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

datf = pd.read_csv('Data - Food Sales.csv', encoding =
'unicode_escape')

datf.shape
```

```
(244, 9)
```

```
datf.head(10)
```

```
        ID    Date Region         City  Category         Product  Qty
\
0  ID07351   1-Jan   East       Boston      Bars          Carrot   33

1  ID07352   4-Jan   East       Boston  Crackers     Whole Wheat   87

2  ID07353   7-Jan   West  Los Angeles   Cookies  Chocolate Chip   58

3  ID07354  10-Jan   East     New York   Cookies  Chocolate Chip   82

4  ID07355  13-Jan   East       Boston   Cookies       Arrowroot   38

5  ID07356  16-Jan   East       Boston      Bars          Carrot   54

6  ID07357  19-Jan   East       Boston  Crackers     Whole Wheat  149

7  ID07358  22-Jan   West  Los Angeles      Bars          Carrot   51

8  ID07359  25-Jan   East     New York      Bars          Carrot  100

9  ID07360  28-Jan   East     New York    Snacks    Potato Chips   28


   UnitPrice  TotalPrice
0       1.77       58.41
1       3.49      303.63
2       1.87      108.46
3       1.87      153.34
4       2.18       82.84
5       1.77       95.58
6       3.49      520.01
7       1.77       90.27
8       1.77      177.00
9       1.35       37.80
```

```
datf.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 244 entries, 0 to 243
Data columns (total 9 columns):
 #   Column      Non-Null Count  Dtype  
---  ------      --------------  -----  
 0   ID          244 non-null    object 
 1   Date        244 non-null    object 
 2   Region      244 non-null    object 
 3   City        244 non-null    object 
 4   Category    244 non-null    object 
 5   Product     244 non-null    object 
 6   Qty         244 non-null    int64  
 7   UnitPrice   244 non-null    float64
 8   TotalPrice  244 non-null    float64
dtypes: float64(2), int64(1), object(6)
memory usage: 17.3+ KB
```

```
# From above output we see that our data has no null value column.
# All columns have 244 non-null values.
# So Data Cleaning is not required.

# To further ensure that no null value is present we check for null
values :

pd.isnull(datf).sum()
```

```
ID            0
Date          0
Region        0
City          0
Category      0
Product       0
Qty           0
UnitPrice     0
TotalPrice    0
dtype: int64
```

```
datf.columns
```

```
Index(['ID', 'Date', 'Region', 'City', 'Category', 'Product', 'Qty',
       'UnitPrice', 'TotalPrice'],
      dtype='object')
```

```
datf.rename(columns = {'UnitPrice' : 'Unit Price in Dollars'}, inplace
= True)

datf.columns
```

```
Index(['ID', 'Date', 'Region', 'City', 'Category', 'Product', 'Qty',
       'Unit Price in Dollars', 'TotalPrice'],
      dtype='object')
```

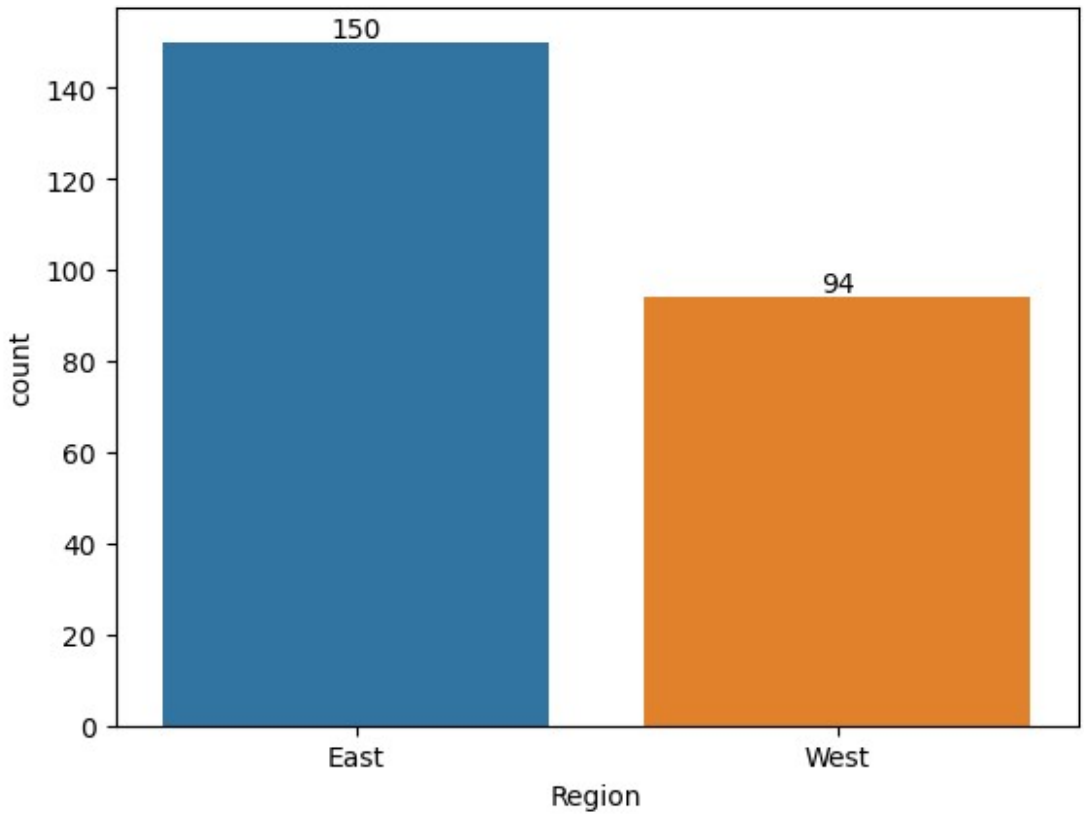
```
datf.rename(columns = {'TotalPrice' : 'Total Price in Dollars'},
inplace = True)

datf.columns
```

```
Index(['ID', 'Date', 'Region', 'City', 'Category', 'Product', 'Qty',
       'Unit Price in Dollars', 'Total Price in Dollars'],
      dtype='object')
```

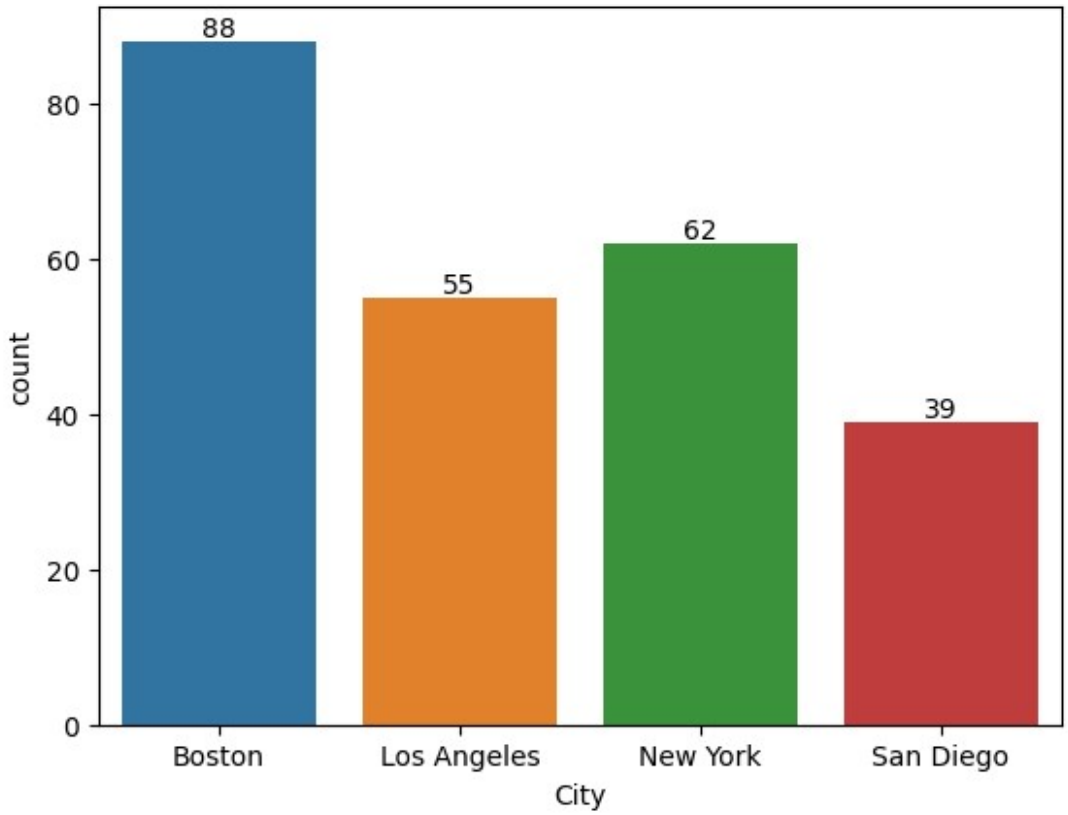
```
datf[['City', 'Category', 'Product', 'Unit Price in Dollars', 'Total
Price in Dollars']].describe()
```

```
       Unit Price in Dollars  Total Price in Dollars
count             244.000000              244.000000
mean                2.200820              136.580246
std                 0.600169              108.354231
min                 1.350000               33.600000
25%                 1.770000               72.570000
50%                 1.870000              102.755000
75%                 2.840000              159.300000
max                 3.490000              817.920000
```

```
regx = sns.countplot(x = 'Region', data = datf)
for bars in regx.containers:
    regx.bar_label(bars)
```



```
cx = sns.countplot(x = 'City', data = datf)
for bars in cx.containers:
    cx.bar_label(bars)
```




```
datf.query(f'City == "Boston"')
```

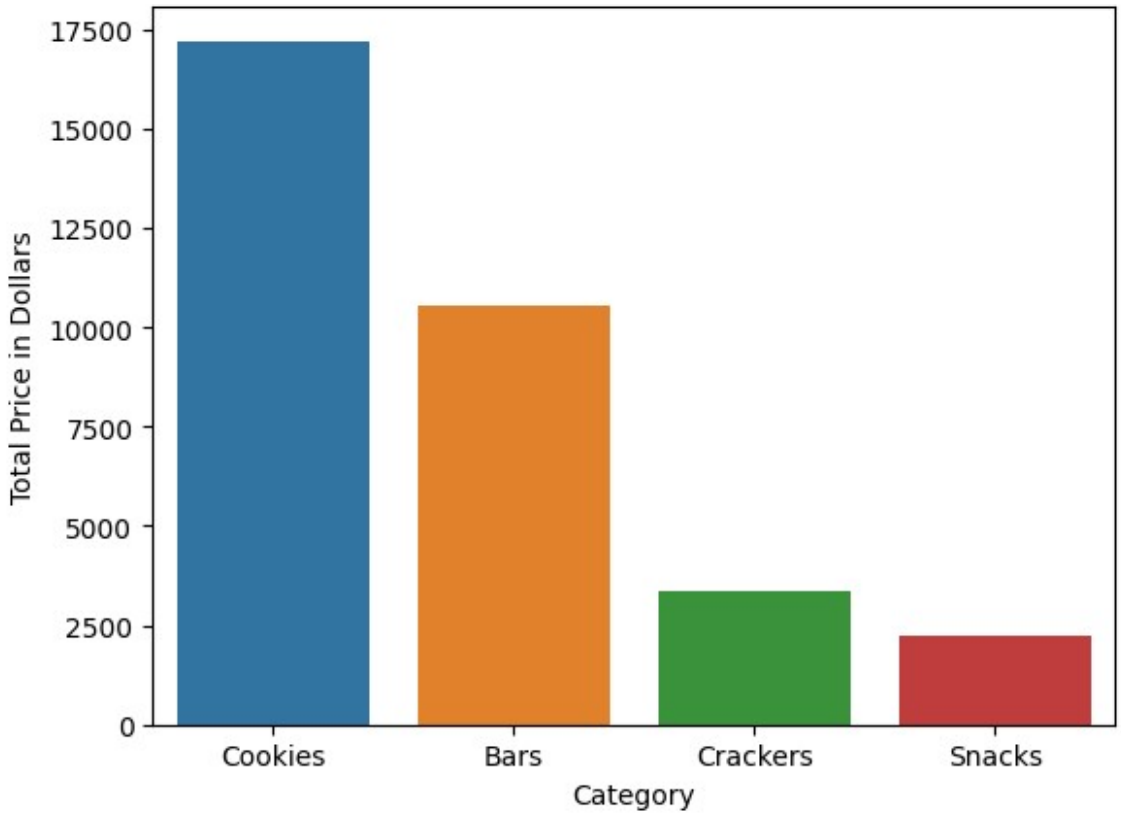
	ID	Date	Region	City	Category	Product	Qty	\
0	ID07351	1-Jan	East	Boston	Bars	Carrot	33	
1	ID07352	4-Jan	East	Boston	Crackers	Whole Wheat	87	
4	ID07355	13-Jan	East	Boston	Cookies	Arrowroot	38	
5	ID07356	16-Jan	East	Boston	Bars	Carrot	54	
6	ID07357	19-Jan	East	Boston	Crackers	Whole Wheat	149	
..	...	...	...	...	...	...	...	...
232	ID07583	27-Nov	East	Boston	Cookies	Chocolate Chip	211	
233	ID07584	30-Nov	East	Boston	Crackers	Whole Wheat	20	
239	ID07590	18-Dec	East	Boston	Cookies	Arrowroot	34	
240	ID07591	21-Dec	East	Boston	Cookies	Chocolate Chip	245	
241	ID07592	24-Dec	East	Boston	Crackers	Whole Wheat	30	

	Unit Price in Dollars	Total Price in Dollars
0	1.77	58.41
1	3.49	303.63
4	2.18	82.84
5	1.77	95.58

```
6                      3.49                   520.01
..                      ...                      ...
232                    1.87                   394.57
233                    3.49                    69.80
239                    2.18                    74.12
240                    1.87                   458.15
241                    3.49                   104.70

[88 rows x 9 columns]
```

```
# From the above analysis we find that maximum customers are from the
City of Boston
# Boston is located in eastern region
# Eastern region has maximum customers

pdtsl = datf.groupby(['Category'], as_index = False)['Total Price in
Dollars'].sum().sort_values(by = 'Total Price in Dollars', ascending =
False)
sns.barplot(x='Category', y= 'Total Price in Dollars', data = pdtsl)
```

```
<Axes: xlabel='Category', ylabel='Total Price in Dollars'>
```




```
pdt = datf.groupby(['Product'], as_index = False)['Total Price in
Dollars'].sum().sort_values(by = 'Total Price in Dollars', ascending =
```

```
False)

pdt
```

	Product	Total Price in Dollars
3	Carrot	7410.99
5	Oatmeal Raisin	7310.16
0	Arrowroot	5330.10
4	Chocolate Chip	4572.15
8	Whole Wheat	3339.93
2	Bran	2945.25
6	Potato Chips	1651.77
7	Pretzels	585.90
1	Banana	179.33

```
datf.query(f'Product == "Carrot"')
```

	ID	Date	Region	City	Category	Product	Qty	\
0	ID07351	1-Jan	East	Boston	Bars	Carrot	33	
5	ID07356	16-Jan	East	Boston	Bars	Carrot	54	
7	ID07358	22-Jan	West	Los Angeles	Bars	Carrot	51	
8	ID07359	25-Jan	East	New York	Bars	Carrot	100	
13	ID07364	9-Feb	West	Los Angeles	Bars	Carrot	44	
..	...	...	...	...	...	...	...	...
219	ID07570	19-Oct	East	Boston	Bars	Carrot	43	
221	ID07572	25-Oct	West	Los Angeles	Bars	Carrot	35	
227	ID07578	12-Nov	West	Los Angeles	Bars	Carrot	137	
230	ID07581	21-Nov	West	San Diego	Bars	Carrot	20	
236	ID07587	9-Dec	East	New York	Bars	Carrot	38	

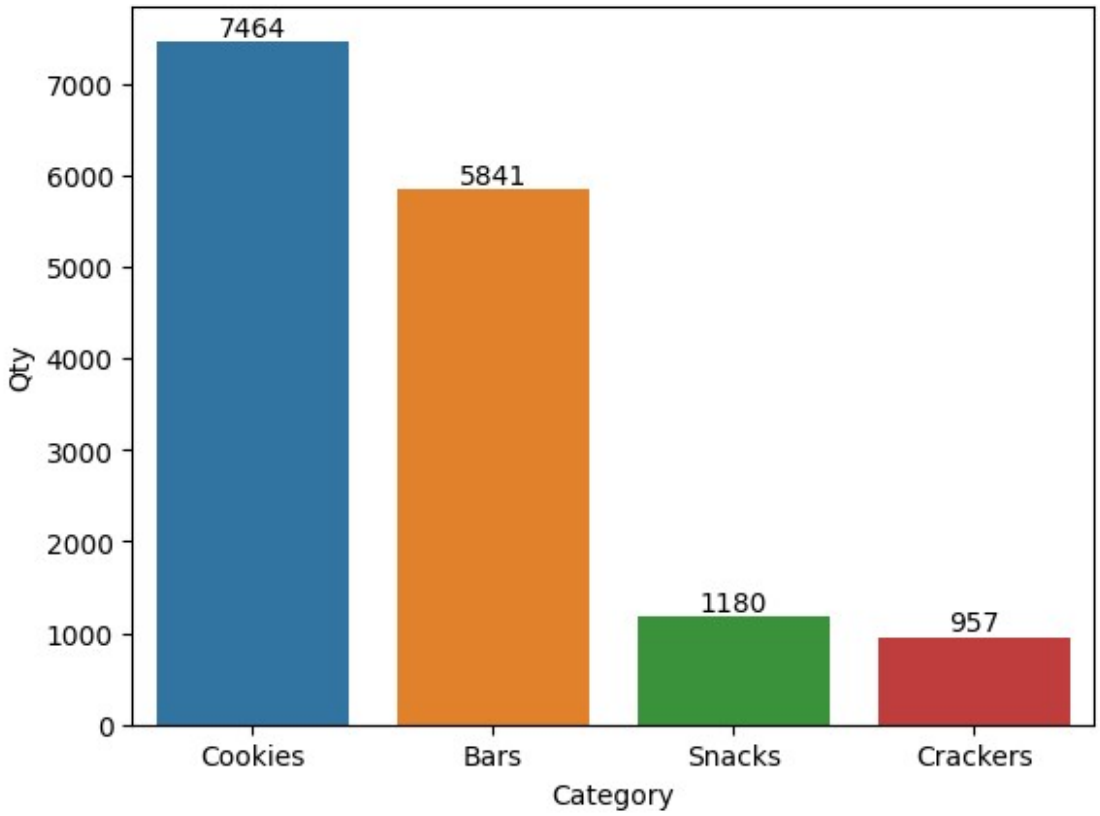
	Unit Price in Dollars	Total Price in Dollars
0	1.77	58.41
5	1.77	95.58
7	1.77	90.27
8	1.77	177.00
13	1.77	77.88
..	...	...
219	1.77	76.11
221	1.77	61.95
227	1.77	242.49
230	1.77	35.40
236	1.77	67.26

```
[64 rows x 9 columns]

# From the above analysis we see that cookies category brings the
highest revenue
# Whereas snacks category brings the lowest revenue
# But in terms of individual product "Carrot" of "Bars" generates the
highest revenue
```

```
qty = datf.groupby(['Product'], as_index = False)
['Qty'].sum().sort_values(by = 'Qty', ascending = False)

qty
```

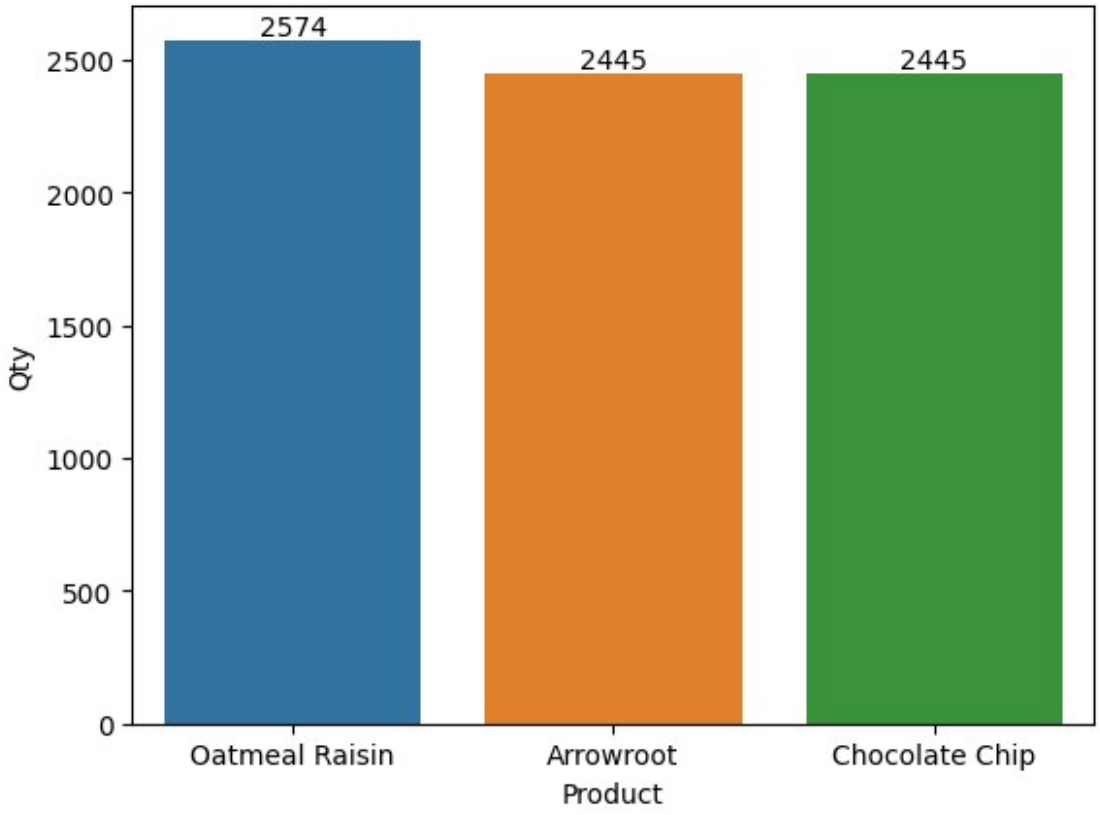
	Product	Qty
3	Carrot	4187
5	Oatmeal Raisin	2574
0	Arrowroot	2445
4	Chocolate Chip	2445
2	Bran	1575
6	Potato Chips	994
8	Whole Wheat	957
7	Pretzels	186
1	Banana	79

```
qtyc = datf.groupby(['Category'], as_index = False)
['Qty'].sum().sort_values(by = 'Qty', ascending = False)
px = sns.barplot(x='Category', y= 'Qty', data = qtyc)
for bars in px.containers:
    px.bar_label(bars)
```



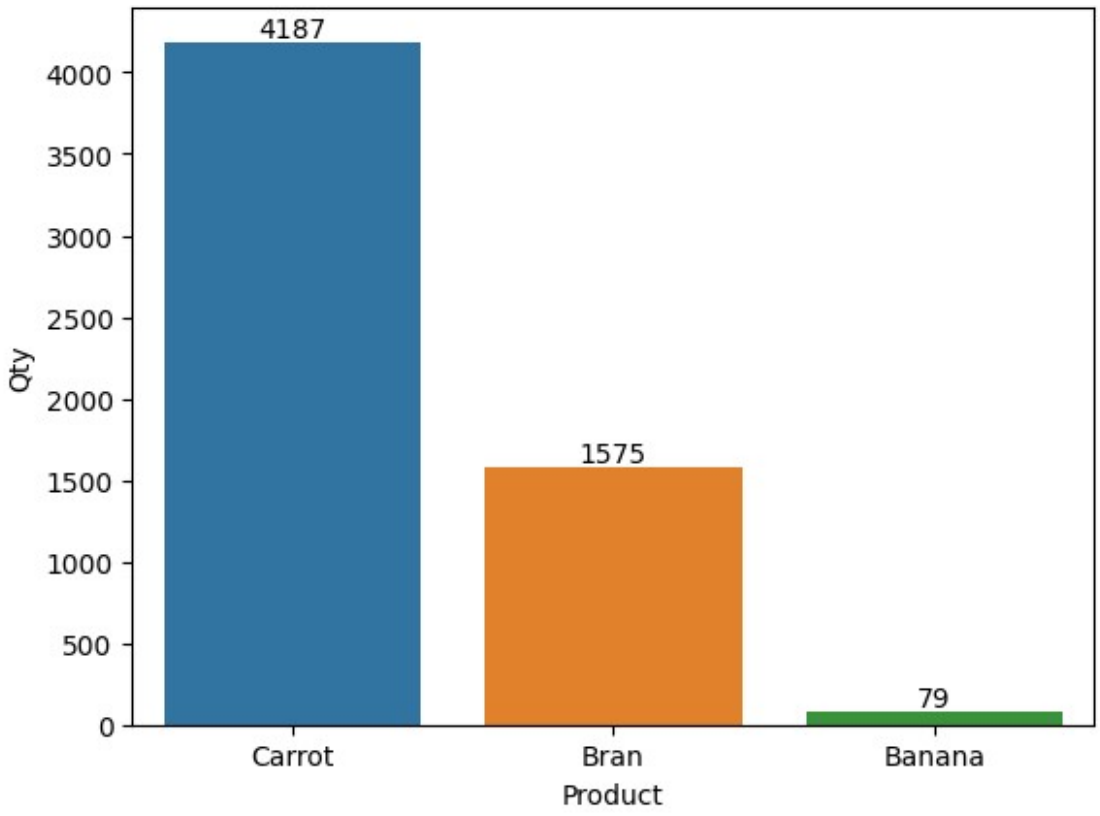

```
# From the above analysis we see that cookies category as whole
constitutes the greatest number of items sold
```

```
# Where as individual product "Carrot" of "Bars" category has highest
number of sales
# Cookies and Bars make up most of the sales hence may be assumed to
have great demands
# Sncks and Crackers make only marginal sales hence may be assumed to
have less demands

cookiesdb1 = datf.query(f'Category == "Cookies"')

cookiesdb2 = cookiesdb1. groupby(['Product'], as_index = False)
['Qty'].sum().sort_values(by = 'Qty', ascending = False)

dx = sns.barplot(x='Product', y= 'Qty', data = cookiesdb2)
for bars in dx.containers:
    dx.bar_label(bars)
```




```
# From the above analysis we see that almost all products in the
cookies category have nearly equal sales and hence demand.
# All the products have their individual sales greater than Snacks and
Crackers Category

barsdb1 = datf.query(f'Category == "Bars"')

barsdb2 = barsdb1. groupby(['Product'], as_index = False)
```

```
['Qty'].sum().sort_values(by = 'Qty', ascending = False)

ax = sns.barplot(x='Product', y= 'Qty', data = barsdb2)
for bars in ax.containers:
    ax.bar_label(bars)
```




```
# From the above analysis we see that in the 'Bars' Category Carrot has the maximum sale with 4187 units
# Bran product has a sale of 1575 units
# Banana has the least sale among the three with only 79 units

# From the above two comparisons we can safely say that maintaining a greater inventory of cookies can help to meet the demand.
# Also Banana units may be reduced as they are sold in very less quantity
# Carrot has nearly twice the sale compared to any product in the cookies category
```

CONCLUSION

From the Data we could obtain the fact that the food store recieves greatest orders from the eastern city of Boston. The Products of the cookies category bring the greatest revenue as well

as sales in terms of units sold All the products of cookies category have nearly similar number of units sold (each above 2000 units) So it is safe to maintain a good inventory of cookies Among all products Carrot of "Bars" category has the maximum revenue and units sold. But other products of "Bars" category donot have an equally sales record. So from "Bars" category Carrots may have more inventory and inventory of banana should be avoided

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THANK YOU