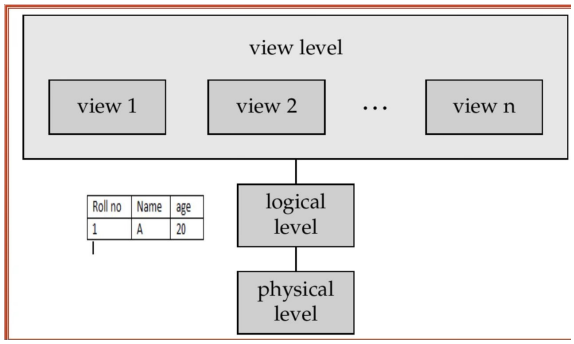
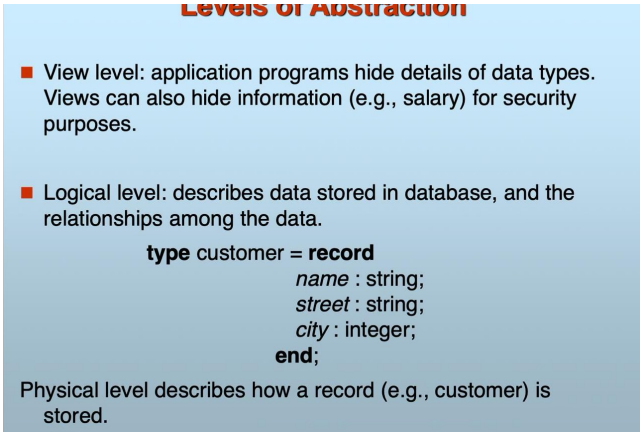
Summarize user of database.
Users are differentiated by the way they expect to interact with the system
? Application programmers – interact with system through
DML calls
? Sophisticated users – form requests in a database query
language
? Specialized users – write specialized database applications
that do not fit into the traditional data processing framework
? Naïve users – invoke one of the permanent application
programs that have been written previously
? E.g. people accessing database over the web, bank tellers, clerical
staff

draw diagram for level of abstraction.





Summarize Data integrity with example.
Data integrity is a concept and process that ensures the accuracy, completeness, consistency, and validity of an organization's data. By following the process, organizations not only ensure the integrity of the data but guarantee they have accurate and correct data in their database.The importance of data integrity increases as data volumes continue to increase exponentially. Major organizations are becoming more reliant on data integration and the ability to accurately interpret information to predict consumer behavior, assess market activity, and mitigate potential data security risks.

Define role of Transaction manager dbms
Transaction Manager in a Database Management System (DBMS) is responsible for ensuring that all database transactions are executed in a reliable, consistent, and safe manner. Its primary role is to manage the operations that make up a transaction, ensuring that they adhere to the ACID properties (Atomicity, Consistency, Isolation, and Durability).

Key Roles of the Transaction Manager:
1. **Ensuring Atomicity**:
2. **Maintaining Consistency**:
3. **Managing Isolation**
4. **Ensuring Durability**:
5. **Concurrency Control**:
6. **Recovery Management**:

Recall physical and logical data independence dbms.

1. Physical Data Independence:

Physical Data Independence refers to the ability to change the physical storage of data without affecting the logical schema or application programs. This means that changes to how data is stored on disk (e.g., modifying indexes, changing file structures, or using different storage devices) do not require changes in the application layer or the logical schema of the database.

2. Logical Data Independence:

Logical Data Independence refers to the ability to change the logical schema (the structure of the database, such as tables, columns, and relationships) without affecting the physical schema or application programs. This means that changes to the logical structure of the database, such as adding new fields, splitting a table, or merging tables, do not necessitate changes in how the data is stored physically or how the applications interact with the database.

Define data redundancy and inconsistency dbms
1. Data Redundancy:

Data redundancy occurs when the same piece of data is stored in multiple places within a database. This often happens in unnormalized databases where the same information is duplicated across multiple tables or within the same table. 2. Data Inconsistency:

Data inconsistency occurs when different copies of the same data do not match, leading to discrepancies in the information stored within the database. This often arises as a consequence of data redundancy, where changes made to one copy of the data are not reflected in other copies.

What is schema dbms
In a Database Management System (DBMS), a schema is the structure that defines the organization, configuration, and relationships of data within the database. It serves as a blueprint for how data is stored, managed, and accessed in the database. The schema outlines the logical view of the entire database, describing how data is logically stored in tables, the relationships between those tables, the types of data stored, and the constraints on the data.

Summarize Data isolation with example
Data isolation in a DBMS ensures that transactions are executed independently, so the operations of one transaction are not visible to others until completed. This prevents issues like dirty reads, where one transaction reads uncommitted data from another.

Example:
If **User A** is transferring money from Account X to Account Y, **User B** should not see the intermediate state where money has been deducted from X but not yet added to Y. Data isolation ensures **User B** only sees the final, consistent state of the transaction.

This prevents conflicts and maintains data consistency when multiple transactions occur simultaneously.

Role of concurrency manager

The *Concurrency Control Manager* in a Database Management System (DBMS) plays a critical role in managing the simultaneous execution of transactions while ensuring the consistency and integrity of the database. Here are its primary functions:

1. **Transaction Isolation**
2. **Preventing Anomalies**
3. **Locking Mechanisms**
4. **Timestamp Ordering**
5. **Deadlock Detection and Resolution**
6. **Multi-Version Concurrency Control (MVCC)**
7. **Performance Optimization**

By effectively managing these aspects, the Concurrency Control Manager ensures that the database remains consistent and reliable, even in the face of simultaneous transaction requests.

Recall logical data independence dbms

Logical Data Independence in a DBMS refers to the ability to change the logical schema of the database (such as tables and relationships) without affecting the external schemas or application programs. This separation ensures that modifications to the database structure do not disrupt how users interact with the data.

What are the responsibilities of DBA dbms

The **Database Administrator (DBA)** in a DBMS has several key responsibilities, including:

1. **Database Design**
2. **Performance Monitoring and Tuning**
3. **Backup and Recovery**
4. **Security Management**
5. **Data Integrity**
6. **Capacity Planning**
7. **Troubleshooting and Support**
8. **Patch Management**
9. **Documentation*
10. **User Training**

Define role of storage manager

The **Storage Manager** in a Database Management System (DBMS) is responsible for managing the physical storage of data on disk. Its primary role includes:

1. **Data Storage Allocation**
2. **Data Retrieval**:
3. **File Organization**
4. **Buffer Management**
5. **Data Indexing**
6. **Data Integrity and Recovery**
7. **Concurrency Control**
8. **Space Management**

In summary, the Storage Manager is crucial for the efficient and reliable storage, retrieval, and management of data within the DBMS.