1. What is data base management system? What are it's characteristics?

Ans:→ A database management system (DBMS) is a system software for creating, and managing database. The DBMS provides users and programming with a systematic way to create, retrive, separate and manage data.

DBMS consists of three main components -

(I) Data definition language (DDL) for defining database structure, (II) Data manipulation language (DML) for ~~quari~~ quercying and updating data. (III) Database engine for manage and control access to the database. DBMS offers data integrity, data security, efficient data retrieval.

Some types of DBMS are - Relational DBMS (RDBMS), Object-oriented DBMS (OODBMS), and NoSQL databases. RDBMS organizes data into tables with predefined relationships. NoSQL databases offer ~~more~~ flexibility for unstructured data.

Examples of DBMS - MySQL, PostgreSQL, Microsoft SQL, Server, Oracle database.

Characteristics of DBMS -

(I) Data definition and manipulation - Define, create and manipulate the structure of database and its data.

(II) Data Integrity - Ensures accuracy and consistency of data.

(III) Data Security - Provide mechanism to control access to data and protecting it from unauthorized users.

(iv) Concurrency Control - Manage simultaneous access to database, maintain data consistency.

(v) Data Independence - changes database structure without affecting application.

(vi) Multi User Support - Permits multiple users to access the database concurrently, managing their interactions effectively.

2) Give the differences between traditional file approach vs DBMS approach?

Ans:→

Traditional file approach	DBMS approach
(i) Data is stored in separate, independent files using file Systems.	(i) Data is organized in a structured manner using tables, relationships, and a centralized database management system.
(ii) Redundancy is common since data is duplicated across various files.	(ii) Redundancy is minimized through normalization, reducing data duplication.
(iii) Ensuring data integrity is challenging, as changes in one file may not be reflected to others.	(iii) Maintains data integrity through constrains, transactions, and normalization.
(iv) Changes in data structure often require modifications in multiple programs.	(iv) Achieves data independence, separating the data structure from application using a data dictionary.
(v) Relies on file-level security, which may be less robust.	(v) Provides better security with user authentication, authorization, encryption at the database level.

(vi) Handling simultaneous access by multiple users can lead to data inconsistency.	(vi) Implements robust concurrency control mechanisms to manage concurrent transaction
(vii) Scaling a is complex, as each applications manages its data independently.	(vii) Easier scalability due to a centralized system that can handle increased data and user loads.
(viii) Querying involves programming in the application language for each file.	(viii) Utilizes SQL or other Query languages, providing a standardized and more straightforward approach to data retrival.
(ix) Backup and recovery procedure are manual and may be error-prone.	(ix) offers automated backup and recovery mechanisms, enhancing data reliability.
(x) Maintenance is complex, requiring changes in multiple programs for data modification.	(x) Centralized maintenance simplifies updates, ensuring consistency across applications.

3) What are functions or rule of DBA?

Ans:⇒ Rule of a DBA are-

(i) Installation of new Software - It is primarily the job of the DBA to install new versions of DBMS software, application software, and other software related to DBMS administration..

(ii) Configuration of hardware and software with the System administrator -

In may cases the system software can only be accessed by system administrator. In this case,

the DBA must work ~~clear~~ closely with the system administrator to perform software installation, and to configure hardware and software so that it functions optionally with the DBMS.

(iii) Database design -

Work on designing the structure of databases to ensure efficient data storage and retrival.

(iv) Security Management -

Implement and manage security measures to ~~proj~~ protect sensitive data, including user access controls, encryption, and authentication.

(v) Backup and Recovery -

Develop and execute backup and recovery plans to prevent data loss and ensure system availability.

(vi) Data Integrity -

Ensure accuracy, consistency, and reliability of data by implementing and enforcing data integrity constrains.

(vii) Troubleshooting –

Address and resolve issues related to database functionality, connectivity and performance.

(viii) Users Support –

Assist users with database-related inquiries, troubleshoot problems, and provide training while needed.

4. List the advantages and disadvantages of DBMS disadvanges ?

Ans :→

Advantages of DBA –

(i) Data Security –

DBA implement security measures to protect sensitive data, ensuring only authorized users have access and that the data is secure from external threats.

(ii) Scalability –

They plan for and implement strategies to scale the database infrastructure as the data volume and user load increase, ensuring the System can handle growing demand.

(III) Data maintenance -

They manage data consistency over time by handling updates, deletions and insertions appropriately to maintain the quality of the data.

(IV) Regulatory Compliance -

DBAs ensure that the database systems completly with relevant regulations and standards, which is crucial in industries with strict data governance requirements.

(V) Cost Effeciency - -

Through effective management and optimizations, DBAs contribute to cost effeciency by minimizing downtime, reducing the risk of data loss and optimizing resource uses.

Disadvantages of DBA -

① Dependency -

Orginizations may become overly dependent on a DBA, and if that person leaves or is unavailable, it could lead to challenging in managing and maintaining the database system.

(11) Overhead -

DBAs may introduce some administrative overhead, espicially if their process and procedure are too rigid or time consuming.

5) What is ER model ?

Ans:→ The Entity - Relationship (ER) model is a conceptual data model used in database design. It represents entities and the relationships between them. Entities are depected as rectangles, and relationships are represented by diamonds, connecting the entities. Attributes, which describe the properties of entities, are illustrated inside the rectangles. The ER model helps in visualizing and designing database structures before implementation.

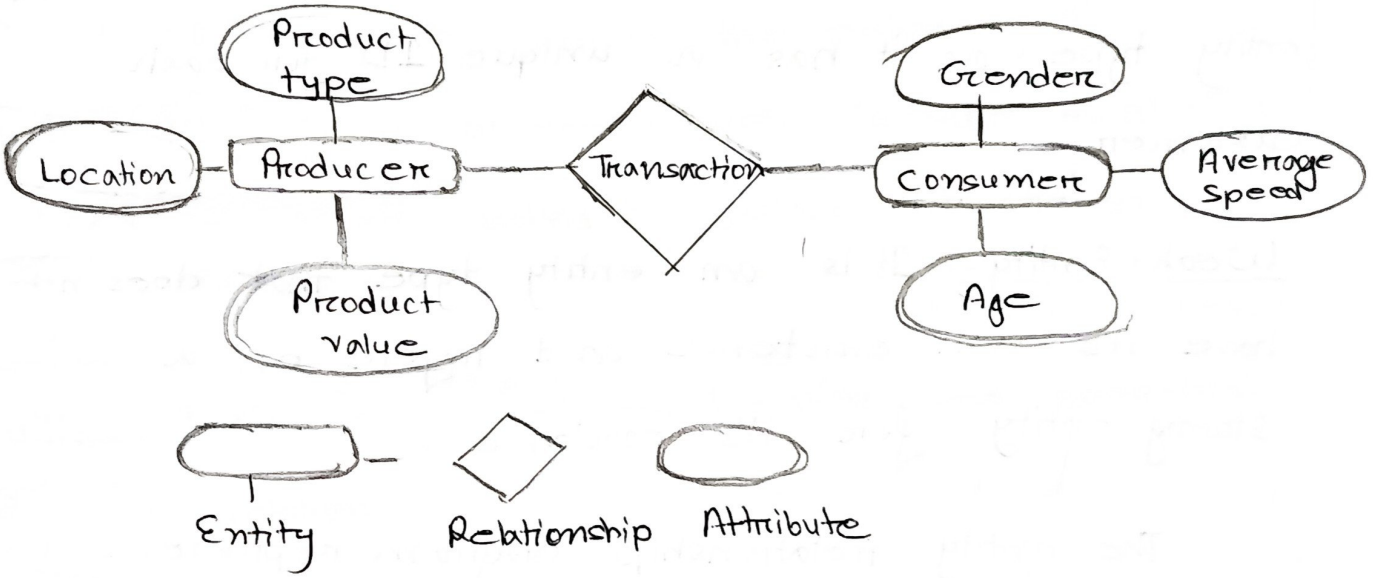
Entities - They are object or concepts about which data is stored. They are represented by rectangles in the ER diagram.

Relationship - ~~Rel~~ Depict connections between entities. Representented by diamonds in the diagram.

Attributes- They are the properties or characters of entities. They depicted inside the rectangles & representing entities.

Cardinality- Cardinality describes the ~~manual~~ numerical relationship between entities in a relationship.

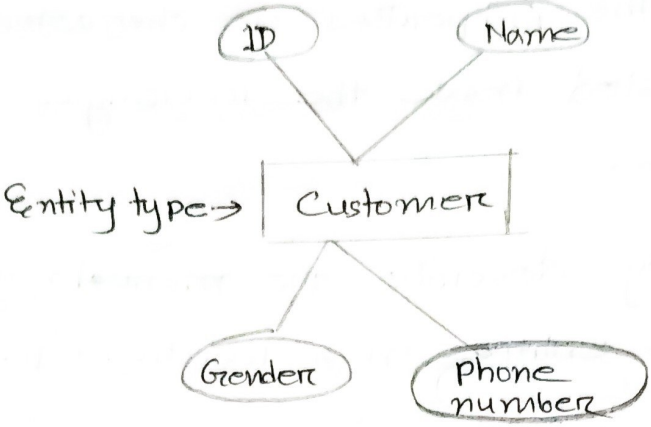
Normalization- ER model involes the process of normalization to organize data efficiently and reduce redundency.



6) What are ~~teh~~ ~~short~~ strong entities ~~entities~~ explain with example?

Ans:- Strong entity - It is a entity that has it's own existence and its independent. The entity relationship diagram represents a strong entity type with the help of a single rectangle.

B

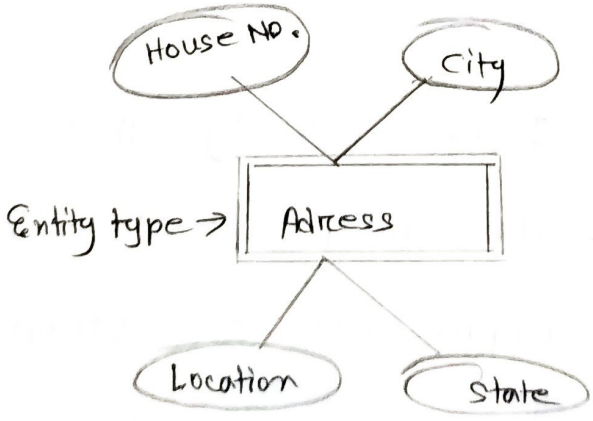


Strong entity type

In the above diagram, the 'customer" is the entity type with attributes such as ID, Name, gender and phone number. Customer is a strong entity type as it has a unique ID for each customer.

Weak Entity — It is an entity type that does not have its own existence and refers on a strong entity for its existance.

The entity relationship diagram represents the weak entity type using double rectangulars.



Weak entity type

Here, "address" is a weak entity type with attributes such as House no., city, Location, State.

7) Steps to conversion of ER model into relational ~~schema~~? Schema?

Ans⇒ (I) Identity Entities - List all the entities from the ER diagram.

(II) Identity attributes - For each entity, identify and list its attributes.

(III) Identify keys - Determine the primary key for each entity. If a primary key is not explicitly defined, consider using a unique identifier.

(IV) Identify relationships - Identify relationships between entities. Determine the cardinality and participation of each relation.

(V) Create Tables - Create a table for each entity. include ~~col~~ ~~coul~~ columns for each attribute and the primary key.

(VI) Create Relationships - Represent relationship between tables using foreign keys. Ensure that foreign keys match the primary keys they refer to in related tables.

(vii) Handle Weak Entities -

If there are weak entities in the ER model, represent them appropriately in the relational schema, typically by combining its attributes with the owning entity or using a separate table.

(viii) Normalize table -

Apply normalization techniques to ensure data integrity and eliminate redundency.

(ix) Review and Refine -

Review relational schema for completeness and accuracy. Refine the schema as needed based on normalization principles and best practices.

(x) Document the schema -

clearly document the resuting relational schema, including tables, columns, primary and foreign keys, and any constrains.

8) Why do you mean by SQL? What are it's types?

Ans Structured Query Language. It is a domain-specific language used for managing

and manipulating relational database. SQL is commonly used for tasks such as querying data, updating records, inserting new data, and creating and modifying database schemas. It provides a standardized way to interact with databases, allowing users to communicate with and retrieve information form database in a consistent and efficient manner.

And it's Types are -

1) Data Query Languag (DQL) - Involves queries for retrieving data from a data base.

(ii) Data definition language (DDL) - concerned with structure of the database.

(iii) Data Manipulation Language (DML) - Involves manipulating the data stored in the database.

(iv) Data control Language (DCL)

Deals with the permissions and access control of the database.

9. Briefly explain three tire architecture of DBMS ?

Ans:→ Three levels are – External level, conceptual level, Internal level.

External level – Also called view level. The reason this level is called "view" is because several users can view their desired data from this level which is internally fetched from database which the help of conceptual and Internal level mapping.

The user does not need to know the database schema details such as data structure, table definition etc. User is only concerned about data which is what returned back to the view level after it has been fetched from database.

This is the top level of the three level DBMS architecture.

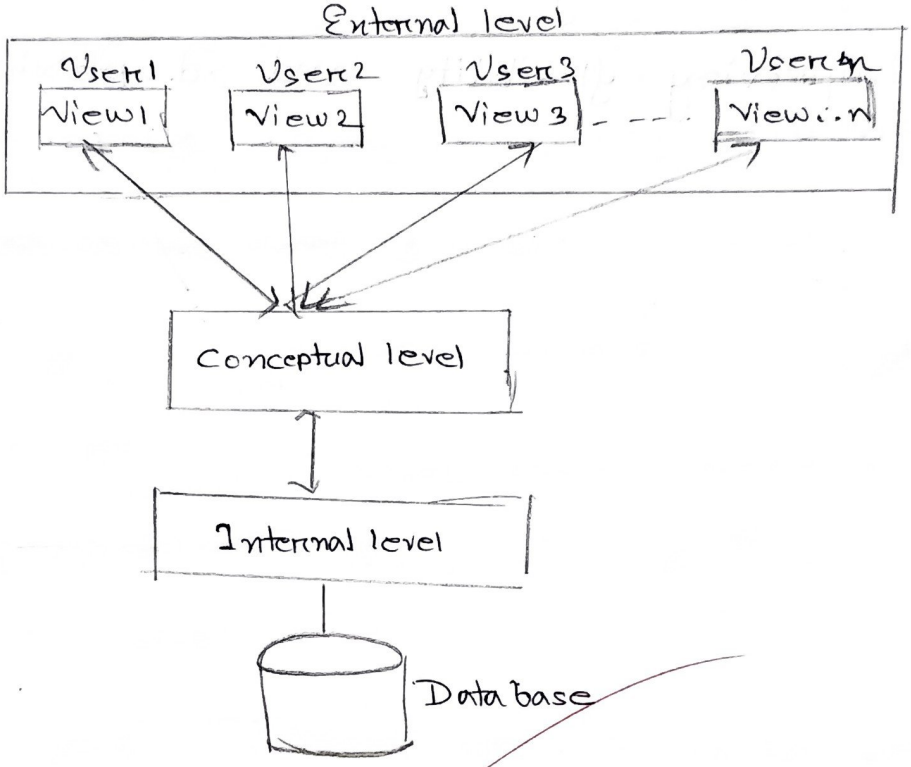
· Conceptual level –

It is also called logical level. The whole design of the database such as relationship among data, schema of data etc., are describe in this level.

Database ~~constraints~~ an constraints and security are also implemented in this level of architecture. Maintain by DBA.

Internal level -

This level is also known as physical level. This level describes how the data is actually stored in the storage devices. This level is also responsible for allocation space to the data. This is the lowest level.



10) What is data independency? What are it's types?

Ans:- Data independence refers to the separation of the user applications or programs from the physical structure of the data.

Types are -

1). Logical Data Independence -

This allows changes in the logical schema (structure of the database) to occur without affecting the existing external schemas (views of the data as seen by users)

(11) Physical data Independence -

This allows changes in the physical storage or organization of data without affecting the logical schema. Applications and user views are insulated from changes in the way data is stored, improving flexibility and adaptability.