

## CST204 DATABASE MANAGEMENT SYSTEMS

### QUESTON BANK OF THIED AND FOUTH MODULE

1. How can we conclude 2 FDs are equivalent
2. Illustrate different anomalies in designing a database
3. How is the purpose of where clause is different from that of having clause
4. Illustrate the concept of trigger in Sql with an example
5. What are the primary operations supported by DML in DBMS? Provide suitable examples. Explain with suitable diagrams.
6. How is the purpose of **where** clause is different from that of **having** clause ?
7. Illustrate different anomalies in designing a database schema.
8. How are Views created and modified in RDBMS, Explain with proper SQL commands.
9. Illustrate structure of B-Tree and B+ Tree and explain how they are different?
10. Differentiate between static hashing and dynamic hashing.
11. What are the different types of single-level ordered indices? Explain.
12. Write short notes on Nested queries
13. Consider an EMPLOYEE file with 10000 records where each record is of size 80 bytes. The file is sorted on employee number (15 bytes long), which is the primary key. Assuming unspanned organization and block size of 512 bytes compute the number of block accesses needed for selecting records based on employee number if,
  - (i) No index is used
  - ii. Single level primary index is used
  - iii. Multi-level primary index is used Assume a block pointer size of 6 bytes
14. Illustrate correlated and non-correlated nested queries with real examples
15. For the relation schema below, give an expression in SQL for each of the queries that follows:  
employee(employee-name, street, city)  
works(employee-name, company-name, salary)  
company(company-name, city)  
manages(employee-name, manager-name)
  - a) Find the names, street address, and cities of residence for all employees who work for the Company 'RIL Inc.' and earn more than \$10,000.
  - b) Find the names of all employees who live in the same cities as the companies for which they work.
  - c) Find the names of all employees who do not work for 'KYS Inc.'. Assume that all people work for exactly one company.

- d) Find the names of all employees who earn more than every employee of 'SB Corporation'. Assume that all people work for at most one company.
- e) List out number of employees company-wise in the decreasing order of number of employees

16. What are Armstrong's axioms?

17. Write an algorithm to compute the attribute closure of a set of attributes (X) under a set of functional dependencies (F).

18. Explain three uses of attribute closure algorithm.

19. EMPLOYEE(ENO, NAME, ADDRESS, DOB, AGE, GENDER, SALARY, DNUM, SUPERENO)

DEPARTMENT(DNO, DNAME, DLOCATION, DPHONE, MGRENO)

PROJECT(PNO, PNAME, PLOCATION, PCOST, CDNO)

DNUM is a foreign key that identifies the department to which an employee belongs.

MGRENO is a foreign key identifying the employee who manages the department.

CDNO is a foreign key identifying the department that controls the project. SUPERENO is a foreign key identifying the supervisor of each employee.

Write relational algebra expressions for the following queries:-

- (a) Names of female employees whose salary is more than 20000.
- (b) Salaries of employee from 'Accounts' department
- (c) Names of employees along with his/her supervisor's name
- (d) For each employee return name of the employee along with his department name and the names of projects in which he/she works
- (e) Names of employees working in all the department

20. Discuss the four ACID properties and their importance.
20. Explain the difference between BCNF and 3NF with an example
21. What are the desirable properties of transactions? Explain
22. Explain DDL and DML with the help of an example database with query
23. Illustrate correlated nested query in DBMS, and how does it differ from a non-correlated nested query?
24. Explain ASSERTIONS in DBMS, including their purpose. Provide an SQL command to create an assertion.
25. Discuss the role of the GROUP BY clause in SQL and its impact on query results.
26. What are triggers in DBMS, and how can they be used to automatically update the 'Total' field when inserting records into the following schema: Student(id, name, subject1, subject2, subject3, Total)
27. Consider an EMPLOYEE file with 10000 records where each record is of size 80 bytes. The file is sorted on employee number (15 bytes long), which is the primary key. Assuming unspanned organization and block size of 512 bytes compute the number of block accesses needed for selecting records based on employee number if,
  - No index is used
  - Single level primary index is used
  - Multi-level primary index is used Assume a block pointer size of 6 bytes
28. Consider the following relations:
  - FACULTY(FNO, NAME, GENDER, AGE, SALARY, DNUM)
  - DEPARTMENT(DNO, DNAME, DPHONE)
  - COURSE(CNO, CNAME, CREDITS, ODNO)
  - TEACHING(FNO, CNO, SEMESTER)
29. DNUM is a foreign key that identifies the department to which a faculty belongs. ODNO is a foreign key identifying the department that offers a course. Write SQL expressions for the following queries:
  - (a) Names and department names of faculty members.
  - (b) Names of faculty members not offering any course.
  - (c) Names of departments offering more than three courses, in alphabetic order.
30. Suppose an ordered file with 30,000 records stored on a disk with block size 1024 bytes. File records are of fixed size with record length  $R = 100$  bytes. Indexing Fields have ordering key field of the file is  $V = 9$  bytes long, a block pointer is  $P = 6$  bytes long. The first level index is supposed to be secondary Index and 2nd and 3rd level indexes are of Primary Index.

□ Find

the blocking factor  
number of blocks in each index levels  
number of block access

31. For the relation schema below, give an expression in SQL for each of the queries that follows:

EMPLOYEE(employee-name, street, city)  
WORKS(employee-name, company-name, salary)  
COMPANY(company-name, city)  
MANAGES(employee-name, manager-name)

- a) Find the names, street address, and cities of residence for all employees who work for the Company 'RIL Inc.' and earn more than \$10,000.
  - b) Find the names of all employees who live in the same cities as the companies for which they work.
  - c) Find the names of all employees who do not work for 'KYS Inc.'. Assume that all people work for exactly one company.
  - d) Find the names of all employees who earn more than every employee of 'SB Corporation'. Assume that all people work for at most one company.
  - e) List out number of employees company-wise in the decreasing order of number of employees
32. Consider the set of keys {1, 2, 3, 4, 5, 6, 7, 8, 9, 10} and an order of 4. Please provide a step-by-step explanation for creating a **B+ Tree** using these keys.
33. Consider a **B-Tree** with Key size is of 10 bytes, block size is of 512 bytes, Record Pointer is of size 8 bytes and block pointer is of size 5 bytes. Find the order of B-Tree ?
34. Provide an explanation of GRID files, accompanied by a clear diagram, highlighting their advantages and disadvantages in data storage and retrieval?
35. Demystify **Extendible hashing**, with a neat diagram illustrating its working, and explain how it handles collisions in the process?
36. What are the key principles or informal guidelines to follow when designing a database schema? Additionally, could you explain the potential consequences or impact of violating these guidelines?
37. Define functional dependency, illustrate it with a relevant example, and explain the purpose or significance of functional dependency in database design?

38. Provide an explanation of the **inference rules or axioms** used in Database Management Systems (DBMS), and discuss their role in deriving new relationships or dependencies from existing ones?
39. Given two sets of functional dependencies,
40.  $E = \{A \rightarrow B, AB \rightarrow C, D \rightarrow AC, D \rightarrow E\}$  and  $F = \{A \rightarrow BC, D \rightarrow AE\}$ , can you determine whether E and F are equivalent or not?