

Ceng352 - Database Management Systems

Written Assignment 2

Spring 2019

Q1 Transactions $T1$, $T2$, $T3$ are to be run concurrently. The following table gives details of the proposed schedule of read/write operations and the time when each such operation is scheduled.

Time	T1	T2	T3
1		read(C)	
2	read(A)		
3	write(A)		
4		read(A)	
5			read(B)
6			write(B)
7		write(A)	
8		write(C)	
9	write(B)		
10			commit
11		commit	
12	commit		

When answering the following questions, indicate shared locks by s_i and exclusive locks by x_i where i is the transaction number. Also indicate the operations of transactions as $R_i(X)$ and $W_i(X)$ for read and write operations respectively where i is the transaction number and X is a data item.

- (a) Describe how the **strict two-phase locking with deadlock detection** would handle the schedule by filling in the following table.

Operation	Given LOCKS on data items			Wait for graph
	A	B	C	

- (b) Describe how the **strict two-phase locking with wound wait deadlock prevention** would handle the schedule. Assume that $TS(T1) = 1$, $TS(T2) = 2$, $TS(T3) = 3$.

Operation	Given LOCKS on data items			Wait for graph
	A	B	C	

Q2 Consider the schedule H below. The symbol $r_i(x)$ stands for a read by transaction T_i to item x and $w_i(x)$ stands for a write by T_i to item x . Suppose **timestamp-based scheduler** is used as the concurrency control protocol.

$$H : r_1(A)r_2(B)w_1(C)r_3(B)r_3(C)w_2(B)w_3(A)$$

Describe what happens as each operation below executes if

(a) $TS(T1) = 1, TS(T2) = 2, TS(T3) = 3$

(b) $TS(T1) = 1, TS(T2) = 3, TS(T3) = 2$

Justify whether each operation is accepted or rejected, and show how the RTS and WTS timestamps of the data items are updated in each step.

Note: If an access is rejected, its parent transaction is aborted; so you can ignore (remove from the schedule) all the subsequent accesses by that transaction)

(a) $TS(T1) = 1, TS(T2) = 2, TS(T3) = 3$

Operation	A		B		C	
	RTS	WTS	RTS	WTS	RTS	WTS

(b) $TS(T1) = 1, TS(T2) = 3, TS(T3) = 2$

Operation	A		B		C	
	RTS	WTS	RTS	WTS	RTS	WTS
