Sample solutions
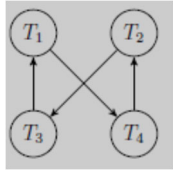
Question 1.
    (A) There is a cycle in the wait-for-graph, so there is a deadlock

    (B) Wait-die
- $X_1(B)$: g
- $X_4(A)$: g
- $S_3(C)$: g
- $S_1(A)$: a (T1 aborts)
- $X_2(D)$: g
- $X_2(C)$: a (T2 aborts)
- $X_3(B)$: g (no locks held on B since T1 was aborted)
- $S_4(D)$: g (no locks held on D since T2 was aborted)

    (C) Wound-wait
- $X_1(B)$: g
- $X_4(A)$: g
- $S_3(C)$: g
- $S_1(A)$: b
- $X_2(D)$: g
- $X_2(C)$: b
- $X_3(B)$: g (T1 aborts)
- $S_4(D)$: g (T2 aborts)

Question 2.
1. IS on D; IS on F2; IS on P1200; S on P1200:5.
2. IS on D; IS on F2; IS on P1200, S on 1201 through 1204, IS on P1205; S on P1200:98/99/100, S on P1205:1/2.
3. IS on D; S on F1
4. IS on D; IS on F1; S on P500 through P520.
5. IS on D; S on F1 (performance hit of locking 970 pages is likely to be higher than other blocked transactions).
6. SIX on D; SIX on F1. It is also fine to acquire IX on D. See slide 79.
7. IX on D; IX on F2; X on P1200. (Locking the whole page is not necessary, but it would require some reorganization or compaction.)
8. IX on D; X on F1 and F2.

Question 3
T1, T4, T5 validate successfully.

Question 4
B & C. A is wrong because internal node should also be modified, etc. Same for D.