

MCQ (30 Multiple choices for 30 Marks)

The time required to position the read/write head over a record to be read is called the ___ time

- a) seek
- b) block transfer
- c) rotational time
- d) Greenwich Mean

The first step in query processing is ___.

- a) scan the query
- b) use heuristic optimization
- c) compute the cost of the operations
- d) determine the execution plan

The ___ approach to scheduling concurrent transactions assigns a global unique stamp to each transaction.

- a. Scheduled
- b. table-locking
- c. unique
- d. timestamping

Lock ___ indicates the level of lock use.

- a. Granularity
- b. Shrinking
- c. growing
- d. serializability

Final Exam

___ deals with ensuring that data is protected against unauthorized access, and if the data are accessed by an authorized user, that the data are used only for an authorized purpose.

- a. Integrity
- b. Compliance
- c. Availability
- d. Confidentiality

_____ refers to making objects available to a human user or a program to which they have a legitimate right

- a. Integrity
- b. Compliance
- c. Availability
- d. Confidentiality

_____ refers to the requirement that information be protected from improper modification. Modification of data includes creation, insertion, updating, changing the status of data, and deletion.

- a. Integrity
- b. Compliance
- c. Availability
- d. Confidentiality

A ____ is a named collection of database access privileges that authorize a user to connect to the database and use the database system resources.

- a. User
- b. Role
- c. Profile
- d. Manager

A distributed database is composed of several parts known as database ____.

- a. Sections
- b. Fragments
- c. Partitions
- d. Parts

_____ distributed database systems integrate only one type of centralized DBMS over a network.

- a. Homogeneous
- b. Heterogeneous
- c. Fully heterogeneous
- d. Combination

(n) ____ database stores each database fragment at a single site.

- a. partially replicated
- b. Unreplicated
- c. fully replicated
- d. Partitioned

Which of the following is NOT part of the generalized model for active database.

- a. event
- b. condition

c. cascade less

d. action

Relations that support an associated time when the event is true are called

a. bi-temporal

b. valid time

c. transaction time

d. two of the above

Which of the following is NOT a feature of image analysis?

a. size

b. color

c. texture

d. shape

Which if the following is a goal of data mining?

a. generating reports

b. retrieving facts

c. predicting behavior

d. finding erroneous data

An association rule is written in the form.

a. $R(a,b)$

b. $a \Rightarrow b$

c. $a | b$

d. $a = b$

An algorithm for finding large itemsets is called _____ algorithm?

a. Cromardi's

b. fast find

c. buchberger's

d. apriori

True or False (20 Marks)

"I didnt remember them for sure :P "

Short Answer Qs (5 questions, each with 6 marks, total with 30 marks)

- 1- Giving a query, draw the Query Tree (I don't remember the query , from chapter 18)
- 2- What is the difference between discretionary and mandatory access control?

3.1 Comparing Discretionary Access Control and Mandatory Access Control

- **Discretionary Access Control (DAC)** policies are characterized by a high degree of flexibility, which makes them suitable for a large variety of application domains.
 - The main drawback of **DAC** models is their vulnerability to malicious attacks, such as Trojan horses embedded in application programs.

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3.1 Comparing Discretionary Access Control and Mandatory Access Control(2)

- By contrast, mandatory policies ensure a high degree of protection in a way, they prevent any illegal flow of information.
- Mandatory policies have the drawback of being too rigid and they are only applicable in limited environments.
- In many practical situations, discretionary policies are preferred because they offer a better trade-off between security and applicability.

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3- What are the different types of spatial data?

26.3.2 Spatial Data Types and Models

This section briefly describes the common data types and models for storing spatial data. Spatial data comes in three basic forms. These forms have become a de facto standard due to their wide use in commercial systems.

■ Map Data²⁶ includes various geographic or spatial features of objects in a map, such as an object's shape and the location of the object within the map. The three basic types of features are points, lines, and polygons (or areas). Points are used to represent spatial characteristics of objects whose locations correspond to a single 2-d coordinate (x, y, or longitude/latitude) in the scale of a particular application. Depending on the scale, some examples of point objects could be buildings, cellular towers, or stationary vehicles.

Moving Geographical Information Systems (GIS), and they are used in areas such as environmental applications, transportation systems, emergency response systems, and battle management. Other databases, such as meteorological databases for weather information, are three-dimensional, since temperatures and other meteorological information are related to three-dimensional spatial points. In general, a spatial database stores objects that have spatial characteristics that describe them and that have spatial relationships among them. The spatial relationships among the objects are important, and they are often needed when querying the database. Although a spatial database can in general refer to an n-dimensional space for any n, we will limit our discussion to two dimensions as an illustration.

4- Describe the desirable Properties of Transactions

3 Desirable Properties of Transactions (1)

ACID properties:

- **Atomicity:** A transaction is an atomic unit of processing; it is either performed in its entirety or not performed at all.
- **Consistency preservation:** A correct execution of the transaction must take the database from one consistent state to another.
- **Isolation:** A transaction should not make its updates visible to other transactions until it is committed; this property, when enforced strictly, solves the temporary update problem and makes cascading rollbacks of transactions unnecessary (see Chapter 21).
- **Durability or permanency:** Once a transaction changes the database and the changes are committed, these changes must never be lost because of subsequent failure.

5- Describe the Deadlock prevention approach .

Database Concurrency Control

Dealing with Deadlock and Starvation

▪ Deadlock prevention

- A transaction locks all data items it refers to before it begins execution.
- This way of locking prevents deadlock since a transaction never waits for a data item.
- The conservative two-phase locking uses this approach.

Database Concurrency Control

Dealing with Deadlock and Starvation

▪ Deadlock detection and resolution

- In this approach, deadlocks are allowed to happen. The scheduler maintains a wait-for-graph for detecting cycle. If a cycle exists, then one transaction involved in the cycle is selected (victim) and rolled-back.
- A wait-for-graph is created using the lock table. As soon as a transaction is blocked, it is added to the graph. When a chain like: T_i waits for T_j waits for T_k waits for T_i or T_j occurs, then this creates a cycle. One of the transaction o

SQL question (3 questions for 10 marks)

Three questions asking about the Grant Privilege as the following slides:

2.5 An Example (2)

- User account A1 can create tables under the schema called **EXAMPLE**.
- Suppose that A1 creates the two base relations **EMPLOYEE** and **DEPARTMENT**
 - A1 is then **owner** of these two relations and hence **all the relation privileges** on each of them.
- Suppose that A1 wants to grant A2 the privilege to insert and delete tuples in both of these relations, but A1 does not want A2 to be able to propagate these privileges to additional accounts:

```
GRANT INSERT, DELETE ON
EMPLOYEE, DEPARTMENT TO A2;
```

Figure 24.1
Schemas for the two relations EMPLOYEE and DEPARTMENT.

2.5 An Example (3)

EMPLOYEE						
Name	Sex	Bdate	Address	Sex	Salary	Dno

DEPARTMENT		
Dnumber	Dname	Mgr_ssn

Figure 24.1
Schemas for the two relations EMPLOYEE and DEPARTMENT.

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Schemas for the two relations EMPLOYEE and DEPARTMENT.

2.5 An Example (4)

- Suppose that A1 wants to allow A3 to retrieve information from either of the two tables and also to be able to propagate the SELECT privilege to other accounts.
- A1 can issue the command:


```
GRANT SELECT ON EMPLOYEE, DEPARTMENT
TO A3 WITH GRANT OPTION;
```
- A3 can grant the **SELECT** privilege on the **EMPLOYEE** relation to A4 by issuing:


```
GRANT SELECT ON EMPLOYEE TO A4;
```

 - Notice that A4 can't propagate the SELECT privilege because GRANT OPTION was not given to A4

Figure 24.1
Schemas for the two relations EMPLOYEE and DEPARTMENT.

2.5 An Example (5)

- Suppose that A1 decides to revoke the SELECT privilege on the EMPLOYEE relation from A3; A1 can issue:


```
REVOKE SELECT ON EMPLOYEE FROM A3;
```
- The DBMS must now automatically revoke the SELECT privilege on EMPLOYEE from A4, too, because A3 granted that privilege to A4 and A3 does not have the privilege any more.

Figure 24.1
Schemas for the two relations EMPLOYEE and DEPARTMENT.

Long Answer Question (1 question for 10 Marks) :

What is the additional function of distributed database over centralized database, list four feature and describe them.

25.1.6 Additional Functions of Distributed Databases

Distribution leads to increased complexity in the system design and implementation. To achieve the potential advantages listed previously, the DDBMS software must be able to provide the following functions in addition to those of a centralized DBMS:

- **Keeping track of data distribution.** The ability to keep track of the data distribution, fragmentation, and replication by expanding the DDBMS catalog.
- **Distributed query processing.** The ability to access remote sites and transmit queries and data among the various sites via a communication network.
- **Distributed transaction management.** The ability to devise execution strategies for queries and transactions that access data from more than one site and to synchronize the access to distributed data and maintain the integrity of the overall database.
- **Replicated data management.** The ability to decide which copy of a replicated data item to access and to maintain the consistency of copies of a replicated data item.
- **Distributed database recovery.** The ability to recover from individual site crashes and from new types of failures, such as the failure of communication links.
- **Security.** Distributed transactions must be executed with the proper management of the security of the data and the authorization/access privileges of users.
- **Distributed directory (catalog) management.** A directory contains information (metadata) about data in the database. The directory may be global for the entire DDB, or local for each site. The placement and distribution of the directory are design and policy issues.

These functions themselves increase the complexity of a DDBMS over a centralized DBMS. Before we can realize the full potential advantages of distribution, we must find satisfactory solutions to these design issues and problems. Including all this additional functionality is hard to accomplish, and finding optimal solutions is a step beyond that.