

Assignment – 3

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APPLICATION_SUBMISSION (jobID, applicantID, submittedDate) 4
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Display all the applicant whoso name start by S and P letter..... 4
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8. What is a database management system? Discuss the Advantage of DBMS over File System.

A Database Management System (DBMS) is a software system designed to store, retrieve, manage, and manipulate data efficiently. It provides a structured way to organize data in databases, ensuring data integrity, security, and easy access.. A Traditional File System is a method of storing data in flat files (e.g., .txt, .csv, .dat) without a structured database. Each file contains records, but there is no relationship between files, leading to data redundancy and inconsistency.

The advantages of using DBMS over traditional filing system are given below:

- i. **Data Redundancy Control:** DBMS minimizes duplication of data through normalization, while file systems often have redundant data across multiple files stored in different locations.
- ii. **Data Consistency:** Ensures all data conforms to rules and constraints, unlike file systems where consistency must be manually maintained.
- iii. **Data Sharing:** Allows concurrent access by multiple users/applications, while file systems typically allow only one user at a time.
- iv. **Data Integrity:** Provides mechanisms to maintain accuracy and validity of data through constraints and validation rules.
- v. **Security Features:** Offers user authentication, authorization, and access controls at various levels.
- vi. **Backup and Recovery:** Built-in mechanisms for data backup and recovery from failures.
- vii. **Data Independence:** Separates physical storage from logical representation, allowing changes without affecting applications.
- viii. **Efficient Query Processing:** Provides powerful query languages (like SQL) for complex data retrieval.
- ix. **Centralized Management:** Single repository for data with centralized administration.
- x. **Concurrency Control:** Manages simultaneous access by multiple users to prevent inconsistencies.

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13. What is a serializable schedule? Characterize schedule based on recoverability.
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18. Describe different types of join operations used in SQL?
19. What is data abstraction? Explain with its level.

The three-schema architecture is a framework to separate the database into three levels of abstraction. Its purpose is to separate user applications from physical database, to allow data independence and to simplify database management, maintenance and security.

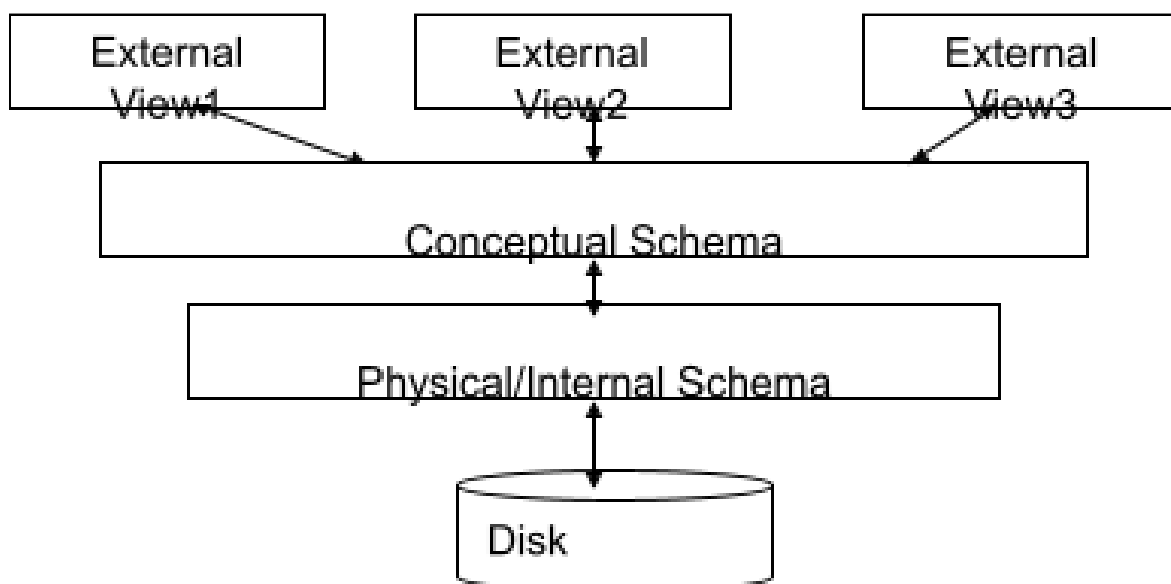


Figure 1: 3-schema architecture

The layers of abstraction are:

1. Internal Level (Physical Schema):

It is the lowest level of abstraction. It describes how data is physically stored in the database. Includes file structures, indexes, compression, storage devices, etc. Example: Student data is stored as binary records in files on a hard disk, sorted by roll.

2. Conceptual Level (Logical Schema):

It is the middle level of abstraction. It describes the structure of the entire database for a community of users. It is independent of physical storage through logical data independence. It includes entities, relationships, constraints (primary & foreign keys), data types, etc. Example: Student(Roll, Name, Major) is a logical table, with Roll as primary key and possibly foreign keys to other tables.

3. External Level (View Schema):

It is the highest level of abstraction. It describes how individual users or applications see the data. Each user can have a customized view. It allows access control, simplification, and security. Example:

A teacher's view: Student(RollNo, Name)

A finance department's view: Student(RollNo, FeeStatus)

20. What is Normalization? Explain any two normal forms in detail.
21. Define roles of DBA on Relational Database
22. Explain in detail about ACID properties.
23. Describe different components of DBMS.
24. What is the difference between physical and logical data independence?

Aspect	Logical Data Independence	Physical Data Independence
Definition	Ability to change the conceptual schema without affecting external schemas (user views).	Ability to change the internal schema without affecting the conceptual schema.

Aspect	Logical Data Independence	Physical Data Independence
Level Affected	Between conceptual and external levels.	Between internal and conceptual levels.
What Changes?	Modifications to tables, relationships, or constraints (e.g., adding/removing entities or attributes).	Changes in file structures, storage devices, or access methods (e.g., indexing, hashing).
Impact on Users	Applications not using the modified schema remain unaffected.	No impact on application programs or user queries.
Purpose	Protects applications from changes in the logical database design.	Protects the database design from changes in physical storage.
Complexity	Harder to achieve (may require view definitions).	Easier to achieve (handled by the DBMS).
Example	Adding a phone_number column to a Student table without breaking existing apps that don't use this field.	Switching from B-tree to hash indexing for faster searches without altering table structures.

25. Define the time stamp base protocol. explain the condition for R/W operations.
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- 33. Construct an ER diagram for a university using all possible components like different types of entities, attributes, relationship etc and convert it into a database schema.**
- 34. List the roles of Database administrator. Explain different types of Database user.**

A database user is an individual, application, or system that interacts with a database to perform operations such as storing, retrieving, updating, or managing data. Each user is typically assigned specific access rights and privileges based on their role to ensure security and proper data management.

Database users can be categorized based on their level of interaction with the database system:

I. End Users:

End users are database users who interact with database by issuing commands from a terminal through predefined application programs to perform functions like create, retrieve, modify and delete. Example: Bank tellers using an interface to access customer accounts

II. Application Programmers:

Application programmers are database users who develop applications that interact with the database using programming languages and APIs like Access, FoxPro, COBOL, etc. These application programs are used by end users to operate on data. Example: Developers creating e-commerce websites that connect to product databases.

III. Database Administrators (DBAs):

DBAs are database users who maintains the database description in original form. It is responsible for overall control of the database system. Example: Database managers ensuring that the product database runs smoothly, securely, and efficiently—supporting developers, customers, and business operations.

The responsibilities of a DBA are:

i. Schema definition and modification:

The creation and modification of the original description of the database structure and the way that structure is reflected by the files of the physical database.

ii. Storage structure and access method definition:

The DBA determines how data is physically stored on disk, including file organization, portioning and tablespace management. The DBA also chooses the best access methods for query efficiency through indexing strategies like B-tree, hashmap, bitmaps.

iii. Granting authorization for data access:

Granting access to the database to different users.

iv. Routine maintenance:

Making backup copies of the database and repairing damage to the database due to hardware or software failures or misuse.

- 35. List the steps to draw E-R diagrams and Design E-R diagram for Education Portal**
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