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| 1. Most real-world database transactions are formed by only one database request.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 484 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 2. Although the DBMS is designed to recover a database to a previous consistent state when an interruption prevents the completion of a required set of transactions, the transactions themselves are defined by the end user or programmer and must be semantically correct.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | p. 486 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Comprehension | |

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| 3. The DBMS guarantees that the semantic meaning of a transaction truly represents the real-world event.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 486 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 4. Atomicity indicates the permanence of the database's consistent state.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 487 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 5. Serializability means that data used during the execution of a transaction cannot be used by a second transaction until the first one is completed.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 487 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 6. Incomplete or improper transactions can have a devastating effect on database integrity.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 487 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 7. Durability requires that all portions of the transaction must be treated as a single, logical unit of work in which all operations are applied and completed to produce a consistent database.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 487 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 8. The multiuser DBMS must implement controls to ensure serializability and isolation of transactions, in addition to atomicity and durability, in order to guard the database's consistency and integrity.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 488 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 9. The phenomenon of uncommitted data occurs when two transactions are executed concurrently and the first transaction is rolled back after the second transaction has already accessed the uncommitted data—thus violating the isolation property of transactions.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | p. 491 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-2 - LO10-2 | | *NATIONAL STANDARDS:* | United States - BUSPROG: Analytic | | *TOPICS:* | Concurrency Control | | *KEYWORDS:* | Bloom's: Comprehension | |

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| 10. The scheduler establishes the order in which the operations within concurrent transactions are executed.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 494 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-2 - LO10-2 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 11. A scheduler facilitates data isolation to ensure that two transactions do not update the same data element at the same time.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 495 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-2 - LO10-2 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 12. A lock guarantees the open use of a data item to multiple transactions.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 495 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 13. In a page-level lock, the DBMS will lock an entire diskpage.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 497 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 14. A field-level lock allows concurrent transactions to access the same row, as long as they require the use of different fields within that row.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 498 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 15. A shared lock produces no conflict as long as all the concurrent transactions are read-write only.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 499 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 16. A growing phase in a two-phase lock is when a transaction acquires all the required locks without locking any data.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 500 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 17. Timestamps must only have the single property of uniqueness.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 502 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-4 - LO10-4 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Time Stamping Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 18. Time stamping demands a lot of system resources because many transactions might have to be stopped, rescheduled, and stamped.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 502 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-4 - LO10-4 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Time Stamping Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 19. An optimistic approach is based on the assumption that the majority of the database operations do not conflict.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 503 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-5 - LO10-5 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Time Stamping Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 20. When using an optimistic approach, during the read phase, a transaction reads the database, executes the needed computations, and makes the updates to a private copy of the database values.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | p. 504 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-5 - LO10-5 | | *NATIONAL STANDARDS:* | United States - BUSPROG: Analytic | | *TOPICS:* | Concurrency Control with Time Stamping Methods | | *KEYWORDS:* | Bloom's: Comprehension | |

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| 21. The serializable isolation level is the least restrictive level defined by the ANSI SQL standard.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 505 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-6 - LO10-6 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | ANSI Level of Transaction Isolation | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 22. The reason for the different levels of isolation is to increase transaction concurrency.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 505 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-6 - LO10-6 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | ANSI Level of Transaction Isolation | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 23. The transaction recovery write-ahead-log protocol ensures that transaction logs are always written before any database data are actually updated.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 506 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-7 - LO10-7 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Database Recovery Management | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 24. The last step in the write-through technique recovery procedure is to identify the last checkpoint in the transaction log.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 507 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-7 - LO10-7 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Database Recovery Management | | *KEYWORDS:* | Bloom's: Knowledge | |

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| Multiple Choice |

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| 25. Transaction is a \_\_\_\_ unit of work that must be either entirely completed or aborted​   |  |  |  | | --- | --- | --- | |  | a. | ​time | |  | b. | ​practical | |  | c. | ​logical | |  | d. | ​physical |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 484 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 26. A consistent database state is \_\_\_   |  |  |  | | --- | --- | --- | |  | a. | ​one in which all tables have foreign keys | |  | b. | one in which all data integrity constraints are satisfied | |  | c. | ​one in which all table are normalized | |  | d. | ​one in which all SQL statements only update one table at a time |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 484 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 27. \_\_\_\_\_ requires that all operations of a transaction be completed.   |  |  |  | | --- | --- | --- | |  | a. | ​Specificity | |  | b. | Atomicity | |  | c. | ​Durability | |  | d. | ​Time stamping |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 484 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 28. \_\_\_\_\_ means that data used during the execution of a transaction cannot be used by a second transaction until the first one is completed.   |  |  |  | | --- | --- | --- | |  | a. | ​Serializability | |  | b. | Atomocity | |  | c. | Isolation | |  | d. | ​Time stamping |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 487 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 29. A single- user database system automatically ensures\_\_\_\_\_ of the database, because only one transaction is executed at a time.   |  |  |  | | --- | --- | --- | |  | a. | ​serializability and durability | |  | b. | atmocity and isolation | |  | c. | serializability and Isolation | |  | d. | ​atomicity and serializability |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | p. 488 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Comprehension | |

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| 30. The ANSI ha define standard that govern SQL database transactions. Transaction support is provided by two SQL statements\_\_\_\_ and ROLLBACK.   |  |  |  | | --- | --- | --- | |  | a. | ​RETRIEVE | |  | b. | ASSIGN | |  | c. | UPDATE | |  | d. | ​COMMIT |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 488 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 31. ANSI ha defines four events that signal the end of a transaction. Of the following events, which is defined by ANSI as being equivalent to a COMMIT?   |  |  |  | | --- | --- | --- | |  | a. | Five SQL statements are executed. | |  | b. | ​The end of a program is successfully reached. | |  | c. | The program is abnormally terminated. | |  | d. | The database is shut down for  maintenance |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 488 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 32. The ANSI ha define standard that govern SQL database transactions. Of the following events, which is defined by ANSI as being equivalent to a ROLLBACK?   |  |  |  | | --- | --- | --- | |  | a. | ​Five SQL statements are executed. | |  | b. | The end of a program is successfully reached. | |  | c. | The program is abnormally terminated. | |  | d. | The database is shut down for maintenance. |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 488 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 33. The implicit beginning of a transaction is \_\_\_   |  |  |  | | --- | --- | --- | |  | a. | when database is started | |  | b. | when a table is accessed for the first time | |  | c. | when the first SQL statement is encountered | |  | d. | when the COMMIT command is issued |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 489 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 34. The information stored in the \_\_\_ is used by the DBMS for a recovery requirement triggered by a ROLLBACK statement, a program's adnormal termination, or a system failure such as a network discrepancy or a disk crash   |  |  |  | | --- | --- | --- | |  | a. | data dictionary | |  | b. | metadata | |  | c. | rollback manager | |  | d. | transaction log |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 489 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 35. One of the three most common data integrity and consistency problem is \_\_\_.   |  |  |  | | --- | --- | --- | |  | a. | lost updates | |  | b. | disk failures | |  | c. | user errors | |  | d. | deadlocks |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 490 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-2 - LO10-2 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 36. \_\_\_\_\_ occurs when a transaction accesses data before and after one or more other transactions finish working with such data.   |  |  |  | | --- | --- | --- | |  | a. | Inconsistent retrievals | |  | b. | The phenomena of uncommitted data | |  | c. | lost update problems | |  | d. | Dirty read problems |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 492 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-2 - LO10-2 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 37. As long as two transactions, T1 and T2, access \_\_\_\_ data, there is no conflict, and the order of execution is irrelevant to the final outcome.   |  |  |  | | --- | --- | --- | |  | a. | shared | |  | b. | common | |  | c. | unrelated | |  | d. | locked |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 494 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-2 - LO10-2 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 38. \_\_\_ are required to prevent another transaction form reading inconsistent data   |  |  |  | | --- | --- | --- | |  | a. | Locks | |  | b. | Schedules | |  | c. | Stamps | |  | d. | Logs |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 495 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control With Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 39. The \_\_\_ manager is responsible for assigning and policing the locks used by transactions.   |  |  |  | | --- | --- | --- | |  | a. | transaction | |  | b. | database | |  | c. | lock | |  | d. | schedule |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 495 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control With Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 40. Lock\_\_\_\_\_ indicates the level of lock use.   |  |  |  | | --- | --- | --- | |  | a. | granularity | |  | b. | shrinking | |  | c. | growing | |  | d. | serializability |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 496 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control With Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 41. A \_\_\_\_lock locks the entire table preventing access to any row by a transaction while another transaction is using the table.   |  |  |  | | --- | --- | --- | |  | a. | database-level | |  | b. | table-level | |  | c. | page-level | |  | d. | row-level |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 496 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control With Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 42. A \_\_\_\_lock locks the entire diskpage.   |  |  |  | | --- | --- | --- | |  | a. | transaction-level | |  | b. | table-level | |  | c. | page-level | |  | d. | row-level |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 497 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control With Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 43. A diskpage, or page, is the equivalent of a \_\_\_.   |  |  |  | | --- | --- | --- | |  | a. | database table | |  | b. | disk sector | |  | c. | database schema | |  | d. | diskblock |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 497 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control With Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 44. A\_\_\_\_\_ allows concurrent transactions to access different rows of the same table.   |  |  |  | | --- | --- | --- | |  | a. | database table | |  | b. | table-level | |  | c. | page-level | |  | d. | row-level |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 498 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control With Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 45. A(n)\_\_\_\_\_ specifically reserves access to the transaction that locked the object.   |  |  |  | | --- | --- | --- | |  | a. | shared lock | |  | b. | exclusive lock | |  | c. | binary lock | |  | d. | deadlock |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 499 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control With Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 46. A(n)\_\_\_\_\_ lock exists when concurrent transactions are granted read access on the basis of a common lock   |  |  |  | | --- | --- | --- | |  | a. | shared | |  | b. | exclusive | |  | c. | binary | |  | d. | two-phase |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 499 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control With Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 47. What is a rule that applies to the two-phase locking protocol.   |  |  |  | | --- | --- | --- | |  | a. | two transaction cannot have conflicting lock. | |  | b. | no unlock operation can precede a lock operation in a different transaction. | |  | c. | no data is affected until all locks are released. | |  | d. | no data is affected until the transaction is in its locked position |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | p. 500 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: Analytic | | *TOPICS:* | Concurrency Control With Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 48. A(n) \_\_\_\_ phase in a two phase lock is when  transaction releases all locks and cannot obtain any new lock.   |  |  |  | | --- | --- | --- | |  | a. | growing | |  | b. | shrinking | |  | c. | locking | |  | d. | unlocking |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 500 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control With Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 49. A(n) \_\_\_\_ condition occurs when two or more transactions wait for ach other to unlock data.   |  |  |  | | --- | --- | --- | |  | a. | deadlock | |  | b. | exclusive lock | |  | c. | binary lock | |  | d. | two-phase lock |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 500 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control With Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 50. The \_\_\_\_\_ approach to scheduling concurrent transactions assigns a global unique stamp to each transaction.   |  |  |  | | --- | --- | --- | |  | a. | scheduled | |  | b. | table-locking | |  | c. | unique | |  | d. | timestamping |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 502 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-4 - LO10-4 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control With Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 51. In the wait/die scheme,:   |  |  |  | | --- | --- | --- | |  | a. | ​ the older transaction rolls back the younger transaction and reschedule it | |  | b. | the younger, preempted transaction is rescheduled using the same time stamp. | |  | c. | the older transaction wait for the younger one to complete and release its locks. | |  | d. | both younger and older transactions wait indefinitely to be released. |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 503 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-4 - LO10-4 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 52. In the optimistic approach, during the\_\_\_\_ phase, a transaction scans the database, executes the needed computations, and makes the updates to a private copy of the database values.   |  |  |  | | --- | --- | --- | |  | a. | read | |  | b. | validation | |  | c. | write | |  | d. | shared |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 504 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-5 - LO10-5 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 53. In the optimistic approach, during the\_\_\_\_ phase, changes are permanently applied to the database.   |  |  |  | | --- | --- | --- | |  | a. | read | |  | b. | validation | |  | c. | write | |  | d. | shared |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 504 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-5 - LO10-5 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 54. The \_\_\_\_\_ isolation level ensures that queries return consistent results.   |  |  |  | | --- | --- | --- | |  | a. | read uncommitted | |  | b. | read committed | |  | c. | serializable | |  | d. | repeatable read |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 504 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-6 - LO10-6 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 55. A(n)  \_\_\_\_\_\_\_ occurs when a transaction executes a query at time T1, and it runs the same query at same time T2, yielding additional rows that satisfy the query   |  |  |  | | --- | --- | --- | |  | a. | phantom read | |  | b. | dirty read | |  | c. | uncommitted dependency | |  | d. | nonrepeatable read |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 504 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-6 - LO10-6 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 56. Although the DBMS is designed to recover a database to a previous consistent state when an interruption prevents the completion of a required set of transactions, the transactions themselves are defined by the end user or programmer and must be \_\_\_\_\_ correct.   |  |  | | --- | --- | | *ANSWER:* | semantically | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | p. 486 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Comprehension | |

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| 57. If a(n) \_\_\_\_\_ is issued before the termination of a transaction, the DBMS will restore the database only for that particular transaction, rather than for all transactions, in order to maintain the durability of the previous transactions.   |  |  | | --- | --- | | *ANSWER:* | ROLLBACK | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | p. 489 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Comprehension | |

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| 58. The objective of \_\_\_\_\_ control is to ensure the serializability of transactions in a multiuser database environment.   |  |  | | --- | --- | | *ANSWER:* | concurrency | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 490 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 59. The \_\_\_\_\_ occurs when two concurrent transactions, T1 and T2, are updating the same data element and one of the updates is lost.   |  |  | | --- | --- | | *ANSWER:* | lost update problem | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 490 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-2 - LO10-2 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 60. The scheduler’s main job is to create a(n) \_\_\_\_\_ of a transaction’s operation, in which the interleaved executions of transactions yield the same results as if the transactions were executed in serial order.   |  |  | | --- | --- | | *ANSWER:* | serializable schedule | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 494 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 61. The \_\_\_\_\_ interleaves the execution of database operations to ensure serializability.   |  |  | | --- | --- | | *ANSWER:* | scheduler | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 494 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-2 - LO10-2 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 62. To determine the appropriate order of the operations, the scheduler bases its actions on concurrency control algorithms, such as \_\_\_\_\_ or time stamping methods.   |  |  | | --- | --- | | *ANSWER:* | locking | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 494 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-2 - LO10-2 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 63. Most multiuser \_\_\_\_\_ automatically initiate and enforce locking procedures, where all locking information is managed by the lock manager.   |  |  | | --- | --- | | *ANSWER:* | DBMSs  database management systems  database management systems (DBMSs) | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 495 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 64. \_\_\_\_\_ can take place at any of the following levels: database, table, page, row, or field.   |  |  | | --- | --- | | *ANSWER:* | Locking | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 496 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 65. \_\_\_\_\_-level locks are less restrictive than database-level locks, but they create traffic jams when many transactions are waiting to access the same table.   |  |  | | --- | --- | | *ANSWER:* | Table | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 496 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 66. As a rule, a(n) \_\_\_\_\_ must unlock the object after its termination.   |  |  | | --- | --- | | *ANSWER:* | transaction | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 67. The \_\_\_\_\_ rule states that only one transaction at a time can own an exclusive lock on the same object.   |  |  | | --- | --- | | *ANSWER:* | mutual exclusive | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 499 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 68. If T1 has not unlocked data item Y, T2 cannot begin; if T2 has not unlocked data item X, T1 cannot continue. Consequently, T1 and T2 each wait for the other to unlock the required data item. Such a deadlock is also known as a(n) \_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | deadly embrace | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 500-501 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 69. Uniqueness ensures that no equal time stamp values can exist, and \_\_\_\_\_ ensures that time stamp values always increase.   |  |  | | --- | --- | | *ANSWER:* | monotonicity | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 502 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-4 - LO10-4 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 70. In a heavily used database management system (DBMS), the prevention and detection of \_\_\_\_\_ constitutes an important DBMS function.   |  |  | | --- | --- | | *ANSWER:* | deadlocks | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 504 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-5 - LO10-5 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 71. \_\_\_\_\_ ensure that a disk physical failure will not impair the DBMS's ability to recover data.   |  |  | | --- | --- | | *ANSWER:* | Redundant transaction logs | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 506 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-7 - LO10-7 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Database Recovery Management | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 72. Database transaction \_\_\_\_\_ restores a database from an inconsistent state to a previously consistent state.   |  |  | | --- | --- | | *ANSWER:* | recovery | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | p. 506 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-7 - LO10-7 | | *NATIONAL STANDARDS:* | United States - BUSPROG: - Analytic | | *TOPICS:* | Database Recovery Management | | *KEYWORDS:* | Bloom's: Knowledge | |

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| 73. What is transaction isolation and why it is important?   |  |  | | --- | --- | | *ANSWER:* | Isolation means that the data used during the execution of a transaction cannot be used by a second transaction until the first one is completed. In other words, if transaction T1 is being executed and is using the data item X, that data item cannot be accessed by any other transaction (T2 ... Tn) until T1 ends. This property is particularly useful in multiuser database environments because several users can access and update the database at the same time. | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | p. 487 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Comprehension | |

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| 74. Explain the transaction log. What is its function?   |  |  | | --- | --- | | *ANSWER:* | A DBMS uses a transaction log to keep track of all transactions that update the database. The DBMS uses the information stored in this log for a recovery requirement triggered by a ROLLBACK statement, a program’s abnormal termination, or a system failure such as a network discrepancy or a disk crash. | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | p. 489 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-1 - LO10-1 | | *NATIONAL STANDARDS:* | United States - BUSPROG: Analytic | | *TOPICS:* | What is a Transaction? | | *KEYWORDS:* | Bloom's: Comprehension | |

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| 75. How does a shared/exclusive lock schema increase the lock manager’s overhead?   |  |  | | --- | --- | | *ANSWER:* | The type of lock held must be known before a lock can be granted.  Three lock operations exist: READ\_LOCK to check the type of lock, WRITE\_LOCK to issue the lock, and UNLOCK to release the lock.  The schema has been enhanced to allow a lock upgrade from shared to exclusive and a lock downgrade from exclusive to shared. | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | p. 500 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Comprehension | |

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| 76. What are the three basic techniques to control deadlocks?   |  |  | | --- | --- | | *ANSWER:* | 1. Deadlock prevention. A transaction requesting a new lock is aborted when there is the possibility that a deadlock can occur. If the transaction is aborted, all changes made by this transaction are rolled back and all locks obtained by the transaction are released. The transaction is then rescheduled for execution. Deadlock prevention works because it avoids the conditions that lead to deadlocking. 2. Deadlock detection. The DBMS periodically tests the database for deadlocks. If a deadlock is found, the “victim” transaction is aborted (rolled back and restarted) and the other transaction continues. 3. Deadlock avoidance. The transaction must obtain all of the locks it needs before it can be executed. This technique avoids the rolling back of conflicting transactions by requiring that locks be obtained in succession. However, the serial lock assignment required in deadlock avoidance increases action response times. | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | p. 502 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-3 - LO10-3 | | *NATIONAL STANDARDS:* | United States - BUSPROG: Analytic | | *TOPICS:* | Concurrency Control with Locking Methods | | *KEYWORDS:* | Bloom's: Comprehension | |

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| 77. What are database checkpoints?   |  |  | | --- | --- | | *ANSWER:* | Database checkpoints are operations in which the DBMS writes all of its updated buffers to disk. While this is happening, the DBMS does not execute any other requests. A checkpoint operation is also registered in the transaction log. As a result of this operation, the physical database and the transaction log will be in sync. This synchronization is required because update operations update the copy of the data in the buffers and not in the physical database. Checkpoints are automatically scheduled by the DBMS several times per hour. Checkpoints also play an important role in transaction recovery | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | p. 507 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-7 - LO10-7 | | *NATIONAL STANDARDS:* | United States - BUSPROG: Analytic | | *TOPICS:* | Database Recovery Management | | *KEYWORDS:* | Bloom's: Comprehension | |

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| 78. How do transaction recovery procedures use the deferred-write and write-through techniques to recover transactions?   |  |  | | --- | --- | | *ANSWER:* | The database recovery process involves bringing the database to a consistent state after a failure. Transaction recovery procedures generally make use of deferred-write and write-through techniques.    When the recovery procedure uses a deferred-write technique, the transaction operations do not immediately update the physical database. Instead, only the transaction log is updated. The database is physically updated only after the transaction reaches its commit point, using information from the transaction log. If the transaction aborts before it reaches its commit point, no changes need to be made to the database because it was never updated. The recovery process for all started and committed transactions follows these steps:    1. Identify the last checkpoint in the transaction log. This is the last time transaction data were physically saved to disk.    2. For a transaction that started and was committed before the last checkpoint, nothing needs to be done because the data are already saved.    3. For a transaction that performed a commit operation after the last checkpoint, the DBMS uses the transaction log records to redo the transaction and update the database, using the “after” values in the transaction log. The changes are made in ascending order, from oldest to newest.    4. For any transaction that had a ROLLBACK operation after the last checkpoint or that was left active before the failure occurred, nothing needs to be done because the database was never updated.    When the recovery procedure uses a write-through technique, the database is immediately updated by transaction operations during the transaction’s execution, even before the transaction reaches its commit point. If the transaction aborts before it reaches its commit point, a ROLLBACK or undo operation needs to be done to restore the database to a consistent state. In that case, the ROLLBACK operation will use the transaction log “before” values. The recovery process follows these steps:    1. Identify the last checkpoint in the transaction log. This is the last time transaction data were physically saved to disk.    2. For a transaction that started and was committed before the last checkpoint, nothing needs to be done because the data are already saved.    3. For a transaction that was committed after the last checkpoint, the DBMS redoes the transaction, using the “after” values of the transaction log. Changes are applied in ascending order, from oldest to newest.    4. For any transaction that had a ROLLBACK operation after the last checkpoint or that was left active before the failure occurred, the DBMS uses the transaction log records to ROLLBACK or undo the operations, using the “before” values in the transaction log. Changes are applied in reverse order, from newest to oldest. | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | p. 507-508 | | *LEARNING OBJECTIVES:* | DATA.CORO.15.LO10-7 - LO10-7 | | *NATIONAL STANDARDS:* | United States - BUSPROG: Analytic | | *TOPICS:* | Database Recovery Management | | *KEYWORDS:* | Bloom's: Comprehension | |