Introduction to Database Systems

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Assighnment 2

1. List the student names and roll numbers of students who are enrolled in all courses offered by a department that has at least one professor who has never taught a course with prerequisites.

```
select s.rollNo,s.name
from student as s
where
    not exists
    (
        select *
        from course as c
        where
            exists
            (
            select p.empId
            from professor as p,teaching as t
            where p.deptNo=c.deptNo and
            p.empId=t.empId and
            t.courseId not in (select p.courseId
            from prerequisite as p)

            ) and
        not exists
            (
            select e.rollNo
            from enrollment as e
            where e.rollNo=s.rollNo and
            e.courseId=c.courseId

            )
    )
```

2. Retrieve the courseId, name, and the maximum number of enrollments till the current semester along with the corresponding sem and year for each course.Only consider courses with more than 20 enrollments

```
select c.courseId, c.cname, e.year, e.sem,count(e.rollNo) as max_enroll_count
from course as c
inner join enrollment as e on c.courseId=e.courseId
group by c.courseId,c.cname,e.year,e.sem
having count(e.rollNo) = any
            (
                select max(enroll_count1)
                from
                (
                    select count(ee.rollNo) as enroll_count1
                    from enrollment as ee
                    where ee.courseId =c.courseId
                    group by ee.year, ee.sem
                    having count(ee.rollNo)>20
                ) as max_enrollment
            )
order by c.courseId
```

3. For every department, calculate the average number of 'S' grades earned by students within that department. Only consider students with number of s grades greater than 2

```
select d.deptId,d.name,avg(dep_stud.cg) as avg_numof_sgrade
from department as d,
    (
        select s.deptNo as dn,s.rollNo as sr, count(e.grade) as cg
        from student as s, enrollment as e
        where s.rollNo=e.rollNo and e.grade ='S'
        group by s.deptNo,s.rollNo
        having count(e.grade)>2
    ) as dep_stud
where d.deptId =dep_stud.dn
group by d.deptId
```

4. For each department list the department Ids, names of departments, and total number of students advised by female professors whose names begin with 'S'.

```
select d.deptId, sum(stud_under_lprof.stud_count) as num_stud
from department as d,
    (
        select p.empId as pId,p.deptNO as dId,count(s.rollNO) as stud_count
        from professor as p, student as s
        where s.advisor =p.empId and p.sex='Female' and
            p.name like 's%'
        group by p.empId,p.deptNo
    ) as stud_under_lprof
where d.deptId=stud_under_lprof.dId
group by d.deptId
```

5. List the course Ids and names of the courses that require two prerequisites and have never been taught by the Head of the Computer Science and Engineering (Comp. Sci.) department.

```
(
    select p.courseId, c.cname
    from prerequisite as p , course as c
    where p.courseId = c.courseId
    group by p.courseId,c.cname
    having count(p.preReqCourse)=2
)
except
(
    select distinct t.courseId,c.cname
    from professor as p
    join department as d on d.hod=p.empId
    join teaching as t on t.empId=p.empId
    join course as c on t.courseId=c.courseId
    where d.name='Comp. Sci.'
)
```

6. List the professor Ids and names of the professor who exclusively taught courses offered by their department and had no prerequisites for those courses.

```
select p.empId,p.name
from professor as p
where
    not exists
    (
        select *
        from teaching as t, course as c
        where t.empId=p.empId and
            c.courseId=t.courseId and
            (
                c.deptNo<>p.deptNo or
                exists
                (
                    select *
                    from prerequisite as pre
                    where pre.courseId=c.courseId
                )

            )
    )
```

7. obtain deptId, name for departments, and number of professors who taught at least 2 courses.Only consider departments which has at least 2 such professors

```
select d.deptId, d.name,count(p.empId)
from department as d ,professor as p
where d.deptId=p.deptNo and
    exists
    (
        select e.empId,count(e.courseId)
        from teaching as e
        where e.empId=p.empId
        group by e.empId
        having count(e.courseId)>=2
    )
group by d.deptId,d.name
having count(p.empId)>=2
order by d.deptId
```

8. list the professor Ids and names of professors, where all his/her advisees have at least one course enrolled in common

```
select p.empId,p.name
from professor as p
where
    exists
    (
        select c.courseId
        from course as c
        where
            not exists
            (
                select *
                from student as s
                where s.advisor = p.empId and
                    not exists
                    (
                        select *
                        from enrollment as e
                        where e.courseId = c.courseId and
                            e.rollNo=s.rollNo

                    )
            )
    )
```