20IT4304 Database Management Systems
Assignment I questions from Unit I

S.No	Question	CO Mapping	BTL
1	a.Illustrate DBMS environment that constitutes different types of software components and the types of computer software with which the DBMS interacts. b. Elaborate the importance of workers behind the scene	CO1	Remember
2	a. Discuss in detail about relational model concepts b. Elaborate various database users that involve in day-to-day use of a database.	CO1	Understand
3	Describe the three-schema DBMS architecture with a neat sketch.	CO1	Remember
4	a. Define Data Independence. Differentiate logical and physical data independence with various examples. Which one is harder to achieve? Why? b. Outline the advantages of using the DBMS approach	CO1	Analyze
5	Consider the following relations for a database that keeps track of student enrollment in courses and the books adopted for each course: STUDENT(Ssn, Name, Major, Bdate) COURSE(Course#, Cname, Dept) ENROLL(Ssn, Course#, Quarter, Grade) BOOK_ADOPTION(Course#, Quarter, Book_isbn) TEXT(Book_isbn, Book_title, Publisher, Author) Specify the foreign keys for this schema, stating any assumptions you make.	CO1	Apply
6	a.Discuss the main characteristics of the database approach and how it differs from traditional file systems. b.Summarize database languages and interfaces	CO1	Understand
7	Consider the following relations for a database that keeps track of business trips of salespersons in a sales office: SALESPERSON(Ssn, Name, Start_year, Dept_no) TRIP(Ssn, From_city, To_city, Departure_date, Return_date, Trip_id) EXPENSE(Trip_id, Account#, Amount) A trip can be charged to one or more accounts. Specify the foreign keys for this schema, stating any assumptions you make.	CO1	Apply

database schema

The description of a database is called the **database schema**. This will be defined during the design phase. (OR)

A database schema is the skeleton structure that represents the logical view of the entire database. It defines how the data is organized and how the relations among them are associated.

Example :
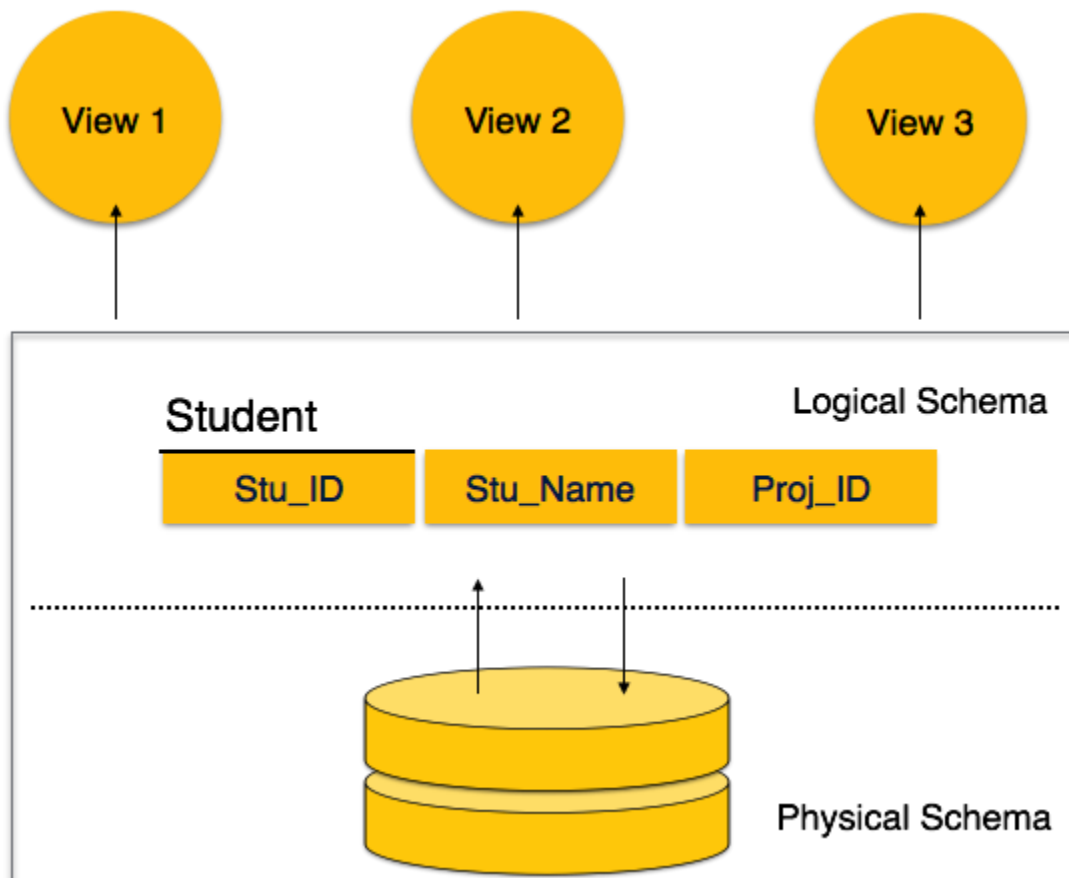
database state or **snapshot or instance**
The actual data in a database may change frequently. A data in a particular moment of time is called a **database state** or **snapshot** .or database instance.

The Three-Schema Architecture (OR) levels of data abstraction (or)

Three Tier Architecture of DBMS

The database approach provides some level of abstraction by hiding details of data storage that are not needed by most database users.

Figure 2.2   Illustrating the three-schema architecture.
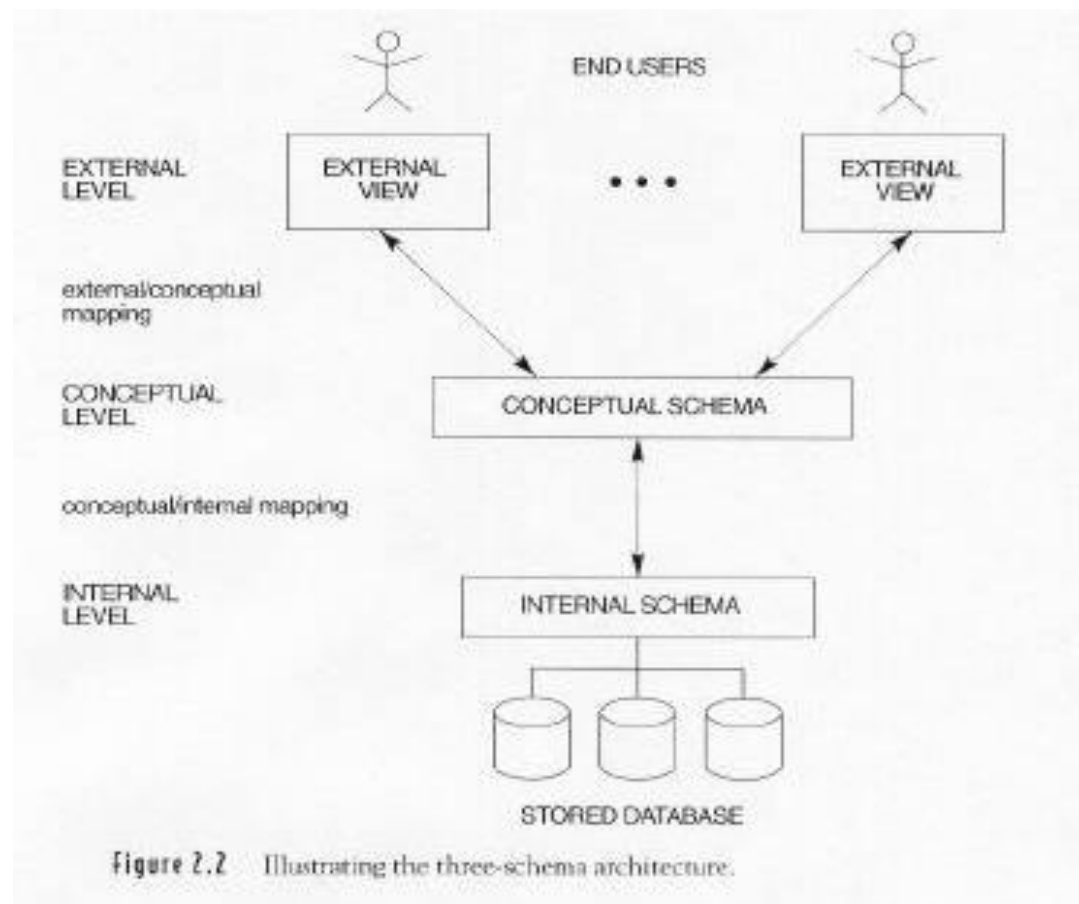
The Internal level / physical level

The internal level has an internal schema, which describes the physical storage structure of the database.

The internal schema uses a physical data model and describes the complete details of data storage and access paths for the

database.

The conceptual level /logical level

The conceptual level has a conceptual schema, which describes what data are stored in database and what relationship among those data

The conceptual schema hides the details of physical storage

structures. It concentrates on describing:entities, data

types, relationships, user operations, and constraints.

A high-level data model or an implementation data model can be used at this level.

The external level /view level

The external level includes a number of external schemas or user views. This is the highest level. A high-level data model or an implementation data model can be used at this level.

Difference between File System and DBMS

S.NO.	File System	DBMS
1.	File system is a software that manages and organizes the files in a storage medium within a computer.	DBMS is a software for managing the database.
2.	Redundant data can be present in a file system.	In DBMS there is no redundant data.
3.	It doesn't provide backup and recovery of data if it is lost.	It provides backup and recovery of data even if it is lost.
4.	There is no efficient query processing in file system.	Efficient query processing is there in DBMS.
5.	There is less data consistency in file system.	There is more data consistency because of the process of normalization.
6.	It is less complex as compared to DBMS.	It has more complexity in handling as compared to file system.
7.	File systems provide less security in comparison to DBMS.	DBMS has more security mechanisms as compared to file system.
8.	It is less expensive than DBMS.	It has a comparatively higher cost than a file system.

Popular DBMS Software's (or) Examples of DBMS S/W'S

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Here, is the list of some popular DBMS system:

- MySQL
- Microsoft Access
- Oracle
- PostgreSQL
- dBASE
- FoxPro
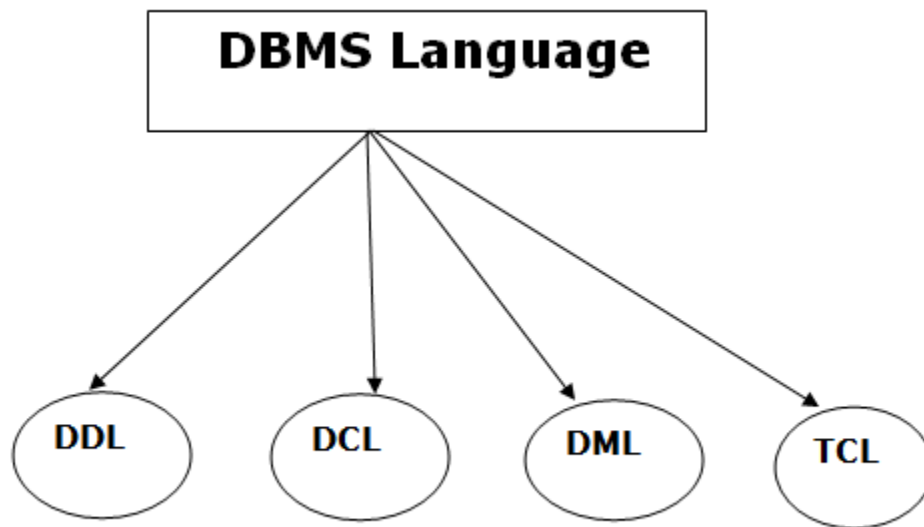- SQLite
- IBM DB2
- MariaDB
- Microsoft SQL Server etc.

Application of DBMS

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Banking
Airlines
Universities
Telecommunication
Finance
Sales
Manufacturing
HR Management

Database Languages & Interfaces

- o A DBMS has appropriate languages and interfaces to express database queries and updates.

Types of Database Language

1. Data Definition Language

- o **DDL** stands for **D**ata **D**efinition **L**anguage. It is used to define database structure or pattern.
- o It is used to create schema, tables, indexes, constraints, etc. in the database.
- o Using the DDL statements, you can create the skeleton of the database.
- o Data definition language is used to store the information of metadata like the number of tables and schemas, their names, indexes, columns in each table, constraints, etc.

Here are some tasks that come under DDL:

- **Create:** It is used to create objects in the database.
- **Alter:** It is used to alter the structure of the database.
- **Drop:** It is used to delete objects from the database.

Difference between Drop and Truncate

Truncate: It is used to remove all records from a table.

2. Data Manipulation Language

DML stands for **D**ata **M**anipulation **L**anguage. It is used for accessing and manipulating data in a database. It handles user requests.

Here are some tasks that come under DML:

- **Select:** It is used to retrieve data from a database.
- **Insert:** It is used to insert data into a table.
- **Update:** It is used to update existing data within a table.
- **Delete:** It is used to delete all records from a table.

3. Data Control Language

DCL stands for **D**ata **C**ontrol **L**anguage.

Here are some tasks that come under DCL:

- **Grant:** It is used to give user access privileges to a database.
- **Revoke:** It is used to take back permissions from the user.

4. Transaction Control Language

TCL is used to run the changes made by the DML statement.

Commit: It is used to save the transaction on the database.

Rollback: It is used to restore the database to original since the last Commit.

Interfaces in DBMS
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A database management system (DBMS) interface is a user interface that allows for the ability to input queries to a database without using the query language itself.

1.Menu-Based Interfaces for Web Clients or Browsing

2. Forms-Based Interfaces

3. Graphical User Interface

4. Natural language Interfaces

5. Speech Input and Output etc..

Advantages (or) Benefits of DBMS
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Reducing Data Redundancy

The file based data management systems contained multiple files that were stored in many different locations in a system or even across multiple systems. Because of this, there were sometimes multiple copies of the same file which lead to data redundancy.

This is prevented in a database as there is a single database and any change in it is reflected immediately. Because of this, there is no chance of encountering duplicate data.

Sharing of Data

In a database, the users of the database can share the data among themselves. There are various levels of authorisation to access the data, and consequently the data can only be shared based on the correct authorisation protocols being followed.

Many remote users can also access the database simultaneously and share the data between themselves.

Data Integrity

Data integrity means that the data is accurate and consistent in the database. Data Integrity is very important as there are multiple databases in a DBMS. All of these databases contain data that is visible to multiple users. So it is necessary to ensure that the data is correct and consistent in all the databases and for all the users.

Data Security

Data Security is vital concept in a database. Only authorised users should be allowed to access the database and their identity should be authenticated using a username and password. Unauthorised users should not be allowed to access the database under any circumstances as it violates the integrity constraints.

Privacy

The privacy rule in a database means only the authorized users can access a database according to its privacy constraints. There are levels of database access and a user can only view the data he is allowed to. For example - In social networking sites, access constraints are different for different accounts a user may want to access.

Backup and Recovery

Database Management System automatically takes care of backup and recovery. The users don't need to backup data periodically because this is taken care of by the DBMS. Moreover, it also restores the database after a crash or system failure to its previous condition.

Data Consistency

Data consistency is ensured in a database because there is no data redundancy. All data appears consistently across the database and the data is same for all the users viewing the database. Moreover, any changes made to the database are immediately reflected to all the users and there is no data inconsistency.

Disadvantages (or) Limitations of DBMS

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- Cost of Hardware and Software of a DBMS is quite high which increases the budget of your organization.

- Most database management systems are often complex systems, so the training for users to use the DBMS is required.

- In some organizations, all data is integrated into a single database which can be damaged because of electric failure or database is corrupted on the storage media

- Use of the same program at a time by many users sometimes lead to the loss of some data.