

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
```

```

[6]:      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]:
```

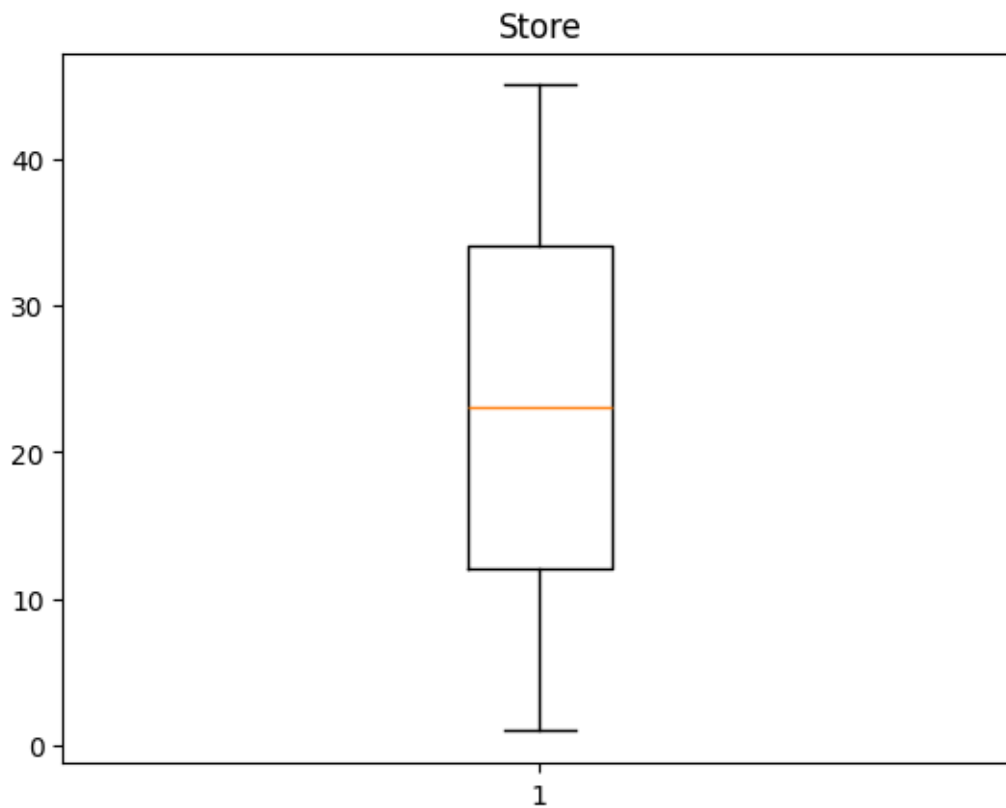
	Store	Date	Weekly_Sales	Holiday_Flag	\
count	6435.000000	6435	6.435000e+03	6435.000000	
mean	23.000000	2011-06-17 00:00:00.000000256	1.046965e+06	0.069930	
min	1.000000	2010-02-05 00:00:00	2.099862e+05	0.000000	
25%	12.000000	2010-10-08 00:00:00	5.533501e+05	0.000000	
50%	23.000000	2011-06-17 00:00:00	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

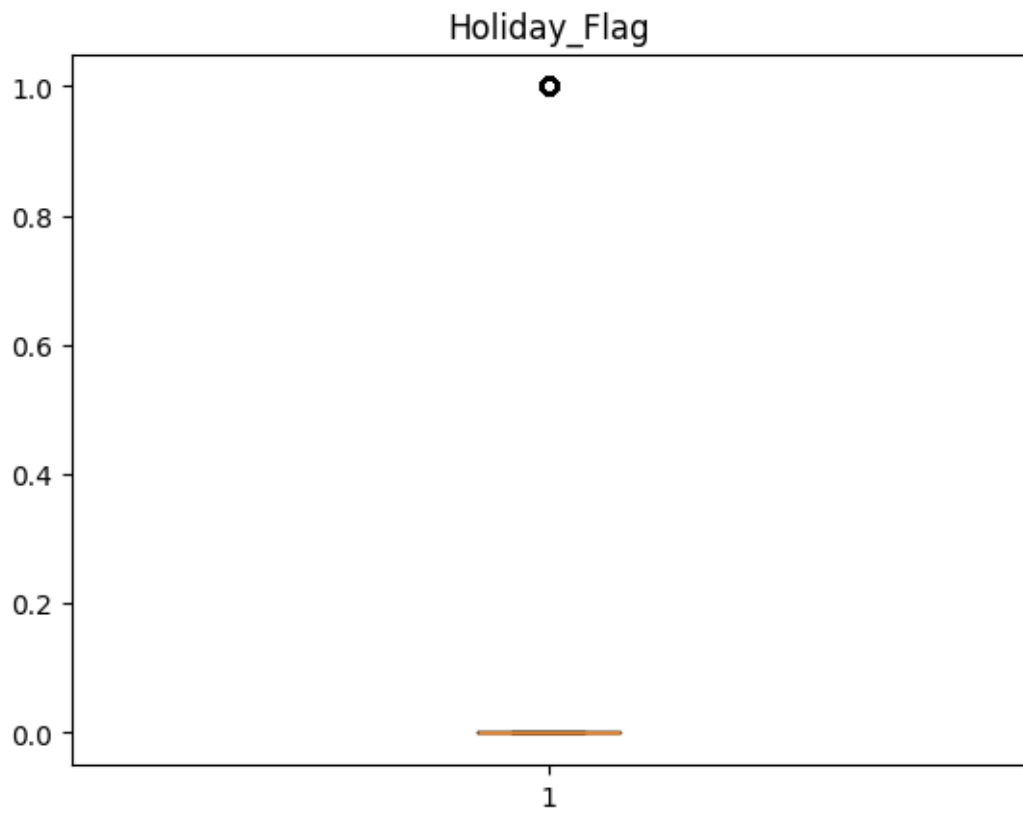
```
[10]: #The average weekly sales is 1.046965e+06
      #The average temperature is 60.663782
      #The average fuel price is 3.358607
```

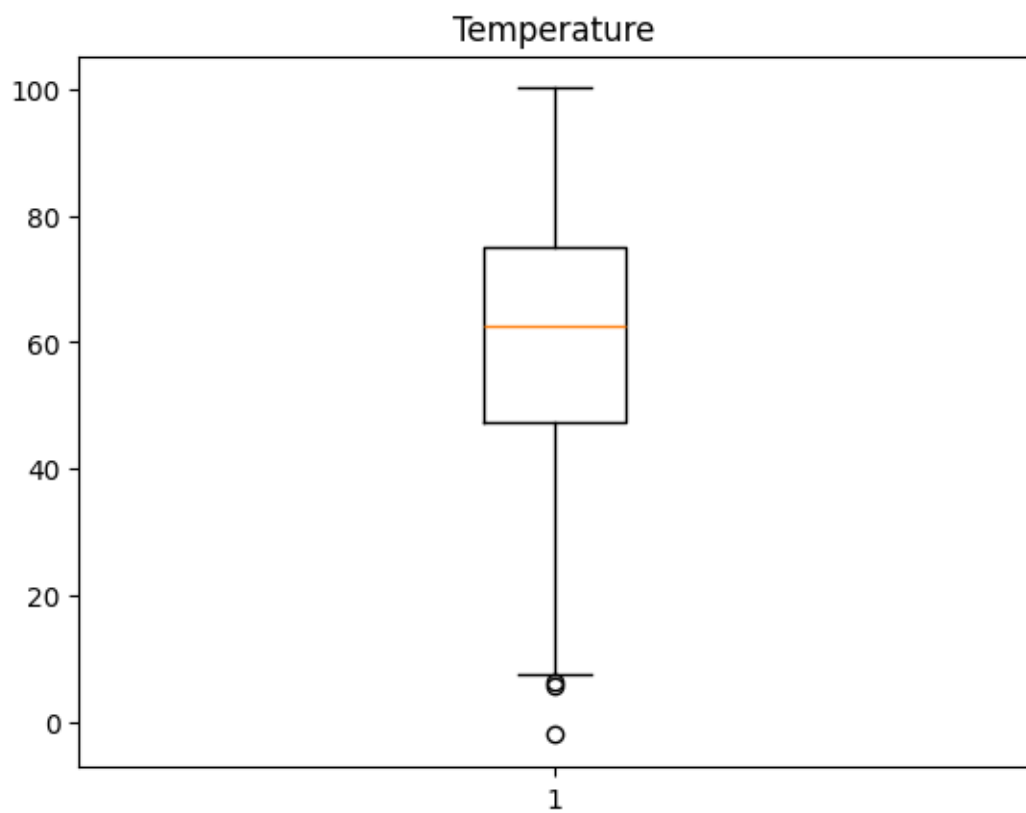
```
[11]: for i in data.columns:
```

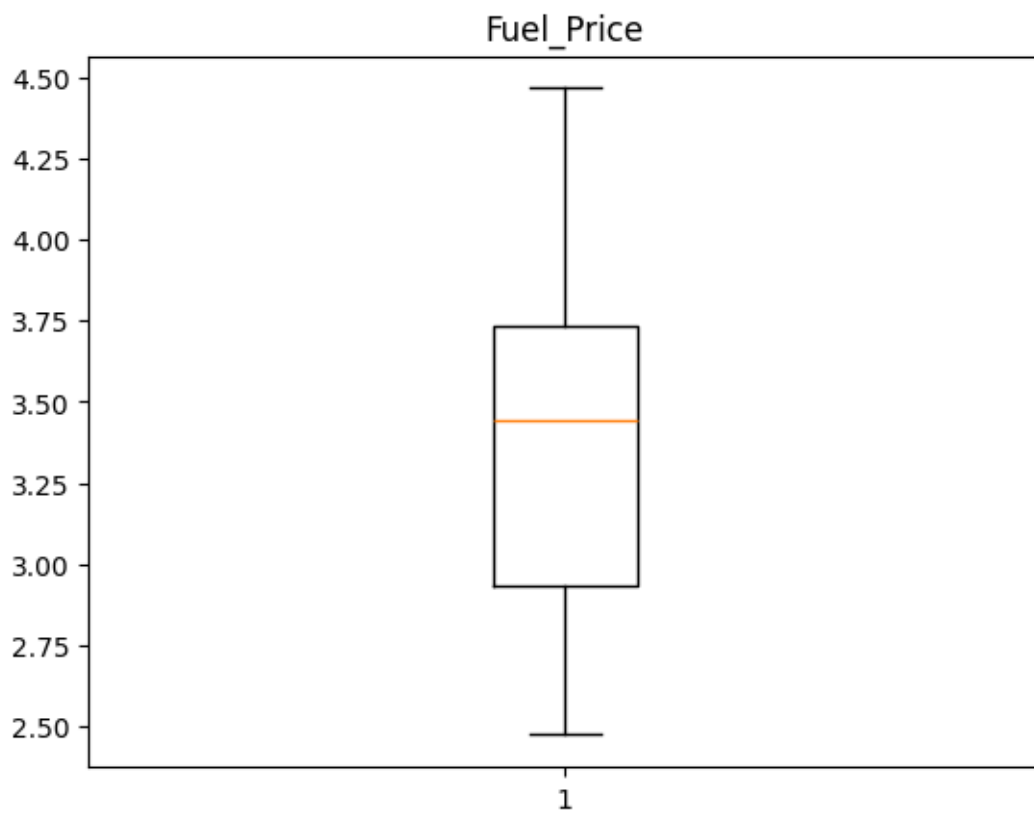
```
# Exclude non-numeric types and datetime columns, as boxplots are for
↪numerical data
if pd.api.types.is_numeric_dtype(data[i]) and not pd.api.types.
↪is_datetime64_any_dtype(data[i]):
    plt.boxplot(data[i])
    plt.title(i)
    plt.show()
```

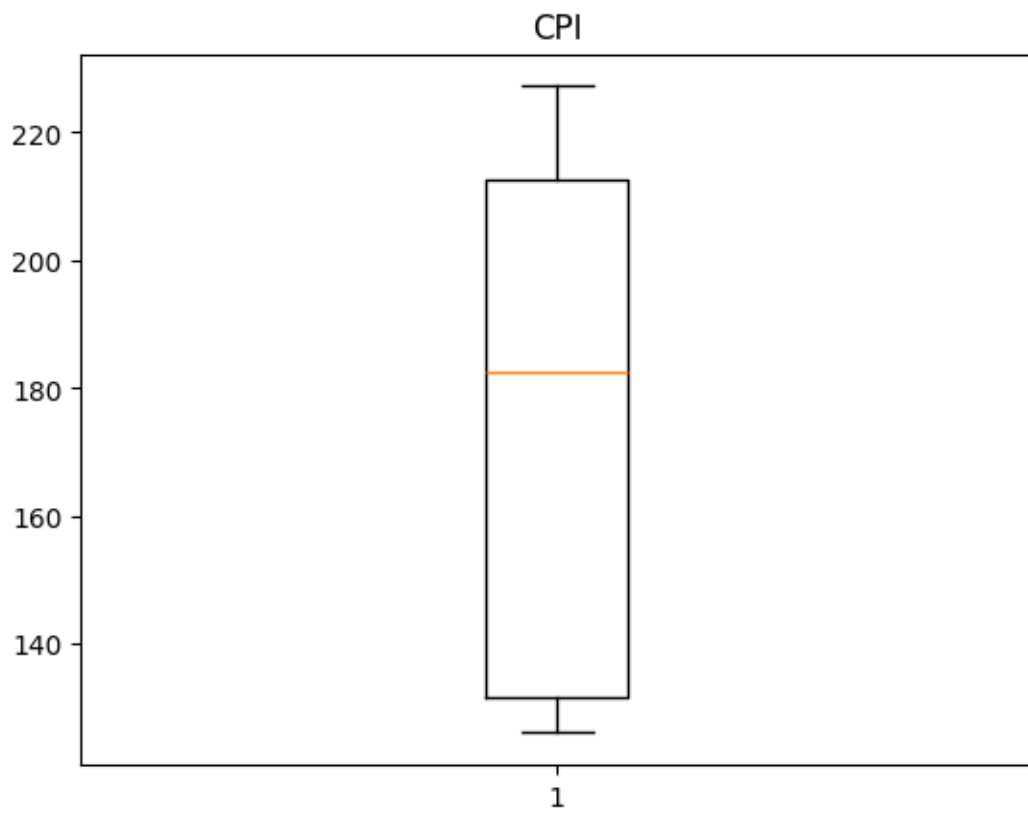


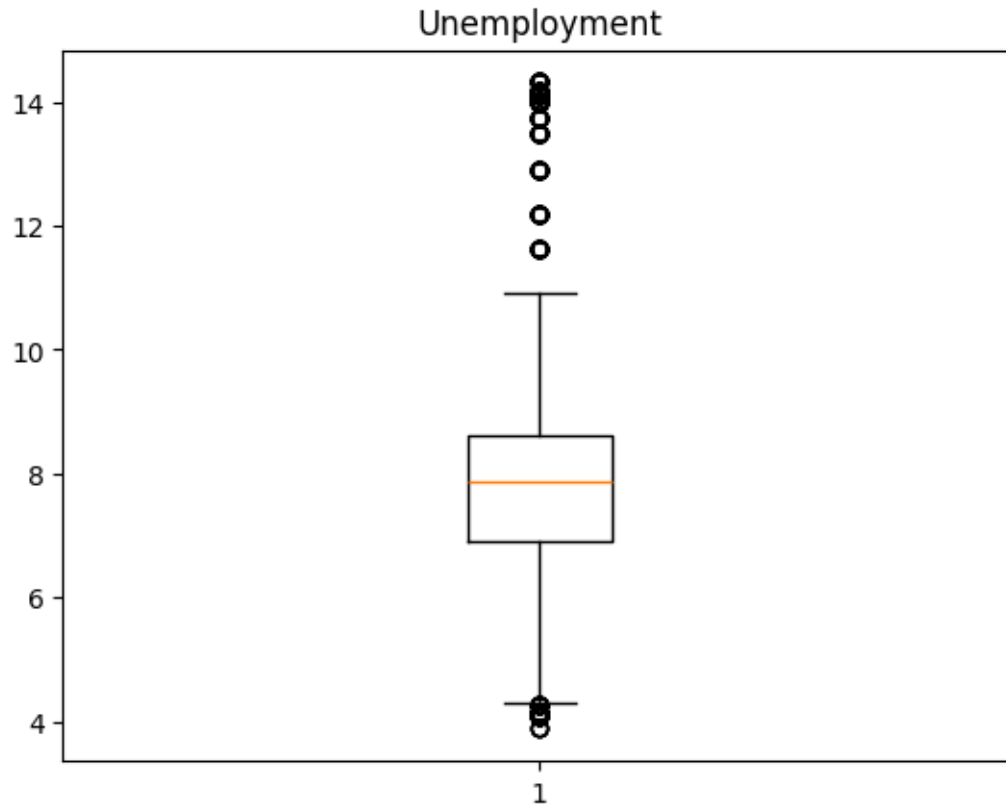




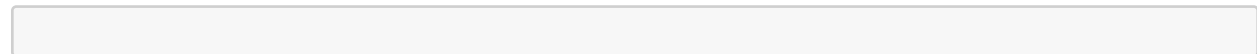








[11]:



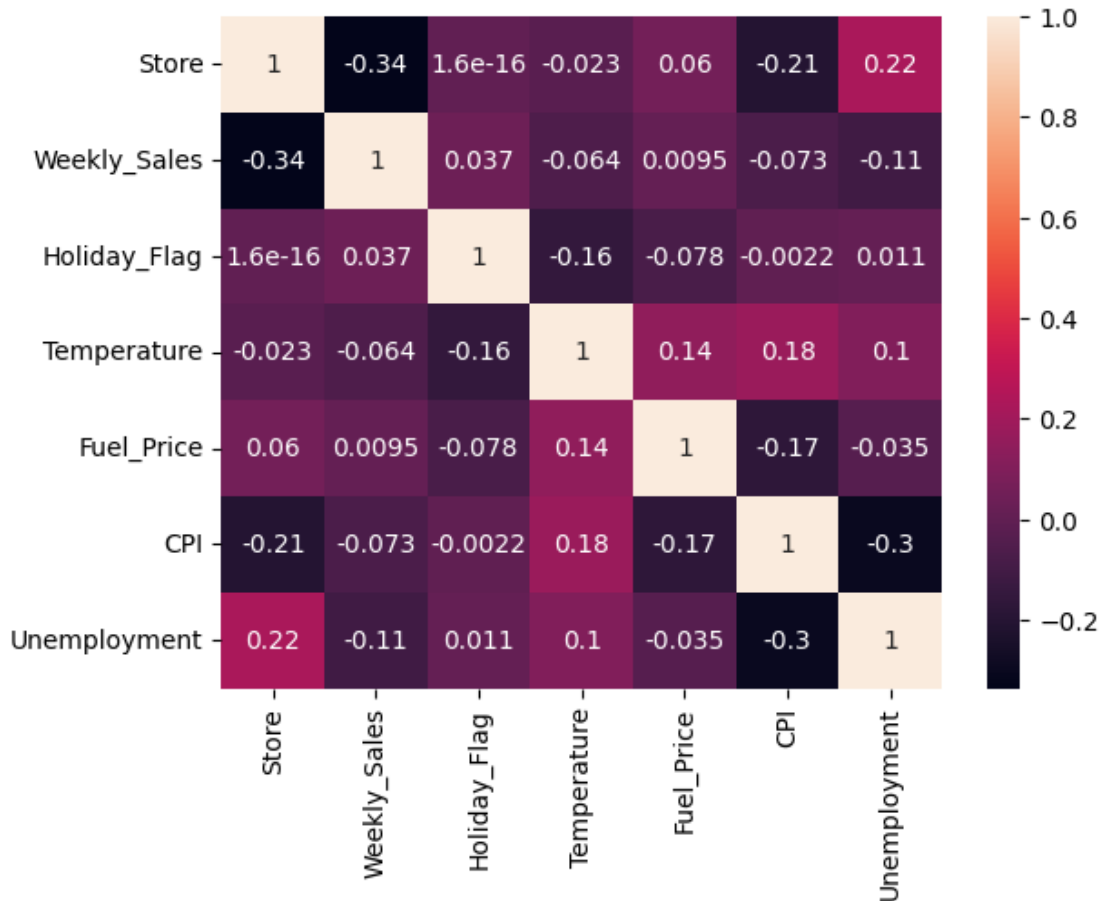
1 Task

- 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
```

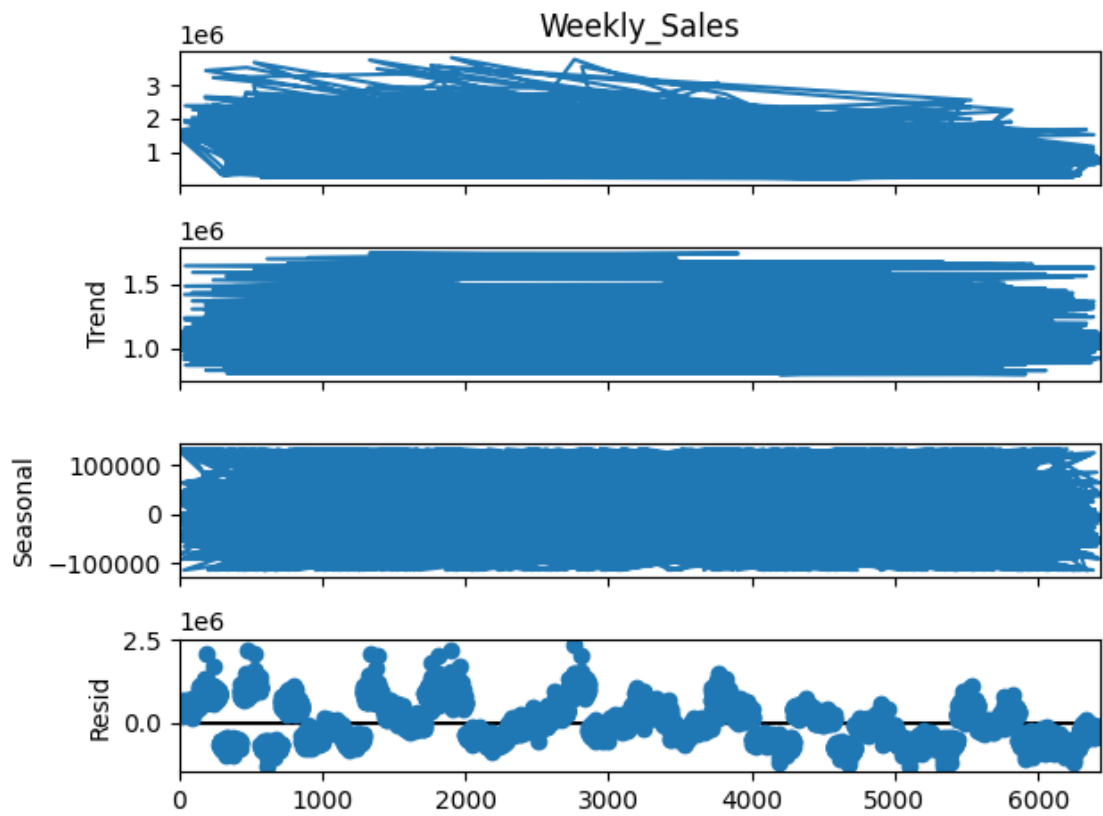
Name: Weekly_Sales, dtype: float64

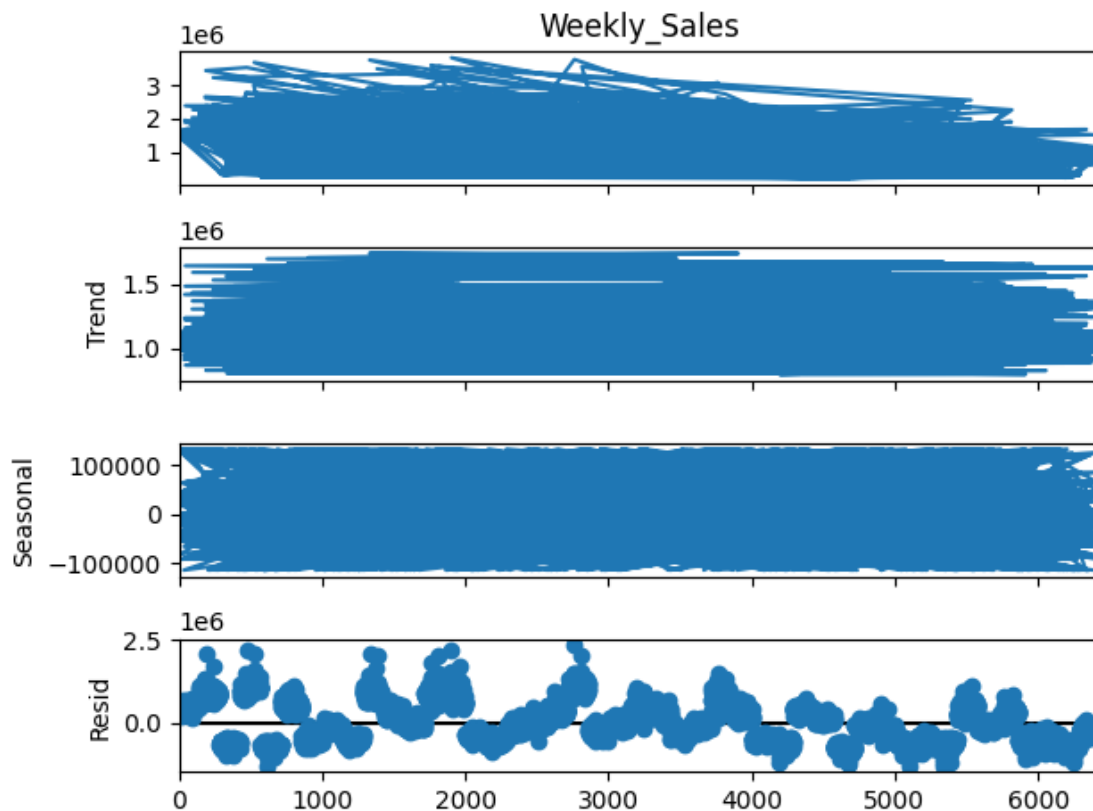
```
[16]: from statsmodels.tsa.seasonal import seasonal_decompose
```

```
[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'
    }
```

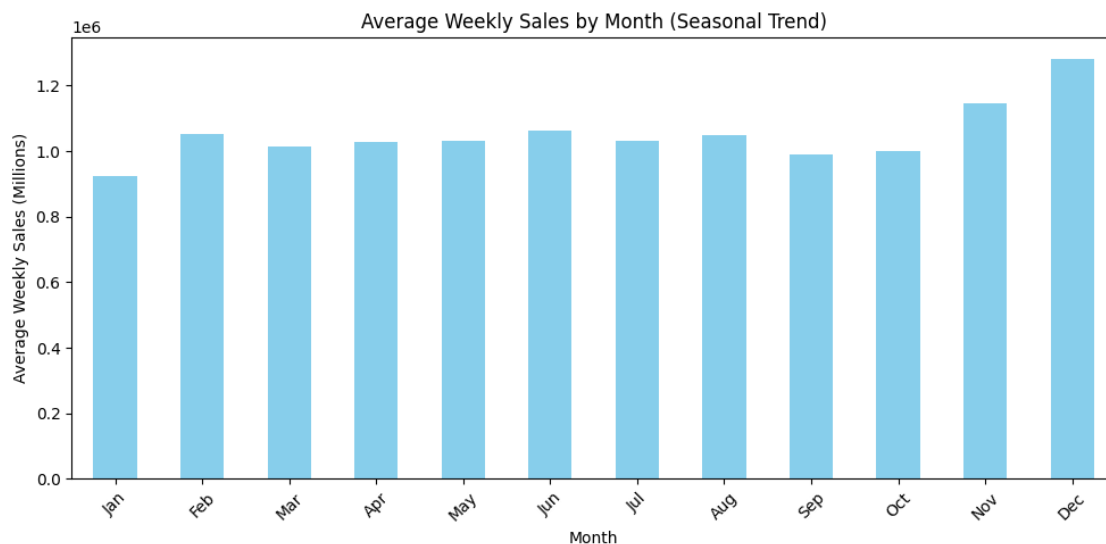
```
[24]: monthly_sales.index = monthly_sales.index.map(month_map)
      monthly_sales
```

```
[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()
```

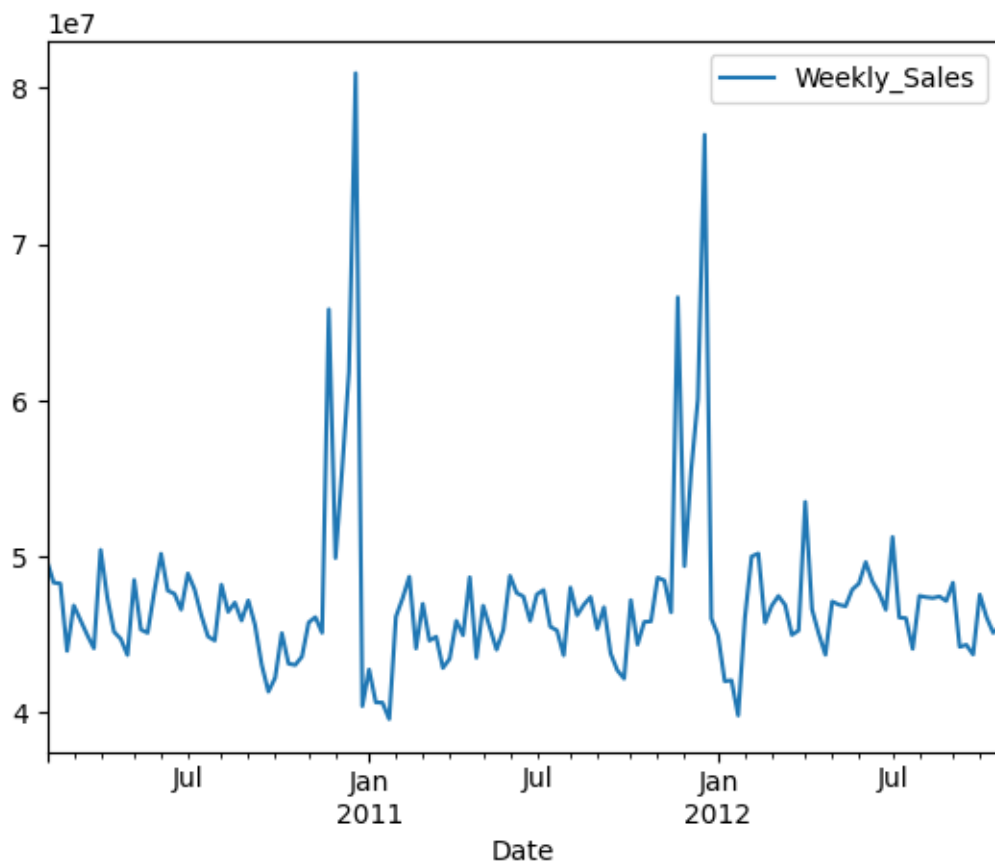
```
[37]: Df
```

```
[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]
```

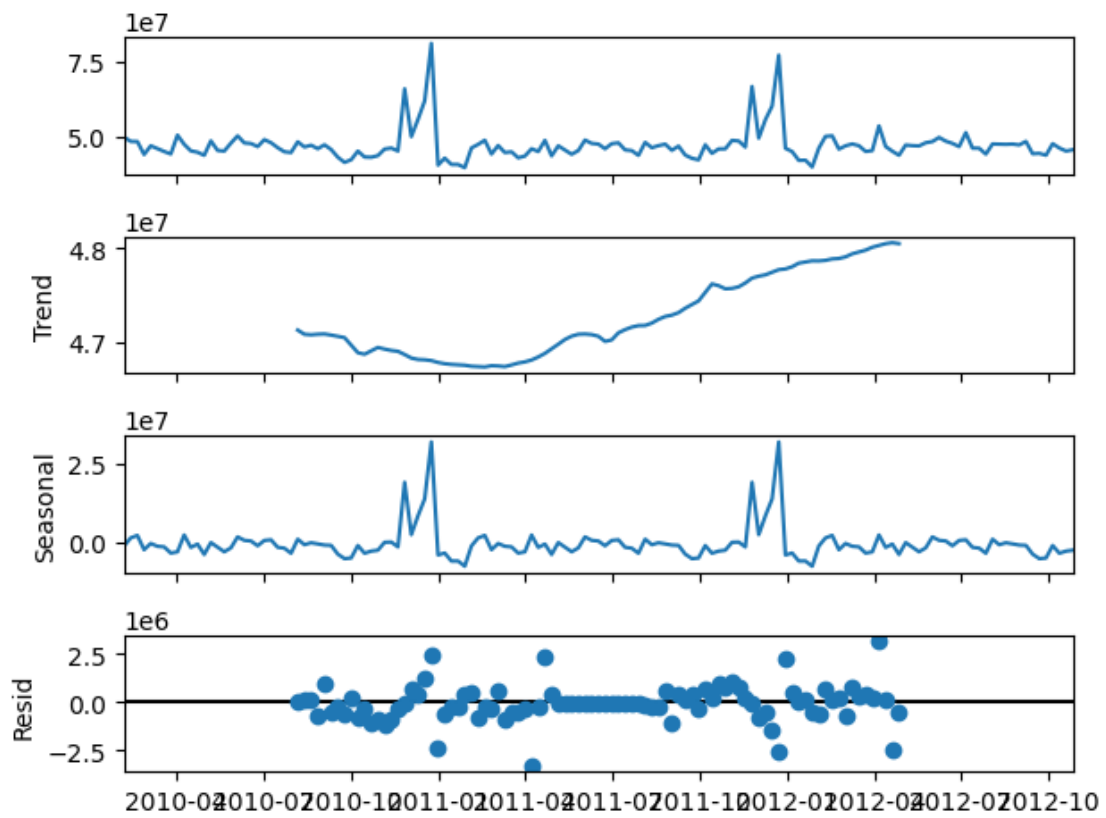
```
[38]: Df.plot()
```

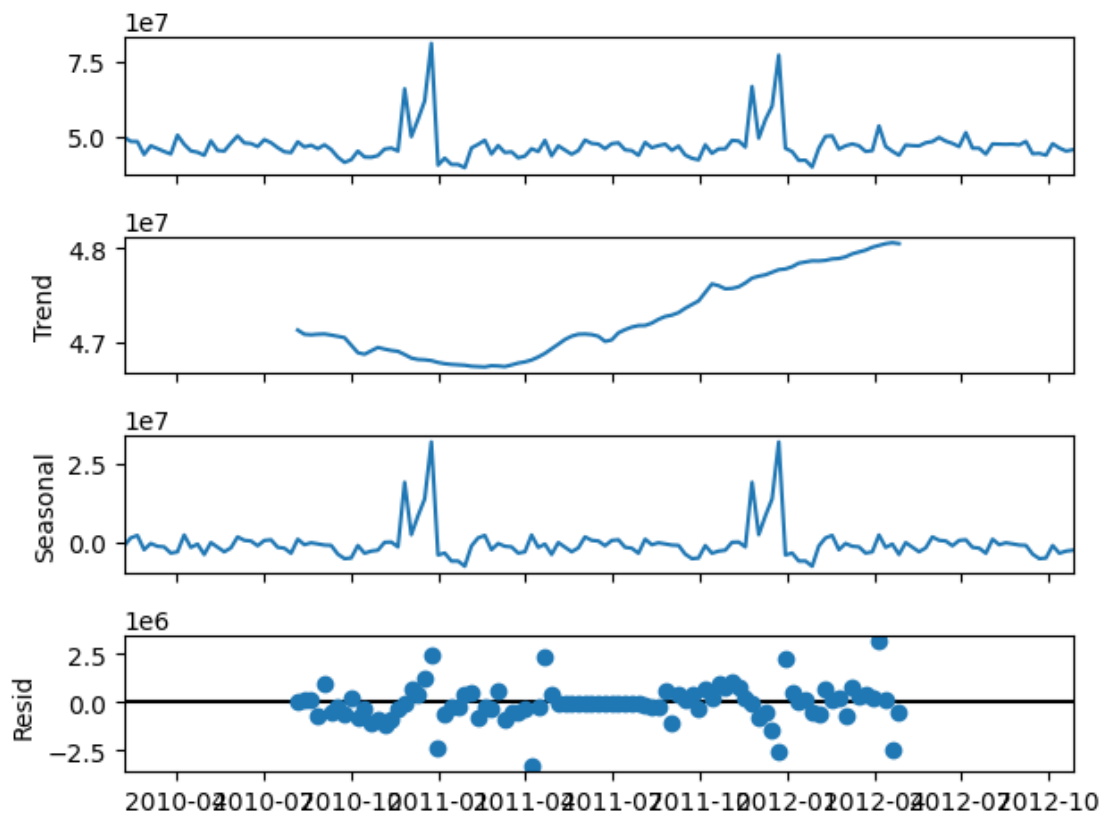
```
[38]: <Axes: xlabel='Date'>
```



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

[39]:



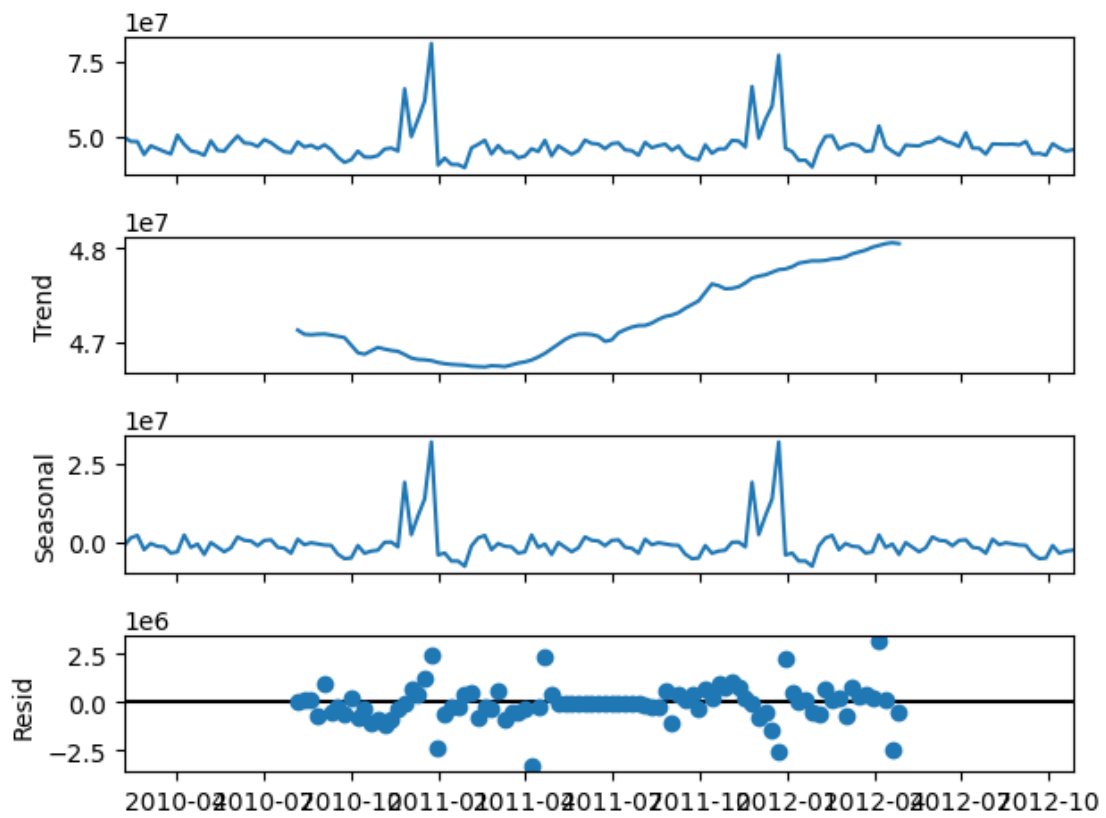


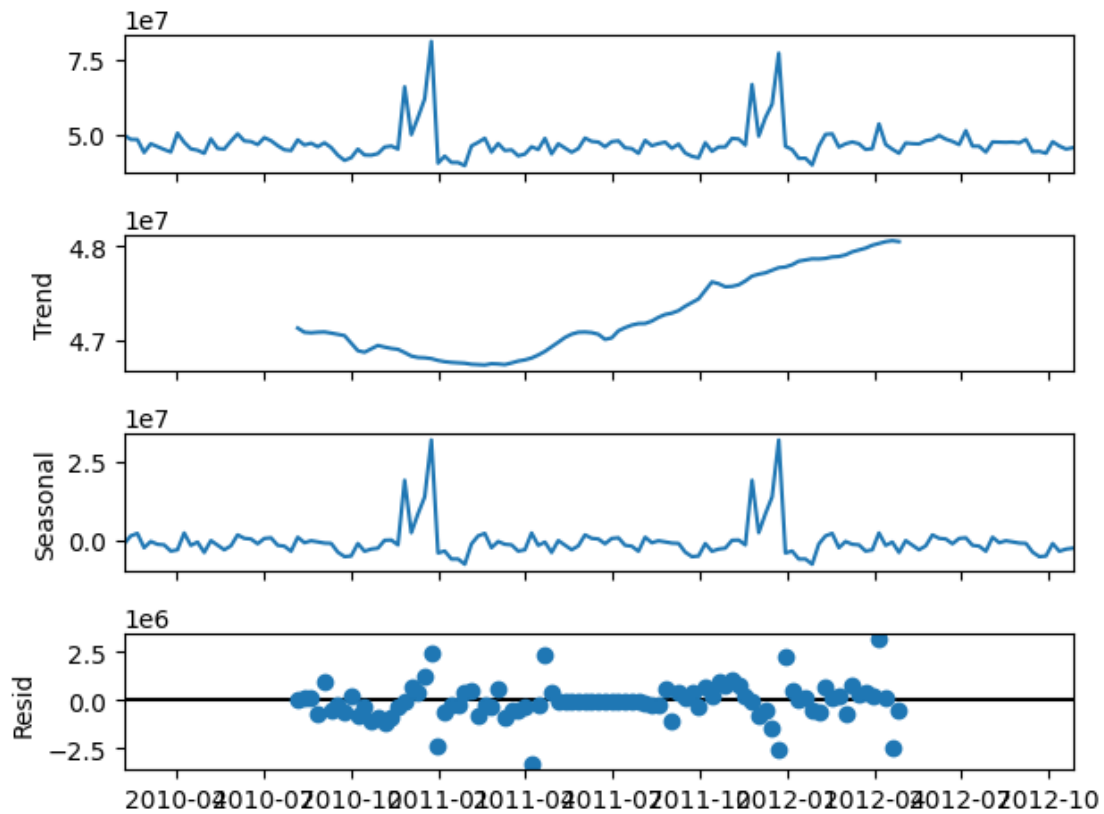
```
[40]: from statsmodels.tsa.seasonal import seasonal_decompose
```

```
[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]:
```

Date	Weekly_Sales
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]:
```

Date	Weekly_Sales
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]:
```

Date	Weekly_Sales
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
```

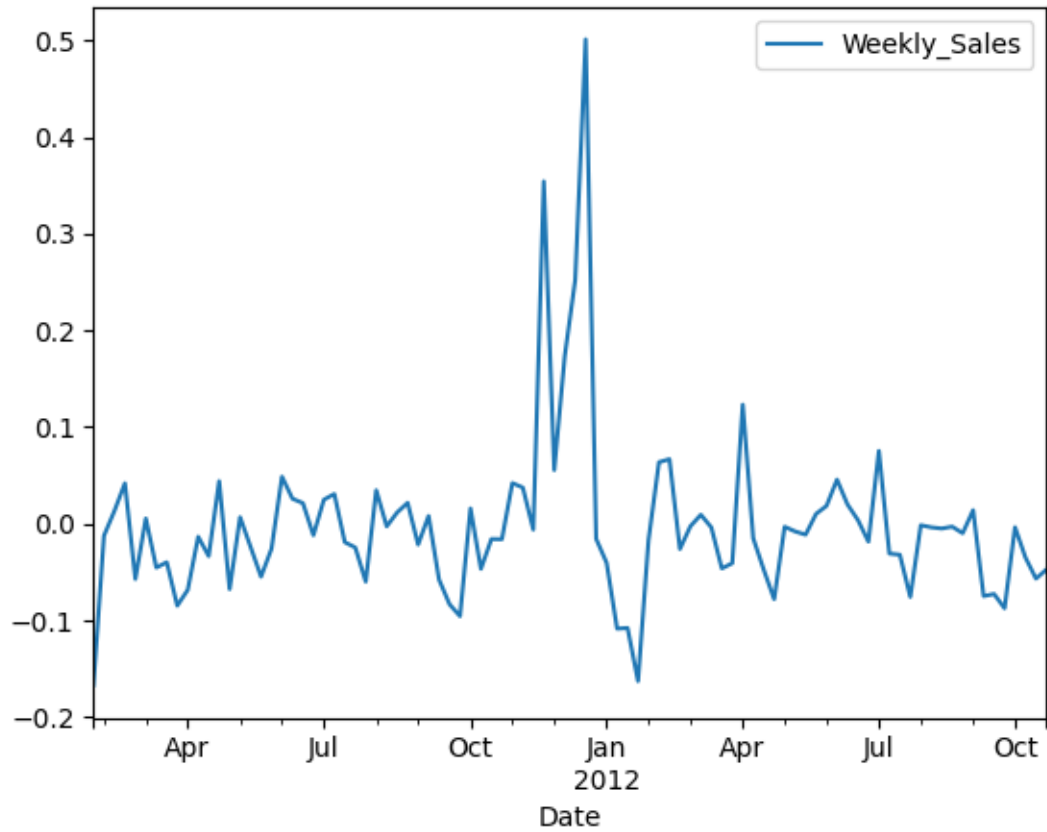
```
[48]: test_result = adfuller(new_data)
```

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

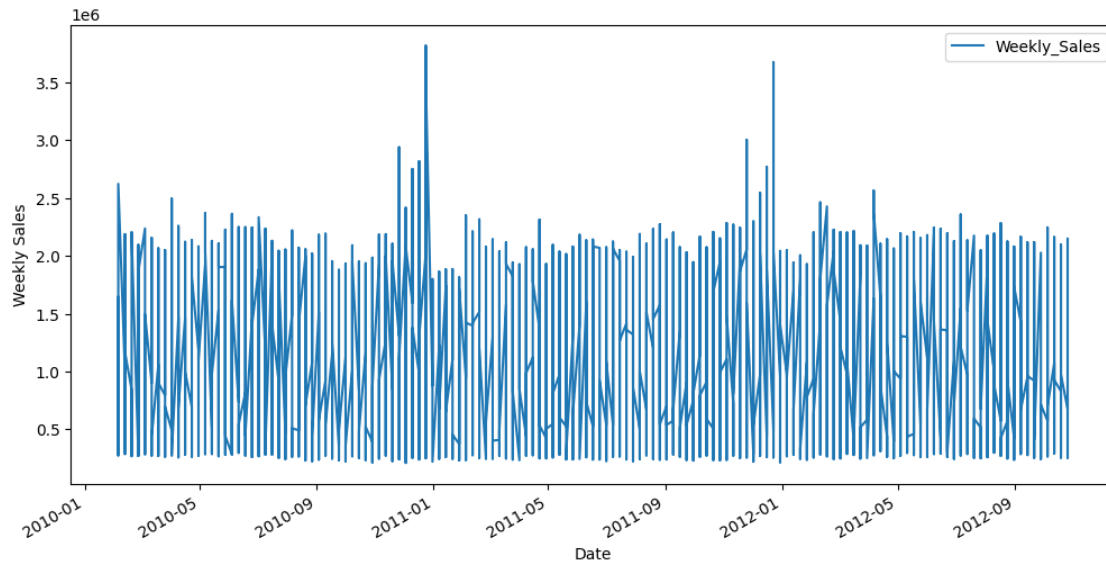
```
[49]: np.float64(0.00028548944319196305)
```

```
[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]:
```

Date	Weekly_Sales
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 "
```

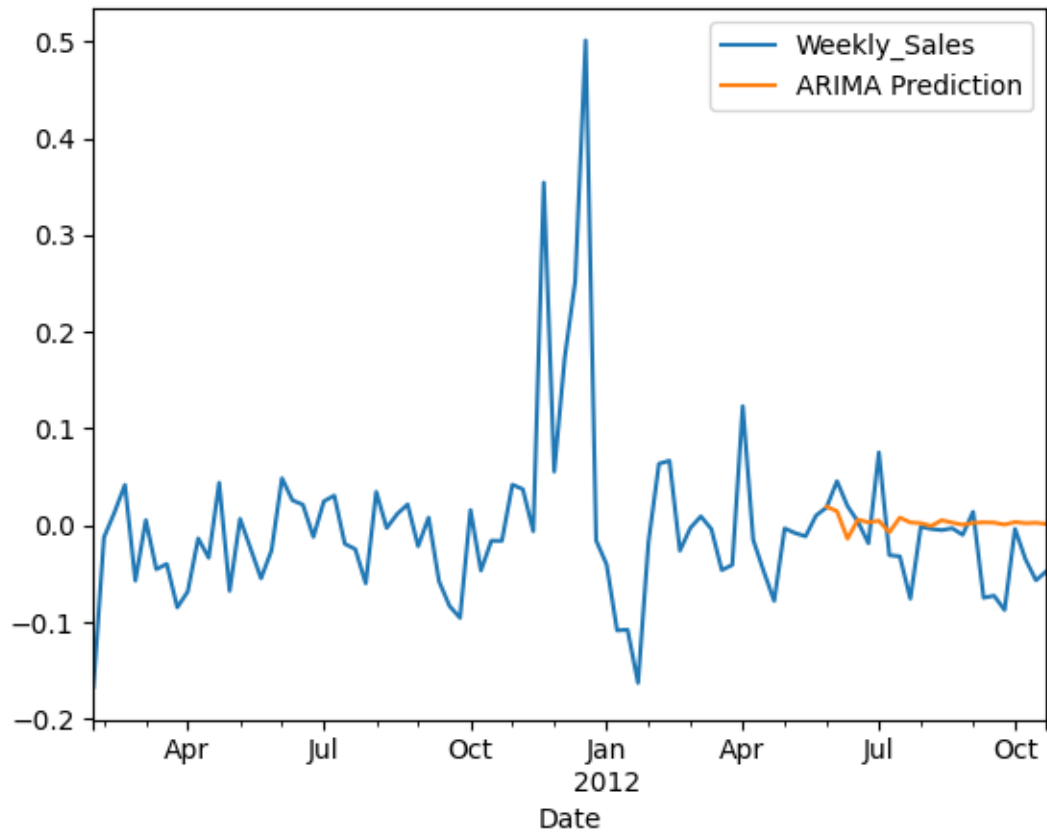
```
[60]: new_data.tail()
```

```
[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

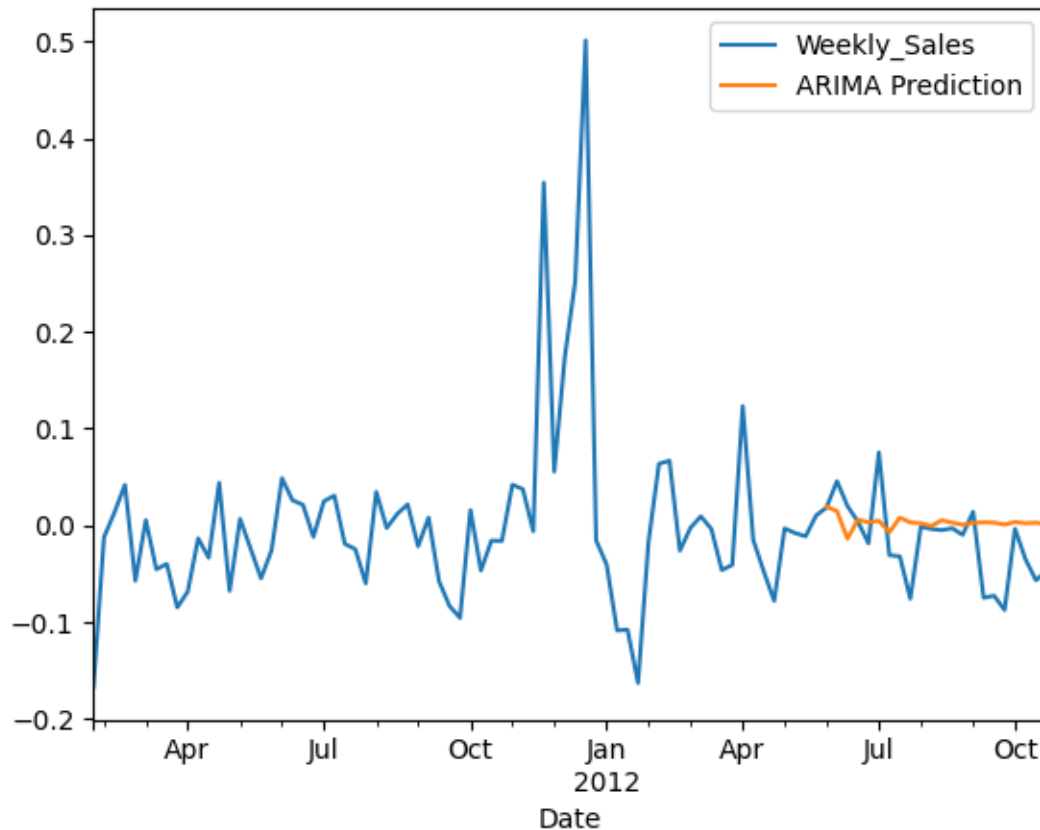
```
[61]: new_data[["Weekly_Sales", "ARIMA Prediction"]].plot()
```

```
[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:

dvisvgm 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
libsyntax2 libteckit0 libtexlua53 libtexluajit2 libwoff1 libzzip-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-arphic-ukai
fonts-arphic-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 libspreadsheet-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:

dvisvgm 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
libsyntax2 libteckit0 libtexlua53 libtexlua53 libtexlua53 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 libsynchronex2
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 libsyntax2:amd64.
Preparing to unpack .../29-libsyntax2_2021.20210626.59705-1ubuntu0.2_amd64.deb
...
Unpacking libsyntax2: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 libzip-0-13:amd64.
Preparing to unpack .../33-libzip-0-13_0.13.72+dfsg.1-1.1_amd64.deb ...
Unpacking libzip-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 libtexluaajit2:amd64 (2021.20210626.59705-1ubuntu0.2) ...
Setting up libfontbox-java (1:1.8.16-2) ...
Setting up rubygems-integration (1.18) ...
Setting up libzip-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 libsynchronet2: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
mktexlsr: 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  
↪with your actual file name
```

<IPython.core.display.Javascript object>

<IPython.core.display.Javascript object>