## SQL Questions & Answers :

1. **What is DBMS?**

A Database Management System (DBMS) is a program that controls creation, maintenance and use of a database. DBMS can be termed as File Manager that manages data in a database rather than saving it in file systems.

1. **What is RDBMS?**

RDBMS stands for Relational Database Management System. RDBMS store the data into the collection of tables, which is related by common fields between the columns of the table. It also provides relational operators to manipulate the data stored into the tables.

Example: SQL Server.

1. **What is SQL?**

SQL stands for Structured Query Language, and it is used to communicate with the Database. This is a standard language used to perform tasks such as retrieval, updation, insertion and deletion of data from a database.

Standard SQL Commands are Select.

1. **What is a Database?**

Database is nothing but an organized form of data for easy access, storing, retrieval and managing of data. This is also known as structured form of data which can be accessed in many ways.

Example: School Management Database, Bank Management Database.

1. **What are tables and Fields?**

A table is a set of data that are organized in a model with Columns and Rows. Columns can be categorized as vertical, and Rows are horizontal. A table has specified number of column called fields but can have any number of rows which is called record.

Example:.

Table: Employee.

Field: Emp ID, Emp Name, Date of Birth.

Data: 201456, David, 11/15/1960.

1. **What is Key and types.**

A key is a single or combination of multiple fields in a table. It is used to fetch or retrieve records/data-rows from data table according to the condition/requirement. Keys are also used to create a relationship among different database tables or views.

We have following types of keys in SQL which are used to fetch records from tables and to make relationship among tables or views.

**1.Super Key:** Super key is a set of one or more than one keys that can be used to identify a record uniquely in a table. Example: Primary key, Unique key, Alternate key are a subset of Super Keys.

**2.Candidate Key:** A Candidate Key is a set of one or more fields/columns that can identify a record uniquely in a table. There can be multiple Candidate Keys in one table. Each Candidate Key can work as Primary Key.

Example: In the below diagram ID, RollNo and EnrollNo are Candidate Keys since all these three fields can be work as Primary Key.

**3.Primary Key:** Primary key is a set of one or more fields/columns of a table that uniquely identify a record in a database table. It cannot accept null, duplicate values. Only one Candidate Key can be Primary Key.

**4.Alternate key:** An Alternate key is a key that can be work as a primary key. Basically, it is a candidate key that currently is not a primary key.

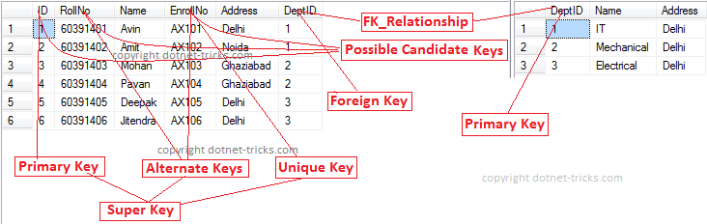
Example: In the below diagram RollNo and EnrollNo become Alternate Keys when we define ID as Primary Key.

**5.Composite/Compound Key:** Composite Key is a combination of more than one fields/columns of a table. It can be a Candidate key, Primary key.

**6.Unique Key:** A unique key is a set of one or more fields/columns of a table that uniquely identify a record in a database table. It is like Primary key but it can accept only one null value and it cannot have duplicate values.

**7.Foreign Key:** Foreign Key is a field in a database table that is Primary key in another table. It can accept multiple null, duplicate values

Example: We can have a DeptID column in the Employee table which is pointing to a DeptID column in a department table where it a primary key.



1. **What are different types of statements supported by SQL?**

There are 3 types of SQL statements: DDL, DML, & DCL

1. **DDL(Data Definition Language) :**DDL or Data Definition Language actually consists of the SQL commands that can be used to define the database schema. It simply deals with descriptions of the database schema and is used to create and modify the structure of database objects in the database.

**Examples of DDL commands:**

* + CREATE – is used to create the database or its objects (like table, index, function, views, store procedure and triggers).
  + DROP – is used to delete objects from the database.
  + ALTER-is used to alter the structure of the database.
  + TRUNCATE–is used to remove all records from a table, including all spaces allocated for the records are removed.
  + COMMENT –is used to add comments to the data dictionary.
  + RENAME –is used to rename an object existing in the database.

1. **DQL (Data Query Language) :**

DQL statements are used for performing queries on the data within schema objects. The purpose of DQL Command is to get some schema relation based on the query passed to it.

**Example of DQL:**

* + SELECT – is used to retrieve data from the database.

1. **DML(Data Manipulation Language) :**The SQL commands that deals with the manipulation of data present in the database belong to DML or Data Manipulation Language and this includes most of the SQL statements.

**Examples of DML:**

* + INSERT – is used to insert data into a table.
  + UPDATE – is used to update existing data within a table
  + DELETE – is used to delete records from a database table.

1. **DCL(Data Control Language) :**DCL includes commands such as GRANT and REVOKE which mainly deals with the rights, permissions and other controls of the database system.

**Examples of DCL commands:**

* + **GRANT**-gives user’s access privileges to database.
  + **REVOKE**-withdraw user’s access privileges given by using the GRANT command.

1. **TCL(transaction Control Language) :**TCL commands deals with the transaction within the database.

**Examples of TCL commands:**

* + **COMMIT**– commits a Transaction.
  + **ROLLBACK**– rollbacks a transaction in case of any error occurs.
  + **SAVEPOINT**–sets a savepoint within a transaction.
  + **SET TRANSACTION**–specify characteristics for the transaction.

1. **How do we use DISTINCT statement? What is its use?**

DISTINCT statement is used with the SELECT statement. If the records contain duplicate values, then DISTINCT is used to select different values among duplicate records.

Syntax: SELECT DISTINCT column\_name(s) FROM table\_name;

1. **What are different Clauses used in SQL?**

SQL clause helps to limit the result set by providing a condition to the query. A clause helps to filter the rows from the entire set of records.

**WHERE Clause:** This clause is used to define the condition, extract and display only those records which fulfill the given condition

Syntax: SELECT column\_name(s)   
FROM table\_name   
WHERE condition;

**GROUP BY Clause:** It is used with SELECT statement to group the result of the executed query using the value specified in it. It matches the value with the column name in tables and groups the end result accordingly.

Syntax: SELECT column\_name(s)  
FROM table\_name  
GROUP BY column\_name;

**HAVING clause:** This clause is used in association with GROUP BY clause. It is applied to each group of result or the entire result as single group and much similar as WHERE clause, the only difference is you cannot use it without GROUP BY clause

Syntax: SELECT column\_name(s)   
FROM table\_name   
GROUP BY column\_name   
HAVING condition;

**ORDER BY clause:** This clause is to define the order of the query output either in ascending (ASC) or in descending (DESC) order. Ascending (ASC) is the default one but descending (DESC) is set explicitly.

Syntax: SELECT column\_name(s)   
FROM table\_name   
WHERE condition   
ORDER BY column\_name ASC|DESC;

**USING clause:** USING clause comes in use while working with SQL Joins. It is used to check equality based on columns when tables are joined. It can be used instead ON clause in Joins.

Syntax: SELECT column\_name(s)    
FROM table\_name   
JOIN table\_name   
USING (column\_name);

1. **Why do we use SQL constraints? Which constraints we can use while creating database in SQL?**

Constraints are used to set the rules for all records in the table. If any constraints get violated then it can abort the action that caused it. Constraints are defined while creating the database itself with CREATE TABLE statement or even after the table is created once with ALTER TABLE statement.

There are 5 major constraints are used in SQL, such as

* **NOT NULL:** That indicates that the column must have some value and cannot be left null
* **UNIQUE:** This constraint is used to ensure that each row and column has unique value and no value is being repeated in any other row or column
* **PRIMARY KEY:** This constraint is used in association with NOT NULL and UNIQUE constraints such as on one or the combination of more than one column to identify the particular record with a unique identity.
* **FOREIGN KEY:** It is used to ensure the referential integrity of data in the table and also matches the value in one table with another using Primary Key
* **CHECK:** It is used to ensure whether the value in columns fulfills the specified condition

1. **What are different JOINS used in SQL?**

There are 4 major types of joins made to use while working on multiple tables in SQL databases

**INNER JOIN:** It is also known as SIMPLE JOIN which returns all rows from BOTH tables when it has at least one column matched.

Syntax: SELECT column\_name(s)   
FROM table\_name1   
INNER JOIN table\_name2   
ON column\_name1=column\_name2;

**LEFT JOIN (LEFT OUTER JOIN):** This join returns all rows from a LEFT table and its matched  
rows from a RIGHT table.

Syntax: SELECT column\_name(s)  
FROM table\_name1  
LEFT JOIN table\_name2  
ON column\_name1=column\_name2;

**RIGHT JOIN (RIGHT OUTER JOIN):** This joins returns all rows from the RIGHT table and its matched rows from a LEFT table.

Syntax: SELECT column\_name(s)  
FROM table\_name1  
RIGHT JOIN table\_name2  
ON column\_name1=column\_name2;

**FULL JOIN (FULL OUTER JOIN):** This joins returns all when there is a match either in the RIGHT table or in the LEFT table.

Syntax: SELECT column\_name(s)  
FROM table\_name1  
FULL OUTER JOIN table\_name2  
ON column\_name1=column\_name2;

1. **What is a Self-Join?**

A self JOIN is a case of regular join where a table is joined to itself based on some relation between its own column(s). Self-join uses the INNER JOIN or LEFT JOIN clause and a table alias is used to assign different names to the table within the query.

SELECT A.emp\_id AS "Emp\_ID",A.emp\_name AS "Employee",

B.emp\_id AS "Sup\_ID",B.emp\_name AS "Supervisor"

FROM employee A, employee B

WHERE A.emp\_sup = B.emp\_id;

1. **What is a Cross-Join?**

Cross join can be defined as a Cartesian product of the two tables included in the join. The table after join contains the same number of rows as in the cross-product of number of rows in the two tables. If a WHERE clause is used in cross join then the query will work like an INNER JOIN.

SELECT stu.name, sub.subject

FROM students AS stu

CROSS JOIN subjects AS sub;

1. **What are transaction and its controls?**

A transaction can be defined as the sequence task that is performed on databases in a logical manner to gain certain results. Operations performed like Creating, updating, deleting records in the database comes from transactions. In simple word, we can say that a transaction means a group of SQL queries executed on database records.

There are 4 transaction controls such as

* **COMMIT:** It is used to save all changes made through the transaction
* **ROLLBACK:** It is used to roll back the transaction such as all changes made by the transaction are reverted back and database remains as before
* **SET TRANSACTION:** Set the name of transaction
* **SAVEPOINT:** It is used to set the point from where the transaction is to be rolled back

1. **What are properties of the transaction?**

**Properties of transaction are known as ACID properties, such as**

* **Atomicity:** Ensures the completeness of all transactions performed. Checks whether every transaction is completed successfully if not then transaction is aborted at the failure point and the previous transaction is rolled back to its initial state as changes undone.
* **Consistency:** Ensures that all changes made through successful transaction are reflected properly on database.
* **Isolation:** Ensures that all transactions are performed independently and changes made by one transaction are not reflected on other.
* **Durability:** Ensures that the changes made in database with committed transactions persist as it is even after system failure.

1. **How many Aggregate Functions are available there in SQL?**

SQL Aggregate Functions calculates values from multiple columns in a table and returns a single value.

There are 7 aggregate functions we use in SQL

* AVG(): Returns the average value from specified columns
* COUNT(): Returns number of table rows
* MAX(): Returns largest value among the records
* MIN(): Returns smallest value among the records
* SUM(): Returns the sum of specified column values
* FIRST(): Returns the first value
* LAST(): Returns Last value

**Example :**

To get the number of products in the products table, you use the **COUNT** function as follows:

SELECT  COUNT(\*) FROM products;

To calculate the average units in stock of the products, you use the **AVG** function as follows:

SELECT AVG(unitsinstock) FROM products;

To calculate units in stock by product category, you use the AVG function with the  **GROUP BY clause** as follows:

SELECT categoryid, AVG(unitsinstock) FROM products GROUP BY categoryid;

To calculate the sum of units in stock by product category, you use the **SUM** function with the  GROUP BY clause as the following query:

SELECT  categoryid, SUM(unitsinstock) FROM products GROUP BY categoryid;

To get the minimum units in stock of products in the products table, you use the **MIN** function as follows:

SELECT MIN(unitsinstock) FROM products;

To get the maximum units in stock of products in the products table, you use the **MAX** function as shown in the following query:

SELECT  MAX(unitsinstock) FROM products;

1. **What are Scalar Functions in SQL?**

Scalar Functions are used to return a single value based on the input values. Scalar Functions are as follows

* **UCASE():** Converts the specified field in upper case

SELECT UCASE(NAME) FROM Students;

* **LCASE():** Converts the specified field in lower case

SELECT LCASE(NAME) FROM Students;

* **MID():** Extracts and returns character from text field

SELECT MID(NAME,1,4) FROM Students; # Fetching first four characters of names of students from the students’ table

* **FORMAT():** Specifies the display format
* **LEN():** Specifies the length of text field

SELECT LENGTH(NAME) FROM Students; # Fetching length of names of students from Students table

* **ROUND():** Rounds up the decimal field value to a number

SELECT ROUND(MARKS,0) FROM table\_name; # Fetching maximum marks among students from the students’ table.

1. **What are triggers?**

Triggers in SQL is kind of stored procedures used to create a response to a specific action performed on the table such as Insert, Update or Delete. You can invoke triggers explicitly on the table in the database. Action and Event are two main components of SQL triggers when certain actions are performed the event occurs in response to that action. Example: When a new student is added to the student database, new records should be created in the related tables like Exam, Score and Attendance tables.

Syntax: CREATE TRIGGER name {BEFORE|AFTER} (event [OR..]}  
ON table\_name [FOR [EACH] {ROW|STATEMENT}]  
EXECUTE PROCEDURE functionname {arguments}

**create** **trigger** dbtrigger    
**on** **database**    
**for**    
create\_table,alter\_table,drop\_table    
**as**    
print'you can not create ,drop and alter table in this database'    
**rollback**;   
**create** **trigger** emptrigger    
**on** emp    
**for**    
**insert**,**update**,**delete**    
**as**    
print'you can not insert,update and delete this table i'    
**rollback**;

1. **What is View in SQL?**

A view is a virtual table which consists of a subset of data contained in a table. Views are not virtually present, and it takes less space to store. View can have data of one or more tables combined, and it is depending on the relationship.

Syntax: CREATE VIEW view\_name AS  
SELECT column\_name(s)  
FROM table\_name  
WHERE condition

1. **How we can update the view?**

SQL CREATE and REPLACE can be used for updating the view. Following query syntax is to be executed to update the created view:

Syntax: CREATE OR REPLACE VIEW view\_name AS  
SELECT column\_name(s)  
FROM table\_name  
WHERE condition

1. **Explain the working of SQL Privileges?**

SQL GRANT and REVOKE commands are used to implement privileges in SQL multiple user environments.  The administrator of the database can grant or revoke privileges to or from users of database object like SELECT, INSERT, UPDATE, DELETE, ALL etc.

**GRANT Command:** This command is used provide database access to user apart from an administrator.

Syntax: GRANT privilege\_name  
ON object\_name  
TO {user\_name|PUBLIC|role\_name}  
[WITH GRANT OPTION];

In above syntax WITH GRANT OPTIONS indicates that the user can grant the access to another user too.

**REVOKE Command:** This command is used provide database deny or remove access to database objects.

Syntax: REVOKE privilege\_name  
ON object\_name  
FROM {user\_name|PUBLIC|role\_name};

1. **What is the difference between DBMS and RDBMS?**

 DBMSs are software applications that help you build and maintain databases. RDBMS is a subset of DBMS, and it is a database management system based on the relational model of the DBMS.

1. **Can we embed Pl/SQL in SQL?**

PL/SQL is a procedural language, and it has one or more SQL statements in it. So, SQL can be embedded in a PL/SQL block; however, PL/SQL cannot be embedded in SQL as SQL executes a single query at a time.

**DECLARE**                            /\* this is a PL/SQL block \*/  
   qty\_on\_hand  NUMBER(5);           
**BEGIN**  
   **SELECT** quantity **INTO** qty\_on\_hand **FROM** inventory     /\* this is the SQL statement embedded in the PL/SQL block   \*/  
     **WHERE** product = 'TENNIS RACKET';  
 **END**;

1. **What is the difference between CHAR and VARCHAR2 datatype in SQL**

CHAR is used to store fixed-length character strings, and VARCHAR2 is used to store variable-length character strings.

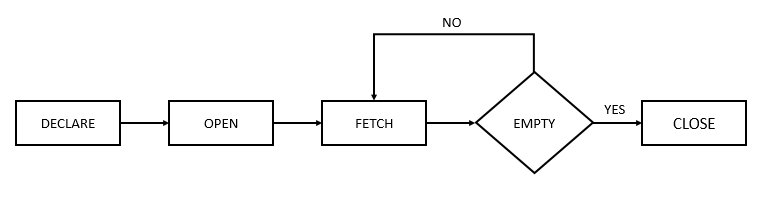
1. **What is a Natural Join?**

Natural join by default is an Inner Join that creates an implicit join based on the common columns in the two tables being joined. A NATURAL JOIN can be an INNER join, a LEFT OUTER join, or a RIGHT OUTER join. The default is INNER join.

SELECT \* FROM COUNTRIES NATURAL JOIN CITIES  
SELECT \* FROM COUNTRIES JOIN CITIES  
    USING (COUNTRY, COUNTRY\_ISO\_CODE)

1. **What is a cursor, and when do you use it?**

A cursor is a database object which is used to manipulate data by traversing row by row in a result set. A cursor is used when you need to retrieve data, one row at a time from a result set and when you need to update records one row at a time.



DECLARE @CustomerId INT  
             ,@Name VARCHAR(100)  
             ,@Country VARCHAR(100)   
      --DECLARE AND SET COUNTER.  
      DECLARE @Counter INT  
      SET @Counter = 1  
      --DECLARE THE CURSOR FOR A QUERY.  
      DECLARE PrintCustomers CURSOR READ\_ONLY  
      FOR  
      SELECT CustomerId, Name, Country  
      FROM Customers   
      --OPEN CURSOR.  
      OPEN PrintCustomers   
      --FETCH THE RECORD INTO THE VARIABLES.  
      FETCH NEXT FROM PrintCustomers INTO  
      @CustomerId, @Name, @Country   
      --LOOP UNTIL RECORDS ARE AVAILABLE.  
      WHILE @@FETCH\_STATUS = 0  
      **BEGIN**  
             IF @Counter = 1  
             **BEGIN**  
                        PRINT 'CustomerID' + CHAR(9) + 'Name' + CHAR(9) + CHAR(9) + CHAR(9) + 'Country'  
                        PRINT '------------------------------------'  
             **END**  
             --PRINT CURRENT RECORD.             PRINT CAST(@CustomerId AS VARCHAR(10)) + CHAR(9) + CHAR(9) + CHAR(9) + @Name + CHAR(9) + @Country  
             --INCREMENT COUNTER.  
             SET @Counter = @Counter + 1  
             --FETCH THE NEXT RECORD INTO THE VARIABLES.  
             FETCH NEXT FROM PrintCustomers INTO  
             @CustomerId, @Name, @Country  
      **END**   
      --CLOSE THE CURSOR.  
      CLOSE PrintCustomers  
      DEALLOCATE PrintCustomers

1. **What is a set-based solution?**

Cursors operate on individual rows, and in the case of a set, it works on a resultant set of data, which could be a table/view or a join of both. The resultant set is an output of a SQL query.

1. **What is a forward cursor?**

Forward cursors support fetching of rows from start to end from a result set. You cannot go to the previous row in the result set.

1. **State one situation where the set-based solution is advantageous over the cursor-based solution?**

Set-based solutions provide better performance as they work on a result set and not on one row at a time. They are concise and more readable.

1. **What is normalization?**

Normalization is the process of minimizing redundancy and dependency by organizing fields and table of a database. The main aim of Normalization is to add, delete or modify field that can be made in a single table.

1. **What is Denormalization.**

Denormalization is a technique used to access the data from higher to lower normal forms of database. It is also process of introducing redundancy into a table by incorporating data from the related tables.

1. **What are all the different normalizations?**

The normal forms can be divided into 5 forms, and they are explained below -.

**First Normal Form (1NF):** This should remove all the duplicate columns from the table. Creation of tables for the related data and identification of unique columns.

**Second Normal Form (2NF):** Meeting all requirements of the first normal form. Placing the subsets of data in separate tables and Creation of relationships between the tables using primary keys.

**Third Normal Form (3NF):** This should meet all requirements of 2NF. Removing the columns which are not dependent on primary key constraints.

**Fourth Normal Form (4NF):** Meeting all the requirements of third normal form and it should not have multi- valued dependencies.

1. **What do you mean by data integrity?**

Data Integrity defines the accuracy as well as the consistency of the data stored in a database. It also defines integrity constraints to enforce business rules on the data when it is entered into an application or a database.

1. **What is the difference between clustered and non-clustered index in SQL?**

The differences between the clustered and non-clustered index in SQL are:

* Clustered index is used for easy retrieval of data from the database and its faster whereas reading from non-clustered index is relatively slower.
* Clustered index alters the way records are stored in a database as it sorts out rows by the column which is set to be clustered index whereas in a non-clustered index, it does not alter the way it was stored but it creates a separate object within a table which points back to the original table rows after searching.
* One table can only have one clustered index whereas it can have many non-clustered index

1. **Write a SQL query to display the current date?**

In SQL, there is a built-in function called GetDate() which helps to return the current timestamp/date.

1. **What do you understand by query optimization?**

The phase that identifies a plan for evaluation query which has the least estimated cost is known as query optimization. The advantages of query optimization are as follows:

* The output is provided faster
* A larger number of queries can be executed in less time
* Reduces time and space complexity

1. **What are Entities and Relationships?**

**Entities:**  A person, place, or thing in the real world about which data can be stored in a database. Tables store data that represents one type of entity. For example – A bank database has a customer table to store customer information. The customer table stores this information as a set of attributes (columns within the table) for each customer.

**Relationships:** Relation or links between entities that have something to do with each other. For example – The customer’s name is related to the customer account number and contact information, which might be in the same table. There can also be relationships between separate tables (for example, customer to accounts).

1. **What is an Index?**

An index refers to a performance tuning method of allowing faster retrieval of records from the table. An index creates an entry for each value and hence it will be faster to retrieve data.

1. **Explain different types of index in SQL.**

There are three types of index in SQL namely:

**Unique Index:** This index does not allow the field to have duplicate values if the column is unique indexed. If a primary key is defined, a unique index can be applied automatically.

**Clustered Index:** This index reorders the physical order of the table and searches based on the basis of key values. Each table can only have one clustered index.

**Non-Clustered Index**: Non-Clustered Index does not alter the physical order of the table and maintains a logical order of the data. Each table can have many non-clustered indexes.

1. **What is the difference between DELETE and TRUNCATE?**

The basic difference in both is DELETE is DML command and TRUNCATE is DDL

DELETE is used to delete a specific row from the table whereas TRUNCATE is used to remove all rows from the table.We can use DELETE with WHERE clause but cannot use TRUNCATE with it

1. **What is the difference between DROP and TRUNCATE?**

TRUNCATE removes all rows from the table which cannot be retrieved back, DROP removes the entire table from the database and it cannot be retrieved back.

1. **What are the different operators available in SQL?**

There are three operators available in SQL, namely:

* Arithmetic Operators
* Logical Operators
* Comparison Operators

1. **Are NULL values same as that of zero or a blank space?**

A NULL value is not at all same as that of zero or a blank space. NULL value represents a value which is unavailable, unknown, assigned or not applicable whereas a zero is a number and blank space is a character.

1. **What is the difference between cross join and natural join?**

The cross join produces the cross product or Cartesian product of two tables whereas the natural join is based on all the columns having the same name and data types in both the tables.

**46. What is subquery in SQL?**

A subquery is a query inside another query where a query is defined to retrieve data or information back from the database. In a subquery, the outer query is called as the main query whereas the inner query is called subquery. Subqueries are always executed first and the result of the subquery is passed on to the main query. It can be nested inside a SELECT, UPDATE or any other query. A subquery can also use any comparison operators such as >,< or =.

**47. What are the different types of a subquery?**

There are two types of subquery namely, Correlated and Non-Correlated.

**Correlated subquery:** These are queries which select the data from a table referenced in the outer query. It is not considered as an independent query as it refers to another table and refers the column in a table.

**Non-Correlated subquery:** This query is an independent query where the output of subquery is substituted in the main query.

**48. What is the need for group functions in SQL?**

Group functions work on the set of rows and return one result per group. Some of the commonly used group functions are: AVG, COUNT, MAX, MIN, SUM, VARIANCE.

**49. What is a Relationship and what are they?**

Relation or links are between entities that have something to do with each other. Relationships are defined as the connection between the tables in a database. There are various relationships, namely:

* One to One Relationship.
* One to Many Relationship.
* Many to One Relationship.
* Self-Referencing Relationship.

**50.  How can you insert NULL values in a column while inserting the data?**

* Implicitly by omitting column from column list.
* Explicitly by specifying NULL keyword in the VALUES clause

**51. What is the main difference between ‘BETWEEN’ and ‘IN’ condition operators?**

BETWEEN operator is used to display rows based on a range of values in a row whereas the IN-condition operator is used to check for values contained in a specific set of values.

Example of BETWEEN: SELECT \* FROM Students where ROLL\_NO BETWEEN 10 AND 50;

Example of IN: SELECT \* FROM students where ROLL\_NO IN (8,15,25);

**52. Why are SQL functions used?**

SQL functions are used for the following purposes:

* To perform some calculations on the data
* To modify individual data items
* To manipulate the output
* To format dates and numbers
* To convert the data types

**53. What is the need for MERGE statement?**

This statement allows conditional update or insertion of data into a table. It performs an UPDATE if a row exists, or an INSERT if the row does not exist.

**54. What do you mean by recursive stored procedure?**

Recursive stored procedure refers to a stored procedure which calls by itself until it reaches some boundary condition. This recursive function or procedure helps the programmers to use the same set of code n number of times.

**55. What is CLAUSE in SQL?**

SQL clause helps to limit the result set by providing a condition to the query. A clause helps to filter the rows from the entire set of records.

For example – WHERE, HAVING clause.

**56. What is the difference between ‘HAVING’ CLAUSE and a ‘WHERE’ CLAUSE?**

HAVING clause can be used only with SELECT statement. It is usually used in a GROUP BY clause and whenever GROUP BY is not used, HAVING behaves like a WHERE clause.  
Having Clause is only used with the GROUP BY function in a query whereas WHERE Clause is applied to each row before they are a part of the GROUP BY function in a query.

**57. List the ways in which Dynamic SQL can be executed?**

Following are the ways in which dynamic SQL can be executed:

* Write a query with parameters.
* Using EXEC.
* Using sp\_executesql.

**58. What are the various levels of constraints?**

Constraints are the representation of a column to enforce data entity and consistency. There are two levels  of a constraint, namely:

column level constraint & table level constraint

1. **What are case manipulation functions?**

Case manipulation functions converts the existing data in the table to lower, upper or mixed case characters.

**59. List some case manipulation functions in SQL?**

There are three case manipulation functions in SQL, namely:

**LOWER**: This function returns the string in lowercase. It takes a string as an argument and returns it by converting it into lower case. Syntax: LOWER(‘string’)

**UPPER**: This function returns the string in uppercase. It takes a string as an argument and returns it by converting it into uppercase. Syntax: UPPER(‘string’)

**INITCAP**: This function returns the string with the first letter in uppercase and rest of the letters in lowercase. Syntax: INITCAP(‘string’)

**60. What are the different set operators available in SQL?**

Some of the available set operators are – Union, Intersect or Minus operators.

**61. What is an ALIAS command?**

ALIAS command in SQL is the name that can be given to any table or a column. This alias name can be referred in WHERE clause to identify a particular table or a column.

**62. What are aggregate and scalar functions?**

Aggregate functions are used to evaluate mathematical calculation and returns a single value. These calculations are done from the columns in a table. For example- max (), count () is calculated with respect to numeric.

Scalar functions return a single value based on the input value. For example – UCASE (), NOW () are calculated with respect to string.

**63. How can you fetch alternate records from a table?**

You can fetch alternate records i.e both odd and even row numbers. For example- To display even numbers, use the following command:

Select studentId from (Select rowno, studentId from student) where mod(rowno,2) =0

Now, to display odd numbers:

Select studentId from (Select rowno, studentId from student) where mod(rowno,2) =1

**64. Name the operator which is used in the query for pattern matching?**

LIKE operator is used for pattern matching, and it can be used as -.

% – It matches zero or more characters.

For example- select \* from students where studentname like ‘a%’

\_ (Underscore) – it matches exactly one character.  
For example- select \* from student where studentname like ‘abc\_’

**65. How can you select unique records from a table?**

You can select unique records from a table by using the DISTINCT keyword.

Select DISTINCT studentID from Student - Using this command, it will print unique student id from the table Student.

**Q66. How can you fetch first 5 characters of the string?**

There are a lot of ways to fetch characters from a string. For example:

Select SUBSTRING(StudentName,1,5) as studentname from student

**Q67. What is the main difference between SQL and PL/SQL?**

SQL is a query language that allows you to issue a single query or execute a single insert/update/delete whereas PL/SQL is Oracle’s “Procedural Language” SQL, which allows you to write a full program (loops, variables, etc.) to accomplish multiple operations such as selects/inserts/updates/deletes.

**Q68. What is a View?**

A view is a virtual table which consists of a subset of data contained in a table. Since views are not present, it takes less space to store. View can have data of one or more tables combined and it depends on the relationship.

**Q69. What are Views used for?**

A view refers to a logical snapshot based on a table or another view. It is used for the following reasons:

* Restricting access to data.
* Making complex queries simple.
* Ensuring data independence.
* Providing different views of same data.

**70. What is a Stored Procedure?**

A stored procedure is a collection of SQL statements which can be used as a function to access the database. We can create these stored procedures previously before using it and can execute these them wherever we require and also apply some conditional logic to it. Stored procedures are also used to reduce network traffic and improve the performance.

Syntax: CREATE Procedure Procedure\_Name

(

//Parameters

)

AS

BEGIN

SQL statements in stored procedures to update/retrieve records

END

**71. List some advantages and disadvantages of Stored Procedure?**

**Advantages:** A Stored Procedure can be used as a modular programming which means create once, store and call for several times whenever it is required. This supports faster execution. It also reduces network traffic and provides better security to the data.

**Disadvantage:** The only disadvantage of Stored Procedure is that it can be executed only in the database and utilizes more memory in the database server.

**72. List all the types of user-defined functions?**

There are three types of user-defined functions, namely:

* Scalar Functions
* Inline Table-valued functions
* Multi-statement valued functions

Scalar returns the unit, variant defined the return clause. Other two types of defined functions return table.

**Q73. What do you mean by Collation?**

Collation is defined as a set of rules that determine how data can be sorted as well as compared. Character data is sorted using the rules that define the correct character sequence along with options for specifying case-sensitivity, character width etc.

**Q74. What are the different types of Collation Sensitivity?**

Following are the different types of collation sensitivity:

* Case Sensitivity: A and a and B and b.
* Kana Sensitivity: Japanese Kana characters.
* Width Sensitivity: Single byte character and double-byte character.
* Accent Sensitivity.

**75. What is Auto Increment in SQL?**

Autoincrement keyword allows the user to create a unique number to get generated whenever a new record is inserted into the table.  
This keyword is usually required whenever PRIMARY KEY in SQL is used.AUTO INCREMENT keyword can be used in Oracle and IDENTITY keyword can be used in SQL SERVER.

**Q76. What is a Datawarehouse?**

Datawarehouse refers to a central repository of data where the data is assembled from multiple sources of information. Those data are consolidated, transformed and made available for the mining as well as online processing. Warehouse data also have a subset of data called Data Marts.

**77. What are the different authentication modes in SQL Server? How can it be changed?**

Windows mode and Mixed Mode – SQL and Windows. You can go to the below steps to change authentication mode in SQL Server:

Click Start> Programs> Microsoft SQL Server and click SQL Enterprise Manager to run SQL Enterprise Manager from the Microsoft SQL Server program group.

Then select the server from the Tools menu.

Select SQL Server Configuration Properties, and choose the Security page.

**Q78. What are STUFF and REPLACE function?**

STUFF Function: This function is used to overwrite existing character or inserts a string into another string. Syntax:

STUFF(string\_expression,start, length, replacement\_characters)

where,  
string\_expression: it is the string that will have characters substituted

start: This refers to the starting position  
length: It refers to the number of characters in the string which are substituted.

replacement\_string: They are the new characters which are injected in the string.

REPLACE function: This function is used to replace the existing characters of all the occurrences. Syntax:

REPLACE (string\_expression, search\_string, replacement\_string)

**79. What is Online Transaction Processing (OLTP)?**

Online Transaction Processing (OLTP) manages transaction based applications which can be used for data entry, data retrieval and data processing. OLTP makes data management simple and efficient. Unlike OLAP systems goal of OLTP systems is serving real-time transactions.

Example – Bank Transactions on a daily basis.

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

**UNION** operator is used to combine the results of two tables, and it eliminates duplicate rows from the tables.

**MINUS** operator is used to return rows from the first query but not from the second query. Matching records of first and second query and other rows from the first query will be displayed as a result set.

**INTERSECT** operator is used to return rows returned by both the queries.

**82. How can you create an empty table from an existing table?**

Select \* into studentcopy from student where 1=2

Here, we are copying student table to another table with the same structure with no rows copied.

**94: Which function is used to return the remainder in a division operator in SQL?**

The MOD function returns the remainder in the division operation.

**97: What are the character manipulation functions?**

Character manipulation functions alter, extract and change the character string.

**98: What are the different character manipulation functions?**

* CONCAT: joins two or more string values.
* SUBSTR: extracts string of a specific length.
* LENGTH: returns the length of the string
* INSTR: returns the position of the specific character.
* LPAD: padding of the left-side character value for right-justified value.
* RPAD: padding of right-side character value for left-justified value.
* TRIM: removes the defined character from beginning and end or both.
* REPLACE: replaces a specific sequence of characters with another sequence of characters.

**99: Define inconsistent dependency.**

The difficulty of accessing data as the path may be broken or missing defines inconsistent dependency. Inconsistent dependency enables users to search for data in the wrong different table which afterward results in an error as an output.

**100. What are UNION, MINUS and INTERSECT commands?**

The UNION operator combines and returns the result-set retrieved by two or more SELECT statements.  
The MINUS operator in SQL is used to remove duplicates from the result-set obtained by the second SELECT query from the result-set obtained by the first SELECT query and then return the filtered results from the first.  
The INTERSECT clause in SQL combines the result-set fetched by the two SELECT statements where records from one match the other and then returns this intersection of result-sets.

Certain conditions need to be met before executing either of the above statements in SQL -

Each SELECT statement within the clause must have the same number of columns

The columns must also have similar data types

The columns in each SELECT statement should necessarily have the same order

SELECT name FROM Students /\* Fetch the union of queries \*/

UNION

SELECT name FROM Contacts;

SELECT name FROM Students /\* Fetch the union of queries with duplicates\*/

UNION ALL

SELECT name FROM Contacts;

SELECT name FROM Students /\* Fetch names from students \*/

MINUS /\* that aren't present in contacts \*/

SELECT name FROM Contacts;

SELECT name FROM Students /\* Fetch names from students \*/

INTERSECT /\* that are present in contacts as well \*/

SELECT name FROM Contacts;

**1. What are the two authentication modes in SQL Server?**

There are two authentication modes – Windows Mode & Mixed Mode

Modes can be changed by selecting the tools menu of SQL Server configuration properties and choose security page.

**2.  What Is SQL Profiler?**

SQL Profiler is a tool which allows system administrator to monitor events in the SQL server.  This is mainly used to capture and save data about each event of a file or a table for analysis.

**4. What are the differences between local and global temporary tables?**

Local temporary tables  are visible when there is a connection, and are deleted when the connection is closed. CREATE TABLE #<tablename>

Global temporary tables  are visible to all users, and are deleted when the connection that created it is closed. CREATE TABLE ##<tablename

**5. What is CHECK constraint?**

A CHECK constraint can be applied to a column in a table to limit the values that can be placed in a column. Check constraint is to enforce integrity.

**6. Can SQL servers linked to other servers?**

SQL server can be connected to any database which has OLE-DB provider to give a link. Example: Oracle has OLE-DB provider which has link to connect with the SQL server group.

**7.  What is sub query and its properties?**

* A sub-query is a query which can be nested inside a main query like Select, Update, Insert or Delete statements. This can be used when expression is allowed. Properties of sub query can be defined as
* A sub query should not have order by clause
* A sub query should be placed in the right hand side of the comparison operator of the main query
* A sub query should be enclosed in parenthesis because it needs to be executed first before the main query
* More than one sub query can be included

**8. What are the types of sub query?**

There are three types of sub query –

* Single row sub query which returns only one row
* Multiple row sub query which returns multiple rows.
* Multiple column sub query which returns multiple columns to the main query. With that sub query result, Main query will be executed.

**9. What is SQL server agent?**

The SQL Server agent plays  a vital role in day to day tasks of SQL server administrator(DBA). Server agent’s purpose is to implement the tasks easily with the scheduler engine which allows our jobs to run at scheduled date and time.

**10. What are scheduled tasks in SQL Server?**

Scheduled tasks or jobs are used to automate processes that can be run on a scheduled time at a regular interval. This scheduling of tasks helps to reduce human intervention during night time and feed can be done at a particular time. User can also order the tasks in which it has to be generated.

**11. What is COALESCE in SQL Server?**

COALESCE is used to return first non-null expression within the arguments. This function is used to return a non-null from more than one column in the arguments.

Example – Select COALESCE(empno, empname, salary) from employee;

**12.   How exceptions can be handled in SQL Server Programming?**

Exceptions are handled using TRY—-CATCH constructs and it is handles by writing scripts inside the TRY block and error handling in the CATCH block.

**13.   What is the purpose of FLOOR function?**

FLOOR function is used to round up a non-integer value to the previous least integer. Example is given FLOOR(6.7) - Returns 6.

**14.   Can we check locks in database? If so, how can we do this lock check?**

Yes, we can check locks in the database. It can be achieved by using in-built stored procedure called sp\_lock.

**15.   What is the use of SIGN function?**

SIGN function is used to determine whether the number specified is Positive, Negative and Zero. This will return +1,-1 or 0. Ex:- SIGN(-35) returns -1

**17.   What are the types of Triggers?**

There are four types of triggers and they are:

* Insert
* Delete
* Update
* Instead of

**18.   What is an IDENTITY column in insert statements?**

IDENTITY column is used in table columns to make that column as Auto incremental number or a surrogate key.

**19.   What is Bulkcopy in SQL?**

Bulkcopy is a tool used to copy large amount of data from Tables. This tool is used to load large amount of data in SQL Server.

**20.   What will be query used to get the list of triggers in a database?**

Query to get the list of triggers in database- Select \* from sys.objects where type=’tr

**MySQL**

**21.   What is the difference between UNION and UNION ALL?**

UNION: To select related information from two tables UNION command is used. It is similar to JOIN command.  
UNION All: The UNION ALL command is equal to the UNION command, except that UNION ALL selects all values. It will not remove duplicate rows, instead it will retrieve all rows from all tables.

**22.   How Global temporary tables are represented and its scope?**

Global temporary tables are represented with ## before the table name. Scope will be the outside the session whereas local temporary tables are inside the session. Session ID can be found using @@SPID.

**23.  What are the differences between Stored Procedure and the dynamic SQL?**

Stored Procedure is a set of statements which is stored in a compiled form. Dynamic SQL is a set of statements that dynamically constructed at runtime and it will not be stored in a Database and it simply execute during run time.

**24. What is Collation?**

Collation is defined to specify the sort order in a table. There are three types of sort order –

* Case sensitive
* Case Insensitive
* Binary

**25.  How can we get count of the number of records in a table?**

Select \* from <tablename> Select count(\*) from <tablename> Select rows from sysindexes where id=OBJECT\_ID(tablename) and indid<2

**26. What is the command used to get the version of SQL Server?**

Select SERVERPROPERTY(‘productversion’)

**27.   What is UPDATE\_STATISTICS command?**

UPDATE\_STATISTICS command is used to update the indexes on the tables when there is a large amount of deletions or modifications or bulk copy occurred in indexes.

**28.   What is the use of SET NOCOUNT ON/OFF statement?**

By default, NOCOUNT is set to OFF and it returns number of records got affected whenever the command is getting executed. If the user doesn’t want to display the number of records affected, it can be explicitly set to ON- (SET NOCOUNT ON).

**29.   Which SQL server table is used to hold the stored procedure scripts?**

Sys.SQL\_Modules is a SQL Server table used to store the script of stored procedure. Name of the stored procedure is saved in the table called Sys.Procedure.

**30.   What are Magic Tables in SQL Server?**

Insert and Delete tables are created when the trigger is fired for any DML command. Those tables are called Magic Tables in SQL Server. These magic tables are used inside the triggers for data transaction.

**31.   What is the difference between SUBSTR and CHARINDEX in the SQL Server?**

The SUBSTR function is used to return specific portion of string in a given string. But, INSTR function gives character position in a given specified string. Ex :-SUBSTR(“Smiley”,3)

Gives result as Smi :- CHARINDEX(“Smiley”,’i’,1) - Gives 3 as result as I appears in 3rd position of the string

**32.   What is the use of =,==,=== operators?**

= is used to assign one value or variable to another variable. == is used for comparing two strings or numbers. === is used to compare only string with the string and number with numbers.

**33.   What is ISNULL() operator?**

ISNULL function is used to check whether value given is NULL or not NULL in sql server. This function also provides to replace a value with the NULL.

**34.   What is the use of FOR Clause?**

FOR clause is mainly used for XML and browser options. This clause is mainly used to display the query results in XML format or in browser.

**35.   What will be the maximum number of index per table?**

For SQL Server 2008 100 Index can be used as maximum number per table. 1 Clustered Index and 999 Non-clustered indexes per table can be used in SQL Server.

1000 Index can be used as maximum number per table. 1 Clustered Index and 999 Non-clustered indexes per table can be used in SQL Server.

1 Clustered Index and 999 Non-clustered indexes per table can be used in SQL Server.

**37.   What is the difference between varchar and nvarchar types?**

Varchar and nvarchar are same but the only difference is that nvarhcar can be used to store Unicode characters for multiple languages and it also takes more space when compared with varchar.

**38.   What is the use of @@SPID?**

A @@SPID returns the session ID of the current user process.

**39.   What is the command used to Recompile the stored procedure at run time?**

Stored Procedure can be executed with the help of keyword called RECOMPILE.

Example Exe <SPName>  WITH RECOMPILE - Or we can include WITHRECOMPILE in the stored procedure itself.

**40.   How to delete duplicate rows in SQL Server?**

Duplicate rows can be deleted using CTE and ROW NUMER feature of SQL Server.

**41.   Where are SQL Server user names and passwords stored in SQL Server?**

User Names and Passwords are stored in sys.server\_principals and sys.sql\_logins. But passwords are not stored in normal text.

**42.   What is the difference between GETDATE and SYSDATETIME?**

Both are same but GETDATE can give time till milliseconds and SYSDATETIME can give precision till nanoseconds. SYSDATE TIME is more accurate than GETDATE.

**43.   How data can be copied from one table to another table?**

INSERT INTO SELECT - This command is used to insert data into a table which is already created.

SELECT INTO - This command is used to create a new table and its structure and data can be copied from existing table.

**44.   What is TABLESAMPLE?**

TABLESAMPLE is used to extract sample of rows randomly that are all necessary for the application. The sample rows taken are based on the percentage of rows.

**45.   Which command is used for user defined error messages?**

RAISEERROR is the command used to generate and initiates error processing for a given session. Those user defined messages are stored in sys.messages table.

**46.   What do mean by XML Datatype?**

XML data type is used to store XML documents in the SQL Server database. Columns and variables are created and store XML instances in the database.

**47.   What is CDC?**

CDC is abbreviated as Change Data Capture which is used to capture the data that has been changed recently. This feature is present in SQL Server 2008.

**48.   What is SQL injection?**

SQL injection is an attack by malicious users in which malicious code can be inserted into strings that can be passed to an instance of SQL server for parsing and execution. All statements have to checked for vulnerabilities as it executes all syntactically valid queries that it receives. Even parameters can be manipulated by the skilled and experienced attackers.

**49.   What are the methods used to protect against SQL injection attack?**

* Use Parameters for Stored Procedures
* Filtering input parameters
* Use Parameter collection with Dynamic SQL
* In like clause, user escape characters

**50.   What is Filtered Index?**

Filtered Index is used to filter some portion of rows in a table to improve query performance, index maintenance and reduces index storage costs. When the index is created with WHERE clause, then it is called Filtered Index

**51. How many types of Privileges are available in SQL?**

There are two types of privileges used in SQL, such as

System Privilege: System privileges deal with an object of a particular type and specifies the right to perform one or more actions on it which include Admin allows a user to perform administrative tasks, ALTER ANY INDEX, ALTER ANY CACHE GROUP CREATE/ALTER/DELETE TABLE, CREATE/ALTER/DELETE VIEW etc.

Object Privilege: This allows to perform actions on an object or object of another user(s) viz. table, view, indexes etc. Some of the object privileges are EXECUTE, INSERT, UPDATE, DELETE, SELECT, FLUSH, LOAD, INDEX, REFERENCES etc.

**53. What is SQL Sandbox in SQL Server?**

SQL Sandbox is the safe place in SQL Server Environment where untrusted scripts are executed. There are 3 types of SQL sandbox, such as

Safe Access Sandbox: Here a user can perform SQL operations such as creating stored procedures, triggers etc. but cannot have access to the memory and cannot create files.

• External Access Sandbox: User can have access to files without having a right to manipulate the memory allocation.

• Unsafe Access Sandbox: This contains untrusted codes where a user can have access to memory.

**55. What is the difference between SQL and MySQL?**

SQL is a structured query language that is used for manipulating and accessing the relational database, on the other hand, MySQL itself is a relational database that uses SQL as the standard database language.

**56. What is the use of NVL function?**

NVL function is used to convert the null value to its actual value.

**59. How many row comparison operators are used while working with a subquery?**

There are 3-row comparison operators which are used in subqueries such as IN, ANY and ALL.

**64. What is the difference between Nested Subquery and Correlated Subquery?**

Subquery within another subquery is called as Nested Subquery. If the output of a subquery is depending on column values of the parent query table then the query is called Correlated Subquery.

SELECT adminid(SELEC Firstname+’ ‘+Lastname FROM Employee WHERE

empid=emp. adminid)AS EmpAdminId FROM Employee

This query gets details of an employee from Employee table.

**66. State some properties of Relational databases?**

* + In relational databases, each column should have a unique name
  + Sequence of rows and columns in relational databases are insignificant
  + All values are atomic and each row is unique

**67. What are Nested Triggers?**

Triggers may implement data modification logic by using INSERT, UPDATE, and DELETE statement. These triggers that contain data modification logic and find other triggers for data modification are called Nested Triggers.

**90. How to select random rows from a table?**

Ans. Using SAMPLE clause we can select random rows.

Example: SELECT \* FROM table\_name SAMPLE(10);

**91. Which TCP/IP port does SQL Server run?**

Ans. By default SQL Server runs on port 1433.

**92. Can we rename a column in the output of SQL query?**

Ans. Yes using the following syntax we can do this.

SELECT column\_name AS new\_name FROM table\_name;

**93. Give the order of SQL SELECT?**

Ans. Order of SQL SELECT clauses is: SELECT, FROM, WHERE, GROUP BY, HAVING, ORDER BY. Only the SELECT and FROM clause are mandatory.

**94. Suppose a Student column has two columns, Name and Marks. How to get name and marks of top three students.**

Ans. SELECT Name, Marks FROM Student s1 where 3 <= (SELECT COUNT(\*) FROM Students s2 WHERE s1.marks = s2.marks)

**95. What is SQL comments?**

Ans. SQL comments can be put by two consecutive hyphens (–).

**97. What do you mean by ROWID?**

Ans. It’s an 18 character long pseudo column attached with each row of a table.

**99. What do you mean by query optimization?**

Ans. Query optimization is a process in which database system compares different query strategies and select the query with the least cost.

**100. What is Referential Integrity?**

Ans. Set of rules that restrict the values of one or more columns of the tables based on the values of the primary key or unique key of the referenced table.

**101. What is Case Function?**

Ans. Case facilitates if-then-else type of logic in SQL. It evaluates a list of conditions and returns one of multiple possible result expressions.

**102. Define a temp table?**

Ans. A temp table is a temporary storage structure to store the data temporarily.

**103. What are the advantages of Views?**

1.Views restrict access to the data because the view can display selective columns from the table.

2.Views can be used to make simple queries to retrieve the results of complicated queries. For example, views can be used to query information from multiple tables without the user knowing.

**104. List the various privileges that a user can grant to another user?**

Ans. SELECT, CONNECT, RESOURCES.

**105. What is schema?**

Ans. A schema is a collection of database objects of a User.

**106. Do View contain Data?**

Ans. No, Views are virtual structure.

**107. Can a View based on another View?**

Ans. Yes, A View is based on another View.

**110. What is CTE?**

Ans. A CTE or common table expression is an expression which contains temporary result set which is defined in a SQL statement.