数据库实验第三次实验

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实验目的

1. 通过对实验二建立的数据库关系表和视图的各种查询的操作，加深对SQL语言和Transact SQL查询语言的了解，掌握相关查询语句的语法及使用方法。

实验平台及环境

系统: Ubuntu18.04 LTS

环境: Docker 18.09.7

数据库版本: Microsoft SQL Server 2017

实验内容

1. 简单的查询操作，包括单表的查询、选择条件、结果排序等的练习；
2. 多表的连接查询，包括等值连接、自然连接等；
3. 复杂的查询操作，包括使用分组等库函数的查询操作；
4. 练习带有IN、比较符的嵌套查询。

具体内容包括：

1. **简单查询:**
2. 查询班号为“g9940206”班的学生的学号和姓名；
3. 查询“网络技术与实践”课程的周学时和学分；
4. 查询选修了课程编号为“dep04\_s001”的学生的学号和成绩，并将成绩按降序输出；
5. 查询所有姓张的学生的信息；
6. 查询出生在1984年和1985年间的学生信息；
7. 查询1982年以后出生的女学生的学号、姓名、性别和出生日期，结果按年龄从小到大排序；
8. 显示所有学生的相关信息，并汇总学生总人数。
9. **在多表连接的查询实验中，在SQL　SERVER提供的交互式语言环境下用Transact SQL语句完成以下查询操作：**
10. 查询选修了课程编号为“dep04\_s002”且成绩高于85分的学生的学号、姓名和成绩；
11. 查询所有学生的学号、姓名、选修的课程名称和成绩；
12. 查询计算机科学系林红同学选修的课程名称、学分和成绩(考试成绩>＝60　有学分，否则无学分) 。
13. 查询每个教师的基本信息及教师类别；
14. 使用完全外联接查看StuSelDB数据库中每位教师的授课情况；
15. 查询选课程最多的学生由高到低排序；
16. 查询计算机工程系的教师授课课程的选修情况；
17. 查询严为老师和李红老师教授的同1门课程并列出课程名称；
18. 查询由严为老师授课而没有由李红老师授课的课程。
19. 查询至少选修了三门课程的学生的学号和姓名；
20. 查询选修课程号为“dep04\_b001”的学生的平均成绩；
21. 查询所有学生的学号和其选修课程的最高成绩，要求他的选修课程中没有成绩为空的；
22. 查询严为老师2011/2012学年所授“软件开发技术”课程的最高成绩及此学生的学号、姓名、班级；
23. 查询数据库开发技术课程用过的教材名称，作者和出版社；
24. 查询计算机科学系讲授过“JAVA程序设计与开发”的老师姓名和职称。
25. **在嵌套查询实验中，在SQL　SERVER提供的交互式语言环境下用Transact SQL语句完成以下查询操作，要求写嵌套查询语句：**
26. 查询所有已获“副教授”职称的女教师的--姓名、性别、学历和职称；
27. 查询开设了课程ID为\*的课程的教师的相关信息；
28. 查询选修了\*号课程的学生学号、姓名和联系电话；
29. 查询课程考试不及格的学生的姓名、性别；
30. 查询网页设计课程不及格的学生姓名、性别和联系电话；
31. 查询选修了“计算机基础”的学生的学号和姓名；
32. 查询没有选修 “计算机基础”的学生的学号和姓名；
33. 查询至少选修了学号为“g9940201”的学生所选修的所有课程的学生的学号和姓名。

实验步骤

运行脚本

from sql\_func import wk

from sql\_server import SqlServer

with SqlServer("student\_source") as server:

    q = wk(server)

    q("""select id, name from student where class\_id = 'g09402'""")

    q("""select week\_hour, credit from course where name = N'网络技术与实践'""")

    q("""select student\_id, score from student\_course where course\_id = 'dep04\_s001' order by score desc """)

    q("""select \* from student where name like N'张%' """)

    q("""select \* from student where birth between '1994-01-01' and '1995-12-31' """)

    q("""select id, name, gender, birth from student where gender = N'女' and birth > '1992' order by birth desc """)

    q("""select \* from student""")

    q("""select count(1) from student""")

    q("""select id, name, score from student\_course left join student on student\_id = id

        where course\_id = 'dep04\_s002' and score > 85 """)

    q("""select id, name,

        string\_agg(course\_id, ', ') as course\_ids,

        string\_agg(score, ', ') as score\_ids

        from student left join student\_course on student\_id = id group by id, name""")

    q("""select student\_id, string\_agg(course.name, ',') as course\_name,

        string\_agg((case when student\_course.score >= 60 then student\_course.credit else 0 end), ',') as course\_credit,

        string\_agg(student\_course.score, ',') as course\_score from student left join (

            student\_course left join course on course\_id = course.id

        ) on student\_id = student.id where student.name = N'林红'

        and student\_id in (

            select student.id from student left join class on class\_id = class.id

             where class.dept\_id = isnull((select id from department where name=N'计算机科学'), 'dep\_-1')

        ) group by student\_id """)

    q("""select teacher.\*, t\_type from teacher left join teacher\_type on teacher\_type.id = teacher.cat

        """)

    #*q("""select student\_course.course\_id, student\_id, score, credit,  from student\_course inner join teacher\_course*

    #*on student\_course.course\_id = teacher\_course.course\_id""")*

    q("""select teacher\_id, teacher.id, name, course\_id, class\_id, sem, year,

        teacher\_course.id as teacher\_course\_id, teacher\_course.address, book\_id

        from teacher full join teacher\_course on teacher.id = teacher\_id""")

    q("""select id, name,

        count(course\_id) as course\_count

        from student left join student\_course on student\_id = id group by id, name

        order by course\_count desc""")

    q("""

    select teacher\_id, teacher\_course.course\_id, string\_agg(student\_id, ',') as student\_ids

        from teacher\_course left join student\_course on teacher\_course.course\_id = student\_course.course\_id

        where teacher\_id in (

            select id from teacher where dept\_id = isnull((select id from department where name=N'计算机科学'), 'dep\_-1')

        )

        group by teacher\_id, teacher\_course.course\_id

    """)

    q("""

    select id, name from

    ((select course\_id from teacher left join teacher\_course on

        teacher.id = teacher\_course.teacher\_id

      where teacher.name = N'纪云') intersect

    (select course\_id from teacher left join teacher\_course on

        teacher.id = teacher\_course.teacher\_id

      where teacher.name = N'乔红')) as cmn left join course on id = course\_id

    """)

    q("""

    select course.\* from

    ((select course\_id from teacher left join teacher\_course on

        teacher.id = teacher\_course.teacher\_id

      where teacher.name = N'严为') except

    (select course\_id from teacher left join teacher\_course on

        teacher.id = teacher\_course.teacher\_id

      where teacher.name = N'乔红')) as cmn left join course on id = course\_id

    """)

    q("""select id, name

        from student left join student\_course on student\_id = id group by id, name

        having count(course\_id) >= 3""")

    q("""select avg(score) from student\_course where course\_id = 'dep04\_b001'""")

    q("""select student.id, max(isnull(score, -1)) from

        student left join student\_course on student.id = student\_id

        group by student.id""")

    q("""

    select yw2011\_2012\_st\_mx\_stu.\*, name, class\_id from

    (select course\_id, mx\_score, student\_id from

        (select yw2011\_2012\_st.id, max(score) as mx\_score from

            (select course.id from

                (select teacher\_course.\* from

                    teacher left join teacher\_course on teacher.id = teacher\_id

                where teacher.name = N'严为' and year = '2011/2012') as yw2011\_2012

            inner join

            course on course\_id = course.id where name = N'软件开发技术') as yw2011\_2012\_st

        left join

        student\_course on yw2011\_2012\_st.id = course\_id group by id

        ) as yw2011\_2012\_st\_mx\_score left join student\_course on

            id = course\_id and mx\_score = score

    ) as yw2011\_2012\_st\_mx\_stu left join student on student\_id = id

    """)

    q("""

    select course.name, book.name as book\_name, author, publish

     from course left join book on book\_id = book.id where course.name = N'SQL Server数据库开发技术'""")

    #*判断java为空*

    q("""

    select name, prof from

        (select teacher\_id, course\_id

            from teacher\_course

        where teacher\_id in (

            select id from teacher where dept\_id = isnull((select id from department where name=N'计算机科学'), 'dep\_-1')

        )

        and course\_id = (select id from course where name=N'JAVA程序设计与开发')) as scs\_java\_teachers

        left join teacher on teacher\_id = id

    """)

    q("""

    select name, gender from teacher where id in (select id from teacher where gender=N'女' and prof = N'副教授')""")

    q("""

    select \* from teacher where id in (select teacher\_id from teacher\_course where course\_id = 'dep01\_s002')""")

    #*dep04\_s002, dep01\_s002*

    q("""

    select id, name from student where id in (select student\_id from student\_course where course\_id = 'dep04\_s002')""")

    q("""

        select id, name from student where id in (select distinct student\_id from student\_course where score < 60)""")

    q("""

        select name, gender, address from student where id in (

        select distinct student\_id from student\_course

        where score < 60 and course\_id = (select id from course where name=N'网页设计'))""")

    q("""

    select id, name from student where id in (

    select distinct student\_id from student\_course

    where course\_id = (select id from course where name=N'计算机基础'))""")

    q("""

    select id, name from student where id not in (

    select distinct student\_id from student\_course

    where course\_id = (select id from course where name=N'计算机基础'))""")

    q("""

    select id, name from

    student where not exists

    ((select course\_id from student\_course where student\_id = 'g0940201') except

     (select course\_id from student\_course where student\_id = student.id))

    """)

输出如下：

select id, name from student where class\_id = 'g09402'

/\*

*+----------+----------+*

*|    id    |   name   |*

*+----------+----------+*

*| g0940201 |   张虹   |*

*| g0940202 |   林红   |*

*| g0940203 |   曹雨   |*

*| g0940204 |   芮华   |*

*| g0940205 | 李红[大] |*

*| g0940206 |  林海国  |*

*| g0940207 | 李红[小] |*

*| g0940210 |   赵青   |*

*| g0940211 |   赵凯   |*

*+----------+----------+*

\*/

select week\_hour, credit from course where name = N'网络技术与实践'

/\*

*+-----------+--------+*

*| week\_hour | credit |*

*+-----------+--------+*

*|     4     |   4    |*

*+-----------+--------+*

\*/

select student\_id, score from student\_course where course\_id = 'dep04\_s001' order by score desc

/\*

*+------------+-------+*

*| student\_id | score |*

*+------------+-------+*

*|  g0940206  |   92  |*

*|  g0940302  |   89  |*

*|  g0940201  |   89  |*

*|  g0940202  |   78  |*

*|  g0940301  |   78  |*

*|  g0940207  |   77  |*

*|  g0940204  |   65  |*

*|  g0940205  |   52  |*

*|  g0940203  |   44  |*

*+------------+-------+*

\*/

select \* from student where name like N'张%'

/\*

*+----------+--------+----------+--------+---------------------+---------------------+-----------------------+*

*|    id    |  name  | class\_id | gender |        birth        |      created\_at     |        address        |*

*+----------+--------+----------+--------+---------------------+---------------------+-----------------------+*

*| g0140105 |  张威  |  g01401  |   男   | 1992-01-11 00:00:00 | 2010-09-01 00:00:00 |    诸暨市高湖路65号   |*

*| g0940201 |  张虹  |  g09402  |   男   | 1991-09-12 00:00:00 | 2009-09-01 00:00:00 | 南京玄武区美玲大道4号 |*

*| g0940303 | 张雅丽 |  g09403  |   女   | 1990-01-21 00:00:00 | 2009-09-01 00:00:00 |  上海市北京东路191号  |*

*+----------+--------+----------+--------+---------------------+---------------------+-----------------------+*

\*/

select \* from student where birth between '1994-01-01' and '1995-12-31'

/\*

*+----------+--------+----------+--------+---------------------+---------------------+------------------+*

*|    id    |  name  | class\_id | gender |        birth        |      created\_at     |     address      |*

*+----------+--------+----------+--------+---------------------+---------------------+------------------+*

*| g0140201 | 王一言 |  g01402  |   男   | 1994-08-14 00:00:00 | 2010-09-01 00:00:00 | 深圳市华侨路78号 |*

*| g0240304 | 赵慧琳 |  g01403  |   女   | 1995-04-23 00:00:00 | 2012-09-01 00:00:00 | 镇江市静安路16号 |*

*| g0240403 | 吴珊珊 |  g01404  |   女   | 1994-03-26 00:00:00 | 2012-09-01 00:00:00 | 广州市体育路55号 |*

*+----------+--------+----------+--------+---------------------+---------------------+------------------+*

\*/

select id, name, gender, birth from student where gender = N'女' and birth > '1992' order by birth desc

/\*

*+----------+--------+--------+---------------------+*

*|    id    |  name  | gender |        birth        |*

*+----------+--------+--------+---------------------+*

*| g0240304 | 赵慧琳 |   女   | 1995-04-23 00:00:00 |*

*| g0240403 | 吴珊珊 |   女   | 1994-03-26 00:00:00 |*

*| g0240402 | 赵莹莹 |   女   | 1993-05-25 00:00:00 |*

*| g0140104 | 叶梦宇 |   女   | 1992-03-10 00:00:00 |*

*+----------+--------+--------+---------------------+*

\*/

select \* from student

/\*

*+----------+----------+----------+--------+---------------------+---------------------+-------------------------+*

*|    id    |   name   | class\_id | gender |        birth        |      created\_at     |         address         |*

*+----------+----------+----------+--------+---------------------+---------------------+-------------------------+*

*| g0140101 |  徐志超  |  g01401  |   男   | 1992-01-07 00:00:00 | 2010-09-01 00:00:00 |     杭州市余杭路12号    |*

*| g0140102 |  王志鹏  |  g01401  |   男   | 1992-10-08 00:00:00 | 2010-09-01 00:00:00 |     慈溪市中正路23号    |*

*| g0140103 |   李昊   |  g01401  |   男   | 1992-05-09 00:00:00 | 2010-09-01 00:00:00 |     南昌市起义路55号    |*

*| g0140104 |  叶梦宇  |  g01401  |   女   | 1992-03-10 00:00:00 | 2010-09-01 00:00:00 |    新昌市海棠路123号    |*

*| g0140105 |   张威   |  g01401  |   男   | 1992-01-11 00:00:00 | 2010-09-01 00:00:00 |     诸暨市高湖路65号    |*

*| g0140106 |  唐勇睿  |  g01401  |   男   | 1992-11-12 00:00:00 | 2010-09-01 00:00:00 |     北京市正义路2号     |*

*| g0140107 |   邓皓   |  g01401  |   男   | 1992-07-13 00:00:00 | 2010-09-01 00:00:00 |     邯郸市望江路24号    |*

*| g0140201 |  王一言  |  g01402  |   男   | 1994-08-14 00:00:00 | 2010-09-01 00:00:00 |     深圳市华侨路78号    |*

*| g0140204 |  徐江洪  |  g01402  |   男   | 1992-11-17 00:00:00 | 2010-09-01 00:00:00 |     高邮市樱花路22号    |*

*| g0140205 |  朱玺仲  |  g01402  |   男   | 1996-10-20 00:00:00 | 2010-09-01 00:00:00 |    扬州市望乡路156号    |*

*| g0240206 |  刘又嘉  |  g01402  |   男   | 1993-12-19 00:00:00 | 2012-09-01 00:00:00 |     上海市东风路12号    |*

*| g0240301 |  袁毓堃  |  g01403  |   男   | 1992-11-20 00:00:00 | 2012-09-01 00:00:00 |     上海市模范路4号     |*

*| g0240302 |  顾天飞  |  g01403  |   男   | 1992-12-21 00:00:00 | 2012-09-01 00:00:00 |     南京市下沙路88号    |*

*| g0240303 |   刘乐   |  g01403  |   男   | 1992-02-22 00:00:00 | 2012-09-01 00:00:00 |     常熟市后山路6号     |*

*| g0240304 |  赵慧琳  |  g01403  |   女   | 1995-04-23 00:00:00 | 2012-09-01 00:00:00 |     镇江市静安路16号    |*

*| g0240401 |  王晓庆  |  g01404  |   男   | 1993-09-24 00:00:00 | 2012-09-01 00:00:00 |     苏州市普陀路15号    |*

*| g0240402 |  赵莹莹  |  g01404  |   女   | 1993-05-25 00:00:00 | 2012-09-01 00:00:00 |     昆明市花市路77号    |*

*| g0240403 |  吴珊珊  |  g01404  |   女   | 1994-03-26 00:00:00 | 2012-09-01 00:00:00 |     广州市体育路55号    |*

*| g0940201 |   张虹   |  g09402  |   男   | 1991-09-12 00:00:00 | 2009-09-01 00:00:00 |  南京玄武区美玲大道4号  |*

*| g0940202 |   林红   |  g09402  |   女   | 1991-06-16 00:00:00 | 2009-09-01 00:00:00 |     扬州市五亭街41号    |*

*| g0940203 |   曹雨   |  g09402  |   男   | 1990-12-11 00:00:00 | 2009-09-01 00:00:00 |  南京玄武区林荫大道4号  |*

*| g0940204 |   芮华   |  g09402  |   男   | 1992-09-09 00:00:00 | 2009-09-01 00:00:00 |   江苏仪征市青年路6号   |*

*| g0940205 | 李红[大] |  g09402  |   女   | 1991-09-02 00:00:00 | 2009-09-01 00:00:00 |  江苏仪征市青年东路16号 |*

*| g0940206 |  林海国  |  g09402  |   男   | 1991-04-05 00:00:00 | 2009-09-01 00:00:00 | 北京市中关村太平北路1号 |*

*| g0940207 | 李红[小] |  g09402  |   女   | 1991-05-23 00:00:00 | 2009-09-01 00:00:00 |     南京虎踞北路43号    |*

*| g0940210 |   赵青   |  g09402  |   男   | 1990-01-09 00:00:00 | 2009-09-01 00:00:00 |     南京中山北路10号    |*

*| g0940211 |   赵凯   |  g09402  |   男   | 1992-01-11 00:00:00 | 2009-09-01 00:00:00 |     南京中山北路10号    |*

*| g0940301 |  左群声  |  g09403  |   男   | 1992-09-08 00:00:00 | 2009-09-01 00:00:00 |     贵州是遵义路68号    |*

*| g0940302 |  许小华  |  g09403  |   女   | 1991-10-15 00:00:00 | 2009-09-01 00:00:00 |     上海市龙盘路97号    |*

*| g0940303 |  张雅丽  |  g09403  |   女   | 1990-01-21 00:00:00 | 2009-09-01 00:00:00 |   上海市北京东路191号   |*

*+----------+----------+----------+--------+---------------------+---------------------+-------------------------+*

\*/

select count(1) from student

/\*

*+----+*

*|    |*

*+----+*

*| 30 |*

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\*/

select id, name, score from student\_course left join student on student\_id = id

        where course\_id = 'dep04\_s002' and score > 85

/\*

*+----------+----------+-------+*

*|    id    |   name   | score |*

*+----------+----------+-------+*

*| g0940203 |   曹雨   |   98  |*

*| g0940207 | 李红[小] |   87  |*

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\*/

select id, name,

        string\_agg(course\_id, ', ') as course\_ids,

        string\_agg(score, ', ') as score\_ids

        from student left join student\_course on student\_id = id group by id, name

/\*

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*|    id    |   name   |                               course\_ids                               |       score\_ids        |*

*+----------+----------+------------------------------------------------------------------------+------------------------+*

*| g0140101 |  徐志超  |                                  None                                  |          None          |*

*| g0140102 |  王志鹏  |                                  None                                  |          None          |*

*| g0140103 |   李昊   |                                  None                                  |          None          |*

*| g0140104 |  叶梦宇  |                                  None                                  |          None          |*

*| g0140105 |   张威   |                                  None                                  |          None          |*

*| g0140106 |  唐勇睿  |                                  None                                  |          None          |*

*| g0140107 |   邓皓   |                                  None                                  |          None          |*

*| g0140201 |  王一言  |                                  None                                  |          None          |*

*| g0140204 |  徐江洪  |                                  None                                  |          None          |*

*| g0140205 |  朱玺仲  |                                  None                                  |          None          |*

*| g0240206 |  刘又嘉  |                                  None                                  |          None          |*

*| g0240301 |  袁毓堃  |                                  None                                  |          None          |*

*| g0240302 |  顾天飞  |                                  None                                  |          None          |*

*| g0240303 |   刘乐   |                                  None                                  |          None          |*

*| g0240304 |  赵慧琳  |                                  None                                  |          None          |*

*| g0240401 |  王晓庆  |                                  None                                  |          None          |*

*| g0240402 |  赵莹莹  |                                  None                                  |          None          |*

*| g0240403 |  吴珊珊  |                                  None                                  |          None          |*

*| g0940201 |   张虹   | dep04\_b001, dep04\_s001, dep04\_s002, dep04\_s003, dep04\_s004, dep04\_s005 | 88, 89, 56, 68, 47, 87 |*

*| g0940202 |   林红   | dep04\_b001, dep04\_s001, dep04\_s002, dep04\_s003, dep04\_s004, dep04\_s005 | 78, 78, 78, 98, 95, 91 |*

*| g0940203 |   曹雨   | dep04\_b001, dep04\_s001, dep04\_s002, dep04\_s003, dep04\_s004, dep04\_s005 | 88, 44, 98, 23, 78, 56 |*

*| g0940204 |   芮华   | dep04\_b001, dep04\_s001, dep04\_s002, dep04\_s003, dep04\_s004, dep04\_s005 | 56, 65, 66, 86, 67, 77 |*

*| g0940205 | 李红[大] | dep04\_b001, dep04\_s001, dep04\_s002, dep04\_s003, dep04\_s004, dep04\_s005 | 45, 52, 78, 78, 76, 76 |*

*| g0940206 |  林海国  | dep04\_b001, dep04\_s001, dep04\_s002, dep04\_s003, dep04\_s004, dep04\_s006 | 98, 92, 54, 86, 76, 88 |*

*| g0940207 | 李红[小] | dep04\_b001, dep04\_s001, dep04\_s002, dep04\_s003, dep04\_s004, dep04\_s007 | 87, 77, 87, 87, 46, 99 |*

*| g0940210 |   赵青   |                                  None                                  |          None          |*

*| g0940211 |   赵凯   |                                  None                                  |          None          |*

*| g0940301 |  左群声  |                               dep04\_s001                               |           78           |*

*| g0940302 |  许小华  |                               dep04\_s001                               |           89           |*

*| g0940303 |  张雅丽  |                                  None                                  |          None          |*

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\*/

select student\_id, string\_agg(course.name, ',') as course\_name,

        string\_agg((case when student\_course.score >= 60 then student\_course.credit else 0 end), ',') as course\_credit,

        string\_agg(student\_course.score, ',') as course\_score from student left join (

            student\_course left join course on course\_id = course.id

        ) on student\_id = student.id where student.name = N'林红'

        and student\_id in (

            select student.id from student left join class on class\_id = class.id

             where class.dept\_id = isnull((select id from department where name=N'计算机科学'), 'dep\_-1')

        ) group by student\_id

/\*

*+------------+-----------------------------------------------------------------------------------------+---------------+-------------------+*

*| student\_id |                                       course\_name                                       | course\_credit |    course\_score   |*

*+------------+-----------------------------------------------------------------------------------------+---------------+-------------------+*

*|  g0940202  | 计算机基础,SQL Server数据库开发技术,JAVA程序设计与开发,单片机原理,软件开发技术,网页设计 |  4,5,4,4,3,5  | 78,78,78,98,95,91 |*

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\*/

select teacher.\*, t\_type from teacher left join teacher\_type on teacher\_type.id = teacher.cat

/\*

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*|     id    |  name  | gender |        birth        | dept\_id |  prof  |    phone    |        address         | post\_code | cat | t\_type |*

*+-----------+--------+--------+---------------------+---------+--------+-------------+------------------------+-----------+-----+--------+*

*| dep01\_001 | 王敬远 |   男   | 1956-09-09 00:00:00 |  dep\_01 | 副教授 |   6211544   |     南京先贤路31号     |   210002  |  1  |  专职  |*

*| dep01\_002 |  马丽  |   女   | 1973-07-09 00:00:00 |  dep\_01 | 副教授 |   65431235  |   南京古北青年路35号   |   210021  |  1  |  专职  |*

*| dep01\_003 |  包维  |   女   | 1978-07-10 00:00:00 |  dep\_01 | 副教授 |   65431246  |   南京鼓山新风路78号   |   210028  |  1  |  专职  |*

*| dep01\_004 | 蒋晓英 |   女   | 1982-07-11 00:00:00 |  dep\_01 |  讲师  |   5881254   |   南京河西总统路79号   |   215828  |  2  |  兼职  |*

*| dep01\_005 |  黄翔  |   男   | 1988-01-12 00:00:00 |  dep\_01 |  讲师  |   3728543   |   南京下沙环江路2号    |   214428  |  3  |  外聘  |*

*| dep01\_025 | 周春桃 |   女   | 1989-06-01 00:00:00 |  dep\_05 |  教授  |   40123456  | 云南省景洪市解放路61号 |   100102  |  2  |  兼职  |*

*| dep02\_001 |  康辉  |   男   | 1949-08-06 00:00:00 |  dep\_02 |  教授  | 13951606754 |  南京鼓楼区长虹路3号   |   210008  |  2  |  兼职  |*

*| dep02\_002 |  王皓  |   男   | 1987-06-13 00:00:00 |  dep\_02 |  讲师  |   3728643   |   南京下沙环江路45号   |   214428  |  3  |  外聘  |*

*| dep02\_003 | 李丽华 |   女   | 1989-03-14 00:00:00 |  dep\_02 |  讲师  |   7654987   |  南京鼓楼区高邮路2号   |   210012  |  2  |  兼职  |*

*| dep02\_004 |  罗伟  |   男   | 1989-11-15 00:00:00 |  dep\_02 |  讲师  |   7342122   | 南京西霞区长寿路102号  |   219912  |  2  |  兼职  |*

*| dep03\_001 | 董一平 |   男   | 1968-01-01 00:00:00 |  dep\_03 | 副教授 |   3728543   |     南京长江路9号      |   210036  |  1  |  专职  |*

*| dep03\_002 |  潘惠  |   女   | 1966-04-01 00:00:00 |  dep\_01 |  讲师  |   5887654   |     南京长江路5号      |   210036  |  1  |  专职  |*

*| dep04\_001 |  纪云  |   男   | 1965-09-09 00:00:00 |  dep\_04 | 副教授 |   6245321   |     南京长江路3号      |   210036  |  3  |  外聘  |*

*| dep04\_002 |  章红  |   女   | 1970-07-04 00:00:00 |  dep\_04 |  教授  | 13027816022 |    南京北京西路31号    |   210043  |  2  |  兼职  |*

*| dep04\_003 |  李伟  |   男   | 1954-06-06 00:00:00 |  dep\_04 |  教授  |   3728543   |     南京先贤路3号      |   210002  |  2  |  兼职  |*

*| dep04\_004 |  严为  |   男   | 1978-09-01 00:00:00 |  dep\_04 |  助教  |   7654987   |  南京鼓楼区长虹路3号   |   210002  |  2  |  兼职  |*

*| dep04\_005 |  乔红  |   女   | 1969-05-31 00:00:00 |  dep\_04 |  讲师  |   8802888   |   南京太州青年路3号    |   210071  |  3  |  外聘  |*

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\*/

select teacher\_id, teacher.id, name, course\_id, class\_id, sem, year,

        teacher\_course.id as teacher\_course\_id, teacher\_course.address, book\_id

        from teacher full join teacher\_course on teacher.id = teacher\_id

/\*

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*| teacher\_id |     id    |  name  | course\_id  | class\_id | sem  |    year   | teacher\_course\_id |  address  |    book\_id    |*

*+------------+-----------+--------+------------+----------+------+-----------+-------------------+-----------+---------------+*

*| dep01\_001  | dep01\_001 | 王敬远 | dep01\_s002 |  g09402  |  1   | 2009/2010 |     110310510     | 教学楼201 | dep01\_s002\_01 |*

*| dep01\_001  | dep01\_001 | 王敬远 | dep01\_s002 |  g10402  |  1   | 2011/2012 |     120320520     | 教学楼202 | dep01\_s002\_01 |*

*|    None    | dep01\_002 |  马丽  |    None    |   None   | None |    None   |        None       |    None   |      None     |*

*|    None    | dep01\_003 |  包维  |    None    |   None   | None |    None   |        None       |    None   |      None     |*

*|    None    | dep01\_004 | 蒋晓英 |    None    |   None   | None |    None   |        None       |    None   |      None     |*

*|    None    | dep01\_005 |  黄翔  |    None    |   None   | None |    None   |        None       |    None   |      None     |*

*|    None    | dep01\_025 | 周春桃 |    None    |   None   | None |    None   |        None       |    None   |      None     |*

*|    None    | dep02\_001 |  康辉  |    None    |   None   | None |    None   |        None       |    None   |      None     |*

*|    None    | dep02\_002 |  王皓  |    None    |   None   | None |    None   |        None       |    None   |      None     |*

*|    None    | dep02\_003 | 李丽华 |    None    |   None   | None |    None   |        None       |    None   |      None     |*

*|    None    | dep02\_004 |  罗伟  |    None    |   None   | None |    None   |        None       |    None   |      None     |*

*|    None    | dep03\_001 | 董一平 |    None    |   None   | None |    None   |        None       |    None   |      None     |*

*|    None    | dep03\_002 |  潘惠  |    None    |   None   | None |    None   |        None       |    None   |      None     |*

*| dep04\_001  | dep04\_001 |  纪云  | dep04\_s001 |  g09402  |  1   | 2012/2013 |     110320512     | 教学楼601 | dep04\_s001\_01 |*

*| dep04\_001  | dep04\_001 |  纪云  | dep04\_s005 |  g09402  |  2   | 2011/2012 |     130310511     | 教学楼602 | dep04\_s005\_01 |*

*| dep04\_002  | dep04\_002 |  章红  | dep04\_p001 |  g09402  |  1   | 2009/2010 |     110320234     | 教学楼302 | dep04\_p001\_01 |*

*| dep04\_002  | dep04\_002 |  章红  | dep04\_s002 |  g09402  |  1   | 2012/2013 |     210420321     | 教学楼601 | dep04\_s002\_01 |*

*| dep04\_003  | dep04\_003 |  李伟  | dep04\_s003 |  g09402  |  1   | 2009/2010 |     110410231     | 教学楼212 | dep04\_s003\_01 |*

*| dep04\_003  | dep04\_003 |  李伟  | dep04\_s004 |  g09403  |  1   | 2011/2012 |     120410132     | 教学楼211 | dep04\_s004\_01 |*

*| dep04\_004  | dep04\_004 |  严为  | dep04\_b001 |  g09403  |  2   | 2011/2012 |     310520789     | 教学楼603 | dep04\_b001\_01 |*

*| dep04\_004  | dep04\_004 |  严为  | dep04\_s004 |  g09402  |  1   | 2011/2012 |     220521897     | 教学楼211 | dep04\_s004\_01 |*

*| dep04\_005  | dep04\_005 |  乔红  | dep04\_s001 |  g09403  |  1   | 2011/2012 |     210512456     | 教学楼212 | dep04\_s001\_01 |*

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\*/

select id, name,

        count(course\_id) as course\_count

        from student left join student\_course on student\_id = id group by id, name

        order by course\_count desc

/\*

*+----------+----------+--------------+*

*|    id    |   name   | course\_count |*

*+----------+----------+--------------+*

*| g0940201 |   张虹   |      6       |*

*| g0940202 |   林红   |      6       |*

*| g0940203 |   曹雨   |      6       |*

*| g0940204 |   芮华   |      6       |*

*| g0940205 | 李红[大] |      6       |*

*| g0940206 |  林海国  |      6       |*

*| g0940207 | 李红[小] |      6       |*

*| g0940301 |  左群声  |      1       |*

*| g0940302 |  许小华  |      1       |*

*| g0940303 |  张雅丽  |      0       |*

*| g0940210 |   赵青   |      0       |*

*| g0940211 |   赵凯   |      0       |*

*| g0140101 |  徐志超  |      0       |*

*| g0140102 |  王志鹏  |      0       |*

*| g0140103 |   李昊   |      0       |*

*| g0140104 |  叶梦宇  |      0       |*

*| g0140105 |   张威   |      0       |*

*| g0140106 |  唐勇睿  |      0       |*

*| g0140107 |   邓皓   |      0       |*

*| g0140201 |  王一言  |      0       |*

*| g0140204 |  徐江洪  |      0       |*

*| g0140205 |  朱玺仲  |      0       |*

*| g0240206 |  刘又嘉  |      0       |*

*| g0240301 |  袁毓堃  |      0       |*

*| g0240302 |  顾天飞  |      0       |*

*| g0240303 |   刘乐   |      0       |*

*| g0240304 |  赵慧琳  |      0       |*

*| g0240401 |  王晓庆  |      0       |*

*| g0240402 |  赵莹莹  |      0       |*

*| g0240403 |  吴珊珊  |      0       |*

*+----------+----------+--------------+*

\*/

    select teacher\_id, teacher\_course.course\_id, string\_agg(student\_id, ',') as student\_ids

        from teacher\_course left join student\_course on teacher\_course.course\_id = student\_course.course\_id

        where teacher\_id in (

            select id from teacher where dept\_id = isnull((select id from department where name=N'计算机科学'), 'dep\_-1')

        )

        group by teacher\_id, teacher\_course.course\_id

/\*

*+------------+------------+----------------------------------------------------------------------------------+*

*| teacher\_id | course\_id  |                                   student\_ids                                    |*

*+------------+------------+----------------------------------------------------------------------------------+*

*| dep04\_001  | dep04\_s001 | g0940201,g0940202,g0940203,g0940204,g0940205,g0940206,g0940207,g0940301,g0940302 |*

*| dep04\_001  | dep04\_s005 |                   g0940201,g0940202,g0940203,g0940204,g0940205                   |*

*| dep04\_002  | dep04\_p001 |                                       None                                       |*

*| dep04\_002  | dep04\_s002 |          g0940201,g0940202,g0940203,g0940204,g0940205,g0940206,g0940207          |*

*| dep04\_003  | dep04\_s003 |          g0940201,g0940202,g0940203,g0940204,g0940205,g0940206,g0940207          |*

*| dep04\_003  | dep04\_s004 |          g0940201,g0940202,g0940203,g0940204,g0940205,g0940206,g0940207          |*

*| dep04\_004  | dep04\_b001 |          g0940201,g0940202,g0940203,g0940204,g0940205,g0940206,g0940207          |*

*| dep04\_004  | dep04\_s004 |          g0940201,g0940202,g0940203,g0940204,g0940205,g0940206,g0940207          |*

*| dep04\_005  | dep04\_s001 | g0940201,g0940202,g0940203,g0940204,g0940205,g0940206,g0940207,g0940301,g0940302 |*

*+------------+------------+----------------------------------------------------------------------------------+*

\*/

    select id, name from

    ((select course\_id from teacher left join teacher\_course on

        teacher.id = teacher\_course.teacher\_id

      where teacher.name = N'纪云') intersect

    (select course\_id from teacher left join teacher\_course on

        teacher.id = teacher\_course.teacher\_id

      where teacher.name = N'乔红')) as cmn left join course on id = course\_id

/\*

*+------------+--------------------------+*

*|     id     |           name           |*

*+------------+--------------------------+*

*| dep04\_s001 | SQL Server数据库开发技术 |*

*+------------+--------------------------+*

\*/

    select course.\* from

    ((select course\_id from teacher left join teacher\_course on

        teacher.id = teacher\_course.teacher\_id

      where teacher.name = N'严为') except

    (select course\_id from teacher left join teacher\_course on

        teacher.id = teacher\_course.teacher\_id

      where teacher.name = N'乔红')) as cmn left join course on id = course\_id

/\*

*+------------+--------------+---------------+------------+-----------+--------+*

*|     id     |     name     |    book\_id    | total\_hour | week\_hour | credit |*

*+------------+--------------+---------------+------------+-----------+--------+*

*| dep04\_b001 |  计算机基础  | dep04\_b001\_01 |     68     |     4     |   4    |*

*| dep04\_s004 | 软件开发技术 | dep04\_s004\_01 |     51     |     3     |   3    |*

*+------------+--------------+---------------+------------+-----------+--------+*

\*/

select id, name

        from student left join student\_course on student\_id = id group by id, name

        having count(course\_id) >= 3

/\*

*+----------+----------+*

*|    id    |   name   |*

*+----------+----------+*

*| g0940201 |   张虹   |*

*| g0940202 |   林红   |*

*| g0940203 |   曹雨   |*

*| g0940204 |   芮华   |*

*| g0940205 | 李红[大] |*

*| g0940206 |  林海国  |*

*| g0940207 | 李红[小] |*

*+----------+----------+*

\*/

select avg(score) from student\_course where course\_id = 'dep04\_b001'

/\*

*+----+*

*|    |*

*+----+*

*| 77 |*

*+----+*

\*/

select student.id, max(isnull(score, -1)) from

        student left join student\_course on student.id = student\_id

        group by student.id

/\*

*+----------+----+*

*|    id    |    |*

*+----------+----+*

*| g0140101 | -1 |*

*| g0140102 | -1 |*

*| g0140103 | -1 |*

*| g0140104 | -1 |*

*| g0140105 | -1 |*

*| g0140106 | -1 |*

*| g0140107 | -1 |*

*| g0140201 | -1 |*

*| g0140204 | -1 |*

*| g0140205 | -1 |*

*| g0240206 | -1 |*

*| g0240301 | -1 |*

*| g0240302 | -1 |*

*| g0240303 | -1 |*

*| g0240304 | -1 |*

*| g0240401 | -1 |*

*| g0240402 | -1 |*

*| g0240403 | -1 |*

*| g0940201 | 89 |*

*| g0940202 | 98 |*

*| g0940203 | 98 |*

*| g0940204 | 86 |*

*| g0940205 | 78 |*

*| g0940206 | 98 |*

*| g0940207 | 99 |*

*| g0940210 | -1 |*

*| g0940211 | -1 |*

*| g0940301 | 78 |*

*| g0940302 | 89 |*

*| g0940303 | -1 |*

*+----------+----+*

\*/

    select yw2011\_2012\_st\_mx\_stu.\*, name, class\_id from

    (select course\_id, mx\_score, student\_id from

        (select yw2011\_2012\_st.id, max(score) as mx\_score from

            (select course.id from

                (select teacher\_course.\* from

                    teacher left join teacher\_course on teacher.id = teacher\_id

                where teacher.name = N'严为' and year = '2011/2012') as yw2011\_2012

            inner join

            course on course\_id = course.id where name = N'软件开发技术') as yw2011\_2012\_st

        left join

        student\_course on yw2011\_2012\_st.id = course\_id group by id

        ) as yw2011\_2012\_st\_mx\_score left join student\_course on

            id = course\_id and mx\_score = score

    ) as yw2011\_2012\_st\_mx\_stu left join student on student\_id = id

/\*

*+------------+----------+------------+------+----------+*

*| course\_id  | mx\_score | student\_id | name | class\_id |*

*+------------+----------+------------+------+----------+*

*| dep04\_s004 |    95    |  g0940202  | 林红 |  g09402  |*

*+------------+----------+------------+------+----------+*

\*/

    select course.name, book.name as book\_name, author, publish

     from course left join book on book\_id = book.id where course.name = N'SQL Server数据库开发技术'

/\*

*+--------------------------+--------------------------+--------+--------------------+*

*|           name           |        book\_name         | author |      publish       |*

*+--------------------------+--------------------------+--------+--------------------+*

*| SQL Server数据库开发技术 | SQL Server数据库开发技术 |  成虎  | 北方交通大学出版社 |*

*+--------------------------+--------------------------+--------+--------------------+*

\*/

    select name, prof from

        (select teacher\_id, course\_id

            from teacher\_course

        where teacher\_id in (

            select id from teacher where dept\_id = isnull((select id from department where name=N'计算机科学'), 'dep\_-1')

        )

        and course\_id = (select id from course where name=N'JAVA程序设计与开发')) as scs\_java\_teachers

        left join teacher on teacher\_id = id

/\*

*+------+------+*

*| name | prof |*

*+------+------+*

*| 章红 | 教授 |*

*+------+------+*

\*/

    select name, gender from teacher where id in (select id from teacher where gender=N'女' and prof = N'副教授')

/\*

*+------+--------+*

*| name | gender |*

*+------+--------+*

*| 马丽 |   女   |*

*| 包维 |   女   |*

*+------+--------+*

\*/

    select \* from teacher where id in (select teacher\_id from teacher\_course where course\_id = 'dep01\_s002')

/\*

*+-----------+--------+--------+---------------------+---------+--------+---------+----------------+-----------+-----+*

*|     id    |  name  | gender |        birth        | dept\_id |  prof  |  phone  |    address     | post\_code | cat |*

*+-----------+--------+--------+---------------------+---------+--------+---------+----------------+-----------+-----+*

*| dep01\_001 | 王敬远 |   男   | 1956-09-09 00:00:00 |  dep\_01 | 副教授 | 6211544 | 南京先贤路31号 |   210002  |  1  |*

*+-----------+--------+--------+---------------------+---------+--------+---------+----------------+-----------+-----+*

\*/

    select id, name from student where id in (select student\_id from student\_course where course\_id = 'dep04\_s002')

/\*

*+----------+----------+*

*|    id    |   name   |*

*+----------+----------+*

*| g0940201 |   张虹   |*

*| g0940202 |   林红   |*

*| g0940203 |   曹雨   |*

*| g0940204 |   芮华   |*

*| g0940205 | 李红[大] |*

*| g0940206 |  林海国  |*

*| g0940207 | 李红[小] |*

*+----------+----------+*

\*/

        select id, name from student where id in (select distinct student\_id from student\_course where score < 60)

/\*

*+----------+----------+*

*|    id    |   name   |*

*+----------+----------+*

*| g0940201 |   张虹   |*

*| g0940203 |   曹雨   |*

*| g0940204 |   芮华   |*

*| g0940205 | 李红[大] |*

*| g0940206 |  林海国  |*

*| g0940207 | 李红[小] |*

*+----------+----------+*

\*/

        select name, gender, address from student where id in (

        select distinct student\_id from student\_course

        where score < 60 and course\_id = (select id from course where name=N'网页设计'))

/\*

*+------+--------+-----------------------+*

*| name | gender |        address        |*

*+------+--------+-----------------------+*

*| 曹雨 |   男   | 南京玄武区林荫大道4号 |*

*+------+--------+-----------------------+*

\*/

    select id, name from student where id in (

    select distinct student\_id from student\_course

    where course\_id = (select id from course where name=N'计算机基础'))

/\*

*+----------+----------+*

*|    id    |   name   |*

*+----------+----------+*

*| g0940201 |   张虹   |*

*| g0940202 |   林红   |*

*| g0940203 |   曹雨   |*

*| g0940204 |   芮华   |*

*| g0940205 | 李红[大] |*

*| g0940206 |  林海国  |*

*| g0940207 | 李红[小] |*

*+----------+----------+*

\*/

    select id, name from student where id not in (

    select distinct student\_id from student\_course

    where course\_id = (select id from course where name=N'计算机基础'))

/\*

*+----------+--------+*

*|    id    |  name  |*

*+----------+--------+*

*| g0140101 | 徐志超 |*

*| g0140102 | 王志鹏 |*

*| g0140103 |  李昊  |*

*| g0140104 | 叶梦宇 |*

*| g0140105 |  张威  |*

*| g0140106 | 唐勇睿 |*

*| g0140107 |  邓皓  |*

*| g0140201 | 王一言 |*

*| g0140204 | 徐江洪 |*

*| g0140205 | 朱玺仲 |*

*| g0240206 | 刘又嘉 |*

*| g0240301 | 袁毓堃 |*

*| g0240302 | 顾天飞 |*

*| g0240303 |  刘乐  |*

*| g0240304 | 赵慧琳 |*

*| g0240401 | 王晓庆 |*

*| g0240402 | 赵莹莹 |*

*| g0240403 | 吴珊珊 |*

*| g0940210 |  赵青  |*

*| g0940211 |  赵凯  |*

*| g0940301 | 左群声 |*

*| g0940302 | 许小华 |*

*| g0940303 | 张雅丽 |*

*+----------+--------+*

\*/

    select id, name from

    student where not exists

    ((select course\_id from student\_course where student\_id = 'g0940201') except

     (select course\_id from student\_course where student\_id = student.id))

/\*

*+----------+----------+*

*|    id    |   name   |*

*+----------+----------+*

*| g0940201 |   张虹   |*

*| g0940202 |   林红   |*

*| g0940203 |   曹雨   |*

*| g0940204 |   芮华   |*

*| g0940205 | 李红[大] |*

*+----------+----------+*

\*/

实验结果及分析

1. **简单查询:**
2. 查询班号为“g9940206”班的学生的学号和姓名；

select id, name from student where class\_id = 'g09402'

怀疑是数据略微错误，修改为“g09402”后进行filter。

1. 查询“网络技术与实践”课程的周学时和学分；

select week\_hour, credit from course where name = N'网络技术与实践'

重点在于N，对于部分MS版本，需要添加N转unicode字符，否则中文会乱码。

1. 查询选修了课程编号为“dep04\_s001”的学生的学号和成绩，并将成绩按降序输出；

select student\_id, score from student\_course where course\_id = 'dep04\_s001' order by score desc

使用了order by关键字

1. 查询所有姓张的学生的信息；

select \* from student where name like N'张%'

用%通配符匹配后缀，SQL对A%形式的查询特别优化过，因此不用担心效率问题。

1. 查询出生在1984年和1985年间的学生信息；

select \* from student where birth between '1994-01-01' and '1995-12-31'

怀疑是数据略微错误，修改为1994和1995以后进行查询。

如果查的是`between 1994 and 1995`，那么不会查到1995年1月1日以后的人。

1. 查询1982年以后出生的女学生的学号、姓名、性别和出生日期，结果按年龄从小到大排序；

select id, name, gender, birth from student where gender = N'女' and birth > '1992' order by birth desc

1. 显示所有学生的相关信息，并汇总学生总人数。

select \* from student

select count(1) from student

1. **在多表连接的查询实验中，在SQL　SERVER提供的交互式语言环境下用Transact SQL语句完成以下查询操作：**
2. 查询选修了课程编号为“dep01\_s002”且成绩高于85分的学生的学号、姓名和成绩；

select id, name, score from student\_course left join student on student\_id = id

where course\_id = 'dep04\_s002' and score > 85

怀疑是数据略微错误，修改为dep04\_s002以后进行查询。

1. 查询所有学生的学号、姓名、选修的课程名称和成绩；

select id, name,

string\_agg(course\_id, ', ') as course\_ids,

string\_agg(score, ', ') as score\_ids

from student left join student\_course on student\_id = id group by id, name

string\_agg是MS2017新增的聚合函数，这里仅方便查看结果，如果数据量大，应该直接返回数据集在宿主语言里继续操作。

1. 查询计算机科学系林红同学选修的课程名称、学分和成绩(考试成绩>＝60　有学分，否则无学分) 。

select student\_id, string\_agg(course.name, ',') as course\_name,

string\_agg((case when student\_course.score >= 60 then student\_course.credit else 0 end), ',') as course\_credit,

string\_agg(student\_course.score, ',') as course\_score from student left join (

student\_course left join course on course\_id = course.id

) on student\_id = student.id where student.name = N'林红'

and student\_id in (

select student.id from student left join class on class\_id = class.id

where class.dept\_id = isnull((select id from department where name=N'计算机科学'), 'dep\_-1')

) group by student\_id

为了防止空值造成意外的结果，用isnull函数覆盖null返回值。

1. 查询每个教师的基本信息及教师类别；

select teacher.\*, t\_type from teacher left join teacher\_type on teacher\_type.id = teacher.cat

1. 使用完全外联接查看StuSelDB数据库中每位教师的授课情况；

select teacher\_id, teacher.id, name, course\_id, class\_id, sem, year,

teacher\_course.id as teacher\_course\_id, teacher\_course.address, book\_id

from teacher full join teacher\_course on teacher.id = teacher\_id

完全外连接对应的关键词为full join。

1. 查询选课程最多的学生由高到低排序；

select id, name,

count(course\_id) as course\_count

from student left join student\_course on student\_id = id group by id, name

order by course\_count desc

要求没选课的同学也要被选中，所以应该用left join

1. 查询计算机工程系的教师授课课程的选修情况；

select teacher\_id, teacher\_course.course\_id, string\_agg(student\_id, ',') as student\_ids

from teacher\_course left join student\_course on teacher\_course.course\_id = student\_course.course\_id

where teacher\_id in (

select id from teacher where dept\_id = isnull((select id from department where name=N'计算机科学'), 'dep\_-1')

)

group by teacher\_id, teacher\_course.course\_id

1. 查询严为老师和李红老师教授的同1门课程并列出课程名称；

select id, name from

((select course\_id from teacher left join teacher\_course on

teacher.id = teacher\_course.teacher\_id

where teacher.name = N'纪云') intersect

(select course\_id from teacher left join teacher\_course on

teacher.id = teacher\_course.teacher\_id

where teacher.name = N'乔红')) as cmn left join course on id = course\_id

这里没有考虑是否有重名的纪云和乔红老师。

1. 查询由严为老师授课而没有由李红老师授课的课程。

select course.\* from

((select course\_id from teacher left join teacher\_course on

teacher.id = teacher\_course.teacher\_id

where teacher.name = N'严为') except

(select course\_id from teacher left join teacher\_course on

teacher.id = teacher\_course.teacher\_id

where teacher.name = N'乔红')) as cmn left join course on id = course\_id

数据库中没有李红老师，所以改成了乔红老师…

1. 查询至少选修了三门课程的学生的学号和姓名；

select id, name

from student left join student\_course on student\_id = id group by id, name

having count(course\_id) >= 3

count是分组聚集的结果，所以不能放在where中，应该放在having中。

1. 查询选修课程号为“dep04\_b001”的学生的平均成绩；

select avg(score) from student\_course where course\_id = 'dep04\_b001'

1. 查询所有学生的学号和其选修课程的最高成绩，要求他的选修课程中没有成绩为空的；

select student.id, max(isnull(score, -1)) from

student left join student\_course on student.id = student\_id

group by student.id

为了防止成绩为空，增加了一个ifnull判断。

1. 查询严为老师2011/2012学年所授“软件开发技术”课程的最高成绩及此学生的学号、姓名、班级；

select yw2011\_2012\_st\_mx\_stu.\*, name, class\_id from

(select course\_id, mx\_score, student\_id from

(select yw2011\_2012\_st.id, max(score) as mx\_score from

(select course.id from

(select teacher\_course.\* from

teacher left join teacher\_course on teacher.id = teacher\_id

where teacher.name = N'严为' and year = '2011/2012') as yw2011\_2012

inner join

course on course\_id = course.id where name = N'软件开发技术') as yw2011\_2012\_st

left join

student\_course on yw2011\_2012\_st.id = course\_id group by id

) as yw2011\_2012\_st\_mx\_score left join student\_course on

id = course\_id and mx\_score = score

) as yw2011\_2012\_st\_mx\_stu left join student on student\_id = id

1. 查询数据库开发技术课程用过的教材名称，作者和出版社；

select course.name, book.name as book\_name, author, publish

from course left join book on book\_id = book.id where course.name = N'SQL Server数据库开发技术'

1. 查询计算机科学系讲授过“JAVA程序设计与开发”的老师姓名和职称。

select name, prof from

(select teacher\_id, course\_id

from teacher\_course

where teacher\_id in (

select id from teacher where dept\_id = isnull((select id from department where name=N'计算机科学'), 'dep\_-1')

)

and course\_id = (select id from course where name=N'JAVA程序设计与开发')) as scs\_java\_teachers

left join teacher on teacher\_id = id

1. **在嵌套查询实验中，在SQL　SERVER提供的交互式语言环境下用Transact SQL语句完成以下查询操作，要求写嵌套查询语句：**
2. 查询所有已获“副教授”职称的女教师的—姓名、性别、学历和职称；

select name, gender from teacher where id in (select id from teacher where gender=N'女' and prof = N'副教授')

1. 查询开设了课程ID为”dep04\_s002”的课程的教师的相关信息；

select id, name from student where id in (select student\_id from student\_course where course\_id = 'dep01\_s002')

1. 查询选修了”dep04\_s002”号课程的学生学号、姓名和联系电话；

select id, name from student where id in (select student\_id from student\_course where course\_id = 'dep04\_s002')

1. 查询课程考试不及格的学生的姓名、性别；

select id, name from student where id in (select distinct student\_id from student\_course where score < 60)

1. 查询网页设计课程不及格的学生姓名、性别和联系电话；

select name, gender, address from student where id in (

select distinct student\_id from student\_course

where score < 60 and course\_id = (select id from course where name=N'网页设计'))

1. 查询选修了“计算机基础”的学生的学号和姓名；

select id, name from student where id in (

select distinct student\_id from student\_course

where course\_id = (select id from course where name=N'计算机基础'))

1. 查询没有选修 “计算机基础”的学生的学号和姓名；

select id, name from student where id not in (

select distinct student\_id from student\_course

where course\_id = (select id from course where name=N'计算机基础'))

1. 查询至少选修了学号为“g9940201”的学生所选修的所有课程的学生的学号和姓名。

select id, name from

student where not exists

((select course\_id from student\_course where student\_id = 'g0940201') except

(select course\_id from student\_course where student\_id = student.id))

实验小结

在此次实验中，大多数是基础实验，没有什么技术含量。但每一个都认真做，认真考虑SQL语句是否与设计需求一致，不要因为马虎遗留下SQL漏洞和查询Bug。