Assignment 3

Ai and ml

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1. Penguine_size.csv is downloaded

2. Load the dataset into the tool.

```
import numpy as np
import pandas as pd
```

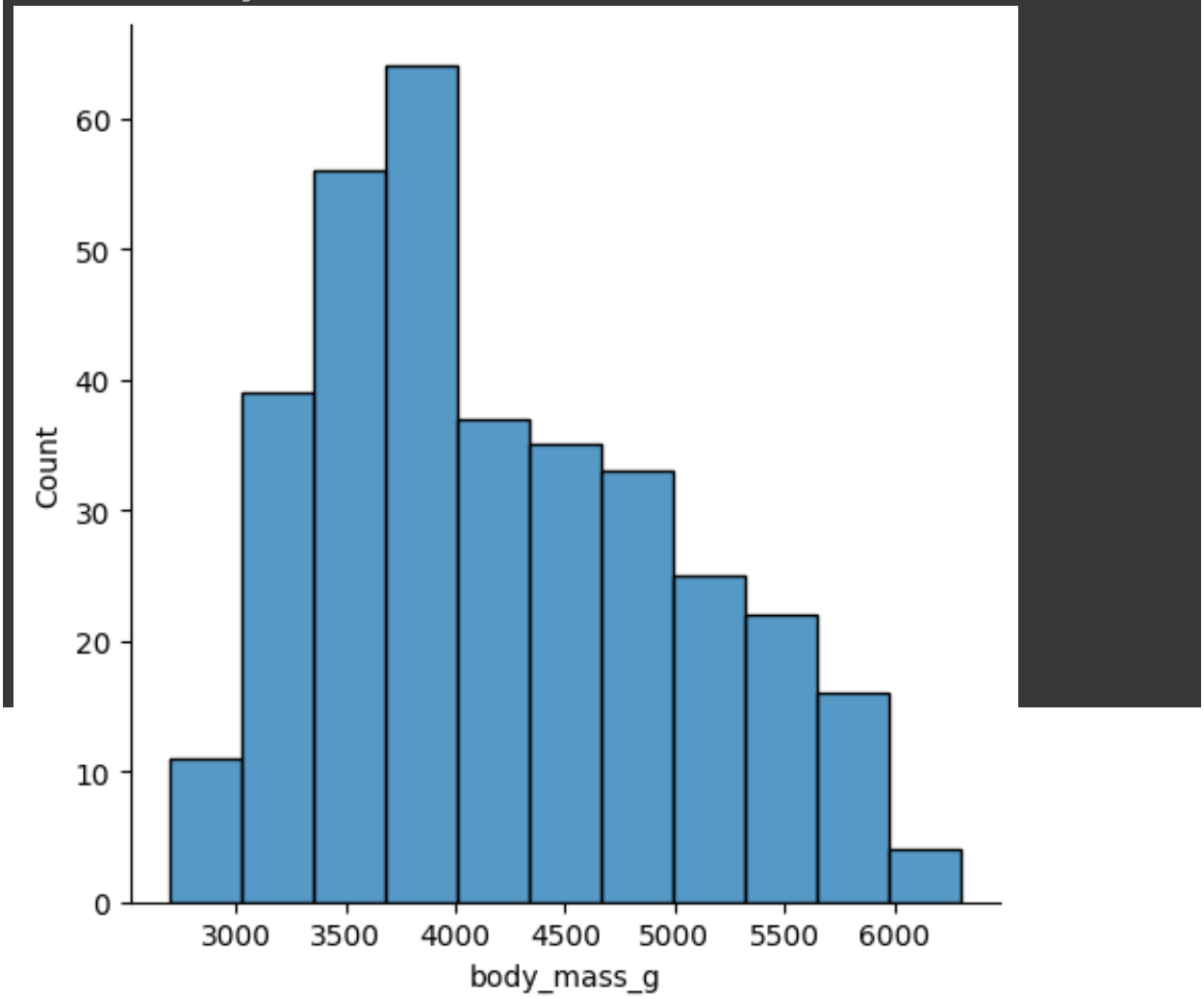
```
df=pd.read_csv('/content/penguins_size.csv')
df.head()
```

	species	island	culmen_length_mm	culmen_depth_mm	flipper_length_mm
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	
4	Adelie	Torgersen	36.7	19.3	193.0

3.1. Perform Univariates Analysis

```
from matplotlib import rcParams
import seaborn as sns
sns.displot(df.body_mass_g)
```

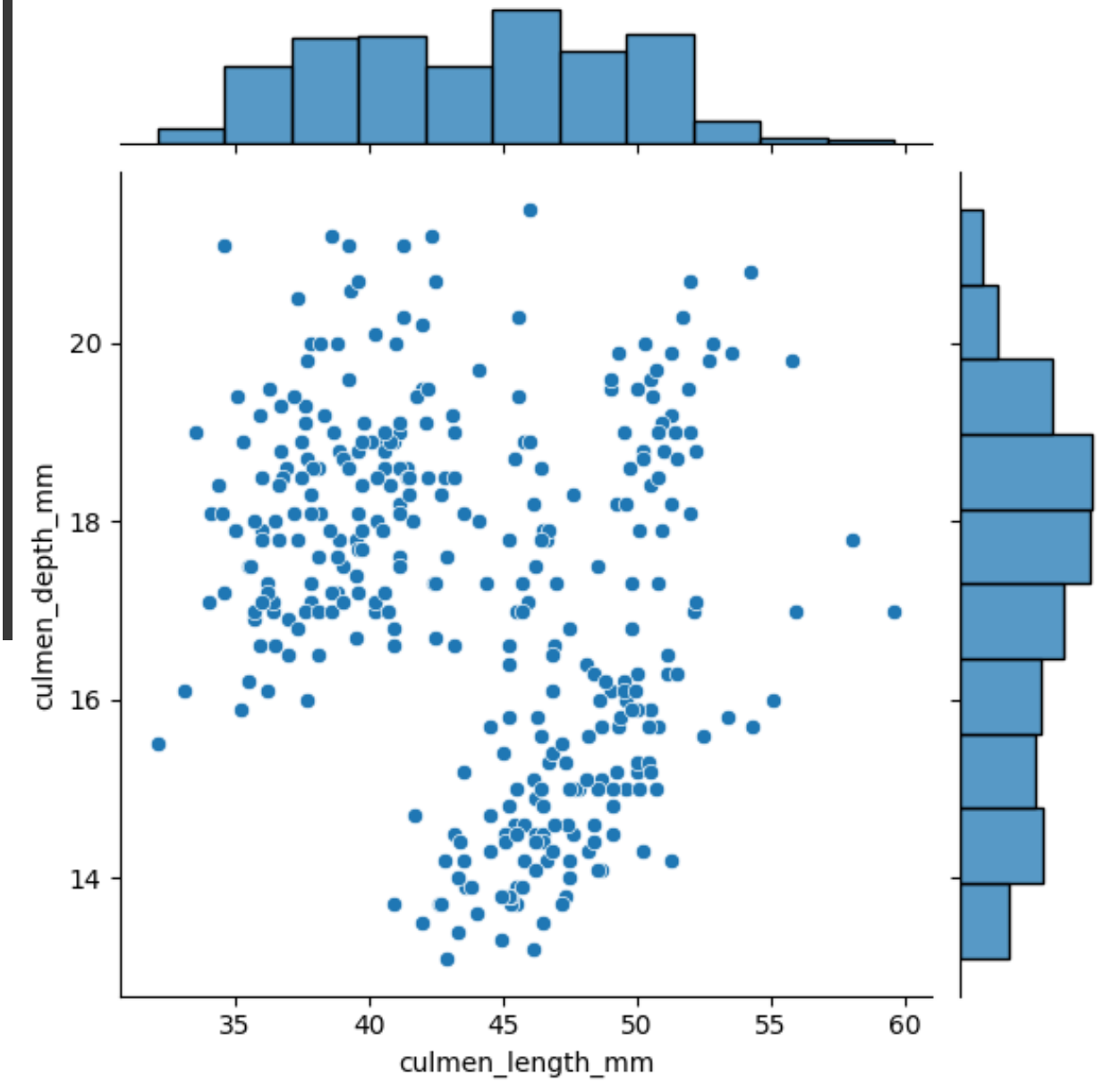
```
<seaborn.axisgrid.FacetGrid at 0x7dd35d76c910>
```



3.2. Perform Bivariates Analysis

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

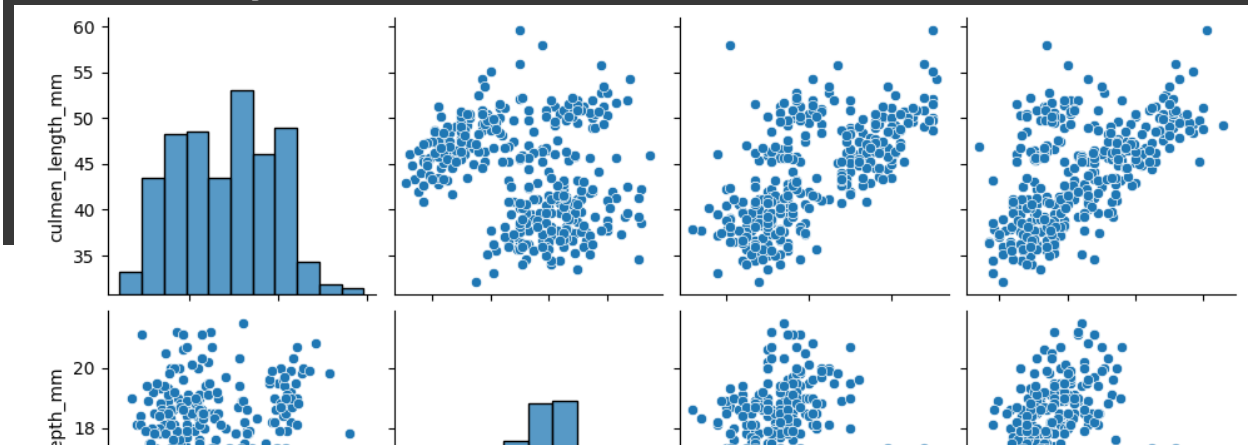
```
<seaborn.axisgrid.JointGrid at 0x7dd35d76c5e0>
```

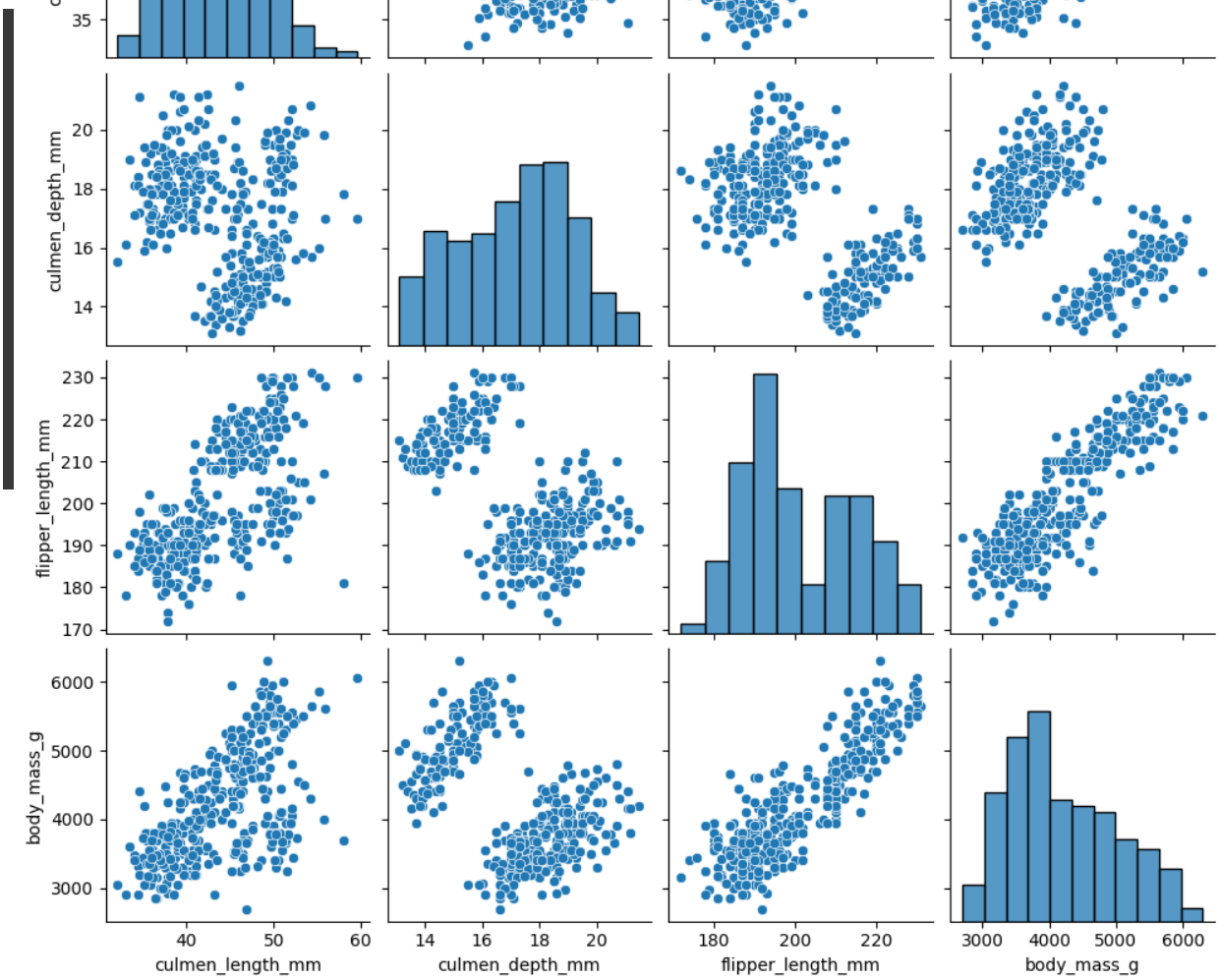


3.3. Perform Multi-Variate Analysis

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

```
<seaborn.axisgrid.PairGrid at 0x7dd35b1b8a60>
```




culmen_length_mm
culmen_depth_mm
flipper_length_mm
body_mass_g
40
50
60
14
16
18
20
180
200
220
3000
4000
5000
6000

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 if there any null values in the 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)
```

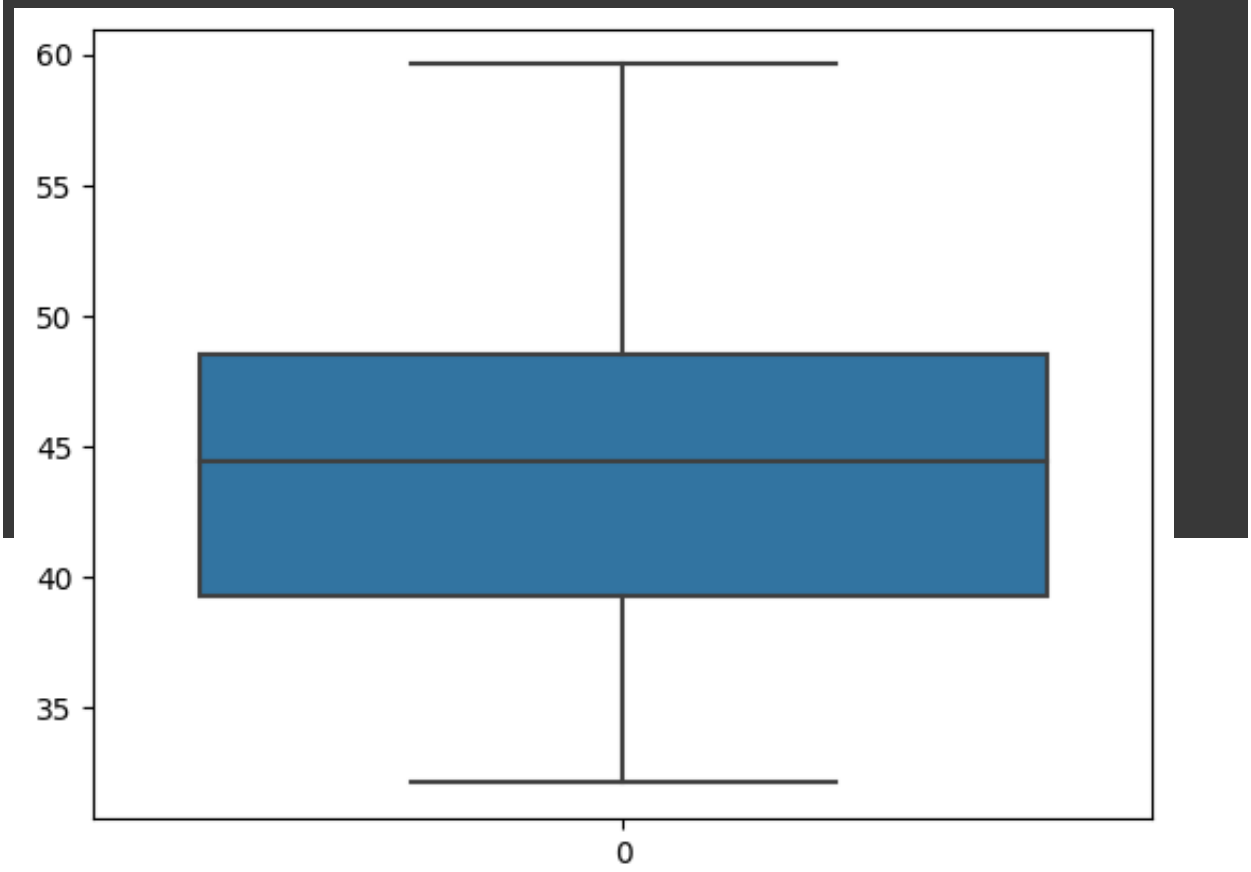
```
# Now all null values are replaced with median and mode and dealt properly.
df.isnull().any()
```

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

L. Find the outliers and replace the outliers

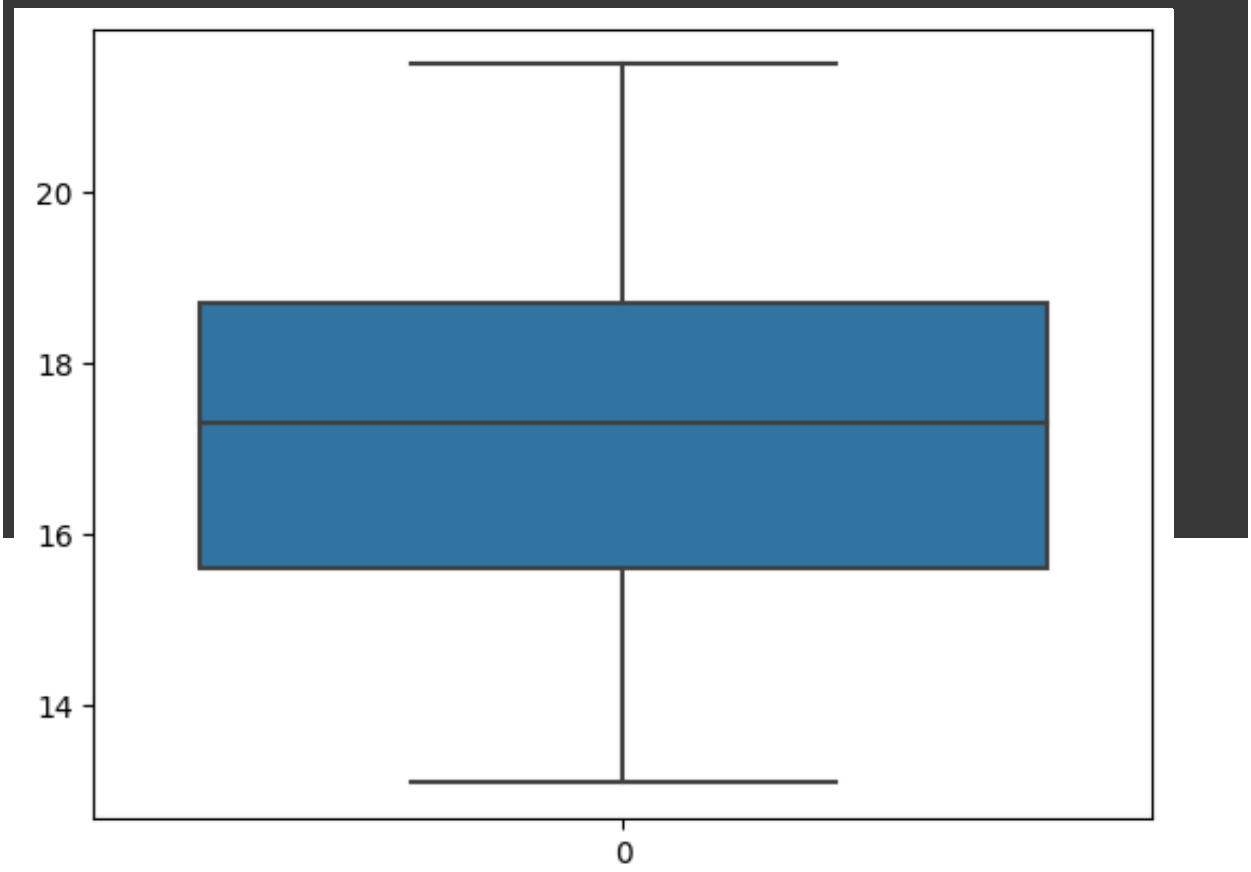
```
sns.boxplot(df.culmen_length_mm)
```

```
<Axes: >
```



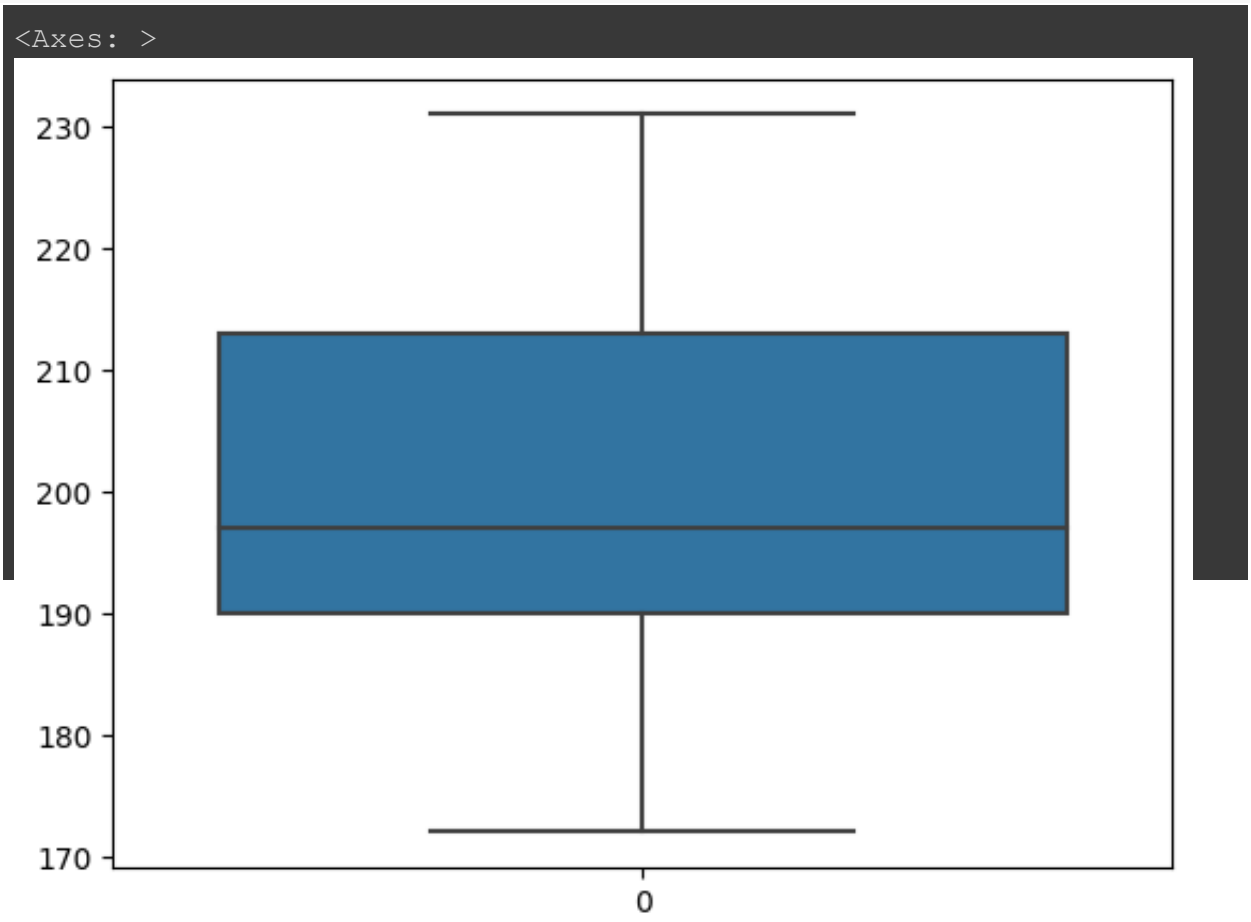
```
sns.boxplot(df.culmen_depth_mm)
```

```
<Axes: >
```



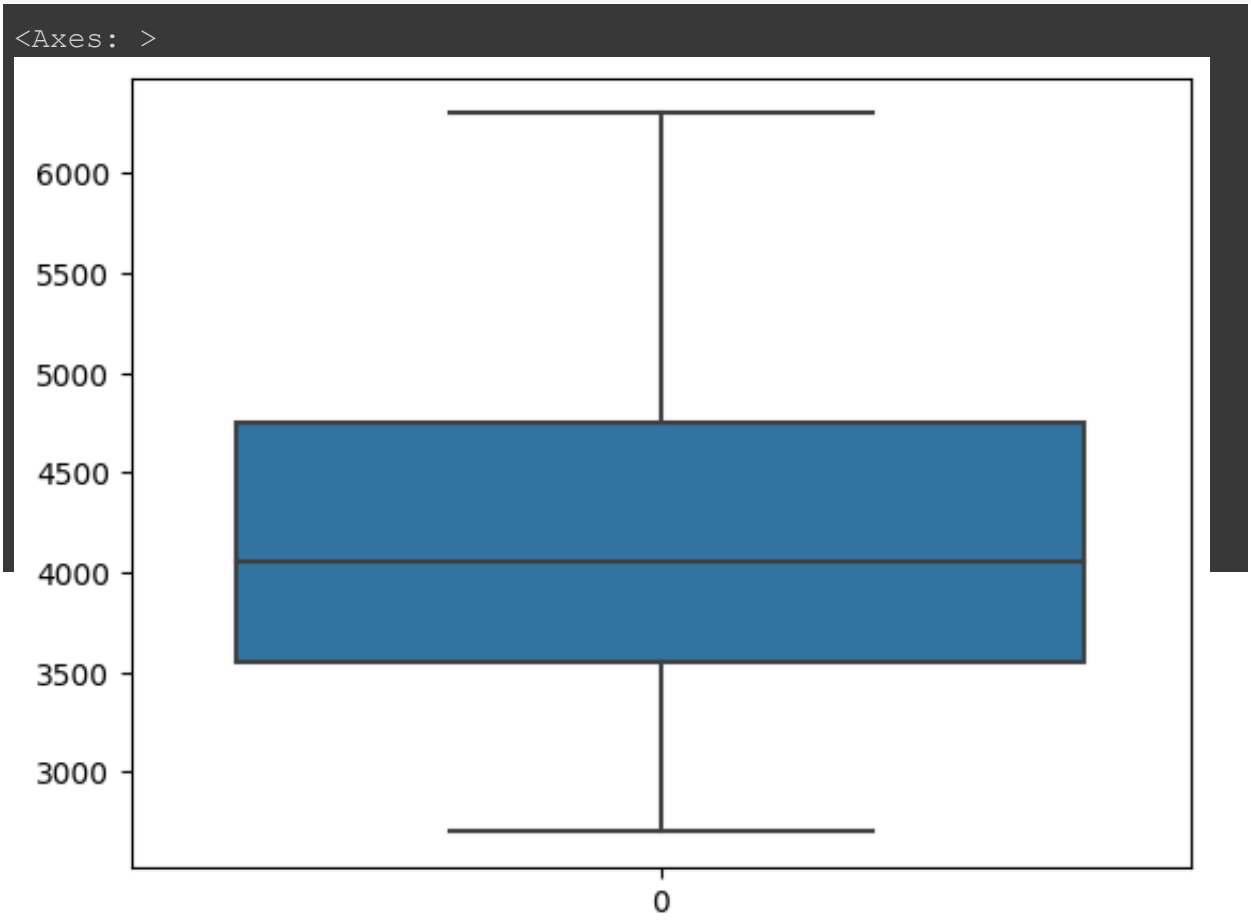
```
sns.boxplot(df.flipper_length_mm)
```

```
<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

O. 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	
1	2	39.50	17.4	186.0	
2	2	40.30	18.0	195.0	
3	2	44.45	17.3	197.0	
4	2	36.70	19.3	193.0	

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

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

10. Scaling the independent 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

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=
```

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,)
```

---------- **DONE** ----------

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