SET-1

Code No: 2420504

IV B. Tech II Semester Regular Examinations, April/May 2009
DISTRIBUTED DATABASES
(Computer Science & Engineering)

Time: 3 Hours **Max. Marks 80**

Answer any FIVE questions
All questions carry equal marks

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1. a) Why we need to have distributed databases, and distinguish the features of distributed databases with centralized databases.
   b) Explain in brief about vertical fragmentation. (10+6)
2. a) Explain about how fragmented relation simplification is done.
   b) Explain the concept of Operator tree with an example. (8+8)
3. a) Discuss how query optimization is useful in distributed databases.
   b) Explain how semi-join operations can be reduced in DDB. (8+8)
4. a) Write about the atomicity of transactions in distributed databases with emphasis on failures and logs and recovery methods.
   b) Write about concurrency control based on locking in centralized databases. (8+8)
5. Explain different optimistic methods for distributed concurrency control.
6. Explain the following
   a) Weighted Majority locking
   b) Checkpoints
   c) Cold Restart (6+5+5)
7. Write in brief about the following:
   a) Object query processing
   b) Object Query processing issues
   c) Object query execution (5+5+6)
8. Explain the following in detail:
   a) Distributed Component Object Model
   b) Query optimization issues in Distributed Multi DBMS. (8 +8)

SET-2

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1. a) Write about horizontal and vertical fragmentation.
   b) Explain with an example how to construct global relations from fragments. (10+6)
2. a) Describe how the distributed grouping and aggregate function evaluation will be performed in Distributed databases.
   b) Discuss query processing with an example. (10+6)
3. a) Explain how we can estimate results of algebraic operations Union, difference and Cartesian product.
   b) Explain how we can reduce the relation using semi-joins with an example. (8+8)
4. a) Explain how concurrency control in distributed databases is implemented based on locking.
   b) Explain the centralized and hierarchical communication structure for commit protocols. (6+10)
5. Explain the following for Distributed database systems
   a) Distributed Deadlock detection
   b) False Deadlocks
   c) Distributed Deadlock prevention. (5+5+6)
6. Explain the various problems which arise when trying to design a reliable distributed database system? (16)
7. Explain briefly about the following:
   a) Distributed garbage collection
   b) Transaction management in object DBMS.
   c) Transaction as objects (5+5+6)
8. Explain briefly about the following:
   a) Object Management Architecture
   b) Multi-database recovery.
   c) Query optimization issues in Multi-DBMS (4+4+8)

SET-3

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1. a) Write about different types of fragmentation in detail.
   b) Given a global relation
   EMP (EMPNUM,NAME,SAL,TAX,MGRNUM,DEPTNUM)
   Write the mixed fragmentation definition and fragmentation tree of relation EMP. (8+8)
2. a) Discuss query processing in detail with an example.
   b) Explain about semi-join reduction in DDB. (8+8)
3. a) Explain optimization graphs for DDB with a suitable example
   b) Explain the problems in query optimization. (6+10)
4. a) Explain the 2-phase commitment protocol.
   b) In 2-phase locking for DDB how it effects the availability and recovery. (10+6)
5. a) Explain the conservative timestamp method.
   b) Explain the differences between preemptive and non preemptive methods? (8+8)
6. Explain the following:
   a) Primary site approach
   b) Primary copy locking
   c) Site-to-site Protection. (5+6+5)
7. Describe in detail cache consistency and object identifier management in object management? (16)
8. Explain the following in detail:
   a) COM/OLE and Database Interoperability.
   b) Push-Based Technologies (8+8)

SET-4

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1. Explain the following
   a) Heterogeneous databases
   b) Data independence
   c) Horizontal and Derived Horizontal Fragmentation (5+5+6)
2. a) Prove that the following two queries have the same semantics
   $PJ_{NAME, DEPTNUM}\ SL_{DEPTNUM=10}EMP$
   $SL_{DEPTNUM=10}\ PJ_{NAME, DEPTNUM}\ EMP$
   b) Draw an operator tree for the following query
   $PJ_{SNUM}\ SL_{LOC=\text{“East”}}\ (SUPPLY\ \ JN_{DEPTNUM=DEPTNUM}\ DEPT\ )$ (8+8)
3. a) Explain the objectives of query process optimization
   b) Explain how we can estimate results of algebraic operations Selection and Projection. (6+10)
4. a) Discuss the architectural aspects of distributed transactions
   b) Write about granularity based locking. (8+8)
5. Explain concurrency control based on timestamps. (16)
6. a) Explain how the catalog management is done in Distributed Databases.
   b) Explain how user identification and Authorization rule enforcement is performed in DDB. (8+8)
7. Write a short note on the following:
   a) Pointer Swizzling
   b) Object clustering
   c) Object migration. (5+6+5)
8. Explain about Transaction and Computation Model for Distributed Multi-DBMS in detail with an example. (16)