# CMPT606 – Advanced Database
# Fall 2019 – Homework 3

## Due Midnight Thursday 05/12/2019 – Submit your softcopy to blackboard.

**Exercise 1 [10 points]**
Consider the following 2 transactions T1 and T2:

| $T_1$ | $T_2$ |
|---|---|
| read(X); | read(X); |
| X:=X-10; | X:= X*1.02; |
| write(X); | read(Y); |
| read(Y); | Y:= Y*1.02; |
| Y:=Y+10; | write(X); |
| write(Y); | write(Y); |

a. [4 pts] Give a *serial schedule* for these transactions

b. [6 pts] Give an *equivalent conflict-serializable schedule* for these transactions.

**Exercise 2 [10 points]**
Draw the precedence graph for the following schedule and test whether it is conflict serializable or not.

| T1 | T2 | T3 |
|---|---|---|
| W(A) | | |
| R(B) | | |
| R(C) | | |
| | | W(B) |
| W(B) | | |
| | | W(C) |
| | R(C) | |
| | W(B) | |
| | W(C) | |
| | | R(A) |

## Exercise 3 [30 points]

Consider the following transaction log from the start of the execution of a database system that is capable of running undo/redo logging with checkpointing:
(1) < START T1 >
(2) <T1, A, 55, 20>
(3) <T1, B, 255, 20>
(4) <START T2>
(5) <T1, A, 89, 45>
(6) <T2, C, 40, 20>
(7) <COMMIT T1>
(8) <START T3>
(9) <T3, E, 50, 20>
(10) <T2, D, 50, 20>
(11) <START CKPT (T2,T3)>
(12) <T2, C, 70, 30>
(13) <COMMIT T2>
(14) <START T4>
(15) <T4, F, 105, 20>

(16) <COMMIT T3>
(17) <END CKPT>
(18) <T4, F, 155, 95>
(19) <COMMIT T4>
Suppose the log entries are in the format < $T_{id}$, Variable, Newvalue, Oldvalue >. What is the value of the data items A, B, C, D, E, and F on disk after recovery:
(1) if the system crashes just before line 10 is written to disk?
(2) if the system crashes just before line 13 is written to disk?
(3) if the system crashes just before line 14 is written to disk?
(4) if the system crashes just before line 19 is written to disk?
(5) if the system crashes just after line 19 is written to disk?