

KULLIYAH OF INFORMATION & COMMUNICATION TECHNOLOGY

INFO 4311 DATA WAREHOUSING

END-OF-SEMESTER INDIVIDUAL ASSESSMENT 2

SEMESTER 1, 2024/2025

SECTION 2

NORTHWIND_SALES_DW

PREPARED BY:

NAME	MATRIC NO.
Muhammad Hafiz Faruqi bin Md Saifuddin	2217241

LECTURER: ASSOC. PROF. DR. LILI MARZIANA BT. ABDULLAH

1. Introduction to Dataset

The dataset used for this analysis is derived from the Northwind Sales Reporting Data Warehouse (NorthwindSales_DW_Schema_Data), a transformed and dimensional version of the Northwind database. This dataset focuses on sales-related data and contains key tables such as DimCustomers, DimDate, DimEmployees, DimProducts, and FactNorthwindSales.

The Northwind database initially represents a sample database used to demonstrate the functionality of relational database systems. It contains information about products, customers, orders, and employees, making it a valuable resource for analysing sales and customer trends.

2. Purpose of Analysis

The goal of this analysis is to:

1. Explore the sales data between 1996 and 1998 to identify trends, patterns, and key contributors to revenue.
2. Provide actionable insights for decision-making by creating three analytical forms:
 - A tabular report for granular analysis.
 - A line chart for visualising monthly sales trends over the years.
 - A treemap for focusing on the performance of the top 10 products.
3. Enable a better understanding of seasonal patterns, product performance, and customer behaviours, which can help forecast demand, improve marketing strategies, and optimise resource allocation.

3. Description of Each Analytical Form

Tabular Report

Description:

This structured table presents key metrics such as total sales revenue, quantity sold, and customer and product performance over three years (1996–1998). Each row details specific transactions or aggregated data, making it easy to analyse trends, outliers, and high-performing entities.

Purpose:

To provide granular insights into individual sales records and highlight performance by customer, product, and period. This format is ideal for deep dives into data, identifying outliers, and monitoring KPIs like total sales, peak months, or top customers.

Northwind Sales Summary Report						Month		
year	Month	ProductName	ContactName	TotalQuantity	TotalSales			
1998	February	Thüringer Rostbratwurst	Patricia McKenna	140	\$17,330.60	Janua...	Febru...	March
1998	February	Côte de Blaye	Horst Kloss	60	\$15,810.00			
1998	March	Côte de Blaye	Mario Pontes	60	\$15,810.00			
1996	November	Côte de Blaye	Georg Pippis	50	\$10,540.00	April	May	June
1997	January	Côte de Blaye	Jytte Petersen	50	\$10,540.00			
1998	February	Côte de Blaye	Paula Wilson	40	\$10,540.00	July	August	Septe...
1997	January	Côte de Blaye	Jean Fresnière	49	\$10,329.20			
1996	December	Côte de Blaye	Lúcia Carvalho	40	\$8,432.00			
1997	May	Côte de Blaye	Horst Kloss	30	\$7,905.00			
1998	January	Côte de Blaye	Howard Snyder	30	\$7,905.00			
1998	January	Côte de Blaye	Philip Cramer	30	\$7,905.00			
1998	April	Thüringer Rostbratwurst	Jose Pavarotti	60	\$7,427.40			
1998	April	Côte de Blaye	Karl Jablonski	25	\$6,587.50			
1997	December	Manjimup Dried Apples	Roland Mendel	120	\$6,360.00	1996	1997	1998
1997	March	Côte de Blaye	Paula Wilson	30	\$6,324.00	ProductName <input type="checkbox"/> Alice Mutton <input type="checkbox"/> Aniseed Syrup <input type="checkbox"/> Boston Crab Meat <input type="checkbox"/> Camembert Pierrot <input type="checkbox"/> Carnarvon Tigers <input type="checkbox"/> Chai <input type="checkbox"/> Chang <input type="checkbox"/> Chartreuse verte		
1998	April	Thüringer Rostbratwurst	Maria Larsson	50	\$6,189.50			
1998	April	Raclette Courdavault	Roland Mendel	110	\$6,050.00			
1998	April	Raclette Courdavault	Jose Pavarotti	100	\$5,500.00			
1997	April	Schoggi Schokolade	Horst Kloss	120	\$5,268.00			
1997	October	Thüringer Rostbratwurst	Horst Kloss	40	\$4,951.60			
1997	September	Mishi Kobe Niku	Patricia McKenna	50	\$4,850.00			
1997	April	Thüringer Rostbratwurst	Jose Pavarotti	36	\$4,456.44			
1997	September	Thüringer Rostbratwurst	Michael Holz	36	\$4,456.44			
1998	May	Manjimup Dried Apples	Roland Mendel	120	\$4,222.50			
Total				51317	\$1,354,458.59			

Preview of Tabular Report: Northwind Sales Summary Report

Columns		
year	✓	✕
date	✓	✕
Month		✕
ProductName	✓	✕
ContactName	✓	✕
TotalQuantity	✓	✕
TotalSales	✓	✕

Query for Analysis

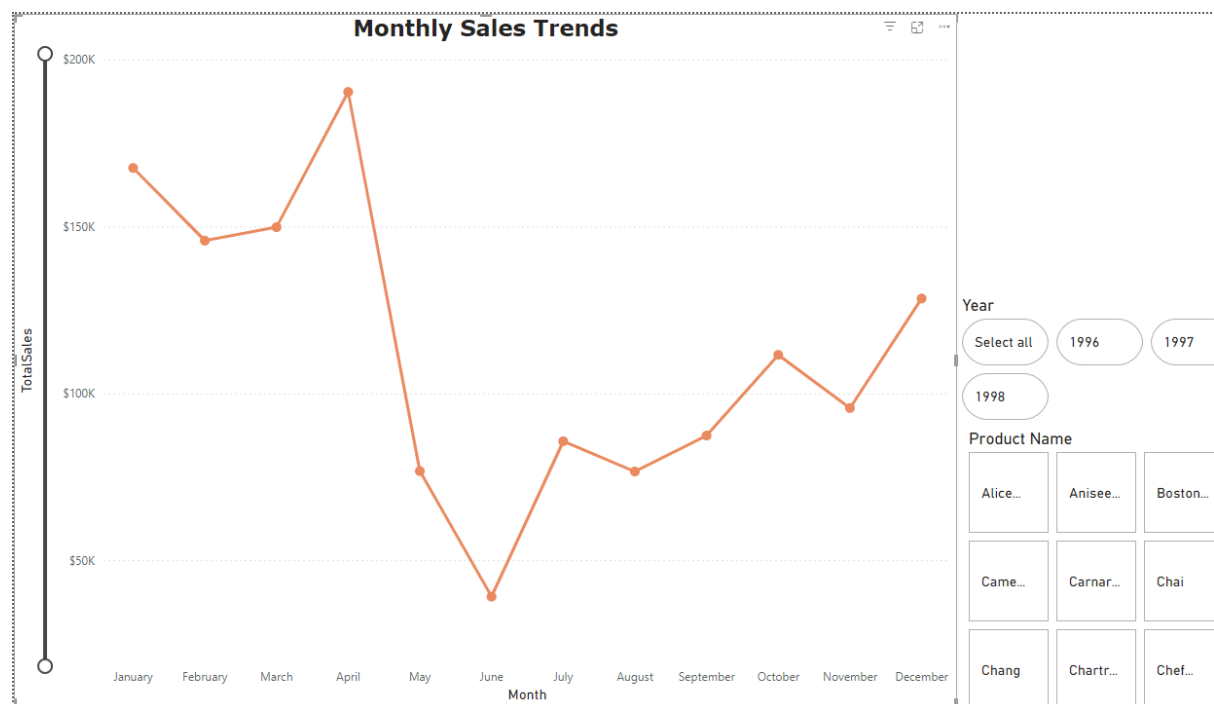
Line Chart

Description:

This is a line chart visualising monthly sales trends from 1996 to 1998. The chart connects data points for each month, revealing seasonal patterns and variations in revenue. Filters for year and product allow users to explore specific trends and changes in performance over time.

Purpose:

This visualisation highlights seasonal trends, year-on-year growth, and monthly fluctuations in sales. It helps forecast demand, plan marketing campaigns, and understand periods of high or low performance.



Preview of Line Chart: Monthly Sales Trends

X-axis	
date	✕
Month	✕
Y-axis	
TotalSales	✕
Secondary y-axis	
Add data fields here	
Legend	
Add data fields here	
Small multiples	
Add data fields here	
Tooltips	
Add data fields here	

Query for Analysis

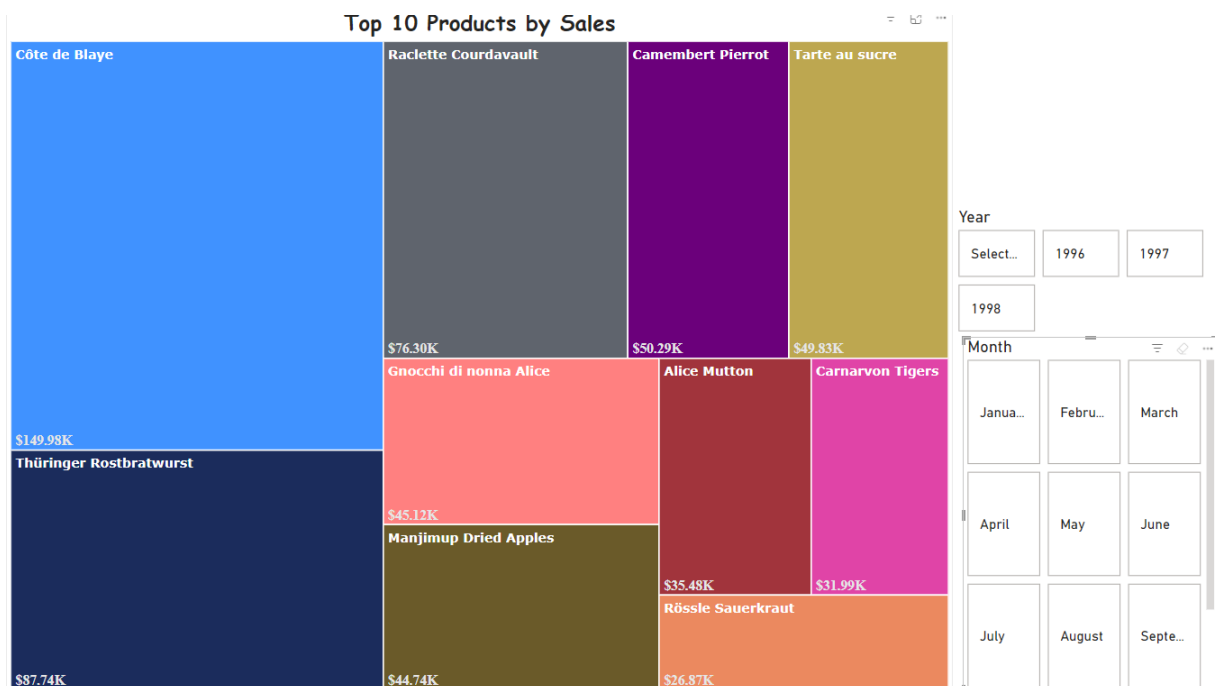
Tree Map

Description:

This is a treemap displaying the top 10 products by total sales revenue, with rectangles sized according to their contribution to overall revenue. Filters for year and month allow for a detailed exploration of product performance over time.

Purpose:

To focus on the concentration of value by highlighting high-revenue products and their share in total sales. It supports strategic resource allocation, inventory management, and identifying opportunities for product promotion or seasonal targeting.



Preview of TreeMap: Top 10 Products by Sales

The screenshot shows the query editor interface. On the left, there is a 'Filters' section with a search bar and a list of filters: 'Data limit is 10', 'ProductName is (All)', and 'TotalSales is (All)'. Below this is a 'Details' section with a search bar and a list of details: 'Add data fields here', 'Values', 'TotalSales', 'Tooltips', 'Add data fields here', 'Drill through', 'Cross-report', 'Keep all filters', and 'Add drill-through fields here'. The 'Cross-report' toggle is set to 'Off' and the 'Keep all filters' toggle is set to 'On'.

Query for Analysis

4. Analyze and Interpret Insights

Tabular Report

Trends:

- The total sales over the three years (1996–1998) reached more than \$1.3 million, with a total quantity sold exceeding 51k. This indicates a strong overall performance in sales across the period.
- Sales show seasonal fluctuations with stronger sales in specific months like April, where more than \$190k was generated. This could be attributed to increased demand, possibly due to promotions, events, or seasonality.

Key Performance Indicators (KPIs):

- Top customers such as Patricia McKenna, who generated \$17.3k in sales from Thüringer Rostbratwurst in February 1998, highlight the importance of customer segmentation. Tracking top customers can help target marketing and sales efforts.
- The product performance also stands out, with Thüringer Rostbratwurst generating almost \$90k over the three years, peaking at \$17.3k in February 1998. This points to the importance of identifying high-performing products and understanding seasonal trends.

Outliers:

- Patricia McKenna's large order of 140 units could be considered an outlier. This points to the possibility of bulk buying, which may warrant further investigation for targeted offers or loyalty programs.

Line Chart

Patterns:

- The line chart highlights a strong seasonal trend, with April consistently showing the highest sales across the three years. This suggests a recurring peak period, possibly tied to events or high demand in specific months.
- The June trend shows a consistently low sales performance, which could suggest an off-peak period or factors affecting the product or region during that time.

Comparisons:

- When examining by year, it's evident that 1998 showed the highest sales in April, indicating an extreme demand during that period. However, in May 1998, the sales dipped significantly, which can help identify months with lower engagement or external factors affecting sales.
- The trend from 1996 shows a steady increase in sales from September to December, suggesting that this period could correspond with holidays, promotional events, or product demand spikes.

Relationships:

- The year and product filter reveal that certain products, like Chai, saw fluctuations in sales based on the time of year. In contrast, others like Côte de Blaye consistently performed well across all years, showing that some products have a more stable sales pattern than others.

Treemap:

Value Concentration:

- The treemap shows the top 10 products by total sales revenue, with Côte de Blaye dominating the sales with over \$149k in the three years. This highlights the product's strong market presence and consistent performance, making it a strategic focus for the business.
- Smaller rectangles represent products with lower but still significant contributions to total sales. For instance, products like Manjimup Dried Apples see a sales spike in June, suggesting they have seasonal demand, which can help businesses plan for inventory and promotional strategies.

Strategic Decisions:

- The year filter in the treemap allows for the analysis of changes in product performance over time. Côte de Blaye remains the top performer across all three years, indicating its dominance in the market. By filtering by month, we can identify patterns that suggest demand fluctuations due to events, promotions, or seasonal changes.
- The month filter shows that some products have specific demand periods, such as Wimmers gute Semmelknödel in May 1998, which could be helpful for resource allocation and supply chain planning, ensuring that the company is prepared for these peaks.

5. Insights from Visualisation

Tabular Report

- The report reveals that total sales for the three years from 1996 until 1998 were more than \$1.3 million.
- More than 51,000 units were sold across all products, highlighting the scale of operations.
- Certain customers played a significant role in driving revenue. For example, Patricia McKenna generated over \$17.3k in February 1998, primarily driven by the sale of Thüringer Rostbratwurst (140 units).

year	Month	ProductName	ContactName	TotalQuantity	TotalSales
1998	February	Thüringer Rostbratwurst	Patricia McKenna	140	\$17,330.60
1998	February	Côte de Blaye	Horst Kloss	60	\$15,810.00
1998	March	Côte de Blaye	Mario Pontes	60	\$15,810.00
1996	November	Côte de Blaye	Georg Pippis	50	\$10,540.00
1997	January	Côte de Blaye	Jytte Petersen	50	\$10,540.00
1998	February	Côte de Blaye	Paula Wilson	40	\$10,540.00
1997	January	Côte de Blaye	Jean Fresnière	49	\$10,329.20
1996	December	Côte de Blaye	Lúcia Carvalho	40	\$8,432.00
1997	May	Côte de Blaye	Horst Kloss	30	\$7,905.00
1998	January	Côte de Blaye	Howard Snyder	30	\$7,905.00
1998	January	Côte de Blaye	Philip Cramer	30	\$7,905.00
1998	April	Thüringer Rostbratwurst	Jose Pavarotti	60	\$7,427.40
1998	April	Côte de Blaye	Karl Jablonski	25	\$6,587.50
1997	December	Manjimup Dried Apples	Roland Mendel	120	\$6,360.00
1997	March	Côte de Blaye	Paula Wilson	30	\$6,324.00
1998	April	Thüringer Rostbratwurst	Maria Larsson	50	\$6,189.50
1998	April	Raclette Courdavault	Roland Mendel	110	\$6,050.00
1998	April	Raclette Courdavault	Jose Pavarotti	100	\$5,500.00
1997	April	Schoggi Schokolade	Horst Kloss	120	\$5,268.00
1997	October	Thüringer Rostbratwurst	Horst Kloss	40	\$4,951.60
1997	September	Mishi Kobe Niku	Patricia McKenna	50	\$4,850.00
1997	April	Thüringer Rostbratwurst	Jose Pavarotti	36	\$4,456.44
1997	September	Thüringer Rostbratwurst	Michael Holz	36	\$4,456.44
1998	May	Manjimup Dried Apples	Roland Mendel	120	\$4,332.00
Total				51317	\$1,354,458.59

Month

Janua... Febru... March

April May June

July August Septe...

Year

1996 1997 1998

ProductName

☐ Sir Rodney's Scones

☐ Sirop d'érable

☐ Spegesild

☐ Steeleye Stout

☐ Tarte au sucre

☐ Teatime Chocolate Biscuits

☐ Thüringer Rostbratwurst

☐ Tofu

- Sales vary across different periods, with some months showing stronger performance than others. For example, in April, the total sales generated reached more than \$190k.

year	Month	ProductName	ContactName	TotalQuantity	TotalSales
1998	April	Thüringer Rostbratwurst	Jose Pavarotti	60	\$7,427.40
1998	April	Côte de Blaye	Karl Jablonski	25	\$6,587.50
1998	April	Thüringer Rostbratwurst	Maria Larsson	50	\$6,189.50
1998	April	Raclette Courdavault	Roland Mendel	110	\$6,050.00
1998	April	Raclette Courdavault	Jose Pavarotti	100	\$5,500.00
1997	April	Schoggi Schokolade	Horst Kloss	120	\$5,268.00
1997	April	Thüringer Rostbratwurst	Jose Pavarotti	36	\$4,456.44
1997	April	Côte de Blaye	Miguel Angel Paolino	15	\$3,952.50
1998	April	Rössle Sauerkraut	Roland Mendel	70	\$3,192.00
1997	April	Sir Rodney's Marmalade	Roland Mendel	39	\$3,159.00
1997	April	Camembert Pierrot	Horst Kloss	84	\$2,856.00
1997	April	Gnocchi di nonna Alice	Roland Mendel	70	\$2,660.00
1998	April	Manjimup Dried Apples	Horst Kloss	44	\$2,332.00
1998	April	Perth Pasties	Michael Holz	70	\$2,296.00
1998	April	Carnarvon Tigers	Georg Pippis	35	\$2,187.50
1998	April	Sasquatch Ale	Roland Mendel	150	\$2,100.00
1998	April	Gumbär Gummibärchen	Horst Kloss	63	\$1,967.49
1998	April	Chang	Jose Pavarotti	100	\$1,900.00
1998	April	Sirop d'érable	Roland Mendel	66	\$1,881.00
1998	April	Veggie-spread	Yang Wang	42	\$1,843.80
1998	April	Uncle Bob's Organic Dried Pears	Maria Larsson	60	\$1,800.00
1998	April	Camembert Pierrot	Ann Devon	50	\$1,700.00
1998	April	Raclette Courdavault	Karl Jablonski	30	\$1,650.00
Total				6592	\$190,329.95

Month

Janua...
Febru...
March

April
May
June

July
August
Septe...

Year

1996
1997
1998

ProductName
☐ Sir Rodney's Scones
☐ Sirop d'érable
☐ Spegesild
☐ Steeleye Stout
☐ Tarte au sucre
☐ Teatime Chocolate Biscuits
☐ Thüringer Rostbratwurst
☐ Tofu

- Specific products like Thüringer Rostbratwurst stood out, contributing nearly \$90k in sales over three years. Its peak sales occurred in February 1998, with a revenue of \$17.3k, demonstrating a significant demand during that period.

year	Month	ProductName	ContactName	TotalQuantity	TotalDiscount	TotalSales
1998	February	Thüringer Rostbratwurst	Patricia McKenna	140	\$15,473.75	\$17,330.60
1998	April	Thüringer Rostbratwurst	Jose Pavarotti	60	\$5,570.55	\$7,427.40
1998	April	Thüringer Rostbratwurst	Maria Larsson	50	\$4,642.12	\$6,189.50
1997	October	Thüringer Rostbratwurst	Horst Kloss	40	\$4,951.60	\$4,951.60
1997	April	Thüringer Rostbratwurst	Jose Pavarotti	36	\$4,456.44	\$4,456.44
1997	September	Thüringer Rostbratwurst	Michael Holz	36	\$4,456.44	\$4,456.44
1996	November	Thüringer Rostbratwurst	Frédérique Citeaux	35	\$3,465.00	\$3,465.00
1998	February	Thüringer Rostbratwurst	Philip Cramer	24	\$2,970.96	\$2,970.96
1997	December	Thüringer Rostbratwurst	Annette Roulet	20	\$2,352.01	\$2,475.80
1997	August	Thüringer Rostbratwurst	José Pedro Freyre	20	\$2,475.80	\$2,475.80
1997	December	Thüringer Rostbratwurst	Martin Sommer	20	\$1,856.85	\$2,475.80
1996	September	Thüringer Rostbratwurst	Rene Phillips	25	\$2,227.50	\$2,475.00
1997	February	Thüringer Rostbratwurst	Jose Pavarotti	24	\$2,019.60	\$2,376.00
1997	December	Thüringer Rostbratwurst	Renate Messner	18	\$2,228.22	\$2,228.22
1997	January	Thüringer Rostbratwurst	Ann Devon	21	\$2,079.00	\$2,079.00
1996	December	Thüringer Rostbratwurst	Art Braunschweiger	20	\$1,980.00	\$1,980.00
1997	March	Thüringer Rostbratwurst	Palle Ibsen	18	\$1,603.80	\$1,782.00
Total				746	\$80,368.64	\$87,736.40

Month

Janua...
Febru...
March

April
May
June

July
August
Septe...

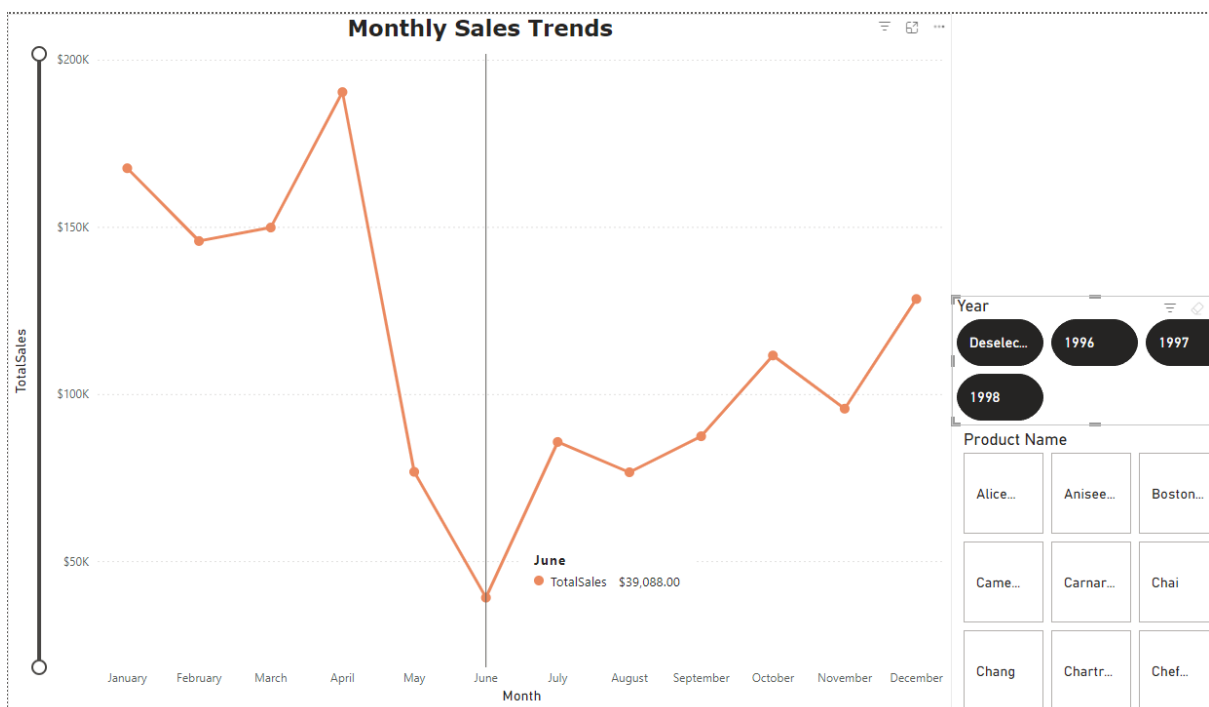
Year

1996
1997
1998

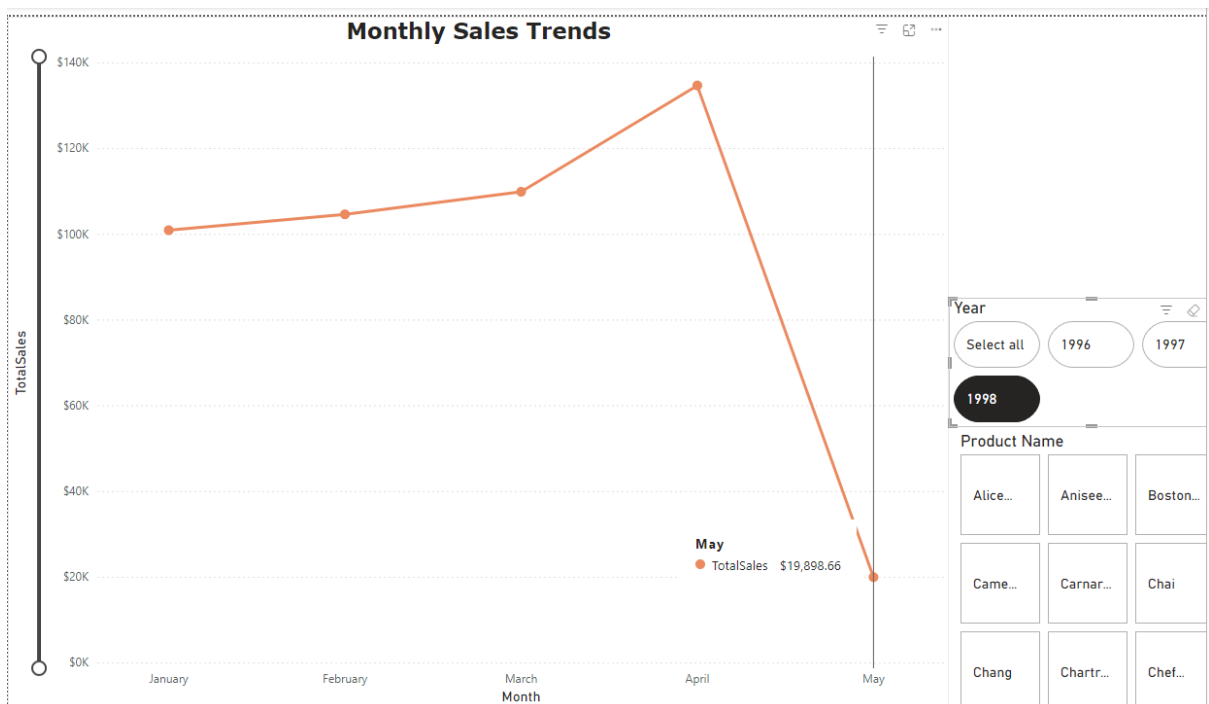
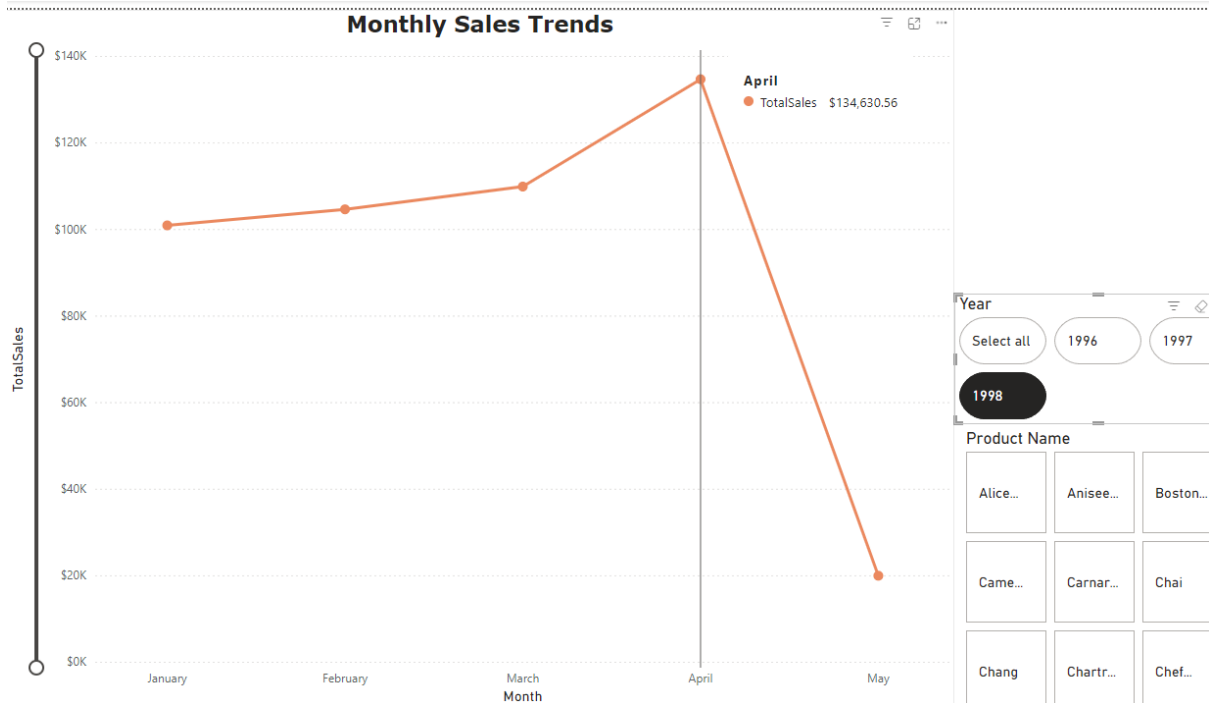
ProductName
☐ Sir Rodney's Scones
☐ Sirop d'érable
☐ Spegesild
☐ Steeleye Stout
☐ Tarte au sucre
☐ Teatime Chocolate Biscuits
☒ Thüringer Rostbratwurst
☐ Tofu

Line Chart

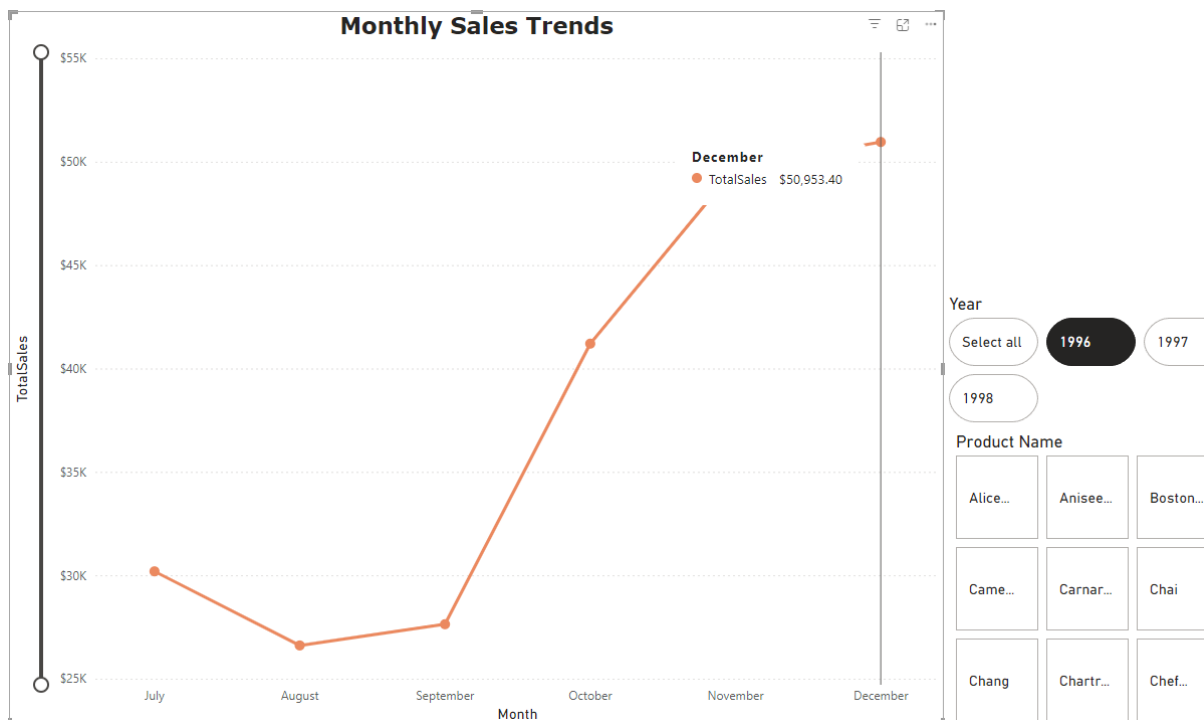
- Over the three years (1996–1998), specific months consistently show higher revenue, indicating clear seasonal sales trends. For example, April consistently shows the highest sales across the three years, with more than \$190k generated. This could indicate a seasonal demand spike, potentially linked to events or campaigns occurring in this period.
- Besides, June has the lowest sales performance over the three years. During this period, the sales that were generated were less than \$40k. This trend could signal an off-season period or other factors affecting sales during this month.



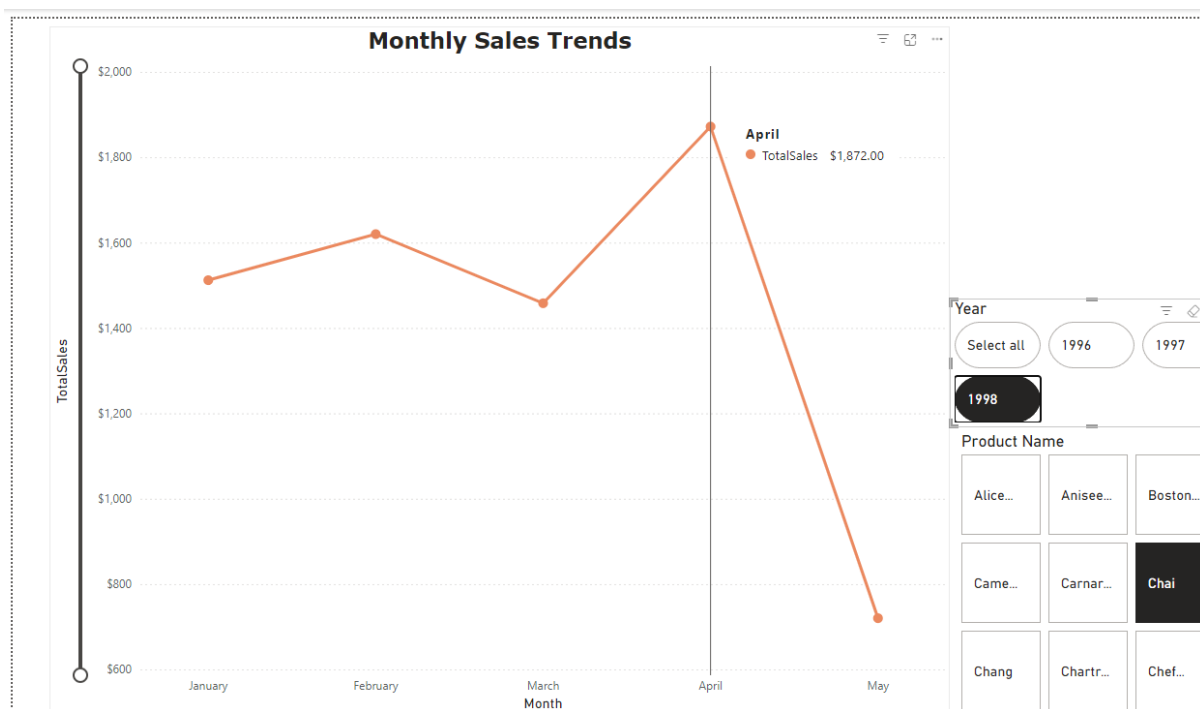
- When filtering by year, we can see how the sales patterns change over time.
- In 1998, April had the sharpest sales peak with over \$134k in revenue, showing excellent performance. However, May 1998 recorded the lowest sales at just \$19k, reflecting a sharp decline.

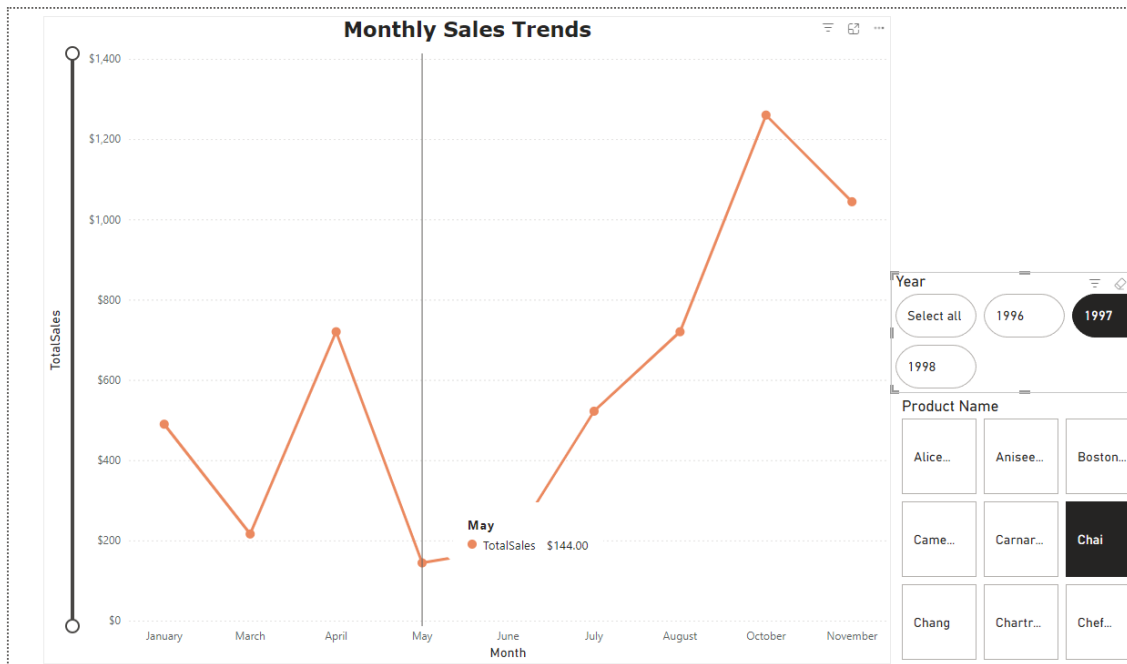


- In 1996, sales showed a gradual increase after September, peaking in December with \$50.9k in revenue. This pattern likely corresponds to holiday-related demand or seasonal product popularity.



- Combining year and product filters reveals product-level sales trends. For instance, Chai achieved strong sales of \$1.8k in April 1998 yet recorded its lowest performance of \$144 in May 1997, indicating fluctuations in demand based on specific months and years.

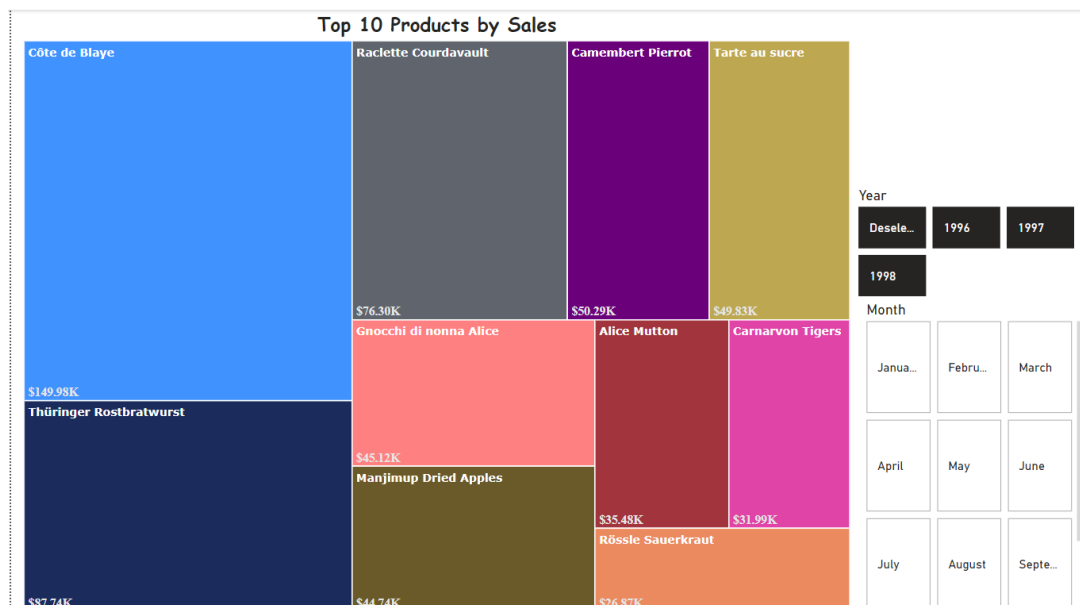




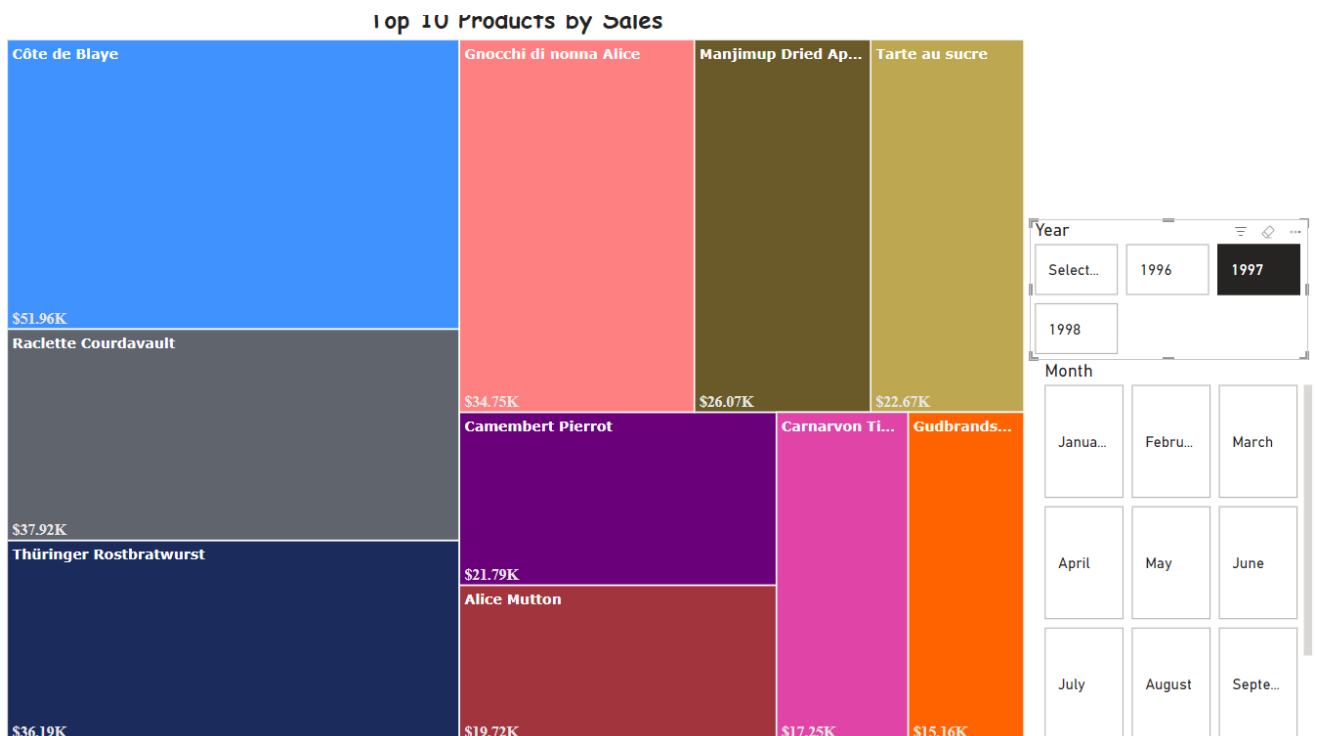
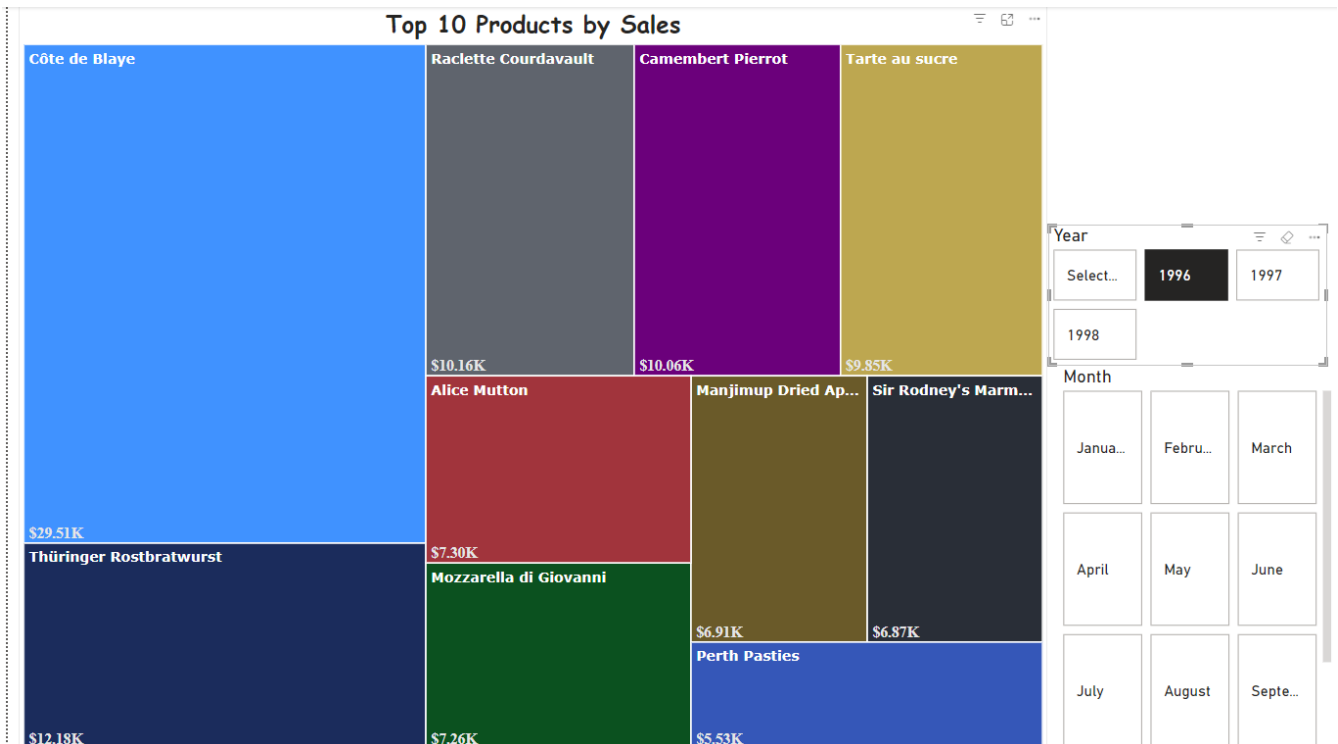
TreeMap

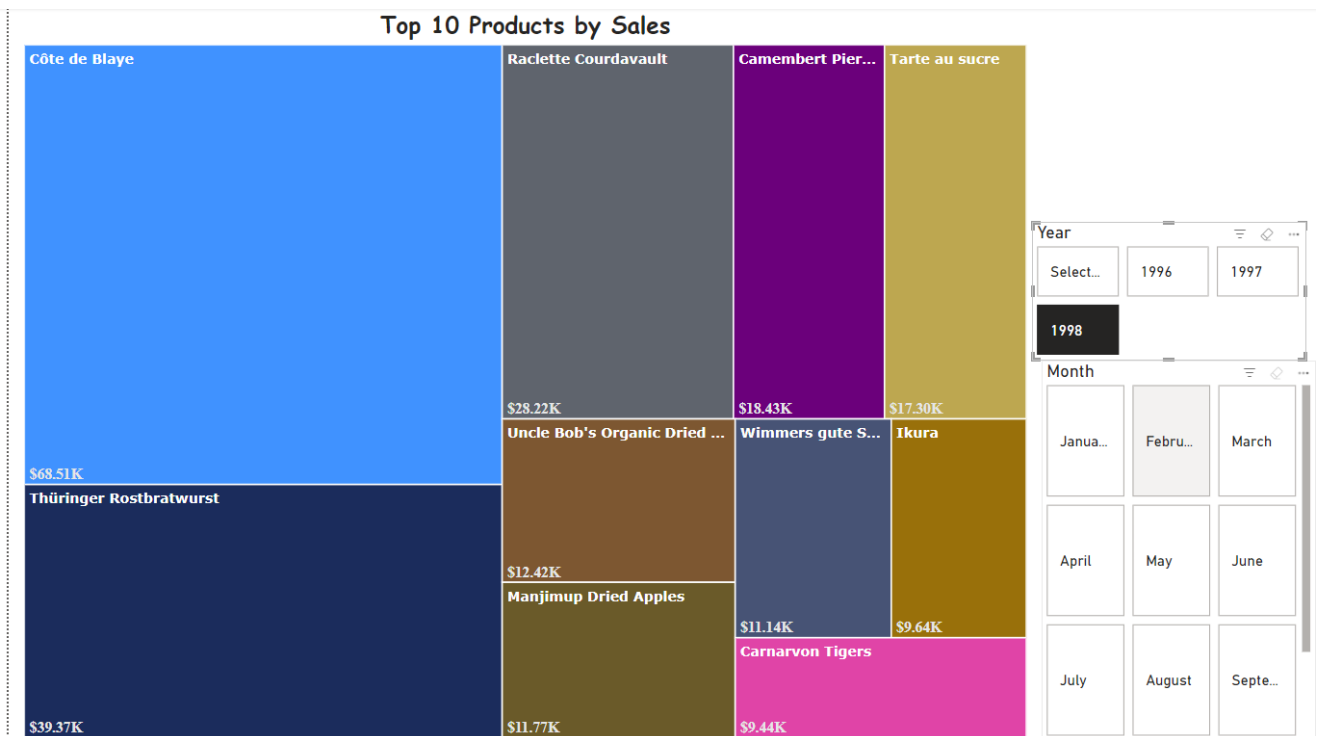
The treemap illustrates the top 10 products based on total sales revenue, with each rectangle's size representing its contribution. Filters for year and month allow deeper exploration of the sales patterns of each top 10 product over the whole three-year period.

- First, the visualisation shows that the largest rectangles belong to the highest-selling products during the three years, showing that they have a dominant role in the company's revenue. The product that shows dominance is Côte de Blaye, which has generated more than \$149k for three years, followed by Thüringer Rostbratwurst and Raclette Courdavault, both in second and third place.
- The smaller rectangles indicate products with lower sales, but they still make it into the top 10. It shows that they are still consistent with the demands.

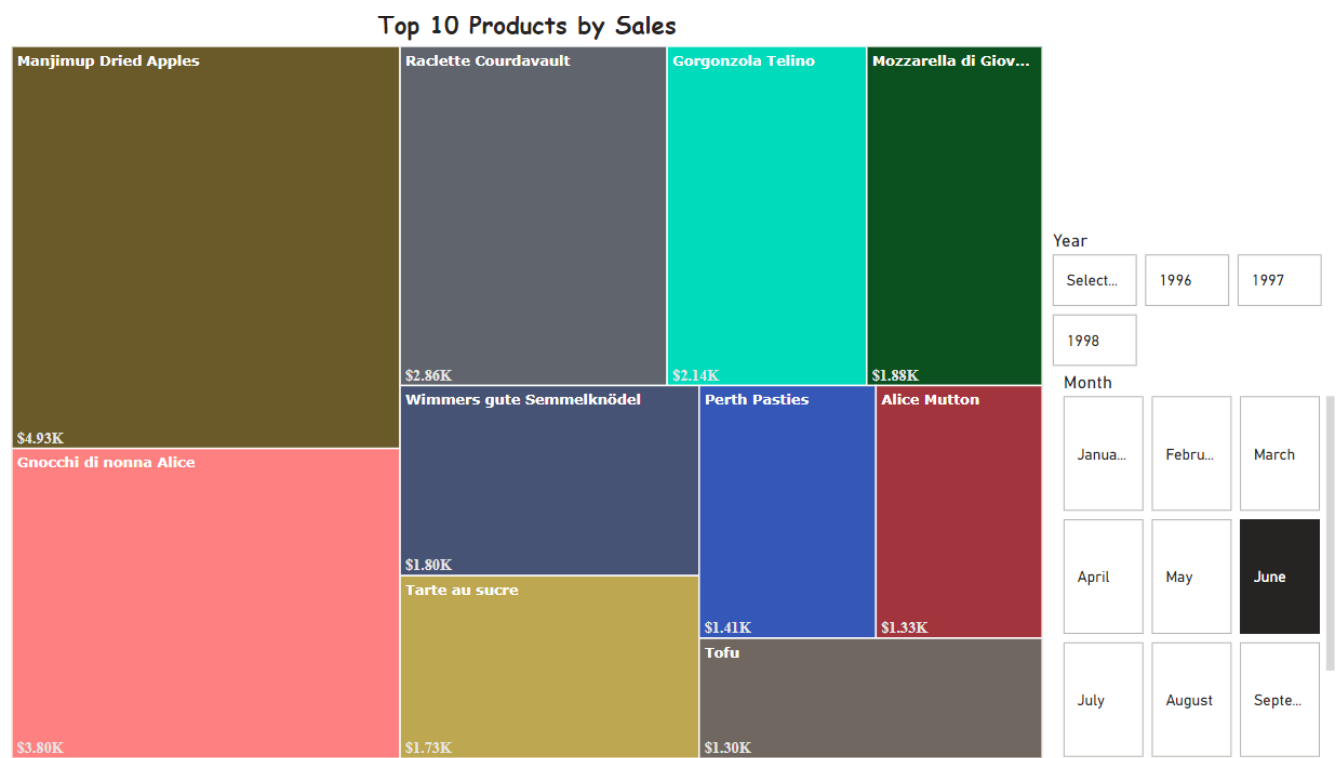


- Next, the year filter reveals how the top 10 products vary annually. For instance, Côte de Blaye shows its absolute dominance by taking first place for all three years while the second until tenth place keeps changing. Here, it shows the dominance of these products from 1996 until 1998.

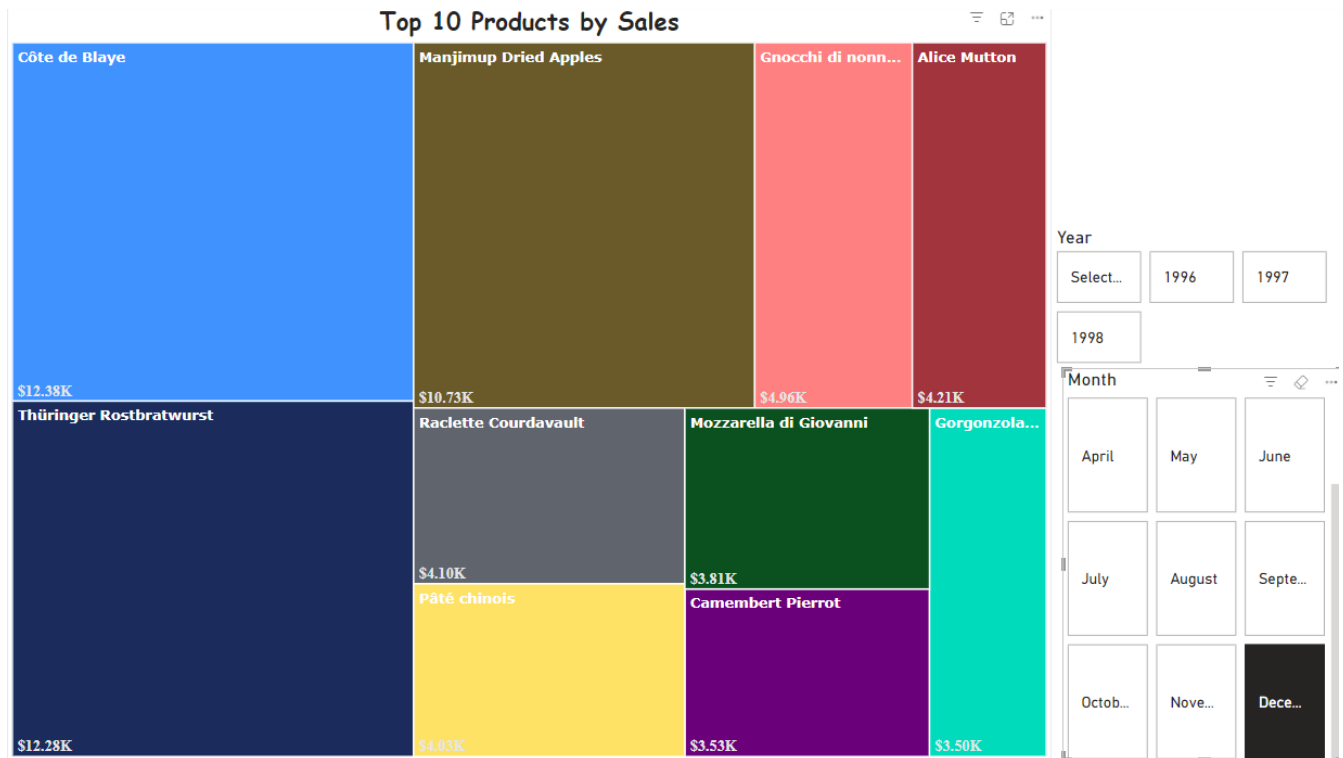




- Manjimup Dried Apples shows a significant June sales spike across all three years, indicating strong mid-year demand, possibly linked to specific events or holidays.

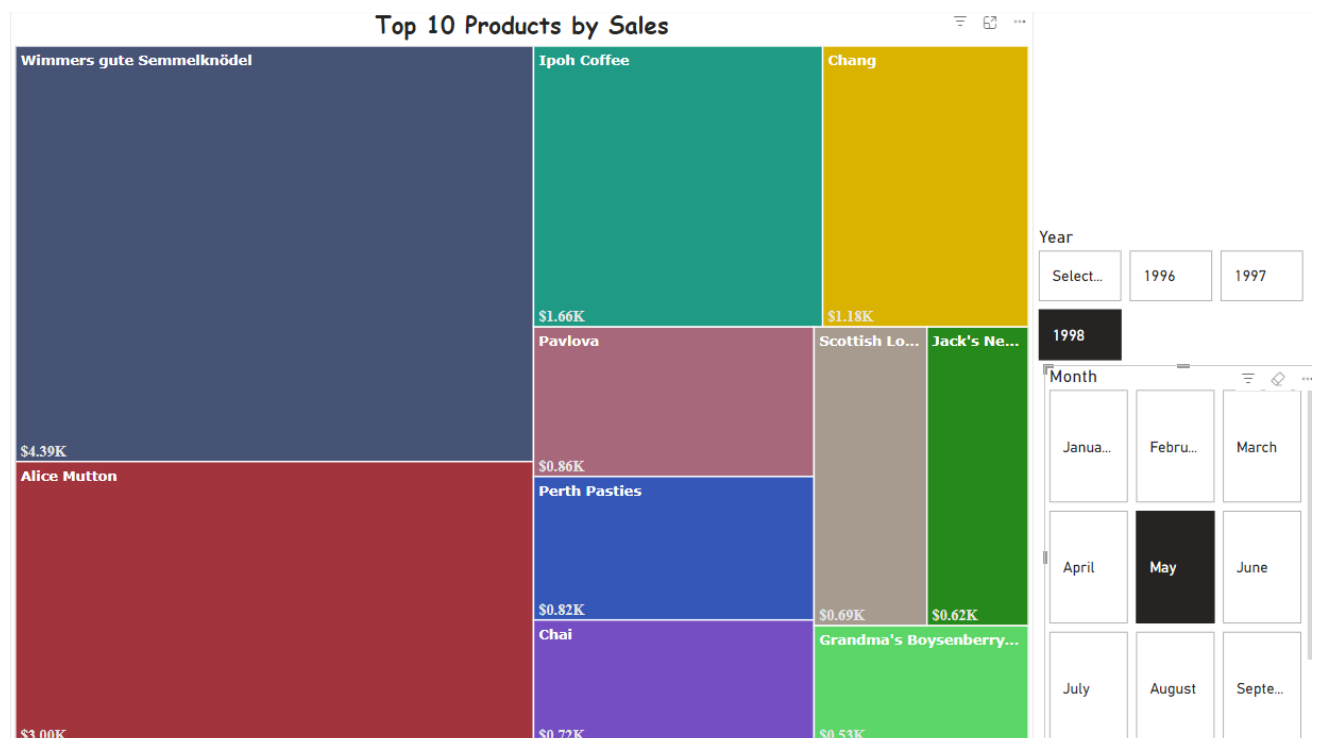


- In December, Côte de Blaye leads with \$12.38k in sales, suggesting heightened demand during holiday seasons.



Combining both filters shows how specific products perform during different times of the year.

- Wimmers gute Semmelknödel topped sales in May 1998, generating \$4.39k, indicating potential demand tied to a specific event or festival.



- Similarly, in May 1997, Côte de Blaye led sales, emphasising its consistent dominance and relevance during event-related periods.

