Assignment 4: Concurrency and OLAP

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1 Problem 1: Serializability and 2PL

1.1 Yes/No Questions

Questions

1. All serial transactions are both conict serializable and view serializable.
2. For any schedule, if it is view serializable, then it must be conict serializable.
3. Under 2PL protocol, there can be schedules that are not serial.
4. Any transaction produced by 2PL must be conict serializable.
5. Strict 2PL guarantees no deadlock.

Answers

1. Yes
2. No
3. Yes
4. No
5. No

1.2 Serializability

Time	T_1	T_2	T_3
1			$R(A)$
2			$W(A)$
3	$R(A)$		
4	$W(A)$		
5		$R(B)$	
6		$W(B)$	
7	$R(C)$		
8	$W(C)$		
9			$R(C)$
10			$W(C)$
11			$R(B)$
12			$W(B)$

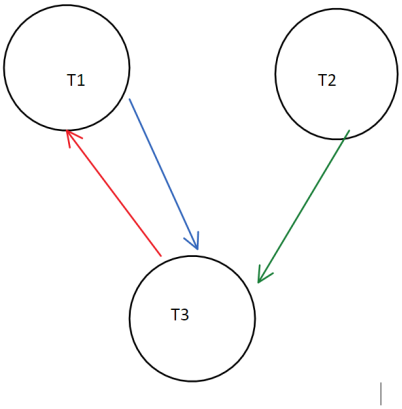
Figur 1: Serializability Schedule, S1

Questions and given schedule

1. Is this schedule serial?
2. Give the dependency graph of this schedule.
3. Is this schedule conict serializable?
4. If you answer yes to the previous question, provide the equivalent serial schedule. If you answer no, briey explain why.
5. Could this schedule have been produced by 2PL?

Answer 1 No, because transactions are strated before running transactions are completed. For instance transaction T_2 starts before T_1 has ended.

Answer 2



Answer 3 No, because a schedule is conflict serializable if and only if the graph is acyclic. However, the graph contains a cycle between T1 and T3.

Answer 4 Not answered since no was stated in the answer above.

Answer 5 Yes it could have been produced by 2PL, because it is View Serializable. It is View Serializable because it is View Equivalent to the following schedule *S2*:

S2

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

Figur 2: Serializability Schedule, S2

and as such it upholds the 2PL Protocol's guarantee of serializability.