DATA MINING
LAB 2

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Query for Creating Table and Inserting Values :

```
#Creating table
USE my_database;

CREATE TABLE FactSales (
    DateKey INT,
    ProductKey INT,
    CustomerKey INT,
    StoreKey INT,
    QtySold INT,
    SalesAmount DECIMAL(10, 2),
    DiscountAmount DECIMAL(10, 2),
    TaxAmount DECIMAL(10, 2),
    NetSalesAmount DECIMAL(10, 2)
);


CREATE TABLE DimProduct (
    ProductKey INT PRIMARY KEY,
    ProductName VARCHAR(100),
    Category VARCHAR(50),
    SubCategory VARCHAR(50),
    Brand VARCHAR(50),
    Price DECIMAL(10, 2)
);

CREATE TABLE DimCustomer (
    CustomerKey INT PRIMARY KEY,
    FirstName VARCHAR(50),
    LastName VARCHAR(50),
    Email VARCHAR(100),
    PhoneNo VARCHAR(15),
    Address VARCHAR(200),
    City VARCHAR(50),
    State VARCHAR(50),
    Country VARCHAR(50),
    LoyaltyLevel VARCHAR(50)
```

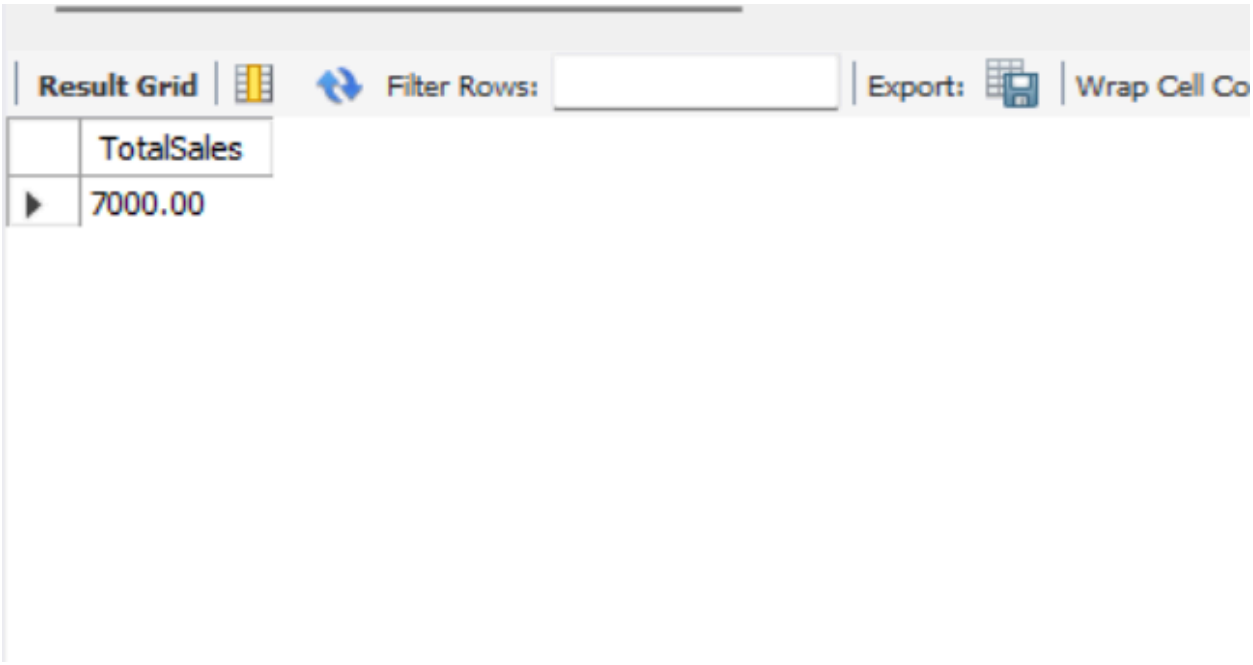
```
);

CREATE TABLE DimDate (
    DateKey INT PRIMARY KEY,
    FullDate DATE,
    Day INT,
    Month INT,
    Year INT,
    DayName VARCHAR(15),
    MonthName VARCHAR(15),
    Quarter INT
);

CREATE TABLE DimStore (
    StoreKey INT PRIMARY KEY,
    Region VARCHAR(50),
    ManagerName VARCHAR(50),
    OpeningDate DATE
);

# Inserting Values

INSERT INTO DimProduct (ProductKey, ProductName, Category, SubCategory, Brand, Price)
SELECT 1, 'Laptop', 'Electronics', 'Computers', 'BrandA', 1000.00
FROM DUAL
WHERE NOT EXISTS (SELECT 1 FROM DimProduct WHERE ProductKey = 1);

INSERT INTO DimProduct (ProductKey, ProductName, Category, SubCategory, Brand, Price)
SELECT 2, 'Smartphone', 'Electronics', 'Mobile Phones', 'BrandB', 500.00
FROM DUAL
WHERE NOT EXISTS (SELECT 1 FROM DimProduct WHERE ProductKey = 2);

INSERT INTO DimProduct (ProductKey, ProductName, Category, SubCategory, Brand, Price)
SELECT 3, 'Tablet', 'Electronics', 'Tablets', 'BrandC', 300.00
FROM DUAL
WHERE NOT EXISTS (SELECT 1 FROM DimProduct WHERE ProductKey = 3);


INSERT INTO DimCustomer (CustomerKey, FirstName, LastName, Email, PhoneNo, Address, City, State, Country, LoyaltyLevel)
SELECT 1, 'John', 'Doe', 'john@example.com', '1234567890', '123 Main St', 'New York', 'NY', 'USA', 'Gold'
FROM DUAL
WHERE NOT EXISTS (SELECT 1 FROM DimCustomer WHERE CustomerKey = 1);

INSERT INTO DimCustomer (CustomerKey, FirstName, LastName, Email, PhoneNo, Address, City, State, Country, LoyaltyLevel)
SELECT 2, 'Jane', 'Smith', 'jane@example.com', '0987654321', '456 Elm St', 'Los Angeles', 'CA', 'USA', 'Silver'
FROM DUAL
WHERE NOT EXISTS (SELECT 1 FROM DimCustomer WHERE CustomerKey = 2);


INSERT INTO DimDate (DateKey, FullDate, Day, Month, Year, DayName, MonthName, Quarter)
SELECT 20230101, '2023-01-01', 1, 1, 2023, 'Sunday', 'January', 1
FROM DUAL
WHERE NOT EXISTS (SELECT 1 FROM DimDate WHERE DateKey = 20230101);

INSERT INTO DimDate (DateKey, FullDate, Day, Month, Year, DayName, MonthName, Quarter)
```

```
SELECT 20230102, '2023-01-02', 2, 1, 2023, 'Monday', 'January', 1
FROM DUAL
WHERE NOT EXISTS (SELECT 1 FROM DimDate WHERE DateKey = 20230102);


INSERT INTO DimStore (StoreKey, Region, ManagerName, OpeningDate)
SELECT 1, 'North', 'Alice', '2020-01-01'
FROM DUAL
WHERE NOT EXISTS (SELECT 1 FROM DimStore WHERE StoreKey = 1);

INSERT INTO DimStore (StoreKey, Region, ManagerName, OpeningDate)
SELECT 2, 'South', 'Bob', '2021-01-01'
FROM DUAL
WHERE NOT EXISTS (SELECT 1 FROM DimStore WHERE StoreKey = 2);

INSERT INTO FactSales (DateKey, ProductKey, CustomerKey, StoreKey, QtySold, SalesAmount, DiscountAmount, TaxAmount,
NetSalesAmount)
SELECT 20230101, 1, 1, 1, 2, 2000.00, 100.00, 180.00, 1720.00
FROM DUAL
WHERE NOT EXISTS (SELECT 1 FROM FactSales WHERE DateKey = 20230101 AND ProductKey = 1 AND CustomerKey = 1
AND StoreKey = 1);

INSERT INTO FactSales (DateKey, ProductKey, CustomerKey, StoreKey, QtySold, SalesAmount, DiscountAmount, TaxAmount,
NetSalesAmount)
SELECT 20230102, 2, 2, 2, 3, 1500.00, 50.00, 135.00, 1315.00
FROM DUAL


WHERE NOT EXISTS (SELECT 1 FROM FactSales WHERE DateKey = 20230102 AND ProductKey = 2 AND CustomerKey = 2
AND StoreKey = 2);
```

4. Distributive and Algebraic Functions

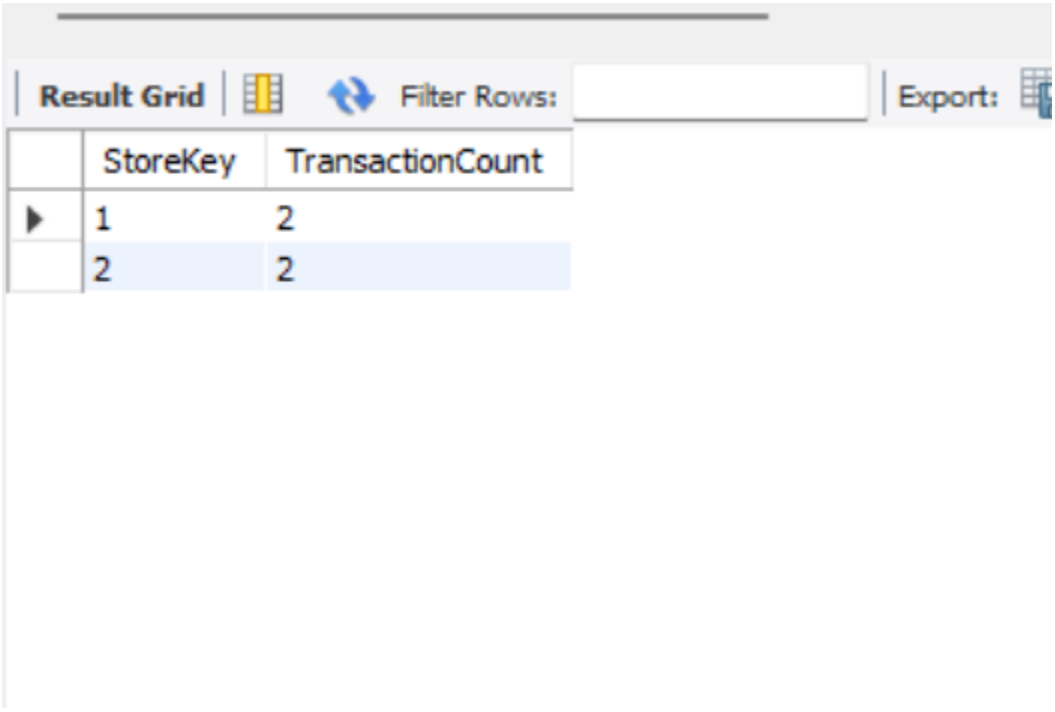
Total Sales

```
SELECT SUM(SalesAmount) AS TotalSales
FROM FactSales;
```



Count of Transactions Per Store

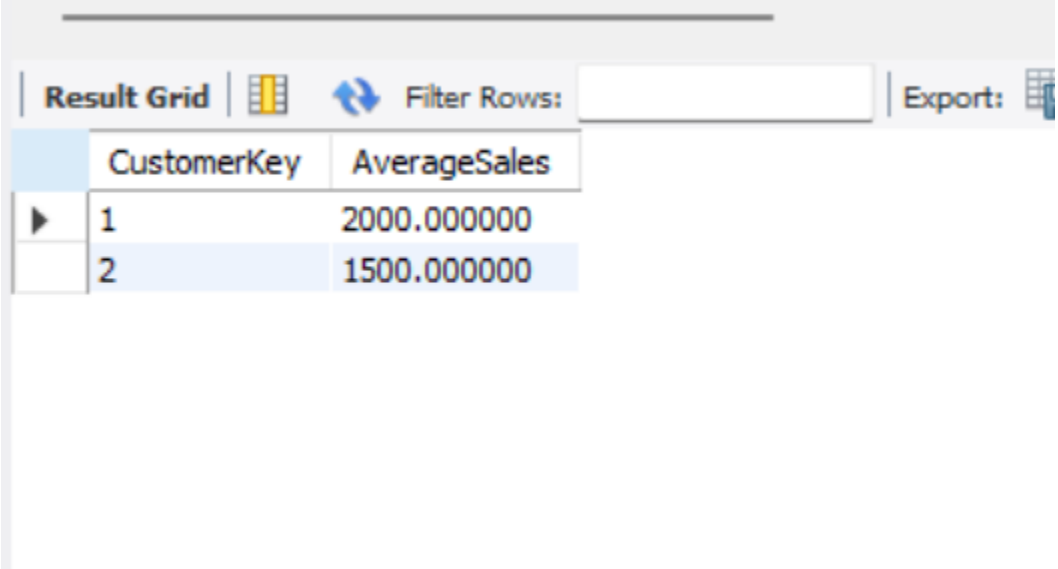
```
SELECT
   StoreKey,
   COUNT(*) AS TransactionCount
FROM FactSales
GROUP BY StoreKey;
```



Average Sales Per Customer

SELECT

```
    CustomerKey,
    AVG(SalesAmount) AS AverageSales
FROM FactSales
GROUP BY CustomerKey;
```



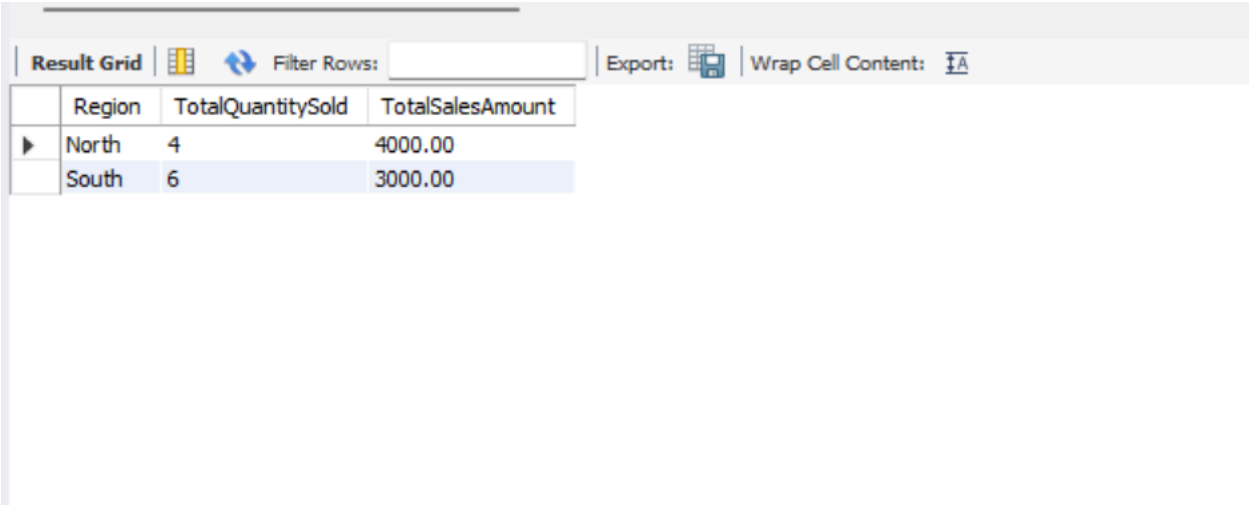
Result Grid | Filter Rows: | Export:

CustomerKey	AverageSales
1	2000.000000
2	1500.000000

5. Summarisability

Aggregate Data at the Region Level

```
SELECT
    s.Region,
    SUM(f.QtySold) AS TotalQuantitySold,
    SUM(f.SalesAmount) AS TotalSalesAmount
FROM FactSales f
JOIN DimStore s ON f.StoreKey = s.StoreKey
GROUP BY s.Region;
```

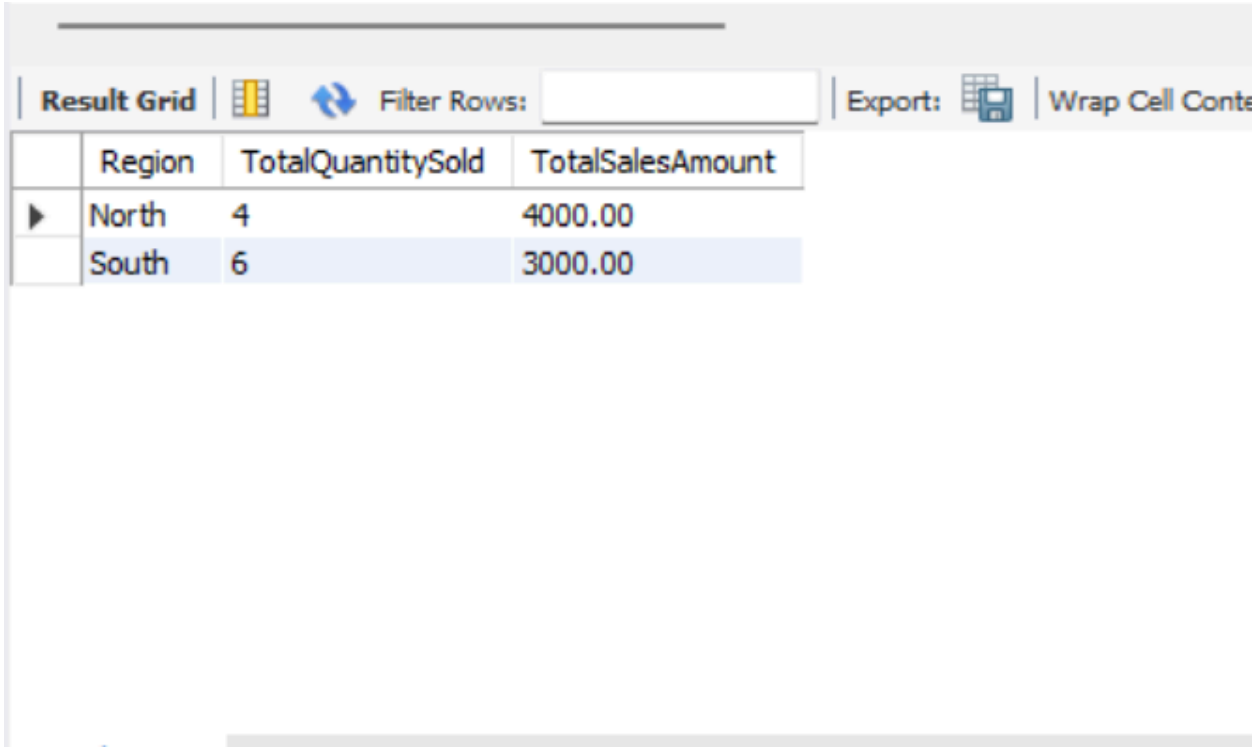


Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Region	TotalQuantitySold	TotalSalesAmount
North	4	4000.00
South	6	3000.00

Aggregate Data at the Store Level

```
SELECT
   s.Region,
   SUM(StoreTotal.TotalQuantitySold) AS TotalQuantitySold,
   SUM(StoreTotal.TotalSalesAmount) AS TotalSalesAmount
FROM (
   SELECT
      f.StoreKey,
      SUM(f.QtySold) AS TotalQuantitySold,
      SUM(f.SalesAmount) AS TotalSalesAmount
   FROM FactSales f
   GROUP BY f.StoreKey
) AS StoreTotal
JOIN DimStore s ON StoreTotal.StoreKey = s.StoreKey
GROUP BY s.Region;
```



Region	TotalQuantitySold	TotalSalesAmount
North	4	4000.00
South	6	3000.00

7. Drill Across

```
SELECT
   p.ProductName AS Product,
   s.Region AS Region,
   SUM(CASE WHEN d.Year = 2023 THEN f.SalesAmount ELSE 0 END) AS Sales_2023,
   SUM(CASE WHEN d.Year = 2024 THEN f.SalesAmount ELSE 0 END) AS Sales_2024,
   (SUM(CASE WHEN d.Year = 2023 THEN f.SalesAmount ELSE 0 END) -
    SUM(CASE WHEN d.Year = 2024 THEN f.SalesAmount ELSE 0 END)) AS Sales_Diff
FROM FactSales f
JOIN DimDate d ON f.DateKey = d.DateKey
JOIN DimStore s ON f.StoreKey = s.StoreKey
JOIN DimProduct p ON f.ProductKey = p.ProductKey
WHERE d.Year IN (2022, 2023)
GROUP BY p.ProductName, s.Region
ORDER BY s.Region, p.ProductName;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

	Product	Region	Sales_2023	Sales_2024	Sales_Diff
▶	Laptop	North	4000.00	0.00	4000.00
	Smartphone	South	3000.00	0.00	3000.00

10. Range Query and Range Sum Query

Query to retrieve sales data for all transactions between two dates:

```
SELECT
   *
FROM FactSales f
JOIN DimDate d ON f.DateKey = d.DateKey
WHERE d.FullDate BETWEEN '2023-01-01' AND '2023-12-31'
ORDER BY d.FullDate;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

	DateKey	ProductKey	CustomerKey	StoreKey	QtySold	SalesAmount	DiscountAmount	TaxAmount	NetSalesAmount
▶	20230101	1	1	1	2	2000.00	100.00	180.00	1720.00
	20230101	1	1	1	2	2000.00	100.00	180.00	1720.00
	20230102	2	2	2	3	1500.00	50.00	135.00	1315.00
	20230102	2	2	2	3	1500.00	50.00	135.00	1315.00

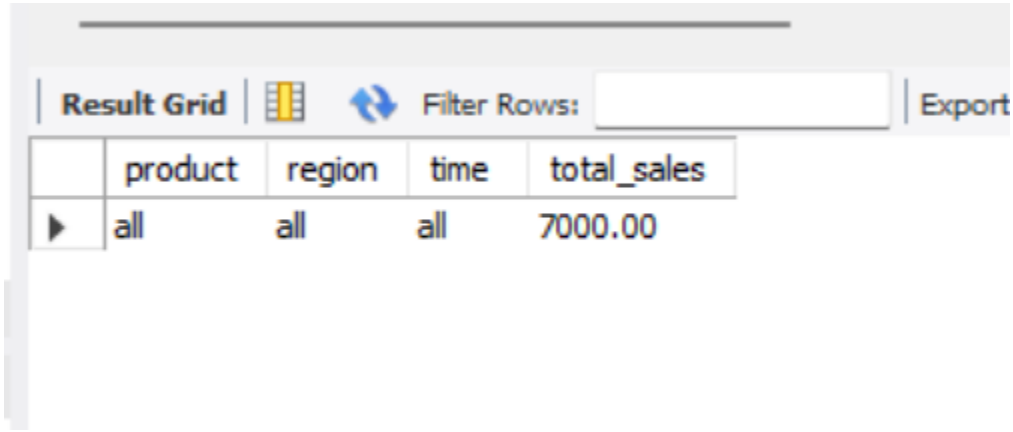
Query to calculate the range sum of sales for a specific product category over a given time period:

```
SELECT
   p.ProductName,
   SUM(f.SalesAmount) AS TotalSales
FROM FactSales f
JOIN DimProduct p ON f.ProductKey = p.ProductKey
JOIN DimDate d ON f.DateKey = d.DateKey
WHERE p.Category = 'Electronics' -- Specify the product category
AND d.FullDate BETWEEN '2023-01-01' AND '2023-12-31'
GROUP BY p.ProductName
ORDER BY TotalSales DESC;
```

	ProductName	TotalSales
▶	Laptop	4000.00
	Smartphone	3000.00

11. Lattice of Cuboids

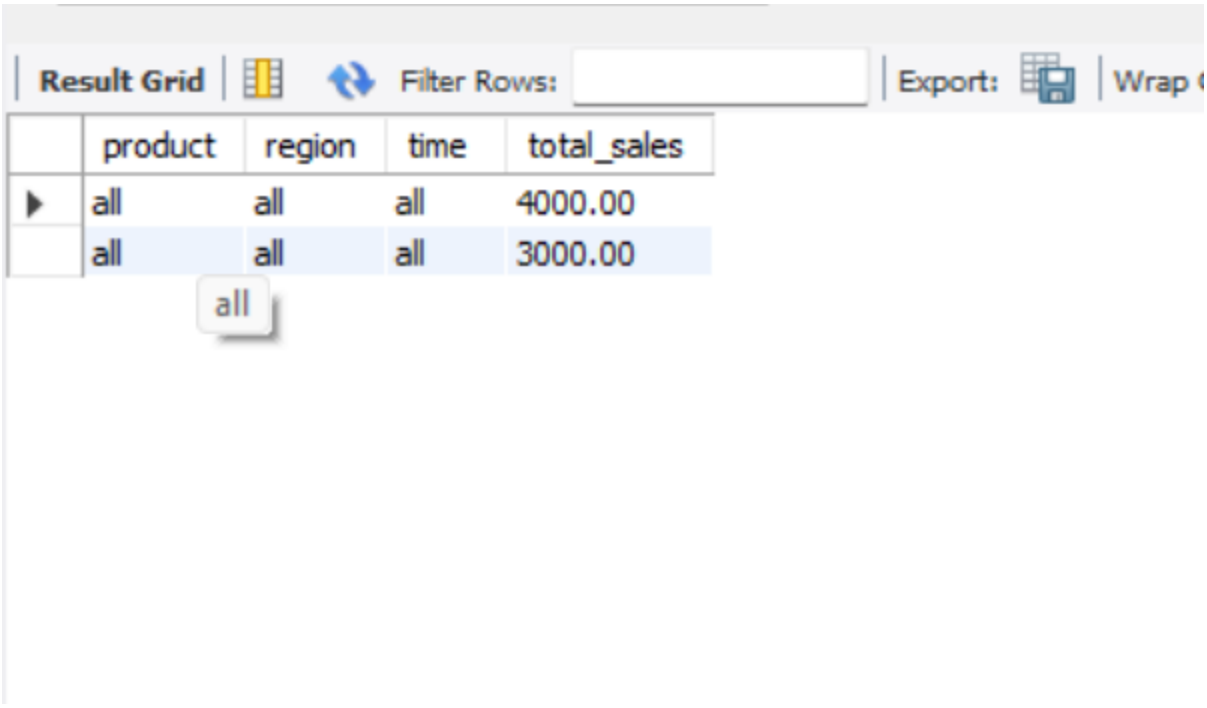
```
SELECT
   'all' AS product,
   'all' AS region,
   'all' AS time,
   SUM(f.SalesAmount) AS total_sales
FROM FactSales f
JOIN DimProduct p ON f.ProductKey = p.ProductKey
JOIN DimStore s ON f.StoreKey = s.StoreKey
JOIN DimDate d ON f.DateKey = d.DateKey;
```



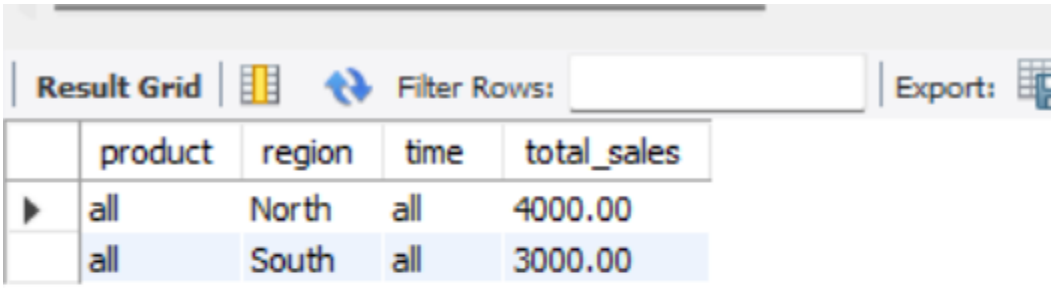
	product	region	time	total_sales
▶	all	all	all	7000.00

One-Dimensional Cuboids

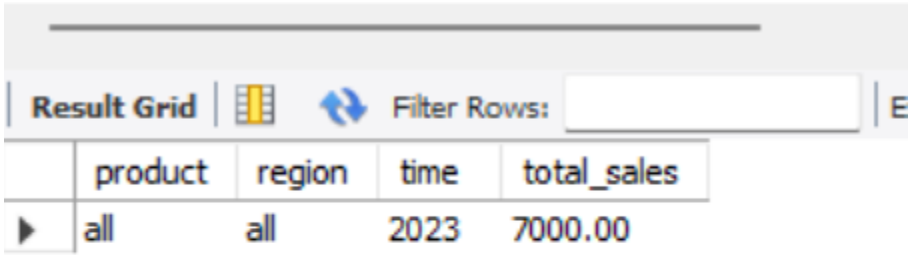
```
SELECT
   'all' AS product,
   'all' AS region,
   'all' AS time,
   SUM(f.SalesAmount) AS total_sales
FROM FactSales f
JOIN DimProduct p ON f.ProductKey = p.ProductKey
JOIN DimStore s ON f.StoreKey = s.StoreKey
JOIN DimDate d ON f.DateKey = d.DateKey
GROUP BY p.ProductName;
```




```
SELECT
    'all' AS product,
    s.Region AS region,
    'all' AS time,
    SUM(f.SalesAmount) AS total_sales
FROM FactSales f
JOIN DimStore s ON f.StoreKey = s.StoreKey
JOIN DimDate d ON f.DateKey = d.DateKey
GROUP BY s.Region;
```

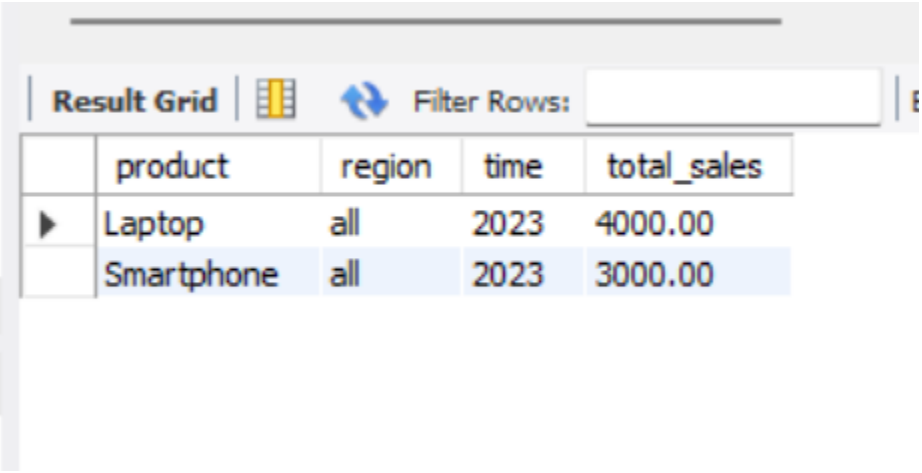


```
SELECT
    'all' AS product,
    'all' AS region,
    d.Year AS time,
    SUM(f.SalesAmount) AS total_sales
FROM FactSales f
JOIN DimDate d ON f.DateKey = d.DateKey
GROUP BY d.Year;
```



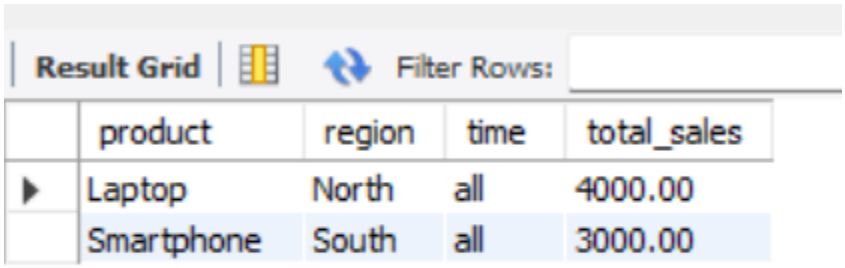
product	region	time	total_sales
all	all	2023	7000.00

```
SELECT
    p.ProductName AS product,
    'all' AS region,
    d.Year AS time,
    SUM(f.SalesAmount) AS total_sales
FROM FactSales f
JOIN DimProduct p ON f.ProductKey = p.ProductKey
JOIN DimDate d ON f.DateKey = d.DateKey
GROUP BY p.ProductName, d.Year;
```



product	region	time	total_sales
Laptop	all	2023	4000.00
Smartphone	all	2023	3000.00

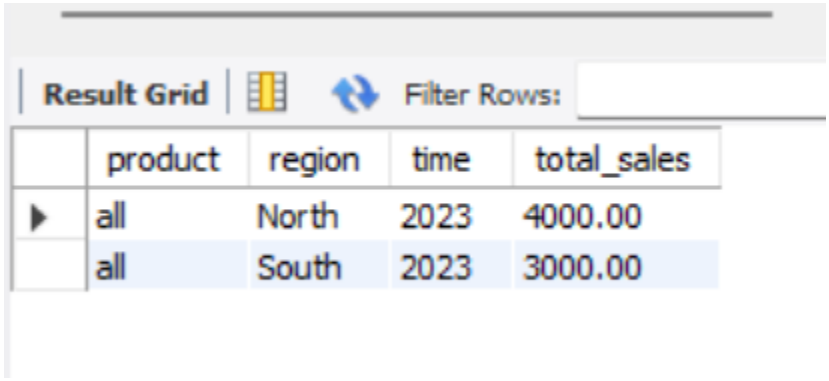
```
SELECT
    p.ProductName AS product,
    s.Region AS region,
    'all' AS time,
    SUM(f.SalesAmount) AS total_sales
FROM FactSales f
JOIN DimProduct p ON f.ProductKey = p.ProductKey
JOIN DimStore s ON f.StoreKey = s.StoreKey
GROUP BY p.ProductName, s.Region;
```



Result Grid | Filter Rows:

product	region	time	total_sales
Laptop	North	all	4000.00
Smartphone	South	all	3000.00

```
SELECT
    'all' AS product,
    s.Region AS region,
    d.Year AS time,
    SUM(f.SalesAmount) AS total_sales
FROM FactSales f
JOIN DimStore s ON f.StoreKey = s.StoreKey
JOIN DimDate d ON f.DateKey = d.DateKey
GROUP BY d.Year, s.Region;
```



Result Grid | Filter Rows:

product	region	time	total_sales
all	North	2023	4000.00
all	South	2023	3000.00