

```
1/a create table faculty (
    fid int,
    fname varchar(20),
    dept varchar(10),
    primary key (fid)
);

create table student (
    snum int,
    sname varchar(20),
    major varchar(10),
    age int,
    gpa float,
    primary key (snum)
);

create table enrolled (
    snum int,
    cname varchar(20),
    primary key (snum, cname),
    foreign key (snum) references student (snum),
    foreign key (cname) references class (cname)
);

create table class (
    cname varchar(10),
    meets_at time,
    room varchar(10),
    fid int,
    primary key (cname),
    foreign key (fid) references faculty (fid)
);
```

b) student - faculty - class - enrolled

- 2) select s.sname
from student s
where s.major = 'cs'
and s.name like 'M%' ;
- 3) select s.sname
from student s
where s.age > (
 select s.age
 from student s
 where s.name = 'Gwolde') ;
- 4) select s.sname
from student s
where s.age < all (
 select s.age
 from student s
 where s.name like 'Z%') ;
- 5) select f.fname
from faculty f
where f.fid Not in (
 select c.fid
 from class c) ;
- 6) select f.fname
from faculty f
join class c
on f.fid = c.cid
join enrolled e

on c.name = e.name
join student s
on e.snum = s.snum
where s.major = 'music'
intersect
select f.fname
from faculty f
join class c
on f.fid = c.cid
join enrolled e
on c.name = e.name
join student s
on e.snum = s.snum
where s.major = 'cs';

7/a) create temporary table t1
select count(*) as num, e cname
from enrolled e
group by e cname;
select t1 cname
from t1
where t1 num in (
select MAX(t1 num)
from t1);

b) select s.sname
from student s
where s.age < (
select AVG(s.age)
from student s);

8) create temporary table t1

```
select MAX(s.gpa)
from student s
join enrolled e
on s.num = e.num;
select f.fname, t1.gpa
from t1
join faculty f
on f.fid = t1.fid;
```

9) select f.fname, count(*) as 'Number of classes'

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from faculty f left outer join class c
group by f.fname;
```

10) Thename, age (δ cname = 'database' (student \bowtie enrolled))

11) T1 = Π cname (\exists major = 'cs' (enrolled \bowtie student))

\cap Π cname (\exists major = 'music' (enrolled \bowtie student))

Π fname (faculty \bowtie (T1 \bowtie class))

12) T2 = Π cname (\exists major = 'cs' (enrolled \bowtie student))

- Π cname (\exists major = 'music' (enrolled \bowtie student))

Π fname (faculty \bowtie (T2 \bowtie class))