```
import pandas as pd
import numpy as np
```

Importing Training Dataset

```
xtrain = pd.read_csv('Train.csv')
```

EDA on Training Dataset

```
xtrain.head()
```

	Item_Identifier	Item_Weight	Item_Fat_Content	Item_Visibility	Item_Type	Item_MRP	Outlet_Identifier	Outlet_Establishment_Year	O
0	FDA15	9.30	Low Fat	0.016047	Dairy	249.8092	OUT049	1999	
1	DRC01	5.92	Regular	0.019278	Soft Drinks	48.2692	OUT018	2009	
2	FDN15	17.50	Low Fat	0.016760	Meat	141.6180	OUT049	1999	
3	FDX07	19.20	Regular	0.000000	Fruits and Vegetables	182.0950	OUT010	1998	
4	NCD19	8.93	Low Fat	0.000000	Household	53.8614	OUT013	1987	

Next steps: Generate code with xtrain | View recommended plots | New interactive sheet

```
print("Number of Rows = ", xtrain.shape[0])
print("Number of Features = ", xtrain.shape[1])
```

```
Number of Rows =  8523
Number of Features =  12
```

```
xtrain.describe()
```

	Item_Weight	Item_Visibility	Item_MRP	Outlet_Establishment_Year	Item_Outlet_Sales
count	8523.000000	8523.000000	8523.000000	8523.000000	8523.000000
mean	12.857645	0.066132	140.992782	1997.831867	2181.288914
std	4.226124	0.051598	62.275067	8.371760	1706.499616
min	4.555000	0.000000	31.290000	1985.000000	33.290000
25%	9.310000	0.026989	93.826500	1987.000000	834.247400
50%	12.857645	0.053931	143.012800	1999.000000	1794.331000
75%	16.000000	0.094585	185.643700	2004.000000	3101.296400
max	21.350000	0.328391	266.888400	2009.000000	13086.964800

```
xtrain.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 8523 entries, 0 to 8522
Data columns (total 12 columns):
 #   Column                     Non-Null Count  Dtype
---  ------                     --------------  -----
 0   Item_Identifier            8523 non-null   object
 1   Item_Weight                7060 non-null   float64
 2   Item_Fat_Content           8523 non-null   object
 3   Item_Visibility            8523 non-null   float64
 4   Item_Type                  8523 non-null   object
 5   Item_MRP                   8523 non-null   float64
 6   Outlet_Identifier          8523 non-null   object
 7   Outlet_Establishment_Year  8523 non-null   int64
 8   Outlet_Size                6113 non-null   object
 9   Outlet_Location_Type       8523 non-null   object
 10  Outlet_Type                8523 non-null   object
```

```
 11  Item_Outlet_Sales          8523 non-null   float64
dtypes: float64(4), int64(1), object(7)
memory usage: 799.2+ KB
```

Chacking for NULL values

```
xtrain.isnull().sum()
```

	0
Item_Identifier	0
Item_Weight	1463
Item_Fat_Content	0
Item_Visibility	0
Item_Type	0
Item_MRP	0
Outlet_Identifier	0
Outlet_Establishment_Year	0
Outlet_Size	2410
Outlet_Location_Type	0
Outlet_Type	0
Item_Outlet_Sales	0

Handling Missing Values

```
#Filling Missing Values in Item_Weight with mean
xtrain['Item_Weight'] = xtrain['Item_Weight'].fillna(xtrain['Item_Weight'].mean())
```

```
xtrain.isnull().sum()
```

	0
Item_Identifier	0
Item_Weight	0
Item_Fat_Content	0
Item_Visibility	0
Item_Type	0
Item_MRP	0
Outlet_Identifier	0
Outlet_Establishment_Year	0
Outlet_Size	2410
Outlet_Location_Type	0
Outlet_Type	0
Item_Outlet_Sales	0

```
xtrain['Outlet_Size'].value_counts()
```

Outlet_Size	count
Medium	2793
Small	2388
High	932

```
xtrain.groupby('Outlet_Type')['Outlet_Size'].agg(pd.Series.mode)
```

Outlet_Type	Outlet_Size
Grocery Store	Small
Supermarket Type1	Small
Supermarket Type2	Medium
Supermarket Type3	Medium

```
xtrain.loc[xtrain['Outlet_Type']=='Grocery Store','Outlet_Size']='Small'
xtrain.loc[xtrain['Outlet_Type']=='Supermarket Type1','Outlet_Size']='Small'
xtrain.loc[xtrain['Outlet_Type']=='Supermarket Type2','Outlet_Size']='Medium'
xtrain.loc[xtrain['Outlet_Type']=='Supermarket Type3','Outlet_Size']='Medium'
```

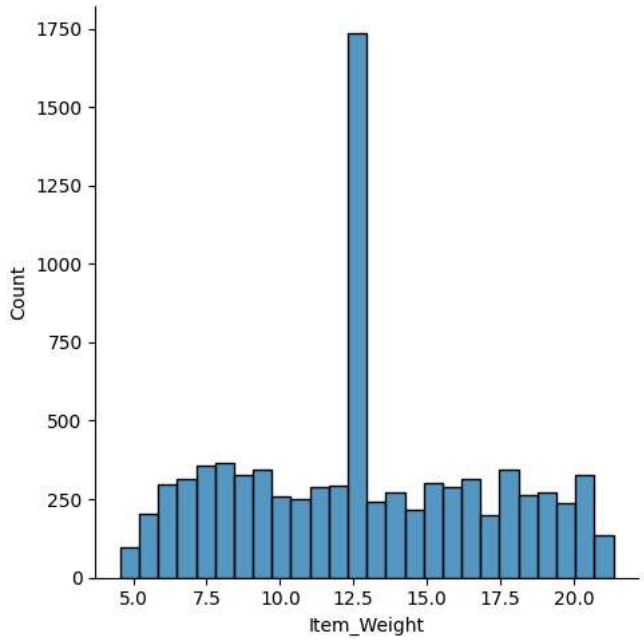
```
xtrain.isna().sum()
```

	0
Item_Identifier	0
Item_Weight	0
Item_Fat_Content	0
Item_Visibility	0
Item_Type	0
Item_MRP	0
Outlet_Identifier	0
Outlet_Establishment_Year	0
Outlet_Size	0
Outlet_Location_Type	0
Outlet_Type	0
Item_Outlet_Sales	0

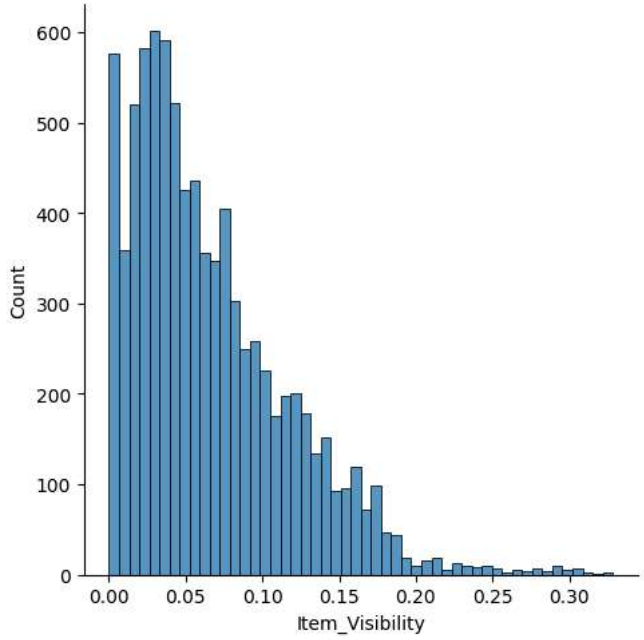
Data Visualization

```
import matplotlib.pyplot as plt
import seaborn as sns
```

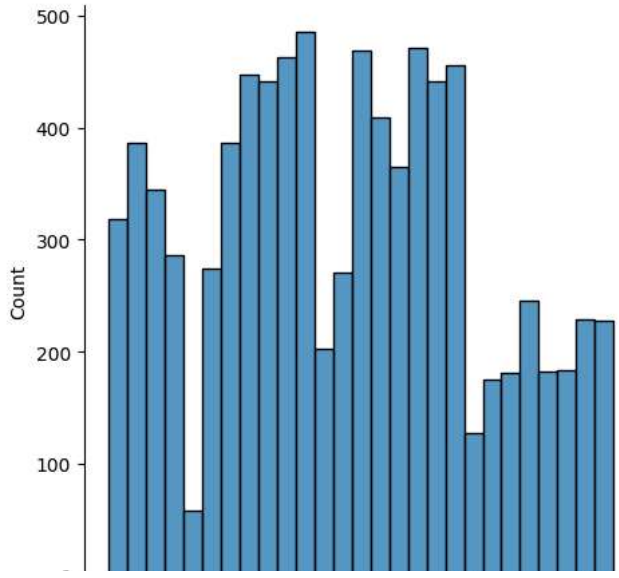
```
numcolumns = ['Item_Weight',    'Item_Visibility',  'Item_MRP', 'Item_Outlet_Sales']
for col in numcolumns:
    plt.figure(figsize=(10,5))
    sns.displot(xtrain[col])
    plt.show()
```

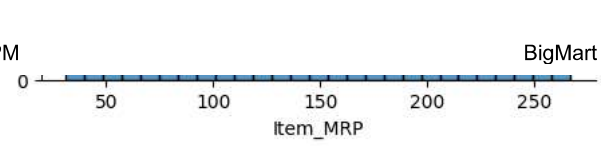



```
<Figure size 1000x500 with 0 Axes>
```

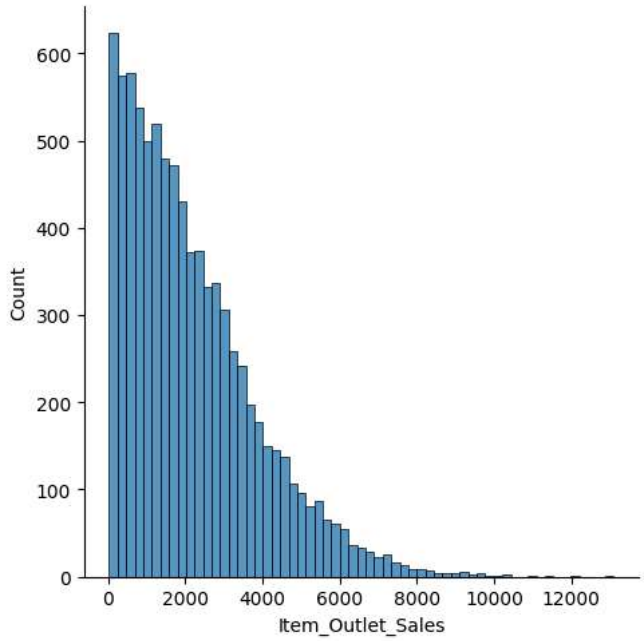



```
<Figure size 1000x500 with 0 Axes>
```





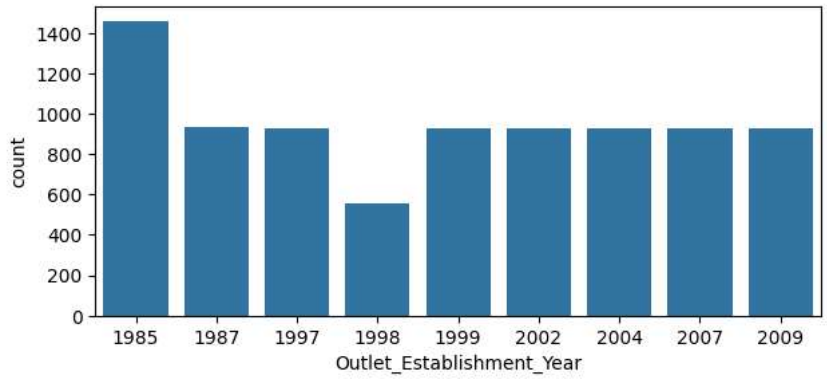

```
<Figure size 1000x500 with 0 Axes>
```

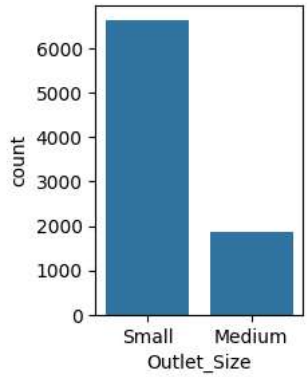


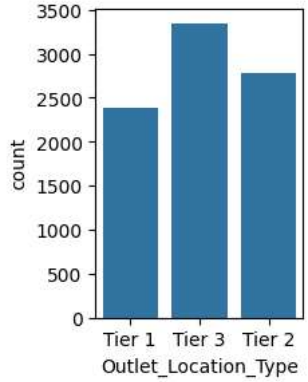
Categorical Variable Viz

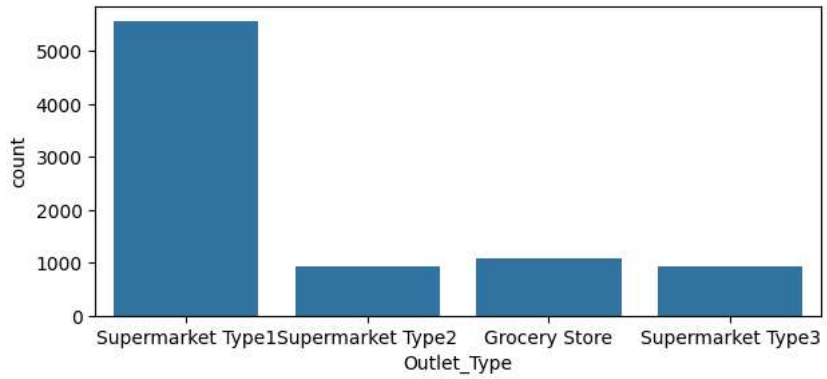
```
#Outlet Viz
plt.figure(figsize=(7,3))
sns.countplot(x='Outlet_Establishment_Year', data=xtrain)
plt.show()

plt.figure(figsize=(2,3))
sns.countplot(x='Outlet_Size', data=xtrain)
plt.show()

plt.figure(figsize=(2,3))
sns.countplot(x='Outlet_Location_Type', data=xtrain)
plt.show()

plt.figure(figsize=(7,3))
sns.countplot(x='Outlet_Type', data=xtrain)
plt.show()


#Product Property Viz
plt.figure(figsize=(25,5))
sns.countplot(x='Item_Type', data=xtrain)
plt.show()

plt.figure(figsize=(5,3))
sns.countplot(x='Item_Fat_Content', data=xtrain)
plt.show()
```

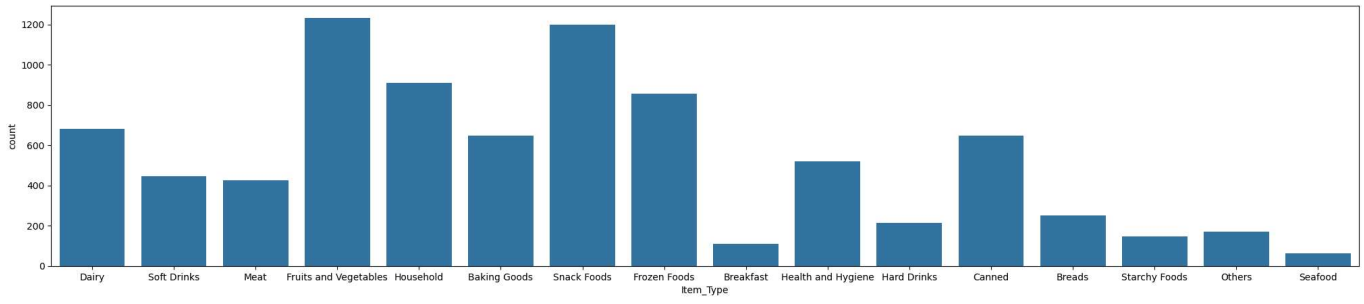
[+]

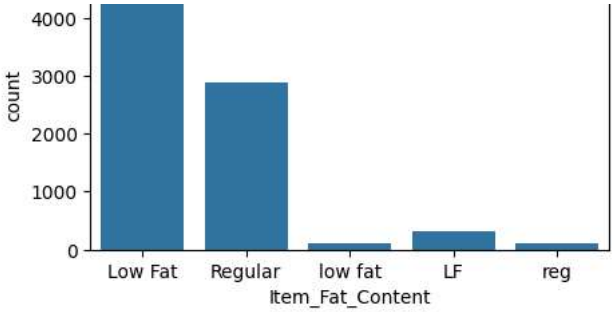

count
Outlet_Establishment_Year
1985
1987
1997
1998
1999
2002
2004
2007
2009


count
Outlet_Size
Small
Medium


count
Outlet_Location_Type
Tier 1
Tier 3
Tier 2


count
Outlet_Type
Supermarket Type1
Supermarket Type2
Grocery Store
Supermarket Type3


count
Item_Type
Dairy
Soft Drinks
Meat
Fruits and Vegetables
Household
Baking Goods
Snack Foods
Frozen Foods
Breakfast
Health and Hygiene
Hard Drinks
Canned
Breads
Starchy Foods
Others
Seafood



Data Preprocessing

```
xtrain['Item_Fat_Content'].value_counts()
```

Item_Fat_Content	count
Low Fat	5089
Regular	2889
LF	316
reg	117
low fat	112

```
xtrain.loc[xtrain['Item_Fat_Content']=='LF','Item_Fat_Content']='Low Fat'
xtrain.loc[xtrain['Item_Fat_Content']=='low fat','Item_Fat_Content']='Low Fat'
xtrain.loc[xtrain['Item_Fat_Content']=='reg','Item_Fat_Content']='Regular'

#After Correction
xtrain['Item_Fat_Content'].value_counts()
```

Item_Fat_Content	count
Low Fat	5517
Regular	3006

Label Encoding of Categorical Variables

```
from sklearn.preprocessing import LabelEncoder


Encod= LabelEncoder()
xtrain['Outlet_Size']=Encod.fit_transform(xtrain['Outlet_Size'])
xtrain['Outlet_Type']=Encod.fit_transform(xtrain['Outlet_Type'])
xtrain['Outlet_Location_Type']=Encod.fit_transform(xtrain['Outlet_Location_Type'])

xtrain['Item_Type']=Encod.fit_transform(xtrain['Item_Type'])
xtrain['Item_Fat_Content']=Encod.fit_transform(xtrain['Item_Fat_Content'])

xtrain['Item_Identifier']=Encod.fit_transform(xtrain['Item_Identifier'])
xtrain['Outlet_Identifier']=Encod.fit_transform(xtrain['Outlet_Identifier'])


xtrain.head()
```

	Item_Identifier	Item_Weight	Item_Fat_Content	Item_Visibility	Item_Type	Item_MRP	Outlet_Identifier	Outlet_Establishment_Year	O
0	156	9.30	0	0.016047	4	249.8092	9	1999	
1	8	5.92	1	0.019278	14	48.2692	3	2009	
2	662	17.50	0	0.016760	10	141.6180	9	1999	
3	1121	19.20	1	0.000000	6	182.0950	0	1998	
4	1297	8.93	0	0.000000	9	53.8614	1	1987	

Next steps: Generate code with xtrain View recommended plots New interactive sheet

Data Scaling

```
from sklearn.preprocessing import StandardScaler


Encod= StandardScaler()

xtrain['Item_MRP']=Encod.fit_transform(xtrain['Item_MRP'].values.reshape(-1,1))
xtrain['Item_Weight']=Encod.fit_transform(xtrain['Item_Weight'].values.reshape(-1,1))
xtrain['Item_Visibility']=Encod.fit_transform(xtrain['Item_Visibility'].values.reshape(-1,1))
xtrain['Item_Outlet_Sales']=Encod.fit_transform(xtrain['Item_Outlet_Sales'].values.reshape(-1,1))

xtrain.head()
```

	Item_Identifier	Item_Weight	Item_Fat_Content	Item_Visibility	Item_Type	Item_MRP	Outlet_Identifier	Outlet_Establishment_Year	O
0	156	-0.841872	0	-0.970732	4	1.747454	9	1999	
1	8	-1.641706	1	-0.908111	14	-1.489023	3	2009	
2	662	1.098554	0	-0.956917	10	0.010040	9	1999	
3	1121	1.500838	1	-1.281758	6	0.660050	0	1998	
4	1297	-0.929428	0	-1.281758	9	-1.399220	1	1987	

Next steps: Generate code with xtrain View recommended plots New interactive sheet

Seperating features and labels

```
Features = xtrain.drop(columns=['Item_Outlet_Sales'], axis=1)
Target = xtrain['Item_Outlet_Sales']

Features
```

	Item_Identifier	Item_Weight	Item_Fat_Content	Item_Visibility	Item_Type	Item_MRP	Outlet_Identifier	Outlet_Establishment_Year
0	156	-0.841872	0	-0.970732	4	1.747454	9	1999
1	8	-1.641706	1	-0.908111	14	-1.489023	3	2009
2	662	1.098554	0	-0.956917	10	0.010040	9	1999
3	1121	1.500838	1	-1.281758	6	0.660050	0	1998
4	1297	-0.929428	0	-1.281758	9	-1.399220	1	1987
...	...	...	...	...	...	...	...	...
8518	370	-1.418084	0	-0.181193	13	1.180783	1	1987
8519	897	-1.059578	1	-0.371154	0	-0.527301	7	2002
8520	1357	-0.534243	0	-0.599784	8	-0.897208	6	2004
8521	681	-1.336444	1	1.532880	13	-0.607977	3	2009
8522	50	0.459634	0	-0.411936	14	-1.052261	8	1997

8523 rows × 11 columns

```
Target.head()
```

	Item_Outlet_Sales
0	0.910601
1	-1.018440
2	-0.049238
3	-0.849103
4	-0.695373

Split Train Test Dataset

```
from sklearn.model_selection import train_test_split

Features_train,Features_test,Target_train,Target_test = train_test_split(Features,Target,test_size=0.2,random_state=42)
```

Importing the Model

```
from sklearn.ensemble import RandomForestRegressor
from sklearn.svm import SVR

import sklearn.metrics as metrics
```

Random Forrest Regression

```
model= RandomForestRegressor()

#Fitting Model on Training data
model.fit(Features_train,Target_train)

#Test Dataset Prediction
prediction = model.predict(Features_test)

#Error Calculation
absoluteError = metrics.mean_absolute_error(Target_test,prediction)
print("Mean Absolute Error: ", absoluteError)

squaredError = metrics.mean_squared_error(Target_test,prediction)
print("Mean Squared Error: ", squaredError)
```

```
Mean Absolute Error:  0.4483054460294603
Mean Squared Error:  0.41463272669421214
```

SVM

```
model=SVR()

#Fitting Model on Training data
model.fit(Features_train,Target_train)

#Test Dataset Prediction
prediction = model.predict(Features_test)

#Error Calculation
absoluteError = metrics.mean_absolute_error(Target_test,prediction)
print("Mean Absolute Error: ", absoluteError)

squaredError = metrics.mean_squared_error(Target_test,prediction)
print("Mean Squared Error: ", squaredError)
```

```
Mean Absolute Error:  0.7432809334031226
Mean Squared Error:  0.9562528325456281
```

Save Model

```
from joblib import dump
dump(model, 'SVR.joblib')
```

```
['SVR.joblib']
```

Making a Predictive System

```
xtest = pd.read_csv('Test.csv')
```

```
xtest.head()
```

	Item_Identifier	Item_Weight	Item_Fat_Content	Item_Visibility	Item_Type	Item_MRP	Outlet_Identifier	Outlet_Establishment_Year	O
0	FDW58	20.750	Low Fat	0.007565	Snack Foods	107.8622	OUT049	1999	
1	FDW14	8.300	reg	0.038428	Dairy	87.3198	OUT017	2007	
2	NCN55	14.600	Low Fat	0.099575	Others	241.7538	OUT010	1998	
3	FDQ58	7.315	Low Fat	0.015388	Snack Foods	155.0340	OUT017	2007	
4	FDY38	NaN	Regular	0.118599	Dairy	234.2300	OUT027	1985	

Next steps: Generate code with xtest | View recommended plots | New interactive sheet

```
xtest.shape[1]
```

```
11
```

```
xtrain.shape[1]
```

```
12
```

Pre Processing Test Data

```
xtest.describe()
```

	Item_Weight	Item_Visibility	Item_MRP	Outlet_Establishment_Year
count	4705.000000	5681.000000	5681.000000	5681.000000
mean	12.695633	0.065684	141.023273	1997.828903
std	4.664849	0.051252	61.809091	8.372256
min	4.555000	0.000000	31.990000	1985.000000
25%	8.645000	0.027047	94.412000	1987.000000
50%	12.500000	0.054154	141.415400	1999.000000
75%	16.700000	0.093463	186.026600	2004.000000
max	21.350000	0.323637	266.588400	2009.000000

```
xtest.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5681 entries, 0 to 5680
Data columns (total 11 columns):
 #   Column                     Non-Null Count  Dtype
---  ------                     --------------  -----
 0   Item_Identifier            5681 non-null   object
 1   Item_Weight                4705 non-null   float64
 2   Item_Fat_Content           5681 non-null   object
 3   Item_Visibility            5681 non-null   float64
 4   Item_Type                  5681 non-null   object
```

```
 5   Item_MRP                   5681 non-null   float64
 6   Outlet_Identifier          5681 non-null   object
 7   Outlet_Establishment_Year  5681 non-null   int64
 8   Outlet_Size                4075 non-null   object
 9   Outlet_Location_Type       5681 non-null   object
 10  Outlet_Type                5681 non-null   object
dtypes: float64(3), int64(1), object(7)
memory usage: 488.3+ KB
```

```
xtest['Item_Fat_Content'].value_counts()
```

Item_Fat_Content	count
Low Fat	3396
Regular	1935
LF	206
reg	78
low fat	66

```
xtest.loc[xtest['Item_Fat_Content']=='LF','Item_Fat_Content']='Low Fat'
xtest.loc[xtest['Item_Fat_Content']=='low fat','Item_Fat_Content']='Low Fat'
xtest.loc[xtest['Item_Fat_Content']=='reg','Item_Fat_Content']='Regular'

#After Correction
xtest['Item_Fat_Content'].value_counts()
```

Item_Fat_Content	count
Low Fat	3668
Regular	2013

Label Encoding

```
Encod= LabelEncoder()
xtest['Outlet_Size']=Encod.fit_transform(xtest['Outlet_Size'])
xtest['Outlet_Type']=Encod.fit_transform(xtest['Outlet_Type'])
xtest['Outlet_Location_Type']=Encod.fit_transform(xtest['Outlet_Location_Type'])

xtest['Item_Type']=Encod.fit_transform(xtest['Item_Type'])
xtest['Item_Fat_Content']=Encod.fit_transform(xtest['Item_Fat_Content'])

xtest['Item_Identifier']=Encod.fit_transform(xtest['Item_Identifier'])
xtest['Outlet_Identifier']=Encod.fit_transform(xtest['Outlet_Identifier'])
```

```
xtest.head()
```

	Item_Identifier	Item_Weight	Item_Fat_Content	Item_Visibility	Item_Type	Item_MRP	Outlet_Identifier	Outlet_Establishment_Year	O
0	1103	20.750	0	0.007565	13	107.8622	9	1999	
1	1067	8.300	1	0.038428	4	87.3198	2	2007	
2	1406	14.600	0	0.099575	11	241.7538	0	1998	
3	809	7.315	0	0.015388	13	155.0340	2	2007	
4	1184	NaN	1	0.118599	4	234.2300	5	1985	

Next steps: Generate code with xtest | View recommended plots | New interactive sheet

```
xtest.isnull().sum()
```