Lab 4: Dipesh Singh – 190905520

Question 1: Find the number of students in each course.

```
select course_id,
    title,
    count(*)
from takes
    natural join course
group by (course_id, title);
```

Question 2: Find those departments where the average number of students are greater than 10.

```
with cnt_stu(dept_name, cnt) as (
    select dept_name,
        count(*)
    from student
    group by dept_name
)
select dept_name,
    cnt
from cnt_stu
where cnt > 100;
```

Question 3: Find the total number of courses in each department.

```
select dept_name,
    count(*)
from course
group by (dept_name);
```

Question 4: Find the names and average salaries of all departments whose average salary is greater than 42000.

```
with avg_sal(dept_name, sal_avg) as (
    select dept_name,
        avg(salary)
    from instructor
```

```
    group by dept_name
)
select dept_name,
    sal_avg
from avg_sal
where sal_avg > 42000;
```

Question 5: Find the enrolment of each section that was offered in Spring 2009.

```
select sec_id,
    semester,
    year,
    count(distinct ID)
from takes
group by (sec_id, semester, year)
having semester = 'Spring'
    and year = 2009;
```

Question 6: List all the courses with prerequisite courses, then display course id in increasing order.

```
select *
from prereq
order by course_id asc;
```

Question 7: Display the details of instructors sorting the salary in decreasing order.

```
select *
from instructor
order by salary desc;
```

Question 8: Find the maximum total salary across the departments.

```
select max(sal)
from (
        select dept_name,
```

```
            sum(salary) as sal
        from instructor
        group by dept_name
    );
```

Question 9: Find the average instructors' salaries of those departments where the average salary is greater than 42000.

```
select dept_name,
    average
from (
        select dept_name,
            avg(salary) as average
        from instructor
        group by dept_name
    )
where average > 42000;
```

Question 10: Find the sections that had the maximum enrolment in Spring 2010.

```
select sec_id,
    total
from (
        select sec_id,
            count(distinct ID) as total
        from takes
        where semester = 'Fall'
            and year = 2009
        group by (sec_id)
    )
where total >= all(
        select count(distinct ID) as total
        from takes
        where semester = 'Spring'
            and year = 2010
```

```
        group by (sec_id)
    );
```

Question 11: Find the names of all instructors who teach all students that belong to 'CSE' department.

```
select distinct name
from instructor
    natural join teaches
where course_id in (
        select distinct course_id
        from takes
            natural join course
        where dept_name = 'Comp. Sci.'
    );
```

Question 12: Find the average salary of those department where the average salary is greater than 50000 and total number of instructors in the department are more than 5.

```
select dept_name,
    total,
    avg_sal
from(
        select dept_name,
            count(*) as total,
            avg(salary) as avg_sal
        from instructor
        group by dept_name
    )
where total > 5
    and avg_sal > 50000;
```

Question 13: Find all departments with the maximum budget.

```
with max_bug(val) as (
    select max(budget)
```

```
    from department
)
select dept_name,
    budget
from department,
    max_bug
where budget = val;
```

Question 14: Find all departments where the total salary is greater than the average of the total salary at all departments.

```
with tot(dept_name, total) as (
    select dept_name,
        sum(salary) as tot
    from instructor
    group by dept_name
),
avge(val) as (
    select avg(total)
    from tot
)
select dept_name,
    total
from tot,
    avge
where total > val;
```

Question 15: Find the sections that had the maximum enrolment in Fall 2009

```
with totl(sec_id, cnt) as (
    select sec_id,
        count(distinct ID)
    from takes
    where semester = 'Fall'
        and year = 2009
```

```
    group by sec_id
),
mx(val) as (
    select max(cnt)
    from totl
)
select sec_id,
    cnt
from totl,
    mx
where cnt = val;
```

Question 16: Select the names of those departments where the total credits earned by all the students is greater than the total credits earned by all the students in the Finance Department

```
with tot_credits(dept_name, credits) as (
    select dept_name,
        sum(tot_cred)
    from student
    group by dept_name
),
fin_tot(val) as (
    select sum(tot_cred)
    from student
    where dept_name = 'Finance'
)
select dept_name,
    credits
from tot_credits,
    fin_tot
where credits > val;
```

Question 17: Delete all the instructors of Finance department.

```
savepoint q17;
```

```sql
delete from instructor
where dept_name = 'Finance';
```

Question 18: Delete all courses in CSE department.

```sql
delete from takes
where course_id in (
        select course_id
        from takes
            natural join course
        where dept_name = 'Comp. Sci.'
    );
delete from teaches
where course_id in (
        select course_id
        from teaches
            natural join course
        where dept_name = 'Comp. Sci.'
    );
delete from prereq
where course_id in (
        select course_id
        from prereq
            natural join course
        where dept_name = 'Comp. Sci.'
    )
    or prereq_id in (
        select c.course_id
        from prereq p,
            course c
        where dept_name = 'Comp. Sci.'
            and p.prereq_id = c.course_id
    );
delete from course
where dept_name = 'Comp. Sci.';
```

Question 19: Transfer all the students from CSE department to IT department.

```
update student
set dept_name = 'Physics'
where dept_name = 'Comp. Sci.';
```

Question 20: Increase salaries of instructors whose salary is over $100,000 by 3%, and all others receive a 5% raise

```
update instructor
set salary = case
        when salary > 100000 then salary * 1.03
        else salary * 1.05
    end;
    rollback;
```