

QUIZ 12 – ICS 321 Fall 2017

Chapter 8 – Transactions. Today we examined transaction scheduling and resource locking.

Exercise 8.1 on page 130 examines a sequence of database transactions interleaved shown on the right.

At time t36 the wait-for graph for tasks waiting for resources is shown below the transactions on the right.

The spreadsheet on the back shows the sequence of transactions and how the resources are requested and allocated.

1. With age as priority for finishing (youngest being the victim to break a deadlock), which task would you choose to terminate and rollback to break the deadlock? (Hint, see the spreadsheet on the back side.)
2. After the deadlock is broken, assume all tasks are through requesting resources, and they all commit as soon as they can execute again. What is the sequence of completion? (Hint, see the spreadsheet on the back side.)
3. At what time period is each resource not used anymore?

- | | |
|----|----|
| a: | e: |
| b: | f: |
| c: | g: |
| d: | h: |

4. What was the last allocation request that closed the loop causing the deadlock?

What Task (T1-T12):

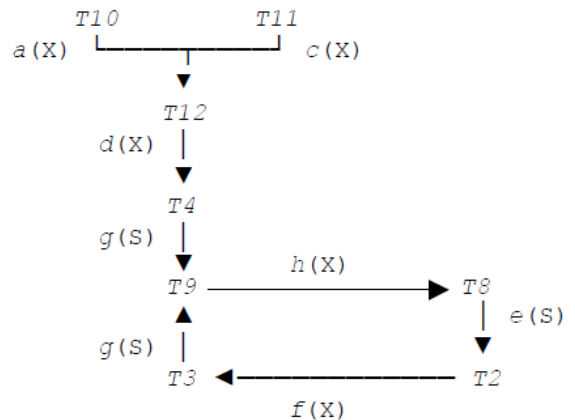
Requesting what Resource (a-h):

With what Function (Retrieve or Update):

At what Time (t01-t36):

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time t00      .....
time t01      (T1)   : RETRIEVE a ;
time t02      (T2)   : RETRIEVE b ;
...           (T1)   : RETRIEVE c ;
...           (T4)   : RETRIEVE d ;
...           (T5)   : RETRIEVE a ;
...           (T2)   : RETRIEVE e ;
...           (T2)   : UPDATE e ;
...           (T3)   : RETRIEVE f ;
...           (T2)   : RETRIEVE f ;
...           (T5)   : UPDATE a ;
...           (T1)   : COMMIT ;
...           (T6)   : RETRIEVE a ;
...           (T5)   : ROLLBACK ;
...           (T6)   : RETRIEVE c ;
...           (T6)   : UPDATE c ;
...           (T7)   : RETRIEVE g ;
...           (T8)   : RETRIEVE h ;
...           (T9)   : RETRIEVE g ;
...           (T9)   : UPDATE g ;
...           (T8)   : RETRIEVE e ;
...           (T7)   : COMMIT ;
...           (T9)   : RETRIEVE h ;
...           (T3)   : RETRIEVE g ;
...           (T10)  : RETRIEVE a ;
...           (T9)   : UPDATE h ;
...           (T6)   : COMMIT ;
...           (T11)  : RETRIEVE c ;
...           (T12)  : RETRIEVE d ;
...           (T12)  : RETRIEVE c ;
...           (T2)   : UPDATE f ;
...           (T11)  : UPDATE c ;
...           (T12)  : RETRIEVE a ;
...           (T10)  : UPDATE a ;
...           (T12)  : UPDATE d ;
...           (T4)   : RETRIEVE g ;
time t36      .....
    
```



t	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	a	b	c	d	e	f	g	h
1	T1	RETRIEVE a											T1-S							
2	T2		RETRIEVE b											T2-S						
3	T1	RETRIEVE c													T1-S					
4	T4			RETRIEVE d												T4-S				
5	T5				RETRIEVE a								T5-S							
6	T2		RETRIEVE e														T2-S			
7	T2		UPDATE e														T2-X			
8	T3		RETRIEVE f															T3-S		
9	T2		RETRIEVE f															T2-S		
10	T5				UPDATE a								T5-X*							
11	T1	COMMIT											T1-R, T5-X		T1-R					
12	T6					RETRIEVE a							T6-S*							
13	T5				ROLLBACK								T5-R, T6-S							
14	T6					RETRIEVE c									T6-S					
15	T6					UPDATE c									T6-X					
16	T7						RETRIEVE g												T7-S	
17	T8							RETRIEVE h												T8-S
18	T9								RETRIEVE g										T9-S	
19	T9								UPDATE g										T9-X*	
20	T8							RETRIEVE e									T8-S*			
21	T7						COMMIT												T7-R, T9-X	
22	T9								RETRIEVE h											T9-S
23	T3		RETRIEVE g																T3-S*	
24	T10									RETRIEVE a			T10-S							
25	T9								UPDATE h											T9-X*
26	T6					COMMIT							T6-R		T6-R					
27	T11										RETRIEVE c				T11-S					
28	T12											RETRIEVE d				T12-S				
29	T12											RETRIEVE c			T12-S					
30	T2	UPDATE f																T2-X*		
31	T11										UPDATE c				T11-X*					
32	T12											RETRIEVE a	T12-S							
33	T10									UPDATE a			T10-X*							
34	T12											UPDATE d				T12-X*				
35	T4			RETRIEVE g															T4-S*	
36	T9							ROLLBACK											T9-R, T3-S, T4-S	T9-R
37	T3		COMMIT															T3-R, T2-X	T3-R	
38	T2	COMMIT												T2-R			T2-R, T8-S	T2-R		
39	T4			COMMIT												T4-R, T12-X			T4-R	
40	T8							COMMIT									T8-R			T8-R
41	T12										COMMIT		T12-R, T10-X		T12-R, T11-X					
42	T10									COMMIT			T10-R							
43	T11										COMMIT				T11-R					