CS601

DATABASE MANAGEMENT SYSTEM

Multiple Choice Questions

1. What is the main drawback of the hierarchical model?
   a) Lack of standardization
   b) High Cost
   c) Poor performance
   d) None of these
2. Which is another name for weak entity?
   a) Child
   b) Owner
   c) Dominant
   d) All of these
3. Relations produced from an E-R model will always be in
   a) 1 NF
   b) 3 NF
   c) 2 NF
   d) 4NF
4. Normalization follows
   a) top down approach
   b) bottom up approach
   c) both of (a) and (b)
   d) None of these
5. To test equality with the NULL, operator …… is used.
   a) =
   b) ==
   c) IS NULL
   d) none of these
6. Which of the following ensures the atomicity of the transactions?
   a) Transaction management component
   b) Application programmer
   c) Concurrency control component
   d) Recovery management component
7. ……. key cannot be null.
   a) Primary
   b) Foreign
   c) Candidate
   d) Unique
8. If a relation is in ……., it is also in 3NF
   a) 2 NF
   b) BCNF
   c) both (a) and (b)
   d) none of these
9. A table can be logically connected to another table by defining a
   a) hyperlink
   b) common field
   c) foreign key
   d) primary key
10. Consider the schema R (ABCD) and functional dependencies A-> B, C -> D. Then the decomposition of R into R1 (AB) and R2 (CD) is
    a) dependency preserving and lossless join

b) lossless join but not dependency preserving
c) dependency preserving but not lossless join
d) not dependency preserving and not lossless join

11. Which of the following features is supported in the relational database model?
    a) Complex data types
    b) Multi-valued attributes
    c) Association with multiplicities
    d) Generalization relationships

Short Answer Type Questions

1. a) What do you mean by functional dependency?
   b) What are the main characteristics of functional dependencies?

2. "Every relational schema having two attributes is in BCNF." Prove that this statement. Define candidate key.
3. What are the problems that may occur due to concurrent execution of transactions?
4. What is two phase locking? How does it guarantee serializability?
5. Discuss the ACID properties of transaction.
6. Consider the relation schemas given below:
   STUDENT (student_id, name)
   ENROLLEDIN (student_id, subject_code)
   SUBJECTS (subject_code, lecturer)
   Write relational algebra for the following:
   i) who teaches CP 1500 or CP 3020
   ii) who teaches at least two different subjects?
   iii) what are the names of the students taking a subject taught by Roger?
7. Suppose you have a classical music collection consisting of CDs and/or LPs and/or tapes, and you want to build a database that will let you find which recording you have for a specific composer (e.g. Sibelius) or conductor (e.g. Simon Rattle) or soloist (e.g. Arthur Grumiaux) or work (e.g. Beethovan's Fifth) or orchestra (e.g. the NYPO) or kind of work (e.g. violin concerto) or chamber group (e.g. the Kronos Quartet).
   Draw an E-R diagram for this database.
8. Write SQL statements on the following tables:

   SALESPEOPLE (snum, sname city, commission)

   CUSTOMERS (cnum, cname, city, rating, snum)

   ORDERS (onum, amt, odate, cnum, snum)

   a) Show the commissions of all the salespersons who receive at least one order of amount greater than Rs. 5,000
   b) Find all the customers located in cities where salesperson 'Amit' has customers.

Long Answer Type Questions

9. a) Consider the following relation schema

   customer (cust_name, street, city)
   account (account_no, branchname, balance)
   branch (branch_name, city, assets)
   borrow (loan_no, branch_name, amount).

   i) Find the names of all customers who live in the same street and city as RAM. (Write Relational Algebra Expression)

   ii) Find all customers who have an account all branches located in Salt Lake. (Write Relational Algebra expression)

   iii) Find all customers who have an account at all branches located in Gariahat. (Write SQL Query).

   iv) Find all loan members for loans with an amount greater than Rs. 10,000/- (Write SQL Query)

   b) Explain the roles of Database Administrator (DBA).

10. a) Draw an E-R diagram for the following:

    A department store operates in several cities. In a city there is one headquarters coordinating the local operations. A city may have several stores. Stores hold any amount of items Customers place their orders for any number of items to a given store.

    b) Why we need query optimization?

    c) Consider the relation R(A, B, C, D, E) with the set of F = { A -> C, B -> C, C -> D, DC -> C, CE -> A }. Suppose the relation has been decomposed by the relations R1 (A, D), R2 (A, B), R3 (B, E), R4 (C, D, E), R5 (A, E). Is this decomposition lossy or lossless? Justify your answer.

11. a) What is blocking factor? Explain the difference between B-tree and B+ tree indexing with proper example.
    b) What is Schedule? Describe the growing phase and shrinking phase with example of the two-phase locking protocol.
    c) Briefly discuss the ACID properties of transaction in DBMS.

12. Write short notes on any three of the following:
    a) DBMS architecture
    b) Atomicity problem
    c) Multi-level index

d) Three level data abstraction
e) Lossless and Lossy Decompositions
f) Integrity constraints

13. a) Consider the schedule shown below:
    i) Show that it is not Conflict Serializable.
    ii) Is it view serializable? Explain your answer.

T_1	T_2	T_3
		Write (Y)
Read (Y)		Read (X)
Write (Y)	Read (Z)	
Read (X)		Write (Z)
Write (X)		
	Write (Y)	

b) What is meant by Granularity of Locking?
c) Briefly discuss Deadlock avoidance techniques in concurrent transactions.