run both **Star Schema** and **Snowflake Schema** in **MS SQL Server using SSMS (SQL Server Management Studio)**.

✅ Part 1: Getting Started in SSMS

Step 1: Open SSMS and Connect to SQL Server

- Open **SQL Server Management Studio (SSMS)**.
- Connect to your local server:
    - Server type: **Database Engine**
    - Server name: localhost or your machine name
    - Authentication: **Windows Authentication** (default) or use your credentials

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⭐ Part 2: Star Schema Implementation (Simple)

🚀 Step 2: Create a Database

```
CREATE DATABASE StarSchemaDB;
GO

USE StarSchemaDB;
GO
```

🗂️ Step 3: Create Tables

```
-- Dimension Table: Product
CREATE TABLE Product (
    ProductID INT PRIMARY KEY,
    ProductName VARCHAR(100),
    Category VARCHAR(50)
);
```

```
-- Dimension Table: Customer
CREATE TABLE Customer (
    CustomerID INT PRIMARY KEY,
    FirstName VARCHAR(50),
    LastName VARCHAR(50),
    Email VARCHAR(100)
);

-- Dimension Table: Time
CREATE TABLE Time (
    TimeID INT PRIMARY KEY,
    Date DATE,
    Month INT,
    Quarter INT,
    Year INT
);

-- Fact Table: Sales
CREATE TABLE Sales (
    SalesID INT PRIMARY KEY,
    ProductID INT FOREIGN KEY REFERENCES Product(ProductID),
    CustomerID INT FOREIGN KEY REFERENCES Customer(CustomerID),
    TimeID INT FOREIGN KEY REFERENCES Time(TimeID),
    Quantity INT,
    TotalAmount DECIMAL(10,2)
);
```

🧾 Step 4: Insert Sample Data

```
-- Product Table
INSERT INTO Product VALUES (1, 'Laptop', 'Electronics');
INSERT INTO Product VALUES (2, 'Phone', 'Electronics');

-- Customer Table
INSERT INTO Customer VALUES (1, 'John', 'Doe', 'john.doe@email.com');
INSERT INTO Customer VALUES (2, 'Alice', 'Smith', 'alice.smith@email.com');

-- Time Table
INSERT INTO Time VALUES (1, '2025-01-15', 1, 1, 2025);
INSERT INTO Time VALUES (2, '2025-04-19', 4, 2, 2025);

-- Sales Table
```

```
INSERT INTO Sales VALUES (1, 1, 1, 1, 2, 2000.00);
INSERT INTO Sales VALUES (2, 2, 2, 2, 1, 700.00);
```

🔍 Step 5: Run a JOIN Query to View Star Schema Data

```
SELECT
   S.SalesID,
   P.ProductName,
   C.FirstName + ' ' + C.LastName AS CustomerName,
   T.Date,
   S.Quantity,
   S.TotalAmount
FROM
   Sales S
JOIN
   Product P ON S.ProductID = P.ProductID
JOIN
   Customer C ON S.CustomerID = C.CustomerID
JOIN
   Time T ON S.TimeID = T.TimeID;
```

❄️ Part 3: Snowflake Schema Implementation (Normalized)

Step 6: Create a New Database for Snowflake (Optional)

```
CREATE DATABASE SnowflakeSchemaDB;
GO

USE SnowflakeSchemaDB;
GO
```

Step 7: Create Normalized Tables

```
-- Category Table (New for Snowflake)
CREATE TABLE Category (
   CategoryID INT PRIMARY KEY,
   CategoryName VARCHAR(50)
);
```

```
-- Product Table (References Category)
CREATE TABLE Product (
    ProductID INT PRIMARY KEY,
    ProductName VARCHAR(100),
    CategoryID INT FOREIGN KEY REFERENCES Category(CategoryID)
);

-- Customer Table
CREATE TABLE Customer (
    CustomerID INT PRIMARY KEY,
    FirstName VARCHAR(50),
    LastName VARCHAR(50),
    Email VARCHAR(100)
);

-- Time Table
CREATE TABLE Time (
    TimeID INT PRIMARY KEY,
    Date DATE,
    Month INT,
    Quarter INT,
    Year INT
);

-- Fact Table: Sales
CREATE TABLE Sales (
    SalesID INT PRIMARY KEY,
    ProductID INT FOREIGN KEY REFERENCES Product(ProductID),
    CustomerID INT FOREIGN KEY REFERENCES Customer(CustomerID),
    TimeID INT FOREIGN KEY REFERENCES Time(TimeID),
    Quantity INT,
    TotalAmount DECIMAL(10,2)
);
```

Step 8: Insert Sample Data (Snowflake Schema)

```
-- Category Table
INSERT INTO Category VALUES (1, 'Electronics');

-- Product Table
INSERT INTO Product VALUES (1, 'Laptop', 1);
INSERT INTO Product VALUES (2, 'Phone', 1);
```

```
-- Customer Table
INSERT INTO Customer VALUES (1, 'John', 'Doe', 'john.doe@email.com');
INSERT INTO Customer VALUES (2, 'Alice', 'Smith', 'alice.smith@email.com');

-- Time Table
INSERT INTO Time VALUES (1, '2025-01-15', 1, 1, 2025);
INSERT INTO Time VALUES (2, '2025-04-19', 4, 2, 2025);

-- Sales Table
INSERT INTO Sales VALUES (1, 1, 1, 1, 2, 2000.00);
INSERT INTO Sales VALUES (2, 2, 2, 2, 1, 700.00);
```

Step 9: Query Snowflake Schema with Extra Join

```
SELECT
    S.SalesID,
    P.ProductName,
    C.FirstName + ' ' + C.LastName AS CustomerName,
    Cat.CategoryName,
    T.Date,
    S.Quantity,
    S.TotalAmount
FROM
    Sales S
JOIN
    Product P ON S.ProductID = P.ProductID
JOIN
    Category Cat ON P.CategoryID = Cat.CategoryID
JOIN
    Customer C ON S.CustomerID = C.CustomerID
JOIN
    Time T ON S.TimeID = T.TimeID;
```

- ✅ A **Star Schema** in StarSchemaDB
- ✅ A **Snowflake Schema** in SnowflakeSchemaDB

You can **run all this code directly** in **SSMS**, by pasting it into a **New Query window** and clicking **Execute (F5)**.