SQL SERVER

SQL Server is software developed by Microsoft.

* It is also called as MS SQL Server.
* It is implemented from the specification of RDBMS.

Features of MS SQL Server:

1. MS SQL Server is highly scalable
2. MS SQL Server is platform independent
3. MS SQL Server can be run on a single laptop or a network of cloud servers.
4. MS SQL Server is both a GUI and command based software
5. MS SQL Server supports SQL language which is an IBM product, non-procedural, common database and case insensitive language.

Basics of SQL Server:

1. Querying data

* Select 🡪 it used to select data from a database.

1. Sorting data

* Order by 🡪 sort the result set in ascending or descending order

Ascending ----- default

Descending ----- use the key DESC

1. Limiting rows

* Offset fetch 🡪 limit the number of rows returned by a query
* Select top 🡪 limit the number of rows or percentage of rows returned in a query’s result set

1. Filtering data

* Distinct 🡪 select distinct values in one or more columns of a table
* Where 🡪 filter rows in the output of a query based on one or more conditions
* And 🡪 combine two Boolean expressions and return true if all expressions are true
* Or 🡪 combine two Boolean expressions and return true if either of conditions is true
* In 🡪 check whether a value matches any value in a list or a subquery
* Between 🡪test if a value is between a range of values
* Like 🡪 check if a character string matches a specified pattern
* Column 🡪show you how to use column aliases to change the heading of the query output
* Table aliases 🡪 table alias to improve the readability of a query

1. Joining data

* Joins 🡪 a join clause is used to combine rows from two or more tables, based on a related column between them.
* Inner join 🡪select rows from a table that have matching rows in another table
* Left join 🡪return all rows from the left table and matching rows from the right table.

The result is null from the right side, if there is no match

* Right join 🡪 return all rows from the right table and matching rows from the left table.

The result is null from the left side, if there is no match

* Full outer join 🡪return matching rows from both left and right tables, and rows from each side if no matching rows exist
* Self join 🡪 a self join is a regular join, but the table is joined with itself
* Cross join 🡪join multiple unrelated tables and create Cartesian product of rows in the joined tables.

1. Grouping data

* Group by 🡪group the query result based on the values in a specified list of column expressions
* Having 🡪 specify a search condition for a group or an aggregate function.
* Grouping sets 🡪generates multiple grouping sets
* Cube 🡪generate grouping sets with all combinations of the dimension columns
* Rollup 🡪generate grouping sets with an assumption of the hierarchy input columns.

1. Subquery

This section deals with Subquery which is a query nested within another statement such as SELECT, INSERT, UPDATE or DELETE statement.

* Subquery 🡪it explains the Subquery concept and show you how to use various Subquery type to select data
* Exists 🡪test for the existence of rows returned by a Subquery
* Any 🡪returns true if any of the Subquery values meet the condition
* All 🡪returns true if all of the Subquery values meet the condition

1. Set operations

* Union 🡪combine the result sets of two or more queries into a single result set.
* Intersect 🡪return the intersection of the result sets of two or more queries.
* Except 🡪find the difference between the two result set of two input queries

1. Common table expression(CTE)

* CTE 🡪use common table expressions to make complex queries more readable
* Recursive CTE 🡪query hierarchical data using recursive cte.

1. Pivot

* Pivot 🡪coverts rows to columns.

1. Modifying data

* Insert 🡪insert a row into a table
* Insert multiple rows 🡪insert multiple rows into a table using a single INSERT statement
* Insert into select 🡪insert data into a table from the result of a query
* Update 🡪change the existing values in a table
* Update join 🡪update values in a table based on values another using joins clause.
* Delete 🡪delete one or more rows of a table
* Merge 🡪walk you through the steps of performing a mixture of insertion, update and deletion using a single statement

1. Data definition

* Create database 🡪show you how to create a new database in a SQL server instance using the CREATE database statement and SQL server management studio
* Drop database 🡪learn how to delete existing databases
* Create schema 🡪 describe how to create a new schema in a database
* Alter schema 🡪 show how to transfer a securable from a schema to another within the same database
* Drop schema 🡪learn how to delete a schema from a database
* Create table 🡪walk through the steps of creating a new table in a specific schema of a database
* Identity column 🡪learn how to use IDENTITY property to create the identity column for a table
* Sequence 🡪describe how to generate a sequence of numeric values based on a specification
* Alter table add column 🡪show you how to add one or more columns to an existing table
* Alter table alter column 🡪show you how to change the definition of existing columns in a table
* Alter table drop column 🡪learn how to drop one or more columns from a table.
* Computed columns 🡪to reuse the calculation logic in multiple queries
* Drop table 🡪show you how to delete tables from the database
* Truncate table 🡪delete all data from a table faster and more efficiently
* Select into 🡪learn how to create a table and insert from a query into it
* Rename a table 🡪walk through the process of renaming a table to a new one
* Temporary table 🡪for storing temporarily immediate data in stored procedures or database session

1. Expressions

* Case 🡪add if-else logic to SQL queries by using simple and searched case expressions
* Coalesce 🡪handle null values effectively using the coalesce expression
* Null if 🡪return null if the two arguments are equal; otherwise, return the first argument

Data Types of SQL SERVER:

* Bit 🡪 store bit data i.e., 0,1, or NULL in the database with the BIT data type
* Int 🡪integer types in SQL Server including BIGINT, INT, SMALLINT, and TINYINT
* Decimal 🡪how to store exact numeric values in the database by using DECIMAL or NUMERIC data type
* Char 🡪how to store fixed-length, non-Unicode character string in the database
* NChar 🡪 how to store fixed-length, Unicode character strings in the database
* Varchar 🡪 store variable-length, non-Unicode string in the database
* Nvarchar 🡪 store variable-length, Unicode string data in the table
* Datatime2 🡪illustrate to store both date and time data in a database
* Date 🡪the date data type store dates in the tables
* Time 🡪to store time data in the database
* Datetimeoffset 🡪manipulates the datetime with the time zone

Types of SQL Statements:

SQL commands are instructions

It is used to communicate with the database

It is also used to perform various specific tasks, functions, and queries of data

1. DDL
2. DML
3. DCL
4. TCL
5. DQL

**Data Definition Language (DDL):**

DDL changes the structure of the table like creating a table, deleting a table, altering a table etc….

All the commands of DDL are auto-committed.

There are some commands under DDL:

1. Create

It is used to create a new table in the database

1. Alter

It is used to alter the structure of the database

1. Drop

It is used to delete both the structure and record stored in the table

1. Truncate

It is used to delete all the rows from the table and free the space containing the table

**Data Manipulation Language (DML):**

DML commands are used to modify the database

It is responsible for all form of changes in the database

It is not auto-committed.

There are some commands under DML:

1. Insert

It is used to insert data into the row of the table

1. Update

It is used to update or modify the value of a column in the table

1. Delete

It is used to remove one or more row from a table

**Data Control Language (DCL):**

DCL commands are used to grant and take back authority from any database user

These are some commands under DCL:

1. Grant

It is used to give user access privileges to a database

1. Revoke

It is used to take back permissions from the user

**Transaction Control Language (TCL):**

TCL commands can only use with DML commands

It automatically committed in the database

There are some commands under TCL:

1. Commit

It is used to save all the transactions to the database

1. Rollback

It is used to undo transactions that have not already been saved to the database

1. Savepoint

It is used to roll the transaction back to a certain point without rolling back the entire transaction

**Data Query Language (DQL):**

DQL is used to fetch the data from the database

1. Select

This is the same as the projection operation of relational algebra

It is used to select the attribute based on the condition described by WHERE clause.

SQL Aggregate Functions:

SQL aggregation function is used to perform the calculations on multiple rows of a single column of a table

It returns a single value

It is also used to summarize the data

Types of SQL Aggregation Function:

1. Count function

* It is used to count the number of rows in a database table
* It can work both numeric and non-numeric data types
* Count considers duplicate and NULL
* COUNT(\*)

1. Sum function

* It is used to calculate the sum of all selected columns
* It works on numeric fields only
* SUM()

1. Avg function

* It is used to calculate the average value of the numeric type
* AVG function returns the average of all non-Null values
* AVG()

1. Max function

* It is used to find the maximum value of certain column
* It determines the largest value of all selected values of a column
* MAX()

1. Min function

* It is used to find the minimum value of certain column
* It determines the smallest value of all selected values of a column
* MIN()