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INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech IV Semester End Examinations (Supplementary) - July, 2018

Regulation: IARE – R16

DATABASE MANGEMENT SYSTEM

Time: 3 Hours

(CSE)

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT – I

- What are five main functions of a database administrator? Explain the difference between physical and logical data independence [7M]
 - Design a relational database for a university registrar's office the office maintain data about each class, including the instructor, the number of students enrolled, and time and place of the class meetings. For each student - class pair, a grade is recorded. [7M]
- Describe the Entity-Relationship Model thoroughly? Explain the basic concepts like Entity Sets, Relationship Sets and Attributes in detail with respective diagrams? [7M]
 - Construct an E-R Diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. Each insurance policy covers one or more cars, and has one or more premium payments associated with it. Each payment is for a particular period of time, and has an associated due date, and the date when the payment was received. [7M]

UNIT – II

- Explain the Relational Algebra importance? Illustrate the various operations in detail with respective examples? [7M]
 - Given the relations
employee(name,salary,deptno)
department (deptno, deptname, address)
 - Solve which query cannot be expressed using the basic relational algebra operations
 - Write a query in TRC and DRC to display employee names along with department names in which they work. [7M]
- Define Join. Explain different types of joins in relational algebra. [7M]
 - Consider the employee database ,where the primary keys are underlined.
Employee(empname,street,city,land phone) Works(empname,companyname,salary)
Company(companyname,city)
Manages(empname,management)
Give an expression in the relational algebra for each request.
 - Find the names of all employees who work for First Bank Corporation

- ii. Find the names ,street addresses ,cities and land phone no's of residence of all employees who work for first Bank Corporation and earn morethan 300000 per annum
- iii. Find the names of all employees who earn more than every employees of Small Bank Corporation.

[7M]

UNIT – III

- 5. (a) Define decomposition and how does it address redundancy? Discuss the problems That may be caused by the use of decompositions? [7M]
- (b) Compute the closure of the following set F of functional dependencies for relation Schema R = (A, B, C, D, E). $A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A$ List the candidate keys for R. [7M]
- 6. (a) Define the Normalization? What are the different types of normalizations? Discuss the 2NF and BCNF with an example? Define the Normalization? What are the different types of normalizations? Discuss the 2NF and BCNF with an example? [7M]
- (b) Suppose that we have the following three tuples in a legal instance of a relation schema S with three attributes ABC (listed in order): (1,2,3), (4,2,3), and (5,3,3). Which of the following dependencies can you infer does not hold over schema S?
 - i. $A \rightarrow B$
 - ii. $BC \rightarrow A$
 - iii. $B \rightarrow C$

[7M]

UNIT – IV

- 7. (a) Discuss how do you implement Atomicity and Durability? Illustrate Concurrent execution of transaction with examples [7M]
- (b) Suppose that we have only two types of transactions, T 1 and T 2. Transactions preserve database consistency when run individually. We have defined several integrity constraints such that the DBMS never executes any SQL statement that brings the database into an inconsistent state. Assume that the DBMS does not perform any concurrency control. Give an example schedule of two transactions T 1 and T 2 that satisfies all these conditions, yet produces a database instance that is not the result of any serial execution of T 1 and T 2. [7M]
- 8. (a) Describe the concept of Concurrency Control? Apply the concept of Lock -Based protocols and Time -Stamp Based protocols with respective examples? [7M]
- (b) Consider the following transactions with data items P and Q initialized to zero:


```
T1: read(P);
    read(Q);
    If P=0 then Q:=Q+1;
    write(Q);
T2: read(Q);
    read(P);
    If Q=0 then P:=P+1;
    write(P);
```

Solve and find any non-serial interleaving of T1 and T2 for concurrent execution leads to a serializable schedule or non serializable schedule. Explain.

[7M]

UNIT – V

9. (a) Explain in detail about ISAM. Compare and Contrast Extendible Hashing with Linear Hashing [7M]
- (b) Suppose that we are using extendible hashing on a file that contains records with the following search-key values: 2,3,5,7,11,17,19,23,29,31 Show the extendible hash structure for this file if the hash function is $h(x) = x \text{ mod } 8$ and buckets can hold three records. [7M]
10. (a) Write in detail about Static Hashing [7M]
- (b) Construct a B+-tree for the following set of key values:
(2, 3, 5, 7, 11, 17, 19, 23, 29, 31)
Assume that the tree is initially empty and values are added in ascending order. Construct B+-trees for the cases where the number of pointers that will fit in one node is as follows: Four, Six [7M]

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