



## Advanced Database Management Systems (1060)

P. Pages : 3

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Attempt **any five** of the following.
5. Assume suitable data, if necessary.
6. Neat diagram must be drawn whenever necessary.
7. Black figures to the right indicate full marks.

1. a) Explain with example how structured types can be used to create tables with composite attribution. **10**
- b) Consider the bank database given below, where primary keys are underlined, and the following SQL query . **10**
- Select T. branch name  
from branch T, branch S  
Where T. Assets > S. assets and S. branch - city = "Brooklyn".

Database:

Branch (branch - name, branch - city, assets)  
Customer (Customer - name, customer - street, customer - city)  
Loan (loan - number, branch name, amount)  
borrower (customer - name , loan - number)  
account (account - number, branch - name, balance)  
depositor (customer - name, account - number)

write an efficient relational - algebra expressions that is equivalent to this query. Justify your choice.

2. Consider the bank database with following schema. **12**
- Branch (branch - name, branch - city, assets)  
Account ( account - number, branch - name, balance)  
Depositor (customer - name, account - number)

Write relational - algebra expressions for the query " find the names of all customers who have an account at any branch located in Brooklyn with balance over Rs 7000. Generate multiple transformation for the given query. Explain how optimizer select best plan after multiple transformation.

- b) Justify the following statement: Concurrent execution of transaction is more important when data must be fetched from (slow) disk or when transaction are long, and is less important when data are in memory and transactions are very short. 8

3. a) Consider the following two transaction: 10

T31: read (A);  
read (B)  
if A = 0 then B: = B+1;  
Write (B):

T32: read (B) ;  
read (A) ;  
if B = 0 then A: A+1;  
write (A)

Add Lock and unlock instruction to T31 and T32, So that they observe The two - phase locking protocol. Can the execution of these transaction results in a deadlock ?

- b) "The cost communication between the client and the server is high compared to that of local memory reference". Justify your answer. 10

4. a) What form of parallelism (interquery, interoperation or intraoperation) is likely to be the most important for each of the following tasks ? 10

- i) Increasing the throughput of a system with many small queries.  
ii) Increasing the throughput of a system with a few large queries, when the number of disks and processors is large.

- b) Compute r & s for the relation given below & explain 10

r

A	B	C
1	2	3
4	5	6
1	2	4
5	3	2
8	9	7

s

C	D	E
3	4	5
3	6	8
2	3	2
1	4	1
1	2	3

5. a) Differentiate between interquery parallelism and intraquery parallelism . 10  
 b) Explain how fragmentation can be done in distributed databases. 10
6. a) Consider a relation that is fragmented horizontally by plant - number: 10  
 employee (name, address, salary, plant - number)  
 Assume that each fragment has two replicas: One stored at the New York site and one stored locally at the plant site. Describe a good processing strategy for the following queries entered at the San Jose Site:  
 i) Find all employees at the Boca plant.  
 ii) Find the average salary of all employees.  
 iii) Find the highest paid employees at each of the following sites: Toronto, Edmonton, Vancouver, Montreal.  
 iv) Find the lowest paid employee in the company.  
 b) Explain parallel Database Architectures with neat diagram. 10
7. a) Explain Representation of geometric information in spatial & geographic data. 10  
 b) Describe "Time in Database." 10
8. a) What is client - server systems ? How it is different with centralized systems. 10  
 b) Write note on 'Handling of skew'. 10

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