Database Schema is the same as Q5 in HW2

```sql
# 12
SELECT t2.deptid,
        SUM(if (t2.size = "large",1,0)) gLarge,
        SUM(if (t2.size = "medium",1,0)) gMedium,
        SUM(if (t2.size = "small",1,0)) gSmall
FROM(
    SELECT t1.deptid, t1.size, t1.section
    FROM(
        SELECT DISTINCT C.deptid, C.cid, E.section, COUNT(E.sid) AS scount,
        if (scount < 30, "small",
        if (scount > 30 and scount < 80, "medium",
        if (scount > 80, "large",Null))) AS size
        FROM enrollment E
        group by C.cid, C.section
        join courses C USING (cid)) t1
    group by t1.deptid, t1.size) t2
group by t2.deptid;
```

```sql
# 13
SELECT  P.pname
FROM Professor P
LEFT JOIN (SELECT t2.deptid,
                SUM(if (t2.size = "large",1,0)) gLarge,
                SUM(if (t2.size = "medium",1,0)) gMedium,
                SUM(if (t2.size = "small",1,0)) gSmall
            FROM(
                SELECT t1.deptid, t1.size, t1.section
                FROM(
                    SELECT DISTINCT C.deptid, C.cid, E.section, COUNT(E.sid) AS scount,
                    if (scount < 30, "small",
                    if (scount > 30 and scount < 80, "medium",
                    if (scount > 80, "large",Null))) AS size
                    FROM enrollment E
                    group by C.cid, C.section
                    join courses C USING (cid)) t1
                group by t1.deptid, t1.size) t2
            group by t2.deptid) t3 USING (deptid)
WHERE P.pname IN (SELECT P.pname
                    FROM professor P
                    group by P.deptid
                    HAVING (COUNT(p.deptid)>20) and gLarge >gSmall+gMedium);
```

```sql
# 14
SELECT t2.cid, t2.section, fail*100/tot AS percentage
FROM(
    SELECT t1.cid,t1.section,t1.tot,count(t1.sid) as fail
    FROM
        (SELECT DISTINCT E.cid, E.section,E.sid, E.grade,count(sid) as tot
        FROM enrollment E
        group by E.section,E.cid) AS t1
    WHERE t1.grade in ('D', 'F')) AS t2;
```

```sql
# 15
SELECT DISTINCT t3.pname
FROM(
    SELECT DISTINCT t2.cid, t2.section, fail*100/tot AS percentage, t2.SSN, P.pname
    FROM(
        SELECT DISTINCT t1.cid,t1.section,t1.tot,t1.SSN, count(t1.sid) as fail
        FROM(
            SELECT DISTINCT E.cid, E.section,E.sid, E.grade,count(E.sid) as tot,T.SSN
            FROM enrollment E
            JOIN teaches T ON E.cid=T.cid AND E.section=T.section) AS t1
        WHERE t1.grade in ('D', 'F')) AS t2
    JOIN professors P ON P.SSN = t1.SSN) AS t3
HAVING MAX(t3.percentage);
```

```sql
# 16
SELECT SUM(if(E.grade='D' or 'F',1,0))/COUNT(E.sid) AS percentage
FROM enrollment E;
```

```sql
# 17
SELECT cid, section
FROM(
    SELECT E.cid, E.section, SUM(if(E.grade='D' or 'F',1,0))/COUNT(E.sid) AS sec_percentage
    FROM enrollment E
    GROUP BY E.cid, E.section) t1
    JOIN (SELECT SUM(if(E.grade = 'D' or 'F',1,0))/COUNT(E.sid) AS avg_percentage
            FROM enrollment E) t2
    WHERE sec_percentage > avg_percentage;
```

```sql
# 18
SELECT t1.deptid,SUM(d1.count)/COUNT(*) AS SPS,
                SUM(if(d1.grade = 'A', t1.count, 0))/SUM(t1.count) AS '% A',
                SUM(if(d1.grade = 'B', t1.count, 0))/SUM(t1.count) AS '% B',
                SUM(if(d1.grade = 'C', t1.count, 0))/SUM(t1.count) AS '% C',
                SUM(if(d1.grade = 'D', t1.count, 0))/SUM(t1.count) AS '% D',
                SUM(if(d1.grade = 'F', t1.count,0))/SUM(t1.count) AS '% F'
FROM(
```

```sql
FROM(
    SELECT DISTINCT C.deptid, E.cid, E.section, E.grade, COUNT(E.sid) AS count
    FROM enrollment E
    JOIN Courses C ON C.cid=E.cid
    GROUP BY E.cid, E.section, E.grade) AS t1
GROUP BY t1.deptid;
```