Cheat Sheet

for

T. Haerder and A. Reuter (1983): **Principles of Transaction-Oriented Database Recovery**. *ACM Comp. Surveys 15*(4)

Concept	What?	Consequences
	Properties of Transactions	
Atomicity	Either all of the TA's actions are properly reflected in the DB or none of them	
Consistency	All TAs leave the DB in a consistent state (by definition)	
Isolation	No TAs "sees" what other, concurrently executed TAs do/did	
Durability	Effects of a *committed* TA are permanent (i.e. survive subsequent crashes)	
	Types of Failure	
TA failure	ABORT by the TA or by the system	Transaction UNDO needs to be processed
System failure	DBMS crashes due to, e.g., bug or power outage	Log based recovery after restart
Media failure	Disks (or magnetic tapes) become unusable	Global REDO
	Recovery Actions	
Transact.UNDO	Undo everything done by an *aborted* TA (during normal DBMS operation)	
Global UNDO	Undo everything done by TAs that have been active when a system failure happened	
Partial REDO	Redo committed TAs that have not been completely persisted before a system failure	
Global REDO	Restore all changes from committed TAs after a media failure ("archive recovery")	
	Propagation Strategies	
¬ATOMIC	Pages can be (written and) propagated only separately	Propagation is vulnerable to system crashes
ATOMIC	Sets of written pages can be propagated as an atomic unit	Certain guarantees can be given for what is on the disk after a crash
	Page Replacement	
STEAL	Modified pages may written and/or propagated at any time	
¬STEAL	Modified pages are kept in buffer at least until EOT	UNDO is not necessary
	End of Transaction (EOT) Processing	
FORCE	All pages modified by a TA are written and propagated during EOT (before reporting a successful commit to the TA)	Partial REDO is not necessary
¬FORCE	No propagation is triggered during EOT	