AWD

SQL TOPICS

INTRODUCTION TO T-SQL

- Overview of T-SQL and its importance.
- Differences between T-SQL and standard SQL.

- Setting up the development environment (e.g., SQL Server Management Studio).
- SELECT statements.
- Filtering data with WHERE clauses.
- Sorting data with ORDER BY.
- Limiting results with TOP and OFFSET-FETCH.

STORED PROCEDURES AND FUNCTIONS

- Creating and executing stored procedures.
- Creating and using user-defined functions (scalar and table-valued).
- Parameter handling and output parameters. Error handling in stored procedures.

ADVANCED QUERIES

- JOIN operations (INNER JOIN, LEFT JOIN, RIGHT JOIN, FULL JOIN, CROSS JOIN).

- Subqueries and correlated subqueries.
- Common Table Expressions (CTEs).
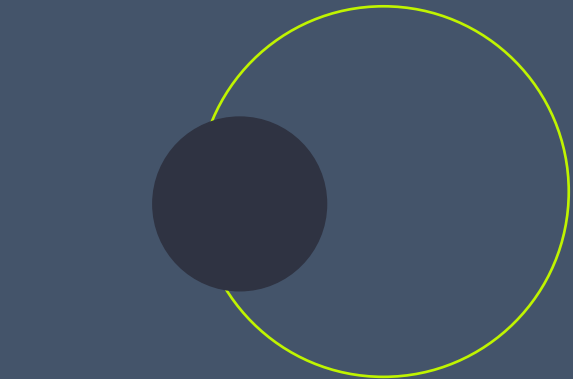
1.Data Manipulation

- INSERT, UPDATE, DELETE statements.
- MERGE statement.
- Using OUTPUT clause.

2.Data Definition Language (DDL)

- Creating and modifying tables (CREATE TABLE, ALTER TABLE).
- Creating and modifying views (CREATE VIEW, ALTER VIEW).
- Indexes (CREATE INDEX, UNIQUE, CLUSTERED, NONCLUSTERED).
- Constraints (PRIMARY KEY, FOREIGN KEY, UNIQUE, CHECK, DEFAULT).

Other Topics

- **Transactions and Concurrency**

  - Understanding transactions (BEGIN TRANSACTION, COMMIT, ROLLBACK).
  - Transaction isolation levels.
  - Handling deadlocks and blocking.

- **Error Handling and Control-of-Flow**

  - TRY...CATCH blocks.
  - RAISERROR and THROW.
  - Control-of-flow language (IF...ELSE, WHILE, GOTO, CASE).

- **Dynamic SQL**

  - Constructing and executing dynamic SQL with EXEC and sp_executesql.
  - Pros and cons of dynamic SQL.
  - Preventing SQL injection.

- **Temporary Tables and Table Variables**

  - Creating and using temporary tables (CREATE TABLE #temp).
  - Table variables (DECLARE @tableVar TABLE).
  - Differences and use cases for temporary tables and table variables.

- **Cursors**

  - Understanding and using cursors (DECLARE, OPEN, FETCH, CLOSE, DEALLOCATE).
  - When to use cursors and their performance implications.

- **Performance Tuning**

  - Query execution plans and analysing performance.
  - Index optimization and maintenance.
  - Statistics and their impact on performance.
  - Query optimization techniques.

- **Views and Indexed Views**

- Creating and managing views.
- Using indexed views for performance improvements.
- Considerations and limitations of indexed views.

- **Security**

  - Managing database security (users, roles, permissions).
  - Securing objects with GRANT, REVOKE, DENY.
  - Encryption and decryption.

- **Advanced Data Types and Functions**

  - Working with XML and JSON data.
  - Full-text search.
  - Spatial data types and functions.

- **ETL Operations**

  - Bulk insert operations (BULK INSERT, bcp utility).
  - Data import/export techniques.
  - Using SQL Server Integration Services (SSIS).

- **Common T-SQL Functions**

  - String functions (LEN, SUBSTRING, CHARINDEX, REPLACE).
  - Date and time functions (GETDATE, DATEADD, DATEDIFF, FORMAT).
  - Aggregate functions (SUM, AVG, MIN, MAX, COUNT).
  - Analytical functions (LEAD, LAG, FIRST_VALUE, LAST_VALUE).

- **Working with Hierarchical Data**

  - Hierarchical data structures.
  - Using recursive CTEs to manage hierarchical data.
  - HierarchyID data type.

- **SQL Server System Functions and Metadata**

  - System functions (SCOPE_IDENTITY, @@IDENTITY, @@ROWCOUNT).
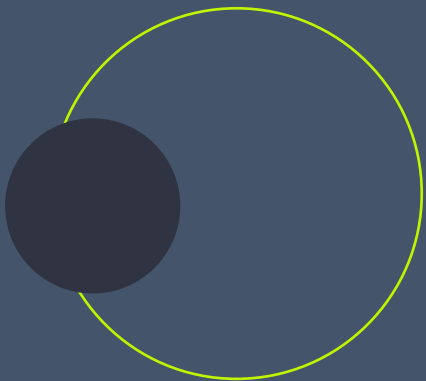
- Metadata queries (INFORMATION_SCHEMA, sys objects).

- **Best Practices and Advanced Techniques**

  - Coding standards and best practices.
  - Writing maintainable and readable T-SQL code.
  - Advanced scripting techniques and automation.