

LET'S START WITH DBMS :).

Database recovery management

It involves strategies and processes to restore a database to a consistent state after a failure or crash.

Types of Database Failures

- **Transaction Failure:** Occurs when a transaction cannot complete successfully due to logical errors or system issues (like deadlocks).
- **System Failure:** Occurs when the entire system crashes due to hardware or software failures, leading to loss of in-memory data.
- **Media Failure:** Occurs when the physical storage (e.g., hard drives) is damaged, resulting in data loss or corruption.

LET'S START WITH DBMS :).

Database recovery management

Recovery Phases

- **Analysis Phase:** Identifies the point of failure and the transactions that were active at that time.
- **Redo Phase:** Reapplies changes from committed transactions to ensure the database reflects all completed operations.
- **Undo Phase:** Reverts the effects of incomplete transactions to maintain consistency.

LET'S START WITH DBMS :).

Database recovery management

Recovery Techniques

- **Backup and Restore:** Regular backups are taken to ensure data can be restored. Full, incremental, and differential backups are common types.
- **Logging:** Keeps a record of all transactions. The Write-Ahead Logging (WAL) protocol ensures that logs are written before any changes are applied to the database.
- **Shadow Paging:** Maintains two copies of the database pages; one is updated, and the other remains unchanged until the transaction commits.