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Database & SQL

Day 9 Lab

✓ Part 3: What is the difference between the following objects in SQL Server

1-

Batch	Script	Transaction
A batch is a set of SQL statements executed together as a unit. If there's an error within a batch, some statements might not execute. So, it's a Set of independent queries (insert -update-delete…, etc.) executed without guaranteed of success or fail.	A script is a collection of one or more SQL statements or batches stored in a file (e.g., .sql file). Scripts are used to automate database tasks.	A transaction is a sequence of database operations that are treated as a single logical unit of work. Transactions adhere to ACID properties (Atomicity, Consistency, Isolation, Durability), ensuring data integrity. If any part of a transaction fails, the entire transaction can be rolled back.

2-

Trigger	Stored procedure
A trigger is a special type of stored procedure that automatically executes in response to certain events on a table, such as INSERT, UPDATE, or DELETE operations. Triggers are used to enforce business rules, audit data changes, or perform other related tasks.	A stored procedure is a precompiled collection of SQL statements that can be executed by name. Stored procedures are used to encapsulate complex logic, improve performance, and enhance security.

3-

Stored procedure	Functions
A stored procedure can perform various actions in the database, including querying data, modifying data, and calling other procedures. It can return multiple result sets and can also return data through output parameters.	A function is designed to perform a specific calculation and return a single value (scalar function) or a table of values (table-valued function). Functions have limitations on what they can do; for example, they generally cannot modify data.

4-

Drop	Truncate	Delete
The DROP statement is a **DDL** command that removes a database object, such as a table, view, or index, from the database.	The TRUNCATE TABLE statement is a **DDL** command that removes all rows from a table. It is faster than DELETE because it deallocates the data pages used by the table. TRUNCATE cannot be used with triggers.	The DELETE statement is a **DML** command that removes specific rows from a table based on a specified condition. It removes rows one by one and can be used with triggers.

5-

Select	Select Into
The SELECT statement is a DQL command that retrieves data from one or more tables or views.	The SELECT INTO statement creates a new table and inserts the data retrieved by the SELECT statement into the new table.

6-

Local Variable	Global Variable
Local variables are declared within a batch, stored procedure, or function, and their scope is limited to that specific block of code. They are typically used to store temporary values during the execution of the code. Local variable names begin with sign (@).	In SQL Server, global variables are system functions (e.g., @@VERSION, @@SERVERNAME) that provide information about the current session or server. They are predefined by the system.

7-

Convert Statement	Cast Statement
The CONVERT function is used to change data from one data type to another. It is SQL Server-specific and provides more formatting options, especially for date and time values.	The CAST function is an ANSI-SQL standard function that also changes data from one data type to another.

Note: ANSI SQL (American National Standards Institute Structured Query Language) is a standardized database query language designed to ensure consistent database management and interoperability across various Database Management Systems (DBMS).

8-

DDL	DML	DCL	DQL	TCL
Data Definition Language: Deals with the structure of database objects. Examples: CREATE, ALTER, DROP.	**Data Manipulation Language:** Deals with data manipulation. Examples: INSERT, UPDATE, DELETE.	**Data Control Language:** Deals with controlling access to data. Examples: GRANT, REVOKE.	**Data Query Language:** Deals with retrieving data. Example: SELECT.	**Transaction Control Language:** Deals with transaction management. Examples: COMMIT, ROLLBACK.

9-

For XML Raw	For XML Auto
Retrieves data in a simple, row-centric XML format. Each row is represented as an element.	Retrieves data in a more complex, table-centric XML format. Tables are represented as elements, and columns as attributes or sub-elements.

10-

Table-Valued Function	Multi-Statement Function
Returns a table as a result of a single SELECT statement. It's treated much like a view and can be very efficient. The Inline Table-Valued Function cannot have BEGIN and END blocks	Returns a table, but its logic can involve multiple SQL statements, variable declarations, and control-of-flow statements. Multi-Statement Table-Valued Function has the Begin and End blocks.

11-

Varchar (50)	Varchar(max)
Defines a string column that can hold up to 50 characters. It's a fixed-length storage, meaning it uses only the necessary space (up to 50 characters).	Defines a string column that can hold a very large amount of text data (up to 2GB). It's suitable for storing large text documents.

12-

Datetime	Datetime2(7)	Datetimeoffset (7)
Stores date and time values from January 1, 1753, to December 31, 9999, with an accuracy of approximately 3.33 milliseconds.	Stores date and time values with greater precision (up to 100 nanoseconds). The (7) indicates the fractional seconds precision. It has a wider date range than datetime.	Stores date and time values with time zone offset. The (7) again indicates fractional seconds precision.

13-

Default Instance	Named Instance
If you install only one instance of SQL Server on a server, it's usually the default instance. You can connect to it using the server's name. One instance can be the default instance. The default instance has no name. If a connection request specifies only the name of the computer, the connection is made to the default instance.	If you install multiple instances of SQL Server on a single server, each instance must have a unique name. You connect to a named instance using the server's name followed by the instance name (e.g., Server Name\Instance Name).

14-

SQL Authentication	Windows Authentication
This is a method for verifying user connecting to SQL Server: Uses a username and password created and managed within SQL Server.	This is also a method for verifying user connecting to SQL Server: Uses Windows user accounts and security to authenticate users. It's generally considered more secure.

15-

Clustered Index	Non-Clustered Index
Determines the physical order of data in a table. A table can have only one clustered index. Clustered indexes are faster than non-clustered indexes since they don't involve any extra lookup step. Primary keys are by default clustered indexes. The clustered index can store data on the disk.	Creates a separate structure that points to the data in the table. A table can have multiple non-clustered indexes. Requires more memory due to additional index structure. The non-clustered index does not store data on the disk.

16-

Group By Rollup	Group By Cube
Generates hierarchical subtotals from left to right in the GROUP BY list.	Generates all possible subtotals for all combinations of the GROUP BY columns.

17-

Sequence	Identity
Sequence is a way to generate unique numbers. A user-defined object that generates a sequence of numeric values. It provides more control over the sequence generation and can be shared by multiple tables since is it is not tied to any table. The value for the SEQUENCE object can be reset.	Is also a way to generate unique numbers. A property of a table column that automatically generates sequential numbers for new rows and cannot be shared among multiple tables since it is a table column property. The value for the IDENTITY property cannot be reset to its initial value.

18-

Inline Function	View
A type of table-valued function that returns a result set from a single SELECT statement. It can be used like a view but can also accept parameters.	A virtual table based on the result of a SELECT statement. It simplifies complex queries and provides a layer of abstraction.

19-

Table variable	Temporary table
Declared like a variable but stores a table. It has limited scope (stored procedure, or function) and is stored in memory.	A table created using # (local) or ## (global) prefix. It's stored in the tempdb database and can be accessed by multiple sessions (global temporary tables).

20-

Row_number()	Dense_Rank()
Assigns a unique sequential integer to each row within the partition of a result set.	Assigns a rank to each row within the partition of a result set, with no gaps in the ranking sequence. Rows with equal values receive the same rank.