Assignment3_Adwyth_Sumesh_21BCE5604

September 14, 2023

#####1. We downloaded the dataset penguins_size.csv

#####2. Loading the dataset.

[ ]:
```
import numpy as np
import pandas as pd
```

[ ]:
```
df = pd.read_csv('/content/penguins_size.csv')
df.head()
```

[ ]:

	species	island	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g	sex
0	Adelie	Torgersen	39.1	18.7	181.0	3750.0	MALE
1	Adelie	Torgersen	39.5	17.4	186.0	3800.0	FEMALE
2	Adelie	Torgersen	40.3	18.0	195.0	3250.0	FEMALE
3	Adelie	Torgersen	NaN	NaN	NaN	NaN	NaN
4	Adelie	Torgersen	36.7	19.3	193.0	3450.0	FEMALE

#####3.1. Perform Univariate Analysis

[ ]:
```
from matplotlib import rcParams
import seaborn as sns
```

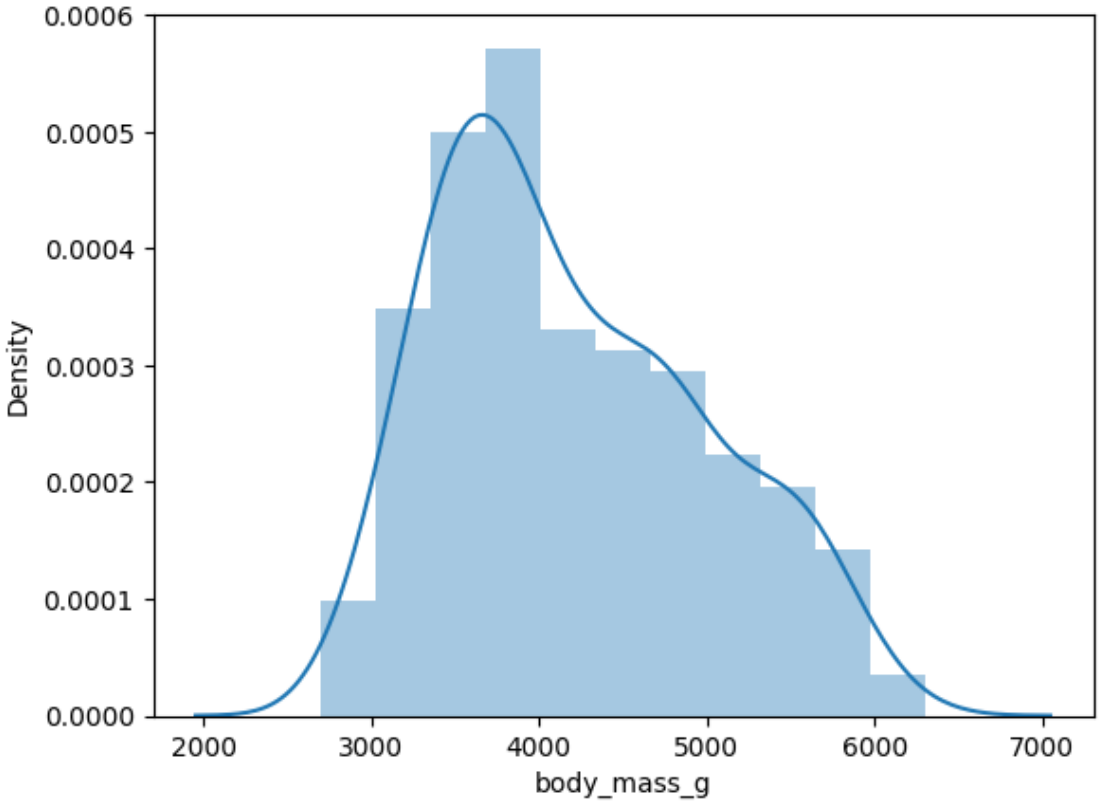
[ ]:
```
sns.distplot(df.body_mass_g)
```

```
<ipython-input-4-176964dae727>:1: UserWarning:

`distplot` is a deprecated function and will be removed in seaborn v0.14.0.

Please adapt your code to use either `displot` (a figure-level function with
similar flexibility) or `histplot` (an axes-level function for histograms).

For a guide to updating your code to use the new functions, please see
```

https://gist.github.com/mwaskom/de44147ed2974457ad6372750bbe5751

```
sns.distplot(df.body_mass_g)
```

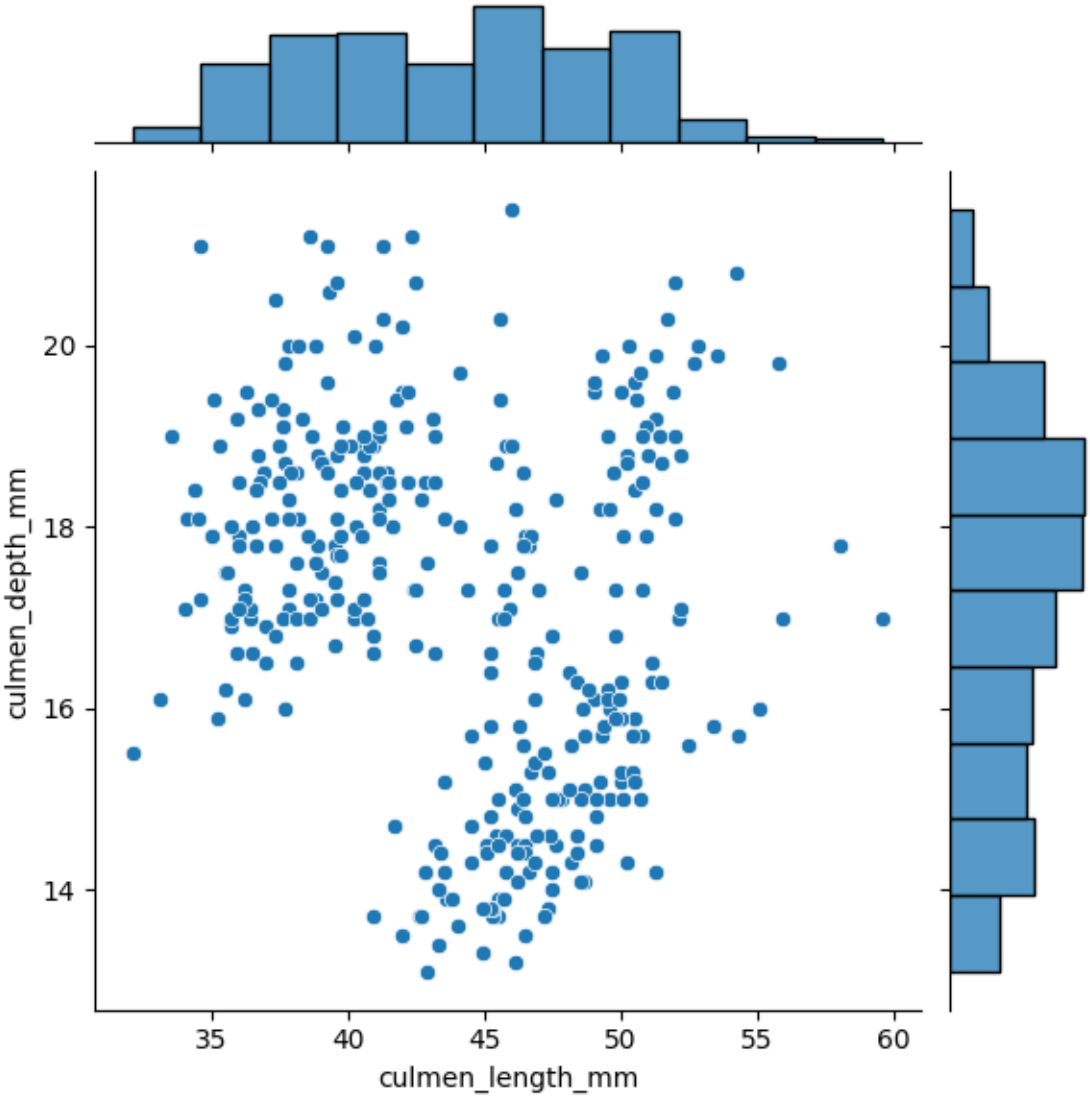
[ ]: <Axes: xlabel='body_mass_g', ylabel='Density'>



#####3.2. Perform Bivariate Analysis

[ ]:
```
sns.jointplot(x='culmen_length_mm',y='culmen_depth_mm',data=df)
```

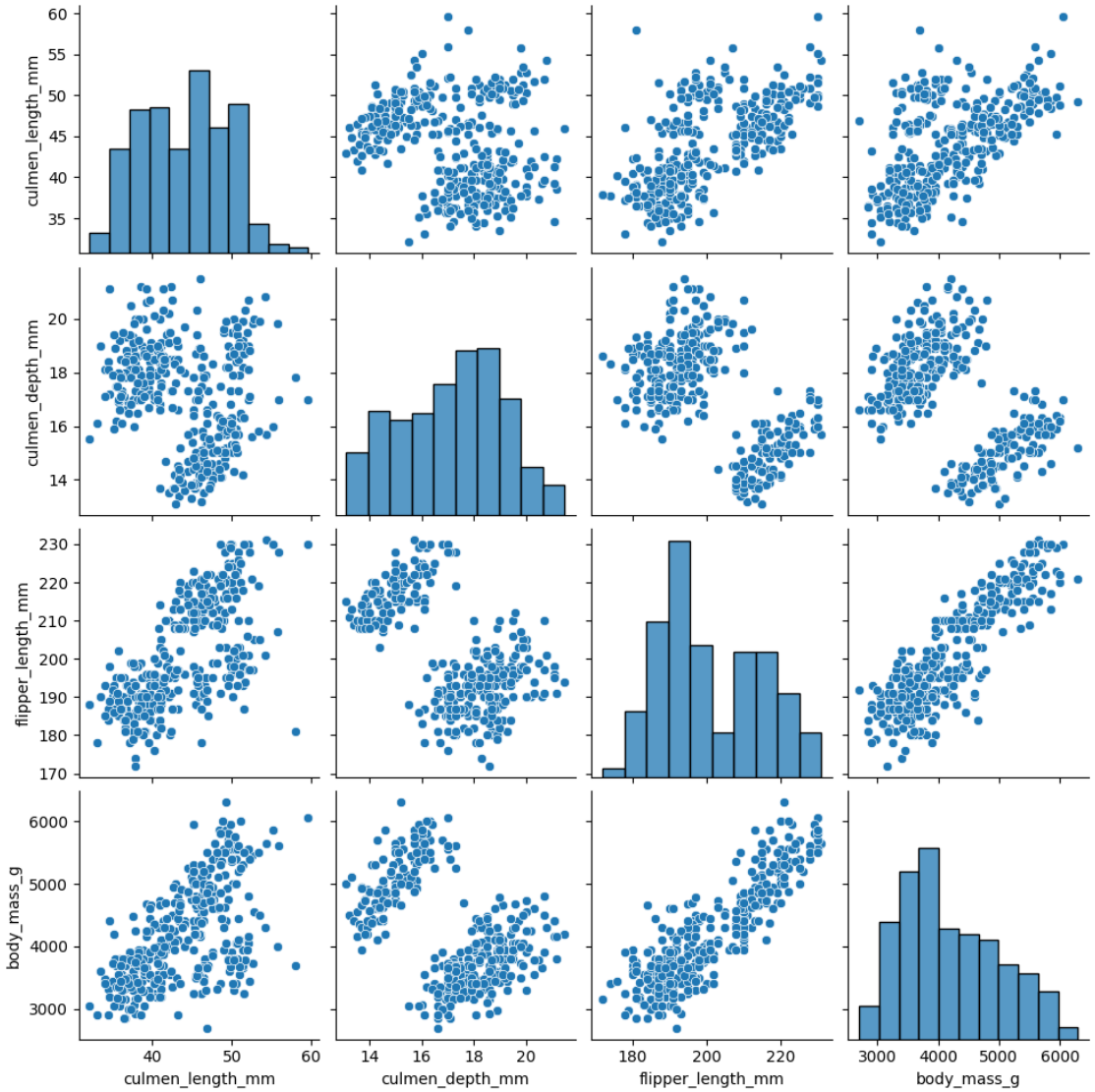
[ ]: <seaborn.axisgrid.JointGrid at 0x7c313325c6a0>



#####3.3. Perform Multi-Variate Analysis

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

[ ]:
```
<seaborn.axisgrid.PairGrid at 0x7c31298f71f0>
```



#####4. Perform descriptive statistics on the dataset.

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

[ ]:

	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g
count	342.000000	342.000000	342.000000	342.000000
mean	43.921930	17.151170	200.915205	4201.754386
std	5.459584	1.974793	14.061714	801.954536
min	32.100000	13.100000	172.000000	2700.000000
25%	39.225000	15.600000	190.000000	3550.000000
50%	44.450000	17.300000	197.000000	4050.000000
75%	48.500000	18.700000	213.000000	4750.000000
max	59.600000	21.500000	231.000000	6300.000000

#####5. Check for Missing values and deal with them.

[ ]:
```
df.isnull().any() #Checking is there any null values in our dataset
```

[ ]:
```
species              False
island               False
culmen_length_mm      True
culmen_depth_mm       True
flipper_length_mm     True
body_mass_g           True
sex                   True
dtype: bool
```

[ ]:
```
df.isnull().sum()
```

[ ]:
```
species               0
island                0
culmen_length_mm      2
culmen_depth_mm       2
flipper_length_mm     2
body_mass_g           2
sex                  10
dtype: int64
```

[ ]:
```
# Code to replace null values in numerical columns with MEDIAN
df['culmen_length_mm'].fillna(df['culmen_length_mm'].median(),inplace=True)
df['culmen_depth_mm'].fillna(df['culmen_depth_mm'].median(),inplace=True)
df['flipper_length_mm'].fillna(df['flipper_length_mm'].median(),inplace=True)
df['body_mass_g'].fillna(df['body_mass_g'].median(),inplace=True)

# Code to replace null values in categorical column with MODE
df['sex'].fillna(df['sex'].mode().iloc[0],inplace=True)
```

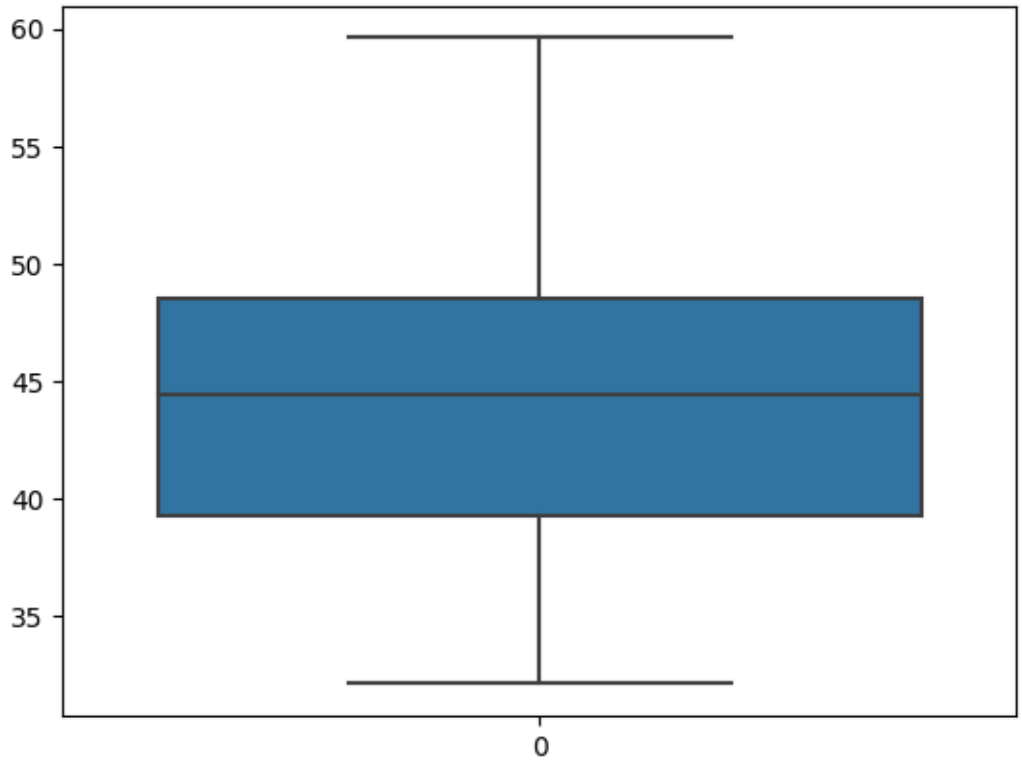
[ ]:
```
# Now all null values are replaced with median and mode and dealt properly.

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

[ ]:
```
species              False
island               False
culmen_length_mm     False
culmen_depth_mm      False
flipper_length_mm    False
body_mass_g          False
sex                  False
dtype: bool
```

#####6. Find the outliers and replace the outliers

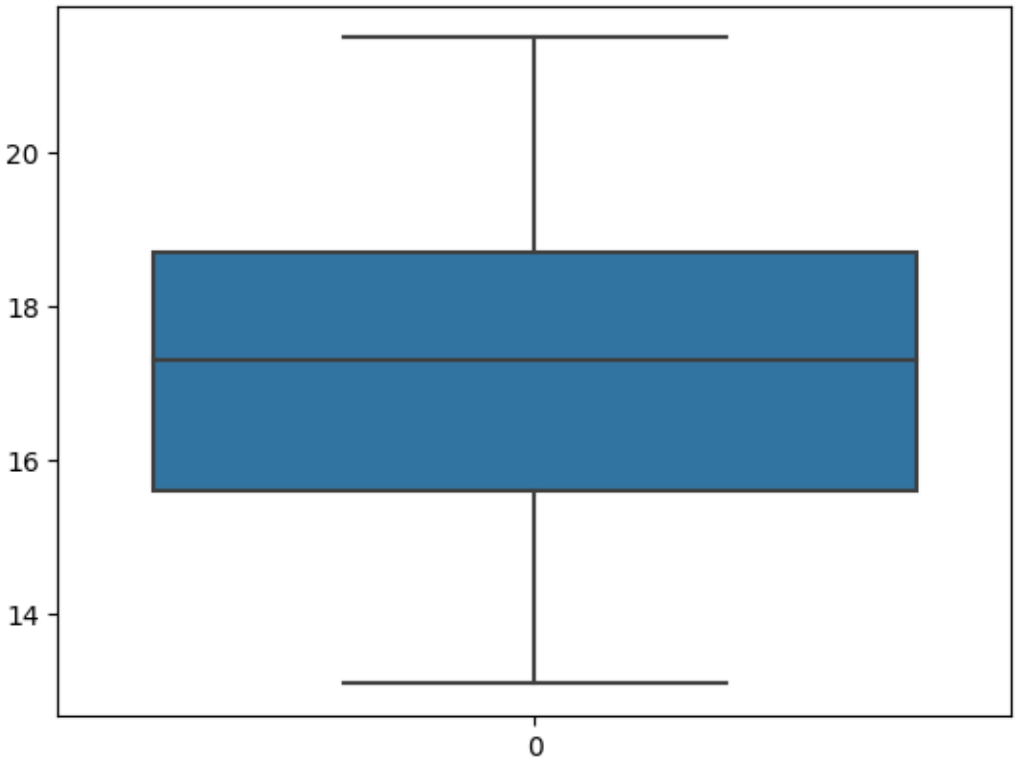
[ ]:
```
sns.boxplot(df.culmen_length_mm)
```

[ ]: <Axes: >



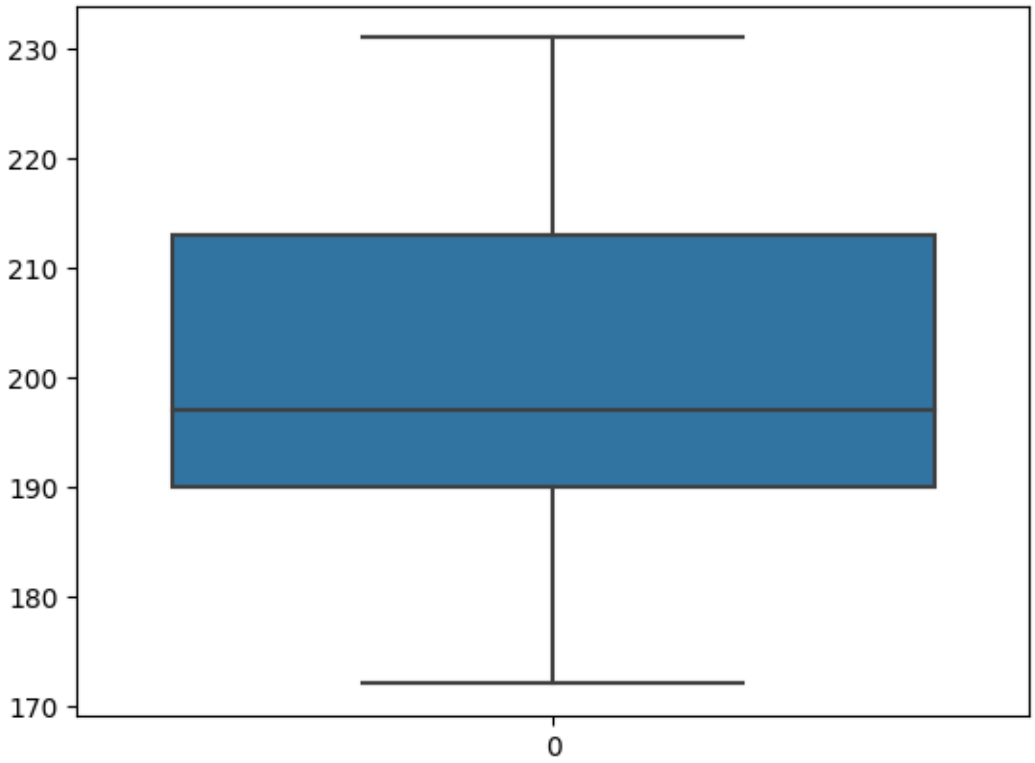
[ ]:
```
sns.boxplot(df.culmen_depth_mm)
```

[ ]: <Axes: >



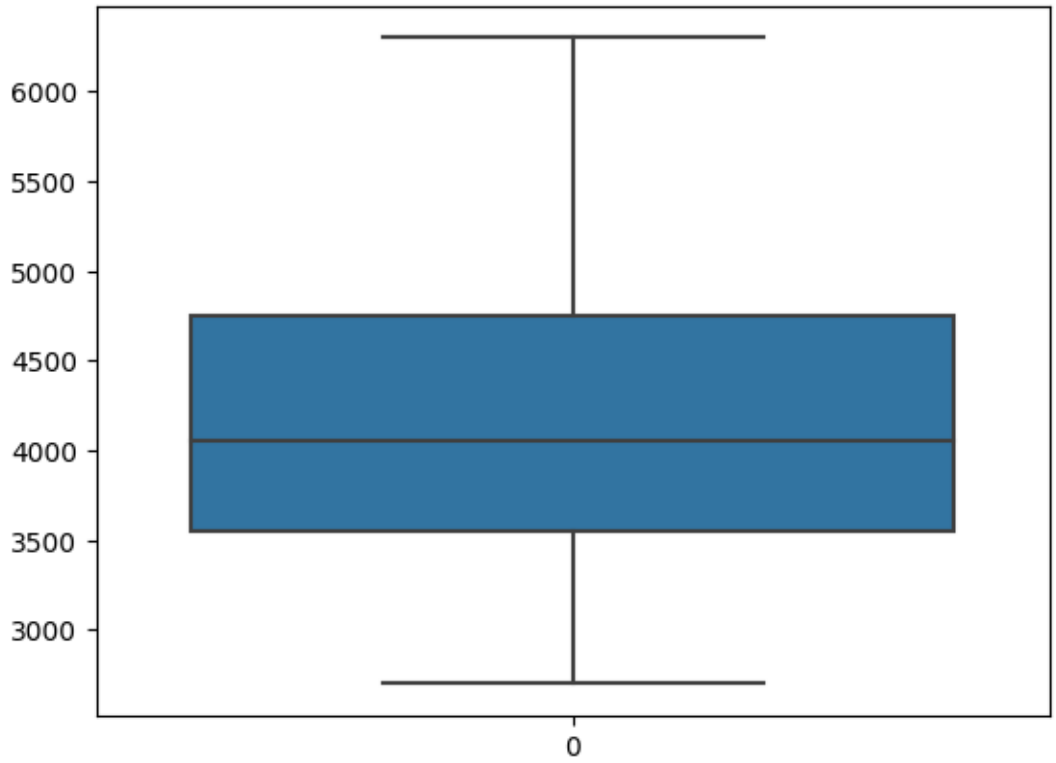
[ ]:
```
sns.boxplot(df.flipper_length_mm)
```

[ ]:
```
<Axes: >
```



[ ]:
```
sns.boxplot(df.body_mass_g)
```

[ ]: <Axes: >



######Hence there are no outliers in the dataset.

#####7. Check for Categorical columns and perform encoding.

[ ]:
```
from sklearn.preprocessing import LabelEncoder
le = LabelEncoder()
df['sex'] = le.fit_transform(df['sex'])
df['species'] = le.fit_transform(df['species'])
df['island'] = le.fit_transform(df['island'])
df.head()
```

[ ]:

	species	island	culmen_length_mm	culmen_depth_mm	flipper_length_mm	\
0	0	2	39.10	18.7	181.0	
1	0	2	39.50	17.4	186.0	
2	0	2	40.30	18.0	195.0	
3	0	2	44.45	17.3	197.0	
4	0	2	36.70	19.3	193.0	

	body_mass_g	sex
0	3750.0	2
1	3800.0	1
2	3250.0	1
3	4050.0	2

```
4       3450.0    1
```

#####8. Check the correlation of independent variables with the target (TARGET IS SPECIES and remaining are independent)

[ ]:
```
df.corr().species.sort_values(ascending=False)
```

[ ]:
```
species              1.000000
flipper_length_mm    0.850819
body_mass_g          0.747547
culmen_length_mm     0.728706
sex                 -0.003823
island              -0.635659
culmen_depth_mm     -0.741282
Name: species, dtype: float64
```

#####9. Split the data into dependent and independent variables

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

[ ]:
```
   island  culmen_length_mm  culmen_depth_mm  flipper_length_mm  body_mass_g  \
0       2              39.10             18.7              181.0       3750.0
1       2              39.50             17.4              186.0       3800.0
2       2              40.30             18.0              195.0       3250.0
3       2              44.45             17.3              197.0       4050.0
4       2              36.70             19.3              193.0       3450.0

   sex
0    2
1    1
2    1
3    2
4    1
```

[ ]:
```
Y=df['species']
Y.head()
```

[ ]:
```
0    0
1    0
2    0
3    0
4    0
Name: species, dtype: int64
```

#####10. Scaling the data

[ ]:
```
from sklearn.preprocessing import MinMaxScaler
scale = MinMaxScaler()
X_scaled = pd.DataFrame(scale.fit_transform(X),columns=X.columns)
X_scaled.head()
```

[ ]:

	island	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g	\
0	1.0	0.254545	0.666667	0.152542	0.291667	
1	1.0	0.269091	0.511905	0.237288	0.305556	
2	1.0	0.298182	0.583333	0.389831	0.152778	
3	1.0	0.449091	0.500000	0.423729	0.375000	
4	1.0	0.167273	0.738095	0.355932	0.208333	

	sex
0	1.0
1	0.5
2	0.5
3	1.0
4	0.5

#####11. Split the data into training and testing

[ ]:
```
from sklearn.model_selection import train_test_split
X_train,X_test,Y_train,Y_test = train_test_split(X_scaled,Y,test_size=0.
↪2,random_state=0)
```

#####12. Check the training and testing data shape.

[ ]:
```
X_train.shape
```

[ ]: (275, 6)

[ ]:
```
X_test.shape
```

[ ]: (69, 6)

[ ]:
```
Y_train.shape
```

[ ]: (275,)

[ ]:
```
Y_test.shape
```

[ ]: (69,)