

Fall 2007 CS186 Discussion Section:
Week 15, 12/03 - 12/07

Your friendly TAs

December 2, 2007

1 Crash Recovery

1. General questions

- (a) If the buffer pool is large enough that uncommitted data are never forced to disk, is UNDO still necessary?
- (b) How about REDO?
- (c) If updates are always forced to disk when a transaction commits, is UNDO still necessary?
- (d) How about REDO?
- (e) After a soft crash, where in the log should Analysis start?
- (f) Where should REDO start?
- (g) Where should UNDO end?

2. Consider the execution shown in the following table:

| LSN | LOG |
|-----|----------------------|
| 00 | begin_checkpoint |
| 10 | end_checkpoint |
| 20 | Update: T1 writes P5 |
| 30 | Update: T2 writes P3 |
| 40 | T2 commit |
| 50 | T2 end |
| 60 | Update: T3 writes P3 |
| 70 | Update: T1 writes P2 |
| 80 | T1 abort |
| | Crash, Restart |

- (a) What is done during Analysis? Be precise about the points at which Analysis begins and ends and describe the contents of any tables constructed in this phase. Assume that the Dirty Page Table and Transaction Table were empty before the start of the log.
 - (b) What is done during REDO? Be precise about the points at which REDO begins and ends.
 - (c) What is done during UNDO? Be precise about the points at which UNDO begins and ends.
3. Consider the execution of the ARIES recovery algorithm given the following log (assume a checkpoint is completed before LSN 0 and the Dirty Page Table (DPT) and Transaction Tables for that checkpoint are empty):

| LSN | LOG |
|-----|----------------------|
| 10 | Update: T1 writes P1 |
| 20 | Update: T2 writes P3 |
| 30 | T1 abort |
| 40 | Update: T3 writes P4 |
| 50 | Update: T2 writes P2 |
| 60 | T2 commit |
| 70 | Update: T3 writes P2 |
| 80 | T2 end |
| | Crash, Restart |

(a) **During Analysis:**

- What log records are read?
- What are the contents of the Dirty Page Table (DPT) and the transaction table at the end of the analysis stage?

(b) **During Redo:**

- What log records are read?
- What data pages are read?
- What operations are redone (assuming no updates made it out to disk before the crash)?
- Show any new log records that are written.

(c) **During Undo:**

- What log records are read?
- What operations are undone?
- Show any new log records that are written (for CLRs, be sure to show the undoNextLSN)?