

# PRACTICE PROBLEM SET #10

CSC 261/461 (Database Systems), Spring 2018,  
University of Rochester

## Problem 1

Apply Shared lock S(A) or exclusive lock E(A) on any object A as per Strict 2PL technique. Draw wait-for graphs for each schedule. Indicate if the schedule will cause deadlock.

| $T_1$ | $T_2$ |
|-------|-------|
| R(X)  |       |
|       | W(X)  |
| R(Y)  |       |
|       | W(Y)  |

Draw wait-for graphs

Deadlock? (y/n)

| $T_1$ | $T_2$ |
|-------|-------|
| R(X)  |       |
|       | R(Y)  |
| W(Y)  |       |
|       | W(X)  |

Draw wait-for graphs

Deadlock? (y/n)

## Problem 2

Two schedules (Read (R) and Write (W) operations of three transactions  $T_1$ ,  $T_2$ , and  $T_3$ ) are given. Assume operations are listed in a chronological order.

For both schedules, draw the conflict / precedence / serializability graph. Find an equivalent serial schedule (if any). Justify if no serial schedule is available.

### Precedence graph

| $T_1$ | $T_2$ | $T_3$ |
|-------|-------|-------|
| R(X)  |       |       |
| R(Y)  |       |       |
| W(Y)  |       |       |
|       |       | R(Y)  |
|       |       | R(X)  |
|       | R(Z)  |       |
|       | W(Z)  |       |
|       |       | W(Y)  |
|       |       | W(X)  |
| R(Z)  |       |       |
|       | R(Y)  |       |
|       | W(Y)  |       |
| W(X)  |       |       |

An equivalent serial schedule (if any)

Justify if no equivalent serial schedule is possible.

| $T_1$ | $T_2$ | $T_3$ |
|-------|-------|-------|
| R(Y)  |       |       |
| R(Z)  |       |       |
|       | R(X)  |       |
|       | W(X)  |       |
| W(Y)  |       |       |
| W(Z)  |       |       |
|       |       | R(Z)  |
|       | R(Y)  |       |
|       | W(Y)  |       |
|       |       | R(Y)  |
|       |       | W(Y)  |
|       |       | R(X)  |
|       |       | W(X)  |

### Precedence graph

An equivalent serial schedule (if any)

Justify if no equivalent serial schedule is possible.