displayed in a table below the second one:

无列名	
1	724

At the bottom of the IDE, there is a status bar showing a green checkmark icon, the text '查 (local) (10.0 RTM) | DESKTOP-B2V7J46\guzy0 ... | School | 00:00:00 | 3 行'.

NULL值含义是成绩不存在或成绩未知。

2. 查询选修课程C++的学生的编号和成绩，使用 ORDER BY按成绩进行排序时,取NULL的项是否出现在结果中？如果有，在什么位置？

```
use school
select sid, score
from choices inner join courses on choices.cid = courses.cid
where cname = 'C++'
order by score
```

2.sql - (local).Sch...-B2V7J46\guzy0 (51))

```
use school
select sid, score
from choices inner join courses on choices.cid = courses.cid
where cname = 'C++'
order by score
```

结果 消息

	sid	score
1	845947855	NULL
2	890918686	NULL
3	898137922	NULL
4	867715893	NULL
5	872519782	NULL
6	886109186	NULL
7	884877167	NULL
8	893869264	NULL
9	834918408	NULL
10	873557912	NULL

(local) (10.0 RTM) | DESKTOP-B2V7J46\guzy0 ... | School | 00:00:00 | 6031 行

有，在升序的开头，降序的结尾。

3. 在上面的查询的过程中，如果加上保留字 DISTINCT会有什么效果呢？

```
use school
select distinct sid, score
from choices inner join courses on choices.cid = courses.cid
where cname = 'C++'
order by score
```

3.sql - (local).Sch....B2V7J46\guzy0 (55)

```
use school
select distinct sid, score
from choices inner join courses on choices.cid = courses.cid
where cname = 'C++'
order by score
```

结果 消息

	sid	score
1	800554079	NULL
2	800575453	NULL
3	800579690	NULL
4	800758208	NULL
5	800895421	NULL
6	800989091	NULL
7	801045247	NULL
8	801095737	NULL
9	801197660	NULL
10	801259696	NULL

(local) (10.0 RTM) | DESKTOP-B2V7J46\guzy0 ... | School | 00:00:00 | 6024 行

去掉重复的(sid, score)

4. 按年级对所有的学生进行分组，能得到多少个组？与现实的情况有什么不同？

```
use school
select grade
from students
group by grade
```

4.sql - (local).Sch....-B2V7J46\guzy0 (54)

```
use school
select grade
from students
group by grade
```

结果 消息

	grade
1	1998
2	2004
3	2001
4	1996
5	2002
6	1999
7	1993
8	2000
9	1994
10	1997
11	1991
12	NULL
13	2003
14	1992
15	1995

查询已成功执行。 | (local) (10.0 RTM) | DESKTOP-B2V7J46\guzy0 ... | School | 00:00:00 | 15 行

14组, 有一个NULL

5. 结合分组,使用集合函数求每个课程选修的学生的平均分,总的选课记录数,最高成绩,最低成绩,讨论考察取空值的项对集合函数的作用的影响。

```
use school
select cid, avg(score), count(*), max(score), min(score)
from choices
group by cid
```

5.sql - (local).Sch...-B2V7J46\guzy0 (58)

```

use school
select cid, avg(score), count(*), max(score), min(score)
from choices
group by cid

```

结果 消息

	cid	(无列名)	(无列名)	(无列名)	(无列名)
1	10008	75	5985	99	50
2	10019	75	6074	99	50
3	10018	76	5969	99	50
4	10040	75	6102	99	50
5	10011	76	6086	99	50
6	10028	75	6042	99	50
7	10035	76	6104	99	50
8	10021	76	5916	99	50
9	10046	76	6069	99	50
10	10032	75	6073	99	50

✓ (local) (10.0 RTM) | DESKTOP-B2V7J46\guzy0 ... | School | 00:00:00 | 50 行

除了count(*), 都会忽略含null的元组。如果全是null, count返回0, 其他聚集函数返回null

6. 采用嵌套查询的方式,利用比较运算符和谓词ALL的结合来查询表 STUDENTS中最晚入学的学生年级。当存在 GRADE取空值的项时,考虑可能出现的情况,并解释。

```

use school
select distinct grade
from students
where grade >= all (select grade
                    from students
                    where grade is not null)

```

6.sql - (local).Sch...-B2V7J46\guzy0 (59)

```
use school
select distinct grade
from students
where grade >= all (select grade
                    from students
                    where grade is not null)
```

结果 消息

	grade
1	2004

✓ 查 (local) (10.0 RTM) | DESKTOP-B2V7J46\guzy0 ... | School | 00:00:00 | 1 行

则需要加入is not null的限制（如本题），因为NULL与所有的比较运算符都是不匹配的，因而无法找到一个grade大于等于所有的grade