SSQL 测试文档

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一、测试简介

解释器除了实现基本的 SSQL 增删查改功能外，还实现了布尔表达式、逻辑表达式功能。这样，解释器可以分为六个子功能：创建表格、插入列、删除列、查询表格、布尔表达式、逻辑表达式。

测试针对这六个子功能分别进行测试。对于每一个子功能，首先测试正确语句，接着根据该子功能容易出错的几项内容分别进行测试。比如，对于创建一个表格常见的错误有：语法错误、插入重复列、指定多个主值、指定的主值不存在、创建已存在的表格。在测试创建功能项时，我们针对性地对这几项常见错误进行测试。

二、测试内容

2.1 创建功能

本项主要测试 SSQL 的创建表格功能，测试内容有正确创建语句、语法错误、插入重复列、指定多个主值、指定的主值不存在、创建已存在的表格。

2.1.1 正确创建

1.测试语句：

CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid));

预期结果：创建表格成功

测试结果：成功创建表格

```
>> CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid));
Create table 'Student' succeed!
```

2.测试语句：不指定 DETAULT 值

CREATE TABLE Teacher(sid INT, age INT, PRIMARY KEY(sid));

预期结果：创建表格成功

测试结果：成功创建表格

```
>> CREATE TABLE Teacher(sid INT, age INT, PRIMARY KEY(sid));
Create table 'Teacher' succeed!
```

2.1.2 语法错误

1.测试语句：

CREATE TABLE Student(sid INT, age INT DEFAULT, PRIMARY KEY(sid));

预期结果：语法错误，DEFAULT 未指定值

测试结果：语法错误

```
>> CREATE TABLE Student(sid INT, age INT DEFAULT, PRIMARY KEY(sid));
Grammar Error :
CREATE TABLE Student(sid INT, age INT DEFAULT, PRIMARY KEY(sid));
                                              ^
```

2.测试语句：

CREATE Student (sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid, age));

预期结果：语法错误

测试结果：语法错误

```
>> CREATE Student (sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid, age));
Grammar Error :
CREATE Student (sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid, age));
       ^^^^^^^
```

2.1.2 插入重复列

1.测试语句：

CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid), age INT);

预期结果：错误，age 列重复

测试结果：错误，age 列重复

```
>> CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid), age INT
);
Error :  The table has the same fields called 'age' when you create it!
```

2.测试语句：

CREATE TABLE Student(sid INT, sid INT DEFAULT = 18, PRIMARY KEY(sid));

预期结果：错误，sid 列重复

测试结果：错误，sid 列重复

```
>> CREATE TABLE Student(sid INT, sid INT DEFAULT = 18, PRIMARY KEY(sid));
Error :  The table has the same fields called 'sid' when you create it!
```

2.1.3 指定多个主值

1.测试语句：

CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid), PRIMARY KEY(age));

预期结果：错误，重复主值

测试结果：错误，重复主值

```
>> CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid), PRIMARY KEY(age));
Error :  The statment has two primary key declarations
```

2.1.4 指定主值不存在

1.测试语句：

CREATE TABLE Student(sid INT, age INT DEFAULT = 18,

PRIMARY KEY(height));
预期结果：错误，指定主值不存在
测试结果：错误，指定主值不存在

```
>> CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(height));
Error :  The primary key called 'height' doesn't in the table.
```

2.测试语句：
CREATE TABLE Student(sid INT, sid INT DEFAULT = 18, PRIMARY KEY(sid, height));
预期结果：错误，主值 height 不存在
测试结果：错误，主值 height 不存在

```
>> CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid,height));
Error :  The primary key called 'height' doesn't in the table.
```

2.1.5 创建已存在表格

1.测试语句：
CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid));
CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid));
预期结果：第二句错误，Student 表格已存在
测试结果：第二句错误，Student 表格已存在

```
>> CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid));
Create table 'Student' succeed!

>> CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid));
Error :  The table has been created before!
```

2.2 插入功能

本项主要测试 SSQL 的插入列功能，测试内容有正确插入语句、语法错误、插入不存在表格、重复列、列不存在，列值数量不对应,主值已存在。首先使用
CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid));
创建了 Student 表格。

2.2.1 正确插入

1.测试语句：
INSERT INTO Student(sid, age) VALUES(1111, 18);
预期结果：插入成功
测试结果：成功插入一列

```
>> INSERT INTO Student(sid, age) VALUES(1111, 18);
insert value to table 'Student' succeed!
```

2.2.2 语法错误

1.测试语句：

INSERT INTO Student Teacher(sid, age) VALUES(1111, 18);

预期结果：语法错误

测试结果：语法错误

```
>> INSERT INTO Student Teacher(sid, age) VALUES(1111, 18);
Grammar Error :
INSERT INTO Student Teacher(sid, age) VALUES(1111, 18);
                    ^^^^^^^
```

2.测试语句：

INSERT INTO Student (sid, age) VALUES(coco, 18);

预期结果：语法错误

测试结果：语法错误

```
>> INSERT INTO Student(sid, age) VALUES(coco, 18);
Grammar Error :
INSERT INTO Student(sid, age) VALUES(coco, 18);
                                     ^^^^
```

2.2.3 插入不存在的表格

1.测试语句：

INSERT INTO Teacher(sid, age) VALUES(1111, 18);

预期结果：错误，Teacher 表格不存在

测试结果：错误，Teacher 表格不存在

```
>> INSERT INTO Teacher(sid, age) VALUES(1111, 18);
Error :  The table called 'Teacher' has not been created yet!
```

2.2.4 插入重复列

1.测试语句：

INSERT INTO Student(sid, age, age) VALUES(1111, 18, 19);

预期结果：错误，age 列重复

测试结果：错误，age 列重复

```
>> INSERT INTO Student(sid, age, age) VALUES(1111, 18, 19);
Error :  The table has the same fields called 'age' when you create it!
```

2.测试语句：

INSERT INTO Student(sid, sid, age) VALUES(1111, 1111, 19);

预期结果：错误，sid 列重复

测试结果：错误，sid 列重复

```
>> INSERT INTO Student(sid, sid, age) VALUES(1111, 1111, 19);
Error :  The table has the same fields called 'sid' when you create it!
```

2.2.5 列不存在

1.测试语句：

INSERT INTO Student(sid, height) VALUES(1111, 18);

预期结果：错误，height 列不存在

测试结果：错误，height 列不存在

```
>> INSERT INTO Student(sid, height) VALUES(1111, 18);
Error :  The field called 'height' doesn't in this table!
```

2.测试语句：

INSERT INTO Student(height) VALUES(1111);

预期结果：错误，height 列不存在

测试结果：错误，height 列不存在

```
>> INSERT INTO Student(height) VALUES(1111);
Error :  The field called 'height' doesn't in this table!
```

2.2.6 列值数量不对应

1.测试语句：

INSERT INTO Student(sid) VALUES(1111, 18);

预期结果：错误，列值数量不对应

测试结果：错误，列值数量不对应

```
>> INSERT INTO Student(sid) VALUES(1111, 18);
Error :  The size of fields and the size of value don't match.
```

2.测试语句：

INSERT INTO Student(sid, age) VALUES(1111);

预期结果：错误，列值数量不对应

测试结果：错误，列值数量不对应

```
>> INSERT INTO Student(sid, age) VALUES(1111);
Error :  The size of fields and the size of value don't match.
```

2.2.7 主值已存在

1.测试语句：

INSERT INTO Student(sid, age) VALUES(1111, 18);
INSERT INTO Student(sid, age) VALUES(1111, 18);

预期结果：第二句错误，主值已存在

测试结果：第二句错误，主值已存在

```
>> INSERT INTO Student(sid, age) VALUES(1111, 18);
Error :  The primary key 'sid' has the same value '1111' after you insert!
```

2.3 删除功能

本项主要测试 SSQL 的删除列功能，测试内容有正确插入语句、语法错误、表格不存在、属性不存在。每项使用

CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid));
INSERT INTO Student(sid, age) VALUES(1111, 18);
INSERT INTO Student(sid, age) VALUES(1112, 19);
INSERT INTO Student(sid, age) VALUES(1113, 23);

创建了 Student 表格,里面含有 3 行。

2.3.1 正确删除

1.测试语句：

DELETE FROM Student WHERE age > 10 && age < 20;

预期结果：删除成功

测试结果：删除成功

```
>> DELETE FROM Student WHERE age > 10 && age < 20;
Delete OK
```

```
|---------------|---------------|
|       sid     |       age     |
|---------------|---------------|
|       1113    |       23      |
|---------------|---------------|
```

2.测试语句：

DELETE FROM Student ;

预期结果：删除成功

测试结果：删除成功

```
>> DELETE FROM Student;
Delete OK
```

```
|---------------|---------------|
|       sid     |       age     |
|---------------|---------------|
```

2.3.2 语法错误

1.测试语句：

DELETE FROM Student age > 10;

预期结果：语法错误

测试结果：语法错误

```
>> DELETE FROM Student age > 10;
Grammar Error :
DELETE FROM Student age > 10;
                    ^^^
```

2.测试语句：

DELETE Student WHERE age > 10;

预期结果：语法错误

测试结果：语法错误

```
>> DELETE Student age > 10;
Grammar Error :
DELETE Student age > 10;
       ^^^^^^^
```

2.3.3 表格不存在

1.测试语句：

DELETE FROM Teacher WHERE age > 10;

预期结果：表格不存在

测试结果：表格不存在

```
>> DELETE FROM Teacher WHERE age > 10;
Error :  The table called 'Teacher' has not been created yet!
```

1.测试语句：

DELETE FROM Teacher;

预期结果：表格不存在

测试结果：表格不存在

```
>> DELETE FROM Student WHERE age > 10 && age < 20;
Delete OK
```

2.3.4 属性不存在

1.测试语句：

DELETE FROM Student WHERE height > 10;

预期结果：height 属性不存在

测试结果：height 属性不存在

```
>> DELETE FROM Student WHERE height > 10;
Error :  The field in conditions called height doesn't in this table!
```

1.测试语句：

DELETE FROM Student WHERE age > 10 && height > 10;

预期结果：height 属性不存在

测试结果：height 属性不存在

```
>> DELETE FROM Student WHERE age > 10 && height > 10;
Error :  The field in conditions called height doesn't in this table!
```

2.4 查询功能

本项主要测试 SSQL 的删除列功能，测试内容有正确查询语句、语法错误、表格不存在、返回属性不存在，查询属性不存再。首先使用

CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid));

INSERT INTO Student(sid, age) VALUES(1111, 18);

INSERT INTO Student(sid, age) VALUES(1112, 19);

INSERT INTO Student(sid, age) VALUES(1113, 23);

创建了 Student 表格,里面含有 3 行。

2.4.1 正确查询

1.测试语句：

SELECT sid FROM Student WHERE age < 20;

预期结果：查询成功

测试结果：查询成功

```
>> SELECT sid FROM Student WHERE age < 20;
|---------------|
|       sid     |
|---------------|
|       1112    |
|---------------|
|       1111    |
|---------------|
Query OK
```

2.测试语句：

SELECT * FROM Student ;

预期结果：查询成功

测试结果：查询成功

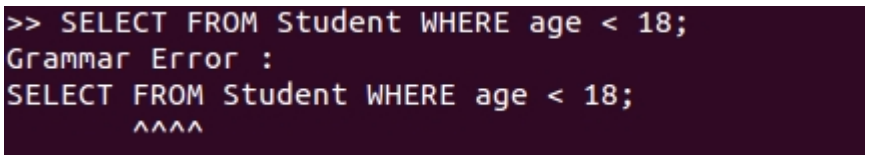
2.4.2 语法错误

1.测试语句：

SELECT FROM Student WHERE age < 18;

预期结果：语法错误

测试结果：语法错误

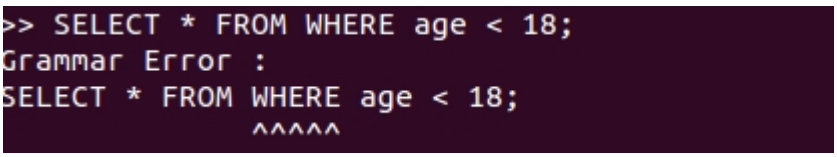


2.测试语句：

SELECT * FROM WHERE age < 18;

预期结果：语法错误

测试结果：语法错误



2.4.3 表格不存在

1.测试语句：

SELECT * FROM Teacher WHERE age > 10;

预期结果：表格不存在

测试结果：表格不存在

```
>> SELECT * FROM Teacher WHERE age > 10;
Error :  The table called 'Teacher' has not been created yet!
```

2.测试语句：

SELECT sid FROM Boy WHERE age > 10;

预期结果：表格不存在

测试结果：表格不存在

```
>> SELECT sid FROM Boy WHERE age > 10;
Error :  The table called 'Boy' has not been created yet!
```

2.4.4 返回属性不存在

1.测试语句：

SELECT sid, height FROM Student WHERE age < 18;

预期结果：返回字段不存在

测试结果：返回字段不存在

```
>> SELECT sid,height FROM Student WHERE age < 18;
Error :  The field selected called 'height' doesn't in this table!
```

2.测试语句：

SELECT height FROM Student WHERE age < 18;

预期结果：返回字段不存在

测试结果：返回字段不存在

```
>> SELECT height FROM Student WHERE age < 19;
Error :  The field selected called 'height' doesn't in this table!
```

2.4.5 查询属性不存在

1.测试语句：

SELECT * FROM Student WHERE height > 10;

预期结果：查询属性不存在

测试结果：查询属性不存在

```
>> SELECT * FROM Student WHERE height > 10;
Error :  The field in conditions called 'height' doesn't in this table!
```

2.测试语句：

SELECT * FROM Student WHERE age < 10 && height > 10;

预期结果：查询属性不存在

测试结果：查询属性不存在

```
>> SELECT * FROM Student WHERE age < 10 && height < 10;
Error :  The field in conditions called 'height' doesn't in this table!
```

2.5 布尔表达式

本项主要测试 SSQL 的布尔表达式功能，测试内容有逻辑与、逻辑或、逻辑非。首先使用

CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid));
INSERT INTO Student(sid, age) VALUES(1111, 18);
INSERT INTO Student(sid, age) VALUES(1112, 19);
INSERT INTO Student(sid, age) VALUES(1113, 23);
INSERT INTO Student(sid, age) VALUES(1114, 19);

创建了 Student 表格,里面含有 4 行。

2.5.1 逻辑与

1.测试语句：

SELECT * FROM Student WHERE age == 19 && sid == 1112;

预期结果：

sid	age
1112	19

测试结果：

```
>> SELECT * FROM Student WHERE age == 19 && sid == 1112;
|---------------|---------------|
|       sid     |       age     |
|---------------|---------------|
|       1112    |       19      |
|---------------|---------------|
Query OK, 1 rows affected.
```

2.测试语句：

SELECT * FROM Student WHERE age > 18 && age < 20 && sid > 1112 ;

预期结果：

sid	age
1112	19

测试结果：

```
>> SELECT * FROM Student WHERE age > 18 && age < 20 && sid > 1112;
|---------------|---------------|
|       sid     |       age     |
|---------------|---------------|
|       1114    |       19      |
|---------------|---------------|
Query OK, 1 rows affected.
```

3.测试语句：

SELECT * FROM Student WHERE age > 18 && age < 25 ;

预期结果：

sid	age
1112	19
1113	23
1114	19

测试结果：

```
>> SELECT * FROM Student WHERE age > 18 && age < 25;
|---------------|---------------|
|       sid     |       age     |
|---------------|---------------|
|       1112    |       19      |
|---------------|---------------|
|       1113    |       23      |
|---------------|---------------|
|       1114    |       19      |
|---------------|---------------|
Query OK, 3 rows affected.
```

2.5.2 逻辑或

1.测试语句：

SELECT * FROM Student WHERE age == 19 || sid == 1111;

预期结果：

sid	age
1112	19
1111	18
1114	19

测试结果：

```
>> SELECT * FROM Student WHERE age == 19 || sid == 1111;
|---------------|---------------|
|       sid     |       age     |
|---------------|---------------|
|       1112    |       19      |
|---------------|---------------|
|       1111    |       18      |
|---------------|---------------|
|       1114    |       19      |
|---------------|---------------|
Query OK, 3 rows affected.
```

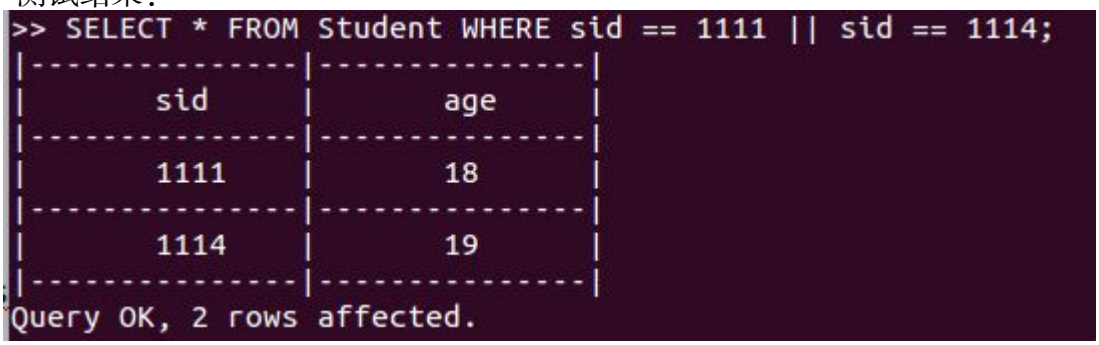
2.测试语句：

SELECT * FROM Student WHERE sid == 1111 || sid == 1113;

预期结果：

sid	age
1111	18
1113	19

测试结果：



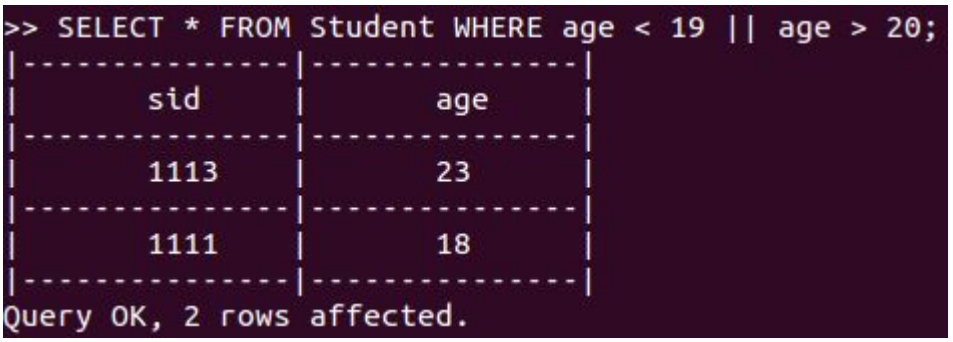
3.测试语句：

SELECT * FROM Student WHERE age < 19 || age > 20 ;

预期结果：

sid	age
1113	23
1111	18

测试结果：



2.5.3 逻辑非

1.测试语句：

SELECT * FROM Student WHERE !(age == 19);

预期结果：

sid	age
1113	23
1111	18

测试结果：

```
>> SELECT * FROM Student WHERE !(age == 19);
|---------------|---------------|
|       sid     |       age     |
|---------------|---------------|
|       1113    |       23      |
|---------------|---------------|
|       1111    |       18      |
|---------------|---------------|
Query OK, 2 rows affected.
```

2.测试语句：

SELECT * FROM Student WHERE !(sid == 1111 || age == 19);

预期结果：

sid	age
1113	23

测试结果：

```
>> SELECT * FROM Student WHERE !(sid == 1111 || age == 19);
|---------------|---------------|
|       sid     |       age     |
|---------------|---------------|
|       1113    |       23      |
|---------------|---------------|
Query OK, 1 rows affected.
```

3.测试语句：

SELECT * FROM Student WHERE !sid == 1111 && !age == 19;

预期结果：

sid	age
1113	23

测试结果：

```
>> SELECT * FROM Student WHERE !sid == 1111 && !age == 19;
|---------------|---------------|
|       sid     |       age     |
|---------------|---------------|
|       1113    |       23      |
|---------------|---------------|
Query OK, 1 rows affected.
```

2.6 算术表达式

本项主要测试 SSQL 的布尔表达式功能，测试内容有加法运算、减法运算、乘法运算、除法运算。首先使用

```
CREATE TABLE Student(sid INT, age INT DEFAULT = 18, PRIMARY KEY(sid));
INSERT INTO Student(sid, age) VALUES(1111, 18);
INSERT INTO Student(sid, age) VALUES(1112, 19);
INSERT INTO Student(sid, age) VALUES(1113, 23);
INSERT INTO Student(sid, age) VALUES(1114, 19);
```

创建了 Student 表格,里面含有 4 行。

2.6.1 加法运算

1.测试语句：

预期结果：

sid	age

测试结果：

```
>> SELECT * FROM Student WHERE age + 5 < 18 + 1 + 2;
|---------------|---------------|
|       sid     |       age     |
|---------------|---------------|
Query OK, 0 rows affected.
```

2.测试语句：

```
SELECT * FROM Student WHERE sid + age < 1135;
```

预期结果：

sid	age
1112	19
1111	18
1114	19

测试结果：

```
>> SELECT * FROM Student WHERE sid + age < 1135;
|---------------|---------------|
|       sid     |       age     |
|---------------|---------------|
|       1112    |       19      |
|---------------|---------------|
|       1111    |       18      |
|---------------|---------------|
|       1114    |       19      |
|---------------|---------------|
Query OK, 3 rows affected.
```

2.6.2 减法运算

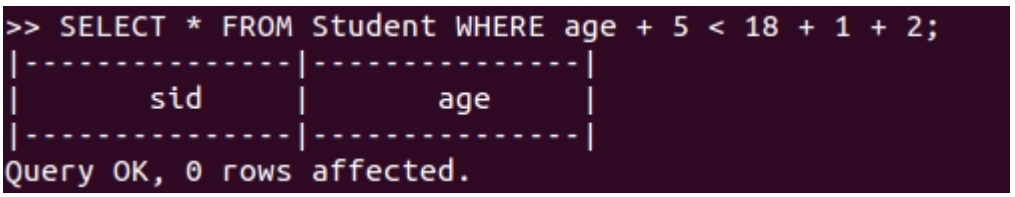
1.测试语句：

SELECT * FROM Student WHERE age + 5 < 18 +1 + 2;

预期结果：

sid	age

测试结果：



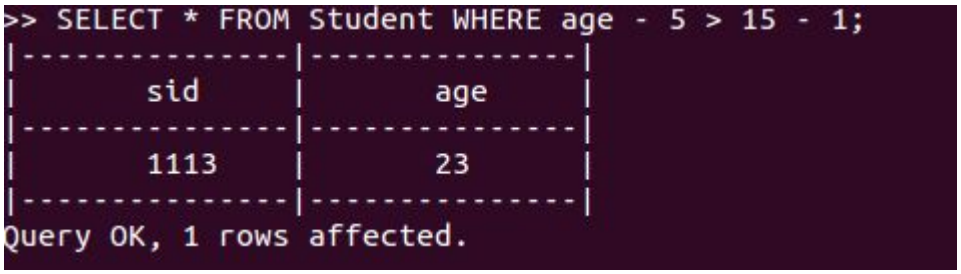
2.测试语句：

SELECT * FROM Student WHERE age - 5 > 15 - 1;

预期结果：

sid	age
1113	23

测试结果：



2.6.3 乘法运算

1.测试语句：

SELECT * FROM Student WHERE age * 5 <= 100;

预期结果：

sid	age
1112	19
1111	18
1114	19

测试结果：

```
>> SELECT * FROM Student WHERE age - 5 > 15 - 1;
|---------------|---------------|
|       sid     |       age     |
|---------------|---------------|
|       1113    |       23      |
|---------------|---------------|
Query OK, 1 rows affected.
```

2. 测试语句：

SELECT * FROM Student WHERE age * 6 > 105 + 4;

预期结果：

sid	age
1113	23

测试结果：

```
>> SELECT * FROM Student WHERE age * 6 - 15 > 105 + 4;
|---------------|---------------|
|       sid     |       age     |
|---------------|---------------|
|       1113    |       23      |
|---------------|---------------|
Query OK, 1 rows affected.
```

2.6.4 除法运算

1.测试语句：

SELECT * FROM Student WHERE age / 0 <= 100;

预期结果：错误，除 0 运算

测试结果：

```
>> SELECT * FROM Student WHERE age / 0 <= 100;
Error :  Number divided by 0 in the expressions
```

2. 测试语句：

SELECT * FROM Student WHERE age / 4 > 2*3 - 2;

预期结果：

sid	age
1113	23

测试结果：

```
>> SELECT * FROM Student WHERE age / 4 > 2*3-2;
|---------------|---------------|
|       sid     |       age     |
|---------------|---------------|
|       1113    |       23      |
|---------------|---------------|
Query OK, 1 rows affected.
```

3. 测试语句：

SELECT * FROM Student WHERE age > 6*3 / 4 + 10 / 5 - 2 + 14;

预期结果：

sid	age
1114	19
1113	23
1112	19

测试结果：

```
>> SELECT * FROM Student WHERE age > 6*3 / 4 + 10 / 5 - 2 + 14;
|---------------|---------------|
|       sid     |       age     |
|---------------|---------------|
|       1114    |       19      |
|---------------|---------------|
|       1113    |       23      |
|---------------|---------------|
|       1112    |       19      |
|---------------|---------------|
Query OK, 3 rows affected.
```

三、总结

经测试，解释器实现了数据库创建、插入、删除、查询、布尔表达式运算、算术表达式运算六个子功能，测试过程中未出现功能异常。