Challenge

Import Libraries

In [12]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
```

Load CSV file and Read

In [13]:

```
auditors = pd.read_csv('auditors.csv' )
auditors.head()
```

Out[13]:

	Auditor ID	First	Last	Region
0	234	Sue	Smith	Northern California
1	536	Bob	Smith	Northern California
2	98	Jack	Smith	New York
3	203	Jill	Smith	New York
4	304	Jerry	Johnson	Texas

In [14]:

```
prices = pd.read_csv('prices.csv' )
prices.head()
```

Out[14]:

	Auditor ID	Date	Price	Store ID	UPC
0	234	10/18/2017	24.95	66999	268588472
1	234	10/27/2017	49.71	66999	475245085
2	234	10/20/2017	25.75	66999	126967843
3	234	10/23/2017	18.81	66999	708930835
4	234	10/23/2017	33.32	66999	325885139

Import json Library and Load Json file.

In [15]:

```
import json
%matplotlib inline
with open("stores.json") as datafile:
  stores = json.load(datafile)
stores = pd.DataFrame(stores)
stores.head()
```

Out[15]:

	Banner	Region	Store ID
0	Walmart	Northern California	66999
1	Trader Joes	Northern California	4698
2	Safeway	Northern California	39482
3	Whole Foods	Northern California	34957
4	Walmart	New York	12837

Merge certain columns of prices table with auditors table.

In [16]:

```
result = pd.merge(auditors, prices[['Auditor ID','Price', 'Store ID','UPC']],on='Auditor ID')
result.head()
```

Out[16]:

	Auditor ID	First	Last	Region	Price	Store ID	UPC
0	234	Sue	Smith	Northern California	24.95	66999	268588472
1	234	Sue	Smith	Northern California	49.71	66999	475245085
2	234	Sue	Smith	Northern California	25.75	66999	126967843
3	234	Sue	Smith	Northern California	18.81	66999	708930835
4	234	Sue	Smith	Northern California	33.32	66999	325885139

Merge certain columns of stores table with result table.

In [17]:

```
result1 = pd.merge(result, stores[['Store ID','Banner']],on='Store ID')
result1.head()
```

Out[17]:

	Auditor ID	First	Last	Region	Price	Store ID	UPC	Banner
0	234	Sue	Smith	Northern California	24.95	66999	268588472	Walmart
1	234	Sue	Smith	Northern California	49.71	66999	475245085	Walmart
2	234	Sue	Smith	Northern California	25.75	66999	126967843	Walmart
3	234	Sue	Smith	Northern California	18.81	66999	708930835	Walmart
4	234	Sue	Smith	Northern California	33.32	66999	325885139	Walmart

Drop the columns which are not required

In [18]:
```
result2=result1.drop(columns=['Auditor ID','First','Last','Store ID'])
result2.head()
```

Out[18]:

	Region	Price	UPC	Banner
0	Northern California	24.95	268588472	Walmart
1	Northern California	49.71	475245085	Walmart
2	Northern California	25.75	126967843	Walmart
3	Northern California	18.81	708930835	Walmart
4	Northern California	33.32	325885139	Walmart

Crosstab of the dataframe

In [19]:
```
result3=pd.crosstab([result2.Banner, result2.UPC],result2.Region,values=result2.Price,aggfunc=np.sum)
result3.head(10)
```

Out[19]:

	Region	**Kansas**	**New York**	**Northern California**	**Texas**
Banner	**UPC**				
Safeway	**11873171**	NaN	6.09	NaN	5.19
	15052612	53.99	NaN	NaN	54.49
	16482322	17.89	NaN	NaN	18.09
	16729338	7.99	9.39	NaN	8.09
	16829288	3.59	4.19	NaN	3.59
	16900911	29.19	34.19	NaN	29.49
	16999755	5.29	6.19	NaN	5.29
	17066659	3.09	3.59	NaN	3.09
	19696884	NaN	NaN	NaN	5.89
	19911643	NaN	NaN	NaN	30.69

Count missing values for each columns

```
In [21]: result3.isna().sum()
```

```
Out[21]: Region
         Kansas                 1844
         New York               1600
         Northern California    3603
         Texas                  1166
         dtype: int64
```

Count non-null values for each columns

```
In [22]: result3.info() #no null objects
```

```
<class 'pandas.core.frame.DataFrame'>
MultiIndex: 4931 entries, (Safeway, 11873171) to (Whole Foods, 999185078)
Data columns (total 4 columns):
Kansas                 3087 non-null float64
New York               3331 non-null float64
Northern California    1328 non-null float64
Texas                  3765 non-null float64
dtypes: float64(4)
memory usage: 176.5+ KB
```

See statistical parameters

```
In [23]: result3.describe()
```

Out[23]:

Region	Kansas	New York	Northern California	Texas
count	3087.000000	3331.000000	1328.000000	3765.000000
mean	21.390198	31.368157	35.471310	30.084550
std	18.610435	17.436303	19.717375	16.709557
min	0.690000	0.590000	0.690000	0.590000
25%	1.990000	17.020000	19.090000	16.290000
50%	17.690000	31.090000	34.990000	29.840000
75%	37.490000	45.590000	51.597500	44.060000
max	59.990000	70.090000	74.490000	63.890000

Drop missing values

In [24]:

```
result4=result3.dropna()
result4.head(10)
```

Out[24]:

	Region	Kansas	New York	Northern California	Texas
Banner	**UPC**				
Trader Joes	**16729338**	7.59	7.89	8.89	7.69
	19911643	28.99	30.09	33.99	29.19
	44276570	36.19	37.69	42.49	36.59
	54548062	39.29	40.89	46.09	39.69
	58785197	19.79	20.59	23.19	19.99
	81927167	33.69	35.09	39.49	33.99
	112509592	38.69	40.29	45.39	39.09
	157129774	6.69	6.99	7.89	6.79
	161725486	34.89	36.39	40.99	35.29
	172380215	36.69	38.19	43.09	37.09

See statistical parameters after removing NA's

In [25]:

```
result4.describe()
```

Out[25]:

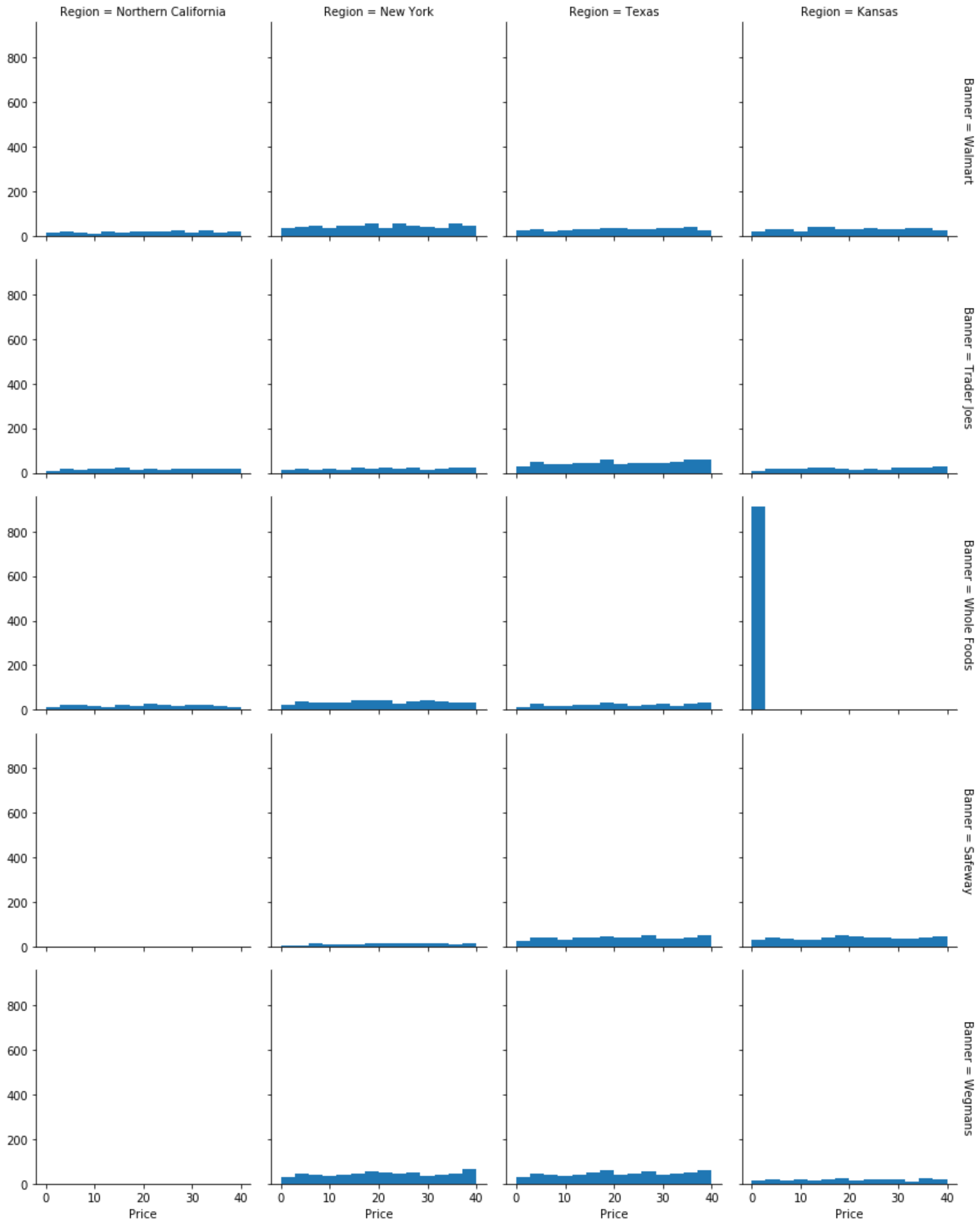
Region	Kansas	New York	Northern California	Texas
count	388.000000	388.000000	388.000000	388.000000
mean	13.543093	31.652216	35.631495	30.711804
std	16.476823	18.098351	20.350657	17.529367
min	0.860000	0.690000	0.690000	0.590000
25%	1.990000	16.477500	18.570000	16.055000
50%	1.990000	30.440000	34.340000	29.540000
75%	23.845000	46.285000	52.097500	44.885000
max	56.390000	65.390000	73.690000	63.490000

In [26]:

```
grid = sns.FacetGrid(result2, row="Banner", col="Region", margin_titles=True)
grid.map(plt.hist, "Price", bins=np.linspace(0, 40, 15))
```

Out[26]:

```
<seaborn.axisgrid.FacetGrid at 0x20749870390>
```



Northern California has only three banners (Not Safeway and Wegmans)

Kansas has maximum number of Whole Foods

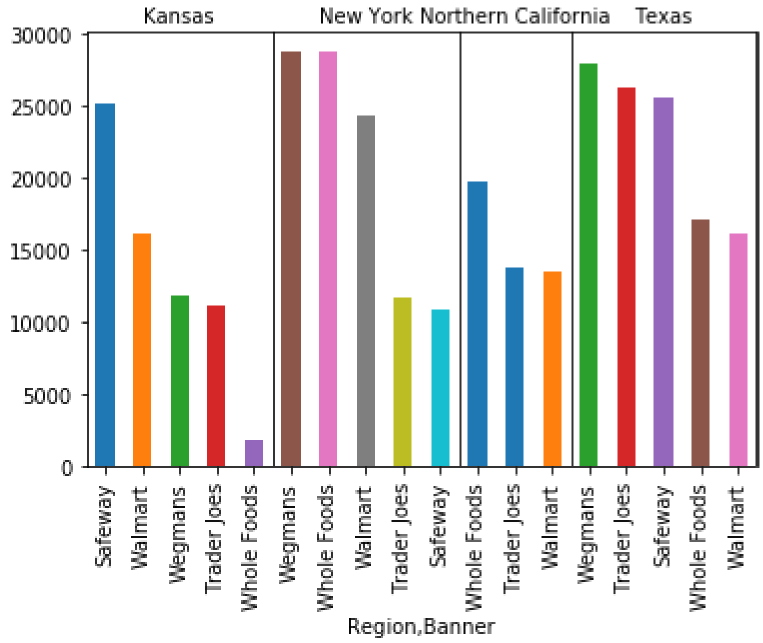
Newyork has minimum number of Safeway

In [27]:

```
group = result2.groupby(["Region","Banner"]).sum()
total_price = group["Price"].groupby(level=0, group_keys=False)
gtp = total_price.nlargest(5)
ax = gtp.plot(kind="bar")
#draw lines and titles
count = gtp.groupby("Region").count()
cs = np.cumsum(count)
for i in range(len(count)):
    title = count.index.values[i]
    ax.axvline(cs[i]-.5, lw=0.8, color="k")
    ax.text(cs[i]-(count[i]+1)/2., 1.02, title, ha="center",
            transform=ax.get_xaxis_transform())
# shorten xticklabels
ax.set_xticklabels([l.get_text().split(", ")[1][:-1] for l in ax.get_xticklabels()])
```

Out[27]:

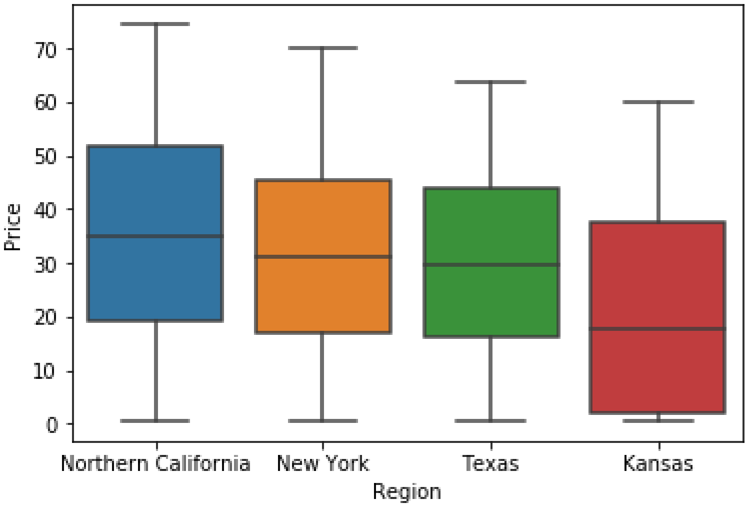
```
[Text(0, 0, 'Safeway'),
 Text(0, 0, 'Walmart'),
 Text(0, 0, 'Wegmans'),
 Text(0, 0, 'Trader Joes'),
 Text(0, 0, 'Whole Foods'),
 Text(0, 0, 'Wegmans'),
 Text(0, 0, 'Whole Foods'),
 Text(0, 0, 'Walmart'),
 Text(0, 0, 'Trader Joes'),
 Text(0, 0, 'Safeway'),
 Text(0, 0, 'Whole Foods'),
 Text(0, 0, 'Trader Joes'),
 Text(0, 0, 'Walmart'),
 Text(0, 0, 'Wegmans'),
 Text(0, 0, 'Trader Joes'),
 Text(0, 0, 'Safeway'),
 Text(0, 0, 'Whole Foods'),
 Text(0, 0, 'Walmart')]
```



For Kansas price of Whole foods are cheapest among all four states and all Banners.

In [28]:
```
bx = sns.boxplot(x="Region", y="Price", data=result2)
bx
```

Out[28]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x2074ab4de80>
```

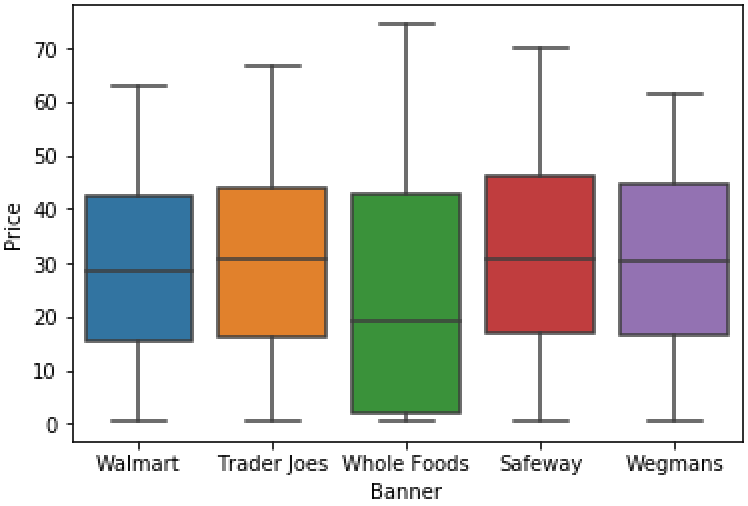


Mean price of Kansas is minimum with maximum range.

Mean price of Northern California is maximum.

In [29]:
```
bx1 = sns.boxplot(x="Banner", y="Price", data=result2)
bx1
```

Out[29]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x2074ac010b8>
```

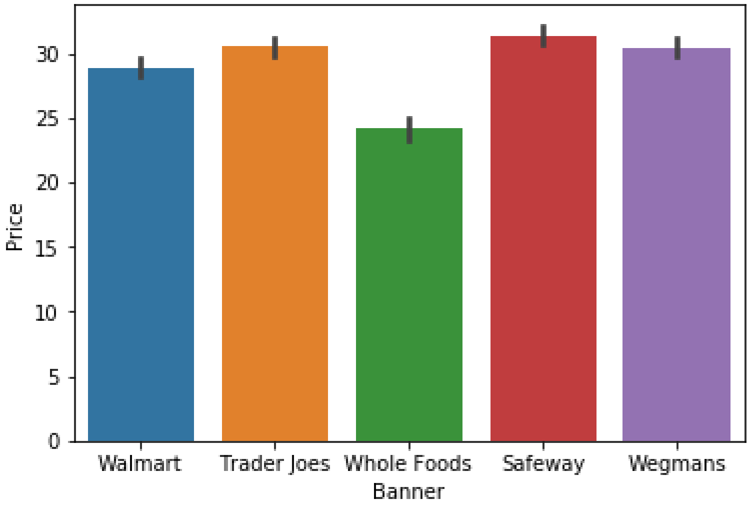


Mean price of Kansas is minimum with maximum range.

Mean price of North California is maximum.

```
In [31]: sns.barplot(x='Banner',y='Price',data=result2)
```

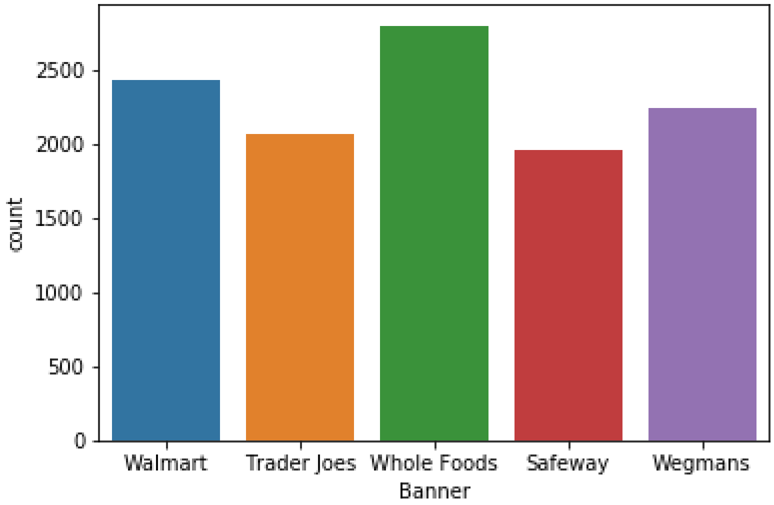
```
Out[31]: <matplotlib.axes._subplots.AxesSubplot at 0x2074ad62278>
```



Counting total number of different Banners

```
In [32]: sns.countplot(x='Banner',data=result2)
```

```
Out[32]: <matplotlib.axes._subplots.AxesSubplot at 0x2074ade05f8>
```



Export cross tabulated table as csv file.

In [39]:

```
import csv
results=pd.DataFrame(result3)
results.head()
results.to_csv(r'C:\Users\rc_as\Data_Science\Interview_challenge\Cross_Table.csv',sep= ';')
```