|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **National University of Computer and Emerging Sciences, Lahore Campus** | | | | |
| C:\Users\saif\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\final design.jpg | **Course:** | **Database Systems** | **Course Code:** | **CS219** |
| **Program:** | **BS(Computer Science)** |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| **Practice Problem:** | **Transactions** |  |  |

**Q1.** Determine whether each schedule is strict, cascadeless, recoverable, or non-recoverable. Provide proper reason.

S1: r1(X); w1(X); r1(Y); w1(Y); r2(X); C1; w2(X); C2;

S2: r1(X); r2(X); w1(X); r1(Y); w1(Y); w2(X); C1; C2;

S3: r1(X); r2(X); w1(X); r1(Y); w1(Y); C1; w2(X); C2;

S4: r2(X); r1(X); w2(X); C2; w1(X); r1(Y); w1(Y); C1;

S5: r1(X); w1(X); r1(Y); w1(Y); r2(X); w2(X); C2; C1;

**Q2.** Consider the following schedule of four transactions T1, T2, T3, and T4.

S: r1(A); r4(A); w1(A); w3(B); r2(A); r2(B); w2(C); r4(B); r4(C); r2(D); r3(E).

Draw the serializability (precedence) graph for this schedule. State whether this schedule is (conflict) serializable or not. If the schedule is serializable, write down the equivalent serial schedule(s) otherwise explain why it is not.

**Q3.** Consider the following classes of schedules: conflict-serializable, view-serializable, strict, cascadeless, recoverable and non-recoverable. For a schedule *S: r2(X), w3(X), w1(Y), r2(Y), r2(Z), r3(Y), c3, c2, r1(Z), c1*, state which of the preceding classes it belongs to. Give proper reason. The actions are listed in the order they are scheduled. Also draw the serializability (precedence) graph for this schedule. If the schedule is conflict-serializable, write down the equivalent serial schedule(s) otherwise explain why it is not.

**Q4.** Given these transactions find the following schedules (if possible):

T1: r1(A); r1(B); w1(B); w1(A); c1;

T2: r2(B); w2(B); c2;

T3: r3(B); w3(B); B=B+2; w3(B); c3;

**a)** A recoverable schedule with cascade-rollback and lost update problem.

**b)** A cascade-free but not strict schedule.