

CSE 444 Practice Problems

Transactions: Recovery

1. Transactions: recovery

(a) What are STEAL and NO-STEAL policies?

(b) What are FORCE and NO-FORCE policies?

2. UNDO Logging

Consider the content of the following **undo log**:

LSN1	<START T1>
LSN2	<T1 X 5>
LSN3	<START T2>
LSN4	<T1 Y 7>
LSN5	<T2 X 9>
LSN6	<START T3>
LSN7	<T3 Z 11>
LSN8	<COMMIT T1>
LSN9	<START CKPT(T2,T3)>
LSN10	<T2 X 13>
LSN11	<T3 Y 15>
	*C*R*A*S*H*

- Show how far back in the recovery manager needs to read the log. Write below the earliest LSN that the recovery manager reads.

- Show below the actions of the recovery manager during recovery:

- What is the value of X at the end of the recovery ?

3. REDO Logging

After a system crash, the **redo-log** using non-quiet checkpointing contains the following data:

```
< START T1 >
< T1, A, 10 >
< START T2 >
< T2, B, 5 >
< T1, C, 7 >
< START T3 >
< T3, D, 12 >
< COMMIT T1 >
< START CKPT ???? >
< START T4 >
< T2, E, 5 >
< COMMIT T2 >
< T3, F, 1 >
< T4, G, 15 >
< END CKPT >
< COMMIT T3 >
< START T5 >
< T5, H, 3 >
< START CKPT ???? >
< COMMIT T5 >
```

- (a) What are the correct values of the two <START CKPT ????> records? You have to provide two correct values for the two ????.s.

First START CKPT: _____

Second START CKPT: _____

(b) Indicate and **explain** what fragment of the log the recovery manager needs to read.

(c) Assuming that the two `< START CKPT ??? >` records are correctly stored in the log, according to your answer above, show which elements are recovered by the redo recovery manager and compute their values after recovery.

4. Aries

- (a) In the ARIES method, assuming NO checkpoints have been used, explain what happens during the ANALYSIS pass of recovery. Your answer should indicate at least (1) what part of the log the system reads and in what direction and (2) what data structures the system rebuilds.

- (b) After the analysis pass, the protocol performs a REDO pass. Explain (1) where does REDO start reading the log and in what direction it reads the log, (2) what happens during the REDO pass.

- (c) The last pass during recovery is the UNDO pass. Explain (1) where does the UNDO start reading the log and in what direction it reads the log, (2) what happens during the UNDO pass.