

# SQL Fundamentals

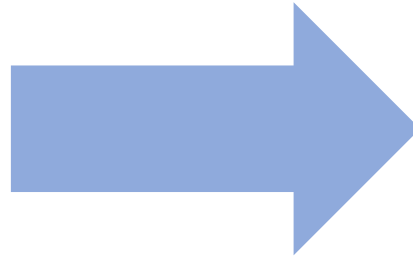
For Analyst and Data Analyst

# Leverage SQL for data analytics and business intelligence decision

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SQL Server  
Management  
Studio



Excel



Tableau



PowerBI

## (Pre-Quiz) SQL Fundamentals for Analyst and Data Analyst



<https://forms.office.com/r/AYbYykY4J8>

Can anyone guess what is the output of this query?



Practical-Alarm1763 1d

```
SELECT
    c.name AS 'Candidate',
    i.question AS
'Interview_Questions',
    a.answer AS 'Answer',
    CASE
        WHEN a.correct = 1 THEN
'Passed'
        ELSE 'Fucked'
    END AS 'Result'
FROM
    Candidates c
INNER JOIN
    Interviews i ON c.candidate_id
= i.candidate_id
INNER JOIN
    Answers a ON i.interview_id =
a.interview_id
WHERE
    c.experience = 'None' AND
c.claimed_expertise = 'SQL';
```

# Learning Objectives

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By the end of this session, you'll be able to:

- Understand what SQL is and how it is used
- Set up SQL Server and SQL Server Management Studio
- Fundamentals of database and how to query them
- How to get popular database in your local machine for training
- Connect your SQL Server to Excel and PowerBI (optional)
- Expand learning curve using documentations, Github and MOOCs

# Prerequisites and setup steps

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- A virtual machine or computer running Windows 10, Windows 11, with at least 4 CPUs and 8GB RAM.
- **Display:** At least 1440x900 or 1600x900 (16:9) recommended.
- **Internet connectivity:** You must have the ability to connect to the Internet
- Microsoft Excel (recommended) and Microsoft Power BI Desktop installed (optional)
- You will need Administrator rights on the virtual machine or computer. It is recommended to use your own personal laptop, **do not** use company laptop or owned by others.

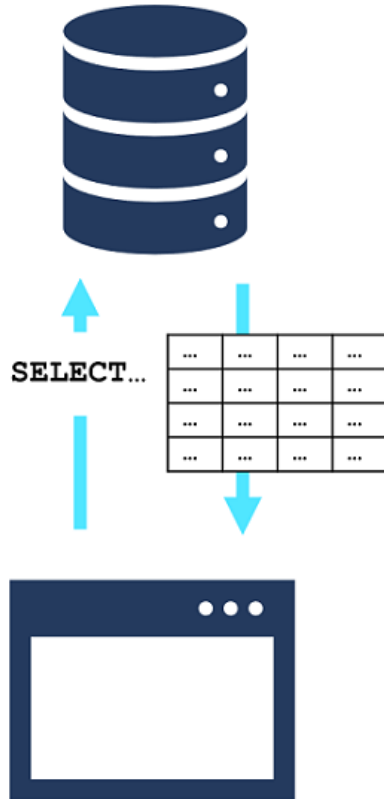
Module 1

# What is SQL?



# Introduction to SQL: SQL in brief

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- SQL stands for **Structured** Query Language, and was designed in the **early 1970s** at IBM
- SQL is used to **communicate and manipulate** with relational databases
- There is universal standard for SQL set by the American National Standards Institute (ANSI), with updates released every ~3-5 years
- Vendors are constantly adding new features on top of the standards, which creates **different “flavors” of SQL** (MySQL, PostgreSQL, SQLite, etc.)
- SQL is the standard language for relational database management



# Introduction to SQL: Different flavors of SQL

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These flavors of SQL are much more similar than they are different – all are based on the same universal standard, with slight variations in syntax. Each vendors add their own **variations** and **extensions**.

# Introduction to SQL: Microsoft SQL Server

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Microsoft database systems such as SQL Server, Azure SQL Database, Azure Synapse Analytics, and others use a dialect of SQL called **Transact-SQL, or T-SQL**.

T-SQL includes language extensions for writing stored procedures and functions, which are application code that is stored in the database, and managing user accounts.

# Introduction to SQL: Important Technology / Concepts

Technology / Concept	Description
SQL Server 2022	The latest major version of SQL Server. <a href="#">Microsoft SQL Server is a relational database management system (RDBMS). Applications and tools connect to a SQL Server instance or database, and communicate using Transact-SQL (T-SQL).</a>
SQL Server Management Studio (SSMS)	Graphical User Interface Management and Query Tool
Microsoft Azure	Microsoft's cloud platform for computing, data, and applications.
Database	<a href="#">A database in SQL Server is made up of a collection of tables that stores a specific set of <i>structured</i> data.</a>
Tables	<a href="#">Tables are database <i>objects</i> that contain all the data in a database.</a> In table, data is logically organized in a row-and-column format similar to a spreadsheet
Schema	In a SQL database, a schema is a list of logical structures of data
Instance	The name of the server or instance. For example, MyServer or MyServer\MyInstance.
Database normalization	Normalization is the process of structuring the tables and columns in a relational database to minimize redundancy and preserve data integrity.
Cardinality	Cardinality refers to the uniqueness of values in a column of a table, commonly described as how two tables relate (one-to-one, one-to-many, or many-to-many). <ul style="list-style-type: none"><li>• <b>Primary keys</b> are unique, cannot contain duplicates and null</li><li>• <b>Foreign keys</b> are non-unique, may contain duplicates and null</li></ul>

# Introduction to SQL :Database, Schemas and Table

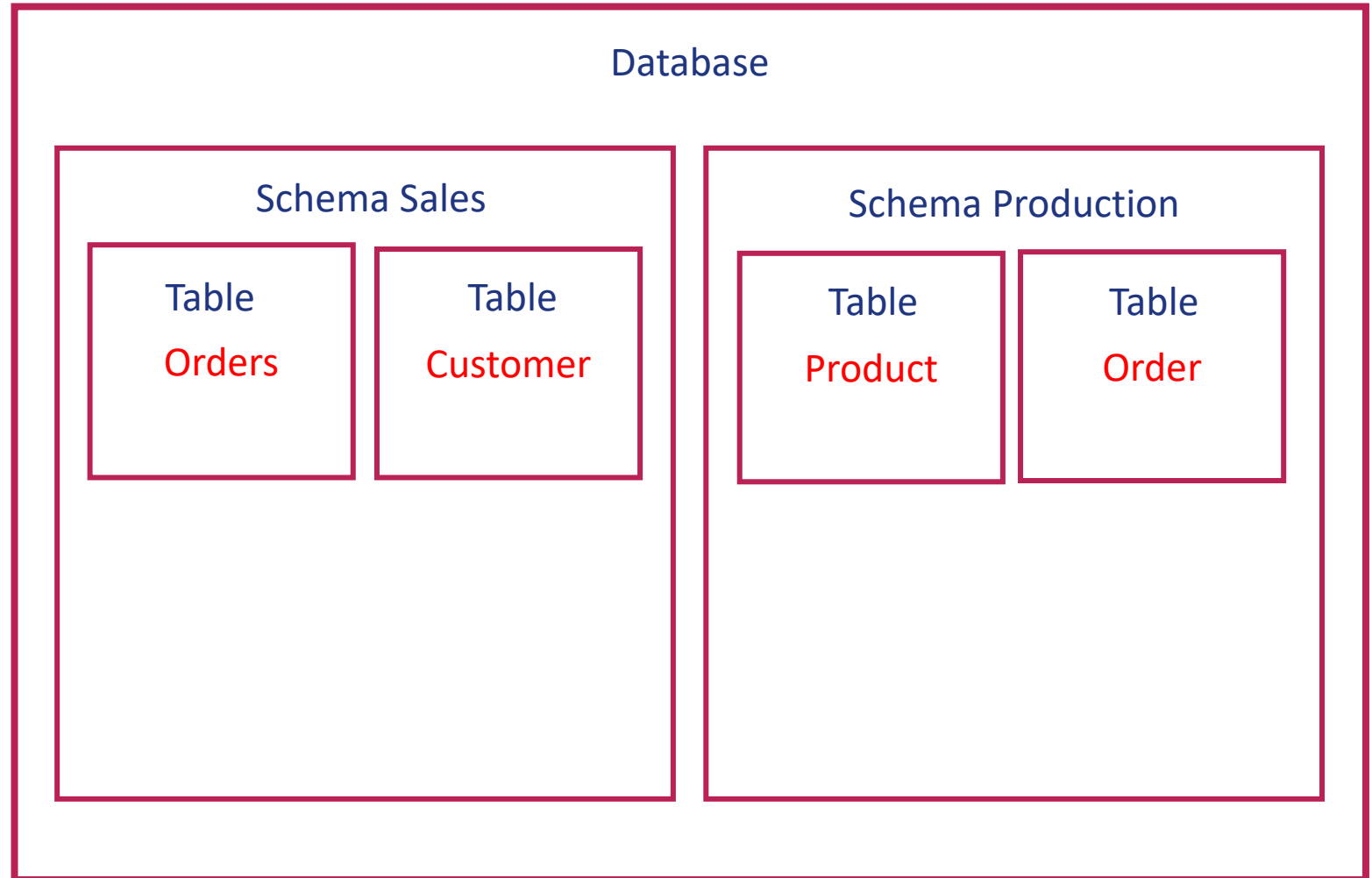
A set as "a collection of definite, distinct objects considered as a whole."

In terms applied to SQL Server databases, you can think of a set as a collection of **distinct objects** containing zero or more members of the same type.

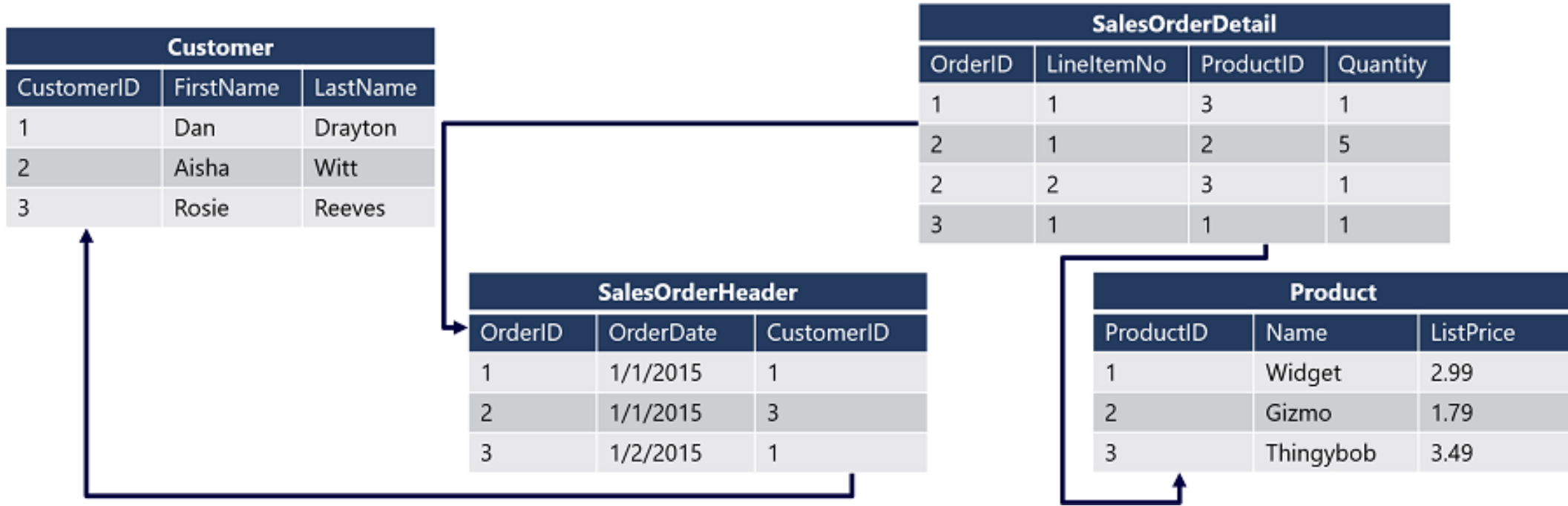
For example, the **Customer** table represents a set: specifically, the set of all customers.

There is no concept of a *first* row, a *second* row, or a *last* row.

You will see that the results of a SELECT statement also form a set.



# Introduction to SQL: Relational Database



The diagram shows a relational database that contains **four tables**:  
**Customer | SalesOrderHeader | SalesOrderDetail | Product**

# Introduction to SQL: Important Concept

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Technology / Concept	Description
The “Big 6” statements and clauses	SELECT, FROM, WHERE, GROUP BY, HAVING, and ORDER BY
“GROUP BY” aggregate functions	COUNT, COUNT(DISTINCT), MIN, MAX, AVG, and SUM
Query Multiple Tables using JOINS	INNER JOIN, LEFT JOIN, RIGHT JOIN, FULL OUTER JOIN, and UNION

# Introduction to SQL: Common T-SQL Data Types

Data Types	Specification	Storage
INT	INT(-2,147,483,648 to 2,147,483,647)	4 bytes
BIGINT	INT(-9,223,372,036,854,775,808) to (9,223,372,036,854,775,807)	8 bytes
FLOAT	Decimal (precise to 23 digits)	Depends on value of n
DECIMAL	DECIMAL Decimal (to 65 digits – most precise)	

Data Types	Specification	Storage
CHAR	String (0 – 255)	
VARCHAR	String (0 – 255)	
TEXT	String (0 – 65535)	
Date	yyyy-MM-dd	
Datetime2	yyyy-MM-dd HH:mm:ss[.nnnnnnnn]	
Time	hh:mm:ss[.nnnnnnnn]	

Module 2

# Setting SQL Server and SQL Server Management Studio



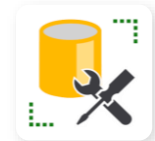


# Setting up SQL Server (Developer) and SQL Server Management Studio

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Learn how to install SQL Server Management Studio

- [Install SQL Server 2022 \(Developer\)](#):
  - Choose basic installation
- [Install SQL Server Management Studio](#):
  - [Installation instruction](#):
- [SQL Documentation Navigation Tips](#)
- Tools: SQL Server, SQL Server Management Studio, Excel, [PowerBI \(optional\)](#)
- PC Requirement: <https://learn.microsoft.com/en-us/sql/ssms/download-sql-server-management-studio-ssms?view=sql-server-ver16>



# Youtube Playlist: Setting up SQL Server (Developer) and SQL Server Management Studio

**SQL Fundamentals**  
For Analyst and Data Analysts

SQL Server 2022  
SQL Server Management Studio 20

## SQL Masterclass with Syarmine

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This is a video guide for SQL Masterclass with Syarmine

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Module 3

# Creating a Database and Table

# Creating a Database and Table - From Excel to SQL

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Excel



PowerBI



SQL SSMS

# Creating a Database and Table

In SQL Server database systems, tables are defined within *schemas* to create logical namespaces in the database.

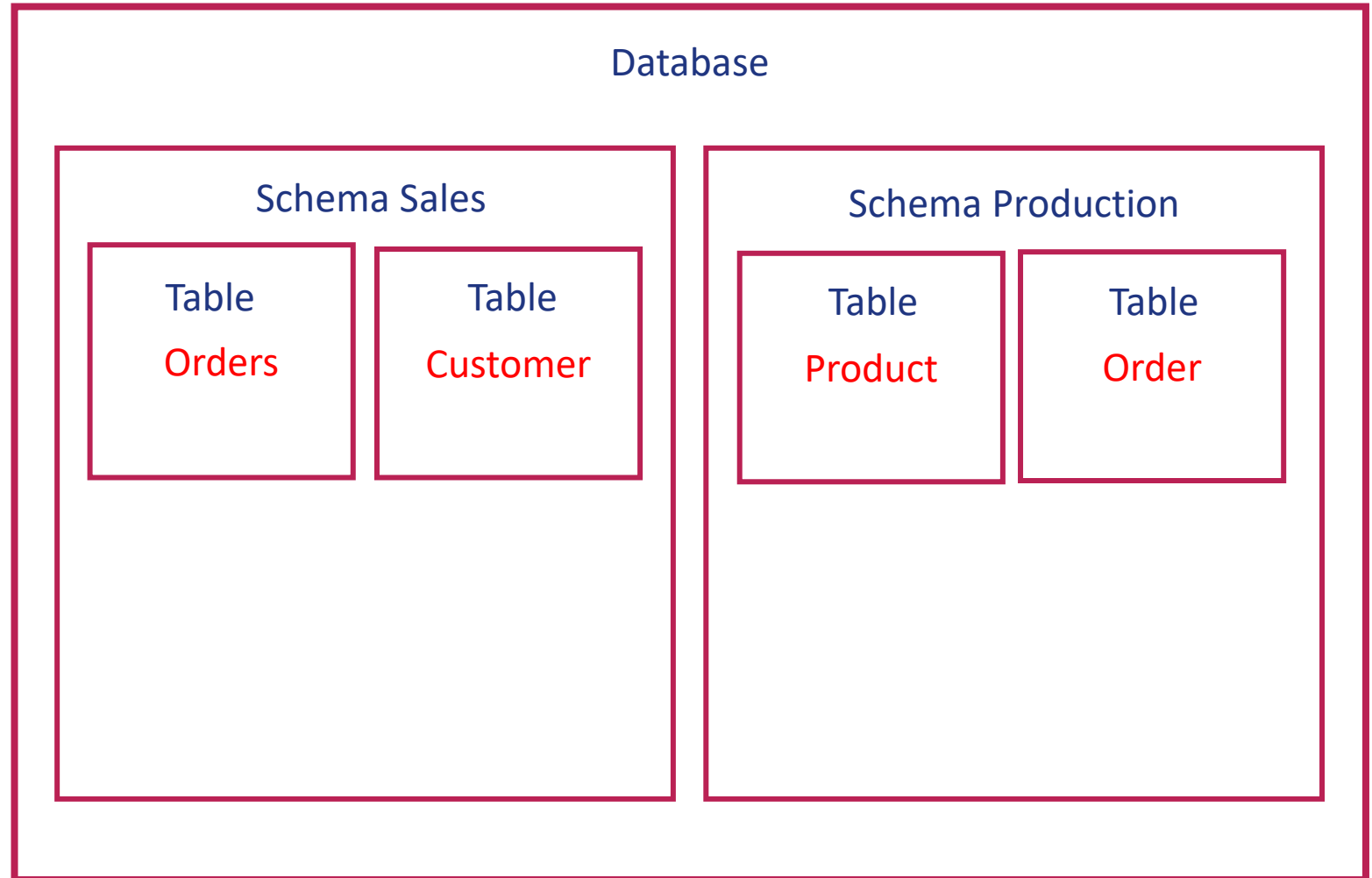
For example, a **Customer** table might be defined in a **Sales** schema, while a **Product** table is defined in a **Production** schema.

The database might track details of orders that customers have placed in an **Order** table in the **Sales** schema. You then might also need to track orders from suppliers for product components in an **Order** table in the **Production** schema.

Database systems such as SQL Server use a hierarchical naming system:

For example:

***Server1.StoreDB.Sales.Order***.



# Different statements in SQL

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In any SQL dialect, the SQL statements are grouped together into several different types of statements. These different types are:

- **Data Manipulation Language** (DML) is the set of SQL statements that focuses on querying and modifying data. DML statements include SELECT, the primary focus of this training, and modification statements such as INSERT, UPDATE, and DELETE. ← we focus on this
- **Data Definition Language** (DDL) is the set of SQL statements that handles the definition and life cycle of database objects, such as tables, views, and procedures. DDL includes statements such as CREATE, ALTER, and DROP. ← and this
- **Data Control Language** (DCL) is the set of SQL statements used to manage security permissions for users and objects. DCL includes statements such as GRANT, REVOKE, and DENY.

DML statements are also used by application developers to perform "CRUD" operations to create, read, update, or delete application data.

# Deconstructing SQL statement

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```
SELECT OrderDate, COUNT(OrderID) AS Orders  
FROM Sales.Order  
WHERE Status = 'Shipped'  
GROUP BY OrderDate  
HAVING COUNT(OrderID) > 1  
ORDER BY OrderDate DESC;
```

# Deconstructing SQL statement

---

```
SELECT OrderDate, COUNT(OrderID) AS Orders  
FROM Sales.Order  
WHERE Status = 'Shipped'  
GROUP BY OrderDate  
HAVING COUNT(OrderID) > 1  
ORDER BY OrderDate DESC;
```

Column(s)

Table




# Deconstructing SQL statement

SQL STATEMENT	REMARK
<code>SELECT</code> OrderDate, COUNT(OrderID) AS Orders	The SELECT clause returns the <b>OrderDate</b> column, and the count of <b>OrderID</b> values, to which is assigns the name (or <i>alias</i> ) <b>Orders</b> :
<code>FROM</code> Sales.Order	The FROM clause identifies which table is the source of the rows for the query; in this case it's the <b>Sales.SalesOrder</b> table:
<code>WHERE</code> Status = 'Shipped'	The WHERE clause filters rows out of the results, keeping only those rows that satisfy the specified condition; in this case, orders that have a status of "shipped":
<code>GROUP BY</code> OrderDate	The GROUP BY clause takes the rows that met the filter condition and groups them by <b>OrderDate</b> , so that all the rows with the same <b>OrderDate</b> are considered as a single group and one row will be returned for each group:
<code>HAVING</code> COUNT(OrderID) > 1	After the groups are formed, the HAVING clause filters the groups based on its own predicate. Only dates with more than one order will be included in the results:
<code>ORDER BY</code> OrderDate <code>DESC</code> ;	For the purposes of previewing this query, the final clause is the ORDER BY, which sorts the output into descending order of <b>OrderDate</b> :

# The “Big 6” Elements of SQL SELECT Statement

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START OF STATEMENT




SELECT	Identifies the column(s) you want your	SELECT columnName
FROM	Identifies the table(s) your query will pull data from	FROM tableName
WHERE	(Optional) Specifies record-filtering criteria for filtering your results	WHERE logicalCondition
GROUP BY	(Optional) Specifies how to group the data in your results	GROUP BY columnName
HAVING	(Optional) Specifies group-filtering criteria for filtering your results	HAVING logicalCondition
ORDER BY	(Optional) Specifies the order in which your query results are displayed	ORDER BY columnName

END OF STATEMENT

# Execution of SQL SELECT Statement

START OF STATEMENT



FROM	The FROM clause is evaluated first, to provide the source rows for the rest of the statement. A virtual table is created and passed to the next step.
WHERE	The WHERE clause is next to be evaluated, filtering those rows from the source table that match a predicate. The filtered virtual table is passed to the next step.
GROUP BY	GROUP BY is next, organizing the rows in the virtual table according to unique values found in the GROUP BY list. A new virtual table is created, containing the list of groups, and is passed to the next step. From this point in the flow of operations, only columns in the GROUP BY list or aggregate functions may be referenced by other elements.
HAVING	The HAVING clause is evaluated next, filtering out entire groups based on its predicate. The virtual table created in step 3 is filtered and passed to the next step.
SELECT	The SELECT clause finally executes, determining which columns will appear in the query results. Because the SELECT clause is evaluated after the other steps, any column aliases (in our example, <b>Orders</b> ) created there cannot be used in the GROUP BY or HAVING clause.
ORDER BY	The ORDER BY clause is the last to execute, sorting the rows as determined by its column list.

END OF STATEMENT

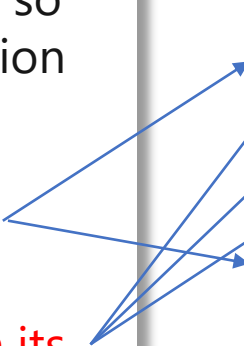
# Writing a readable T-SQL query

Consider the following guidelines to make your T-SQL code easily readable (and therefore easier to understand and debug!):

- **Capitalize** T-SQL keywords, like SELECT, FROM, AS, and so on. Capitalizing keywords is a commonly used convention that makes it easier to find each clause of a complex statement.
- Start **a new line** for each major clause of a statement.
- If the SELECT list contains more than a few columns, expressions, or aliases, consider listing **each column on its own line**.
- **Indent lines** containing subclauses or columns to make it clear which code belongs to each major clause

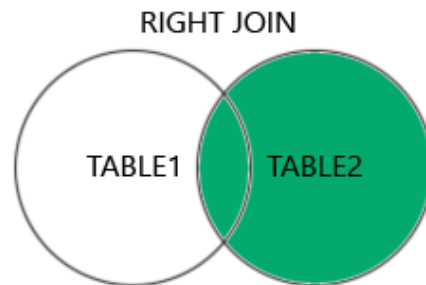
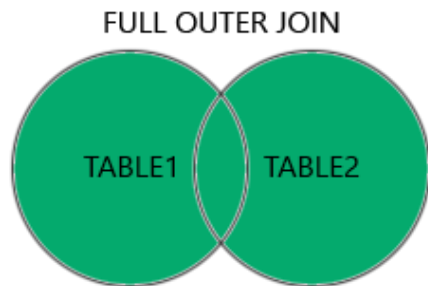
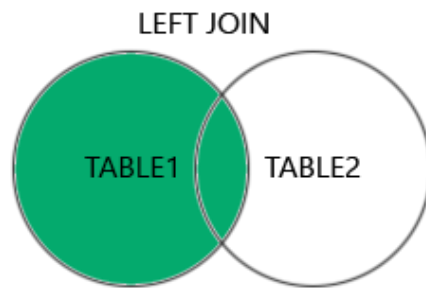
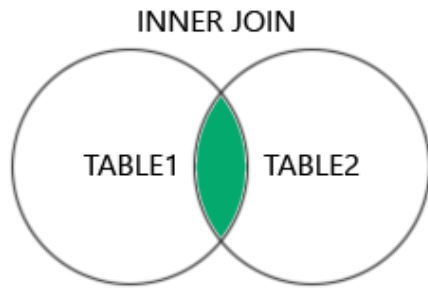
```
SELECT FirstName  
FROM Sales
```

```
SELECT  
    FirstName,  
    ID,  
    Age  
FROM Sales  
ORDER BY Age
```

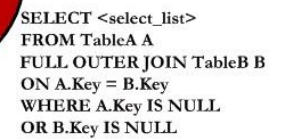
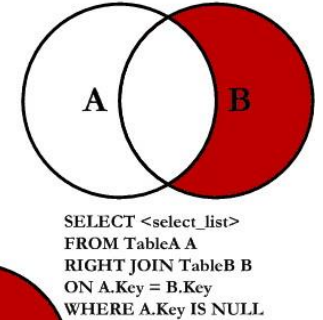
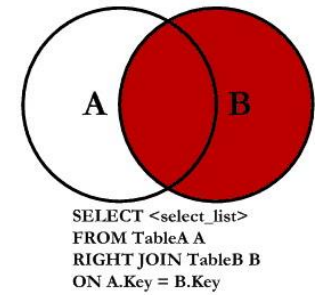
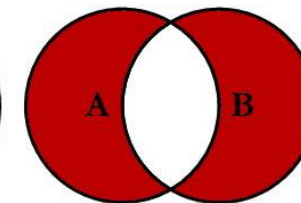
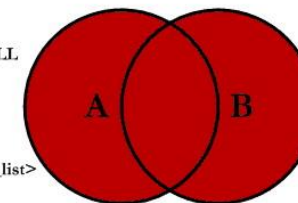
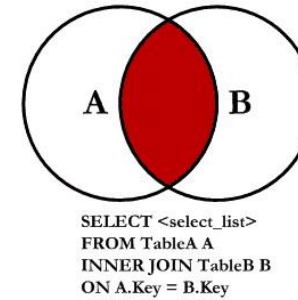
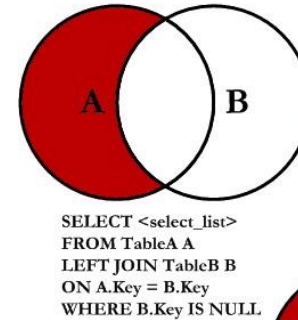
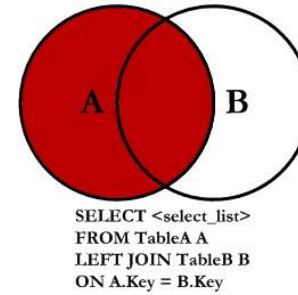


```
SELECT  
    | FirstName,  
    | ID,  
    | Age  
FROM Sales  
ORDER BY Age
```

# Database Join

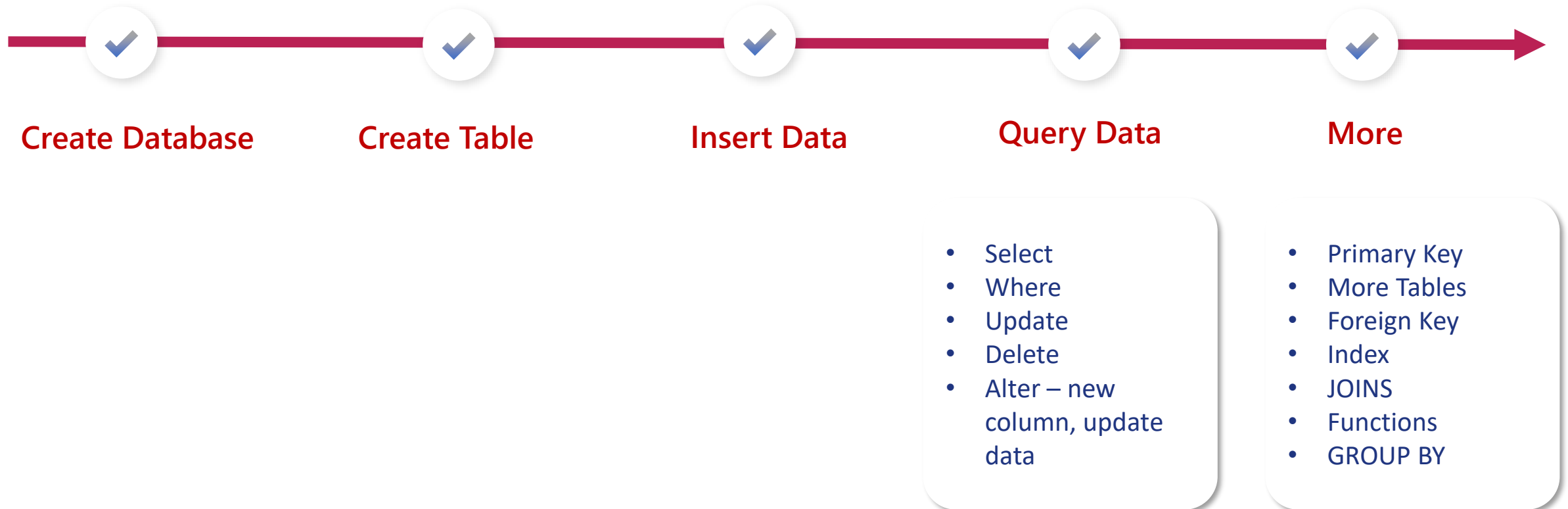


## SQL JOINS

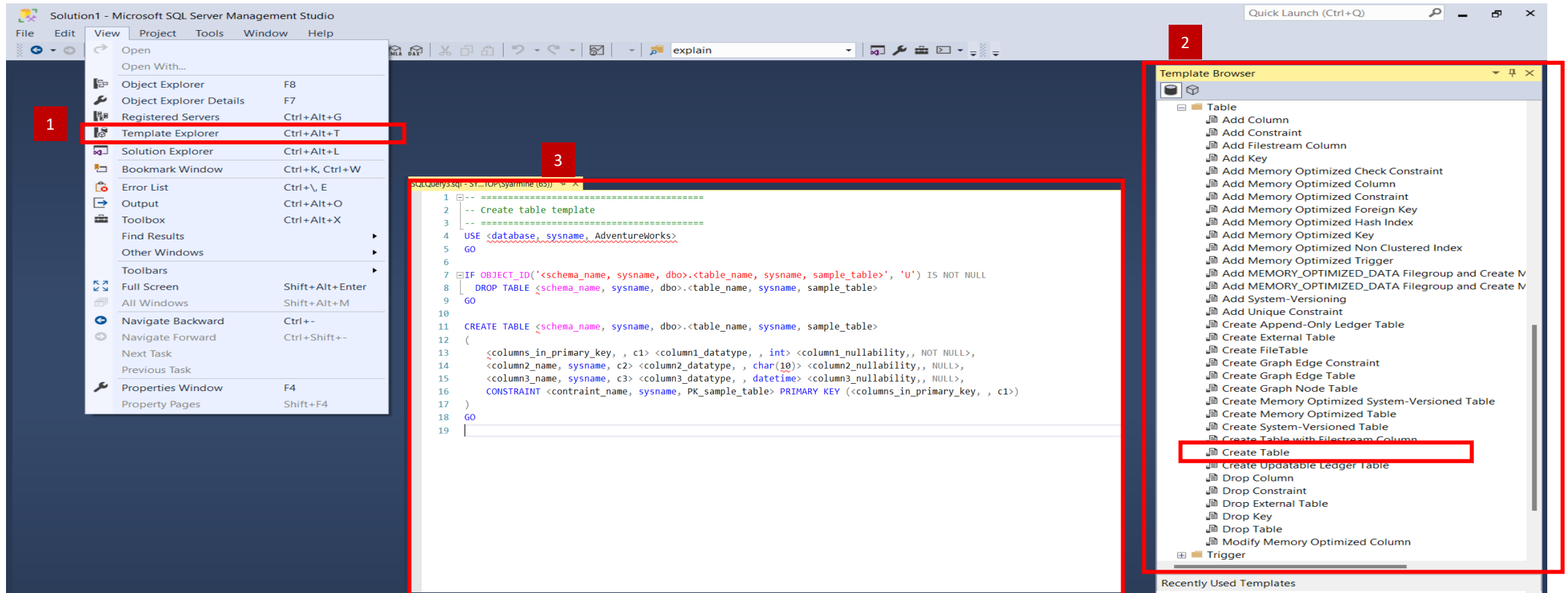


# Creating a Database and Table - From Excel to SQL

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# Extra: Use TEMPLATES in SQL Server Management Studio



1. Select "Template Explorer"
2. Select available templates. For example, select "Create table"
3. Sample of "Create Table" template

## Extra: Use TEMPLATES in SQL Server Management Studio

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- There are pre-built Transact-SQL Templates that are available in SSMS.
- Use Template Browser to locate the template. You can:
  - Open a template
    - Create a database
    - Create a table
  - Edit a template
  - Locate the template on disk
  - Save the template
  - Save custom template
- Read more here: <https://learn.microsoft.com/en-us/sql/ssms/template/templates-ssms?view=sql-server-ver16>



## Extra: Use VIEWS in SQL Server Management Studio

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- A view is **a virtual table** whose contents are defined by a query. Like a table, a view consists of a set of named columns and rows of data.
- Views are generally used to focus, simplify, and customize the perception each user has of the database. Unless indexed, a view does not exist as a stored set of data values in a database.
- A view acts **as a filter** on the underlying tables referenced in the view. The query that defines the view can be from **one or more tables** or from other views in the current or other databases (i.e using joins)
- Security: Views can be used as security mechanisms by letting users access data through the view, without granting the users permissions to directly access the underlying base tables of the view.
- Types of view: Indexed view, Partitioned view, System view
- The CREATE VIEW must be the first statement in a query batch. A view can have a maximum of 1,024 columns.

## Extra: Use VIEWS in SQL Server Management Studio

---

```
CREATE VIEW view_name
```

```
AS
```

```
SELECT statement
```

## Extra: Use SUBQUERIES in SQL Server Management Studio

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- A subquery is a SELECT statement nested within another query.
- The nested query, which is the subquery, is referred to as the inner query. The query containing the nested query is the outer query.
- The purpose of a subquery is to return results to the outer query. The form of the results will determine whether the subquery is a scalar or multi-valued subquery:
  - **Scalar** subqueries return a single value. Outer queries must process a single result.
  - **Multi-valued subqueries** return a result much like a single-column table. Outer queries must be able to process multiple values.

## Extra: Use SUBQUERIES in SQL Server Management Studio

---

### SCALAR SUBQUERIES

```
SELECT
    SalesOrderID,
    ProductID,
    OrderQty
FROM
    Sales.SalesOrderDetail
WHERE SalesOrderID =
    (SELECT MAX(SalesOrderID)
     FROM Sales.SalesOrderHeader);
```

### MULTI-VALUED SUBQUERIES

```
SELECT
    c.CustomerID,
    o.SalesOrderID
FROM
    Sales.Customer AS c
JOIN
    Sales.SalesOrderHeader AS o ON
    c.CustomerID = o.CustomerID
WHERE
    c.CountryRegion = 'Canada';
```

Module 4

# Understanding scripts, restore a database and templates for database creation

# Understanding scripts and database restore from popular databases

---

- Go to [this Github repositories](#) and download the sample databases:
  - [Adventureworks](#)
  - Contoso
  - Northwind
  - Wide World Importers
- You can replicate these databases by **installing the database** or **installing from a backup**.
- Read more here: <https://learn.microsoft.com/en-us/sql/samples/adventureworks-install-configure?view=sql-server-ver16&tabs=ssms>

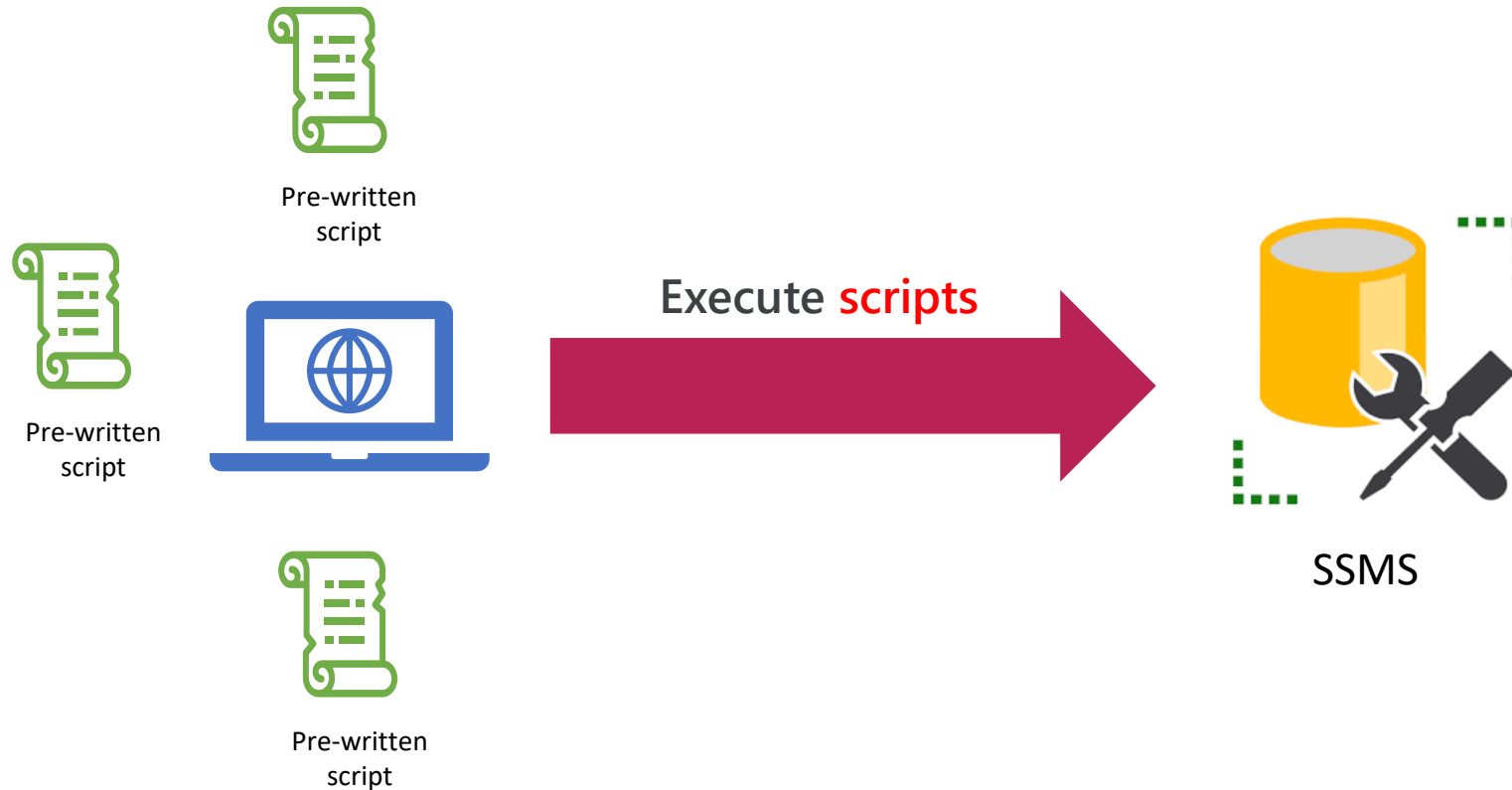
# Understanding scripts from popular databases

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- Installing AdventureWorks
  - Download AdventureWorks-oltp-install-script.zip and extract the zip file to the C:\Samples\AdventureWorks folder.
  - Open C:\Samples\AdventureWorks\instawdb.sql in SQL Server Management Studio and follow the instructions at the top of the file.
  - *Enable SQLCMD mode via Query tab*
- Run a pre-written script (i.e by content creator or database administrator) within SSMS

# Execute scripts from safe and popular databases

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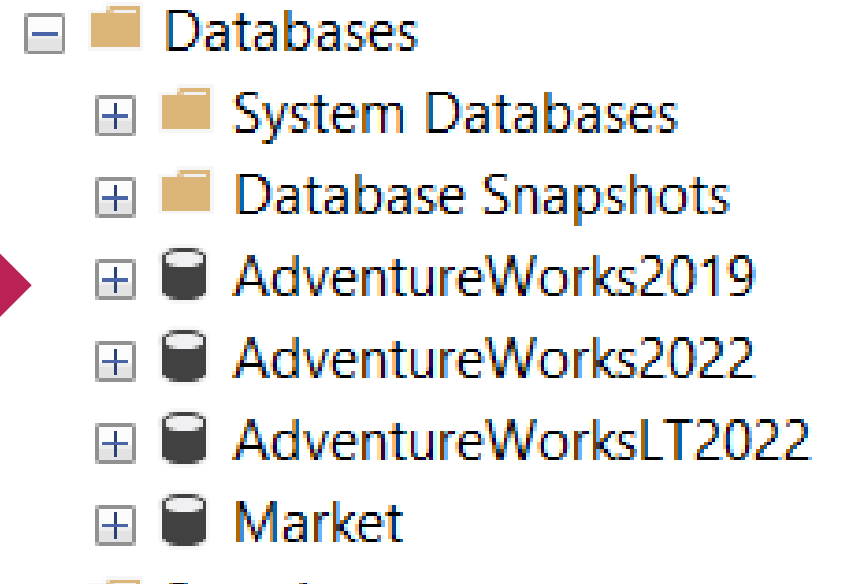


# Example: Execute scripts from AdventureWorks database

```
1 =====
2 File:      instawdb.sql
3
4 Summary:  Creates the AdventureWorks sample database. Run this on
5 any version of SQL Server (2008R2 or later) to get AdventureWorks for your
6 current version.
7
8 Date:     October 26, 2017
9 Updated:  October 26, 2017
10
11 =====
12 This file is part of the Microsoft SQL Server Code Samples.
13
14 Copyright (C) Microsoft Corporation. All rights reserved.
15
16 This source code is intended only as a supplement to Microsoft
17 Development Tools and/or on-line documentation. See these other
18 materials for detailed information regarding Microsoft code samples.
19
20 All data in this database is fictitious.
21
22 THIS CODE AND INFORMATION ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
23 KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
24 IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A
25 PARTICULAR PURPOSE.
26 =====*/
27
28
29 HOW TO RUN THIS SCRIPT:
30
31 1. Enable full-text search on your SQL Server instance.
32
33 2. Open the script inside SQL Server Management Studio and enable SQLCMD mode.
34    This option is in the Query menu.
35
36 3. Copy this script and the install files to C:\Samples\AdventureWorks, or
37    set the following environment variable to your own data path
```

AdventureWorks script leading to creation of  
AdventureWorks database

Execute **scripts**



AdventureWorks database created

# Understanding database restore from popular databases

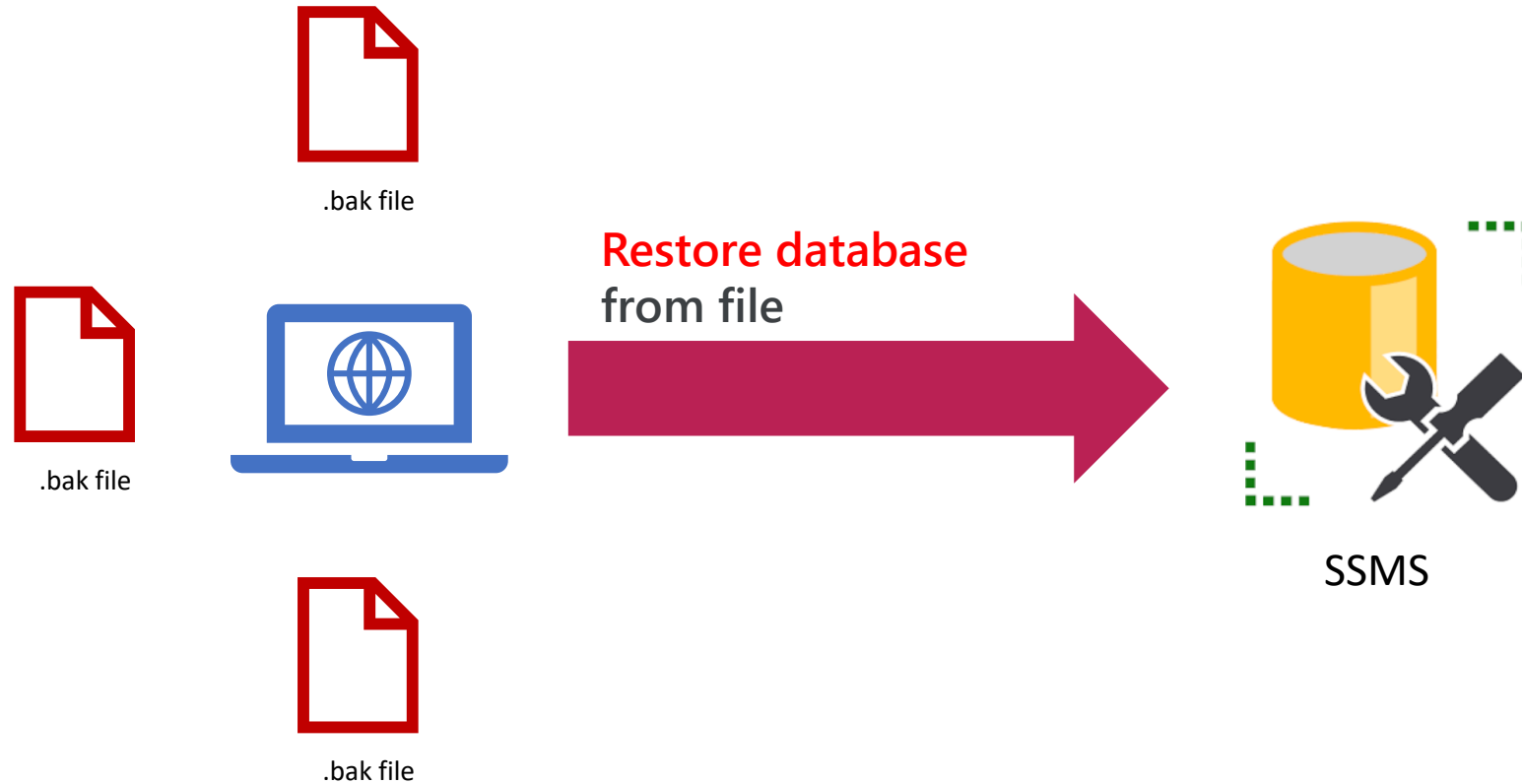
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## Install a database from database backup

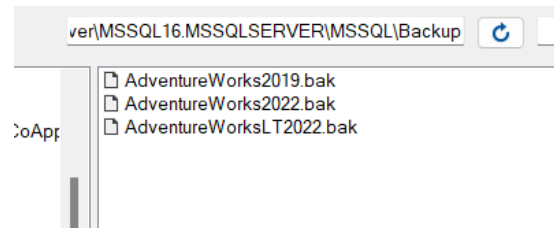
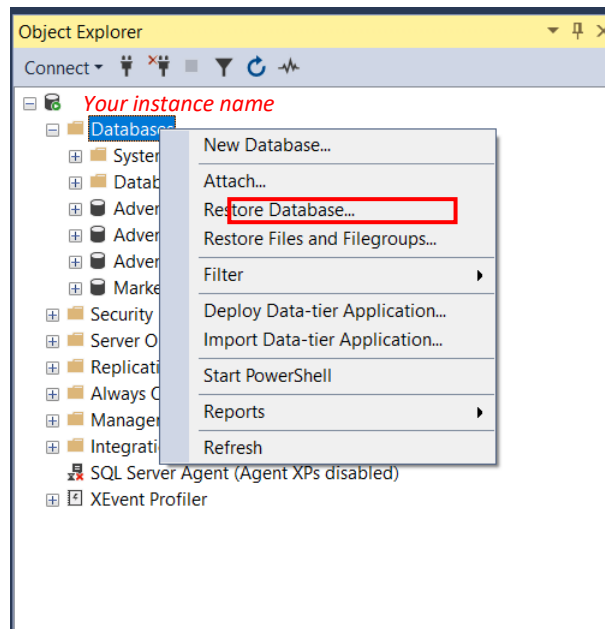
- Locate the Backup folder for your SQL Server instance. The default path for 64-bit SQL Server 2016 is **C:\Program Files\Microsoft SQL Server\MSSQL13.MSSQLSERVER\MSSQL\Backup**. The MSSQL value is MSSQL14 for SQL Server 2017, MSSQL13 for SQL Server 2016, MSSQL12 for SQL Server 2014, MSSQL11 for SQL Server 2012, and MSSQL10 for SQL Server 2008R2.
- **Download the .bak file** from AdventureWorks release and save it to the Backup folder for your SQL Server instance.
- Open SQL Server Management Studio and connect to your SQL Server instance.
- **Restore the database** using the SQL Server Management Studio user interface. For more information, see Restore a database backup using SSMS.
- Or, run the RESTORE DATABASE command in a new query Window. On the Standard toolbar, click the New Query button.

# Restore database using file from safe and popular databases

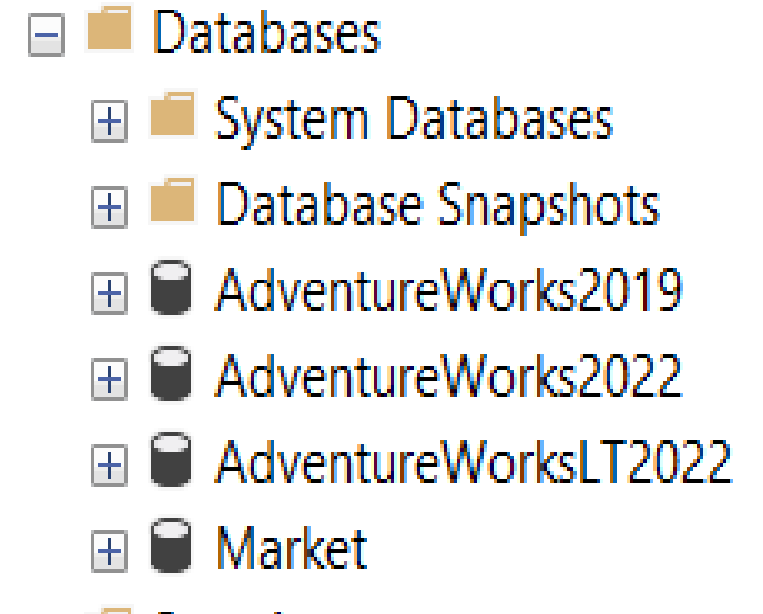
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# Example: Restore database using AdventureWorks .bak file



Restore database  
using **file**



Module 5

# Connecting SQL Server to Excel and PowerBI

# Connect to the Database Engine

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- **Connection options:** When you connect to the Database Engine, you must provide an instance name (that is, the server or instance where the Database Engine is installed), a network protocol, and a connection port, in the following format:
- **Connect to SQL Server on the same machine as the client (this session):** If you're connecting to a server configured with default settings, use one of the following options:
  - localhost
  - 127.0.0.1
  - . (a single period)
- Use **get data** from Excel or PowerBI and **connect** in Tableau



Excel

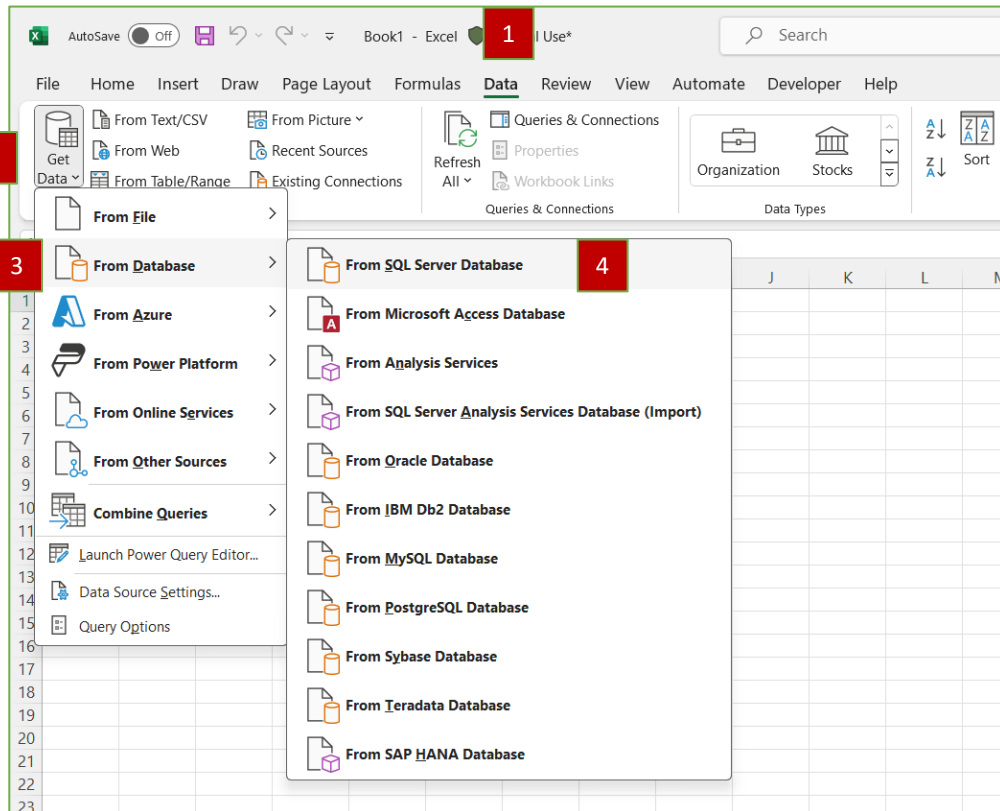


PowerBI

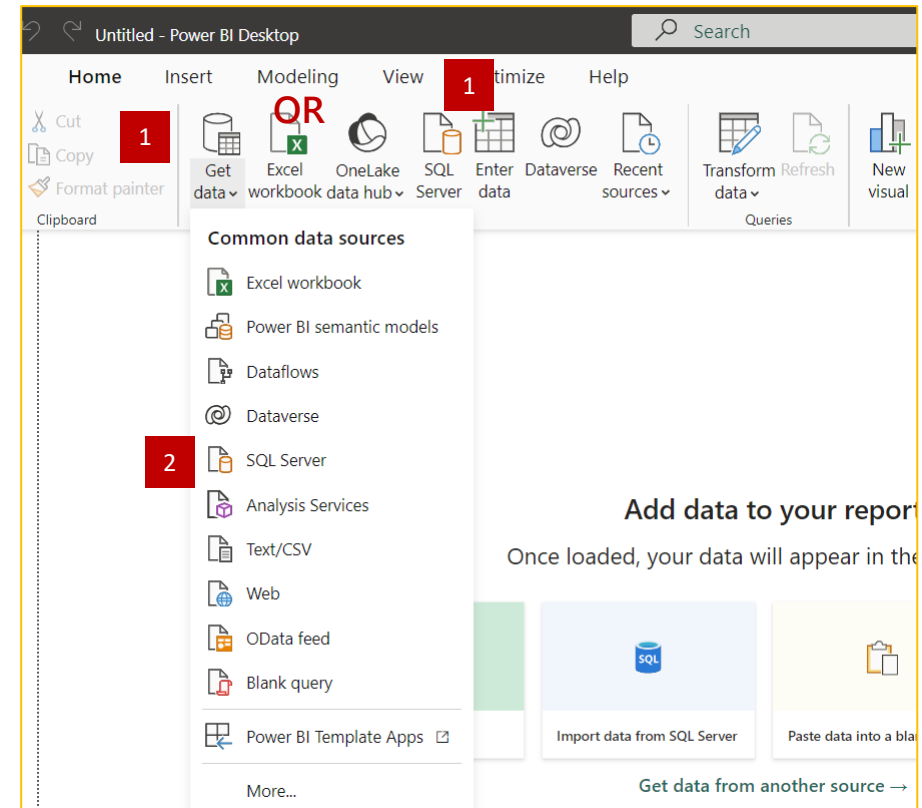
# Connect to the Database Engine



Excel



PowerBI





Excel



PowerBI

# Connect to the Database Engine



Excel

## SQL Server database

Server ⓘ

Database (optional)

▸ Advanced options



PowerBI

## SQL Server database

Server ⓘ

Database (optional)

Data Connectivity mode ⓘ

☒ Import

☐ DirectQuery

▸ Advanced options

Server name: If you use local server, can use *localhost*, . Or *ServerName*

Database (optional): You now may use AdventureWorks2019, AdventureWorks2022 or AdventureWorksLT2022 or Market





Excel



PowerBI

# Connect to the Database Engine

---



Excel



PowerBI

Data acquisition by

Power Query

# Data transformation: Using Power Query

The screenshot displays the Microsoft Power Query Editor window titled "Orders - Power Query Editor". The interface includes a ribbon with tabs: File, Home, Transform, Add Column, and View. The Transform tab is active, showing various data manipulation options like "Remove Columns", "Sort", and "Merge Queries".

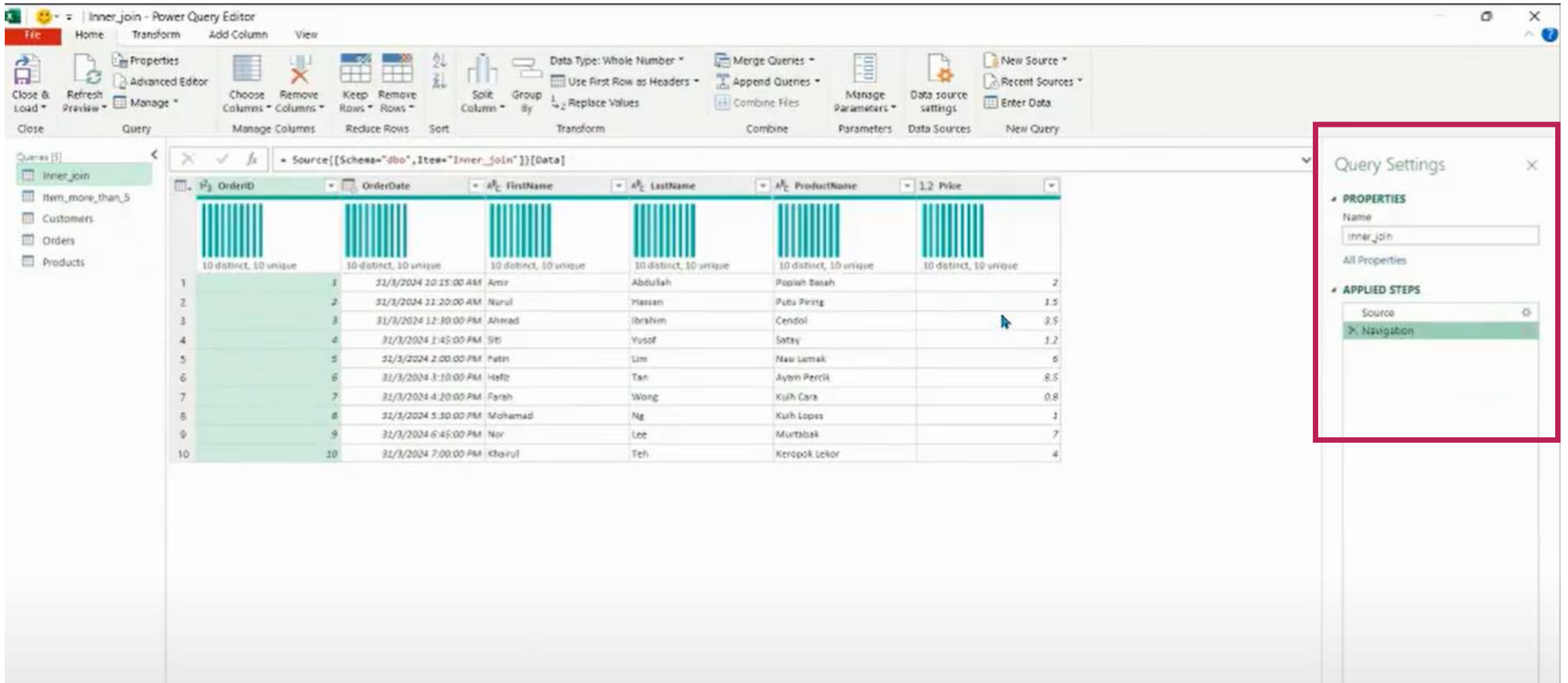
On the left, the "Queries" pane lists "Inner\_join", "Item\_more\_than\_5", "Customers", "Orders" (selected), and "Products". The main area shows a data table with columns: OrderID, OrderDate, Customers.FirstName, Customers.LastName, Products.ProductName, and Products.Price. The table contains 10 rows of data.

On the right, the "Query Settings" pane is visible, showing the "Properties" tab with the query name "Orders" and the "Applied Steps" list. The "Applied Steps" list includes "Source", "Navigation", "Merged Queries", "Expanded Customers", "Merged Queries1", "Expanded Products", and "Removed Columns" (highlighted).

The formula bar at the top of the main area displays the M query: `Table.RemoveColumns(#"Expanded Products",{"CustomerID", "ProductID"})`.

	OrderID	OrderDate	Customers.FirstName	Customers.LastName	Products.ProductName	Products.Price
1	1	31/3/2024 10:15:00 AM	Amir	Abdullah	Popiah Basah	2
2	2	31/3/2024 11:20:00 AM	Nurul	Hassan	Puteh Piring	1.5
3	3	31/3/2024 12:30:00 PM	Ahmad	Ibrahim	Cendol	3.5
4	4	31/3/2024 1:45:00 PM	Siti	Yusof	Satay	1.2
5	5	31/3/2024 2:00:00 PM	Patih	Lim	Nasi Lemak	6
6	6	31/3/2024 3:10:00 PM	Hafiz	Tan	Ayam Percik	8.5
7	7	31/3/2024 4:20:00 PM	Farah	Wong	Kuah Cera	0.8
8	8	31/3/2024 5:30:00 PM	Mohamad	Ng	Kuah Lopes	1
9	9	31/3/2024 6:45:00 PM	Nor	Lee	Murtabak	7
10	10	31/3/2024 7:00:00 PM	Khairul	Teh	Keropok Lekor	4

# Data transformation: Fetch transformed data from SQL



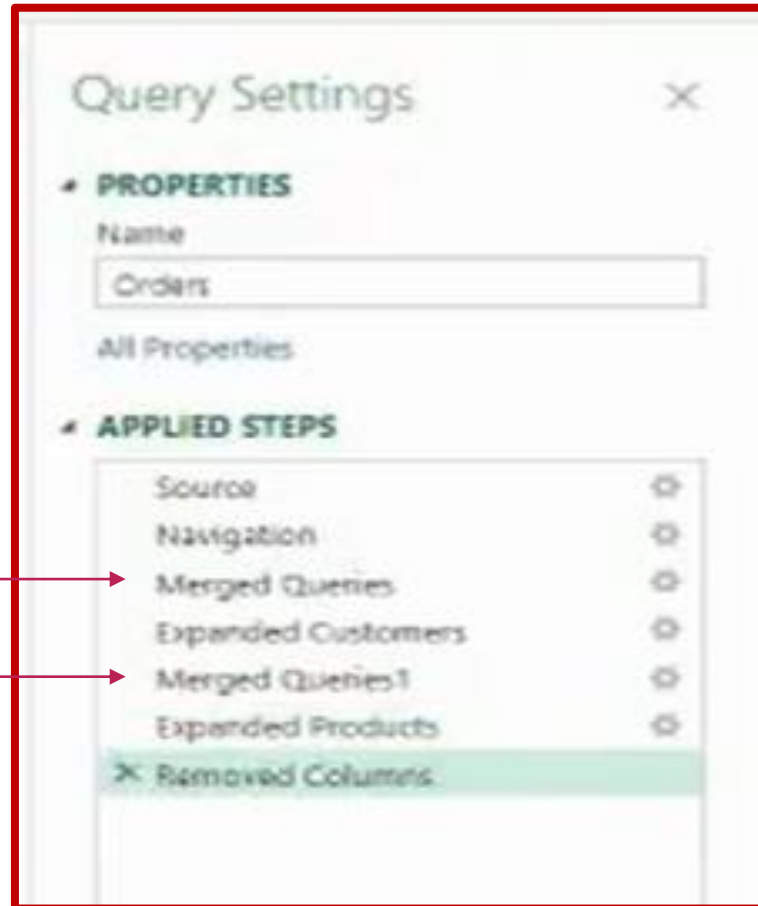
The screenshot displays the Power Query Editor interface. The main area shows a table with 10 rows and 6 columns: OrderID, OrderDate, FirstName, LastName, ProductName, and Price. The data is as follows:

OrderID	OrderDate	FirstName	LastName	ProductName	Price
1	31/3/2024 10:15:00 AM	Amir	Abdullah	Popiah Basah	2
2	31/3/2024 11:20:00 AM	Nurul	Hassan	Putu Piring	1.5
3	31/3/2024 12:30:00 PM	Ahmad	Ibrahim	Cendol	3.5
4	31/3/2024 1:45:00 PM	Siti	Yusof	Satay	1.2
5	31/3/2024 2:00:00 PM	Putih	Lim	Nasi Lemak	6
6	31/3/2024 3:10:00 PM	Hayti	Tan	Ayam Percik	8.5
7	31/3/2024 4:20:00 PM	Farah	Wong	Kuah Cere	0.8
8	31/3/2024 5:30:00 PM	Mohamad	Ng	Kuah Lopes	1
9	31/3/2024 6:45:00 PM	Nor	Lee	Murtabak	7
10	31/3/2024 7:00:00 PM	Kharul	Teh	Keropok Lekor	4

The 'Query Settings' pane on the right is highlighted with a red box. It shows the 'Name' field set to 'inner\_join' and the 'Applied Steps' list containing 'Source' and 'Navigation'.

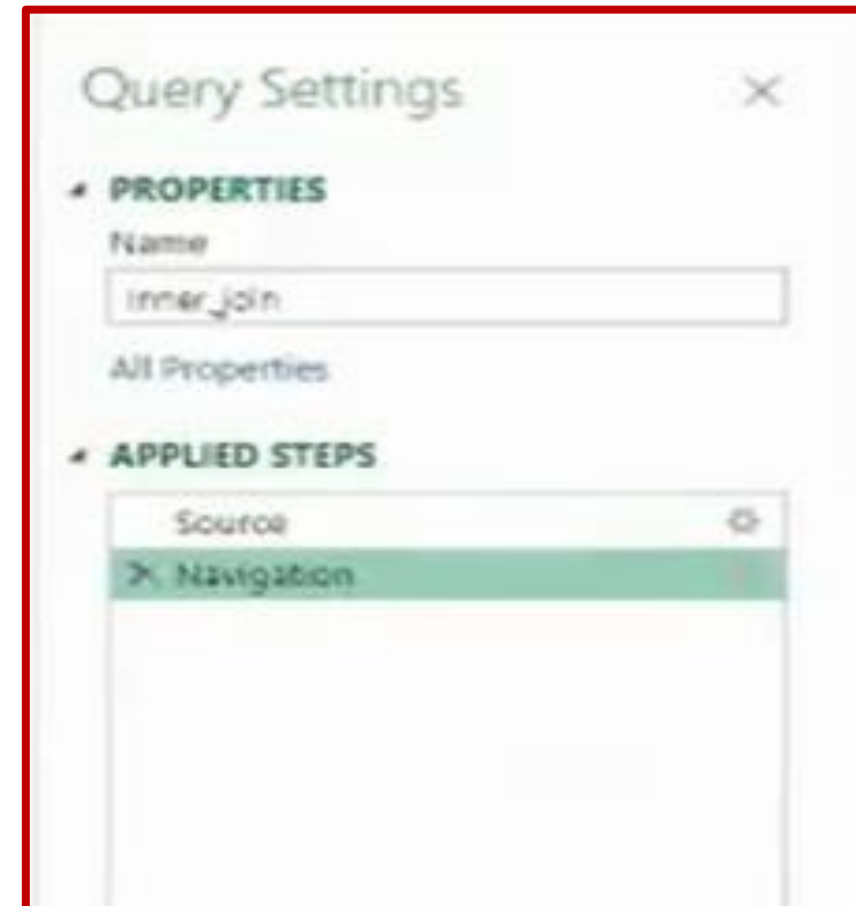
# What is the difference?

All transformation inside Power Query



Merge happened 2x

All transformation happened prior SQL,  
only need to load the table / view



Less step → improved performance

# The process in the background...

Excel / PowerBI: Recorded **automatically** as M-language as you click in Power Query



The screenshot shows the 'Advanced Editor' window in Power Query. The title bar says 'Advanced Editor'. The query name 'Orders' is displayed at the top left. On the top right, there is a 'Display Options' dropdown and a help icon. The main area contains M-code for a query named 'Orders'. The code starts with 'let' and defines 'Source' as a SQL database connection. It then performs nested joins for 'Customers' and 'Products' and finally removes columns. The code is as follows:

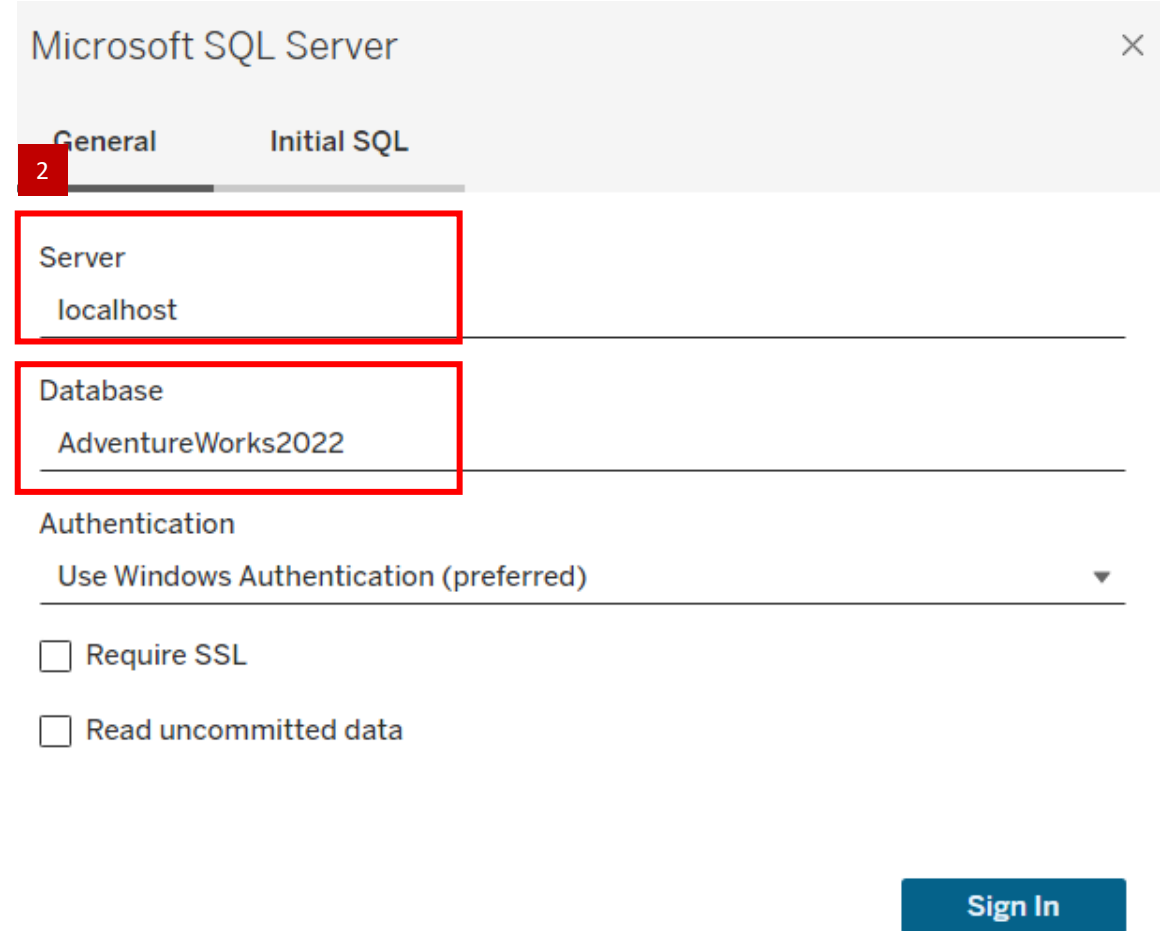
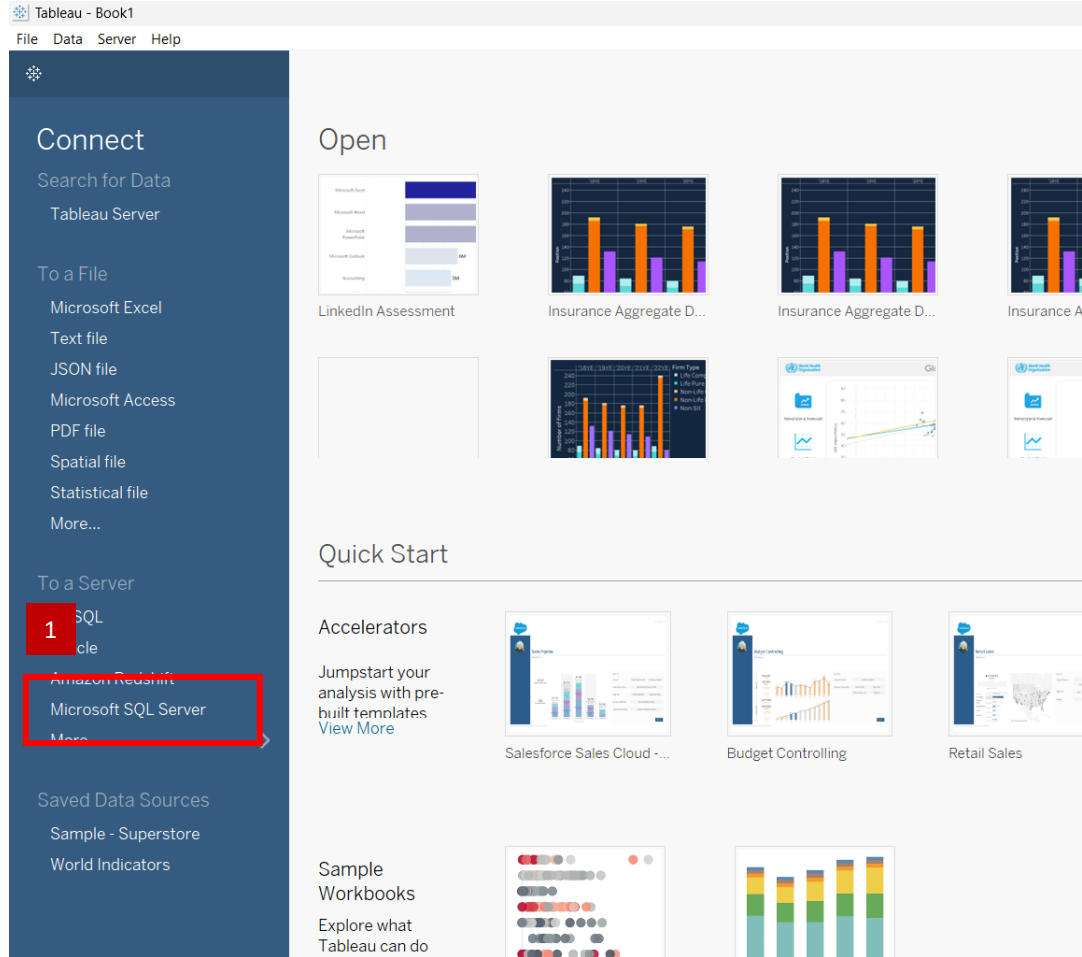
```
let
    Source = Sql.Database(".", "Market"),
    dbo_Orders = Source[[Schema="dbo",Item="Orders"]][Data],
    #"Merged Queries" = Table.NestedJoin(dbo_Orders, {"CustomerID"}, Customers, {"CustomerID"}, "Customers", JoinKind.Inner),
    #"Expanded Customers" = Table.ExpandTableColumn(#"Merged Queries", "Customers", {"FirstName", "LastName"}, {"Customers.FirstName", "Customers.LastName"}),
    #"Merged Queries1" = Table.NestedJoin(#"Expanded Customers", {"ProductID"}, Products, {"ProductID"}, "Products", JoinKind.Inner),
    #"Expanded Products" = Table.ExpandTableColumn(#"Merged Queries1", "Products", {"ProductName", "Price"}, {"Products.ProductName", "Products.Price"}),
    #"Removed Columns" = Table.RemoveColumns(#"Expanded Products", {"CustomerID", "ProductID"})
in
    #"Removed Columns"
```

SSMS (T-SQL): More control, get the **output set based on your input**, happened **BEFORE** pre-loaded in Power Query.

```
-- JOINS
-- INNER JOINS
-- An inner join will return rows where there is at least one match in both tables.
SELECT Orders.OrderID, Orders.OrderDate, Customers.FirstName, Customers.LastName, Products.ProductName, Products.Price
FROM Orders
INNER JOIN Customers ON Orders.CustomerID = Customers.CustomerID
INNER JOIN Products ON Orders.ProductID = Products.ProductID;
```



# Connect to the Database Engine (Tableau)



# Tableau Data Source Pane

The screenshot displays the Tableau Data Source Pane with three numbered callouts:

- 1** Points to the **Connections** pane, which shows a connection to `localhost` (Microsoft SQL Server) and the selected database `AdventureWorks2022`.
- 2** Points to the **Table** pane, which lists available tables such as `ProductModel`, `SalesOrderDetail`, and `SalesPerson`.
- 3** Points to the canvas pane, which shows a relationship diagram between `SalesOrderDetail` and `SalesOrderDetail1`.

Below the panes, the selected table `SalesOrderDetail1` is shown with 11 fields and 121317 rows. A preview of the data is displayed below:

Name	Fields
SalesOrderDetail1	

#	SalesOrderID (SalesOrd...
43659	
43659	
43659	

1. Connection to server *localhost* and database *AdventureWorks2022*
2. Tables available
3. Canvas pane to create relationship between logical tables

Module 6

# Expand learning curve using MOOCs and Github for learning



# Microsoft Career Path

## Explore careers



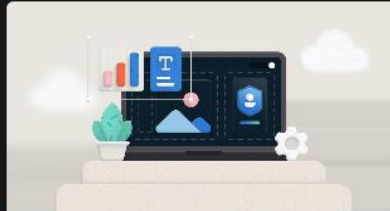
### Administrator

Scale technical solutions across the company.



### AI Engineer

Define and implement cutting-edge AI solutions.



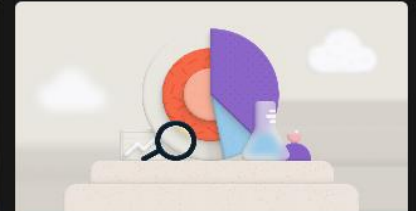
### App Maker

Build business applications the easy way.



### Business User

Increase efficiency and productivity in your business.



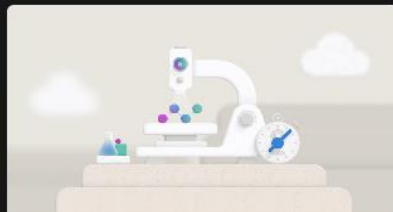
### Data Analyst

Make meaningful decisions with your data.



### Data Engineer

Make your complex data available and accessible.



### Data Scientist

Find the trends and develop data-driven solutions for your business.



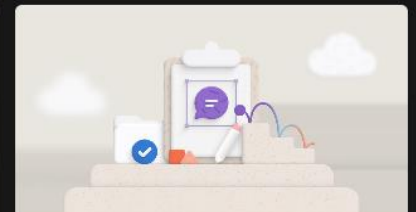
### Developer

Make technology work for everyone.



### DevOps Engineer

Blend your technical expertise with business savvy.



### Functional Consultant

Implement custom business applications.

# Microsoft Certifications

## Become Microsoft Certified

Learn more at: [microsoft.com/credentials](https://microsoft.com/credentials)

Full certification title

★ Expert certification

🔒 This certification has prerequisites

Exam requirements

MB-300 + MB-310

	Infrastructure	Data and AI		Digital app and innovation	Modern work	Business applications			Security
<div>Fundamentals</div> <div>Master the basics</div>	<div>Azure Fundamentals</div> <div>AZ-900</div>	<div>Azure AI Fundamentals</div> <div>AI-900</div>	<div>Azure Data Fundamentals</div> <div>DP-900</div>		<div>Microsoft 365 Fundamentals</div> <div>MS-900</div>	<div>Dynamics 365 Fundamentals (CRM)</div> <div>MB-910</div>	<div>Dynamics 365 Fundamentals (ERP)</div> <div>MB-920</div>	<div>Power Platform Fundamentals</div> <div>PL-900</div>	<div>Security, Compliance, and Identity Fundamentals</div> <div>SC-900</div>
<div>Role-based</div> <div>Expand your technical skill set</div>	<div>Azure Administrator Associate</div> <div>AZ-104</div> <div>Azure Solutions Architect Expert</div> <div>AZ-305</div> <div>Azure Network Engineer Associate</div> <div>AZ-700</div> <div>Windows Server Hybrid Administrator Associate</div> <div>AZ-800AZ-801</div>	<div>Azure AI Engineer Associate</div> <div>AI-102</div> <div>Azure Data Scientist Associate</div> <div>DP-100</div> <div>Azure Database Administrator Associate</div> <div>DP-300</div> <div>Azure Data Engineer Associate</div> <div>DP-203</div> <div>Azure Enterprise Data Analyst Associate</div> <div>DP-500</div> <div>Fabric Analytics Engineer Associate</div> <div>DP-600</div>	<div>Azure Developer Associate</div> <div>AZ-204</div> <div>DevOps Engineer Expert</div> <div>AZ-400</div>	<div>Endpoint Administrator Associate</div> <div>MD-102</div> <div>Administrator Expert</div> <div>MS-102</div> <div>Teams Administrator Associate</div> <div>MS-700</div> <div>Collaboration Communications Systems Engineer Associate</div> <div>MS-721</div>	<div>Dynamics 365 Sales Functional Consultant Associate</div> <div>MB-210</div> <div>Dynamics 365 Customer Service Functional Consultant Associate</div> <div>MB-230</div> <div>Dynamics 365 Finance Functional Consultant Associate</div> <div>MB-300MB-310</div> <div>Dynamics 365 Supply Chain Management Functional Consultant Associate</div> <div>MB-300MB-335</div> <div>Dynamics 365 Finance and Operations Apps Developer Associate</div> <div>MB-300MB-550</div> <div>Dynamics 365 Supply Chain Central Functional Consultant Associate</div> <div>MB-300MB-335</div> <div>Dynamics 365 Finance and Operations Apps Solution Architect Expert</div> <div>MB-700</div> <div>Dynamics 365 Marketing Functional Consultant Associate</div> <div>MB-220</div> <div>Dynamics 365 Field Service Functional Consultant Associate</div> <div>MB-240</div> <div>Dynamics 365 Supply Chain Management Functional Consultant Associate</div> <div>MB-300MB-330</div> <div>Dynamics 365 Finance and Operations Apps Developer Associate</div> <div>MB-300MB-500</div> <div>Dynamics 365 Business Central Functional Consultant Associate</div> <div>MB-600</div> <div>Dynamics 365 Business Central Developer Associate</div> <div>MB-920</div> <div>Power Platform Functional Consultant Associate</div> <div>PL-200</div> <div>Power BI Data Analyst Associate</div> <div>PL-300</div> <div>Power Platform Developer Associate</div> <div>PL-400</div> <div>Power Automate RPA Developer Associate</div> <div>PL-500</div> <div>Power Platform Solution Architect Expert</div> <div>PL-600</div> <div>Power Platform App Maker Associate</div> <div>PL-100</div>	<div>Azure Security Engineer Associate</div> <div>AZ-500</div> <div>Cybersecurity Architect Expert</div> <div>SC-100</div> <div>Security Operations Analyst Associate</div> <div>SC-200</div> <div>Identity and Access Administrator Associate</div> <div>SC-300</div> <div>Information Protection and Compliance Administrator Associate</div> <div>SC-400</div>			
<div>Specialty</div> <div>Deepen your technical skills and manage industry solutions</div>	<div>Azure for SAP Workloads Specialty</div> <div>AZ-120</div> <div>Azure Virtual Desktop Specialty</div> <div>AZ-140</div>	<div>Azure Cosmos DB Developer Specialty</div> <div>DP-420</div>				<div>Customer Data Platform Specialty</div> <div>MB-260</div>			

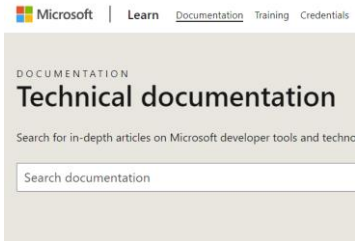
# Learn more

---



Get this presentation and code

<https://github.com/Syarmine/SQL-Masterclass>



Learn more about SQL Server 2022

<https://www.microsoft.com/en-my/sql-server/sql-server-2022>



Take the Microsoft Learning Path

<https://learn.microsoft.com/en-us/sql/sql-server/educational-sql-resources>

# Post-Quiz

---



<https://forms.office.com/r/QVGuSzE9ir>

# Summary

---

Do you understand this now?

No need to lie about your SQL proficiency anymore



Practical-Alarm1763 1d

```
SELECT
    c.name AS 'Candidate',
    i.question AS
    'Interview_Questions',
    a.answer AS 'Answer',
    CASE
        WHEN a.correct = 1 THEN
        'Passed'
        ELSE 'Fucked'
    END AS 'Result'
FROM
    Candidates c
INNER JOIN
    Interviews i ON c.candidate_id
    = i.candidate_id
INNER JOIN
    Answers a ON i.interview_id =
    a.interview_id
WHERE
    c.experience = 'None' AND
    c.claimed_expertise = 'SQL';
```

# Thank you for your attention!

## Follow me on:



@SyarmineS



@ Syarmine Shah – connect and say hi!