

- Final exam: Tuesday, May 18th; 1:00 - 3:00
- focus on 2nd half of semester: design — isolation levels

- * isolation levels implemented with locks: Row level locks
- writes: exclusive locks
 - reads: shared locks

	Writes	Reads
Read Uncommitted	X-C	no locks
Read Committed	X-C	R-S (shared lock held until query completes)
Repeatable Read	X-C	R-S* (read from committed database the first time; read from cache for all subsequent reads)
Serializable	X-C	R-C

↓
 exclusive locks held until transaction completes

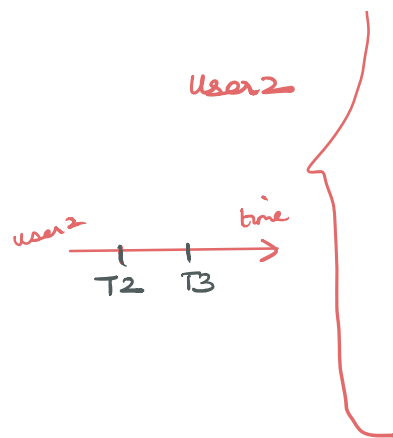
↓
 (read lock until transaction completes)

Example that shows phantom tuples in MySQL

a	b
5	x
10	y

user1 { T1: a = a + 10
commit

{ T2: Repeatable Read
q1: select a



q2: select a

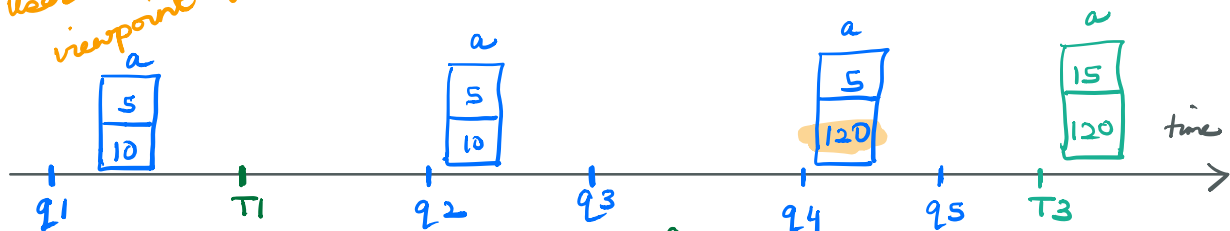
q3: a = a + 100 where b = 'y'

q4: select a

q5: commit

T3: select a

user 2's
viewpoint of a



Reality
(what is
stored)



mysql only shows phantom behaviour in the row you changed. Other rows remain unchanged.