Section 7: Transactions Worksheet Solutions

Precedence Graphs

Consider the following transaction schedules. For each schedule, draw the precedence graph and indicate if it is conflict-serializable or not, by circling **Yes or No.**

1. Conflict-serializable: **Yes / No**

r1(A); w1(B); r2(B); w2(C); r3(C); w3(A);

Solution: YES. The graph is 1 → 2 → 3.

2. Conflict-serializable: **Yes / No**

r1(A); r2(B); r3(B); w3(A); w2(C); r3(D); r3(C); w1(B);

Solution: NO. There is a cycle between transactions 1 and 3. T1 precedes T3 on A but follows it on B.

Consider a concurrency control manager that uses strict two phase locking that schedules three transactions:

- T1 : R1(A), R1(B), W1(A), W1(B), Co1
- T2 : R2(B), W2(B), R2(C), W2(C), Co2
- T3 : R3(C), W3(C), R3(A), W3(A), Co3

Each transaction begins with its first read operation, and commits with the Co statement.

a)

R2(B), W2(B), R3(C), W3(C), R3(A), W3(A), Co3, R2(C), W2(C), Co2, R1(A), R1(B), W1(A), W1(B), Co1

b)

R2(B), W2(B), R3(C), W3(C), R1(A), R1(B), W1(A), W1(B), Co1, R2(C), W2(C), Co2, R3(A), W3(A), Co3

c)

R1(A), R1(B), R2(B), W2(B), R2(C), W2(C), Co2, R3(C), W3(C), R3(A), W3(A), Co3, W1(A), W1(B), Co1

Answer the following questions for each of the schedules below:

1. **Is the schedule conflict-serializable? If yes, indicate a serialization order.**

a) Solution: yes: 3,2,1
b) Solution: no
c) Solution: no