

## Object Relational Database Advance databases

### Types of Transactional Scheduling

- i) Serializability > execution is in series manner like executed one after another
  - ii) Concurrency Control > it ensures Concurrency control allowing Monotonicity > transaction to execute concurrently
- Difference between <sup>n</sup> database and object relational database

#### > Relational Database

The data and relationships are also represented by a collection of inter-related tables, it is a DBMS that enables the user to create, update, adm

#### > Object Oriented Database

It is where data is represented in form of object as used in object oriented programming objects as used in object oriented programming implementing polymorphism, encapsulation, and inheritance

Types of data mining te.

- > Characterization > general properties
- > Discrimination > focus on differentiating
- > Association and Correlation analysis
- > Classification
- > prediction
- > Clustering

Using Suitable examp justify the need for multimedia database

- > Storage and Retrieval of multimedia
- > Analysis and processing of multimedia parts
- > ~~Content~~ Knowledge dissemination
- > Education and training
- > Real time Control and monitoring

Describe the architecture of multimedia database

Multimedia External Schema

Multimedia Conceptual Schema

mapping

Multimedia Internal Schema

- > Multimodality
  - > Data Repository
  - > Metadata Management
  - > Content Retrieval
- Characteristic of data warehouse

- > Subject Oriented
- > Integrated
- > Time Variant
- > Non Volatile

### Transparency issues in a distributed database environment

- > Location transparency
- > Access transparency
- > Concurrency transparency
- > Replication transparency
- > Performance transparency
- > Scaling transparency

### Reconstruction

In context of data recovery or disaster recovery  
reconstruction could imply the effectiveness or capability  
of a system to reconstruct lost or corrupt data  
from back ups

## Differentiation    2-tier    3-tier

- 2-tier → Client is responsible for the presentation and business logic while server manages data storage and processing
- In 3-tier there are three tiers that client tier, application tier and data tier

## Characteristics of multimedia database systems

- Support for multimedia Data types
- Concurrency Control
- Persistence
- Privacy
- Integrity Control
- Recovery
- Query Support

Object oriented database system extends principles of object oriented programming to realm of data management allowing for more natural, flexible and efficient representation, manipulation and querying of data within the database.

### Limitations experienced by relational database

- > Imprecision mismatch, occurs primarily by matching data
- > Complex Data type relationships
- > Scalability and performance.

### How object oriented model manages data

#### Security

- > Encapsulation
- > Access Control
- > Inheritance and polymorphism
- > Encryption and Cryptography
- > Audit Trail and Logging.

Schema refers to the structural definition or blueprints that defines the organization, relationships, and constraints of the data store.

## Disadvantage of Object Oriented database System

- > Complexity
- > Lack of Standardization
- > Performance Overhead
- > Scalability and Adoption

Data mining - It is the process of discovering patterns and extracting useful information from large database

OLAP (online analytical process) → technology used for analyzing multidimensional data from multiple perspective. It enables users to perform complex queries and analysis on data warehouse.

OLTP (online transaction processing) → It is a type of database processing that manages transactions-oriented application.

Data warehouse - A centralized repository that stores structured, historical data from multiple sources.

Decision Support Database → It is designed to support decision making process by providing access of relevant data and tool for analysis.

Enterprise database - It is used by organizations to store and manage data related to their operations and transactions.

Views → It is a virtual table that is derived from one or more base tables. It does not store data but it displays data from other tables.

Distributed Database Management - the Systems that manages a database spread across multiple location or sites connected through a Computer network.

~~1~~ Main three levels found in typical Client

- > presentation tier - It is front-end user interface layer
- > Application tier - It contains application logic
- > Data tier - backend tier or database tier, it is responsible for storing data

Difference between 2-tier and 3-tier

2-tier has two main tiers ~~the client tier - { presentation / Application }~~  
~~- Server tier~~

3-tier there are three main tier,  
- presentation  
- Application  
- data tier

presentation - handles user interface

Application - It contains business logic and processing logic of the application

Data tier - Managing data storage and retrieval  
It consists of Database

## Structured query language (SQL)

> It is a standard programming language used for managing and manipulating relational databases

### Two SQL Commands:

#### 1) Select Command

Select column1, column2... from table-name where condition

Example

Select first-name, last-name From employee where designation = 'Manager'

#### 2) Insert Command

Insert into tablename (column, column) values  
(value, ...);

Example: insert into employee(first-name)  
values ('John');

Data Security > refers to measures and practices implemented to protect data from unauthorised access etc.

### Importance of Securing data

1. Protection of Sensitive Information
2. Prevent data loss
3. Preserving data integrity

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#### Threats

- > Cybersecurity threats
- > Data Breaches
- > Malware and Ransomware
- > Phishing Attacks
- >

## Definition of transactions

### Serializability

refers to property of a Schedule of Concurrent transaction in which the execution appears as if transactions are executed one after another in a serial order

### Monotonicity

refers to property related to the consistency of transaction executions in a concurrent environments

### Uncu