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 : Transaction control concept

Transaction Concepts – ACID Properties - Schedules – Serializability – Concurrency Control - Need for Concurrency – Locking Protocols – Two Phase Locking – Deadlock – Transaction Recovery - Save Points – Isolation Levels – SQL Facilities for Concurrency and Recovery

TRANSACTION CONCEPTS

- A **transaction** is a **collection of operations** that forms single **logical unit of work**.

- Transactions are essential concepts that ensure data integrity, consistency, and reliability.

- Transactions are **sets of one or more SQL statements** that are **treated as a single unit of work**.

They follow the **ACID properties**, which stands for Atomicity, Consistency, Isolation, and Durability.

TRANSACTION CONCEPTS

Simple Transaction Example

1.Read your account balance

2.Deduct the amount from your balance

3.Write the remaining balance to your account

4.Read your friend‘s account balanace

5.Add the amount to his account balance

6.Write the new updated balance to his account

This whole set of operations can be called a transaction

TRANSACTION CONCEPTS

- **Transaction processing system**
  - The system with large database and hundreds of concurrent users that are executing database transaction.
  - Eg :Reservation system , Banking system etc

Concurrent access

- ✓ Multiple user accessing a system at the same time
- ✓ Single user-one user at a time can use a system
- ✓ Multi user-many user use the system at a time. It can be achieved by multiprogramming:

TRANSACTION CONCEPTS

Parallel- multi-users access different resources at the same time.

Interleaved- Multiple users access a single resource b on time.

Transaction operations

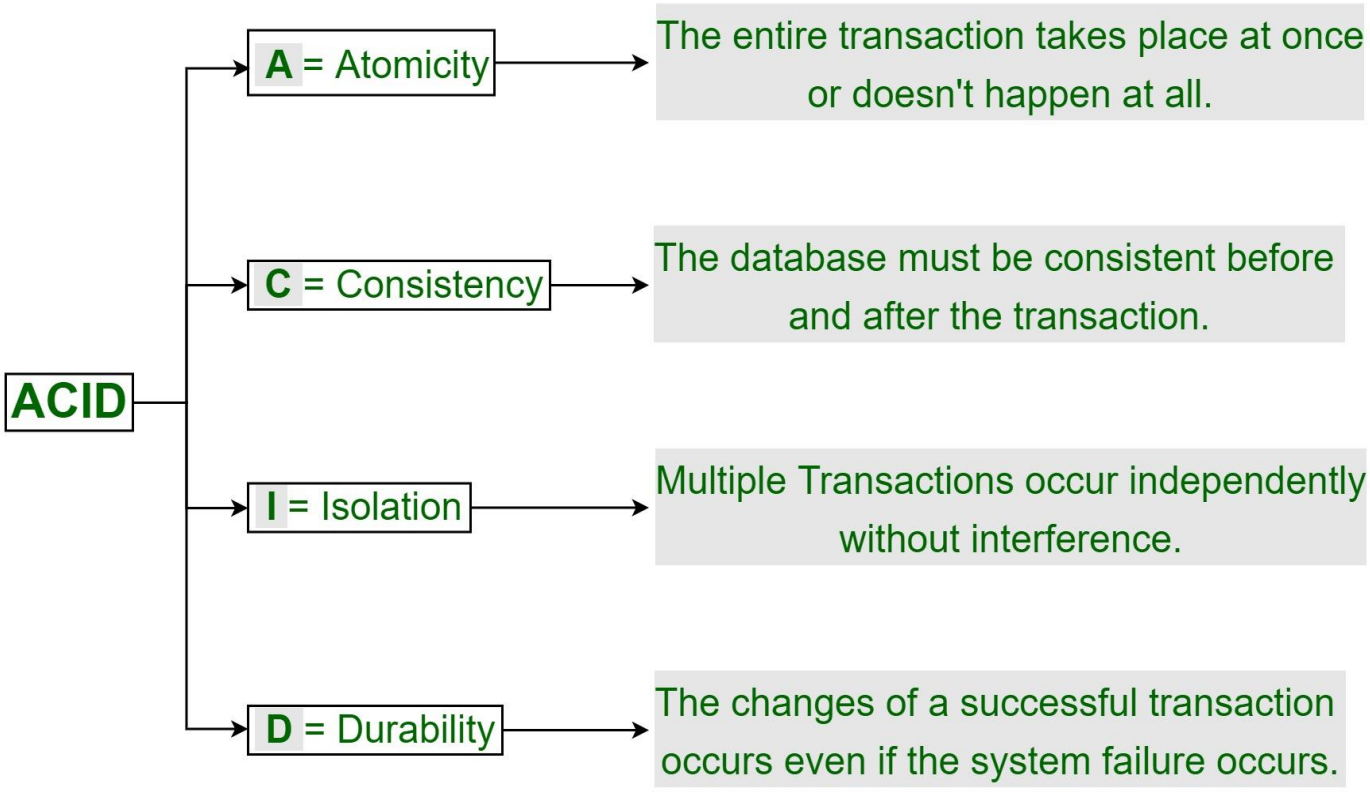
- Read(x)
  It transfer the data item **x** from the database to a local buffer belonging to the transaction that executed the read operation.
- Write(x)
  It transfer the data item **x** from the local buffer of the transaction to the database i.e. it write back to the database.

ACID Properties

- ✓ To ensure the integrity of data during a transaction, database system maintains the following properties. These properties are widely known as ACID properties

ACID Properties

ACID Properties in DBMS



ACID Properties

Atomicity

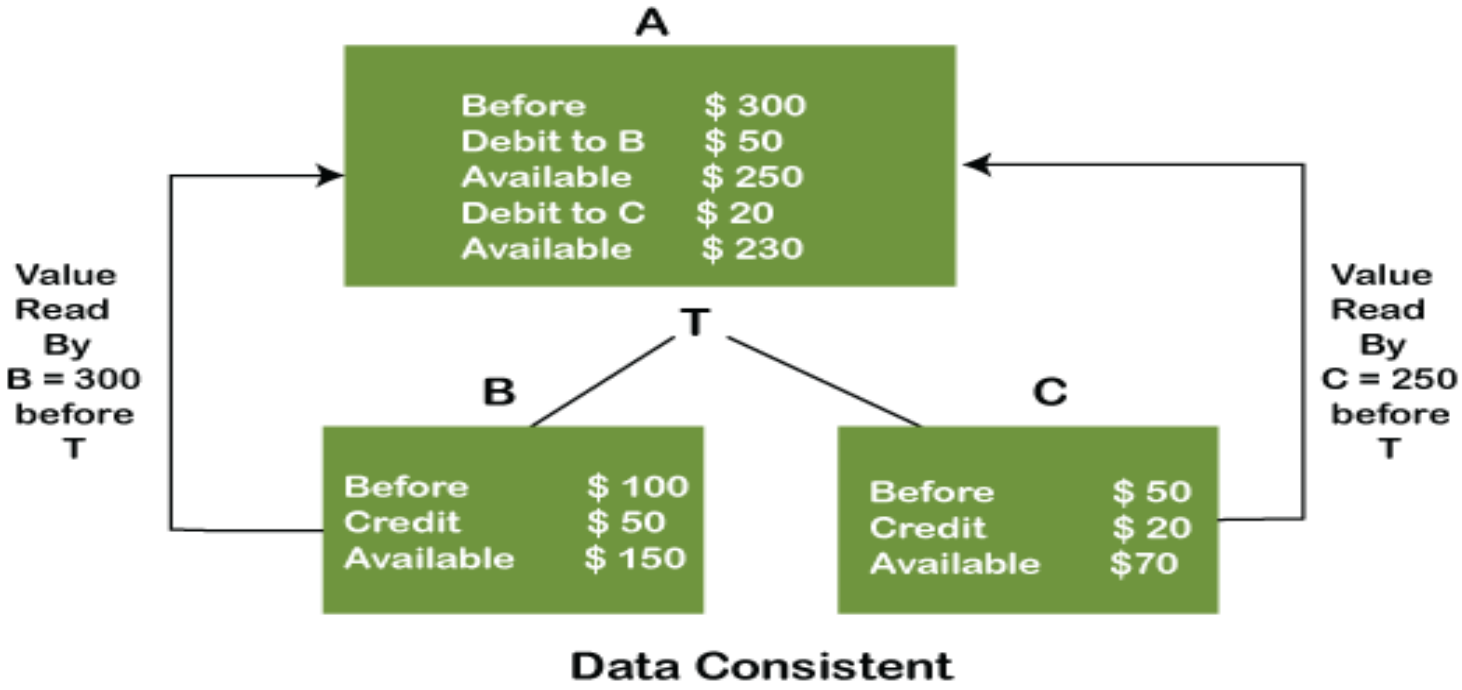
This property ensures that a transaction is **treated as an indivisible unit.** It means that **either all the operati within a transaction are executed successfully**

Before: X : 500	Y: 200
Transaction T	
T1	T2
Read (X) X: = X − 100 Write (X)	Read (Y) Y: = Y + 100 Write (Y)
After: X : 400	Y : 300

ACID Properties

Consistency

The word **consistency means** that the value should remain preserved always. In DBMS, the integrity of the da should be maintained, which means if a change in t database is made, it should remain preserved always.

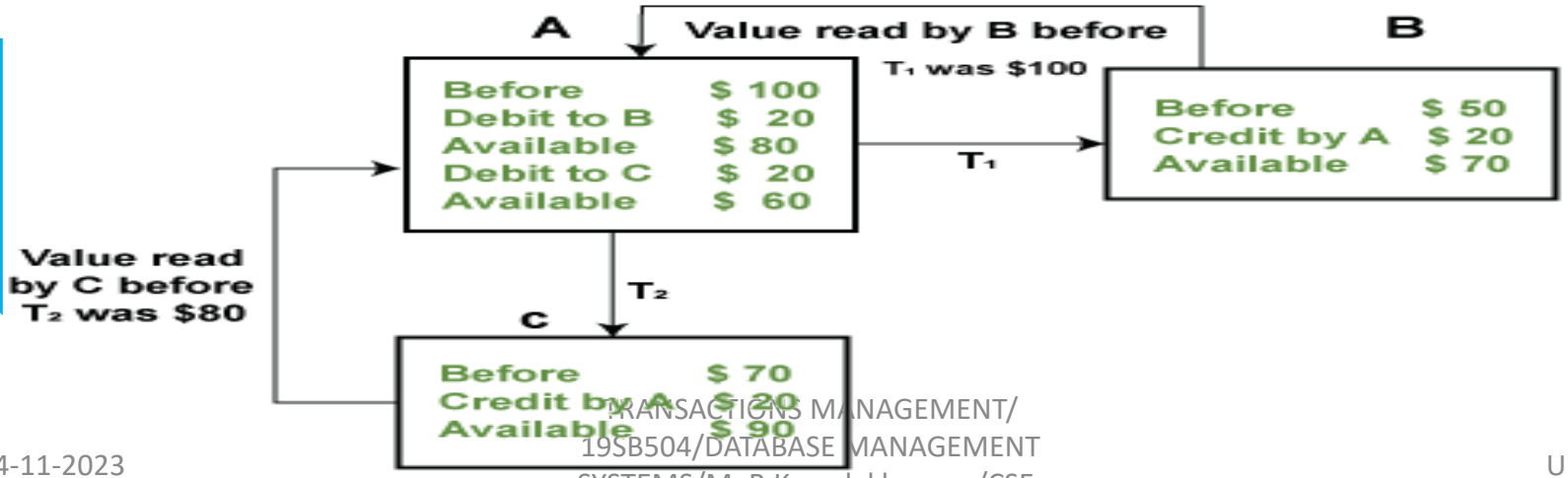


ACID Properties

Isolation

The term 'isolation' means separation.

- ✓ It means if two operations are being performed on two different databases, they may not affect t value of one another. In the case of transactio when two or more transactions occur simultaneously, the consistency should remain maintained



Isolation - Independent execution of T_1 & T_2 by A

ACID Properties

Durability

- ✓ Durability ensures the permanency of something. In DBMS, the term durability ensures that the data after t successful execution of the operation becom permanent in the database

- ✓ The durability of the data should be so perfect that even if the system fails or leads to a crash, the database still survives.

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Thank You…….