ARIES
Concurrency Control and Recovery
Components

- full operation record
- uncommitted transactions
- pages not flushed
- snapshots of TT + DPT
- flushed pages

Log
Transaction table
Dirty page table
Checkpoints
Disk
Passes

replay log

perform updates

remove effects of losing transactions

Analysis

Redo

Undo
Analysis pass

Reconstruct state of transaction table and dirty page table at time of crash

Start at last checkpoint

Transaction table: add when started, remove when committed

Dirty page table: add only (conservative redo)
Redo pass

Play forward log

Don’t need to apply update if:
  page not in DPT
  LSN of record < recoveryLSN in DPT
  LSN of record <= pageLSN of page
Undo pass

Undo any transactions left in transaction table

Write CLRs to prevent repeated undos
In an ARIES-based logging system, how could you simplify the system if you knew that the database never wrote dirty pages from uncommitted transactions to disk?
A:

In this case, a separate UNDO phase is not required during recovery. Undo related logging work such as before-images of pages also need not be done at run-time.