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05SCS13

First Semester M.Tech. Degree Examination, Dec.09-Jan.10
Database Management Systems

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions.***

1 a. What is the difference between specialization hierarchy and specialization lattice? Explain each of them with an example. **(10 Marks)**

b. Explain ER to relational mapping algorithm, with a suitable example. **(10 Marks)**

2 a. Explain normalization and its role in the design of good database design. **(10 Marks)**

b. Consider the following schema

EMP (Ename, SSN, bdate, Address, Salary, Dno, Dname, mgrSSN, dlocation, projname, Pno, Plocation).

Check whether it is in 2NF and 3NF. If not, convert it into 2NF and 3NF. Show the conversion steps. **(10 Marks)**

3 a. Given R = {SSN, Ename, Pnumber, Pname, Plocation, Hours} ; D = {R1, R2, R3} ; R1 = EMP = {SSN, Ename } ; R2 = PROJ = {Pnumber, Pname, Plocation} ; R3 = WORKS – ON = { SSN, Pnumber, Hours } and functional dependencies are F = {SSN → Ename ; Pnumber → {Pname, Plocation}, {SSN, Pnumber →hours} }. Prove that the decomposition of Relation R has the lossless join or non additive join property. Also write its algorithm. **(10 Marks)**

b. What are multivalued dependencies (MVDs)? Discuss with an example, why MVDs are undesirable? How can these be avoided? **(10 Marks)**

4 a. Explain the various problems that may arise if concurrency is not controlled. **(10 Marks)**

b. Consider the three transactions T1, T2 and T3 and the two schedules S1 and S2 given below. Draw the serializability (precedence) graphs for S1 and S2 and state whether each schedule is serializable or not. If a schedule is serializable, write down the equivalent serial schedules.

T1 : r1(x) ; r1(z) ; w1(x) ;
T2 : r2(z) ; r2(y) ; w2(z) ; w2(y) ;
T3 : r3(x) ; r3(y) ; w3(y) ;

(06 Marks)

S1 : r1(x) ; r2(z) ; r1(z) ; r3(x) ; r3(y) ;
w1(x) ; w3(y) ; r2(y) ; w2(z) ; w2(y) ;

S2 : r1(x) ; r2(z) ; r3(x) ; r1(z) ; r2(y) ; r3(y) ;
w1(x) ; w2(z) ; w3(y) ; w3(y) ;

c. Define domain – key – normal form and give an example. **(04 Marks)**

5 a. Consider the SQL query

SELECT Lname FROM Emp, PROJ, WORKS – ON
WHERE Pname = 'ABC' AND Pno = Pnumber AND
ESSN = SSN AND Bdate = '15 – 08 – 1960'.

Give the query tree and show the steps in converting this tree in heuristic steps. **(10 Marks)**

... transaction states using state transition diagram. **(06 Marks)**

... note on system log. **(04 Marks)**

... serial, non – serial and conflict serializable schedules. Give one example for each. **(10 Marks)**

... 2-phase locking protocol. How does it guarantee serializability? **(10 Marks)**

... deadlock prevention protocols, with an example. **(10 Marks)**

... write – ahead logging, steal/no – steal and force / no – force techniques in recovery. **(10 Marks)**

... notes on :

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... databases

... oral databases.

... outed databases. **(20 Marks)**

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