DB_Report_Lab1

PB19111713钟颖康

1. 实验目的

按要求完成图书馆数据库。

2. 实验过程

2.1 创建三个基本表

根据给出的基本表结构可以直接写出，测试数据采用助教在QQ群内发布的版本，对细节稍有修改。

```
-- Book
Create Table Book(
    ID char(8),
    name varchar(50) Not NULL,
    author varchar(50),
    price float,
    status int default 0,

    Constraint PK_Book PRIMARY KEY (id)
);

-- Reader
Create Table Reader(
    ID char(8),
    name varchar(50),
    age int,
    address varchar(50),

    Constraint PK_reader PRIMARY KEY (ID)
);

-- Borrow
create Table borrow(
    book_id char(8),
    reader_id char(8),
    borrow_date date,
    return_date date,

    Constraint PK_Book Primary Key (book_id, reader_id),
    constraint FK_borrow_book_id Foreign Key (book_id) references Book(id),
    Constraint FK_Borrow_reader_id Foreign Key (reader_id) References
Reader(id)
);
```

2.2 完成小题

2.2.1 查询Rose的读者号和地址

```sql
select id, address from reader where name = 'Rose';
```

2.2.2 查询读者Rose所借阅读书(包括已还和未还图书的图书名和借期)

```sql
select book.name, borrow.borrow_date from book, reader, borrow
where borrow.book_id = book.id and borrow.reader_id = reader.id
    and reader.name = 'Rose';
```

2.2.3 查询未借阅图书的读者姓名

```sql
select reader.name from reader
where reader.id not in (
    select distinct reader_id from borrow
);
```

2.2.4 查询Ullman所写的书的书名和单价

```sql
select name, price from book where author = 'Ullman';
```

2.2.5 查询读者“李林”借阅未还的图书的图书号和书名

```sql
select book.name, book.id from book, reader, borrow
where book.id = borrow.book_id and reader.id = borrow.reader_id
    and reader.name = '李林' and borrow.return_date is null;
```

2.2.6 查询借阅图书数目超过3本的读者姓名

先按读者号分组，然后在每个分组上进行聚集计算。

```sql
select reader.name from reader
where reader.id in (
    select reader.id from reader, borrow
        where reader.id = borrow.reader_id
        group by borrow.reader_id
        having count(*) > 3
);
```

2.2.7 查询没有借阅读者“李林”所借的任何一本书的读者姓名和读者号

李林借过的书→借过“李林借过的书”的人→没有借过李林所借的任何一本书的人。

```sql
select distinct reader.name, reader.id from reader, borrow
where not exists (
    select borrow.book_id from book, borrow
    where reader.id = borrow.reader_id
        and borrow.book_id in (
        select book_id from reader, borrow
        where reader.id = borrow.reader_id
            and reader.name = '李林'
    )
);
```

2.2.8 查询书名中包含“MySQL”的图书书名及图书号

```sql
select book.name, book.id from book
where book.name like '%MySQL%';
```

2.2.9 查询2021年借阅图书数目排名前6的读者号、姓名、年龄以及借阅图书数

在2021年的借书关系表中对读者号进行分组，在每个组内使用聚集函数，然后排序查询，降序并选取前6个。

```sql
select reader.ID, reader.name, reader.age, temp.count
from reader, (
    select count(distinct book_ID) as count, reader_id
        from borrow
        where date_format(borrow_date, '%Y') = '2021'
        group by reader_id
) as temp
where reader.id = temp.reader_id
order by temp.count DESC limit 6;
```

2.2.10 创建一个读者借书信息的视图，该视图包含读者号、姓名、所借图书号、图书名和借期; 并使用该视图查询最近一年所有读者的读者号以及所借阅的不同图书数

```sql
create view reader_borrow_view as (
    select reader.id as rid, reader.name as rname,
        book.id as bid, book.name as bname,
        borrow.borrow_date as borrow_date
    from book, reader, borrow
    where reader.id = borrow.reader_id and book.id = borrow.book_id
);

select rid, count(*)
    from reader_borrow_view
    where borrow_date > '2021-04-10'
    group by rid;
```

2.3 设计一个存储过程, 实现对 Book 表的 ID 的修改(本题要求不得使用外键定义时的on update cascade选项, 因为该选项不是所有 DBMS 都支持)

插入新的图书→更新借书关系→删除旧的图书

```
delimiter //
create procedure update_book_id(in old_id char(8), in new_id char(8))
begin
    insert into book (id, name, author, price, status)
        select new_id as id, name, author, price, status
        from book where id = old_id;
    update borrow set book_id = new_id where book_id = old_id;
    delete from book where id = old_id;
end //
delimiter ;
```

2.4 设计一个存储过程, 检查每本图书status是否正确, 并返回status不正确的图书数

统计状态为0但还没还的书与状态为1但已经还了的书。

```
delimiter //
create procedure check_status(out wrong_count int)
begin
    select count(*) into wrong_count from book
    where book.status = 0 and book.id in (
        select distinct book_id from borrow
        where return_date is null
    ) or book.status = 1 and book.id not in (
        select distinct book_id from borrow
        where return_date is null
    );
end //
delimiter ;
```

2.5 设计触发器, 实现: 当一本书被借出时, 自动将Book表中相应图书的status修改为1; 当某本书被归还时, 自动将status改为0

在插入新的借书关系时，若该书已经归还，则更新状态为0，否则状态为1；更新借书关系同理。

```
delimiter //
create trigger update_status_when_borrow after insert on borrow
for each row
begin
    if new.return_date is not null then
        update book set status = 0 where id = new.book_id;
    else
        update book set status = 1 where id = new.book_id;
    end if;
end //

create trigger update_status_when_return after update on borrow
for each row
begin
    if new.return_date is not null then
        update book set status = 0 where id = new.book_id;
    else
        update book set status = 1 where id = new.book_id;
    end if;
end //
```

```
21 delimiter ;
```

3. 实验总结

- 实验内容全部完成。
- 心得体会：本次实验感觉比较基础，部分小题理清逻辑即可很容易写出。