Important Questions

CHAPTER – 1 DATABASE SYSTEM ARCHITECTURE

1. Define DBMS. Explain advantages and disadvantages of conventional file-based system over database management system.

2. Explain three level architecture of DBMS.

3. What is Data Independence? Explain different types of data independence with suitable example.

CHAPTER – 2 DATA MODELS

1. What is data model? Enlist different types of data models.

2. Explain Network and Object Oriented Data Model & Relational Model in detail.

3. Define (A)Primary Key (B) Foreign Key (C) Unique Key (D) Candidate Key

4. What are integrity constraints? Explain various types of Integrity constraints with example.

5. Explain ER Model with example also draw different symbols used in ER Diagram.

6. Design a database for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted Your design should include an E-R diagram, a set of relational schemas, and a list of constraints, including primary-key and foreign-key constraints.

7. Design a database for an airline. The database must keep track of customers and their reservations, flights and their status, seat assignments on individual flights, and the schedule and routing of future flights. Your design should include an E-R diagram, a set of relational schemas, and a list of constraints, including primary-key and foreign-key constraints.

8. Define E-R Diagram. Draw an E-R Diagram for Hospital Billing System.

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CHAPTER 3: RELATIONAL QUERY LANGUAGES

1. What is Relational Algebra? Explain all the operations performed on relational algebra.

2. Explain different types of outer joins with example.

3. Discuss in brief : (A) SQL3 (B) ORACLE (C)DB2

CHAPTER 4: RELATIONAL DATABASE DESIGN

1. What is functional dependency? Explain lossless decomposition&dependency preserving decomposition.

2. Given FD's for relation R{A,B,C,D,E,F}, Find closure of FD set by applying Armstrong's Axioms. (A→B, A→C, CD→E,CD→F,B→E)

3. Compute the closure of the following set of F of functional dependencies for relational schema R{A,B,C,D,E} (A→BC,CD→E,B→D,E→A)

4. Here are two sets of FDs for R(A,B,C,D,E). Are they equivalent? (1) {A→B, AB→C, D→AC, D→E} (2) {A→BC, D→AE}

5. Consider schema EMPLOYEE(E-ID, E-NAME, E-CITY, E-STATE) and FD={E-ID→E-NAME, E-ID→E-CITY, E-ID→E-STATE, E-CITY→E-STATE} (1)Find attribute of closure for (E-ID)$^+$ (2) Find attribute of closure for (E-NAME)$^+$.

6. Compute the closure of R(A,B,C,D,E) with the following set of functional dependencies {A→BC, CD→E, B→D, E→A} List the candidate keys of R.

7. What is normalization? Why normalization process is needed? Explain 1NF,2NF,3NFandBCNF with example.

8. A college maintains details of its lecturer's subject area skills. These details comprise: {lecturer number, lecturer name, lecturer grade, department code, department name, subject code, subject name, subject level}. Assume that each lecturer may teach many subjects but may not belong to more than one department. Subject code, subject name and subject level are repeating fields. Normalize this data to Third normal form.

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9. Explain Multi Valued Dependency and 4NF.

10. Normalize the following schema, with given constraints, to 4NF.

    books(accessionno, isbn, title, author, publisher)

    users(userid, name, deptid, deptname)

    List of constraints:

    accessionno → isbn

    isbn → title

    isbn → publisher

    isbn →→ author

    userid → name

    userid → deptid

    deptid → deptname

11. Compute the closure of the following set F of functional dependencies for relation schema R = (ABCDE), F = {A -> C, E -> D, B -> C}

12. List the candidate keys for R.

13. What is Functional dependency? Explain all its types with example.

CHAPTER 5: QUERY PROCESSING AND OPTIMIZATION

1. Explain query evaluation process.

2. Explain the purpose of sorting with example with reference to query optimization.

3. Explain the measures of finding out the cost of a query in query processing.

4. Discuss various steps of Query processing with diagram.

CHAPTER 6: STORAGE STRATEGIES

1. Illustrate Indexing With Suitable Example.

2. Construct a B-tree of order 5 for the following data {3, 14, 7, 1, 8, 5, 11, 17, 13, 6, 23, 12, 20, 26, 4, 16, 18, 24, 25, 19}.

3. Construct B+ tree for the following set of key values { 2, 3, 5, 7, 11, 17, 19, 23, 29,31 } after creation of B+ tree perform following series of operations: (A) insert 9 (B) insert 10 (C) insert 8 (D) delete 23 (E) delete 19.

4. Write a short note on hashing.

5. The following key values are organized in an extensible hashing technique { 1, 3, 5, 8, 9, 12, 17, 28}. Show the extensible hash structure for this file if the hash function is h(x)=x mod 8 and buckets can hold three records. Show how extendable hash structure changes as the result of each of the following steps: Insert 2, Insert 24, Delete 5, Delete 12.

CHAPTER 7: TRANSACTION PROCESSING

1. Explain Transaction & ACID property in detail.
2. Explain various states of transaction with suitable diagram.
3. What is Schedule? Explain serializability of scheduling.
4. Explain conflict serializability. Compare view serializability and conflict serializability.
5. What is concurrency? What are the three problems due to concurrency? How problems can be avoided?
6. Explain two phase locking with its advantages and disadvantages.
7. Explain three concurrency problem. How does the strict two phase locking protocol solve three problems of concurrency? Explain with example.
8. Write difference between shared lock and exclusive lock.
9. Explain time stamp based protocol.
10. What is deadlock? When it occurs? How to avoid it?
11. Explain log based recovery and explain all its types with example.
12. What is a recoverable schedule? Why is recoverability of schedules desirable? Are there any circumstances under which it would be desirable to allow non-recoverable schedules? Explain your answer

13. Write short note on 2PC Protocol.

14. Explain Conflict serializability

15. Define wait-Die and Wound-wait.

CHAPTER 8: DATABASE SECURITY

1. What is the difference between data security and data integrity?

2. Compare Discretionary access control and Mandatory Access Control.

CHAPTER 9: SQL CONCEPTS

1. Describe the following SQL functions: **(i)** Add_months(x,y) **(ii)** Rtrim() **(iii)** To_date

2. Explain on delete cascade with example.

3. Explain system recovery procedure with Checkpoint record concept.

4. Explain commit, rollback and savepoint command.

5. Consider the following relations:

   EMP(empno, ename, jobtitle, managerno, hiredate, sal, commission, deptno)

   DEPT(deptno, dname, location)

   Answer the following queries in SQL and Give an expression in the relational algebra to express each of the following queries.

   a. Find the Employees working in the department number10, 20, 30 only.

   b. Find Employees whose names start with letter A or letter a.

   c. Find Employees along with their department name.

   d. Find the Employees who are working in Smith's department

   e. Find the Employees who get salary more than Allen's salary.

   f. Display employees who are getting maximum salary in each department.

   g. Find list of employees whose hire date is on or before 1-April-18.

6. Write SQL statements (Query) for following tables:

   E1 (eno,ename,age,city,bcode)

   E2 (bcode, bname)

    a. Display employees' details whose branch code is between 1 to 5.

    b. Find an average age of all employees whose branch code is 3.

    c. Retrieve branch information in descending order.

    d. Add new branch in E2 table.

    e. Display eno, ename and age of employees whose city is Ahmedabad.

    f. Delete employee details whose age is 29.

    g. Change age of employee to 25 whose employee no is 6.

7. Differentiate Grant and Revoke with example.
8. Define Encryption, DCL and DML.

CHAPTER 10: PL/SQL CONCEPTS

1. Write PL/SQL block to print the sum of even numbers from 1 to 100.
2. Explain Cursor in PL/SQL .
3. Write a PL/SQL cursor to display the names and branch of all students from the STUDENT relation.
4. Explain stored procedure with proper example.
5. Write a note on Trigger.
6. Write short note on stored Procedure with example
7. Write PL/SQL block to print whether the given number is Armstrong number or not.