Menoufia University
Faculty of Electronic Engineering
Second semester.
Computer Science and engineering Dept.

جامعة المنوفية

Final Written Exam
CSE 426: Elective Course
Date: 12 - 6 - 2019
Time: 180 min (10:00 to 1:00)

Answer the following questions: 2 pages   four questions   Total mark: [70]

First question:

Choose the correct answer:

1. The purpose of timestamping is to avoid locks?
   (a) Ture   (b) False

2. Some of the columns of a relation are at different sites in which of the following
   (a) Horizontal Partitioning   (c) Vertical Partitioning
   (b) Data replication   (d) Data localization

3. Which of the following is the advantage of replication?
   (a) Reduced network traffic   (c) If the database fails at one site, a
   (b) Each transaction may proceed   copy can be located at another site
       without coordination across the   (d) All of the above
       network.

4. With failure transparency, all the actions of a transaction are commited or none of them are commited?
   (a) True   (b) False

5. Depending on the situation each node in the distributed database system can act as :
   (a) client   (c) client and server
   (b) server   (d) none of the above

6. Which transaction contains statements that access more than one site ?
   (a) Remote transaction   (c) Both a and b
   (b) Distributed transaction   (d) none of the above

7. Which machanism guaranteed that all database sites participating in distributed transaction either all commit or all roll back the statements in the transaction ?
   (a) commit   (c) concurrency control
   (b) Two-phase commit Protocol   (d) none of the above

8. What are the two basic database acess operations in a tranaction ?
   (a) commit   (c) select
   (b) read and write   (d) vote

9. The purpose of data localization layer in distributed query processing is:
   (a) Transfer the query from   (c) Reduce the network
       operating on the global relations   communication overhead
       to operate on fragments.   (d) All of the above
   (b) Reduce CPU service

10. Procedure a failed site has to go through to recover its state after a reset :
    a) Recovery Protocol   c) Transaction control
    b) Termination Protocol   d) Concurrency control

11. Site autonomy means each local DBMS retains complete control over local data and processing
    a) True   b) False

12. In internal schema data is defined in terms of file structures for storage and retrieval :
    a) True   b) False

13. Top-down design is a suitable approach when a database system is being designed from scratch
   a) True   b) False

14. SaaS is a service model that involves outsourcing the basic infrastructure and platform
   a) True   b) False

15. An autonomous homogenous environment is which of the following?
   (a) The same DBMS is at each node and each DBMS works independently
   (b) A different DBMS is at each node and each DBMS works independently.
   (c) A different DBMS is at each node and a central DBMS coordinates database access
   (d) The same DBMS is at each node and a central DBMS coordinates database access.

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Second question:

You have the following global schema in a distributed database system:

employee (employee-name, street, city)
works (employee-name, company-name, salary)
company (company-name, city)
manages (employee-name, manager-name)

The database is located at three sites (Hobart, Perth and Brisbane) .

Consider this query:

SELECT   E.employee-name, W.salary
FROM   employee E, works W, company C
WHERE   E.employee-name = W.employee-name AND E.city = C.city
AND   W.company-name = C.company-name

   I.   Construct the *all possible query trees* for the above query.
   II. show two examples of vertical fragmentation for this schema.
   III. Suppose the transaction for this quey completes successfully. Describe how 2-phase commit protocols works on this transaction.

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Third question:

   (a) What are the different ideas for increasing the degree of concurrency? You may give examples.
   (b) Describe two methods that could be used for *deadlock* detection in distributed database.
   (c) Give examples of distributed transaction executions that lead to :

      i. lost update   **ii.** dirty read

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Forth question:

   a) Imagine the situation in 2PC protocol when one participant sends a "vote-abort" message while another one sends "global-commit". Is this possible? Why?
   b) Under which situations will it be beneficial to have replication or fragmentation of data? (you may give examples)
   c) What is the purpose of *system log* used in the transaction processing system?

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