mySQL用户手册

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1.数据结构设计

- 结构体information用于存储表格的基本信息，包括表格的文件名字、行数、列数和表格的属性

```
struct information
{
    int row = 0;
    int col = 0;
    string filename;
    vector<string> attribute;
};
```

- TABLE用于存储整个数据库各个表格的信息，用map实现

```
map<string, information> TABLE;
```

- table用于存储各个表格的具体信息，是一个结构体

```
struct table
{
    string tablename;
    vector<string> val;
    vector<map<string,string>> content;
};
```

2.功能分解

mysql主要分解为如下功能：

- 利用正则表达式对输入的字符串进行匹配分析，根据结果调用不同的命令函数
- 支持CREAT TABLE命令，能够根据输入或者已经存在的文件创建表格，在命令行输出并将表格的信息存到总表中
- 支持DROP TABLE命令，能够根据输入删除table
- 支持TABLE LIST命令，输出总表中各个table的主要信息
- 支持INSERT INTO命令，能根据输入向table中插入行
- 支持DELETE命令，根据输入删除特定的行
- 支持UPDATA命令，根据输入更新指定列或者全部列
- 支持SELECT命令，根据输入选择不同的列进行特定的操作后进行展示
- 支持事务文件，根据事务文件自动执行里面的命令
- 对相关的文件进行读写操作

3.模块设计

主要分为3个模块

- main函数模块
  模仿终端，会自动打印'~$ ′，同时接受输入，当为“mysql”时，调用mysql函数，进入数据库界面，当输入为“quit”时退出程序，当输入为其他命令时，会输出“Command not found!”。
- mysql函数
  模仿数据库，当输入为“quit”时返回main函数，当输入为其他时，会利用正则表达式对字符串进行分析，分别调用不同的命令，当调用的命令格式不正确时会输出“Command format error!”。
- command模块
  该模块主要包括SQL支持的各种命令的函数实现。

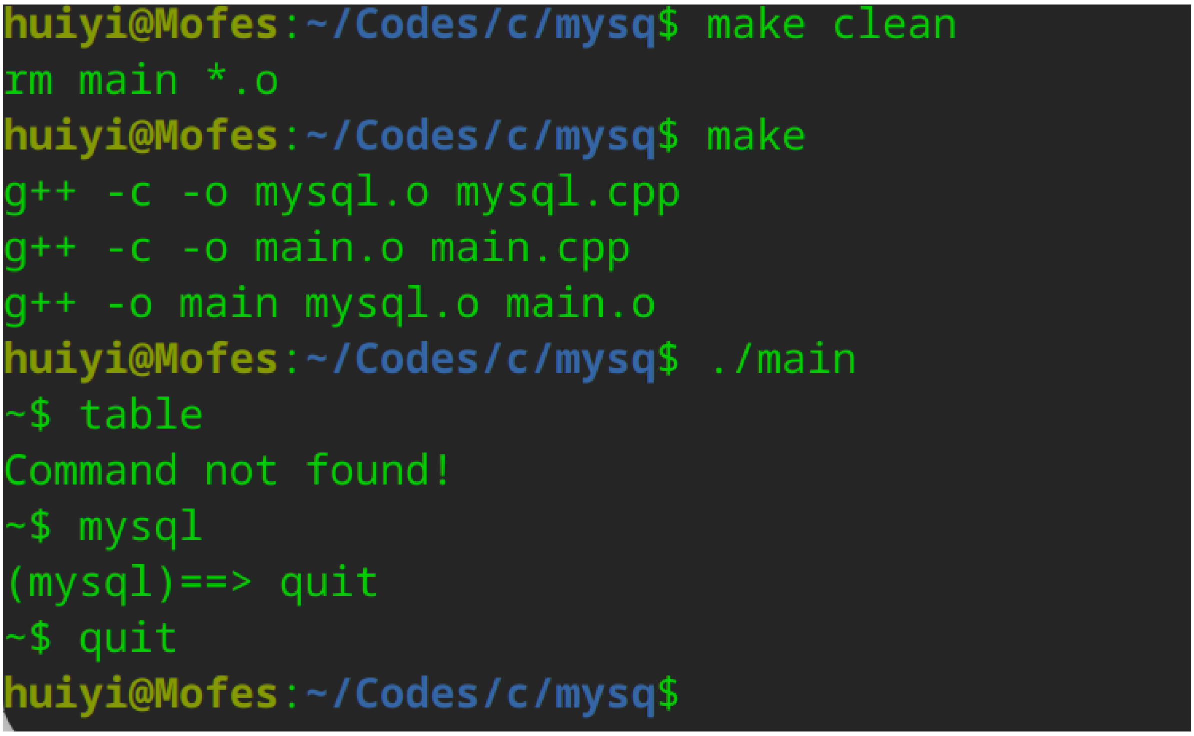
4.核心函数声明

```
void create_table(string &data);
void file_write(vector<string> inf, string path);
void file_read(vector<string> &inf, string path);
void table_read(string tablename, table &dest);
void print(vector<string> inf);
void drop_table(string &data);
void table_list();
void insert_into(string &data);
void delete_table(string &data);
void updata_table(string &data);
void getmap(string &data, map<string, string> &dest);
void select_table(string &data);
void alter_table(string &data);
void file_do();
void getval(string &data, vector<string> &dest);
void mysql();
```

5.成果展示

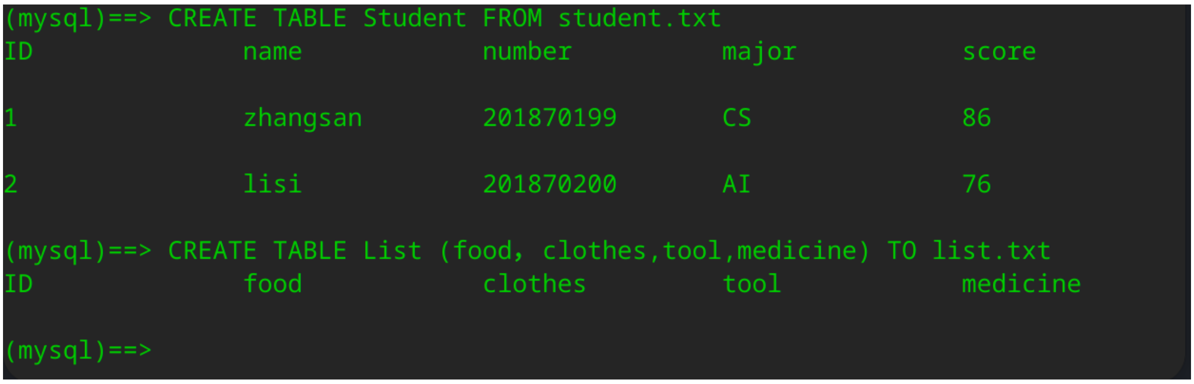
5.1 基础部分

5.11 命令行界面交互

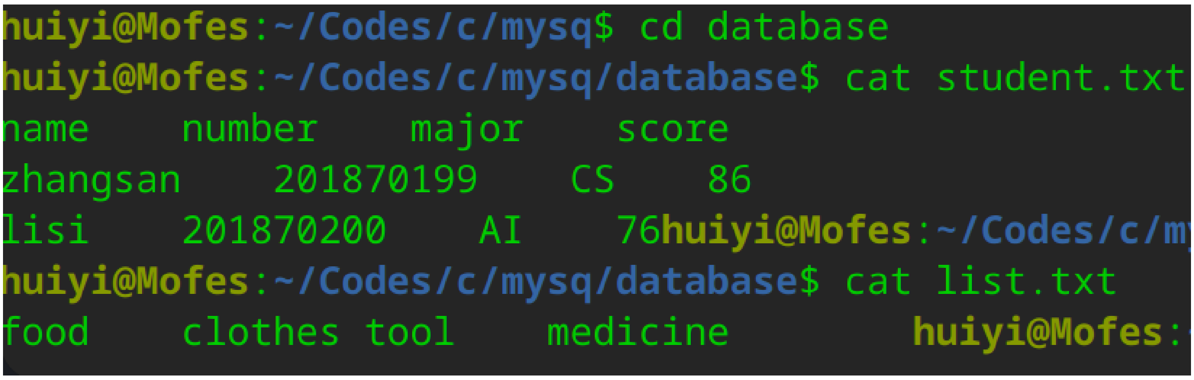


```
huiyi@Mofes:~/Codes/c/mysq$ make clean
rm main *.o
huiyi@Mofes:~/Codes/c/mysq$ make
g++ -c -o mysql.o mysql.cpp
g++ -c -o main.o main.cpp
g++ -o main mysql.o main.o
huiyi@Mofes:~/Codes/c/mysq$ ./main
~$ table
Command not found!
~$ mysql
(mysql)==> quit
~$ quit
huiyi@Mofes:~/Codes/c/mysq$
```

5.12 CREATE TABLE语句

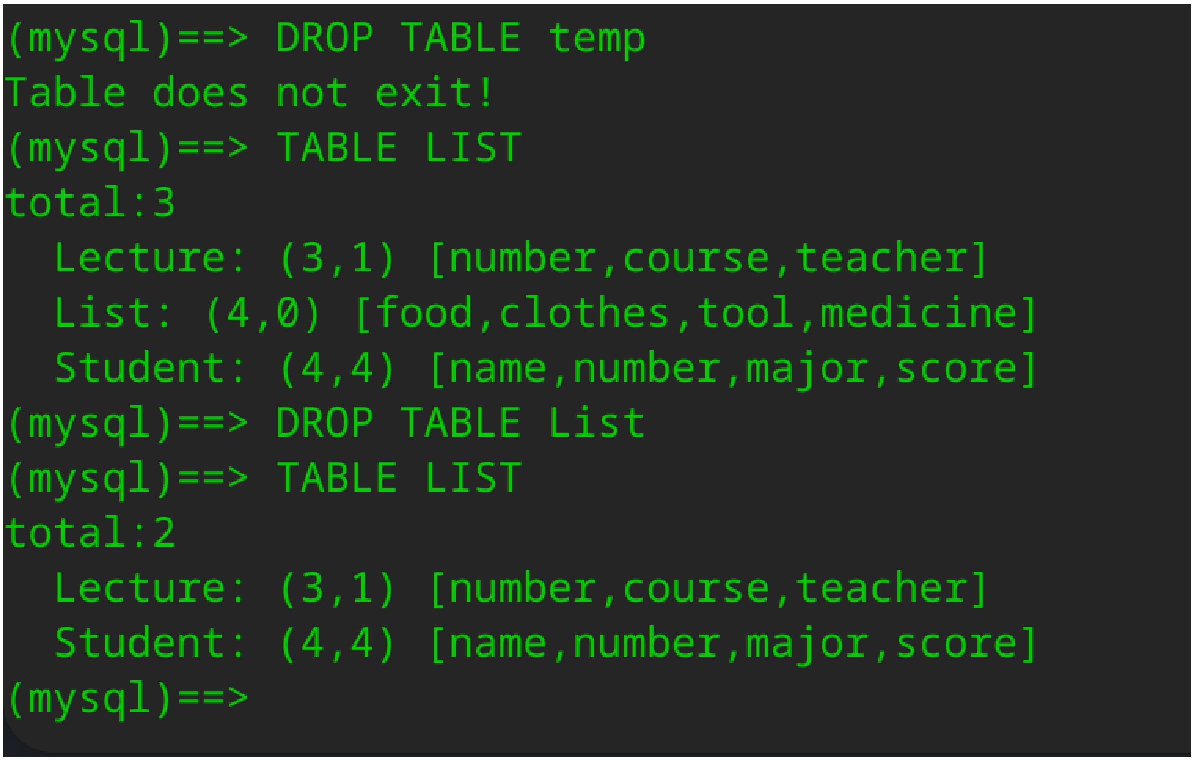


```
(mysql)==> CREATE TABLE Student FROM student.txt
ID              name            number          major           score

1               zhangsan        201870199       CS              86

2               lisi            201870200       AI              76

(mysql)==> CREATE TABLE List (food, clothes,tool,medicine) TO list.txt
ID              food            clothes         tool            medicine

(mysql)==>
```



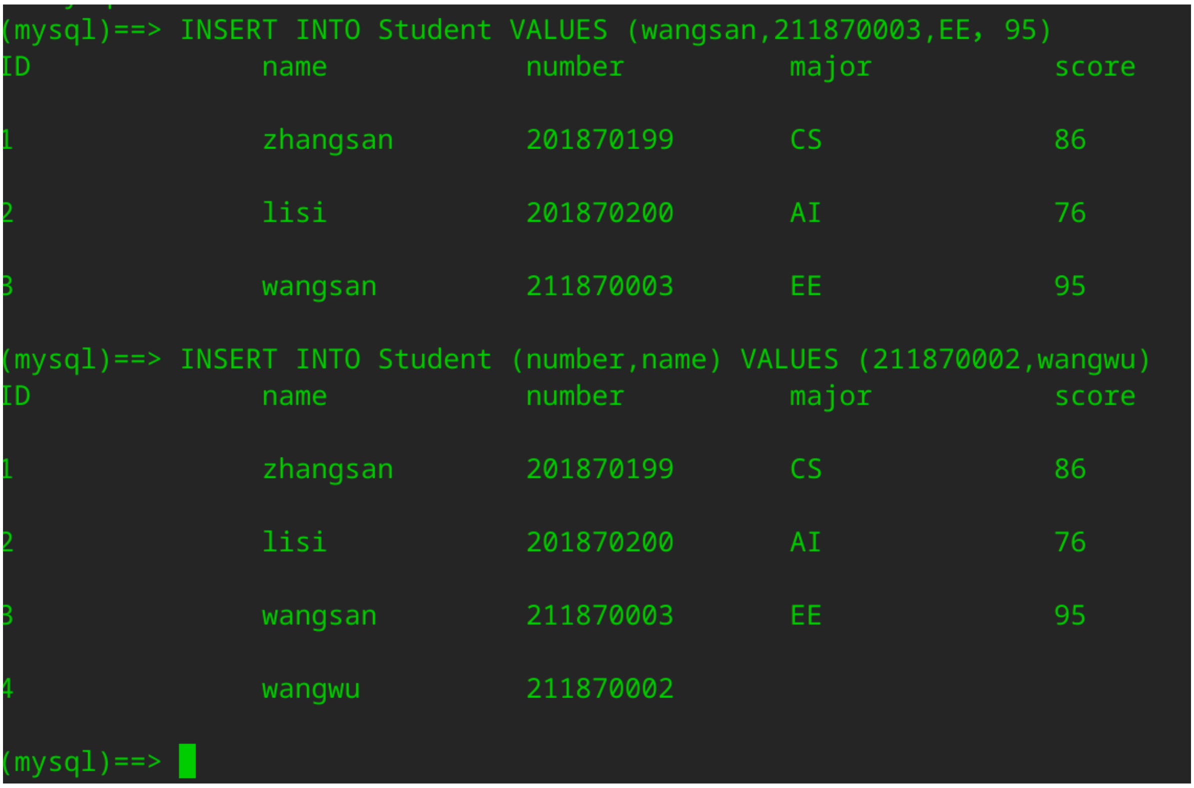
```
huiyi@Mofes:~/Codes/c/mysq$ cd database
huiyi@Mofes:~/Codes/c/mysq/database$ cat student.txt
name    number    major    score
zhangsan    201870199    CS    86
lisi    201870200    AI    76huiyi@Mofes:~/Codes/c/my
huiyi@Mofes:~/Codes/c/mysq/database$ cat list.txt
food    clothes tool    medicine        huiyi@Mofes:
```

5.13 DROP TABLE语句



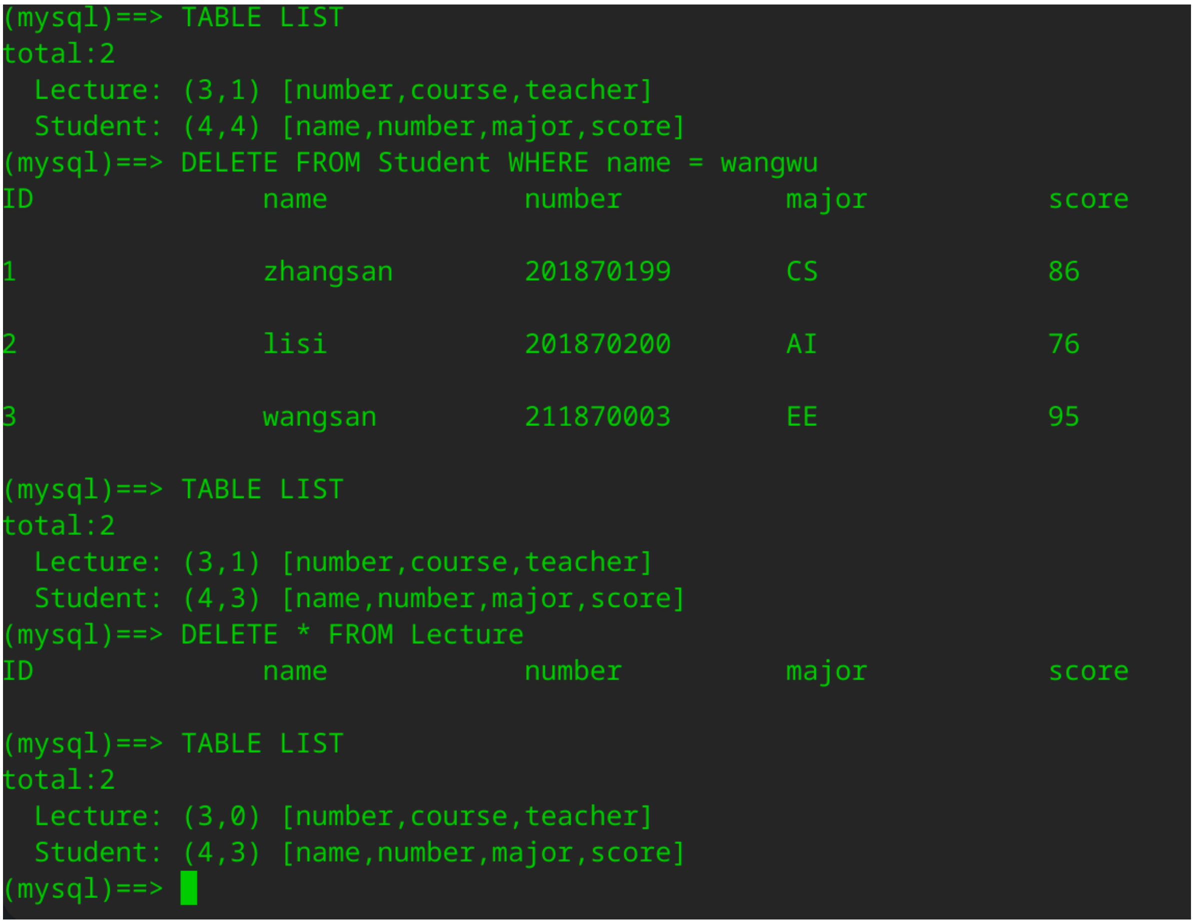
```
(mysql)==> DROP TABLE temp
Table does not exit!
(mysql)==> TABLE LIST
total:3
  Lecture: (3,1) [number,course,teacher]
  List: (4,0) [food,clothes,tool,medicine]
  Student: (4,4) [name,number,major,score]
(mysql)==> DROP TABLE List
(mysql)==> TABLE LIST
total:2
  Lecture: (3,1) [number,course,teacher]
  Student: (4,4) [name,number,major,score]
(mysql)==>
```

5.14 INSERT INTO语句



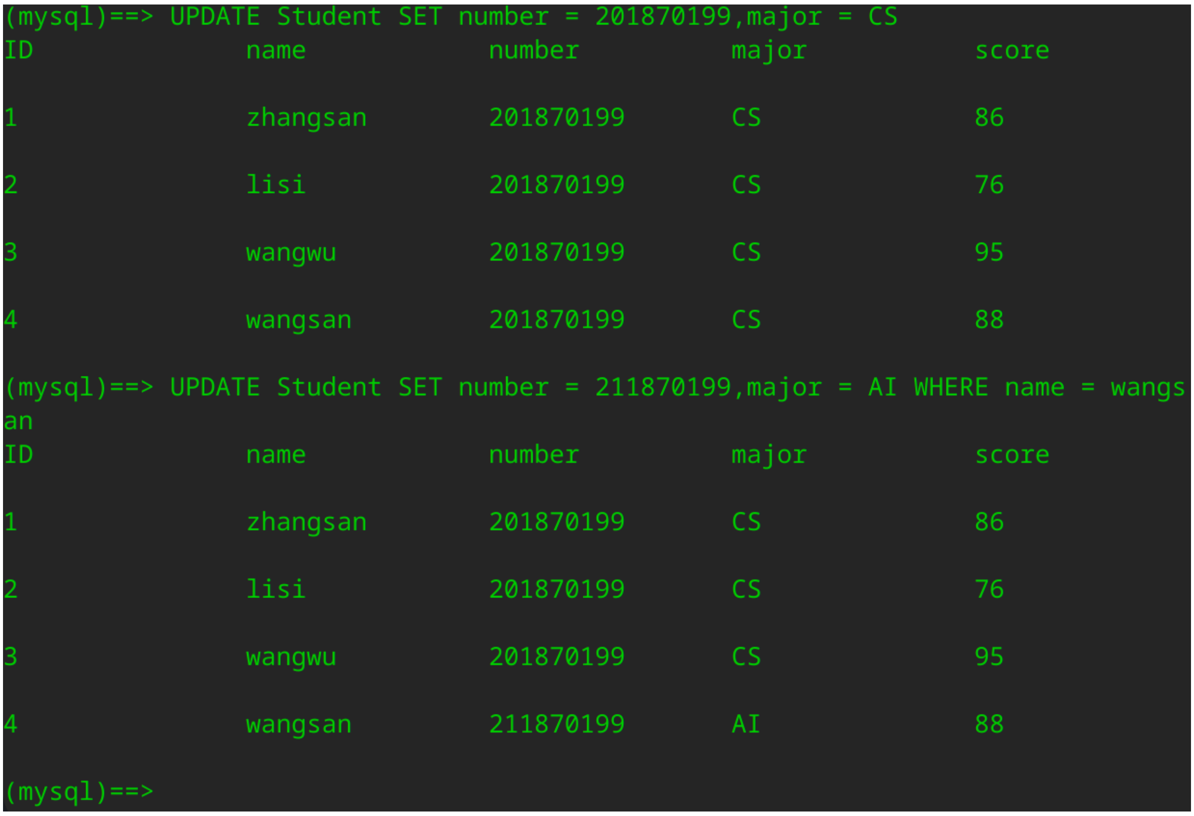
```
(mysql)==> INSERT INTO Student VALUES (wangsan,211870003,EE, 95)
ID              name            number          major           score

1               zhangsan        201870199       CS              86

2               lisi            201870200       AI              76

3               wangsan         211870003       EE              95

(mysql)==> INSERT INTO Student (number,name) VALUES (211870002,wangwu)
ID              name            number          major           score

1               zhangsan        201870199       CS              86

2               lisi            201870200       AI              76

3               wangsan         211870003       EE              95

4               wangwu          211870002

(mysql)==>
```

5.15 DELETE语句



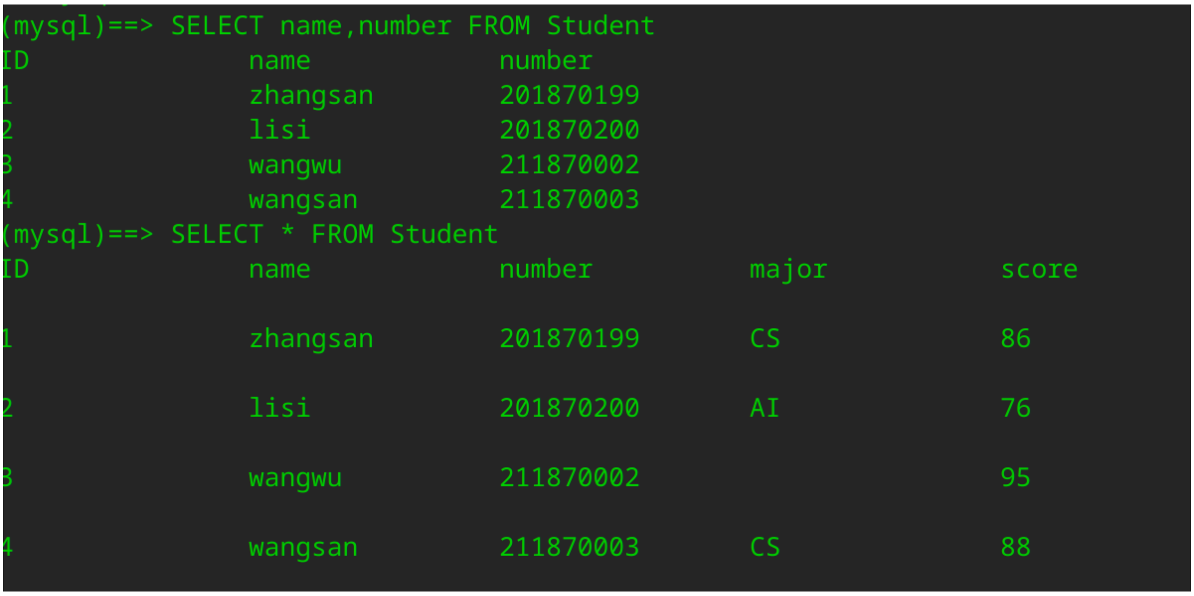
```
(mysql)==> TABLE LIST
total:2
  Lecture: (3,1) [number,course,teacher]
  Student: (4,4) [name,number,major,score]
(mysql)==> DELETE FROM Student WHERE name = wangwu
ID              name            number          major           score

1               zhangsan        201870199       CS              86

2               lisi            201870200       AI              76

3               wangsan         211870003       EE              95

(mysql)==> TABLE LIST
total:2
  Lecture: (3,1) [number,course,teacher]
  Student: (4,3) [name,number,major,score]
(mysql)==> DELETE * FROM Lecture
ID              name            number          major           score

(mysql)==> TABLE LIST
total:2
  Lecture: (3,0) [number,course,teacher]
  Student: (4,3) [name,number,major,score]
(mysql)==> 
```

5.16 UPDATE语句

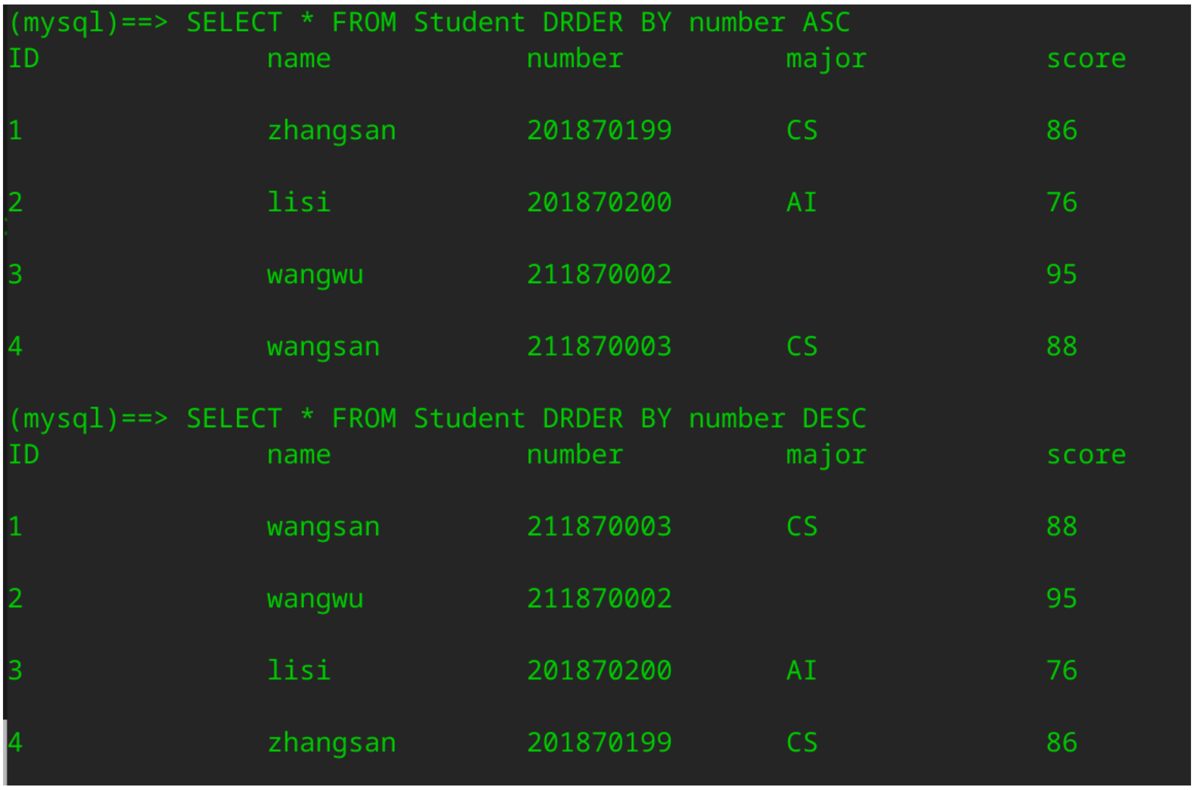


```
(mysql)==> UPDATE Student SET number = 201870199,major = CS
ID              name            number          major           score

1               zhangsan        201870199       CS              86

2               lisi            201870199       CS              76

3               wangwu          201870199       CS              95

4               wangsan         201870199       CS              88

(mysql)==> UPDATE Student SET number = 211870199,major = AI WHERE name = wangs
an
ID              name            number          major           score

1               zhangsan        201870199       CS              86

2               lisi            201870199       CS              76

3               wangwu          201870199       CS              95

4               wangsan         211870199       AI              88

(mysql)==>
```

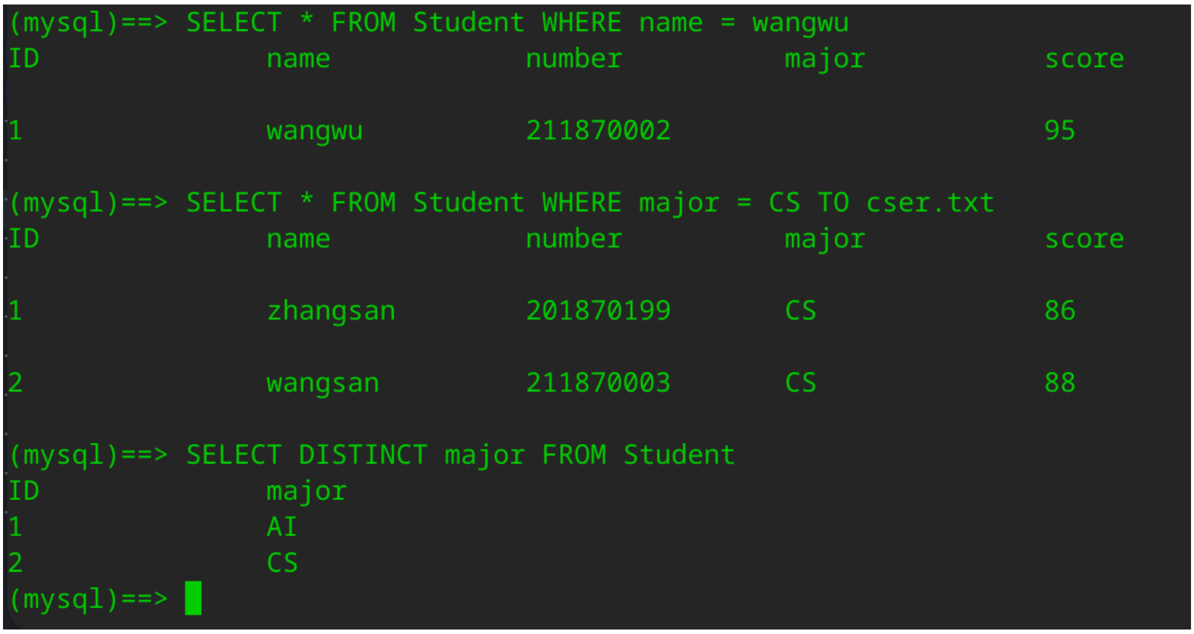
5.17 SELECT语句



```
(mysql)==> SELECT name,number FROM Student
ID              name            number
1               zhangsan        201870199
2               lisi            201870200
3               wangwu          211870002
4               wangsan         211870003
(mysql)==> SELECT * FROM Student
ID              name            number          major           score

1               zhangsan        201870199       CS              86

2               lisi            201870200       AI              76

3               wangwu          211870002                       95

4               wangsan         211870003       CS              88
```



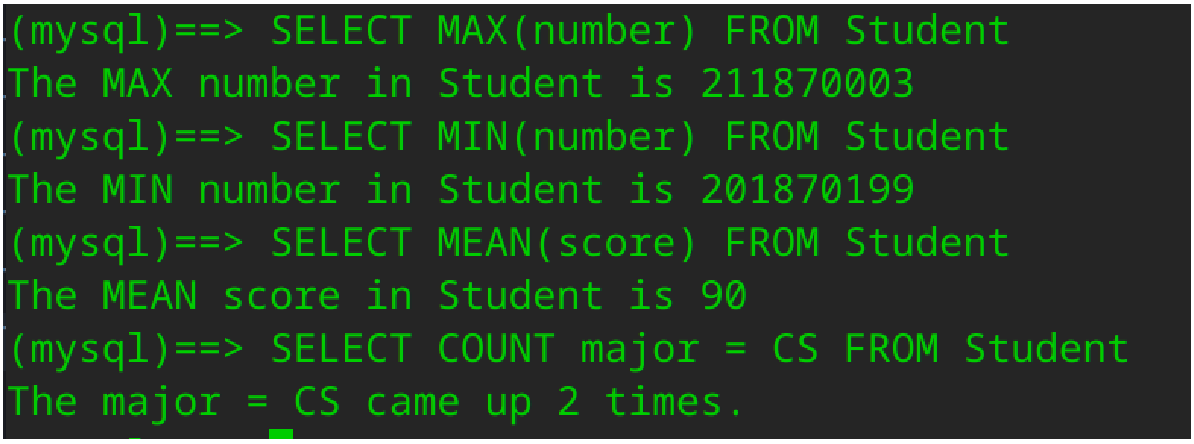
```
(mysql)==> SELECT * FROM Student DRDER BY number ASC
ID              name            number          major           score

1               zhangsan        201870199       CS              86

2               lisi            201870200       AI              76

3               wangwu          211870002                       95

4               wangsan         211870003       CS              88

(mysql)==> SELECT * FROM Student DRDER BY number DESC
ID              name            number          major           score

1               wangsan         211870003       CS              88

2               wangwu          211870002                       95

3               lisi            201870200       AI              76

4               zhangsan        201870199       CS              86
```



```
(mysql)==> SELECT * FROM Student WHERE name = wangwu
ID              name            number          major           score

1               wangwu          211870002                       95

(mysql)==> SELECT * FROM Student WHERE major = CS TO cser.txt
ID              name            number          major           score

1               zhangsan        201870199       CS              86

2               wangsan         211870003       CS              88

(mysql)==> SELECT DISTINCT major FROM Student
ID              major
1               AI
2               CS
(mysql)==> 
```

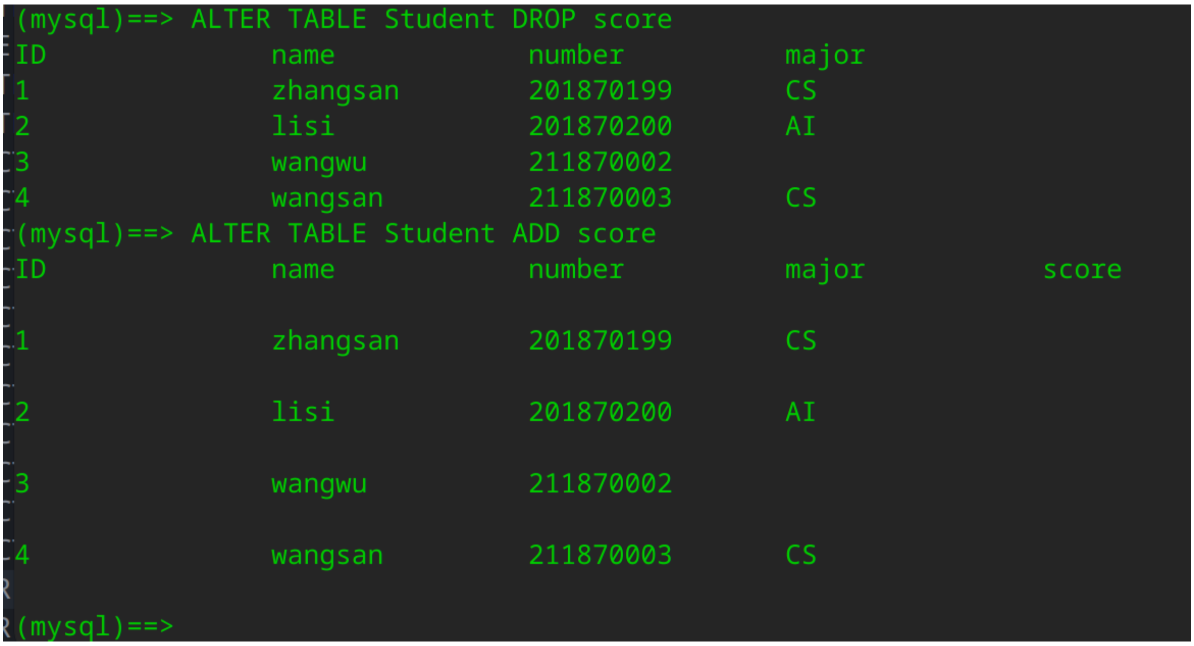
5.2 拓展部分

5.21 对数值属性可求最大最小值、计数、求平均数



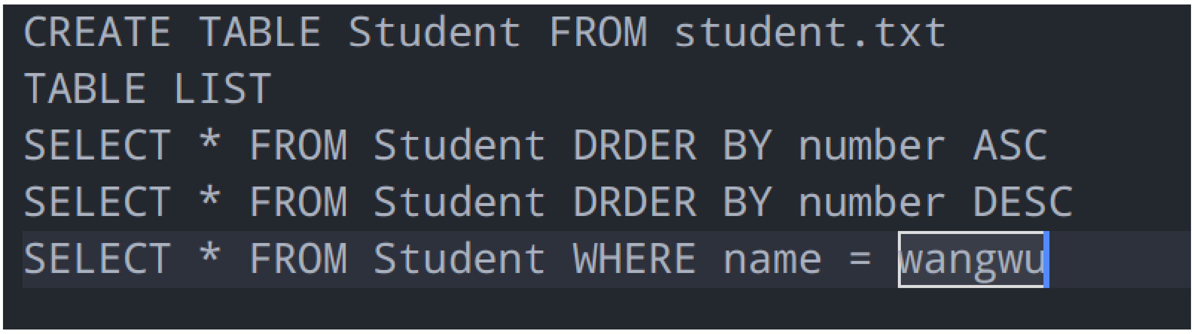
```
(mysql)==> SELECT MAX(number) FROM Student
The MAX number in Student is 211870003
(mysql)==> SELECT MIN(number) FROM Student
The MIN number in Student is 201870199
(mysql)==> SELECT MEAN(score) FROM Student
The MEAN score in Student is 90
(mysql)==> SELECT COUNT major = CS FROM Student
The major = CS came up 2 times.
```

5.22 ALTER TABLE语句

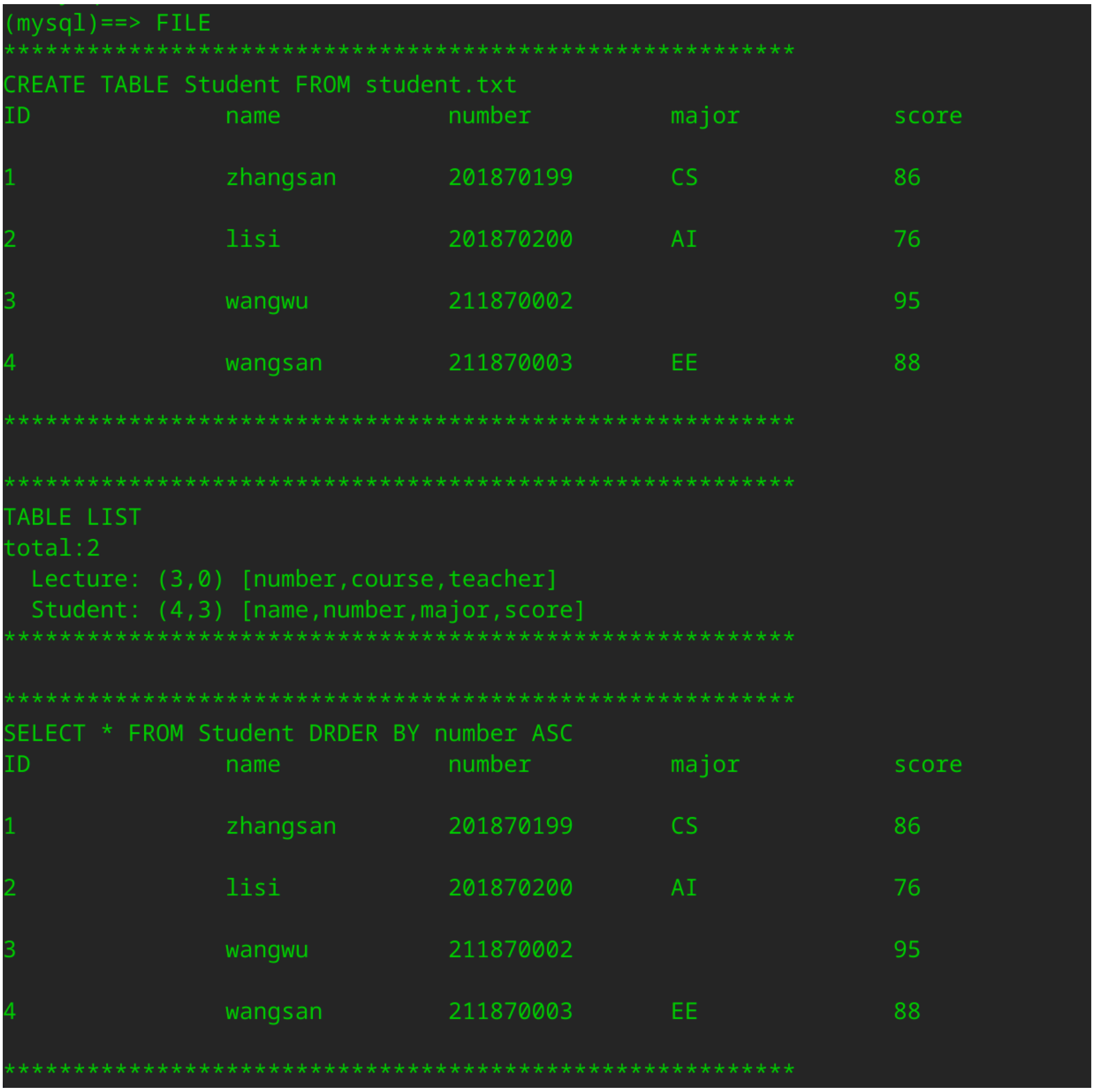


```
(mysql)==> ALTER TABLE Student DROP score
ID              name            number          major
1               zhangsan        201870199       CS
2               lisi            201870200       AI
3               wangwu          211870002
4               wangsan         211870003       CS
(mysql)==> ALTER TABLE Student ADD score
ID              name            number          major           score

1               zhangsan        201870199       CS

2               lisi            201870200       AI

3               wangwu          211870002

4               wangsan         211870003       CS

(mysql)==>
```

5.23 支持事务文件



```
CREATE TABLE Student FROM student.txt
TABLE LIST
SELECT * FROM Student DRDER BY number ASC
SELECT * FROM Student DRDER BY number DESC
SELECT * FROM Student WHERE name = wangwu
```



```
(mysql)==> FILE
*********************************************************
CREATE TABLE Student FROM student.txt
ID              name            number          major           score

1               zhangsan        201870199       CS              86

2               lisi            201870200       AI              76

3               wangwu          211870002                       95

4               wangsan         211870003       EE              88

*********************************************************

*********************************************************
TABLE LIST
total:2
  Lecture: (3,0) [number,course,teacher]
  Student: (4,3) [name,number,major,score]
*********************************************************

*********************************************************
SELECT * FROM Student DRDER BY number ASC
ID              name            number          major           score

1               zhangsan        201870199       CS              86

2               lisi            201870200       AI              76

3               wangwu          211870002                       95

4               wangsan         211870003       EE              88

*********************************************************
```