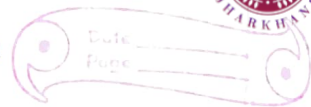


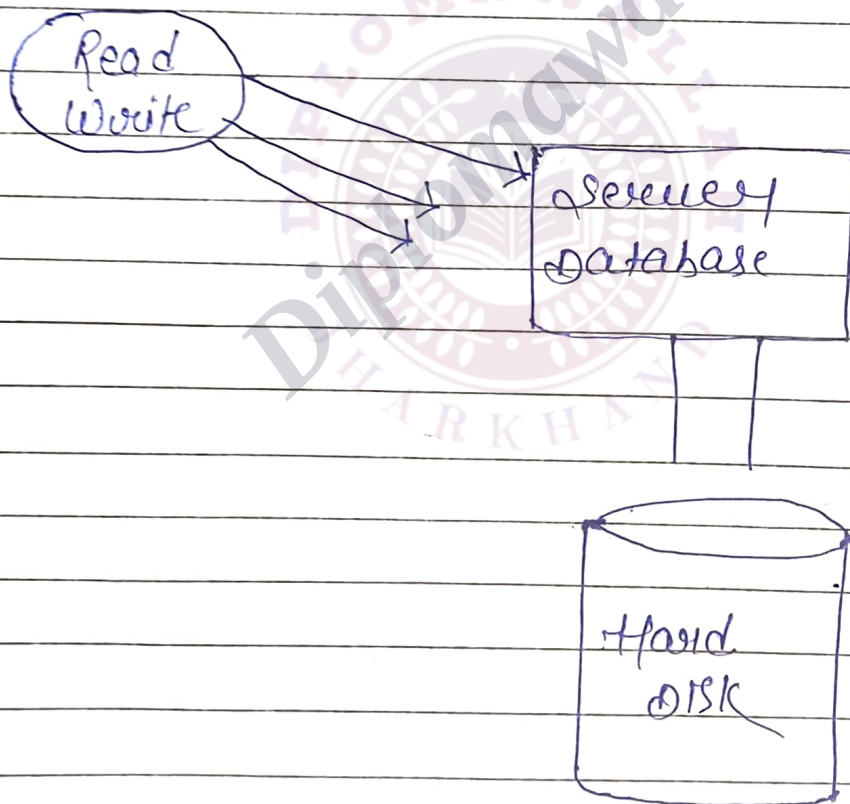
X ROM to RAM

X All performance run in ROM until commit



Transaction

- A Transaction can be defined as a group of tasks. A single task is the minimum processing unit which cannot be divided further.
- A Transaction is an action or series of action that are being performed by a single user or application, which reads or updates the contents of the database.



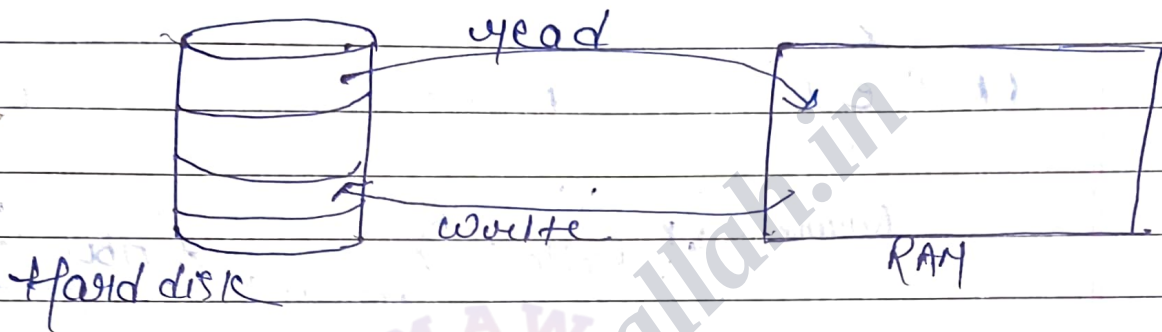
If n number of task is then i.e. commit and $n-1$ is the partially committed.



Transaction operation (perform on RAM)

(i) Read (access data from database)

(ii) write (write a data on database)



$$R(A) = 2600$$

$$\begin{aligned} A &= A - 2000 \\ A &= 600 \end{aligned}$$

$$W(A) = 2400$$

$$R(B) = 2800$$

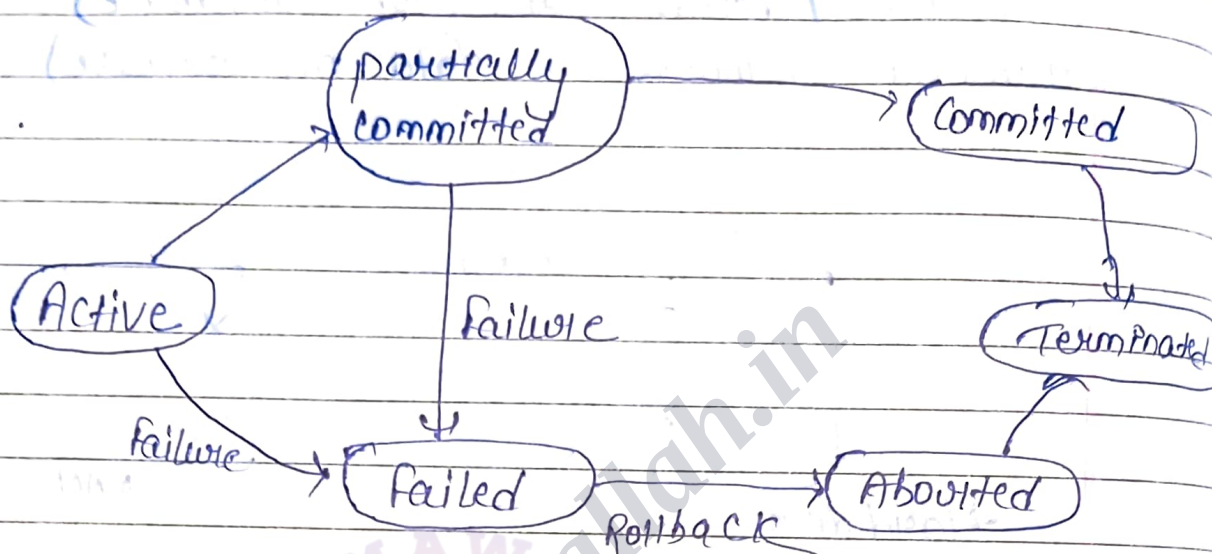
$$B = B + 2000$$

$$\begin{aligned} B &= 2800 + 2000 \\ B &= 4800 \end{aligned}$$

$$W(B) = 4500$$

Commit

Transaction State



* Commit cannot be failed because, the ^{data} saved permanently into hard disk.

• Here in the Transaction state:-

1) Active state.

- The transaction starts in this state.
- It performs read and write operations.
- If everything goes well means no error occur then it moves to the partially committed state.
- If a failure occurs it moves to the failed state.

ii) partially committed state

- The transaction has executed all its operator but has not yet saved changes permanently.
- If no failure occurs, it moves to the 'Committed State'.
- If failure occurs before committing it moves to the failed state.

iii) Committed state

- The transaction successfully saves all its changes to the database.
 - It then moves to the Terminated State.
- Note:- A committed transaction cannot fail because its data is permanently stored.

iv) Failed state

- The transaction enters this state due to an error or failure.
- It cannot proceed to commit; instead, it must rollback.
- It then moves to the Aborted state.

v) Aborted state

- The transaction has rolled back (undoing changes).
- It can be restarted or discarded and finally transaction moves to terminated state.

Terminated state

- The transaction is either been committed or aborted and is completely finished.

ACID property

ACID properties used for complex the transaction with their rules.

→ Transaction property called ACID properties.

A → Atomicity

C → Consistency

I → Isolation

D → Durability

* A transaction is a single logical unit of work, which accesses and possibly modifies the contents of a database.

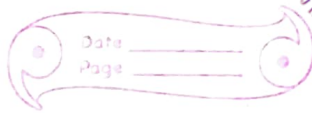
* Transaction access data using read and write operations.

* In order to maintain the data consistency before and after transaction, certain properties followed, and there is called ACID properties.

Atomicity: — The entire transaction takes place at once, or does not happen at all.

Consistency: — The database must be consistent before and after the transaction.

Isolation: — Multiple transaction occur independently without interference.



- **Durability**:- The changes of a successful transaction occurs even if the system failure occurs.

P4Q

Q. Discuss the main characteristics of the database approach and how it differs from traditional file system.

The database approach is a modern way of managing data that overcomes the limitation of the traditional file-based system.

The key characteristics of database approach are:-

1. **Self-describing nature**- A database system includes Meta data (data about data), which defines the structure and constraints of the database.
2. **Data Abstraction**:- users interact with data at different abstraction levels (physical, logical, and view levels) rather than dealing with data storage.
3. **Data Independence**- The database structure change without affecting to the application program.
 - **Logical Data Independence** - Changes in the logical schema not affect the application program.
 - **Physical Data Independence** - Changes in the physical storage do not affect logical structure.

Website:- Diplomawallah.in

4. Data Integrity and Security - Constraints are enforced to maintain data consistency, and authentication mechanism ensure authorize access.

5. Multi - user Access & concurrency control - Multiple user can access and modify the data simultaneously without conflicts using techniques like transaction Management and locking.

6. Data Redundancy Control.

7. Data Sharing & Centralized Control

8. Transaction Management

9. Backup and Recovery