

IV B.Tech II Semester Regular Examinations, Apr/May 2006
DATA BASE MANAGEMENT SYSTEMS
(Electrical & Electronic Engineering)

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain
 - i. Database
 - ii. DBMS
 - iii. Entity
 - iv. Relationships[2+2+2+2]
(b) Explain the historical perspective of DBMS [8]
2. (a) Explain the three set-manipulation constructs available in SQL with examples.
(b) What is a subquery? Explain with examples. [9+7]
3. (a) Construct a B tree of order 2 to maintain the keys 1,9,8,6,4,5 and 10.
(b) Show how 4 is replaced by 7 in the tree constructed in the above question. [8+8]
4. Discuss the salient features of processing a high level query. Mention the steps and explain each step with an example. [16]
5. (a) Discuss the reasons for converting SQL queries into relational algebra queries before optimization is done.
(b) What is meant by query execution plan? Explain its significance. [10+6]
6. (a) Explain the functional dependencies and multi valued dependencies with examples.
(b) What is normalization? Discuss the 1NF,2NF, and 3NF Normal forms with examples. [8+8]
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+8]
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? [5+5+6]

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1. (a) Define the following with suitable examples:
 - i. Relation
 - ii. Cardinality of a relation
 - iii. Super-key
 - iv. Candidate key. [2+2+2+3](b) Explain the structure of relational model. [7]
2. (a) What are views? Discuss the problems encountered in modifying database through views.
(b) What is an embedded SQL? Give examples. [10+6]
3. (a) Explain what the buffer manager must do to process a read request for a page . what happens if the requested page is in the pool but not pinned.
(b) Explain what happens if there is a page request when all pages in the buffer pool are dirty. [8+8]
4. (a) Explain about projection based on sorting.
(b) Explain about projection based on hashing. [8+8]
5. (a) Why is it not desirable to force users to make an explicit choice of a query processing strategy? Are there cases in which it is desirable for users to be aware of the costs of competing query processing strategies? Explain.
(b) What are the advantages and disadvantages of hash indices relative to B+ - tree indices? How the type of index available influences the choice of query processing strategy? [8+8]
6. (a) What do you understand by the mapping cardinalities?
(b) For the following relation scheme, tell whether it is in 3 NF or not. Employee (E_code,E_name,Dname,salary,projectno,Termination_dataof _project) Where each project no has unique termination_dateof_project.
Justify your answer, if it in not 3NF bring it into 3NF through normalization.
m [6+10]
7. (a) Explain Binary locks, Shared Locks and Exclusive locks ?
(b) What is the two phase locking protocol? How does is guarantee serializability. [6+10]

8. (a) Write short notes on
- i. Write-Ahead log protocol
 - ii. Check pointing [4+4]
- (b) Explain how a System Crash can be recovered using ARIES algorithm? [8]

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(b) What is an embedded SQL? Give examples. [10+6]
3. (a) Write a note on inverted files.
(b) Distinguish between sparse and dense index. [8+8]
4. Discuss about the following:
 - (a) The system R optimizer.
 - (b) The iterator interface for operators and access methods. [10+6]
5. Show that the following equivalences hold and explain how they can be applied to improve the efficiency of certain updates.
 - (a) $(r1 \cup r2) \cup r3 = r1 \cup (r2 \cup r3)$
 - (b) $r1 \cup r2 = r2 = r2 \cup r3$
 - (c) $\sigma_p(r1 - r2) = \sigma_p(r1) - \sigma_p(r2)$ [5+4+7]
6. (a) What is super key and candidate key. Explain with examples.
(b) Explain with an entity– relation ship model diagram an airline reservation system. Identify the entities, attributes and relation ship exist among entities. [6+10]
7. (a) Explain Two phase locking with algorithms.
(b) What is Transaction? In what ways is it different from an ordinary program (Like 'C'). [10+6]
8. (a) What is the difference between
 - i. Stable storage and disk.

- ii. System crash and a media failure.
- iii. Check points and fuzzy dumps. [3+3+4]
- (b) Give a short note on crash recovery. [6]

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1. (a) Explain the following with an example:
 - i. Primary Key
 - ii. Secondary Key
 - iii. Super Key
 - iv. Foreign Key. [3+2+2+3]
 (b) Explain the relation schema and relation instance with examples. [6]
2. Explain the various types of aggregate functions with suitable examples in SQL. [16]
3. (a) Construct a B tree of order 2 to maintain the keys 1,9,8,6,4,5 and 10.
 (b) Show how 4 is replaced by 7 in the tree constructed in the above question. [8+8]
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? [8+8]
5. (a) Discuss the role of relational algebra equivalences in query optimization.
 (b) Explain various steps involved in the query processing. [8+8]
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. [6+10]
7. (a) Define these terms atomicity, consistency, isolation, durability, schedule, blind write.
 (b) Write a note on the properties of transactions. [12+4]
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? [5+5+6]
