Lab 3 : Dipesh Singh – 190905520

Question 1 :

Find courses that ran in Fall 2009 or in Spring 2010

```
(
    select course_id
    from section
    where semester = 'Fall'
        and year = 2009
)
union
(
    select course_id
    from section
    where semester = 'Spring'
        and year = 2010
);
```

Question 2 :

Find courses that ran in Fall 2009 and in spring 2010

```
(
    select course_id
    from section
    where semester = 'Fall'
        and year = 2009
)
intersect
(
    select course_id
    from section
    where semester = 'Spring'
        and year = 2010
);
```

Question 3 :

Find courses that ran in Fall 2009 but not in Spring 2010

```
(
    select course_id
    from section
    where semester = 'Fall'
        and year = 2009
)
minus
(
    select course_id
    from section
    where semester = 'Spring'
        and year = 2010
);
```

Question 4 :

Find the name of the course for which none of the students registered.

```
select title
from course
where course_id not in (
        select unique course_id
        from takes
    );
```

Question 5 :

Find courses offered in Fall 2009 and in Spring 2010.

```
select course_id
from section
where semester = 'Fall'
    and year = 2009
    and course_id in (
        select course_id
```

```
        from section
        where semester = 'Spring'
            and year = 2010
    );
```

Question 6 :

Find the total number of students who have taken course taught by the instructor with ID 10101.

```
select count(unique C.ID) as cnt
from takes C
where course_id in (
        select course_id
        from teaches T
        where T.ID = 10101
    );
```

Question 7 :

Find courses offered in Fall 2009 but not in Spring 2010.

```
select course_id
from section
where semester = 'Fall'
    and year = 2009
    and course_id not in (
        select course_id
        from section
        where semester = 'Spring'
            and year = 2010
    );
```

Question 8 :

Find the names of all students whose name is same as the instructor's name.

```
select name
from student S
```

```
where name in (
        select all name
        from instructor I
        where I.name = S.name
    );
```

Question 9 :

Find names of instructors with salary greater than that ofsome (at least one) instructorin the Biology department.

```
select name
from instructor
where salary > some(
        select salary
        from instructor
        where dept_name = 'Biology'
    );
```

Question 10 :

Find the names of all instructors whose salary is greater than the salary of all instructors in the Biology department.

```
select name
from instructor
where salary > all(
        select salary
        from instructor
        where dept_name = 'Biology'
    );
```

Question 11 :

Find the departments that have the highest average salary.

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

```
    group by dept_name
),
max_avg(val) as (
    select max(val)
    from avg_sal
)
select dept_name
from avg_sal a,
    max_avg b
where a.val = b.val;
```

Question 12 :

Find the names of those departments whose budget is lesser than the average salary of all instructors.

```
select dept_name
from department
where budget < all(
        select avg(salary)
        from instructor
    );
```

Question 13 :

Find all courses taught in both the Fall 2009 semester and in the Spring 2010 semester.

```
select course_id
from section S
where semester = 'Spring'
    and year = 2010
    and exists(
        select course_id
        from section T
        where semester = 'Fall'
            and year = 2009
            and T.course_id = S.course_id
```

```
    );
```

Question 14 :

Find all students who have taken all courses offered in the Biology department.

```
select distinct S.ID,
    S.name
from student S
where not exists(
        (
            select course_id
            from course
            where dept_name = 'Biology'
        )
        minus
        (
            select T.course_id
            from takes T
            where S.ID = T.ID
        )
    );
```

Question 15 :

Find all courses that were offered at most once in 2009.

```
select course_id
from (
        select course_id,
            count (*) count
        from section
        where section.year = 2009
        group by course_id
    )
where count = 1;
```

Question 16 :

Find all the studentswho have opted at least two courses offered by CSE department.

```
select ID
from (
        select ID,
            count(*) as c
        from takes
            natural join course
        where dept_name = 'Comp. Sci.'
        group by ID
    )
where c >= 2;
```

Question 17 :

Find the average instructors salary of those departments where the averagesalary 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 18 :

Create a view all_courses consisting of course sections offered by Physics department in the Fall 2009, with the building and room number of each section.

```
create view all_courses as (
    select course.course_id,
        sec_id,
        building,
```

```
        room_number
    from course,
        section
    where course.course_id = section.course_id
        and course.dept_name = 'Physics'
        and section.semester = 'Fall'
        and section.year = 2009
);
```

Question 19 :

Select all the courses from all_courses view.

```
select *
from all_courses;
```

Question 20 :

Create a view department_total_salary consisting of department name and total salary of that department.

```
create view department_total_salary as (
    select dept_name,
        sum(salary) as total_sal
    from instructor
    group by dept_name
);
select *
from department_total_salary;
```