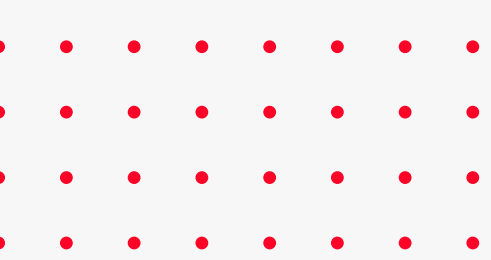


# Car Sales Analysis

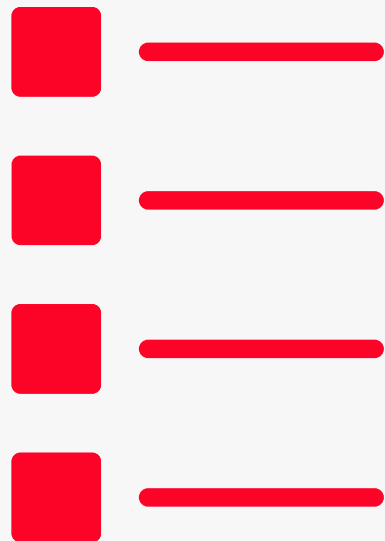
**Presented by : Group " A "**

**Supervised by : Eng.Abdullah Mostafa**





# Problem Definition



The problem at hand is to analyze car sales data to identify trends, patterns, and insights based on various attributes such as color, brand, and gender preferences. The primary goal is to utilize data visualization techniques to uncover actionable insights that can drive strategic decision-making in car marketing, sales optimization, and inventory management.

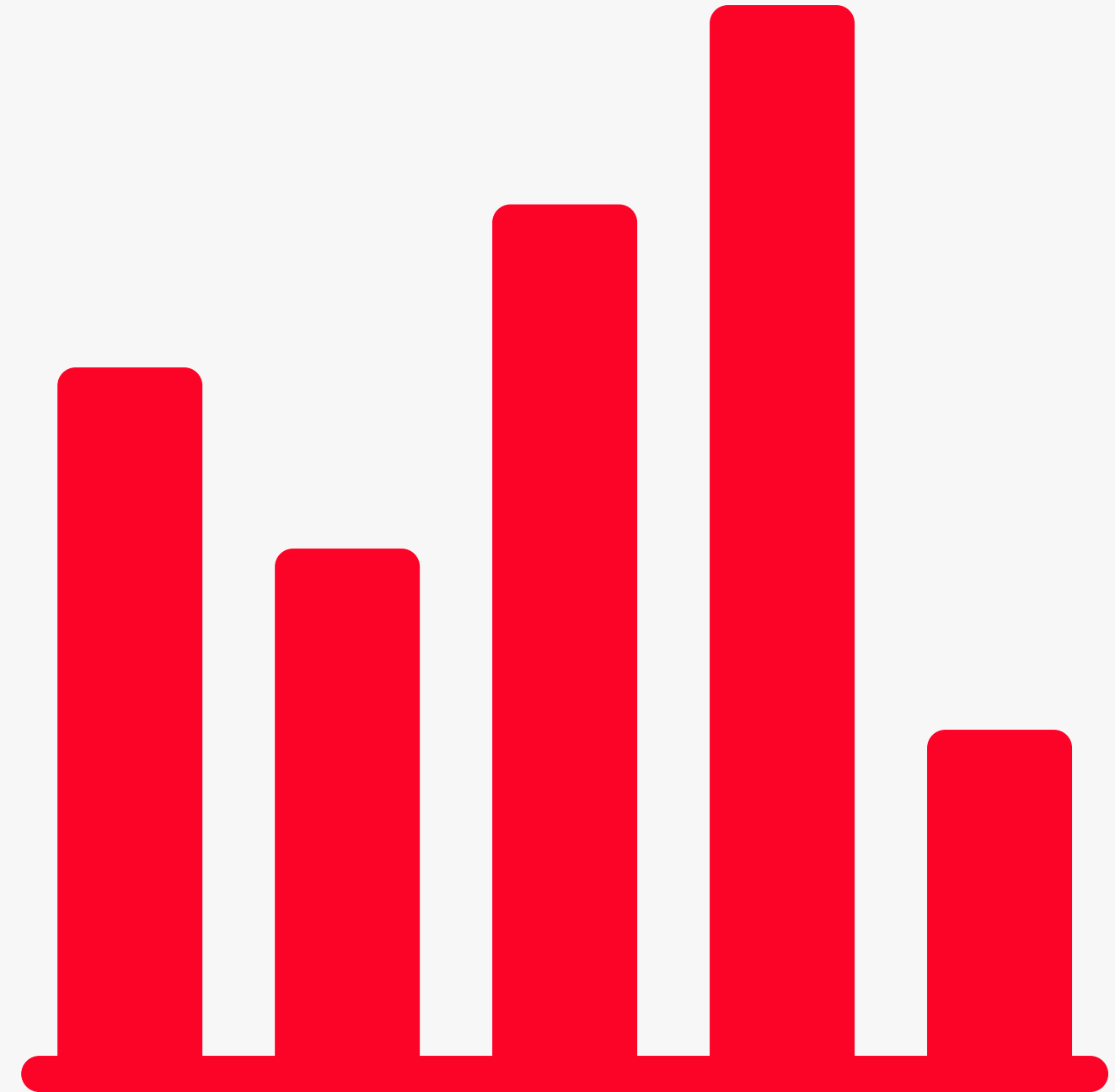
**Key Objectives:**

- 1. Identify Top-Selling Car Colors:** Understand which car colors are most popular among customers and how their sales trends change over time.
- 2. Brand Performance Analysis:** Determine which car brands have the highest and lowest sales, and analyze the factors contributing to their performance.
- 3. Gender-Based Sales Distribution:** Investigate how car sales vary between male and female customers.
- 4. Trend Analysis:** Examine car sales trends over time to detect any seasonality or long-term shifts in preferences.
- 5. Actionable Insights:** Develop recommendations for targeted marketing, inventory planning, and promotional strategies.

# Key Business Questions



- What are the top-performing car brands and models?
- How do customer demographics impact sales?
- What trends can we forecast for future sales?
- What actions should dealerships take to maximize profits?
- How does sales performance vary by region, and what can we learn from the top-performing areas?
- Are there any patterns in car sales based on seasonality or specific dates?





# Data Preparation & Cleaning

## Load Data

```
In [2]: file = 'Cleared_data.csv'
cars_db = pd.read_csv(file)

In [3]: cars_db.head()
```

```
Out[3]:
```

	Customer_Name	Phone	Gender	Annual_Income	Car_id	Model	Color	Engine	Body_Style	Company
0	Geraldine	8264678	Male	13500	C_CND_000001	Expedition	Black	DoubleÃ Overhead Camshaft	SUV	Ford
1	Gia	6848189	Male	1480000	C_CND_000002	Durango	Black	DoubleÃ Overhead Camshaft	SUV	Dodge
2	Gianna	7298798	Male	1035000	C_CND_000003	Eldorado	Red	Overhead Camshaft	Passenger	Cadillac
3	Giselle	6257557	Male	13500	C_CND_000004	Celica	Pale White	Overhead Camshaft	SUV	Toyota
4	Grace	7081483	Male	1465000	C_CND_000005	TL	Red	DoubleÃ Overhead Camshaft	Hatchback	Acura

## Data Reading

```
In [4]: cars_db.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 23906 entries, 0 to 23905
Data columns (total 16 columns):
#   Column              Non-Null Count  Dtype
---  ---
0   Car_id              23906 non-null  object
1   Date                23906 non-null  datetime64[ns]
2   Customer Name       23905 non-null  object
3   Gender              23906 non-null  object
4   Annual Income       23906 non-null  int64
5   Dealer_Name         23906 non-null  object
6   Company             23906 non-null  object
7   Model               23906 non-null  object
8   Engine              23906 non-null  object
9   Transmission        23906 non-null  object
10  Color               23906 non-null  object
11  Price ($)           23906 non-null  int64
12  Dealer_No           23906 non-null  object
13  Body Style          23906 non-null  object
14  Phone               23906 non-null  int64
15  Dealer_Region       23906 non-null  object
dtypes: datetime64[ns](1), int64(3), object(12)
memory usage: 2.9+ MB
```

## Data Exploration (EDA)

## Fill The Missing Value

```
In [14]: #replace the missing value with any unique data
cars_db['Customer_Name'] = cars_db['Customer_Name'].fillna('Murad')

In [15]: missed_value = cars_db['Customer_Name'] == 'Murad'
cars_db[missed_value]
```

```
Out[15]:
```

	Customer_Name	Phone	Gender	Annual_Income	Car_id	Model	Color	Engine	Body_Style	Company
7564	Murad	7203103	Male	680000	C_CND_007565	Ram Pickup	Pale White	DoubleÃ Overhead Camshaft	Hardtop	Dodge

## Data Cleaning

## Dictionary of mapping

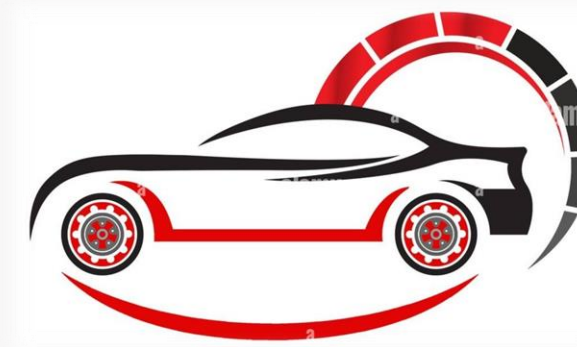
```
In [5]: city_to_state = {
    "Aurora": "Colorado",
    "Austin": "Texas",
    "Greenville": "South Carolina",
    "Janesville": "Wisconsin",
    "Middletown": "New York",
    "Pasco": "Washington",
    "Scottsdale": "Arizona",
}
```

```
In [6]: cars_db['Dealer_State'] = cars_db['Dealer_Region'].map(city_to_state)
```

```
In [7]: cars_db.head(3)
```

## Data Transformation

# Main KPIs



## Key KPIs:

- Total Revenue
- Average Car Price
- Number of Sold Car

Total Revenue

**\$671,525,465**

Average Car Price

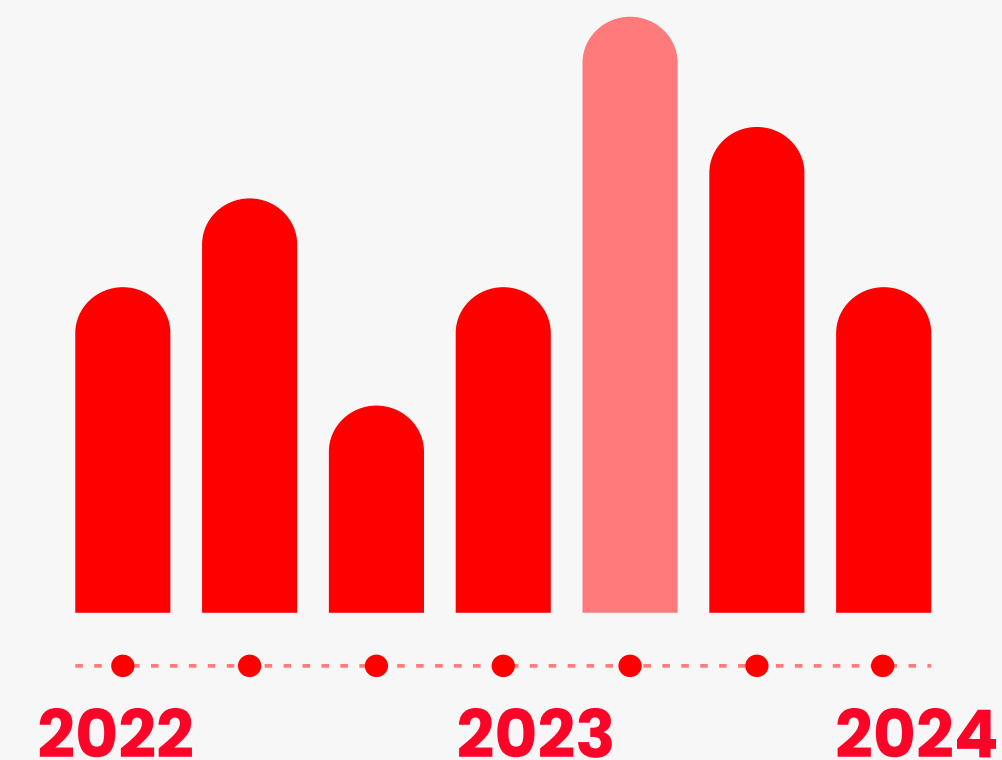
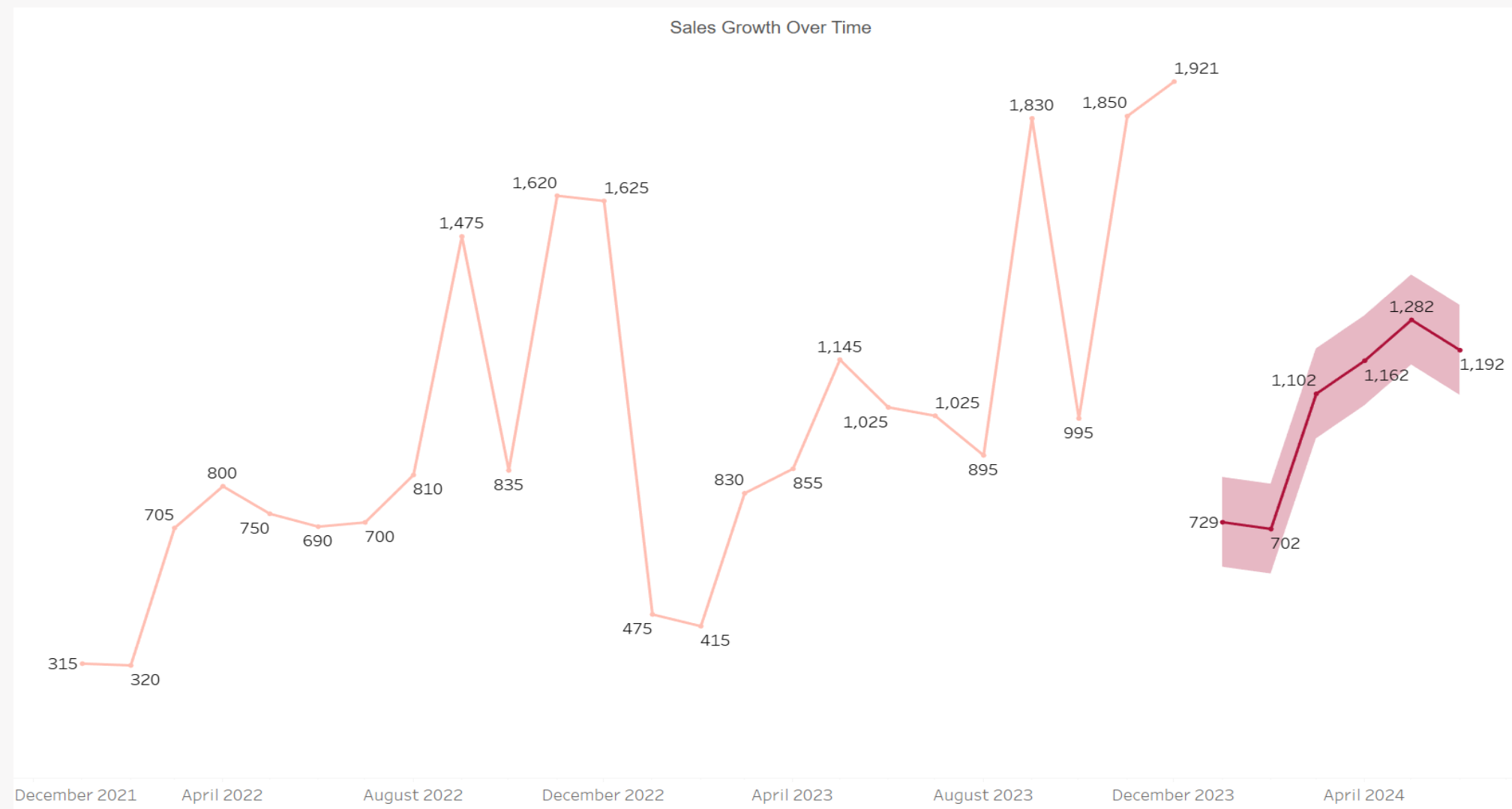
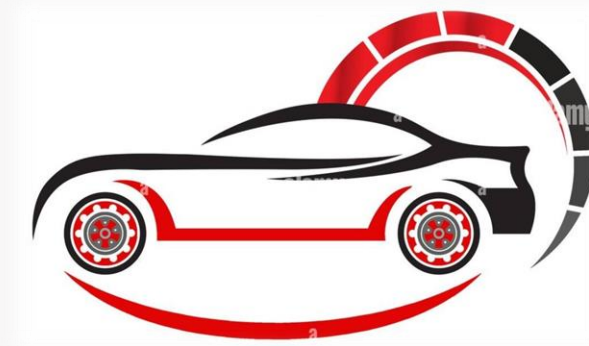
**\$28,090**

No. of Cars Sold

**23,906**



# Insights



**Insight:** The total sales for the current year amounted to **371,185,120**, compared to **300,340,345** in the previous year. This represents a **23.6% increase** in sales, indicating significant growth in revenue year over year.

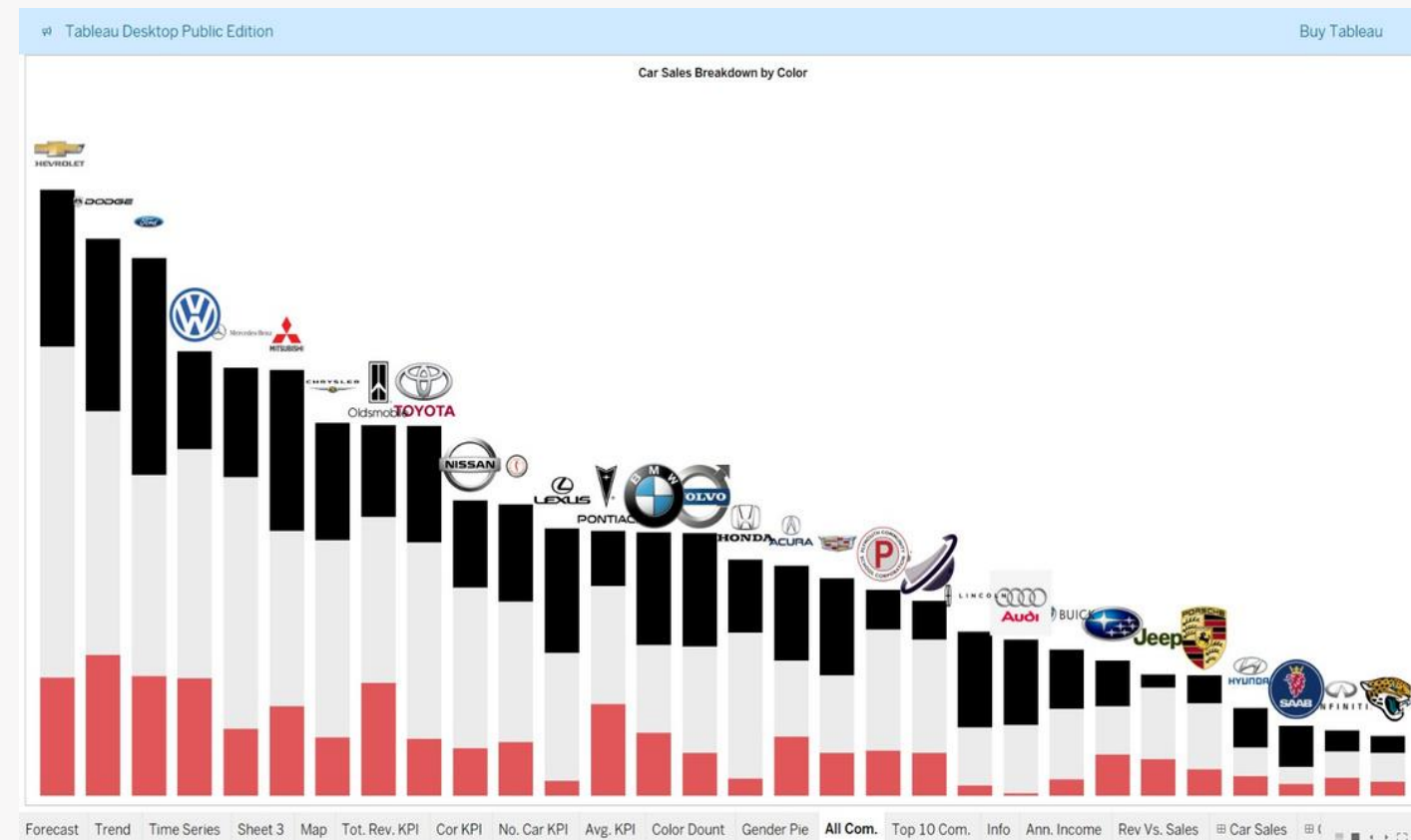
**Action Plan:** Focus on peak sales months (May, September, November, and March) for targeted campaigns.

Introduce summer clearance discounts to boost sales during slow months (June - August)

Encourage purchases in January and February with financing incentives or free maintenance offers.

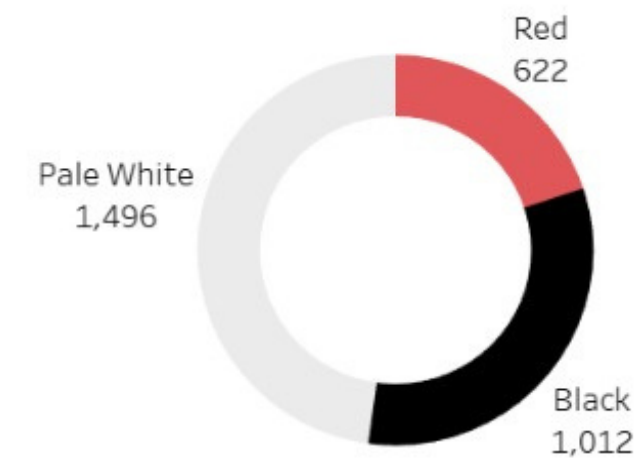


# Car Sales Insights



**Insight:** Chevrolet and Dodge have the highest car sales, with pale white being the most popular color among top brands.

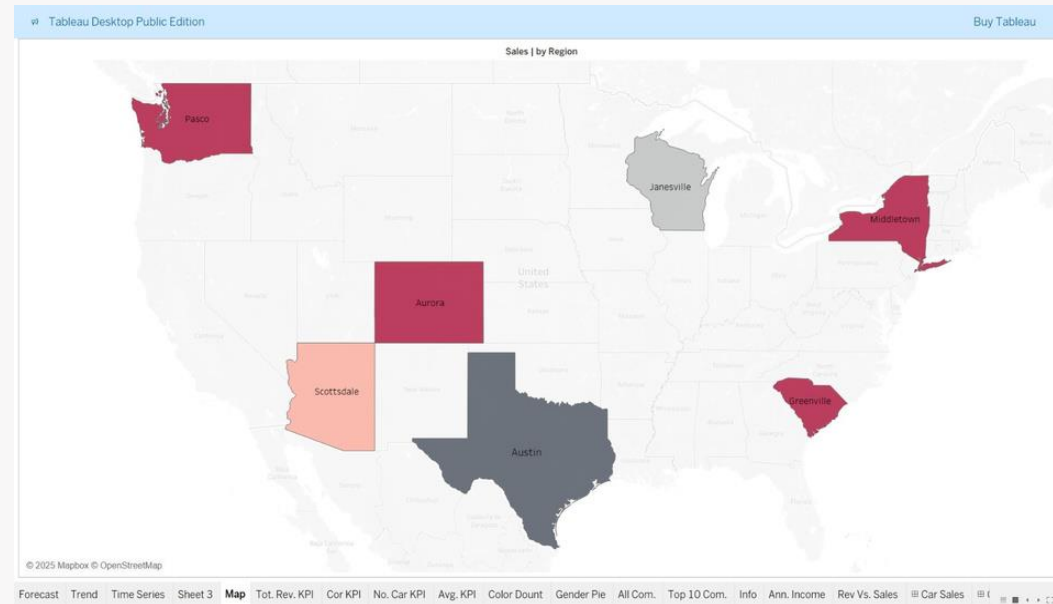
**Action Plan:** Increase inventory of pale white cars, especially for popular brands like Chevrolet and Dodge, while analyzing factors driving their higher sales to replicate success with other brands.



**Insight:** Pale White is the most popular car color, followed by Black and Red.

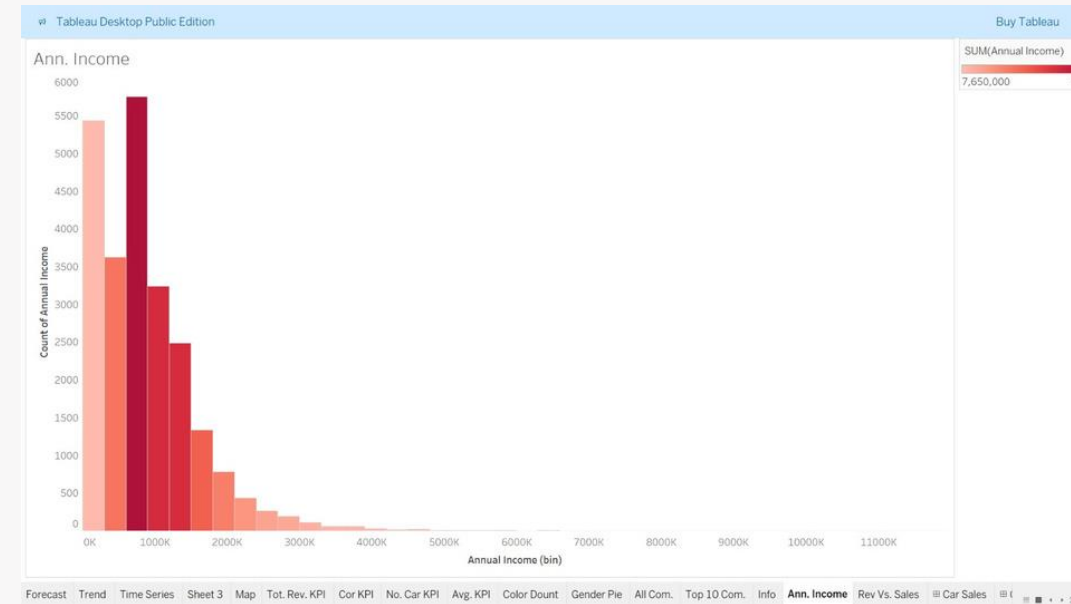
**Action Plan:** Optimize inventory by stocking more Pale White and Black cars, while considering targeted promotions to boost Red car sales.

# Customer Demographics Insights



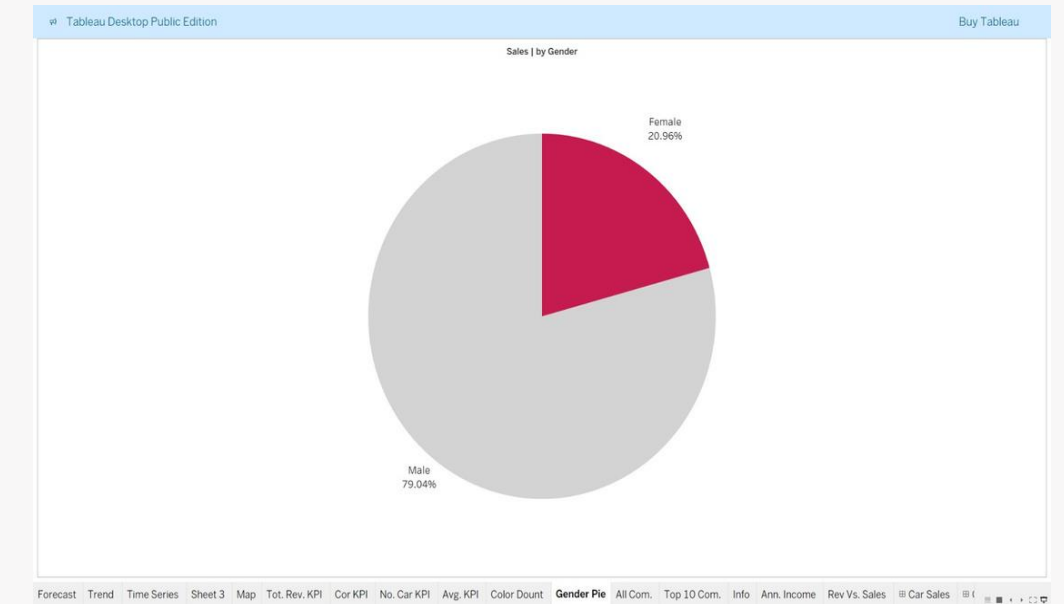
**Insight:** Austin and Pasco are the top-performing regions in terms of car sales, while Scottsdale and Janesville show relatively lower sales.

**Action Plan:** Increase marketing efforts and promotional campaigns in lower-performing regions to boost sales, while maintaining strong customer engagement in top regions to sustain high performance.



**Insight:** The majority of car buyers have an annual income below \$1 million, with a sharp decline in the number of buyers as income increases.

**Action Plan:** Focus on offering affordable and mid-range car options to cater to the largest customer segment, while also introducing premium packages for high-income customers to maximize revenue.



**Insight:** The majority of car sales (79.04%) are made to male customers, while female customers account for only 20.96% of sales.

**Action Plan:** Develop targeted marketing strategies to attract more female buyers, such as emphasizing safety features, aesthetics, and practical functionalities. Additionally, consider collaborations with brands or influencers that appeal to women.



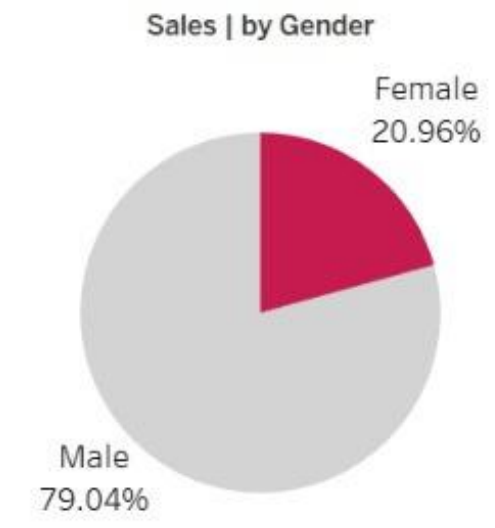
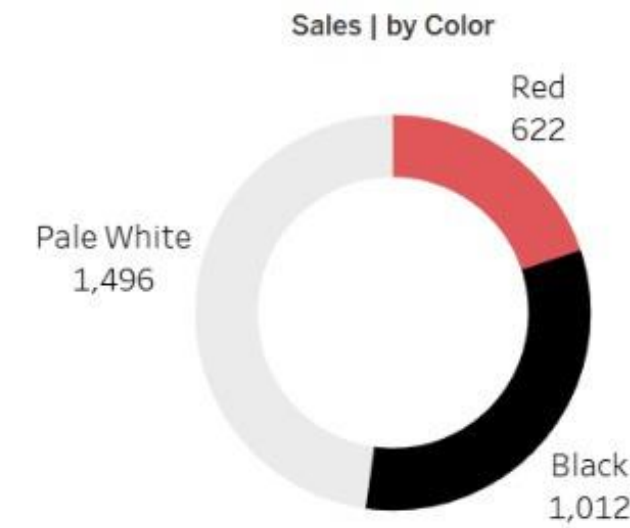
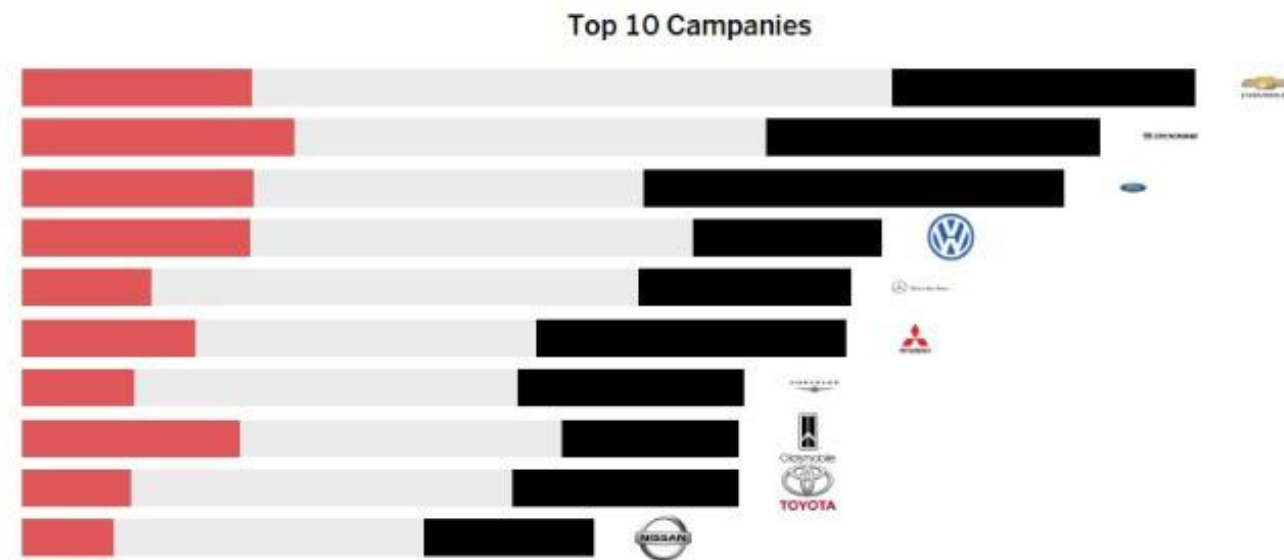
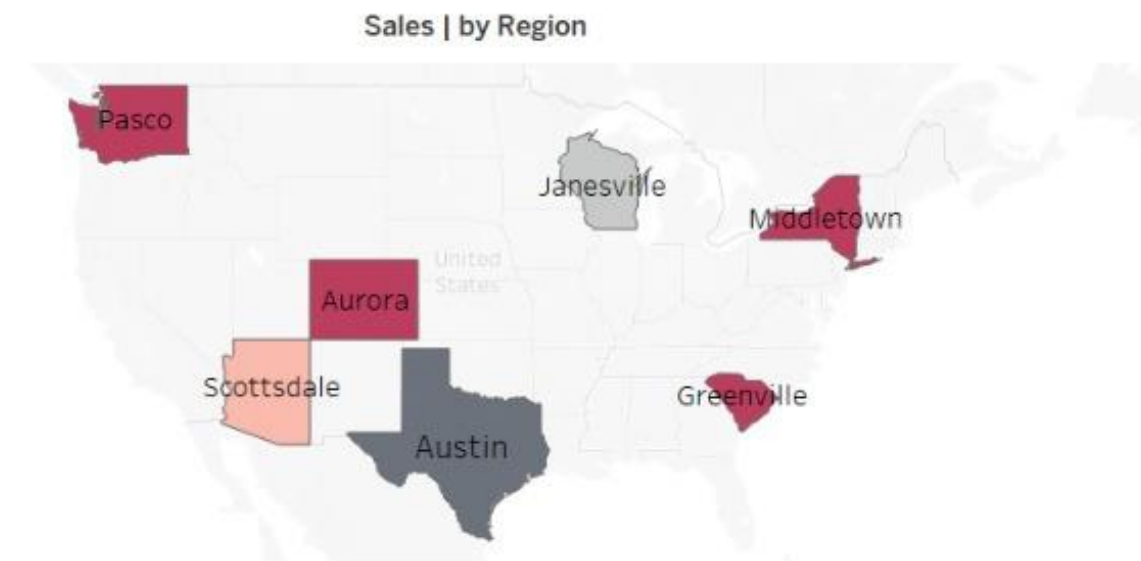
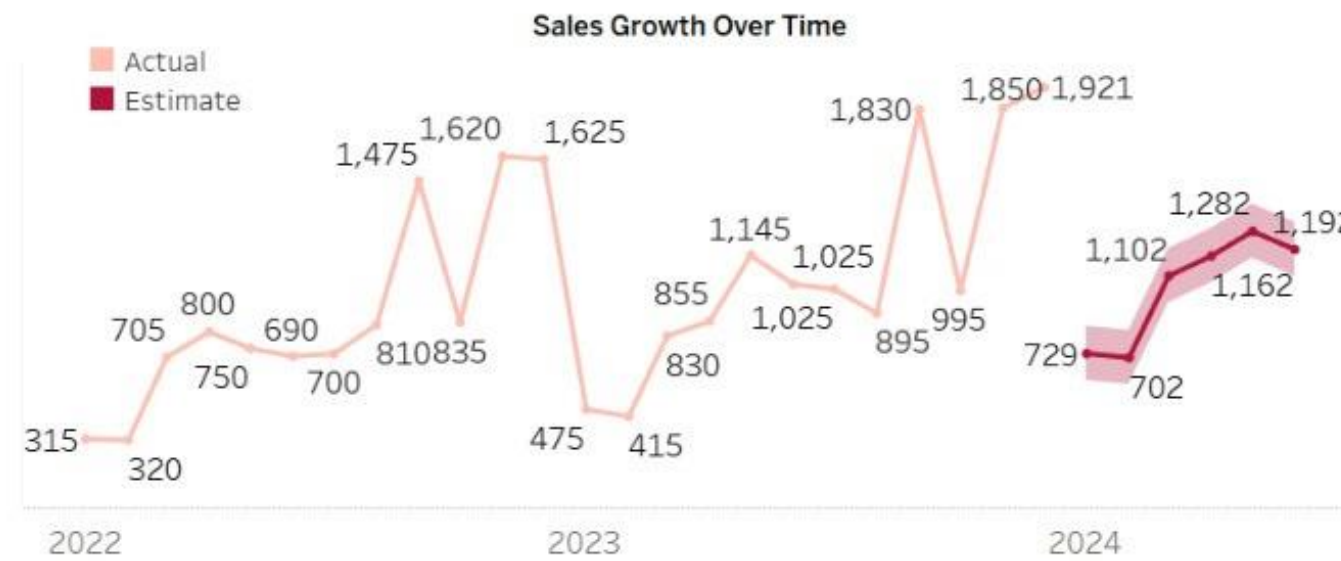
# Dashboard



## USA Car Sales Analysis (2022 - 2023)



Total Revenue	No. of Cars Sold	Average Car Price	Correlation Coefficient
\$671,525,465	23,906	\$28,090	0.012



# Dashboard



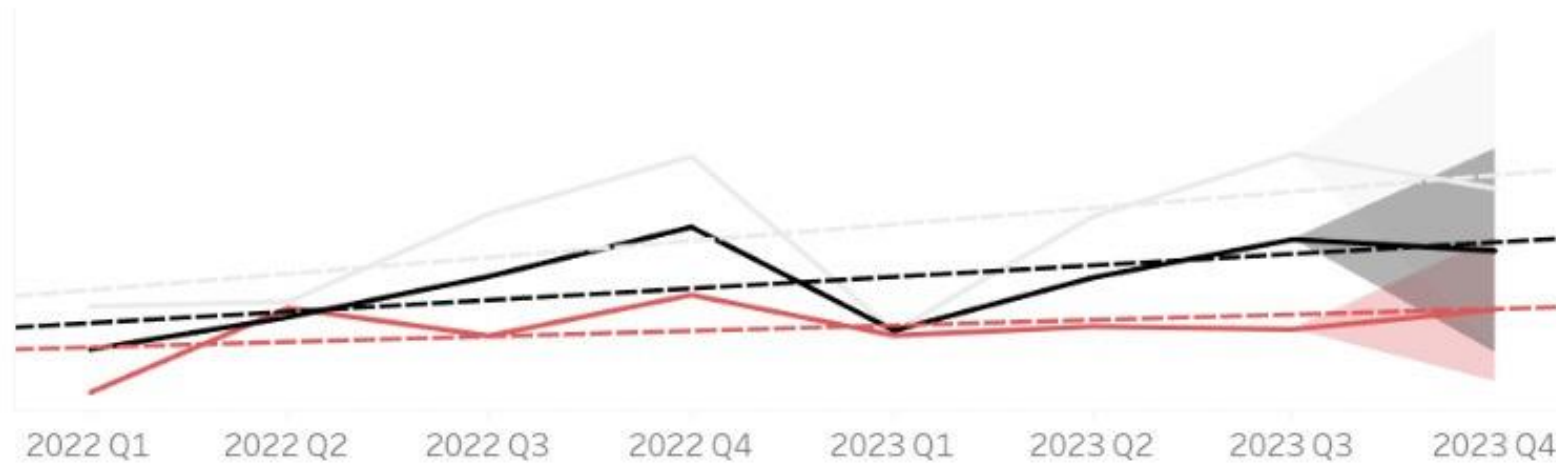
## USA Car Sales Analysis (2022 - 2023)

i



Total Revenue	No. of Cars Sold	Average Car Price	Correlation Coefficient
\$671,525,465	23,906	\$28,090	0.012

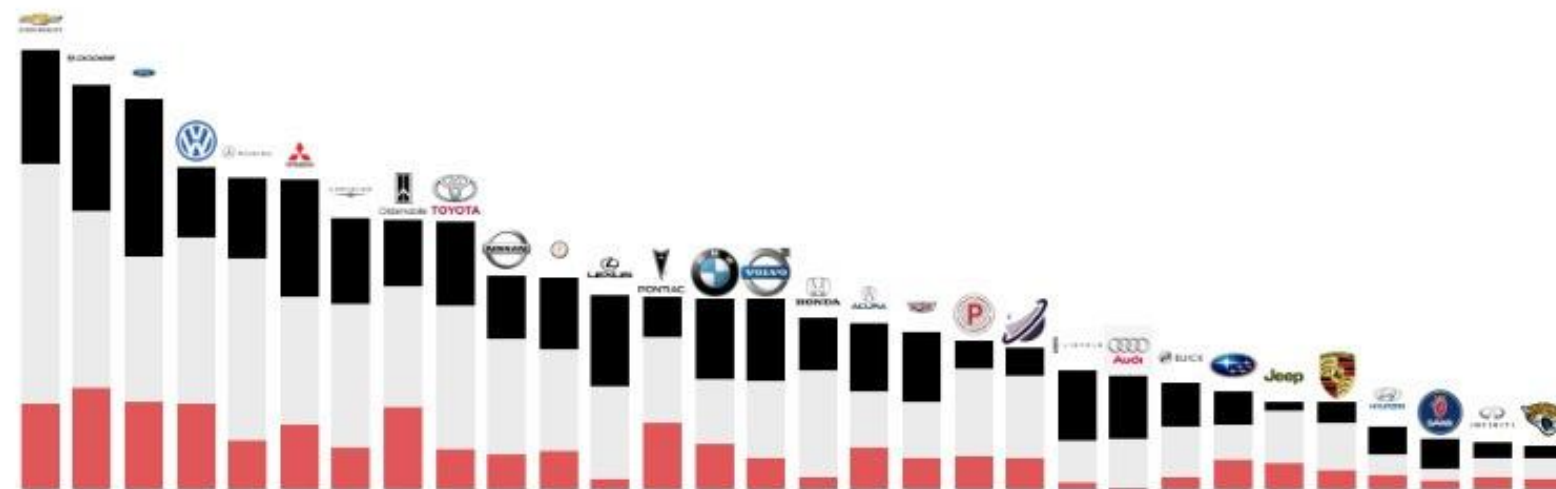
Car Sales Trends by Color over Time.



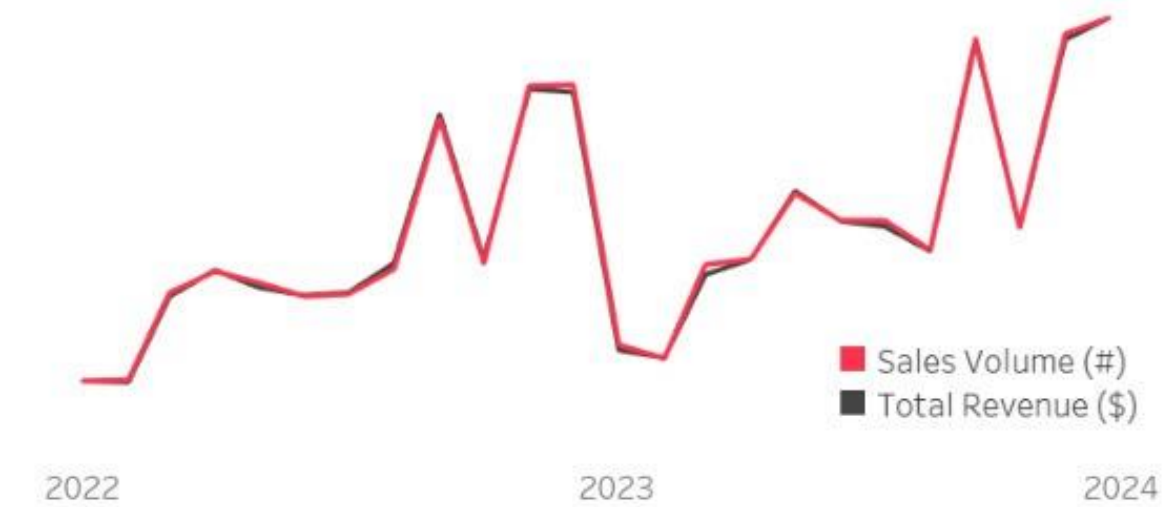
Sales | by Region



Car Sales Breakdown by Color



Total Revenue Vs. Sales Volume



# Thank You

