ACID PROPERTIES

* TRANSACTION –

A transaction in SQL is a group of SQL statements that are treated as a single unit and they are execute by applying the principle “ do everything or do nothing” and a successful transaction must pass the ACID test. In the context of transaction processing ACID refers to the four key properties of transaction such as

A - ATOMICITY

C – CONSISTENCY

I – ISOLATION

D- DURABILITY

* ATOMICITY –

Ensure that all operations within the work unit are completed successfully, otherwise the transaction is aborted at the point of failure and previous operation are rolled back to their former state.

EX. Transferring money from one bank account involves steps:-

* Debit amount X from Account A
* Credit amount X to Account B

As per atomicity , either all debit and credit operation succeed to they all fail. If the debit succeed ,but credit fails for any reason, the entire transaction is rolled back .Atomicity ensure there are no partial or incomplete transactions.

* CONSISTENCY –

Ensures that the database data is in a consistent state before the transaction started and also left the data in a consistent state after the transaction is completed .

EX. A transaction crediting 5000 to a bank account with a current balance of 3000 is invalid if the account has an overdraft limit of 1000 the transaction violets consistency by exceeding the permissible account limit hence, it is blocked and aborted

* ISOLATION –

This ensure that the intermediate state of a transaction is invisible to other transaction must be isolated from the data modification made by all other transaction isolation.

EX. Transaction 1 update a change and leaves it uncommitted meanwhile, transaction 2 read the updated change , if transaction 1 roll back the change , transaction 2 will have read data that is considered never to have existed

* DURABILITY –

Durability ensure that once a transaction is committed, its changes are permanent and will survive any subsequent system failure . the transaction changes are saved to the database permanently and even if the system crashes, the changes remain intact & can be recovered.

EX. If a transaction update a customer’s address, durability ensure the updated address is not lost due to a hard disk failure or power outage . the change will persist with the help of storage devices backup and logs

ADVANTAGES OF ACID PROPERTIES

* Data Consistency : - ACID properties ensure that the data remains consistent and accurate after any transaction execution
* Data Intergrity : - Acid properties maintain the integrity of the data by ensuring that any changes to the database are permanent and cannot be lost.

DISADVANTAGES OF ACID PROPERTIES

* Performance : - The ACID properties can cause a performance overhead in the system as they require additional processing to ensure data consistency and integrity.
* Scalability :- The ACID properties may cause scalability issue in large distributed system where multiple transaction occur concurrently.