Build a Data Pipeline for Processing and Storing Sales Data

THE SITUATION

Created a data pipeline to process and store sales data from a CSV file. The pipeline will transform and load the data with Python into a PostgreSQL and MySQL database for further analysis using Power BI.
Tools required: Python (Pandas), PostgreSQL, MySQL, DBdiagram.io and Power BI

THE STEPS

Used DBdiagram.io:

- To design a dimensional model for MavenMarket Database.

Used MySQL and PostgreSQL to:

- Create a database title MavenMarket.
- Define the database schema under the database (MavenMarket):
  Product,
  region,
  store,
  return product.

Used Python to:

- Use pandas library to load the sales data from the CSV file into pandas dataframe.
- Use pandas to clean and transform the data as needed. For instance, drop some columns that are not needed in product and store table.
- Use the psycopg2 and mysql library to connect to the PostgreSQL and MySQL database.
- Use pandas, psycopg2, and mysql to load the cleaned and transformed data into the database.
- Runed some test queries on the data in the database to ensure the data pipeline is working correctly.

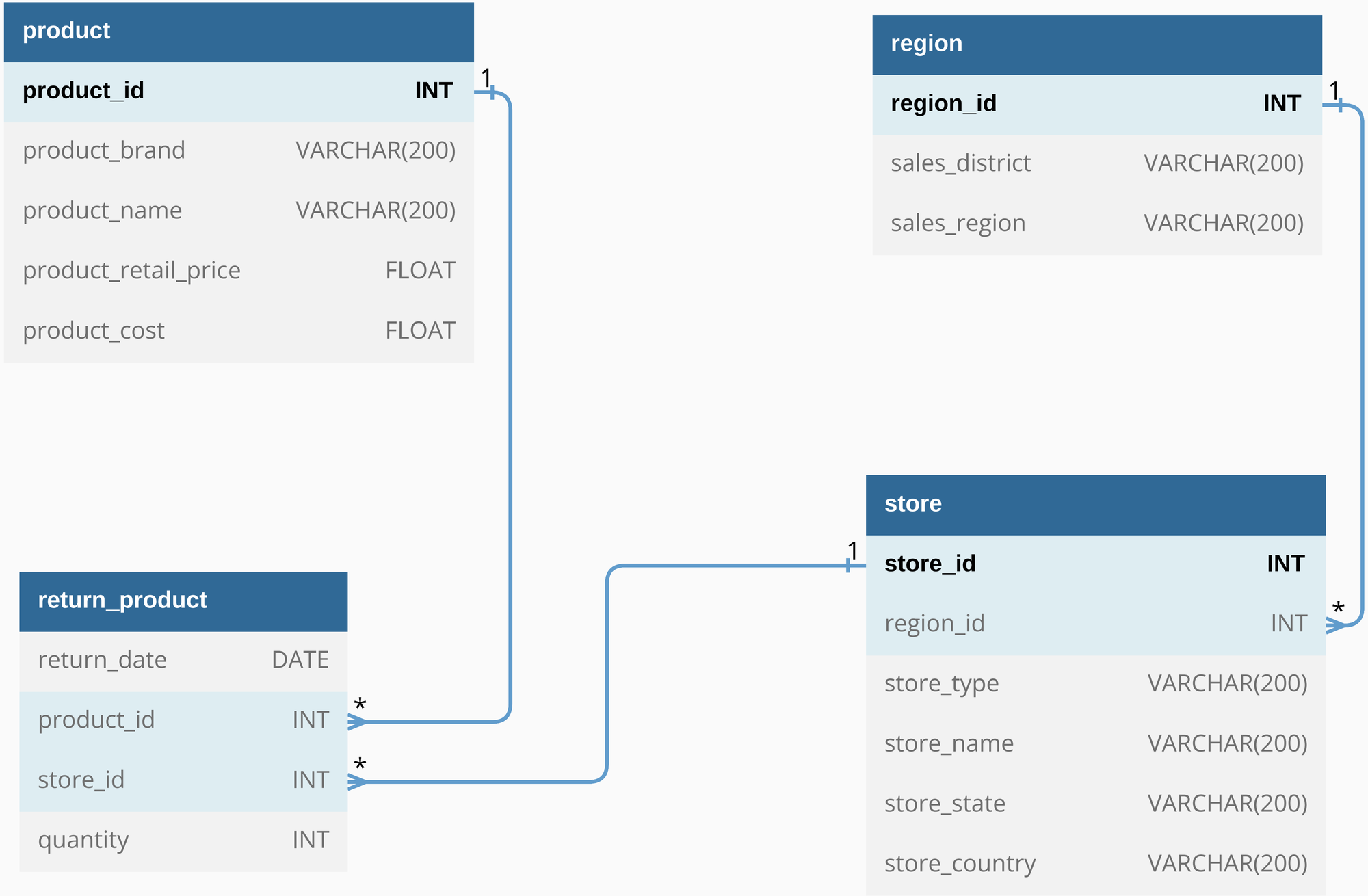
Used PowerBI to:

- To connect the raw data
- Build a relational data model
- Create new calculated columns and DAX measures
- Design an interactive report to analyze and visualize the data

THE SUMMARY

After performing data wrangling, data modelling and data visualization. Here, are the following insights from the dataset.

- Portland reached 1,000 sales in December to close out the year
- High Top product returns doubled in Mexico (4 to 8), at a return rate of 1.2%
- Plato products drove the strongest overall profit margin (63.55%) in 1998.


product
product_id INT
product_brand VARCHAR(200)
product_name VARCHAR(200)
product_retail_price FLOAT
product_cost FLOAT
region
region_id INT
sales_district VARCHAR(200)
sales_region VARCHAR(200)
store
store_id INT
region_id INT
store_type VARCHAR(200)
store_name VARCHAR(200)
store_state VARCHAR(200)
store_country VARCHAR(200)
return_product
return_date DATE
product_id INT
store_id INT
quantity INT
1
*
1
*
1
*
dbdiagram.io

SQL SCRIPTS FOR MAVENMARKET

```
CREATE TABLE product (
  product_id INT PRIMARY KEY,
  product_brand VARCHAR(200),
  product_name VARCHAR(200),
  product_retail_price FLOAT,
  product_cost FLOAT
);
CREATE TABLE region (
  region_id INT PRIMARY KEY,
  sales_district VARCHAR(200),
  sales_region VARCHAR(200)
);
CREATE TABLE return_product (
  return_date DATE,
  product_id INT,
  store_id INT,
  quantity INT,
  FOREIGN KEY (product_id)
    REFERENCES product (product_id),
  FOREIGN KEY (store_id)
    REFERENCES store (store_id)
);
CREATE TABLE store (
  store_id INT PRIMARY KEY,
  region_id INT,
  store_type VARCHAR(200),
  store_name VARCHAR(200),
  store_state VARCHAR(200),
  store_country VARCHAR(200),
  FOREIGN KEY (region_id)
    REFERENCES region (region_id) );
```

Read Dataset

In [1]:
```
import pandas as pd
```

In [2]:
```
# Read Products data
MavenMarket_Products = pd.read_csv(r'C:\Users\Lenovo\Desktop\Personal Documents\DataSet\Maven+Market+CSV+Files\MavenMarket_Products.csv',delimiter = ",")
MavenMarket_Products.head(5)
```

Out[2]:

	product_id	product_brand	product_name	product_sku	product_retail_price	product_cost	product_weight	recyclable	low_fat
0	1	Washington	Washington Berry Juice	90748583674	2.85	0.94	8.39	NaN	NaN
1	2	Washington	Washington Mango Drink	96516502499	0.74	0.26	7.42	NaN	1.0
2	3	Washington	Washington Strawberry Drink	58427771925	0.83	0.40	13.10	1.0	1.0
3	4	Washington	Washington Cream Soda	64412155747	3.64	1.64	10.60	1.0	NaN
4	5	Washington	Washington Diet Soda	85561191439	2.19	0.77	6.66	1.0	NaN

In [3]:
```
# Read Regions data
Regions = pd.read_csv(r'C:\Users\Lenovo\Desktop\Personal Documents\DataSet\Maven+Market+CSV+Files\MavenMarket_Regions.csv',delimiter = ",")
Regions.head(5)
```

Out[3]:

	region_id	sales_district	sales_region
0	1	San Francisco	Central West
1	2	Mexico City	Mexico Central
2	3	Los Angeles	South West
3	4	Guadalajara	Mexico West
4	5	Vancouver	Canada West

In [4]:
```
# Read MavenMarket_Returns_1997-1998 data
Returns = pd.read_csv(r'C:\Users\Lenovo\Desktop\Personal Documents\DataSet\Maven+Market+CSV+Files\MavenMarket_Returns_1997-1998.csv',delimiter = ",", parse_dates = ["return_date"])
Returns.head(5)
```

Out[4]:

	return_date	product_id	store_id	quantity
0	1997-01-01	250	6	1
1	1997-01-01	628	6	1
2	1997-01-01	869	6	1
3	1997-01-02	469	11	1
4	1997-01-02	532	23	2

In [5]:
```
# Read MavenMarket_Stores_1997-1998 data
MavenMarket_Stores = pd.read_csv(r'C:\Users\Lenovo\Desktop\Personal Documents\DataSet\Maven+Market+CSV+Files\MavenMarket_Stores.csv',delimiter = ",")
MavenMarket_Stores.head(5)
```

Out[5]:

	store_id	region_id	store_type	store_name	store_street_address	store_city	store_state	store_country	store_phone	first_opened_date	last_remodel_date	total_sqft	grocery_sqft
0	1	28	Supermarket	Store 1	2853 Bailey Rd	Acapulco	Guerrero	Mexico	262-555-5124	1/9/1982	12/5/1990	23593	17475
1	2	78	Small Grocery	Store 2	5203 Catanzaro Way	Bellingham	WA	USA	605-555-8203	4/2/1970	6/4/1973	28206	22271
2	3	76	Supermarket	Store 3	1501 Ramsey Circle	Bremerton	WA	USA	509-555-1596	6/14/1959	11/19/1967	39696	24390
3	4	27	Gourmet Supermarket	Store 4	433 St George Dr	Camacho	Zacatecas	Mexico	304-555-1474	9/27/1994	12/1/1995	23759	16844
4	5	4	Small Grocery	Store 5	1250 Coggins Drive	Guadalajara	Jalisco	Mexico	801-555-4324	9/18/1978	6/29/1991	24597	15012

Data Wranging

In [6]:
```
#drop some columns
Product = MavenMarket_Products.drop(["product_sku", "product_weight", "recyclable", "low_fat"], axis = 1)
Product.head(5)
```

Out[6]:

	product_id	product_brand	product_name	product_retail_price	product_cost
0	1	Washington	Washington Berry Juice	2.85	0.94
1	2	Washington	Washington Mango Drink	0.74	0.26
2	3	Washington	Washington Strawberry Drink	0.83	0.40
3	4	Washington	Washington Cream Soda	3.64	1.64
4	5	Washington	Washington Diet Soda	2.19	0.77

In [7]:
```
Store = MavenMarket_Stores.drop(["store_phone","first_opened_date","last_remodel_date","total_sqft","grocery_sqft", "store_street_address","store_city"], axis = 1)
Store.head(5)
```

Out[7]:

	store_id	region_id	store_type	store_name	store_state	store_country
0	1	28	Supermarket	Store 1	Guerrero	Mexico
1	2	78	Small Grocery	Store 2	WA	USA
2	3	76	Supermarket	Store 3	WA	USA
3	4	27	Gourmet Supermarket	Store 4	Zacatecas	Mexico
4	5	4	Small Grocery	Store 5	Jalisco	Mexico

Load Data in MySQL

In [8]:
```
pip install sqlalchemy
```

```
Requirement already satisfied: sqlalchemy in c:\users\lenovo\anaconda3\lib\site-packages (1.4.32)
Requirement already satisfied: greenlet!=0.4.17 in c:\users\lenovo\anaconda3\lib\site-packages (from sqlalchemy) (1.1.1)
Note: you may need to restart the kernel to use updated packages.
```

In [9]:
```
import sqlalchemy
```

In [10]:
```
pip install mysql
```

```
Requirement already satisfied: mysql in c:\users\lenovo\anaconda3\lib\site-packages (0.0.3)
Requirement already satisfied: mysqlclient in c:\users\lenovo\anaconda3\lib\site-packages (from mysql) (2.1.1)
Note: you may need to restart the kernel to use updated packages.
```

In [11]:
```
engine1 = sqlalchemy.create_engine("mysql://sammy:password@localhost/mavenmarket")
```

In [20]:
```
Product.to_sql(name = 'product', con = engine1, index = False, if_exists = "replace")
```

Out[20]:
```
1560
```

In [19]:
```
Regions.to_sql(name = 'region', con = engine1, index = False, if_exists = 'replace')
```

Out[19]:
```
109
```

In [18]:
```
Store.to_sql(name = 'store', con = engine1, index = False, if_exists = 'replace')
```

Out[18]:
```
24
```

In [17]:
```
Returns.to_sql(name = 'return_product', con = engine1, index = False, if_exists = 'replace')
```

Out[17]:
```
7087
```

Load Data in PostgreSQL

In [21]:
```
engine = sqlalchemy.create_engine("postgresql+psycopg2://Uche:diamond@localhost/MavenMarket")
```

In [26]:
```
Product.to_sql(name = 'product', con = engine, index = False, if_exists = 'replace')
```

Out[26]:
```
560
```

In [25]:
```
Regions.to_sql(name = 'region', con = engine, index = False, if_exists = 'replace')
```

Out[25]:
```
109
```

In [24]:
```
Store.to_sql(name = 'store', con = engine, index = False, if_exists = 'replace')
```

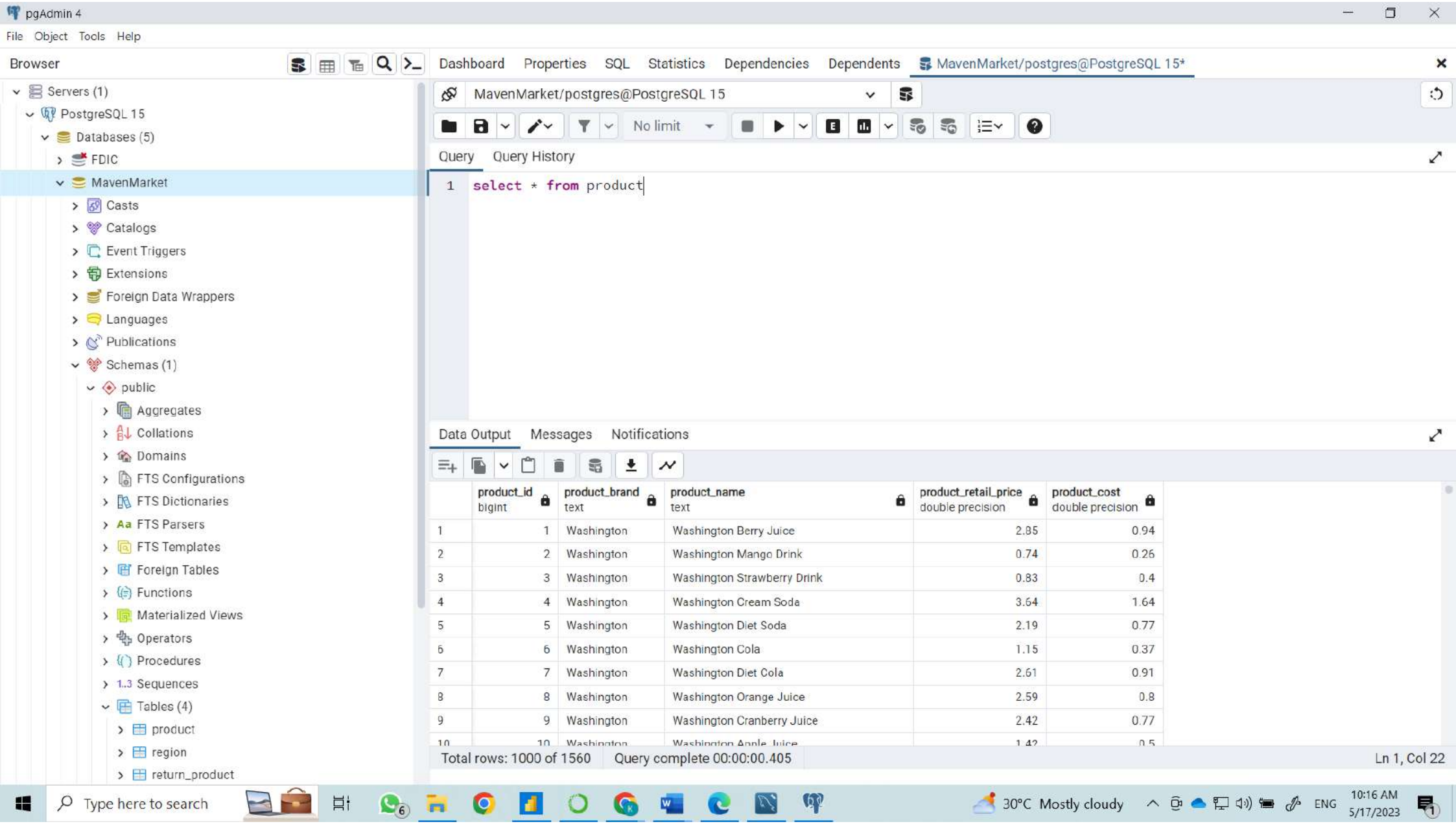
Out[24]:
```
24
```

In [23]:
```
Returns.to_sql(name = 'return_product', con = engine, index = False, if_exists = 'replace')
```

Out[23]:
```
87
```

In [ ]:
```

```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File Object Tools Help
Browser
Dashboard Properties SQL Statistics Dependencies Dependents MavenMarket/postgres@PostgreSQL 15*
Servers (1)
PostgreSQL 15
Databases (5)
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MavenMarket
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Aggregates
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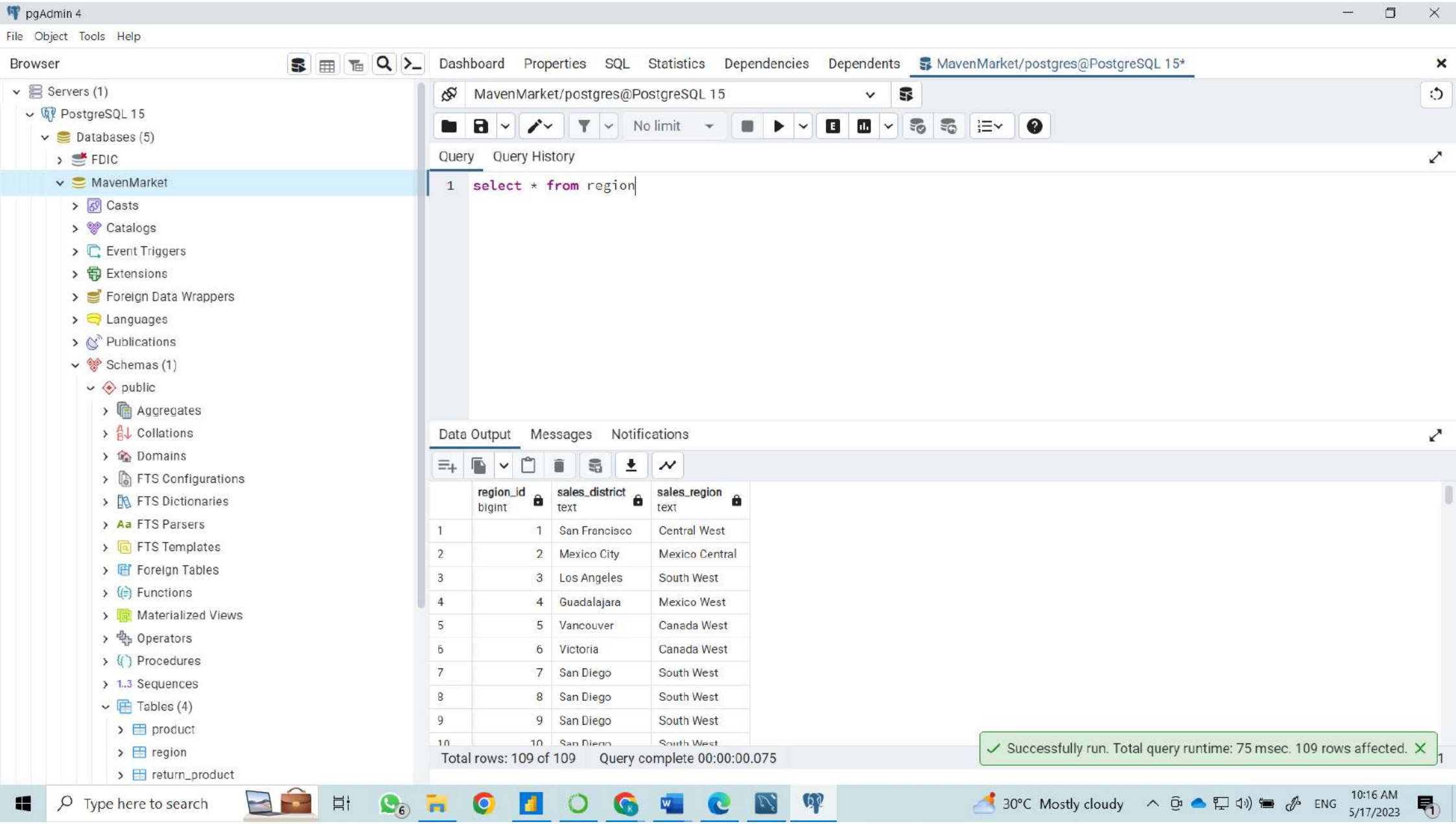
FTS Configurations
FTS Dictionaries
FTS Parsers
FTS Templates
Foreign Tables
Functions
Materialized Views
Operators
Procedures
Sequences
Tables (4)
product
region
return_product
MavenMarket/postgres@PostgreSQL 15
No limit
Query Query History
1 select * from product
Data Output Messages Notifications
product_id bigint
product_brand text
product_name text
product_retail_price double precision
product_cost double precision
1 1 Washington Washington Berry Juice 2.85 0.94
2 2 Washington Washington Mango Drink 0.74 0.26
3 3 Washington Washington Strawberry Drink 0.83 0.4
4 4 Washington Washington Cream Soda 3.64 1.64
5 5 Washington Washington Diet Soda 2.19 0.77
6 6 Washington Washington Cola 1.15 0.37
7 7 Washington Washington Diet Cola 2.61 0.91
8 8 Washington Washington Orange Juice 2.59 0.8
9 9 Washington Washington Cranberry Juice 2.42 0.77
Total rows: 1000 of 1560
Query complete 00:00:00.405
Ln 1, Col 22
Type here to search
30°C Mostly cloudy
ENG
10:16 AM
5/17/2023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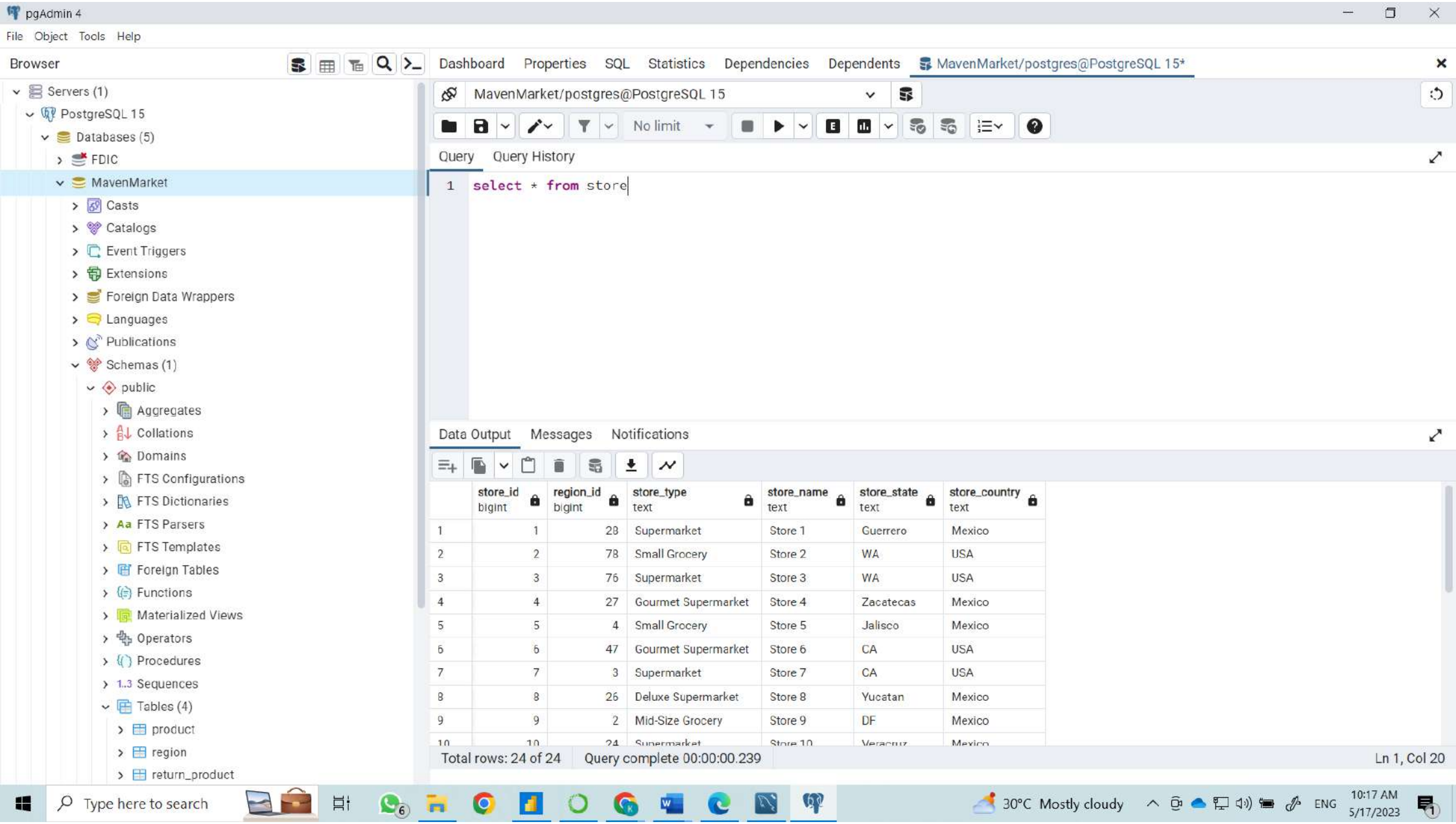
Tables (4)
product
region
return_product
MavenMarket/postgres@PostgreSQL 15
No limit
Query Query History
1 select * from region
Data Output Messages Notifications
region_id bigint
sales_district text
sales_region text
1 1 San Francisco Central West
2 2 Mexico City Mexico Central
3 3 Los Angeles South West
4 4 Guadalajara Mexico West
5 5 Vancouver Canada West
6 6 Victoria Canada West
7 7 San Diego South West
8 8 San Diego South West
9 9 San Diego South West
Total rows: 109 of 109
Query complete 00:00:00.075
Successfully run. Total query runtime: 75 msec. 109 rows affected.
Type here to search
30°C Mostly cloudy
ENG
10:16 AM
5/17/2023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FTS Parsers
FTS Templates
Foreign Tables
Functions
Materialized Views
Operators
Procedures
Sequences
Tables (4)
product
region
return_product
MavenMarket/postgres@PostgreSQL 15
No limit
Query Query History
1 select * from store
Data Output Messages Notifications
store_id bigint
region_id bigint
store_type text
store_name text
store_state text
store_country text
1 1 28 Supermarket Store 1 Guerrero Mexico
2 2 78 Small Grocery Store 2 WA USA
3 3 76 Supermarket Store 3 WA USA
4 4 27 Gourmet Supermarket Store 4 Zacatecas Mexico
5 5 4 Small Grocery Store 5 Jalisco Mexico
6 6 47 Gourmet Supermarket Store 6 CA USA
7 7 3 Supermarket Store 7 CA USA
8 8 26 Deluxe Supermarket Store 8 Yucatan Mexico
9 9 2 Mid-Size Grocery Store 9 DF Mexico
Total rows: 24 of 24
Query complete 00:00:00.239
Ln 1, Col 20
Type here to search
30°C Mostly cloudy
ENG
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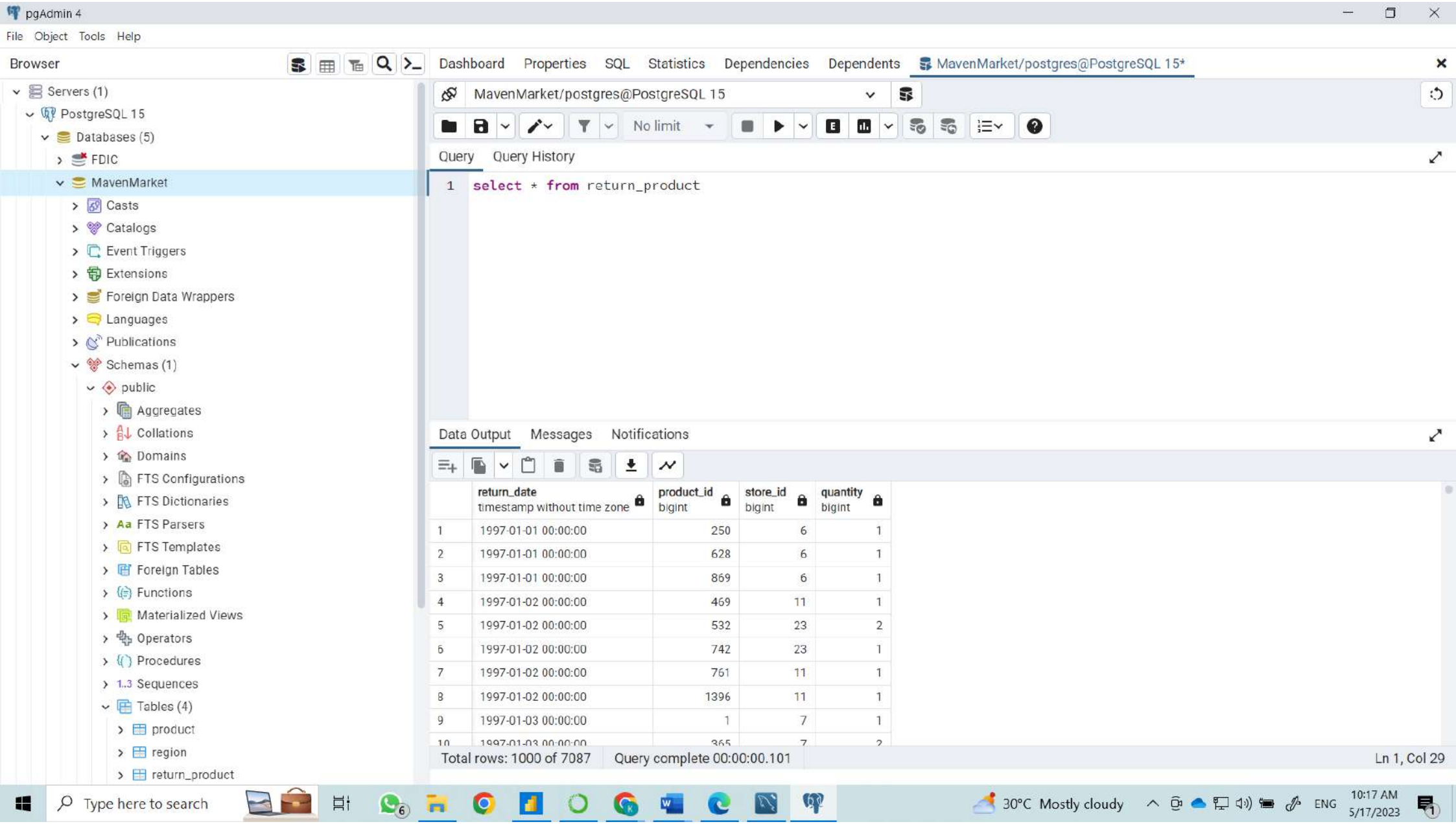
5/17/2023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Procedures
Sequences
Tables (4)
product
region
return_product
MavenMarket/postgres@PostgreSQL 15
No limit
Query Query History
1 select * from return_product
Data Output Messages Notifications
return_date timestamp without time zone
product_id bigint
store_id bigint
quantity bigint
1 1997-01-01 00:00:00 250 6 1
2 1997-01-01 00:00:00 628 6 1
3 1997-01-01 00:00:00 869 6 1
4 1997-01-02 00:00:00 469 11 1
5 1997-01-02 00:00:00 532 23 2
6 1997-01-02 00:00:00 742 23 1
7 1997-01-02 00:00:00 761 11 1
8 1997-01-02 00:00:00 1396 11 1
9 1997-01-03 00:00:00 1 7 1
Total rows: 1000 of 7087
Query complete 00:00:00.101
Ln 1, Col 29
Type here to search
30°C Mostly cloudy
ENG
10:17 AM
5/17/2023

MAVEN MARKET

Product Brand	Total Transactions	Total Profit	Profit Margin	Return Rate
Hermanos	5,342	$21,753	58.64%	0.95%
Ebony	5,238	$20,354	59.81%	0.96%
Tell Tale	5,112	$19,982	58.05%	0.99%
Tri-State	5,099	$19,980	58.91%	1.10%
High Top	4,940	$19,810	60.42%	1.01%
Nationeel	4,408	$18,617	60.44%	1.18%
Best Choice	4,218	$18,355	60.64%	0.81%
Horatio	4,195	$17,737	58.42%	1.26%
Fort West	4,108	$15,834	59.80%	0.97%
Fast	4,097	$16,469	61.03%	1.07%
Sunset	3,953	$14,018	60.45%	1.03%
Carrington	3,891	$14,883	59.52%	0.78%
Red Wing	3,870	$15,870	59.36%	1.06%
Big Time	3,816	$15,560	60.20%	1.05%
Cormorant	3,744	$15,749	61.60%	0.87%
Imagine	3,634	$15,102	61.40%	1.06%
Super	3,618	$13,868	60.59%	0.96%
Denny	3,584	$16,015	58.02%	0.99%
High Quality	3,577	$16,139	59.98%	1.13%
Golden	3,550	$13,256	58.72%	0.88%
BBB Best	3,514	$12,991	62.12%	0.80%
PigTail	3,467	$11,617	60.68%	1.04%
Plato	3,352	$12,748	63.55%	1.06%
Landslide	3,270	$10,647	58.65%	0.98%
CDR	3,078	$12,062	58.98%	1.11%
Better	2,823	$9,179	61.15%	1.07%
Carlson	2,564	$10,534	61.20%	0.97%
Pleasant	2,564	$10,187	60.18%	0.92%
Just Right	2,558	$9,283	59.54%	0.83%
Bravo	2,484	$11,027	59.15%	0.82%
Total	**113,668**	**$449,627**	**59.94%**	**1.00%**

Current Month Transactions

18,325

Goal: 17,339 (+5.69%)

Current Month Profit

$71,682

Goal: 67.87K (+5.61%)

Current Month Returns

496

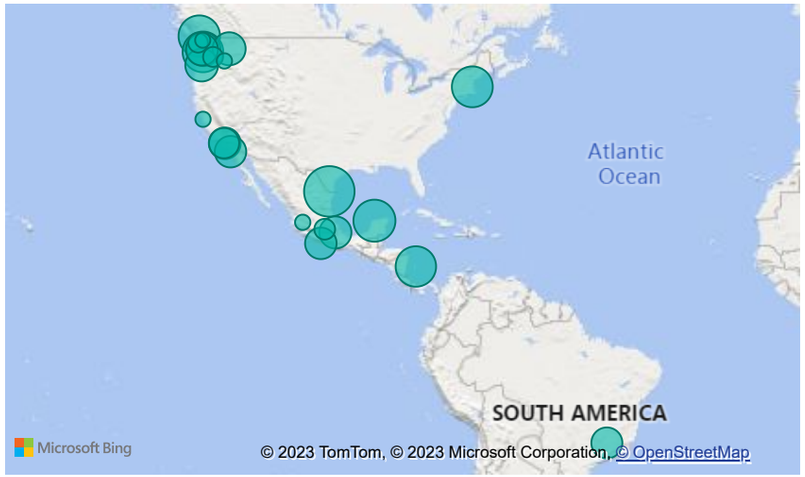
Goal: 482 (-2.9%)

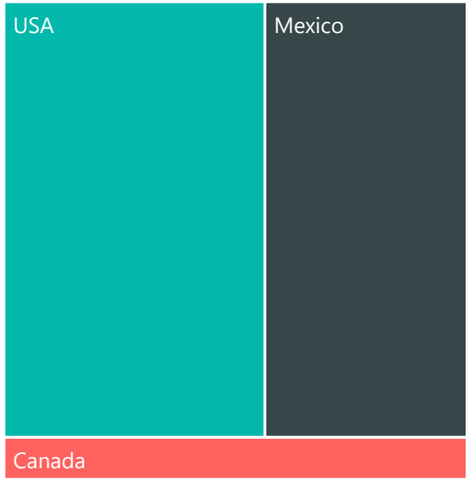
Select all

Canada

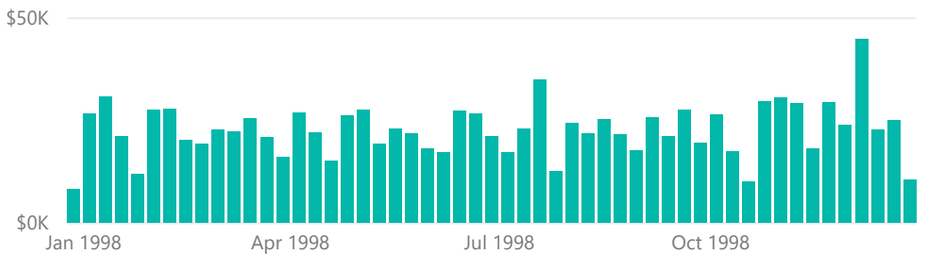
Mexico

USA





Weekly Revenue Trending



Revenue vs. Target