Gian Lacson   Araz A   Hunter G Thomas H   Kahosha K   Aldaire T

Final Project - Spinning Wild

1. What is the total revenue of the company during the provided time period?

   Business Understanding
   - BA QUESTION: What is the total revenue of all orders?
   - Problem Type: Descriptive problem
   - Required Data: Revenue of each order

   Data Understanding
   - Required Data: Revenue of each order
   - Provided: Yes or No (if No, describe the retrieve method)?
        Calculated by multiplying a quantity by price; Calculate total revenue by
        the sum of the selling price
        - **Total Revenue = $386,424.23**
   - Statistical Description: Continuous or Categorical Data?
        - **Mean: $5,018.50**
        - **Max: $62,976.50**
        - **Min: $70**
        - **Range: $62,906.50**
        - **Standard deviation: $7,938**

        Visualization Chart (Bar Chart):

        Profit Distrubtion
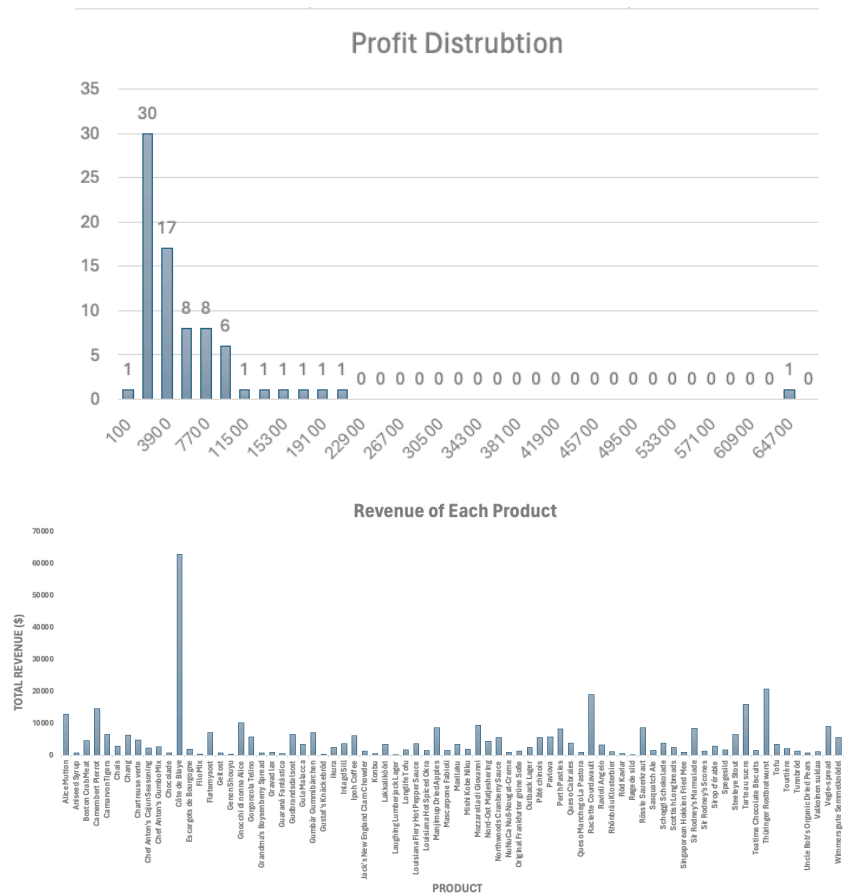

        Revenue of Each Product

Alternative:

- The total revenue of all orders of W3school Retail is $386,424.23.
- The revenue of each order detail is mostly located in a range of ($2000, to $9600), the average is $5,018.50, the minimum revenue is $70, and the maximum revenue is $62,976.50.

Profit Distrubtion

Revenue of Each Product

Gian Lacson   Araz A   Hunter G   Thomas H   Kahosha K   Aldaire T

2. Which products sell the best and which ones perform the least in terms of sales?
   Business Understanding
   - BA QUESTION: What are the top-selling products and the lowest-performing products of all orders?
   - Problem Type: Descriptive, Predictive, or Prescriptive Problem?
   - Required Data: Sales of products

   Data Understanding
   - Required Data: Sales of products
   - Provided: Yes or No (if No, describe the retrieve method)?
     > Create PivotTable with ProductID (row) and Quantity (value → Sum of Quantity → sort in ascending order to determine most selling in quantity) and Selling Price (value → Sum of Selling Price → sort in ascending order to determine best selling in overall revenue)
   - **Best Selling (in Price): ProductID 38 (Côte de Blaye)**
         - **Total Revenue Incurred from product = $62,976.50**
       - **Best Selling (in Quantity): ProductID 31 (Gorgonzola Telino)**
         - **Total units sold = 458 units**
       - **Worst Selling (in Quantity and Price): ProductID 67 (Laughing Lumberjack Lager)**
         - **Total Revenue Incurred from product = $70**
         - **Total units sold = 5 units**
   - Statistical Description: Continuous or Categorical Data?
       - Visualization Chart (Bar/Column Chart):

Gian Lacson   Araz A   Hunter G   Thomas H   Kahosha K   Aldaire T
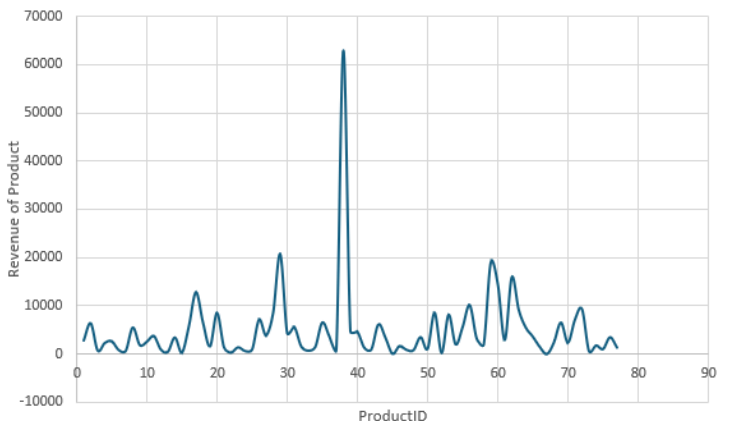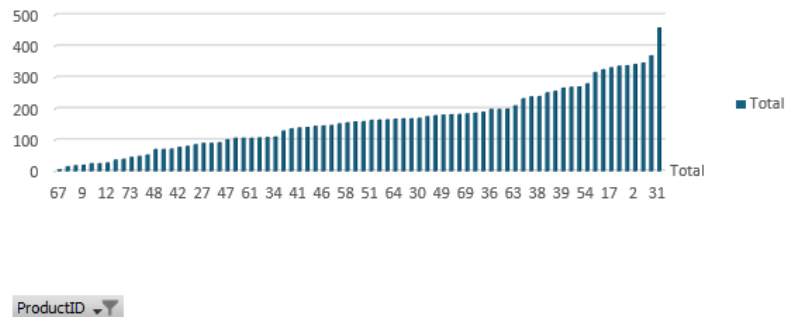
Alternative:

- The top-selling product of W3school Retail is Côte de Blaye which incurred a total revenue of $62,976.50. The worst-selling product is Laughing Lumberjack Lager, and it incurred a total revenue of $70.

Profit of Products

3. Which region has the highest purchasing power? Which region has the least?
   Business Understanding
   - BA QUESTION: Which regions demonstrate the highest and lowest purchasing power?
   - Problem Type: <mark>Descriptive</mark>, Predictive, or Prescriptive Problem?
   - Required Data: Number of customers in different countries

   Data Understanding
   - Required Data: Total sales from different countries
   - Provided: Yes or <mark>No</mark> (if No, describe the retrieve method)?
        Add VLOOKUP of Country to OrderDetails
        (=VLOOKUP(D2,Customer!$A$2:$G$92,7,FALSE); Create PivotTable
        with Country (row) and Selling Price (value → Sum of Selling Price →
        sort in ascending order)
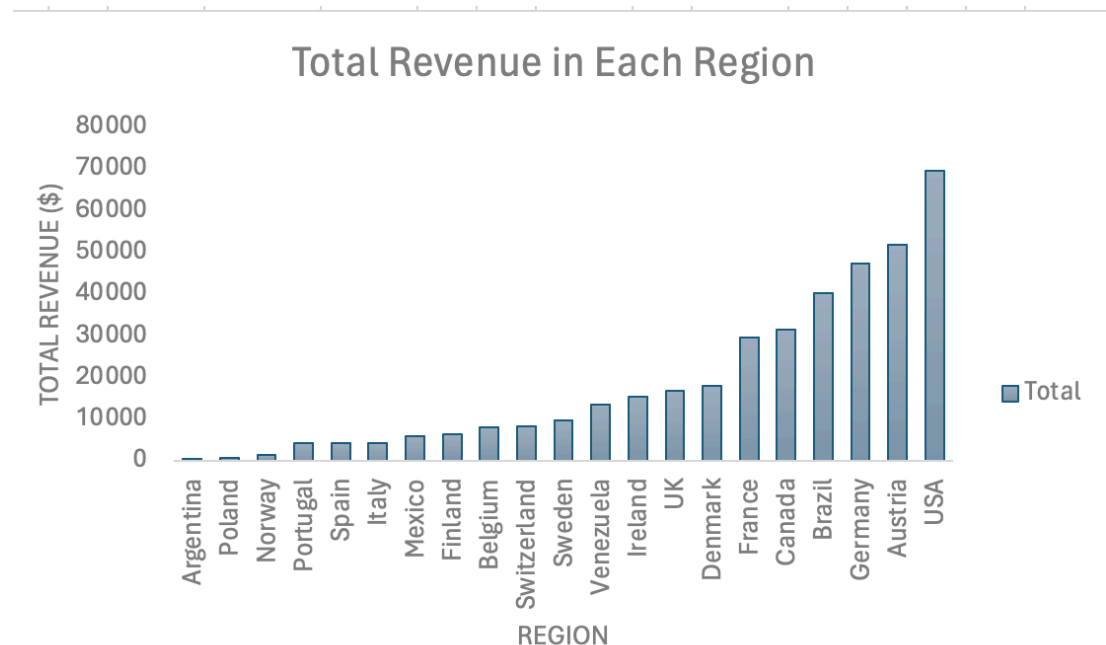   - **Highest Purchasing Power: USA**
            - **Amount spent = $69,611.75**
            - **Quantity bought = 2,139 products**
        - **Lowest Purchasing Power: Argentina**
   - **Amount spent: $399**
            - **Quantity bought = 24 products**
   - Statistical Description: Continuous or <mark>Categorical Data</mark>?
        Visualization Chart (Bar/Column Chart):

Total Revenue in Each Region

A column chart titled "Total Revenue in Each Region" with the y-axis labeled TOTAL REVENUE ($) ranging from 0 to 80000 and the x-axis labeled REGION. Regions from left to right: Argentina, Poland, Norway, Portugal, Spain, Italy, Mexico, Finland, Belgium, Switzerland, Sweden, Venezuela, Ireland, UK, Denmark, France, Canada, Brazil, Germany, Austria, USA. Legend: Total.

Alternative:

● The region that has the highest purchasing power for W3school Retail is the USA which
has spent a total of $69,611.75. The region that has the lowest purchasing power for
W3school retail is Argentina has spent a total of $399.

Total Revenue in Each Region
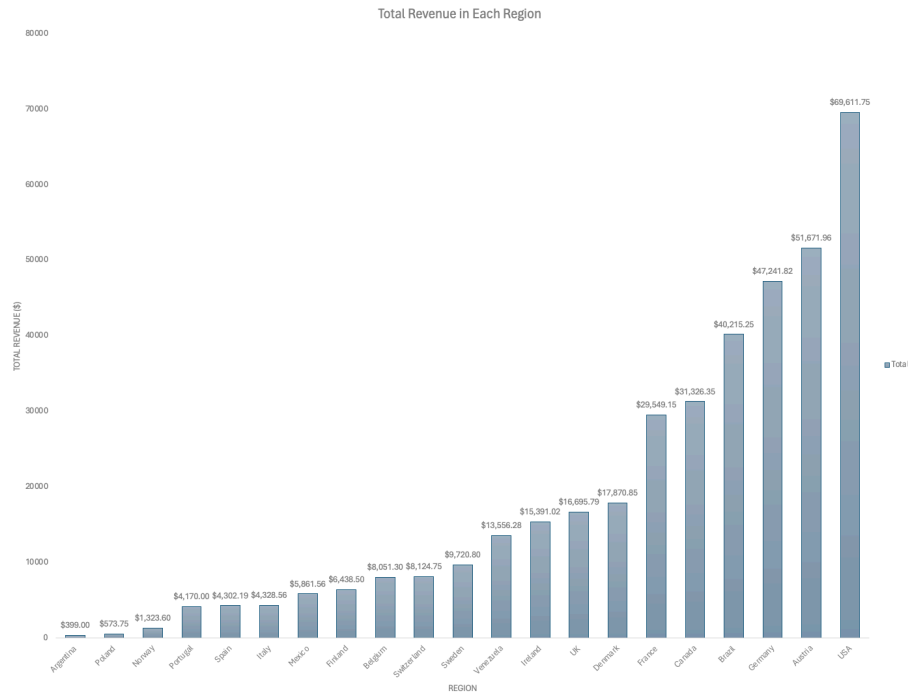
4. Which employee has the best performance? And which one has the worst?

Business Understanding

- BA QUESTION: Which employee has the best and lowest performance?
- Problem Type: Descriptive, Predictive, or Prescriptive Problem?
- Required Data: Number of orders from each customer

Data Understanding

- Required Data: Number of orders from each customer
- Provided: Yes or No?

  Use the "Orders" Excel sheet -> use =VLOOKUP(A1:A197,OrderDetails!B1:D519,3,FALSE) to match quantity with OrderID -> then use =VLOOKUP(A1:A197,OrderDetails!B1:D519,2,FALSE) to match ProductID with OrderID -> then use =VLOOKUP(E1#,Products!A1:F78,6,FALSE) to match Price with ProductID -> then multiply Quantity by Price to find Revenue of Products Employee Sold -> then create a PivotTable using EmployeeID and Revenue of Products Employee Sold -> EmployeeID to rows and Revenue to Values
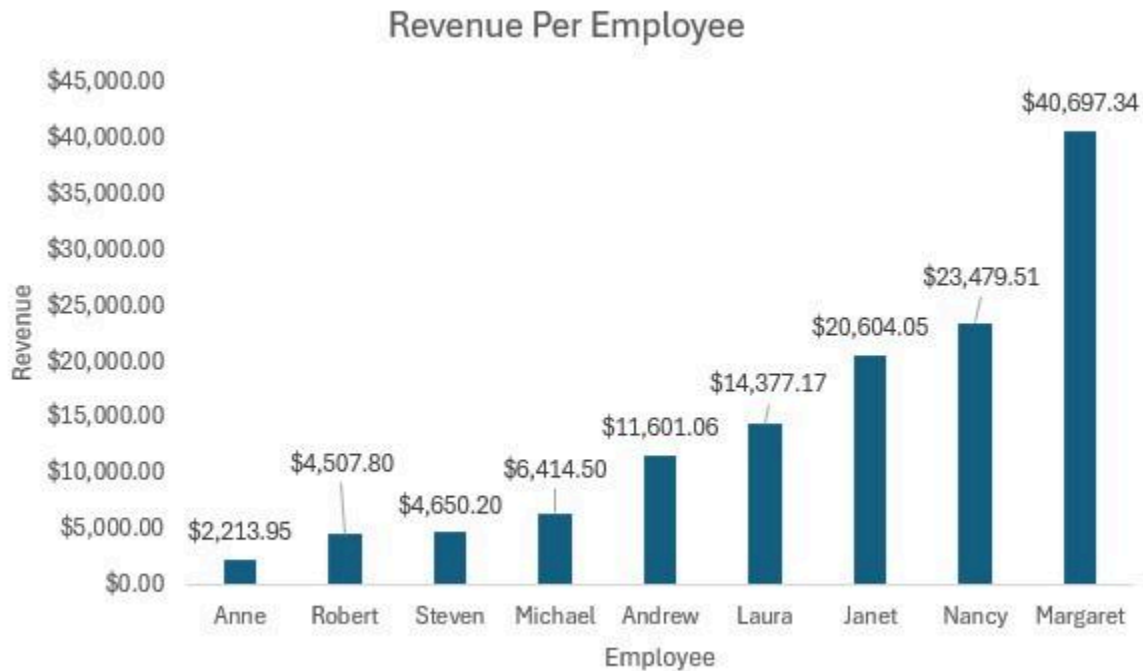
  - Best Employee: **Employee ID 4 (Margaret Peacock)**
  - Worst Employee: **Employee ID 9 (Anne Dodsworth)**

- Statistical Description: Continuous or Categorical Data?

  - Revenue from Best Employee **(Margaret Peacock): $40,697.34**
  - Revenue from Worst Employee **(Anne Dodsworth): $2,213.95**

  Visualization Chart (Bar/Column Chart):
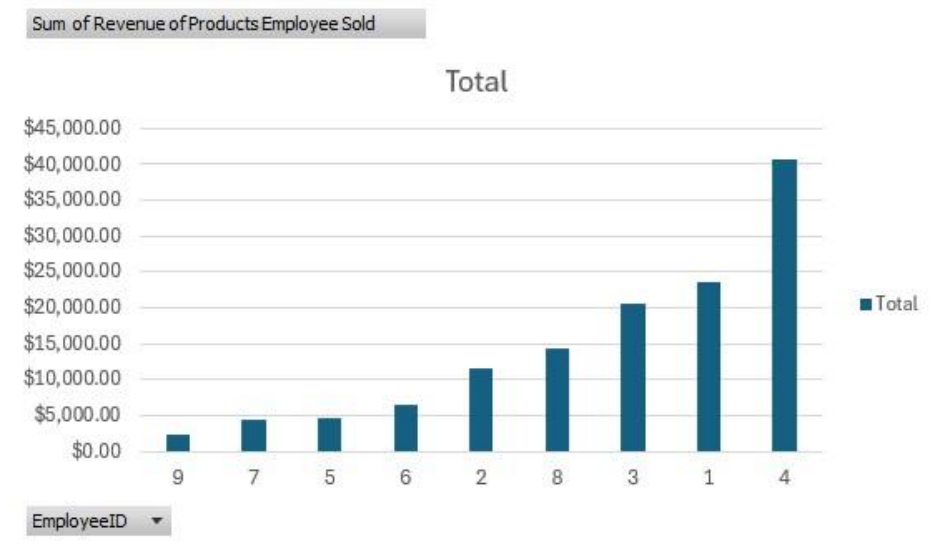
Alternative:

- The top performing employee of W3school Retail is Margaret Peacock who has sold a revenue of $40,697.34 of product. The worst performing employee of W3school Retail is Anne Dodsworth who has sold a revenue of $2,213.95 of product.

Revenue Per Employee

Chart titled "Revenue Per Employee" with y-axis labeled "Revenue" ranging from $0.00 to $45,000.00 and x-axis labeled "Employee". Bar values:
- Anne: $2,213.95
- Robert: $4,507.80
- Steven: $4,650.20
- Michael: $6,414.50
- Andrew: $11,601.06
- Laura: $14,377.17
- Janet: $20,604.05
- Nancy: $23,479.51
- Margaret: $40,697.34

5. What is the sales pattern of this company in the past six months?
   Business Understanding
   - BA QUESTION: What is the pattern of sales for the past 6 months?
   - Problem Type: <mark>Descriptive</mark>, Predictive, or Prescriptive Problem?
   - Required Data: Sum of quantity and price for each month

   Data Understanding
   - Required Data: OrderID, OrderDate, ProductID, Quantity, Price
   - Provided: Yes or <mark>No</mark>?
     - Use the "Orders" Excel sheet -> Sort the OrderDate by Oldest to Newest -> use =VLOOKUP(A1:A197,OrderDetails!B1:D519,3,FALSE) to match quantity with OrderID -> then use =VLOOKUP(A1:A197,OrderDetails!B1:D519,2,FALSE) to match ProductID with OrderID -> then use =VLOOKUP(F1#,Products!A1:F78,6,FALSE) to match Price with ProductID -> then multiply Quantity by Price to find revenue -> Use =SUM function by each month to find the revenue for that month -> Label each revenue according to its month -> Create a Time-Series Chart
   - Statistical Description: <mark>Continuous</mark> or Categorical Data?
     - **Mean: $14,642.16**
     - **Max: $19,562.50**
     - **Min: $11,363.80**
     - **Range: $8,198.70**
     - **Standard deviation: 3112.90**

     Visualization Chart (Distribution Chart):

Alternative:

- The sales pattern from the past six months of W3school Retail has fluctuated with the highest difference between September to November. The highest revenue incurred was in the month of November with a total revenue of **$19,562.50, while the lowest revenue incurred was in the month of September with a total revenue of $11,363.80.**

Revenue For Six Months

$40,000.00
$34,246.62
$35,000.00
$30,000.00
$25,000.00

Revenue

$20,000.00 $19,562.50
$13,517.25 $12,727.74 $13,393.20
$15,000.00 $11,363.80 $17,288.47
$10,000.00
$5,000.00 $6,446.00
$0.00

JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER JANUARY FEBRUARY

Months

6. Approximately, what is the revenue for the second quarter of 2024 expected to be?

Business Understanding

- BA QUESTION: What is the expected revenue for Q2 in 2024?
- Problem Type: Descriptive, <mark>Predictive</mark>, or Prescriptive Problem?
  - List the performance measure (Check Module 9) you will use for your BA model: Average error estimations – Average Error and Root Mean Squared Error. The averages in this data set will be the average sales and the average sales prices.
- Required Data: Months and sales

Data Understanding

- Required Data: Use the "Orders" Excel sheet -> Sort the OrderDate by Oldest to Newest -> use =VLOOKUP(A1:A197,OrderDetails!B1:D519,3,FALSE) to match quantity with OrderID -> then use =VLOOKUP(A1:A197,OrderDetails!B1:D519,2,FALSE) to match ProductID with OrderID -> then use =VLOOKUP(F1#,Products!A1:F78,6,FALSE) to match Price with ProductID -> then multiply Quantity by Price to find revenue -> Use =SUM function by each month to find the revenue for that month -> Label each revenue according to its month -> Create a Time-Series Chart. Using the months July 2023 to January 2024.
- Provided: Yes or <mark>No</mark>?

      Request from Stakeholders***
- Statistical Description: <mark>Continuous</mark> or Categorical Data?
  - Mean: $17,442.80
  - Max: $34,246.62
  - Min: $11,363.80
  - Range: $22,882.82
  - Standard deviation: 7347.308

  Visualization Chart (Distribution Chart):

Gian Lacson Araz A Hunter G Thomas H Kahosha K Aldaire T
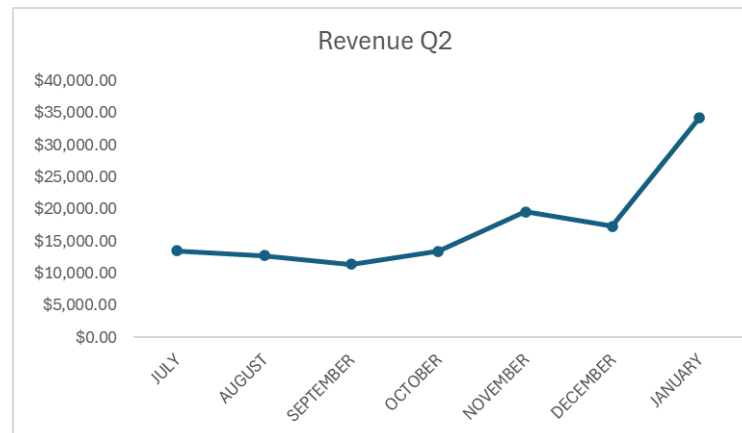
Alternative:

- The appropriate model is Linear Trend Projection because of the linear relationship between time and revenue growth.
- Model: Linear Regression
- Performance measurements demonstrate its capability to forecast revenue trends accurately, with an expected total revenue of $122,099.58 for Quarter 2 of 2024. The exclusion of February reflects the ongoing nature of data collection for that month.
- The expected total revenue for Quarter 2 of 2024 is $122,099.58. February was not included in the expected total revenue due to the fact the month is still ongoing for 2024.

Revenue For 2nd Quarter
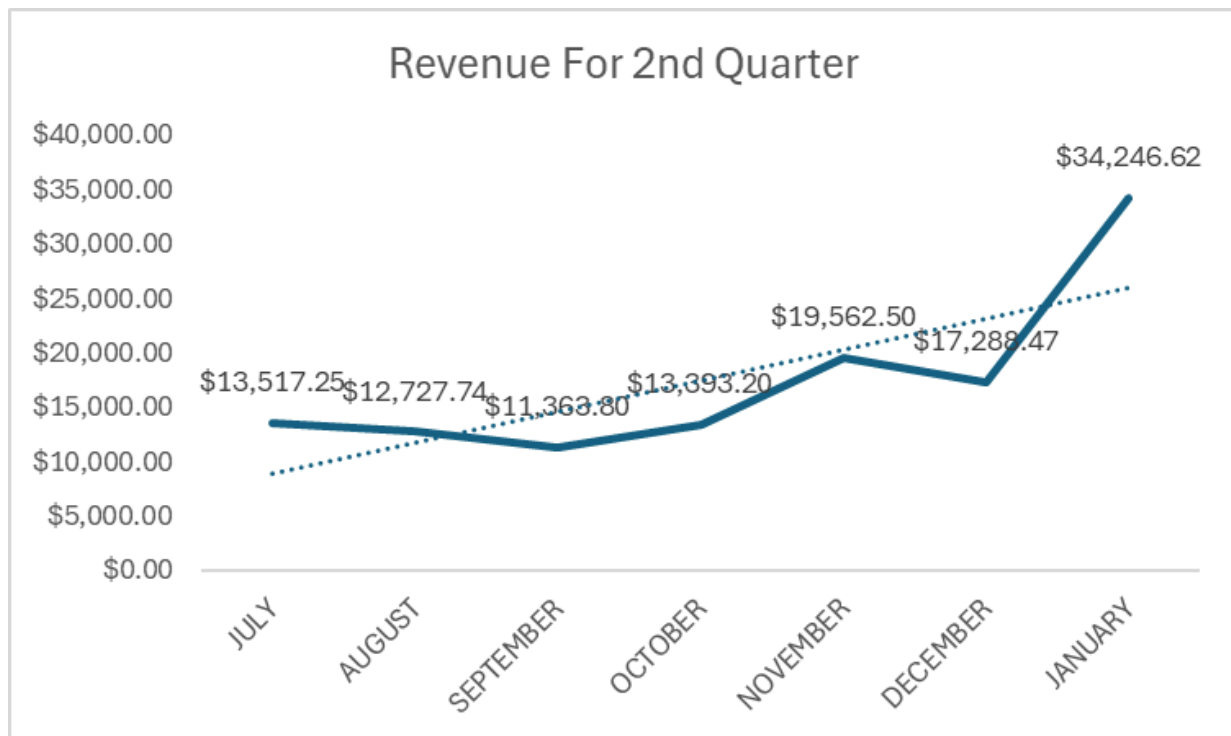
7. Which products should no longer be purchased, which products should have increased procurement, and what is the optimal quantity for each product to ensure maximum **profit (revenue - cost)**? What might be the potential **profit (revenue - cost)** amount?

Business Understanding
- BA QUESTION: What products should be discontinued? What products should be purchased more? How much of each product should be bought to increase profit and what would be the revenue in doing so? The objective is profit maximization.
- Problem Type: Descriptive, Predictive, or <mark>Prescriptive</mark> Problem?
- Required Data: total profit and total costs

Data Understanding
- Required Data: Create a Model Simple LP from the following data
  - three best-selling products
    - Côte de Blaye
      - selling price $263.50 per unit
      - costs $100 per unit
    - Thüringer Rostbratwurst
      - selling price $123.79 per unit
      - costs $58 per unit,
    - Raclette Courdavault
      - selling price $55 per unit
      - costs $30 per unit
  - Total profit
    - =SUMPRODUCT(selling price, quantity)-SUMPRODUCT(cost, quantity)
      - Or =SUMPRODUCT(B7:D7,B10:D10)-SUMPRODUCT(B6:D6,B10:D10)
  - Constraints
    - quantity requirement of 1,000 units of Raclette Courdavault
      - Raclette Courdavault (quantity) $\geq 1,000$
    - budget allocation of $250,000
      - Budget = SUMPRODUCT (cost per unit, quantity) $\leq$ 250,000
        - Or SUMPRODUCT (B6:B6,B10:D10) $\leq$ 250,000
      - Budget $\leq$ 250,000

■ quantity limitation of no more than 2,000 units of Côte de Blaye
  ● Côte de Blaye (quantity) ≤ 2,000
- Provided: Yes or No?
- Statistical Description: Continuous or Categorical Data?
  Visualization Chart:

Model				
Allocation of Funds	250000			
parameters				
	Côte de Blaye	Thüringer Rostbratwurst	Raclette Courdavault	
cost per unit	100	58	30	
selling price	263.5	123.79	55	
product	Côte de Blaye	Thüringer Rostbratwurst	Raclette Courdavault	
quanity	2000	344.8275862	1000	
total profit	374,686			
constraints	used	available		
total budget	250,000	250,000		
quantity requirments	1000	1000		
quantity limtations	2000	2000		

Microsoft Excel 16.77 Answer Report
Worksheet: [FinalProjectDatabase_MessedUP.xlsx]Sheet1
Report Created: 5/7/24 12:50:53 PM
Result: Solver found a solution. All constraints and optimality conditions are satisfied.
Solver Engine
  Engine: Simplex LP
  Solution Time: 3119.841 Seconds.
  Iterations: 3 Subproblems: 0
Solver Options
  Max Time Unlimited, Iterations Unlimited, Precision 0.000001, Use Automatic Scaling
  Max Subproblems Unlimited, Max Integer Sols Unlimited, Integer Tolerance 1%, Assume NonNegative

Objective Cell (Max)

Cell	Name	Original Value	Final Value
$B$12	total profit Côte de Blaye	0	374,686

Variable Cells

Cell	Name	Original Value	Final Value	Integer
$B$10	quanity Côte de Blaye	0	2000	Contin
$C$10	quanity Thüringer Rostbratwurst	0	344.8275862	Contin
$D$10	quanity Raclette Courdavault	0	1000	Contin

Constraints

Cell	Name	Cell Value	Formula	Status	Slack
$B$15	total budget used	250,000	$B$15<=$C$15	Binding	0
$B$16	quantity requirments used	1000	$B$16>=$C$16	Binding	0
$B$17	quantity limtations used	2000	$B$17<=$C$17	Binding	0

Alternative:

- The model is a Simplex LP which helps determine profit maximization. In order to maximize profits by $374,686 the company should order 2,000 units of Côte de Blaye and 1,000 units of Raclette Courdavault and 344 units of Thüringer Rostbratwurst
- Constraints
  - The quantity requirement of 1,000 units of Raclette Courdavault is more than or equal to 1,000 units.
  - The company can allocate less than or equal to $250,000 of its budget to purchasing the top three products.
  - The quantity limitation of no more than 2,000 units of Côte de Blaye.

Model					
Allocation of Funds	250000				
parameters					
	Côte de Blaye		Thüringer Rostbratwurst	Raclette Courdavault	
cost per unit	100		58	30	
selling price	263.5		123.79	55	
product	Côte de Blaye		Thüringer Rostbratwurst	Raclette Courdavault	
quanity	2000		344.8275862	1000	
total profit	374,686				
constraints	used		available		
total budget	250,000		250,000		
quantity requirments	1000		1000		
quantity limtations	2000		2000		