B. Tech

BCSE 3202

Fourth Semester Examination – 2008

RELATIONAL DATABASE MANAGEMENT SYSTEMS

Full Marks – 70

Time – 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*
The figures in the right-hand margin indicate marks.

1.   Define the following terms :   2 ×10

   (a) What is the difference between a primary key and a candidate key ?

   (b) Let **R = (A, B, C, D)** and functional dependencies (1) **A → C**, (2) **AB → D**. What is the **closure of { A, B }** ?

   (c) What do you mean by semi less join ?

   (d) Define super key and give example to illustrate the super key.

   (e) What are the two techniques to prevent deadlock ?

   (f) What do you mean by multi-valued dependency ?

   (g) Define and differentiate between Natural Join and Inner Join.

   (h) What is meant by Concurrency ?

   (i) Mention the various categories of Data Model.

   (j) Define : Entity Type, Entity Set and Value Set.

2. (a) What is normalization of relation ? What is a key attribute in a relation ? What is the difference between 1st Normal Form, 2nd normal form and 3rd normal form ?

5

(b) Define entity, attribute and relationships as used in relational databases. Describe purpose of E-R Model. Illustrate your answer with an example.   5

3. (a) Define the structure and properties of B Tree. Explain how the B tree is used as a index structure. Construct a B tree of order 3 with following key value : **10, 2, 30, 20, 86, 4, 6, 3, 60, 84, 88, 33, 52, 91, 69**.   5

(b) What are the major components of the relational model ? What is simple relational database ? What are two models in which you can use SQL ?   5

4. (a) Explain difference between Implicit and Explicit locks. Give examples to support your answer.   5

(b) What is an object-oriented database ? What is its advantages compared 'to relational database ? Explain some applications where an object-oriented database may be useful.   5

5. (a) State Armstrong's axioms. Show that Armstrong's axioms are complete.   5

(b) Explain the difference between inner join and outer join. What are the restrictions on using outer join ? Give examples to support your answer. 5

6. (a) What does the term *redundancy* mean ? Discuss the implications of r edundancy in a relational database. 5

(b) Define (i) Primary key, and (ii) Foreign key, Suppose relation $R(A,B,C,D,E)$ has functional dependencies:

$$AB \rightarrow C$$
$$D \rightarrow A$$
$$AE \rightarrow B$$
$$CD \rightarrow E$$
$$BE \rightarrow D$$

Find all the candidate keys of R. 5

7. (a) What is a distributed database management system ? How is it different to that of client server database systems ? 5

(b) Consider the following tables : 2

S

A	B	C
3	7	9
8	6	5

R

A	F	G
5	8	1
8	2	6

Show the semantics and the output of the following query :

SELECT *
FROM S, R
WHERE S.A = R.A AND S.B = R.G ;

(c) Define "Data mining". What are the supports must available with DBMS to facilitate data mining ? 3

8. (a) List out the six fundamental operators and 4 additional operators in relational algebra.

2.5

(b) Explain the two conditions needed for the set difference operation (union operation) to be valid. 2.5

(c) Construct a B+ tree of order 1 with following keys, **1, 9, 5, 3, 7, 11, 17, 13, 15 ?** 2.5

(d) What is the use of outer join and list out the three types of outer join with the notations used in relational algebra ?

2.5

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