# 《数据库系统实验》

# 实验报告

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|---|---|
| **题目** | （实验 7） |
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| **学号** | |
| **班级** | 计科 X 班 |

## 一. 实验环境：

操作系统：windows

图形界面：mysql3.7.31, mysql workbench

## 二. 实验内容与完成情况：

索引的使用效果测试。参照实验示例上机操作，增大 test 表的记录到 8 万条或更多，重做实验。多次记录耗时，并作分析比较。

### 2.1 创建 test 表，创建存储过程，并调用

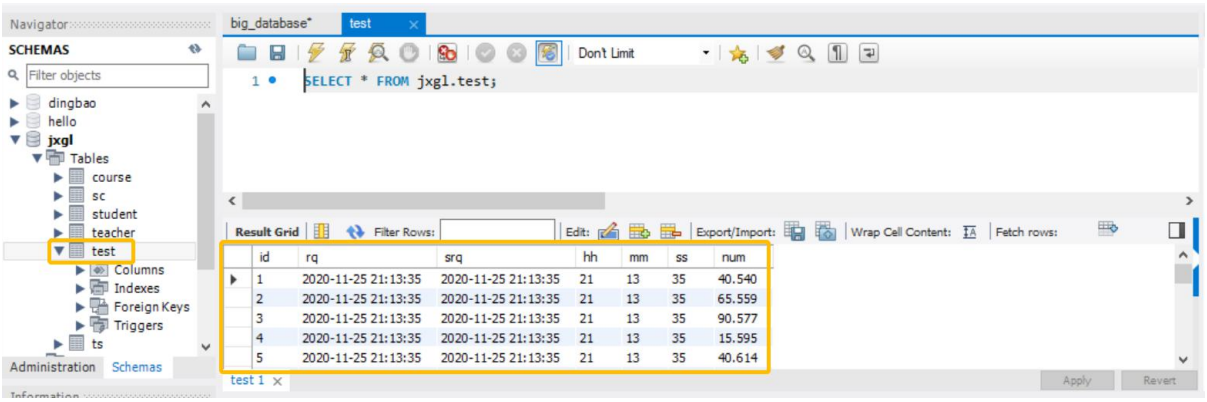
代码：

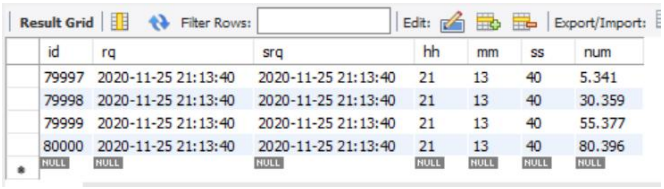
```
create table test(id int unique auto_increment, rq datetime null, wrrq varchar(20) null,
hh smallint null, mm smallint null, ss smallint null, num numeric(12,3), primary key(id))
auto_increment=1 engine=MyISAM;

delimiter //
create procedure p1()
begin
    set @i=1;
    while @i<=80000 do
        insert into test(rq, srq, hh, mm, ss, num)
            values(now(),now(),hour(now()),minute(now()),second(now()),rand(@i)*100);
        set @i = @i+1;
    end while;
end//

call p1();
```

运行结果：



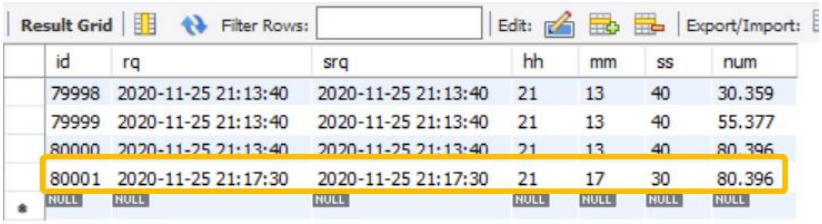

## 2.2 未建索引时按以下步骤操作

### 2.2.1 单记录插入

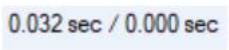
代码：

```
delimiter //
select @i:=max(id) from test;
insert into test(rq,srq,hh,mm,ss,num)
    values(now(),now(),hour(now()),minute(now()),second(now()),rand(@i)*100);
```

运行结果：




耗时：0.032sec

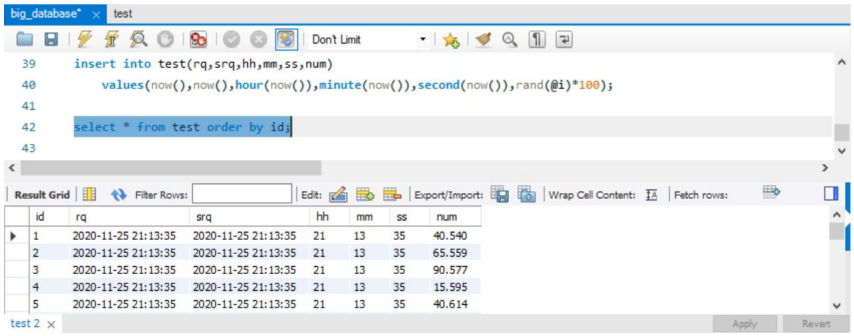



### 2.2.2 查询所有记录，按 id 排序

代码：

```
select * from test order by id;
```

运行结果：



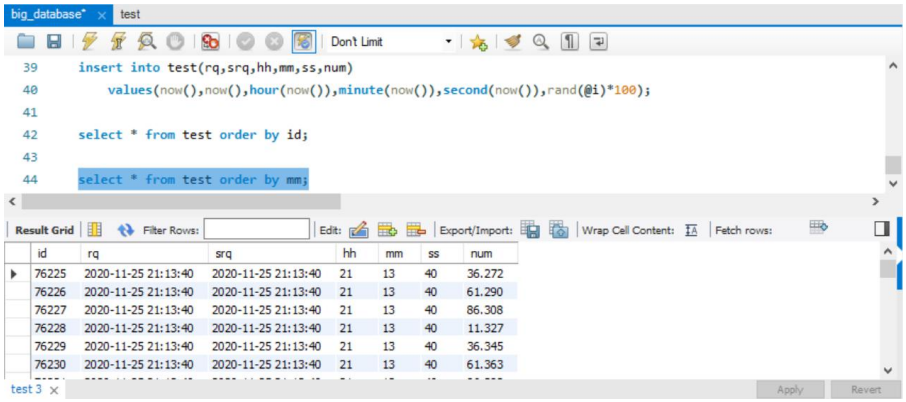

耗时：0.110sec


### 2.2.3 查询所有记录，按 mm 排序

代码：

```
select * from test order by mm;
```

运行结果：



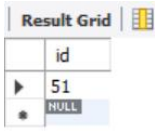

耗时：0.031sec


### 2.2.4 单记录查询

代码：

```
select id from test where id=51;
```

运行结果：




耗时：0 sec


## 2.3 对 test 表的 mm 字段建立非聚集索引

### 2.3.1 建立索引耗时

代码：

```
create index indexname1 on test(mm);
```

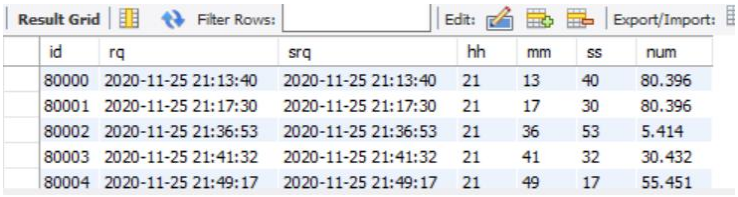
运行结果：耗时 0.344sec


### 2.3.2 单记录插入

代码：

```
delimiter //
select @i:=max(id) from test;
insert into test(rq,srq,hh,mm,ss,num)
    values(now(),now(),hour(now()),minute(now()),second(now()),rand(@i)*100);
```

运行结果：



Result Grid | Filter Rows: | Edit: | Export/Import:

| id | rq | srq | hh | mm | ss | num |
|---|---|---|---|---|---|---|
| 80000 | 2020-11-25 21:13:40 | 2020-11-25 21:13:40 | 21 | 13 | 40 | 80.396 |
| 80001 | 2020-11-25 21:17:30 | 2020-11-25 21:17:30 | 21 | 17 | 30 | 80.396 |
| 80002 | 2020-11-25 21:36:53 | 2020-11-25 21:36:53 | 21 | 36 | 53 | 5.414 |
| 80003 | 2020-11-25 21:41:32 | 2020-11-25 21:41:32 | 21 | 41 | 32 | 30.432 |
| 80004 | 2020-11-25 21:49:17 | 2020-11-25 21:49:17 | 21 | 49 | 17 | 55.451 |

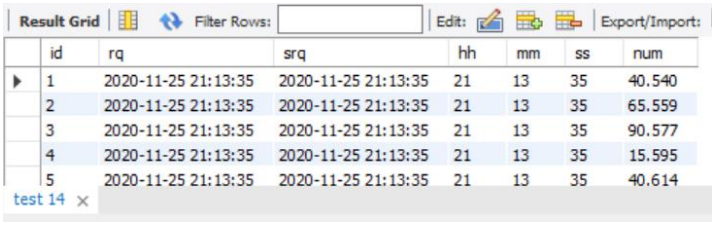
耗时：0sec，明显小于上面的 0.032sec


### 2.3.3 查询所有记录，按 id 排序

代码：

```
select * from test order by id;
```

运行结果：



Result Grid | Filter Rows: | Edit: | Export/Import:

| id | rq | srq | hh | mm | ss | num |
|---|---|---|---|---|---|---|
| 1 | 2020-11-25 21:13:35 | 2020-11-25 21:13:35 | 21 | 13 | 35 | 40.540 |
| 2 | 2020-11-25 21:13:35 | 2020-11-25 21:13:35 | 21 | 13 | 35 | 65.559 |
| 3 | 2020-11-25 21:13:35 | 2020-11-25 21:13:35 | 21 | 13 | 35 | 90.577 |
| 4 | 2020-11-25 21:13:35 | 2020-11-25 21:13:35 | 21 | 13 | 35 | 15.595 |
| 5 | 2020-11-25 21:13:35 | 2020-11-25 21:13:35 | 21 | 13 | 35 | 40.614 |

test 14

耗时：0.062sec，明显小于上面的 0.110sec

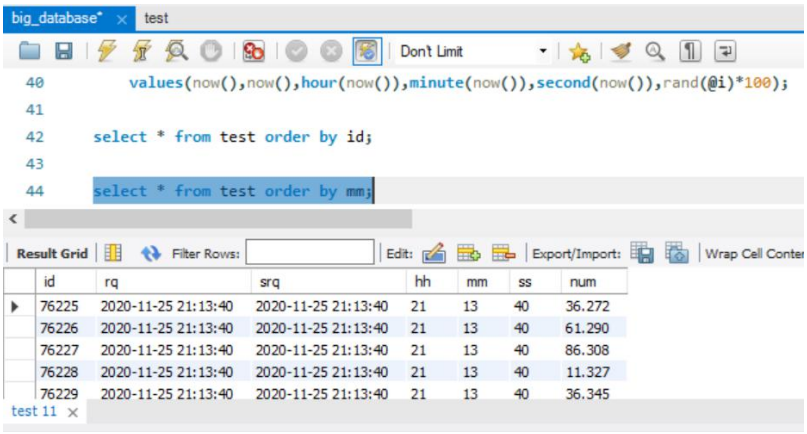



### 2.3.4 查询所有记录，按 mm 排序

代码：

```
select * from test order by mm;
```

运行结果：



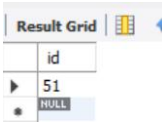

耗时：0.047sec，多于上面无索引使得 0.031sec


### 2.3.5 单记录查询

代码：

```
select id from test where id=51;
```

运行结果：




耗时：0sec，和上面的一样


### 2.3.6 删除索引

代码：

```
drop index indexname1 on test;
```

运行结果及耗时：