Fall 2004 Exercise Questions

Week 15 – Ending 12/10/04

Exercise

1.

a) If the buffer pool is large enough that uncommited 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:

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 that Dirty Page Table (DPT) and Transaction Tables are empty when the checkpoint is written):

LSN Log

LSN	**LOG**
00	Begin_checkpoint
10	End_checkpoint
20	Update: T1 writes P1

30	Update: T2 writes P2
40	Update: T3 writes P3
50	T2 commit
60	Update: T3 writes P2
70	T2 end
80	Update: T1 writes P5
90	T3: abort
CRASH, RESTART	

a) What is the value of the LSN stored in the master log record?
b) What is done during Analysis?
c) What is done during Redo?
d) What is done during Undo?
e) Show the log when recovery is complete, including all prevLSN and undoNextLSN values in log records.