

True/False:

1. Berkeley's first CS Ph.D. (1969) Jim Gray won the Turing Award.
2. A 2PL Schedule may lead to cascading abort, Strict 2PL can fix this.
3. There was no downtime for GMail in 2010.

Short Answer:

1. What are anomalies with Interleaved Execution?
2. What are the requirements for two transaction operations to conflict?
3. Two schedules are conflict equivalent iff:
4. What are meanings of MTBF, MTTF, MTTR?

Long Answer:

1. Consider the two transactions below. Assume each instruction (i.e., read, write, addition, subtraction) takes one time unit, and acquiring/releasing a lock takes zero time units. Once a

transaction acquires a shared lock it cannot upgrade it to an exclusive lock, and once a transaction acquires an exclusive lock it cannot downgrade it to a shared lock..

Transaction1	Transaction2
R(A);	R(A);
A = A + 100;	A = A - 50;
W(A);	W(A)
R(B);	
B = B - 100;	
W(B);	

a) What is the minimum possible execution time taken by both transactions when using 2PL (2 phase locking)? Show a schedule that achieves the minimum time. The diagram below shows the first several instructions executed by each transaction for such a schedule. Note that Transaction 2 is not getting the lock when requesting it, instead, Transaction2 needs to wait for the lock to be released by Transaction 1.

Transaction 1 Lock_X(A) <granted>	Transaction 2
R(A)	Lock_X(A)

b) What is the minimum possible execution time taken by both transactions when using strict 2PL? Show a schedule that achieves the minimum time.

Transaction1	Transaction2
Lock_X(A) <granted>	
R(A)	Lock_X(A)

