DBMS RDBMS & MySQL Questions

1. What is DBMS?

   DBMS is a collection of programs that facilitates users to create and maintain a database. In other words, DBMS provides us an interface or tool for performing different operations such as the creation of a database, inserting data into it, deleting data from it, updating the data, etc. DBMS is a software in which data is stored in a more secure way as compared to the file-based system. Using DBMS, we can overcome many problems such as- data redundancy, data inconsistency, easy access, more organized and understandable, and so on. There is the name of some popular Database Management System- MySQL, Oracle, SQL Server, Amazon simple DB (Cloud-based), etc.

2. What is a Database system?

   The collection of database and DBMS software together is known as a database system. Through the database system, we can perform many activities such as-

   The data can be stored in the database with ease, and there are no issues of data redundancy and data inconsistency.

   The data will be extracted from the database using DBMS software whenever required. So, the combination of database and DBMS software enables one to store, retrieve and access data with considerate accuracy and security.

3. What is Checkpoint in DBMS?

   The Checkpoint is a type of mechanism where all the previous logs are removed from the system and permanently stored in the storage disk.

4. What is mean by transparent DBMS?

   The transparent DBMS is a type of DBMS which keeps its physical structure hidden from users. Physical structure or physical storage structure implies to the memory manager of the DBMS, and it describes how the data stored on disk.

5. Define RDBMS?

RDBMS stands for Relational Database Management Systems. It is used to maintain the data records and indices in tables. RDBMS is the form of DBMS which uses the structure to identify and access data concerning the other piece of data in the database. RDBMS is the system that enables you to perform different operations such as- update, insert, delete, manipulate and administer a relational database with minimal difficulties. Most of the time RDBMS use SQL language because it is easily understandable and is used for often.

6. Which are the types of database language and define them?

Data Definition Language (DDL) e.g., CREATE, ALTER, DROP, TRUNCATE, RENAME, etc. All these commands are used for updating the data that?s why they are known as Data Definition Language.

Data Manipulation Language (DML) e.g., SELECT, UPDATE, INSERT, DELETE, etc. These commands are used for the manipulation of already updated data that's why they are the part of Data Manipulation Language.

DATA Control Language (DCL) e.g., GRANT and REVOKE. These commands are used for giving and removing the user access on the database. So, they are the part of Data Control Language.

Transaction Control Language (TCL) e.g., COMMIT, ROLLBACK, and SAVEPOINT. These are the commands used for managing transactions in the database. TCL is used for managing the changes made by DML.

7. What is Data Model?

The Data model is specified as a collection of conceptual tools for describing data, data relationships, data semantics and constraints. These models are used to describe the relationship between the entities and their attributes.

There is the number of data models:

- Hierarchical data model
- network model
- relational model
- Entity-Relationship model and so on.

8. What is Relationship?

The Relationship is defined as an association among two or more entities. There are three types of relationships in DBMS-

One-To-One: Here one record of any object can be related to one record of another object.

One-To-Many (many-to-one): Here one record of any object can be related to many records of other object and vice versa.

Many-to-many: Here more than one records of an object can be related to n number of records of another object.

9. What is Data Abstraction in DBMS?

Data abstraction in DBMS is a process of hiding irrelevant details from users. Because database systems are made of complex data structures so, it makes accessible the user interaction with the database.

10. What is Degree in Relation?

    The degree of relation is a number of attribute of its relation schema. A degree of relation is also known as Cardinality it is defined as the number of occurrence of one entity which is connected to the number of occurrence of other entity. There are three degree of relation they are one-to-one(1:1), one-to-many(1:M), many-to-one(M:M).

11. Define relation and relation schema?

    A Relation Schema is specified as a set of attributes. It is also known as table schema. It defines what the name of the table is. Relation schema is known as the blueprint with the help of which we can explain that how the data is organized into tables. This blueprint contains no data.

    A relation is specified as a set of tuples. A relation is the set of related attributes with identifying key attributes.

12. Which are different levels of Data Abstraction?

    Physical level: It is the lowest level of abstraction. It describes how data are stored.

    Logical level: It is the next higher level of abstraction. It describes what data are stored in the database and what the relationship among those data is.

    View level: It is the highest level of data abstraction. It describes only part of the entire database.

13. What is DDL?

    Data Definition Language (DDL) is a standard for commands which defines the different structures in a database. Most commonly DDL statements are CREATE, ALTER, and DROP. These commands are used for updating data into the database.

14. Which are the different type of DML?

    Data Manipulation Language (DML) is a language that enables the user to access or manipulate data as organized by the appropriate data model. For example- SELECT, UPDATE, INSERT, DELETE.

    There is two types of DML:

    Procedural DML or Low level DML: It requires a user to specify what data are needed and how to get those data.

    Non-Procedural DML or High level DML: It requires a user to specify what data are needed without specifying how to get those data.

15. What is Relational Algebra?

    Relational Algebra is a Procedural Query Language which contains a set of operations that take one or two relations as input and produce a new relationship. Relational algebra is the basic set of operations for the relational model. The decisive point of relational algebra is that it is similar to the algebra which operates on the number.

There are few fundamental operations of relational algebra:

- select
- project
- set difference
- union
- rename, etc.

16. What is Relation Calculus?

Relational Calculus is a Non-procedural Query Language which uses mathematical predicate calculus instead of algebra. Relational calculus doesn't work on mathematics fundamentals such as algebra, differential, integration, etc. That's why it is also known as predicate calculus.

There is two type of relational calculus:

- Tuple relational calculus
- Domain relational calculus

17. What is Normalization?

    Normalization is a process of analysing the given relation schemas according to their functional dependencies. It is used to minimize redundancy and also used to minimize insertion, deletion and update distractions. Normalization is considered as an essential process as it is used to avoid data redundancy, insertion anomaly, updation anomaly, deletion anomaly.

18. Which are the different normal forms?

    First Normal Form(1NF)

    Second Normal Form(2NF)

    Third Normal Form(3NF)

    Boyce & Codd Normal Form (BCNF)

19. What is Denormalization?

Denormalization is the process of boosting up database performance and adding of redundant data which helps to get rid of complex data. Denormalization is a part of database optimization technique. This process is used to avoid the use of complex and costly joins. Denormalization doesn't refer to the thought of not to normalize instead of that denormalization takes place after normalization. In this process, firstly the redundancy of the data will be removed using normalization process than through denormalization process we will add redundant data as per the requirement so that we can easily avoid the costly joins.

20. What is ER Model?

    E-R model is a short name for the Entity-Relationship model. This model is based on the real world. It contains necessary objects (known as entities) and the relationship among these objects. Here the primary objects are the entity, attribute of that entity, relationship set, an attribute of that relationship set can be mapped in the form of E-R diagram.

21. What is an entity type?

    An entity type is specified as a collection of entities, having the same attributes. Entity type typically corresponds to one or several related tables in the database. A characteristic or trait which defines or uniquely identifies the entity is called entity type.

22. What is an entity set?

    The entity set specifies the collection of all entities of a particular entity type in the database. An entity set is known as the set of all the entities which share the same properties.

23. What is a weak entity set?

    An entity set that doesn't have sufficient attributes to form a primary key is referred to as a weak entity set. The member of a weak entity set is known as a subordinate entity. Weak entity set does not have a primary key, but we need a mean to differentiate among all those entries in the entity set that depend on one particular strong entity set.

24. What is an Attribute?

    An attribute refers to a database component. It is used to describe the property of an entity. An attribute can be defined as the characteristics of

the entity. Entities can be uniquely identified using the attributes. Attributes represent the instances in the row of the database.

25. Which are the two-Data integrity rule in DBMS?

    Data integrity is one significant aspect while maintaining the database. So, data integrity is enforced in the database system by imposing a series of rules. Those set of integrity is known as the integrity rules.

    There are two integrity rules in DBMS:

    Entity Integrity: It specifies that "Primary key cannot have a NULL value."

    Referential Integrity: It specifies that "Foreign Key can be either a NULL value or should be the Primary Key value of other relation.

26. What do you mean by extension and intension?

    Extension: The Extension is the number of tuples present in a table at any instance. It changes as the tuples are created, updated and destroyed. The actual data in the database change quite frequently. So, the data in the database at a particular moment in time is known as extension or database state or snapshot. It is time dependent.

    Intension: Intension is also known as Data Schema and defined as the description of the database, which is specified during database design and is expected to remain unchanged. The Intension is a constant value that gives the name, structure of tables and the constraints laid on it.

27. Define Data Independence and which are the two types?

    Data independence specifies that "the application is independent of the storage structure and access strategy of data." It makes you able to modify the schema definition at one level without altering the schema definition in the next higher level.

    It makes you able to modify the schema definition in one level should not affect the schema definition in the next higher level.

    There are two types of Data Independence:

Physical Data Independence: Physical data is the data stored in the database. It is in the bit-format. Modification in physical level should not affect the logical level.

Logical Data Independence: Logical data in the data about the database. It basically defines the structure. Such as tables stored in the database. Modification in logical level should not affect the view level.

28. Which are the different level of data abstraction?

Physical level: It is the lowest level of abstraction. It describes how data are stored.

Logical level: It is the next higher level of abstraction. It describes what data are stored in the database and what relationship among those data.

View level: It is the highest level of data abstraction. It describes only part of the entire database.

29. What is join? Which are the different type and it categories?

The Join operation is one of the most useful activities in relational algebra. It is most used way to combine information from two or more relations. A Join is always performed based on the same or related column. Most complex queries of SQL involve JOIN command.

There are following types of joins:

- Inner joins: Inner join is of 3 categories. They are:
  - Theta joins.
  - Natural join
  - Equi join.
- Outer joins: Outer join have three types. They are:
  - Left outer join.
  - Right outer join
  - Full outer join

30. What is the difference between Delete and Truncate command?

DELETE command: DELETE command is used to delete rows from a table based on the condition that we provide in a WHERE clause.

- DELETE command delete only those rows which are specified with the WHERE clause.
- DELETE command can be rolled back.
- DELETE command maintain a log, that's why it is slow.
- DELETE use row lock while performing DELETE function.

TRUNCATE command: TRUNCATE command is used to remove all rows (complete data) from a table. It is similar to the DELETE command with no WHERE clause.

- The TRUNCATE command removes all the rows from the table.
- The TRUNCATE command cannot be rolled back.
- The TRUNCATE command doesn't maintain a log. That's why it is fast.
- TRUNCATE use table log while performing the TRUNCATE function.

31. How do communicate with RDBMS?
    You have to use Structured Query Language (SQL) to communicate with the RDBMS. Using queries of SQL, we can give the input to the database and then after processing of the queries database will provide us the required output.
32. Describe the types of keys?

Primary key: The Primary key is an attribute in a table that can uniquely identify each record in a table. It is compulsory for every table.

Candidate key: The Candidate key is an attribute or set of an attribute which can uniquely identify a tuple. The Primary key can be selected from these attributes.

Super key: The Super key is a set of attributes which can uniquely identify a tuple. Super key is a superset of the candidate key.

Foreign key: The Foreign key is a primary key from one table, which has a relationship with another table. It acts as a cross-reference between tables.

33.. What is 1NF, 2NF and 3NF?

1NF is the **First Normal Form**. It is the simplest type of normalization that you can implement in a database. The primary objectives of 1NF are to:

- Every column must have atomic (single value)
- To Remove duplicate columns from the same table
- Create separate tables for each group of related data and identify each row with a unique column.

2NF is the **Second Normal Form**. A table is said to be 2NF if it follows the following conditions:

- The table is in 1NF, i.e., firstly it is necessary that the table should follow the rules of 1NF.
- Every non-prime attribute is fully functionally dependent on the primary key, i.e., every non-key attribute should be dependent on the primary key in such a way that if any key element is deleted, then even the non_key element will still be saved in the database.

3NF stands for **Third Normal Form**. A database is called in 3NF if it satisfies the following conditions:

- It is in second normal form.
- There is no transitive functional dependency.

34. Define object-oriented model?

    E-R model is an Entity-Relationship model. E-R model is based on a real-world which is made up of entities and related objects. Entities are illustrated in a database by a set of attributes.

35. What are the advantages of RDBMS?

    Controlling Redundancy.
    Integrity can be enforced.
    Inconsistency can be avoided.
    Data can be shared.
    Standard can be enforced.

36. Name some subsystem in RDBMS?

Input-output, Security, Language Processing, Storage Management, Logging and Recovery, Distribution Control, Transaction Control, Memory management.

37. What is MySQL?

MySQL is a database management system for web servers. It can grow with the website as it is highly scalable. Most of the websites today are powered by MySQL.

38. Advantages of MySQL?

Flexibility: MySQL runs on all operating systems

Power: MySQL focuses on performance

Enterprise-Level SQL Features: MySQL had for some time been lacking in advanced features such as subqueries, **views**, and stored procedures.

Full-Text Indexing and Searching

Query Caching: This helps enhance the speed of MySQL greatly

Replication: One MySQL server can be duplicated on another, providing numerous advantages

Configuration and Security.

39. What does SQL in MySQL Stands for?

The SQL in MySQL stands for Structured Query Language. This language is also used in other databases such as Oracle and Microsoft SQL Server. One can use commands such as the following to send requests from a database.

40. What does MySQL Database Contains?
A MySQL database contains one or more tables, each of which contains records or rows. Within these rows are various columns or fields that contain the data itself.

41. Which are the different ways you can interact with MySQL?

There are three main ways you can interact with MySQL:

- using a command line
- via a web interface
- through a programming language

42. what are some of the common MySQL commands?

Command	Action
ALTER	To alter a database or table
BACKUP	To back-up a table
\c	To cancel Input
CREATE	To create a database
DELETE	To delete a row from a table
DESCRIBE	To describe a table's columns
DROP	To delete a database or table
EXIT(ctrl+c)	To exit
GRANT	To change user privileges
HELP (\h, \?)	Display help
INSERT	Insert data
LOCK	Lock table(s)
QUIT(\q)	Same as EXIT
RENAME	Rename a Table
SHOW	List details about an object
SOURCE	Execute a file
STATUS (\s)	Display the current status
TRUNCATE	Empty a table
UNLOCK	Unlock table(s)
UPDATE	Update an existing record
USE	Use a database

43. How do you create a Table?

For example:

```
CREATE TABLE history (
author VARCHAR (128),
title VARCHAR (128),
type VARCHAR (16),

    year CHAR(4));
```

44. How do you insert data into MySQL?

The INSERT INTO statement is used to add new records to a MySQL table:

```
INSERT INTO table_name (column1, column2, column3...)
VALUES (value1, value2, value3,)
```

If we want to add values for all the columns of the table, we do not need to specify the column names in the SQL query. However, the order of the values should be in the same order as the columns in the table. The INSERT INTO syntax would be as follows:

```
INSERT INTO table_name
VALUES (value1, value2, value3, ...);
```

45. How do you remove a column from the database?

You can remove a column by using the DROP keyword:

```
ALTER TABLE classics DROP pages;
```

46. How to create Index in MySQL?

In MySQL, there are different index types, such as a regular INDEX, a PRIMARY KEY, or a FULLTEXT index. You can achieve fast searches with the help of an index. Indexes speed up performance by either ordering the data on disk so it's quicker to find your result or, telling the SQL engine where to go to find your data.

Example: Adding indexes to the history table:

```
ALTER TABLE history ADD INDEX(author(10));
ALTER TABLE history ADD INDEX(title(10));
ALTER TABLE history ADD INDEX(category(5));
ALTER TABLE history ADD INDEX(year);
DESCRIBE history;
```

47. How to delete a data from a MySQL Table?

In MySQL, the DELETE statement is used to delete records from a table:

```
DELETE FROM table_name
WHERE column_name = value_name;
```

48. Which is the numeric data type in MySQL?

Type Name	Meaning
TINYINT	Very Small Integer
SMALLINT	Small Integer
MEDIUMINT	Medium-sized Integer
INT	Standard Integer
BIGINT	Large Integer
DECIMAL	Fixed-point number
FLOAT	Single-precision floating-point number
DOUBLE	Double-precision floating-point number
BIT	Bit-field

49. Which are the string data type in MySQL?

Type Name	Meaning
CHAR	fixed-length nonbinary(character) string
VARCHAR	variable-length nonbinary string
BINARY	fixed-length binary string
VARBINARY	variable-length binary string
TINYBLOB	Very small BLOB(binary large object)
BLOB	Small BLOB
MEDIUMBLOB	Medium-sized BLOB
LONGBLOB	Large BLOB
TINYTEXT	A very small nonbinary string
TEXT	Small nonbinary string
MEDIUMTEXT	Medium-sized nonbinary string
LONGTEXT	Large nonbinary string
ENUM	An enumeration; each column value is assigned, one enumeration member
SET	A set; each column value is assigned zero or more set members
NULL	NULL in SQL is the term used to represent a missing value. A NULL value in a table is a value in a field that appears to be blank. This value is different than a zero value or a field that contains spaces.

50. Which are the different type of indexes?

Indexes are: –

Clustered index: – It is the index at which data is physically stored in the disk. Therefore, only one clustered index can be created to a database table.

non-clustered index: – It does not define physical data but it defines a logical ordering. Typically, B-Tree or B+ trees are created for this purpose.