SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-IOT Including CS&BCT

COURSE NAME : 19SB504   DATABASE MANAGEMENT SYSTEMS

III YEAR / V SEMESTER

Unit IV-   **TRANSACTIONS MANAGEMENT**

Topic :**SQL FACILITIES FOR CONCURRENCY AND RECOVERY**

SQL Facilities for Concurrency and Recovery

✓ SQL, the Structured Query Language, provides various **facilities for managing concurrency and recovery in a database system.**

✓ These facilities help **ensure that multiple transactions** can operate concurrently while maintaining data **consisten**cy and providing mechanisms for **recovering** from **system failures.**
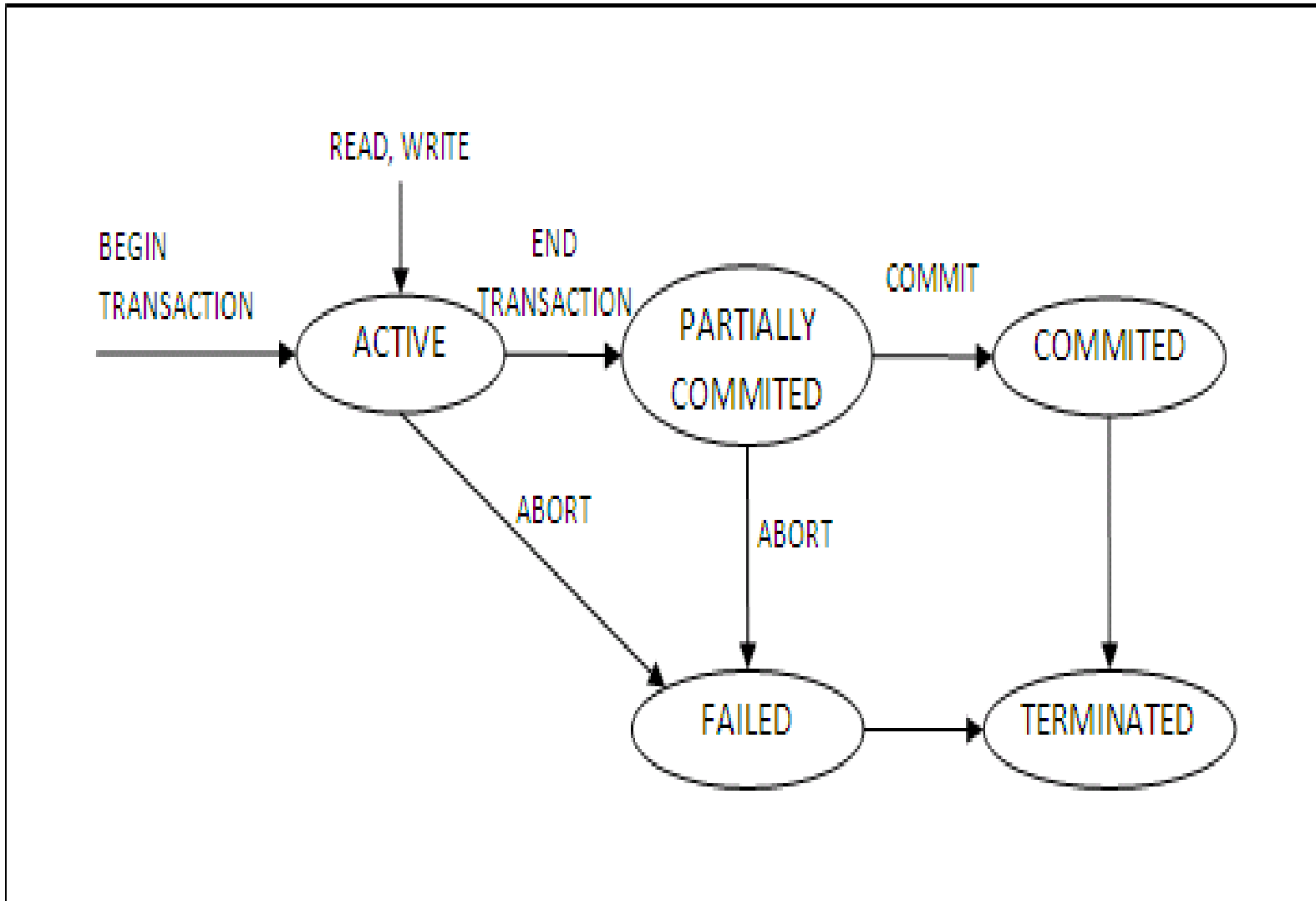
SQL facilities for concurrency and recovery

1. Transaction Control Statements
2. Savepoints
3. Isolation Levels
4. Locking Mechanisms
5. Logging and Recovery
6. ACID Properties
7. Two-Phase Commit
8. Point-in-Time Recovery
9. Backup and Restore

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1. Transaction Control Statements

SQL provides statements to control transactions, including **BEGIN TRANSACTION, COMMIT**, and **ROLLBACK**. These statements allow you to start, commit, and roll back transactions, respectively, ensuring data consistency and recovery options.

2. Savepoints

As mentioned earlier, SQL supports savepoints. You can set **savepoints** within a transaction to create **checkpoints** that enable you to roll back to a specific point in the transaction in case of an error or failure.

3.Isolation Levels

SQL allows you to set the isolation level for transactions using **SET TRANSACTION ISOLATION LEVEL**. This defines the level of data isolation and determines how transactions **interact with each other,** helping manage concurrency.

4. Locking Mechanisms

SQL provides locking mechanisms that allow transactions to **control access to data**. Common lock types include **shared locks and exclusive locks**. These mechanisms help prevent conflicts between concurrent transactions.

5. Logging and Recovery

SQL database management systems maintain transaction **logs that record all changes made by transactions**. This log is crucial for recovery. SQL also provides **recovery mechanisms**, allowing the DBMS to restore the database to a consistent state in case of system failures.

6. ACID Properties

SQL adheres to the ACID (**Atomicity, Consistency, Isolation, Durability**) properties, which ensure that transactions are atomic (indivisible), maintain data consistency, provide isolation between transactions, and guarantee that changes are durable and won't be lost even in the face of a system failure.

7. Two-Phase Commit (2PC)

SQL supports the Two-Phase Commit protocol for distributed transactions. This protocol **ensures** that transactions **across multiple databases** or systems are either **committed or rolled back** consistently, preventing data inconsistencies.

8. Point-in-Time Recovery

SQL databases often **support point-in-time recovery**, which allows you to **recover a database** to a specific point in time, such as before a critical error or **data corruption occurred**.

9. Backup and Restore

SQL databases offer backup and restore features, enabling you to create copies of your database for disaster recovery purposes and to restore the database to a known state in case of data loss.

Thank You…….

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