**1. What is DBMS ?**

The database management system is a collection of programs that enables user to store, retrieve, update and delete information from a database.

**2. What is RDBMS ?**

Relational Database Management system (RDBMS) is a database management system (DBMS) that is based on the relational model. Data from relational database can be accessed or reassembled in many different ways without having to reorganize the database tables. Data from relational database can be accessed using an API , Structured Query Language (SQL).

**3. What is SQL ?**

Structured Query Language(SQL) is a language designed specifically for communicating with databases. SQL is an ANSI (American National Standards Institute) standard.

**4. What are the different type of SQL's statements ?**

This is one of the frequently asked SQL Interview Questions to freshers. SQL statements are broadly classified into three. They are

1. **DDL** – Data Definition Language

DDL is used to define the structure that holds the data. For example, Create, Alter, Drop and Truncate table.

2. **DML**– Data Manipulation Language

DML is used for manipulation of the data itself. Typical operations are Insert, Delete, Update and retrieving the data from the table. Select statement is considered as a limited version of DML, since it can't change data in the database. But it can perform operations on data retrieved from DBMS, before the results are returned to the calling function.  
3. **DCL**– Data Control Language   
DCL is used to control the visibility of data like granting database access and set privileges to create tables etc. Example - Grant, Revoke access permission to the user to access data in database.  
**5. What are the Advantages of SQL ?**

1. **SQL is not a proprietary language** used by specific database vendors. Almost every major DBMS supports SQL, so learning this one language will enable programmers to interact with any database like ORACLE, SQL ,MYSQL etc.

2. **SQL is easy to learn**. The statements are all made up of descriptive English words, and there aren't that many of them.  
3. SQL is actually a very powerful language and by using its language elements you can perform very **complex and sophisticated database operations**. **6. what is a field in a database ?**

A field is an area within a record reserved for a specific piece of data.   
**Examples**: Employee Name, Employee ID etc

**7. What is a Record in a database ?**

A record is the collection of values / fields of a specific entity: i.e. an Employee, Salary etc.

**8. What is a Table in a database ?**

A table is a collection of records of a specific type. For example, employee table, salary table etc.

**11. What is a Database Lock ?**

Database lock tells a transaction, if the data item in questions is currently being used by other transactions.

**12. What are the type of locks ?**

**1. Shared Lock**

When a shared lock is applied on data item, other transactions can only read the item, but can't write into it.

**2. Exclusive Lock**

When an exclusive lock is applied on data item, other transactions can't read or write into the data item.

**14. What is a primary key?**

A primary key is a column whose values **uniquely identify every row** in a table. Primary key values can never be reused. If a row is deleted from the table, its primary key may not be assigned to any new rows in the future. To define a field as primary key, following conditions had to be met :

1. No two rows can have the same primary key value.

2. Every row must have a primary key value

3. The primary key field cannot be null

4. Values in primary key columns can never be modified or updated

**15. What is a Composite Key ?**

A Composite primary key is a type of candidate key, which represents a set of columns whose values uniquely identify every row in a table.  
 **For example -** if "Employee\_ID" and "Employee Name" in a table is combined to uniquely identify a row it’s called a Composite Key.

**16. What is a Composite Primary Key ?**

A Composite primary key is a set of columns whose values uniquely identify every row in a table. What it means is that, a table which contains composite primary key will be indexed based on the columns specified in the primary key. This key will be referred in Foreign Key tables.  
**For example** - if the combined effect of columns, "Employee\_ID" and "Employee Name" in a table is required to uniquely identify a row, its called a Composite Primary Key. In this case, both the columns will be represented as primary key.

**17. What is a Foreign Key ?**

When a "one" table's primary key field is added to a related "many" table in order to create the common field which relates the two tables, it is called a foreign key in the "many" table.  
For example, the salary of an employee is stored in salary table. The relation is established via foreign key column “Employee\_ID\_Ref” which refers “Employee\_ID” field in the Employee table.

**18. What is a Unique Key ?**

Unique key is same as primary with the difference being the existence of null. Unique key field allows one value as NULL value.

SQL Insert, Update and Delete Commands Interview Questions

**19. Define SQL Insert Statement ?**

SQL INSERT statement is used to add rows to a table. For a full row insert, SQL Query should start with “insert into “ statement followed by table name and values command, followed by the values that need to be inserted into the table. The insert can be used in several ways:

1. To insert a single complete row.

2. To insert a single partial row.

**20. Define SQL Update Statement ?**

SQL Update is used to update data in a row or set of rows specified in the filter condition.  
The basic format of an SQL UPDATE statement is, Update command followed by table to be updated and SET command followed by column names and their new values followed by filter condition that determines which rows should be updated.

**21. Define SQL Delete Statement ?**

SQL Delete is used to delete a row or set of rows specified in the filter condition.  
The basic format of an SQL DELETE statement is, DELETE FROM command followed by table name followed by filter condition that determines which rows should be updated.

**23. Define Join and explain different type of joins?**

Another frequently asked SQL Interview Questions on Joins.

In order to avoid data duplication, data is stored in related tables. **Join** keyword is used to fetch data from related tables. "Join" return rows when there is at least one match in both table.

Type of joins are

**Right Join**

Return all rows from the right table, even if there are no matches in the left table.

**Left Join**

Return all rows from the left table, even if there are no matches in the right table.

**Full Join**

Return rows when there is a match in one of the tables.

**24. What is Self-Join?**

Self-join is query used to **join a table to itself**. Aliases should be used for the same table comparison.

**25. What is Cross Join?**

Cross Join will return all records where each row from the first table is combined with each row from the second table.

**26. What is a view?**

The views are virtual tables. Unlike tables that contain data, views simply contain queries that dynamically retrieve data when used.

**27. What is a materialized view?**

Materialized views are also a view but are disk based. **Materialized views** get updates on specific duration, base upon the interval specified in the query definition. We can index materialized view. **28. What are the advantages and disadvantages of views in a database?**

**Advantages**:

1. Views don't store data in a physical location.

2. The view can be used to hide some of the columns from the table.

3. Views can provide Access Restriction, since data insertion, update and deletion is not possible with the view.

**Disadvantages**:

1. When a table is dropped, associated view become irrelevant.

2. Since the view is created when a query requesting data from view is triggered, its a bit slow.

3. When views are created for large tables, it occupies more memory.

**29. What is a stored procedure?**

Stored Procedure is a function which contains a collection of SQL Queries. The procedure can take inputs, process them and send back output.

**30. What are the advantages a stored procedure?**

Stored Procedures are pre-complied and stored in the database. This enables the database to execute the queries much faster. Since many queries can be included in a stored procedure, round trip time to execute multiple queries from source code to database and back is avoided.

**31. What is a trigger?**

Database triggers are sets of commands that get executed when an event(Before Insert, After Insert, On Update, On delete of a row) occurs on a table, views.

**32. Explain the difference between DELETE , TRUNCATE and DROP commands?**

Once **delete operation** is performed, Commit and Rollback can be performed to retrieve data.  
Once the **truncate** statement is executed, Commit and Rollback statement cannot be performed. Where condition can be used along with delete statement but it can't be used with truncate statement.  
**Drop** command is used to drop the table or keys like primary, foreign from a table.

**34. What is Union, minus and Interact commands?**

MINUS operator is used to return rows from the first query but not from the second query. INTERSECT operator is used to return rows returned by both the queries.

## 1. When is the UPDATE\_STATISTICS command used?

- When the processing of large data is done, this command is used.   
- Whenever large number of deletions, modification or copy takes place into the tables, the indexes need to be updated to take care of these changes. UPDATE\_STATISTICS performs this job.

## 2. Differentiate between a HAVING CLAUSE and a WHERE CLAUSE.

**HAVING CLAUSE**

- HAVING CLAUSE is used only with the SELECT statement.   
- It is generally used in a GROUP BY clause in a query.   
- If GROUP BY is not used, HAVING works like a WHERE clause.

**WHERE Clause**

- It is applied to each row before they become a part of the GROUP BY function in a query.

## 3. What do you understand by a view? What does the WITH CHECK OPTION clause for a view do?

- A view is a virtual table that consists of fields from one or more real tables.  
- It is usually used to join multiple tables and get the data.   
- The WITH CHECK OPTION for a view prevents any modification to the data that does not confirm to the WHERE clause of the view definition.  
- This allows the data belonging to the view to be updated through the view.

## 4. Explain query execution plan?

- The optimizer available in SQL Server optimizes the code to be effectively executed.   
- A query execution plan shows how this optimizer would run the query.  
- Query execution plan can be viewed by :   
- Using the Show Execution Plan option available in Query Analyzer,  
- Displaying Estimated Execution Plan on the query dropdown menu,   
- Use the SET SHOWPLAN\_TEXT ON command before running a query and capturing the execution plan event in a SQL Server Profiler trace.

## 5. What is the function of SQL Server Agent Windows service?

- It is a Windows service which handles the tasks scheduled within the SQL Server environment. These tasks are also called as job and are stored with in SQL server. The jobs may run through a trigger, a predefined schedule or on demand.   
- This service is very useful in determining why a particular job did not run as intended.

## 6. Comment on Transactions.

- Using transactions we can group all SQL commands into a single unit.   
- The transaction begins with some task and finishes only when all tasks within it are over.  
- The transaction gets over successfully only when all commands in it are successfully over. Even if one command fails, the whole transaction fails.   
- The BEGIN TRANSACTION, ROLLBACK TRANSACTION, and COMMIT TRANSACTION statements are used to work with transactions.   
- A group of tasks starts with the begin statement.   
- In case of any problem, the rollback command is executed to abort the transaction.   
- If all the tasks run successfully, all commands are executed through commit statement.

## 7. Differentiate between a primary key and a unique key.

- By default, clustered index on the column are created by the primary key whereas nonclustered index are created by unique key.   
- Primary key doesn't allow NULLs, but unique key allows one NULL.

## 8. What is recursion? Is it possible for a stored procedure to call itself or recursive stored procedure?  How many levels of SP nesting is possible?

Recursion is method of problem solving where the solution is arrived at by repetitively applying the logic and solution to the subsets of the problem.

Transact-SQL supports recursion. So, yes it is possible for a stored procedure to call itself.

Stored procedures and managed code references can be nested up to 32 levels.

## 9. What are the advantages of using Stored Procedures?

- They help in reducing the network traffic and latency which in turn boosts application performance.   
- They help in promoting code reuse.   
- They provide better security to data.   
- It is possible to encapsulate the logic using stored procedures. This allows to change stored procedure code without affecting clients.   
- It is possible to reuse stored procedure execution plans, which are cached in SQL Server's memory. This reduces server overhead.

## 10. a.) What do you mean by an execution plan? Why is it used? How would you view it?

a.) An execution plan can be called as a road map that graphically or textually shows the data retrieval methods which have been chosen by the SQL   
Server query optimizer, for a stored procedure or ad- hoc query.   
  
b.) It is used because it is a very useful tool for a developer to understand the performance characteristics of a query or stored procedure.   
  
c.) There exists an option called "Show Execution Plan" in Query Analyzer. If this option is turned on, it will display query execution plan in separate window when the query is run again.

## 11. You want to implement the following relationships while designing tables. How would you do it? a.) One-to-one b.) One-to-many  c.) Many-to-many

a.) One-to-One relationship - can be implemented as a single table and rarely as two tables with primary and foreign key relationships.   
  
b.) One-to-Many relationships - by splitting the data into two tables with primary key and foreign key relationships.   
  
c.) Many-to-Many - by using a junction table with the keys from both the tables forming the composite primary key of the junction table.

## 12. Differentiate between DELETE and TRUNCATE.

- Truncate can not be rolled back while Delete can be.   
- Truncate keeps the lock on table while Delete keeps the lock on each row.   
- Truncate resets the counter of the Identity column while Delete doesn't do so.   
- Trigger is not fired in Truncate while it happens in Delete.

## 13. What are the properties of the Relational tables?

Relational tables have six properties:  
1. Values are atomic.   
2. Column values are of the same kind.   
3. Each row is unique.   
4. The sequence of columns is insignificant.   
5. The sequence of rows is insignificant.   
6. Each column must have a unique name.

## 14. Explain the following.

a.) COLLATION.   
  
Collation is a type of sort order. There are mainly three types of sort orders, namely:   
i.) Dictionary case sensitive  
ii.)Dictionary - case insensitive   
iii.)Binary.  
b.) Stored Procedure  
- It is a set of T-SQL statements combined together to perform a single task formed by combining many small tasks.   
- When you actually run a Stored procedure, a set of statements is run.

## 16. Explain the following:

a.) Dirty pages.   
These are the buffer pages that contain modifications which have not been written to disk.  
  
b.) ETL - Extraction, Transformation, and Loading.   
- It is the process of copying and cleaning data from heterogeneous sources.   
- It is an important part of development projects for data warehousing and business intelligence.

## 17. Differentiate between a Local and a Global temporary table?

- A local temporary table exists only for the duration of a connection or, if defined inside a compound statement, for the duration of the compound statement.   
  
- Global temporary tables (created with a double “##”) are visible to all sessions.   
- Global temporary tables are dropped when the session that created it ends, and all other sessions have stopped referencing it.

## 18. Explain different types of Locks in SQL Server.

There are 3 kinds of locks in SQL Server  
i.) Shared locks - they are used for operations which do not allow any change or update of data. For e.g. SELECT.   
ii.) Update locks - they are used when SQL Server wants to modify a page. The update page lock is then promoted to an exclusive page lock before actually making the changes.   
iii.) Exclusive locks - they are used for the data modification operations. For e.g. UPDATE, INSERT, or DELETE.