

# Mint Classics - Analyze Data in a Model Car Database with MySQL Workbench

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# ASK

In response to Mint Classics Company’s request, I, as a data analyst, will utilize MySQL Workbench to explore the provided data model and sample tables. I will identify key insights to recommend inventory reduction strategies while ensuring timely customer service, aiming for a 24-hour order fulfillment window. My queries will focus on understanding inventory distribution, identifying slow-moving products, and proposing actionable steps to optimize storage facilities. The goal is to provide valuable insights for informed decision-making in streamlining Mint Classics Company’s inventory management processes.

## Project Objectives

1. Explore products currently in inventory.
2. Determine important factors that may influence inventory reorganization/reduction.
3. Provide analytic insights and data-driven recommendations.

## Business Talk with Mint Classic’s Stake Holders

1. Are there products with high inventory but low sales? How can we optimize the inventory of such products?
2. Are all the warehouses currently in use still necessary? How can we review warehouses that have low or inactive inventory?
3. Is there a relationship between product prices and their sales levels? How can price adjustments impact sales?
4. Who are the customers contributing the most to sales? How can sales efforts be focused on these valuable customers?
5. How can the performance of sales employees be evaluated using sales data?
6. How can customer payment trends be analysed? .
7. How can the performance of various product lines be compared? Which products are the most successful, and which ones need improvement or removal?
8. How can the company’s credit policies be evaluated? Are there any customers with credit issues that need to be addressed?

# PREPARE

## Task 1 – Import the Classic Model Car Relational Database

Downloaded “mintclassicsDB.sql” to create and populate Mint Classics relational database in MySQL.

R Markdown is employed for report creation, allowing seamless integration of code, text, and output in a single document.

## Connect to MySQL database using ODBC in R

```
# Loading essential libraries for analysis:

library(RODBC)
library(DBI)
library(odbc)

# Establish a connection to MySQL database using the "MySQL_DSN" data source name

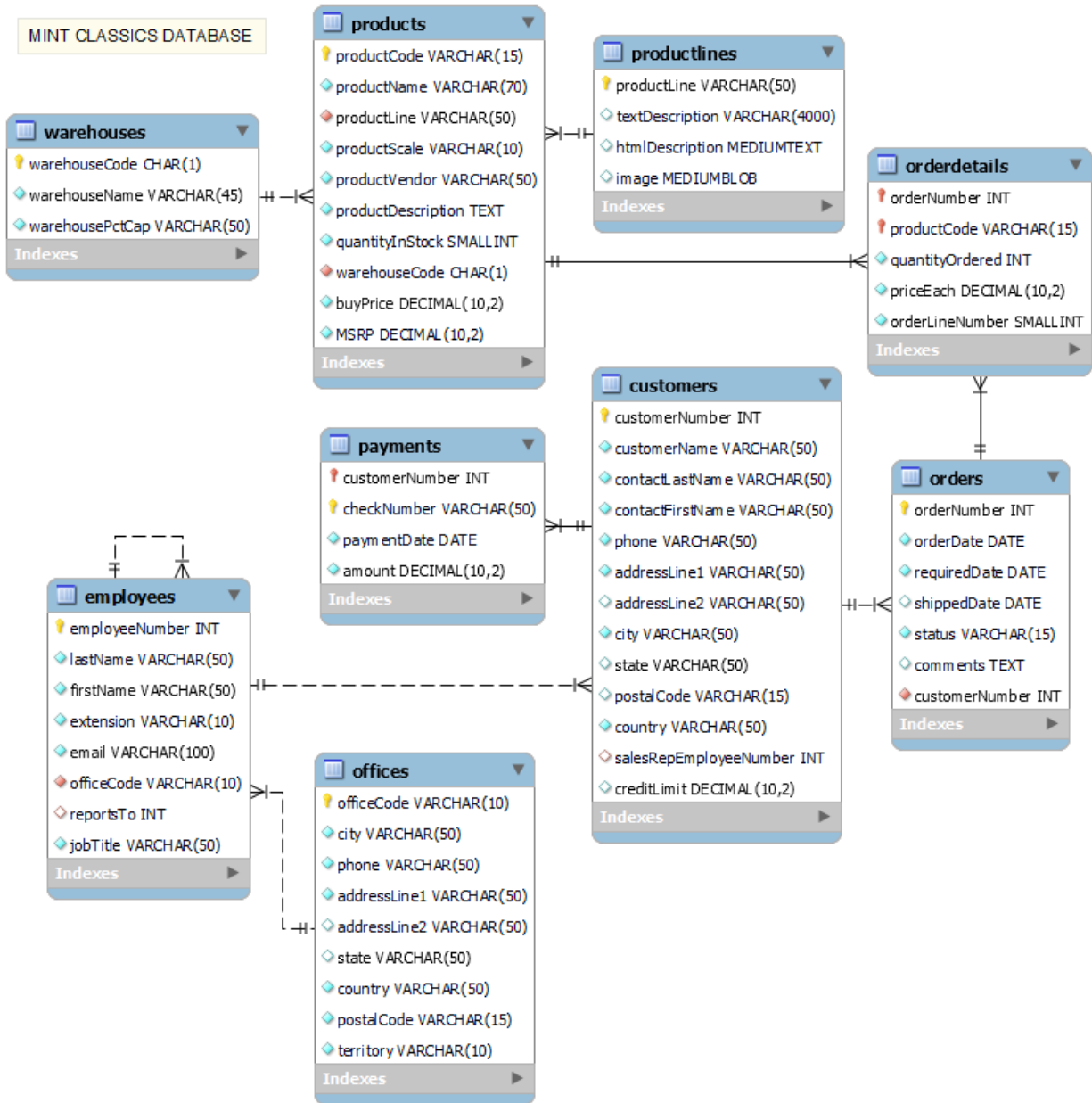
con <- dbConnect(odbc::odbc(), "MySQL_DSN")
```

## Task 2 – Familiarize with the Mint Classic database and business processes.

In the Mint Classics Company's database, there are 9 tables, each serving a specific purpose:

1. Warehouses: Compiles data on the company's warehouses used for storing product inventory.
2. Products: Compiles data about product types, stock quantities, sales quantities, purchase prices, and more.
3. Product Lines: Compiles data about the descriptions of each product line the company sells.
4. Customers: Compiles data about customer profiles, including names, addresses, credit limits, and other details.
5. Payments: Compiles data about payments made by customers, including payment dates and amounts.
6. Orders: Compiles data regarding customer orders for specific products.
7. Order Details: Compiles data about orders for specific products, including the quantity of products ordered and the price of each product.
8. Employees: Compiles data about company employees, including names, addresses, offices, and more.
9. Offices: Compiles data about company office profiles.

These tables collectively store information essential for managing inventory, tracking sales, handling customer orders, processing payments, managing employees, and organizing the company's physical infrastructure.



Task 3 – Investigate the business problem and identifying tables impacted.

## PROCESS AND ANALYSE

Question 1 : Are there products with high inventory but low sales?  
How can we optimize the inventory of such products?

```
-- To Get the products with high inventory but low sales

Select productName,
       quantityInStock,
       sum(quantityOrdered),
       (quantityInStock-sum(quantityOrdered)) as Current_Inventory,
       (sum(quantityOrdered) / avg(quantityInStock)) as Inventory_Turnover_Ratio
from products as p
left join orderdetails as o
  on p.productCode = o . productCode
group by productName,quantityInStock
order by Inventory_Turnover_Ratio
limit 20
```

```
# The products with high inventory but low sales

print(Question_1)
```

```
##               productName quantityInStock
## 1          1985 Toyota Supra          7733
## 2          1995 Honda Civic          9772
## 3          2002 Chevy Corvette          9446
## 4          1982 Ducati 996 R          9241
## 5          1976 Ford Gran Torino          9127
## 6          1965 Aston Martin DB5          9042
## 7          1968 Dodge Charger          9123
## 8    America West Airlines B757-200          9653
## 9          1932 Model A Ford J-Coupe          9354
## 10         2002 Suzuki XREO          9997
## 11         1999 Indy 500 Monte Carlo SS          8164
## 12         1948 Porsche Type 356 Roadster          8990
## 13         1912 Ford Model T Delivery Wagon          9173
## 14    1950's Chicago Surface Lines Streetcar          8601
## 15         1948 Porsche 356-A Roadster          8826
## 16 1936 Mercedes-Benz 500K Special Roadster          8635
## 17         1966 Shelby Cobra 427 S/C          8197
## 18         1982 Lamborghini Diablo          7723
## 19         1904 Buick Runabout          8290
## 20         1961 Chevrolet Impala          7869
##      sum(quantityOrdered) Current_Inventory Inventory_Turnover_Ratio
```

## 1	NA	NA	NA
## 2	917	8855	0.0938
## 3	894	8552	0.0946
## 4	906	8335	0.0980
## 5	915	8212	0.1003
## 6	914	8128	0.1011
## 7	925	8198	0.1014
## 8	984	8669	0.1019
## 9	957	8397	0.1023
## 10	1028	8969	0.1028
## 11	855	7309	0.1047
## 12	948	8042	0.1055
## 13	991	8182	0.1080
## 14	934	7667	0.1086
## 15	972	7854	0.1101
## 16	960	7675	0.1112
## 17	915	7282	0.1116
## 18	912	6811	0.1181
## 19	990	7300	0.1194
## 20	941	6928	0.1196

Observations in the analysis:

Products like “1985 Toyota Supra” have high inventory and low sales. Optimization includes targeted promotions, adjusting pricing, and improving demand forecasting to reduce excess stock and enhance overall inventory turnover.

---

**Question 2: Are all the warehouses currently in use still necessary?  
How can we review warehouses that have low or inactive inventory?**

```
-- Total Available stock WRT Product Line

Select w.warehouseName,
       p.productLine,
       sum(p.quantityInStock) as Available_Stock
from products as p
inner join warehouses as w
  on p.warehouseCode = w.warehouseCode
group by w.warehouseName,p.productLine
order by Available_Stock desc
```

```
# Total Available stock WRT Product Line
print(Question_2a)
```

```
##   warehouseName    productLine Available_Stock
```

```
## 1      East      Classic Cars      219183
## 2      West      Vintage Cars      124880
## 3      North     Motorcycles       69401
## 4      North     Planes            62287
## 5      South     Trucks and Buses   35851
## 6      South     Ships            26833
## 7      South     Trains            16696
```

```
-- Total Available stock WRT warehouse name

Select w.warehouseName,
       sum(p.quantityInStock) as Available_Stock
from products as p
inner join warehouses as w
  on p.warehouseCode = w.warehouseCode
group by w.warehouseName
order by Available_Stock desc
```

```
# Total Available stock WRT warehouse name

print(Question_2b)
```

```
##  warehouseName Available_Stock
## 1      East      219183
## 2      North     131688
## 3      West      124880
## 4      South     79380
```

### Observations in the analysis:

Based on the analysis of available stock across warehouses, it appears that all warehouses are still necessary. Each warehouse holds substantial stock for different product lines, indicating ongoing operational relevance. Consider optimizing inventory distribution but retaining all warehouses to ensure timely service and accommodate varying product demands across regions.

---

**Question 3: Is there a relationship between product prices and their sales levels? How can price adjustments impact sales?**

```
-- To Find Correlation between Buy price and Quantity_Ordered

Select p.productCode,
       p.productName,
       p.buyPrice, sum(od.quantityOrdered) as Quantity_Ordered
from products as p
```

```

left join orderdetails as od
  on p.productCode = od.productCode
Group by p.productCode,productName
order by buyPrice desc
Limit 20

```

```
print(Question_3)
```

	productCode	productName	buyPrice	Quantity_Ordered
## 1	S10_4962	1962 LanciaA Delta 16V	103.42	932
## 2	S18_2238	1998 Chrysler Plymouth Prowler	101.51	986
## 3	S10_1949	1952 Alpine Renault 1300	98.58	961
## 4	S24_3856	1956 Porsche 356A Coupe	98.30	1052
## 5	S12_1108	2001 Ferrari Enzo	95.59	1019
## 6	S12_1099	1968 Ford Mustang	95.34	933
## 7	S18_1984	1995 Honda Civic	93.89	917
## 8	S18_4027	1970 Triumph Spitfire	91.92	945
## 9	S10_4698	2003 Harley-Davidson Eagle Drag Bike	91.02	985
## 10	S12_3148	1969 Corvair Monza	89.14	963
## 11	S18_1749	1917 Grand Touring Sedan	86.70	918
## 12	S10_4757	1972 Alfa Romeo GTA	85.68	1030
## 13	S18_4600	1940s Ford truck	84.76	1061
## 14	S18_1129	1993 Mazda RX-7	83.51	947
## 15	S12_3891	1969 Ford Falcon	83.05	965
## 16	S24_2011	18th century schooner	82.34	1011
## 17	S12_1666	1958 Setra Bus	77.90	972
## 18	S18_3232	1992 Ferrari 360 Spider red	77.90	1808
## 19	S18_1662	1980s Black Hawk Helicopter	77.27	1040
## 20	S12_3380	1968 Dodge Charger	75.16	925

```
# Correlation between Buy price and Quantity_Ordered
```

```
# Load ggplot2
```

```
library(ggplot2)
```

```
# Create a scatter plot
```

```

ggplot(Question_3, aes(x = buyPrice, y = Quantity_Ordered)) +
  geom_point() +
  geom_smooth(method = "lm", se = FALSE) +
  labs(title = "Correlation Between Buying Price and Quantity Ordered",
       x = "Buying Price",
       y = "Quantity Ordered")

```

```
## 'geom_smooth()' using formula = 'y ~ x'
```





Observations in the analysis:

The correlation chart visually depicts the relationship between buying price and quantity ordered for Mint Classics Company's products. The linear regression line suggests a potential positive correlation, indicating that as buying prices increase, the quantity ordered tends to rise. Further statistical analysis may be needed for a precise correlation assessment.

---

**Question 4: Who are the customers contributing the most to sales?  
How can sales efforts be focused on these valuable customers?**

```
-- Customers contributing the most to sales

Select p.customerNumber as Customer_Number,
       c.customerName as Customer_Name,
       round(sum(amount),0) as Total_Sales_Amount
from payments as p
inner join customers as c
```

```

on p.customerNumber=c.customerNumber
group by p.customerNumber
Order by Total_Sales_Amount desc
Limit 15

```

```
print(Question_4)
```

##	Customer_Number	Customer_Name	Total_Sales_Amount
## 1	141	Euro+ Shopping Channel	715739
## 2	124	Mini Gifts Distributors Ltd.	584188
## 3	114	Australian Collectors, Co.	180585
## 4	151	Muscle Machine Inc	177914
## 5	148	Dragon Souvenirs, Ltd.	156251
## 6	323	Down Under Souvenirs, Inc	154622
## 7	187	AV Stores, Co.	148410
## 8	276	Anna's Decorations, Ltd	137034
## 9	321	Corporate Gift Ideas Co.	132341
## 10	146	Saveley & Henriot, Co.	130305
## 11	278	Rovelli Gifts	127530
## 12	353	Reims Collectables	126983
## 13	119	La Rochelle Gifts	116950
## 14	363	Online Diecast Creations Co.	116449
## 15	496	Kelly's Gift Shop	114497

Observations in the analysis:

The top contributing customers to sales are Euro+ Shopping Channel and Mini Gifts Distributors Ltd. To focus sales efforts on these valuable customers, implement personalized marketing strategies, offer exclusive promotions, and ensure excellent customer service. Analyze their preferences to tailor product recommendations, fostering long-term relationships and maximizing revenue.

---

**Question 5: How can the performance of sales employees be evaluated using sales data?**

```

-- Performance of Sales Employees

select  e.employeeNumber as Employee_Number,
        concat(e.firstName," ",e.lastName) as Employee_Name,
        sum(od.priceEach * od.quantityOrdered) as Total_Sales_Amount
from employees as e
left join customers as c
on e.employeeNumber = c.salesRepEmployeeNumber
left join orders as o
on c.customerNumber = o.customerNumber

```

```

left join orderdetails as od
  on o.orderNumber = od.orderNumber
group by e.employeeNumber,e.lastName,e.firstName
order by Total_Sales_Amount desc
limit 15

```

*# Performance of Sales Employees*

```
print(Question_5)
```

##	Employee_Number	Employee_Name	Total_Sales_Amount
## 1	1370	Gerard Hernandez	1258577.8
## 2	1165	Leslie Jennings	1081530.5
## 3	1401	Pamela Castillo	868220.6
## 4	1501	Larry Bott	732096.8
## 5	1504	Barry Jones	704853.9
## 6	1323	George Vanauf	669377.1
## 7	1612	Peter Marsh	584593.8
## 8	1337	Loui Bondur	569485.8
## 9	1611	Andy Fixter	562582.6
## 10	1216	Steve Patterson	505875.4
## 11	1286	Foon Yue Tseng	488212.7
## 12	1621	Mami Nishi	457110.1
## 13	1702	Martin Gerard	387477.5
## 14	1188	Julie Firrelli	386663.2
## 15	1166	Leslie Thompson	347533.0

Observations in the analysis:

Gerard Hernandez leads in total sales among employees, demonstrating strong sales performance. To enhance overall sales, consider leveraging Hernandez's strategies and providing targeted training. Recognize and reward top performers, fostering a competitive yet collaborative sales environment that motivates the team to achieve higher revenue goals.

## Question 6: How can customer payment trends be analysed?

*-- Customer Payment Trends*

```

Select c.customerName as Customer_Name,
      c.customerNumber as Customer_Number,
      orderDate as Order_Date,
      paymentDate as Payment_Date,
      datediff(paymentDate,orderDate) as Date_Difference,
      amount as Payment_Amount

```

```

from payments as p
inner join orders as o
on p.customerNumber = o.customerNumber
inner join customers as c
on c.customerNumber = p.customerNumber
order by date_difference desc
limit 30

```

*# Customer Payment Trends*

```
print(Question_6)
```

##	Customer_Name	Customer_Number	Order_Date	Payment_Date
## 1	Euro+ Shopping Channel	141	2003-01-31	2005-05-19
## 2	Euro+ Shopping Channel	141	2003-01-31	2005-03-25
## 3	Euro+ Shopping Channel	141	2003-01-31	2005-03-18
## 4	Reims Collectables	353	2003-05-07	2005-06-09
## 5	Mini Gifts Distributors Ltd.	124	2003-03-26	2005-04-16
## 6	Euro+ Shopping Channel	141	2003-06-06	2005-05-19
## 7	Dragon Souvenirs, Ltd.	148	2003-04-16	2005-03-27
## 8	Mini Gifts Distributors Ltd.	124	2003-03-26	2005-03-05
## 9	Reims Collectables	353	2003-07-10	2005-06-09
## 10	Alpha Cognac	242	2003-07-04	2005-06-03
## 11	Euro+ Shopping Channel	141	2003-01-31	2004-12-31
## 12	Down Under Souvenirs, Inc	323	2003-06-25	2005-05-23
## 13	Euro+ Shopping Channel	141	2003-06-27	2005-05-19
## 14	Kelly's Gift Shop	496	2003-07-07	2005-05-25
## 15	Lyon Souvenirs	250	2003-07-01	2005-05-17
## 16	Online Diecast Creations Co.	363	2003-01-06	2004-11-17
## 17	Blauer See Auto, Co.	128	2003-01-09	2004-11-18
## 18	Vitachrome Inc.	181	2003-01-10	2004-11-16
## 19	Baane Mini Imports	121	2003-01-29	2004-11-28
## 20	Royale Belge	381	2003-04-11	2005-02-03
## 21	Danish Wholesale Imports	145	2003-02-11	2004-12-01
## 22	Euro+ Shopping Channel	141	2003-06-06	2005-03-25
## 23	Rovelli Gifts	278	2003-02-17	2004-12-05
## 24	Mini Gifts Distributors Ltd.	124	2003-07-02	2005-04-16
## 25	Euro+ Shopping Channel	141	2003-06-06	2005-03-18
## 26	Land of Toys Inc.	131	2003-02-24	2004-12-02
## 27	Baane Mini Imports	121	2003-01-29	2004-11-04
## 28	Mini Gifts Distributors Ltd.	124	2003-03-26	2004-12-27
## 29	Euro+ Shopping Channel	141	2003-01-31	2004-11-01
## 30	Euro+ Shopping Channel	141	2003-06-27	2005-03-25
##	Date_Difference	Payment_Amount		
## 1	839	46895.48		
## 2	784	65071.26		
## 3	777	120166.58		
## 4	764	46656.94		
## 5	752	83598.04		
## 6	713	46895.48		
## 7	711	3516.04		
## 8	710	101244.59		
## 9	700	46656.94		

## 10	700	12432.32
## 11	700	116208.40
## 12	698	75020.13
## 13	692	46895.48
## 14	688	30253.75
## 15	686	17928.09
## 16	681	50799.69
## 17	679	7466.32
## 18	676	44400.50
## 19	669	34638.14
## 20	664	14379.90
## 21	659	20564.86
## 22	658	65071.26
## 23	657	37654.09
## 24	654	83598.04
## 25	651	120166.58
## 26	647	50025.35
## 27	645	17876.32
## 28	642	47142.70
## 29	640	36140.38
## 30	637	65071.26

#### Observations in the analysis:

The analysis reveals notable payment trends among customers. Euro+ Shopping Channel consistently exhibits extended date differences, potentially impacting cash flow. Mini Gifts Distributors Ltd. and Reims Collectables also demonstrate significant variations. Strategies for prompt communication, targeted promotions, and credit term adjustments may be considered to optimize payment cycles and enhance financial stability.

---

**Question 7: How can the performance of various product lines be compared? Which products are the most successful, and which ones need improvement or removal?**

```
-- Performance of various product lines

Select p.productLine,
       sum(quantityInStock) as Total_Inventory,
       sum(quantityOrdered) as Total_sales,
       sum(quantityOrdered*priceEach) as Total_Revenue,
       (sum(quantityOrdered)/sum(quantityInStock))*100 as Sales_to_Inventory_Percentage
from products as p
left join productlines as pl
  on p.productLine = pl.productLine
left join orderdetails as od
```

```
on p.productCode = od.productCode
group by p.productLine
order by Total_Revenue desc
```

*# Performance of various product lines*

```
print(Question_7)
```

```
##      productLine Total_Inventory Total_sales Total_Revenue
## 1   Classic Cars      5851766      35582      3853922.5
## 2   Vintage Cars      3439570      22933      1797559.6
## 3   Motorcycles      1915517      12778      1121426.1
## 4 Trucks and Buses      1003828      11001      1024113.6
## 5         Planes      1744036      11872       954637.5
## 6         Ships       732251       8532       663998.3
## 7         Trains       450792       2818       188532.9
## Sales_to_Inventory_Percentage
## 1                      0.6081
## 2                      0.6667
## 3                      0.6671
## 4                      1.0959
## 5                      0.6807
## 6                      1.1652
## 7                      0.6251
```

Observations in the analysis:

The performance analysis of various product lines indicates notable findings. “Trucks and Buses” and “Ships” stand out with high Sales-to-Inventory percentages, demonstrating effective inventory turnover and strong demand. However, “Planes” and “Classic Cars” show room for improvement, suggesting potential adjustments in marketing or inventory management to enhance their performance.

---

**Question 8: How can the company’s credit policies be evaluated? Are there any customers with credit issues that need to be addressed?**

*-- Company’s credit policies evaluation*

```
Select c.customerName as Customer_Name,
       c.customerNumber as Customer_Number,
       sum(c.creditLimit) as Credit_Limit,
       sum(p.amount) as Total_payment,
```

```

        (sum(p.amount)-sum(c.creditLimit)) as Credit_Limit_Diff
from payments as p
left join customers as c
    on p.customerNumber = c.customerNumber
Group by c.customerNumber,c.creditLimit
Having
    sum(p.amount) < sum(c.creditLimit)
order by Total_payment
Limit 15

```

*# Company's credit policies evaluation*

```
print(Question_8)
```

##	Customer_Name	Customer_Number	Credit_Limit
## 1	Boards & Toys Co.	219	22000
## 2	Auto-Moto Classics Inc.	198	69000
## 3	Atelier graphique	103	63000
## 4	Frau da Collezione	473	69600
## 5	Royale Belge	381	94000
## 6	Microscale Inc.	456	79600
## 7	Double Decker Gift Stores, Ltd	489	86600
## 8	Bavarian Collectables Imports, Co.	415	77000
## 9	Cambridge Collectables Co.	173	86800
## 10	Gifts4AllAges.com	362	83800
## 11	Tekni Collectables Inc.	328	86000
## 12	Men 'R' US Retailers, Ltd.	347	115400
## 13	Signal Collectibles Ltd.	487	120600
## 14	Volvo Model Replicas, Co	144	106200
## 15	West Coast Collectables Co.	475	110800
##	Total_payment	Credit_Limit_Diff	
## 1	7918.60	-14081.40	
## 2	21554.26	-47445.74	
## 3	22314.36	-40685.64	
## 4	25358.32	-44241.68	
## 5	29217.18	-64782.82	
## 6	29230.43	-50369.57	
## 7	29586.15	-57013.85	
## 8	31310.09	-45689.91	
## 9	32198.69	-54601.31	
## 10	33533.47	-50266.53	
## 11	38281.51	-47718.49	
## 12	41506.19	-73893.81	
## 13	42570.37	-78029.63	
## 14	43680.65	-62519.35	
## 15	43748.72	-67051.28	

Observations in the analysis:

The evaluation of the company's credit policies reveals concerning credit limit discrepancies for several customers. Notably, "Boards & Toys Co.," "Auto-Moto Classics Inc.," and "Royale Belge" have exceeded their credit limits, indicating potential credit issues that need urgent attention. Addressing these discrepancies promptly and reassessing credit policies may mitigate financial risks and enhance credit management practices.

## Task 4 – Suggestions and Recommendations for solving the business problem.

### SHARE AND ACT

**Inventory Optimization:** Targeted promotions, pricing adjustments, and improved forecasting for slow-moving products like "1985 Toyota Supra."

**Warehouse Efficiency:** Regularly review inventory levels in each warehouse, optimizing distribution while retaining operational relevance for timely service.

**Price-Sales Relationship:** Leverage the positive correlation between buying price and quantity ordered for strategic price adjustments to potentially boost overall sales.

**Customer-Centric Strategies:** Implement personalized marketing and promotions for top contributing customers like Euro+ Shopping Channel and Mini Gifts Distributors Ltd.

**Sales Employee Recognition:** Recognize top-performing sales employees like Gerard Hernandez, fostering a competitive and collaborative environment through targeted training and rewards.

**Payment Cycle Optimization:** Address extended date differences for consistent customers like Euro+ Shopping Channel and Reims Collectables through proactive communication and credit term adjustments.

**Product Line Enhancement:** Focus on improving sales for product lines like "Planes" and "Classic Cars" through targeted marketing and inventory management adjustments.

**Credit Policy Review:** Address credit limit discrepancies for customers like "Boards & Toys Co." and "Auto-Moto Classics Inc." by promptly reassessing and adjusting credit policies.

### CONCLUSION

In conclusion, the analysis of various aspects of Mint Classics Company's operations provides valuable insights and recommendations for enhancing overall business performance. The company can optimize inventory by implementing targeted promotions and pricing adjustments for slow-moving products, ensuring efficient distribution across all warehouses. The positive correlation between product prices and sales levels suggests strategic pricing adjustments can positively impact sales. Focusing sales efforts on top-contributing customers like Euro+ Shopping Channel and Mini Gifts Distributors Ltd. is crucial, involving personalized marketing and exceptional customer service. Recognizing and rewarding top-performing sales employees, exemplified by Gerard Hernandez, can foster a competitive yet collaborative sales environment. Proactive measures, such as communication and credit term adjustments, are recommended to optimize customer payment cycles. The performance analysis of product lines highlights the need for marketing and inventory management adjustments, especially for "Planes" and "Classic Cars." Lastly, credit policies should be promptly reviewed and adjusted to address credit limit discrepancies and mitigate financial risks. Overall, these recommendations aim to enhance efficiency, customer satisfaction, and profitability for Mint Classics Company.



```
# Disconnect using odbc
```

```
dbDisconnect(con)
```

```
# Gratitude to Google and Coursera for invaluable learning opportunities.
```