Unit-2

1.what is file based databased systems?

The systems that are used to organize and maintain data files are known as file based data systems. These file systems are used to handle a single or multiple files and are not very efficient.

Functionalities:

The functionalities of a File-based Data Management System are as follows –

- A file based system helps in basic data management for any user.

- The data stored in the file based system should remain consistent. Any transactions done in the file based system should not alter the consistency property.

- The file based system should not allow any illegal or potentially hazardous operations to occur on the data.

- The file based system should allow concurrent access by different processes and this should be carefully coordinated.

- The file based system should make sure that the data is uniformly structured and stored so it is easier to access it.

## Advantages of File Based System

- The file Based system is not complicated and is simpler to use.

- Because of the above point, this system is quite inexpensive.

- Because the file based system is simple and cheap, it is normally suitable for home users and owners of small businesses.

- Since the file based system is used by smaller organisations or individual users, it stores comparatively lesser amount of data. Hence, the data can be accessed faster and more easily.

Disadvantages of File Based System

- The File based system is limited to a smaller size and cannot store large amounts of data.
- This system is relatively uncomplicated but this means it cannot support complicated queries, data recovery etc.
- There may be redundant data in the file based system as it does not have a complex mechanism to get rid of it.
- The data is not very secure in a file based system and may be corrupted or destroyed.
- The data files in the file based system may be stored across multiple locations. Consequently, it is difficult to share the data easily with multiple users.

2.what is database approach and explain it?

The database approach. The database approach is an improvement on the shared file solution as the use of a database management system (DBMS) provides facilities for querying, data security and integrity, and allows simultaneous access to data by a number of different users.

Database physically stored in files on disks
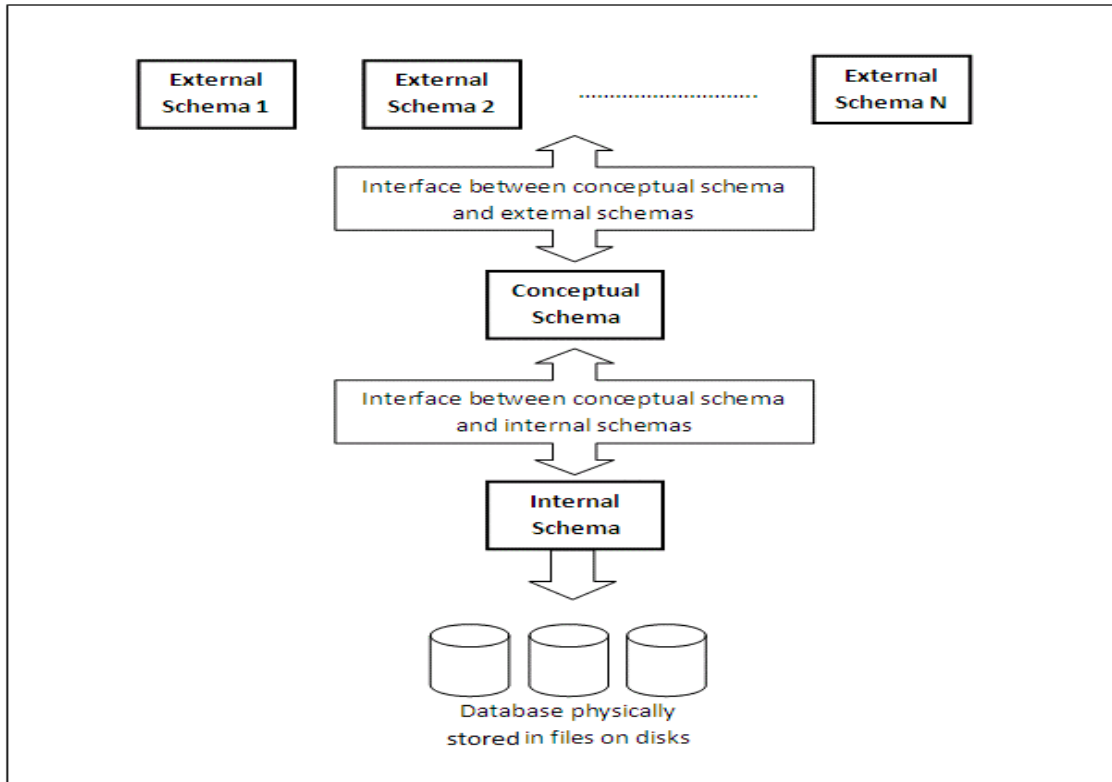
The database approach

The database approach is an improvement on the shared file solution as the use of a database management system (DBMS) provides facilities for querying, data security and integrity, and allows simultaneous access to data by a number of different users. At this point we should explain some important terminology:

- **Database:** A database is a collection of related data.

- **Database management system:** The term 'database management system', often abbreviated to DBMS, refers to a software system used to create and manage databases. The software of such systems is complex, consisting of a number of different components, which are described later in this chapter. The term database system is usually an alternative term for database management system.

- **System catalogue/Data dictionary:** The description of the data in the database management system.

- **Database application:** Database application refers to a program, or related set of programs, which use the database management system to perform the computer-related tasks of a particular business function, such as order processing.

One of the benefits of the database approach is that the problem of physical data dependence is resolved; this means that the underlying structure of a data file can be changed without the application programs needing amendment. This is achieved by a hierarchy of levels of data specification. Each such specification of data in a database system is called a schema.

3.what is a data model?explian?

A Data Model in Database Management System (DBMS) is the concept of tools that are developed to summarize the description of the database. Data Models provide us with a

transparent picture of data which helps us in creating an actual database. It shows us from the design of the data to its proper implementation of data.

Types of Relational Models

1. Conceptual Data Model
2. Representational Data Model
3. Physical Data Model

It is basically classified into 3 types:-
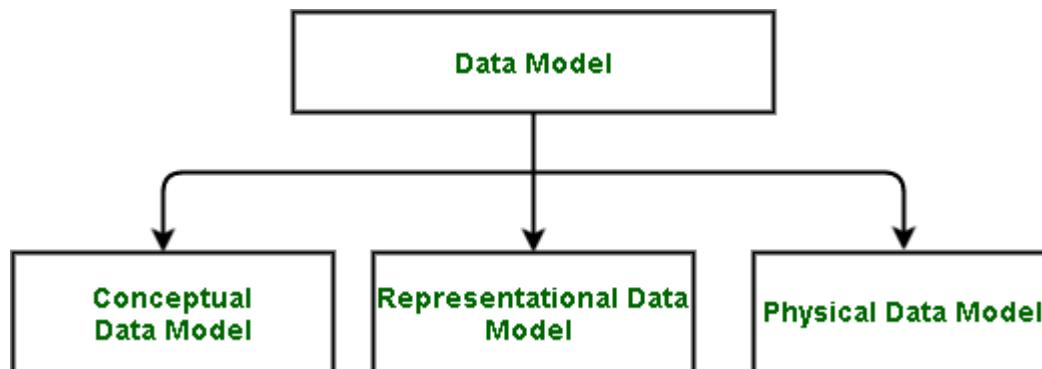
1. Conceptual Data Model

The conceptual data model describes the database at a very high level and is useful to understand the needs or requirements of the database. It is this model, that is used in the requirement-gathering process i.e. before the Database Designers start making a particular database.

Entity-Relationship Model(ER Model): It is a high-level data model which is used to define the data and the relationships between them. It is basically a conceptual design of any database which is easy to design the view of data.

Components of ER Model:

1. **Entity:** An entity is referred to as a real-world object. It can be a name, place, object, class, etc. These are represented by a rectangle in an ER Diagram.
2. **Attributes:** An attribute can be defined as the description of the entity. These are represented by Eclipse in an ER Diagram. It can be Age, Roll Number, or Marks for a Student.
3. **Relationship:** Relationships are used to define relations among different entities. Diamonds and Rhombus are used to show Relationships.

Characteristics of a conceptual data model

- Offers Organization-wide coverage of the business concepts.
- This type of Data Models are designed and developed for a business audience.

2. Representational Data Model

This type of data model is used to represent only the logical part of the database and does not represent the physical structure of the database. The representational data model allows us to focus primarily, on the design part of the database.

3. Physical Data Model

The physical Data Model is used to practically implement Relational Data Model. Ultimately, all data in a database is stored physically on a secondary storage device

such as discs and tapes. This is stored in the form of files, records, and certain other data structures. It has all the information on the format in which the files are present and the structure of the databases, the presence of external data structures, and their relation to each other.

Characteristics of a physical data model:

- The physical data model describes data need for a single project or application though it maybe integrated with other physical data models based on project scope.
- Data Model contains relationships between tables that which addresses cardinality and nullability of the relationships.

4.what are the components of database systems?

Components of DBMS

There are many components available in the DBMS. Each component has a significant task in the DBMS. A database environment is a collection of components that regulates the use of data, management, and a group of data. These components consist of people, the technique of Handel the database, data, hardware, software, etc. there are several components available for the DBMS. We are going to explain five main topics of the database below.
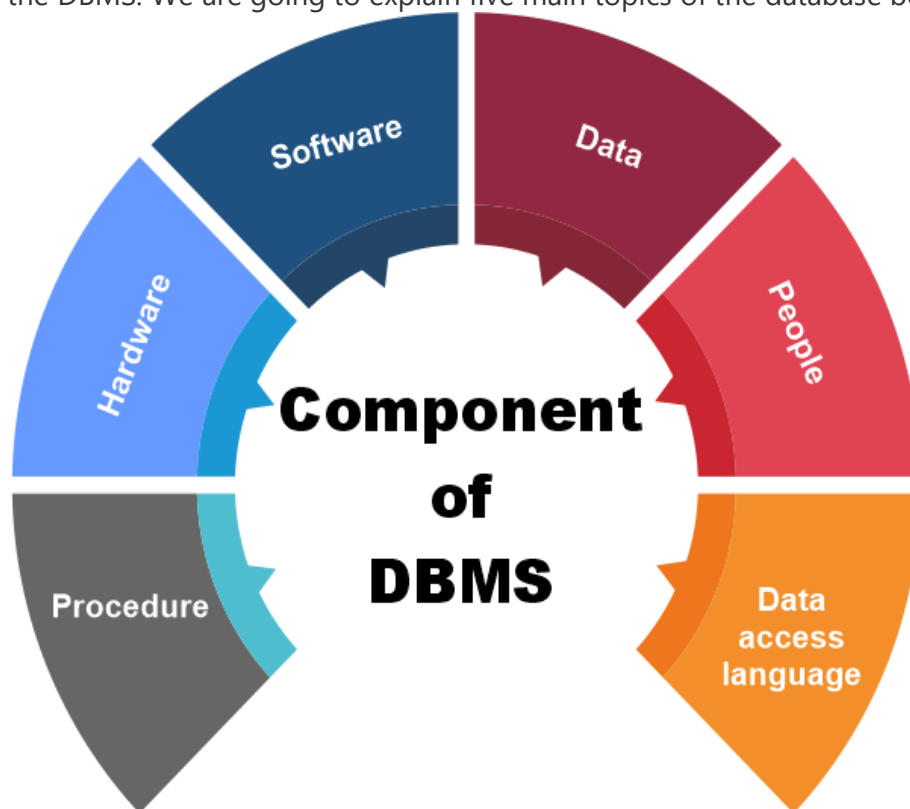
a.hardware

- o Here the hardware means the physical part of the DBMS. Here the hardware includes output devices like a printer, monitor, etc., and storage devices like a hard disk.

- o In DBMS, information hardware is the most important visible part. The equipment which is used for the visibility of the data is the printer, computer, scanner, etc. This equipment is used to capture the data and present the output to the user.
- o With the help of hardware, the DBMS can access and update the database.

b.Software

- o Software is the main component of the DBMS.
- o Software is defined as the collection of programs that are used to instruct the computer about its work. The software consists of a set of procedures, programs, and routines associated with the computer system's operation and performance. Also, we can say that computer software is a set of instructions that is used to instruct the computer hardware for the operation of the computers.

c.Data

- o The term data means the collection of any raw fact stored in the database. Here the data are any type of raw material from which meaningful information is generated.
- o The database can store any form of data, such as structural data, non-structural data, and logical data.
- o The structured data are highly specific in the database and have a structured format. But in the case of non-structural data, it is a collection of different types of data, and these data are stored in their native format.

d.Procedures

- o The procedure is a type of general instruction or guidelines for the use of DBMS. This instruction includes how to set up the database, how to install the database, how to log in and log out of the database, how to manage the database, how to take a backup of the database, and how to generate the report of the database.

e.Database Access Language

- o Database Access Language is a simple language that allows users to write commands to perform the desired operations on the data that is stored in the database.
  Data Definition Language(DDL): It is used to construct a database. DDL implements database schema at the physical, logical, and external levels.

The following commands serve as the base for all DDL commands:

- o ALTER<object>
- o COMMENT

- CREATE<object>
- DESCRIBE<object>
- DROP<object>
- SHOW<object>
- USE<object>

Data Manipulation Language(DML): It is used to access a database. The DML provides the statements to retrieve, modify, insert and delete the data from the database.

The following commands serve as the base for all DML commands:

- INSERT
- UPDATE
- DELETE
- LOCK
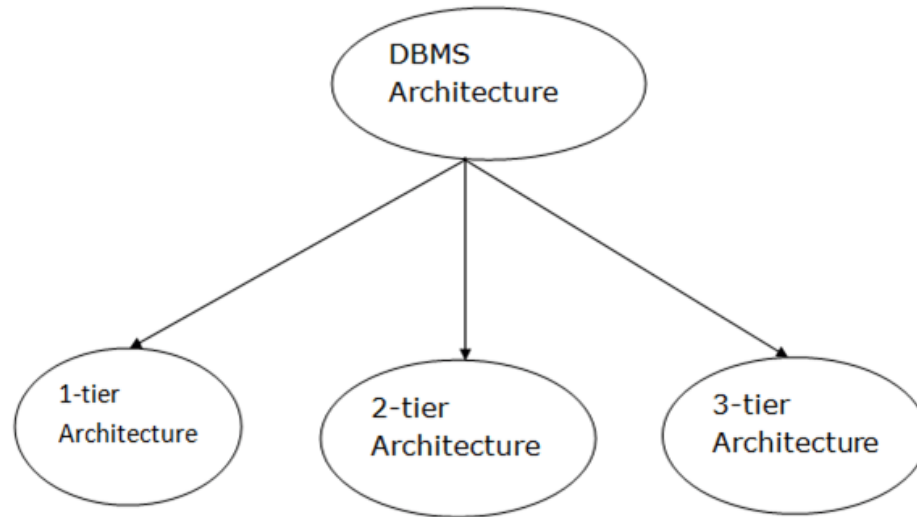- CALL
- EXPLAIN PLAN

f.People

- The people who control and manage the databases and perform different types of operations on the database in the DBMS.
- The people include database administrator, software developer, and End-user.
- Database administrator-database administrator is the one who manages the complete database management system. DBA takes care of the security of the DBMS, its availability, managing the license keys, managing user accounts and access, etc.
- The users of the database can be classified into different groups.
  - Native Users
  - Online Users
  - Sophisticated Users
  - Specialized Users
  - Application Users
  - DBA - Database Administrator

5.Explain the database architecture?

- The DBMS design depends upon its architecture. The basic client/server architecture is used to deal with a large number of PCs, web servers, database servers and other components that are connected with networks.

- o The client/server architecture consists of many PCs and a workstation which are connected via the network.
- o DBMS architecture depends upon how users are connected to the database to get their request done.

Types of DBMS Architecture

Database architecture can be seen as a single tier or multi-tier. But logically, database architecture is of two types like: **2-tier architecture** and **3-tier architecture**.

1-Tier Architecture

- o In this architecture, the database is directly available to the user. It means the user can directly sit on the DBMS and uses it.
- o Any changes done here will directly be done on the database itself. It doesn't provide a handy tool for end users.
- o The 1-Tier architecture is used for development of the local application, where programmers can directly communicate with the database for the quick response.

2-Tier Architecture

- o The 2-Tier architecture is same as basic client-server. In the two-tier architecture, applications on the client end can directly communicate with the database at the server side. For this interaction, API's like: **ODBC**, **JDBC** are used.
- o The user interfaces and application programs are run on the client-side.

- The server side is responsible to provide the functionalities like: query processing and transaction management.
- To communicate with the DBMS, client-side application establishes a connection with the server side.
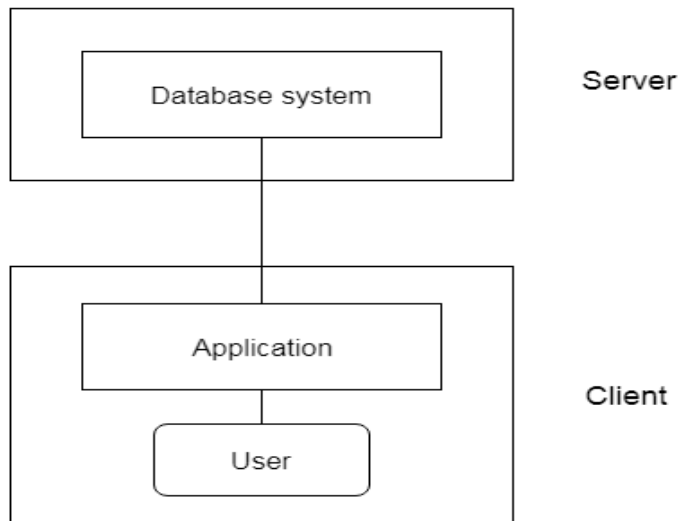

Fig: 2-tier Architecture

3-Tier Architecture

- The 3-Tier architecture contains another layer between the client and server. In this architecture, client can't directly communicate with the server.
- The application on the client-end interacts with an application server which further communicates with the database system.
- End user has no idea about the existence of the database beyond the application server. The database also has no idea about any other user beyond the application.
- The 3-Tier architecture is used in case of large web application.
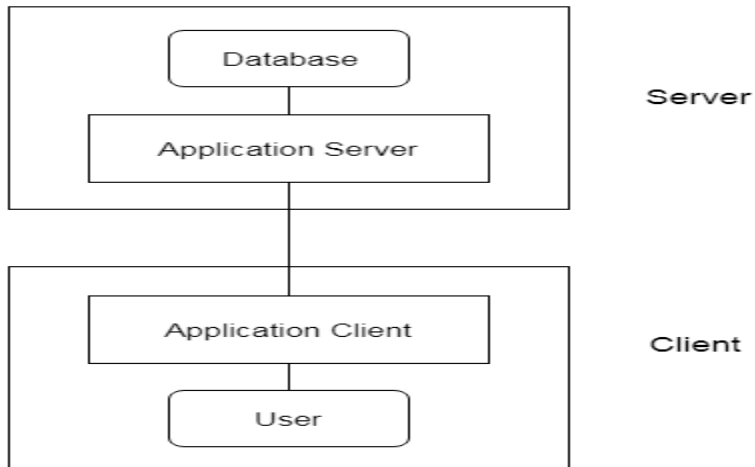
7. What are the various DBMS vendors and their products?

The major DBMS vendors are Oracle, IBM, Microsoft and Sybase (see Oracle Database, DB2, SQL Server and ASE). MySQL and SQLite are very popular open source products (see MySQL and SQLite).

All information on the vendors your company has onboarded and used is considered vendor data. Managing this vendor data is part of the vendor management process; this includes vendor contracts, contact details and location, purchasing terms, and legal documentation.

A vendor is an individual or company that supplies goods and services to businesses or consumers. Vendors buy products or services from distributors and resell them to others, usually individual consumers. Their main goals are to monitor customers' interests and to have enough goods in stock to meet demand.