Data Exploration and Descriptive Summary

Monthly Sales Performance Trends

Which month achieved the highest total sales, and what was the total sales figure recorded during that period?

1. Overview

This analysis aims to explore and visualize monthly sales trends to uncover insights into the temporal dynamics of business performance.By identifying the month with the highest total sales, stakeholders can make informed strategic decisions such as aligning marketing campaigns, inventory planning, and promotional activities with high-performing periods. Through an engaging bar chart visualization, this report transforms raw transactional data into a powerful narrative of revenue trends across the year.

2. Goal

- To conduct an exploratory data analysis (EDA) focused on monthly sales performance.
- To identify which month generated the highest total sales.
- To derive actionable insights that can support data-driven decision-making and improve business strategy.

3. Business Challenge

- Lack of visibility into monthly sales patterns hampers effective planning and resource allocation.
- The business struggles to identify peak and off-peak sales months, limiting its ability to optimize promotional efforts and inventory cycles.
- Without clarity on seasonal sales trends, forecasting, and budgeting remain reactive rather than proactive.
- Decision-makers lack concrete evidence to justify strategic timing for marketing or product rollouts

4. Analysis Approach

- Clean, preprocess, and aggregate sales data by month.
- Visualize monthly sales using an intuitive bar chart to enhance interpretability.

- Use visual storytelling and formatted labels to make the insights easily digestible for both technical and non-technical stakeholders.
- Share recommendations based on findings to optimize business planning and improve revenue targeting.

Importing libraries

In [9]:
```
import pandas as pd
import matplotlib.pyplot as plt
import matplotlib.ticker as tick
```

Loading the clean dataframe (post-ETL process)

In [11]:
```
df = pd.read_csv("C:\\Monthly_Sales\\cleaned_data.csv")
```

In [12]:
```
df.head()
```

Out[12]:

	Order ID	Product Name	Units Purchased	Unit Price	Order Date	Delivery Address	Month	Month Name	Year	D We
0	160155	Alienware Monitor	1	400.99	2024-01-01 05:04:00	765 Ridge St, Portland, OR 97035	1	January	2024	M
1	151041	AAA Batteries (4-pack)	1	4.99	2024-01-01 05:04:00	964 Lakeview St, Atlanta, GA 30301	1	January	2024	M
2	146765	AAA Batteries (4-pack)	1	4.99	2024-01-01 05:20:00	546 10th St, San Francisco, CA 94016	1	January	2024	M
3	145617	Amana Washing Machine	1	600.00	2024-01-01 05:24:00	961 Meadow St, Portland, OR 97035	1	January	2024	M
4	156535	Lightning Charging Cable	2	14.95	2024-01-01 05:45:00	451 Elm St, Los Angeles, CA 90001	1	January	2024	M

In [13]:
```
df.shape
```

Out[13]:
```
(171780, 13)
```

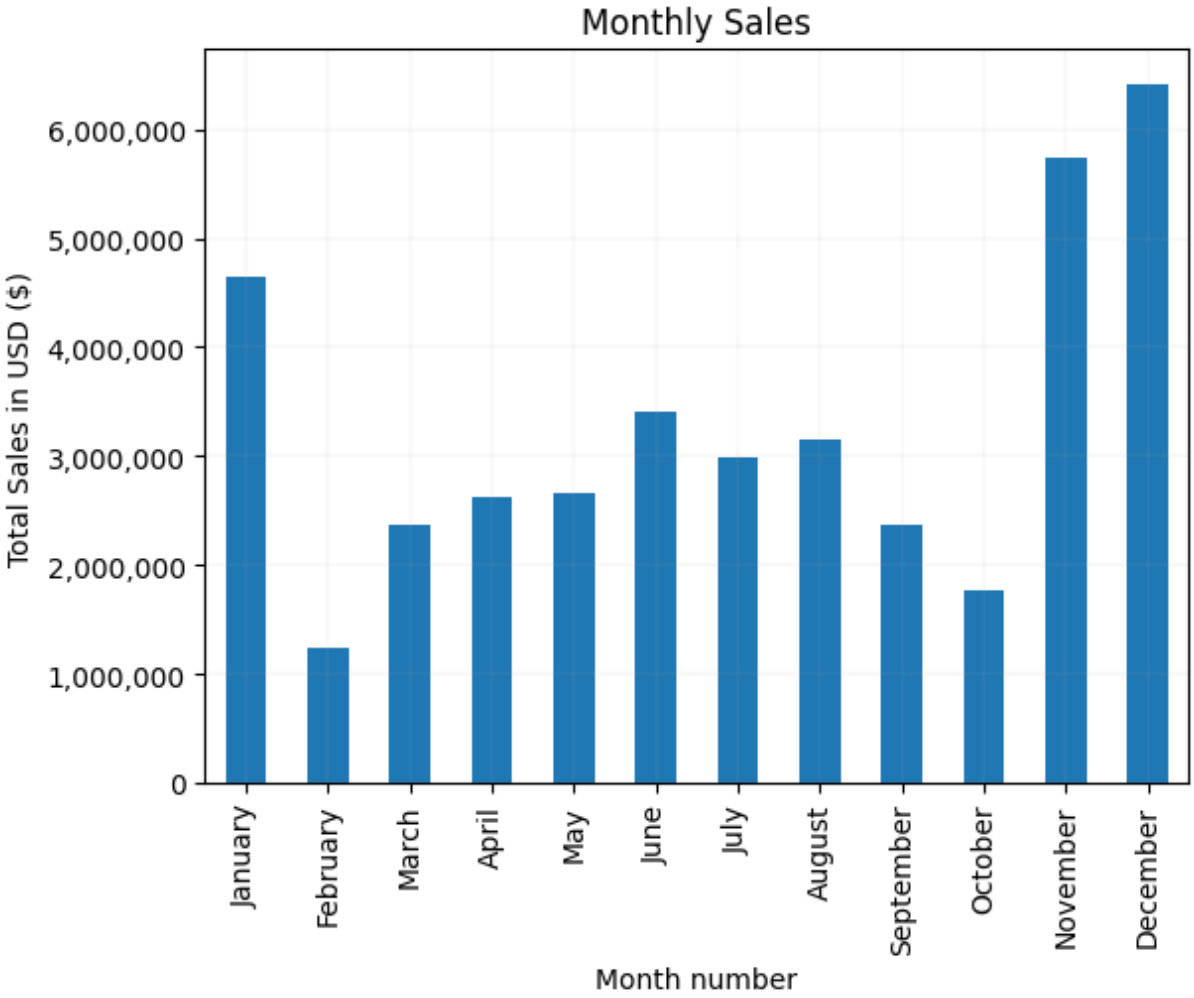
Month and its corresponding sales figure.

In [15]:
```
monthly_sales = df.groupby('Month')['Total Sales'].sum()
monthly_sales
```

Out[15]:
```
Month
1     4643726.50
2     1235808.22
3     2360571.99
4     2621378.14
5     2658910.61
6     3409702.73
7     2990650.83
8     3144247.72
9     2371339.60
10    1760284.20
11    5746819.31
12    6412321.59
Name: Total Sales, dtype: float64
```

Plotting Monthly Sales

In [17]:
```
# Grouping by Month
monthly_sales = df.groupby(df['Month Name'])['Total Sales'].sum()

# Sorting Months Chronologically
month_order = ['January', 'February', 'March','April','May', 'June', 'July', 'Augus
monthly_sales = monthly_sales.reindex(month_order)


# Plotting
ax = monthly_sales.plot(kind='bar', title="Monthly Sales")

ax.set_xlabel('Month number')
ax.set_ylabel('Total Sales in USD ($)')

# Formatting the y-axis with comma separators
ax.get_yaxis().set_major_formatter(plt.FuncFormatter(lambda x, _: f'{int(x):,}'))

plt.xticks(rotation=90)
plt.grid(linewidth=0.1)

plt.savefig(r"C:/Users/DELL/OneDrive - COVENANT UNIVERSITY/Desktop/1. Retail Sales

plt.show()
```



Key Insights

1. December recorded the highest total sales, with a revenue of $6,412,321.59, making it the most profitable month of the year.
2. November followed as the second-highest month with $5,746,819.31, indicating a strong year-end sales trend.
3. February was the weakest month, with the lowest total sales of $1,235,808.22.

A noticeable sales surge begins from June onward, suggesting a buildup toward the end-of-year peak.

Strategic Recommendations

1. Capitalize on Q4 sales momentum: Invest heavily in marketing, promotions, and inventory during November and December,

as these months are proven high performers—likely driven by holidays, year-end bonuses,

and seasonal demand.

2. Launch pre-holiday campaigns starting Q3 (around July–September) to create demand early and ride the momentum.

3. Investigate low performance in February: Look into potential causes

(example, post-holiday fatigue, customer spending behavior, or operational lags) and explore strategies like targeted promotions or loyalty incentives to boost engagement.

4. Use seasonality to guide forecasting: Align production, staffing, and budget planning with high

and low-performing months for optimized operations and cost efficiency.