TEAM ID	PNT2022TMID27851
STUDENT NAME	JEEVITHA.R
DOMAIN NAME	HEALTH CARE
PROJECT NAME	EARLY DETECTION OF CHRONIC KIDNEY DISEASE USING MACHINE LEARNING
MAXIMUM MARKS	2 MARKS

- LOAD THE DATASET INTO THE DATASET

LOAD DATASET

```
[1] import pandas as pd
    import numpy as np
    import matplotlib.pyplot as plt
    import seaborn as sns
```

```
[3] df = pd.read_csv('abalone.csv')
```

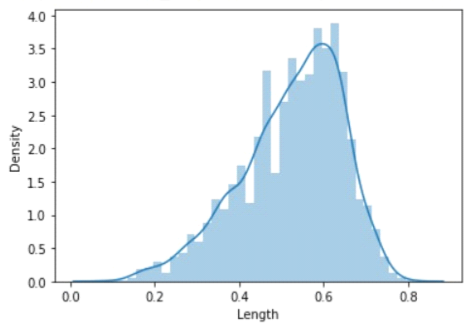
- PERFORM BELOW VISUALIZATIONS
  - UNIVARIANT

VISUALIZATIONS

UNIVARIANT ANALYSIS

```
[4] sns.distplot(df.Length)

/usr/local/lib/python3.7/dist-packages/seaborn/distributions.py:2619: FutureWarning: `distplot` is a deprecated fun
  warnings.warn(msg, FutureWarning)
<matplotlib.axes._subplots.AxesSubplot at 0x7f61214aa210>
```

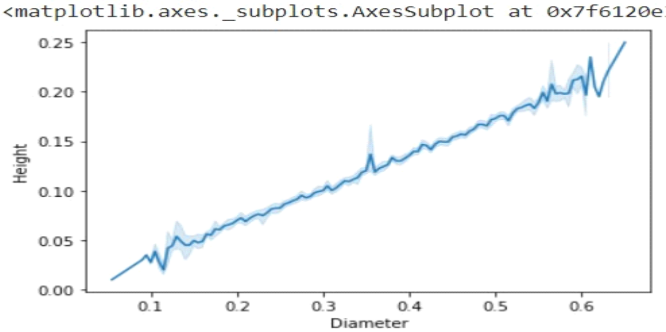


- BIVARIANT

BIVARIANT ANALYSIS

```
[5] sns.lineplot(df.Diameter,df.Height)

/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarning: Pass
  FutureWarning
<matplotlib.axes._subplots.AxesSubplot at 0x7f6120e37150>
```

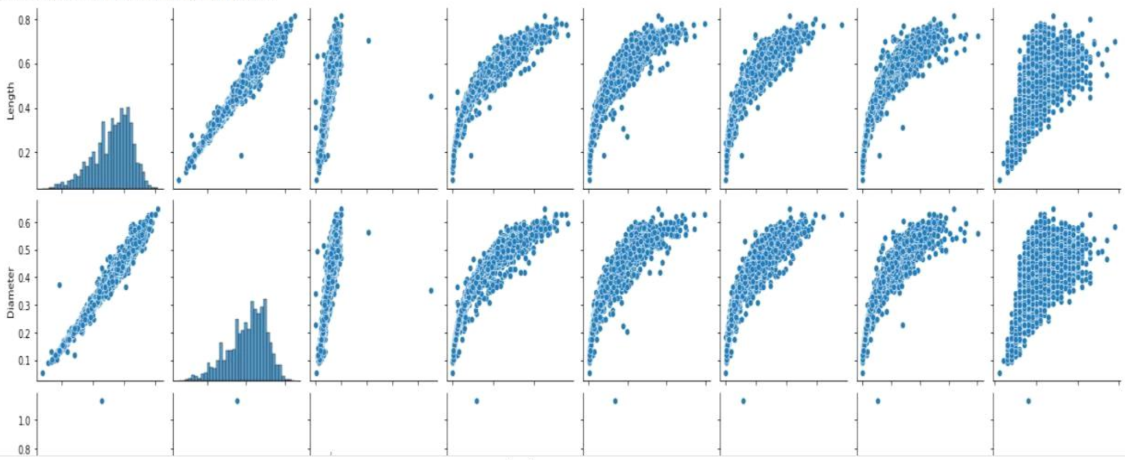


- MULTIVARIANT

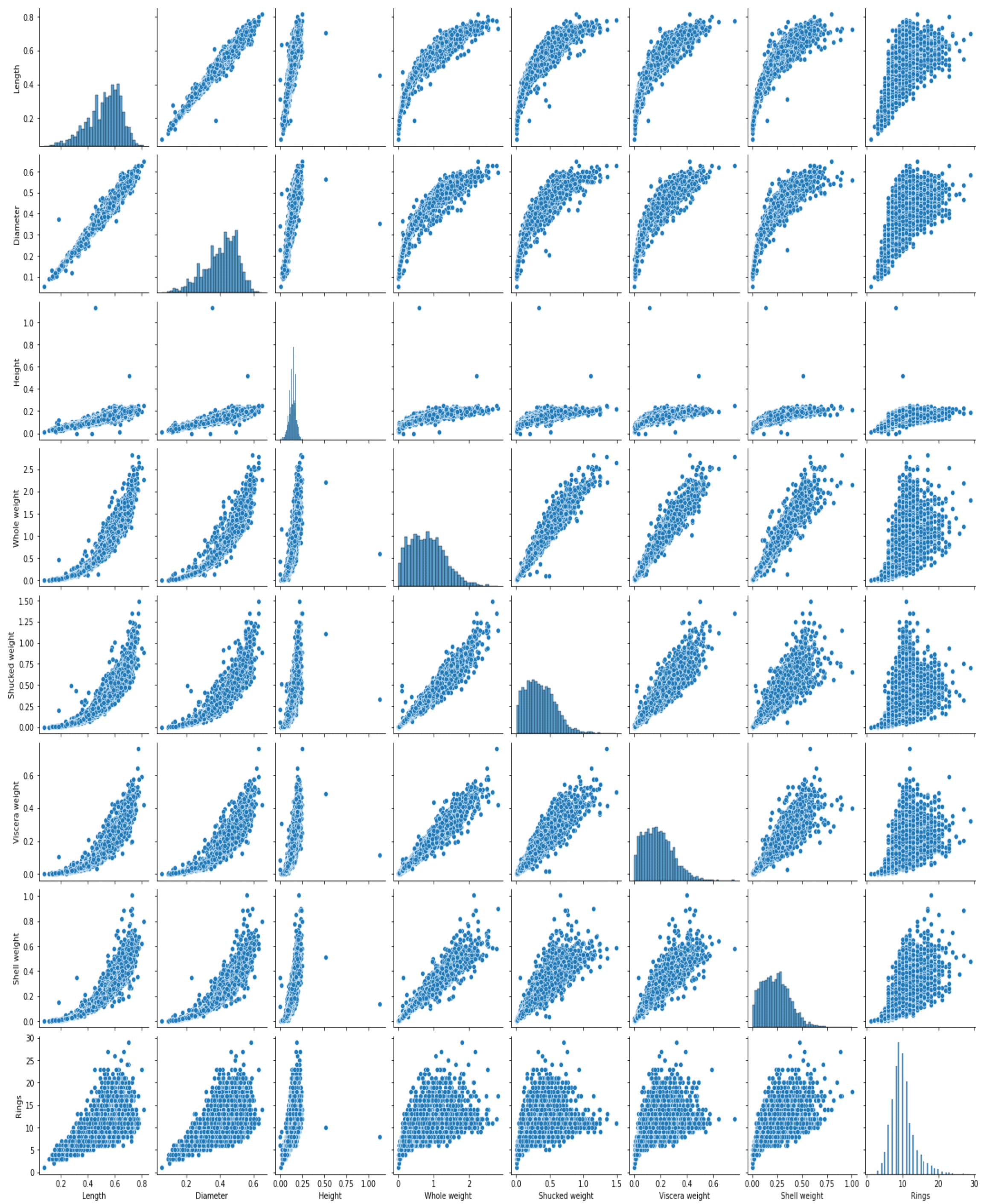
MULTIVARIANT ANALYSIS

```
sns.pairplot(df)
```

```
<seaborn.axisgrid.PairGrid at 0x7f6120deaf10>
```



✓ 0s completed at 1:34 AM



- PERFORM DESCRIPTIVE STATISTICS ONTHE DATASET

DESCRIPTIVE STATISTICS

[7]
```
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	0.139203	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	1.488000	0.760000	1.005000	29.000000

[8]
```
df.shape
```

```
(4177, 9)
```

[9]
```
df.info()
```

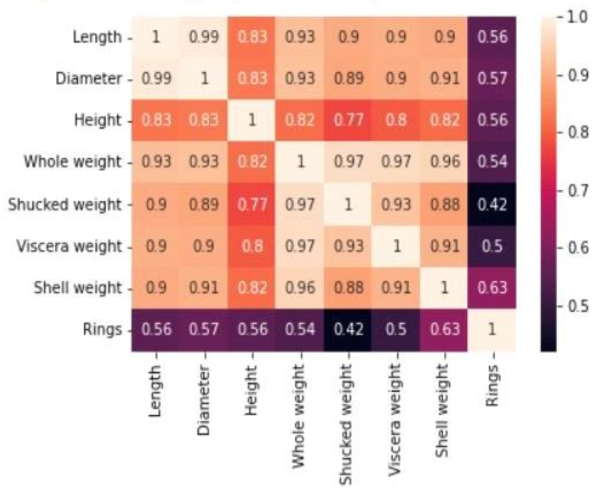
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4177 entries, 0 to 4176
Data columns (total 9 columns):
 #   Column          Non-Null Count  Dtype  
---  ------          --------------  -----  
 0   Sex             4177 non-null   object 
 1   Length          4177 non-null   float64
 2   Diameter        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
```

```
[11] df.corr()
```

	Length	Diameter	Height	Whole weight	Shucked weight	Viscera weight	Shell weight	Rings
Length	1.000000	0.986812	0.827554	0.925261	0.897914	0.903018	0.897706	0.556720
Diameter	0.986812	1.000000	0.833684	0.925452	0.893162	0.899724	0.905330	0.574660
Height	0.827554	0.833684	1.000000	0.819221	0.774972	0.798319	0.817338	0.557467
Whole weight	0.925261	0.925452	0.819221	1.000000	0.969405	0.966375	0.955355	0.540390
Shucked weight	0.897914	0.893162	0.774972	0.969405	1.000000	0.931961	0.882617	0.420884
Viscera weight	0.903018	0.899724	0.798319	0.966375	0.931961	1.000000	0.907656	0.503819
Shell weight	0.897706	0.905330	0.817338	0.955355	0.882617	0.907656	1.000000	0.627574
Rings	0.556720	0.574660	0.557467	0.540390	0.420884	0.503819	0.627574	1.000000

```
[12] sns.heatmap(df.corr(),annot=True)
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f611d1ecc90>
```



- CHECK FOR MISSING VALUES AND DEALWITH THEM

CHECK FOR MISSING VALUES AND DEAL WITH THEM

```
[13] 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
```

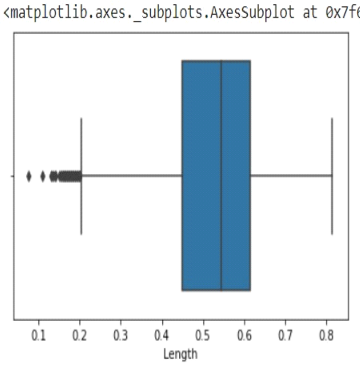
```
[14] df['Length'].fillna(df['Length'].mean(),inplace=True)
```

- FIND THE OUTLIERS AND REPLACETHEM OUTLIERS

FIND THE OUTLIERS AND REPLACE THEM OUTLIERS

```
[15] sns.boxplot(df.Length)

/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarning: Pass the following variable as a keyword arg: x. From v
  FutureWarning
<matplotlib.axes._subplots.AxesSubplot at 0x7f612059ac90>
```

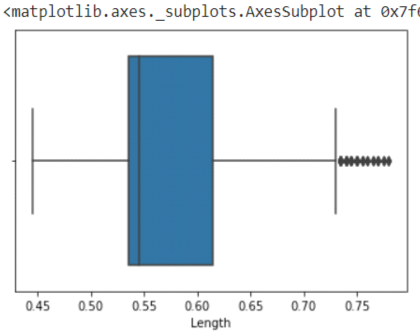


[16] df.median()

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:1: FutureWarn
  """Entry point for launching an IPython kernel.
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
```

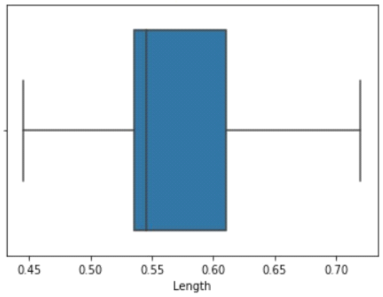
[23]
```
Q1 = df.Length.quantile(0.25)
Q3 = df.Length.quantile(0.75)
IQR = Q3 - Q1
upper_limit = Q3 + 1.5 * IQR
lower_limit = Q3 - 1.5 * IQR
df['Length'] = np.where(df['Length']<lower_limit,0.5450,df['Length'])
sns.boxplot(df.Length)
```

```
/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarning: Pass the following variable as a ke
  FutureWarning
<matplotlib.axes._subplots.AxesSubplot at 0x7f6118b5d090>
```



```
[25] Q1 = df.Length.quantile(0.25)
     Q3 = df.Length.quantile(0.75)
     IQR = Q3 - Q1
     upper_limit = Q3 + 1.5 * IQR
     lower_limit = Q3 - 1.5 * IQR
     df['Length'] = np.where(df['Length']>upper_limit,0.5450,df['Length'])
     sns.boxplot(df.Length)

/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarning: Pass the following variable as a keyword arg:
  FutureWarning
<matplotlib.axes._subplots.AxesSubplot at 0x7f6118aed090>
```



- CHECK FOR CATEGORICAL COLUMNAND PERFORM ENCODING

CHECK FOR CATEGORICAL COLUMN AND PERFORM ENCODING

```
[30] from sklearn.preprocessing import LabelEncoder
```

```
[32] le = LabelEncoder()
     df.Sex = le.fit_transform(df.Sex)
     df.head()
```

	Sex	Length	Diameter	Height	Whole weight	Shucked weight	Viscera weight	Shell weight	Rings
0	2	0.455	0.365	0.095	0.5140	0.2245	0.1010	0.150	15
1	2	0.545	0.265	0.090	0.2255	0.0995	0.0485	0.070	7
2	0	0.530	0.420	0.135	0.6770	0.2565	0.1415	0.210	9
3	2	0.545	0.365	0.125	0.5160	0.2155	0.1140	0.155	10
4	1	0.545	0.255	0.080	0.2050	0.0895	0.0395	0.055	7

- SPLIT THE DATA INTO DEPENDENT ANDINDEPENDENT VARIABLES

SPLIT THE DATA INTO DEPENDENT AND INDEPENDENT VARIABLES

[33]
```
X = df.drop(columns=['Rings'],axis=1)
X.head()
```

	Sex	Length	Diameter	Height	Whole weight	Shucked weight	Viscera weight	Shell weight
0	2	0.455	0.365	0.095	0.5140	0.2245	0.1010	0.150
1	2	0.545	0.265	0.090	0.2255	0.0995	0.0485	0.070
2	0	0.530	0.420	0.135	0.6770	0.2565	0.1415	0.210
3	2	0.545	0.365	0.125	0.5160	0.2155	0.1140	0.155
4	1	0.545	0.255	0.080	0.2050	0.0895	0.0395	0.055

[34]
```
y = df.Rings
y.head()
```

```
0    15
1     7
2     9
3    10
4     7
Name: Rings, dtype: int64
```

- SCALE THE INDEPENDENT VARIABLES

SCALE THE INDEPENDENT VARIABLES

```
[38] from sklearn.preprocessing import MinMaxScaler
```

```
[39] scale = MinMaxScaler()
     X_scaled = pd.DataFrame(scale.fit_transform(X),columns=X.columns)
     X_scaled
```

	Sex	Length	Diameter	Height	Whole weight	Shucked weight	Viscera weight	Shell weight
0	1.0	0.036364	0.521008	0.084071	0.181335	0.150303	0.132324	0.147982
1	1.0	0.363636	0.352941	0.079646	0.079157	0.066241	0.063199	0.068261
2	0.0	0.309091	0.613445	0.119469	0.239065	0.171822	0.185648	0.207773
3	1.0	0.363636	0.521008	0.110619	0.182044	0.144250	0.149440	0.152965
4	0.5	0.363636	0.336134	0.070796	0.071897	0.059516	0.051350	0.053313
...	...	...	...	...	...	...	...	...
4172	0.0	0.436364	0.663866	0.146018	0.313441	0.248151	0.314022	0.246637
4173	1.0	0.527273	0.647059	0.119469	0.341420	0.294553	0.281764	0.258097
4174	1.0	0.563636	0.705882	0.181416	0.415796	0.352724	0.377880	0.305431
4175	0.0	0.654545	0.722689	0.132743	0.386931	0.356422	0.342989	0.293473
4176	1.0	0.963636	0.840336	0.172566	0.689393	0.635171	0.495063	0.491779

4177 rows × 8 columns

- SPLIT THE DATA INTO TRAINING ANDTESTING

SPLIT THE DATA INTO TRAINING AND TESTING

```
from sklearn.model_selection import train_test_split
```

```
[41] X_train,X_test,y_train,y_test = train_test_split(X_scaled,y,test_size=0.3,random_state = 0)
```

```
[42] X_train.shape

(2923, 8)
```

```
[43] X_test.shape

(1254, 8)
```

```
[44] y_train.shape

(2923,)
```

```
[45] y_test.shape

(1254,)
```

- BUILD THE MODEL

BUILD THE MODEL

```
[49] from sklearn.linear_model import LinearRegression
     model = LinearRegression()
```

- TRAIN THE MODEL

TRAIN THE MODEL

```
[51] model.fit(X_train,y_train)
```

```
LinearRegression()
```

- TEST THE MODEL

TEST THE MODEL

```
[52] y_predict = model.predict(X_test)
```

```
[53] pd.DataFrame({'Actual':y_test,'Predicted':y_predict})
```

	Actual	Predicted
668	13	13.287283
1580	8	9.927522
3784	11	10.338571
463	5	5.422012
2615	12	10.627746
...	...	...
1052	12	14.794857
3439	8	8.409200
1174	9	8.971563
2210	18	18.703214
2408	15	11.648978

1254 rows × 2 columns

- MEASURE THE PERFORMANCE USINGMETRICS

MEASURE THE PERFORMANCE USING METRICS

```
from sklearn import metrics
```

```
[55] metrics.r2_score(y_test,y_predict)
```

```
0.5202338594368163
```