

9/4/18

# concurrency control

T1 lock - X(B);  
read (B);  
B := B - 50;  
write (B);  
unlock (B);  
lock - X(A);  
read (A);  
A := A + 50;  
write (A);  
unlock (A);

T2 : lock - S(A);  
read (A);  
unlock (A);  
lock - S(B);  
read (B);  
unlock (B);  
display (A+B);

T3 : lock - X(B);  
read (B);  
B := B - 50;  
write (B);  
lock - X(A);  
read (A);  
A := A + 50;  
write (A);  
unlock (B);  
unlock (A);

T4 : lock - S(A);  
read (A);  
lock - S(B);  
read (B);  
display (A+B);  
unlock (A);  
unlock (B);

T3	T4
lock - X(B)	
read (B)	
B := B - 50	
write (B)	
	lock - S(A)
	read (A)
	lock - S(B)
lock - X(A)	

Schedule 2

## Granting of locks

$$T_3 \rightarrow X(Q)$$

$$T_2 \rightarrow S(Q)$$

$$T_4 \rightarrow S(Q)$$

$$T_5 \rightarrow S(Q)$$

when a transaction  $T_i$  requests a lock on a data item  $Q$ , in a particular mode  $M$ , the concurrency control manager runs the lock provided that:

- 1) there is no other transaction holding a lock on  $Q$  in a mode that conflicts with  $M$ .
- 2) there is no other transaction that is waiting for a lock on  $Q$ , and that made its lock request before  $T_i$ .

## 2-Phase locking Protocol (2PL)

1. Growing Phase

2. Shrinking phase

lock point - last of the locks being acquired

$$T_1 \rightarrow T_2 \rightarrow T_3$$

Precedence graph

