Question 9 (10 marks)

Consider the following transactions:

```
T1:  R(X)  R(Y)  W(X)  W(Y)
T2:  W(X)  R(Y)
T3:  R(Y)  R(X)  W(Y)
```

Note that above is *not* a schedule; it simply gives the sequence of read/write operations for each transaction. We assume that all transactions eventually commit successfully.

Using the transactions above, answer the following questions:

a. Add appropriate lock/unlock operations for a two-phase locking strategy.

b. Give a possible schedule that might arise from executing the transactions defined in part (a).

c. Add lock/unlock operations which are definitely *not* based on two-phase locking.

d. Give a po transactions defined in part (c).

In answering the questions above ...

- show lock operations as follows:
  - *Lr(X)* = a request for a read-lock on the object *X*
  - *Lw(X)* = a request for a write-lock on the object *X*
  - *U(X)* = a request to release the lock currently held on object *X*
- use the following notation in giving schedules:
  - write them with time increasing left-to-right, and with each transaction on a separate line
  - each column should contain only one operation (i.e. only one operation executes at a given point in time)
  - indicate a delay waiting on a lock by a dotted line from the lock request until the operation that is eventually executed when the lock is acquired

In other words, use the same kind of notation that is used on pages I-67 and I-69 of the Course Notes.

- in giving possible schedules, you may use any order of operations that you wish, provided that
- there is some overlap between the transaction operations
- the order is consistent with the operations within each transaction
- the order follows what would be induced by your lock operations

Show all working.

Instructions:

- Type your answer to this question into the file called `q9.txt`
- Submit via: **`give cs9315 sample_q9 q9.txt`**
  or via: Webcms3 > exams > Sample Exam > Submit Q9 > Make Submission

End of Question