

CMSC 424. Homework 4

Due: no due date (but do the exercises)

1. Read chapters 15, 16, 17.
2. Exercise 15.11 Consider the following two transactions
T1: read(A);
 read(B);
 if A = 0 then B = B +1;
 write(B);
T2: read(B);
 read(A);
 if B = 0 then A = A+1;
 write(A);
Let the consistency requirement be A=0 and B=0, with A=B=0 the initial values
 - i. Show that every serial execution involving these two transactions preserves the consistency of the database;
 - ii. Show a concurrent execution of T1 and T2 that produces a nonserializable schedule;
 - iii. Is there a concurrent execution of T1 and T2 that produces a serializable schedule?
3. Exercise 16.2. Add lock and unlock instructions to the transactions from exercise 2. Can the execution of these transactions result in a deadlock?
4. Exercise 17.10. Explain the purpose of the checkpoint mechanism. How often should checkpoints be performed? How does the frequency of checkpoints affect:
 - i. System performance when no failure occurs?
 - ii. The time it takes to recover from a system crash?
 - iii. The time it takes to recover from a disk crash?