

《数据库系统实验》实验报告

题目	实验13
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一.实验环境

操作系统：Windows 10

应用：MySQL Workbench 8.0 CE

二.实验内容与完成情况

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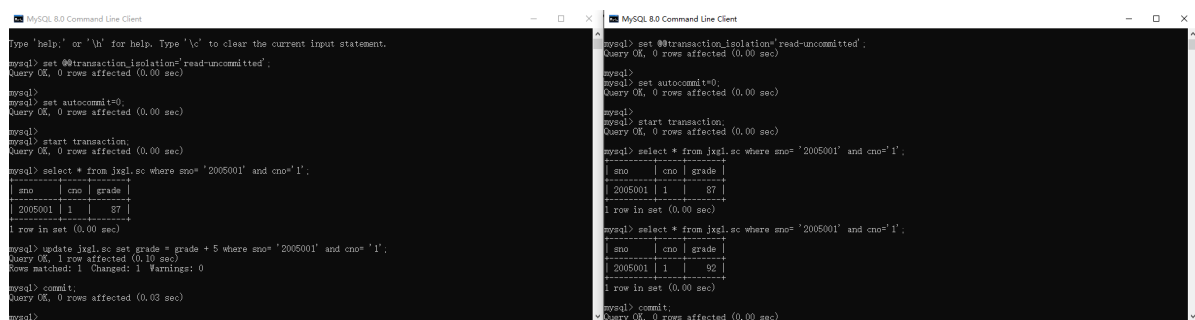
Table调整

```
insert into student value('2005001','student0','男',20,'ss');
insert into course value('1','test0','01',2);
insert into sc value('2005001','1',87);
```

使用到的指令

```
set @@transaction_isolation='read-uncommitted';
set autocommit=0;
start transaction;
select * from jxgl.sc where sno= '2005001' and cno='1';
update jxgl.sc set grade = grade + 5 where sno= '2005001' and cno= '1';
```

实验结果



The image shows two side-by-side screenshots of the MySQL Command Line Client. The left screenshot shows the initial state of the 'sc' table with one row (sno=2005001, cno=1, grade=87). The right screenshot shows the result after the 'update' command, where the grade has been incremented by 5, resulting in a grade of 92.

```
mysql> set @@transaction_isolation='read-uncommitted';
Query OK, 0 rows affected (0.00 sec)

mysql> set autocommit=0;
Query OK, 0 rows affected (0.00 sec)

mysql> start transaction;
Query OK, 0 rows affected (0.00 sec)

mysql> select * from jxgl.sc where sno= '2005001' and cno='1';
+----+----+-----+
| sno | cno | grade |
+----+----+-----+
| 2005001 | 1 | 87 |
+----+----+-----+
1 row in set (0.00 sec)

mysql> update jxgl.sc set grade = grade + 5 where sno= '2005001' and cno= '1';
Query OK, 1 row affected (0.10 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> commit;
Query OK, 0 rows affected (0.03 sec)

mysql>
```

```
mysql> set @@transaction_isolation='read-uncommitted';
Query OK, 0 rows affected (0.00 sec)

mysql> set autocommit=0;
Query OK, 0 rows affected (0.00 sec)

mysql> start transaction;
Query OK, 0 rows affected (0.00 sec)

mysql> select * from jxgl.sc where sno= '2005001' and cno='1';
+----+----+-----+
| sno | cno | grade |
+----+----+-----+
| 2005001 | 1 | 87 |
+----+----+-----+
1 row in set (0.00 sec)

mysql> select * from jxgl.sc where sno= '2005001' and cno='1';
+----+----+-----+
| sno | cno | grade |
+----+----+-----+
| 2005001 | 1 | 92 |
+----+----+-----+
1 row in set (0.00 sec)

mysql> commit;
Query OK, 0 rows affected (0.00 sec)

mysql>
```

分析

不可重复读是指在一个事务内多次读同一数据。在这个事务还没有结束时，另外一个事务也访问该同一数据。那么在第一个事务的两次读数据之间，由于第二个事务的修改，第一个事务两次读到的数据可能是不一样的，因此称为不可重复读。

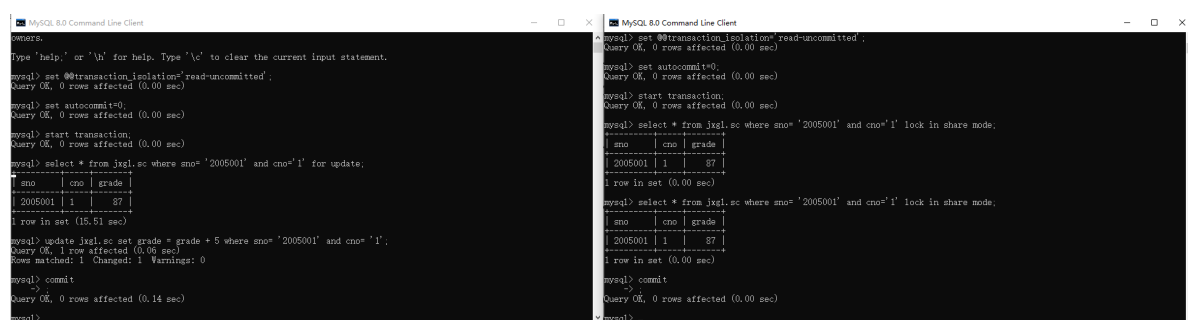
在本次实验中，`session_2` 读到了 `session_1` 没有 commit 的 update 语句，导致了不可重复读问题的出现。

12-8

使用到的指令

```
set @@transaction_isolation='read-uncommitted';
set autocommit=0;
start transaction;
select * from jxgl.sc where sno= '2005001' and cno='1' for update;
select * from jxgl.sc where sno= '2005001' and cno='1' lock in share mode;
update jxgl.sc set grade = grade + 5 where sno= '2005001' and cno= '1';
```

实验结果



分析

`session_2` 在读时加了锁，`session_1` 因为没有获得锁所以无法读取，避免了不可重复读问题。

12-9

Table调整

```
insert into student value('2005002','student1','男',20,'ss');
insert into course value('2','test','01',2);
insert into sc value('2005002','2',95);
insert into student value('2005003','student3','男',20,'ss');
```

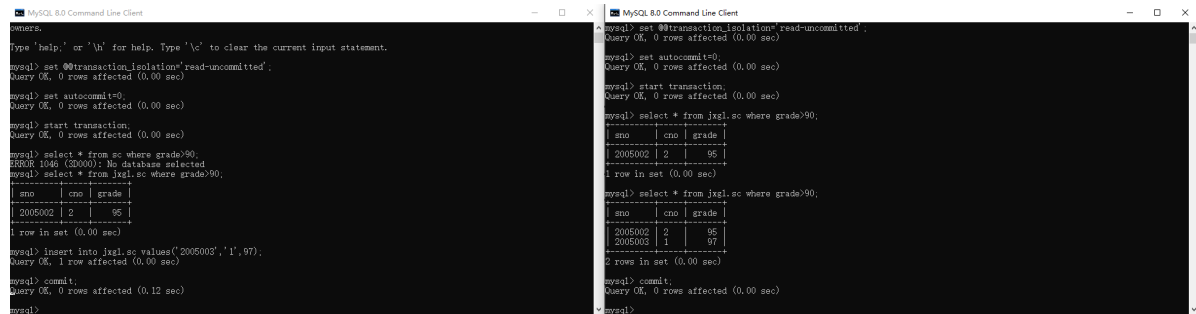
使用到的指令

```

set @@transaction_isolation='read-uncommitted';
set autocommit=0;
start transaction;
select * from jxgl.sc where grade>90;
insert into jxgl.sc values('2005003','1',97);

```

实验结果



分析

当两个事务并发时，在事务处理（读写等）符合条件数据之后，意外发现还有符合条件但是未处理的数据存在，实际是由另一个事务将新行插入数据库中导致的，这种情况被称为幻影问题。

在本次实验中，`session_2` 读到了 `session_1` 没有 `commit` 的 `update` 语句，导致了幻影问题。

12-10

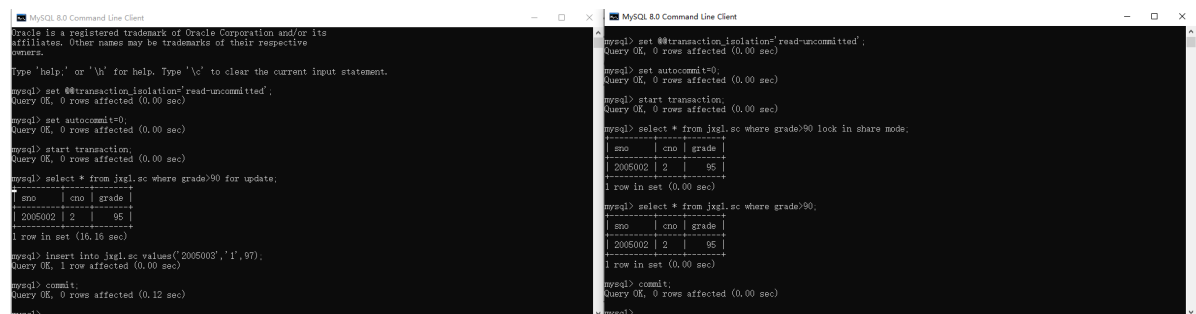
使用到的指令

```

set @@transaction_isolation='read-uncommitted';
set autocommit=0;
start transaction;
select * from jxgl.sc where grade>90;
select * from jxgl.sc where grade>90 lock in share mode;
select * from jxgl.sc where grade>90 for update;
insert into jxgl.sc values('2005003','1',97);

```

实验结果



分析

`session_2` 在读时加了锁, `session_1` 因为没有获得锁所以无法读取, 避免了幻影问题。