
DATABASE SYSTEMS

ASSIGNMENT 1

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1. List five limitations of a conventional file and discuss any one of them.

The relational database management system can help with a variety of file system issues. Most of them are not:

- Data Redundancy: While it is possible for the same data to appear twice in separate files, relational DBMS greatly reduces this possibility;
- Accessing Data Challenges;
- Limited Data Sharing Integrity Issues;
- Inconsistent Concurrent Access;
- Security Issues

2. Describe the 'database' approach.

The database strategy outperforms the shared file solution because it uses a database management system (DBMS) that allows multiple users to access data simultaneously and offers tools for querying, data protection, and integrity. At this stage, we should define a few key terms:

A database is a grouping of connected data.

Database management system: A software program used to create and maintain databases is referred to as a "database management system," or DBMS for short. Such systems' software is intricate and made up of various parts, some of which are discussed later in this chapter. The database management system is frequently referred to as the phrase database system.

An application that uses a database management system to carry out computer-related operations for a specific business function, like order processing, is referred to as a database application. One advantage of the database approach is that the issue of physical data reliance is overcome, allowing for changes to the underlying structure of a data file without requiring changes to the application programs. A hierarchy of levels for data specification is used to accomplish this. A schema is a name given to each such specification of data in a database system.

3. Discuss two advantages of the database approach

- Increased information sharing: One advantage of the database management strategy is that the DBMS helps create an environment where end users have better access to more and better-managed information. End users can respond quickly to changes in their existing conditions thanks to this access.
- Enhanced information security: The risks of information security breaches become more noticeable when more users access the information. Partnerships invest a lot of time, effort, and money into making ensuring that corporate information is used properly. A DBMS enables a system to more effectively authorize information protection and security measures.

4. List 4 costs or risks of the database approach and discuss any one of them

- Brand-new, specialized staff

Organizations using the database strategy frequently need to hire or train people to design and deploy. Additionally, due to the quick advancements in technology, these new hires will require constant retraining or skill upgrades.

- Transformation fees

Older programs in an organization that are built on file processing and/or outdated database technology are frequently referred to as "legacy systems."

An organization may frequently find the cost of upgrading these antiquated systems to contemporary database technology to be prohibitive when assessed in terms of money, effort, and organizational commitment.

- Necessity of explicit backup and restoration

A shared database must always be current and accessible.

This necessitates the development and usage of elaborate systems for providing data backup copies and for recovering a database in the event of damage. The importance of these issues has grown in the context of today's security-conscious society.

- Complexity and cost of installation and management

A multiuser database management system is a significant and complicated suite of software that has a high initial investment, necessitates the installation and operation of a skilled staff, and incurs considerable yearly maintenance and support expenses.

Upgrades to the organization's hardware and data communications systems might be necessary in addition to installing this system. To stay up with new releases and updates, extensive ongoing training is typically needed.

5. Describe the main components of the database environment.

Every system environment is made up of specific elements that aid in the organisation and management of the system. Even the environment of the database system is made up of the following elements:

- Hardware

All the physical components that make up the database system are included in the hardware component of the database system environment. It comprises printers, network devices, input and output devices, storage devices, CPUs, and many more.

- Software

All the software we need to access, store, and control the database is included in the database environment's software component. as DBMS, application software, operating systems, and utilities. The operating system activates computer hardware and permits the use of additional software. The database is managed and governed by DBMS software. The application program and utilities have access to the database, and you can even modify the database if necessary.

- People

When discussing the persons component, all those connected to the database are included. A set of users, or end users, may access the database solely to find answers to their questions. A database designer, or DDD, may have been engaged in the database's creation.

Database programmers and analysts may be involved in creating the apps that will have a user interface that allows for data entry, and database administrators may be in charge of keeping an eye on the database.

- Procedures

The function that governs and controls the use of the database is what is meant by the procedure component of the database environment.

- Data

Data components are a group of associated facts that can be documented and have an implicit significance in the database.

6. Discuss the roles of three different individuals in the database environment

- Administrators of data

As with any other company resource, the database and DBMS need to be managed. Determining data elements, data names, and their connections to the database are the responsibility of the data administrator (DA). They also go by the name "Data Analyst."

Administrators of databases (DBA): An IT expert who works on building, maintaining, querying, and tuning the company's database is known as a database administrator (DBA). They are also in charge of protecting the integrity and security of data. A DBA is responsible for various tasks. DBA is responsible for maintaining a high-performing database.

- Database architects

Designers of logical databases: The entities and properties of the data, as well as their relationships and storage limitations, are all things that the logical database designer is concerned with. The organization's data, as well as any restrictions on it, must be fully understood by the logical database designer.

Designers of physical databases: The physical database designer makes the practical implementation of the logical database design decisions. Mapping a collection of tables and integrity constraints to the logical database design. To achieve optimal performance, storage and access techniques must be used for the data.

- User Groups

The end users are the database's "clients," and it has been created, put into use, and is still being maintained to meet their informational demands.

Intelligent Users: The sophisticated end user is conversant with the features provided by the DBMS and the database's internal structure.

Unsavvy users: These are the users who interact with the database through the current application. For instance, an online library system, a system for purchasing tickets, an ATM, etc.

7. Compare and contrast the external, conceptual, and internal schemas

- External Schema: This represents data that end users or application programs can access and gives users personalized information.
- Conceptual Schema: This type of schema represents the logical organization of the data and how it is stored in a database. Conceptual schema gives data to customizable external schema that application programs can access.
- Internal Schema: This diagram illustrates how data is physically stored on a disc or other physical storage device. Data from internal schema are mapped to external schema via conceptual schema.

8. Discuss the importance of the three-schema architecture for databases

A database schema, which is a component of a data dictionary, describes the relationships between the many elements that make up a database, such as tables, views, stored procedures, and more. A database designer typically develops a database schema to aid programmers whose applications will communicate with the database.

The three-schema architecture separates the physical database from the user application by dividing the database into three levels. Simply put, this architecture shields the user from the specifics of physical storage.

9. Discuss the need for conceptual schema.

A conceptual schema is a summary of the informational requirements driving a database's design. Usually, it merely covers the key ideas and their primary connections. This model is typically a first cut, lacking enough information to create a real database. For a group of users, this level describes the overall database structure. When a database system is constructed, the conceptual model, also referred to as the data model, can be utilized to explain the conceptual schema.

10. Formulate a schema for managing data on personal affairs

This below is a database for personal affairs, we have three entities with their attributes such that:

- ✓ Products: Prod_ID, Prod_Designation, Quantity, Price and Type;
- ✓ Customers: Custom_ID, Name, Address and Phone;
- ✓ Order: Order_ID, Custom_ID, Shipping_Address, Prod_ID, Quantity and Date.

Customer

Cust_ID	Cust_Name	Cust_Address	Cust_Phone

Product

Pdt_Num	Prod_Design	Pdt_Qty	Pdt_Price	Pdt_Type

Order

Order_Num	Cust_ID	Shipping_Address	Pdt_Num	Qty	Date