浙江大学 2023–2024 学年春夏季学期

《数据库系统》课程课堂测试三

(Quiz 3 for Database Systems)

考生姓名：_____ 学号：_____ 专业：_____ 得分：_____

Problem 1. Consider a SQL table ***T*(*A int unique*, *B int*).** Assume there are no NULL values. As specified, attribute *A* is a key. Consider the following three SQL queries:

Q1: Select *B* From *T*
Where *B* >= some (Select *B* From *T*);
Q2: Select *B* From *T* as T_1
Where *B* > all (Select *B* From *T* as T_2 where T_2.A < > T_1.A);
Q3: Select max(*B*) From *T*;

Which of the queries above are equivalent? Please show a smallest single instance of *T* you can come up with that demonstrates your answer.

Case 1: Q2 and Q3 are equivalent, if the maximum of *B* is only once.
Case 2: None are equivalent, if the maximum of *B* is multiple times.

A	B
1	5
2	7
3	3

Case 1

Q1: 5
7
3
Q2: 7
Q3: 7

A	B
1	7
2	5
3	7

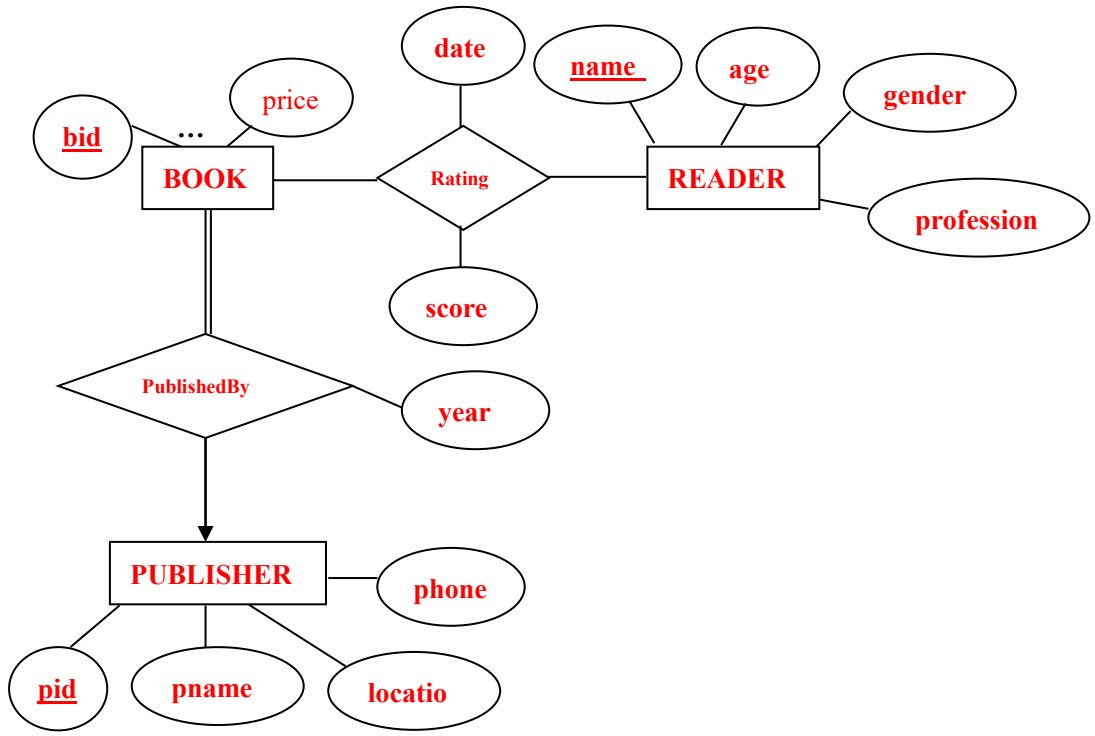
Case2

Q1: 5
7
3
Q2:
Q3: 7

Problem 2. Consider the following relational schemas describing ***books***, ***publishers***, ***readers***, and reader ratings of the books:

***Book*(*bid*, *title*, *author*, *price*)** // ***bid* is a primary key**
***Reader*(*name*, *age*, *gender*, *profession*)** // ***name* is a primary key**
***Rating*(*name*, *bid*, *date*, *score*)** // **(*name*, *bid*) is a primary key**
***Publisher*(*pid*, *pname*, *location*, *phone*)** // ***pid* is a primary key**
***PublishedBy*(*bid*, *pid*, *year*)** // ***bid* is a primary key**

(1) Draw an E-R diagram from which these relational schemas could have been produced. Your diagram should be fully connected, and it should be as detailed as possible from the information you have.



(2) Please make necessary formalization of the relational schemas above, to get a minimum number of relation schemas.

Book(*bid*, *title*, *author*, *price*, *pid*, *year*) // *bid* is a primary key

Reader(*name*, *age*, *gender*, *profession*) // *name* is a primary key

Rating(*name*, *bid*, *date*, *score*) // (*name*, *bid*) is a primary key

Publisher(*pid*, *pname*, *location*, *phone*) // *pid* is a primary key

(3) Write SQL data definition statements for the relation schemas from the issue/step (2), and give necessary integrity constraints on them.

```
Create table Publisher(pid       char(10) primary key,
                       pname     varchar(30),
                       location  varchar(50),
                       phone     varchar(20));

Create table Book(bid       char(10) primary key,
                  title     varchar(50),
                  author    varchar(50),
                  price     real,
                  pid       char(10),
                  year      date,
```

```
                    Foreign key(pid) references publisher);

Create table Reader(name          varchar(15) primary key,
                    age           int,
                    gender        char(1) not null,
                    profession    varchar(30),
                    check (gender in ('M', 'F')));

Create table Rating(name      varchar(15),
                    bid       char(10),
                    date      date,
                    score     real,
                    primary key (name, bid),
                    foreign key (name) references reader,
                    foreign key (bid) references book);
```