

**CSE411**  
**Sample questions on Concurrency**

Q.1: Put appropriate lock and find lock status for the following:

T1	T2	T3	Lock status
LOCK-S(A)			GRANT(A, T1)
READ(A)			
	LOCK-S(A)		GRANT(A, T2)
	READ(A)		
		LOCK-X(B)	GRANT(B, T3)
		WRITE(B)	
		LOCK-X(A)	WAIT(A, T3)
		Write (A)	

(a)

T7	T8	T9	Lock status
LOCK-S(A)			GRANT(A, T7)
READ(A)			
	LOCK-X(A)		WAIT(A, T8)
	WRITE(A)		
		LOCK-S(A)	WAIT(A, T9)
		READ(A)	

(b)

T7	T8	T9	Lock status
LOCK-X(A)			GRANT(A, T7)
WRITE(A)			
	LOCK-X(B)		GRANT(B, T8)
	WRITE(B)		
		LOCK-X(C)	GRANT(C, T9)
		WRITE(C)	

Q2: Explain with example a) Lock compatibility matrix, b) Starvation, c) Checkpoint

a. Lock Compatibility Matrix

	S	X
S	true	false
X	false	false

b. Starvation

A transaction may be waiting for an X-lock on an item, while a sequence of other transactions request are granted an S-lock on the same item.

The same transaction is repeatedly rolled back due to deadlocks

Example

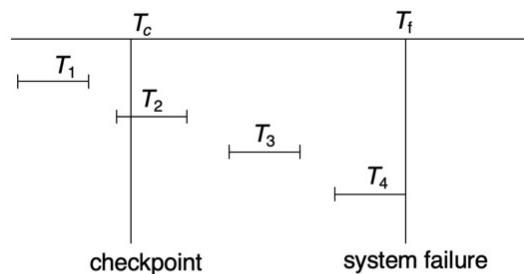
T1	T2	T3	Lock status
LOCK-S(A)			GRANT(A,T1)
READ(A)			
	LOCK-S(A)		GRANT(A,T2)
	READ(A)		
		LOCK-X(A)	WAIT(A,T3)
		WRITE(A)	

Example

T1	T2	T3	T4	LOCK STATUS
READ(P)				GRANT
	WRITE(P)			WAIT
		READ(P)		GRANT
			READ(P)	GRANT

c. checkpoint

### Example of Checkpoints



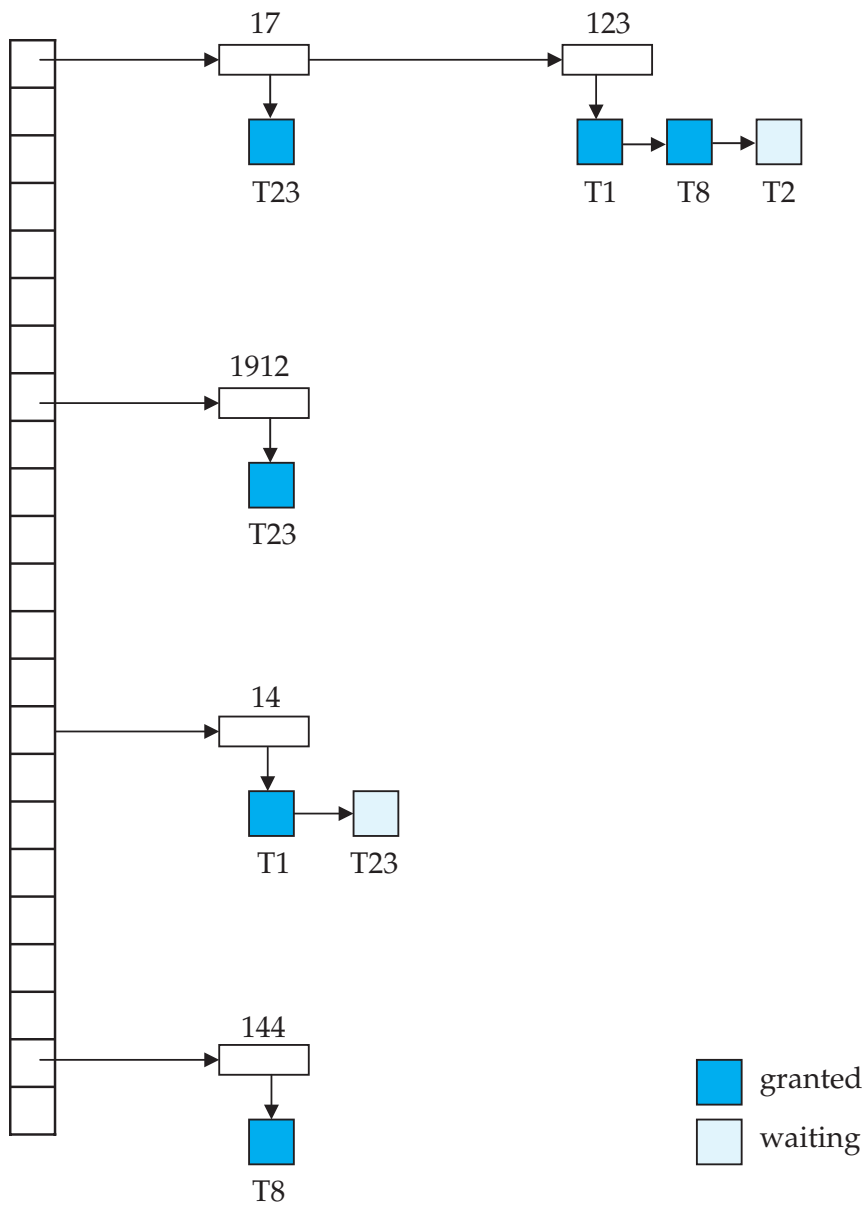
- $T_1$  can be ignored (updates already output to disk due to checkpoint)
- $T_2$  and  $T_3$  redone.
- $T_4$  undone

Q3.

- Find all locks of T1, T23 and status of the locks from the given lock table as follows.
- The transactions and locking status are given as follows:

T1 has 4 locks on A, D, G and K with grant status. T2 has three locks on D, G and K with status grant for all. T3 has 4 locks on A, D, G and K with all waiting status. The hash values for characters A to F is 5 and G to J is 15 and K to N is 10.

Construct the lock table and find the lock type (Lock-X or Lock-S) of T2.



a)

T1	T23	Status
Lock-S(123)		Grant(123, T1)
Read(123)		
	Lock-S(17)	Grant(17, T2)
	Read(17)	

b) Hash-Index

