G.H. Raisoni College of Engineering & Management, Amravati.

Question Bank (DBMS)

Third Year CSE

UNIT 1

Q.1. Explain the three levels of data abstraction.

Q.2. What are the advantages and disadvantages of DBMS over traditional file system?

Q.3. Define each of the following with suitable example:-

i) Weak Entity Set ii) Partial Key iii) Foreign key iv) Total Participation

v) Derived attribute vi) Primary key iv) Aggregation

Q.4. Explain with suitable example DDL and DML.

Q.5. Explain with diagram all the mapping cardinalities

Q.6. List six major steps that would be taken while setting up a database for a particular enterprise.

Q.7. Explain the different roles of database administrators, application programmers and end-users of a database.

Q.8. Explain the distinction between the terms Primary key, Candidate key and Super key.

Q.9. What is Data independence? Why is it needed? Explain the role of data independence considering the physical and logical data independence.

Q.10. Define and explain the following terms associated with E-R model

i) Entity

ii) Attribute, Single valued and Multi valued attributes

iii) Entity Set

iv) Domain

Q.11. Consider a database used to record the marks that student gets in different exams of different course offerings. Construct an E-R diagram that models exams as entities and use a ternary relationship for the above database.

Q.12. Design an E-R diagram for keeping track of the exploits of your favourite sports team. You should store the matches played, the score in each match, the players in each match and individual player statistics for each match. Summary should be modeled as derived attributes.

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UNIT 2

Q.1. Let R= (A,B,C) and let r_1 and r_2 both be relations on R. Give an expression in the domain relational calculus that is equivalent to each of the following.

i) r1 U r2

ii) r1 ∩ r2

iii) r1 - r2

iv) $\pi_{A,B}(r1) \bowtie \pi_{B,C}(r2)$

Q.2. Suppose that we have a relation (student-id, score) and we wish to assign grade to student based on the score as follows:

Grade F if score<40, grade C if 40<=score<60, grade B if 60<=score<80, and Grade S if 80<= score. Write SQL queries to do the following

a) Display the grade for each students, based on marks relation.
b) Find the number of students with each grade.

Q.3. Consider the employee database where the primary keys are underlined. Construct the SQL queries for this relational database.

employee (*employee-name*, street, city)

works (*employee-name*, city)

manages (*employee-name*, manager-name)

company (*company-name*, city)

(i) Find the name, street, addresses and cities of residence of all employees who work for First Bank Corporation and each earn more than$10,000.

(ii) Find all employees in the database who do not work for First Bank Corporation.

(iii) Assume that the companies may be located in several cities. Find all companies located in every city in which Small Bank Corporation is located.

(iv) Find those companies whose employees earn a higher salary, on average, than the average salary at First Bank Corporation.

(v) Find the company that has the most employees.

(vi) Give all managers of First Bank Corporation a 10% raise unless the salary becomes greater than $1,00,000;in such cases; give only a 3% raise.

Q.4. Let R=(A,B) and S=(A,C) and let r(R) and s(S) be relations. Write relational expressions equivalent to following domain relational calculus expressions.

i) {‹ a › | ∃ b(‹a, b, c› € r ^ b = 17)}

ii) {‹ a, b, c › | ‹a, b› € r ^ ‹a, c› € s }.

Q.5. Explain the fundamental operations of Relational Algebra.

Q.6. Differentiate between relation and relation schema giving a suitable example.

UNIT 3

Q.1. Define trigger. Explain need for trigger with example.

Q.2. What SQL trigger to carry out the following action: on delete of an account, for each owner of the account, check if the owner has any remaining accounts, and if she does not, delete her from the depositor relation.

Q.3. Consider the following relational database:

employee (*employee-name*, street, city)

works (*employee-name*, company-name, salary)

manages (*employee-name*, manager-name)

company (*company-name*, city)

Give an SQL DDL definition of this database. Identify referential integrity constraints that should hold, and include them in DDL definition.

Q.4. List and explain with suitable example the pitfalls in relational database design.

Q.5. Define the term Normalization? Why is it necessary to decompose a relation into several relations? With an example state the anomalies are removed by decomposition.

Q.6. What is role? Explain authorization grant graph.

Q.7. Explain with suitable example the concept of functional dependencies.

Q.8. Explain with appropriate example, a relation is said to be in 1 NF, 2NF and 3 NF.

Q.9. Explain different encryption techniques.

Q.10. Use Armstrong's axioms to prove the soundness of decomposition rule.

UNIT 4

Q.1. Consider the schema Account (account number, branch-name, balance) and Branch (branch-name, branch-city, assets).Give the optimize queries for the following:

a) Write the nested query on the relation account to find for each branch with name starting with 'B', all accounts with maximum balance at the branch.
b) Rewrite the preceding query, without using nested subquery, that is, decorrelate the query.

Q.2. What is meant by Query Optimization? How is it achieved?

Q.3. Describe the steps involved in query processing. Explain the functionality of each step.

Q.4. Give and explain Merge Join Algorithm for computing join operation.

Q.5. Give and explain the selection algorithm using indices.

Q.6. What is cost based optimization.

UNIT 5

Q.1. How atomicity and durability of a transaction is implemented by recovery management.

Q.2. What are the different states that every transaction enters into, and if transaction aborts? What action a system initiates?

Q.3. Describe the ACID properties. Explain the usefulness of each.

Q.4. List advantages and disadvantages of Two-phase locking.

Q.5. What is cascadeless schedule? Why cascadelessness of schedules desirable? Are there any circumstances under which it would be desirable to allow non cascadeless schedules? Explain your answer with example.

Q.6. Justify the following statement:

Concurrent execution of transaction 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.

UNIT 6

Q.1. Explain how lock requests are implemented.

Q.2. Show by example that there are schedules possible under the tree protocol that are not possible under the Two-phase locking and vice-versa.

Q.3. Draw architecture of remote backup system and explain several issues in designing remote backup systems.

Q.4. Explain Timestamp based protocol.

Q.5. Explain the shadow paging crash recovery technique.

Q.6. Explain what are the deferred and immediate modification versions of the logbased recovery schemes; and compare them. (in terms of ease of implementation and overhead cost)

Q.7. What is deadlock? Explain deadlock detection and recovery.

Q.8. Describe with an example the phantom phenomenon. Write down how the index locking protocol operates.

Q.9. Consider the following two transactions:

```
T31:  read(A);
      read(B);
      if A=0 then B:= B+1;
      write(B);
T32:  read(B);
      read(A);
      if B=0 then A:= A+1;
      write(A);
```

Add lock and unlock instructions to transactions T31 and T32, so that they observe the Two-phase locking protocol. Can the executions of these transactions result in a deadlock?