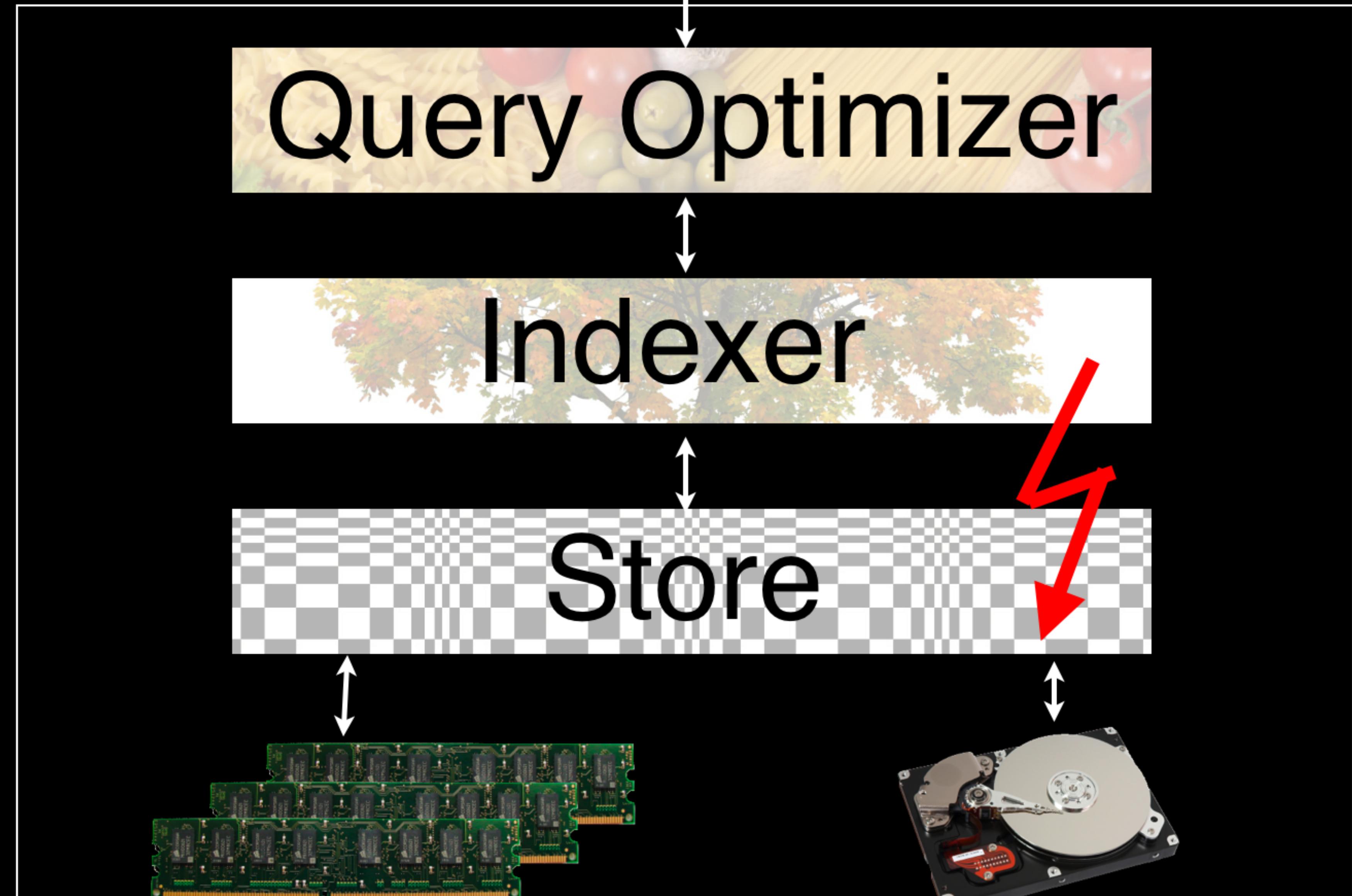


DBMS



Error Scenarios

dirty page

D Y

power failure

fire, flood, earthquake, tsunami, burglary, ...

hardware error (hard disk crash, memory failure, network problem)

software error

janitor's dog...

Forensics



Recovery in ANY Software

undo-functionality

backup copies

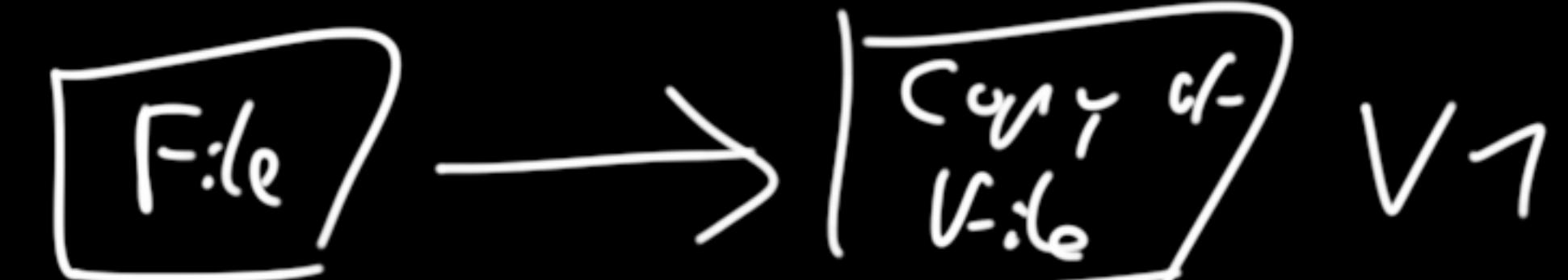
journaled file systems (metadata vs content)

“Do not switch off“ messages (FAIL!)



will not be able to recover

Recovery := mechanism allowing us to get back
to a consistent state



ACID?

ACID recap

Atomicity:

all or nothing

A!

Consistency:

consistent state preservation

Isolation:

concurrent transactions have same effect as

some serial schedule

Durability:

committed changes will never be lost

D!

Concurrency Control

Local Error

error or ABORT in application program

or: ABORT triggered by system due to deadlock

database system: just fine, up and running

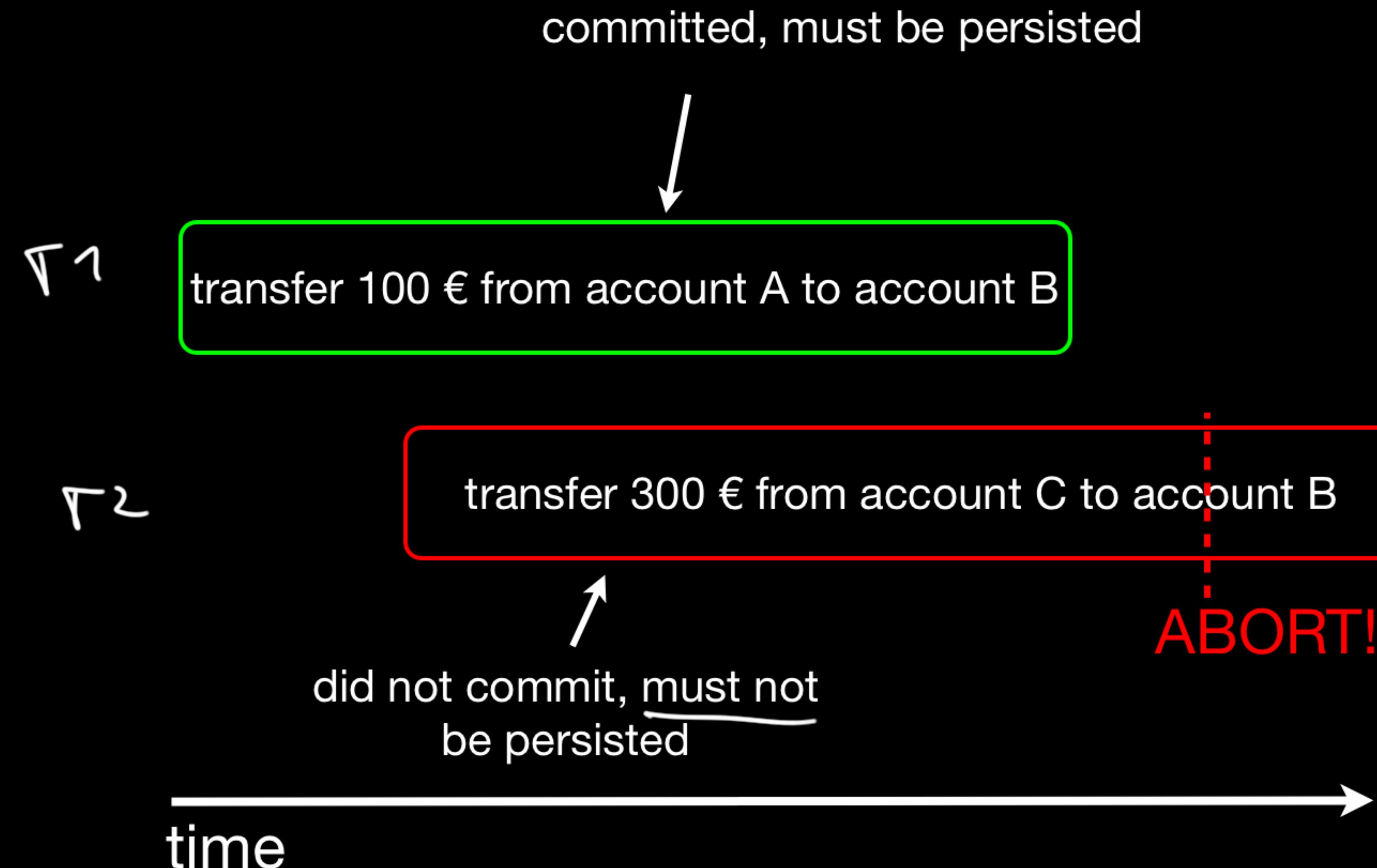
tasks:

Local Undo: remove persisted changes done by non-committed TAs

A!

COL concurrent
caused

Example: Local Error

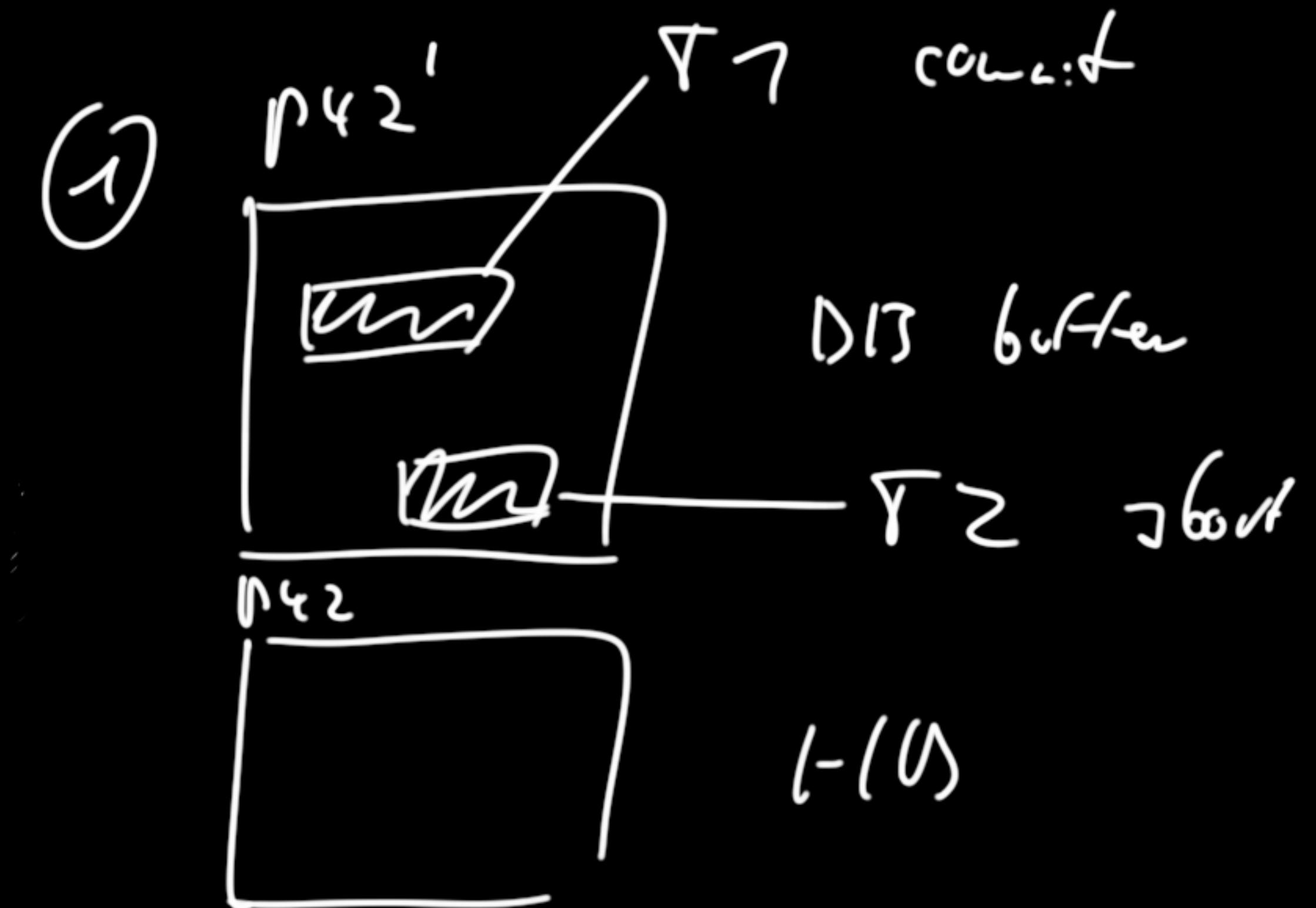


Loss of Main Memory

=> dirty pages in database buffer lost

database system: still able to restart

tasks:

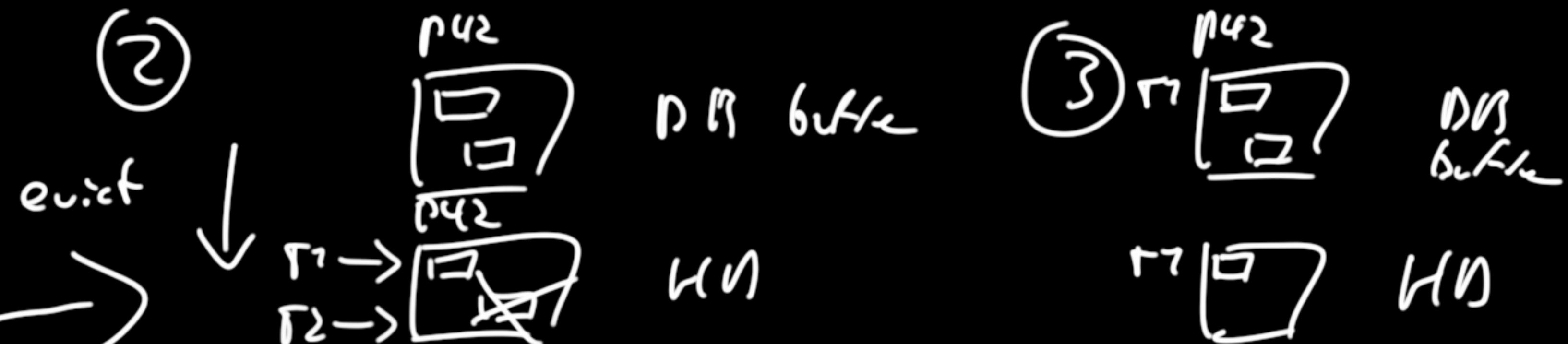


Undo: remove persisted changes done by non-committed TAs

A!

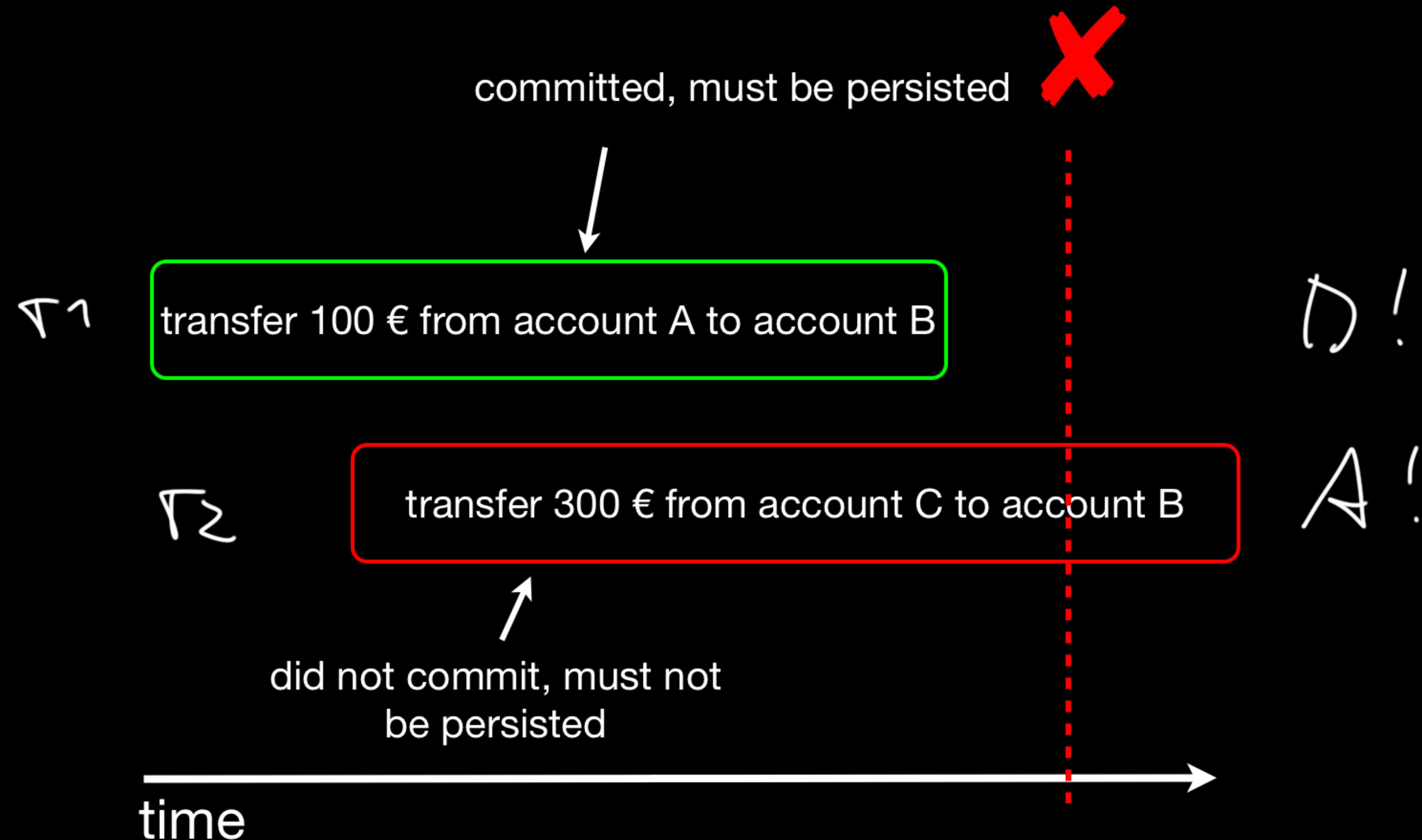
Redo: persist all non-persisted changes done by committed TAs

D!



Example: Loss of Main Memory

power failure!



Loss of External Memory/Storage

=> database store and/or log lost



database system: still able to restart (but hey: **on what data exactly?**)

tasks:

re~~live~~

get/install database store/log replica/copy!

D!

proceed as in loss of main memory (see above)

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