Recovery and Rollback

Preserving Atomicity of Transactions

Atomic Principle

• Transaction is either fully completed and preserved
• Or erased: as though it had never been
• In practical terms
  – Committed
  – Rolled Back
Contexts

- 2 contexts for Rollback
- Transaction fails during normal processing
  - Deadlock
  - Own Choice
  - Dirty Read
- System Crashes
  - Some transactions committed
  - Some incomplete
  - All are dead

Concepts

- Commit: System promises to preserve effects of transaction
- Partial Commit: Transaction asks system for commit
- Log or Journal
  - record of all reads, writes, commits and other information
  - used in recovering from system crash
  - may be used in deciding whether to grant commit
Concepts (cont.)

• Rollback: remove all effects of Write by uncompleted transaction.
• Undo: operation to remove effect of one write by uncompleted transaction from stored database
• Redo: operation to ensure that effect of one write by committed transaction is in stored database.

• Note: Only Writes are Undone or Redone.