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MANIPAL INSTITUTE OF TECHNOLOGY
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VI SEM -END SEMESTER EXAMINATION (CSE)
Advanced Database Systems (CSE-310.2)

TIME : 3 HOURS 21-07-2011 MAX.MARKS : 50

Note: Answer any full five questions. Missing data may be suitably assumed.

1A. Consider the following two interleaved transactions in schedule(S) and suppose a consistency condition requires that A or B must always be equal to 1. Assume that A=B=1 before S executes.

T1	T2
Read_item(A)	
	Read_item(B)
	Read_item(A)
Read_item(B)	
If(A=1) then B:=B+1	
	If(B=1) then A:=A+1
	Write_item(A)
Write_item(B)	

1. Will the database be in consistent state after S executes.
2. Suggest a suitable method to check whether the given schedule can be serializable or not. Use the same to check for the above schedule.

1B. With an example, explain nested-loop join and hash join algorithms used in computing the join of relations. ((1+3)+(2+4))

2A. Consider the relations r1(A, B,C), r2(C, D, E), and r3(E, F). Assume that there are no primary keys. Let V(C, r1) be 900, V(C, r2) be 1100, V(E, r2) be 50, and V(E, r3) be 100. Assume that r1 has 1000 tuples, r2 has 1500 tuples, and r3 has 750 tuples. Estimate the size of r1 $\bowtie$ r2 $\bowtie$ r3 and give an efficient strategy for computing the join.

2B. Explain how to use a histogram to estimate the size of a selection of the form

1. $\sigma_{A \leq v}(r)$
2. $\sigma_{A=v}(r)$

2C. Explain the purpose of check point mechanism and its use in restart recovery.

(4+3+3)

3A. How do you check the presence of deadlock in the schedule? If present explain the deadlock recovery method.

3B. Explain how delete and insert will affect concurrency control?

3C. In multiple-granularity locking, what is the difference between implicit and explicit locking? (4+3+3)

4. Consider the relational schema employee(person_name,street,city), works(person_name, company_name, salary) company(company_name, city) and manages(person_name, manager_name).

1. Give a schema definition in SQL corresponding to the relational schema, but using references to express foreign-key relationships.
2. Write in SQL for the each of the following
    a) Find the company with the most employees.
    b) Find the company with the smallest payroll.
    c) Find those companies whose employ earn a highest salary, on average, than the average salary at First Bank Corporation.

((4)+(2+2+2))

5A. Explain the different types of coordinator selection algorithms in distributed database.

5B. With an example explain the semi-join strategy in distributed database.

5C. Consider a relation : employee (name, address, salary, plant_number) and machine (machine_number, type, plant_number). Assume that the employee relation is fragmented horizontally by plant_number and that each fragment is stored locally at its corresponding plant site. Assume that the machine relation is stored in its entirety at the "Armonk" site. Describe the good strategy for processing the following queries:

1. Find all employees at the plant that contains machine number 1130.
2. Find all employees at the plant that contains machine whose type is " milling machine".
3. Find all machines at the "Almaden" plant.
4. Find: employee $\bowtie$ machine. ((3+2)+(1+2+1+1))

6A. List and explain the aspects needed to be addressed when adding persistence support to C++ language.

6B. Explain how to recover from a system crash in immediate (log-based) database method by taking an example with its update file contents.

C. Explain Fragment-and-Replication join method. (4+3+3)

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