Assignment-3

1. penguins_size.csv is downloaded

2. Load the dataset into the tool.

[1]:
```
import numpy as np
import pandas as pd
```

[2]:
```
df = pd.read_csv('/content/penguins_size.csv')
df.head()
```

[2]:
```
  species     island  culmen_length_mm  culmen_depth_mm  flipper_length_mm  \
0  Adelie  Torgersen              39.1             18.7              181.0
1  Adelie  Torgersen              39.5             17.4              186.0
2  Adelie  Torgersen              40.3             18.0              195.0
3  Adelie  Torgersen               NaN              NaN                NaN
4  Adelie  Torgersen              36.7             19.3              193.0

   body_mass_g     sex
0       3750.0    MALE
1       3800.0  FEMALE
2       3250.0  FEMALE
3          NaN     NaN
4       3450.0  FEMALE
```

3.1. Perform Univariate Analysis

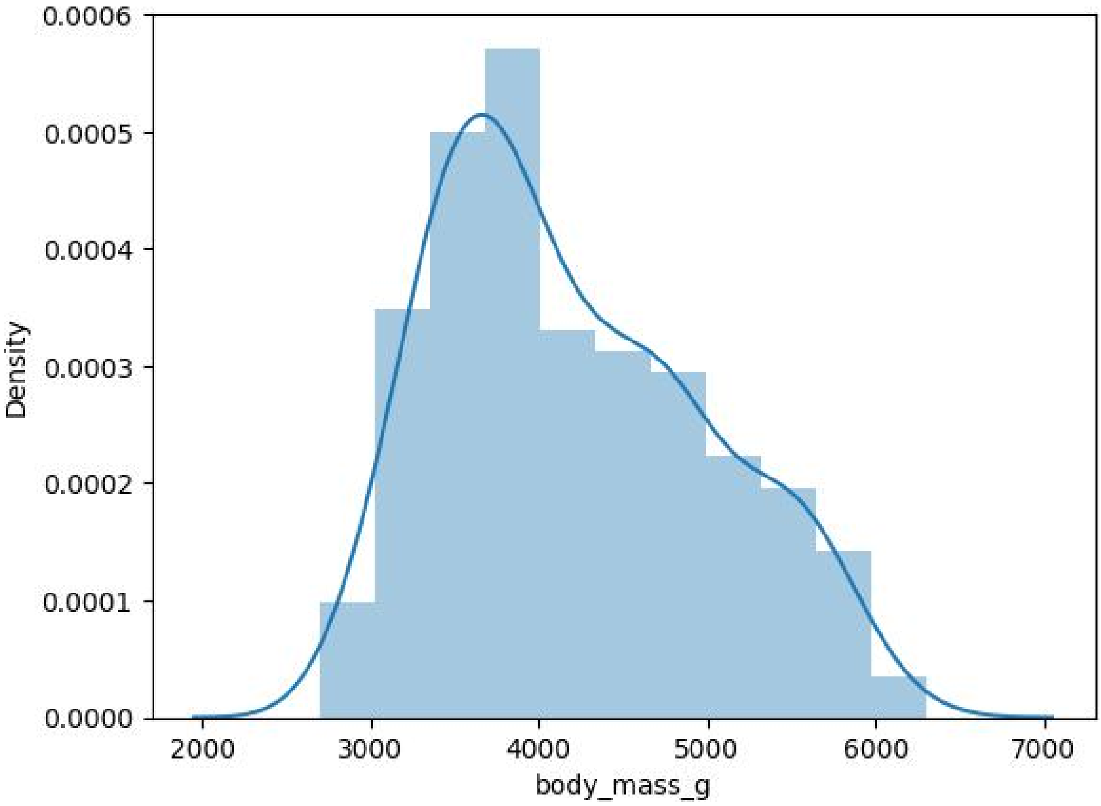
[3]:
```
from matplotlib import rcParams
import seaborn as sns
```

[4]:
```
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)
```

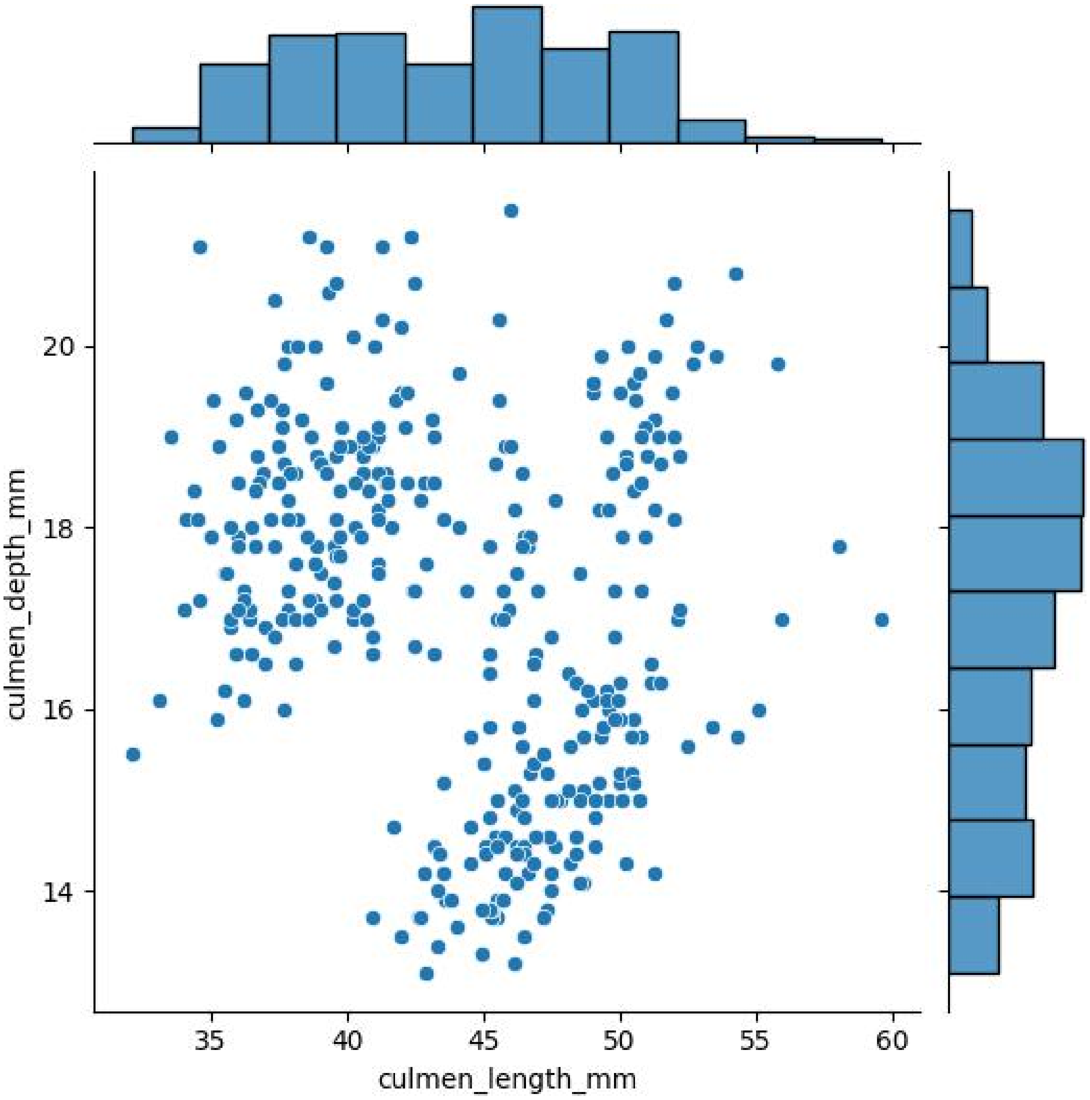
```
[4]: <Axes: xlabel='body_mass_g', ylabel='Density'>
```



3.2. Perform Bivariate Analysis

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

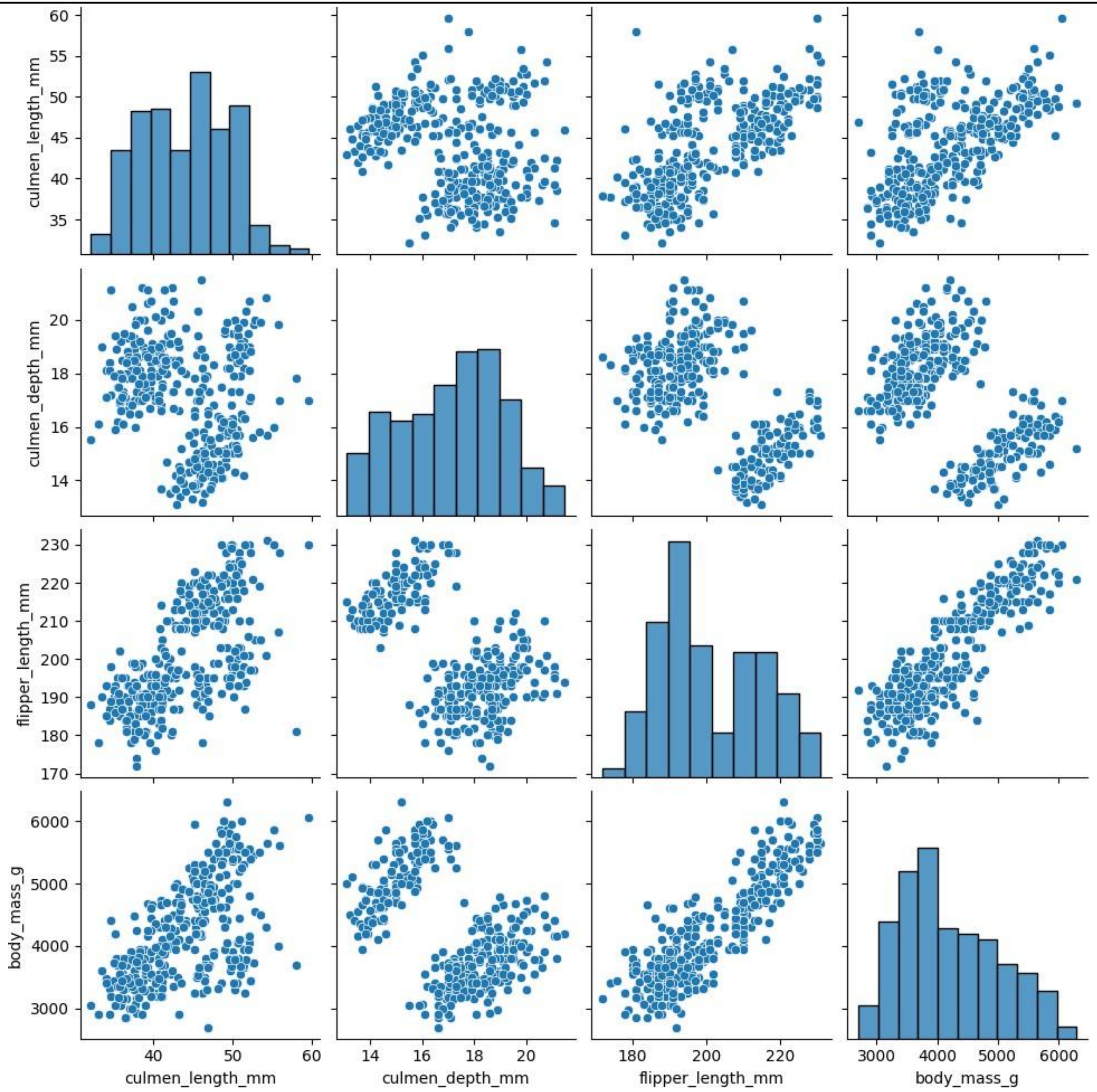
```
[5]: <seaborn.axisgrid.JointGrid at 0x7c313325c6a0>
```



3.3. Perform Multi-Variate Analysis

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

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



4. Perform descriptive statistics on the dataset.

[7]:
```
df.describe()
```

[7]:
```
       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.

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

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

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

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

```
[25]: # 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)
```

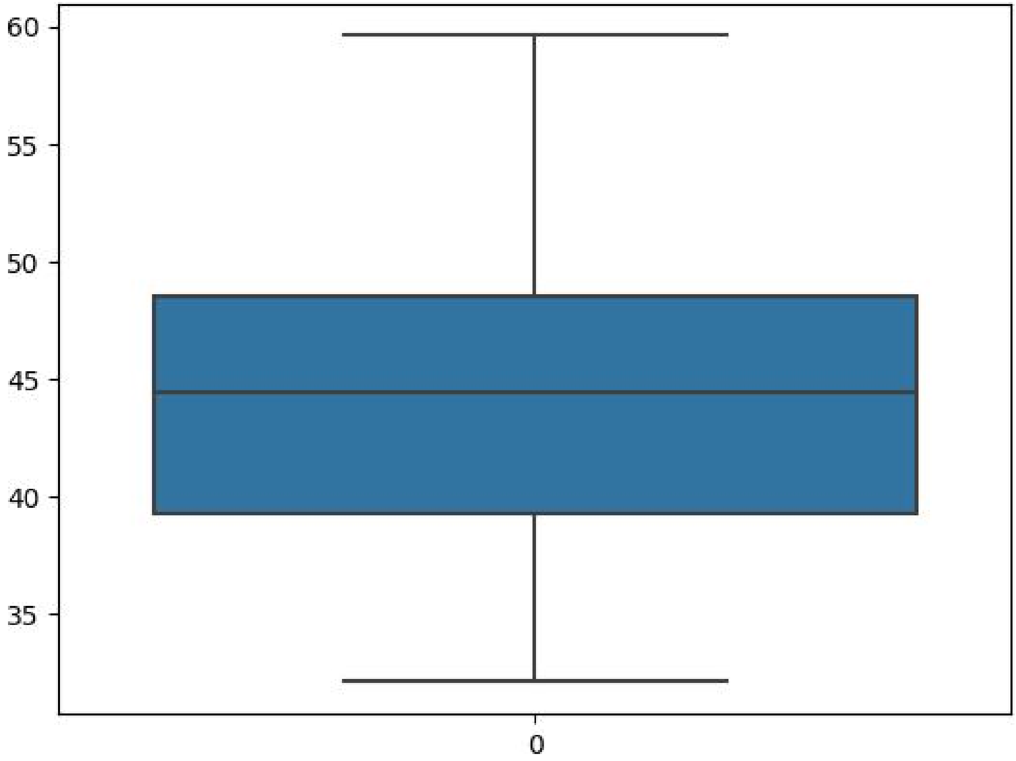
```
[26]: # Now all null values are replaced with median and mode and dealt properly.

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

```
[26]: 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

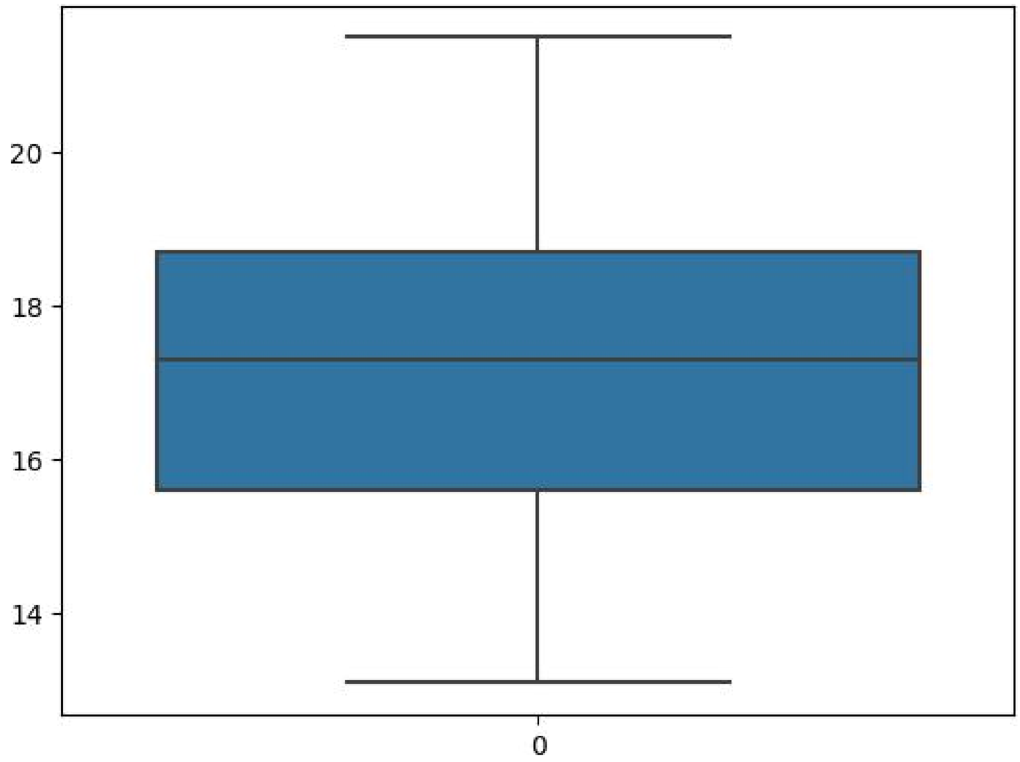
[29]:
```
sns.boxplot(df.culmen_length_mm)
```

[29]:
```
<Axes: >
```



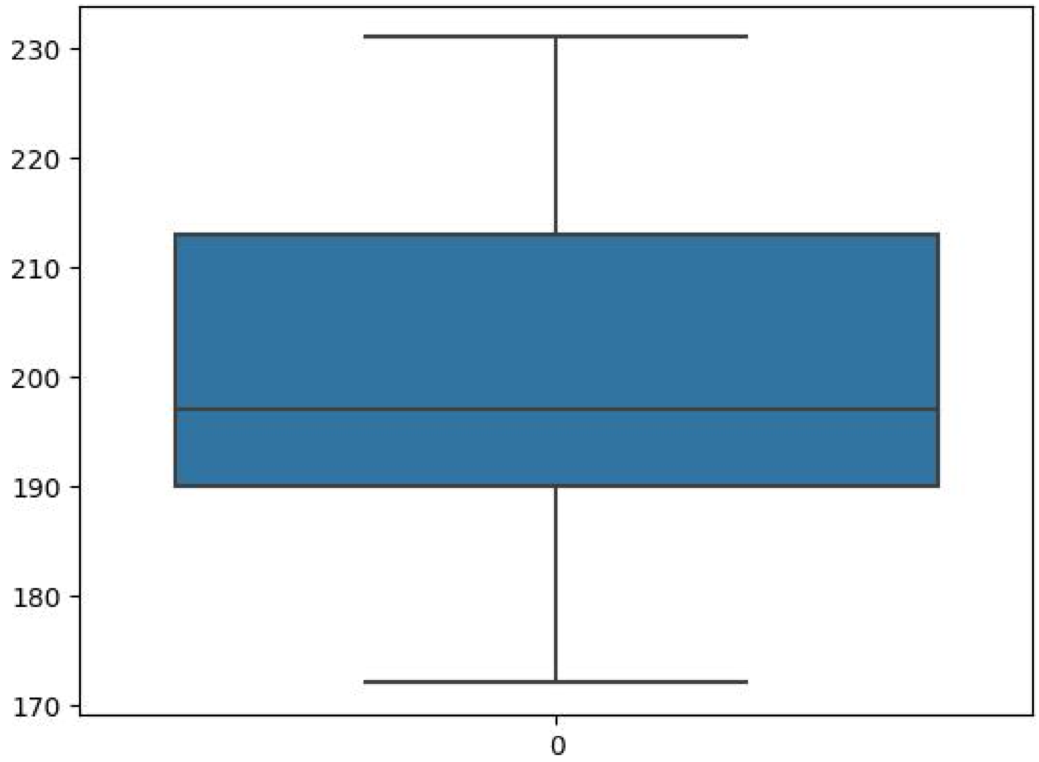
[30]:
```
sns.boxplot(df.culmen_depth_mm)
```

[30]:
```
<Axes: >
```



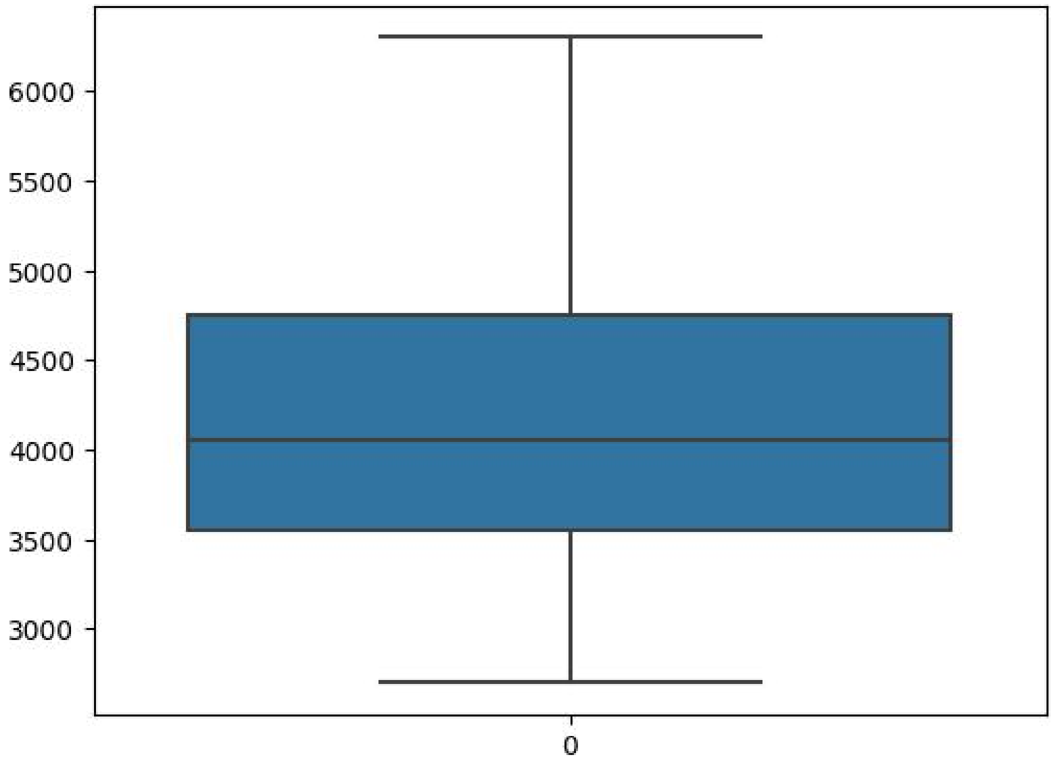
```
[31]: sns.boxplot(df.flipper_length_mm)
```

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



[32]:
```
sns.boxplot(df.body_mass_g)
```

[32]:
```
<Axes: >
```



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

7. Check for Categorical columns and perform encoding.

```
[37]: 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()
```

```
[37]:    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 SPECIESand remaining are independent)

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

```
[38]: 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

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

```
[40]:    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
```

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

```
[41]: 0    0
      1    0
      2    0
      3    0
      4    0
      Name: species, dtype: int64
```

10. Scaling the data

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

```
[42]:    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

```
[48]: 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.

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

```
[49]: (275, 6)
```

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

```
[50]: (69, 6)
```

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

```
[51]: (275,)
```

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

```
[52]: (69,)
```