

# Walmart

November 29, 2025

```
[1]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

```
[2]: data =pd.read_csv("/content/drive/MyDrive/Netflix/Walmart DataSet.csv")
data
```

```
[2]:      Store        Date  Weekly_Sales  Holiday_Flag  Temperature  Fuel_Price \
0          1  05-02-2010     1643690.90           0       42.31    2.572
1          1  12-02-2010     1641957.44           1       38.51    2.548
2          1  19-02-2010     1611968.17           0       39.93    2.514
3          1  26-02-2010     1409727.59           0       46.63    2.561
4          1  05-03-2010     1554806.68           0       46.50    2.625
...
6430      45  28-09-2012     713173.95           0       64.88    3.997
6431      45  05-10-2012     733455.07           0       64.89    3.985
6432      45  12-10-2012     734464.36           0       54.47    4.000
6433      45  19-10-2012     718125.53           0       56.47    3.969
6434      45  26-10-2012     760281.43           0       58.85    3.882

                  CPI  Unemployment
0      211.096358      8.106
1      211.242170      8.106
2      211.289143      8.106
3      211.319643      8.106
4      211.350143      8.106
...
6430  192.013558      8.684
6431  192.170412      8.667
6432  192.327265      8.667
6433  192.330854      8.667
6434  192.308899      8.667

[6435 rows x 8 columns]
```

```
[3]: data.info()
```

```

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 6435 entries, 0 to 6434
Data columns (total 8 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   Store        6435 non-null   int64  
 1   Date         6435 non-null   object  
 2   Weekly_Sales 6435 non-null   float64 
 3   Holiday_Flag 6435 non-null   int64  
 4   Temperature  6435 non-null   float64 
 5   Fuel_Price   6435 non-null   float64 
 6   CPI          6435 non-null   float64 
 7   Unemployment 6435 non-null   float64 
dtypes: float64(5), int64(2), object(1)
memory usage: 402.3+ KB

```

```
[4]: data["Date"] = pd.to_datetime(data["Date"], format="%d-%m-%Y")
```

```
[5]: data=data.sort_values(by='Date', ascending=True)
```

```
[6]: data
```

	Store	Date	Weekly_Sales	Holiday_Flag	Temperature	Fuel_Price	\
0	1	2010-02-05	1643690.90	0	42.31	2.572	
1287	10	2010-02-05	2193048.75	0	54.34	2.962	
5148	37	2010-02-05	536006.73	0	45.97	2.572	
2288	17	2010-02-05	789036.02	0	23.11	2.666	
4147	30	2010-02-05	465108.52	0	39.05	2.572	
...	...	...	...	...	...	...	
3574	25	2012-10-26	688940.94	0	56.69	3.882	
714	5	2012-10-26	319550.77	0	71.70	3.506	
5719	40	2012-10-26	921264.52	0	49.65	3.917	
2573	18	2012-10-26	1127516.25	0	56.09	3.917	
6434	45	2012-10-26	760281.43	0	58.85	3.882	
	CPI	Unemployment					
0	211.096358		8.106				
1287	126.442065		9.765				
5148	209.852966		8.554				
2288	126.442065		6.548				
4147	210.752605		8.324				
...	...	...	...				
3574	216.151590		7.293				
714	224.037814		5.422				
5719	138.728161		4.145				
2573	138.728161		8.243				
6434	192.308899		8.667				

```
[6435 rows x 8 columns]
```

```
[7]: data.isnull().sum()
```

```
[7]: Store      0  
Date       0  
Weekly_Sales 0  
Holiday_Flag 0  
Temperature  0  
Fuel_Price   0  
CPI         0  
Unemployment 0  
dtype: int64
```

```
[8]: data.duplicated().sum()
```

```
[8]: np.int64(0)
```

```
[9]: data.describe()
```

```
[9]:          Store                  Date  Weekly_Sales  Holiday_Flag \\  
count  6435.000000  6435  6.435000e+03  6435.000000  
mean   23.000000  2011-06-17 00:00:00.000000256  1.046965e+06  0.069930  
min    1.000000  2010-02-05 00:00:00  2.099862e+05  0.000000  
25%   12.000000  2010-10-08 00:00:00  5.533501e+05  0.000000  
50%   23.000000  2011-06-17 00:00:00  9.607460e+05  0.000000  
75%   34.000000  2012-02-24 00:00:00  1.420159e+06  0.000000  
max   45.000000  2012-10-26 00:00:00  3.818686e+06  1.000000  
std    12.988182  NaN   5.643666e+05  0.255049  
  
          Temperature  Fuel_Price  CPI  Unemployment  
count  6435.000000  6435.000000  6435.000000  6435.000000  
mean   60.663782   3.358607   171.578394  7.999151  
min    -2.060000   2.472000   126.064000  3.879000  
25%   47.460000   2.933000   131.735000  6.891000  
50%   62.670000   3.445000   182.616521  7.874000  
75%   74.940000   3.735000   212.743293  8.622000  
max   100.140000  4.468000   227.232807  14.313000  
std    18.444933   0.459020   39.356712  1.875885
```

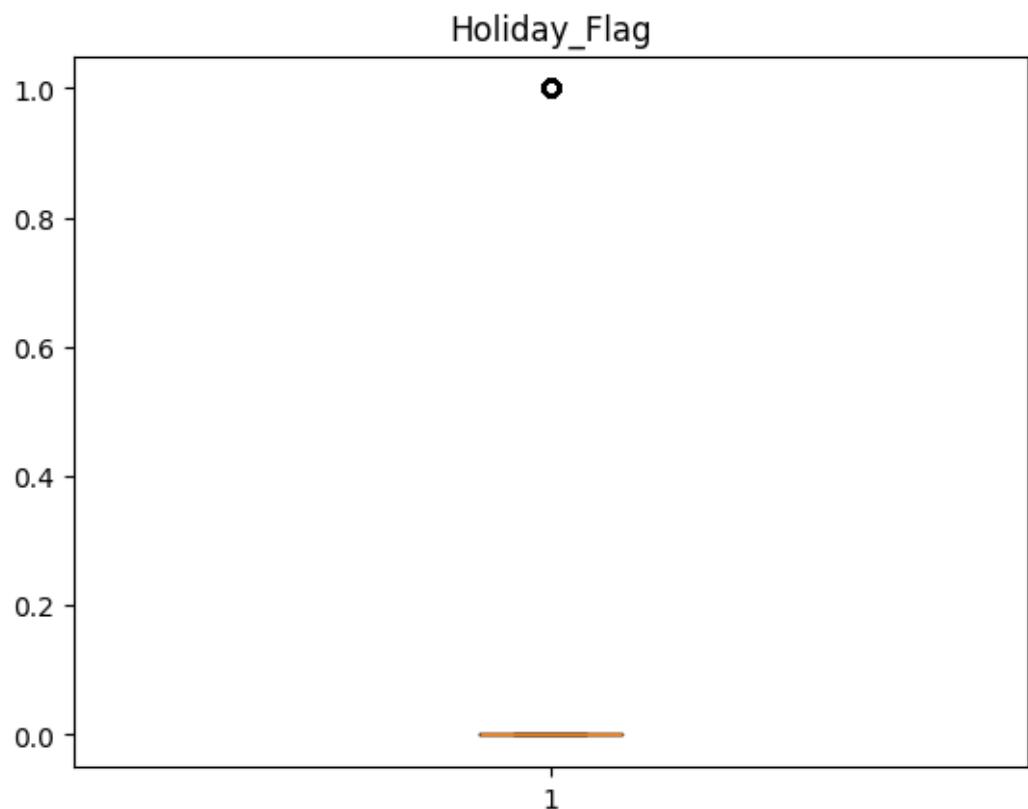
```
[10]: #The average weekly sales is 1.046965e+06  
#The average temperature is 60.663782  
#The average fuel price is 3.358607
```

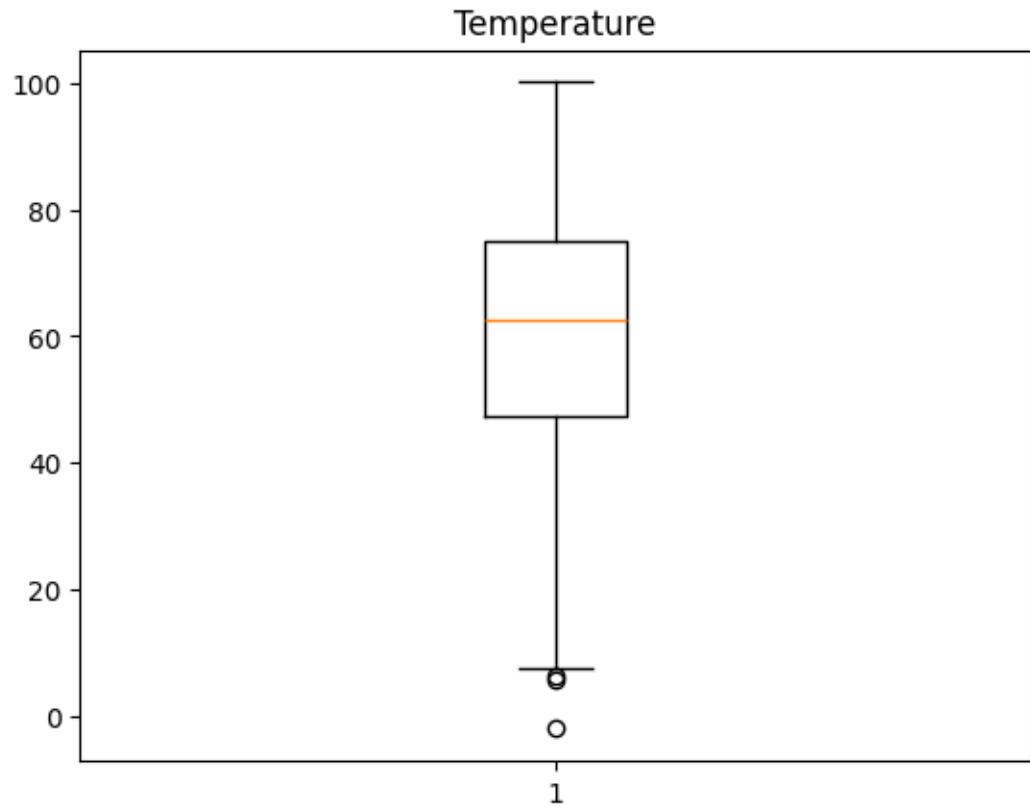
```
[11]: for i in data.columns:
```

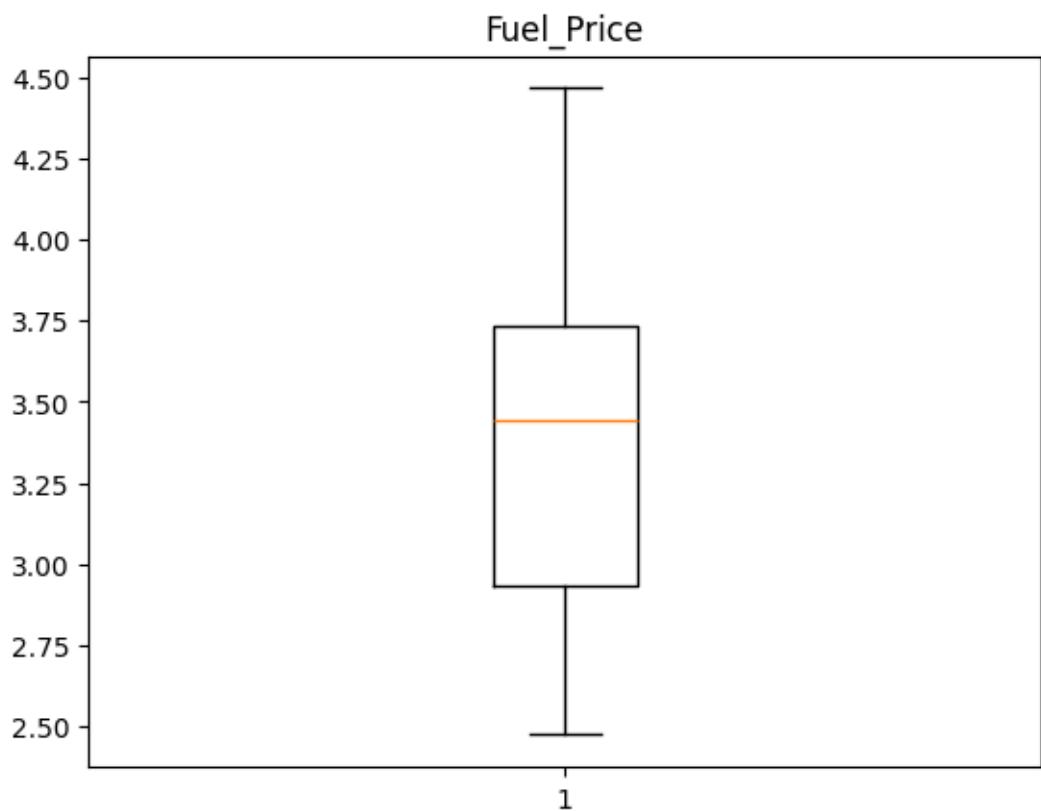
```
# Exclude non-numeric types and datetime columns, as boxplots are for numerical data
if pd.api.types.is_numeric_dtype(data[i]) and not pd.api.types.is_datetime64_any_dtype(data[i]):
    plt.boxplot(data[i])
    plt.title(i)
    plt.show()
```

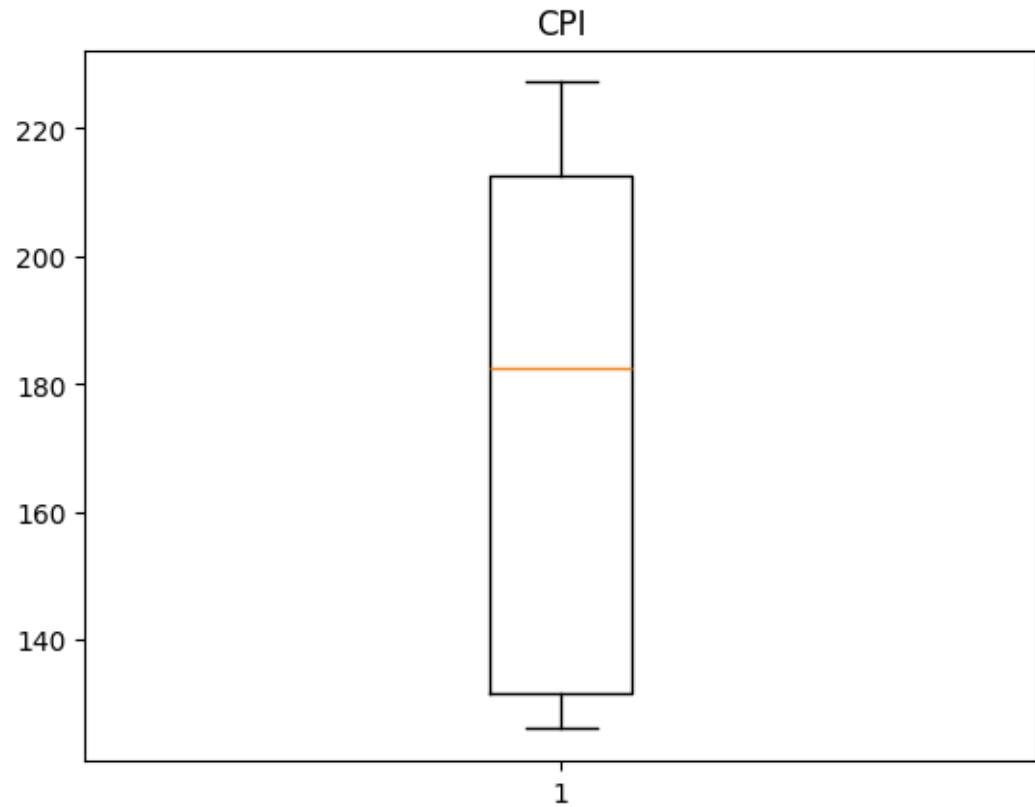


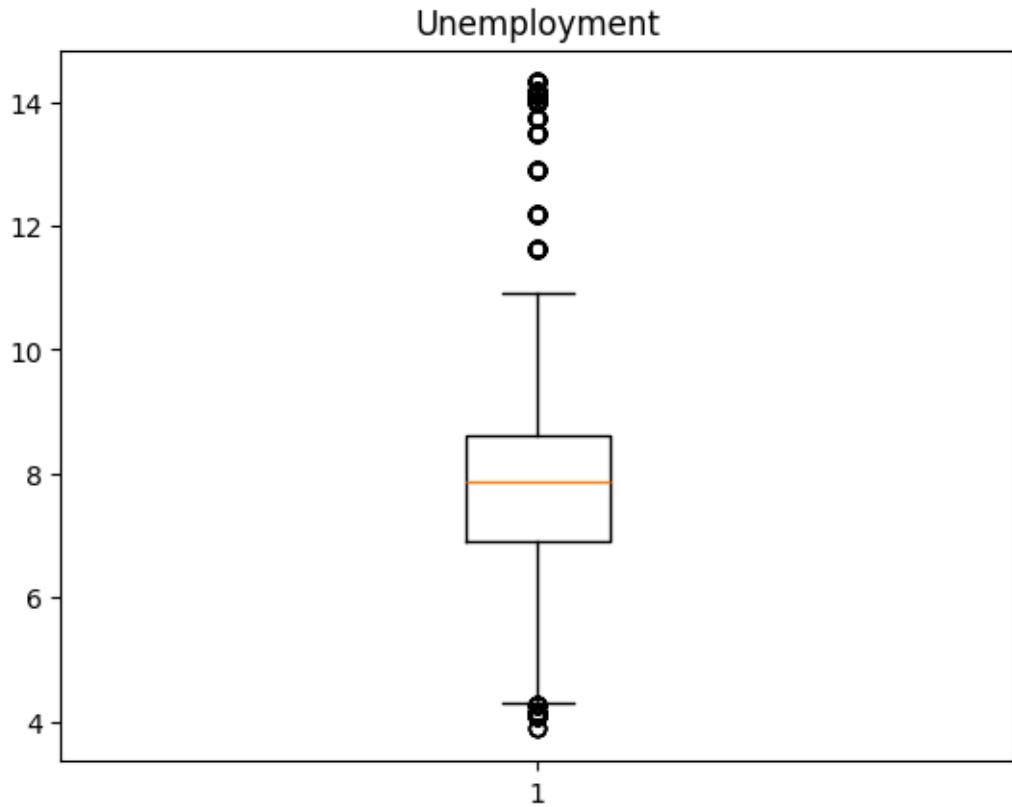












[11]:

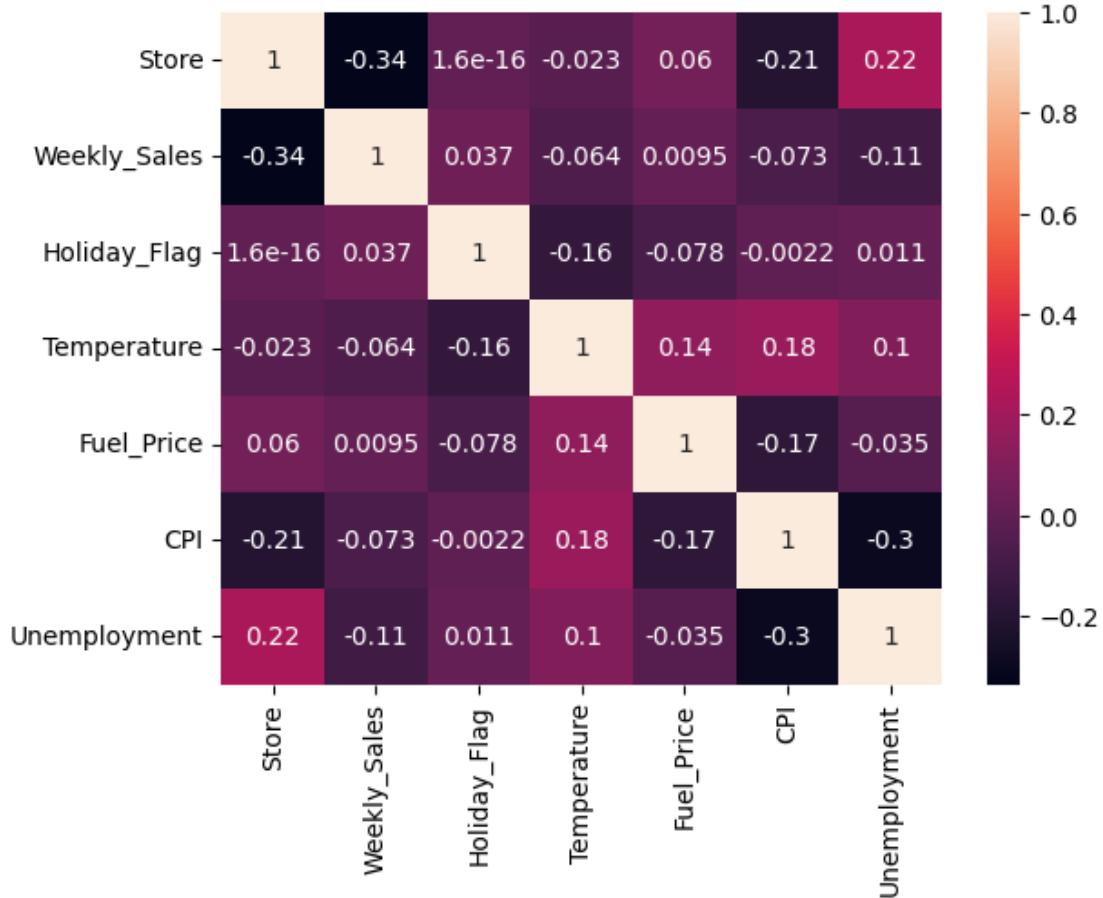
## 1 Task

- If the weekly sales are affected by the unemployment rate, if yes - which stores are suffering the most?

Correlation Analysis Calculate the correlation coefficient between Weekly\_Sales and Unemployment:

```
[12]: corr=data.corr(numeric_only=True)  
sns.heatmap(corr,annot=True)
```

[12]: <Axes: >



A negative correlation (closer to -1) suggests that higher unemployment leads to lower sales. Therefore weekly sales are affected by the unemployment rate.

[12] :

```
[13]: correlation = data['Weekly_Sales'].corr(data['Unemployment'])
print(f"Pearson correlation between Weekly_Sales and Unemployment: {correlation:.4f}")
```

Pearson correlation between Weekly\_Sales and Unemployment: -0.1062

## 1.1 Calculate Store-wise Correlation

Group the data by ‘Store’ and calculate the correlation coefficient between ‘Weekly\_Sales’ and ‘Unemployment’ for each individual store. This will help us understand how the relationship varies per store.

[14] :

```
store_correlations = data.groupby('Store')['Weekly_Sales'].  
    .corr(data['Unemployment'])  
print("Correlation between Weekly_Sales and Unemployment per Store:")  
print(store_correlations.head())
```

Correlation between Weekly\_Sales and Unemployment per Store:

```
Store  
1   -0.097955  
2    0.066325  
3   -0.230413  
4   -0.337015  
5   -0.207043  
Name: Weekly_Sales, dtype: float64
```

**Reasoning:** To identify the stores with the most negative correlations, I will sort the `store_correlations` Series in ascending order and then select the top 5 entries.

Top 5 stores with the most negative correlation between Weekly\_Sales and Unemployment: Store

```
[15]: store_correlations.sort_values(ascending=True).head(5)
```

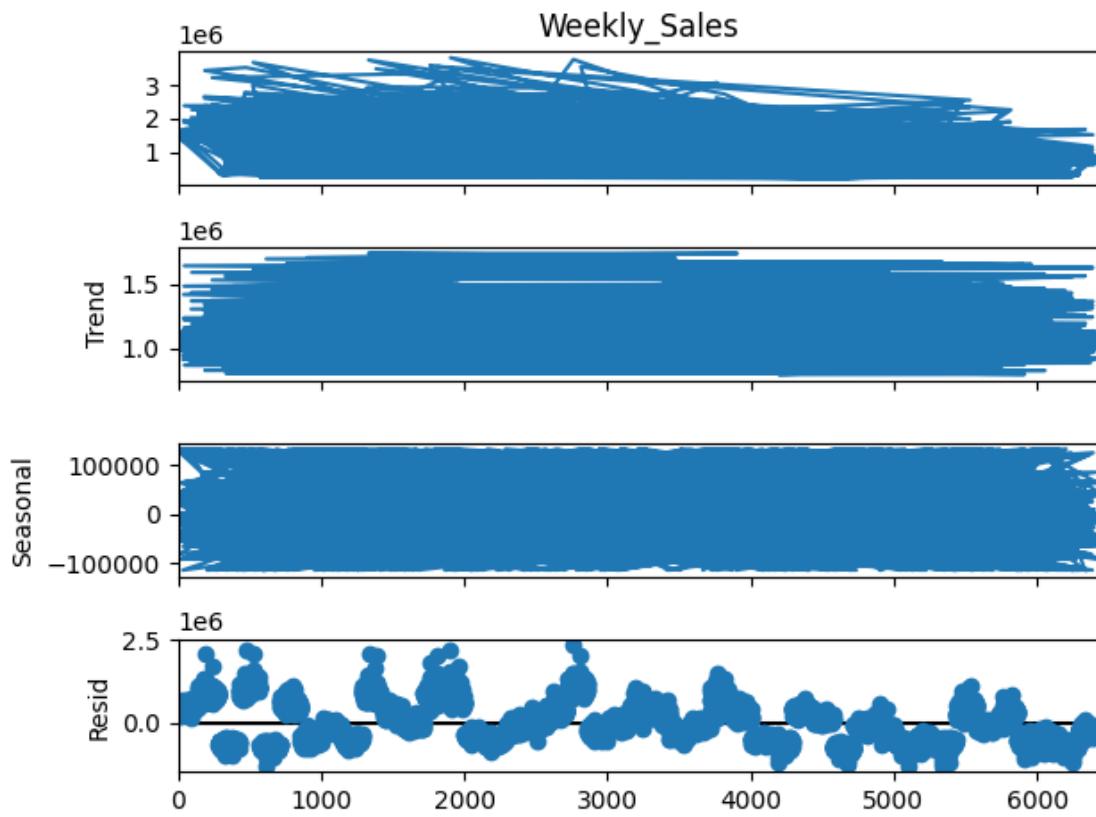
```
[15]: Store  
38   -0.785290  
44   -0.780076  
39   -0.384681  
42   -0.356355  
41   -0.350630  
Name: Weekly_Sales, dtype: float64
```

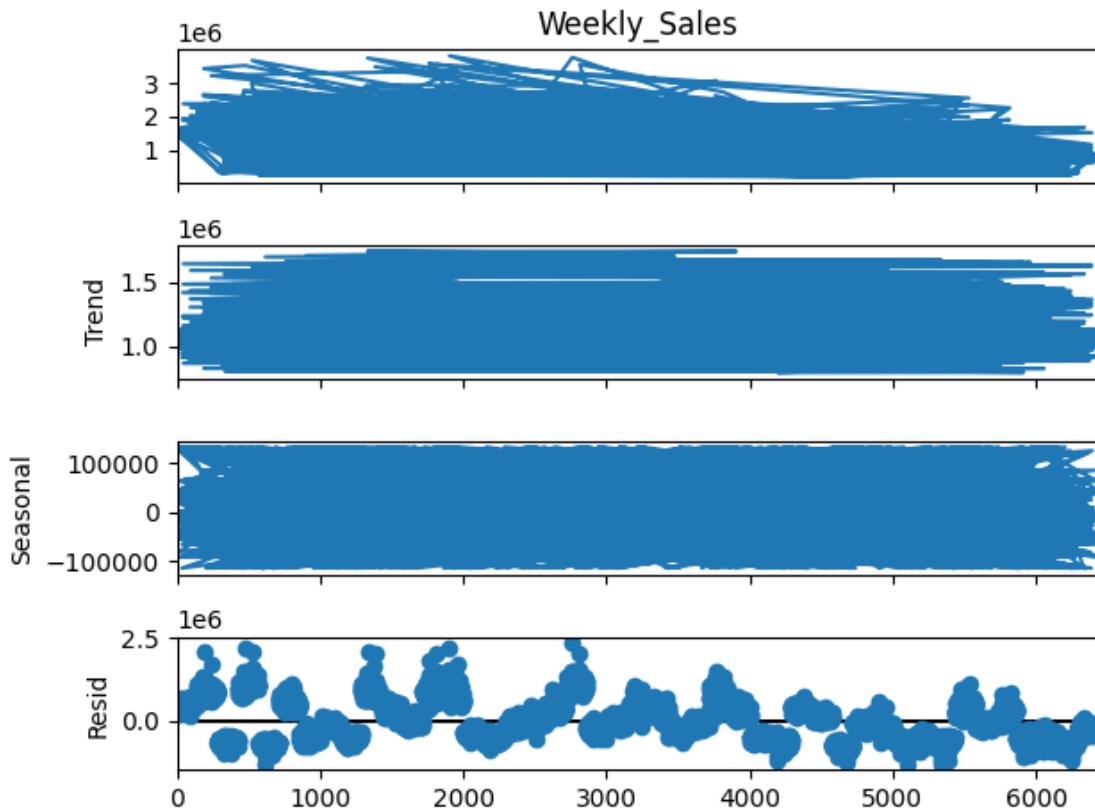
```
[16]: from statsmodels.tsa.seasonal import seasonal_decompose
```

```
[17]: decomposed = seasonal_decompose(data['Weekly_Sales'], period=52)
```

```
[18]: decomposed.plot()
```

```
[18]:
```





```
[19]: data['Month'] = data['Date'].dt.month
```

```
[20]: data
```

```
[20]:      Store      Date  Weekly_Sales  Holiday_Flag  Temperature  Fuel_Price \
0          1 2010-02-05    1643690.90          0       42.31     2.572
1287      10 2010-02-05    2193048.75          0       54.34     2.962
5148      37 2010-02-05    536006.73          0       45.97     2.572
2288      17 2010-02-05    789036.02          0       23.11     2.666
4147      30 2010-02-05    465108.52          0       39.05     2.572
...
3574      25 2012-10-26    688940.94          0       56.69     3.882
714        5 2012-10-26    319550.77          0       71.70     3.506
5719      40 2012-10-26    921264.52          0       49.65     3.917
2573      18 2012-10-26   1127516.25          0       56.09     3.917
6434      45 2012-10-26    760281.43          0       58.85     3.882
```

	CPI	Unemployment	Month
0	211.096358	8.106	2
1287	126.442065	9.765	2
5148	209.852966	8.554	2

```
2288    126.442065      6.548      2
4147    210.752605      8.324      2
...
3574    216.151590      7.293     10
714     224.037814      5.422     10
5719    138.728161      4.145     10
2573    138.728161      8.243     10
6434    192.308899      8.667     10
```

[6435 rows x 9 columns]

```
[21]: monthly_sales = data.groupby('Month')['Weekly_Sales'].mean()
```

```
[22]: monthly_sales
```

```
[22]: Month
1    9.238846e+05
2    1.053200e+06
3    1.013309e+06
4    1.026762e+06
5    1.031714e+06
6    1.064325e+06
7    1.031748e+06
8    1.048017e+06
9    9.893353e+05
10   9.996321e+05
11   1.147266e+06
12   1.281864e+06
Name: Weekly_Sales, dtype: float64
```

Map month numbers to names for better visualization

```
[23]: month_map = {
    1: 'Jan', 2: 'Feb', 3: 'Mar', 4: 'Apr', 5: 'May', 6: 'Jun',
    7: 'Jul', 8: 'Aug', 9: 'Sep', 10: 'Oct', 11: 'Nov', 12: 'Dec'
}
```

```
[24]: monthly_sales.index = monthly_sales.index.map(month_map)
monthly_sales
```

```
[24]: Month
Jan    9.238846e+05
Feb    1.053200e+06
Mar    1.013309e+06
Apr    1.026762e+06
May    1.031714e+06
Jun    1.064325e+06
```

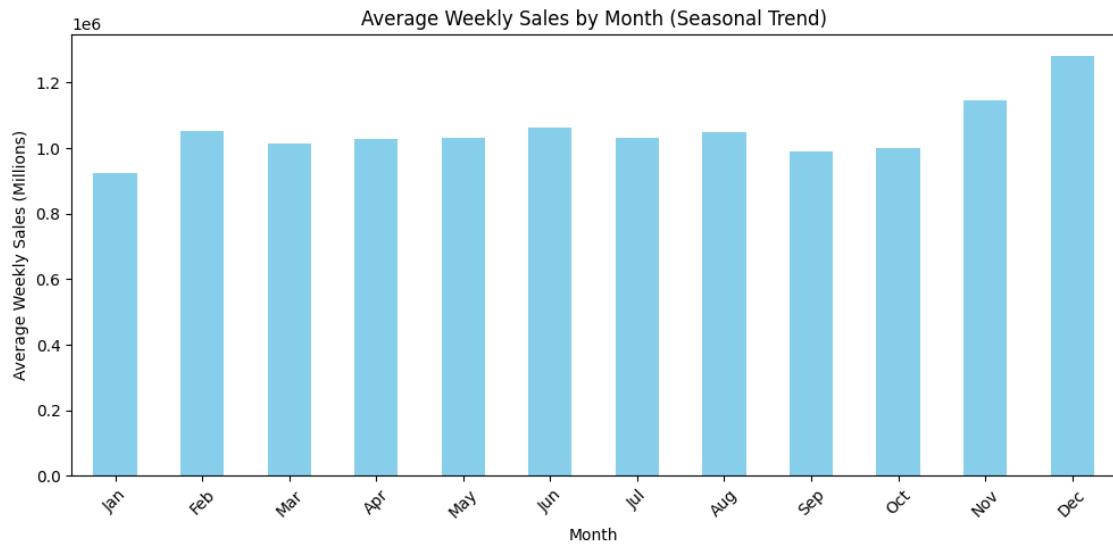
```

Jul      1.031748e+06
Aug      1.048017e+06
Sep      9.893353e+05
Oct      9.996321e+05
Nov      1.147266e+06
Dec      1.281864e+06
Name: Weekly_Sales, dtype: float64

```

## 2 Generates a bar plot to visually confirm the seasonal peaks and troughs.

```
[25]: plt.figure(figsize=(10, 5))
monthly_sales.plot(kind='bar', color='skyblue')
plt.title('Average Weekly Sales by Month (Seasonal Trend)')
plt.xlabel('Month')
plt.ylabel('Average Weekly Sales (Millions)')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```



#Yes, there is a clear seasonal trend, with sales significantly peaking in November and December.

```
[26]: holiday_correlation = data['Weekly_Sales'].corr(data['Holiday_Flag'])
holiday_correlation
```

```
[26]: np.float64(0.03689096801041458)
```

#Conclusion The high sales in November and December are due to the major holiday season

```
[27]: data['Weekly_Sales'].corr(data['Temperature'])
```

```
[27]: np.float64(-0.06381001317946956)
```

No, temperature does not significantly affect the overall weekly sales across all stores in a linear manner.

```
[28]: data['Weekly_Sales'].corr(data['CPI'])
```

```
[28]: np.float64(-0.0726341620401763)
```

Therefore that CPA does not significantly affect overall weekly sales is still true.

```
[29]: total_sales_by_store=data.groupby('Store')['Weekly_Sales'].sum()  
total_sales_by_store
```

```
[29]: Store  
1      2.224028e+08  
2      2.753824e+08  
3      5.758674e+07  
4      2.995440e+08  
5      4.547569e+07  
6      2.237561e+08  
7      8.159828e+07  
8      1.299512e+08  
9      7.778922e+07  
10     2.716177e+08  
11     1.939628e+08  
12     1.442872e+08  
13     2.865177e+08  
14     2.889999e+08  
15     8.913368e+07  
16     7.425243e+07  
17     1.277821e+08  
18     1.551147e+08  
19     2.066349e+08  
20     3.013978e+08  
21     1.081179e+08  
22     1.470756e+08  
23     1.987506e+08  
24     1.940160e+08  
25     1.010612e+08  
26     1.434164e+08  
27     2.538559e+08  
28     1.892637e+08  
29     7.714155e+07  
30     6.271689e+07  
31     1.996139e+08
```

```
32    1.668192e+08
33    3.716022e+07
34    1.382498e+08
35    1.315207e+08
36    5.341221e+07
37    7.420274e+07
38    5.515963e+07
39    2.074455e+08
40    1.378703e+08
41    1.813419e+08
42    7.956575e+07
43    9.056544e+07
44    4.329309e+07
45    1.123953e+08
Name: Weekly_Sales, dtype: float64
```

```
[30]: top_performing_stores=total_sales_by_store.sort_values(ascending=False)
```

```
[31]: top_performing_stores
```

```
[31]: Store
20    3.013978e+08
4     2.995440e+08
14    2.889999e+08
13    2.865177e+08
2     2.753824e+08
10    2.716177e+08
27    2.538559e+08
6     2.237561e+08
1     2.224028e+08
39    2.074455e+08
19    2.066349e+08
31    1.996139e+08
23    1.987506e+08
24    1.940160e+08
11    1.939628e+08
28    1.892637e+08
41    1.813419e+08
32    1.668192e+08
18    1.551147e+08
22    1.470756e+08
12    1.442872e+08
26    1.434164e+08
34    1.382498e+08
40    1.378703e+08
35    1.315207e+08
8     1.299512e+08
```

```
17    1.277821e+08
45    1.123953e+08
21    1.081179e+08
25    1.010612e+08
43    9.056544e+07
15    8.913368e+07
7     8.159828e+07
42    7.956575e+07
9     7.778922e+07
29    7.714155e+07
16    7.425243e+07
37    7.420274e+07
30    6.271689e+07
3     5.758674e+07
38    5.515963e+07
36    5.341221e+07
5     4.547569e+07
44    4.329309e+07
33    3.716022e+07
Name: Weekly_Sales, dtype: float64
```

So the top performing stores according to the historical data are 20, 4, 14, 13, 2, 10, 27, 6, 1.

```
[32]: Worst_performing_stores=total_sales_by_store.sort_values(ascending=True)
Worst_performing_stores
```

```
[32]: Store
33    3.716022e+07
44    4.329309e+07
5     4.547569e+07
36    5.341221e+07
38    5.515963e+07
3     5.758674e+07
30    6.271689e+07
37    7.420274e+07
16    7.425243e+07
29    7.714155e+07
9     7.778922e+07
42    7.956575e+07
7     8.159828e+07
15    8.913368e+07
43    9.056544e+07
25    1.010612e+08
21    1.081179e+08
45    1.123953e+08
17    1.277821e+08
8     1.299512e+08
```

```
35    1.315207e+08
40    1.378703e+08
34    1.382498e+08
26    1.434164e+08
12    1.442872e+08
22    1.470756e+08
18    1.551147e+08
32    1.668192e+08
41    1.813419e+08
28    1.892637e+08
11    1.939628e+08
24    1.940160e+08
23    1.987506e+08
31    1.996139e+08
19    2.066349e+08
39    2.074455e+08
1    2.224028e+08
6    2.237561e+08
27    2.538559e+08
10    2.716177e+08
2    2.753824e+08
13    2.865177e+08
14    2.889999e+08
4    2.995440e+08
20    3.013978e+08
Name: Weekly_Sales, dtype: float64
```

The worst performing stores are 33, 44,5,36,38,3,30

```
[33]: 301397792-37160223
```

```
[33]: 264237569
```

The difference is 264237569

#TIME SERIES FORCAST

```
[34]: data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 6435 entries, 0 to 6434
Data columns (total 9 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   Store        6435 non-null   int64  
 1   Date         6435 non-null   datetime64[ns]
 2   Weekly_Sales 6435 non-null   float64 
 3   Holiday_Flag 6435 non-null   int64  
 4   Temperature  6435 non-null   float64
```

```
5   Fuel_Price    6435 non-null    float64
6   CPI           6435 non-null    float64
7   Unemployment  6435 non-null    float64
8   Month          6435 non-null    int32
dtypes: datetime64[ns](1), float64(5), int32(1), int64(2)
memory usage: 735.6 KB
```

```
[35]: Df = pd.DataFrame({'Date': data['Date'], 'Weekly_Sales': data['Weekly_Sales']})
```

```
[36]: Df = Df.groupby('Date').sum()
```

```
[37]: Df
```

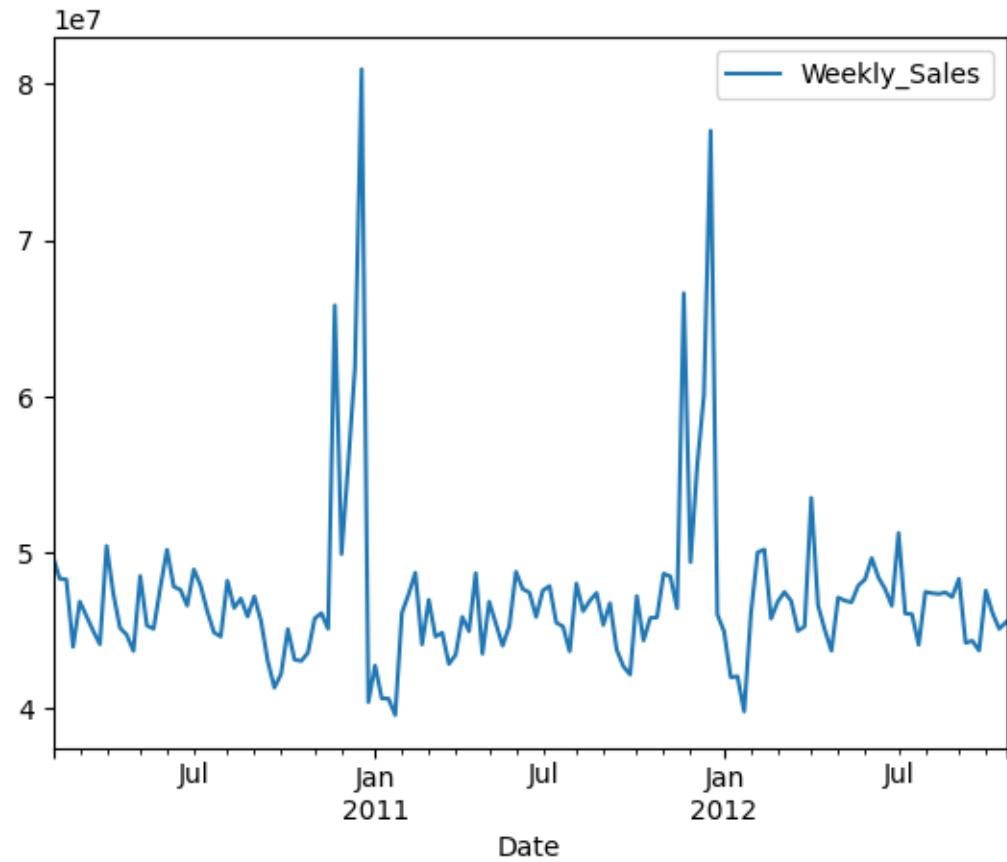
```
[37]:      Weekly_Sales
```

```
Date
2010-02-05    49750740.50
2010-02-12    48336677.63
2010-02-19    48276993.78
2010-02-26    43968571.13
2010-03-05    46871470.30
...
...
2012-09-28    43734899.40
2012-10-05    47566639.31
2012-10-12    46128514.25
2012-10-19    45122410.57
2012-10-26    45544116.29
```

```
[143 rows x 1 columns]
```

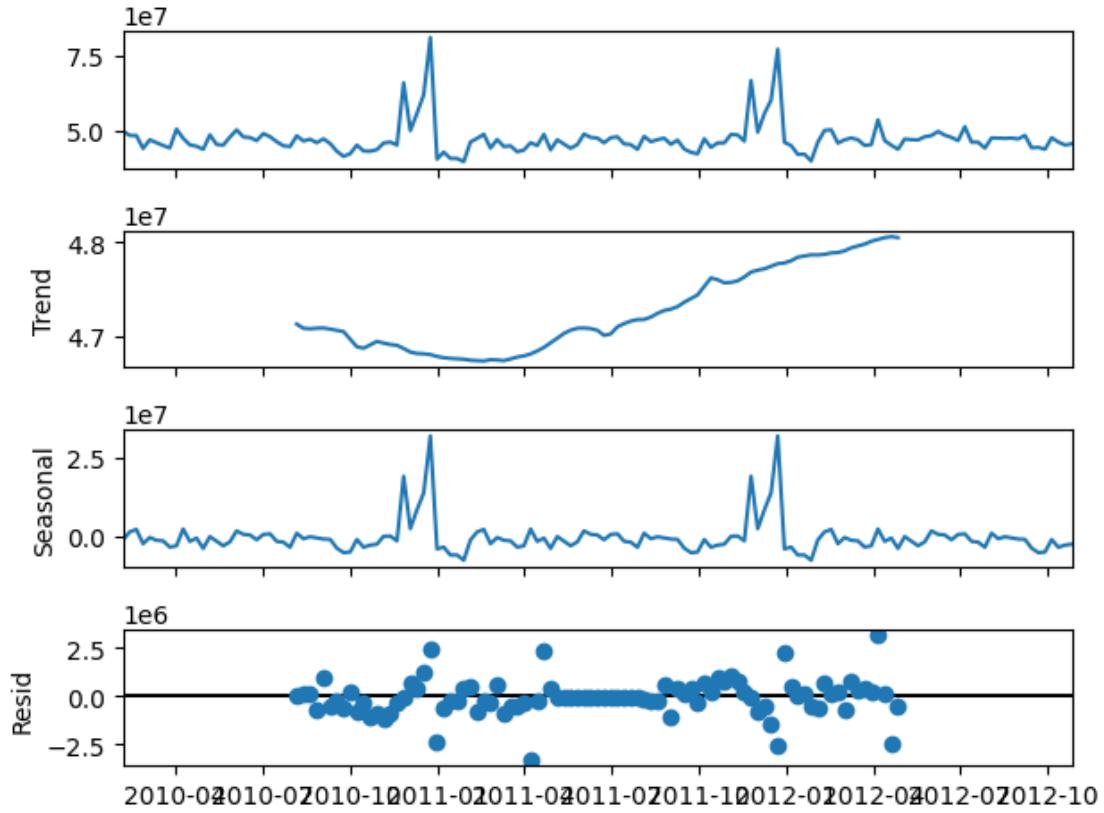
```
[38]: Df.plot()
```

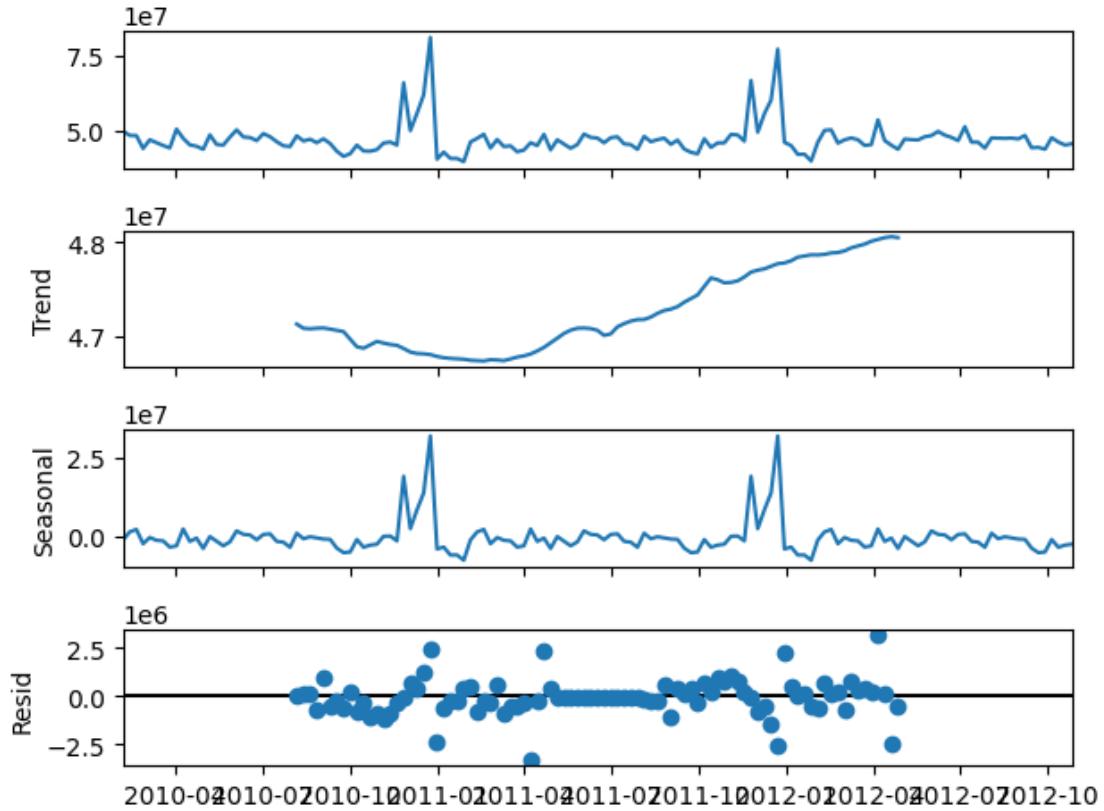
```
[38]: <Axes: xlabel='Date'>
```



```
[39]: from statsmodels.tsa.seasonal import seasonal_decompose  
decomposed = seasonal_decompose(Df, period=52)  
decomposed.plot()
```

[39]:



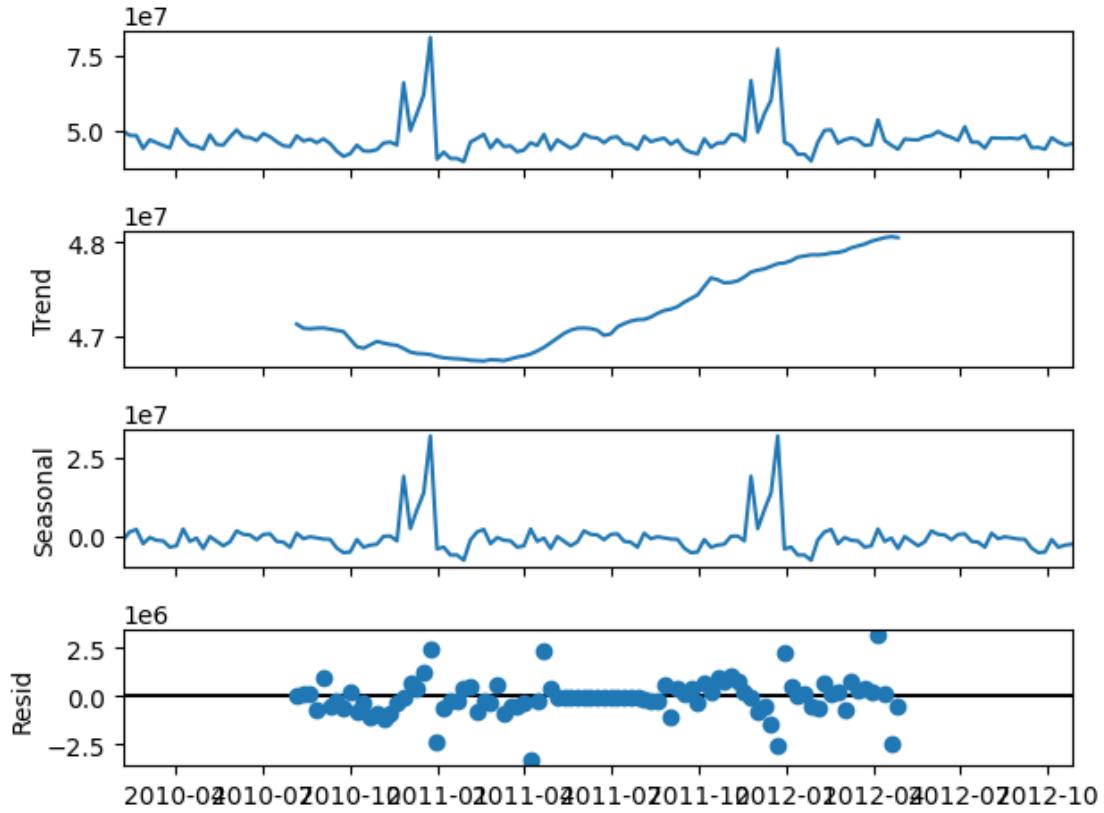


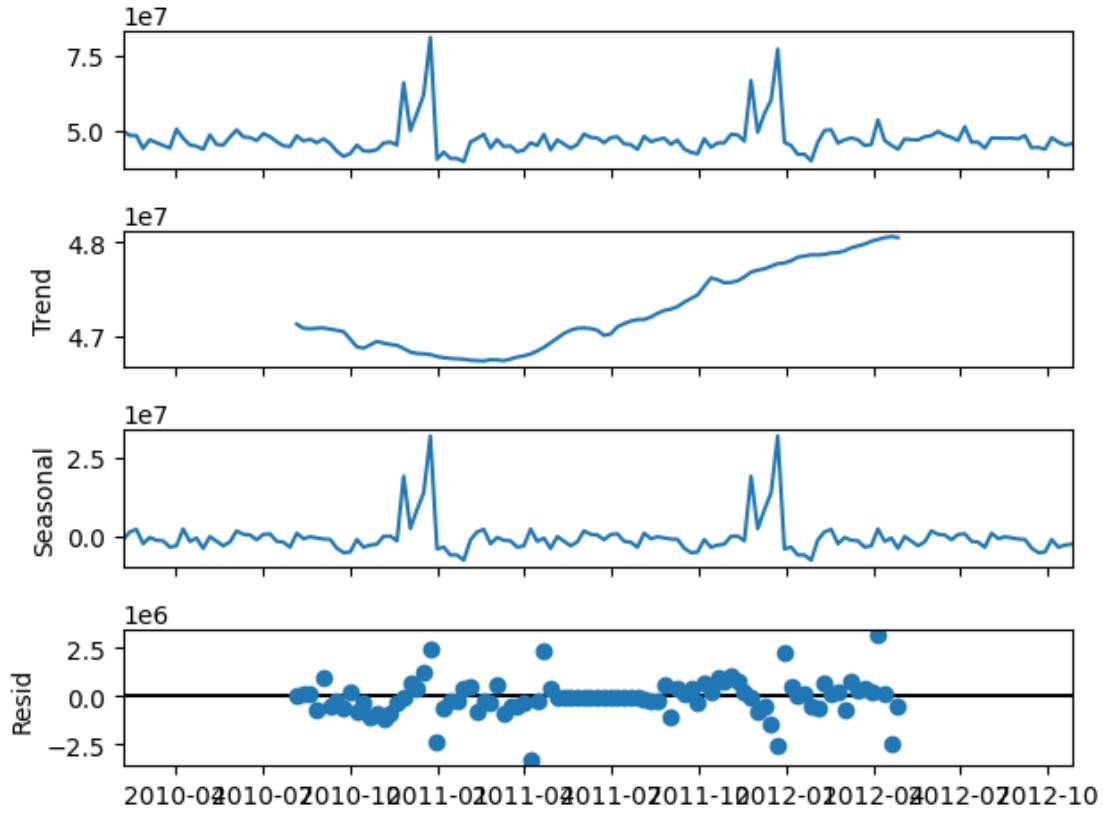
```
[40]: from statsmodels.tsa.seasonal import seasonal_decompose
```

```
[41]: decomposed = seasonal_decompose(Df, period=52)
```

```
[42]: decomposed.plot()
```

```
[42]:
```





```
[43]: first_log = np.log(Df)
first_log = first_log.dropna()
first_log
```

```
[43]:          Weekly_Sales
Date
2010-02-05    17.722536
2010-02-12    17.693701
2010-02-19    17.692466
2010-02-26    17.598986
2010-03-05    17.662920
...
2012-09-28    17.593657
2012-10-05    17.677642
2012-10-12    17.646942
2012-10-19    17.624890
2012-10-26    17.634192
```

[143 rows x 1 columns]

```
[44]: mean_log = first_log.rolling(window =52).mean()
```

```
[45]: mean_log.head(15)
```

```
[45]:          Weekly_Sales  
Date  
2010-02-05      NaN  
2010-02-12      NaN  
2010-02-19      NaN  
2010-02-26      NaN  
2010-03-05      NaN  
2010-03-12      NaN  
2010-03-19      NaN  
2010-03-26      NaN  
2010-04-02      NaN  
2010-04-09      NaN  
2010-04-16      NaN  
2010-04-23      NaN  
2010-04-30      NaN  
2010-05-07      NaN  
2010-05-14      NaN
```

```
[46]: new_data = first_log - mean_log  
new_data = new_data.dropna()  
new_data
```

```
[46]:          Weekly_Sales  
Date  
2011-01-28      -0.167096  
2011-02-04      -0.012514  
2011-02-11      0.013199  
2011-02-18      0.041761  
2011-02-25      -0.057273  
...             ...  
2012-09-28      -0.087539  
2012-10-05      -0.003698  
2012-10-12      -0.035144  
2012-10-19      -0.056901  
2012-10-26      -0.047468
```

[92 rows x 1 columns]

```
[47]: from statsmodels.tsa.stattools import adfuller
```

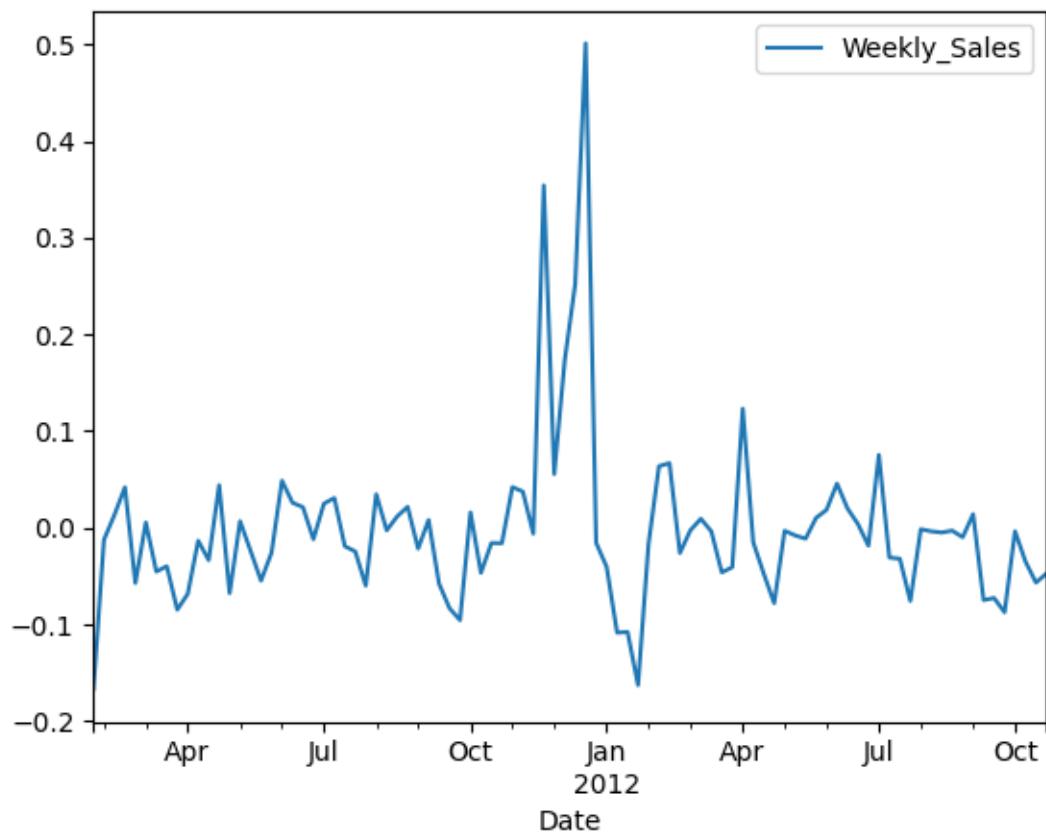
```
[48]: test_result = adfuller(new_data)
```

```
[49]: p_value = test_result[1]  
p_value
```

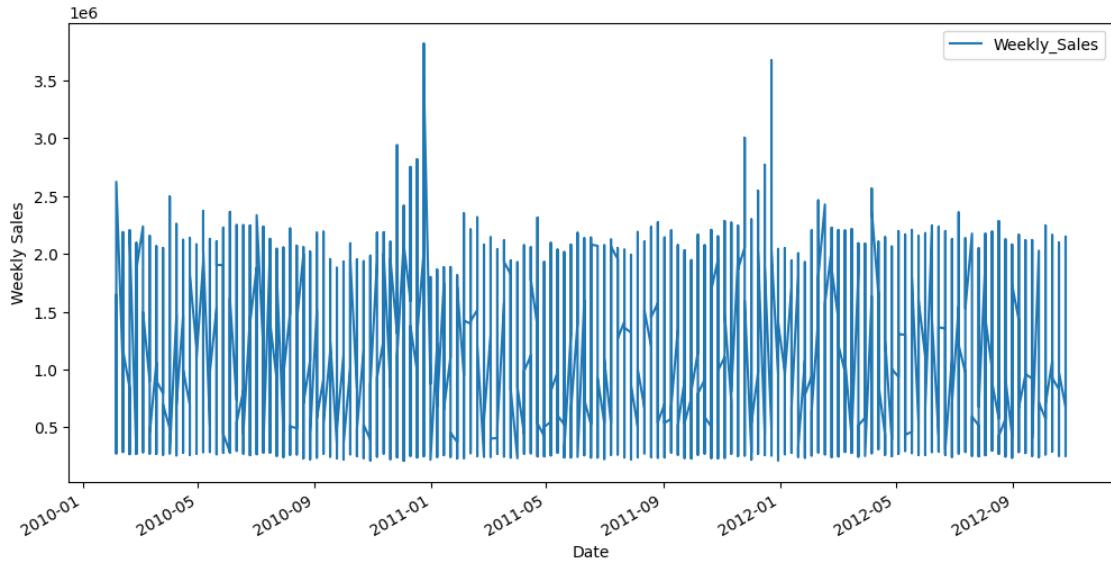
```
[49]: np.float64(0.00028548944319196305)
```

```
[50]: new_data.plot()
```

```
[50]: <Axes: xlabel='Date'>
```



```
[51]: data.plot(x='Date', y='Weekly_Sales', figsize=(12, 6))
plt.xlabel('Date')
plt.ylabel('Weekly Sales')
plt.show()
```



#Model building

```
[52]: new_data
```

```
[52]:      Weekly_Sales
Date
2011-01-28     -0.167096
2011-02-04     -0.012514
2011-02-11      0.013199
2011-02-18      0.041761
2011-02-25     -0.057273
...
2012-09-28     -0.087539
2012-10-05     -0.003698
2012-10-12     -0.035144
2012-10-19     -0.056901
2012-10-26     -0.047468

[92 rows x 1 columns]
```

```
[53]: new_data.iloc[70]
```

```
[53]: Weekly_Sales    0.01837
Name: 2012-06-01 00:00:00, dtype: float64
```

```
[54]: new_data = new_data.asfreq('W-FRI')
```

```
[55]: train = new_data.iloc[:70]["Weekly_Sales"]
test = new_data.iloc[70: ]["Weekly_Sales"]
```

```
[56]: train
```

```
[56]: Date
2011-01-28    -0.167096
2011-02-04    -0.012514
2011-02-11     0.013199
2011-02-18     0.041761
2011-02-25    -0.057273
...
2012-04-27    -0.078171
2012-05-04    -0.003224
2012-05-11    -0.008057
2012-05-18    -0.011408
2012-05-25     0.010083
Freq: W-FRI, Name: Weekly_Sales, Length: 70, dtype: float64
```

```
[57]: test
```

```
[57]: Date
2012-06-01     0.018370
2012-06-08     0.045558
2012-06-15     0.019899
2012-06-22     0.003681
2012-06-29    -0.018646
2012-07-06     0.075273
2012-07-13    -0.030940
2012-07-20    -0.032142
2012-07-27    -0.075863
2012-08-03    -0.001613
2012-08-10    -0.003824
2012-08-17    -0.005037
2012-08-24    -0.003090
2012-08-31    -0.009913
2012-09-07     0.013969
2012-09-14    -0.074960
2012-09-21    -0.072781
2012-09-28    -0.087539
2012-10-05    -0.003698
2012-10-12    -0.035144
2012-10-19    -0.056901
2012-10-26    -0.047468
Freq: W-FRI, Name: Weekly_Sales, dtype: float64
```

```
[58]: from statsmodels.tsa.arima.model import ARIMA
```

```
[59]: model1=ARIMA(train,order=(6,1,6))

# Train the Model

model1=model1.fit()

# Make Prediction

new_data["ARIMA Prediction"] = model1.predict(start = len(train),  
end=len(train)+len(test)-1)
```

```
/usr/local/lib/python3.12/dist-packages/statsmodels/base/model.py:607:  
ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check  
mle_retvals  
    warnings.warn("Maximum Likelihood optimization failed to "
```

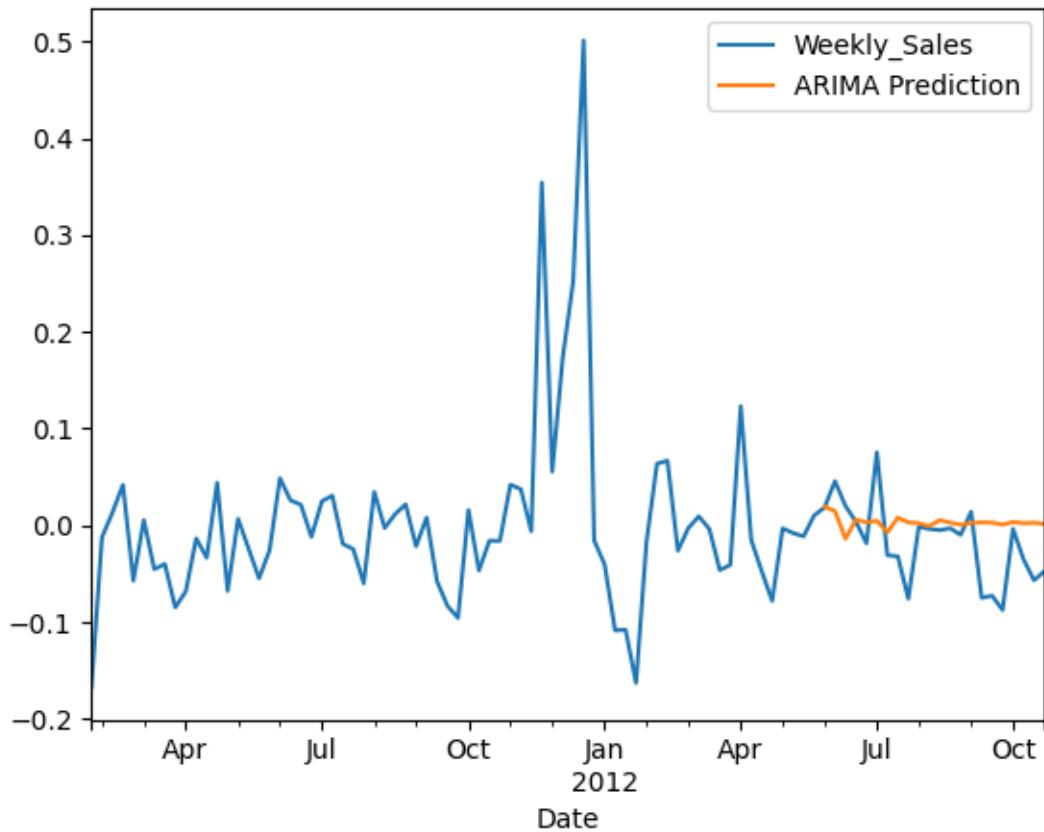
```
[60]: new_data.tail()
```

```
[60]:
```

	Weekly_Sales	ARIMA Prediction
Date		
2012-09-28	-0.087539	0.000682
2012-10-05	-0.003698	0.003324
2012-10-12	-0.035144	0.002115
2012-10-19	-0.056901	0.002563
2012-10-26	-0.047468	0.001374

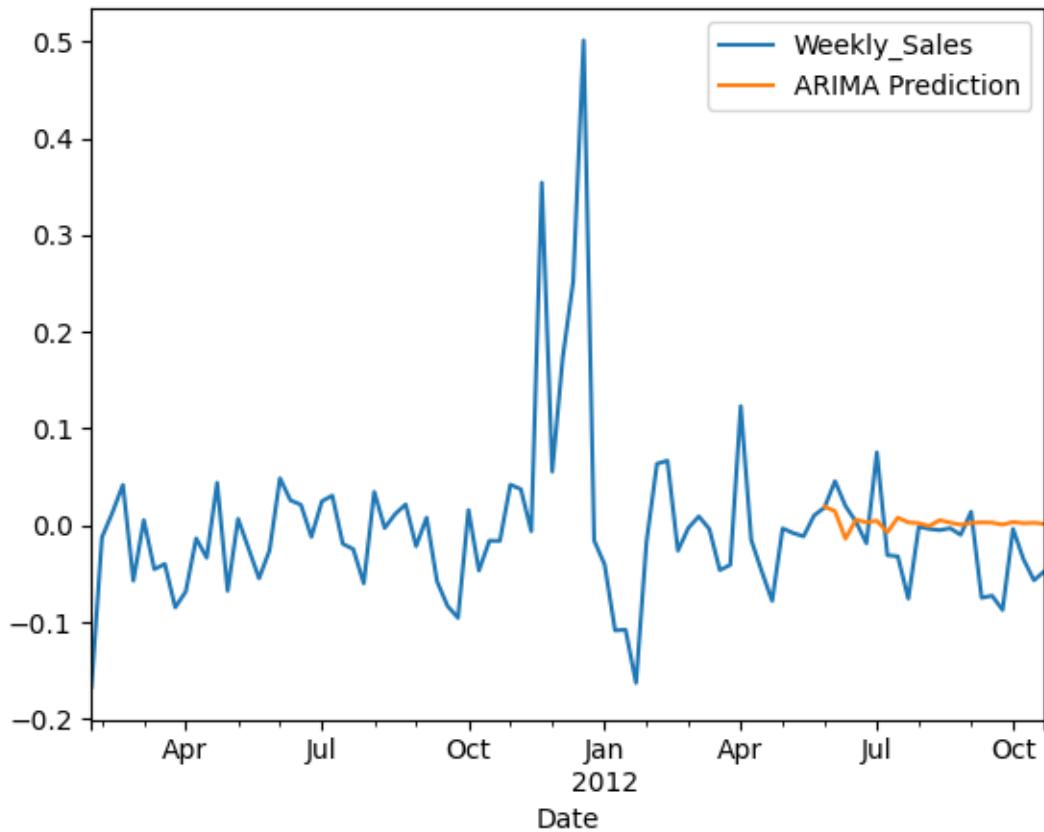
```
[61]: new_data[["Weekly_Sales","ARIMA Prediction"]].plot()
```

```
[61]: <Axes: xlabel='Date'>
```



```
[72]: future_data = model1.forecast(steps = 1)
new_data.plot()
future_data.plot()
```

```
[72]: <Axes: xlabel='Date'>
```



```
[63]: future_data
```

```
[63]: 2012-06-01    0.019266
Freq: W-FRI, dtype: float64
```

### 2.0.1 Forecasting the next week after the entire dataset

To forecast beyond the last date in your `new_data` (which is 2012-10-26), we need to fit the ARIMA model on the complete `new_data` series first.

```
[64]: model_full_data = ARIMA(new_data['Weekly_Sales'], order=(6, 1, 6))
model_full_data_fit = model_full_data.fit()

# Forecast the next 1 week after the end of the new_data series
forecast_next_week = model_full_data_fit.forecast(steps=1)

print("Forecast for the next week:")
print(forecast_next_week)
```

Forecast for the next week:

2012-11-02 -0.005985

```

Freq: W-FRI, dtype: float64
/usr/local/lib/python3.12/dist-packages/statsmodels/base/model.py:607:
ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check
mle_retvals
    warnings.warn("Maximum Likelihood optimization failed to "

[65]: # Forecast the next 1 week after the end of the new_data series
forecast_next_week = model_full_data_fit.forecast(steps=1)

[66]: forecast_next_week

[66]: 2012-11-02 -0.005985
Freq: W-FRI, dtype: float64

```

Now, let's visualize this forecast alongside the new\_data.

```
[68]: !apt-get install texlive-xetex texlive-fonts-recommended texlive-plain-generic

Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  dvipsgm fonts-droid-fallback fonts-lato fonts-lmodern fonts-noto-mono
  fonts-texgyre fonts-urw-base35 libapache-pom-java libcommons-logging-java
  libcommons-parent-java libfontbox-java libgs9 libgs9-common libidn12
  libijs-0.35 libjbig2dec0 libkpathsea6 libpdfbox-jar libptexenc1 libruby3.0
  libsynctex2 libteckit0 libtexlua53 libtexluajit2 libwoff1 libzip-0-13
  lmodern poppler-data preview-latex-style rake ruby ruby-net-telnet
  ruby-rubygems ruby-webrick ruby-xmlrpc ruby3.0 rubygems-integration t1utils
  teckit tex-common tex-gyre texlive-base texlive-binaries texlive-latex-base
  texlive-latex-extra texlive-latex-recommended texlive-pictures tipa
  xfonts-encodings xfonts-utils
Suggested packages:
  fonts-noto fonts-freefont-otf | fonts-freefont-ttf libavalon-framework-java
  libcommons-logging-java-doc libexcalibur-logkit-java liblog4j1.2-java
  poppler-utils ghostscript fonts-japanese-mincho | fonts-ipafont-mincho
  fonts-japanese-gothic | fonts-ipafont-gothic fonts-aphic-ukai
  fonts-aphic-uming fonts-nanum-ri ruby-dev bundler debhelper gv
  | postscript-viewer perl-tk xpdf | pdf-viewer xzdec
  texlive-fonts-recommended-doc texlive-latex-base-doc python3-pygments
  icc-profiles libfile-which-perl libspreadsheets-parseexcel-perl
  texlive-latex-extra-doc texlive-latex-recommended-doc texlive-luatex
  texlive-pstricks dot2tex prerex texlive-pictures-doc vprerex
  default-jre-headless tipa-doc
The following NEW packages will be installed:
  dvipsgm fonts-droid-fallback fonts-lato fonts-lmodern fonts-noto-mono
  fonts-texgyre fonts-urw-base35 libapache-pom-java libcommons-logging-java
  libcommons-parent-java libfontbox-java libgs9 libgs9-common libidn12
```

```
libijs-0.35 libjbig2dec0 libkpathsea6 libpdfbox-java libptexenc1 libruby3.0
libsynctex2 libteckit0 libtexlua53 libtexluajit2 libwoff1 libzip-0-13
lmodern poppler-data preview-latex-style rake ruby ruby-net-telnet
ruby-rubygems ruby-webrick ruby-xmlrpc ruby3.0 rubygems-integration t1utils
teckit tex-common tex-gyre texlive-base texlive-binaries
texlive-fonts-recommended texlive-latex-base texlive-latex-extra
texlive-latex-recommended texlive-pictures texlive-plain-generic
texlive-xetex tipa xfonts-encodings xfonts-utils
0 upgraded, 53 newly installed, 0 to remove and 41 not upgraded.
Need to get 182 MB of archives.
After this operation, 571 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-droid-fallback all
1:6.0.1r16-1.1build1 [1,805 kB]
Get:2 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-lato all 2.0-2.1
[2,696 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy/main amd64 poppler-data all
0.4.11-1 [2,171 kB]
Get:4 http://archive.ubuntu.com/ubuntu jammy/universe amd64 tex-common all 6.17
[33.7 kB]
Get:5 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-urw-base35 all
20200910-1 [6,367 kB]
Get:6 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libgs9-common
all 9.55.0~dfsg1-0ubuntu5.13 [753 kB]
Get:7 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libidn12 amd64
1.38-4ubuntu1 [60.0 kB]
Get:8 http://archive.ubuntu.com/ubuntu jammy/main amd64 libijs-0.35 amd64
0.35-15build2 [16.5 kB]
Get:9 http://archive.ubuntu.com/ubuntu jammy/main amd64 libjbig2dec0 amd64
0.19-3build2 [64.7 kB]
Get:10 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libgs9 amd64
9.55.0~dfsg1-0ubuntu5.13 [5,032 kB]
Get:11 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libkpathsea6
amd64 2021.20210626.59705-1ubuntu0.2 [60.4 kB]
Get:12 http://archive.ubuntu.com/ubuntu jammy/main amd64 libwoff1 amd64
1.0.2-1build4 [45.2 kB]
Get:13 http://archive.ubuntu.com/ubuntu jammy/universe amd64 dvisvgm amd64
2.13.1-1 [1,221 kB]
Get:14 http://archive.ubuntu.com/ubuntu jammy/universe amd64 fonts-lmodern all
2.004.5-6.1 [4,532 kB]
Get:15 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-noto-mono all
20201225-1build1 [397 kB]
Get:16 http://archive.ubuntu.com/ubuntu jammy/universe amd64 fonts-texgyre all
20180621-3.1 [10.2 MB]
Get:17 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libapache-pom-java
all 18-1 [4,720 B]
Get:18 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libcommons-parent-
java all 43-1 [10.8 kB]
Get:19 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libcommons-logging-
```

```
java all 1.2-2 [60.3 kB]
Get:20 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libptexenc1
amd64 2021.20210626.59705-1ubuntu0.2 [39.1 kB]
Get:21 http://archive.ubuntu.com/ubuntu jammy/main amd64 rubygems-integration
all 1.18 [5,336 B]
Get:22 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 ruby3.0 amd64
3.0.2-7ubuntu2.11 [50.1 kB]
Get:23 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 ruby-rubygems
all 3.3.5-2ubuntu1.2 [228 kB]
Get:24 http://archive.ubuntu.com/ubuntu jammy/main amd64 ruby amd64 1:3.0~exp1
[5,100 B]
Get:25 http://archive.ubuntu.com/ubuntu jammy/main amd64 rake all 13.0.6-2 [61.7
kB]
Get:26 http://archive.ubuntu.com/ubuntu jammy/main amd64 ruby-net-telnet all
0.1.1-2 [12.6 kB]
Get:27 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 ruby-webrick
all 1.7.0-3ubuntu0.2 [52.5 kB]
Get:28 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 ruby-xmlrpc all
0.3.2-1ubuntu0.1 [24.9 kB]
Get:29 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libruby3.0
amd64 3.0.2-7ubuntu2.11 [5,114 kB]
Get:30 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libsynctex2
amd64 2021.20210626.59705-1ubuntu0.2 [55.6 kB]
Get:31 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libteckit0 amd64
2.5.11+ds1-1 [421 kB]
Get:32 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtexlua53
amd64 2021.20210626.59705-1ubuntu0.2 [120 kB]
Get:33 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtexluajit2
amd64 2021.20210626.59705-1ubuntu0.2 [267 kB]
Get:34 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libzzip-0-13 amd64
0.13.72+dfsg.1-1.1 [27.0 kB]
Get:35 http://archive.ubuntu.com/ubuntu jammy/main amd64 xfonts-encodings all
1:1.0.5-0ubuntu2 [578 kB]
Get:36 http://archive.ubuntu.com/ubuntu jammy/main amd64 xfonts-utils amd64
1:7.7+6build2 [94.6 kB]
Get:37 http://archive.ubuntu.com/ubuntu jammy/universe amd64 lmodern all
2.004.5-6.1 [9,471 kB]
Get:38 http://archive.ubuntu.com/ubuntu jammy/universe amd64 preview-latex-style
all 12.2-1ubuntu1 [185 kB]
Get:39 http://archive.ubuntu.com/ubuntu jammy/main amd64 t1utils amd64
1.41-4build2 [61.3 kB]
Get:40 http://archive.ubuntu.com/ubuntu jammy/universe amd64 teckit amd64
2.5.11+ds1-1 [699 kB]
Get:41 http://archive.ubuntu.com/ubuntu jammy/universe amd64 tex-gyre all
20180621-3.1 [6,209 kB]
Get:42 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 texlive-
binaries amd64 2021.20210626.59705-1ubuntu0.2 [9,860 kB]
Get:43 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-base all
```

```
2021.20220204-1 [21.0 MB]
Get:44 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-fonts-
recommended all 2021.20220204-1 [4,972 kB]
Get:45 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-latex-base
all 2021.20220204-1 [1,128 kB]
Get:46 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libfontbox-java all
1:1.8.16-2 [207 kB]
Get:47 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libpdfbox-java all
1:1.8.16-2 [5,199 kB]
Get:48 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-latex-
recommended all 2021.20220204-1 [14.4 MB]
Get:49 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-pictures
all 2021.20220204-1 [8,720 kB]
Get:50 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-latex-extra
all 2021.20220204-1 [13.9 MB]
Get:51 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-plain-
generic all 2021.20220204-1 [27.5 MB]
Get:52 http://archive.ubuntu.com/ubuntu jammy/universe amd64 tipa all 2:1.3-21
[2,967 kB]
Get:53 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-xetex all
2021.20220204-1 [12.4 MB]
Fetched 182 MB in 2s (77.3 MB/s)
Extracting templates from packages: 100%
Preconfiguring packages ...
Selecting previously unselected package fonts-droid-fallback.
(Reading database ... 121713 files and directories currently installed.)
Preparing to unpack .../00-fonts-droid-fallback_1%3a6.0.1r16-1.1build1_all.deb
...
Unpacking fonts-droid-fallback (1:6.0.1r16-1.1build1) ...
Selecting previously unselected package fonts-lato.
Preparing to unpack .../01-fonts-lato_2.0-2.1_all.deb ...
Unpacking fonts-lato (2.0-2.1) ...
Selecting previously unselected package poppler-data.
Preparing to unpack .../02-poppler-data_0.4.11-1_all.deb ...
Unpacking poppler-data (0.4.11-1) ...
Selecting previously unselected package tex-common.
Preparing to unpack .../03-tex-common_6.17_all.deb ...
Unpacking tex-common (6.17) ...
Selecting previously unselected package fonts-urw-base35.
Preparing to unpack .../04-fonts-urw-base35_20200910-1_all.deb ...
Unpacking fonts-urw-base35 (20200910-1) ...
Selecting previously unselected package libgs9-common.
Preparing to unpack .../05-libgs9-common_9.55.0~dfsg1-0ubuntu5.13_all.deb ...
Unpacking libgs9-common (9.55.0~dfsg1-0ubuntu5.13) ...
Selecting previously unselected package libidn12:amd64.
Preparing to unpack .../06-libidn12_1.38-4ubuntu1_amd64.deb ...
Unpacking libidn12:amd64 (1.38-4ubuntu1) ...
Selecting previously unselected package libijs-0.35:amd64.
```

```
Preparing to unpack .../07-libijs-0.35_0.35-15build2_amd64.deb ...
Unpacking libijs-0.35:amd64 (0.35-15build2) ...
Selecting previously unselected package libjbig2dec0:amd64.
Preparing to unpack .../08-libjbig2dec0_0.19-3build2_amd64.deb ...
Unpacking libjbig2dec0:amd64 (0.19-3build2) ...
Selecting previously unselected package libgs9:amd64.
Preparing to unpack .../09-libgs9_9.55.0~dfsg1-0ubuntu5.13_amd64.deb ...
Unpacking libgs9:amd64 (9.55.0~dfsg1-0ubuntu5.13) ...
Selecting previously unselected package libkpathsea6:amd64.
Preparing to unpack .../10-libkpathsea6_2021.20210626.59705-1ubuntu0.2_amd64.deb
...
Unpacking libkpathsea6:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Selecting previously unselected package libwoff1:amd64.
Preparing to unpack .../11-libwoff1_1.0.2-1build4_amd64.deb ...
Unpacking libwoff1:amd64 (1.0.2-1build4) ...
Selecting previously unselected package dvisvgm.
Preparing to unpack .../12-dvisvgm_2.13.1-1_amd64.deb ...
Unpacking dvisvgm (2.13.1-1) ...
Selecting previously unselected package fonts-lmodern.
Preparing to unpack .../13-fonts-lmodern_2.004.5-6.1_all.deb ...
Unpacking fonts-lmodern (2.004.5-6.1) ...
Selecting previously unselected package fonts-noto-mono.
Preparing to unpack .../14-fonts-noto-mono_20201225-1build1_all.deb ...
Unpacking fonts-noto-mono (20201225-1build1) ...
Selecting previously unselected package fonts-texgyre.
Preparing to unpack .../15-fonts-texgyre_20180621-3.1_all.deb ...
Unpacking fonts-texgyre (20180621-3.1) ...
Selecting previously unselected package libapache-pom-java.
Preparing to unpack .../16-libapache-pom-java_18-1_all.deb ...
Unpacking libapache-pom-java (18-1) ...
Selecting previously unselected package libcommons-parent-java.
Preparing to unpack .../17-libcommons-parent-java_43-1_all.deb ...
Unpacking libcommons-parent-java (43-1) ...
Selecting previously unselected package libcommons-logging-java.
Preparing to unpack .../18-libcommons-logging-java_1.2-2_all.deb ...
Unpacking libcommons-logging-java (1.2-2) ...
Selecting previously unselected package libptexenc1:amd64.
Preparing to unpack .../19-libptexenc1_2021.20210626.59705-1ubuntu0.2_amd64.deb
...
Unpacking libptexenc1:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Selecting previously unselected package rubygems-integration.
Preparing to unpack .../20-rubygems-integration_1.18_all.deb ...
Unpacking rubygems-integration (1.18) ...
Selecting previously unselected package ruby3.0.
Preparing to unpack .../21-ruby3.0_3.0.2-7ubuntu2.11_amd64.deb ...
Unpacking ruby3.0 (3.0.2-7ubuntu2.11) ...
Selecting previously unselected package ruby-rubygems.
Preparing to unpack .../22-ruby-rubygems_3.3.5-2ubuntu1.2_all.deb ...
```

```
Unpacking ruby-rubygems (3.3.5-2ubuntu1.2) ...
Selecting previously unselected package ruby.
Preparing to unpack .../23-ruby_1%3a3.0~exp1_amd64.deb ...
Unpacking ruby (1:3.0~exp1) ...
Selecting previously unselected package rake.
Preparing to unpack .../24-rake_13.0.6-2_all.deb ...
Unpacking rake (13.0.6-2) ...
Selecting previously unselected package ruby-net-telnet.
Preparing to unpack .../25-ruby-net-telnet_0.1.1-2_all.deb ...
Unpacking ruby-net-telnet (0.1.1-2) ...
Selecting previously unselected package ruby-webrick.
Preparing to unpack .../26-ruby-webrick_1.7.0-3ubuntu0.2_all.deb ...
Unpacking ruby-webrick (1.7.0-3ubuntu0.2) ...
Selecting previously unselected package ruby-xmlrpc.
Preparing to unpack .../27-ruby-xmlrpc_0.3.2-1ubuntu0.1_all.deb ...
Unpacking ruby-xmlrpc (0.3.2-1ubuntu0.1) ...
Selecting previously unselected package libruby3.0:amd64.
Preparing to unpack .../28-libruby3.0_3.0.2-7ubuntu2.11_amd64.deb ...
Unpacking libruby3.0:amd64 (3.0.2-7ubuntu2.11) ...
Selecting previously unselected package libsynctex2:amd64.
Preparing to unpack .../29-libsynctex2_2021.20210626.59705-1ubuntu0.2_amd64.deb
...
Unpacking libsynctex2:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Selecting previously unselected package libteckit0:amd64.
Preparing to unpack .../30-libteckit0_2.5.11+ds1-1_amd64.deb ...
Unpacking libteckit0:amd64 (2.5.11+ds1-1) ...
Selecting previously unselected package libtexlua53:amd64.
Preparing to unpack .../31-libtexlua53_2021.20210626.59705-1ubuntu0.2_amd64.deb
...
Unpacking libtexlua53:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Selecting previously unselected package libtexluajit2:amd64.
Preparing to unpack
.../32-libtexluajit2_2021.20210626.59705-1ubuntu0.2_amd64.deb ...
Unpacking libtexluajit2:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Selecting previously unselected package libzzip-0-13:amd64.
Preparing to unpack .../33-libzzip-0-13_0.13.72+dfsg.1-1.1_amd64.deb ...
Unpacking libzzip-0-13:amd64 (0.13.72+dfsg.1-1.1) ...
Selecting previously unselected package xfonts-encodings.
Preparing to unpack .../34-xfonts-encodings_1%3a1.0.5-0ubuntu2_all.deb ...
Unpacking xfonts-encodings (1:1.0.5-0ubuntu2) ...
Selecting previously unselected package xfonts-utils.
Preparing to unpack .../35-xfonts-utils_1%3a7.7+6build2_amd64.deb ...
Unpacking xfonts-utils (1:7.7+6build2) ...
Selecting previously unselected package lmodern.
Preparing to unpack .../36-lmodern_2.004.5-6.1_all.deb ...
Unpacking lmodern (2.004.5-6.1) ...
Selecting previously unselected package preview-latex-style.
Preparing to unpack .../37-preview-latex-style_12.2-1ubuntu1_all.deb ...
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Unpacking preview-latex-style (12.2-1ubuntu1) ...
Selecting previously unselected package t1utils.
Preparing to unpack .../38-t1utils_1.41-4build2_amd64.deb ...
Unpacking t1utils (1.41-4build2) ...
Selecting previously unselected package teckit.
Preparing to unpack .../39-teckit_2.5.11+ds1-1_amd64.deb ...
Unpacking teckit (2.5.11+ds1-1) ...
Selecting previously unselected package tex-gyre.
Preparing to unpack .../40-tex-gyre_20180621-3.1_all.deb ...
Unpacking tex-gyre (20180621-3.1) ...
Selecting previously unselected package texlive-binaries.
Preparing to unpack .../41-texlive-
binaries_2021.20210626.59705-1ubuntu0.2_amd64.deb ...
Unpacking texlive-binaries (2021.20210626.59705-1ubuntu0.2) ...
Selecting previously unselected package texlive-base.
Preparing to unpack .../42-texlive-base_2021.20220204-1_all.deb ...
Unpacking texlive-base (2021.20220204-1) ...
Selecting previously unselected package texlive-fonts-recommended.
Preparing to unpack .../43-texlive-fonts-recommended_2021.20220204-1_all.deb ...
Unpacking texlive-fonts-recommended (2021.20220204-1) ...
Selecting previously unselected package texlive-latex-base.
Preparing to unpack .../44-texlive-latex-base_2021.20220204-1_all.deb ...
Unpacking texlive-latex-base (2021.20220204-1) ...
Selecting previously unselected package libfontbox-java.
Preparing to unpack .../45-libfontbox-java_1%3a1.8.16-2_all.deb ...
Unpacking libfontbox-java (1:1.8.16-2) ...
Selecting previously unselected package libpdfbox-java.
Preparing to unpack .../46-libpdfbox-java_1%3a1.8.16-2_all.deb ...
Unpacking libpdfbox-java (1:1.8.16-2) ...
Selecting previously unselected package texlive-latex-recommended.
Preparing to unpack .../47-texlive-latex-recommended_2021.20220204-1_all.deb ...
Unpacking texlive-latex-recommended (2021.20220204-1) ...
Selecting previously unselected package texlive-pictures.
Preparing to unpack .../48-texlive-pictures_2021.20220204-1_all.deb ...
Unpacking texlive-pictures (2021.20220204-1) ...
Selecting previously unselected package texlive-latex-extra.
Preparing to unpack .../49-texlive-latex-extra_2021.20220204-1_all.deb ...
Unpacking texlive-latex-extra (2021.20220204-1) ...
Selecting previously unselected package texlive-plain-generic.
Preparing to unpack .../50-texlive-plain-generic_2021.20220204-1_all.deb ...
Unpacking texlive-plain-generic (2021.20220204-1) ...
Selecting previously unselected package tipa.
Preparing to unpack .../51-tipa_2%3a1.3-21_all.deb ...
Unpacking tipa (2:1.3-21) ...
Selecting previously unselected package texlive-xetex.
Preparing to unpack .../52-texlive-xetex_2021.20220204-1_all.deb ...
Unpacking texlive-xetex (2021.20220204-1) ...
Setting up fonts-lato (2.0-2.1) ...
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Setting up fonts-noto-mono (20201225-1build1) ...
Setting up libwoff1:amd64 (1.0.2-1build4) ...
Setting up libtexlua53:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Setting up libijs-0.35:amd64 (0.35-15build2) ...
Setting up libtexluajit2:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Setting up libfontbox-java (1:1.8.16-2) ...
Setting up rubygems-integration (1.18) ...
Setting up libzzip-0-13:amd64 (0.13.72+dfsg.1-1.1) ...
Setting up fonts-urw-base35 (20200910-1) ...
Setting up poppler-data (0.4.11-1) ...
Setting up tex-common (6.17) ...
update-language: texlive-base not installed and configured, doing nothing!
Setting up libjbig2dec0:amd64 (0.19-3build2) ...
Setting up libteckit0:amd64 (2.5.11+ds1-1) ...
Setting up libapache-pom-java (18-1) ...
Setting up ruby-net-telnet (0.1.1-2) ...
Setting up xfonts-encodings (1:1.0.5-0ubuntu2) ...
Setting up t1utils (1.41-4build2) ...
Setting up libidn12:amd64 (1.38-4ubuntu1) ...
Setting up fonts-texgyre (20180621-3.1) ...
Setting up libkpathsea6:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Setting up ruby-webrick (1.7.0-3ubuntu0.2) ...
Setting up fonts-lmodern (2.004.5-6.1) ...
Setting up fonts-droid-fallback (1:6.0.1r16-1.1build1) ...
Setting up ruby-xmlrpc (0.3.2-1ubuntu0.1) ...
Setting up libsynctex2:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Setting up libgs9-common (9.55.0~dfsg1-0ubuntu5.13) ...
Setting up teckit (2.5.11+ds1-1) ...
Setting up libpdfbox-java (1:1.8.16-2) ...
Setting up libgs9:amd64 (9.55.0~dfsg1-0ubuntu5.13) ...
Setting up preview-latex-style (12.2-1ubuntu1) ...
Setting up libcommons-parent-java (43-1) ...
Setting up dvisvgm (2.13.1-1) ...
Setting up libcommons-logging-java (1.2-2) ...
Setting up xfonts-utils (1:7.7+6build2) ...
Setting up libptexenc1:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Setting up texlive-binaries (2021.20210626.59705-1ubuntu0.2) ...
update-alternatives: using /usr/bin/xdvi-xaw to provide /usr/bin/xdvi.bin
(xdvi.bin) in auto mode
update-alternatives: using /usr/bin/bibtex.original to provide /usr/bin/bibtex
(bibtex) in auto mode
Setting up lmodern (2.004.5-6.1) ...
Setting up texlive-base (2021.20220204-1) ...
/usr/bin/ucfr
/usr/bin/ucfr
/usr/bin/ucfr
/usr/bin/ucfr
mktxlsr: Updating /var/lib/texmf/ls-R-TEXLIVEDIST...
```

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mktexlsr: Updating /var/lib/texmf/ls-R-TEXMFMAIN...
mktexlsr: Updating /var/lib/texmf/ls-R...
mktexlsr: Done.
tl-paper: setting paper size for dvips to a4:
/var/lib/texmf/dvips/config/config-paper.ps
tl-paper: setting paper size for dvipdfmx to a4:
/var/lib/texmf/dvipdfmx/dvipdfmx-paper.cfg
tl-paper: setting paper size for xdvi to a4: /var/lib/texmf/xdvi/XDvi-paper
tl-paper: setting paper size for pdftex to a4: /var/lib/texmf/tex/generic/tex-
ini-files/pdftexconfig.tex
Setting up tex-gyre (20180621-3.1) ...
Setting up texlive-plain-generic (2021.20220204-1) ...
Setting up texlive-latex-base (2021.20220204-1) ...
Setting up texlive-latex-recommended (2021.20220204-1) ...
Setting up texlive-pictures (2021.20220204-1) ...
Setting up texlive-fonts-recommended (2021.20220204-1) ...
Setting up tipa (2:1.3-21) ...
Setting up texlive-latex-extra (2021.20220204-1) ...
Setting up texlive-xetex (2021.20220204-1) ...
Setting up rake (13.0.6-2) ...
Setting up libruby3.0:amd64 (3.0.2-7ubuntu2.11) ...
Setting up ruby3.0 (3.0.2-7ubuntu2.11) ...
Setting up ruby (1:3.0~exp1) ...
Setting up ruby-rubygems (3.3.5-2ubuntu1.2) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for mailcap (3.70+nmu1ubuntu1) ...
Processing triggers for fontconfig (2.13.1-4.2ubuntu5) ...
Processing triggers for libc-bin (2.35-0ubuntu3.8) ...
/sbin/ldconfig.real: /usr/local/lib/libtbb.so.12 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtbbmalloc.so.2 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libhwloc.so.15 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtbbbind_2_0.so.3 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtcm.so.1 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtcm_debug.so.1 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libur_adapter_opencl.so.0 is not a symbolic
link

/sbin/ldconfig.real: /usr/local/lib/libur_loader.so.0 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtbbbind_2_5.so.3 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libumf.so.1 is not a symbolic link
```

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/sbin/ldconfig.real: /usr/local/lib/libtbbmalloc_proxy.so.2 is not a symbolic link  
  
/sbin/ldconfig.real: /usr/local/lib/libur_adapter_level_zero.so.0 is not a symbolic link  
  
/sbin/ldconfig.real: /usr/local/lib/libtbbbind.so.3 is not a symbolic link  
  
/sbin/ldconfig.real: /usr/local/lib/libur_adapter_level_zero_v2.so.0 is not a symbolic link  
  
Processing triggers for tex-common (6.17) ...  
Running updmap-sys. This may take some time... done.  
Running mktexlsr /var/lib/texmf ... done.  
Building format(s) --all.  
    This may take some time... done.
```

```
[69]: from google.colab import drive  
drive.mount('/content/gdrive')
```

Mounted at /content/gdrive

```
[70]: !jupyter nbconvert --to pdf '/content/gdrive/MyDrive/Colab Notebooks/Walmart.ipynb'
```

```
[NbConvertApp] Converting notebook /content/gdrive/MyDrive/Colab Notebooks/Walmart.ipynb to pdf  
[NbConvertApp] Support files will be in Walmart_files/  
[NbConvertApp] Making directory ./Walmart_files  
[NbConvertApp] Writing 105285 bytes to notebook.tex  
[NbConvertApp] Building PDF  
[NbConvertApp] Running xelatex 3 times: ['xelatex', 'notebook.tex', '-quiet']  
[NbConvertApp] Running bibtex 1 time: ['bibtex', 'notebook']  
[NbConvertApp] WARNING | bibtex had problems, most likely because there were no citations  
[NbConvertApp] PDF successfully created  
[NbConvertApp] Writing 690710 bytes to /content/gdrive/MyDrive/Colab Notebooks/Walmart.pdf
```

```
[71]: from google.colab import files  
files.download('/content/gdrive/MyDrive/Colab Notebooks/Walmart.pdf') # Replace Walmart.pdf with your actual file name
```

```
<IPython.core.display.Javascript object>  
<IPython.core.display.Javascript object>
```