SQL Examples

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Exercise 5.1 Consider the following relations:

Student(snump: integer, sname: string, major: string, level: string, age: integer)
Class(name: string, meets_at: string, room: string, fid: integer)
Enrolled(snump: integer, cName: string)
Faculty(fid: integer, fName: string, deptId: integer)

The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class.
| create table student(  
|   snum numeric(9,0) primary key,  
|   sname varchar(30),  
|   major varchar(25),  
|   standing varchar(2),  
|   age numeric(3,0)  
| );  
| create table faculty(  
|   fid numeric(9,0) primary key,  
|   fname varchar(30),  
|   deptid numeric(2,0)  
| );  
| create table class(  
|   name varchar(40) primary key,  
|   meets_at varchar(20),  
|   room varchar(10),  
|   fid numeric(9,0),  
|   foreign key (fid) references faculty(fid)  
| );  
| create table enrolled(  
|   snum numeric(9,0),  
|   cname varchar(40),  
|   primary key(snum,cname),  
|   foreign key (snum) references student(snum),  
|   foreign key (cname) references class(name)  
| );
4) Find the names of all students who are enrolled in two classes that meet at the same time.

```sql
SELECT DISTINCT S.sname
FROM Student S
WHERE S.snum IN (SELECT E1.snum
                   FROM Enrolled E1, Enrolled E2, Class C1, Class C2
                   WHERE E1.snum = E2.snum AND E1.cname <> E2.cname
                   AND E1.cname = C1.name
                   AND E2.cname = C2.name AND C1.meets_at = C2.meets_at)
```
5) Find the names of faculty members who teach in every room in which some class is taught.

```
SELECT DISTINCT F.fname
FROM    Faculty F
WHERE   NOT EXISTS (( SELECT *
                      FROM    Class C )
                   EXCEPT
                   (SELECT C1.room
                    FROM    Class C1
                    FROM    Class C
                    WHERE   C1.fid = F.fid ))
```
6) Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five.
9) For each faculty member that has taught classes only in room R128, print the faculty member’s name and the total number of classes she or he has taught.

```
SELECT F.fname, COUNT(*) AS CourseCount
FROM Faculty F, Class C
WHERE F.fid = C.fid
GROUP BY F.fid, F.fname
HAVING EVERY ( C.room = 'R128' )
```
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11) Find the names of students not enrolled in any class.

```sql
SELECT DISTINCT S.sname
FROM Student S
WHERE S.snum NOT IN (SELECT E.snum
                      FROM Enrolled E )
```
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12) For each age value that appears in Students, find the level value that appears most often. For example, if there are more FR level students aged 18 than SR, JR, or SO students aged 18, you should print the pair (18, FR).
Exercise 5.1

```
SELECT S.age, S.level
FROM Student S
GROUP BY S.age, S.level,
HAVING S.level IN (SELECT S1.level
FROM Student S1
WHERE S1.age = S.age
GROUP BY S1.level, S1.age
HAVING COUNT(*) >= ALL (SELECT COUNT(*)
FROM Student S2
WHERE s1.age = S2.age
GROUP BY S2.level, S2.age))
```