**Tutorial 8**

**GC 312**

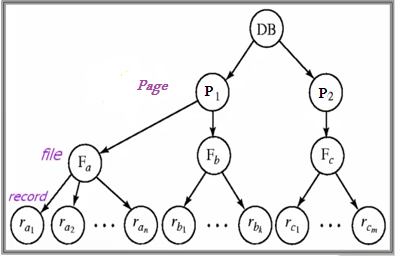
**Problem 1:**

Apply the timestamp ordering algorithm to these schedules and determine whether the algorithm will allow the execution of the schedules.

S1: r2(Z); r2(Y); w2(Y); r3(Y); r3(Z); r1(X); w1(X); w3(Y); w3(Z); r2(X); r1(Y); w1(Y); w2(X);

S2: r3(Y); r3(Z); r1(X); w1(X); w3(Y); w3(Z); r2(Z); r1(Y); w1(Y); r2(Y); w2(Y); r2(X); w2(X);

**Problem 2:**

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Apply the Multiple Granularity protocol to the following transaction:

1. Suppose that transaction T18 reads record ra2 in file Fa.
2. Suppose that transaction T19 modifies record ra9 in file Fa.
3. Suppose that transaction T20 reads all the records in file Fa.
4. Suppose that transaction T21 reads the entire database.