**Database Systems & Web**

**Tutorial 13**

Q1. Consider histories H1 and H2 given below:

**H1 = r1(x); r2(z); r1(z); r3(x); r3(y);w1(x);w3(y); r2(y);w2(z);w2(y)**

**H2 = r1(x); r2(z); r3(x); r1(z); r2(y); r3(y);w1(x);w2(z);w3(y);w2(y)**

These histories are generated by the following transactions:

**T1 = r1(x); r1(z);w1(x)**

**T2 = r2(z); r2(y);w2(z);w2(y)**

**T3 = r3(x); r3(y);w3(y)**

(a) Draw the serialization graph for H1 and state whether or not it is serializable. If it is serializable, give the equivalent serial history.

(b) State whether H2 is or not serializable. If it is serializable, give the equivalent serial history.

Q2. For each of the following transaction schedules, draw the precedence (conflict) graph and decide if the schedule is conflict--serializable. If the schedule is conflict

serializable, , give an equivalent serial schedule. If the schedule is not conflict-serializable, explain why not.



Q3. Consider the following two transactions and schedule (time goes from top to bottom).



1. Is this schedule conflict-serializable? Explain why or why not.
2. Show how 2PL can ensure a conflict-serializable schedule for the same transactions above.
3. Show how the use of locks without 2PL can lead to a schedule that is NOT conflict serializable.

Q4. For each one of the following schedules decide whether they can be produced by a Two Phase Lock (2PL) scheduler



