```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import pickle
from mpl_toolkits.mplot3d import Axes3D


df=pd.DataFrame(pd.read_csv('/content/drive/MyDrive/abalone.csv'))
df
```

	Sex	Length	Diameter	Height	Whole weight	Shucked weight	Viscera weight	Shell weight	Rings
0	M	0.455	0.365	0.095	0.5140	0.2245	0.1010	0.1500	15
1	M	0.350	0.265	0.090	0.2255	0.0995	0.0485	0.0700	7
2	F	0.530	0.420	0.135	0.6770	0.2565	0.1415	0.2100	9
3	M	0.440	0.365	0.125	0.5160	0.2155	0.1140	0.1550	10
4	I	0.330	0.255	0.080	0.2050	0.0895	0.0395	0.0550	7
...	...	...	...	...	...	...	...	...	...
4172	F	0.565	0.450	0.165	0.8870	0.3700	0.2390	0.2490	11
4173	M	0.590	0.440	0.135	0.9660	0.4390	0.2145	0.2605	10
4174	M	0.600	0.475	0.205	1.1760	0.5255	0.2875	0.3080	9
4175	F	0.625	0.485	0.150	1.0945	0.5310	0.2610	0.2960	10
4176	M	0.710	0.555	0.195	1.9485	0.9455	0.3765	0.4950	12

4177 rows × 9 columns

```
df.head()
```

	Sex	Length	Diameter	Height	Whole weight	Shucked weight	Viscera weight	Shell weight	Rings
0	M	0.455	0.365	0.095	0.5140	0.2245	0.1010	0.150	15
1	M	0.350	0.265	0.090	0.2255	0.0995	0.0485	0.070	7
2	F	0.530	0.420	0.135	0.6770	0.2565	0.1415	0.210	9
3	M	0.440	0.365	0.125	0.5160	0.2155	0.1140	0.155	10
4	I	0.330	0.255	0.080	0.2050	0.0895	0.0395	0.055	7

```
df.tail()
```

	Sex	Length	Diameter	Height	Whole weight	Shucked weight	Viscera weight	Shell weight	Rings
4172	F	0.565	0.450	0.165	0.8870	0.3700	0.2390	0.2490	11
4173	M	0.590	0.440	0.135	0.9660	0.4390	0.2145	0.2605	10

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4177 entries, 0 to 4176
Data columns (total 9 columns):
 #   Column          Non-Null Count  Dtype  
---  ------          --------------  -----  
 0   Sex             4177 non-null   object 
 1   Length          4177 non-null   float64
 2   Diameter        4177 non-null   float64
 3   Height          4177 non-null   float64
 4   Whole weight    4177 non-null   float64
 5   Shucked weight  4177 non-null   float64
 6   Viscera weight  4177 non-null   float64
 7   Shell weight    4177 non-null   float64
 8   Rings           4177 non-null   int64  
dtypes: float64(7), int64(1), object(1)
memory usage: 293.8+ KB
```

```
df.describe()
```

	Length	Diameter	Height	Whole weight	Shucked weight	Viscera weight	
count	4177.000000	4177.000000	4177.000000	4177.000000	4177.000000	4177.000000	4177
mean	0.523992	0.407881	0.139516	0.828742	0.359367	0.180594	0
std	0.120093	0.099240	0.041827	0.490389	0.221963	0.109614	0
min	0.075000	0.055000	0.000000	0.002000	0.001000	0.000500	0
25%	0.450000	0.350000	0.115000	0.441500	0.186000	0.093500	0
50%	0.545000	0.425000	0.140000	0.799500	0.336000	0.171000	0
75%	0.615000	0.480000	0.165000	1.153000	0.502000	0.253000	0

```
df.isnull().any()
```

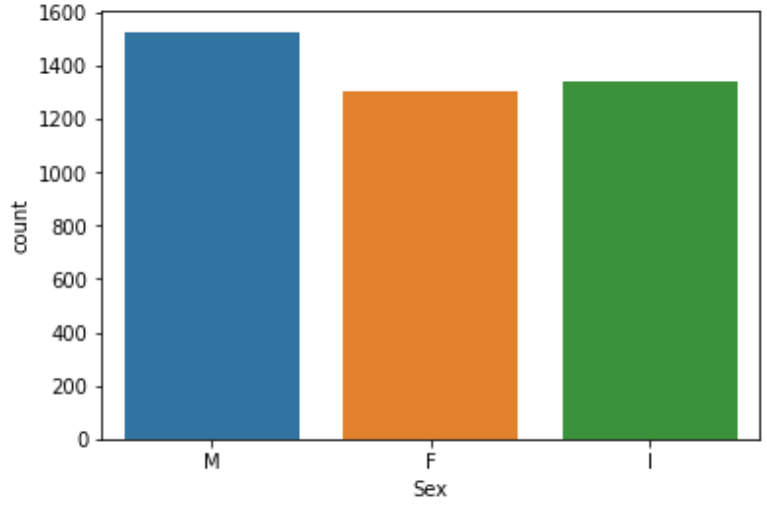
```
Sex               False
Length            False
Diameter          False
Height            False
Whole weight      False
Shucked weight    False
Viscera weight    False
Shell weight      False
Rings             False
dtype: bool
```

```
df.isnull().sum()
```

```
Sex               0
Length            0
Diameter          0
Height            0
Whole weight      0
Shucked weight    0
Viscera weight    0
Shell weight      0
Rings             0
dtype: int64
```

```
sns.countplot(data=df,x='Sex',label='Count')
m,f,i=df['Sex'].value_counts()
print('Number of males',m)
print('Number of females',f)
print('Number of trans',i)
```

```
Number of males 1528
Number of females 1342
Number of trans 1307
```



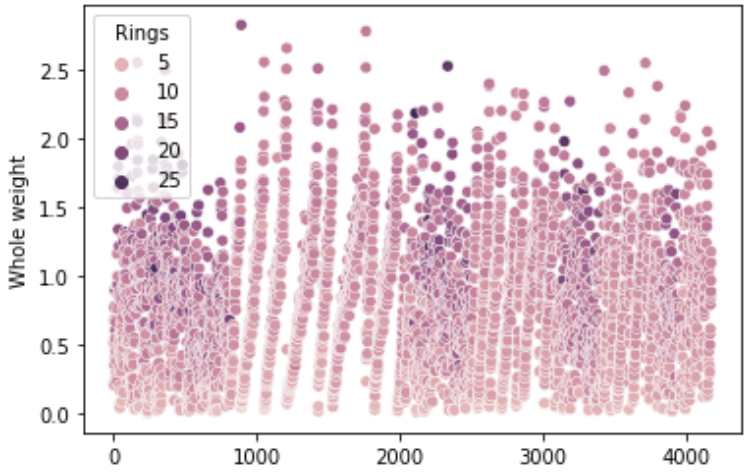

```
df['Sex']=np.where(df['Sex']=='F',0,df['Sex'])
df['Sex']=np.where(df['Sex']=='M',1,df['Sex'])
df['Sex']=np.where(df['Sex']=='I',2,df['Sex'])
```

```
df
```

	Sex	Length	Diameter	Height	Whole weight	Shucked weight	Viscera weight	Shell weight	Rings
0	1	0.455	0.365	0.095	0.5140	0.2245	0.1010	0.1500	15
1	1	0.350	0.265	0.090	0.2255	0.0995	0.0485	0.0700	7
2	0	0.530	0.420	0.135	0.6770	0.2565	0.1415	0.2100	9
3	1	0.440	0.365	0.125	0.5160	0.2155	0.1140	0.1550	10

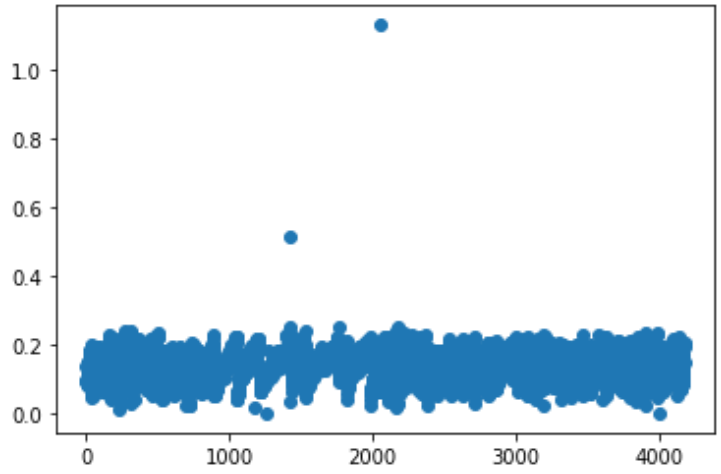
```
sns.scatterplot(x=df.index,y=df['Whole weight'],hue=df['Rings'])
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fbbba8430d0>
```



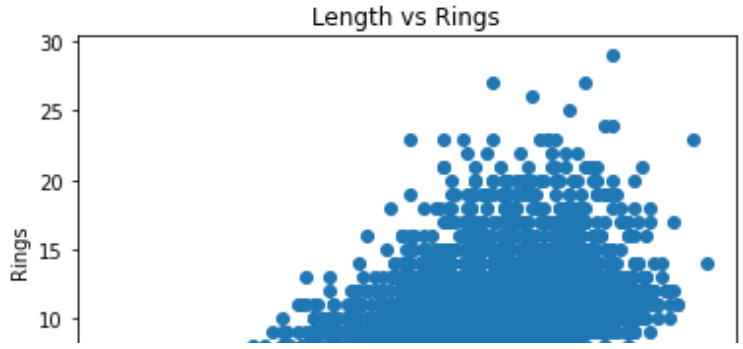

```
plt.scatter(df.index,df['Height'])
```

```
<matplotlib.collections.PathCollection at 0x7fbbba796350>
```



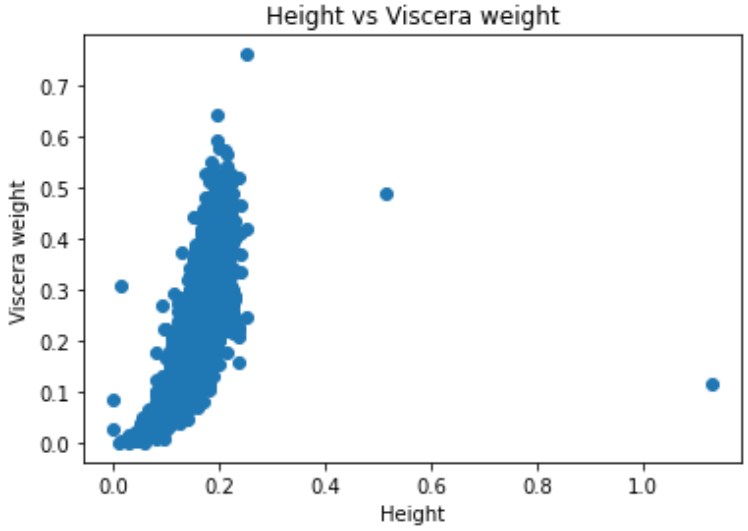

```
plt.scatter(df['Length'],df['Rings'])
plt.title('Length vs Rings')
plt.xlabel('Length')
plt.ylabel('Rings')
```

```
Text(0, 0.5, 'Rings')
```



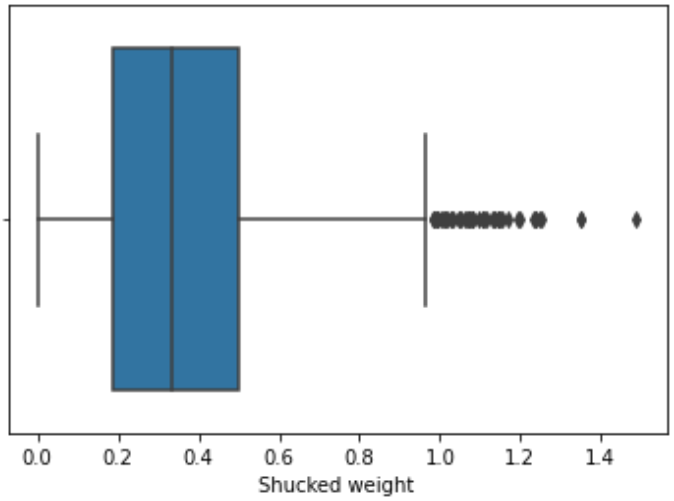

```
plt.scatter(df['Height'],df['Viscera weight'])
plt.title('Height vs Viscera weight')
plt.xlabel('Height')
plt.ylabel('Viscera weight')
```

```
Text(0, 0.5, 'Viscera weight')
```




```
sns.boxplot(df['Shucked weight'])
```

```
/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarning: Pass t
  FutureWarning
<matplotlib.axes._subplots.AxesSubplot at 0x7fbbb8e37dd0>
```




```
Q1=np.percentile(df['Shucked weight'],25,interpolation = 'midpoint')
```

```
Q3=np.percentile(df['Shucked weight'],75,interpolation = 'midpoint')
IQR=Q3-Q1
```

```
df.shape
```

```
(4177, 9)
```

```
upper=np.where(df['Shucked weight'] >= (Q3+1.5*IQR))
lower=np.where(df['Shucked weight'] <= (Q1-1.5*IQR))
```

```
df.drop(upper[0],inplace = True)
df.drop(lower[0],inplace = True)
```

```
df.shape
```

```
(4129, 9)
```

```
x=df.drop(columns='Rings')
y=df['Rings']
```

```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,train_size=0.8,random_state=4)
```

```
x_train.shape
```

```
(3303, 8)
```

```
y_train.shape
```

```
(3303,)
```

```
x_test.shape
```

```
(826, 8)
```

```
y_test.shape
```

```
(826,)
```

```
from sklearn.linear_model import LinearRegression
```

```
reg=LinearRegression()
```

```
reg.fit(x_train,y_train)
```

```
LinearRegression()
```

```
reg.score(x_test,y_test)
```

```
0.5066471607389202
```

```
reg.coef_
```

```
array([ -0.39936441,   1.49517781,  10.68642985,   8.63335562,
         9.4297715 , -21.10100745, -10.73004935,   8.6944531 ])
```