SQL Exercises Solution Document (Superset ID: 6364376)

Advance Concepts

Exercise 1: Ranking and Window Functions

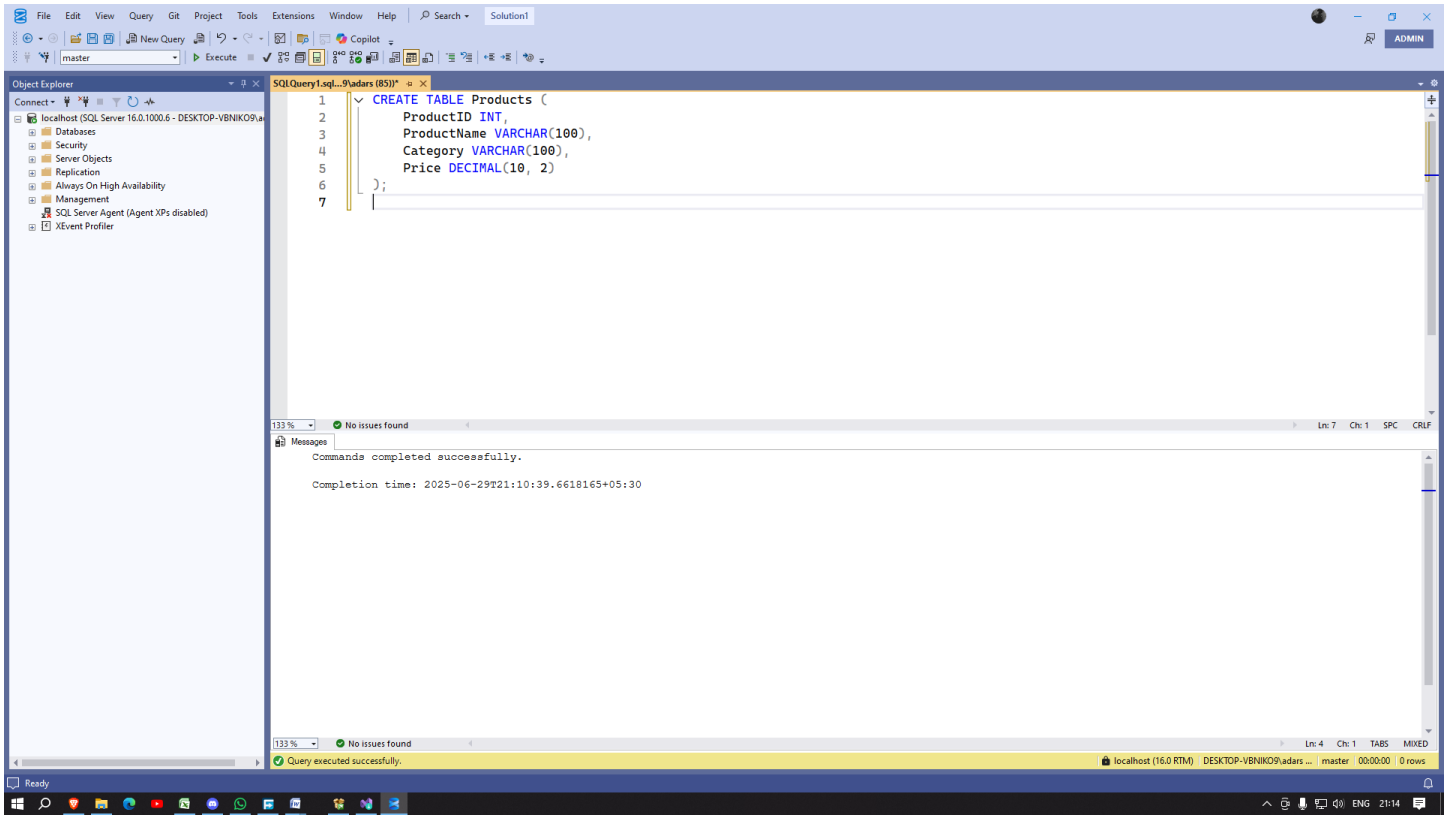
Objective

Demonstrate the use of different ranking window functions (ROW_NUMBER, RANK, DENSE_RANK) to rank products within categories by price.

Database Schema Setup

```
CREATE TABLE Products (
    ProductID INT PRIMARY KEY,
    ProductName VARCHAR(100),
    Category VARCHAR(100),
    Price DECIMAL(10, 2)
);
```

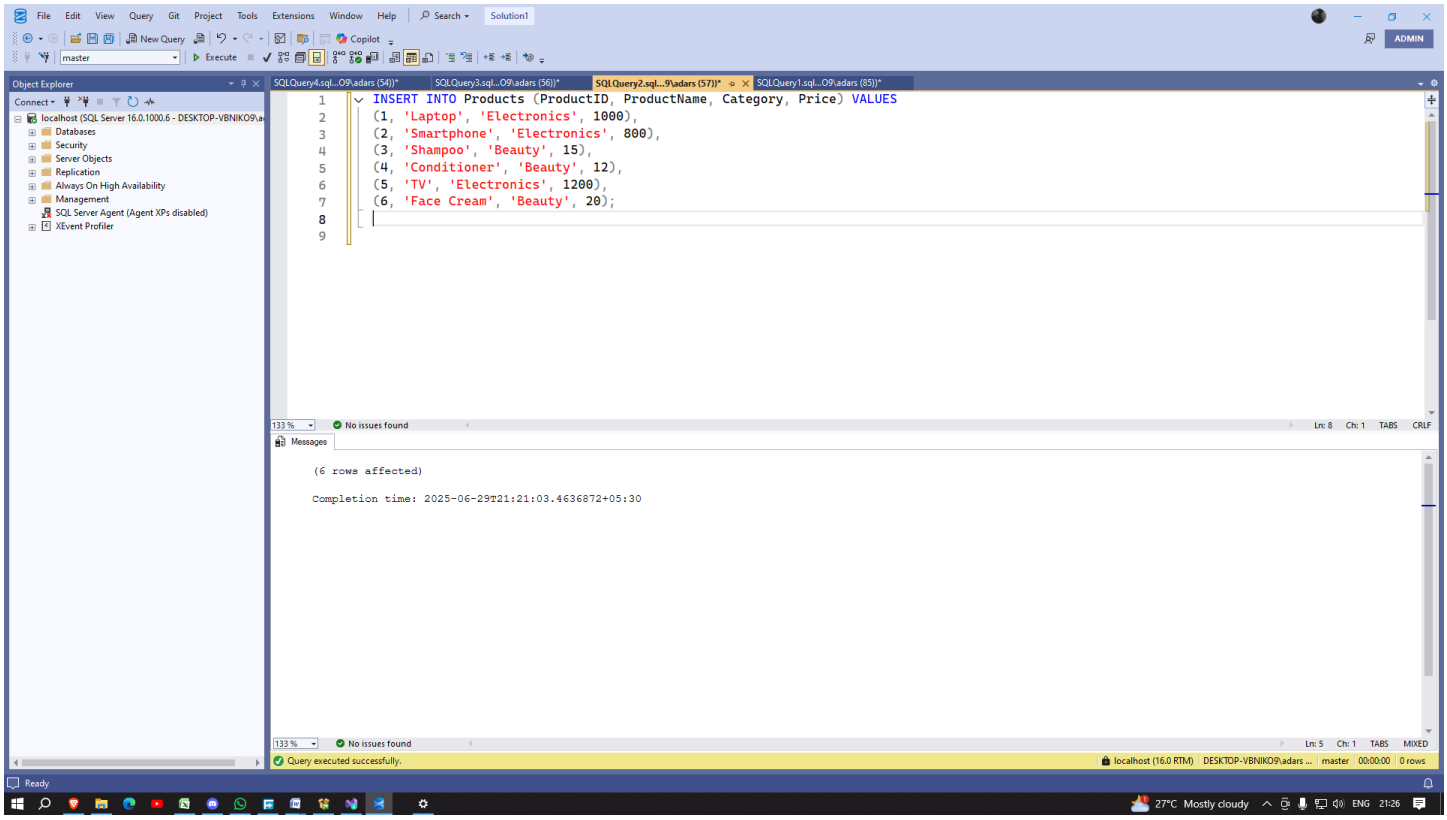
Execution Status: □ Commands completed successfully



Sample Data Insertion

```
INSERT INTO Products (ProductID, ProductName, Category, Price) VALUES
(1, 'Laptop', 'Electronics', 1000),
(2, 'Smartphone', 'Electronics', 800),
(3, 'Shampoo', 'Beauty', 15),
(4, 'Conditioner', 'Beauty', 12),
(5, 'TV', 'Electronics', 1200),
(6, 'Face Cream', 'Beauty', 20);
```

Execution Status: □ (6 rows affected)

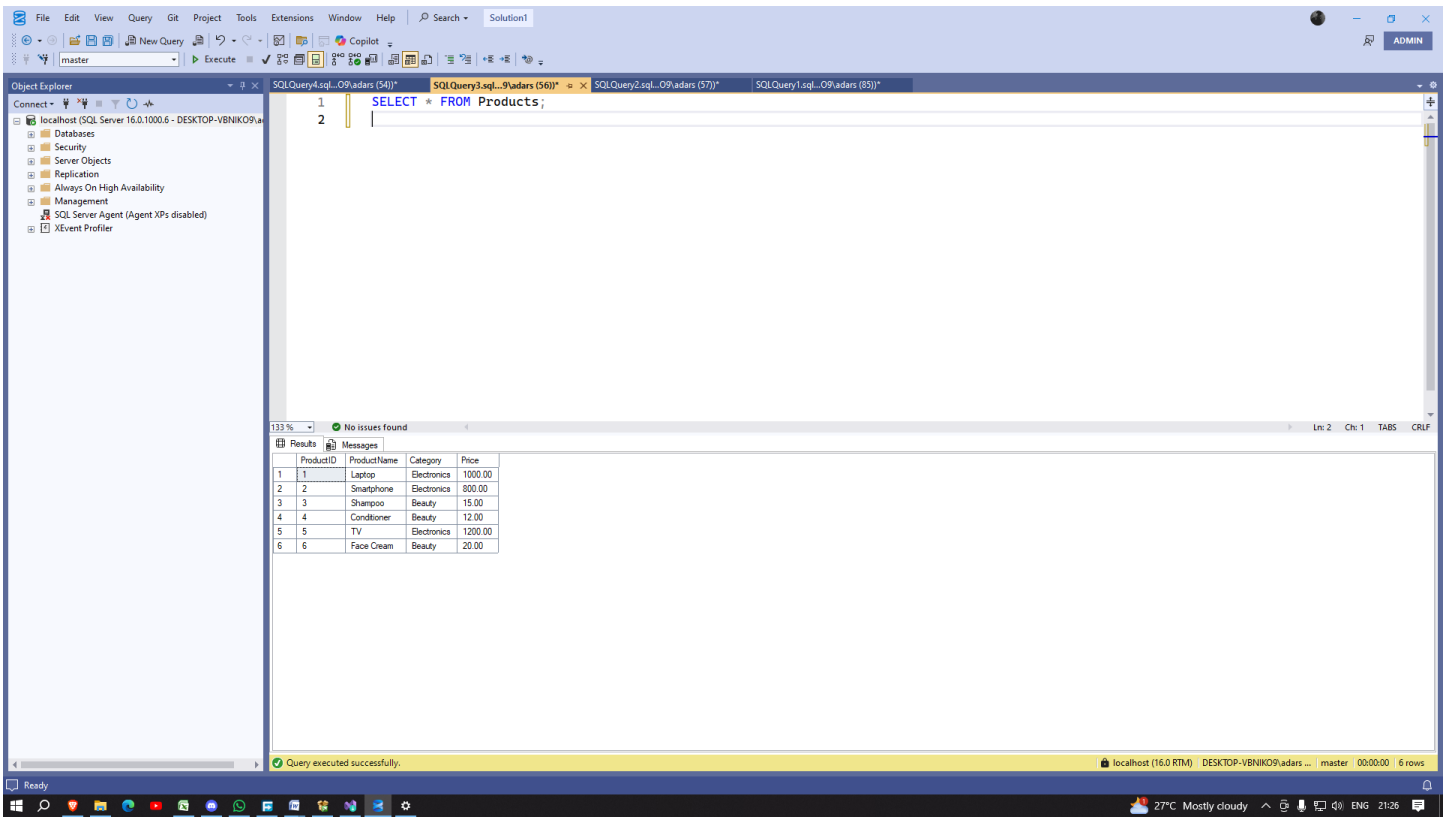


Data Verification Query

```
SELECT * FROM Products;
```

Execution Results:

ProductID	ProductName	Category	Price
1	Laptop	Electronics	1000.00
2	Smartphone	Electronics	800.00
3	Shampoo	Beauty	15.00
4	Conditioner	Beauty	12.00
5	TV	Electronics	1200.00
6	Face Cream	Beauty	20.00

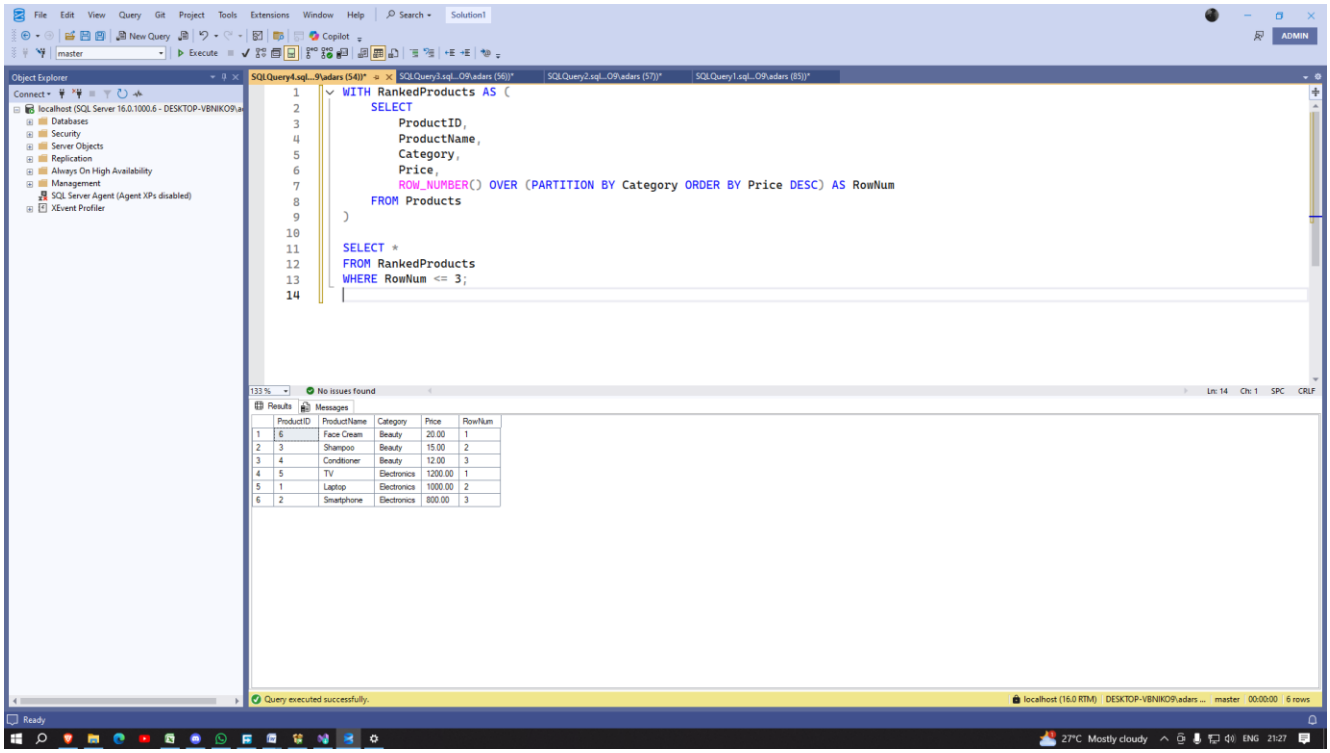


Solution 1: ROW_NUMBER() Function

```
WITH RankedProducts AS (
  SELECT
    ProductID,
    ProductName,
    Category,
    Price,
    ROW_NUMBER() OVER (PARTITION BY Category ORDER BY Price DESC) AS RowNum
  FROM Products
)
SELECT *
FROM RankedProducts
WHERE RowNum <= 3;
```

Execution Results:

ProductID	ProductName	Category	Price	RowNum
6	Face Cream	Beauty	20.00	1
3	Shampoo	Beauty	15.00	2
4	Conditioner	Beauty	12.00	3
5	TV	Electronics	1200.00	1
1	Laptop	Electronics	1000.00	2
2	Smartphone	Electronics	800.00	3

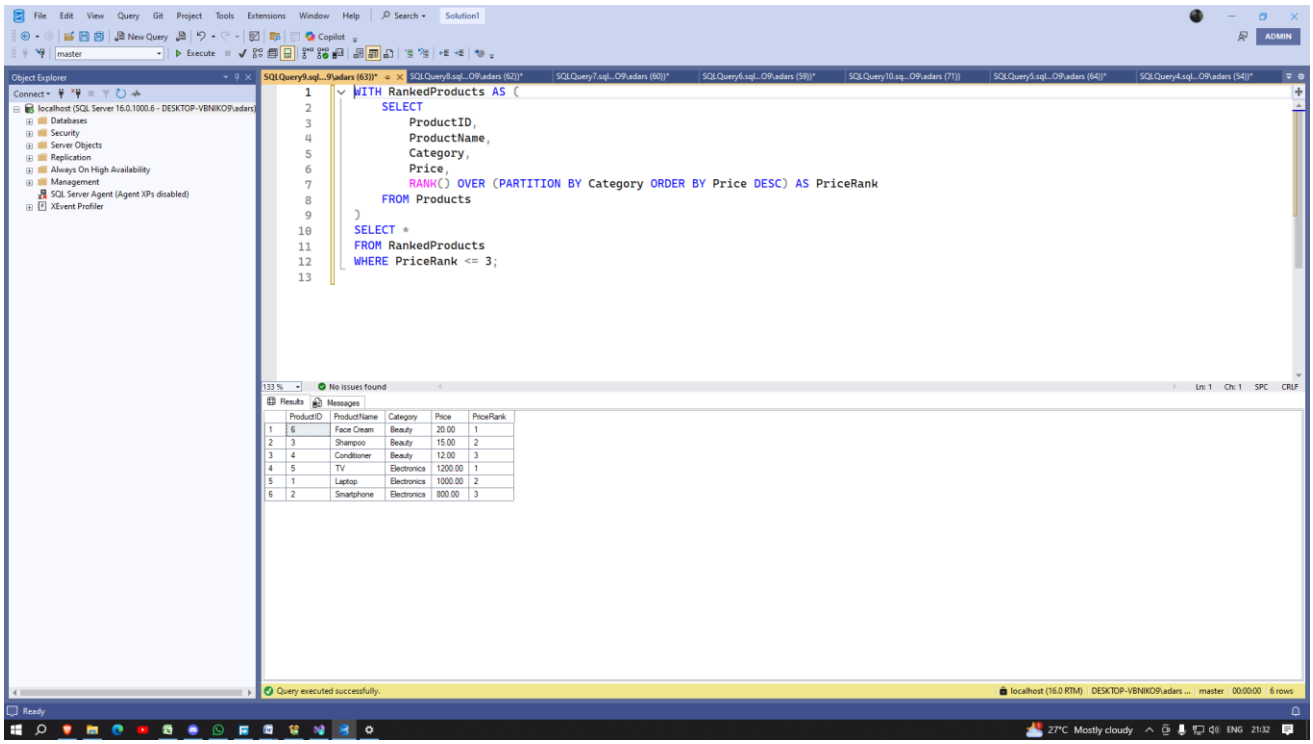


Solution 2: RANK() Function

```
WITH RankedProducts AS (
  SELECT
    ProductID,
    ProductName,
    Category,
    Price,
    RANK() OVER (PARTITION BY Category ORDER BY Price DESC) AS PriceRank
  FROM Products
)
SELECT *
FROM RankedProducts
WHERE PriceRank <= 3;
```

Execution Results:

ProductID	ProductName	Category	Price	PriceRank
6	Face Cream	Beauty	20.00	1
3	Shampoo	Beauty	15.00	2
4	Conditioner	Beauty	12.00	3
5	TV	Electronics	1200.00	1
1	Laptop	Electronics	1000.00	2
2	Smartphone	Electronics	800.00	3

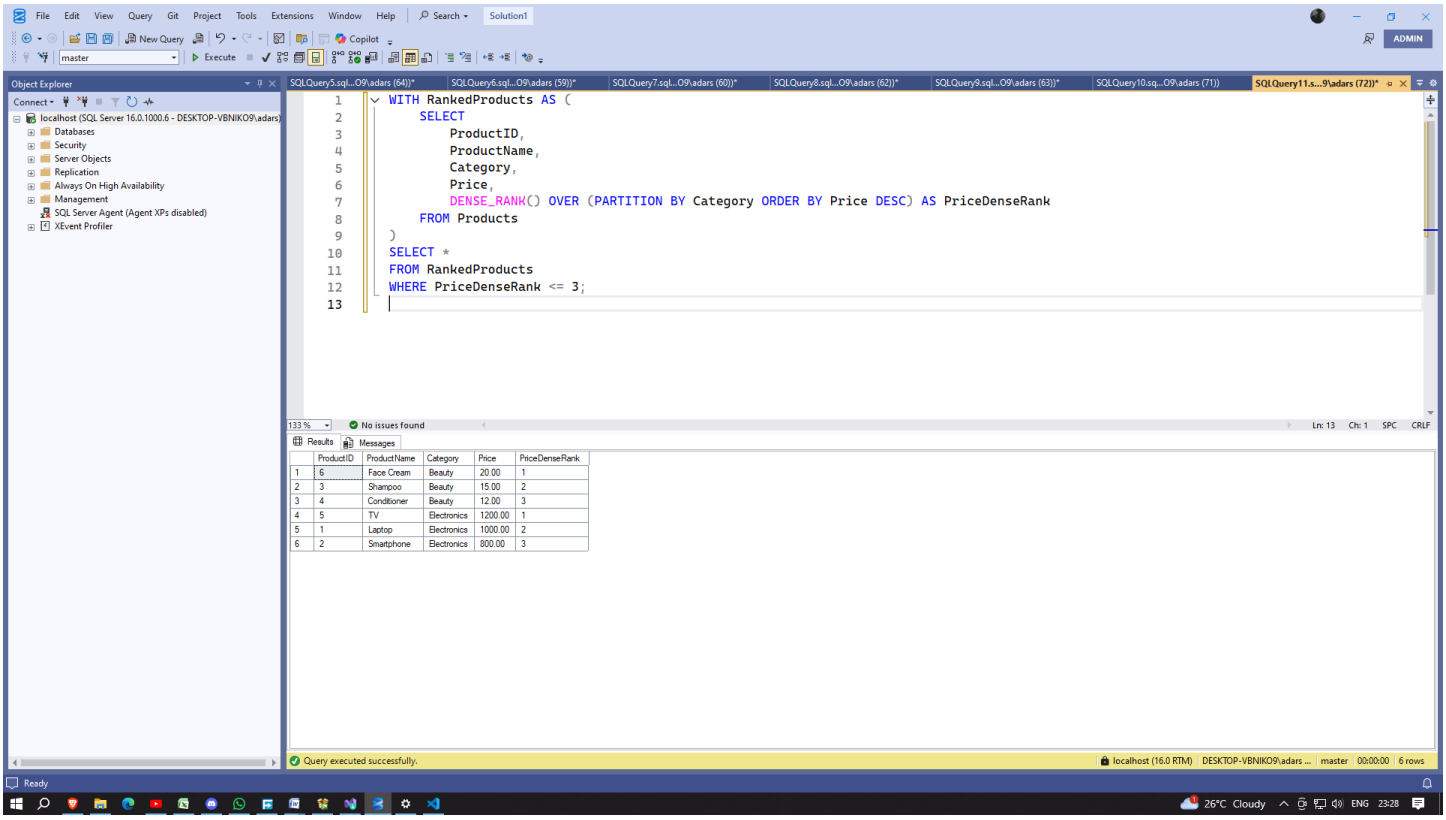


Solution 3: DENSE_RANK() Function

```
WITH RankedProducts AS (
  SELECT
    ProductID,
    ProductName,
    Category,
    Price,
    DENSE_RANK() OVER (PARTITION BY Category ORDER BY Price DESC) AS PriceDenseRank
  FROM Products
)
SELECT *
FROM RankedProducts
WHERE PriceDenseRank <= 3;
```

Execution Results:

Similar to RANK() results for this dataset since there are no ties.



Stored Procedure

Exercise 1: Employee Management System - Stored Procedures

Objective

Create and implement stored procedures for employee management operations including data retrieval and insertion.

Database Schema Setup

```
CREATE TABLE Departments (
    DepartmentID INT PRIMARY KEY,
    DepartmentName VARCHAR(100)
);

CREATE TABLE Employees (
    EmployeeID INT IDENTITY(1,1) PRIMARY KEY,
    FirstName VARCHAR(50),
    LastName VARCHAR(50),
    DepartmentID INT FOREIGN KEY REFERENCES Departments(DepartmentID),
    Salary DECIMAL(10,2),
    JoinDate DATE
);
```

Execution Status: □ Commands completed successfully

Master Data Setup

```
INSERT INTO Departments (DepartmentID, DepartmentName) VALUES
(1, 'HR'),
(2, 'Finance'),
(3, 'IT'),
(4, 'Marketing');

INSERT INTO Employees (FirstName, LastName, DepartmentID, Salary, JoinDate) VALUES
('John', 'Doe', 1, 5000.00, '2020-01-15'),
('Jane', 'Smith', 2, 6000.00, '2019-03-22'),
('Michael', 'Johnson', 3, 7000.00, '2018-07-30'),
('Emily', 'Davis', 4, 5500.00, '2021-11-05');
```

```sql
CREATE TABLE Departments (
    DepartmentID INT PRIMARY KEY,
    DepartmentName VARCHAR(100)
);
CREATE TABLE Employees (
    EmployeeID INT IDENTITY(1,1) PRIMARY KEY,  -- Auto-increment enabled
    FirstName VARCHAR(50),
    LastName VARCHAR(50),
    DepartmentID INT FOREIGN KEY REFERENCES Departments(DepartmentID),
    Salary DECIMAL(10,2),
    JoinDate DATE
);
INSERT INTO Departments (DepartmentID, DepartmentName) VALUES
(1, 'HR'),
(2, 'Finance'),
(3, 'IT'),
(4, 'Marketing');
INSERT INTO Employees (FirstName, LastName, DepartmentID, Salary, JoinDate) VALUES
('John', 'Doe', 1, 5000.00, '2020-01-15'),
('Jane', 'Smith', 2, 6000.00, '2019-03-22'),
('Michael', 'Johnson', 3, 7000.00, '2018-07-30'),
('Emily', 'Davis', 4, 5500.00, '2021-11-05');
```

```
(4 rows affected)

(4 rows affected)

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```
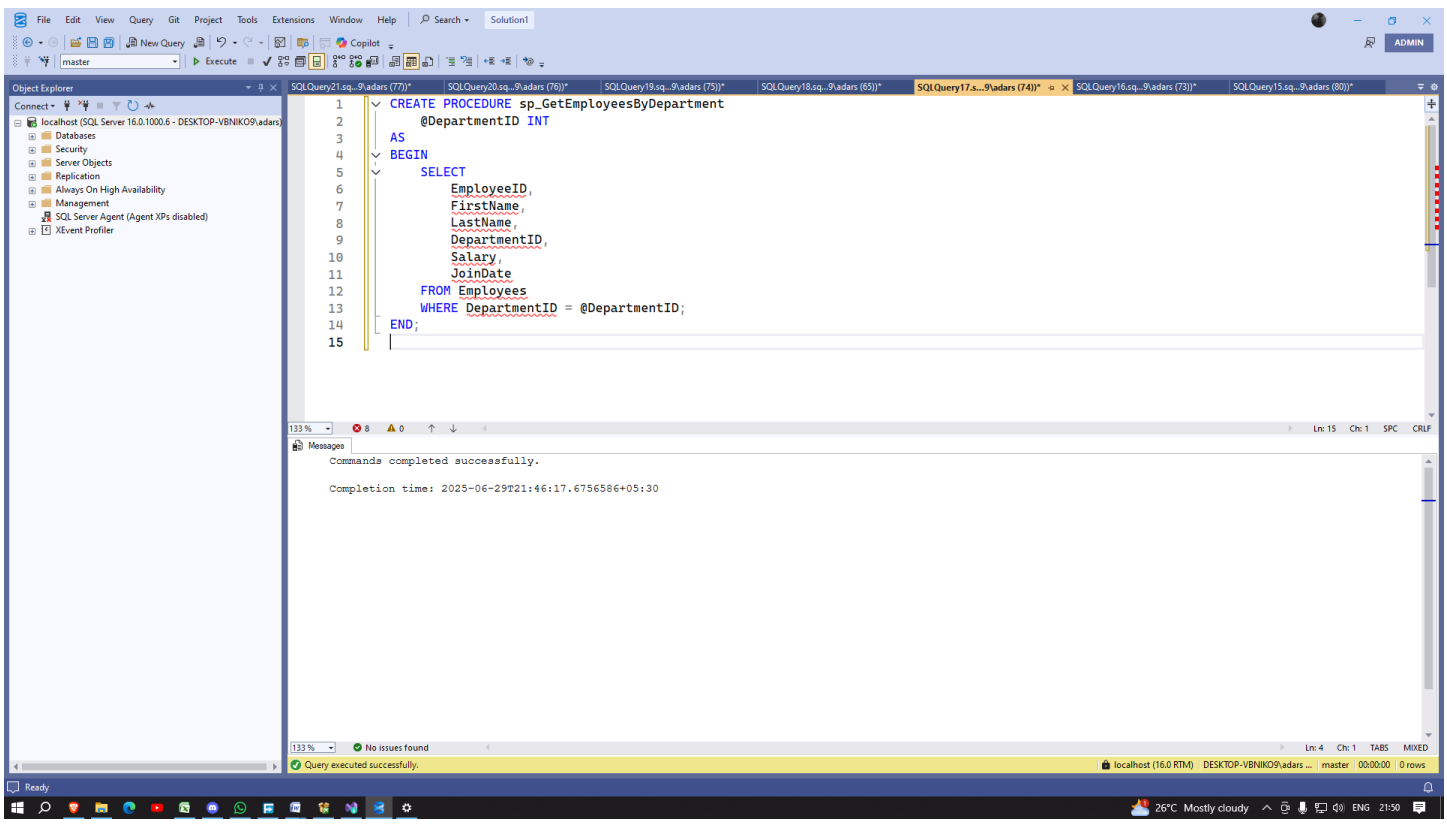

Solution 1: Stored Procedure for Employee Retrieval

```
CREATE PROCEDURE sp_GetEmployeesByDepartment
    @DepartmentID INT
AS
BEGIN
    SELECT
        EmployeeID,
        FirstName,
        LastName,
        DepartmentID,
        Salary,
        JoinDate
    FROM Employees
    WHERE DepartmentID = @DepartmentID;
END;
```

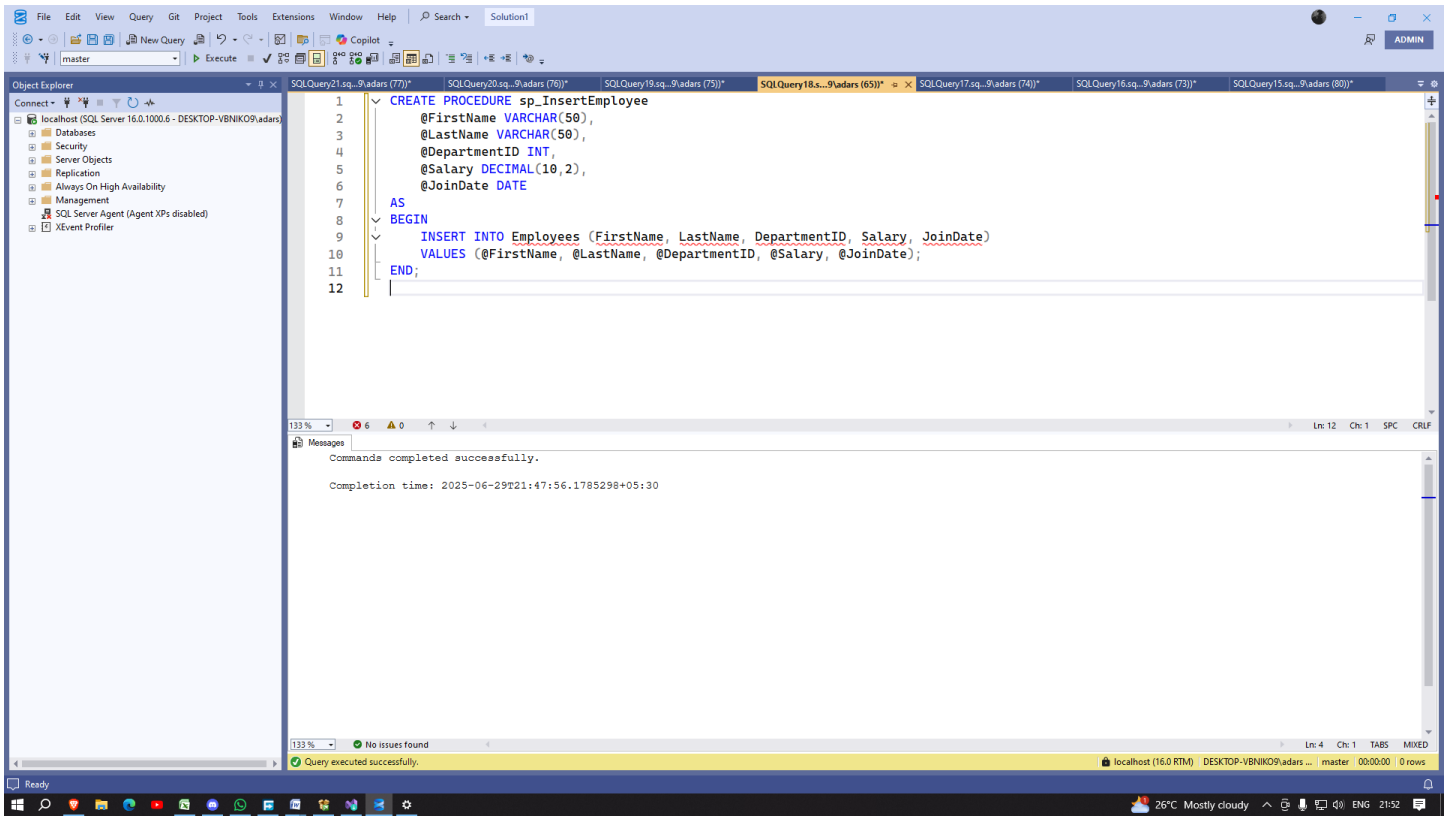
Execution Status: □ Commands completed successfully



Solution 2: Stored Procedure for Employee Insertion

```
CREATE PROCEDURE sp_InsertEmployee
    @FirstName VARCHAR(50),
    @LastName VARCHAR(50),
    @DepartmentID INT,
    @Salary DECIMAL(10,2),
    @JoinDate DATE
AS
BEGIN
    INSERT INTO Employees (FirstName, LastName, DepartmentID, Salary, JoinDate)
    VALUES (@FirstName, @LastName, @DepartmentID, @Salary, @JoinDate);
END;
```

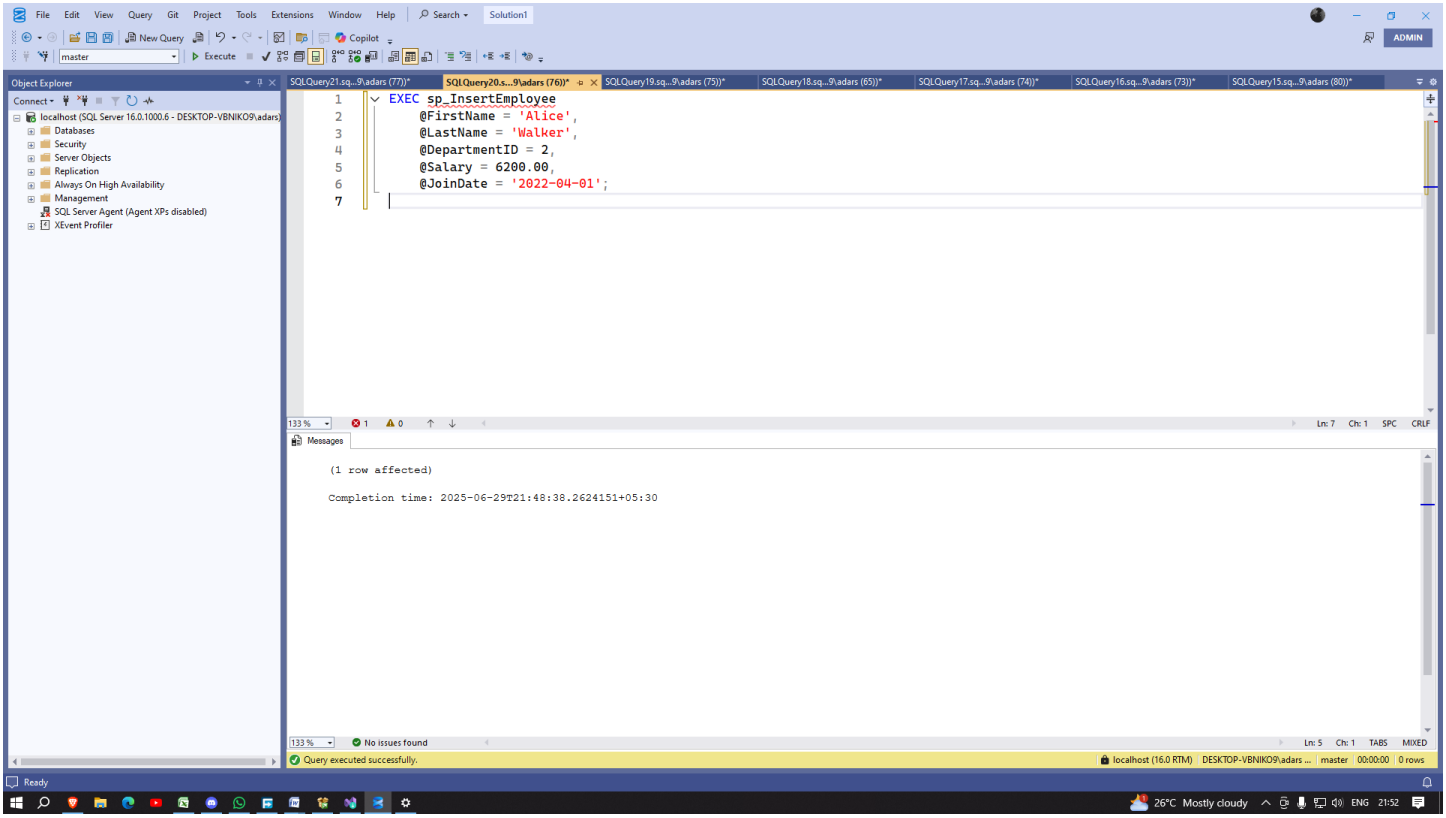
Execution Status: □ Commands completed successfully



Testing Stored Procedure Execution

```
EXEC sp_InsertEmployee
    @FirstName = 'Alice',
    @LastName = 'Walker',
    @DepartmentID = 2,
    @Salary = 6200.00,
    @JoinDate = '2022-04-01';
```

Execution Status: □ Commands completed successfully

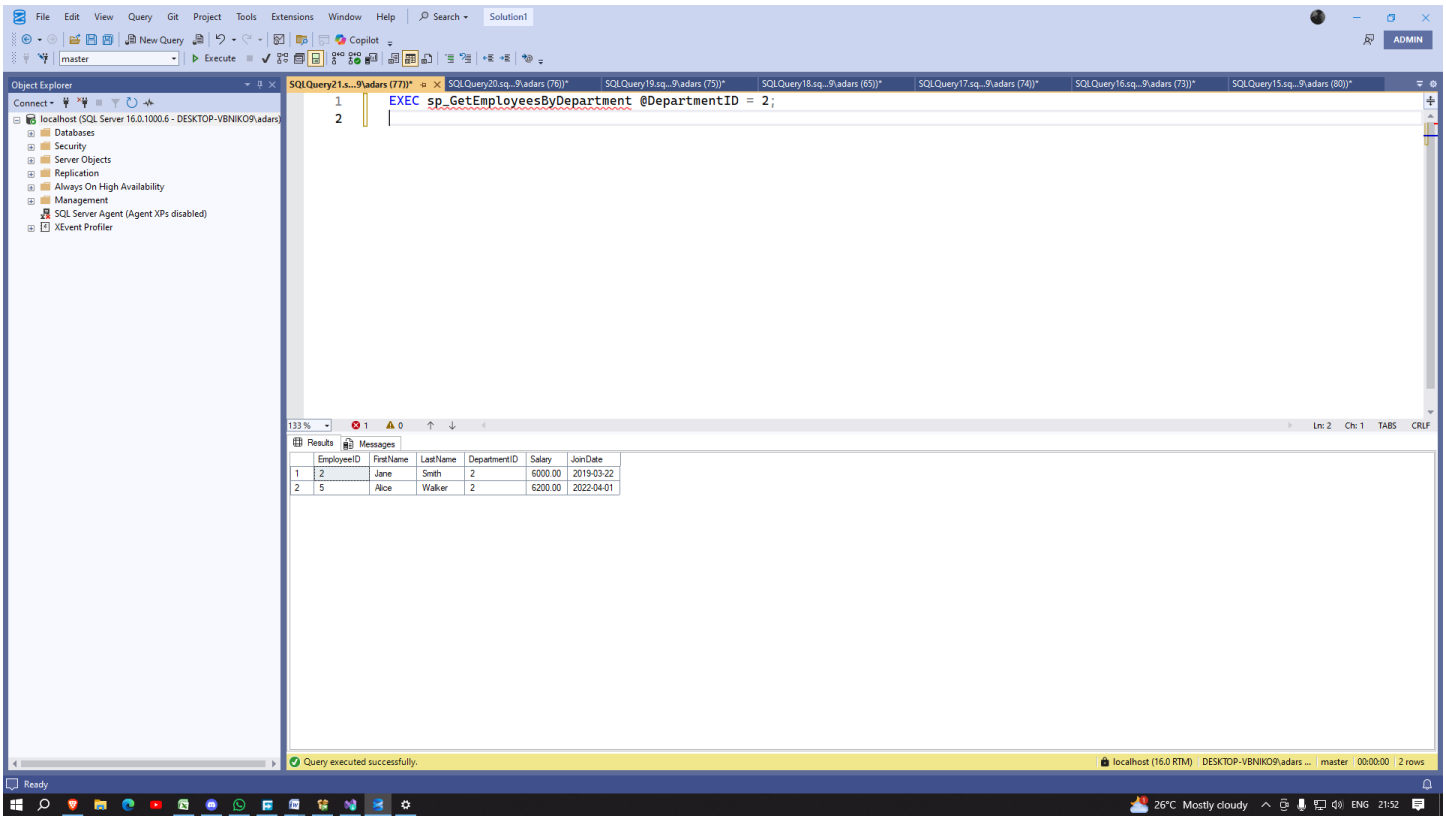


Verifying Data Retrieval

```
EXEC sp_GetEmployeesByDepartment @DepartmentID = 2;
```

Execution Results:

EmployeeID	FirstName	LastName	DepartmentID	Salary	JoinDate
2	Jane	Smith	2	6000.00	2019-03-22
5	Alice	Walker	2	6200.00	2022-04-01



Exercise 5: Return Data from Stored Procedure

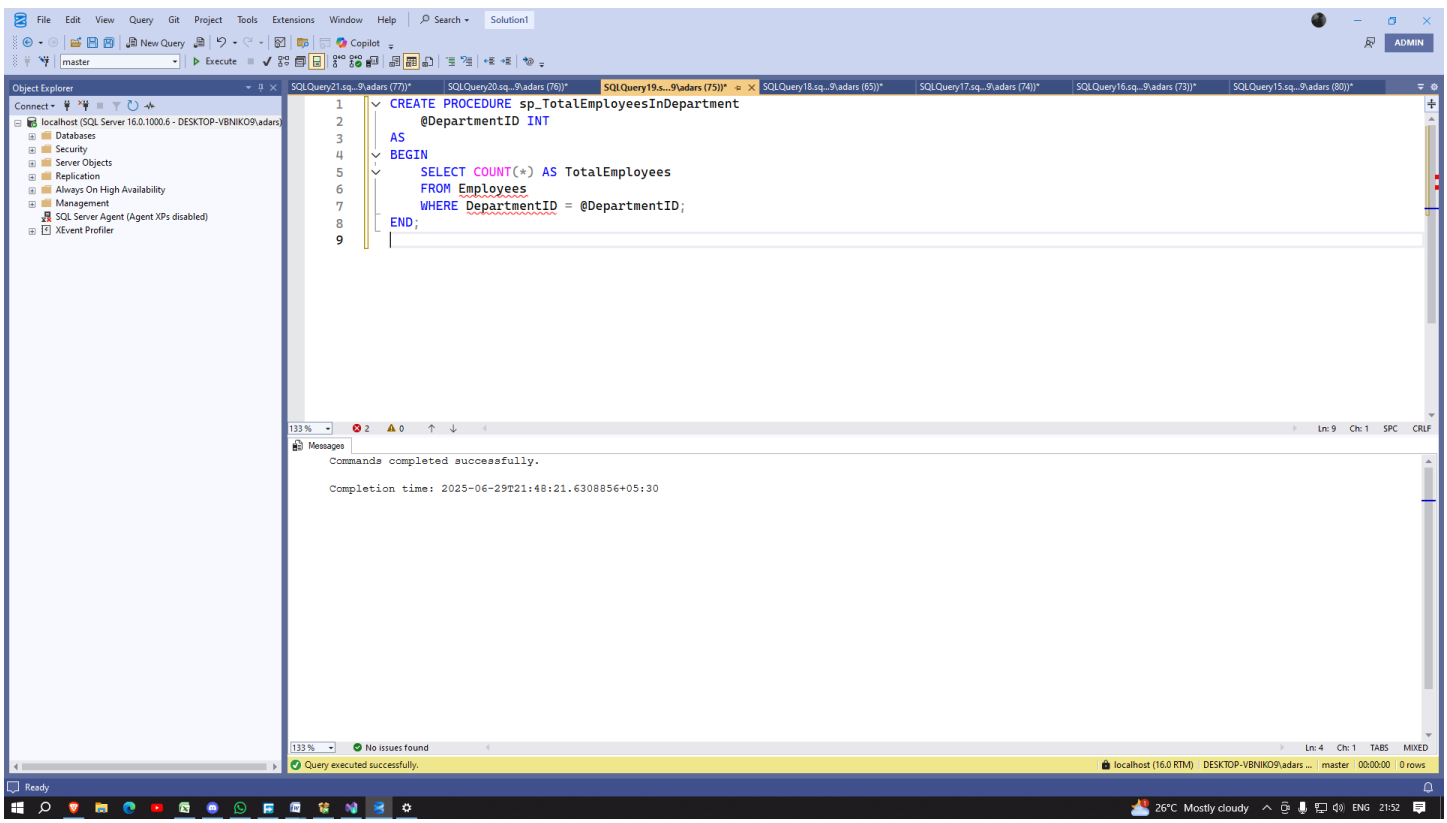
Objective

Create a stored procedure that returns aggregated data (count of employees in a department).

Solution: Employee Counting Procedure

```
CREATE PROCEDURE sp_TotalEmployeesInDepartment
   @DepartmentID INT
AS
BEGIN
   SELECT COUNT(*) AS TotalEmployees
   FROM Employees
   WHERE DepartmentID = @DepartmentID;
END;
```

Execution Status: □ Commands completed successfully



Testing the Counting Procedure

```
EXEC sp_TotalEmployeesInDepartment @DepartmentID = 2;
```

Execution Results:

TotalEmployees
2