

ALCCS

Time: 3 Hours

FEBRUARY 2014

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE:

- Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.
- Parts of a question should be answered at the same place.

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- Q.1**
- a. Give examples of systems that use traditional file processing instead of a database approach.
 - b. Explain heuristic based query optimization.
 - c. Given below are two sets of FDs for a relation R (A, B, C, D, E). Are they equivalent?
 - (i) $A \rightarrow B, AB \rightarrow C, D \rightarrow AC, D \rightarrow E$
 - (ii) $A \rightarrow BC, D \rightarrow AE$
 - d. Explain various components of distributed databases.
 - e. Mention naming conventions to identify the foreign keys efficiently.
 - f. Explain techniques other than chaining to handle bucket overflow in external hashing.
 - g. Prove that cautious waiting avoids deadlock. (7 × 4)
- Q.2**
- a. A bank has many branches, and a large number of customers. A customer can open many different kinds of accounts with the bank. The bank keeps track of the customer with his SSN, name, address, and phone number. Age is a factor to check whether he is a major. There are different types of loans, each identified by a loan number. Customer can take out more than one type of loan, and all branches can give loans. Loans have a duration and interest rate. The account holder can enquire about the balance in his account.
Draw an ER Diagram for the bank. Make suitable assumptions and use them in showing maximum and minimum cardinality ratios. (6)
 - b. Explain domain constraints and key constraints in relational data model. (6)
 - c. Give an example to illustrate the mapping of ER diagrams to tables. (6)

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- Q.3** a. Define Fourth Normal Form. Consider a Relational Schema $R=(A,B,C,D,E)$. Let M be the following set of Multi-Valued Dependencies:-
 $M=(A \twoheadrightarrow BC, B \twoheadrightarrow CD, E \twoheadrightarrow AD)$
 Give a lossless join decomposition of R into Fourth Normal Form. Justify your answer. (6)
- b. Given the following set of FDs on schema $R(V,W,X,Y,Z)$
 $\{Z \rightarrow V, W \rightarrow Y, XY \rightarrow Z, V \rightarrow WX\}$
 State whether the following decomposition are loss-less-join decompositions or not.
 (i) $R_1=(V,W,X)$
 $R_2=(V,Y,Z)$
 (ii) $R_1=(V,W,X)$
 $R_2=(X,Y,Z)$ (6)
- c. Specify the following relational algebra operations in both tuple and domain relational calculus:
 (i) $R(A, B, C)$ NATURAL JOIN $S(C, D, E)$:
 (ii) $R(A, B, C)$ UNION $S(A, B, C)$
 (iii) $R(A, B, C)$ CARTESIAN PRODUCT $S(D, E, F)$ (2*3)
- Q.4** a. Consider the following tables
 Works (Pname, Cname, Salary)
 Lives (Pname, Street, City)
 Locatedin (Cname, City)
 Manager (Pname, Mgrname)
 Where Pname = Person name, Cname = Company name, Mgrname = Manager name
 Write the SQL for the following:
- (i) List the names of the people who work for company Wipro along with the cities they live in.
 (ii) Find the people who work for the company "Infosys" with salary more than Rs. 50000/-. List the names of the people, along with the streets and city addresses.
 (iii) Find the names of the persons who live and work in the same city.
 (iv) Find the names of the person who do not work for "Infosys".
 (v) Find the persons whose salaries are more than that of all of the 'Oracle' employee.
 (vi) Find the names of the companies that are located in every city where the company 'Infosys' is located (12)
- b. How can the key and foreign key constraints be enforced by the DBMS? (3)
- c. What is the difference between DROP and DELETE command? (3)
- Q.5** a. Explain any two techniques used in query optimization for translations the SQL queries into relational algebra. (8)

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- b. Explain the features of web databases. (4)
- c. Explain various types of recovery techniques used in database systems. (6)
- Q.6** a. What do you mean by concurrency control Manager? What is the goal of Concurrency control schemes? (6)
- b. Differentiate between the Shared and Exclusive locking mode with example. (6)
- c. Explain Two-phase locking protocol with example. (6)
- Q.7** Write short notes for any **THREE** of the following:
- (i) Join Operation
 - (ii) BCNF
 - (iii) Tuple versus Domain relational calculus
 - (iv) Weak Entity (6*3)