

Code No: 07A7EC04

R07**Set No. 2**

IV B.Tech I Semester Examinations, MAY 2011
DATA BASE MANAGEMENT SYSTEMS
Common to Mechanical Engineering, Electronics And Computer
Engineering, Electronics And Telematics, Electronics And Communication
Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. (a) What is a weak entity set? Differentiate between weak entity set and strong Entity set.
 (b) Define Aggregation. What is the problem associated with aggregation? Discuss the remedies. [8+8]
2. (a) Explain why 4NF is a normal form more desirable than BCNF.
 (b) Briefly explain reasoning about functional dependencies. [8+8]
3. Describe various components of Data base systems structure with neat sketch. [16]
4. Describe how search, insert, and delete operations work in ISAM indexes. Discuss the need for overflow pages, and their potential impact on performance. What kinds of update workloads are ISAM indexes most vulnerable to, and what kinds of workable do they handle well? [16]
5. Consider the employee database given below
 employee (employee-name, street, city)
 works (employee-name, company-name, salary)
 company (company-name, city)
 manages (employee-name, manager-name),
 Give an expression in SQL for each of the following queries.
 (a) Find the names of all employees who work for First Bank Corporation
 (b) Find the names and cities of residence of all employees who work for First Bank Corporation.
 (c) Find the names, street addresses, and cities of residence of all employees who work for First Bank Corporation and earn more than \$10,000.
 (d) Find all employees in the database who live in the same cities as the companies for which they work. [4+4+4+4]
6. (a) Explain about various binary operations with examples in relational algebra.
 (b) Discuss the use of rename operator with an example. [12+4]
7. (a) Although SIX mode is useful in multiple-granularity locking, an exclusive and intend-shared (XIS) mode is of no use. Why is it useless? Explain.

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- (b) Justify the following statement: Concurrent execution of transactions is more important when data must be fetched from (slow) disk or when transactions are long, and is less important when data is in memory and transactions are very short. [8+8]
8. Explain the reasons why recovery of interactive transactions is more difficult to deal with than is recovery of batch transactions. Is there a simple way to deal with this difficulty? (Hint: Consider an automatic teller machine transaction in which cash is withdrawn.) [16]

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R07**Set No. 4**

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1. (a) Compare procedural and non - procedural DML'S
(b) Explain the database access for application programs. [8+8]
2. (a) What is a relation? Differentiate between relation schema and relation instance. Define the terms unity and degree of relation.
(b) What are integrity constraints over relations? How to enforce these constraints? [8+8]
3. (a) What is multiple granularity? Explain.
(b) Explain testing for serializability. [8+8]
4. Design an E-R diagram for keeping track of the exploits of your favourite sports team. You should store the matches played, the scores in each match, the players in each match and individual player statistics for each match. Summary statistics should be modeled as derived attributes. [16]
5. Suppose that we decompose the schema $R = (A, B, C, D, E)$ into
(A, B, C)
(A, D, E)
Show that this decomposition is a lossless-join decomposition if the following set F of functional dependencies holds:
A \rightarrow BC
CD \rightarrow E
B \rightarrow D
E \rightarrow A. [16]
6. When the system recovers from a crash, it constructs an undo-list and a redo-list. Explain why log records for transactions on the undolist must be processed in reverse order, while those log records for transactions on the redo-list are processed in a forward direction. [16]
7. If you were about to create an index on a relation, what consideration would guide your choice? Discuss:
(a) The choice primary index.
(b) Clustered versus unclustered indexes

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(c) Hash versus tree indexes

(d) The use of a sorted file rather than a tree-based index. [16]

8. Consider the following relations:

Student(snum: integer, sname: string, major: string, level: string, age: integer)

Class(name: string, meets at: time, room: string, fid: integer)

Enrolled(snum: integer, cname: string)

Faculty(fid: integer, fname: string, deptid: integer)

Write the following queries in SQL

- (a) Print the Level and the average age of students for that Level, for all Levels except JR.
- (b) Find the names of students who are enrolled in the maximum number of classes.
- (c) Find the names of students who are not enrolled in any class.
- (d) For each age value that appears in Students, find the level value that appears most often. For example, if there are more FR level students aged 18 than SR, JR, or SO students aged 18, you should print the pair (18, FR). [4+4+4+4]

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1. (a) Explain in detail the following:
 - i. join operation
 - ii. Nested - loop join
 - iii. Block Nested - Loop join.
 (b) For the following relational data base write the expressions in SQL

Branch Schema(branchname,Branchcity,Assets)
 Customer schema(customername,customerstreet,customercity)
 Loan schema(Branchname, loan number, Amount)
 Borrower schema(customername, loan number)
 Account schema (Branchname, Account number, balance)
 Depositor schema(customername, Account number)

 - A. Find the names of all branches in Loan Schema?
 - B. Find all customers having loan, account or both at bank?
 - C. Display customernames in alphabetical order who have a loan at the Perry ridge branch?
 - D. Find set of all customers who have an account at the bank?
- (b) For the following relational database write the expressions in SQL. [8+8]
2. (a) Define decomposition. Explain decomposition using functional dependencies.
 - (b) Define multivalued dependency. Explain decomposition using multivalued dependencies. [8+8]
 3. (a) Define DBMS? Discuss in detail the applicaitons of database system.
 - (b) Explain Database Administrator's responsibilities. [8+8]
 4. Describe in detail about ISAM and compare it with B⁺ trees. [16]
 5. List and explain the various operations of Relational algebra. [16]
 6. Consider the instance of the Students relation shown in Figure below 1
 - (a) Give an example of an attribute (or set of attributes) that you can deduce is not a candidate key, based on this instance being legal.
 - (b) Is there any example of an attribute (or set of attributes) that you can deduce as a candidate key, based on this instance being legal? [8+8]

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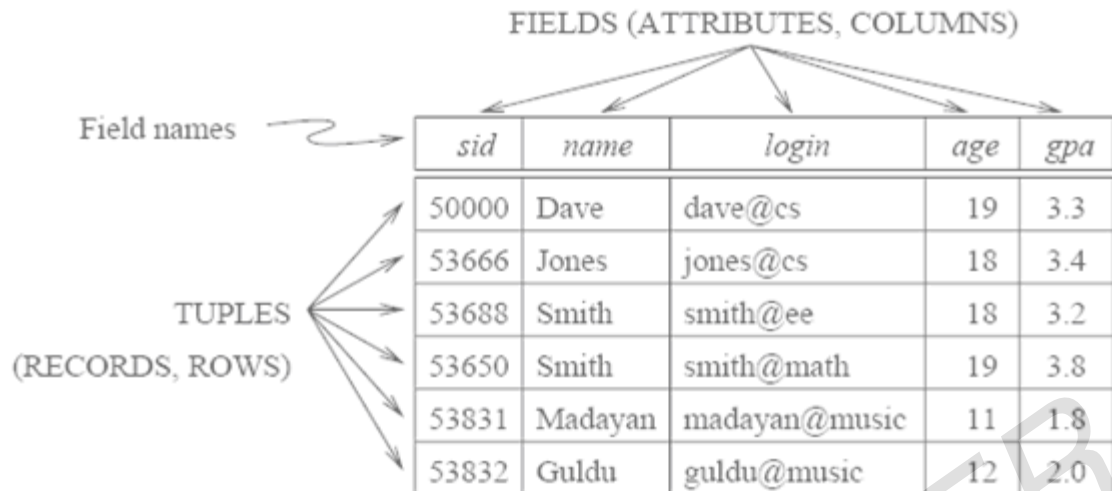
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Figure 1:

7. (a) Distinguish between conflict serializability and view Serializability.
 (b) Discuss about concurrency control mechanisms. [8+8]
8. Explain the following:
- (a) Fuzzy checkpointing
 (b) Archival dump and fuzzy dump.
 (c) Time to commit. [5+5+6]

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1. 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+- tree for the cases where the number of pointers that will fit in one
 node is as follows:
 - (a) Four
 - (b) Six
 - (c) Eight. [16]
2. (a) What is a relational database query? Explain with an example.
 (b) Explain the following fundamental operations of relational algebra. select
 project set rename. [8+8]
3. (a) Explain the following terms:
 - i. Relationship instance.
 - ii. Composite attribute.
 - iii. Multivalued attribute.
 - iv. Derived attribute.
 (b) What is the difference between ternary relationship and aggregation? [12+4]
4. (a) Explain about data structures in ARIES.
 (b) Explain about remote backup systems. [6+10]
5. (a) Show that, in SQL, <> all is identical to not in.
 (b) Consider the relational database given below
 employee (employee-name, street, city)
 works (employee-name, company-name, salary)
 company (company-name, city)
 manages (employee-name, manager-name),
 Using SQL, define a view consisting of manager-name and the average salary
 of all employees who work for that manager. Explain why the database system
 should not allow updates to be expressed in terms of this view. [8+8]

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6. (a) Justify the following statement: “Concurrent execution of transactions is more important when data must be fetched from (slow) disk or when transactions are long, and is less important when data is in memory and transactions are very short”.
- (b) What benefit does strict two-phase locking provide? Discuss its disadvantages. [8+8]
7. Explain the difference between external, internal, and conceptual schemas. How are these different schema layers related to the concepts of logical and physical data independence? [16]
8. (a) What is a minimal cover for a set of FDs? Describe an algorithm for computing the minimal cover of a set of FDs, and illustrate it with an example.
- (b) Discuss how schema refinement through dependency analysis and normalization can improve schemes obtained through ER design. [8+8]

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