|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Term** | **Meaning** | **Focus** | **Reversible?** | **Example Use** |
| **Batch** | Group of commands | Task execution | No | Run multiple queries at once |
| **Script** | File with commands | Automation | No | Initial DB setup |
| **Transaction** | Unit of work (ACID) | Data integrity | Yes (via rollback) | Transfer money between accounts |
| **Backup** | Data snapshot | Recovery | N/A | Recover after crash |

**What’s the difference between batch,script,transaction,BackUp**

**What meant by logging transaction and why this happens**

**Logging a transaction** means that the database system records every change made during a transaction in a transaction log file

This log contains information like:

* What data was changed
* When it was changed
* By whom (if security info is included)
* The "before" and "after" values

**Why It Happens**:

1. **Auditability**: Ensures a verifiable record for compliance and dispute resolution.
2. **Recovery**: Enables system restoration after failures (e.g., database crashes).
3. **Debugging**: Helps trace errors or performance issues.
4. **Security**: Detects fraud or unauthorized access.
5. **Consistency**: Maintains data integrity in distributed systems (e.g., blockchain).
6. **Analytics**: Provides data for monitoring and insights.

**What’s the difference between soft delete and hard delete**

**1. Hard Delete**

* **Definition**: Permanently removes a record from the database.
* **Effect**: Data is gone — you **cannot retrieve it** unless you have a backup.
* **SQL Example**:

DELETE FROM Users WHERE UserId = 5

* **Use case**: When data is no longer needed **at all** (e.g., test data, temporary logs).

**2. Soft Delete**

* **Definition**: Instead of deleting the record, you **mark it as deleted** (usually using a flag or status column), but **keep it** in the database.
* **Effect**: Data is hidden but **still exists** and can be restored later.
* **SQL Example**:

UPDATE Users SET IsDeleted = 1 WHERE UserId = 5

* You just need to filter it out in future queries:

SELECT \* FROM Users WHERE IsDeleted = 0

|  |  |  |
| --- | --- | --- |
|  | **Hard Delete** | **Soft Delete** |
| **Data Removed** | Yes (physically deleted) | No (logically deleted) |
| **Recoverable** | Not easily | Yes |
| **Storage** | Saves space | Takes more space |
| **Performance** | Slightly better over time | May slow down due to larger data |
| **Use Case** | Data you’ll never need again | Data that might be restored/audited |