```
import pandas as pd

df = pd.read_csv("Sales_September_2019.csv")
df.head()
```

```
  Order ID                Product Quantity Ordered Price Each
Order Date  \
0   248151  AA Batteries (4-pack)                4       3.84
09/17/19 14:44
1   248152   USB-C Charging Cable                2      11.95
09/29/19 10:19
2   248153   USB-C Charging Cable                1      11.95
09/16/19 17:48
3   248154       27in FHD Monitor                1     149.99
09/27/19 07:52
4   248155   USB-C Charging Cable                1      11.95
09/01/19 19:03

                       Purchase Address
0    380 North St, Los Angeles, CA 90001
1          511 8th St, Austin, TX 73301
2  151 Johnson St, Los Angeles, CA 90001
3      355 Hickory St, Seattle, WA 98101
4          125 5th St, Atlanta, GA 30301
```

```
df.tail()
```

```
      Order ID                  Product Quantity Ordered Price Each  \
11681   259353  AAA Batteries (4-pack)                3       2.99
11682   259354                  iPhone                1        700
11683   259355                  iPhone                1        700
11684   259356  34in Ultrawide Monitor                1     379.99
11685   259357    USB-C Charging Cable                1      11.95

           Order Date                           Purchase Address
11681  09/17/19 20:56   840 Highland St, Los Angeles, CA 90001
11682  09/01/19 16:00  216 Dogwood St, San Francisco, CA 94016
11683  09/23/19 07:39     220 12th St, San Francisco, CA 94016
11684  09/19/19 17:30   511 Forest St, San Francisco, CA 94016
11685  09/30/19 00:18   250 Meadow St, San Francisco, CA 94016
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 11686 entries, 0 to 11685
Data columns (total 6 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   Order ID          11646 non-null  object
 1   Product           11646 non-null  object
 2   Quantity Ordered  11646 non-null  object
```

```
 3   Price Each        11646 non-null  object
 4   Order Date        11646 non-null  object
 5   Purchase Address  11646 non-null  object
dtypes: object(6)
memory usage: 274.0+ KB
```

```
df.isnull().sum()
```

```
Order ID            40
Product             40
Quantity Ordered    40
Price Each          40
Order Date          40
Purchase Address    40
dtype: int64
```

```
df = df.dropna()

df = df[df["Order Date"] != "Order Date"]

df["Order Date"] = pd.to_datetime(
    df["Order Date"],
    format="%m/%d/%y %H:%M",
    errors="coerce"
)

df["Quantity Ordered"] = pd.to_numeric(df["Quantity Ordered"],
errors="coerce")
df["Price Each"] = pd.to_numeric(df["Price Each"], errors="coerce")

df = df.dropna(subset=["Order Date", "Quantity Ordered", "Price
Each"])

df["Sales"] = df["Quantity Ordered"] * df["Price Each"]
df.head()
```

```
  Order ID                Product  Quantity Ordered  Price Each  \
0   248151  AA Batteries (4-pack)                 4        3.84
1   248152   USB-C Charging Cable                 2       11.95
2   248153   USB-C Charging Cable                 1       11.95
3   248154       27in FHD Monitor                 1      149.99
4   248155   USB-C Charging Cable                 1       11.95

           Order Date                      Purchase Address   Sales
0 2019-09-17 14:44:00    380 North St, Los Angeles, CA 90001   15.36
1 2019-09-29 10:19:00          511 8th St, Austin, TX 73301   23.90
2 2019-09-16 17:48:00  151 Johnson St, Los Angeles, CA 90001   11.95
3 2019-09-27 07:52:00     355 Hickory St, Seattle, WA 98101  149.99
4 2019-09-01 19:03:00         125 5th St, Atlanta, GA 30301   11.95
```

```
df.describe()
```

```
       Quantity Ordered    Price Each                       Order
Date  \
count      11629.000000  11629.000000                         11629

mean           1.128128    179.400007  2019-09-16 03:55:46.151861504

min            1.000000      2.990000            2019-09-01 05:10:00

25%            1.000000     11.950000            2019-09-08 18:06:00

50%            1.000000     14.950000            2019-09-15 22:33:00

75%            1.000000    150.000000            2019-09-23 15:52:00

max            6.000000   1700.000000            2019-10-01 04:06:00

std            0.435077    328.595042                            NaN


               Sales
count  11629.000000
mean     180.481271
min        2.990000
25%       11.950000
50%       14.950000
75%      150.000000
max     1700.000000
std      328.540970
```

```
df.groupby("Product")["Quantity
Ordered"].sum().sort_values(ascending=False)
```

```
Product
AAA Batteries (4-pack)        1927
AA Batteries (4-pack)         1773
USB-C Charging Cable          1594
Lightning Charging Cable      1433
Wired Headphones              1302
Apple Airpods Headphones       968
Bose SoundSport Headphones     830
27in FHD Monitor               482
iPhone                         398
27in 4K Gaming Monitor         382
34in Ultrawide Monitor         378
Google Phone                   342
Flatscreen TV                  294
Macbook Pro Laptop             288
20in Monitor                   277
ThinkPad Laptop                249
Vareebadd Phone                126
LG Washing Machine              46
```

```
LG Dryer                          30
Name: Quantity Ordered, dtype: int64
```

```
df.groupby("Product")
["Sales"].sum().sort_values(ascending=False).head(10)
```

```
Product
Macbook Pro Laptop            489600.00
iPhone                        278600.00
ThinkPad Laptop               248997.51
Google Phone                  205200.00
27in 4K Gaming Monitor        148976.18
Apple Airpods Headphones      145200.00
34in Ultrawide Monitor        143636.22
Flatscreen TV                  88200.00
Bose SoundSport Headphones     82991.70
27in FHD Monitor               72295.18
Name: Sales, dtype: float64
```

```
daily_sales = df.groupby(df["Order Date"].dt.day)
["Sales"].sum().sort_index()
daily_sales
```

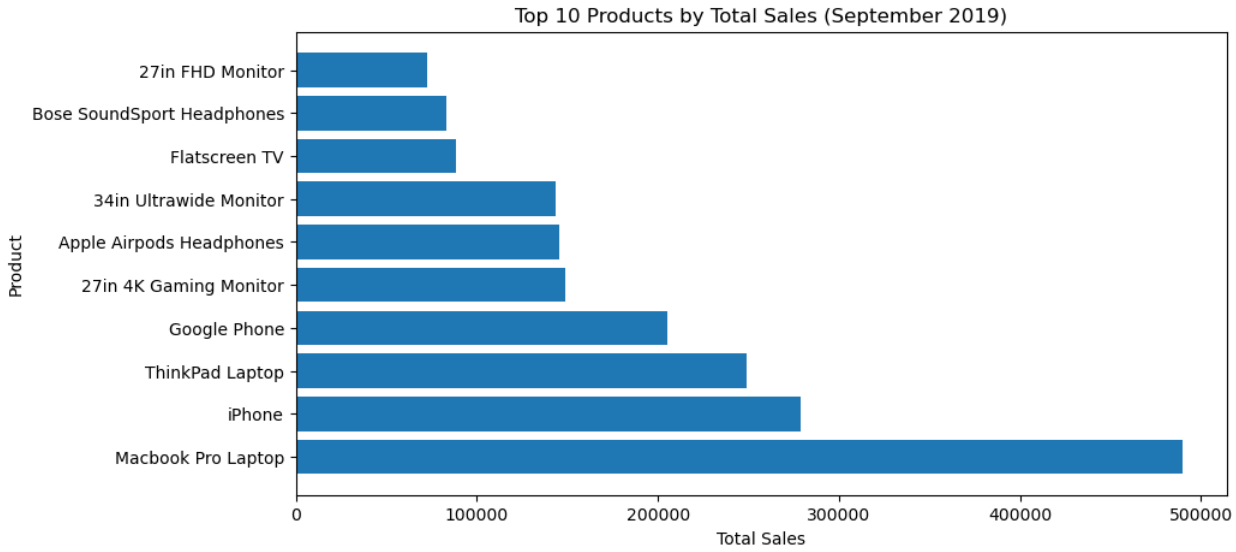
```
Order Date
1     69169.96
2     72275.38
3     62071.29
4     71784.82
5     67834.51
6     70087.10
7     70665.44
8     64098.30
9     79465.82
10    74257.35
11    77830.23
12    74776.11
13    78224.28
14    79399.76
15    73422.21
16    57940.24
17    62443.57
18    76563.30
19    64202.46
20    63013.83
21    62876.26
22    47909.61
23    70232.03
24    66751.42
25    78245.17
26    79307.77
```

```
27    66331.18
28    72096.63
29    73285.42
30    72255.25
Name: Sales, dtype: float64
```

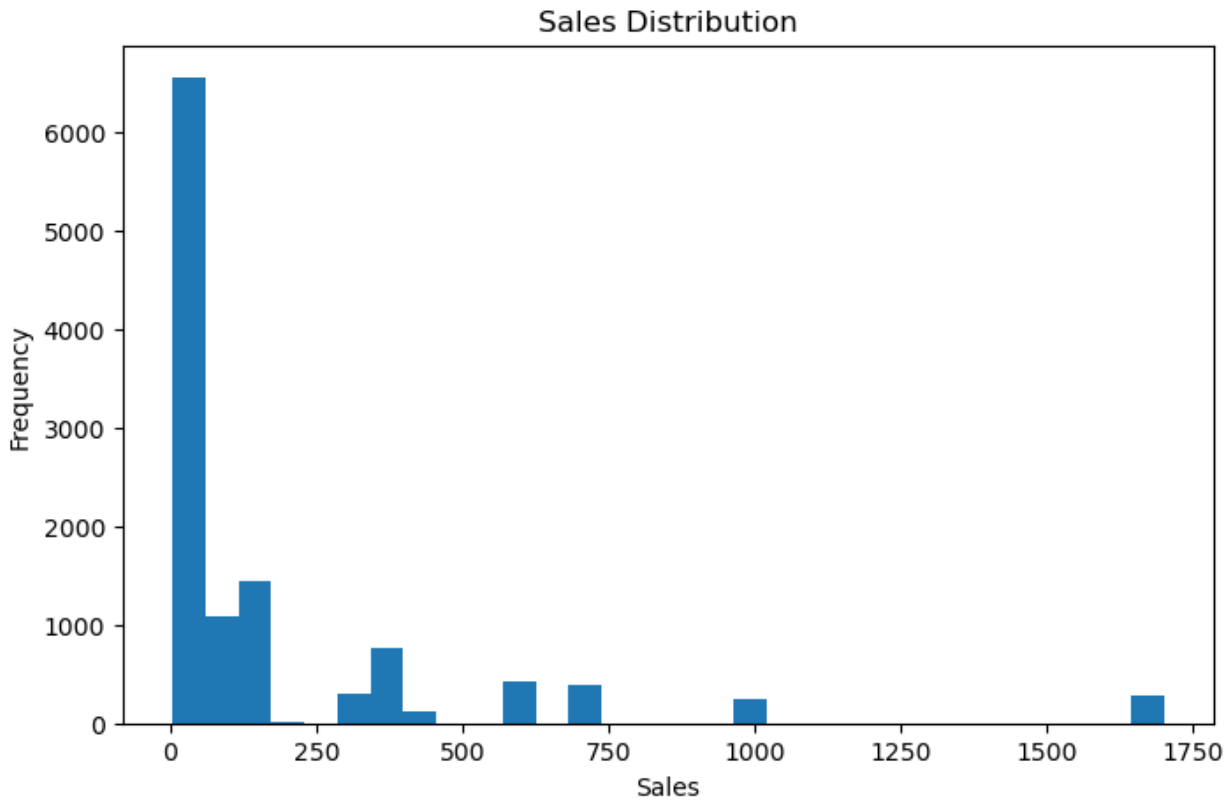
```
df[["Quantity Ordered", "Price Each", "Sales"]].corr()
```

	Quantity Ordered	Price Each	Sales
Quantity Ordered	1.000000	-0.153233	-0.144522
Price Each	-0.153233	1.000000	0.999454
Sales	-0.144522	0.999454	1.000000

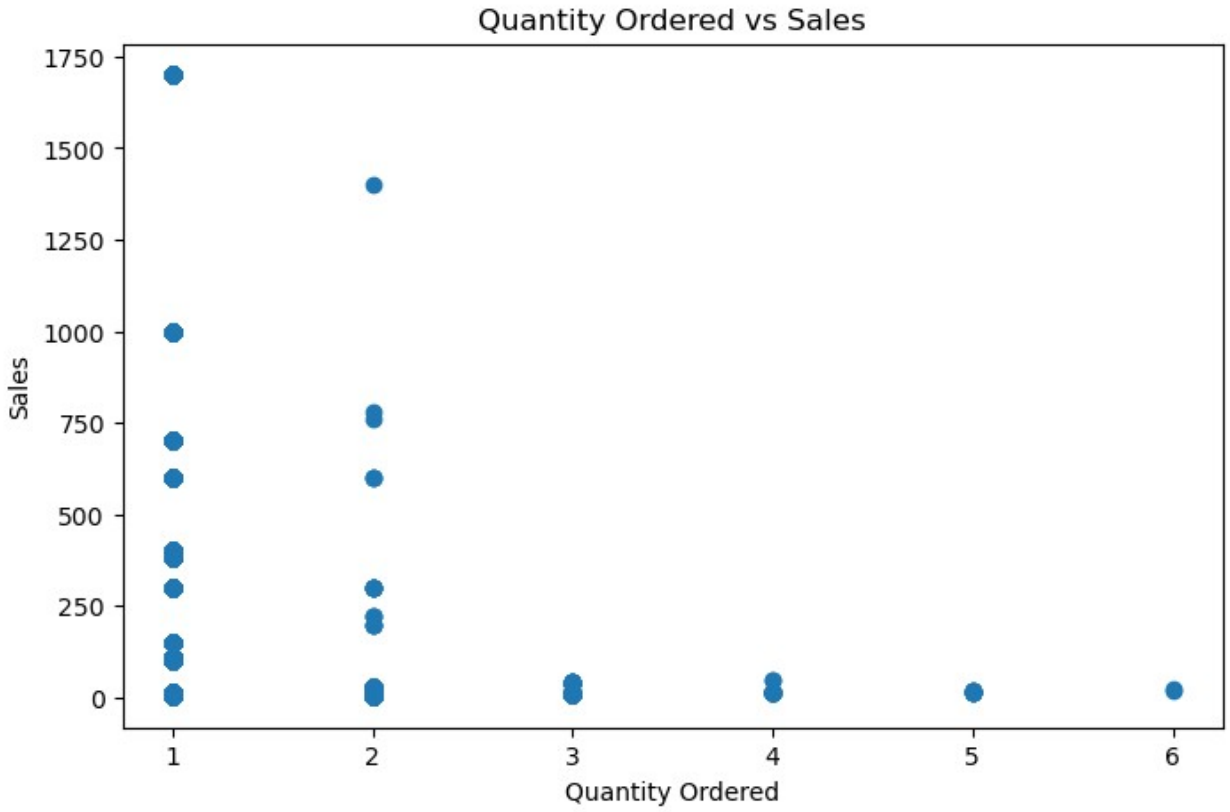
```
import matplotlib.pyplot as plt

top10_sales = df.groupby("Product")
["Sales"].sum().sort_values(ascending=False).head(10)

plt.figure(figsize=(10,5))
plt.barh(top10_sales.index, top10_sales.values)
plt.title("Top 10 Products by Total Sales (September 2019)")
plt.xlabel("Total Sales")
plt.ylabel("Product")
plt.show()
```



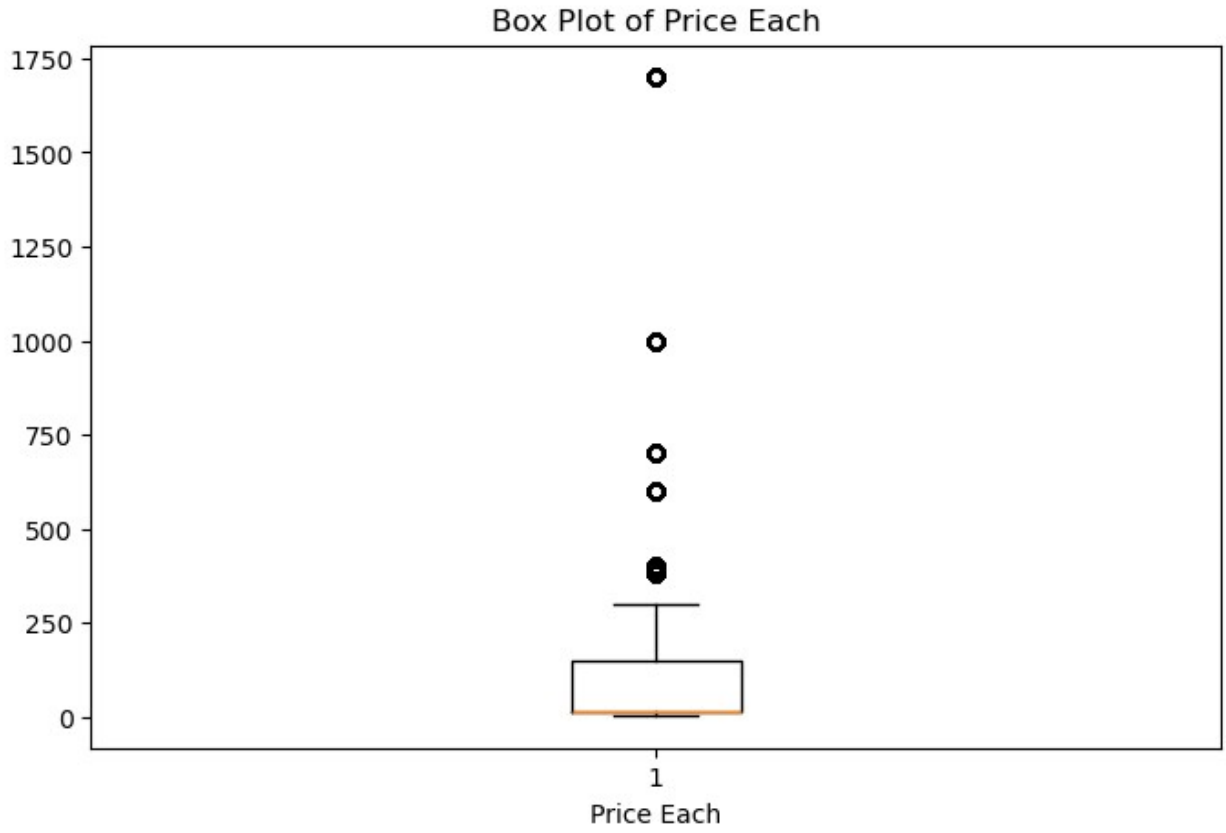

```
plt.figure(figsize=(8,5))
plt.hist(df["Sales"], bins=30)
plt.title("Sales Distribution")
plt.xlabel("Sales")
plt.ylabel("Frequency")
plt.show()
```




```
plt.figure(figsize=(8,5))
plt.scatter(df["Quantity Ordered"], df["Sales"])
plt.title("Quantity Ordered vs Sales")
plt.xlabel("Quantity Ordered")
plt.ylabel("Sales")
plt.show()
```




```
plt.figure(figsize=(8,5))
plt.boxplot(df["Price Each"])
plt.title("Box Plot of Price Each")
plt.xlabel("Price Each")
plt.show()
```



Insights and Interpretation

1. High-priced products such as Macbook Pro Laptop and iPhone generate the highest total sales revenue, despite being sold in lower quantities.
2. Low-priced accessories like batteries and charging cables are sold in large quantities but contribute less to total revenue.
3. The correlation analysis shows a very strong positive relationship between Price Each and Sales, as sales value depends heavily on product price.
4. Quantity Ordered has a weak negative correlation with Sales, indicating that higher sales value does not always result from higher quantities sold.
5. Daily sales fluctuate throughout the month, with certain days showing significantly higher sales than others.

Conclusion

This exploratory data analysis examined sales transactions for September 2019. The analysis highlighted key revenue-generating products, sales patterns, and relationships between quantity, price, and sales. The findings provide useful insights into customer purchasing behavior and product performance.