CS250/219 Database Systems: Ex 8

Problem 1. [2013 Exam] The following is an incomplete schedule of transactions T1 and T2. Add the appropriate locking statements so that (i) the resulting schedule conforms to the two phase locking protocol (with lock conversions), and (ii) all the transactions can execute until the end.

The possible locking statements for you to add are:
lock-S(v) : apply a shared lock on variable v
lock-X(v) : apply an exclusive lock on variable v
upgrade(v) : upgrade a shared lock to an exclusive lock on variable v
unlock(v) : release the lock on variable v

T1	T2
Read (A)	
	Read (A)
	Write(B)
Write (A)	
	Commit
Read (C)	
Commit	

Problem 2. Which of the following schedules is conflict serialisable? Explain your answer by rearranging non-conflict operations to achieve a serial schedule.

T1	T2	T3
	Read(Q)	
Read(P)		
	Write(Q)	
Read(Q)		
		Read(T)
		Write(T)
	Read(P)	
		Read(Q)
	Write(P)	

(a)

T1	T2
	Read(X)
	X--
	Write(X)
Read(Y)	
Y=Y+5	
Write(Y)	
	Read(Y)
	Y++
	Write(Y)

(b)

Problem 3. A database system has just failed, and you are given a recovery log. Use write-ahead log-based recovery with checkpoint to recovery the data. Describe your recovery operations, namely 1) which transactions should be undone and/or redone? 2) how do you find them? 3) describe the undo and/or redo operations. (continue on next page)

<T1 start>
<T2 start>
<T1, x, 1, 2>
<T1 commit>
<T2, y, 1, 3>
<T3 start>
<T3, x, 2, 3>
<checkpoint {T2, T3}>
<T3, z, 1, 2>
<T3 commit>
Failure

--- END ---