Northeastern University

CS 5200 Homework 10 (Chapter 12 Connolly & Begg)
Each question is worth 10 points each.

1. Given the following 2 different transactions. List all potential schedules for T1 and T2 and determine which schedules are conflict serializable and which are not. (10 POINTS)

Transaction 1	Transaction 2
READ(X)	READ(X)
X = X -N;	X = X +M
WRITE(X)	WRITE(X)
READ(Y)	
Y = Y + N	
WRITE(Y)	

2. Which of the following schedules is conflict serializable? For each serializable schedule determine the equivalent serial schedule.(10 POINTS)

Schedule 1	Schedule 2	Schedule 3
T1 Read(X)	T1 Read(X)	T3 Read(X)
T3 Read(X)	T3 Read(X)	T2 Read(X)
T1 Write(X)	T3 Write(X)	T3 Write(X)
T2 Read(X)	T1 Write(X)	T1 Read(X)
T3 Write(X)	T2 Read(X)	T1 Write(X)

3. Draw the precedence graph for the 3 schedules in problem 2. (20 POINTS)
4. Provide a schedule that exhibits the deadlock problem. Describe the issue. (10 POINTS)
5. Apply the timestamping algorithm to the following schedule. State if it can be performed as is or what transactions will need to be restarted given the basic timestamping ordering algorithm. (20 POINTS)

TIME	Transaction A	Transaction B	Transaction C
1		READ(Z)	
2		READ(Y)	
3		WRITE(Y)	

4			READ(Y)
5			READ(Z)
6	READ(X)		
7	WRITE(X)		
8			WRITE(Y)
9			WRITE(Z)
10		READ(X)	
11	READ(Y)		
12	WRITE(Y)		
13		WRITE(X)	

6. Below is a log corresponding to a particular schedule at the point of a system crash for 4 transactions T1, T2, T3, and T4. Suppose that we use the immediate update protocol with checkpointing. Describe the recovery process from the system crash. Specify which transactions are rolled back, which operations in the log are redone and which operations in the log are undone. State whether any cascading rollbacks take place. (20 POINTS)

Start TRANSACTION 1
T1 READ(A)
T1 READ(D)
T1 WRITE(D, 20, 25)
COMMIT T1
CHECKPOINT
Start TRANSACTION T2
T2 READ(B)
T2 WRITE B 12, 18
Start TRANSACTION T4
T4 READ(D)

T4 WRITE (D, 25, 15)
START TRANSACTION T3
T3 WRITE(C,30,40)
T4 READ(A)
T4 WRITE(A, 30, 20)
T4 COMMIT
T2 READ(D)
T2 WRITE(D,15,25)
SYSTEM CRASH

7. Describe what a cascading rollback is. (10 points)

Homework submission

Create a pdf file named hwk10lastnamefi.pdf, where lastname is your last name and fi is your first initial.