LET'S START WITH DBMS :)

T1	T2
R	R
R	W
W	R
W	W

Isolation levels and its types

Why do we need to learn about isolation level?

In systems where multiple transactions are executed concurrently, isolation levels manage the extent to which the operations of one transaction are isolated from those of other transactions.

Isolation levels help prevent common transactional anomalies:

- Dirty Read: Reading uncommitted data from another transaction.
- Non-repeatable Read: Data changes after it has been read within the same transaction.
- Phantom Read: New rows are added or removed by another transaction after a query.

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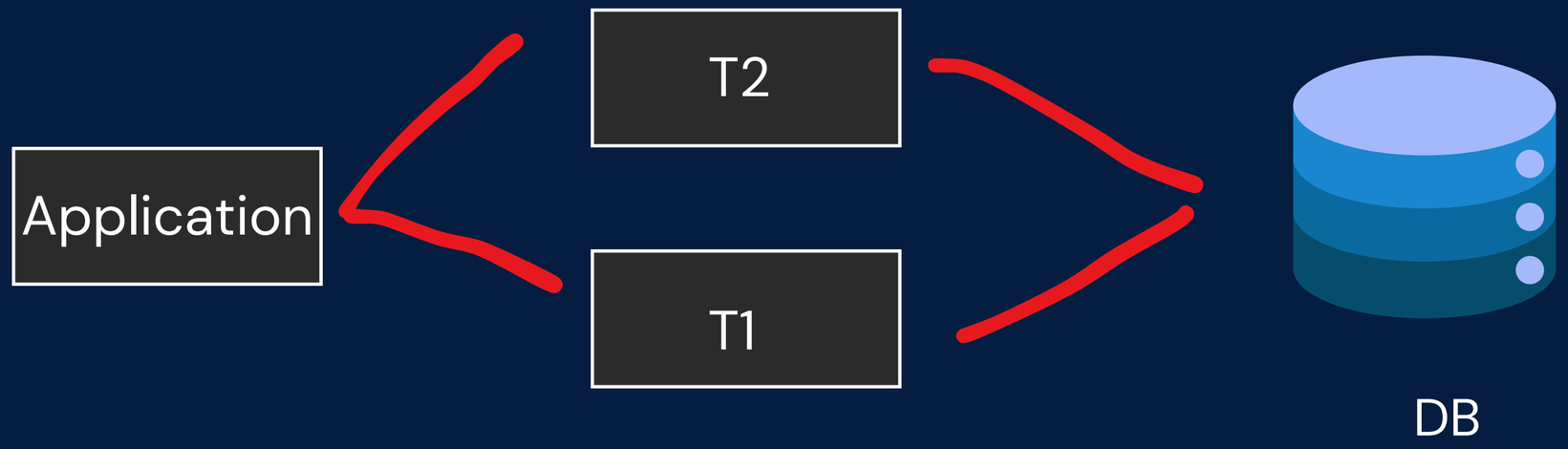
Isolation levels and its types

Isolation level : It determines the degree to which the operations in one transaction are isolated from those in other transactions.



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Isolation levels and its types

Anamolies/Voilations to Isolation level

1. **Dirty Read :** Reading data written by a transaction that has not yet committed

Consider if T2 reads the data written by T1 and if T1 fails, it becomes irrelevant.

T1	T2
W(A)	
	R(A)

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Isolation levels and its types

Anamolies/Voilations to Isolation level

2. Non-Repeatable Read : Reading the same row twice within a transaction and getting different values because another transaction modified the row and committed.

Consider if T2 modifies the data which T1 already Read and if T1 continue the transaction the data will be changed

T1	T2
R(A)	
	R(A)
	W(A)
	Commit
R(A)	

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Isolation levels and its types

Anamolies/Voilations to Isolation level

3. Phantom Read : Getting different sets of rows in subsequent queries within the same transaction because another transaction inserted or deleted rows and committed.

T1(Query(id))->Fetch the name
T2(Query(id)) -> Insert a new entry
T1(Query(id))->Fetch the name

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Isolation levels and its types

There are 4 isolation levels which helps us with these anamolies:

Types of Isolation Levels

- Read Uncommitted
- Read Committed
- Repeatable Read
- Serializable

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Isolation levels and its types

Read Uncommitted: The lowest isolation level where transactions can see uncommitted changes made by other transactions. If Transaction T1 is writing a value to a table, Transaction T2 can read this value before T1 commits.

- Dirty Reads: Yes
- Non-Repeatable Reads: Yes
- Phantom Reads: Yes

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Isolation levels and its types

Read Committed: It ensures that any data read during the transaction is committed at the moment it is read. If T1 has done some write operation T2 can only read the data when T1 is commited

- Dirty Reads: No
- Non-Repeatable Reads: Yes
- Phantom Reads: Yes

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Isolation levels and its types

Repeatable Read: It ensures that if a transaction reads a row, it will see the same values for that row during the entire transaction, even if other transactions modify the data and commit. If Transaction T1 reads a value, Transaction T2 cannot modify that value until T1 completes. But T2 can insert new rows that T1 can see on subsequent reads.

- Dirty Reads: No
- Non-Repeatable Reads: No
- Phantom Reads: Yes

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Isolation levels and its types

Serializable: It ensures a serial transaction execution, so that there is complete isolation. If Transaction T1 is executing, Transaction T2 must wait until T1 completes

- Dirty Reads: No
- Non-Repeatable Reads: No
- Phantom Reads: No