|  |
| --- |
| True / False |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. One of the main functions of a database system is to provide timely answers to end users.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1 Database Performance-Tuning Concepts | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2. Good database performance is easy to evaluate.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1 Database Performance-Tuning Concepts | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3. All factors must be checked to ensure that each system component operates at its optimum level and has sufficient resources to minimize the occurrence of bottlenecks.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1 Database Performance-Tuning Concepts | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 4. DBMS implementations are typically similar in complexity to two-tier client/server configurations.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1a Performance Tuning: Client and Server | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5. A table space has the same meaning as a file extent.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 6. The data cache caches system catalog data and the contents of the indexes.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 7. The SQL cache stores the end-user written SQL.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8. To work with data, the DBMS must retrieve the data from permanent storage and place it in RAM.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9. The purpose of an I/O operation is to move data to and from different computer components or devices.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10. Working with data in the data cache is many times faster than working with data in the data files.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11. Fully equivalent means that the optimized query results are always the same as the original query.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-2a SQL Parsing Phase | | *LEARNING OBJECTIVES:* | 11.02 - Describe how a DBMS processes SQL queries in each of its three phases | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12. The SQL execution activities are performed by the query optimizer.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-2a SQL Parsing Phase | | *LEARNING OBJECTIVES:* | 11.02 - Describe how a DBMS processes SQL queries in each of its three phases | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 13. All transaction management commands are processed during the parsing and execution phases of query processing.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-2b SQL Execution Phase | | *LEARNING OBJECTIVES:* | 11.02 - Describe how a DBMS processes SQL queries in each of its three phases | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 14. An index scan is less efficient than a full table scan.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-3 Indexes and Query Optimization | | *LEARNING OBJECTIVES:* | 11.03 - Explain the role of indexes in speeding up data access | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 15. Indexes do not facilitate join operations.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-3 Indexes and Query Optimization | | *LEARNING OBJECTIVES:* | 11.03 - Explain the role of indexes in speeding up data access | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 16. The B-tree index is used mainly in tables in which column values repeat a relatively small number of times.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-3 Indexes and Query Optimization | | *LEARNING OBJECTIVES:* | 11.03 - Explain the role of indexes in speeding up data access | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 17. The primary factor in determining the most efficient access plan is the I/O cost.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-4 Optimizer Choices | | *LEARNING OBJECTIVES:* | 11.04 - Differentiate between a rule-based optimizer and a cost-based optimizer | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 18. Most current-generation relational DBMSs perform automatic query optimization at the client end.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-5 SQL Performance Tuning | | *LEARNING OBJECTIVES:* | 11.05 - Describe some common practices used to write efficient SQL code | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 19. Maximizing disk contention is one of the general recommendations for the physical storage of databases.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-7 DBMS Performance Tuning | | *LEARNING OBJECTIVES:* | 11.06 - Explain how to formulate queries and tune the DBMS for optimal performance | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 20. RAID systems use a single disk to create storage volumes.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-7 DBMS Performance Tuning | | *LEARNING OBJECTIVES:* | 11.06 - Explain how to formulate queries and tune the DBMS for optimal performance | |

|  |
| --- |
| Multiple Choice |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 21. On the client side, the objective is to generate an SQL query that returns a correct answer in the least amount of time, using a minimum amount of resources at the server end. The activities required to achieve this goal are commonly referred to as \_\_\_\_\_ tuning.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | client SQL | b. | database SQL | |  | c. | SQL performance | d. | DBMS performance |  |  |  | | --- | --- | | *ANSWER:* | c | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1a Performance Tuning: Client and Server | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 22. On the server side, the database environment must be properly configured to respond to clients' requests in the fastest way possible, while making optimum use of existing resources. The activities required to achieve this goal are commonly referred to as \_\_\_\_\_ tuning.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | client and server | b. | database SQL | |  | c. | SQL performance | d. | DBMS performance |  |  |  | | --- | --- | | *ANSWER:* | d | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1a Performance Tuning: Client and Server | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 23. When moving data from permanent storage to RAM, an I/O disk operation retrieves a(n):   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | entire table. | b. | entire physical disk block. | |  | c. | single row containing the attribute requested. | d. | single attribute requested only. |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 24. A DBA determines the initial size of the data files that make up the database; however, as required, the data files can automatically expand in predefined increments known as \_\_\_\_\_.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | procedure cache | b. | buffer cache | |  | c. | supplements | d. | extents |  |  |  | | --- | --- | | *ANSWER:* | d | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 25. A(n) \_\_\_\_\_ is a logical grouping of several data files that store data with similar characteristics.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | procedure cache | b. | table space | |  | c. | data cache | d. | listener |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 26. A system table space, a user data table space, an index table space, and a temporary table space are examples of \_\_\_\_\_.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | procedure caches | b. | file groups | |  | c. | data caches | d. | operation modes |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 27. The data cache is where the data read from the database data files are stored \_\_\_\_\_ the data have been read or \_\_\_\_\_ the data are written to the database data files.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | after; before | b. | after; after | |  | c. | before; before | d. | before; after |  |  |  | | --- | --- | | *ANSWER:* | a | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 28. To work with data, a DBMS must retrieve the data from \_\_\_\_\_ and place them in \_\_\_\_\_.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | data files; procedure cache | b. | RAM; data cache | |  | c. | permanent storage; RAM | d. | temporary files; procedure cache |  |  |  | | --- | --- | | *ANSWER:* | c | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 29. The data cache or \_\_\_\_\_ is a shared, reserved memory area that stores the most recently accessed data blocks in RAM.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | buffer cache | b. | procedure cache | |  | c. | SQL cache | d. | permanent storage |  |  |  | | --- | --- | | *ANSWER:* | a | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 30. The \_\_\_\_\_ is a shared, reserved memory area that stores the most recently executed SQL statements or PL/SQL procedures, including triggers and functions.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | buffer cache | b. | procedure cache | |  | c. | data cache | d. | permanent storage |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 31. To generate database object statistics manually, following syntax should be used in Oracle:   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ANALYZE <TABLE/INDEX> object\_name; | b. | CREATE <TABLE/INDEX> object\_name; | |  | c. | ANALYZE <TABLE/INDEX> object\_name COMPUTE STATISTICS; | d. | CREATE <TABLE/INDEX> object\_name COMPUTE STATISTICS; |  |  |  | | --- | --- | | *ANSWER:* | c | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-1d Database Statistics | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 32. The \_\_\_\_\_ process analyzes SQL queries and finds the most efficient way to access data.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | optimizer | b. | scheduler | |  | c. | listener | d. | user |  |  |  | | --- | --- | | *ANSWER:* | a | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 33. Automatic query optimization means that the:   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | optimization takes place at compilation time by the programmer. | b. | DBMS finds the most cost-effective access path without user intervention. | |  | c. | optimization process is scheduled and selected by the end user or programmer. | d. | database access strategy is defined when the program is executed. |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1c Database Query Optimization Modes | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 34. The DBMS \_\_\_\_\_ the SQL query and chooses the most efficient access/execution plan.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | parses | b. | executes | |  | c. | fetches | d. | processes |  |  |  | | --- | --- | | *ANSWER:* | a | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-2 Query Processing | | *LEARNING OBJECTIVES:* | 11.02 - Describe how a DBMS processes SQL queries in each of its three phases | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 35. Which of the following is the first step of query processing at the DBMS server end?   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | Executing | b. | Parsing | |  | c. | Fetching | d. | Delivering |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-2 Query Processing | | *LEARNING OBJECTIVES:* | 11.02 - Describe how a DBMS processes SQL queries in each of its three phases | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 36. During the \_\_\_\_ phase, the DBMS retrieves the data and sends the result set back to the client.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | parse | b. | execute | |  | c. | fetch | d. | process |  |  |  | | --- | --- | | *ANSWER:* | c | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-2 Query Processing | | *LEARNING OBJECTIVES:* | 11.02 - Describe how a DBMS processes SQL queries in each of its three phases | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 37. If there is no index, the DBMS will perform a \_\_\_\_\_ scan.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | loop | b. | range | |  | c. | row ID table access | d. | full table |  |  |  | | --- | --- | | *ANSWER:* | d | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-3 Indexes and Query Optimization | | *LEARNING OBJECTIVES:* | 11.03 - Explain the role of indexes in speeding up data access | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 38. \_\_\_\_\_ refers to the number of different values a column could possibly have.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | Database statistics | b. | Data sparsity | |  | c. | Bitmap index | d. | Clustering |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-3 Indexes and Query Optimization | | *LEARNING OBJECTIVES:* | 11.03 - Explain the role of indexes in speeding up data access | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 39. Bitmap indexes tend to use less space than a \_\_\_\_\_ because they use bits instead of bytes to store their data.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | hash index | b. | sparse index | |  | c. | B-tree index | d. | reverse index |  |  |  | | --- | --- | | *ANSWER:* | c | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-3 Indexes and Query Optimization | | *LEARNING OBJECTIVES:* | 11.03 - Explain the role of indexes in speeding up data access | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 40. Knowing the sparsity of a column helps you decide whether the use of \_\_\_\_\_ is appropriate.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | query processing | b. | query optimization | |  | c. | an index | d. | a full table scan |  |  |  | | --- | --- | | *ANSWER:* | c | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-3 Indexes and Query Optimization | | *LEARNING OBJECTIVES:* | 11.03 - Explain the role of indexes in speeding up data access | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 41. \_\_\_\_\_ is the central activity during the parsing phase in query processing.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | Clustering | b. | Partitioning | |  | c. | Query validation | d. | Query optimization |  |  |  | | --- | --- | | *ANSWER:* | d | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-4 Optimizer Choices | | *LEARNING OBJECTIVES:* | 11.04 - Differentiate between a rule-based optimizer and a cost-based optimizer | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 42. When setting optimizer hints, \_\_\_\_\_ instructs the optimizer to minimize the overall execution time, that is, to minimize the time it takes to return the total number of rows in the query result set. This hint is generally used for batch mode processes.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ALL\_ROWS | b. | FIRST\_ROWS | |  | c. | INDEX(P\_QOH\_NDX) | d. | OPTIMIZATION\_ROWS |  |  |  | | --- | --- | | *ANSWER:* | a | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-4a Using Hints to Affect Optimizer Choices | | *LEARNING OBJECTIVES:* | 11.04 - Differentiate between a rule-based optimizer and a cost-based optimizer | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 43. In standard SQL, the optimizer hint FIRST\_ROWS is generally used for \_\_\_\_\_ mode processes.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | batch | b. | interactive | |  | c. | transaction | d. | real-time |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-4a Using Hints to Affect Optimizer Choices | | *LEARNING OBJECTIVES:* | 11.04 - Differentiate between a rule-based optimizer and a cost-based optimizer | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 44. In standard SQL, the optimizer hint ALL\_ROWS is generally used for \_\_\_\_\_ mode processes.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | interactive | b. | real-time | |  | c. | batch | d. | transaction |  |  |  | | --- | --- | | *ANSWER:* | c | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-4a Using Hints to Affect Optimizer Choices | | *LEARNING OBJECTIVES:* | 11.04 - Differentiate between a rule-based optimizer and a cost-based optimizer | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 45. The LIKE conditional operator is used by the \_\_\_\_\_ OPERAND1.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | P\_PRICE | b. | V\_STATE | |  | c. | P\_QOH | d. | V\_CONTACT |  |  |  | | --- | --- | | *ANSWER:* | d | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-5b Conditional Expressions | | *LEARNING OBJECTIVES:* | 11.05 - Describe some common practices used to write efficient SQL code | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 46. The \_\_\_\_\_ must be set large enough to permit as many data requests to be serviced from cache as possible.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | data cache | b. | SQL cache | |  | c. | sort cache | d. | optimizer mode |  |  |  | | --- | --- | | *ANSWER:* | a | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-7 DBMS Performance Tuning | | *LEARNING OBJECTIVES:* | 11.06 - Explain how to formulate queries and tune the DBMS for optimal performance | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 47. The majority of primary memory resources will be allocated to the \_\_\_\_\_ cache.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | data | b. | SQL | |  | c. | sort | d. | optimizer |  |  |  | | --- | --- | | *ANSWER:* | a | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-7 DBMS Performance Tuning | | *LEARNING OBJECTIVES:* | 11.06 - Explain how to formulate queries and tune the DBMS for optimal performance | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 48. The \_\_\_\_\_ cache is used as a temporary storage area for ORDER BY or GROUP BY operations, as well as for index-creation functions.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | data | b. | SQL | |  | c. | sort | d. | optimizer |  |  |  | | --- | --- | | *ANSWER:* | c | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-7 DBMS Performance Tuning | | *LEARNING OBJECTIVES:* | 11.06 - Explain how to formulate queries and tune the DBMS for optimal performance | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 49. From the performance point of view, \_\_\_\_\_ databases eliminate disk access bottlenecks.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | RAID | b. | distributed | |  | c. | index-organized | d. | in-memory |  |  |  | | --- | --- | | *ANSWER:* | d | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-7 DBMS Performance Tuning | | *LEARNING OBJECTIVES:* | 11.06 - Explain how to formulate queries and tune the DBMS for optimal performance | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 50. In the context of RAID levels, \_\_\_\_\_ refers to writing the same data blocks to separate drives.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | striping | b. | mirroring | |  | c. | partitioning | d. | aggregating |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-7 DBMS Performance Tuning | | *LEARNING OBJECTIVES:* | 11.06 - Explain how to formulate queries and tune the DBMS for optimal performance | |

|  |
| --- |
| Completion |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 51. End users and the DBMS interact through the use of \_\_\_\_\_ to generate information.   |  |  | | --- | --- | | *ANSWER:* | queries | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1 Database Performance-Tuning Concepts | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 52. A system will perform best when its hardware and software resources are \_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | optimized | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1 Database Performance-Tuning Concepts | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 53. Database \_\_\_\_\_ activities can be divided into those taking place either on the client side or on the server side.   |  |  | | --- | --- | | *ANSWER:* | performance tuning | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1a Performance Tuning: Client and Server | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 54. \_\_\_\_\_ is another name for table space.   |  |  | | --- | --- | | *ANSWER:* | File group | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 55. A(n) \_\_\_\_\_ request is a low-level read or write data access operation to or from computer devices.   |  |  | | --- | --- | | *ANSWER:* | input/output  I/O | | *DIFFICULTY:* | Difficutly: Moderate | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 56. DBMS query processing has \_\_\_\_\_ phases.   |  |  | | --- | --- | | *ANSWER:* | 3  three | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-2 Query Processing | | *LEARNING OBJECTIVES:* | 11.02 - Describe how a DBMS processes SQL queries in each of its three phases | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 57. The \_\_\_\_\_ analyzes the SQL query and finds the most efficient way to access the data.   |  |  | | --- | --- | | *ANSWER:* | query optimizer | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-2a SQL Parsing Phase | | *LEARNING OBJECTIVES:* | 11.02 - Describe how a DBMS processes SQL queries in each of its three phases | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 58. Once an SQL statement is transformed, the DBMS creates what is commonly known as a(n) \_\_\_\_\_ plan.   |  |  | | --- | --- | | *ANSWER:* | access  execution | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-2a SQL Parsing Phase | | *LEARNING OBJECTIVES:* | 11.02 - Describe how a DBMS processes SQL queries in each of its three phases | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 59. \_\_\_\_\_ are ordered sets of values that are crucial in speeding up data access.   |  |  | | --- | --- | | *ANSWER:* | Indexes | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-3 Indexes and Query Optimization | | *LEARNING OBJECTIVES:* | 11.03 - Explain the role of indexes in speeding up data access | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 60. A(n) \_\_\_\_\_ is good for simple and fast lookup operations based on equality conditions.   |  |  | | --- | --- | | *ANSWER:* | hash index | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-3 Indexes and Query Optimization | | *LEARNING OBJECTIVES:* | 11.03 - Explain the role of indexes in speeding up data access | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 61. \_\_\_\_\_ is a measure of the likelihood that an index will be used in query processing.   |  |  | | --- | --- | | *ANSWER:* | Index selectivity | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-5a Index Selectivity | | *LEARNING OBJECTIVES:* | 11.05 - Describe some common practices used to write efficient SQL code | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 62. \_\_\_\_\_ is evaluated based on client perspective.   |  |  | | --- | --- | | *ANSWER:* | SQL performance tuning | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-5 SQL Performance Tuning | | *LEARNING OBJECTIVES:* | 11.05 - Describe some common practices used to write efficient SQL code | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 63. A(n)\_\_\_\_\_ is an index based on a specific SQL function or expression.   |  |  | | --- | --- | | *ANSWER:* | function-based index | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-5a Index Selectivity | | *LEARNING OBJECTIVES:* | 11.05 - Describe some common practices used to write efficient SQL code | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 64. A conditional expression is normally expressed within the \_\_\_\_\_ or HAVING clauses of a SQL statement.   |  |  | | --- | --- | | *ANSWER:* | WHERE | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-5b Conditional Expressions | | *LEARNING OBJECTIVES:* | 11.05 - Describe some common practices used to write efficient SQL code | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 65. \_\_\_\_\_\_ helps provide a balance between performance and fault tolerance.   |  |  | | --- | --- | | *ANSWER:* | RAID  Redundant array of independent disks  RAID (redundant array of independent disks) | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-7 DBMS Performance Tuning | | *LEARNING OBJECTIVES:* | 11.06 - Explain how to formulate queries and tune the DBMS for optimal performance | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 66. The \_\_\_\_\_ table space is the most frequently accessed table space and should be stored in its own volume.   |  |  | | --- | --- | | *ANSWER:* | system | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-7 DBMS Performance Tuning | | *LEARNING OBJECTIVES:* | 11.06 - Explain how to formulate queries and tune the DBMS for optimal performance | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 67. The \_\_\_\_\_ cache is used as a temporary storage area for ORDER BY or GROUP BY operations, as well as for index-creation functions.   |  |  | | --- | --- | | *ANSWER:* | sort | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-7 DBMS Performance Tuning | | *LEARNING OBJECTIVES:* | 11.06 - Explain how to formulate queries and tune the DBMS for optimal performance | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 68. The \_\_\_\_\_ segment table space is used for transaction-recovery purposes.   |  |  | | --- | --- | | *ANSWER:* | rollback | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 11-7 DBMS Performance Tuning | | *LEARNING OBJECTIVES:* | 11.06 - Explain how to formulate queries and tune the DBMS for optimal performance | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 69. A(n) \_\_\_\_\_ table stores the end-user data and the index data in consecutive locations on permanent storage.   |  |  | | --- | --- | | *ANSWER:* | index-organized  clustered index | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-7 DBMS Performance Tuning | | *LEARNING OBJECTIVES:* | 11.06 - Explain how to formulate queries and tune the DBMS for optimal performance | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 70. In a level \_\_\_\_\_ RAID, the data and the parity data is striped across separate drives.   |  |  | | --- | --- | | *ANSWER:* | 5  five | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-7 DBMS Performance Tuning | | *LEARNING OBJECTIVES:* | 11.06 - Explain how to formulate queries and tune the DBMS for optimal performance | |

|  |
| --- |
| Essay |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 71. List and describe some typical DBMS processes.   |  |  | | --- | --- | | *ANSWER:* | Listener: The listener process listens for clients’ requests and handles the processing of the SQL requests to other DBMS processes. Once a request is received, the listener passes the request to the appropriate user process.    User: The DBMS creates a user process to manage each client session. Therefore, when users log on to the DBMS, they are assigned a user process. This process handles all requests the users submit to the server. There are many user processes—at least one per logged-in client.    Scheduler: The scheduler process organizes the concurrent execution of SQL requests.    Lock manager: This process manages all locks placed on database objects, including disk pages.    Optimizer: The optimizer process analyzes SQL queries and finds the most efficient way to access the data. | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-1b DBMS Architecture | | *LEARNING OBJECTIVES:* | 11.01 - Identify the procedures involved in database performance tuning | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 72. Describe query optimization and the modes that an optimizer can operate in.   |  |  | | --- | --- | | *ANSWER:* | Query optimization is the central activity during the parsing phase in query processing. In this phase, the DBMS must choose what indexes to use, how to perform join operations, which table to use first, and so on. Each DBMS has its own algorithms for determining the most efficient way to access the data. The query optimizer can operate in one of two modes:  A rule-based optimizer uses preset rules and points to determine the best approach to execute a query. The rules assign a “fixed cost” to each SQL operation; the costs are then added to yield the cost of the execution plan. For example, a full table scan has a set cost of 10, while a table access by row ID has a set cost of 3.  A cost-based optimizer uses sophisticated algorithms based on statistics about the objects being accessed to determine the best approach to execute a query. In this case, the optimizer process adds up the processing cost, the I/O costs, and the resource costs (RAM and temporary space) to determine the total cost of a given execution plan. | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-4 Optimizer Choices | | *LEARNING OBJECTIVES:* | 11.04 - Differentiate between a rule-based optimizer and a cost-based optimizer | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 73. Why do we need to optimize a DBMS with SQL performance tuning, even though they automatically optimize SQL queries?   |  |  | | --- | --- | | *ANSWER:* | There is considerable room for improvement since the DBMS uses general optimization techniques rather than focus on specific techniques dictated by the special circumstances of the query execution. A poorly written SQL query can, and usually will, bring the database system to its knees from a performance point of view. The majority of current database performance problems are related to poorly written SQL code. Therefore, although a DBMS provides general optimizing services, a carefully written query almost always outperforms a poorly written one. | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-5 SQL Performance Tuning | | *LEARNING OBJECTIVES:* | 11.05 - Describe some common practices used to write efficient SQL code | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 74. Summarize the steps required to formulate a query.   |  |  | | --- | --- | | *ANSWER:* | Queries are usually written to answer questions. In order to formulate a query, the following steps are used.    a) Identify what columns and computations are required:  The first step is needed to determine those required data values that are to be returned. For example, one must determine if names and addresses alone need to be returned or is there a need to include computations as well while returning the output. Another important note in the first step is that the columns in the SELECT statement should return single values.    b) Identify the source tables:  Once the required columns are identified, the source tables used in the query can be determined. If certain attributes appear in more than one table try to use the least number of tables in the query to minimize the number of join operations.    c) Determine how to join the tables:  Once the tables needed in the query statement are determined, one needs to properly identify how to join the tables. In most cases, a natural join is used, but occasionally an outer join is used.    d) Determine what selection criteria is used:  Most queries involve some type of selection criteria. In this case, the operators and operands that are needed by the criteria are determined. The correct data type and the granularity of data in the comparison of criteria need to be ensured.    e) Determine the order in which to display the output:  In the final stage, the required output might be ordered by one or more columns. The ORDER BY clause is particularly used to order the required output in this way but is a very resource-intensive operation for the DBMS. | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-6 Query Formulation | | *LEARNING OBJECTIVES:* | 11.06 - Explain how to formulate queries and tune the DBMS for optimal performance | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 75. How should storage volumes be allocated for indexes, system, and high-usage tables?   |  |  | | --- | --- | | *ANSWER:* | Assign separate data files in separate storage volumes for the indexes, system, and high-usage tables. This ensures that index operations will not conflict with end-user data or data dictionary table access operations. Another advantage of this approach is that different disk block sizes in different volumes can be used. For example, the data volume can use a 16 K block size, while the index volume can use an 8 K block size. Remember that the index record size is generally smaller, and by changing the block size, contention is reduced and I/O operations are minimized. This is very important; many database administrators overlook indexes as a source of contention. By using separate storage volumes and different block sizes, the I/O operations on data and indexes will happen asynchronously; more importantly, the likelihood of write operations blocking read operations is reduced, as page locks tend to lock fewer records. | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 11-7 DBMS Performance Tuning | | *LEARNING OBJECTIVES:* | 11.06 - Explain how to formulate queries and tune the DBMS for optimal performance | |