Database Management Systems

P. Pages : 2

Time : Three Hours

TKN/KS/16/7505

Max. Marks : 80

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Notes : 1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.

1. Draw and explain the architecture of a database management system. **14**

OR

2. a) Explain data independence. **3**

b) Explain three levels of data-abstraction. **5**

c) Explain fundamental operations used in relational algebra with example. **6**

3. a) Consider the following schema of a relational database. **10**

   Customer (C_name, C_street, C_city)
   Branch   (B_name, b_city, b_assets)
   Account   (B_name, acc_num, balance)
   Depositor (C_name, acc_num)
   Loan   (B_name, Loan_num, amount)
   Barrower (C_name, loan_num)

   Assuming suitable primary key:
   i)   Find average account balance at each branch.
   ii) Find all customer names who have loan at "Perryridge" branch
   iii) Find the largest account balance at the bank.
   iv) Find total number of branches at bank.
   v)   Display loan amounts in decreasing order.

   b) Explain the concept of SQL view with example. **3**

OR

4. a) Explain different types of "Join" operations. Give example of each. **7**

b) What are integrity rules? Explain with example. **6**

5. a) What is normalization? Explain with suitable example 1 NF, 2 NF and 3 NF. **7**

b) Construct ER-diagram for the database of a hospital with a set of patients and a set of doctors. Associate with each patient a set of test and examinations. **6**

OR

6. a) Suppose that we decompose the schema. **6**
   R= (A,B,C,D,E) into
   R_1 = (A,B,C) & R_2 (A,D,E)
   Find whether this decomposition is a lossless join decomposition if the following set f of functional dependency hold.
   $A \rightarrow BC$
   $CD \rightarrow E$
   $B \rightarrow D$
   $E \rightarrow A$

   b) Compute the canonical cover of the following set f of functional dependency of relational schema. **7**
   R = (A,B,C,D,E)
   $A \rightarrow BC$
   $CD \rightarrow E$
   $B \rightarrow D$
   $E \rightarrow A$
   List candidate keys for R.

7. a) Define query optimization. What are the various measures to evaluate the cost of query? **6**

   b) Explain the following **any two.** **8**
   i) Distributed Query processing.   ii) Choice of evaluation plans.
   iii) Materialized views.

OR

8. a) Explain the block diagram of query-processing. Explain each component. **7**

   b) Explain transformation of relational expressions with respect to query processing. **7**

9. a) Explain the following. **6**
   i) ACID properties.   ii) Crash recovery.
   iii) States of transaction.

   b) Explain lock-based protocols. **7**

OR

10. a) When does detection algorithm determine that a deadlock exists? Explain action that needs to be taken to recover from deadlock. **6**

    b) What is serializability? Also explain what is conflict and view serializability. **7**

11. a) Write short note on distributed database. **6**

    b) Explain distributed transactions and concurrency control mechanism. **7**

OR

12. a) Explain deadlocks with respect to distributed databases. **6**

    b) Explain security and protection in distributed databases. **7**

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