DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (UG & PG)

Question Bank

Subject Code & Name: 23CST201 / DATABASE MANAGEMENT SYSTEMS

TWO MARKS QUESTIONS & ANSWERS

UNIT I

1. Who is a DBA? What are the responsibilities of a DBA?

A database administrator (short form DBA) is a person responsible for the design, implementation, maintenance and repair of an organization's database. They are also known by the titles Database Coordinator or Database Programmer, and is closely related to the Database Analyst, Database Modeller, Programmer Analyst, and Systems Manager.

2. What is a data model? List the types of data model used.

A database model is the theoretical foundation of a database and fundamentally determines in which manner data can be stored, organized, and manipulated in a database system. It thereby defines the infrastructure offered by a particular database system.

3.Define database management system.

Database management system (DBMS) is a collection of interrelated data and a set of programs to access those data.

4.What is data base management system?

x   A database management system (DBMS) is a software package with computer programs that control the creation, maintenance, and the use of a database.

x   It allows organizations to conveniently develop databases for various applications by database administrators (DBAs) and other specialists.

5.List any eight applications of DBMS.

a) Banking
b) Airlines
c) Universities
d) Credit card transactions
e) Tele communication
f) Finance
g) Sales
h) Manufacturing
i) Human resources

6.What are the disadvantages of file processing system?

The disadvantages of file processing systems are
a) Data redundancy and inconsistency b) Difficulty in accessing data
c) Data isolation
d) Integrity problems
e) Atomicity problems
f) Concurrent access anomalies

7.What are the advantages of using a DBMS?

The advantages of using a DBMS are
a) Controlling redundancy
b) Restricting unauthorized access

c) Providing multiple user interfaces
d) Enforcing integrity constraints.
e) Providing back up and recovery

8.Give the levels of data abstraction.
a) Physical level
b) Logical level
c) View level

9.Define instance and schema.
Instance: Collection of data stored in the data base at a particular moment is called an Instance of the database.
  Schema: The overall design of the data base is called the data base schema.

10.Define the terms of Data base schemas.
1) Physical schema
2) logical schema.
Physical schema: The physical schema describes the database design at the physical level, which is the lowest level of abstraction describing how the data are actually stored.
Logical schema: The logical schema describes the database design at the logical level, which describes what data are stored in the database and what relationship exists among the data.

11.What is conceptual schema?
The schemas at the view level are called subschema's that describe different views of the database.

12.Define data model.
A data model is a collection of conceptual tools for describing data, data relationships, data semantics and consistency constraints.

13.What is storage manager?
A storage manager is a program module that provides the interface between the low level data stored in a database and the application programs and queries submitted to the system.

14.What are the components of storage manager?
The storage manager components include
a) Authorization and integrity manager
b) Transaction manager
c) File manager
d) Buffer manager

15.What is the purpose of storage manager?
The storage manager is responsible for the following
a) Interaction with the file manager
b) Translation of DML commands in to low level file system commands
c) Storing, retrieving and updating data in the database

UNIT II

1.What is embedded SQL? What are its advantages? April/May-2011
Embedded SQL is a method of combining the computing power of a programming language and the database manipulation capabilities of SQL. Embedded SQL statements are SQL

2.What is the difference between tuple relational calculus and domain relational calculus? April/May-2011
The tuple-oriented calculus uses a tuple variables i.e., variable whose only permitted values are tuples of that relation. E.g. QUEL. The domain-oriented calculus has domain variables i.e., variables that range over the

underlying domains instead of over relation. E.g. ILL, DEDUCE....The tuple-oriented calculus uses a tuple variables i.e., variable whose only permitted values are tuples of that relation. E

3.Write short notes on relational model.

The relational model uses a collection of tables to represent both data and the relationships among those data. The relational model is an example of a record based model.

4.Define tuple and attribute.

x Attributes:column headers

x Tuple : Row

5.Define the term relation.

Relation is a subset of a Cartesian product of list domains.

6.Define tuple variable.

Tuple variable is a variable whose domain is the set of all tuples.

7.Define the term Domain.

For each attribute there is a set of permitted values called the domain of that attribute.

8.What is a candidate key?

Minimal super keys are called candidate keys.

9.What is a primary key?

Primary key is chosen by the database designer as the principal means of identifying an entity in the entity set.

10.What is a super key?

A super key is a set of one or more attributes that collectively allows us to identify uniquely an entity in the entity set.

11.Define- relational algebra.

The relational algebra is a procedural query language. It consists of a set of operations that take one or two relation as input and produce a new relation as output.

12.What is a SELECT operation?

The select operation selects tuples that satisfy a given predicate. We use the lowercase letter ss to denote selection.

13.What is a PROJECT operation?

The project operation is a unary operation that returns its argument relation with certain attributes left out. Projection is denoted by pie (pppp).

14.Write short notes on tuple relational calculus.

The tuple relational calculation is anon procedural query language. It describes the desired information with out giving a specific procedure for obtaining that Information.

A query or expression can be expressed in tuple relational calculus as

{t | P (t)}

which means the set of all tuples 't' such that predicate P is true for 't'.

Notations used:

• t[A]   the value of tuple 't' on attribute, A

• t   r   tuple 't' is in relation 'r'

•   there exists

15.Write short notes on domain relational calculus .

The domain relational calculus uses domain variables that take on values from an attribute domain rather than values for entire tuple.

UNIT III

1.What is meant by lossless-join decomposition?

We claim the above decomposition is lossless. How can we decide whether decomposition is lossless?

1.   Let R be a relation schema.

2.   Let F be a set of functional dependencies on R.

3.   Let   and   form a decomposition of R.

4.   The decomposition is a lossless-join decomposition of R if at least one of the following functional dependencies are in   :a. b.

2.List the disadvantages of relational database system.

x   Repetition of data

x   Inability to represent certain information.

3.What is first normal form?

The domain of attribute must include only atomic (simple, indivisible) values.

4.What is meant by functional dependencies?

Consider a relation schema R and a C R and ß C R. The functional dependency a   ß holds on relational schema R if in any legal relation r(R), for all pairs of tuples t1 and t2 in r such that t1 [a] =t1 [a], and also t1 [ß] =t2 [ß].

5.What are the uses of functional dependencies?

To test relations to see whether they are legal under a given set of functional dependencies. To specify constraints on the set of legal relations.

6.What meant by trivial dependency?

Functional dependency of the form a   ß is trivial if ß C a. Trivial functional dependencies are satisfied by all the relations.

7.What are axioms?

Axioms or rules of inference provide a simpler technique for reasoning about functional dependencies.

8.What is meant by computing the closure of a set of functional dependency?

+ The closure of F denoted b y F   is the set of functional dependencies logically implied by F.

9.What is meant by normalization of data?

It is a process of analyzing the given relation schemas based on their Functional Dependencies (FDs) and primary key to achieve the properties

Minimizing redundancy

Minimizing insertion, deletion and updating anomalies

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10. Define Boyce codd normal form .

A relation schema R is in BCNF with respect to a set F of functional + dependencies if, for all functional dependencies in F of the form. a->ß, where a

11. List out the desirable properties of decomposition.

x   Lossless-join decomposition

x   Dependency preservation

x   Repetition of information

12. What is 2NF?

A relation schema R is in 2NF if it is in 1NF and every non-prime attribute A in R is fully functionally dependent on primary key.

13. What is the use of group by clause?

Group by clause is used to apply aggregate functions to a set of tuples. The attributes given in the group by clause are used to form groups. Tuples with the same value on all attributes in the group by clause are placed in one group.

14. What is the use of sub queries?

A sub query is a select-from-where expression that is nested with in another query. A common use of sub queries is to perform tests for set membership, make set comparisons, and determine set cardinality.

15. What is view in SQL? How is it defined?

Any relation that is not part of the logical model, but is made visible to a user as a virtual relation is called a view.

We define view in SQL by using the create view command. The form of the create view command is Create view v as <query expression>

UNIT IV

1. What are the ACID properties?

(atomicity, consistency, isolation, durability) is a set of properties that guarantee database transactions are processed reliably. In the context of databases, a single logical operation on the data is called a transaction. For example, a transfer of funds from one bank account to another, even though that might involve multiple changes (such as debiting one account and crediting another), is a single transaction.

2. What are two pitfalls (problem) of lock-based protocols? APRIL/MAY-2011

x   Deadlock

x   Starvation

3. What is transaction?

Collections of operations that form a single logical unit of work are called transactions.

4. What are the two statements regarding transaction?

The two statements regarding transaction of the form: Begin transaction

End transaction

5. What are the properties of transaction?
The properties o f transactions are:
Atomicity Consistency Isolation Durability
6. What is recovery management component?
Ensuring durability is the responsibility of a software component of the base system
called the recovery management component.

7. When is a transaction rolled back?
Any changes that the aborted transaction made to the database must be undone. Once
the changes caused by an aborted transaction have been undone, then the transaction has been rolled
back.

8. What are the states of transaction?
The states of transaction are
Active
Partially committed
Failed Aborted Committed
Terminated

9. List out the statements associated with a database transaction.
Commit work
Rollback work

10. What is a shadow copy scheme?
It is simple, but efficient, scheme called the shadow copy schemes. It is based on making
copies of the database called shadow copies that one transaction is active at a time. The scheme also
assumes that the database is simply a file on disk.

11. Give the reasons for allowing concurrency.
The reasons for allowing concurrency is if the transactions run serially, a short
transaction may have to wait for a preceding long transaction to complete, which can lead to unpredictable
delays in running a transaction. So concurrent execution reduces the unpredictable delays in running
transactions.

12. What is average response time?
The average response time is that the average time for a transaction to be completed
after it has been submitted.

13. What are the two types of serializability?
The two types of serializability is
Conflict serializability
View serializability

14. Define lock.
Lock is the most common used to implement the requirement is to allow a
transaction to access a data item only if it is currently holding a lock on that item.

15. What are the different modes of lock?

The modes of lock are:
Shared
Exclusive

UNIT V

1. What are the advantages and disadvantages of indexed sequential file? APRIL/MAY-2011
The advantage of ordering records in a sequential file according to a key is that you can then
search the file more quickly. If you know the key value that you want, you can use one of the relatively fast
searches.

2.What is database tuning? APRIL/MAY-2011
Database tuning describes a group of activities used to optimize and homogenize the
performance of a database. It usually overlaps with query tuning, but refers to design of the database
files, selection of the database management system (DBMS), operating system and CPU the DBMS runs on.

3. Give the measures of quality of a disk.
x   Capacity
x   Access time
x   Seek time
x   Data transfer rate
x   Reliability
x   Rotational latency time.

4. Compare sequential access devices versus random access devices with an example. sequential access
devices   random access devices

Must be accessed from the beginning	It is possible to read data from any location
Eg:- tape storage	Eg:-disk storage
Access to data is much slower	Access to data is faster
Cheaper than disk	Expensive when compared with disk

5. What are the types of storage devices?
x   Primary storage
x   Secondary storage
x   Tertiary storage

6.Draw the storage device hierarchy according to their speed and their cost.
x   Cache
x   Main memory x   Flash memory x   Magnetic disk x   Optical disk
x   Magnetic tapes

7.What are called jukebox systems?
Jukebox systems contain a few d rives and numerous disks that can be loaded into one of the
drives automatically.

8.What is called remapping of bad sectors?
If the controller detects that a sector is damaged when the disk is initially formatted, or when
an attempt is made to write the sector, it can logically map the sector to a different physical location.

9.Define access time.
Access time is the time from when a read or write request is issued to when data transfer

begins.

10.Define seek time.

The time for repositioning the arm is called the seek time and it increases with the distance that the arm is called the seek time.

11. Define average seek time.

The average seek time is the average of the seek times, measured over a sequence of random requests.

12. Define rotational latency time.

The time spent waiting for the sector to be accessed to appear under the head is called the rotational latency time.

13. Define average latency time.

The average latency time of the disk is one-half the time for a full rotation of the disk.

14. What is meant by data-transfer rate?

The data-transfer rate is the rate at which data can be retrieved from or stored to the disk.

15. What is meant by mean time to failure?

The mean time to failure is the amount of time that the system could run continuously without failure.

PART B:16 MARKS

UNIT I

1. a. With a neat diagram, explain the structure of a DBMS?

b. Draw an E-R diagram for a small marketing company database, assuming your own data requirements

2. a. Explain the architecture of DBMS

b. Compare File systems with database systems

3. What is meant by Relational calculus? Query examples for tuple and domain relational calculus?

4. Explain all types of data models

5. Explain E-R Model concept and extended E-R model

6. Define relational algebra. With suitable example

7. Roles of data base administrator and the details of aggregate function queries

8. a. With relevant examples discuss the following in SQL

i. DDL ii. DML iii. DCL

iv. Views

b. Construct an ER diagram for a car insurance company that has a set of customers, each of whom owns one/more cars. Each car has associated with it zero to any number of recorded accidents.

9. Explain the 3 schema architecture of DBS.Why do we need mappings between different schema levels

10. Consider the following tabls:

Employee (Emp_no, Name, Emp_city) e

Company (Emp_no, Company_name, Salary)

i. Write a SQL query to display Employee name and company name.

ii. Write a SQL query to display employee name, employee city ,company name and salary of all the employees whose salary >10000

iii. Write a query to display all the employees working in 'XYZ' company.

11. Explain various DML commands with neat syntax.

UNIT II

1. a) What is data integrity? Explain the types of integrity constraints.

b) What are the relational algebra operations supported in SQL?

2. a) Define class Hierarchies and Aggregation?

3. a)Explain the strength and weakness of the Triggers mechanism

and update views in stored procedure. b)What is meant by Integrity and security?

4. Consider the following relational schema Employee (empno,name,office,age) Books(isbn,title,authors,publisher) Loan(empno, isbn,date)

5. Write the following queries in relational algebra.

6. a. Find the names of employees who have borrowed a book

Published by McGraw-Hill.

b. Find the names of employees who have borrowed all books

Published by McGraw-Hill

c. Find the names of employees who have borrowed more than five different books published by McGraw-Hill.

d. For each publisher, find the names of employees who have borrowed

More than five books of that publisher

7. Explain the details about embedded and dynamic SQL

8. Draw a neat sketch to indicate the architecture of a distributed database system. With an example explain the various form of data fragmentation used in DDB.

9. a) What is meant by Selection and projection used in Relational algebra?

b) How we made lossless and loss-join in relational model?

UNIT III

1. a) Explain 1NF, 2Nf and BCNF with suitable example.

b) Consider the universal relation R={ A,B,C,D,E,F,G,H,I} and the set of functional dependencies F={(A,B)->{C},{A}>{D,E},{B}->{F},{F}->{G,H},{D}->[I,J].what is the key for Decompose R

into 2NF,the 3NF relations.

2. What are the pitfalls in relational database design? With a suitable example, explain the role of functional dependency in the process of normalization.

3. What is normalization? Explain all Normal forms.

4. Write about decomposition preservation algorithm for all FD's.

5. Explain functional dependency concepts.

6. Explain 2NF and 3NF in detail.

7. Define BCNF .How does it differ from 3NF.

8. Explain the codd's rules for relational database design.

9. Explain the ACID properties of a transaction.

UNIT IV

1. a) Explain about immediate update and deferred update recovery techniques.

b) Explain the concepts of serializability.

2. a) Explain two-phase locking protocol.

b) Describe about the deadlock prevention schemes.

3. a) How Transactions are possible in Distributed database? Explain briefly

b) What is Transaction state and its ACID properties?

4. a) Discuss about two phase locking and commit protocol

b) Explain various recovery techniques during transaction in detail.

5. a)How can we achieve concurrency control achieved in DBMS through Serializability?

b) Explain Recovery schemas in detail

6. a) What is deadlock prevention and dead lock detection method

b) Explain the deadlock recovery technique

7. Explain the following protocols for concurrency control i) Lock based protocols

ii) Time stamp based protocols DATABASE MANAGEMENT SYSTEM

8. What is concurrency control? how is it implemented in DBMS?

9.a)Write short notes on shadow paging

b)Explain the deffered and immediate-modification version of the log-based recovery scheme

UNIT V

1. a) List the different levels in RAID technology and explain its features.

b) Describe the different method of implementing variable length records.

2. a) Explain the various indexing schemes used in database environment

3. a) What is Raid? List the different levels in Raid technology and explain its features

b) Discuss about primary file storage system

4. Explain static and dynamic Hashing Techniques?

5. Briefly describe about B+ tree index file structure.

6. What are the steps involved in Query processing? How would you estimate the cost of query

7. Discuss selection operation techniques

8. Explain structure of file indices

9. Explain different properties of indexes in detail

10. With a neat diagram explain the steps involved in query process.

11. Explain in detail about B+ tree index files.

12. What is deadlock? Explain the various approaches used to recover from deadlock.