KONGU ENGINEERING COLLEGE, PERUNDURAI – 638060
DEPARTMENT OF INFORMATION TECHNOLOGY
DATABASE MANAGEMENT SYSTEM
TUTORIAL – 5

Roll No : Date: Marks : 20

1. Consider the following log sequence of two transactions on a bank account, with initial balance 12000, that transfer 2000 to a mortgage payment and then apply a 5% interest.

1. T1 start
2. T1 B old=12000 new=10000
3. T1 M old=0 new=2000
4. T1 commit
5. T2 start
6. T2 B old=10000 new=10500
7. T2 commit

Suppose the database system crashes just before log record 7 is written. When the system is restarted, which one statement is true of the recovery procedure?

A. We must redo log record 6 to set B to 10500
B. We must undo log record 6 to set B to 10000 and then redo log records 2 and 3.
C. We need not redo log records 2 and 3 because transaction T1 has committed.
D. We can apply redo and undo operations in arbitrary order because they are idempotent

2. Which of the following scenarios may lead to an irrecoverable error in a database system?

A. A transaction writes a data item after it is read by an uncommitted transaction
B. A transaction reads a data item after it is read by an uncommitted transaction
C. A transaction reads a data item after it is written by a committed transaction
D. A transaction reads a data item after it is written by an uncommitted transaction

3. Consider the following transaction involving two bank accounts x and y.
read(x); x := x – 50; write(x); read(y); y := y + 50; write(y) The constraint that the sum of the accounts x and y should remain constant is that of A. Atomicity **B. Consistency** C. Isolation D. Durability

4. Consider a simple checkpointing protocol and the following set of operations in the log.
(start, T4); (write, T4, y, 2, 3); (start, T1); (commit, T4); (write, T1, z, 5, 7);(checkpoint); (start, T2); (write, T2, x, 1, 9); (commit, T2); (start, T3); (write, T3, z, 7, 2); If a crash happens now and the system tries to recover using both undo and redo operations, what are the contents of the undo list and the redo list

A. Undo: T3, T1; Redo: T2 B. Undo: T3, T1; Redo: T2, T4
C. Undo: none; Redo: T2, T4, T3; T1 D. Undo: T3, T1, T4; Redo: T2

5. Which of the following concurrency protocol ensures both conflict serializability and freedom from deadlock? (a)2 phase Locking (b)Time stamp - ordering

A.Both (a) and (b) B.(a) only **C.(b) only** D.Neither (a) nor (b)

6. Which of the following is correct with respect to Two phase commit protocol?

A. **Ensures serializability** B. Prevents Deadlock C. Detects Deadlock D. Recover from Deadlock

7. Which of the following contains complete record of all activity that affected the contents of a database during a certain period of time?

A. Transaction log B. Query language C. Report writer D. Data manipulation language

8. _____ rules used to limit the volume of log information that has to be handled and processed in the event of system failure involving the loss of volatile information.

(A) Write-ahead log **(B) Check-pointing** (C) Log buffer (D) Thomas

9. Let us assume that transaction T1 has arrived before transaction T2. Consider the schedule

S=r1(A); r2(B) ; w2(A); w1(B); Which of the following is true?
A. Allowed under basic timestamp protocol. **B. Not allowed under basic timestamp protocols because T1 is rolled back** C. Not allowed under basic timestamp protocols because T2 is rolled back D. None of these

10. Consider the following sequence of log records in the log file before the system crashed:
(Start T1), W1 (A, 3, 4), W1 (B, 1, 2), (commit T1), (start T2), W2 (B, 2, 7), W2 (A, 4, 8), system crash
Which of the following would be the recovery sequence in the immediate database modification scheme?
A. Undo T2 {A: =4, B: =2}, Redo T1 {A: =4, B: =2}
B. Redo T1 {A: =4, B: =2}, Undo T2 {A: =4, B: =2}
C. Redo T1 {A: =4, B: =2}, Redo T2 {B: =7, A: =8}
D. Undo T2 {A: =4, B: =2}, Undo T1 {B: =1, A: =3}

11. Consider the following log file, created in a basic check pointing recovery protocol environment:
(start T1); (W1,A,2,3); (start T2); (W2,B,4,5); (W1,B,5,6); (start T3); (commit T1); (W3,A,3,6);
(Checkpoint, T3,T2); (start T4); (W4,A,6,7); (W3,A,7,9); (W4,B,6,7); (commit T4); (start T5); (W5,A,9,4);
If the system crashes now, what is the correct order of recovery operations using undo-list and redo-list?
A. Redo: {(T4,A:=7);(T4,B:=7)}; Undo: {(T5,A:=9);(T3,A:=7);(T2,no op)}
B. Redo:{(T4,A:=7);(T3,A:=9);(T4,B:=7);(T5,A:=4)}
C. Undo: {(T5,A:=9);(T3,A:=7);(T2,no op)}; Redo:{(T4,A:=7);(T4,B:=7)}
D. Undo:{(T5,A:=9);(T4,B:=6);(T3,A:=7);(T4,A:=6)}

12. Which of the following is true?
A. Blind writes appear in any schedule that is view serializable but not conflict serializable
B. Blind writes appear in all view serializable schedules that are also conflict serializable
C. Blind writes appear only in conflict serializable schedules that are not view serializable
D. Blind writes not appear in non conflict serializable schedules

13. Assume a basic checkpointing recovery protocol. Suppose the following schedule is being run:
(start, T1); (W1, A, 1200, 1000); (commit, T1); (checkpoint); (start, T2); (W2, B, 1500, 1800); (start, T3); (W3, A,1000, 500); (start, T4); (W4, C, 3000, 4000); (W3, D, 3000, 2000); (commit, T3); (W2, A, 500, 1500);
Suppose the schedule crashes at this point. What are the undo and redo lists in the correct order?
A. Undo List: T4, T2; Redo List: T1 B. Undo List: T2, T4; Redo List: T3
C. Undo List: T4, T2; Redo List: T1, T3 **D. Undo List: T4, T2; Redo List: T3**

14. Which of the following transaction(s) follow 2-phase locking protocol?
1. lock1(a)read1(a)lock2(b)write2(b)lock1(c)unlock2(b)unclock1(c)lock2(c)unlock1(a)
2. lock1(a)lock1(b)unlock1(a)lock2(a)write2(a)unlock2(a)unlock1(b)
3. lock1(a)lock2(b)lock1(c)lock3(d)unlock2(b)lock3(b)unlock1(a)unlock3(d)unlock1(c)lock3(c)
A. Only 1 **B. Only 2** C. Only 1 and 3 D. None of them

15. In wait-die scheme, transactions T1 and T2 have timestamps 10 and 15 respectively. If T2 requests a data item held by T1 then
A. T2 will be rolled back B. T2 will wait C. T1 will be rolled back D. T1 will wait

16. Consider the following schedule. All the locks are exclusive, and between the lock L and unlock U operations, the corresponding data item is first read and then written.
S: L1(A); L3(D); L1(B); U1(A); L2(C); L2(B); L1(D); L2(B); L3(C); L4(A); L4(C); L5(A);The schedule will result in a deadlock. A. True **B. False**

17. Consider the following schedule S.
S: L1(A); L3(D); L1(B); U1(A); L2(C); L2(B); L1(D); L2(B); L3(C); L4(A); L4(C); L5(A); Which of the following is a valid set of transactions that are potential victims?

A. {T1; T2; T3; T5} B. {T1; T2} C. {T1; T2; T3; T4} **D. {T1; T2; T3}**
Answer: Transactions {T1; T2; T3} are involved in cycle of wait-for graph of the schedule.

18. Suppose a deadlock occurs in the schedule S given below.
S: L1(A); L3(D); L1(B); U1(A); L2(C); L2(B); L1(D); L2(B); L3(C); L4(A); L4(C); L5(A); A transaction that causes the least number of cascading rollbacks is decided to be chosen as victim, then which of the following transaction cannot be chosen as a victim?
A. T3 B. T2 **C. T1** D. Cannot be decided
Answer: T1 will cause cascading rollback, if aborted as T4 is reading item A which was written by T1.

19. Consider three data items D1,D2, and D3, and the following execution schedule of transactions T1, T2, and T3. In this, R(D) and W(D) denote the actions reading and writing the data item D respectively.
S: R2(D3); R2(D2); W2(D2); R3(D2); R3(D3); R1(D1);W1(D1); W3(D2); W3(D3); R2(D1); R1(D2); W1(D2); W2(D1); Check this schedule is conflict serializable or not.

This schedule is not conflict serializable.

20. Find the given schedule is Conflict serializable or view serializable or both.
S : R1(A); R2(A); R3(A); R4(A); W1(B); W2(B); W3(B); W4(B)

This schedule is View serializable only.