

CSE 444: Homework 4

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1 Undo Log

1. (a) T1
T2, T3
T4, T5
- (b) T4: $X_4 \rightarrow 8$
T5: $X_5 \rightarrow 7$
T4: $X_4 \rightarrow 6$
- (c) <START T4> to the end

2 Redo Log

1. (a) T1
T5
- (b) The whole log files needs to be read.
- (c) Redo T1 and T4
T1: $A \rightarrow 15$
T1: $D \rightarrow 5$
T4: $E \rightarrow 10$

3 Aries

1. Write-ahead log:

LSN	TransactionID	prevLSN	type	pageID	log entry	undoNextLSN
1	T1	-	Update	P1	Write A ($A \rightarrow A1$)	-
2	T2	-	Update	P1	Write B ($B \rightarrow B2$)	-
3	T2	2	Update	P2	Write C ($C \rightarrow C3$)	-
4	T2	3	Abort	-	-	-
5	T2	-	CLR	-	Undo T2 LSN 3	2
6	T2	-	CLR	-	Undo T2 LSN 2	-
7	T2	6	END	-	-	-
8	T3	-	Update	P2	Write D ($D \rightarrow D8$)	-
9	T1	1	Commit	-	-	-
10	T1	9	END	-	-	-

: log flushed to disk

Transaction Table:

TransactionID	lastLSN	Status
T3	8	Running

Dirty Page Table:

pageID	recLSN
p1	2
P2	3

P1 is in memory, with value A1 and B, pageLSN is 2.

P2 is in memory, with value C and D8, pageLSN is 8.

2. Transaction Table:

TransactionID	lastLSN	Status
T3	8	Running

Dirty Page Table:

pageID	recLSN
P1	1
P2	3

3. Redo Phase: We start as the firstLSN, which is 1

- 1: Skipped
- 2: Redone
- 3: Redone
- 4: Skipped
- 5: Redone
- 6: Redone
- 7: Skipped
- 8: Redone
- 9: Skipped
- 10: Skipped

4. Undo Phase:

LSN	TransactionID	prevLSN	type	pageID	log entry	undoNextLSN
1	T1	-	Update	P1	Write A (A → A1)	-
2	T2	-	Update	P1	Write B (B → B2)	-
3	T2	2	Update	P2	Write C (C → C3)	-
4	T2	3	Abort	-	-	-
5	T2	-	CLR	-	Undo T2 LSN 3	2
6	T2	-	CLR	-	Undo T2 LSN 2	-
7	T2	6	END	-	-	-
8	T3	-	Update	P2	Write D (D → D8)	-
9	T1	1	Commit	-	-	-
10	T1	9	END	-	-	-
11	T3	8	CLR	-	Undo T3 LSN 8	-

P1 is in memory, with value A1 and B, pageLSN is 2.
P2 is in memory with original value C and D, pageLSN is 11