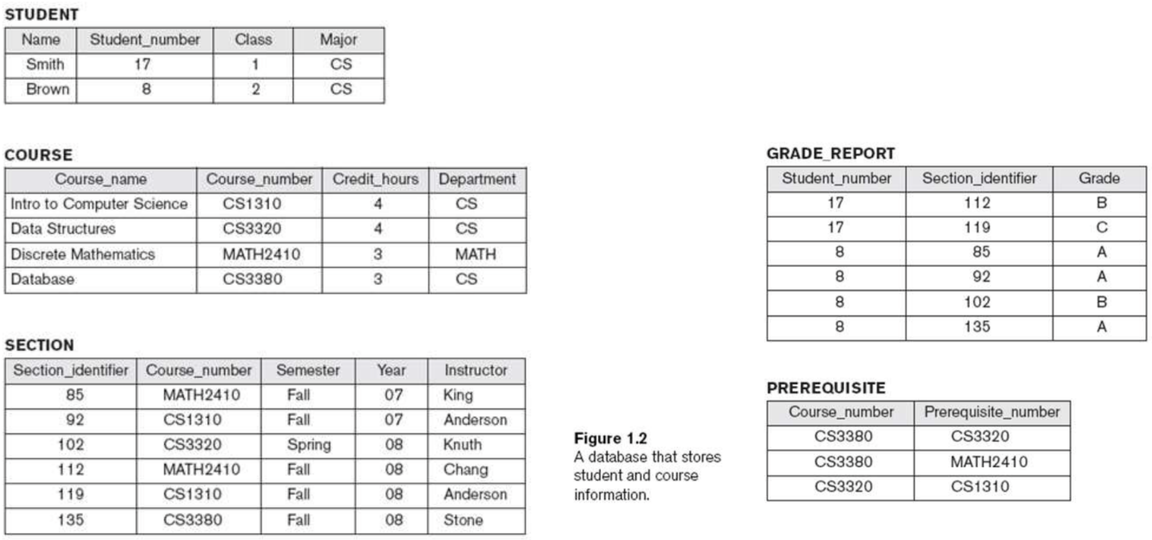
E44065020_何子安_HW3

Tags	Database System Homework #3 (CHP5)

> This report is written in Notion, and being export as PDF.

5.6. Specify the following queries in SQL on the database schema in Figure 1.2.



STUDENT

Name	Student_number	Class	Major
Smith	17	1	CS
Brown	8	2	CS

COURSE

Course_name	Course_number	Credit_hours	Department
Intro to Computer Science	CS1310	4	CS
Data Structures	CS3320	4	CS
Discrete Mathematics	MATH2410	3	MATH
Database	CS3380	3	CS

SECTION

Section_identifier	Course_number	Semester	Year	Instructor
85	MATH2410	Fall	07	King
92	CS1310	Fall	07	Anderson
102	CS3320	Spring	08	Knuth
112	MATH2410	Fall	08	Chang
119	CS1310	Fall	08	Anderson
135	CS3380	Fall	08	Stone

GRADE_REPORT

Student_number	Section_identifier	Grade
17	112	B
17	119	C
8	85	A
8	92	A
8	102	B
8	135	A

PREREQUISITE

Course_number	Prerequisite_number
CS3380	CS3320
CS3380	MATH2410
CS3320	CS1310

Figure 1.2
A database that stores student and course information.

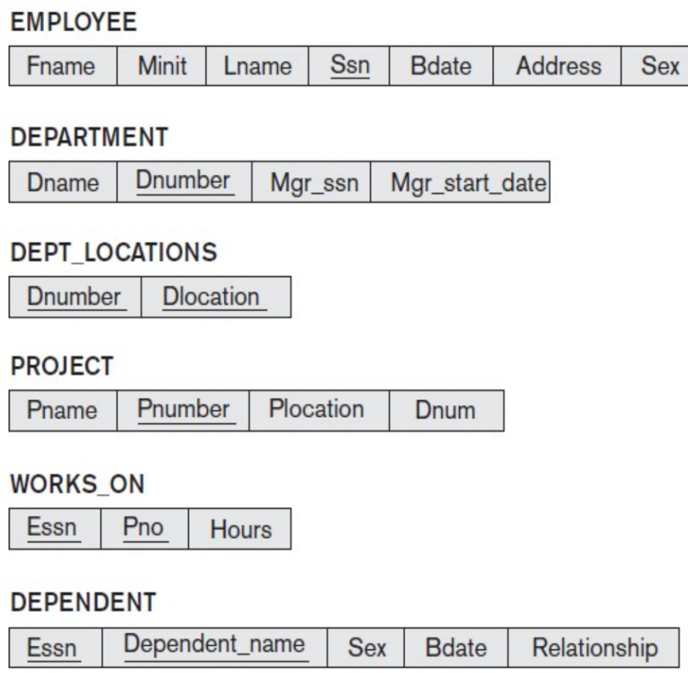
a. Retrieve the names and major departments of all straight-A students (students who have a grade of A in all their courses).

```
SELECT Name, Major
FROM STUDENT
WHERE NOT EXISTS (
  SELECT * FROM GRADE_REPORT
  WHERE StudentNumber= STUDENT.StudentNumber AND NOT(Grade='A')
)
```

b. Retrieve the names and major departments of all students who do not have a grade of A in any of their courses.

```
SELECT Name, Major
FROM STUDENT
WHERE NOT EXISTS (
  SELECT * FROM GRADE_REPORT
  WHERE StudentNumber= STUDENT.StudentNumber AND Grade='A' )
)
```

5.7. In SQL, specify the following queries on the database in Figure 3.5 using the concept of nested queries and concepts described in this chapter.



EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date

DEPT_LOCATIONS

Dnumber	Dlocation

PROJECT

Pname	Pnumber	Plocation	Dnum

WORKS_ON

Essn	Pno	Hours

DEPENDENT

Essn	Dependent_name	Sex	Bdate	Relationship

Figure 3.5
Schema diagram for the COMPANY relational database schema.

a. Retrieve the names of all employees who work in the department that has the employee with the highest salary among all employees.

```
SELECT LNAME FROM EMPLOYEE
WHERE DNO = (
  SELECT DNO FROM EMPLOYEE
  WHERE SALARY = (
    SELECT MAX(SALARY) FROM EMPLOYEE))
```

b. Retrieve the names of all employees whose supervisor’s supervisor has ‘888665555’ for Ssn.

```
SELECT LNAME FROM EMPLOYEE
WHERE SUPERSSN IN (
  SELECT SSN FROM EMPLOYEE
  WHERE SUPERSSN = ‘888665555’)
```

c. Retrieve the names of employees who make at least $10,000 more than the employee who is paid the least in the company.

```
SELECT LNAME FROM EMPLOYEE
WHERE SALARY >= 10000 + (
  SELECT MIN(SALARY) FROM EMPLOYEE)
```

5.8. Specify the following views in SQL on the COMPANY database schema shown in Figure 3.5.

a. A view that has the department name, manager name, and manager salary for every department.

```
CREATE VIEW dnameMgrnameMgrsalary(department_name, manager_name, manager_s
alary) AS
SELECT d.dname, e.fname, e.salary
FROM department d, employee e
WHERE d.mgrssn = e.ssn
```

b. A view that has the employee name, supervisor name, and employee salary for each employee who works in the ‘Research’ department.

```
CREATE VIEW EnameSnameEsalary (employee_name, supervisor_name, employee_sa
lary) AS
SELECT e1.fname, e2.fname, e.salary
FROM employee e1, employee e2
WHERE e1.superssn = e2.ssn
```

c. A view that has the project name, controlling department name, number of employees, and total hours worked per week on the project for each project.

```
CREATE VIEW PnameDnameNofemployeesTotalhourss(project_name, department_nam
e, numOfEmployees, hoursWorkedPerWeek) AS
SELECT p.pname, d.dname, count(*), avg(salary)
FROM employee e, department d, works_on wo, project p
WHERE e.dno = d.dnumber and wo.pno=p.pnumber and wo.essn=e.ssn and p.dnum
 = d.dnumber
GROUP BY p.pname
```

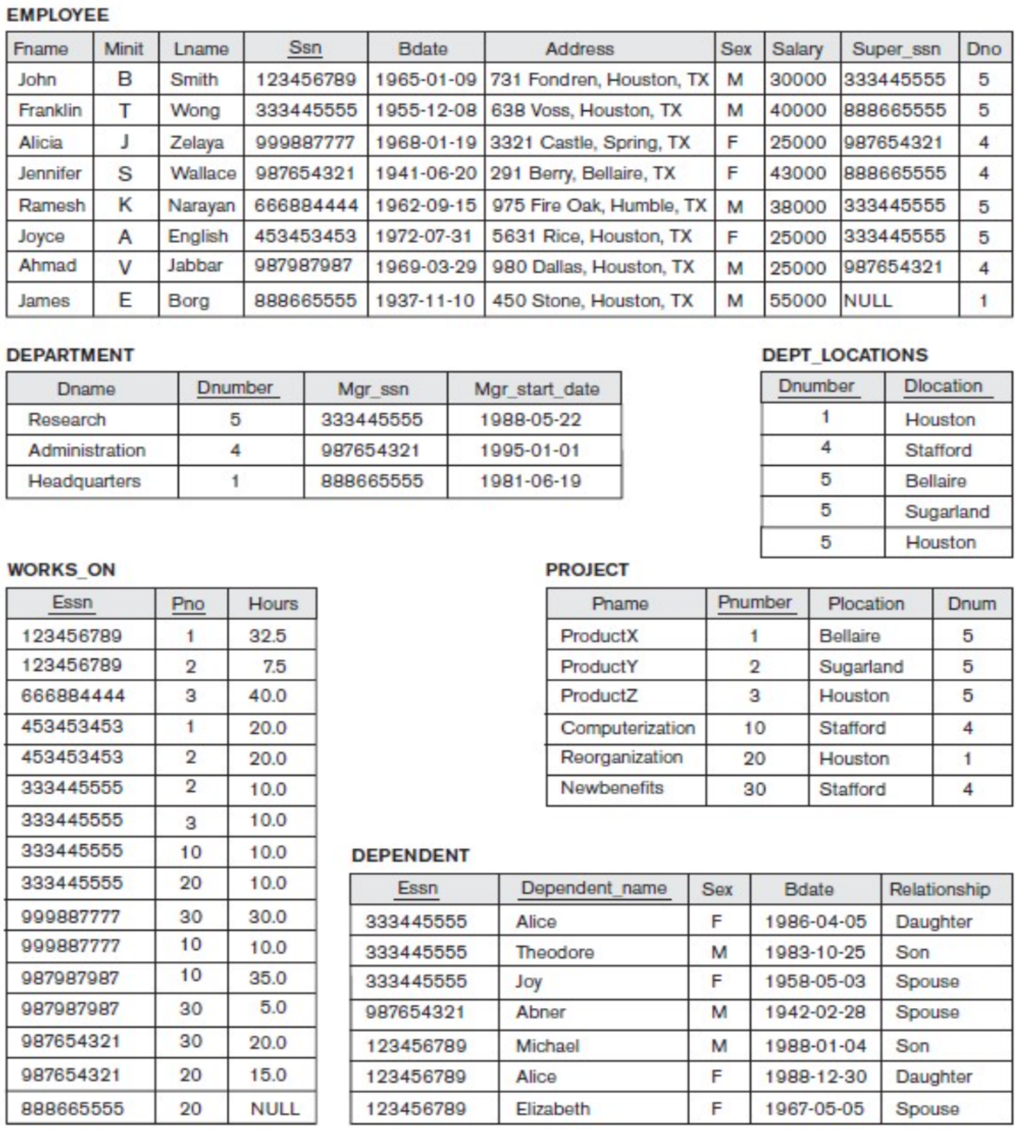
d. A view that has the project name, controlling department name, number of employees, and total hours worked per week on the project for each project with more than one employee working on it.

```
CREATE VIEW PnameDnameNofemployeesTotalhoursss(project_name, department_na
me, numOfEmployees, hoursWorkedPerWeek) AS
SELECT p.pname, d.dname, count(*), avg(salary)
FROM employee e, department d, works_on wo, project p
WHERE e.dno = d.dnumber and wo.pno=p.pnumber and wo.essn=e.ssn and p.dnum
 = d.dnumber and (
  SELECT FROM employee, department
  WHERE dno = dnumber
GROUP BY p.pname
```

5.9. Consider the following view, DEPT_SUMMARY, defined on the COMPANY database in Figure 3.6:

```
CREATE VIEW DEPT_SUMMARY (D, C, Total_s, Average_s) AS
SELECT Dno, COUNT(*), SUM(Salary), AVG(Salary)
FROM EMPLOYEE
GROUP BY Dno
```

Figure 3.6
One possible database state for the COMPANY relational database schema.



EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
John	B	Smith	123456789	1965-01-09	731 Fondren, Houston, TX	M	30000	333445555	5
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
Alicia	J	Zelaya	999887777	1968-01-19	3321 Castle, Spring, TX	F	25000	987654321	4
Jennifer	S	Wallace	987654321	1941-06-20	291 Berry, Bellaire, TX	F	43000	888665555	4
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000	333445555	5
Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000	333445555	5
Ahmad	V	Jabbar	987987987	1969-03-29	980 Dallas, Houston, TX	M	25000	987654321	4
James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000	NULL	1

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date
Research	5	333445555	1988-05-22
Administration	4	987654321	1995-01-01
Headquarters	1	888665555	1981-06-19

DEPT_LOCATIONS

Dnumber	Dlocation
1	Houston
4	Stafford
5	Bellaire
5	Sugarland
5	Houston

WORKS_ON

Essn	Pno	Hours
123456789	1	32.5
123456789	2	7.5
666884444	3	40.0
453453453	1	20.0
453453453	2	20.0
333445555	2	10.0
333445555	3	10.0
333445555	10	10.0
333445555	20	10.0
999887777	30	30.0
999887777	10	10.0
987987987	10	35.0
987987987	30	5.0
987654321	30	20.0
987654321	20	15.0
888665555	20	NULL

PROJECT

Pname	Pnumber	Plocation	Dnum
ProductX	1	Bellaire	5
ProductY	2	Sugarland	5
ProductZ	3	Houston	5
Computerization	10	Stafford	4
Reorganization	20	Houston	1
Newbenefits	30	Stafford	4

DEPENDENT

Essn	Dependent_name	Sex	Bdate	Relationship
333445555	Alice	F	1986-04-05	Daughter
333445555	Theodore	M	1983-10-25	Son
333445555	Joy	F	1958-05-03	Spouse
987654321	Abner	M	1942-02-28	Spouse
123456789	Michael	M	1988-01-04	Son
123456789	Alice	F	1988-12-30	Daughter
123456789	Elizabeth	F	1967-05-05	Spouse

State which of the following queries and updates would be allowed on the view. If a query or update would be allowed, show what the corresponding query or update on the base relations would look like, and give its result when applied to the database in Figure 3.6.

a.

```
SELECT * FROM DEPT_SUMMARY;
```

D	C	Total_s	Average_s
1	1	55000	55000

4	3	93000	31000
5	4	133000	33250

b.

```
SELECT D, C FROM DEPT_SUMMARY
WHERE TOTAL_S > 100000;
```

D	C
5	4

c.

```
SELECT D, AVERAGE_S FROM DEPT_SUMMARY
WHERE C > (
  SELECT C FROM DEPT_SUMMARY
  WHERE D=4);
```

D	AVERAGE_S
5	33250

d.

```
UPDATE DEPT_SUMMARY
SET D=3
WHERE D=4;
```

This query would change all employees whose dept=4 to dept=3.

e.

```
DELETE FROM DEPT_SUMMARY
WHERE C > 4;
```

This query would remove all departments that have more than 4 people from the following view.