

# 实验 2 SQL 数据定义和操作

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## 实验目的

1. 掌握关系数据库语言 SQL 的使用。
2. 使所有的 SQL 作业都能上机通过。实验平台：

## 实验平台

1. 数据库管理系统：MariaDB

## 实验内容

1. 建立数据库。
2. 数据定义
3. 数据更新

02.sql

```
CREATE DATABASE library;
```

```
USE library
```

```
CREATE TABLE book (
```

```

        bno char(8),
        category char(10),
        title varchar(40),
        press varchar(30),
        year int,
        author varchar(20),
        price decimal(7, 2),
        total int,
        stock int);

```

```

CREATE INDEX book_bno ON book (bno);

```

```

CREATE INDEX book_title ON book (title);

```

```

DELIMITER //

```

```

CREATE PROCEDURE insert_book() BEGIN

```

```

    DECLARE i int DEFAULT 1;

```

```

    REPEAT

```

```

        INSERT INTO book VALUES (

```

```

            SUBSTRING(MD5(i), 1, 8),

```

```

            SUBSTRING(MD5(MD5(i)), 1, 10),

```

```

            SUBSTRING(MD5(MD5(MD5(i))), 1,

```

```

40),

```

```

            SUBSTRING(MD5(MD5(MD5(MD5(i))))

```

```

, 1, 30),

```

```

            MD5(MD5(MD5(MD5(MD5(i))))),

```

```

            SUBSTRING(MD5(MD5(MD5(MD5(MD5(M

```

```

D5(i)))))), 1, 20),

```

```

            MD5(MD5(MD5(MD5(MD5(MD5(MD5(i)

```

```

))))),

```

```

            MD5(MD5(MD5(MD5(MD5(MD5(MD5(MD5

```

```

(i))))))),

```

```

            MD5(MD5(MD5(MD5(MD5(MD5(MD5(MD5

```

```

(MD5(i))))))));

```

```

        SET i = i + 1;

```

```

    UNTIL i > 100 END REPEAT;

```

```

END //

```

```

DELIMITER ;

```

```
CALL insert_book();
```

```
DROP PROCEDURE insert_book;
```

```
CREATE TABLE card (  
    cno char(7),  
    name varchar(10),  
    department varchar(40),  
    type char(1),  
    CHECK (type IN ('T','G','U','O')));
```

```
CREATE INDEX card_cno ON card (cno);
```

```
CREATE INDEX card_name ON card (name);
```

```
DELIMITER //
```

```
CREATE PROCEDURE insert_card() BEGIN  
    DECLARE i int DEFAULT 1;  
    REPEAT  
        INSERT INTO card VALUES (  
            SUBSTRING(MD5(i), 1, 7),  
            SUBSTRING(MD5(MD5(i)), 1, 10),  
            SUBSTRING(MD5(MD5(MD5(i))), 1,  
40),  
            if (MOD(i, 4) = 0, 'T', if (MOD  
(i, 4) = 1, 'G', if (MOD(i, 4) = 2, 'U', 'O'))  
));  
        SET i = i + 1;  
    UNTIL i > 100 END REPEAT;  
END //  
DELIMITER ;
```

```
CALL insert_card();
```

```
DROP PROCEDURE insert_card;
```

```
CREATE TABLE borrow (  
    cno char(7),  
    bno char(8),
```

```

        borrow_date date,
        return_date date);

CREATE INDEX borrow_cno ON borrow (cno);

CREATE INDEX borrow_bno ON borrow (bno);

DELIMITER //
CREATE PROCEDURE insert_borrow() BEGIN
    DECLARE i int DEFAULT 1;
    REPEAT
        INSERT INTO borrow VALUES (
            SUBSTRING(MD5(i), 1, 7),
            SUBSTRING(MD5(i), 1, 8),
            MD5(MD5(i)),
            MD5(MD5(MD5(i))));
        SET i = i + 1;
    UNTIL i > 100 END REPEAT;
END //
DELIMITER ;

CALL insert_borrow();

DROP PROCEDURE insert_borrow;

DELETE FROM book WHERE bno LIKE '%c4%';
DELETE FROM card WHERE cno LIKE '%c4%';
DELETE FROM borrow WHERE cno LIKE '%c4%';

UPDATE book SET bno='abcdefgh' WHERE bno LIKE '%c7%';
UPDATE card SET cno='abcdefg' WHERE cno LIKE '%c7%';
UPDATE borrow SET bno='abcdefgh' WHERE bno LIKE '%c7%';
UPDATE borrow SET cno='abcdefg' WHERE cno LIKE '%c7%';

```

MariaDB [none]> source 02.sql

```
zh@ZH-Laptop:/home/zh/同步/课程/数据库系统原理/实验/02
文件(F) 编辑(E) 查看(V) 搜索(S) 终端(T) 帮助(H)
Records: 0 Duplicates: 0 Warnings: 0
Query OK, 0 rows affected (0.04 sec)
Query OK, 1 row affected, 4 warnings (3.79 sec)
Query OK, 0 rows affected (0.02 sec)
Query OK, 0 rows affected (0.26 sec)
Query OK, 0 rows affected (0.17 sec)
Records: 0 Duplicates: 0 Warnings: 0
Query OK, 0 rows affected (0.19 sec)
Records: 0 Duplicates: 0 Warnings: 0
Query OK, 0 rows affected (0.06 sec)
Query OK, 1 row affected (3.91 sec)
Query OK, 0 rows affected (0.03 sec)
Query OK, 0 rows affected (0.31 sec)
Query OK, 0 rows affected (0.16 sec)
Records: 0 Duplicates: 0 Warnings: 0
Query OK, 0 rows affected (0.20 sec)
Records: 0 Duplicates: 0 Warnings: 0
Query OK, 0 rows affected (0.04 sec)
Query OK, 1 row affected, 2 warnings (4.25 sec)
Query OK, 0 rows affected (0.03 sec)
MariaDB [library]> █
```

#### 4. 数据查询

```
SELECT COUNT(*) FROM book;
SELECT SUM(price) FROM book;
SELECT COUNT(*) FROM book WHERE total > 10;
SELECT * FROM book WHERE price = (SELECT MAX(p
rice) FROM book);
SELECT * FROM book NATURAL JOIN borrow;
```

```
zh@ZH-Laptop:/home/zh/同步/课程/数据库系统原理/实验/02
文件(F) 编辑(E) 查看(V) 搜索(S) 终端(T) 帮助(H)

MariaDB [library]> select COUNT(*) from book;
+-----+
| COUNT(*) |
+-----+
|      100 |
+-----+
1 row in set (0.00 sec)

MariaDB [library]> select SUM(price) from book;
+-----+
| SUM(price) |
+-----+
| 1303445.90 |
+-----+
1 row in set (0.00 sec)

MariaDB [library]> select COUNT(*) from book where total > 10;
+-----+
| COUNT(*) |
+-----+
|      40 |
+-----+
1 row in set (0.00 sec)
```

## 5. 视图操作

```
CREATE VIEW book_borrow_card AS SELECT * FROM
book NATURAL JOIN borrow NATURAL JOIN card;
SELECT * FROM book_borrow_card;
UPDATE book_borrow_card SET cno = 'qwertyu' WH
ERE cno LIKE '%c4%';
```

```
zh@ZH-Laptop:/home/zh
文件(F) 编辑(E) 查看(V) 搜索(S) 终端(T) 帮助(H)

MariaDB [(none)]> use library
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [library]> CREATE VIEW book_borrow_card AS SELECT * FROM book NATURAL JOIN borrow NATURAL JOIN card;
Query OK, 0 rows affected (0.05 sec)

MariaDB [library]> SELECT * FROM book_borrow_card;
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| cno | bno | category | title | borrow_date | return_date | name | press | year | author | price |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| c4ca423 | c4ca423b | 28c8edde3d | 40f5888b67c748df7efba008e7c2f9d2 | 0 | 0 | 81d2017f9a08a6bb9e1c | 62.00 | | |
| c81e728 | c81e728d | 665f644e43 | 4a8bd19b3b8676199592a346051f950c | 0 | 0 | a14340745d55e9e9c5a6 | 0.00 |
| 676 | 2650613 | 0000-00-00 | 0000-00-00 | 665f644e43 | 4a8bd19b3b8676199592a346051f950c | U | 29 | 559e60266e26d3429413 | 0.00 |
| eccbc87 | eccbc87e | 38026ed22f | 771409a8fb1543788fe7d9f1ea0987f | 0 | 0 | 2147483647 | c76970f10c291c1e3568 | 9.00 |
| 2147483647 | a07ff67 | 011eece7d2 | 1a1f289428bd7ab3eb8a89d4c90b22f | 0 | 0 | 2147483647 | c76970f10c291c1e3568 | 9.00 |
| a07ff67 | a07ff679 | 011eece7d2 | 1a1f289428bd7ab3eb8a89d4c90b22f | 0 | 0 | 2147483647 | c76970f10c291c1e3568 | 9.00 |
| 5 | 36 | 0000-00-00 | 0000-00-00 | 011eece7d2 | 1a1f289428bd7ab3eb8a89d4c90b22f | T | 0 | 2fc392bc6e31426ab049 | 4.00 |
| e4da3b7 | e4da3b7f | 4e44f1ac85 | eb4fe264c10eb7a528b047aa983a4829 | 0 | 0 | 575 | 714026c2422a54586433 | 0.00 |
| 2147483647 | 5145 | 0000-00-00 | 0000-00-00 | 4e44f1ac85 | eb4fe264c10eb7a528b047aa983a4829 | G | 0 | ef02a0dd28d7c5b387b15 | 2.00 |
| 1679091 | 1679091c | 3d2f8900f2 | cb67c3ae286e9140355eb56d2c33ff5b | 0 | 0 | 13155 | c80ec309df3bf91aadb | 0.00 |
| 8910 | 3 | 0000-00-00 | 0000-00-00 | 3d2f8900f2 | cb67c3ae286e9140355eb56d2c33ff5b | U | 0 | 9f598c3ed520bb070a68 | 4.00 |
| 8f14e45 | 8f14e45f | cd7fd1517e | 63d9b9049808e4ddc24c231dd46775d | 0 | 0 | 114 | d891efe8cf04fe518c86 | 99999.99 |
| c9f0f89 | c9f0f895 | 815e6212de | deb77b7fcd6ee6af0bc2992355eaeae9 | 0 | 0 | 0 | 0f4df7227ef351e59b60 | 5.00 |
| 45c48cc | 45c48cce | 4cd013d3ad | ca7724498403de38829ae36fc9149b75 | 0 | 0 | 0 | 9f598c3ed520bb070a68 | 4.00 |
| d3d9446 | d3d94468 | 848e353b98 | bf492386a1b48076792e9b5596846499 | 0 | 0 | 0 | 9f598c3ed520bb070a68 | 4.00 |
| 5 | 2147483647 | 0000-00-00 | 0000-00-00 | 8d8e353b98 | bf492386a1b48076792e9b5596846499 | U | 0 | 9f598c3ed520bb070a68 | 4.00 |
| 6512bd4 | 6512bd43 | 7bfcd5cd07 | bdc2d12f90867717d1bbc5bc01b6614f | 0 | 0 | 0 | 9f598c3ed520bb070a68 | 4.00 |
| 52 | 52 | 0000-00-00 | 0000-00-00 | 7bfcd5cd07 | bdc2d12f90867717d1bbc5bc01b6614f | 0 | 0 | 9f598c3ed520bb070a68 | 4.00 |
```