

الإسم الرقم

أجب عن جميع الأسئلة
ورقة الإمتحان تشتمل على 6 صفحات

120 Marks

Question 1 (40 marks)

1. Give short definition to the following Terms:

(12 Marks- 3 Marks each)

a) Data base management system (DBMS)?

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b) Time Stamp?

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c) Transaction?

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d) Index?

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2. Fill in blank

(6 Mark- 2 Marks each)

1. A transaction can have one of two outcomes. If it completes successfully, the transaction is to have, on the other hand, if the transaction does not execute successfully, the transaction is ..?

2. There are two main concurrency control techniques that allow transactions to execute safely in parallel subject to certain constraints.....And ..?

3. The basic rules for locking are and ..?

3. Give one example of batch applications and other for online applications? [3]

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4. Give some examples of utility services provided by DBMS? [3]

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5. What are the three general techniques for handling deadlock? [4]

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6. Mention four of the facilities a DBMS should provide to assist with recovery? [4]

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7. Mention the protocols that prevent cascading rollbacks? [4]

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8. What are the problems of the two-phase locking protocol? [4]

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Question 2 (30 marks)

Answer all questions. The answer to each question is a letter of one of the options below the question.

(3 Marks each)

1. Assume transaction A holds a shared lock R. If transaction B also requests for a shared lock on R.
(A) It will result in a deadlock situation. (B) It will immediately be rejected.
(C) It will immediately be granted. (D) It will be granted as soon as it is released by A.
2. Checkpoints are a part of
(A) Recovery measures. (B) Security measures.
(C) Concurrency measures. (D) Authorization measures.
3. Precedence graphs help to find a
(A) Serializable schedule. (B) Recoverable schedule.
(C) Deadlock free schedule. (D) Cascadeless schedule.
4. Shadow paging has
(A) No redo (B) No undo
(C) Redo but no undo (D) Neither redo nor undo
5. Cascading rollback is avoided in all protocol except
(A) Strict two-phase locking protocol. (B) Tree locking protocol
(C) Two-phase locking protocol (D) Validation based protocol.
6. Wait-for graph is used for
(A) Detecting view serializability. (B) Detecting conflict serializability.
(C) Deadlock prevention (D) Deadlock detection
7. Acquires all locks but cannot release any locks?
(A) Growing (B) Shrinking
(C) Deadlock (D) Timestamps
8. Coordinates transactions on behalf of application programs?
(A) Transaction manager (B) Scheduler
(C) Recovery manager (D) Buffer manager

9. Which of the following concurrency control schemes is not based on the serializability property?
 (A) Two – phase locking (B) Graph-based locking
 (C) Time-stamp based locking (D) None of these .
10. Isolation of the transactions is ensured by
 (A) Transaction management (B) Application programmer
 (C) Concurrency control (D) Recovery management

Question 3 (20 marks)

Choose (\checkmark) for the right sentence and (\times) for wrong sentence **(2 Marks each)**

| Sentence | Ans |
|---|-----|
| 1. The scheduler is sometimes referred to as the lock manager. | |
| 2. An apparently successfully completed update operation by one user can be overridden by another user. This is known as the lost update problem. | |
| 3. The uncommitted dependency problem occurs when one transaction is allowed to see the final results of another transaction before it has committed. | |
| 4. To prevent inconsistency from transactions interfering with one another, it is essential to guarantee serializability of concurrent transactions. | |
| 5. If a transaction fails, the atomicity property requires that we redo the effects of the transaction. | |
| 6. The durability property states that once a transaction commits, its changes can undo. | |
| 7. Cascading rollbacks are desirable since they potentially lead to the redoing of a significant amount of work. | |
| 8. In a hash file, records have to be written sequentially to the file. | |
| 9. The use of Thomas’s write rule allows schedules to be generated that would not have been possible under the other concurrency protocols. | |
| 10. In Time stamping young transactions with smaller timestamps, get priority in the event of conflict. | |

Question 4 (30 marks)

Answer all the question in details

1. Briefly mention three functions of each client and server in Two-Tier Client–Server Architecture? **(4 Marks - 2 marks each)**

a) Client

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b) Server

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2. The three-tier design has many advantages over traditional two-tier or single-tier designs.
Briefly mention three of these advantages? [4]

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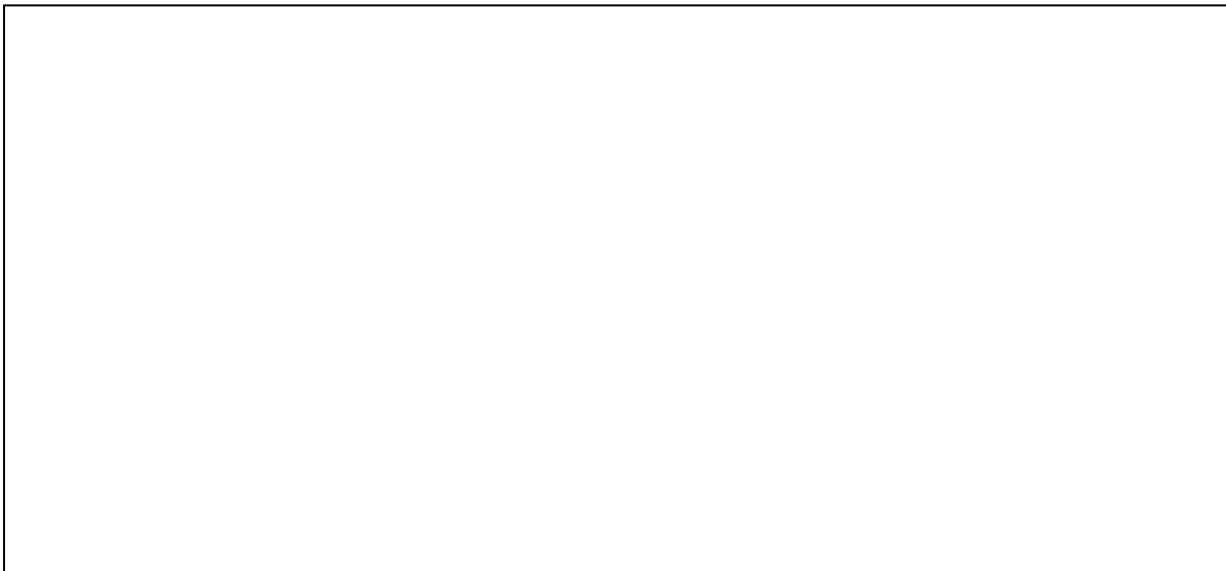
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3. Using drawing describe the state transition diagram for a transaction? [5]



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4. In table below, transaction T1 is executing concurrently with transaction T2.

[6]

| Time | T ₁ | T ₂ | bal_x |
|----------------|--|---|------------------------|
| t ₁ | | begin_transaction | 100 |
| t ₂ | begin_transaction | read(bal_x) | 100 |
| t ₃ | read(bal_x) | bal_x = bal_x + 100 | 100 |
| t ₄ | bal_x = bal_x - 10 | write(bal_x) | 200 |
| t ₅ | write(bal_x) | commit | 90 |
| t ₆ | commit | | 90 |

A) What type of problem caused by this concurrency?

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B) Mention the type of concurrency control techniques can be used to prevent this problem?

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C) Show how concurrency control techniques allow transactions T₁ and T₂ to execute safely in parallel. Fill the table with the solution?

| Time | T ₁ | T ₂ | bal_x |
|-----------------|----------------|----------------|------------------------|
| t ₁ | | | |
| T ₂ | | | |
| T ₃ | | | |
| T ₄ | | | |
| T ₅ | | | |
| T ₆ | | | |
| T ₇ | | | |
| T ₈ | | | |
| T ₉ | | | |
| T ₁₀ | | | |

5. Compare between the following techniques and concepts:- (6 Marks - 3 marks each)

A) Deferred update and Immediate Update for recovery?

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