

《数据库系统概论》实验报告			
题目：实验四 DML 的数据查询	姓名		日期
<p>实验内容与完成情况：</p> <p><b>一、实验内容：</b></p> <p>1. 启动数据库服务软件SQL Server 2008的管理器，用SELECT语句对表进行简单查询操作，整个查询过程只涉及到一个表，是最基本的查询语句。</p> <p>语法格式如下：</p> <p>Select &lt;目标列组&gt; From &lt;数据源&gt; [Where &lt;元组选择条件&gt;] [Group by &lt;分组列&gt; [Having &lt;组选择条件&gt;]] [Order by &lt;排序列1&gt; &lt;排序要求&gt; [, ...n]]</p> <p>2. 用SELECT语句对表进行连接查询操作，连接查询涉及被连接和连接两个表，所以数据源一般为多个表。用来连接两个表的条件称为连接条件，一般格式为：</p> <p>[&lt;表名1&gt;.]&lt;列名1&gt; &lt;比较运算符&gt; [&lt;表名2&gt;.]&lt;列名2&gt;</p> <p>其中比较运算符主要有：=、&gt;、&lt;、&gt;=、&lt;=、!=。</p> <p>3. 用SELECT语句对表进行嵌套查询操作，一个Select...From...Where语句称为一个查询块，将一个查询块嵌套在另一个查询块的Where子句或Having短语的条件中的查询，就是嵌套查询。主要有使用In操作符、使用比较运算符的嵌套查询方式。</p> <p>4. 用SELECT语句对表进行组合查询操作，将SELECT语句的查询结果集再进行集合运算就构成了SQL的组合查询。组合查询操作符有Union(并操作)、Intersect(交操作)和Minus(差操作)。</p> <p><b>二、实验任务</b></p> <p>1. 打开数据库SQL Server 2008的管理查询分析器。</p> <p>2、用INSERT语句向表SC中插入记录,记录见P82。</p> <p>利用以前建立的Student,Course,SC进行查询。（<a href="#">参照书上3.4</a>）</p> <p>3. 简单查询</p> <p>1) 查询全体学生的详细记录：p92</p> <p>SELECT *</p> <p>FROM Student;</p> <p><a href="#">或</a></p> <p>SELECT Sno,Sname,Ssex,Sage,Sdept</p> <p>FROM Student;</p>			

管理器

NW-09CDC885167 (SQL Server 10.0.1600 - W)

数据库

系统数据库

数据库快照

ReportServer

ReportServerTempDB

学生选课3

数据库关系图

表

系统表

dbo.Course

dbo.SC

dbo.Student

视图

同义词

可编程性

Service Broker

存储

安全性

服务器对象

复制

管理

SQLQuery29.sql ...67\sujiao (52))\*

SELECT \*

FROM Student;

结果

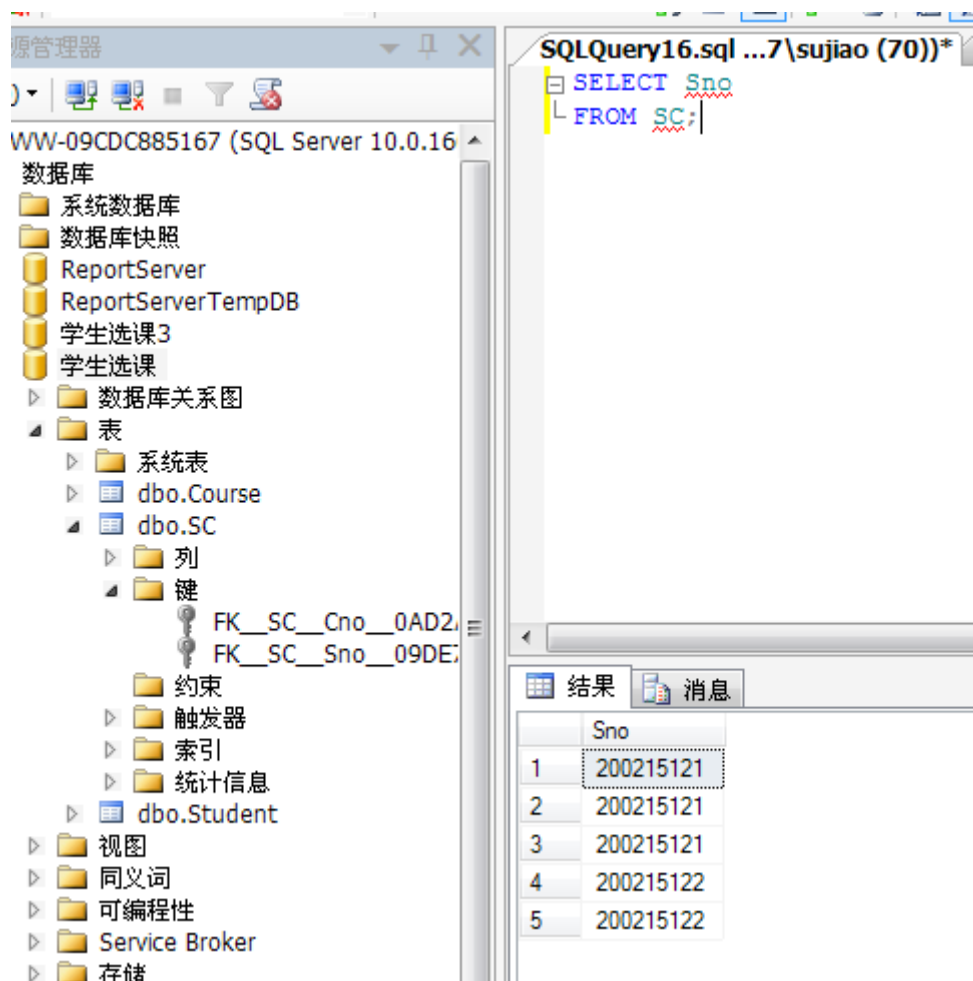
消息

	Sno	Sname	Ssex	Sage	Sdept	Scome
1	200215121	李勇	男	20	CS	NULL
2	200215122	刘晨	男	19	CS	NULL
3	200215123	王敏	女	18	MA	NULL

2) 查询所有选修过课的学生的学号; p93

SELECT Sno

FROM SC;

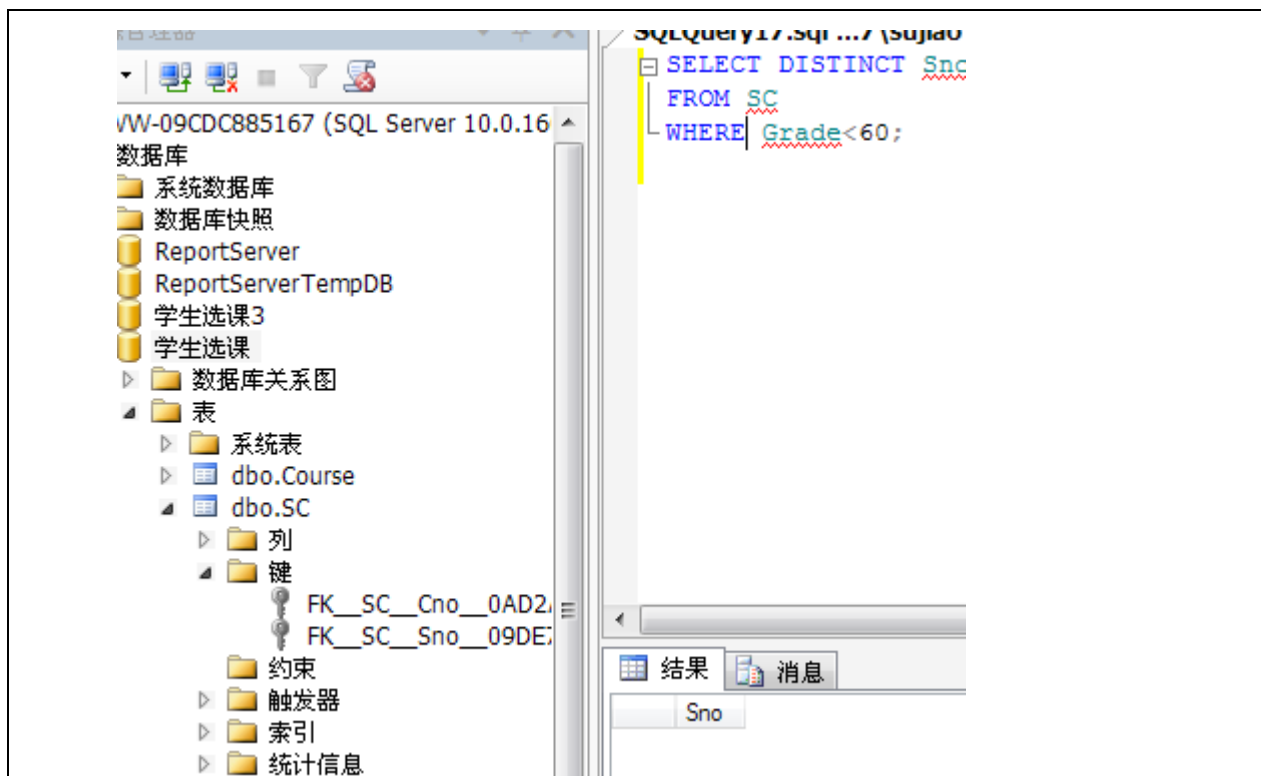


3) 查询考试成绩不及格的学生的学号;

```
SELECT DISTINCT Sno
```

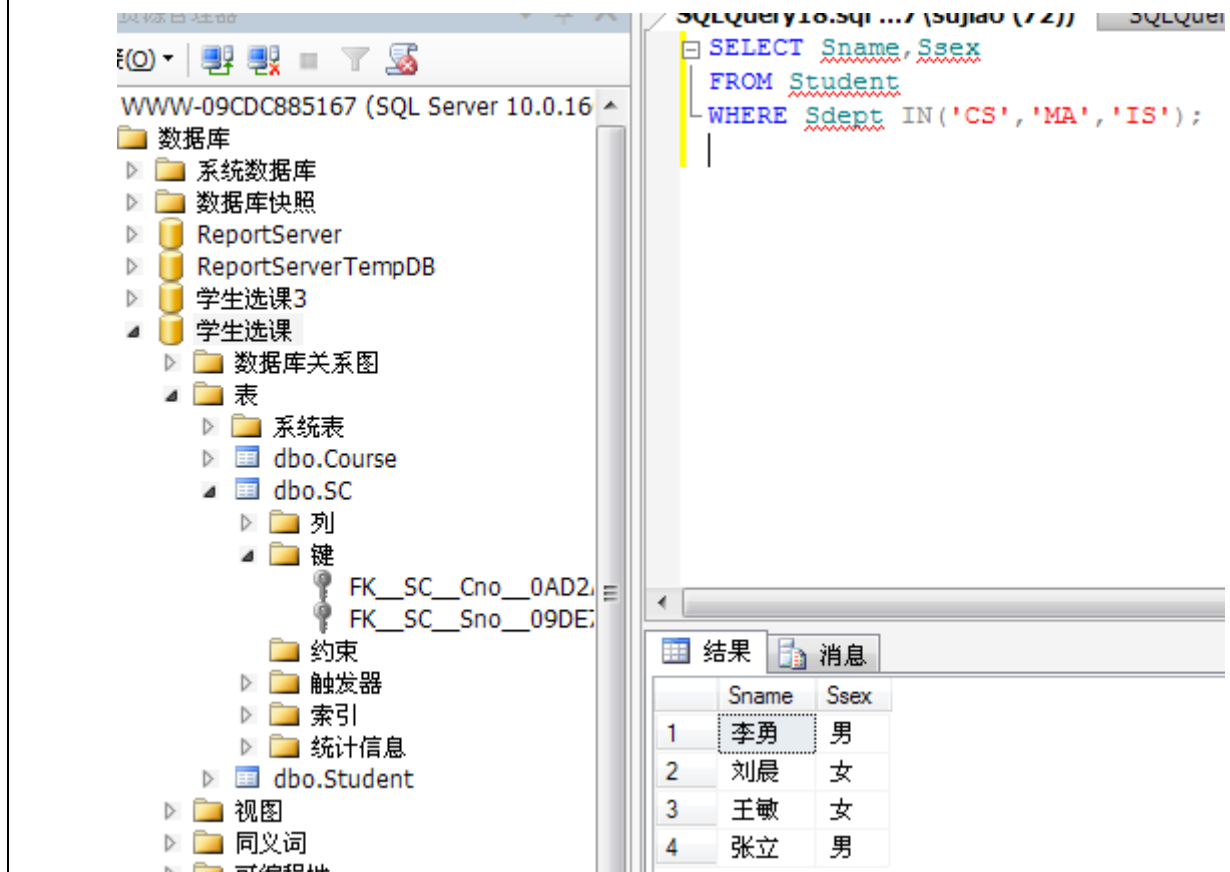
```
FROM SC
```

```
WHERE Grade<60;
```



4) 查信息系 (IS)、数学系 (MA) 和计算机科学系 (CS) 的学生的姓名和性别;

```
SELECT Sname, Ssex
FROM Student
WHERE Sdept IN ('CS', 'MA', 'IS');
```



5) 查所有姓刘的学生的姓名、学号和性别;

```
SELECT Sname,Sno,Ssex  
FROM Student  
WHERE Sname LIKE '刘%';
```

The screenshot shows the SQL Server Enterprise Manager interface on the left, displaying the database structure for 'M-09CDC885167 (SQL Server 10.0.16)'. The '表' (Tables) folder is expanded, showing 'dbo.Student'. On the right, the Query Editor shows the following SQL query:

```
SELECT Sname,Sno,Ssex  
FROM Student  
WHERE Sname LIKE '刘%';
```

Below the query editor, the '结果' (Results) tab is active, displaying a single row of data:

	Sname	Sno	Ssex
1	刘晨	200215122	女

6) 查 DB\_Design 课程的课程号和学分;

```
SELECT Cno,Ccredit  
FROM Course  
WHERE Cname LIKE 'DB\_Design'ESCAPE'\';
```

The screenshot shows the SQL Server Enterprise Manager interface on the left, displaying the database structure for 'VW-09CDC885167 (SQL Server 10.0.16)'. The '表' (Tables) folder is expanded, showing 'dbo.Course'. On the right, the Query Editor shows the following SQL query:

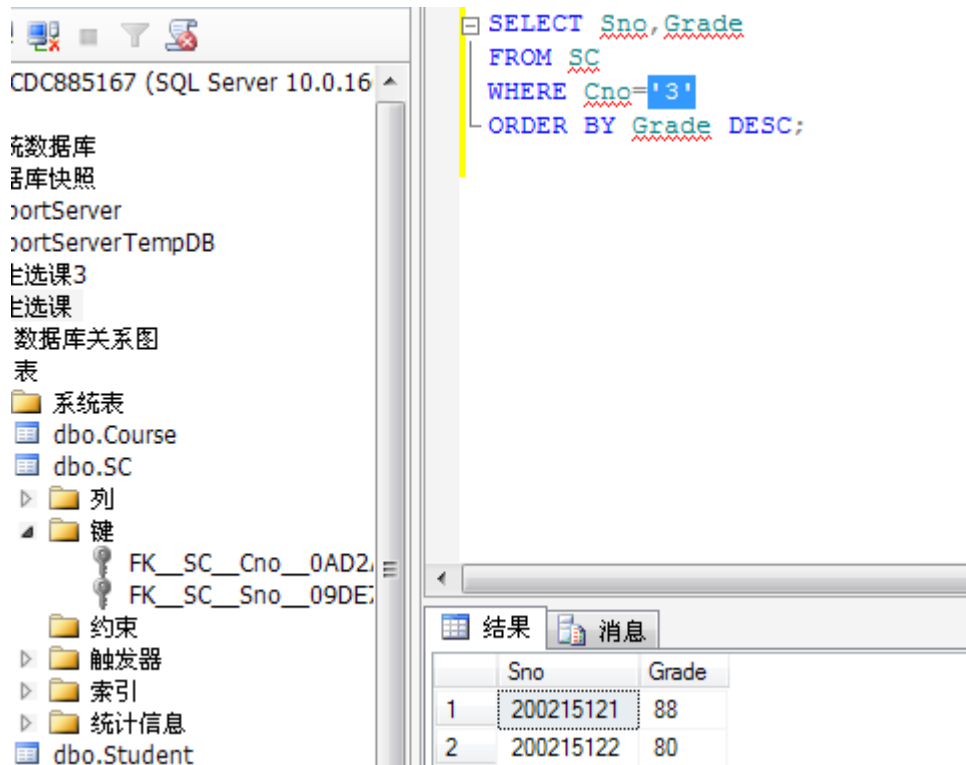
```
SELECT Cno,Ccredit  
FROM Course  
WHERE Cname LIKE 'DB\_Design'ESCAPE'\';
```

Below the query editor, the '结果' (Results) tab is active, displaying the column headers for the query results:

Cno	Ccredit
-----	---------

7) 查询选修了3号课程的学生的学号及其成绩，查询结果按分数降序排列；

```
SELECT Sno,Grade  
FROM SC  
WHERE Cno= '3'  
ORDER BY Grade DESC;
```



The screenshot shows the SQL Server Enterprise Manager interface. On the left, the 'Server Enterprise' tree is expanded to '数据库' (Database) > 'dbo' > '表' (Tables) > 'dbo.SC'. The main window displays the following SQL query:

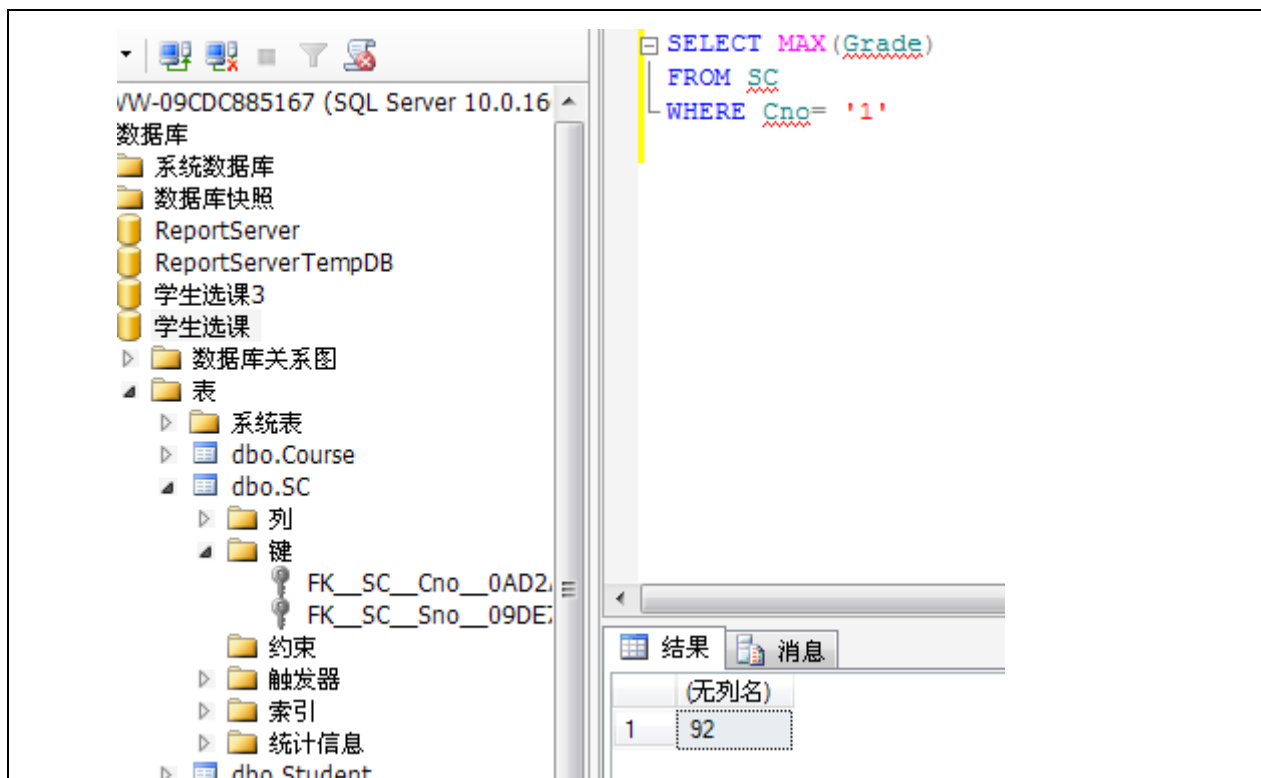
```
SELECT Sno,Grade  
FROM SC  
WHERE Cno='3'  
ORDER BY Grade DESC;
```

Below the query, the '结果' (Results) tab is active, showing a table with two columns: 'Sno' and 'Grade'. The table contains two rows of data:

	Sno	Grade
1	200215121	88
2	200215122	80

9) 查询学习1号课程的学生最高分数；

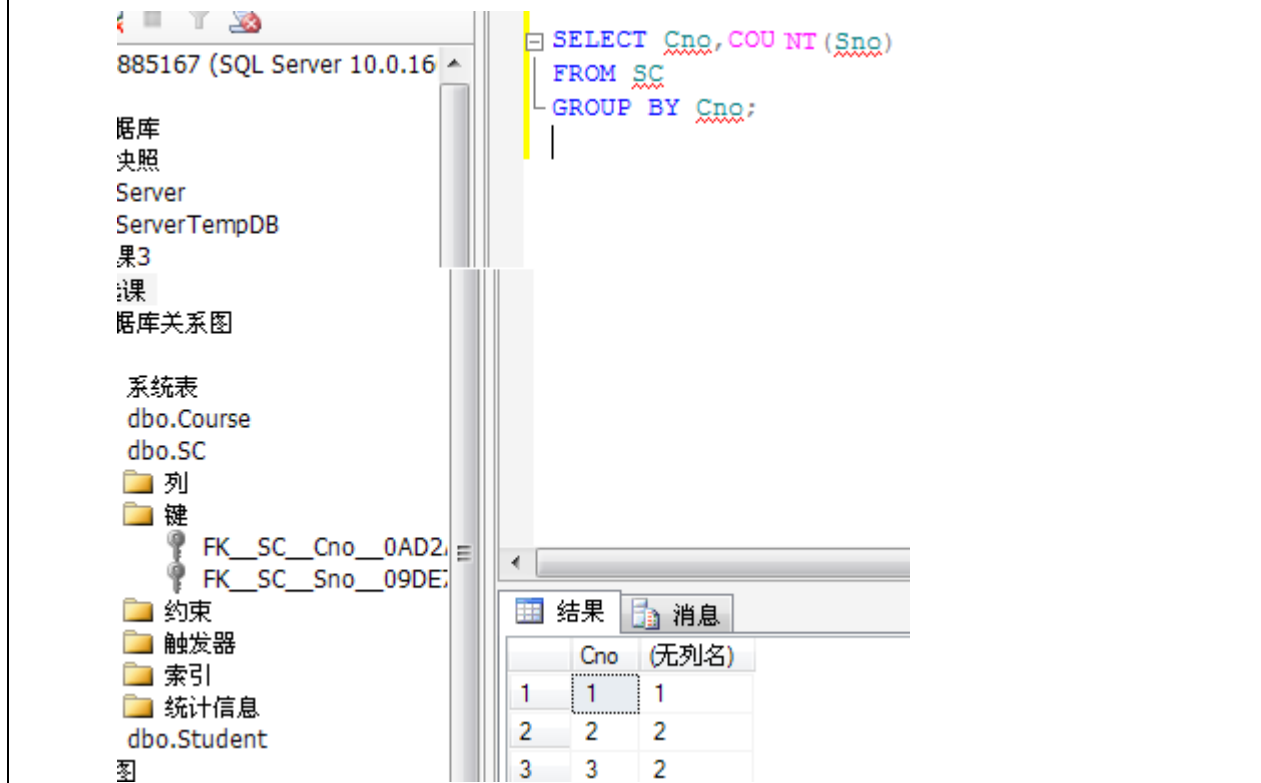
```
SELECT MAX(Grade)  
FROM SC  
WHERE Cno= '1'
```



4. 在查询分析器窗口下用SELECT语句完成连接（嵌套）查询：P99

1)查询各个课程号与相应的选课人数；

```
SELECT Cno,COUNT(Sno)
FROM SC
GROUP BY Cno;
```



2)查询每个学生及其选修课程的情况;

```
SELECT Student.*, SC.*  
FROM Student, SC  
WHERE Student.Sno=SC.Sno;
```

The screenshot shows the SQL Server Enterprise Manager interface. On the left, the 'Server Enterprise' tree is expanded to 'Database' > 'dbo' > 'SC'. The 'SC' table is selected. In the center, a query is entered in the 'Query Editor' window:

```
SELECT Student.*, SC.*  
FROM Student, SC  
WHERE Student.Sno=SC.Sno;
```

Below the query editor, the 'Results' tab is active, displaying the following data:

	Sno	Sname	Ssex	Sage	Sdept	Sno	Cno	Grade
1	200215121	李勇	男	20	CS	200215121	1	92
2	200215121	李勇	男	20	CS	200215121	2	85
3	200215121	李勇	男	20	CS	200215121	3	88
4	200215122	刘晨	女	19	CS	200215122	2	90
5	200215122	刘晨	女	19	CS	200215122	3	80

3)查询每个学生及其选修的课程名及其成绩;

```
SELECT Student.Sno,Sname,Cname,Grade  
FROM Student,SC,Course  
WHERE Student.Sno=SC.sno AND SC.Cno=Course.Cno;
```

The screenshot shows the SQL Server Enterprise Manager interface. On the left, the 'Server Enterprise' tree is expanded to 'Database' > 'dbo' > 'SC'. The 'SC' table is selected. In the center, a query is entered in the 'Query Editor' window:

```
SELECT Student.Sno,Sname,Cname,Grade  
FROM Student,SC, Course  
WHERE Student.Sno=SC.sno AND SC.Cno=Course.Cno;
```

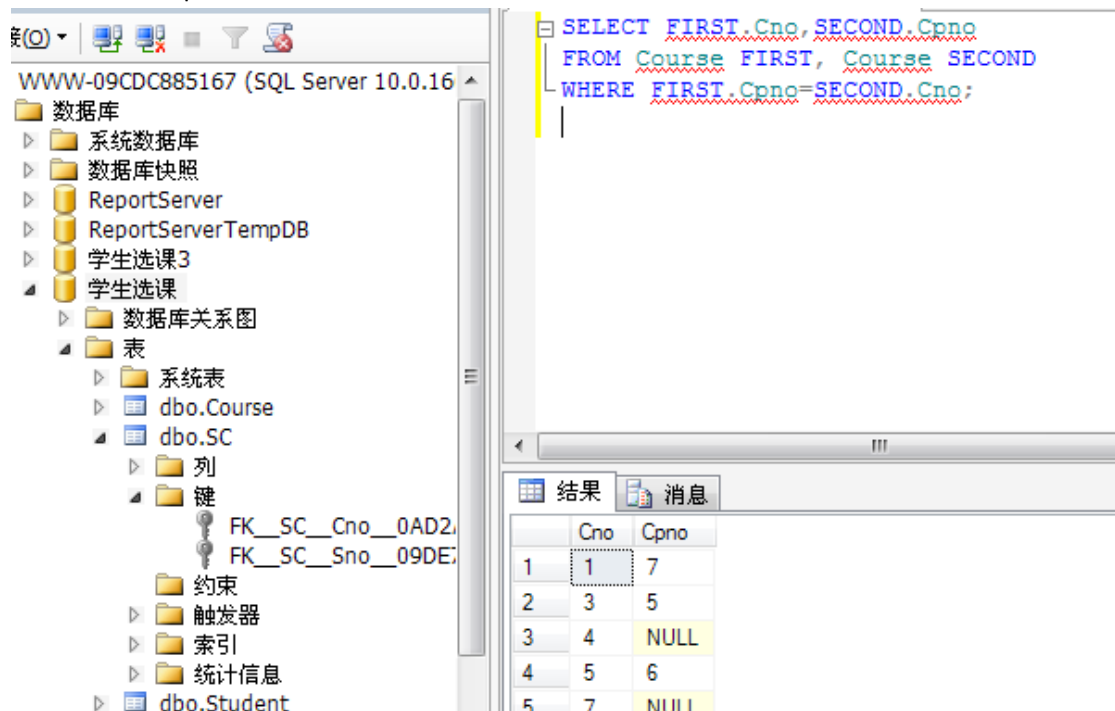
Below the query editor, the 'Results' tab is active, displaying the following data:

	Sno	Sname	Cname	Grade
1	200215121	李勇	数据库	92
2	200215121	李勇	数学	85
3	200215121	李勇	信息系统	88
4	200215122	刘晨	数学	90
5	200215122	刘晨	信息系统	80



4)查询每一门课的间接先行课（即先行课的先行课）。

```
SELECT FIRST.Cno,SECOND.Cpno
FROM Course FIRST, Course SECOND
WHERE FIRST.Cpno=SECOND.Cno;
```



The screenshot shows the SQL Server Enterprise Manager interface on the left, displaying the database structure for 'WWW-09CDC885167 (SQL Server 10.0.16)'. The '数据库' (Database) folder is expanded, showing '系统数据库' (System Databases), '数据库快照' (Database Snapshots), 'ReportServer', 'ReportServerTempDB', '学生选课3', and '学生选课'. The '学生选课' database is selected, and the '表' (Tables) folder is expanded, showing '系统表' (System Tables), 'dbo.Course', and 'dbo.SC'. The 'dbo.SC' table is selected, and the '列' (Columns) folder is expanded, showing 'FK\_SC\_Cno\_0AD2' and 'FK\_SC\_Sno\_09DE'. The '消息' (Messages) tab is selected, showing the query results.

The Query Analyzer window on the right shows the following SQL query:

```
SELECT FIRST.Cno,SECOND.Cpno
FROM Course FIRST, Course SECOND
WHERE FIRST.Cpno=SECOND.Cno;
```

The results are displayed in a table with columns 'Cno' and 'Cpno':

	Cno	Cpno
1	1	7
2	3	5
3	4	NULL
4	5	6
5	7	NULL

5. 在查询分析器窗口下用SELECT语句完成嵌套查询:

1) 求选修了信息系统的学生学号和姓名。

```
SELECT Sno,Name
FROM Student
WHERE Sno IN
    (SELECT Sno
     FROM SC
     WHERE Cno IN
        (SELECT Cno
         FROM Course
         WHERE Cname= '信息系统'
        )
    );
```

885167 (SQL Server 10.0.16)

数据库  
快照  
Server  
ServerTempDB  
果3  
果  
数据库关系图

系统表  
dbo.Course  
dbo.SC  
列  
键  
FK\_SC\_Cno\_0AD2  
FK\_SC\_Sno\_09DE  
约束  
触发器  
索引

```
SELECT Sno, Sname
FROM Student
WHERE Sno IN
(SELECT Sno
FROM SC
WHERE Cno IN
(SELECT Cno
FROM Course
WHERE Cname= '信息系统'
));
```

结果 消息

	Sno	Sname
1	200215121	李勇
2	200215122	刘晨

2) 求2课程的成绩高于李勇的学生学号和成绩。

```
SELECT Sno, Grade
FROM SC
WHERE SC.Cno='2' AND Grade>any(
SELECT Grade
FROM SC
WHERE Sno in(SELECT Sno
FROM Student
WHERE Sname='李勇'
));
```

V-7717F614855 (SQL Server 10.0.1600 - WV)

数据库  
系统数据库  
数据库快照  
33  
ReportServer  
ReportServerTempDB  
学生选课  
数据库关系图  
表  
系统表  
dbo.Course  
dbo.SC  
dbo.Student  
视图  
同义词  
可编程性  
Service Broker  
存储

```
SELECT Sno, Grade
FROM SC
WHERE SC.Cno='2' AND Grade>any(
SELECT Grade
FROM SC
WHERE Sno in(SELECT Sno
FROM Student
WHERE Sname='李勇'
));
```

结果 消息

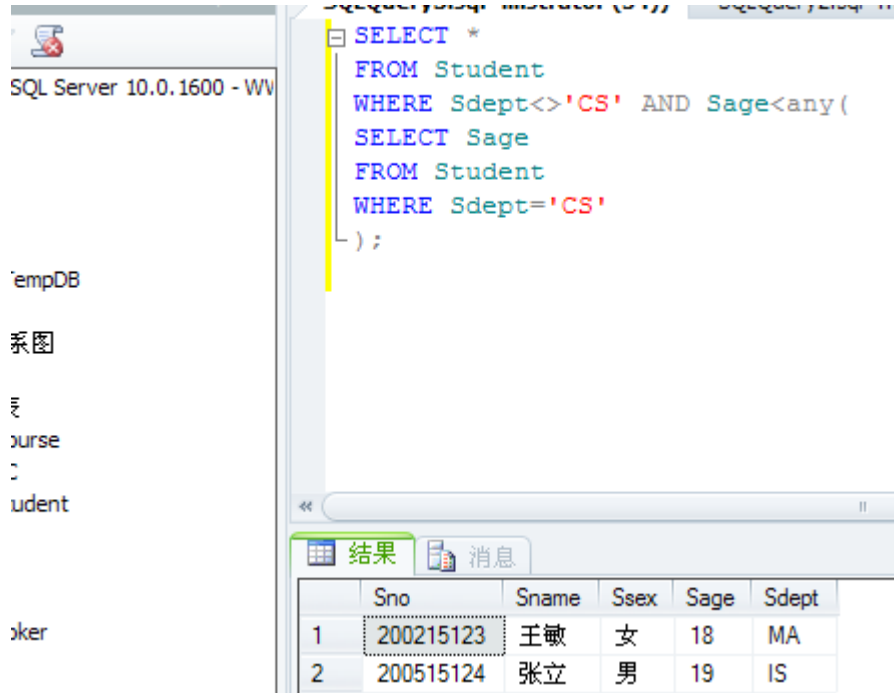
	Sno	Grade
1	200215122	90

3) 求其他系中年龄小于计算机系年龄最大者的学生。

```

SELECT *
FROM Student
WHERE Sdept<>'CS' AND Sage<any(
SELECT Sage
FROM Student
WHERE Sdept='CS'
);

```



The screenshot shows the SQL Server Enterprise Manager interface. The left pane displays the server hierarchy for 'SQL Server 10.0.1600 - WVV'. The right pane is split: the top part shows the SQL query being executed, and the bottom part shows the results in a table grid. The query is a correlated subquery that filters students from departments other than 'CS' based on their age relative to students in the 'CS' department. The results table contains two rows of data.

	Sno	Sname	Ssex	Sage	Sdept
1	200215123	王敏	女	18	MA
2	200515124	张立	男	19	IS

4) 求其他系中比计算机系学生年龄都小的学生。

```

SELECT *
FROM Student
WHERE Sdept<>'CS' AND Sage<all(
SELECT Sage
FROM Student
WHERE Sdept='CS'
);

```

14855 (SQL Server 10.0.1600 - WW)

数据库  
快照  
tServer  
tServerTempDB  
数据库关系图  
系统表  
dbo.Course  
dbo.SC  
dbo.Student  
图  
义词  
编程性  
ervice Broker  
储

```
SELECT *
FROM Student
WHERE Sdept <> 'CS' AND Sage < all (
SELECT Sage
FROM Student
WHERE Sdept = 'CS'
);
```

	Sno	Sname	Ssex	Sage	Sdept
1	200215123	王敏	女	18	MA

5) 求选修了2号课程的学生姓名。

```
SELECT Sname
FROM Student
WHERE EXISTS
(SELECT *
FROM SC
WHERE Sno=Student.Sno AND Cno='2'
);
```

WW-09CDC885167 (SQL Server 10.0.16)

数据库  
系统数据库  
数据库快照  
ReportServer  
ReportServerTempDB  
学生选课3  
学生选课  
数据库关系图  
表  
系统表  
dbo.Course  
dbo.SC  
列  
键  
FK\_SC\_Cno\_0AD2  
FK\_SC\_Sno\_09DE  
约束  
触发器  
表3

```
SELECT Sname
FROM Student
WHERE EXISTS
(SELECT *
FROM SC
WHERE Sno=Student.Sno AND Cno='2'
);
```

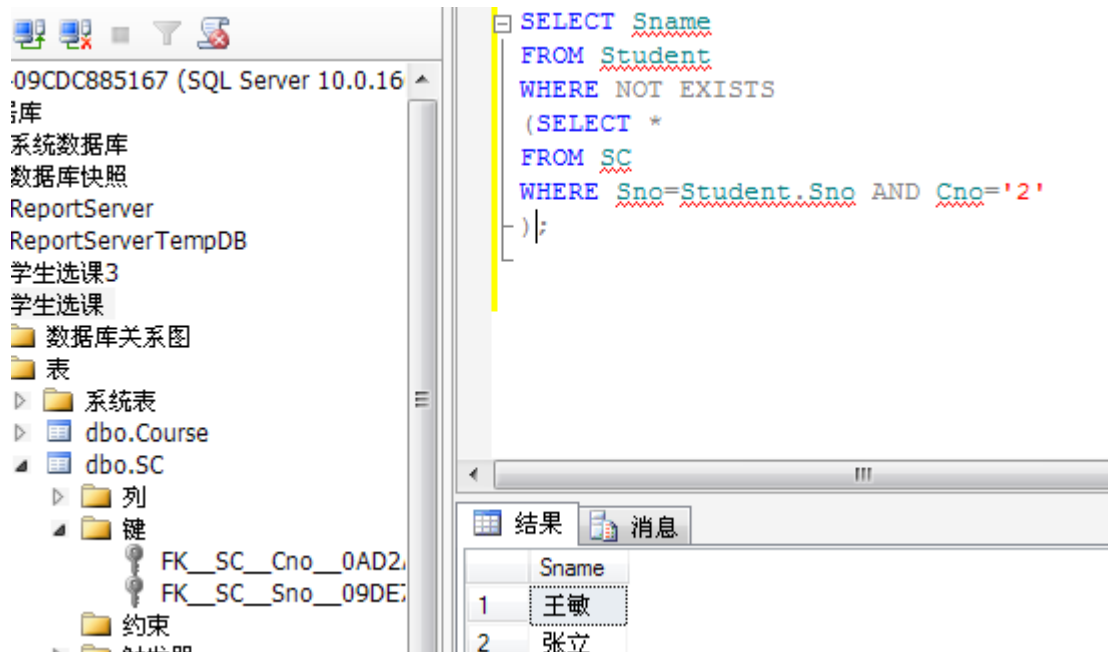
	Sname
1	李勇
2	刘晨

6) 求没有选修2课程的学生姓名。

```

SELECT Sname
FROM Student
WHERE NOT EXISTS
(SELECT *
FROM SC
WHERE Sno=Student.Sno AND Cno='2'
);

```

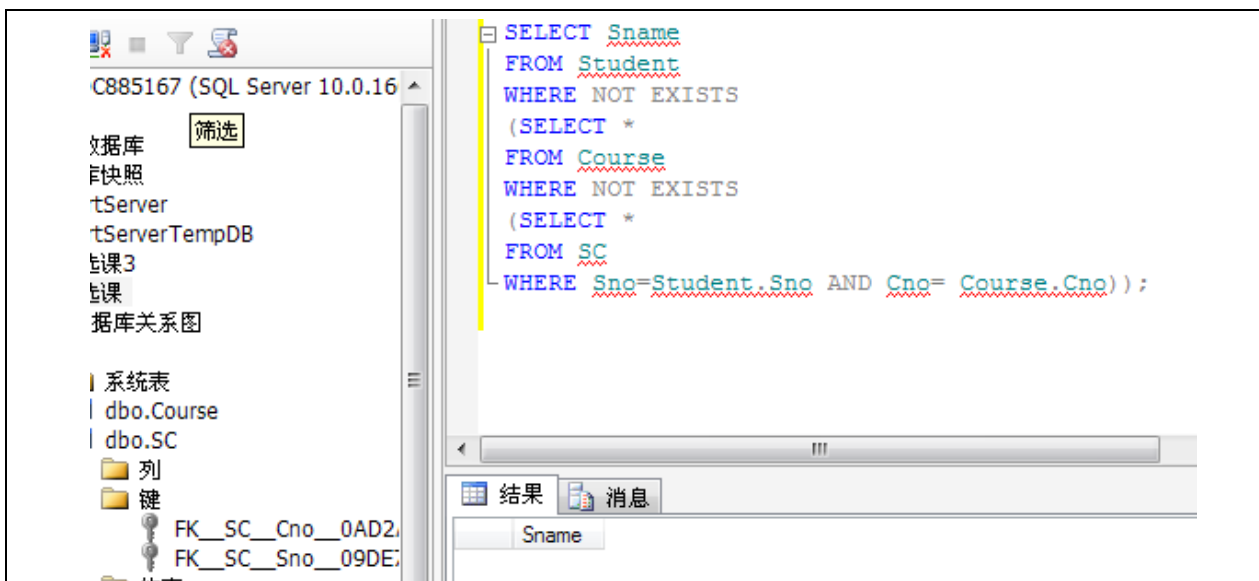


7) 查询选修了全部课程的学生的姓名。

```

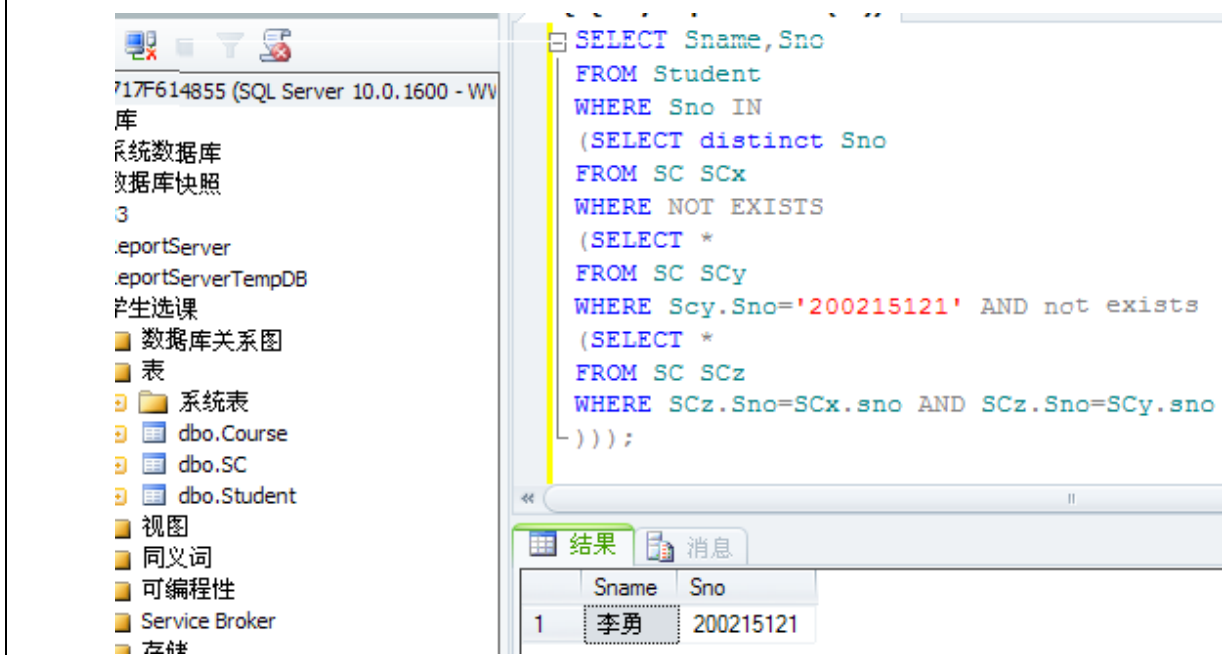
SELECT Sname
FROM Student
WHERE NOT EXISTS
(SELECT *
FROM Course
WHERE NOT EXISTS
(SELECT *
FROM SC
WHERE Sno=Student.Sno AND Cno= Course.Cno));

```



8) 求选修了学号为“200215121”的学生所选修的全部课程的学生学号和姓名。

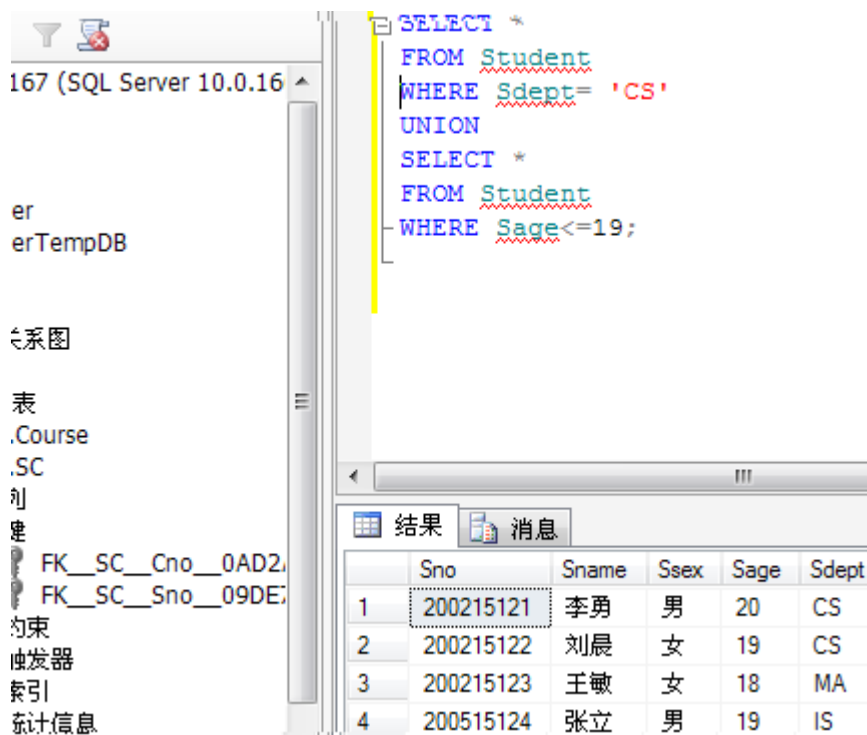
```
SELECT Sname, Sno
FROM Student
WHERE Sno IN
(SELECT distinct Sno
FROM SC SCx
WHERE NOT EXISTS
(SELECT *
FROM SC SCy
WHERE SCy.Sno='200215121' AND not exists
(SELECT *
FROM SC SCz
WHERE SCz.Sno=SCx.sno AND SCz.Sno=SCy.sno
))) ;
```



6、在查询分析器在窗口下用SELECT语句完成集合查询：

1) 查询计算机科学系的学生及年龄不大于19岁的 学生。

```
SELECT *  
FROM Student  
WHERE Sdept= 'CS'  
UNION  
SELECT *  
FROM Student  
WHERE Sage<=19;
```



167 (SQL Server 10.0.16)

er  
erTempDB

关系图

表  
.Course  
.SC  
列  
建  
约束  
触发器  
索引  
统计信息

SELECT \*  
FROM Student  
WHERE Sdept= 'CS'  
UNION  
SELECT \*  
FROM Student  
WHERE Sage<=19;

结果 消息

	Sno	Sname	Ssex	Sage	Sdept
1	200215121	李勇	男	20	CS
2	200215122	刘晨	女	19	CS
3	200215123	王敏	女	18	MA
4	200515124	张立	男	19	IS

2) 查询选修了课程1或者选修了课程2的学生。

```
SELECT Sno  
FROM SC  
WHERE Cno='1'  
UNION  
SELECT Sno  
FROM SC  
WHERE Cno='2';
```

The screenshot shows the SQL Server Enterprise Manager interface for a server named 'WWW-09CDC885167 (SQL Server 10.0.16)'. The left pane displays the database structure, including '数据库' (Databases), '系统数据库' (System Databases), '数据库快照' (Database Snapshots), 'ReportServer', 'ReportServerTempDB', '学生选课3', and '学生选课'. Under '学生选课', there is a '数据库关系图' (Database Diagrams) folder, a '表' (Tables) folder containing '系统表' (System Tables), 'dbo.Course', and 'dbo.SC', and a '列' (Columns) folder. The right pane shows a SQL query window with the following query:

```
SELECT Sno
FROM SC
WHERE Cno='1'
UNION
SELECT Sno
FROM SC
WHERE Cno='2';
```

Below the query window, the '结果' (Results) tab is active, displaying a table with two rows:

	Sno
1	200215121
2	200215122

3) 查询计算机科学系的学生与年龄不大于19岁的学生的交集。

```
SELECT *
FROM Student
WHERE Sdept='CS'
INTERSECT
SELECT *
FROM Student
WHERE Sage<=19;
```

The screenshot shows the SQL Server Enterprise Manager interface for a server named 'WWW-09CDC885167 (SQL Server 10.0.16)'. The left pane displays the database structure, including '数据库' (Databases), '系统数据库' (System Databases), '数据库快照' (Database Snapshots), 'ReportServer', 'ReportServerTempDB', '学生选课3', and '学生选课'. Under '学生选课', there is a '数据库关系图' (Database Diagrams) folder, a '表' (Tables) folder containing '系统表' (System Tables), 'dbo.Course', and 'dbo.SC', and a '列' (Columns) folder. The right pane shows a SQL query window with the following query:

```
SELECT *
FROM Student
WHERE Sdept='CS'
INTERSECT
SELECT *
FROM Student
WHERE Sage<=19;
```

Below the query window, the '结果' (Results) tab is active, displaying a table with one row:

	Sno	Sname	Ssex	Sage	Sdept
1	200215122	刘晨	女	19	CS

4) 查询选修了课程1的学生的集合与选修了课程2的学生的集合。(交集)

```
SELECT Sno
FROM SC
WHERE Cno='1'
```



```

INTERSECT
SELECT Sno
FROM SC
WHERE Cno='2';

```

The screenshot shows the SQL Server Enterprise Manager interface on the left, displaying the database structure for 'MW-09CDC885167 (SQL Server 10.0.16)'. The '数据库' (Database) folder is expanded, showing '系统数据库' (System Databases), '数据库快照' (Database Snapshots), 'ReportServer', 'ReportServerTempDB', '学生选课3', '学生选课', and '数据库关系图' (Database Diagrams). The '表' (Tables) folder is expanded, showing '系统表' (System Tables), 'dbo.Course', and 'dbo.SC'. The 'dbo.SC' table is selected, showing its columns and keys. The SQL Query window on the right contains the following query:

```

SELECT Sno
FROM SC
WHERE Cno='1'
INTERSECT
SELECT Sno
FROM SC
WHERE Cno='2';

```

The '结果' (Results) tab is active, showing a single row with the value '200215121' under the 'Sno' column.

5) 查询计算机科学系的学生与年龄大于19 的学生的差集。

```

SELECT *
FROM Student
WHERE Sdept='CS'
EXCEPT
SELECT *
FROM Student
WHERE Sage<=19;

```

The screenshot shows the SQL Server Enterprise Manager interface on the left, displaying the database structure for '-09CDC885167 (SQL Server 10.0.16)'. The '数据库' (Database) folder is expanded, showing '系统数据库' (System Databases), '数据库快照' (Database Snapshots), 'ReportServer', 'ReportServerTempDB', '学生选课3', '学生选课', and '数据库关系图' (Database Diagrams). The '表' (Tables) folder is expanded, showing '系统表' (System Tables), 'dbo.Course', and 'dbo.SC'. The 'dbo.SC' table is selected, showing its columns and keys. The SQL Query window on the right contains the following query:

```

SELECT *
FROM Student
WHERE Sdept='CS'
EXCEPT
SELECT *
FROM Student
WHERE Sage<=19;

```

The '结果' (Results) tab is active, showing a table with the following data:

	Sno	Sname	Ssex	Sage	Sdept
1	200215121	李勇	男	20	CS

出现的问题及解决方案（列出遇到的问题 and 解决方法，列出没有解决的问题）：

1. `secler` 语句不用加分号；
2. 时刻注意在输入状态；
3. 实验内容中红色时所遇到的问题（已改正）；