Database Programming – Lecture 2

SQL Server Management Studio - SSMS

BY

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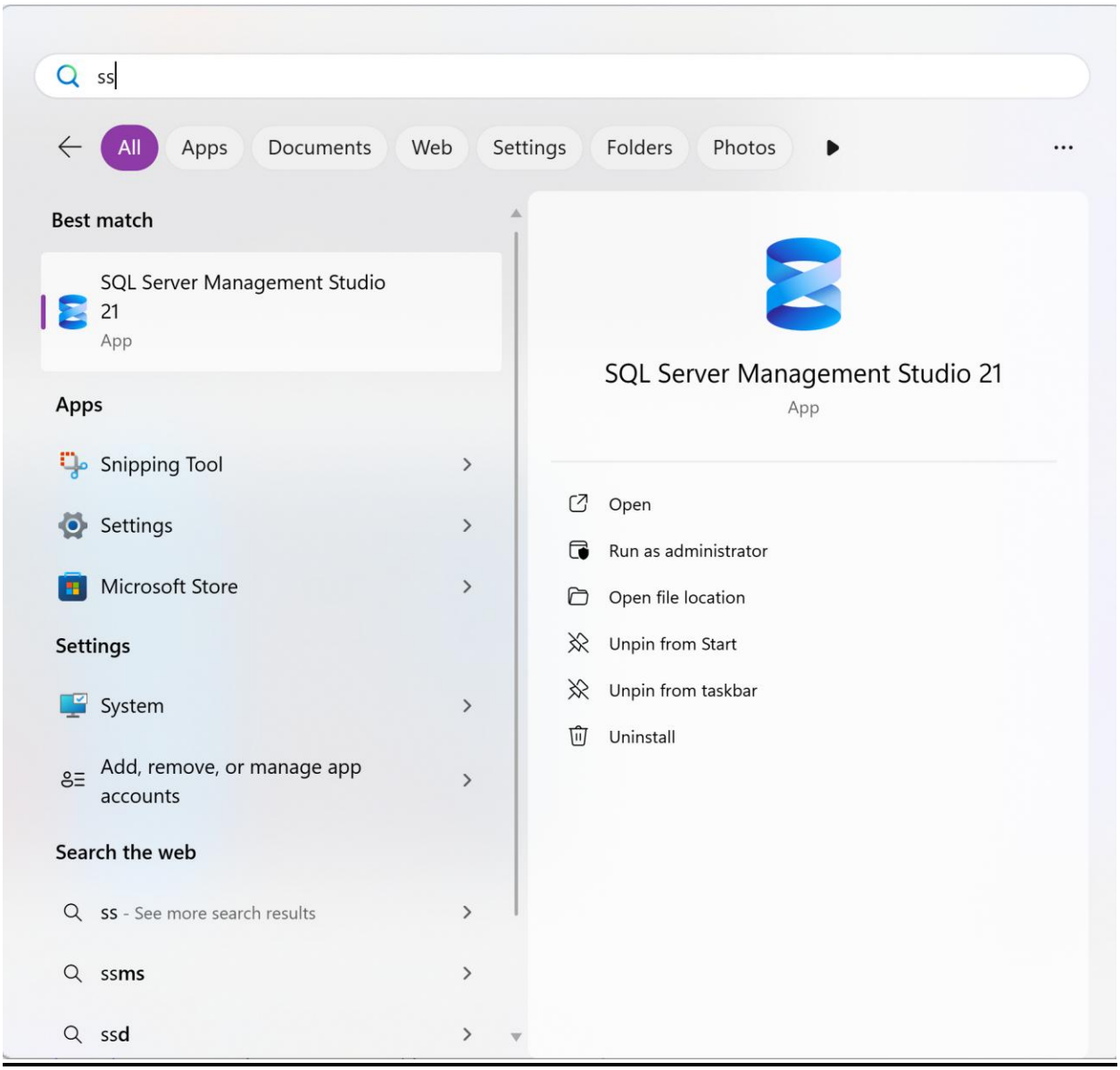
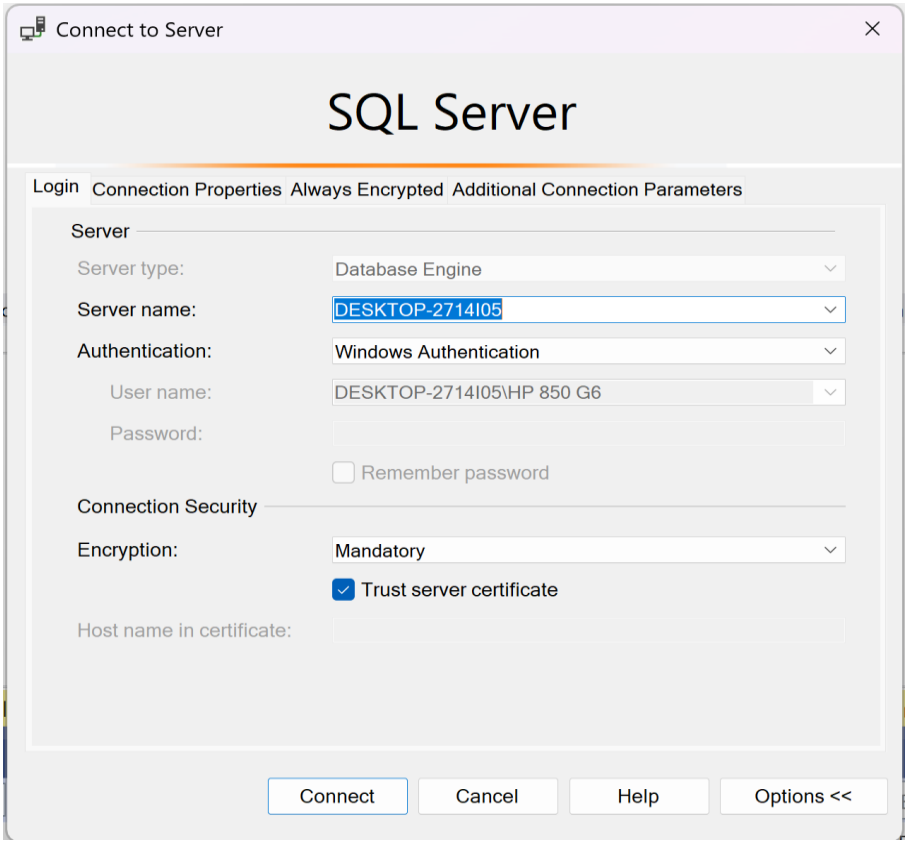
Open SSMS


ss
All
Apps
Documents
Web
Settings
Folders
Photos
Best match
SQL Server Management Studio 21
App
Apps
Snipping Tool
Settings
Microsoft Store
Settings
System
Add, remove, or manage app accounts
Search the web
ss - See more search results
ssms
ssd
SQL Server Management Studio 21
App
Open
Run as administrator
Open file location
Unpin from Start
Unpin from taskbar
Uninstall

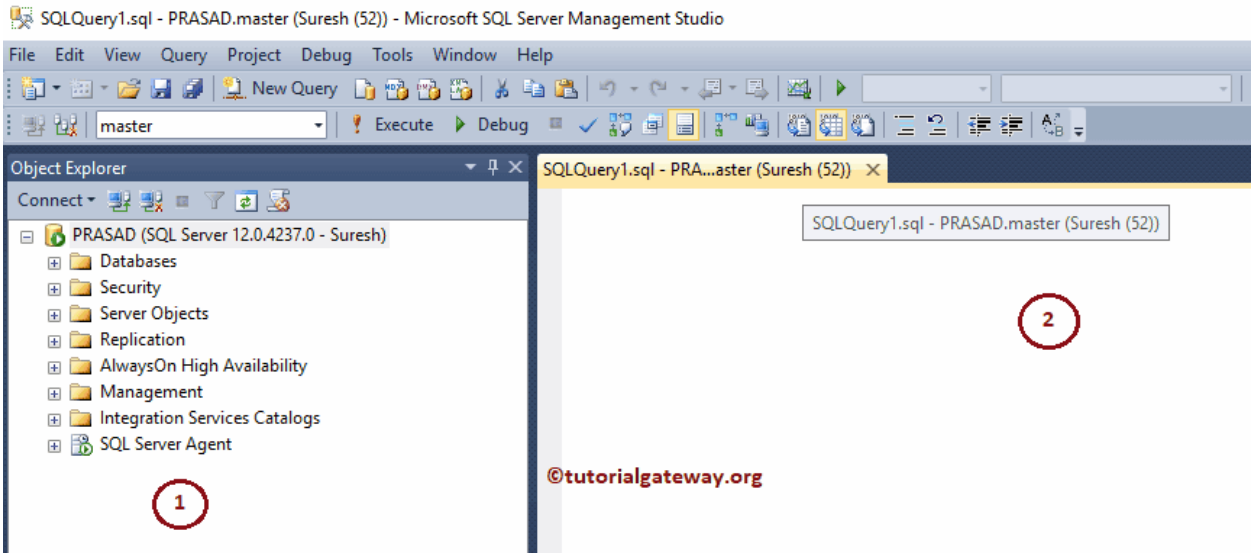
Connect to the server instance



Options

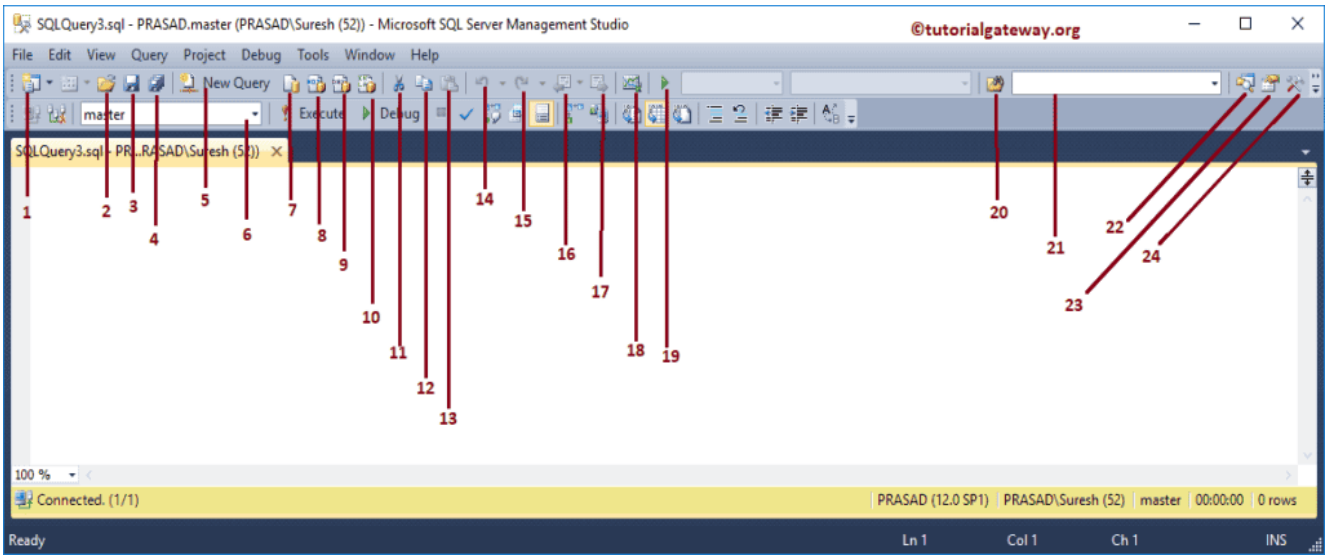
- **Server type:** Database Engine.
- **Server Name:**
    - **Default Instance**: If you installed with the default SQL Server instance name, you could use localhost, the system IP Address, or the computer name.
    - **Named Instance:** If you installed with Named Instance, then you have to specify the instance server name.
- **Authentication**: You must select the authentication you want to use for connecting to the SQL Server Management Studio.
    - **Window Authentication:** If you are the system admin and have installed it on the local computer.
    - **SQL Server Authentication:** We should use this authentication mode in real-time. It will ask the user to enter the Username and Password to connect.

Microsoft SQL Server Management Studio Interface



1. **Object Explorer:** A Tree view structure will display all the database Objects in a Server.
    - **Databases:** Holds the databases that are available on the server. It includes databases that belong to Database Engine, Analysis Services, Reporting Services, and Integration Services. Please click on the Databases folder to see the list of Databases present in the Databases folder.
    - **Security:** It contains all security-related things. Use this folder to Create Logins, Server Roles, etc.
    - **Server Objects:** This folder contains information about Linked Servers, Service Brokers, System Endpoints, Database Mirroring, etc.
    - **Replication:** This folder contains information about Subscriptions and publications.
    - **Management:** Use this folder for maintenance, such as Checking Server Logs, Session health, etc. This folder is for creating Maintenance Plans.
2. **Query Window:** To write and execute SQL scripts against any database.

Standard Toolbar

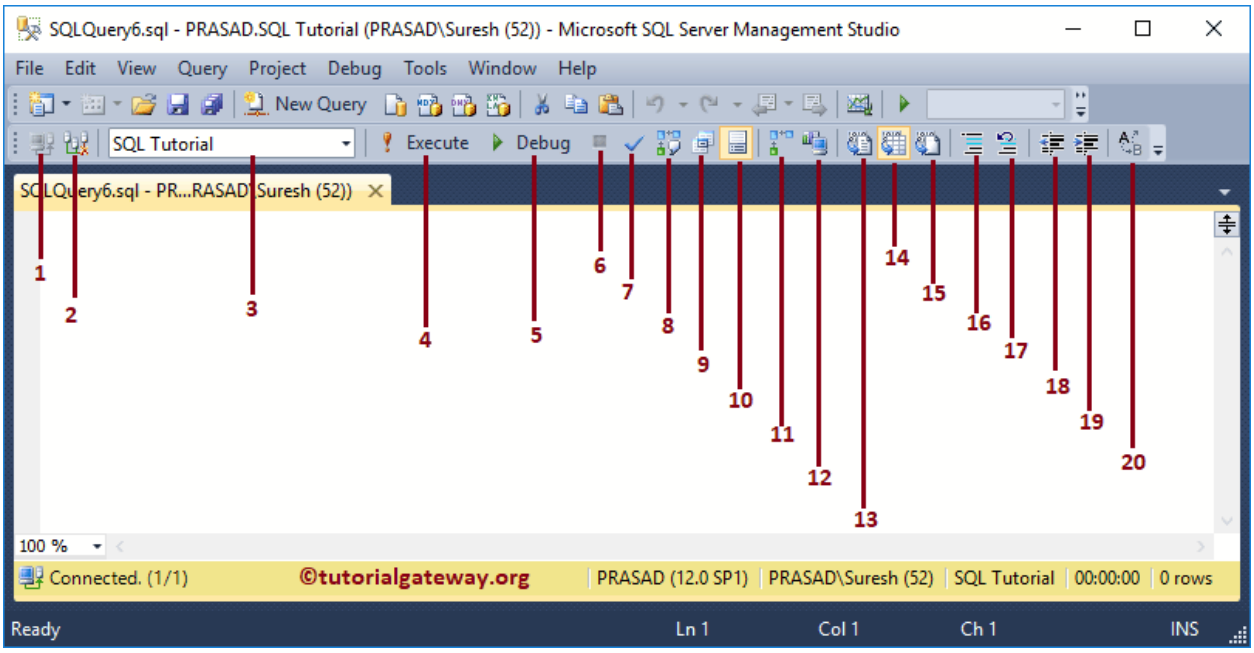


The list of available buttons and their uses in the Management Studio Standard toolbar

1. **New Project: It creates a new project, such as Black Solutions.**
2. **Open File: To navigate within the file system to select the script file.**
3. **Save: Use this to save the file system's current window.**
4. **Save All: This will save all the script windows in the file system.**
5. **New Query: If we want to write a script against any database, then click this New Query.**
6. **Available Databases: This drop-down list will display all the available databases on this server. You can select the database that you want to work on.**
7. **Database Engine: Opens a New window and connects to the database Engine window. First, you must connect with the Database Engine, and then you can use the query window to write your command.**
8. *Analysis Services MDX Query.*
9. *Analysis Services DMX.*
10. *SSAS XMLA.*

11. *Cut: This button will cut the selected text.*
12. *Copy the selected text.*
13. *Paste the Cut or Copy content.*
14. *Undo the changes*
15. *Redo the changes in the window*
16. *Navigate Backward: Use this button to Navigate Backward*
17. *Navigate Forward: To Navigate Forward.*
18. *Activity Monitor: Please click this button to see the activity monitor. It contains information about the process, Resources, data Files, etc.*
19. Start Debug: To debug your code.
20. Find in Files: Use this to find your files.
21. Find: To find the required text in a query window.
22. Solution Explorer: By clicking this, the Solution Explorer Window added to SSMS
23. Properties Window: By clicking this button, the Properties Window added to SSMS
24. Toolbox: By clicking this button, Toolbox added to the left side

SQL Editor Toolbar



Let me show you the available buttons and their uses in the Management Studio Editor toolbar.

25. **Connect: Used to connect to the server.**
26. **Change Connection: You can change the existing connection by clicking this button.**
27. **Available Databases.**
28. **Execute: It executes the query inside the window and returns the result in the result pane.**
29. **Debug: Help you to debut your code.**
30. **Stop: It will stop the running query. It will help you to stop the long-running query.**
31. **Parse: Use this to check whether the Query is parsed or not.**
32. **Display Estimated Execution Plan: This will display the Estimated Execution Plan for this particular script**
33. **Query Option.**

1. Intellisense Enabled.
2. Include Actual Execution Plan.
3. Include Client Statistics.

34. Result to Text: The result in the management studio will be displayed as text.

35. Result to Grid: The result will be displayed in table or grid format. It is the default one.

36. Result to File: This option saves the query result in a text file.

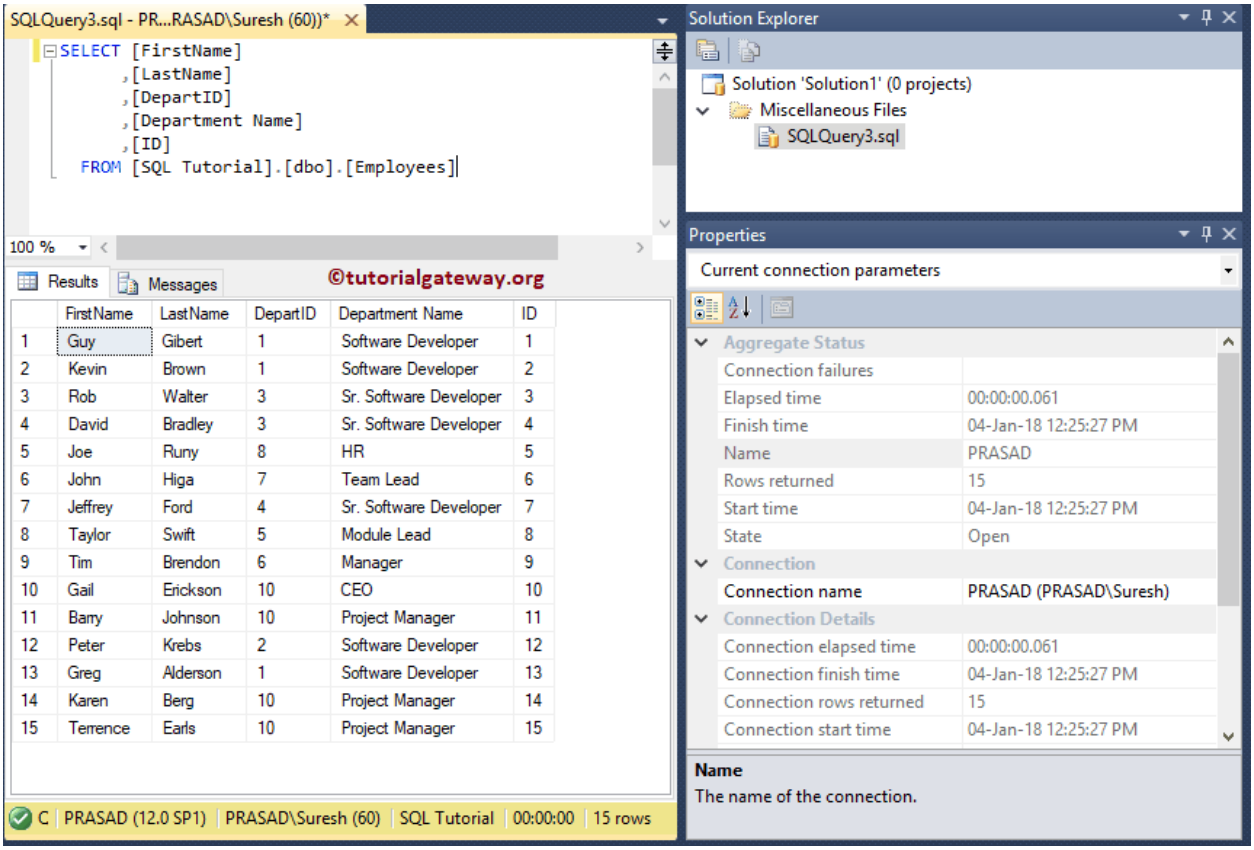
37. Comment out the Selected Line: Click this button to comment on the current line.

38. Uncomment the Selected Lines: Click this button to uncomment the current or selected lines.

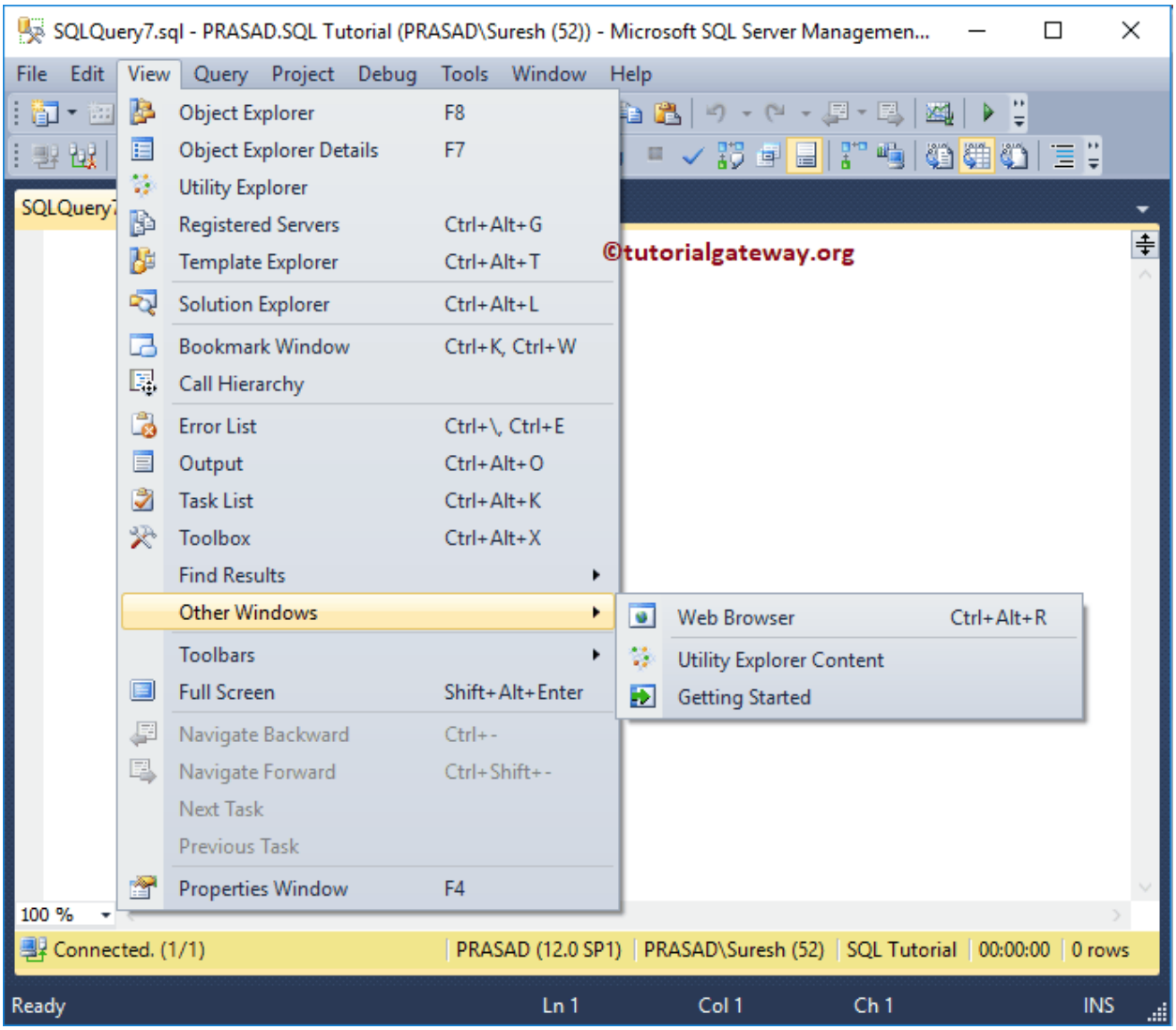
4. Decrease Indent.
5. Increase Indent.
6. Specify Values for the template parameter.

Solution Explorer

The Management Studio Solution Explorer will show you the file information. The Properties Window will show all the information about the query, such as Connection, Execution time, Duration, returned rows, etc.



Menu Toolbar



File Menu: Use the File menu item to Connect Object Explorer, create a new Project, Open existing projects and files, save the queries, and close. For this, click the File Menu -> New -> Choose the required option.

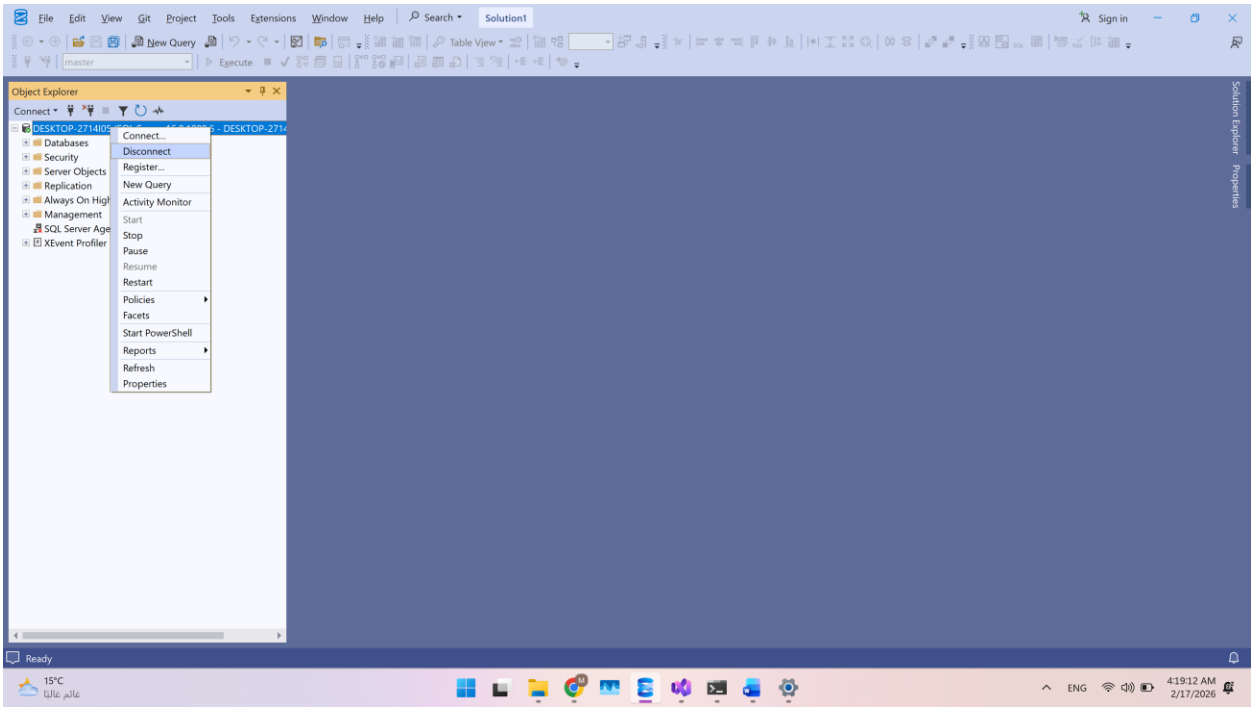
Edit Menu: It performs Cut, Copy, Paste, Delete, Replace, etc. We already explained them in the SQL Server Management Studio Standard Toolbar section.

View Menu: It is one of the crucial menus, and the following Management Studio screenshot will show you the list of available options on this menu item.

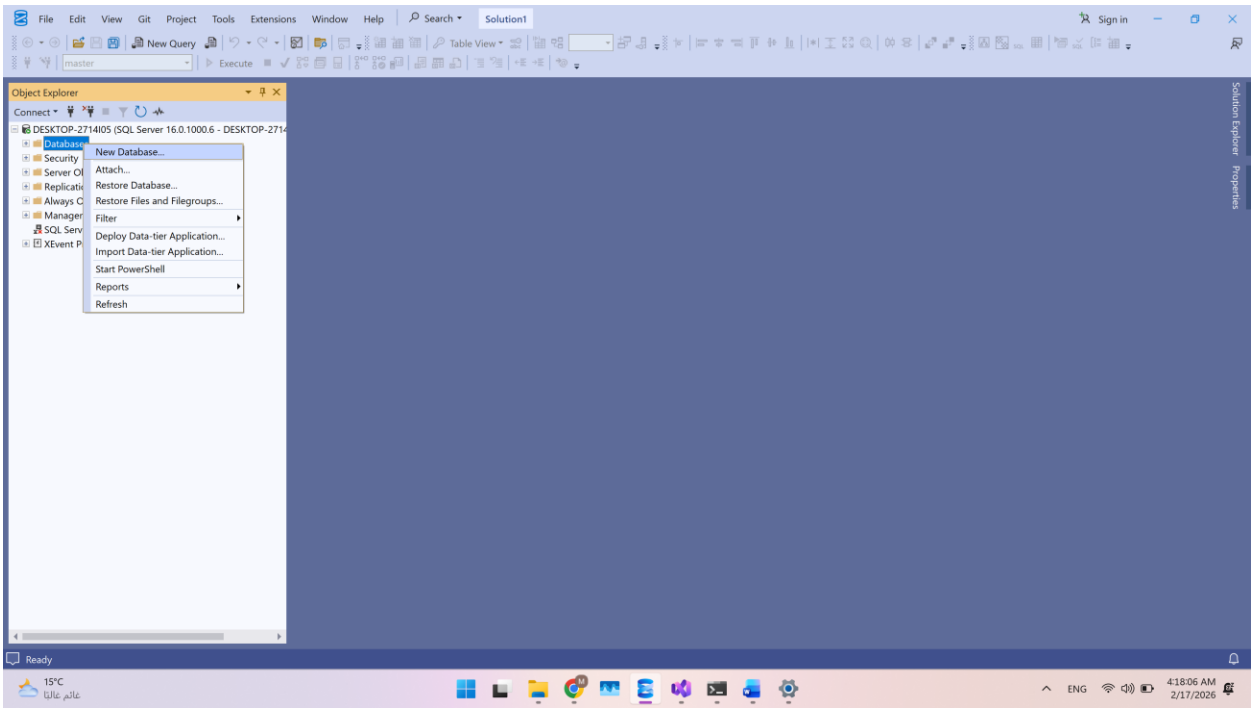
Tools Menu: Use this Management Studio menu to personalize the designer view, choose the third-party toolbox items, etc. We will explore the Options sub-menu for now, so let me select it. To do so, use the Tools Menu -> click on the Options…

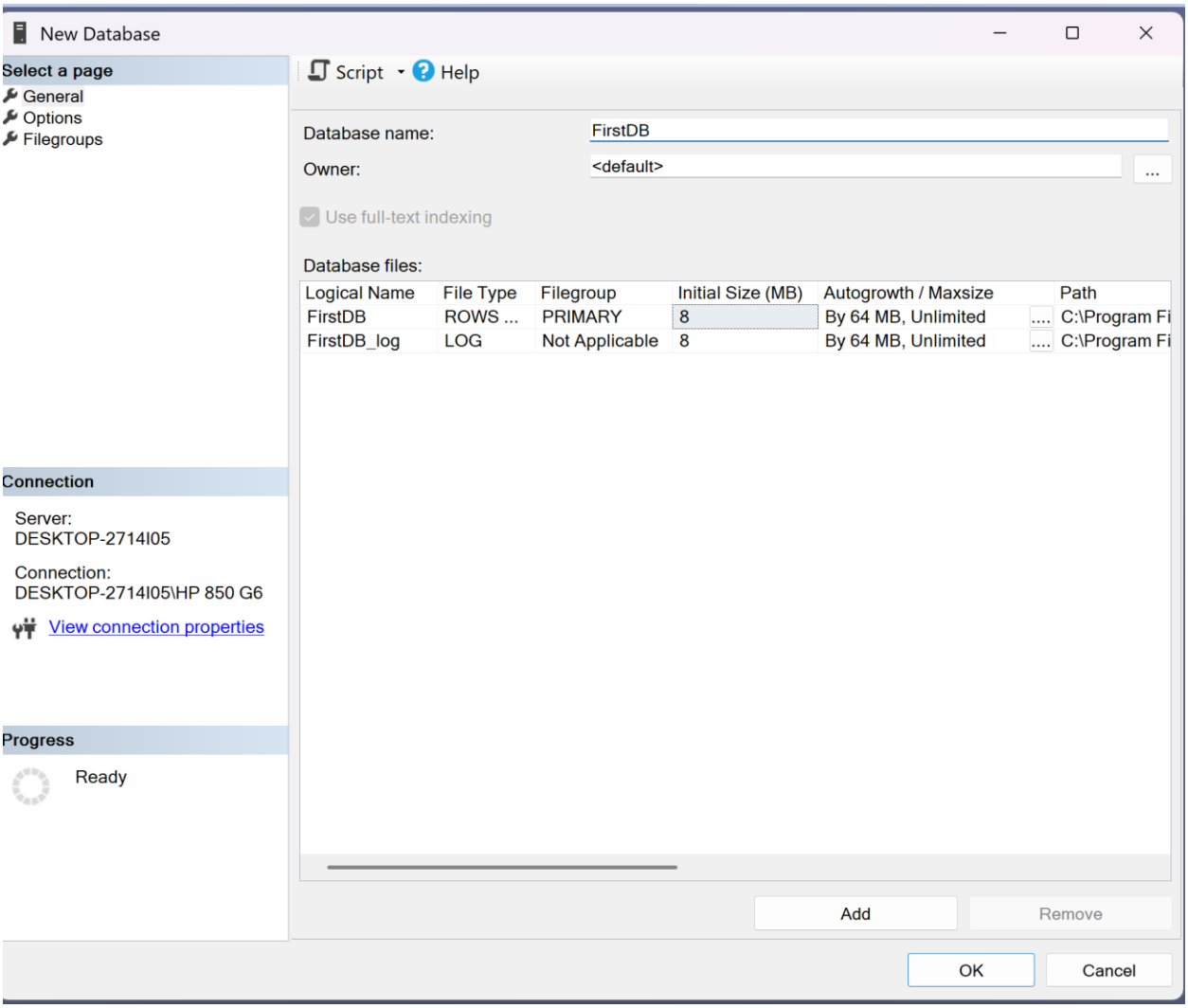
GUI Main Operations

Server Connect/Disconnect

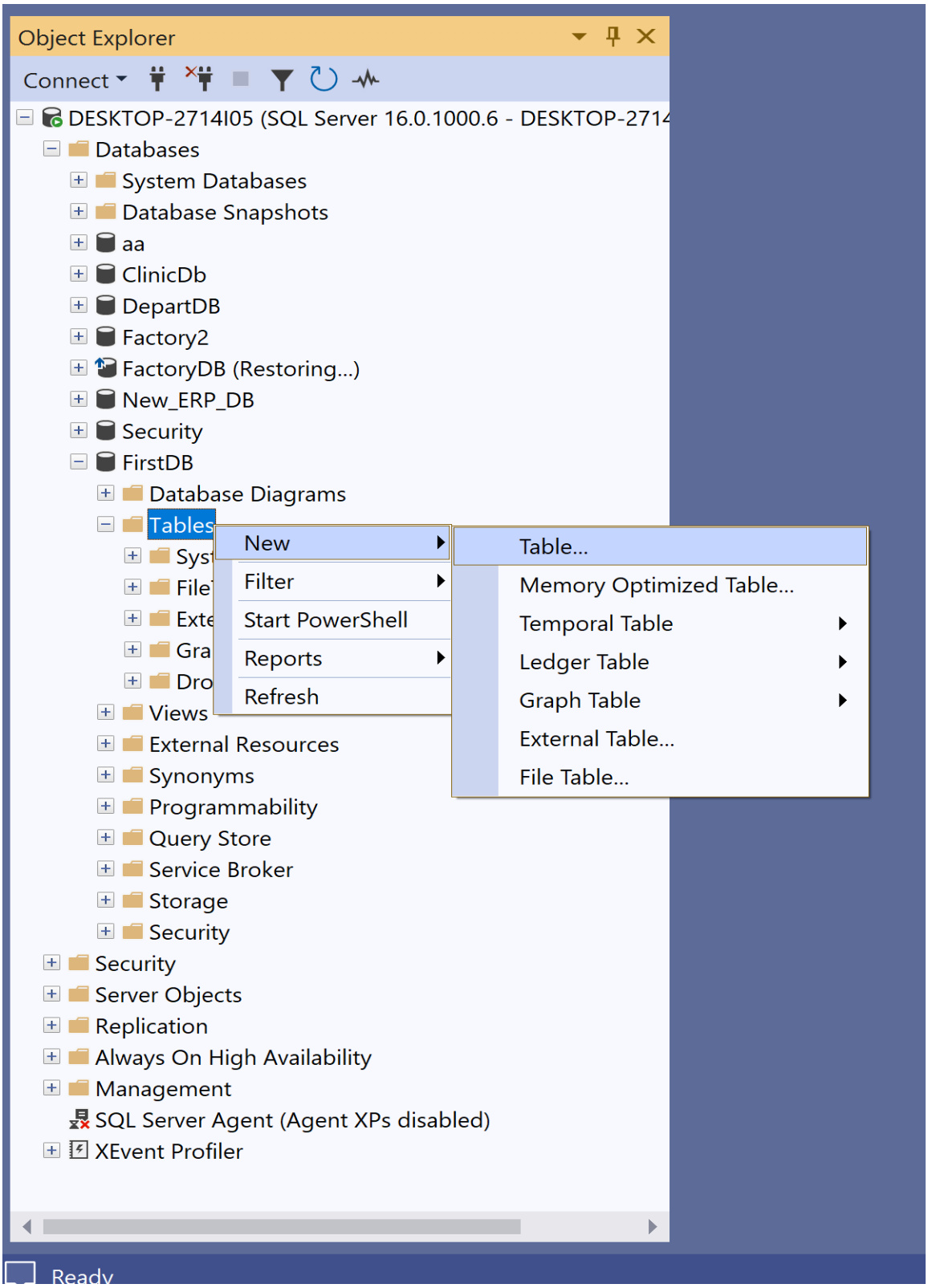


Create DB

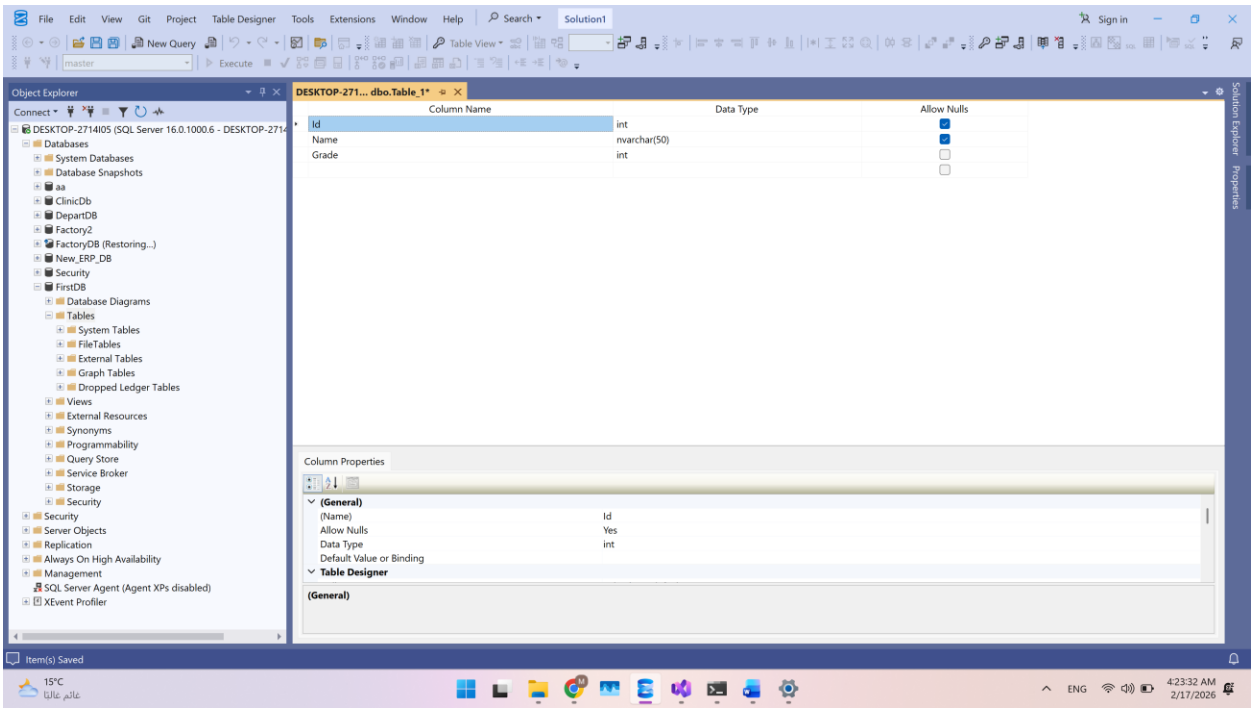



New Database
Select a page
General
Options
Filegroups
Script
Help
Database name:
FirstDB
Owner:
<default>
...
Use full-text indexing
Database files:
Logical Name
File Type
Filegroup
Initial Size (MB)
Autogrowth / Maxsize
Path
FirstDB
ROWS ...
PRIMARY
8
By 64 MB, Unlimited
....
C:\Program Fi
FirstDB_log
LOG
Not Applicable
8
By 64 MB, Unlimited
....
C:\Program Fi
Add
Remove
Connection
Server:
DESKTOP-2714I05
Connection:
DESKTOP-2714I05\HP 850 G6
View connection properties
Progress
Ready
OK
Cancel

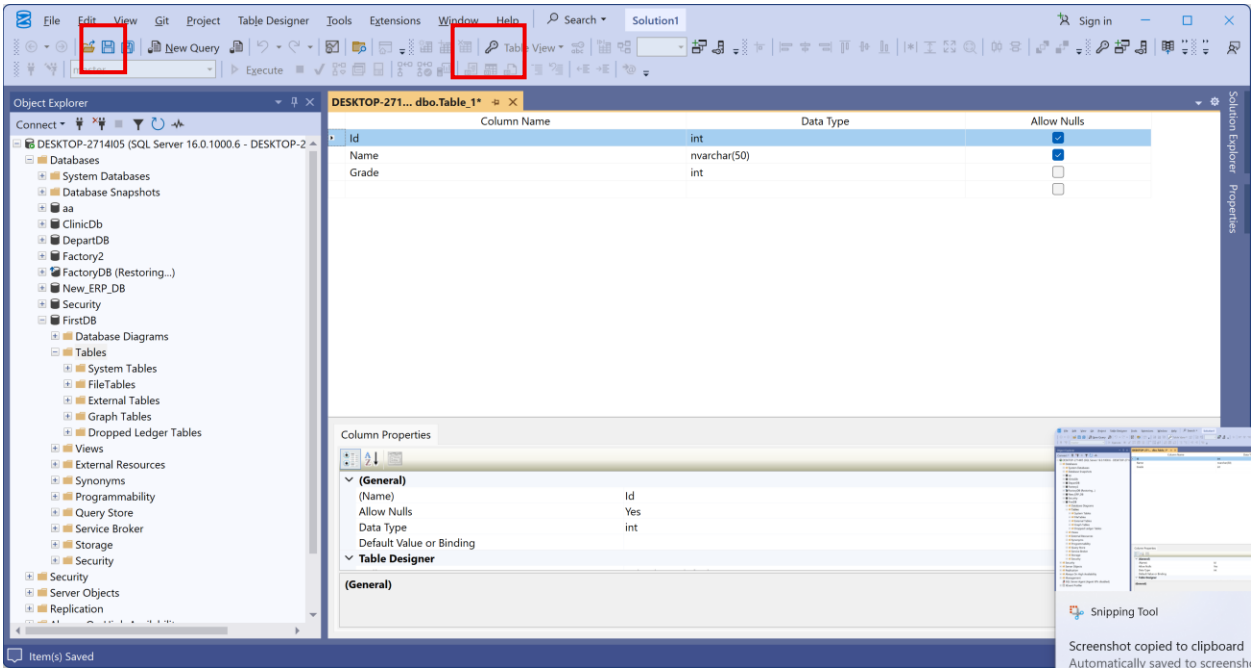
Create Table



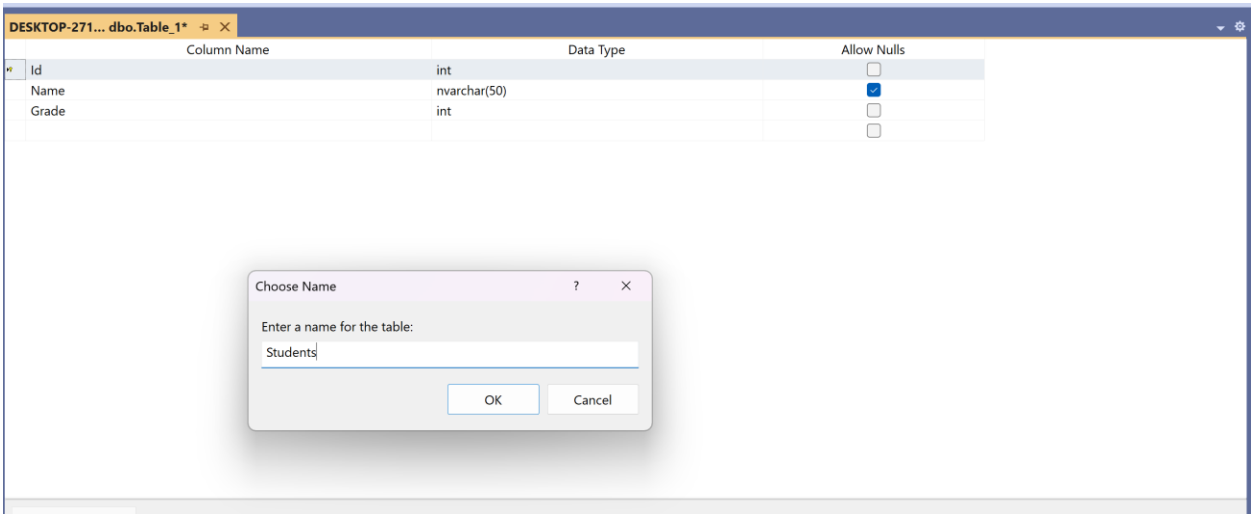
Insert Fields (Columns) and Their Data Types



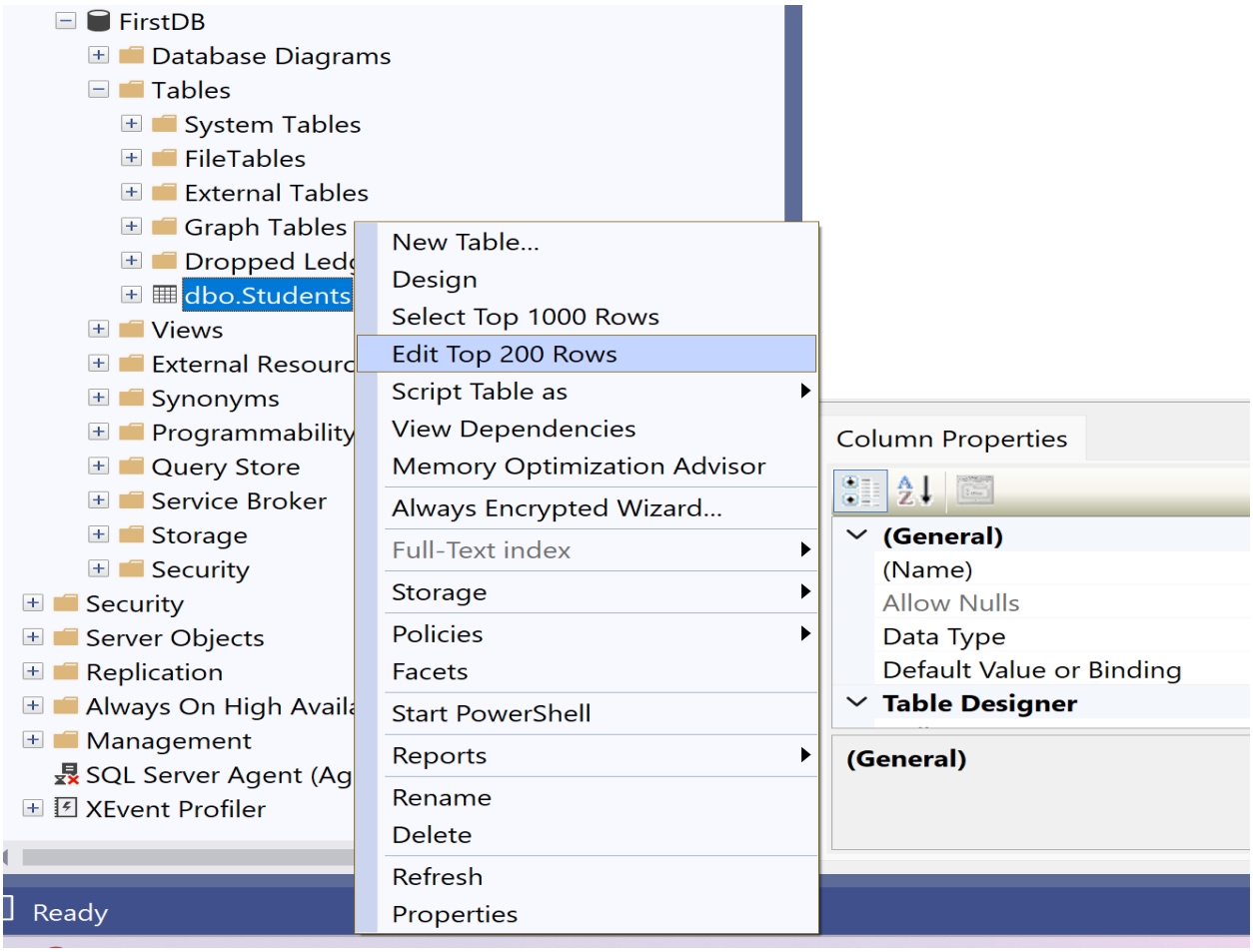
Set PK and save



Insert table name



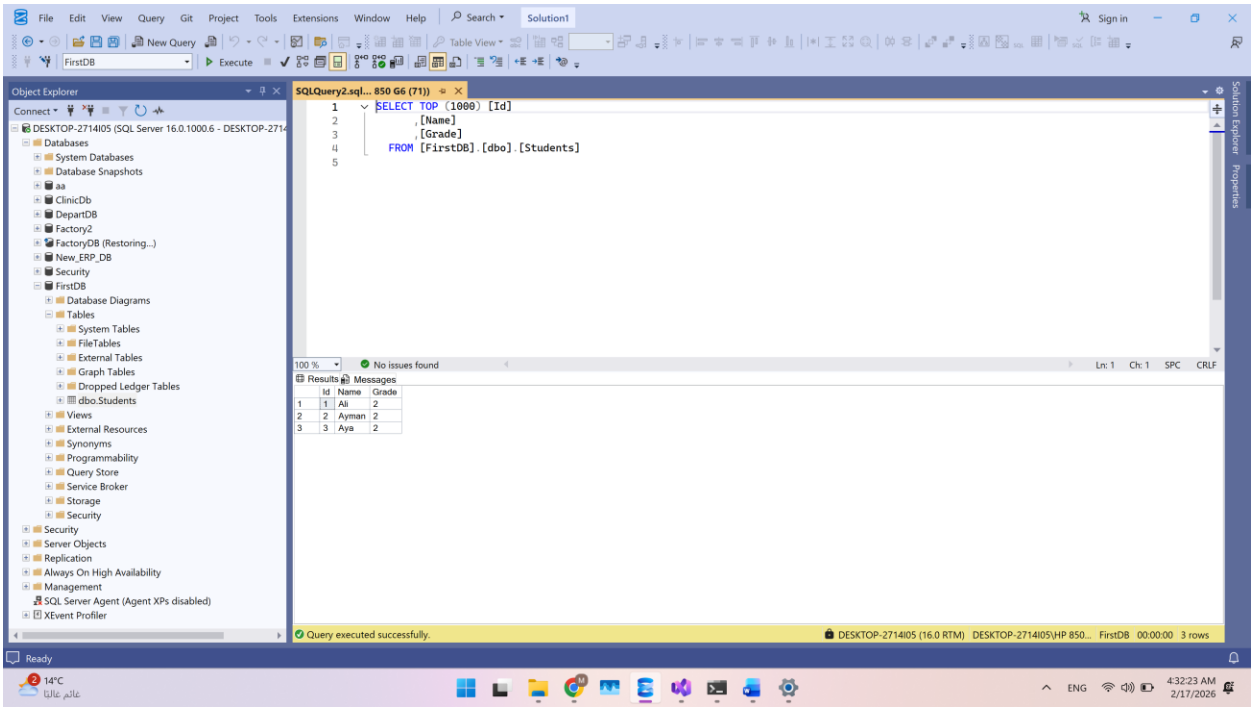
Edit Data



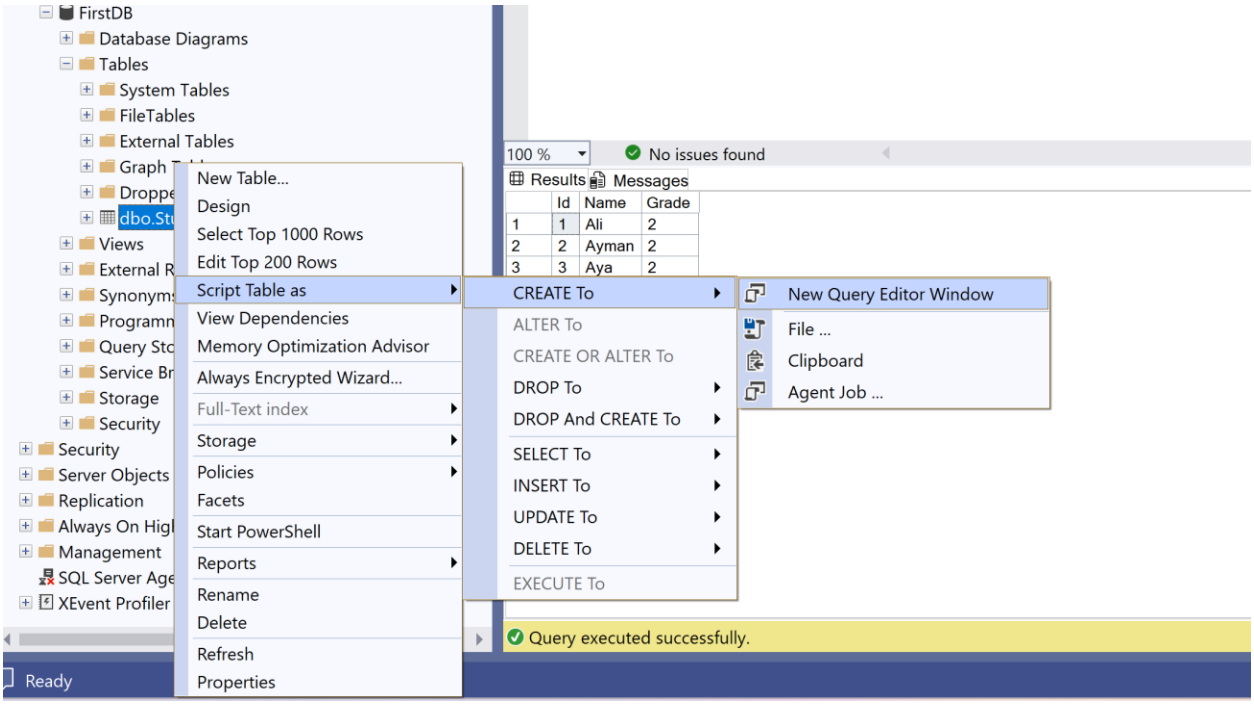
DESKTOP-271...dbo.Students

	Id	Name	Grade
	1	Ali	2
	2	Ayman	2
	3	Aya	2
▶*	NULL	NULL	NULL

Selecting data



Scripting Table



Create SQL Script

```
USE [FirstDB]
GO

/****** Object:  Table [dbo].[Students]    Script Date: 2/17/2026 4:34:04 AM ******/
SET ANSI_NULLS ON
GO

SET QUOTED_IDENTIFIER ON
GO

CREATE TABLE [dbo].[Students](
	[Id] [int] NOT NULL,
	[Name] [nvarchar](50) NULL,
	[Grade] [int] NOT NULL,
 CONSTRAINT [PK_Students] PRIMARY KEY CLUSTERED
(
	[Id] ASC
)WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF,
ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON, OPTIMIZE_FOR_SEQUENTIAL_KEY = OFF) ON
[PRIMARY]
) ON [PRIMARY]
GO
```

Select SQL Script

```
USE [FirstDB]
GO

SELECT [Id]
      ,[Name]
      ,[Grade]
  FROM [dbo].[Students]

GO
```

Insert SQL Script

```
USE [FirstDB]
GO

INSERT INTO [dbo].[Students]
           ([Id]
           ,[Name]
           ,[Grade])
     VALUES
           (<Id, int,>
           ,<Name, nvarchar(50),>
           ,<Grade, int,>)
GO
```

MS SQL Server Data Types

1. Introduction to Data Types

A data type in SQL Server defines the type of data that a column can store. It determines storage size, allowed values, and supported operations. Choosing the correct data type improves performance, storage efficiency, and data integrity.

2. Categories of SQL Server Data Types

SQL Server data types are grouped into the following categories:

- Numeric Data Types
- Character (String) Data Types
- Date and Time Data Types
- Binary Data Types
- Special Data Types

3. Numeric Data Types

A. Exact Numeric Types

Data Type	Storage	Range	Example
BIT	1 bit	0 or 1	1
TINYINT	1 byte	0 to 255	200
SMALLINT	2 bytes	-32,768 to 32,767	15000
INT	4 bytes	±2 billion	1000
BIGINT	8 bytes	Very large integers	9000000000
DECIMAL(p,s)	Variable	Exact decimal	12.50
NUMERIC(p,s)	Variable	Same as DECIMAL	99.99
MONEY	8 bytes	Currency values	1500.75
SMALLMONEY	4 bytes	Smaller currency	500.25

B. Approximate Numeric Types

Data Type	Description
FLOAT	Approximate floating number
REAL	Smaller floating number

4. Character (String) Data Types

A. Non-Unicode

Data Type	Description
CHAR(n)	Fixed-length string
VARCHAR(n)	Variable-length string
VARCHAR(MAX)	Up to 2GB text

B. Unicode (Supports Multiple Languages)

- Use Unicode when storing:
  - Arabic
  - Chinese
  - Multiple languages

Data Type	Description
NCHAR(n)	Fixed Unicode
NVARCHAR(n)	Variable Unicode
NVARCHAR(MAX)	Large Unicode text

5. Date and Time Data Types

Data Type	Description

DATE	Stores date only
TIME	Stores time only
DATETIME	Date + time
DATETIME2	More precise datetime
SMALLDATETIME	Smaller datetime
DATETIMEOFFSET	Date + time + time zone

6. Binary Data Types

Data Type	**Description**
BINARY(n)	Fixed binary
VARBINARY(n)	Variable binary
VARBINARY(MAX)	Large binary (files, PDFs)

7. Special Data Types

- UNIQUEIDENTIFIER – Stores GUID values
- SQL_VARIANT – Stores multiple data types in a single column
- XML – Stores XML-formatted data

8. Data Type Selection Guidelines

- Use INT for primary keys and IDs
- Use DECIMAL for financial data
- Use DATETIME2 instead of DATETIME
- Use NVARCHAR for multilingual systems
- Avoid FLOAT for money calculations
- Avoid VARCHAR(MAX) unless necessary