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.