DBMS Interview Questions

1. Basic DBMS Interview Questions

1. **What is DBMS, and why is it used?**
2. **What are the advantages of using a DBMS?**
3. **What is the difference between DBMS and RDBMS?**
4. **What are ACID properties in DBMS?**
5. **What is normalization, and why is it important?**
6. **What is denormalization, and when is it used?**
7. **What are keys in a database? Explain primary key, foreign key, and candidate key.**
8. **What is a unique key, and how is it different from a primary key?**
9. **What are super key and composite key?**
10. **What is a NULL value, and how is it different from zero or a blank space?**

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2. SQL Queries & Operations

11. **What is the difference between DDL, DML, and DCL?**
12. **What are the commonly used SQL commands?**
13. **How do you retrieve all records from a table?**
14. **What is the difference between WHERE and HAVING?**
15. **What is the use of the GROUP BY clause?**
16. **How do you fetch only the top 5 records from a table?**
17. **What is the difference between INNER JOIN, LEFT JOIN, RIGHT JOIN, and FULL JOIN?**
18. **What is a self-join, and when is it used?**
19. **What is a subquery, and how does it work?**
20. **What is the difference between UNION and UNION ALL?**

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3. Indexing & Performance Optimization

21. **What is an index in DBMS, and why is it used?**
22. **What are the different types of indexes in DBMS?**
23. **What is the difference between clustered and non-clustered index?**
24. **How does indexing improve query performance?**

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25. What are covering indexes?

26. What is the use of the EXPLAIN statement in SQL?

27. What is query optimization, and how is it done?

28. What are materialized views, and how are they different from views?

29. What are stored procedures, and why are they used?

30. How do you optimize a slow SQL query?

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4. Database Normalization & Integrity

31. What is 1NF (First Normal Form)?

32. What is 2NF (Second Normal Form)?

33. What is 3NF (Third Normal Form)?

34. What is BCNF (Boyce-Codd Normal Form)?

35. What is 4NF and 5NF?

36. What are functional dependencies, and why are they important?

37. What is referential integrity, and how is it maintained?

38. What is cascading delete and cascading update?

39. What is an anomaly, and how does normalization help reduce anomalies?

40. What is the difference between partial dependency and transitive dependency?

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5. Transactions & Concurrency Control

41. What is a transaction in DBMS?

42. What are the different states of a transaction?

43. What is the difference between COMMIT and ROLLBACK?

44. What are ACID properties, and why are they important?

45. What are dirty read, phantom read, and non-repeatable read?

46. What are locks in DBMS, and what are their types?

47. What is the difference between pessimistic locking and optimistic locking?

48. What is a deadlock, and how do you prevent it?

49. What is timestamp-based concurrency control?

50. What is two-phase locking (2PL)?

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6. NoSQL & New-Age Databases

51. What is NoSQL, and how is it different from relational databases?

52. What are the different types of NoSQL databases?

53. What is the CAP theorem in NoSQL?

54. What is the difference between MongoDB and MySQL?

55. What is eventual consistency in NoSQL?

56. What is the difference between document-based, key-value, column-family, and graph databases?

57. What is sharding, and why is it used?

58. What is replication, and how does it work?

59. What is Redis, and where is it used?

60. What is Cassandra, and how does it handle data storage?

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7. Stored Procedures, Triggers & Views

61. What is a stored procedure, and how do you create one?

62. What are the advantages of stored procedures?

63. What is a trigger, and when is it used?

64. What is the difference between BEFORE and AFTER triggers?

65. How do you create a view in SQL?

66. What is the difference between a view and a table?

67. Can you update data in a view?

68. What are materialized views, and how do they differ from regular views?

69. What is the purpose of cursors in SQL?

70. What is a recursive query, and how is it used?

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8. Data Warehousing & Big Data

71. What is data warehousing, and why is it used?

72. What is OLAP (Online Analytical Processing)?

73. What is the difference between OLAP and OLTP?

74. What is ETL (Extract, Transform, Load)?

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75. What are fact tables and dimension tables?

76. What is a star schema and snowflake schema?

77. What is Big Data, and how does it relate to DBMS?

78. What is Hadoop, and how does it store data?

79. What is data mining, and why is it important?

80. What is data lake vs. data warehouse?

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9. Database Security & Backup

81. What is database security, and why is it important?

82. What are encryption techniques used in databases?

83. How does role-based access control (RBAC) work in databases?

84. What is SQL injection, and how can it be prevented?

85. How do you perform database backup and restore?

86. What are hot backup and cold backup?

87. What is database mirroring, and how does it work?

88. What is database auditing, and why is it necessary?

89. What are firewalls and intrusion detection systems in DBMS security?

90. What is data masking, and when is it used?

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10. Advanced DBMS Concepts

91. What is BigTable, and how does it work?

92. What are graph databases, and where are they used?

93. What is event sourcing, and how does it relate to databases?

94. What is data versioning, and why is it important?

95. How does blockchain store data, and how is it different from traditional databases?

96. What is the difference between column-oriented and row-oriented databases?

97. What are temporal databases, and why are they used?

98. What is polyglot persistence, and when is it useful?

99. What is NewSQL, and how does it differ from traditional RDBMS?

100. How will AI impact database management in the future?

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