**Exercise 1: Creating a Non-Clustered Index**

Goal: Create a non-clustered index on the ProductName column in the Products table and compare query execution time before and after index creation.

**QUERY**

use OnlineRetailStore;

go

-- Drop tables if they exist

DROP TABLE IF EXISTS OrderDetails;

DROP TABLE IF EXISTS Orders;

DROP TABLE IF EXISTS Products;

DROP TABLE IF EXISTS Customers;

-- Create Customers table

CREATE TABLE Customers (

CustomerID INT PRIMARY KEY,

Name VARCHAR(100),

Region VARCHAR(50)

);

-- Create Products table

CREATE TABLE Products (

ProductID INT PRIMARY KEY,

ProductName VARCHAR(100),

Category VARCHAR(50),

Price DECIMAL(10, 2)

);

-- Create Orders table

CREATE TABLE Orders (

OrderID INT PRIMARY KEY,

CustomerID INT,

OrderDate DATE,

FOREIGN KEY (CustomerID) REFERENCES Customers(CustomerID)

);

-- Create OrderDetails table

CREATE TABLE OrderDetails (

OrderDetailID INT PRIMARY KEY,

OrderID INT,

ProductID INT,

Quantity INT,

FOREIGN KEY (OrderID) REFERENCES Orders(OrderID),

FOREIGN KEY (ProductID) REFERENCES Products(ProductID)

);

-- Insert into Customers

INSERT INTO Customers (CustomerID, Name, Region) VALUES

(1, 'Alice', 'North'),

(2, 'Bob', 'South'),

(3, 'Charlie', 'East'),

(4, 'Diana', 'West');

-- Insert into Products

INSERT INTO Products (ProductID, ProductName, Category, Price) VALUES

(1, 'Laptop', 'Electronics', 1200.00),

(2, 'Tablet', 'Electronics', 500.00),

(3, 'Chair', 'Furniture', 150.00),

(4, 'Desk', 'Furniture', 300.00);

-- Insert into Orders

INSERT INTO Orders (OrderID, CustomerID, OrderDate) VALUES

(1, 1, '2023-01-15'),

(2, 2, '2023-02-20'),

(3, 3, '2023-03-25'),

(4, 4, '2023-04-30');

-- Insert into OrderDetails

INSERT INTO OrderDetails (OrderDetailID, OrderID, ProductID, Quantity) VALUES

(1, 1, 1, 1), -- Alice ordered 1 Laptop

(2, 2, 2, 2), -- Bob ordered 2 Tablets

(3, 3, 3, 1), -- Charlie ordered 1 Chair

(4, 4, 4, 3); -- Diana ordered 3 Desks

-- Exercise 1: Non-Clustered Index

SELECT \* FROM Products WHERE ProductName = 'Laptop';

CREATE NONCLUSTERED INDEX IX\_Products\_ProductName ON Products(ProductName);

SELECT \* FROM Products WHERE ProductName = 'Laptop';

**Exercise 2: Creating a Clustered Index**

Goal: Create a clustered index on the OrderDate column in the Orders table and compare query execution time before and after index creation.

**QUERY:**

-- Exercise 2: Clustered Index

SELECT \* FROM Orders WHERE OrderDate = '2023-01-15';

-- Uncomment next two lines to replace clustered index (only if allowed)

-- ALTER TABLE Orders DROP CONSTRAINT PK\_\_Orders\_\_OrderID;

-- CREATE CLUSTERED INDEX IX\_Orders\_OrderDate ON Orders(OrderDate);

SELECT \* FROM Orders WHERE OrderDate = '2023-01-15';

**Exercise 3: Creating a Composite Index**

Goal: Create a composite index on the CustomerID and OrderDate columns in the Orders.

**QUERY:**

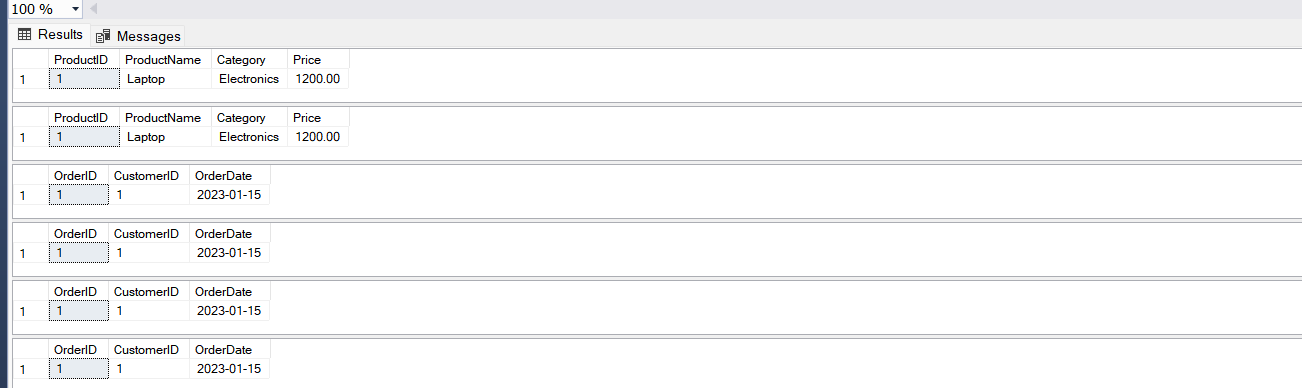
-- Exercise 3: Composite Index

SELECT \* FROM Orders WHERE CustomerID = 1 AND OrderDate = '2023-01-15';

CREATE NONCLUSTERED INDEX IX\_Orders\_CustomerID\_OrderDate ON Orders(CustomerID, OrderDate);

SELECT \* FROM Orders WHERE CustomerID = 1 AND OrderDate = '2023-01-15';

**OUTPUT:**

****