For the following SQL schema:

create table Building (

id int primary key,

address varchar(5000) not null

) engine=InnoDB;

create table Apartment (

id int primary key,

number varchar(31) not null,

building int not null references Building(id)

on update cascade on delete cascade

) engine=InnoDB;

create table RoomType (

id int primary key,

description varchar(5000)

) engine=InnoDB;

create table RoomTypeName (

type int references RoomType(id)

on update cascade on delete cascade,

name varchar(255),

primary key(type, name)

) engine=InnoDB;

create table Room (

id int primary key,

area double not null,

type int not null references RoomType(id)

on update cascade,

apartment int not null references Apartment(id)

on update cascade on delete cascade

) engine=InnoDB;

create table ApartmentFloor (

apartment int references Apartment(id)

on update cascade on delete cascade,

floor int,

primary key(apartment, floor)

) engine=InnoDB;

create table Person (

id int primary key,

name varchar(5000) not null

) engine=InnoDB;

create table Owner (

person int references Person(id)

on update cascade on delete cascade,

apartment int references Apartment(id)

on update cascade on delete cascade,

primary key(person, apartment)

) engine=InnoDB;

alter table Building

add constraint BuildingId foreign key(id) references Apartment(building);

alter table RoomType

add constraint RoomTypeId foreign key(id) references RoomTypeName(type);

Show how to do the following using SQL:

1. Change the owners of Apartment 2C in the building at 100 Main Street to George and Fred.
2. Find the addresses of all buildings that have a Living Room with area greater than 1000 s.f. owned by Fred in an apartment on the fifth floor or higher.
3. Find all apartments, showing the address and apartment number that have 3 or more rooms with the same type.
4. List the buildings in order by address together with the number of apartments in each building.

**CS 5200 Introduction to Database Management  
Solution to Homework #3**

1. This requires two commands: delete existing owners, then insert new ones. There can be more than one building at 100 Main Street and more than one apartment numbered 2C. There could also be more than one person named Fred and more than one person named George.
2. delete from Owner where exists (
3. select \*
4. from Apartment a, Building b
5. where apartment = a.id
6. and a.building = b.id
7. and a.number = '2C'
8. and b.address = '100 Main Street'
9. );
10. insert into Owner(person, apartment)
11. select p.id, a.id
12. from Person p, Apartment a, Building b
13. where (p.name = 'Fred' or p.name = 'George')
14. and a.number = '2C'
15. and a.building = b.id
16. and b.address = '100 Main Street';
17. This is the long form. The "distinct" is not required.
18. select distinct b.address
19. from Building b, Apartment a, Room r, RoomType t,
20. RoomTypeName n, ApartmentFloor f, Owner o, Person p
21. where b.id = a.building
22. and a.id = r.apartment
23. and r.type = t.id
24. and t.id = n.type
25. and a.id = f.apartment
26. and a.id = o.apartment
27. and o.person = p.id
28. and r.area > 1000
29. and n.name = 'Living Room'
30. and f.floor >= 5
31. and p.name = 'Fred';

Here is the short form. One can omit the RoomType:

select distinct b.address

from Building b, Apartment a, Room r, RoomTypeName n,

ApartmentFloor f, Owner o, Person p

where b.id = a.building

and a.id = r.apartment

and r.type = n.type

and a.id = f.apartment

and a.id = o.apartment

and o.person = p.id

and r.area > 1000

and n.name = 'Living Room'

and f.floor >= 5

and p.name = 'Fred';

1. The 3 rooms must have the same type. So rephrase the query as find apartments such that there exists a room type such that the apartment has 3 or more rooms with that type.
2. select b.address, a.number
3. from Building b, Apartment a
4. where b.id = a.building
5. and exists (
6. select \*
7. from RoomType t
8. where 3 >= (select count(\*)
9. from Room r
10. where r.type = t.id
11. and r.apartment = a.id)
12. );
13. Group by building primary key and order by the address. Some databases are not smart enough to figure out that address is constant in the b.id groups. For these, one must group by both b.id and b.address.
14. select b.address, count(\*)
15. from Building b, Apartment a
16. where b.id = a.building
17. group by b.id

order by b.address;