Practice Questions

Consider the following tables.

```
student                 enrolledIn                  subject
   id  |   name            id     |    code           code   | lecturer
------------------------    ---------------------------     ------------------------------------
  1234 |   joe            1234    |   cs1500          cs1500 |   curtis
  4000 |  hector          1234    |   cs1200          cs2001 |   dave
  2000 |   ling           1234    |   cs2001          cs3010 |   curtis
                          4000    |   cs3010          cs2001 |   olivier
                          4000    |   ma3000          ma3000 |   roger
```

Figure out which relational algebra operations were used to obtain each of the following tables.

```
1.
  name
-------------
  joe
  hector
  ling
```

```
2.
lecturer
-------------
  curtis
  dave
  olivier
  roger
```

```
3.
   code  | lecturer
-------------------------------
  cs3010 |   curtis
  cs1500 |   Curtis
```

There are two ways to get this table. Try to list both. *Hint*: Use an OR in the selection condition for one method.

4.
```
     id  |  name
 -------------------------
    1234 |  joe
    4000 | hector
```

There are three ways to get this table.

5.
```
     id  |  name  |   id    |   code
-----------------------------------------------------------------------
    1234 |  joe   |  1234   |   cs1500
    1234 |  joe   |  1234   |   cs1200
    1234 |  joe   |  1234   |   cs2001
    1234 |  joe   |  4000   |   cs3010
    1234 |  joe   |  4000   |   ma3000
```

6.
```
     id  |  name  |   id    |   code
-----------------------------------------------------------------------
    1234 |  joe   |  1234   |   cs1500
    1234 |  joe   |  1234   |   cs1200
    1234 |  joe   |  1234   |   cs2001
```

7.
```
     id  |  name  |   code
--------------------------------------------------------
    1234 |  joe   |   cs1500
    1234 |  joe   |   cs1200
    1234 |  joe   |   cs2001
```

8.
```
     id  |   code
------------------------------------
    1234 |   cs1500
    1234 |   cs1200
    1234 |   cs2001
```

9.
```
     id  |  name  |   code    | lecturer
 ----------------------------------------------------------------------
    4000 | hector |   cs3010  |   curtis
    4000 | hector |   ma3000  |   roger
```

10.
```
    name   |   lecturer
------------------------------------
    joe    |   curtis
   hector  |   curtis
```

Formulating Queries in Relational Algebra

Give the following queries in the relational algebra using the relational schema

```
student(id, name)
enrolledIn(id, code)
subject(code, lecturer)
```

1. What are the names of students enrolled in cs3020?

2. Which subjects is Hector taking?

3. Who teaches cs1500?

4. Who teaches cs1500 or cs3020?

5. Who teaches at least two different subjects?

6. What are the names of students in cs1500 or cs3010?

7. What are the names of students in both cs1500 and cs1200?

8. What are the names of students in at least two different subjects?

9. What are the codes of all the subjects taught?

10. What are the names of all the students?

11. What are the names of all the students in cs1500?

12. What are the names of students taking a subject taught by Roger.

13. What are the names of students who are taking a subject *not* taught by Roger?