

PRACTICE PROBLEM SET #10

CSC 261/461 (Database Systems), Spring 2018,
University of Rochester

Problem 1

Apply Shared lock S(A) or exclusive lock E(A) on any object A as per Strict 2PL technique. Draw wait-for graphs for each schedule. Indicate if the schedule will cause deadlock.

T_1	T_2
R(X)	
	W(X)
R(Y)	
	W(Y)

Draw wait-for graphs

Deadlock? (y/n)

T_1	T_2
R(X)	
	R(Y)
W(Y)	
	W(X)

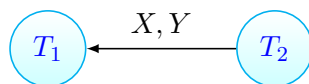
Draw wait-for graphs

Deadlock? (y/n)

Solution:

T_1	T_2
S(X)	
R(X)	
	E(X)
	W(X)
S(Y)	
R(Y)	
	E(Y)
	W(Y)

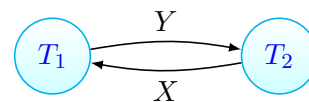
Draw wait-for graphs



Deadlock? No

T_1	T_2
S(X)	
R(X)	
	S(Y)
	R(Y)
E(Y)	
W(Y)	
	E(X)
	W(X)

Draw wait-for graphs



Deadlock? Yes

Problem 2

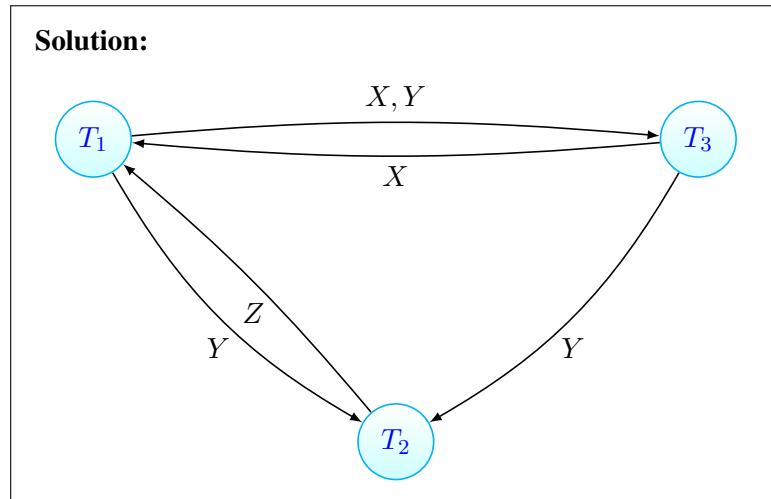
Two schedules (Read (R) and Write (W) operations of three transactions T_1 , T_2 , and T_3) are given. Assume operations are listed in a chronological order.

For both schedules, draw the conflict / precedence / serializability graph. Find an equivalent serial schedule (if any). Justify if no serial schedule is available.

Precedence graph

T_1	T_2	T_3
R(X)		
R(Y)		
W(Y)		
		R(Y)
		R(X)
	R(Z)	
	W(Z)	
		W(Y)
		W(X)
R(Z)		
	R(Y)	
	W(Y)	
W(X)		

Solution:



An equivalent serial schedule (if any)

Solution: No equivalent serial schedule

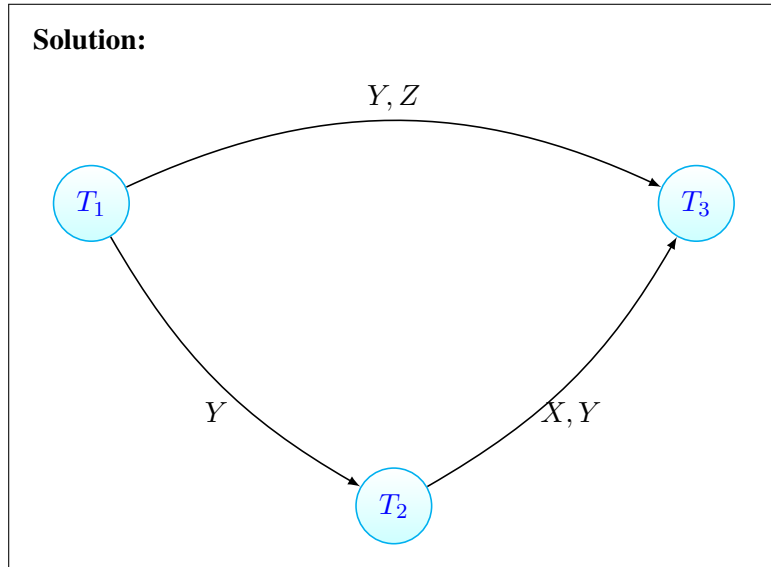
Justify if no equivalent serial schedule is possible.

Solution: Because of cycle

Precedence graph

T_1	T_2	T_3
R(Y)		
R(Z)		
	R(X)	
	W(X)	
W(Y)		
W(Z)		
		R(Z)
	R(Y)	
	W(Y)	
		R(Y)
		W(Y)
		R(X)
		W(X)

Solution:



An equivalent serial schedule (if any)

Solution: $T_1 \rightarrow T_2 \rightarrow T_3$

Justify if no equivalent serial schedule is possible.

Solution: Not applicable