

**II B.Tech. II Semester Regular Examinations, April/May -2005**  
**DATA BASE MANAGEMENT SYSTEMS**  
( Common to Computer Science & Engineering, Information Technology  
and Computer Science & Systems Engineering)

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. Write short notes on:

- (a) Key constraints
- (b) General constraints
- (c) Relational calculus.

2. (a) What is an SQL ? Explain the various aspects of SQL.

(b) Consider the following schema . The primary keys are underlined.

Sailors(sailor-id, sailor-name, sailor-rating, sailor-age)

Boats(boat-id, boat-name, boat-color)

Reserves(sailor-id, boat-id, day)

Write the queries in SQL for the following

- i. Find the names of sailors who have reserved at least one boat.
- ii. Find the ages of sailors whose names begin and end with C and has atleast four characters.
- iii. Find the names of sailors who have reserved a blue or a yellow boat.
- iv. Find the names of sailors who have reserved both a blue and a yellow boat.
- v. Find the names of all sailors who have reserved blue boats but not yellow boats.

3. What are the techniques used to improve the performance of disks in RAID.

4. (a) Explain about projection based on sorting.

(b) Explain about projection based on hashing.

5. (a) Discuss the role of relational algebra equivalences in query optimization.

(b) Explain various steps involved in the query processing.

6. (a) Use the axioms for functional and multivalued dependencies to show that the following rules are sound

- i. the multivalued union rule
- ii. the intersection rule
- iii. the difference rule

- (b) Explain why DKNF is highly desirable normal form , yet one that is difficult to achieve in practice.
- 7. (a) Explain the role of Lock manager in implementing Lock and Unlock requests according to 2PL.  
(b) What steps are taken for the Recovery during Normal Execution of Transactions?
- 8. Answer the following briefly:
  - (a) How is check pointing done in ARIES?
  - (b) Can a second end check point record be encountered during analysis phase?
  - (c) Why is the use of CLRS important for the use of UNDO actions that are not the physical inverse of the original update?

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1. Write short notes on:
  - (a) Key constraints
  - (b) General constraints
  - (c) Relational calculus.
2.
  - (a) What is the role of SQL in a database architecture.
  - (b) What are the notations used in SQL commands.
3.
  - (a) Describe two possible record formats. What are the trades-off between them
  - (b) When a page in the buffer pool is modified, how does the DBMS ensure that this change is propagated to disk.
4.
  - (a) Give the implementation algorithms for union and set-difference based on sorting and hashing.
  - (b) Discuss about demand driven pipeline and producer driven pipeline
5. Discuss various cost estimation methods of access based on indexing principle for relation operators.
6.
  - (a) Explain the difference between weak entity and strong entity set? How to represent the strong entity and weak entity set through ER-diagrams
  - (b) The State Bank of India offers the five different types of accounts : loan, checking, recurring deposits, locker accounts and fixed deposit. . The Bank has a number of branches and a client of the bank can open many accounts. A account can be joint and more than one client may operate an account. Identify the entities , attributes what relationships exist among these entities and Tables. Draw the corresponding E-R diagram
7. Describe each of the following locking protocols.
  - (a) 2PL.
  - (b) Strict 2PL.
  - (c) Conservative 2PL.
8. Answer the following briefly:

- (a) How is check pointing done in ARIES?
- (b) Can a second end check point record be encountered during analysis phase?
- (c) Why is the use of CLRS important for the use of UNDO actions that are not the physical inverse of the original update?

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1. (a) Explain
  - i. Database
  - ii. DBMS
  - iii. Entity
  - iv. Relationships(b) Explain the historical perspective of DBMS
2. (a) Consider the following schema given. The primary keys are underlined.  
Sailors(sailor-id, sailor-name, sailor-rating, sailor-age)  
Boats(boat-id, boat-name, boat-color)  
Reserves(sailor-id, boat-id, day)  
  
Write the Nested queries in SQL.
  - i. Find the names of sailors who have reserved boat number 120
  - ii. Find the names of sailors who have reserved a green boat
  - iii. Find the names of sailors who have not reserved a green boat
  - iv. Find the names of sailors with the highest rating(b) Explain the GROUP BY and HAVING clauses.
3. (a) Explain the term pre-fetching. Why is it important?  
(b) If an index contains data records as data entries, is it clustered or unclustered?  
Dense or sparse?  
(c) Explain the difference between and secondary indices.
4. (a) Describe how to extend the hash-join algorithm to compute the natural left outer join, the natural right outer join and the natural full outer join.  
(b) Explain the structure of optimisation  
(c) What are the usage of query processing techniques?  
(d) Discuss the various steps involved in processing a query with examples?
5. Discuss in detail about estimating the cost of an evaluation plan for a query block.
6. (a) Explain why the PJNF is more desirable normal form than 4NF.  
(b) Explain Domain Key Normal Form(DKNF) with example.

7. (a) Define these terms atomicity, consistency, isolation, durability, schedule, blind write.  
(b) Write a note on the properties of transactions.
8. (a) Discuss the un-do and re-do operations and the recovery techniques that use each.  
(b) Compare the shadow(D)pageing recovery scheme with the log-based recovery schemes in terms of ease of implementation and overhead cost.

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1. Write short notes on:
  - (a) Key constraints
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  - (c) Relational calculus.
2.
  - (a) What is a view? Explain the a views in SQL?
  - (b) Explain nested queries with example in SQL ?
3.
  - (a) Describe three popular file organization techniques on disks and compare them.
  - (b) Discuss the process of disk initialization.
4.
  - (a) Consider the following SQL query for a bank database  
Select T.branch-name  
From branch T, branch S  
where T.Assets > S.assets and S.branch-city="HYDERABAD"  
Write an efficient relational algebra expression that is equivalent to the query.
  - (b) Define query optimization and at what point during query processing does optimization occur?
5.
  - (a) Discuss the role of relational algebra equivalences in query optimization.
  - (b) Explain various steps involved in the query processing.
6.
  - (a) When are two sets of functional dependencies are equivalent? How can we determine their equivalence?
  - (b) Define BCNF ? How does BCNF differ from 3NF. Explain with an example.
7.
  - (a) Define the concept of a schedule for a set of concurrent transactions. Give a suitable example.
  - (b) Explain how does granularity of locking affect the performance of concurrency control algorithm.
8.
  - (a) If a system fails repeatedly during recovery, what is the maximum number of log records that can be written (as a function of number of update and other log records written before crash) before restart completes successfully.

- (b) What is the oldest log record that we need to retain?
- (c) If a bounded amount of stable storage is needed for the log, how can we ensure that there is always enough stable storage to hold all log records written during restart?

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