

CSE5024 Advanced Database Systems

Tutorial 3

1. Consider the following transactions being submitted to the concurrency controller. The two-phase locking protocol is used here.

- (a) Under two-phase locking, what could have been the earliest time to do `Unlock(x)` in transaction T1? *[Hint: think of the lock point]*
- (b) Can the execution of this schedule result in a deadlock? *[Hint: use wait-for-graph]*
- (c) If T2 starts later than T1 (i.e., T2 has a larger timestamp than T1), describe what will happen to T1 and T2, using the wound-wait scheme.
- (d) With the same condition (T2 starts later than T1), what will happen to T1 and T2 if the waitdie scheme is used then?

T1	T2
Lock-S(x)	Lock-S(y)
Read(x)	Read(y)
Lock-X(y)	
Write(y)	
Unlock(x)	
Unlock(y)	
	Lock-X(x)
	Write(x)
	Unlock(x)
	Unlock(y)

2. We are using the **optimistic concurrency control** protocol in the following scenario. A transaction T1 has committed, while T2 has just started the validation phase. By using the information below, explain what

happens to T2 after the validation test. (Hint: consider the 3 types of conflicts between T1 and T2.)

	Start time	Validation time	Finish time	Readset items	Writeset items
T1	0	8	18	{e, f, g}	{a, b, e}
T2	4	20		{c, d, f}	{a, b, f}

3. Suppose that $TS(T1) < TS(T2) < TS(T3)$ in the following schedule. What will happen to T1, T2 and T3 under the **timestamp ordering** protocol (with Thomas' writing rule)?

T1	T2	T3
Read(x)		
	Read(y)	
		Write(x)
	Write(x)	
Write(x)		
		Read(y)
	Write(y)	