

1.The Dataset was successfully Downloaded

Import Libraries

```
In [12]: import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import numpy as np
from sklearn.preprocessing import LabelEncoder, MinMaxScaler
from sklearn.model_selection import train_test_split
from sklearn import linear_model
from sklearn.metrics import mean_squared_error, r2_score
```

2.Load the dataset

```
In [14]: df=pd.read_csv("D:/csv/abalone.csv")
```

```
In [16]: 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

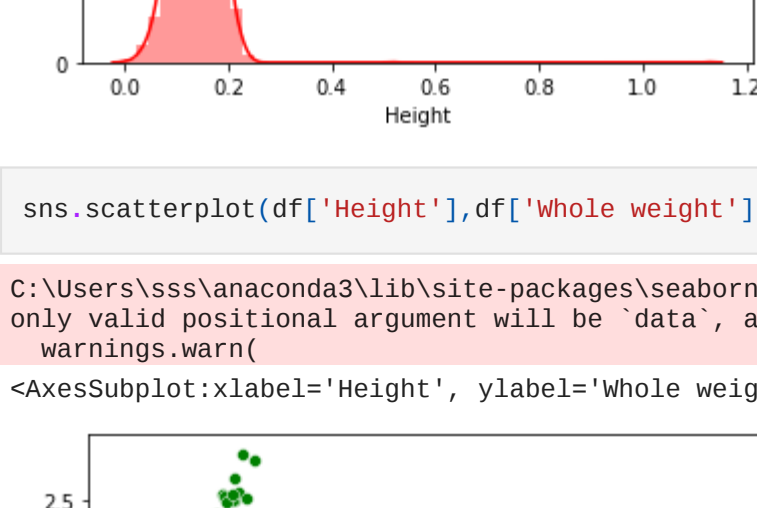
```
In [17]: df.tail()
```

	Sex	Length	Diameter	Height	Whole weight	Shucked weight	Viscera weight	Shell weight	Rings
4172	F	0.565	0.450	0.165	0.6870	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

```
In [19]: sns.distplot(df['Height'],color='red')
```

C:\Users\ss\anaconda3\lib\site-packages\seaborn\distributions.py:2557: 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 flexibility) or 'histplot' (an axes-level function for histograms).

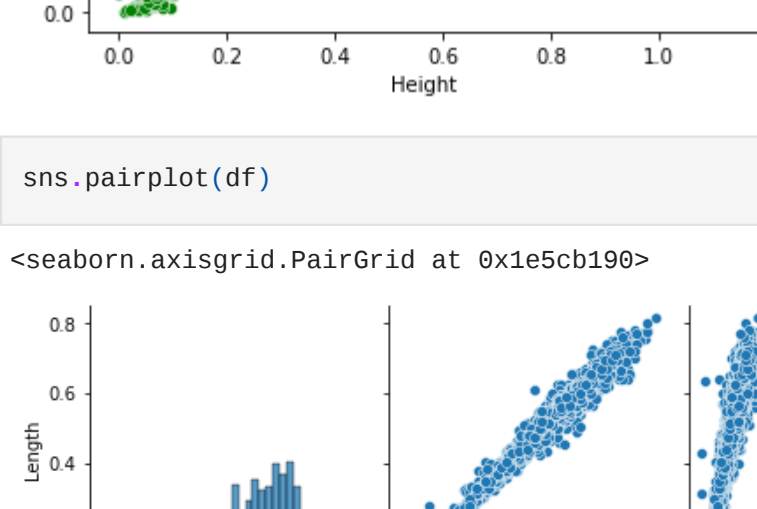
```
Out [19]: <AxesSubplot: xlabel='Height', ylabel='Density'>
```



```
In [28]: sns.scatterplot(df['Height'],df['Whole weight'],color='green')
```

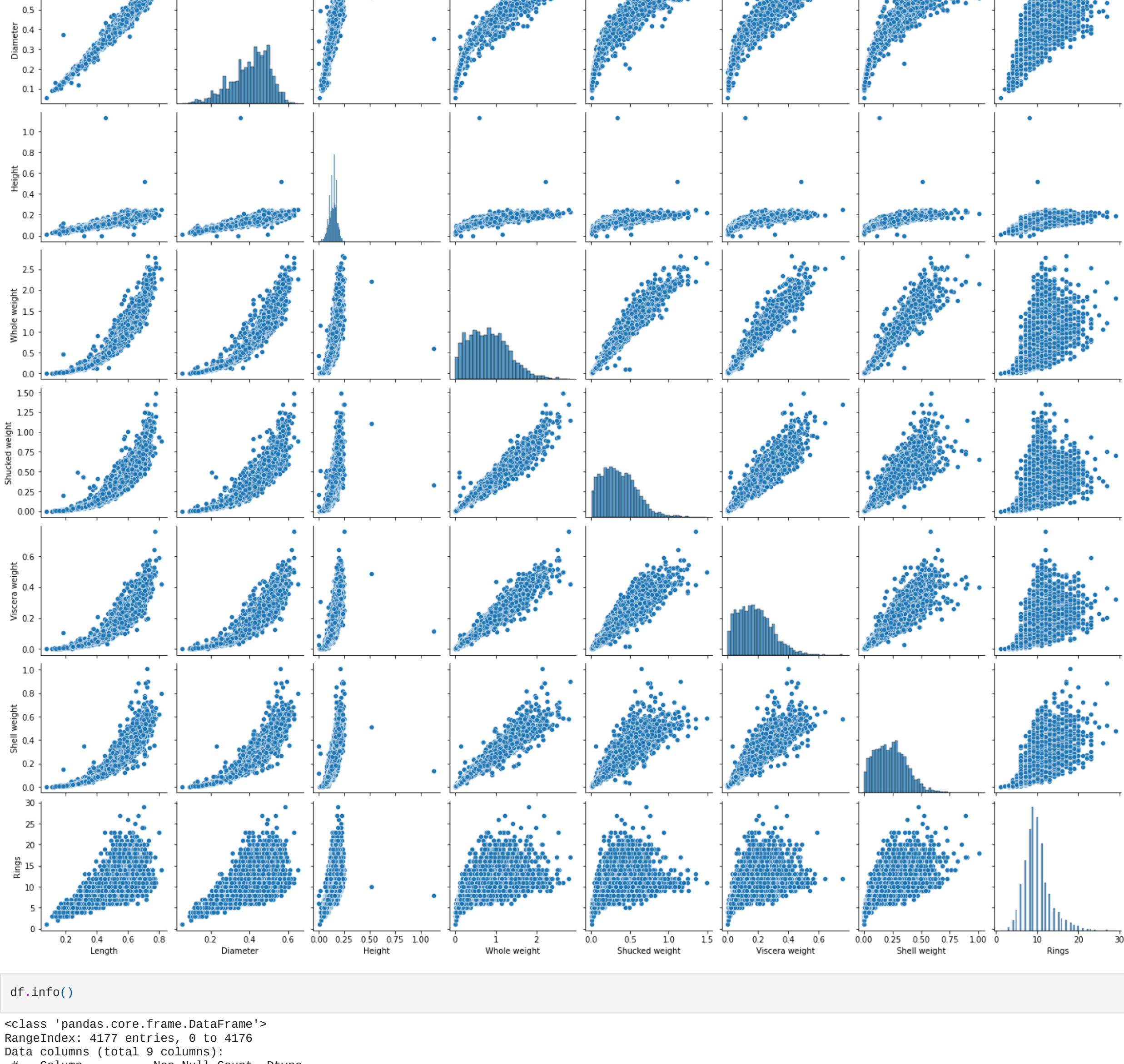
C:\Users\ss\anaconda3\lib\site-packages\seaborn\decorators.py:36: FutureWarning: Pass the following variables as keyword args: x, y. From version 0.12, the only valid positional argument will be 'data', and passing other arguments without an explicit keyword will result in an error or misinterpretation.

```
Out [28]: <AxesSubplot: xlabel='Height', ylabel='Whole weight'>
```



```
In [29]: sns.pairplot(df)
```

```
Out [29]: <seaborn.axisgrid.PairGrid at 0x1e5cb190>
```



```
In [30]: 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: 277.4+ KB
```

```
In [31]: df.mean()
```

```
Out [31]: Length      0.523902
Diameter    0.407881
Height      0.139516
Whole weight 0.828742
Shucked weight 0.358567
Viscera weight 0.180594
Shell weight 0.238821
Rings      9.933684
dtype: float64
```

```
In [33]: df.median()
```

```
Out [33]: Length      0.5450
Diameter    0.4250
Height      0.1400
Whole weight 0.7995
Shucked weight 0.3360
Viscera weight 0.1710
Shell weight 0.2340
Rings      9.0000
dtype: float64
```

```
In [34]: df.mode()
```

	Sex	Length	Diameter	Height	Whole weight	Shucked weight	Viscera weight	Shell weight	Rings
0	M	0.550	0.45	0.15	0.2225	0.175	0.1715	0.275	9.0
1	NaN	0.625	NaN	NaN	NaN	NaN	NaN	NaN	NaN

```
In [35]: df.skew()
```

```
Out [35]: Length      -0.639873
Diameter    -0.609198
Height      3.128827
Whole weight 0.530959
Shucked weight 0.719898
Viscera weight 0.591852
Shell weight 0.620927
Rings      1.114102
dtype: float64
```

```
In [37]: df.kurt()
```

```
Out [37]: Length      0.064621
Diameter    -0.045476
Height      76.025599
Whole weight -0.823644
Shucked weight 0.585154
Viscera weight 0.084012
Shell weight 0.531926
Rings      2.336887
dtype: float64
```

```
In [38]: df.var()
```

```
Out [38]: Length      0.014422
Diameter    0.009849
Height      0.001750
Whole weight 0.248481
Shucked weight 0.049268
Viscera weight 0.012915
Shell weight 0.019377
Rings      10.395266
dtype: float64
```

```
In [39]: df.std()
```

```
Out [39]: Length      0.120093
Diameter    0.099240
Height      0.041827
Whole weight 0.490389
Shucked weight 0.221963
Viscera weight 0.109614
Shell weight 0.193203
Rings      3.224169
dtype: float64
```

```
In [40]: df.max()
```

```
Out [40]: Sex              M
Length      0.815
Diameter    0.65
Height      1.13
Whole weight 2.8255
Shucked weight 1.408
Viscera weight 0.76
Shell weight 1.065
Rings      29
dtype: object
```

```
In [41]: df.min()
```

```
Out [41]: Sex              F
Length      0.075
Diameter    0.055
Height      0.0
Whole weight 0.002
Shucked weight 0.001
Viscera weight 0.0005
Shell weight 0.0015
Rings      1
dtype: object
```

```
In [42]: df.describe()
```

	Length	Diameter	Height	Whole weight	Shucked weight	Viscera weight	Shell weight	Rings
count	4177.000000	4177.000000	4177.000000	4177.000000	4177.000000	4177.000000	4177.000000	4177.000000
mean	0.523992	0.407881	0.139516	0.828742	0.359367	0.180594	0.238831	9.933684
std	0.120093	0.099240	0.041827	0.490389	0.221963	0.109614	0.193203	3.224169
min	0.075000	0.055000	0.000000	0.002000	0.001000	0.000500	0.001500	1.000000
25%	0.450000	0.350000	0.115000	0.441500	0.186000	0.093500	0.130000	8.000000
50%	0.545000	0.425000	0.140000	0.799500	0.336000	0.171000	0.234000	9.000000
75%	0.615000	0.480000	0.165000	1.153000	0.502000	0.253000	0.329000	11.000000
max	0.815000	0.650000	1.130000	2.825500	1.480000	0.760000	1.005000	29.000000

```
In [43]: df.isna().any()
```

```
Out [43]: Sex              False
Length             False
Diameter           False
Height             False
Whole weight       False
Shucked weight     False
Viscera weight     False
Shell weight       False
Rings              False
dtype: bool
```

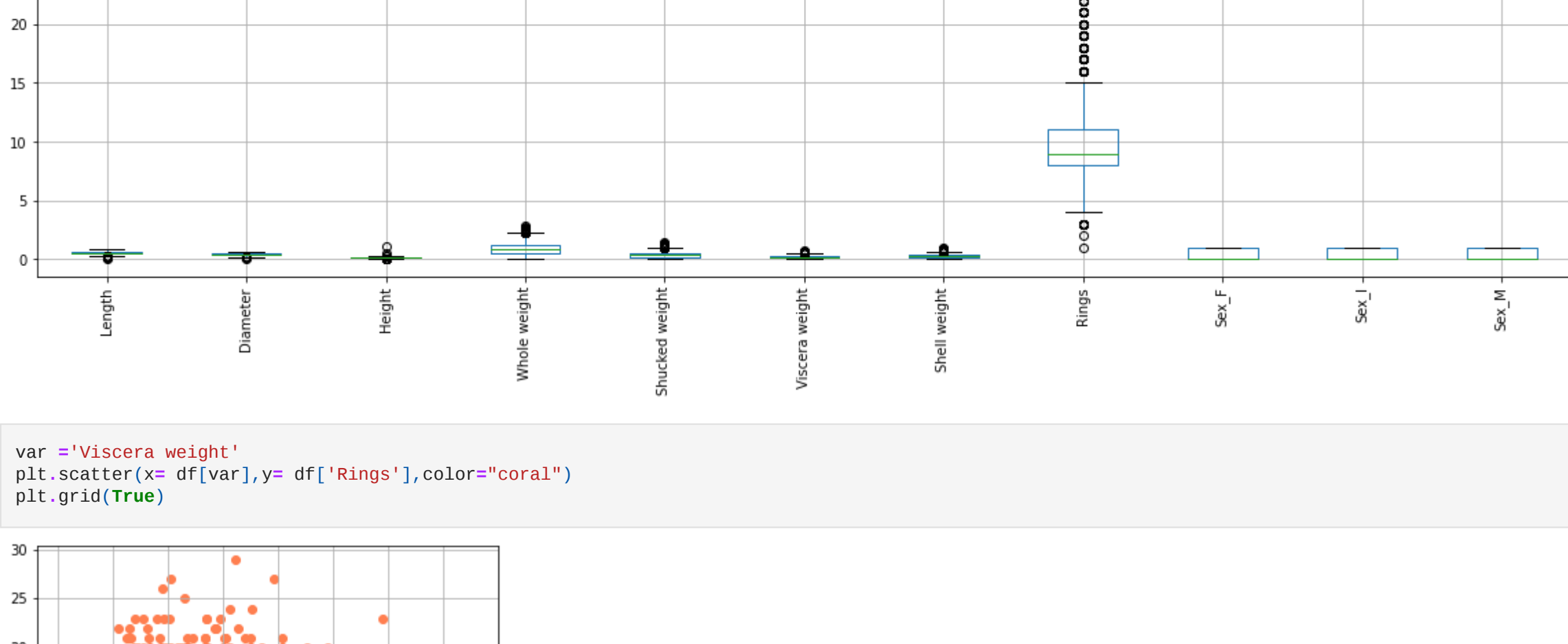
```
In [44]: df.isna().sum()
```

```
Out [44]: Sex              0
Length             0
Diameter           0
Height             0
Whole weight       0
Shucked weight     0
Viscera weight     0
Shell weight       0
Rings              0
dtype: int64
```

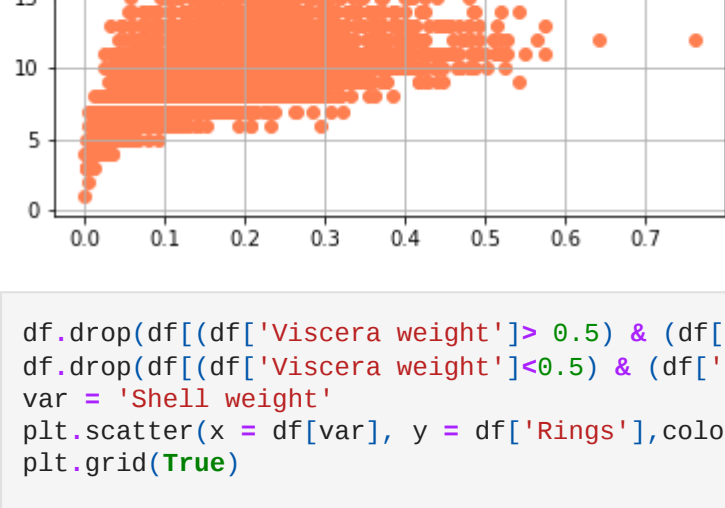
```
In [46]: df=pd.get_dummies(df)
dummy_df=df.copy()
```

```
In [47]: df.boxplot(rot=90,figsize=(20,5))
```

```
Out [47]: <AxesSubplot:~>
```

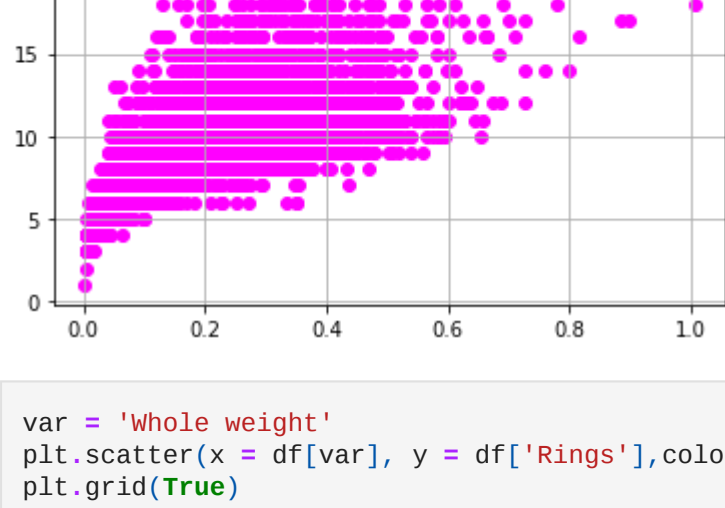


```
In [50]: var = 'Viscera weight'
plt.scatter(x=df[var],y= df['Rings'],color='coral')
plt.grid(True)
```

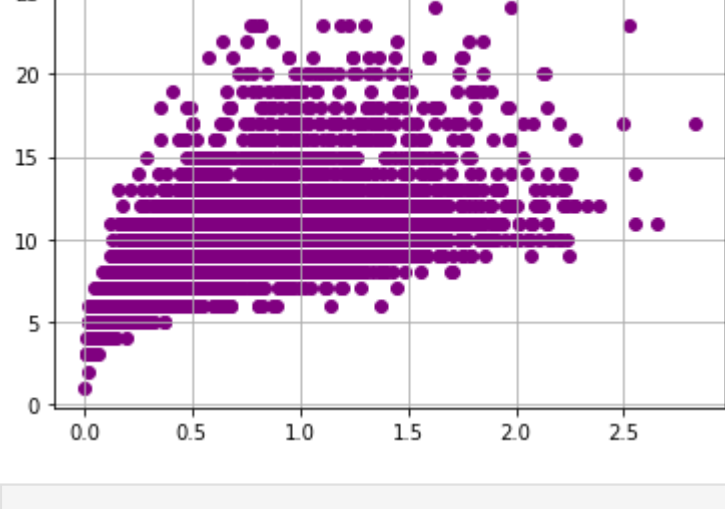


```
In [53]: df.drop(df[(df['Viscera weight']> 0.5) & (df['Rings'] < 20)].index, inplace=True)
df.drop(df[(df['Shell weight']<0.6) & (df['Rings'] > 25)].index, inplace=True)
```

```
var = 'Shell weight'
plt.scatter(x = df[var], y = df['Rings'],color='magenta')
plt.grid(True)
```

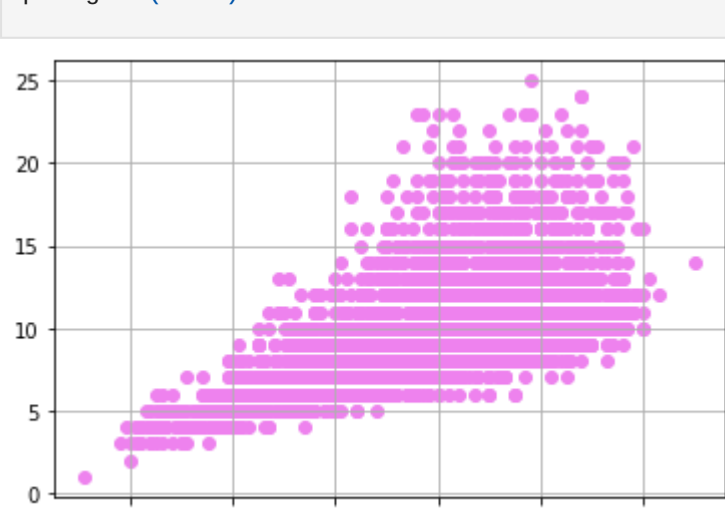


```
In [54]: var = 'Whole weight'
plt.scatter(x = df[var], y = df['Rings'],color='purple')
plt.grid(True)
```



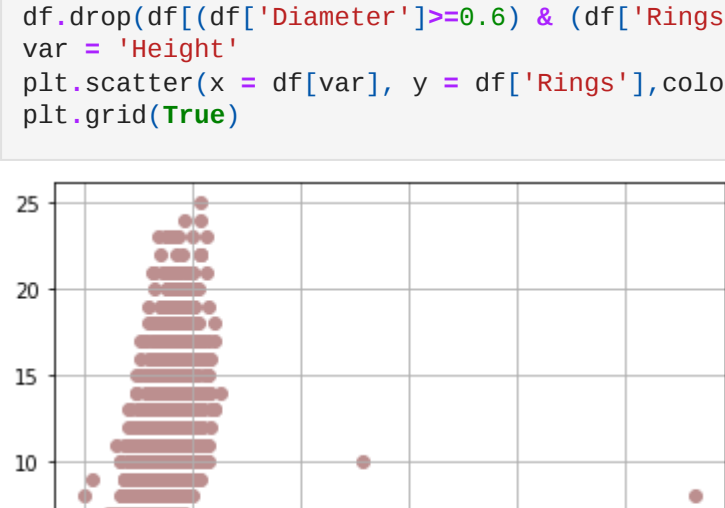
```
In [57]: df.drop(df[(df['Whole weight']>= 2.5) & (df['Rings'] < 25)].index, inplace=True)
df.drop(df[(df['Whole weight']<2.5) & (df['Rings'] > 25)].index, inplace=True)
```

```
var = 'Diameter'
plt.scatter(x = df[var], y = df['Rings'],color='violet')
plt.grid(True)
```



```
In [58]: df.drop(df[(df['Diameter']<0.1) & (df['Rings'] < 5)].index, inplace=True)
df.drop(df[(df['Diameter']<0.6) & (df['Rings'] > 25)].index, inplace=True)
df.drop(df[(df['Diameter']>=0.6) & (df['Rings'] < 25)].index, inplace=True)
```

```
var = 'Height'
plt.scatter(x = df[var], y = df['Rings'],color='rosybrown')
plt.grid(True)
```



```
In [59]: df.drop(df[(df['Height']>0.4) & (df['Rings'] < 15)].index, inplace=True)
df.drop(df[(df['Height']<0.4) & (df['Rings'] > 25)].index, inplace=True)
```

```
x = pd.get_dummies(df)
x.head()
```

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

```
In [62]: x = df.iloc[:,0:10]
y = df.iloc[:,10]
```

```
print(x.shape)
print(y.shape)
```

```
(4132, 10)
(4132,)
```

```
In [66]: from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.25,random_state=0)
```

```
sc = StandardScaler()
x_train=sc.fit_transform(x_train)
x_test = sc.fit_transform(x_test)
```

```
x_train = pd.DataFrame(x_train)
x_train.head()
```

	0	1	2	3	4	5	6	7	8	9
0	1.665936	1.569336	0.963746	1.924895	1.327806	1.547603	2.136692	2.240426	1.502889	-0.604820
1	0.909325	0.856351	0.438113	0.925563	1.295177	0.647487	0.397621	-0.275866	-0.665385	-0.694820
2	0.068646	0.245221	-0.087521	-0.396338	-0.499429	-0.299756	-0.158734	0.038670	-0.665385	1.439221
3	1.077461	1.161916	0.306704	0.894993	0.919941	1.118752	1.703432	0.038670	-0.665385	1.439221
4	-3.041866	-2.912285	-3.109913	-1.677128	-1.606491	-1.628723	-1.695159	-1.848549	-0.665385	1.439221

```
In [68]: from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.25,random_state=0)
```

```
print('x_train.shape : ',x_train.shape)
print('y_train.shape : ',y_train.shape)
print('x_test.shape : ',x_test.shape)
print('y_test.shape : ',y_test.shape)
```

```
x_train.shape : (3099, 10)
y_train.shape : (3099,)
```

```
x_test.shape : (1033, 10)
y_test.shape : (1033,)
```

```
In [69]: from sklearn.linear_model import LinearRegression
abc = LinearRegression()
```

```
Out [69]: LinearRegression()
```

```
In [71]: y_train_pred = abc.predict(x_train)
```

```
In [72]: y_test_pred = abc.predict(x_test)
```

```
In [73]: from sklearn.metrics import mean_absolute_error, mean_squared_error
sq = mean_squared_error(y_train,y_train_pred)
print('Mean Squared error of training set :%2f'%sq)
```

```
pr= mean_squared_error(y_test, y_test_pred)
print('Mean Squared error of testing set :%2f'%pr)
```

```
Mean Squared error of training set :0.000000
Mean Squared error of testing set :0.000000
```

```
In [74]: from sklearn.metrics import r2_score
s = r2_score(y_train, y_train_pred)
print('R2 Score of training set:%.2f'%s)
```

```
p = r2_score(y_test, y_test_pred)
print('R2 Score of testing set:%.2f'%p)
```

```
R2 Score of training set:1.00
R2 Score of testing set:1.00
```

```
In [ ] :
```