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数据库原理与应用 42024401　测验　"数据库原理与应用"期末考试

2019-20202

主页

公告

作业

讨论

评分

人员

大纲

单元

"数据库原理与应用 "期末考试

截止时间 无截止时间　　总分 100　　问题 9

可用 7月2日 13:30 至 7月2日 15:30 大约 2 个小时

时间限制 无

说明

1、考试时间：2020-07-02 星期四 13:30-15:30。

2、闭卷考试，考试过程中不允许页面切换。

3、考生必须独立完成考试，整个考试期间严禁通过任何通信工具或通信软件与任何其他考生进行交流，否则按作弊论处。

4、整个考试期间严禁使用任何搜索引擎，否则按作弊论处。

5、仅最后两道题允许拍照上传答题纸到Canvas，其余各题一律在Canvas答题框中直接作答。

6、只允许在考试的最后8分钟（15:22-15:30）进行拍照上传答题纸到Canvas的操作。

7、全英文作答。

此测验锁定于 7月2日 15:30。

尝试历史记录

	尝试	时间	分数
最新	尝试 1	118 分钟	0，满分 100 分 *

*有些问题尚未计分

□ 正确答案已隐藏。

此测验的分数：**0**，满分 100 分 *

提交时间 7月2日 15:28

此尝试进行了 118 分钟。

问题 **1**	仍未计分 **/ 10** 分

Write the following queries in SQL, using the university schema.

1. Find the names of all students who have taken at least one Comp.Sci. course; make sure there are no duplicate names in the result.
2. Find the IDs and names of all students who have not taken any course offering before Spring 2009.

您的答案:

1.

select distinct name

from student **natural join** takes **natural join** course

where dept_name='Comp.Sci'

2.

select id, name

from student

except

(**select** id,name

 from student **natural join** takes

 where year<2009)

问题 **2**	仍未计分 **/ 13** 分

Consider the insurance database below, where the primary keys are underlined.

person (<u>driver_id</u>, name, address)

car (<u>license</u>, model, year)

accident (<u>report_number</u>, date, location)

owns (<u>driver_id</u>, <u>license</u>)

participated (<u>report_number</u>, <u>license</u>, driver_id, damage_amount)

Please construct the following SQL queries for this relational database.

1. Find the number of accidents in which the cars belonging to you were involved.
2. Update the damage amount for the car with license number "AABB2020" in the accident with report number "AR2197" to $9900.

您的答案：

1.

Assume that the id of your car is **your_id**.

with driver_count(driver_id, accident_cnt）**as**

    select   driver_id, count(*)

    from   person **natural join** participated **natural join** accident

    group by driver_id

select accident_cnt

from driver_count

where driver_id=your_id

2.

update participated

set damage_amount=9900

where license='AABB2020' **and** report_number='AR2197'

问题 3　　　　　　　　仍未计分 / **10** 分

Write a query that returns the name and budget of all departments with more than 12 instructors, using with clause instead of using a function call.

您的答案：

with tmp_dept(dept_name) **as**

　　select dept_name

　　from instructor **natural join** department

　　group by dept_name

　　having count(ID)>12

select dept_name, budget

from tmp_dept **natural join** department

问题 4　　　　　　　　仍未计分 / **10** 分

For relation schema:

class (course_id, title, dept_name, credits, sec_id, semester, year, building, room_number, capacity, time_slot_id)

And Functional dependencies:

course_id→ title, dept_name, credits

building, room_number→capacity

course_id, sec_id, semester, year→building, room_number, time_slot_id

Please decompose the relation schema by following BCNF decomposition algorithm.

您的答案:

1. course_id→ title, dept_name, credits , but course_id is not a superkey, so:

R1=(course_id, title, dept_name, credits)

R2=(course_id, sec_id, semester, year, building, room_number, capacity, time_slot_id)

building, room_number→capacity,but{building, room_number} is not a superky of R2, so we decompose R2 into:

R3=(building, room_number, capacity)

R4=(course_id,sec_id, semester,year, building, room_number, time_slot_id)

Hence,the result is R1, R3, R4.

(course_id, title, dept_name ,credits)

(building, room_number, capacity)

(course_id, sec_id, semester, year, building, room_number, time_slot_id)

问题 5   仍未计分 / **10** 分

What is a primary index? What is a secondary index? Is sequential scan using secondary index efficient?

您的答案:

(1) primary index:

In a sequentially ordered file, the index whose search-key value specificies the same sequential order of the file.

(2) secondary index:

Index whose search-key value specificies an order different from the order of the file.

(3) Sequential scan using secondary index is expensive.

问题 6　　　　　　　　　　仍未计分 / **15** 分

In the teaching management database of a university, there are three tables: students, courses and course selection. Their definitions are as follows:

Student (Sno char(7), Sname char(8), Ssex Char (2), Sage Int, Sdept Char (2)); Fields represent respectively student number, student name, student gender, student age, student department;

Course (Cno Char(8), Cname Char(20), and Ccredit Int). The fields represent course number, course name and course credit respectively;

SC (Sno Char(7), Cno Char(8), Grade Int); the fields represent student number, course number and grade respectively;

Write out the SQL statements according to the following requirements.

① Establish table SC with SQL statement, with (Sno, Cno) as the primary key;

② Insert a record into the student table with your personal information. The value of department field (Sdept) should be the department code SE of software engineering;

③ Retrieve the names and ages of all female students in computer department (department code CS);

④ Retrieve the student number, name, and grade of the students who took the 42024401 course, and sort them in descending order of grade;

⑤ Establish a view (vwStudent) for all the students who are in the department of information system

(department code IS) and have some Grade < 60.

您的答案：

(1)

create table SC

(Sno **varchar**(7),

Cno **varchar**(8),

Grade **numeric**(3,0),

primary key(Sno,Cno);

)

(2)

insert into Student

values('1853401', 'Weiqi Li', 'M', 18, 'SE');

(3)

select Sname, Sage

from Student

where Sdept='CS' **and** Ssex='FM'

(4)

select Sno, Sname, Grade

from Student **natural join** SC **natural join** Course

where Cno='42024401'

order by Grade

(5)

create vwStudent(stu_id, stu_name) **as**

    select Sno, Sname

    from Student **as** S **natural join** SC

    where Sdept='IS' **and**

        60> **some** (**select** Grade

                from SC **natural**

    join Student

where
S.Sno=Student.Sno)

问题 **7**   仍未计分 / **12** 分

There is a relationship model to record the daily output of employees in the factory:

R (employee number, date, daily production, workshop number, workshop director).

If it is stipulated that: each employee has only one daily output per day; each employee can only belong to one workshop; each workshop has only one workshop director. Analyze whether R reaches 3NF. If it is, please verify and explain according to the definition of 3NF; if it is not, decompose it to make the decomposed relationship mode reach 3NF.

您的答案：

(1)

R is not in 3NF.

There is a functional dependency that workshop →director. It is not a trivial functional dependency, and workshop is not a superkey. director is not contained in a candidate key. Hence, R is not in 3NF.

(2)

Functional dependencies in this relation are as follows:

employee number, date → daily production

daily production→date

employee number→workshop

workshop number→director

The conical cover of the relation is also the 4 FDs show above.

By 3NF decomposition algorithm:

R1(employee number, date, daily production)

R2(emplotee number, workshop)

R3(workshop number, director)

问题 **8**   仍未计分 **/ 10** 分

Using the university example, write relational-algebra queries to find the course sections taught by more than one instructor in the following ways:
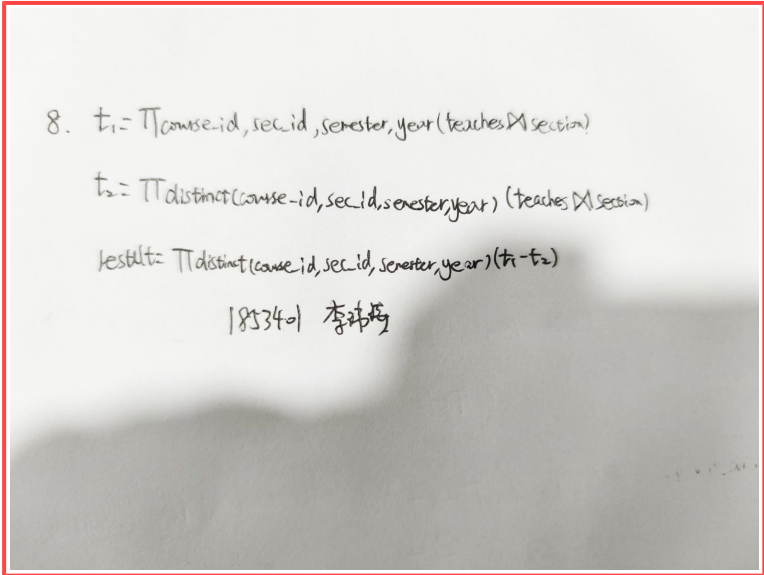
1. Using an aggregate function.
2. Without using any aggregate functions.

您的答案:

1.

$$\sigma_{cnt>1}(_{course\_id,sec\_id,semester,year}G_{count(ID)\ as\ cnt}(teaches \bowtie section))$$

2.

8. $t_1 = \Pi_{course-id, sec\_id, semester, year}(teaches \bowtie section)$

$t_2 = \Pi_{distinct(course-id, sec\_id, semester, year)}(teaches \bowtie section)$

$testult = \Pi_{distinct(course-id, sec\_id, semester, year)}(t_1 - t_2)$

1853401 李玮琦

问题 **9**   仍未计分 **/ 10** 分

If we'd like to delete "Perryridge" from the following B$^+$ tree, please reconstruct it, and draw the new generated B$^+$ tree.
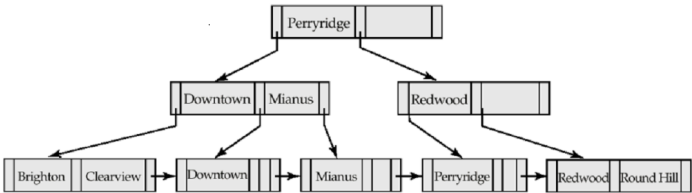
您的答案：
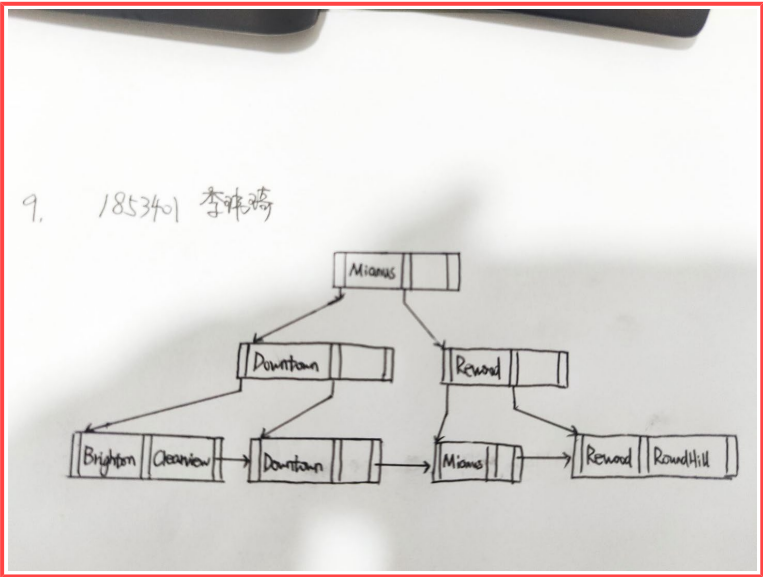
测验分数： **0**，满分 100 分

提交作业详细信息：

时间： 118 分钟

当前分数： 0，满分 100 分 *

保留分数： 0，满分 100 分

* 有些问题尚未计分