COMP9315 Final
Exam

The University of New South Wales
COMP9315 DBMS Implementation
Final Exam

DBMS
Implementation

[Instructions] [Notes] [PostgreSQL] [C]
[Q1] [Q2] [Q3] [Q4] [Q5] [Q6] [Q7] **[Q8]**

Question 8 (6 marks)

Consider the followng three transactions:

```
T1:                  T2:                  T3:

read(X)              read(Y)              read(X)

X = X + 1            Y = Y * 2            read(Y)

write(X)             read(X)              X = X - Y

read(Y)              X = X + Y            Y = Y - 3

Y = Y + 1            write(Y)             write(X)

write(Y)             write(X)             write(Y)

commit               commit               commit
```

Consider also the following concurrent schedule on these three transactions:

```
T1: R(X)        W(X)        R(Y)                    W(Y) C        |

T2:        R(Y)                      R(X)      W(Y)        W(X)   | system

T3:                     R(X)              R(Y)                    | failure
```

Note that we have omitted the computation on X and Y from the schedule. You should assume that it occurs somwhere between the read and the write of the relevant variable. The line of | symbols indicates where a system failure occurred.

Making the following assumptions:

- R = read, W = write, C = commit, A = abort
- initial value of X was 5, initial value of Y was 2
- the system uses write-ahead undo/redo logging
- log entries are written to disk just before the relevant `write` operation starts
- the log is empty before T1 starts; scans of the log can go all the way to its start
- the transaction descriptions show all of the *intended* operations
- any operations not completed before system failure do not actually happen

answer these questions:

a. Show all entries written to the log as the transactions progress in the given schedule (include `<start T`$_i$`>`, `<abort T`$_i$`>`, and `<commit T`$_i$`>`, entries as well as entries for updates)

b. Show how recovery takes place when the system restarts after the system failure
  - which transactions are placed on the undo and redo lists
  - which undo operations occur; which redo operations occur

Show all working.

Instructions:

- Type your answer to this question into the file called q8.txt

- Submit via: **give cs9315 exam_q8 q8.txt**
  or via: Webcms3 > exams > Final Exam > Submit Q8 > Make Submission

End of Question