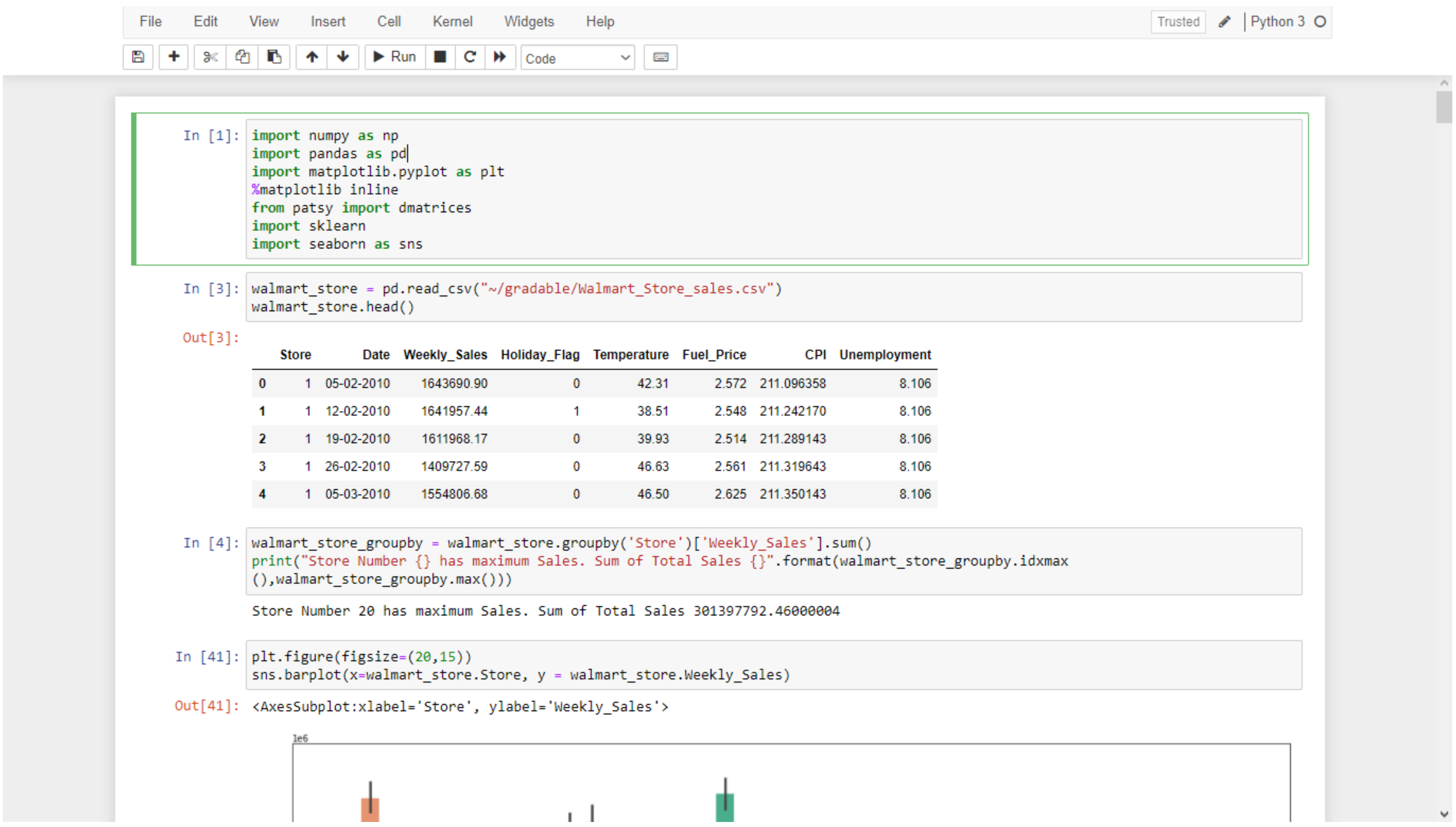


```
In [1]: import numpy as np
        import pandas as pd
        import matplotlib.pyplot as plt
        %matplotlib inline
        from patsy import dmatrices
        import sklearn
        import seaborn as sns
```

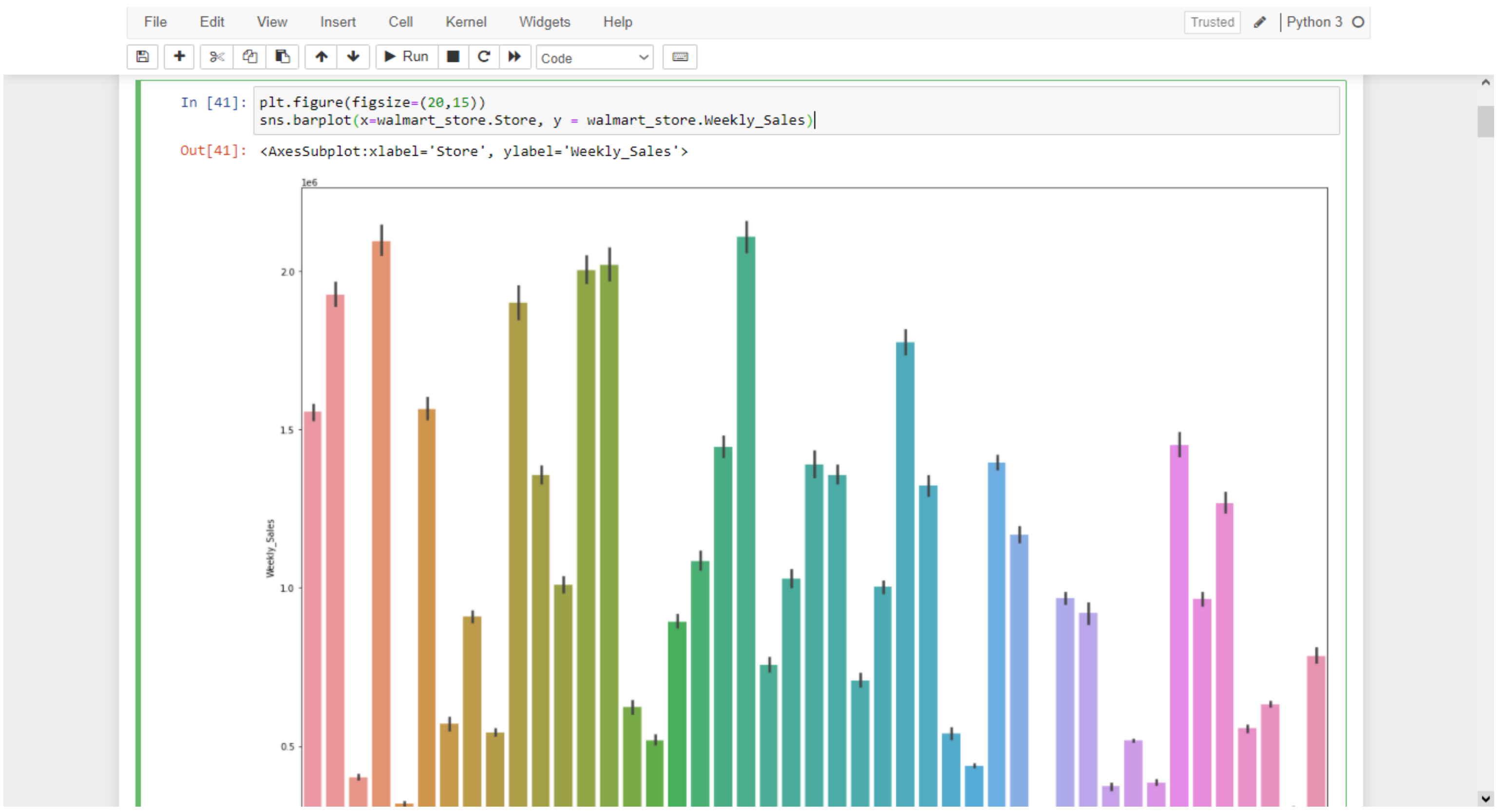
```
In [3]: walmart_store = pd.read_csv("~/gradable/Walmart_Store_sales.csv")
        walmart_store.head()
```

Out[3]:

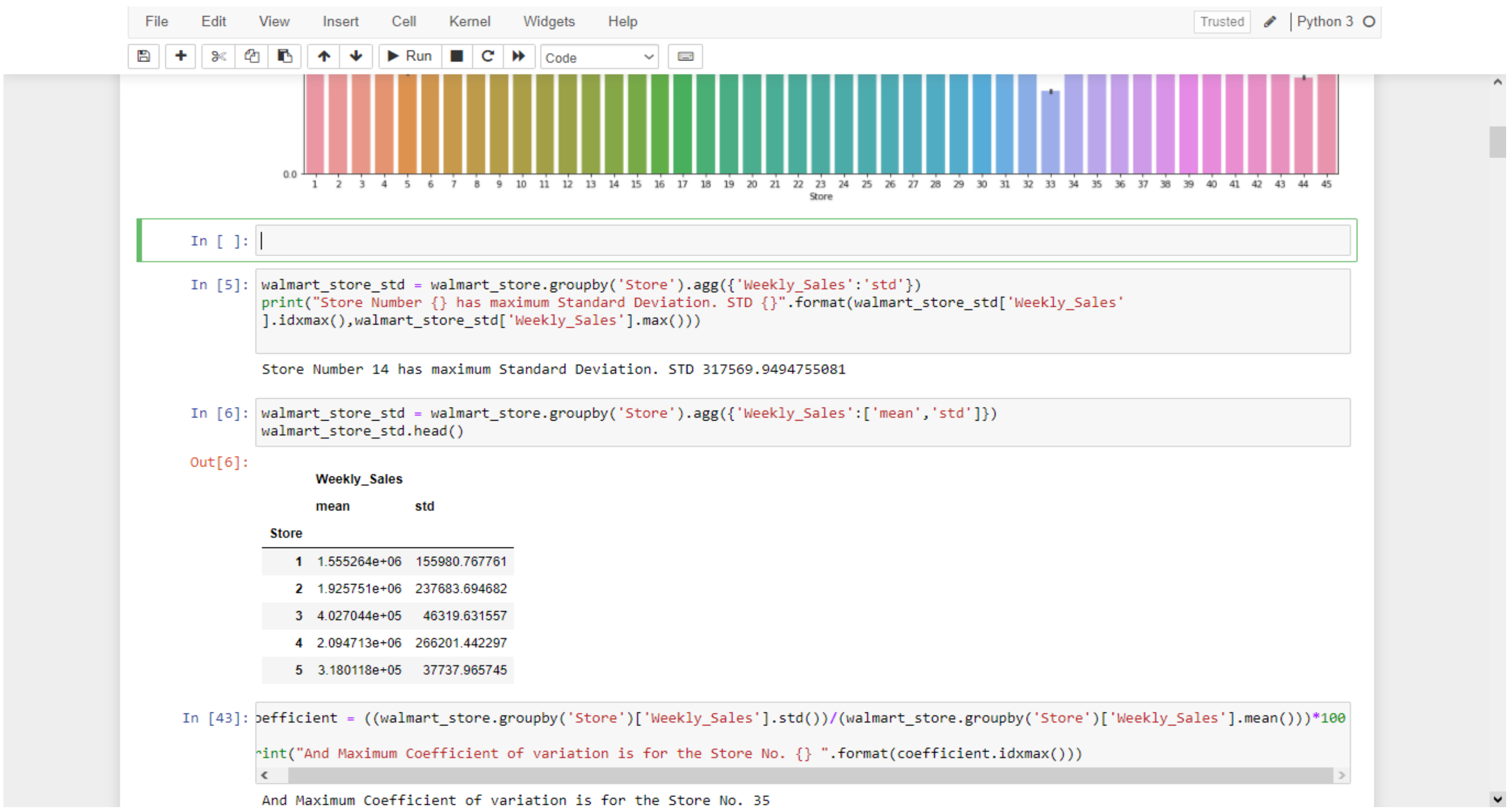
	Store	Date	Weekly_Sales	Holiday_Flag	Temperature	Fuel_Price	CPI	Unemployment
0	1	05-02-2010	1643690.90	0	42.31	2.572	211.096358	8.106
1	1	12-02-2010	1641957.44	1	38.51	2.548	211.242170	8.106
2	1	19-02-2010	1611968.17	0	39.93	2.514	211.289143	8.106
3	1	26-02-2010	1409727.59	0	46.63	2.561	211.319643	8.106
4	1	05-03-2010	1554806.68	0	46.50	2.625	211.350143	8.106

```
In [4]: walmart_store_groupby = walmart_store.groupby('Store')['Weekly_Sales'].sum()
        print("Store Number {} has maximum Sales. Sum of Total Sales {}".format(walmart_store_groupby.idxmax
        (),walmart_store_groupby.max()))

        Store Number 20 has maximum Sales. Sum of Total Sales 301397792.46000004
```

```
In [41]: plt.figure(figsize=(20,15))
         sns.barplot(x=walmart_store.Store, y = walmart_store.Weekly_Sales)

Out[41]: <AxesSubplot:xlabel='Store', ylabel='Weekly_Sales'>
```



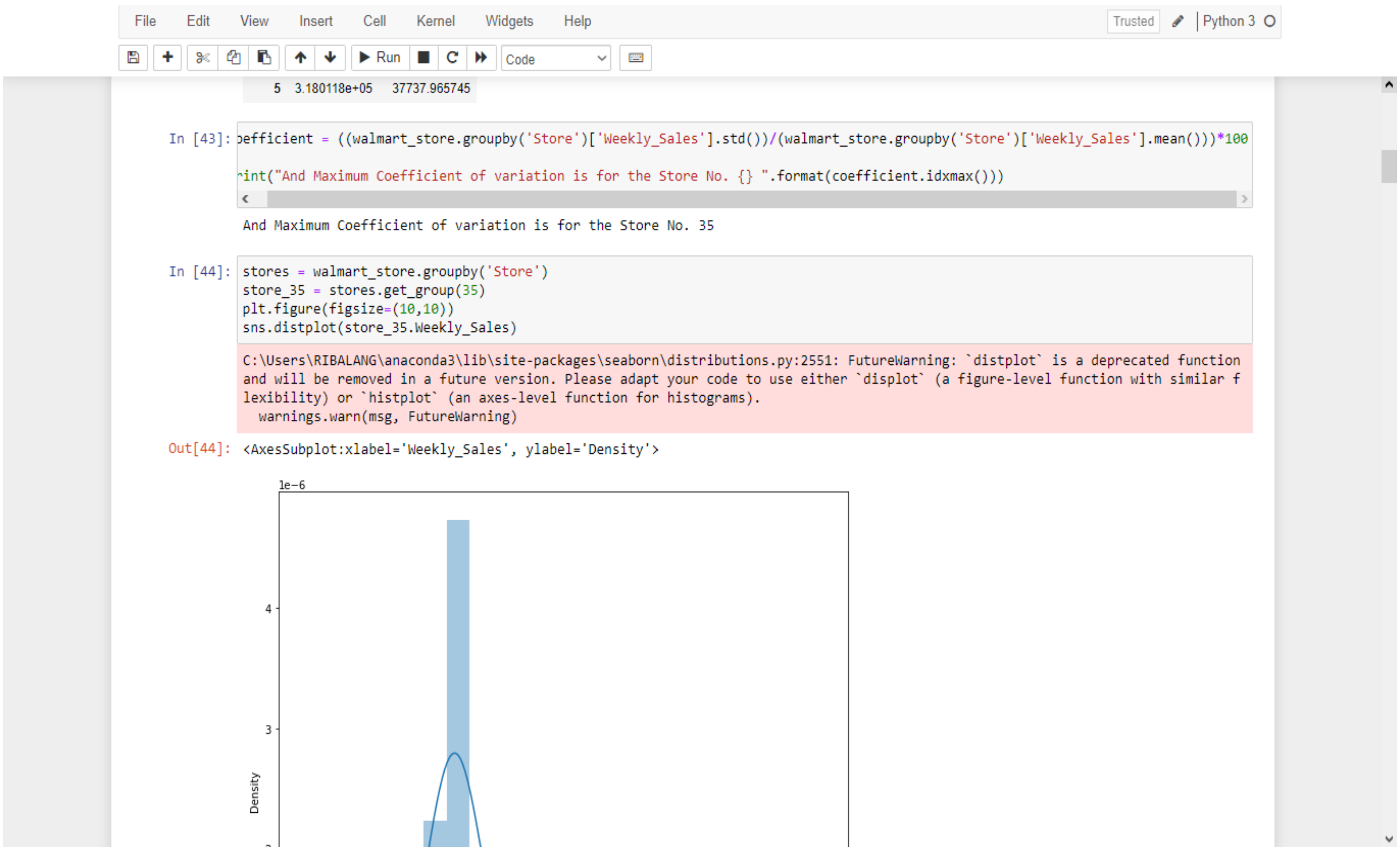
```
In [41]: plt.figure(figsize=(20,15))
         sns.barplot(x=walmart_store.Store, y = walmart_store.Weekly_Sales)

Out[41]: <AxesSubplot:xlabel='Store', ylabel='Weekly_Sales'>
```



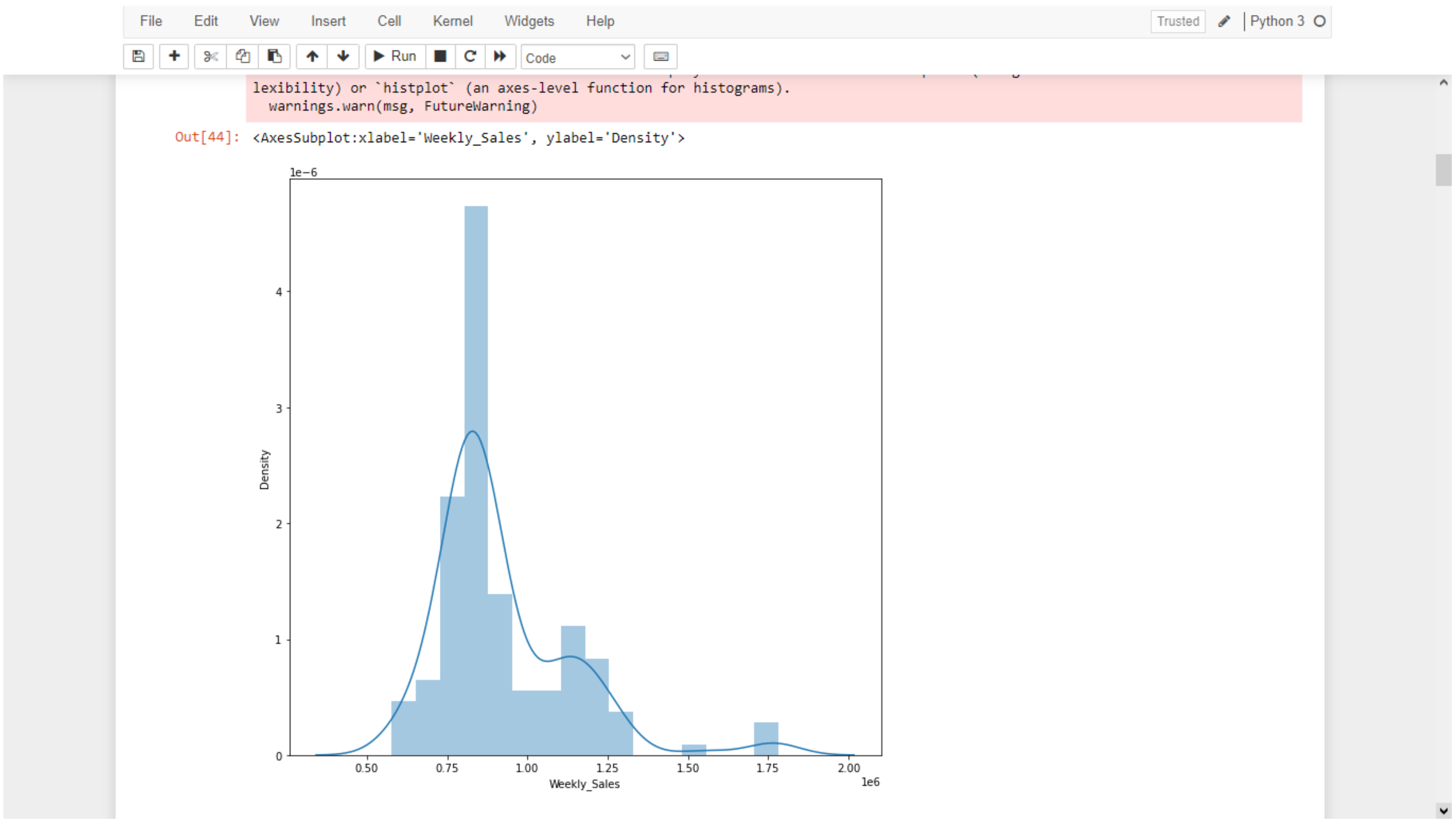
```
In [ ]:

In [5]: walmart_store_std = walmart_store.groupby('Store').agg({'Weekly_Sales':'std'})
        print("Store Number {} has maximum Standard Deviation. STD {}".format(walmart_store_std['Weekly_Sales'
        ].idxmax(),walmart_store_std['Weekly_Sales'].max()))

        Store Number 14 has maximum Standard Deviation. STD 317569.9494755081

In [6]: walmart_store_std = walmart_store.groupby('Store').agg({'Weekly_Sales':['mean','std']})
        walmart_store_std.head()

Out[6]:
```

	Weekly_Sales	
	mean	std
Store		
1	1.555264e+06	155980.767761
2	1.925751e+06	237683.694682
3	4.027044e+05	46319.631557
4	2.094713e+06	266201.442297
5	3.180118e+05	37737.965745

```
In [43]: oefficient = ((walmart_store.groupby('Store')['Weekly_Sales'].std())/(walmart_store.groupby('Store')['Weekly_Sales'].mean()))*100

         rint("And Maximum Coefficient of variation is for the Store No. {} ".format(coefficient.idxmax()))

         And Maximum Coefficient of variation is for the Store No. 35
```

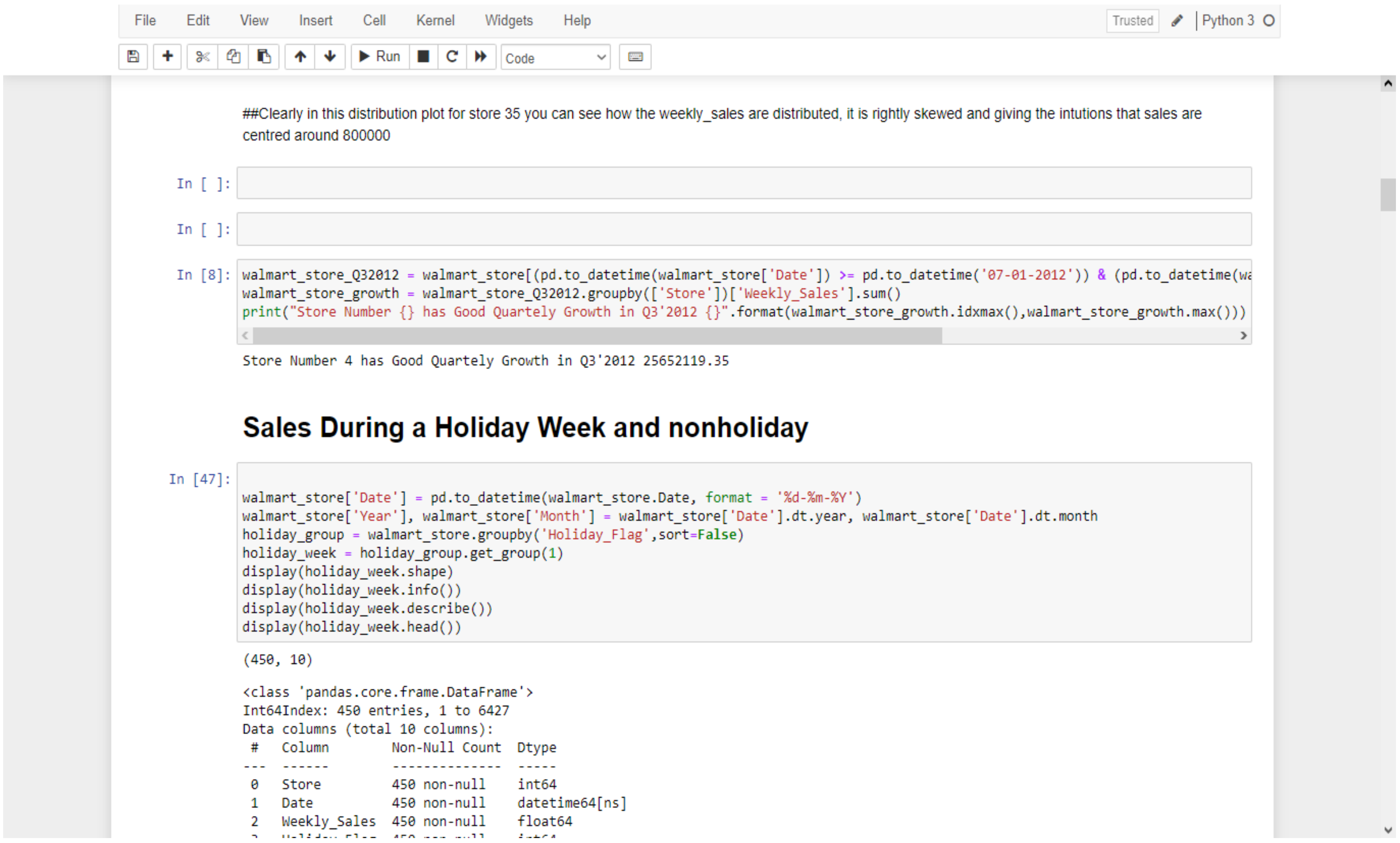


```
5   3.180118e+05   37737.965745

In [43]: oefficient = ((walmart_store.groupby('Store')['Weekly_Sales'].std())/(walmart_store.groupby('Store')['Weekly_Sales'].mean()))*100

         rint("And Maximum Coefficient of variation is for the Store No. {} ".format(coefficient.idxmax()))

         And Maximum Coefficient of variation is for the Store No. 35

In [44]: stores = walmart_store.groupby('Store')
         store_35 = stores.get_group(35)
         plt.figure(figsize=(10,10))
         sns.distplot(store_35.Weekly_Sales)

         C:\Users\RIBALANG\anaconda3\lib\site-packages\seaborn\distributions.py:2551: FutureWarning: `distplot` is a deprecated function
         and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar f
         lexibility) or `histplot` (an axes-level function for histograms).
           warnings.warn(msg, FutureWarning)

Out[44]: <AxesSubplot:xlabel='Weekly_Sales', ylabel='Density'>
```



```
lexibility) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```

Out[44]:
```
<AxesSubplot:xlabel='Weekly_Sales', ylabel='Density'>
```



##Clearly in this distribution plot for store 35 you can see how the weekly_sales are distributed, it is rightly skewed and giving the intutions that sales are centred around 800000

In [ ]:

In [ ]:

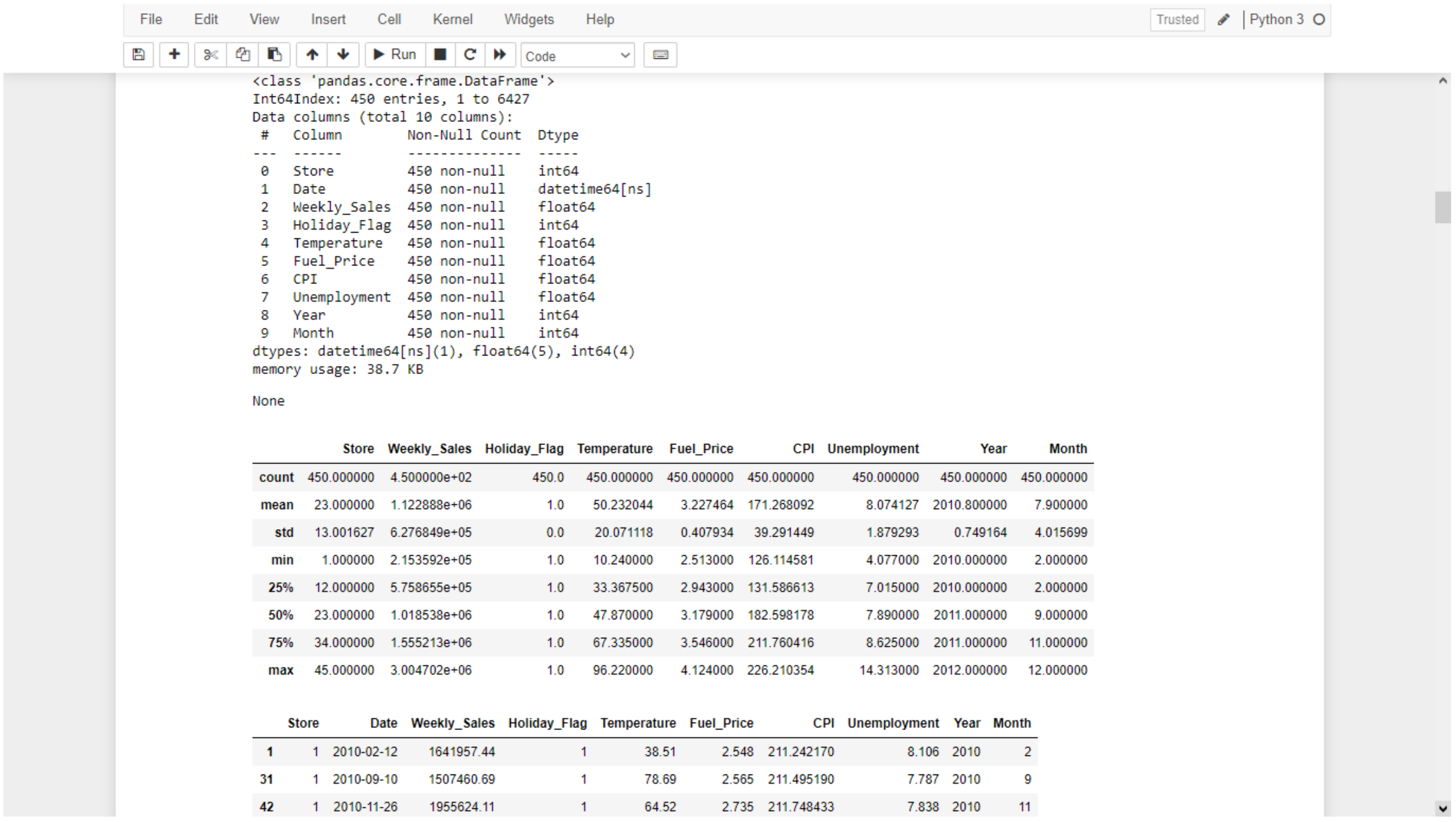
In [8]:
```
walmart_store_Q32012 = walmart_store[(pd.to_datetime(walmart_store['Date']) >= pd.to_datetime('07-01-2012')) & (pd.to_datetime(wa
walmart_store_growth = walmart_store_Q32012.groupby(['Store'])['Weekly_Sales'].sum()
print("Store Number {} has Good Quartely Growth in Q3'2012 {}".format(walmart_store_growth.idxmax(),walmart_store_growth.max()))
```

```
Store Number 4 has Good Quartely Growth in Q3'2012 25652119.35
```

Sales During a Holiday Week and nonholiday

In [47]:
```
walmart_store['Date'] = pd.to_datetime(walmart_store.Date, format = '%d-%m-%Y')
walmart_store['Year'], walmart_store['Month'] = walmart_store['Date'].dt.year, walmart_store['Date'].dt.month
holiday_group = walmart_store.groupby('Holiday_Flag',sort=False)
holiday_week = holiday_group.get_group(1)
display(holiday_week.shape)
display(holiday_week.info())
display(holiday_week.describe())
display(holiday_week.head())
```

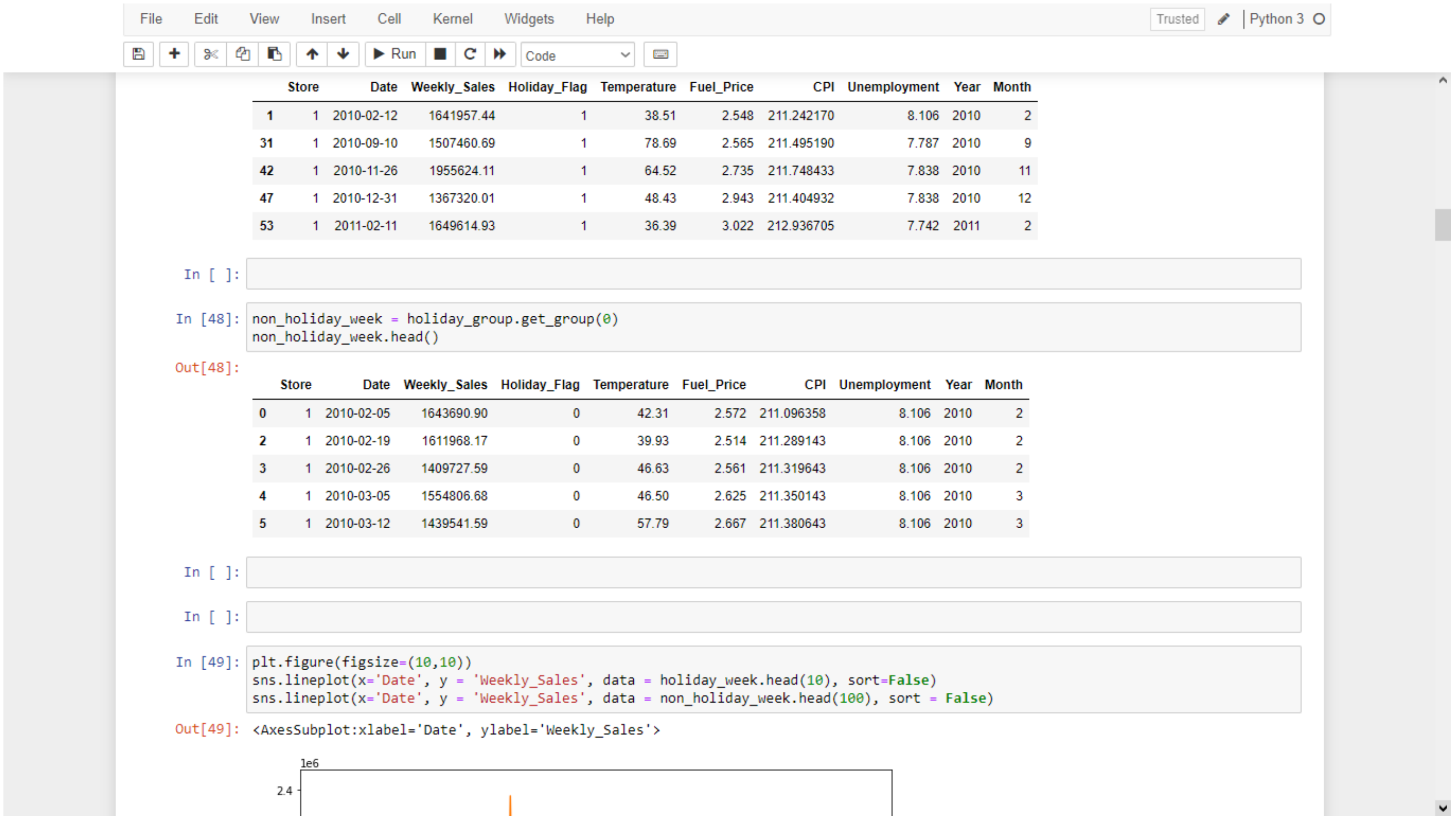
```
(450, 10)

<class 'pandas.core.frame.DataFrame'>
Int64Index: 450 entries, 1 to 6427
Data columns (total 10 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   Store         450 non-null    int64
 1   Date          450 non-null    datetime64[ns]
 2   Weekly_Sales  450 non-null    float64
```



```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 450 entries, 1 to 6427
Data columns (total 10 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   Store         450 non-null    int64
 1   Date          450 non-null    datetime64[ns]
 2   Weekly_Sales  450 non-null    float64
 3   Holiday_Flag  450 non-null    int64
 4   Temperature   450 non-null    float64
 5   Fuel_Price    450 non-null    float64
 6   CPI           450 non-null    float64
 7   Unemployment  450 non-null    float64
 8   Year          450 non-null    int64
 9   Month         450 non-null    int64
dtypes: datetime64[ns](1), float64(5), int64(4)
memory usage: 38.7 KB

None
```

	Store	Weekly_Sales	Holiday_Flag	Temperature	Fuel_Price	CPI	Unemployment	Year	Month
count	450.000000	4.500000e+02	450.0	450.000000	450.000000	450.000000	450.000000	450.000000	450.000000
mean	23.000000	1.122888e+06	1.0	50.232044	3.227464	171.268092	8.074127	2010.800000	7.900000
std	13.001627	6.276849e+05	0.0	20.071118	0.407934	39.291449	1.879293	0.749164	4.015699
min	1.000000	2.153592e+05	1.0	10.240000	2.513000	126.114581	4.077000	2010.000000	2.000000
25%	12.000000	5.758655e+05	1.0	33.367500	2.943000	131.586613	7.015000	2010.000000	2.000000
50%	23.000000	1.018538e+06	1.0	47.870000	3.179000	182.598178	7.890000	2011.000000	9.000000
75%	34.000000	1.555213e+06	1.0	67.335000	3.546000	211.760416	8.625000	2011.000000	11.000000
max	45.000000	3.004702e+06	1.0	96.220000	4.124000	226.210354	14.313000	2012.000000	12.000000

	Store	Date	Weekly_Sales	Holiday_Flag	Temperature	Fuel_Price	CPI	Unemployment	Year	Month
1	1	2010-02-12	1641957.44	1	38.51	2.548	211.242170	8.106	2010	2
31	1	2010-09-10	1507460.69	1	78.69	2.565	211.495190	7.787	2010	9
42	1	2010-11-26	1955624.11	1	64.52	2.735	211.748433	7.838	2010	11



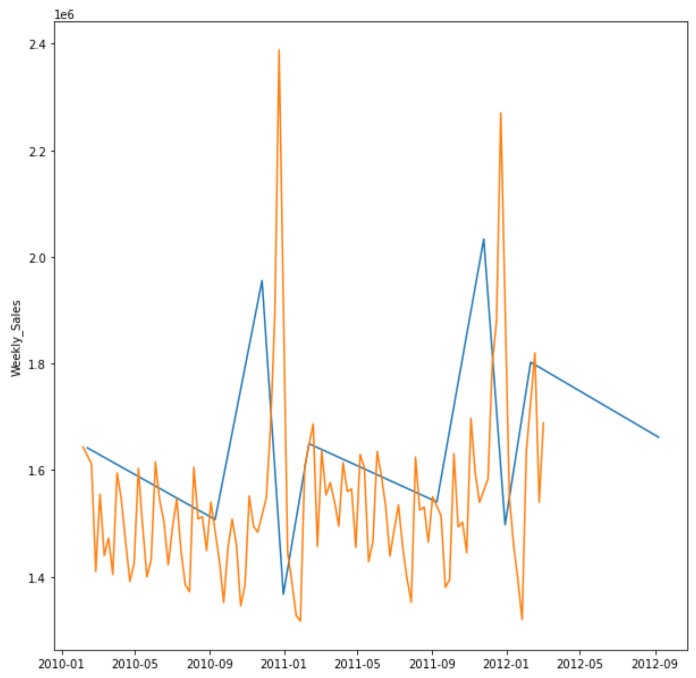
	Store	Date	Weekly_Sales	Holiday_Flag	Temperature	Fuel_Price	CPI	Unemployment	Year	Month
1	1	2010-02-12	1641957.44	1	38.51	2.548	211.242170	8.106	2010	2
31	1	2010-09-10	1507460.69	1	78.69	2.565	211.495190	7.787	2010	9
42	1	2010-11-26	1955624.11	1	64.52	2.735	211.748433	7.838	2010	11
47	1	2010-12-31	1367320.01	1	48.43	2.943	211.404932	7.838	2010	12
53	1	2011-02-11	1649614.93	1	36.39	3.022	212.936705	7.742	2011	2

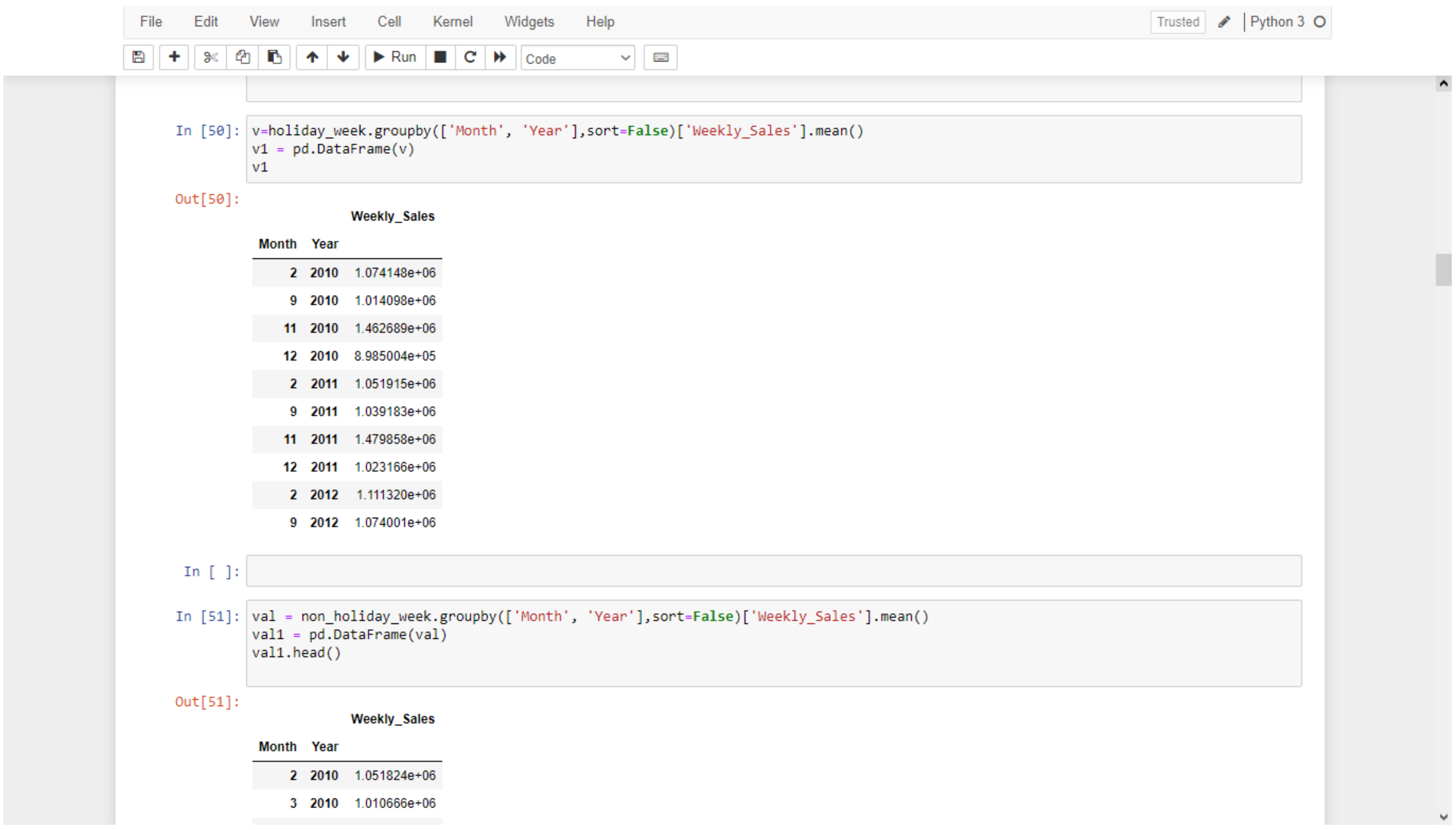
```
In [ ]:

In [48]: non_holiday_week = holiday_group.get_group(0)
         non_holiday_week.head()

Out[48]:
```

	Store	Date	Weekly_Sales	Holiday_Flag	Temperature	Fuel_Price	CPI	Unemployment	Year	Month
0	1	2010-02-05	1643690.90	0	42.31	2.572	211.096358	8.106	2010	2
2	1	2010-02-19	1611968.17	0	39.93	2.514	211.289143	8.106	2010	2
3	1	2010-02-26	1409727.59	0	46.63	2.561	211.319643	8.106	2010	2
4	1	2010-03-05	1554806.68	0	46.50	2.625	211.350143	8.106	2010	3
5	1	2010-03-12	1439541.59	0	57.79	2.667	211.380643	8.106	2010	3

```
In [ ]:

In [ ]:

In [49]: plt.figure(figsize=(10,10))
         sns.lineplot(x='Date', y = 'Weekly_Sales', data = holiday_week.head(10), sort=False)
         sns.lineplot(x='Date', y = 'Weekly_Sales', data = non_holiday_week.head(100), sort = False)

Out[49]: <AxesSubplot:xlabel='Date', ylabel='Weekly_Sales'>
```

```
In [49]: plt.figure(figsize=(10,10))
         sns.lineplot(x='Date', y = 'Weekly_Sales', data = holiday_week.head(10), sort=False)
         sns.lineplot(x='Date', y = 'Weekly_Sales', data = non_holiday_week.head(100), sort = False)

Out[49]: <AxesSubplot:xlabel='Date', ylabel='Weekly_Sales'>
```





```
In [50]: v=holiday_week.groupby(['Month', 'Year'],sort=False)['Weekly_Sales'].mean()
         v1 = pd.DataFrame(v)
         v1
```

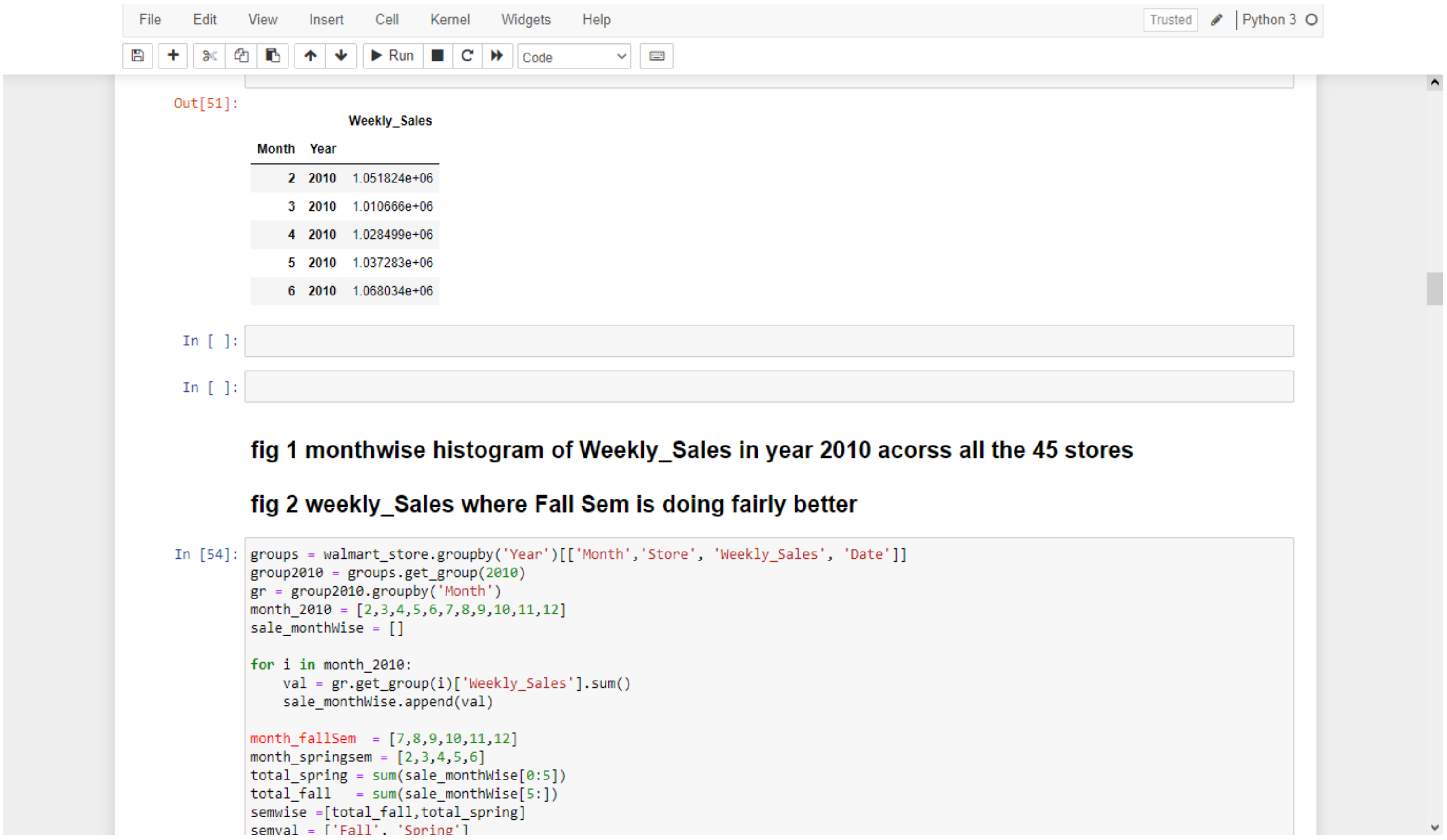
Out[50]:

		Weekly_Sales
Month	**Year**	
2	**2010**	1.074148e+06
9	**2010**	1.014098e+06
11	**2010**	1.462689e+06
12	**2010**	8.985004e+05
2	**2011**	1.051915e+06
9	**2011**	1.039183e+06
11	**2011**	1.479858e+06
12	**2011**	1.023166e+06
2	**2012**	1.111320e+06
9	**2012**	1.074001e+06

```
In [ ]:

In [51]: val = non_holiday_week.groupby(['Month', 'Year'],sort=False)['Weekly_Sales'].mean()
         val1 = pd.DataFrame(val)
         val1.head()
```

Out[51]:

		Weekly_Sales
Month	**Year**	
2	**2010**	1.051824e+06
3	**2010**	1.010666e+06



Out[51]:

		Weekly_Sales
Month	Year	
2	2010	1.051824e+06
3	2010	1.010666e+06
4	2010	1.028499e+06
5	2010	1.037283e+06
6	2010	1.068034e+06

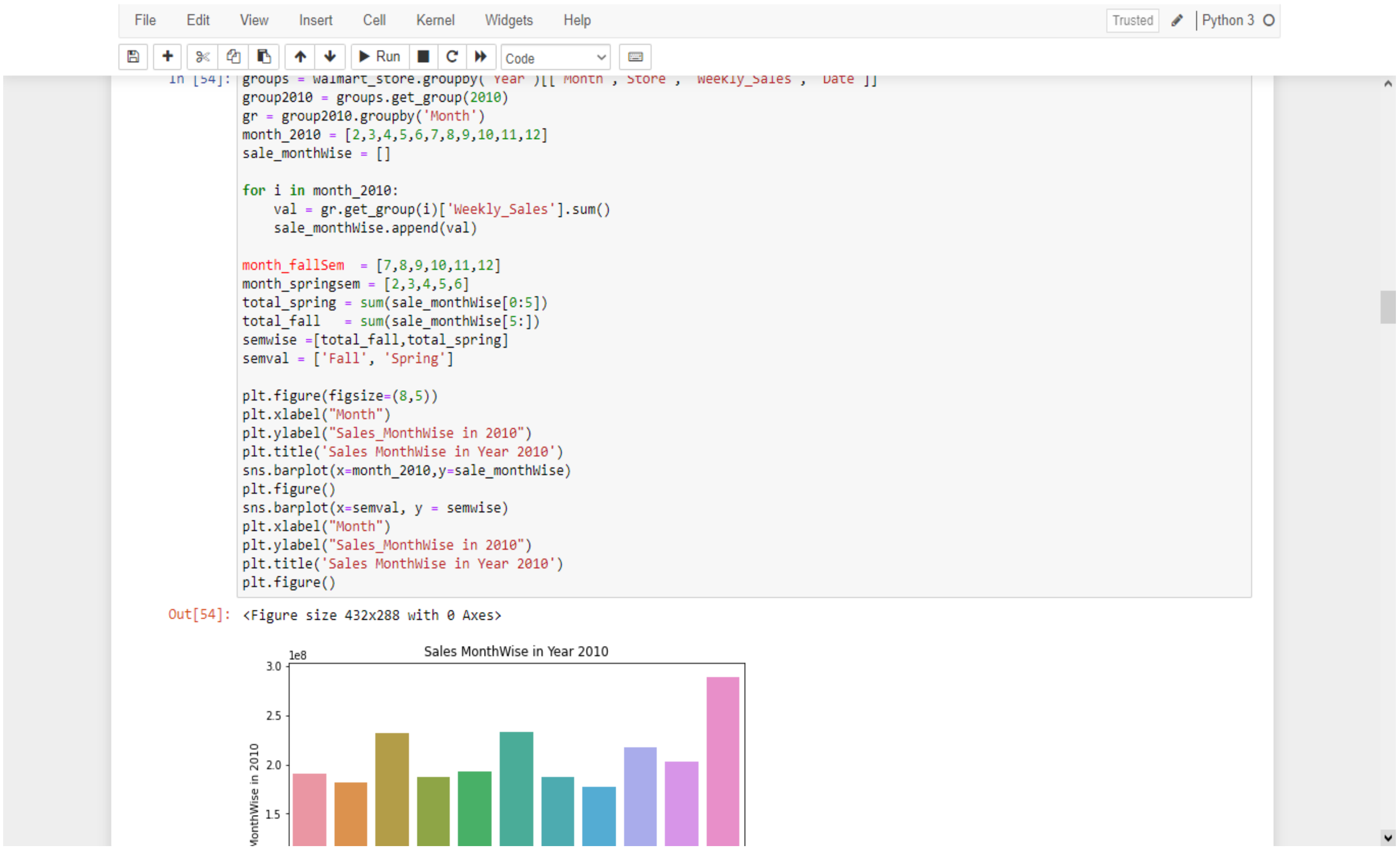
In [ ]:

In [ ]:

fig 1 monthwise histogram of Weekly_Sales in year 2010 acorss all the 45 stores

fig 2 weekly_Sales where Fall Sem is doing fairly better

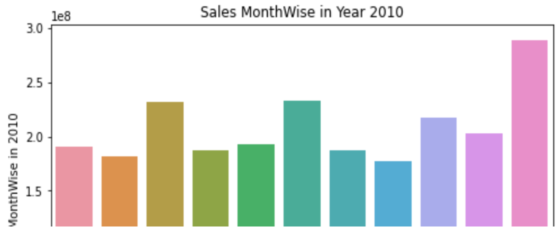
In [54]:
```
groups = walmart_store.groupby('Year')[['Month','Store', 'Weekly_Sales', 'Date']]
group2010 = groups.get_group(2010)
gr = group2010.groupby('Month')
month_2010 = [2,3,4,5,6,7,8,9,10,11,12]
sale_monthWise = []

for i in month_2010:
    val = gr.get_group(i)['Weekly_Sales'].sum()
    sale_monthWise.append(val)

month_fallSem  = [7,8,9,10,11,12]
month_springsem = [2,3,4,5,6]
total_spring = sum(sale_monthWise[0:5])
total_fall   = sum(sale_monthWise[5:])
semwise =[total_fall,total_spring]
semval = ['Fall', 'Spring']
```

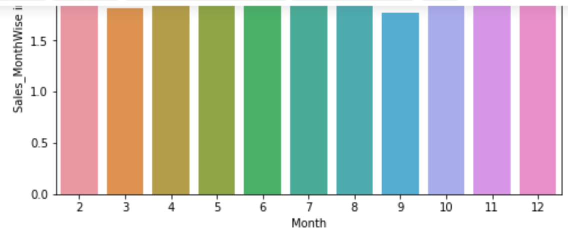


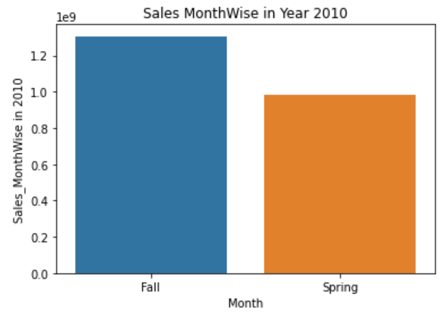
```
In [54]: groups = walmart_store.groupby('Year')[['Month','Store', 'Weekly_Sales', 'Date']]
group2010 = groups.get_group(2010)
gr = group2010.groupby('Month')
month_2010 = [2,3,4,5,6,7,8,9,10,11,12]
sale_monthWise = []

for i in month_2010:
    val = gr.get_group(i)['Weekly_Sales'].sum()
    sale_monthWise.append(val)

month_fallSem  = [7,8,9,10,11,12]
month_springsem = [2,3,4,5,6]
total_spring = sum(sale_monthWise[0:5])
total_fall   = sum(sale_monthWise[5:])
semwise =[total_fall,total_spring]
semval = ['Fall', 'Spring']
```

```
plt.figure(figsize=(8,5))
plt.xlabel("Month")
plt.ylabel("Sales_MonthWise in 2010")
plt.title('Sales MonthWise in Year 2010')
sns.barplot(x=month_2010,y=sale_monthWise)
plt.figure()
sns.barplot(x=semval, y = semwise)
plt.xlabel("Month")
plt.ylabel("Sales_MonthWise in 2010")
plt.title('Sales MonthWise in Year 2010')
plt.figure()
```

Out[54]:
```
<Figure size 432x288 with 0 Axes>
```







```
<Figure size 432x288 with 0 Axes>
```

```
In [ ]:
```

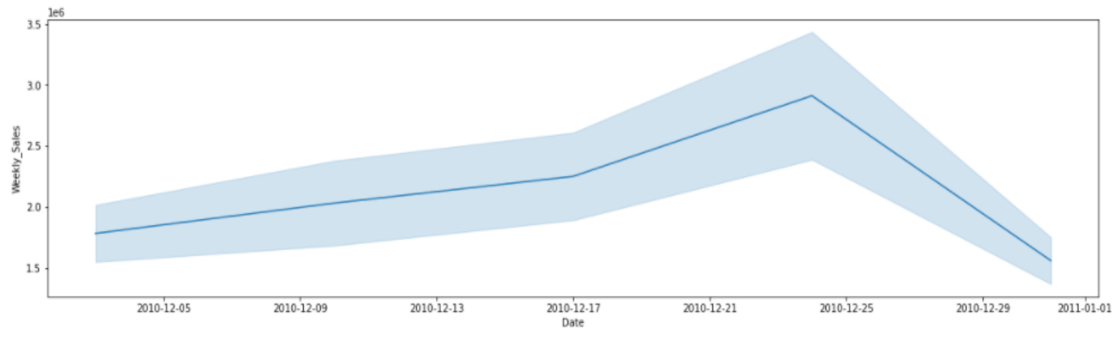
Last Two Plots Talks about the how sales are varying in month of december. On plotting we found out that Because of Christmas we have more sales during the month of december. Provided that these sales beating the sales of the month feb when superbowl was organised. Which is putting fall sem ahead of Spring sem Collectively

Last Two Plots Talks about the how sales are varying in month of december. On plotting we found out that Because of Christmas we have more sales during the month of december. Provided that these sales beating the sales of the month feb when superbowl was organised. Which is putting fall sem ahead of Spring sem Collectively

2010

```
In [56]: group2010Months = group2010.groupby('Month')[['Weekly_Sales', 'Store', 'Date']]
         group2010month12 = group2010Months.get_group(12)
         plt.figure(figsize=(20,5))
         sns.lineplot(x='Date', y = 'Weekly_Sales', data = group2010month12.head(10))
         plt.figure()
         plt.figure(figsize=(20,5))
         sns.barplot(x='Date', y = 'Weekly_Sales', data = group2010month12)
```

```
Out[56]: <AxesSubplot:xlabel='Date', ylabel='Weekly_Sales'>
```



```
<Figure size 432x288 with 0 Axes>
```

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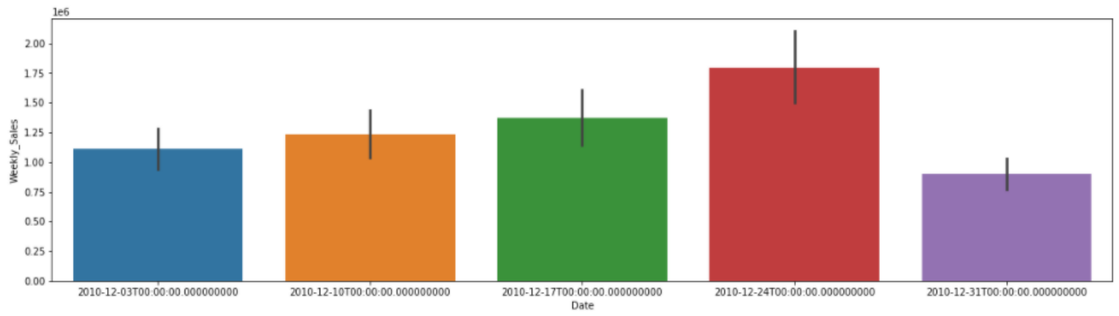
```
<Figure size 432x288 with 0 Axes>
```



2011

In [58]:
```
groups = walmart_store.groupby('Year')[['Month','Store', 'Weekly_Sales', 'Date']]
group2011 = groups.get_group(2011)
gr = group2011.groupby('Month')
month_2011 = [1,2,3,4,5,6,7,8,9,10,11,12]
sale_monthWise = []

for i in month_2011:
    val = gr.get_group(i)['Weekly_Sales'].sum()
    sale_monthWise.append(val)

month_fallSem  = [7,8,9,10,11,12]
month_springsem = [1,2,3,4,5,6]
total_spring  = sum(sale_monthWise[0:5])
total_fall    = sum(sale_monthWise[5:])
semwise =[total_fall,total_spring]
semval = ['Fall', 'Spring']

plt.figure(figsize=(8,5))
plt.xlabel("Month")
```

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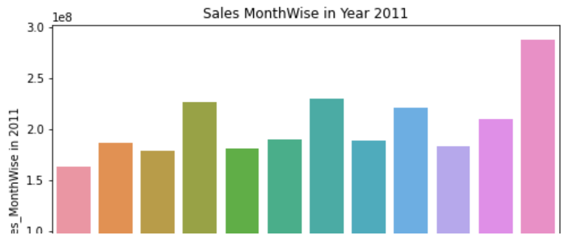
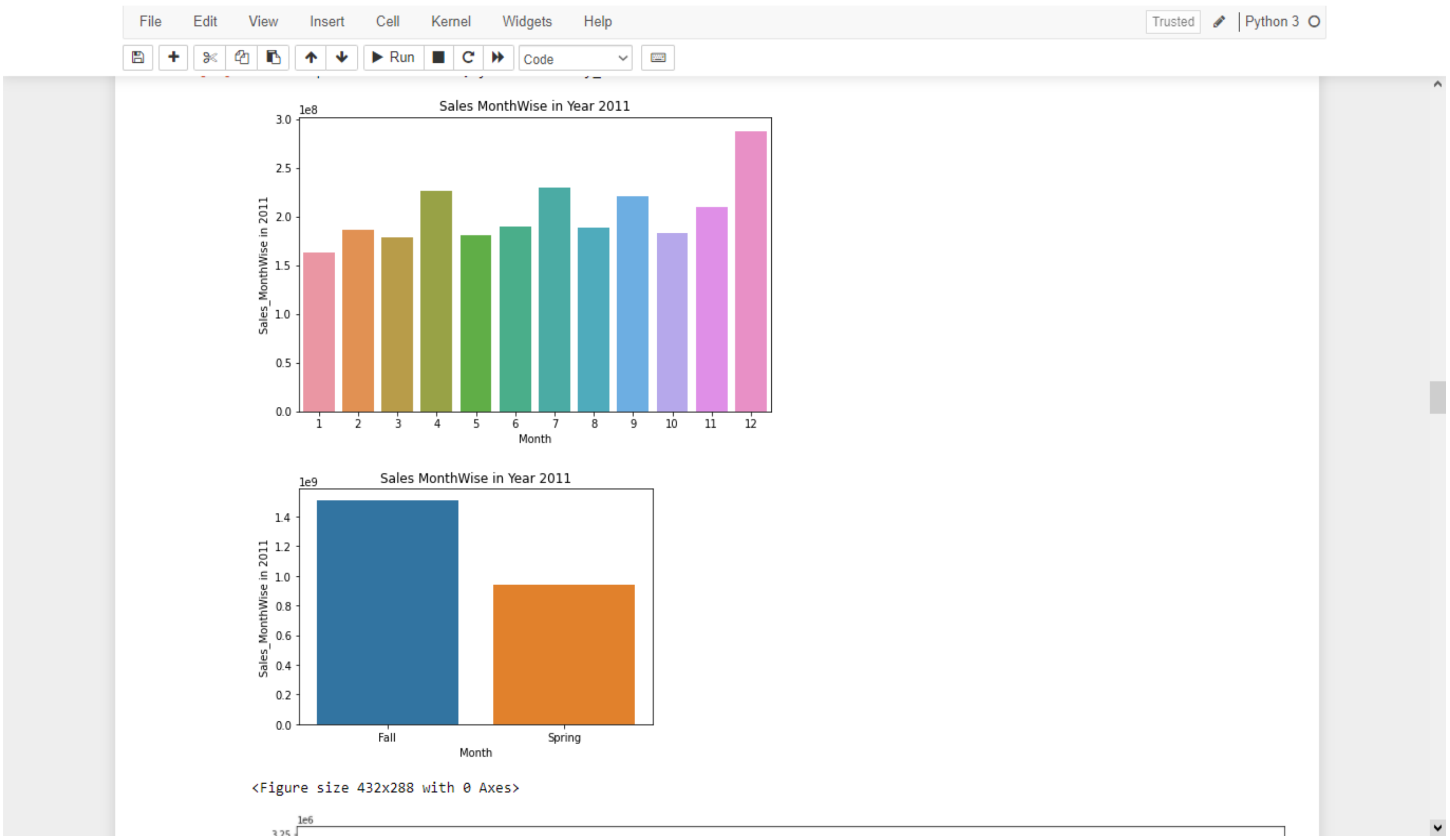
```
month_fallSem  = [7,8,9,10,11,12]
month_springsem = [1,2,3,4,5,6]
total_spring  = sum(sale_monthWise[0:5])
total_fall    = sum(sale_monthWise[5:])
semwise =[total_fall,total_spring]
semval = ['Fall', 'Spring']

plt.figure(figsize=(8,5))
plt.xlabel("Month")
```

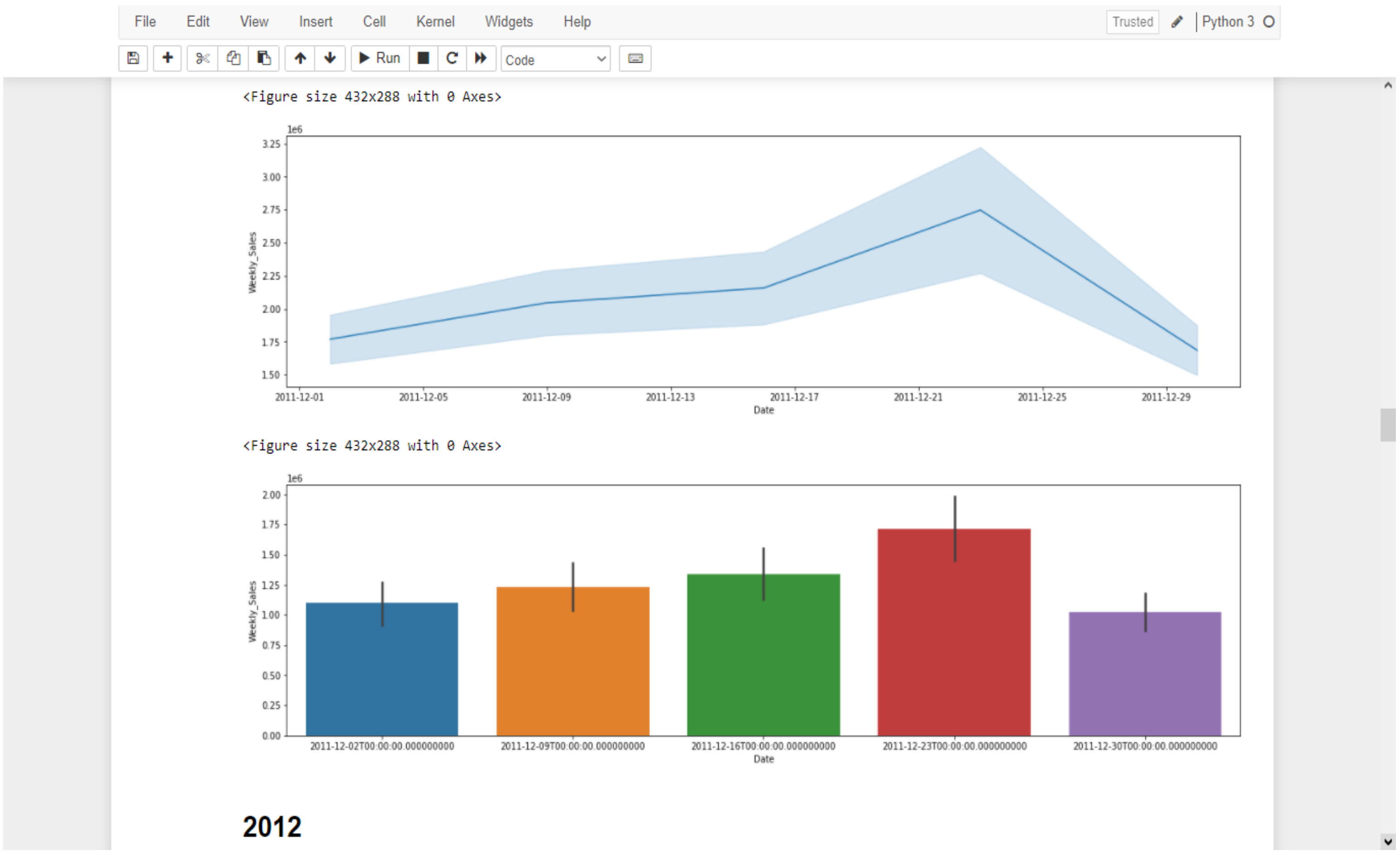
```
plt.ylabel("Sales_MonthWise in 2011")
plt.title('Sales MonthWise in Year 2011')
sns.barplot(x=month_2011,y=sale_monthWise)
plt.figure()
sns.barplot(x=semval, y = semwise)
plt.xlabel("Month")
plt.ylabel("Sales_MonthWise in 2011")
plt.title('Sales MonthWise in Year 2011')
plt.figure()

group2011Months = group2011.groupby('Month')[['Weekly_Sales', 'Store', 'Date']]
group2011month12 = group2011Months.get_group(12)
plt.figure(figsize=(20,5))
sns.lineplot(x='Date', y = 'Weekly_Sales', data = group2011month12.head(10))
plt.figure()
plt.figure(figsize=(20,5))
sns.barplot(x='Date', y = 'Weekly_Sales', data = group2011month12)
```

Out[58]:
```
<AxesSubplot:xlabel='Date', ylabel='Weekly_Sales'>
```




File Edit View Insert Cell Kernel Widgets Help
Trusted
Python 3
Run
Code
Sales MonthWise in Year 2011
1e8
Sales_MonthWise in 2011
0.0 0.5 1.0 1.5 2.0 2.5 3.0
1 2 3 4 5 6 7 8 9 10 11 12
Month
Sales MonthWise in Year 2011
1e9
Sales_MonthWise in 2011
0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4
Fall
Spring
Month
1e6

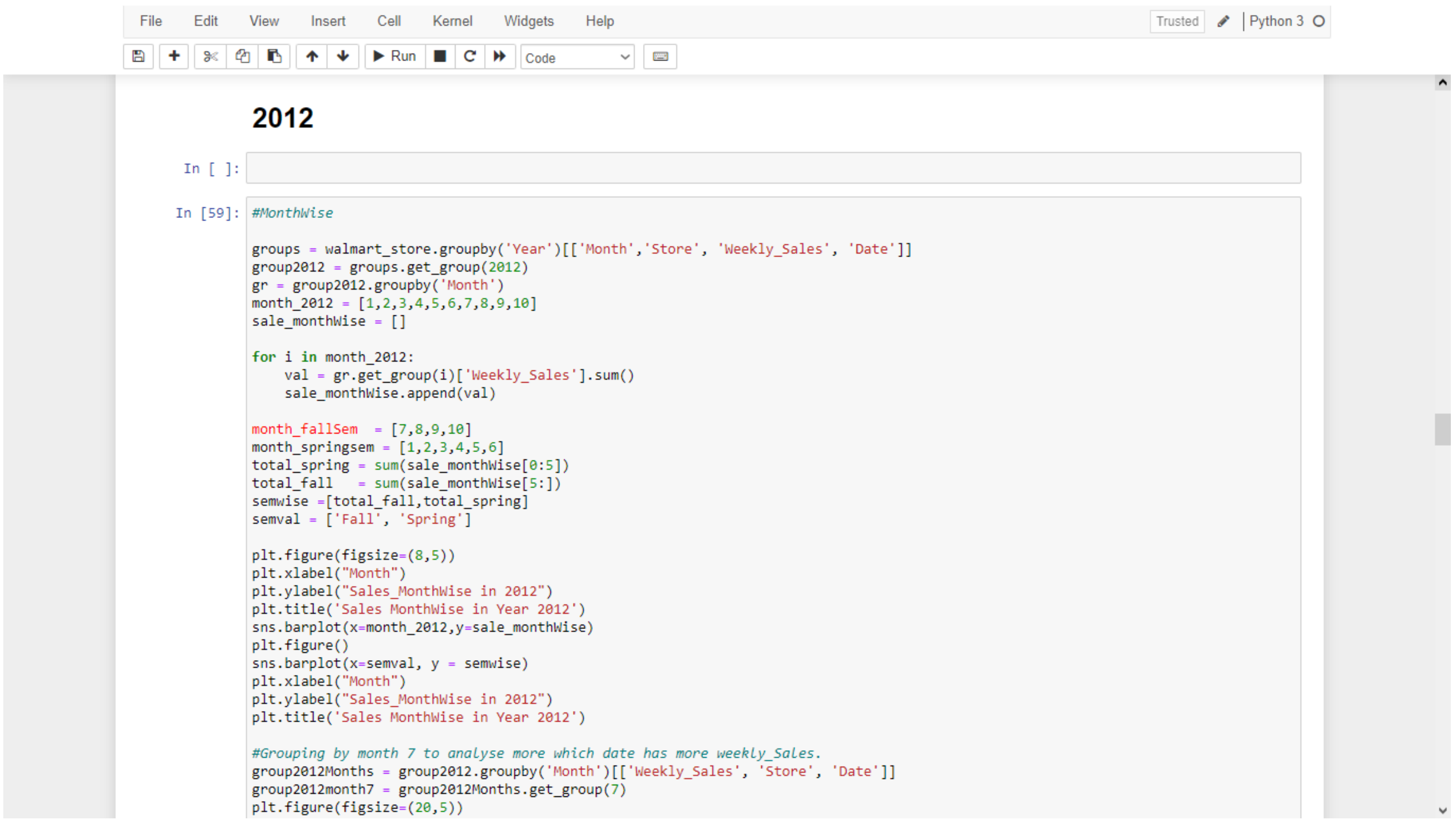
```
<Figure size 432x288 with 0 Axes>
```


File Edit View Insert Cell Kernel Widgets Help
Trusted
Python 3
Run
Code
1e6
Weekly_Sales
1.50 1.75 2.00 2.25 2.50 2.75 3.00 3.25
2011-12-01 2011-12-05 2011-12-09 2011-12-13 2011-12-17 2011-12-21 2011-12-25 2011-12-29
Date
1e6
Weekly_Sales
0.00 0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00
2011-12-02T00:00:00.000000000
2011-12-09T00:00:00.000000000
2011-12-16T00:00:00.000000000
2011-12-23T00:00:00.000000000
2011-12-30T00:00:00.000000000
Date

```
<Figure size 432x288 with 0 Axes>
```

```
<Figure size 432x288 with 0 Axes>
```

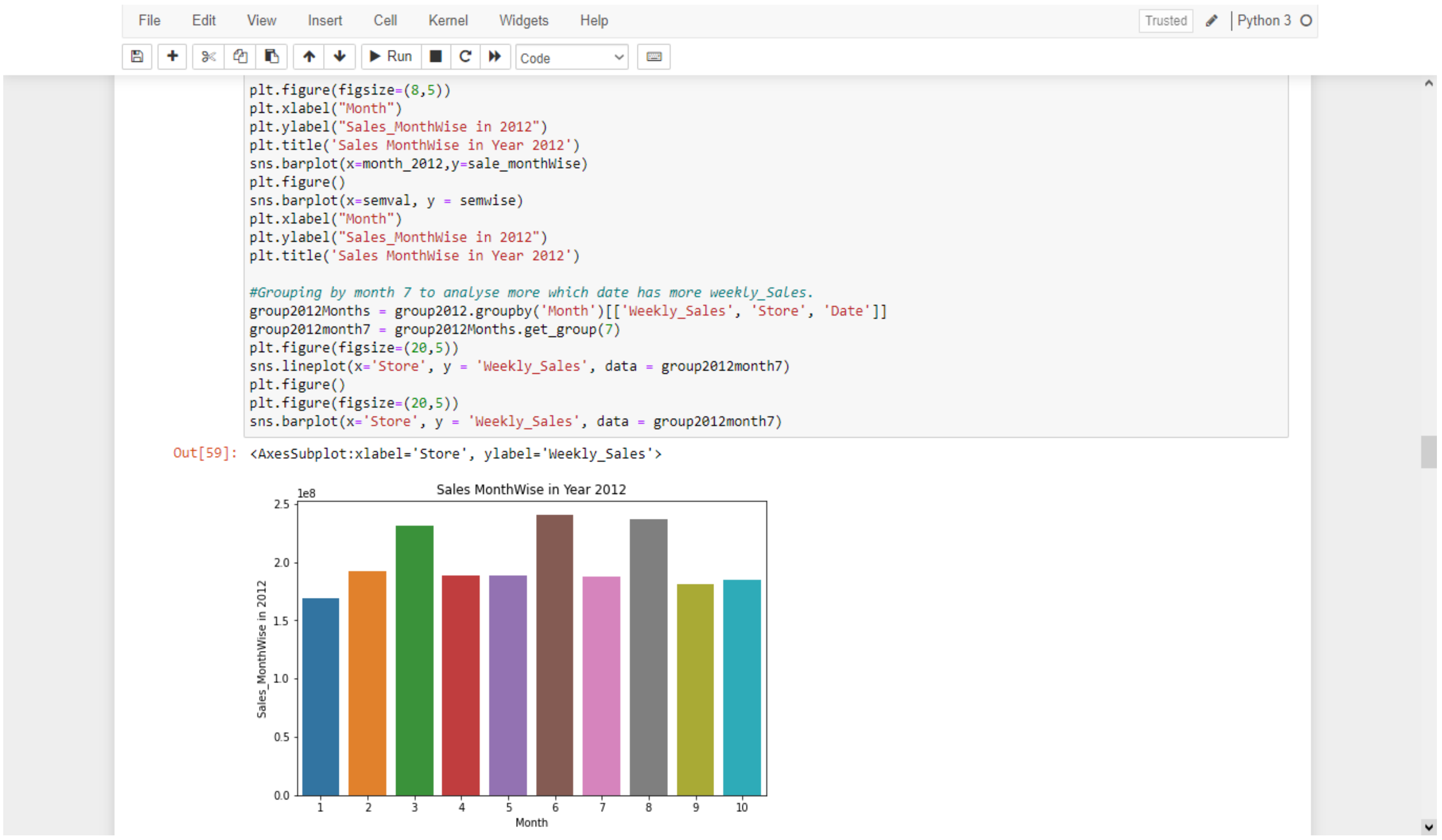
2012



2012

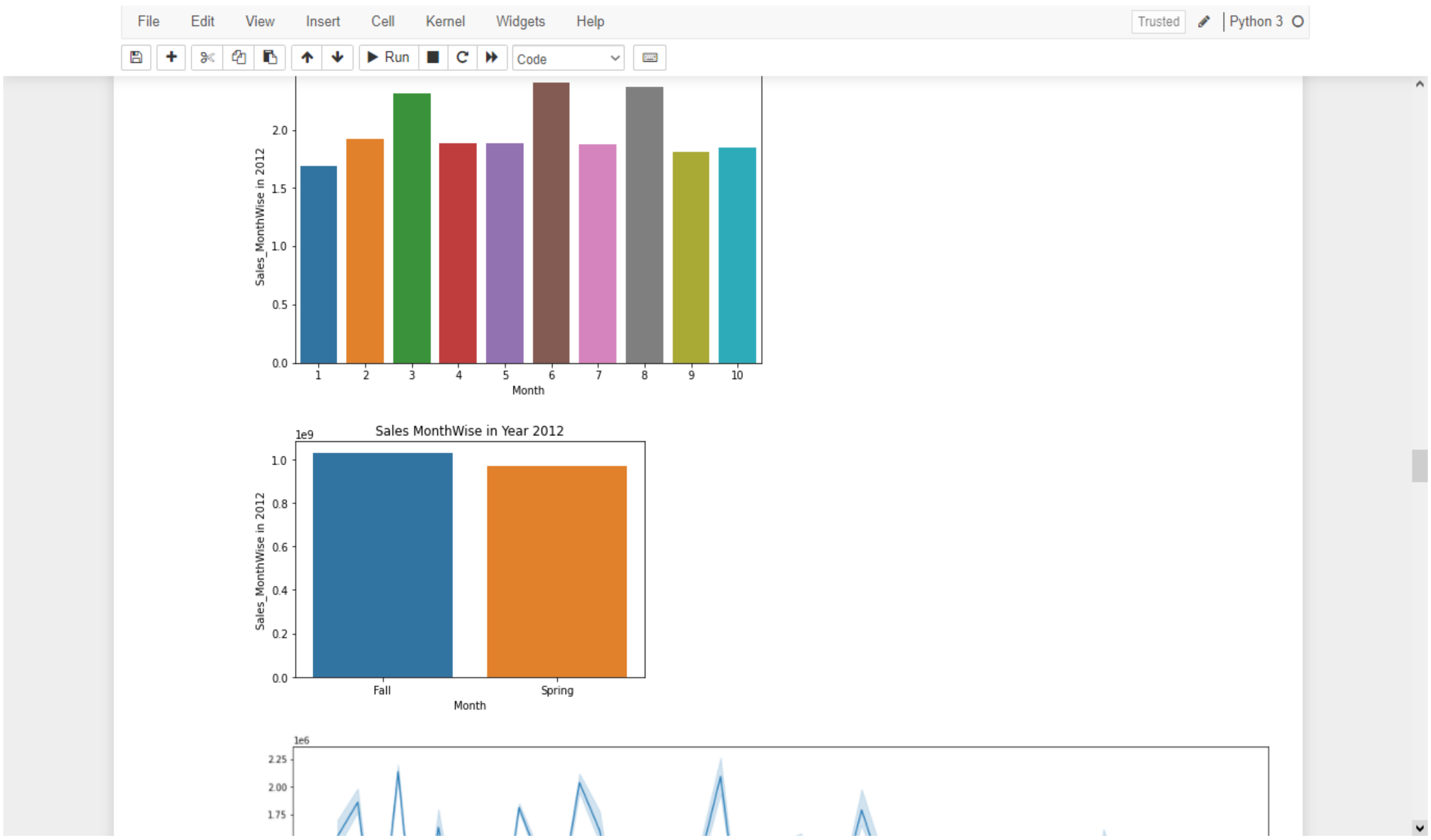
In [ ]:

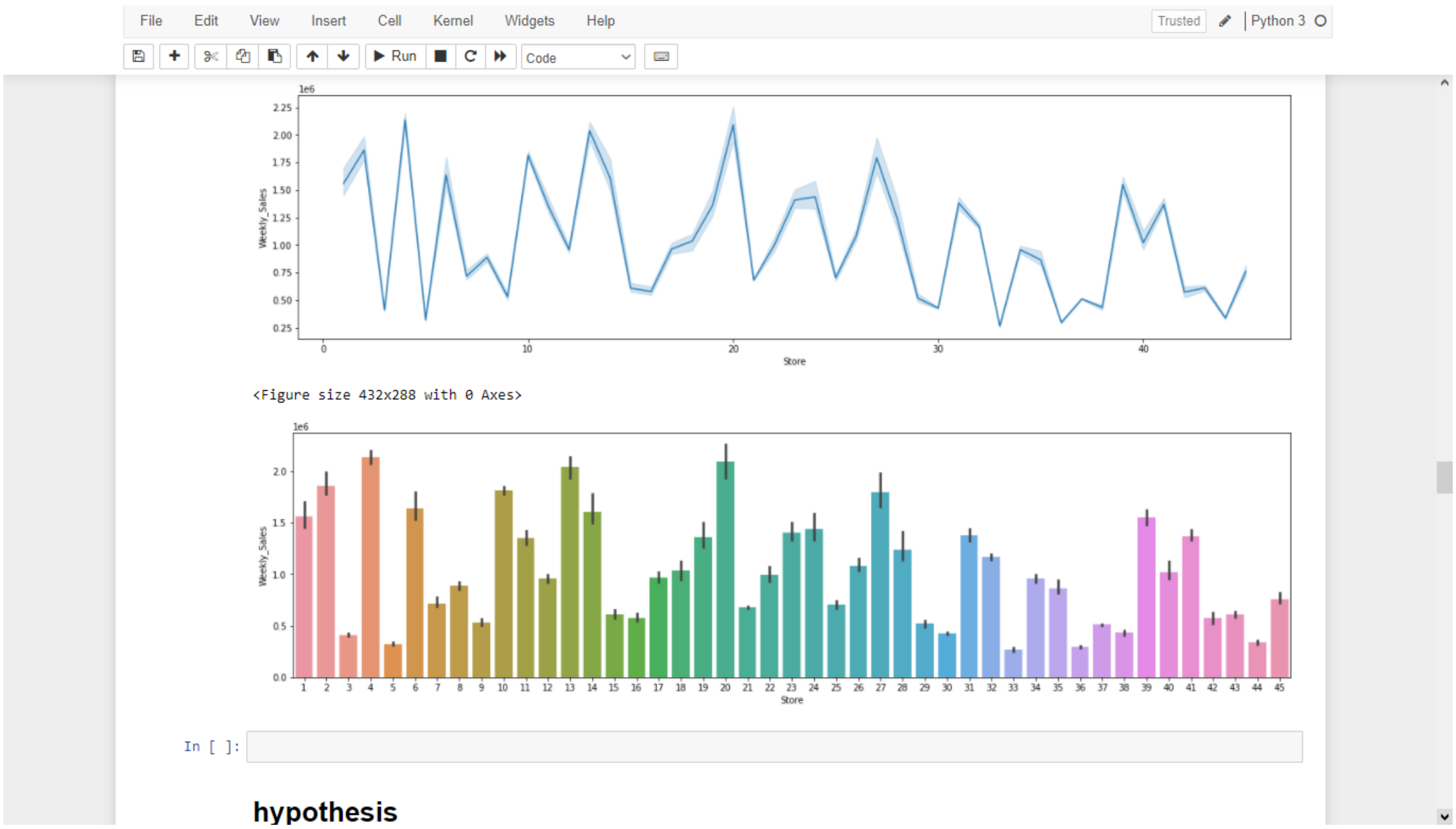
In [59]:
```
#MonthWise

groups = walmart_store.groupby('Year')[['Month','Store', 'Weekly_Sales', 'Date']]
group2012 = groups.get_group(2012)
gr = group2012.groupby('Month')
month_2012 = [1,2,3,4,5,6,7,8,9,10]
sale_monthWise = []

for i in month_2012:
    val = gr.get_group(i)['Weekly_Sales'].sum()
    sale_monthWise.append(val)

month_fallSem  = [7,8,9,10]
month_springsem = [1,2,3,4,5,6]
total_spring = sum(sale_monthWise[0:5])
total_fall   = sum(sale_monthWise[5:])
semwise =[total_fall,total_spring]
semval = ['Fall', 'Spring']

plt.figure(figsize=(8,5))
plt.xlabel("Month")
plt.ylabel("Sales_MonthWise in 2012")
plt.title('Sales MonthWise in Year 2012')
sns.barplot(x=month_2012,y=sale_monthWise)
plt.figure()
sns.barplot(x=semval, y = semwise)
plt.xlabel("Month")
plt.ylabel("Sales_MonthWise in 2012")
plt.title('Sales MonthWise in Year 2012')

#Grouping by month 7 to analyse more which date has more weekly_Sales.
group2012Months = group2012.groupby('Month')[['Weekly_Sales', 'Store', 'Date']]
group2012month7 = group2012Months.get_group(7)
plt.figure(figsize=(20,5))
```



```
plt.figure(figsize=(8,5))
plt.xlabel("Month")
plt.ylabel("Sales_MonthWise in 2012")
plt.title('Sales MonthWise in Year 2012')
sns.barplot(x=month_2012,y=sale_monthWise)
plt.figure()
sns.barplot(x=semval, y = semwise)
plt.xlabel("Month")
plt.ylabel("Sales_MonthWise in 2012")
plt.title('Sales MonthWise in Year 2012')

#Grouping by month 7 to analyse more which date has more weekly_Sales.
group2012Months = group2012.groupby('Month')[['Weekly_Sales', 'Store', 'Date']]
group2012month7 = group2012Months.get_group(7)
plt.figure(figsize=(20,5))
sns.lineplot(x='Store', y = 'Weekly_Sales', data = group2012month7)
plt.figure()
plt.figure(figsize=(20,5))
sns.barplot(x='Store', y = 'Weekly_Sales', data = group2012month7)
```

Out[59]:
```
<AxesSubplot:xlabel='Store', ylabel='Weekly_Sales'>
```

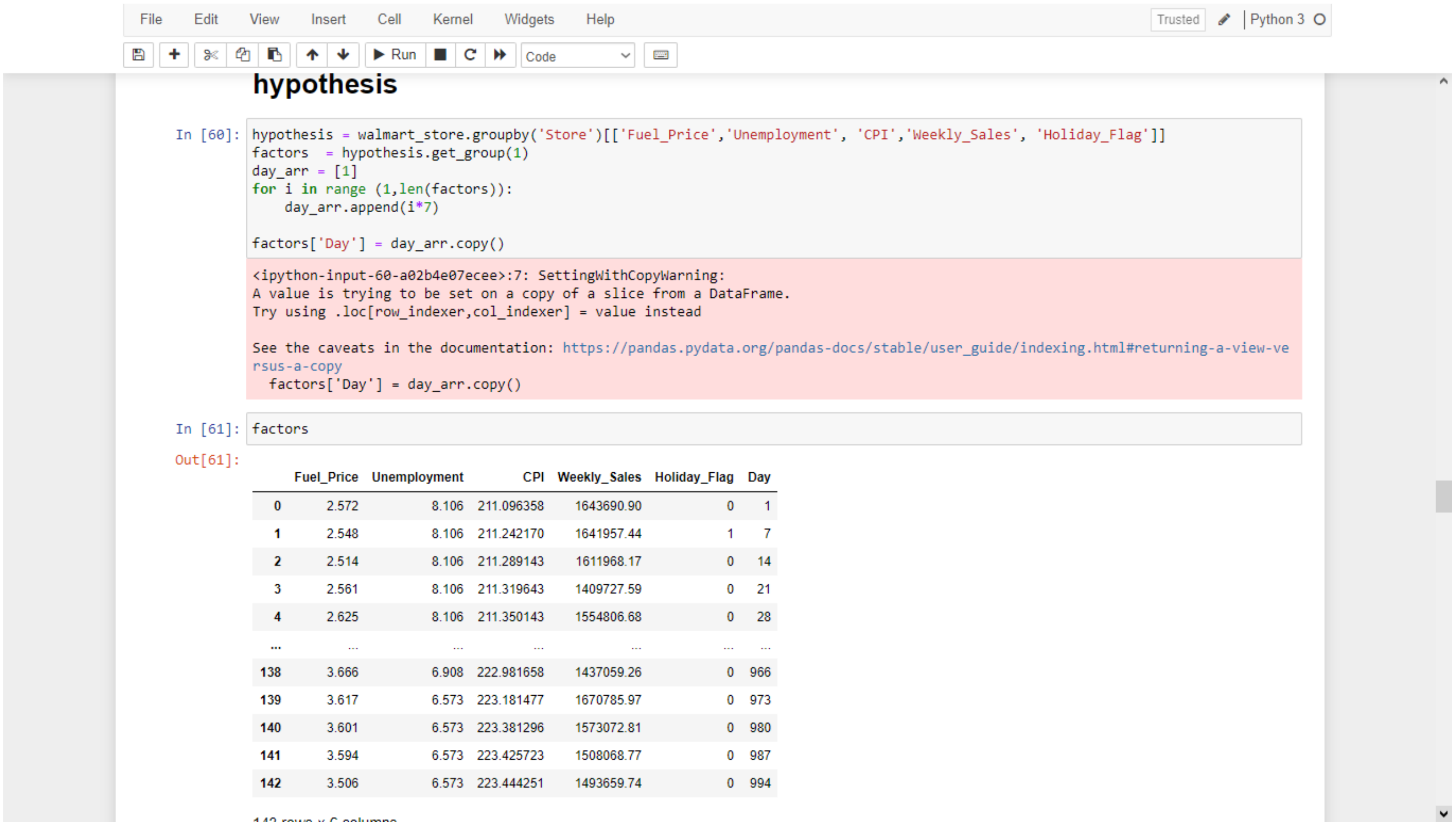




```
<Figure size 432x288 with 0 Axes>
```

```
In [ ]:
```

hypothesis



hypothesis

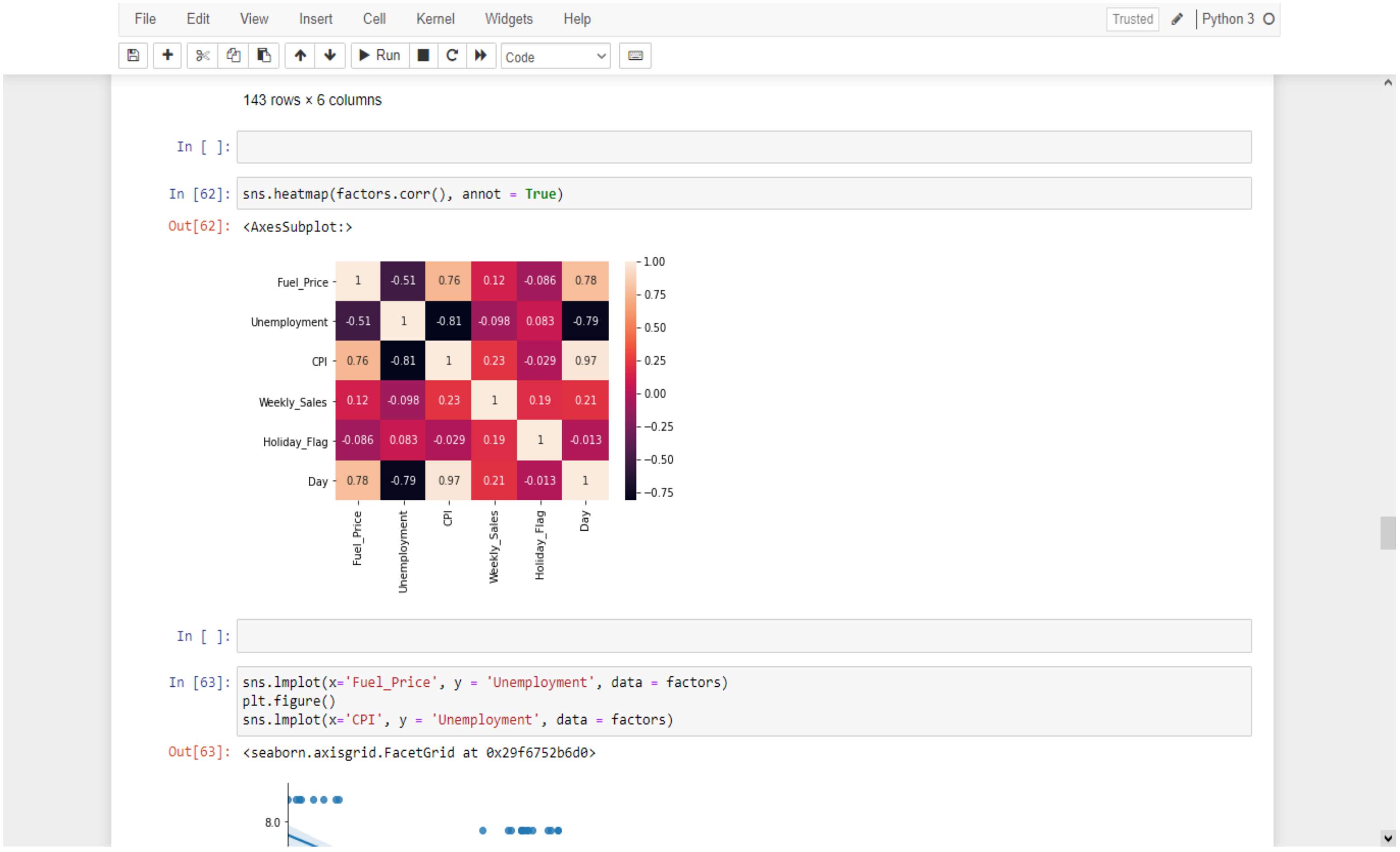
In [60]:
```
hypothesis = walmart_store.groupby('Store')[['Fuel_Price','Unemployment', 'CPI','Weekly_Sales', 'Holiday_Flag']]
factors  = hypothesis.get_group(1)
day_arr = [1]
for i in range (1,len(factors)):
    day_arr.append(i*7)

factors['Day'] = day_arr.copy()
```

```
<ipython-input-60-a02b4e07ecee>:7: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ve
rsus-a-copy
  factors['Day'] = day_arr.copy()
```

In [61]:
```
factors
```

Out[61]:

	Fuel_Price	Unemployment	CPI	Weekly_Sales	Holiday_Flag	Day
0	2.572	8.106	211.096358	1643690.90	0	1
1	2.548	8.106	211.242170	1641957.44	1	7
2	2.514	8.106	211.289143	1611968.17	0	14
3	2.561	8.106	211.319643	1409727.59	0	21
4	2.625	8.106	211.350143	1554806.68	0	28
...	...	...	...	...	...	...
138	3.666	6.908	222.981658	1437059.26	0	966
139	3.617	6.573	223.181477	1670785.97	0	973
140	3.601	6.573	223.381296	1573072.81	0	980
141	3.594	6.573	223.425723	1508068.77	0	987
142	3.506	6.573	223.444251	1493659.74	0	994

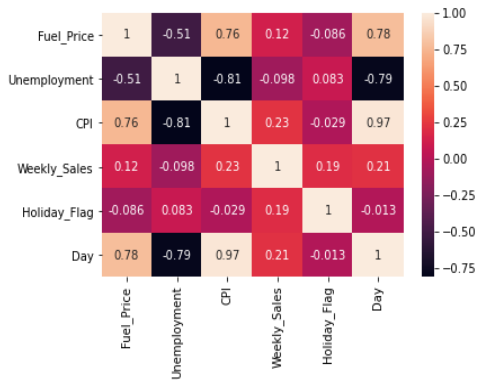


143 rows × 6 columns

In [ ]:

In [62]:
```
sns.heatmap(factors.corr(), annot = True)
```

Out[62]:
```
<AxesSubplot:>
```

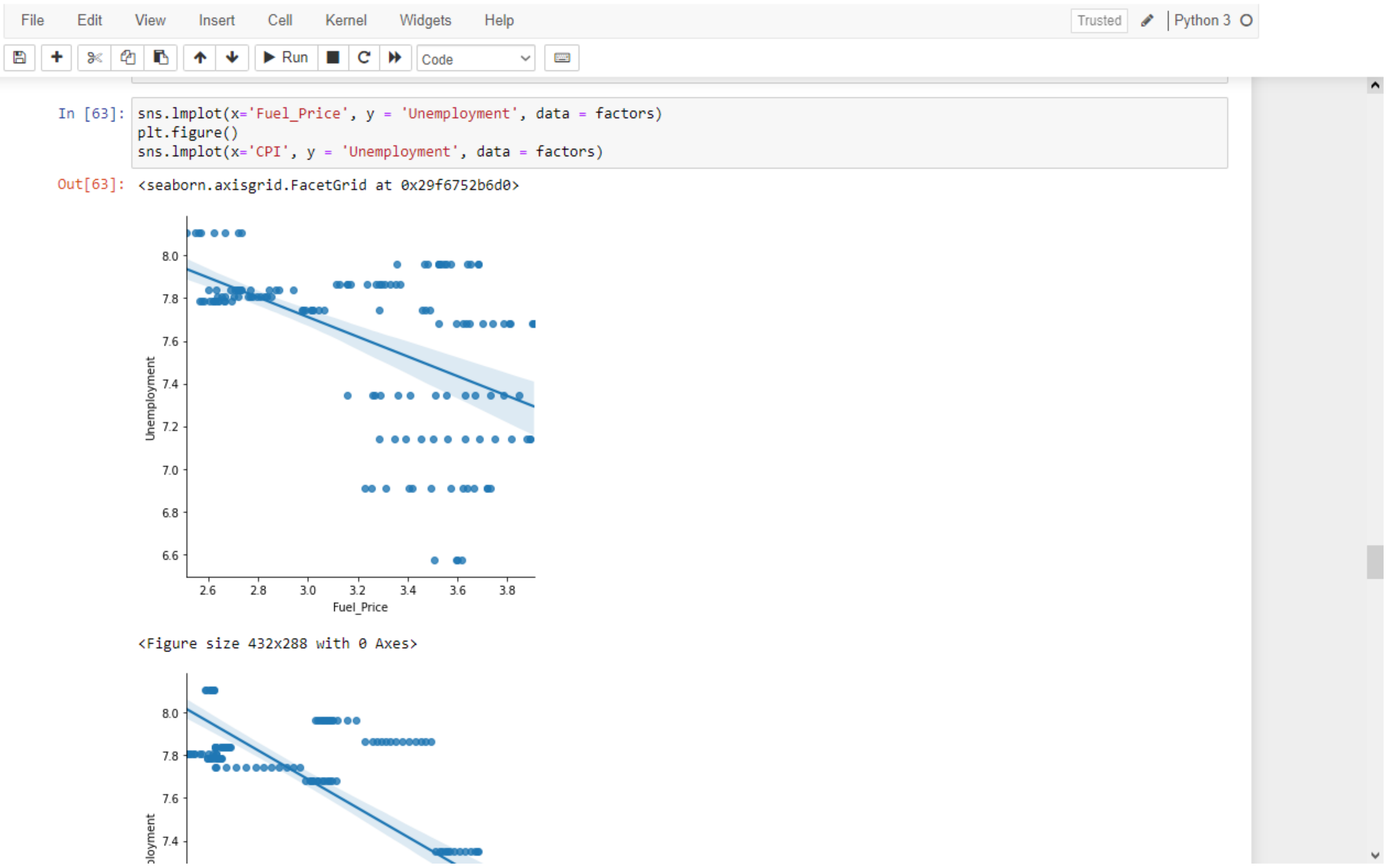


	Fuel_Price	Unemployment	CPI	Weekly_Sales	Holiday_Flag	Day
Fuel_Price	1	-0.51	0.76	0.12	-0.086	0.78
Unemployment	-0.51	1	-0.81	-0.098	0.083	-0.79
CPI	0.76	-0.81	1	0.23	-0.029	0.97
Weekly_Sales	0.12	-0.098	0.23	1	0.19	0.21
Holiday_Flag	-0.086	0.083	-0.029	0.19	1	-0.013
Day	0.78	-0.79	0.97	0.21	-0.013	1

In [ ]:

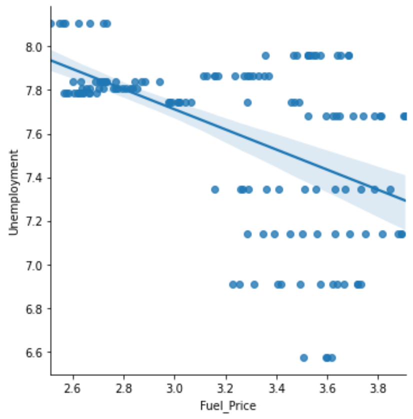
In [63]:
```
sns.lmplot(x='Fuel_Price', y = 'Unemployment', data = factors)
plt.figure()
sns.lmplot(x='CPI', y = 'Unemployment', data = factors)
```

Out[63]:
```
<seaborn.axisgrid.FacetGrid at 0x29f6752b6d0>
```

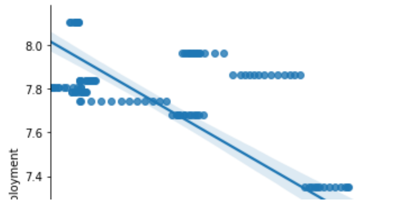


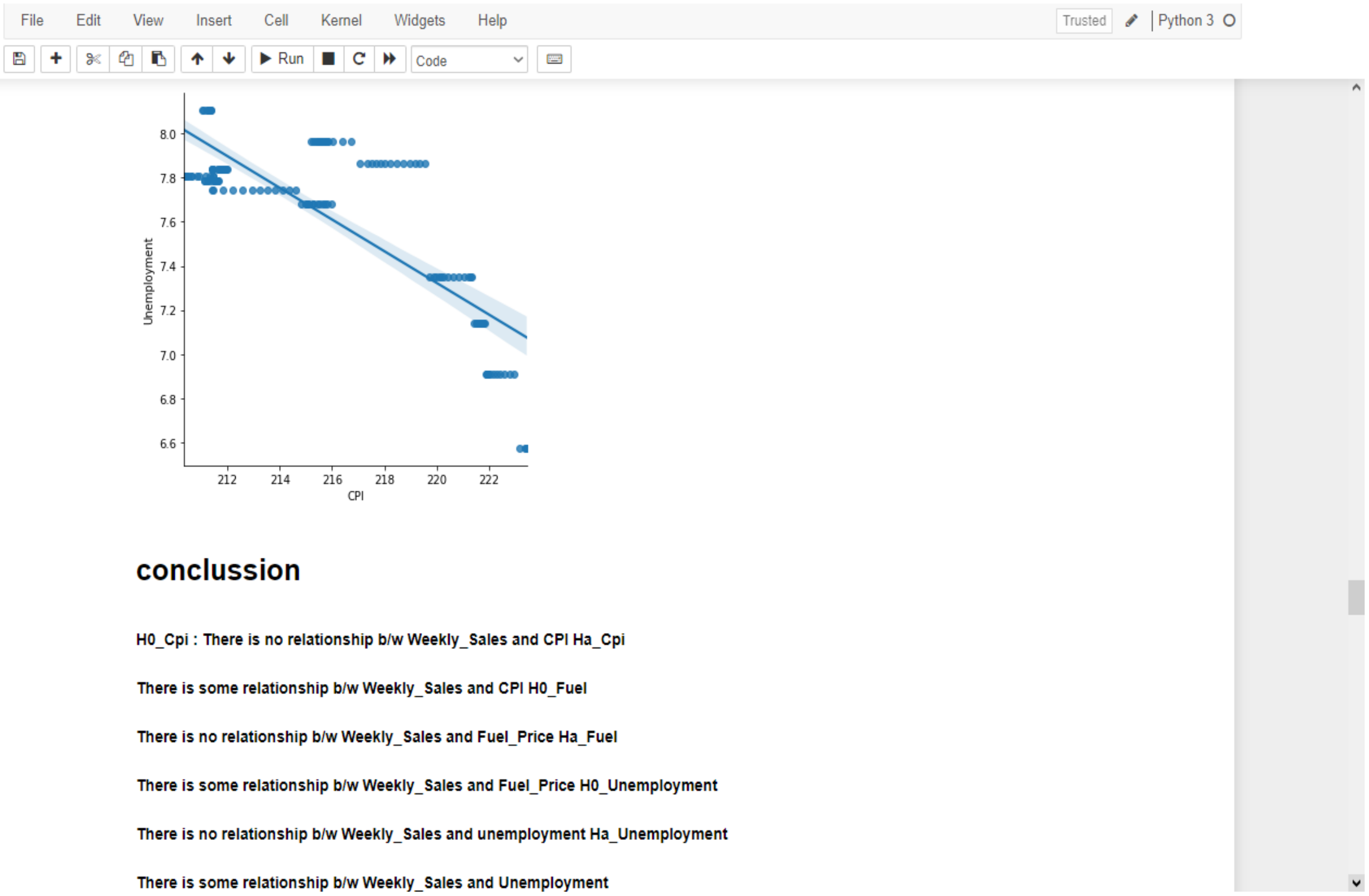
In [63]:
```
sns.lmplot(x='Fuel_Price', y = 'Unemployment', data = factors)
plt.figure()
sns.lmplot(x='CPI', y = 'Unemployment', data = factors)
```

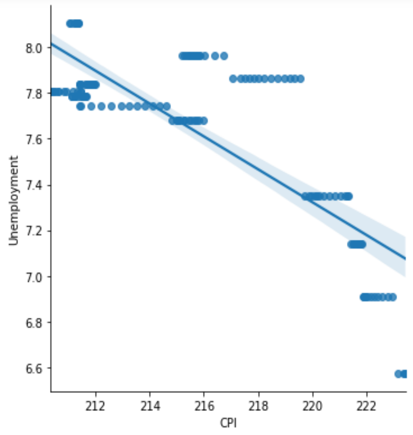
Out[63]:
```
<seaborn.axisgrid.FacetGrid at 0x29f6752b6d0>
```



```
<Figure size 432x288 with 0 Axes>
```







conclussion

H0_Cpi : There is no relationship b/w Weekly_Sales and CPI Ha_Cpi

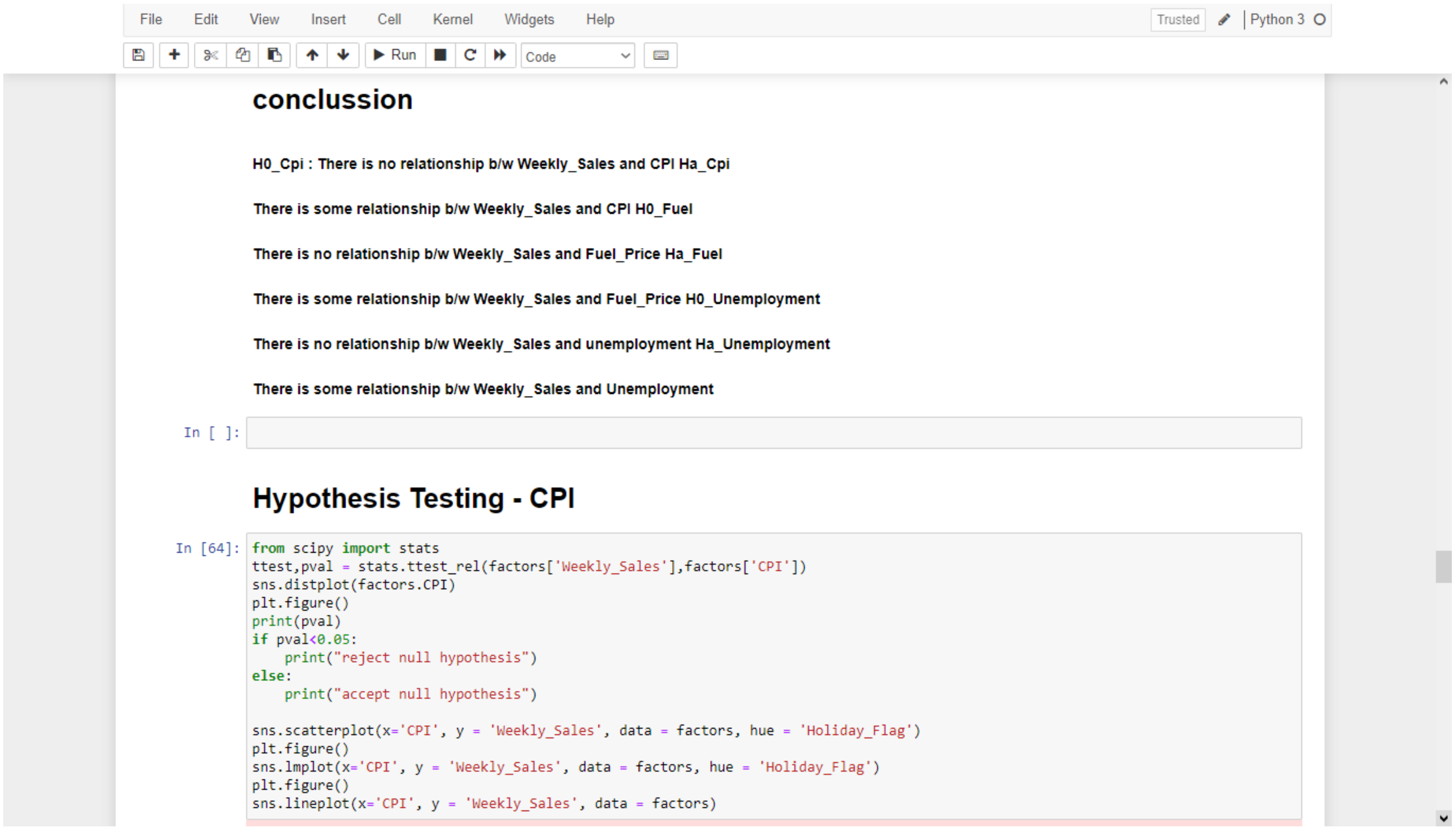
There is some relationship b/w Weekly_Sales and CPI H0_Fuel

There is no relationship b/w Weekly_Sales and Fuel_Price Ha_Fuel

There is some relationship b/w Weekly_Sales and Fuel_Price H0_Unemployment

There is no relationship b/w Weekly_Sales and unemployment Ha_Unemployment

There is some relationship b/w Weekly_Sales and Unemployment



conclussion

H0_Cpi : There is no relationship b/w Weekly_Sales and CPI Ha_Cpi

There is some relationship b/w Weekly_Sales and CPI H0_Fuel

There is no relationship b/w Weekly_Sales and Fuel_Price Ha_Fuel

There is some relationship b/w Weekly_Sales and Fuel_Price H0_Unemployment

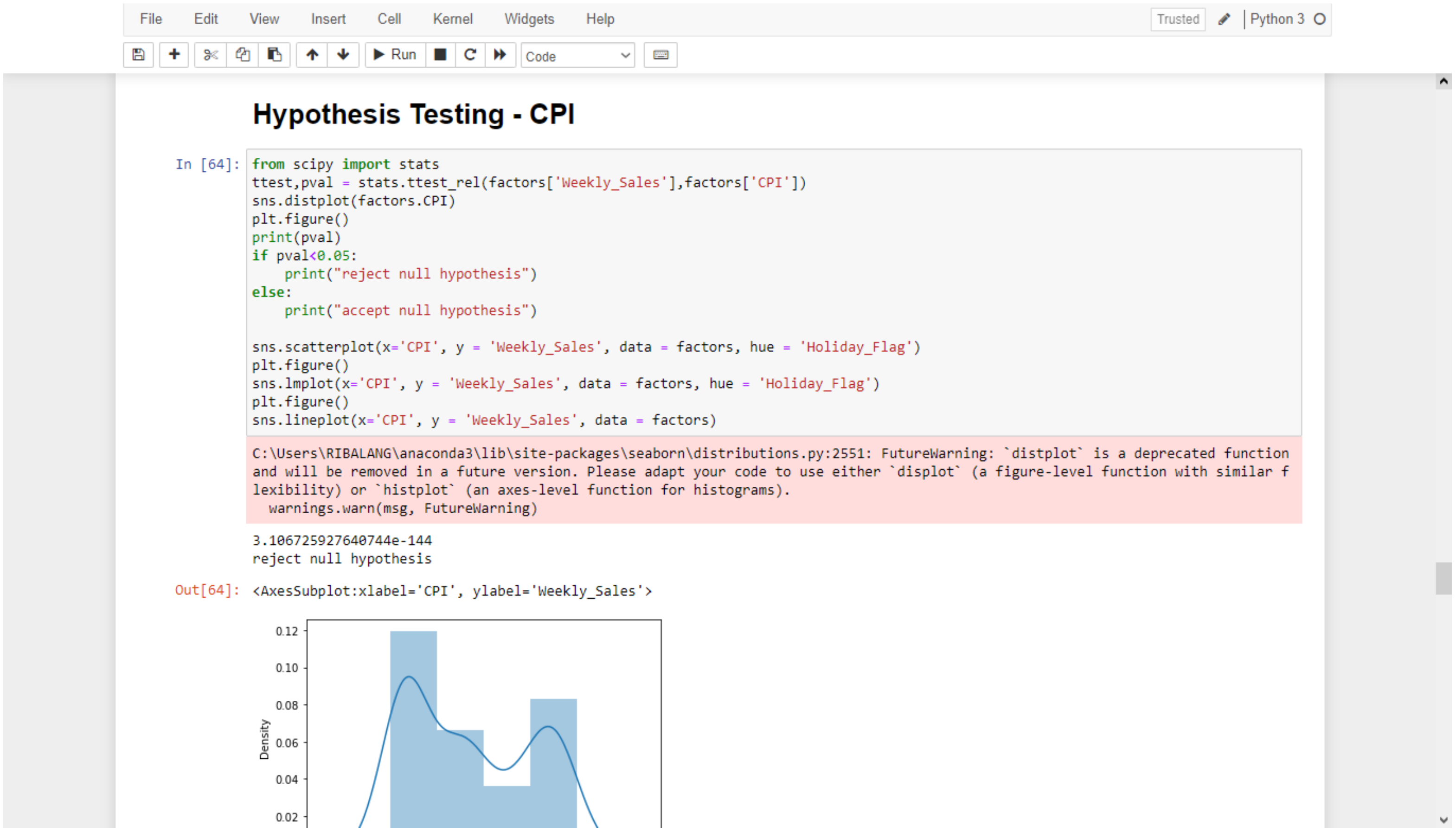
There is no relationship b/w Weekly_Sales and unemployment Ha_Unemployment

There is some relationship b/w Weekly_Sales and Unemployment

In [ ]:

Hypothesis Testing - CPI

In [64]:
```
from scipy import stats
ttest,pval = stats.ttest_rel(factors['Weekly_Sales'],factors['CPI'])
sns.distplot(factors.CPI)
plt.figure()
print(pval)
if pval<0.05:
    print("reject null hypothesis")
else:
    print("accept null hypothesis")

sns.scatterplot(x='CPI', y = 'Weekly_Sales', data = factors, hue = 'Holiday_Flag')
plt.figure()
sns.lmplot(x='CPI', y = 'Weekly_Sales', data = factors, hue = 'Holiday_Flag')
plt.figure()
sns.lineplot(x='CPI', y = 'Weekly_Sales', data = factors)
```



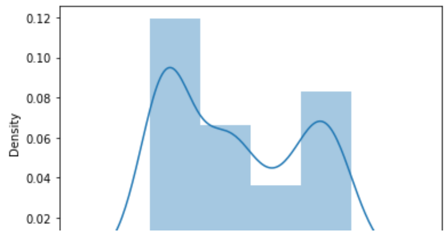
Hypothesis Testing - CPI

In [64]:
```
from scipy import stats
ttest,pval = stats.ttest_rel(factors['Weekly_Sales'],factors['CPI'])
sns.distplot(factors.CPI)
plt.figure()
print(pval)
if pval<0.05:
    print("reject null hypothesis")
else:
    print("accept null hypothesis")

sns.scatterplot(x='CPI', y = 'Weekly_Sales', data = factors, hue = 'Holiday_Flag')
plt.figure()
sns.lmplot(x='CPI', y = 'Weekly_Sales', data = factors, hue = 'Holiday_Flag')
plt.figure()
sns.lineplot(x='CPI', y = 'Weekly_Sales', data = factors)
```

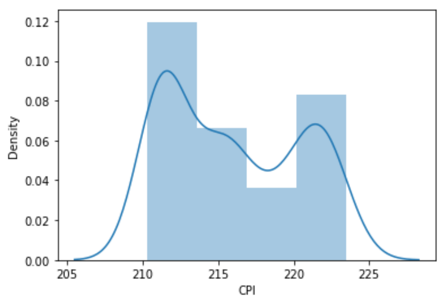
```
C:\Users\RIBALANG\anaconda3\lib\site-packages\seaborn\distributions.py:2551: FutureWarning: `distplot` is a deprecated function
and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar f
lexibility) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```

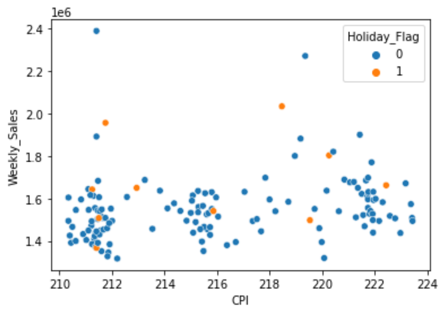
```
3.106725927640744e-144
reject null hypothesis
```

Out[64]:
```
<AxesSubplot:xlabel='CPI', ylabel='Weekly_Sales'>
```



```
Out[64]: <AxesSubplot:xlabel='CPI', ylabel='Weekly_Sales'>
```

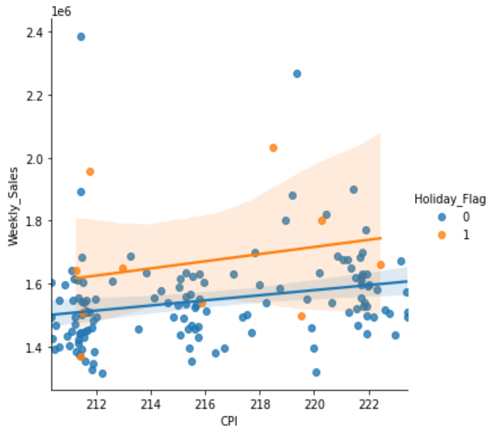

Density
CPI

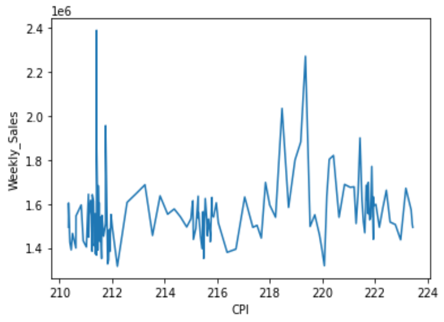

1e6
Weekly_Sales
CPI
Holiday_Flag
0
1

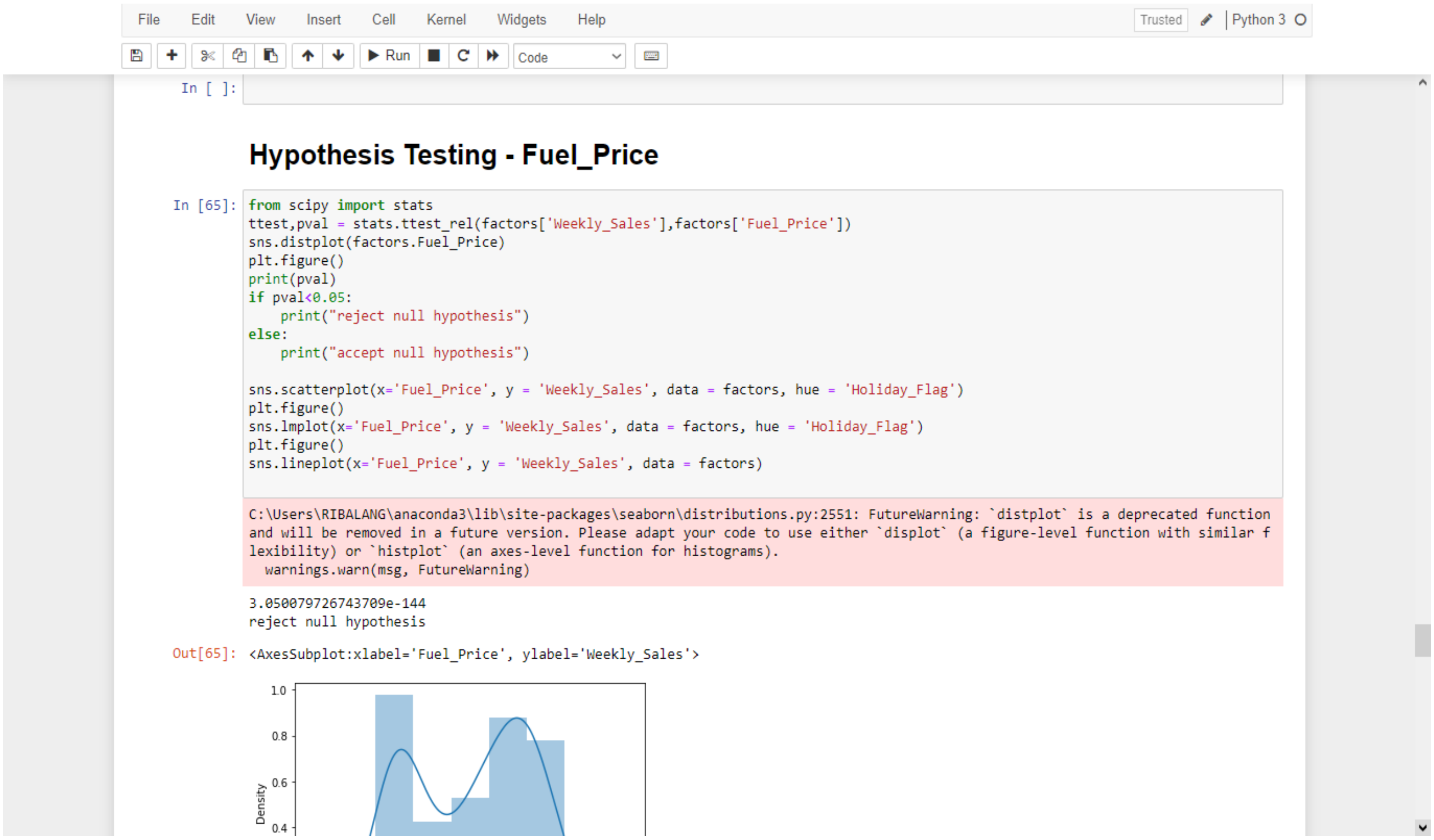
```
<Figure size 432x288 with 0 Axes>
```

1e6

```
<Figure size 432x288 with 0 Axes>
```


1e6
Weekly_Sales
CPI
Holiday_Flag
0
1


1e6
Weekly_Sales
CPI



```
In [ ]:
```

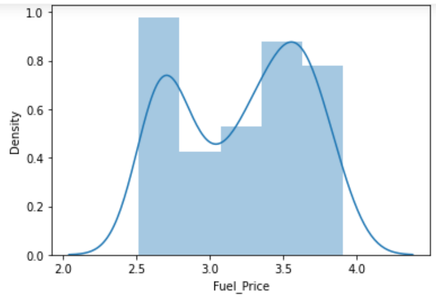
Hypothesis Testing - Fuel_Price

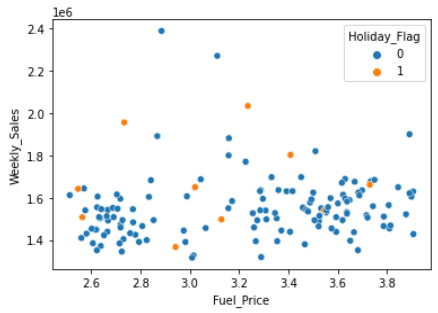
```
In [65]: from scipy import stats
         ttest,pval = stats.ttest_rel(factors['Weekly_Sales'],factors['Fuel_Price'])
         sns.distplot(factors.Fuel_Price)
         plt.figure()
         print(pval)
         if pval<0.05:
             print("reject null hypothesis")
         else:
             print("accept null hypothesis")

         sns.scatterplot(x='Fuel_Price', y = 'Weekly_Sales', data = factors, hue = 'Holiday_Flag')
         plt.figure()
         sns.lmplot(x='Fuel_Price', y = 'Weekly_Sales', data = factors, hue = 'Holiday_Flag')
         plt.figure()
         sns.lineplot(x='Fuel_Price', y = 'Weekly_Sales', data = factors)
```

```
C:\Users\RIBALANG\anaconda3\lib\site-packages\seaborn\distributions.py:2551: FutureWarning: `distplot` is a deprecated function
and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar f
lexibility) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```

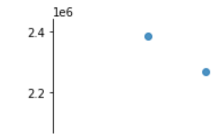
```
3.050079726743709e-144
reject null hypothesis
```

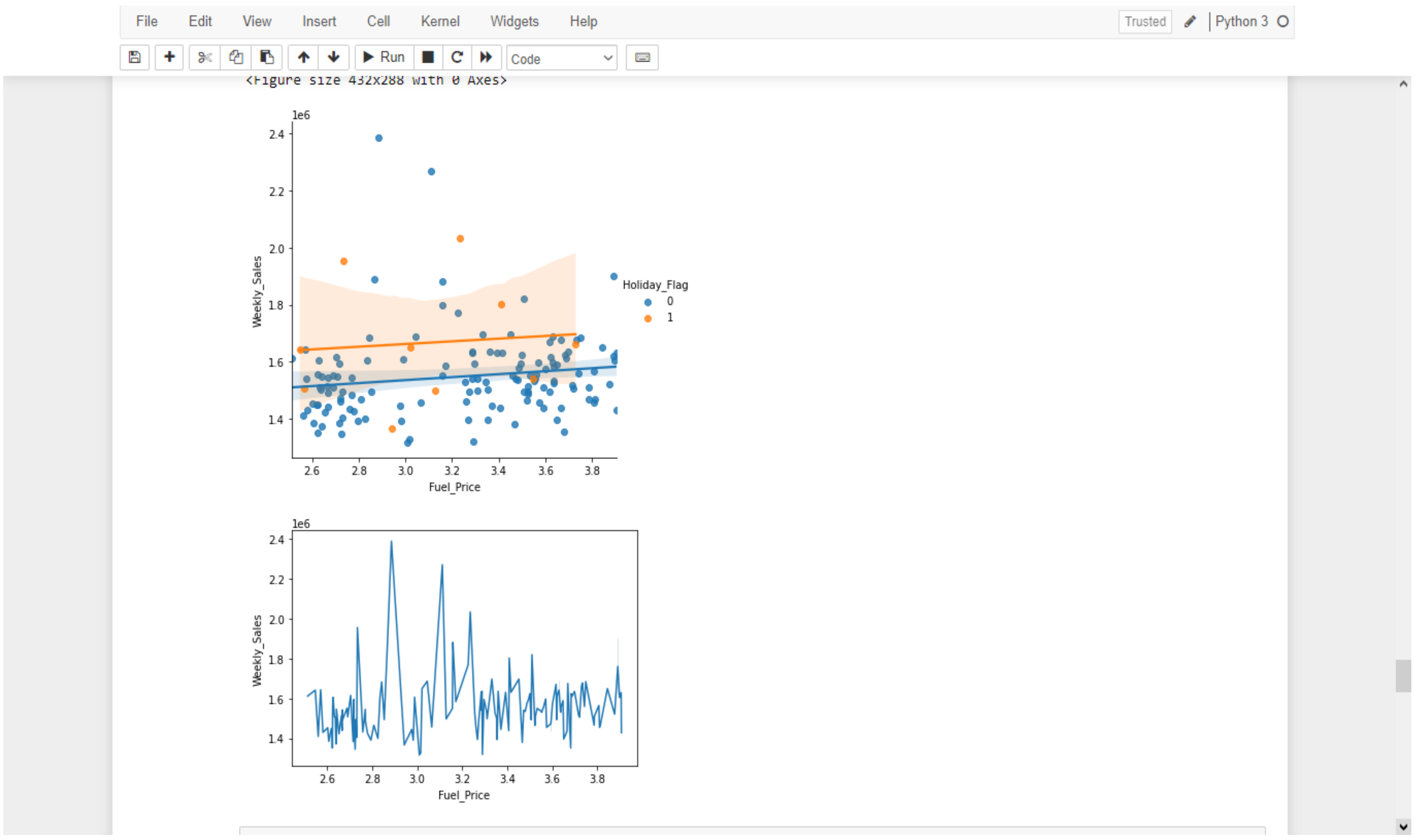
```
Out[65]: <AxesSubplot:xlabel='Fuel_Price', ylabel='Weekly_Sales'>
```



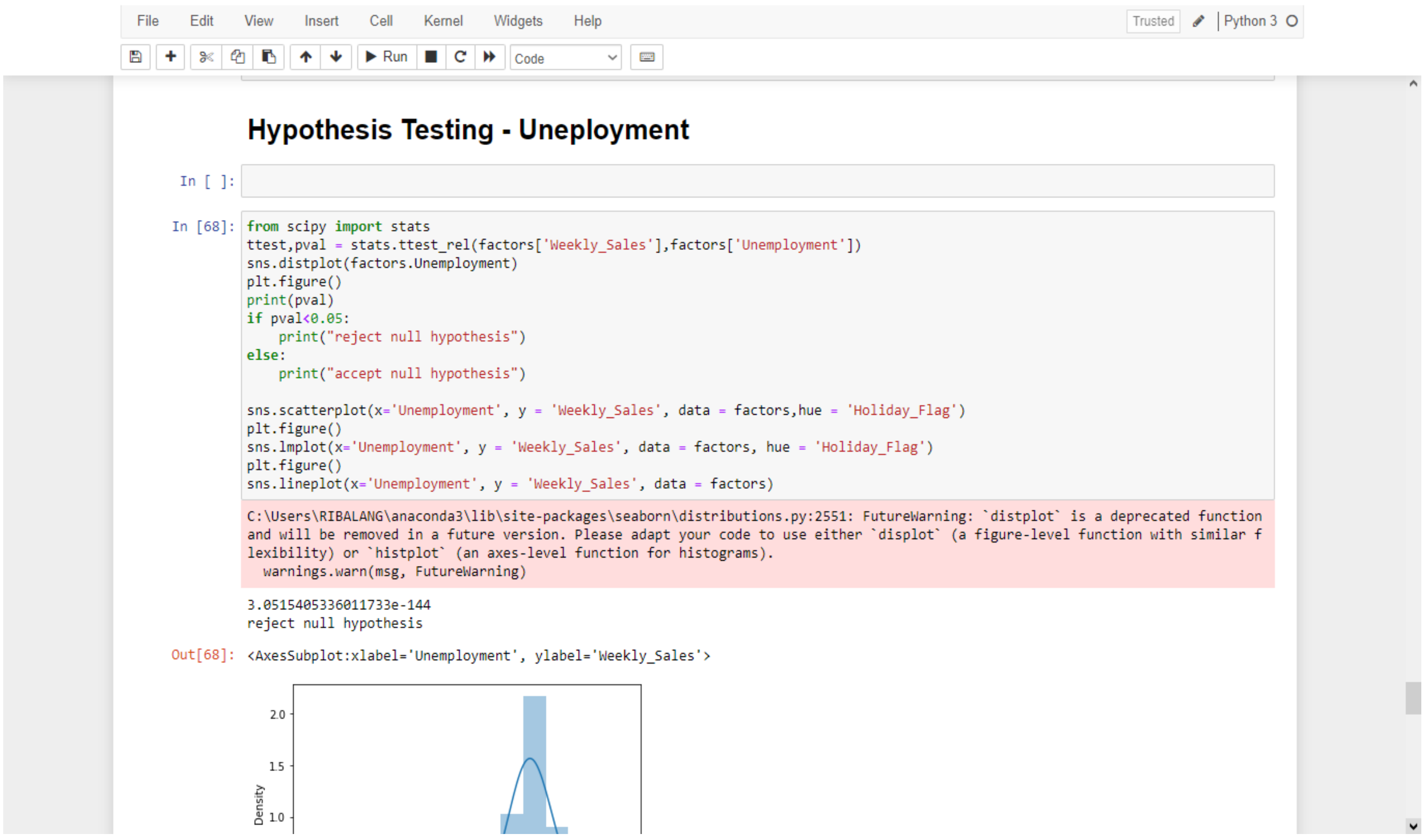


```
<Figure size 432x288 with 0 Axes>
```





```
<Figure size 432x288 with 0 Axes>
```



Hypothesis Testing - Uneployment

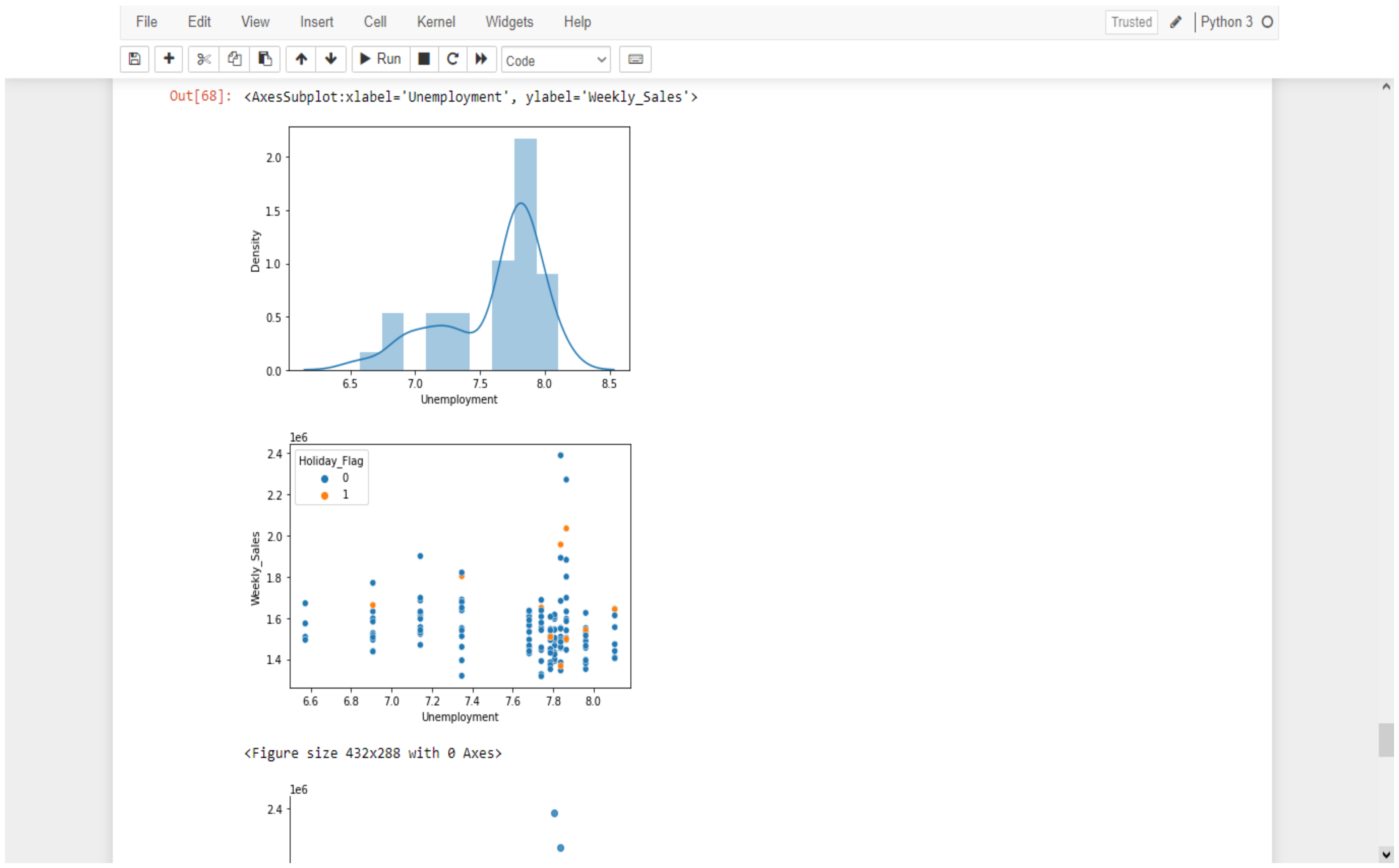
```
In [ ]:
```

```
In [68]: from scipy import stats
ttest,pval = stats.ttest_rel(factors['Weekly_Sales'],factors['Unemployment'])
sns.distplot(factors.Unemployment)
plt.figure()
print(pval)
if pval<0.05:
    print("reject null hypothesis")
else:
    print("accept null hypothesis")

sns.scatterplot(x='Unemployment', y = 'Weekly_Sales', data = factors,hue = 'Holiday_Flag')
plt.figure()
sns.lmplot(x='Unemployment', y = 'Weekly_Sales', data = factors, hue = 'Holiday_Flag')
plt.figure()
sns.lineplot(x='Unemployment', y = 'Weekly_Sales', data = factors)
```

```
C:\Users\RIBALANG\anaconda3\lib\site-packages\seaborn\distributions.py:2551: FutureWarning: `distplot` is a deprecated function
and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar f
lexibility) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```

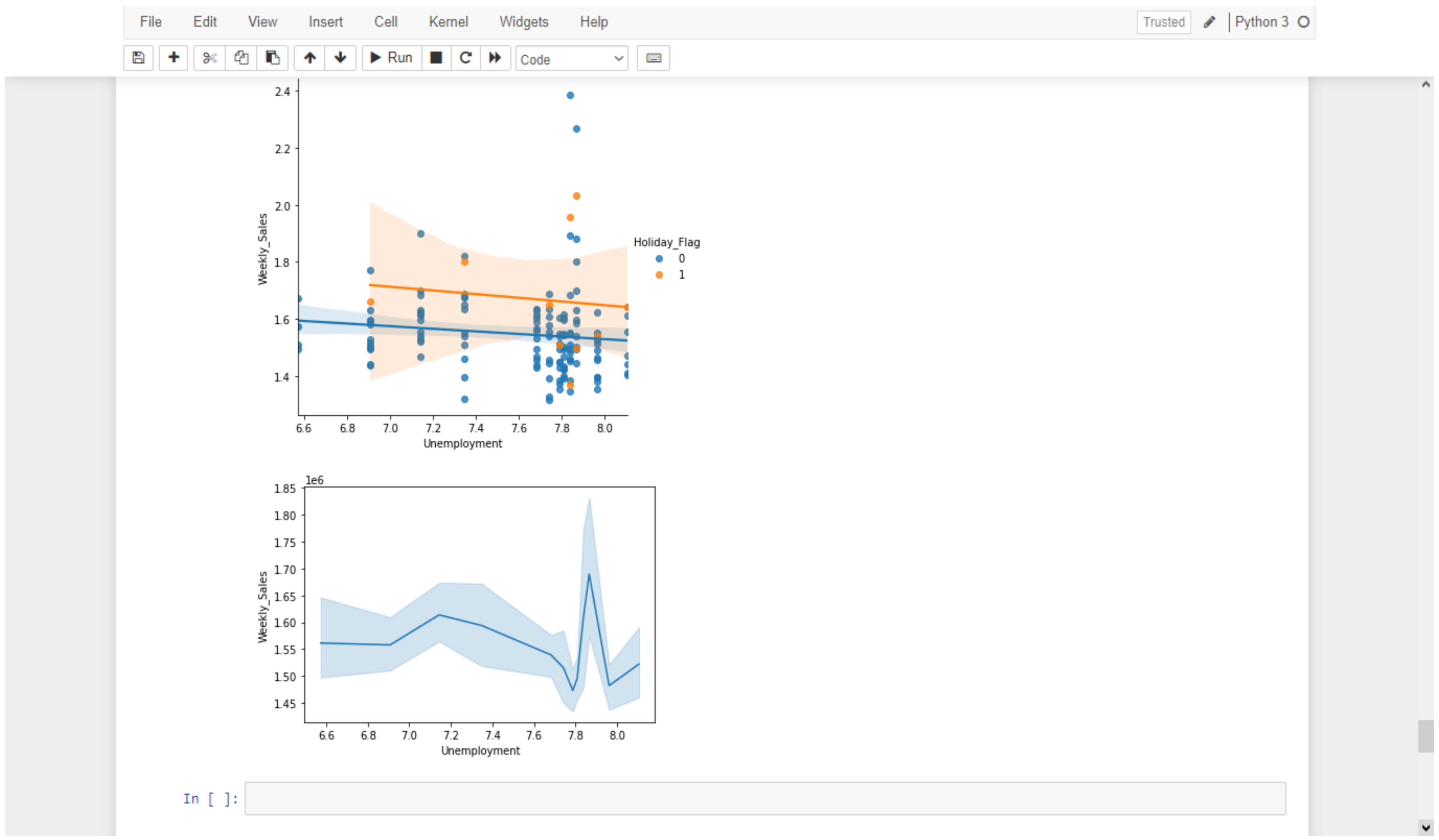
```
3.0515405336011733e-144
reject null hypothesis
```

```
Out[68]: <AxesSubplot:xlabel='Unemployment', ylabel='Weekly_Sales'>
```

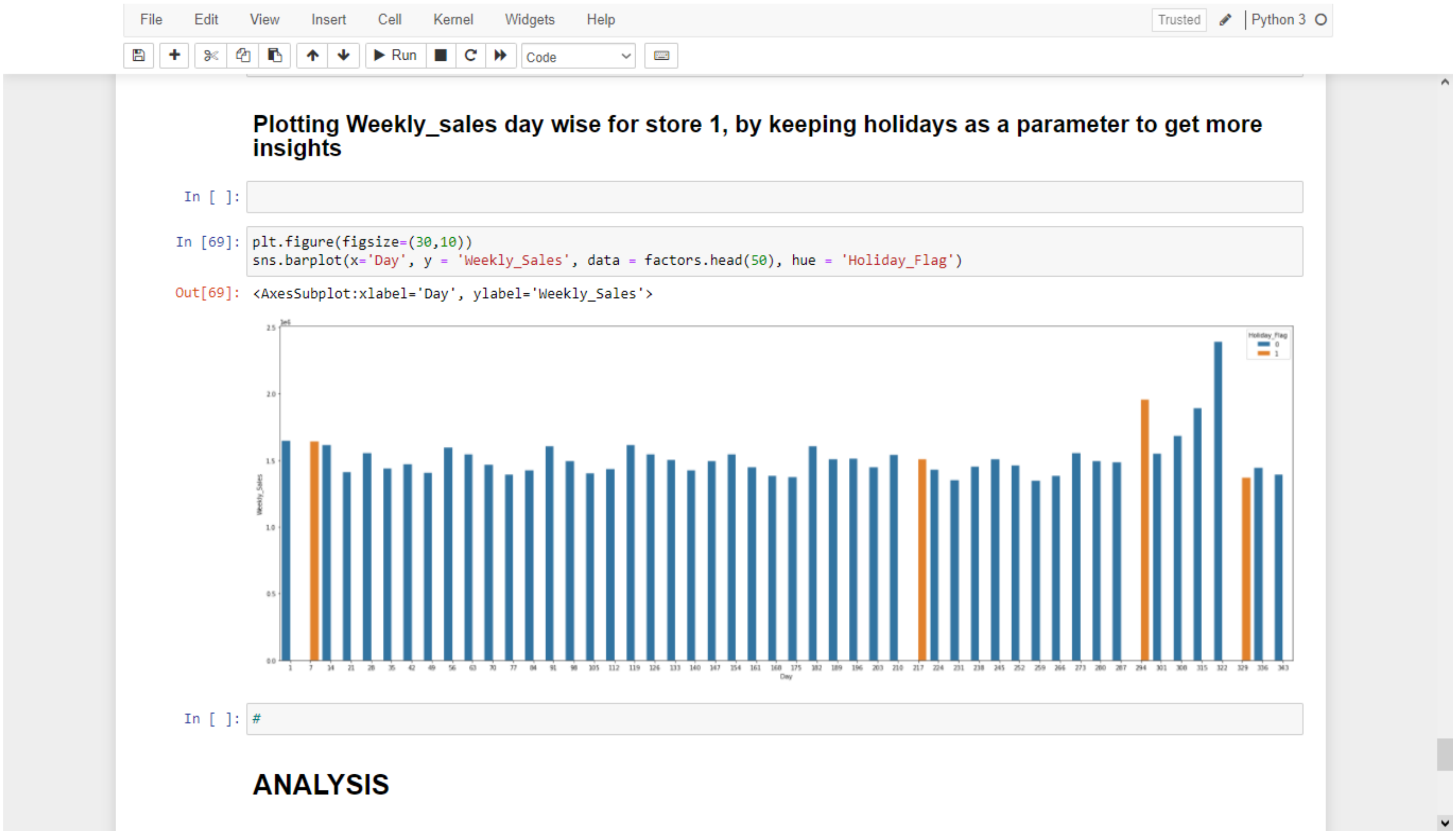

File
Edit
View
Insert
Cell
Kernel
Widgets
Help
Trusted
Python 3
Run
Code
Density
Unemployment
Weekly_Sales
1e6
Holiday_Flag
0
1

```
Out[68]: <AxesSubplot:xlabel='Unemployment', ylabel='Weekly_Sales'>
```

```
<Figure size 432x288 with 0 Axes>
```

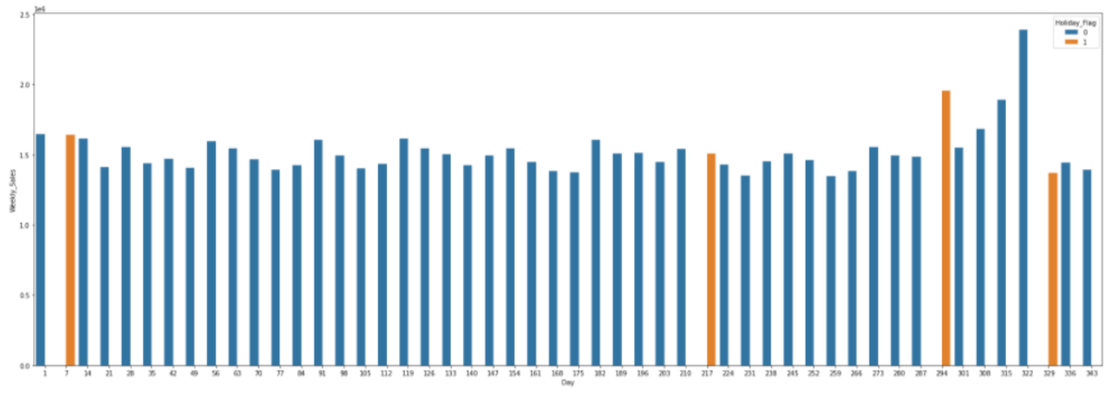

File
Edit
View
Insert
Cell
Kernel
Widgets
Help
Trusted
Python 3
Run
Code
Weekly_Sales
Unemployment
Holiday_Flag
0
1
1e6

```
In [ ]:
```



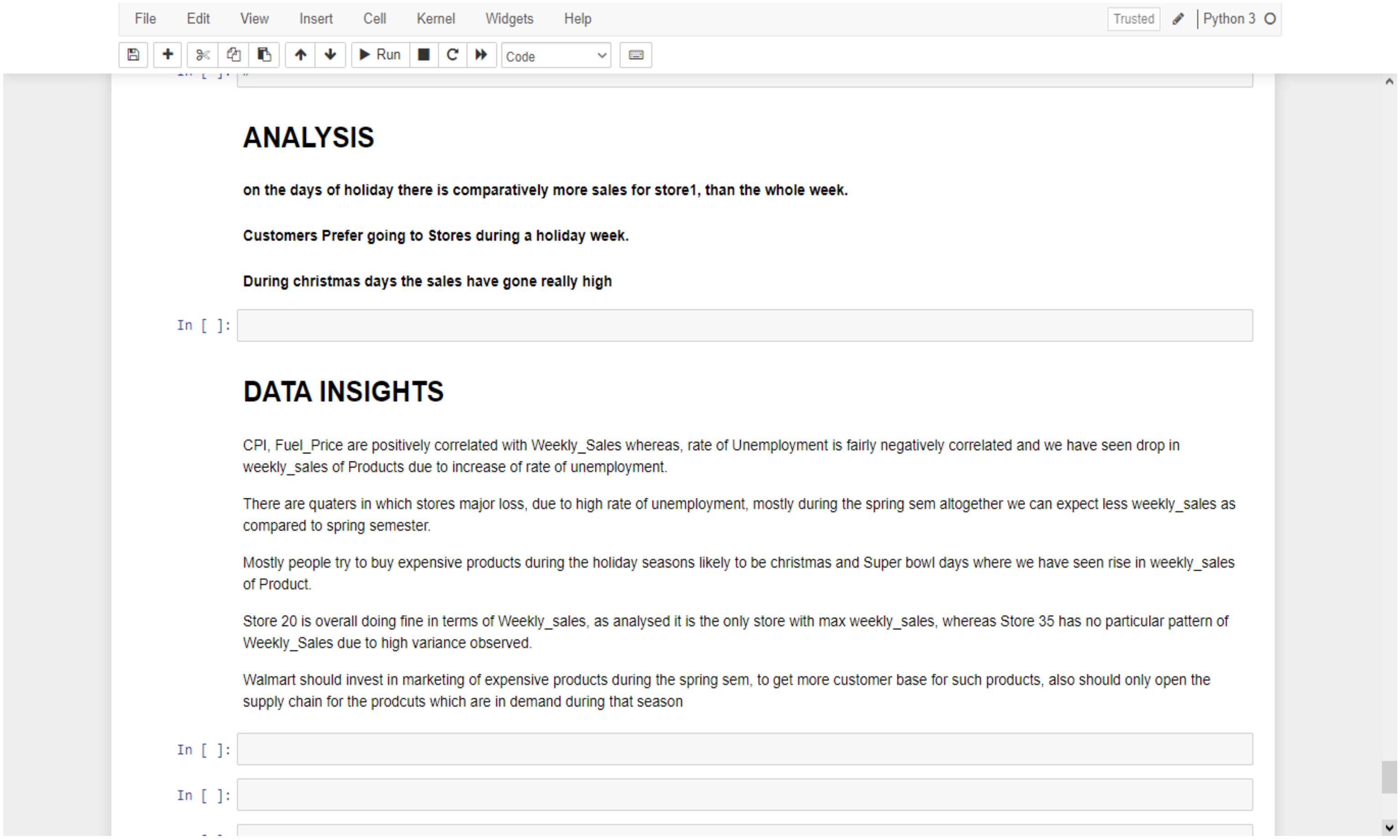
Plotting Weekly_sales day wise for store 1, by keeping holidays as a parameter to get more insights

```
In [ ]:

In [69]: plt.figure(figsize=(30,10))
         sns.barplot(x='Day', y = 'Weekly_Sales', data = factors.head(50), hue = 'Holiday_Flag')

Out[69]: <AxesSubplot:xlabel='Day', ylabel='Weekly_Sales'>
```



```
In [ ]: #
```

ANALYSIS



ANALYSIS

on the days of holiday there is comparatively more sales for store1, than the whole week.

Customers Prefer going to Stores during a holiday week.

During christmas days the sales have gone really high

```
In [ ]:
```

DATA INSIGHTS

CPI, Fuel_Price are positively correlated with Weekly_Sales whereas, rate of Unemployment is fairly negatively correlated and we have seen drop in weekly_sales of Products due to increase of rate of unemployment.

There are quaters in which stores major loss, due to high rate of unemployment, mostly during the spring sem altogether we can expect less weekly_sales as compared to spring semester.

Mostly people try to buy expensive products during the holiday seasons likely to be christmas and Super bowl days where we have seen rise in weekly_sales of Product.

Store 20 is overall doing fine in terms of Weekly_sales, as analysed it is the only store with max weekly_sales, whereas Store 35 has no particular pattern of Weekly_Sales due to high variance observed.

Walmart should invest in marketing of expensive products during the spring sem, to get more customer base for such products, also should only open the supply chain for the prodcuts which are in demand during that season

```
In [ ]:

In [ ]:
```