

Homework 3

CS 336

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1.

CREATE TABLE students

```
( sid          INT,
  name         VARCHAR(20),
  age          INT,
  gpa          FLOAT,
  PRIMARY KEY (sid));
```

CREATE TABLE courses

```
( cid          VARCHAR(15),
  deptid       VARCHAR(15),
  name         VARCHAR(30),
  PRIMARY KEY (cid));
```

CREATE TABLE professors

```
( ssn          INT,
  name         VARCHAR(30),
  address      VARCHAR(50),
  phone        VARCHAR(15),
  deptid       VARCHAR(15),
  PRIMARY KEY (cid));
```

CREATE TABLE enrollment

```
( sid          INT,
  cid          VARCHAR(15),
  section      INT,
  grade        VARCHAR(3),
  PRIMARY KEY(sid, cid),
  FOREIGN KEY(sid) REFERENCES students,
  FOREIGN KEY(cid) REFERENCES courses,
  FOREIGN KEY(cid, section) REFERENCES teaches);
```

CREATE TABLE teaches

```
( cid          VARCHAR(15),
  section      INT,
  ssn          INT,
  PRIMARY KEY(cid, section),
  FOREIGN KEY(cid) REFERENCE courses,
  FOREIGN KEY(ssn) REFERENCES professors);
```

```

2. SELECT DISTINCT p.name
   FROM   teaches t,
          courses c,
          professors p
  WHERE  p.ssn = t.ssn,
        AND   t.cid = c.cid,
        AND   c.deptid = 'cs';

```

```

3. SELECT DISTINCT s.sid
   FROM   students s,
          enrollment e,
          courses c
  WHERE  s.sid = e.sid,
        AND   e.cid = c.cid,
        AND   c.deptid = 'cs';

```

```

4. SELECT DISTINCT p.ssn, p.name
   FROM   teaches t,
          courses c,
          professors p
  WHERE  p.deptid = 'cs',
        AND   t.cid = c.cid,
        AND   p.ssn = t.ssn,
        AND   c.cid NOT IN(
            SELECT  c.cid
            FROM    courses
            WHERE   c.deptid = 'cs'
        )
;

```

```

5. SELECT      c.deptid,
              COUNT(cid)
   FROM        courses c
  GROUP BY    c.deptid;

```

```

6. SELECT  t1.deptid,
FROM(
t1: SELECT      c.deptid,
              COUNT(cid)
   FROM        courses c
  GROUP BY    c.deptid
)
WHERE      t1.COUNT(cid) > 10;

```

7. SELECT DISTINCT s.name

```
FROM    professors p,
        students s,
        enrollment e,
        teaches t
WHERE   s.sid = e.sid
AND     t.ssn = p.ssn
AND     e.section = t.section
AND     p.name LIKE 'M%';
```

8. SELECT c.deptid,
 IF (COUNT(sid) < 30, 'Small',
 IF (COUNT(sid) >= 30 AND COUNT(sid) < 80, 'Medium',
 IF (COUNT(cid) >=80, 'Large'))))
FROM enrollment e,
 course c
WHERE e.cid = c.cid
GROUP BY c.cid e.section

9.SELECT p1.name, p1.deptid,
 t2.small, t2.medium, t2.large
FROM professors p1,
(t3: SELECT p.deptid
 count(*) num_of_profs
FROM professors p
GROUP BY p.deptid
)
(
 SELECT t1.deptid
 SUM(if(t1.size="small",1,0) small,
 SUM(if(t1.size="medium",1,0) medium,
 SUM(if(t1.size="large",1,0) large
FROM
(t1: SELECT c.deptid,
 e.cid,
 e.section,
 count(cid) num_of_students,
 IF (count(cid)<40, 'small',
 IF (count(cid)<80, 'medium', 'large'))
FROM courses c,
 enrollment e
WHERE e.cid = c.cid
GROUP BY c.deptid, e.cid, e.section
)

```

t2: GROUP BY    t1.deptid
)
WHERE          p1.deptid = t3.deptid
AND            p1.deptid = t2.deptid;
AND            t2.large > t2.small + t2.medium,
AND            t3.num_of_profs > 20,

```

10.

```

SELECT          t1.section,
                ((t1.num_of_fail)*(100)/(t1.num_of_students)) percent_of_failed
FROM
(t1:  SELECT      e.cid,
                count(*) num_of_students,
                e.section,
                SUM(if(e.grade="D" OR e.grade="F",1, 0)
                num_of_fail
                FROM      enrollment e
                GROUP BY   e.section
                )
GROUP BY        t1.cid, t1.section;

```

11.

```

SELECT  p.name
FROM
        professors p,
        teaches t,
        (SELECT  t1.cid,
                t1.section,
                ((t1.num_of_fail)* (100)/(t1.num_of_Sstudents)) percent_of_failed
FROM(t1: SELECT  e.cid,
                e.section,
                count(*) num_of_students,
                SUM(if(e.grade="A" OR e.grade="B" OR e.grade="C",1, 0)
                Num_of_pass,
                SUM(if(e.grade="D" OR e.grade="F",1, 0)
                Num_of_fail,
                FROM      enrollment e
                GROUP BY   e.cid, e.section
                )
        t2: GROUP BY    t1.cid, t1.section
        )
WHERE  p.ssn = t.ssn,
AND    t.cid = t2.cid,
AND    t.section = t2.section,

```

AND t2.percentFailed = (SELECT MAX(percent_of_failed)FROM t2);

12. (SELECT ((SUM(t1.num_of_fail)*(100))/(SUM(t1.num_of_students)) ave_percent_failed
FROM

```
(t1: SELECT      e.cid,
                e.section,
                count(*) num_of_students,
                SUM(if(e.grade="A" OR e.grade="B" OR e.grade="C",1, 0)
                num_of_pass,
                SUM(if(e.grade="D" OR e.grade="F",1, 0)
                Num_of_fail,
FROM      enrollment e
GROUP BY  e.cid, e.section
)
```

13. SELECT t2.section
FROM

```
(
    SELECT      t1.cid,
                t1.section,
                ((t1.num_of_fail)* (100))/(t1.numStudents)) percent_of_failed
FROM
(t1: SELECT      e.cid,
                e.section,
                count(*) num_of_students,
                SUM(if(e.grade="A" OR e grade="B" OR e.grade="C",1, 0)
                num_of_pass,
                SUM(if(e.grade="D" OR e.grade="F",1, 0)
                num_of_fail,
FROM      enrollment e
GROUP BY  e.cid, e.section
)
t2: GROUP BY    t1.cid, t1.section)
WHERE      t2.percent_of_failed >
(
    SELECT  AVG(percent_of_failed)
FROM t2);
```

14.

```
SELECT      t1.deptid,
            AVG(t1.numStudents) SPS,
            ((t1.num_of_F)*(100)/(t1.num_of_students)) % F,
            ((t1.num_of_D)*(100)/(t1.num_of_students)) % D,
            ((t1.num_of_C)*(100)/(t1.num_of_students)) % C,
```

```

        ((t1.num_of_B)*(100)/(t1.num_of_students)) % B,
        ((t1.num_of_A)*(100)/(t1.num_of_students)) % A
FROM
(t1: SELECT      c.deptid,
                 e.cid,
                 e.section,
                 count(*) num_of_students,
                 SUM(if(e.grade="F",1, 0) num_of_F,
                 SUM(if(e.grade="D",1, 0) num_of_D,
                 SUM(if(e.grade="C",1, 0) num_of_C,
                 SUM(if(e.grade="B",1, 0) num_of_B,
                 SUM(if(e.grade="A",1, 0) num_of_A,
        WHERE      e.cid = c.cid
        GROUP BY   c.deptid, e.cid, e.section
    )
GROUP BY         t1.deptid;

```