aiml-assingment3-santhosh

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Slot: 6:00 - 8:00 PM

1. Download the dataset: Dataset
2. Load the dataset

[ ]:
```
import pandas as pd
import matplotlib.pyplot as plt
from matplotlib import rcParams
import seaborn as sns
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

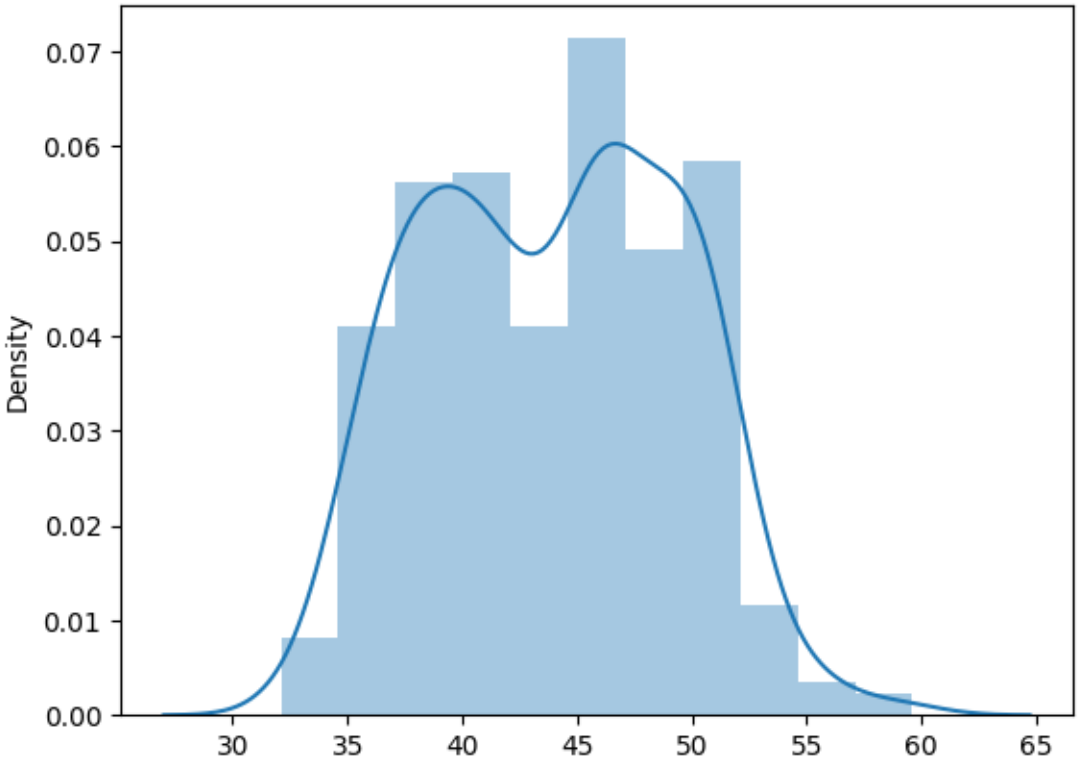
3. Perform Below Visualizations
4. UNIVARIATE ANALYSIS

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

```
<ipython-input-2-632e7580f6db>: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.culmen_length_mm])
```

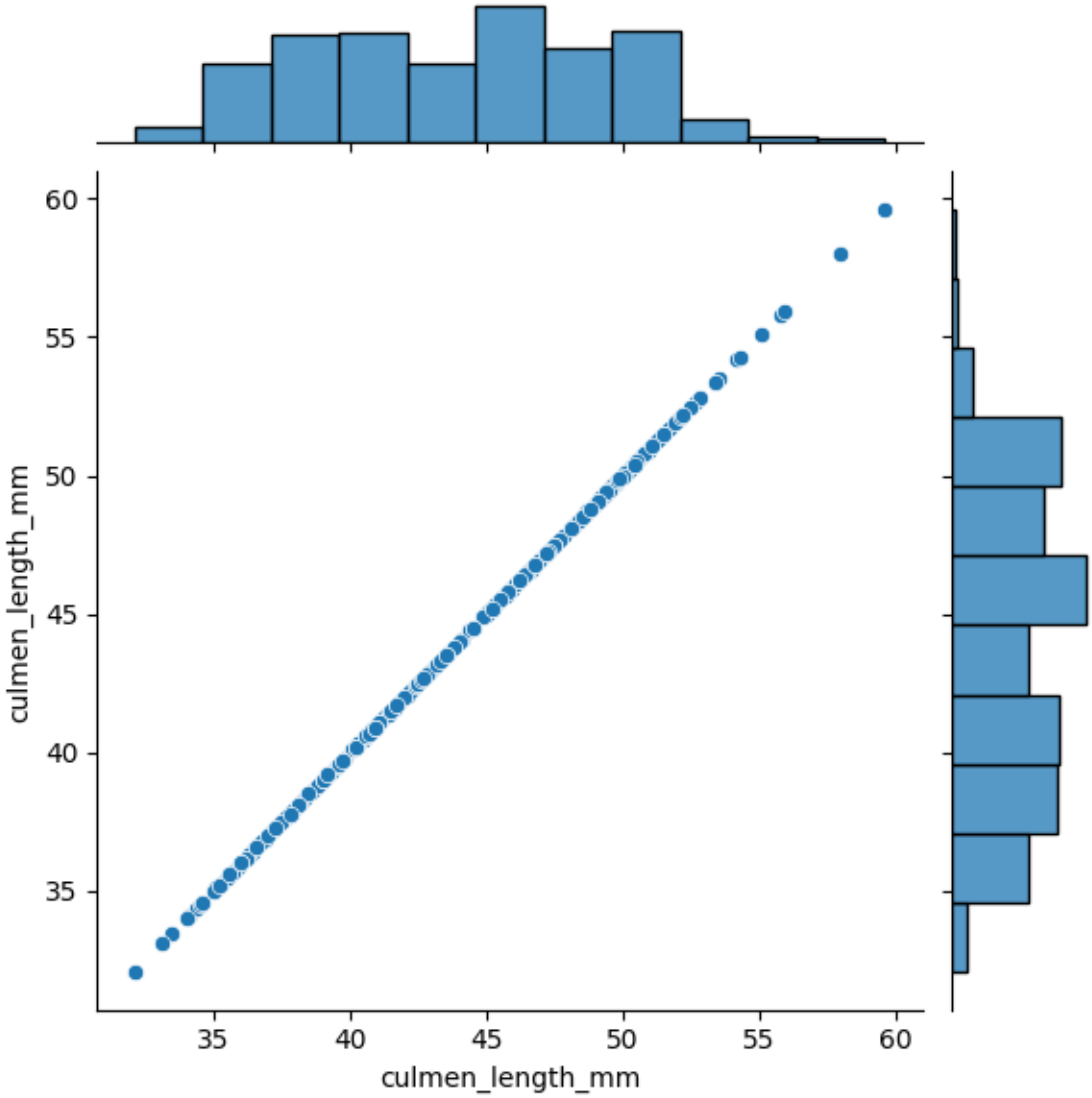
[ ]: <Axes: ylabel='Density'>



2. BI-VARIATE ANALYSIS

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

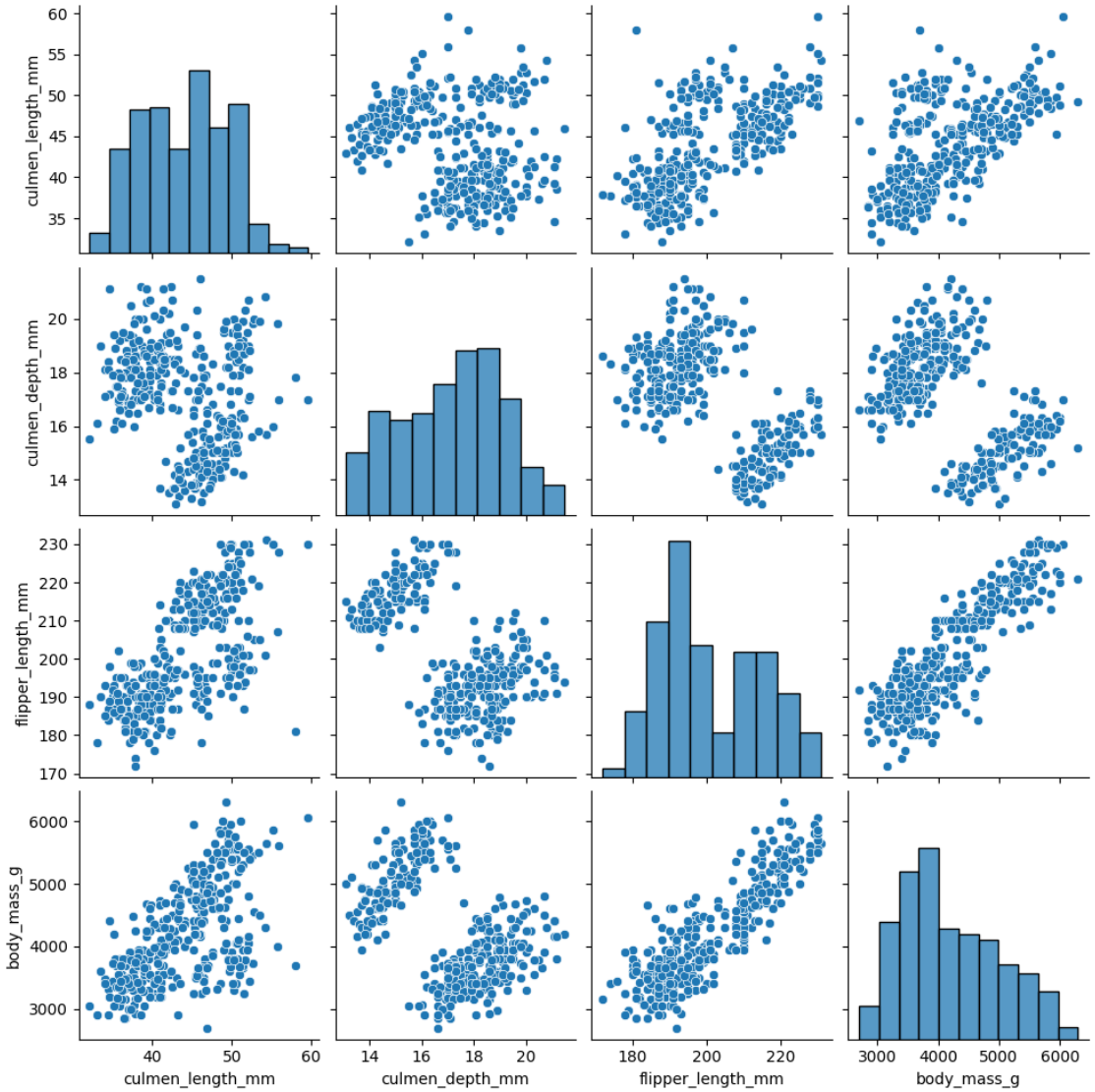
[ ]: <seaborn.axisgrid.JointGrid at 0x7a39d74b38e0>



3. MULTIVARIATE ANALYSIS

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

[ ]:
```
<seaborn.axisgrid.PairGrid at 0x7a39d3040550>
```



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()
```

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

1 We have found that there are null values in the dataset.

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 344 entries, 0 to 343
Data columns (total 7 columns):
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   species            344 non-null    object
 1   island             344 non-null    object
 2   culmen_length_mm   342 non-null    float64
 3   culmen_depth_mm    342 non-null    float64
 4   flipper_length_mm  342 non-null    float64
 5   body_mass_g        342 non-null    float64
 6   sex                334 non-null    object
dtypes: float64(4), object(3)
memory usage: 18.9+ KB
```

2 Handling the null values of numerical parameters with median

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

```
<ipython-input-8-6d467abf240d>:1: FutureWarning: The default value of
numeric_only in DataFrame.median is deprecated. In a future version, it will
default to False. In addition, specifying 'numeric_only=None' is deprecated.
Select only valid columns or specify the value of numeric_only to silence this
warning.
  df.median()
```

[ ]:
```
culmen_length_mm     44.45
culmen_depth_mm      17.30
flipper_length_mm   197.00
```

```
body_mass_g          4050.00
dtype: float64
```

Replacing each column with the value of median

[ ]:
```
df['culmen_length_mm'].fillna(df['culmen_length_mm'].median(),inplace=
True)
df.head()
```

[ ]:
```
  species     island  culmen_length_mm  culmen_depth_mm  flipper_length_mm  \
0  Adelie  Torgersen              39.10             18.7              181.0
1  Adelie  Torgersen              39.50             17.4              186.0
2  Adelie  Torgersen              40.30             18.0              195.0
3  Adelie  Torgersen              44.45              NaN                NaN
4  Adelie  Torgersen              36.70             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
```

[ ]:
```
df['culmen_depth_mm'].fillna(df['culmen_depth_mm'].median(),inplace=True)
df.head()
```

[ ]:
```
  species     island  culmen_length_mm  culmen_depth_mm  flipper_length_mm  \
0  Adelie  Torgersen              39.10             18.7              181.0
1  Adelie  Torgersen              39.50             17.4              186.0
2  Adelie  Torgersen              40.30             18.0              195.0
3  Adelie  Torgersen              44.45             17.3                NaN
4  Adelie  Torgersen              36.70             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
```

[ ]:
```
df['flipper_length_mm'].fillna(df['flipper_length_mm'].median(),inplace=True)
df.head()
```

[ ]:
```
  species     island  culmen_length_mm  culmen_depth_mm  flipper_length_mm  \
0  Adelie  Torgersen              39.10             18.7              181.0
1  Adelie  Torgersen              39.50             17.4              186.0
2  Adelie  Torgersen              40.30             18.0              195.0
```

```
3  Adelie  Torgersen            44.45             17.3              197.0
4  Adelie  Torgersen            36.70             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
```

[ ]:
```
df['body_mass_g'].fillna(df['body_mass_g'].median(),inplace=True)
df.head()
```

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

   body_mass_g     sex
0       3750.0    MALE
1       3800.0  FEMALE
2       3250.0  FEMALE
3       4050.0     NaN
4       3450.0  FEMALE
```

3 Replacing the categorical parameters with Mode

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

[ ]:
```
  species  island  culmen_length_mm  culmen_depth_mm  flipper_length_mm  \
0  Adelie  Biscoe              41.1             17.0              190.0

   body_mass_g   sex
0       3800.0  MALE
```

Replacing the categorical column “sex” with mode

[ ]:
```
df['sex'].fillna(df['sex'].mode().iloc[0],inplace=True)
df.head()
```

[ ]:
```
  species     island  culmen_length_mm  culmen_depth_mm  flipper_length_mm  \
0  Adelie  Torgersen             39.10             18.7              181.0
1  Adelie  Torgersen             39.50             17.4              186.0
2  Adelie  Torgersen             40.30             18.0              195.0
```

```
3  Adelie  Torgersen            44.45             17.3              197.0
4  Adelie  Torgersen            36.70             19.3              193.0

   body_mass_g     sex
0       3750.0    MALE
1       3800.0  FEMALE
2       3250.0  FEMALE
3       4050.0    MALE
4       3450.0  FEMALE
```

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

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

   body_mass_g     sex
0       3750.0    MALE
1       3800.0  FEMALE
2       3250.0  FEMALE
3       4050.0    MALE
4       3450.0  FEMALE
```

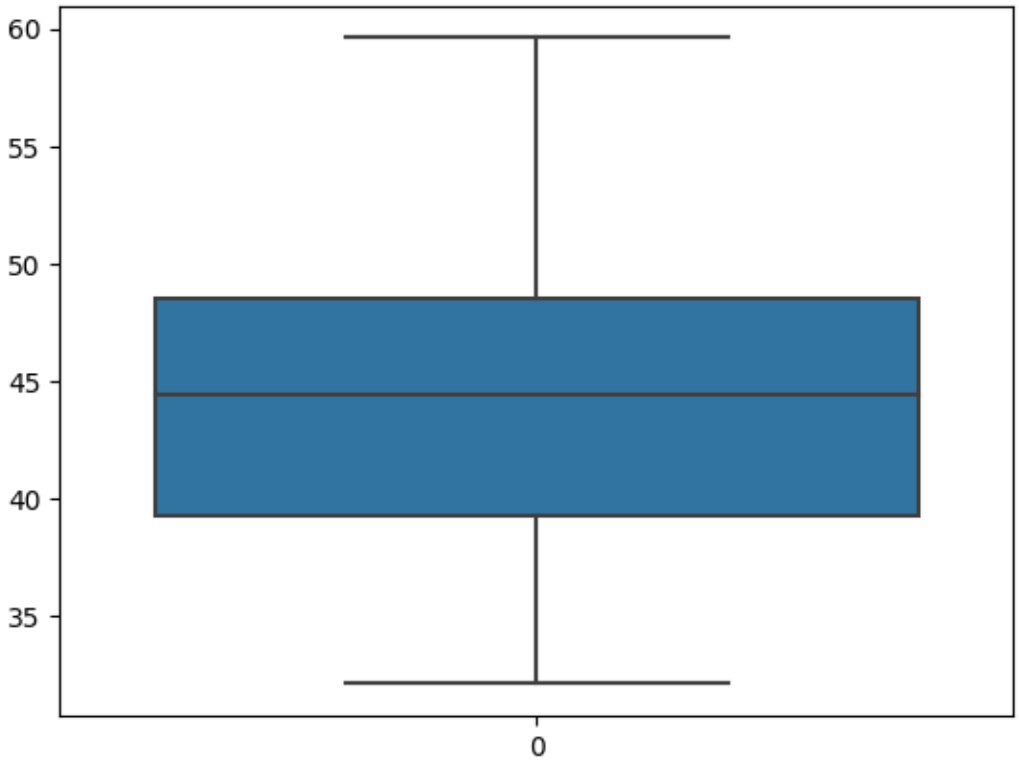
[ ]:
```
df.isnull().any()
```

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

All the missing values have been handled 6. Find the outliers and replace them outliers

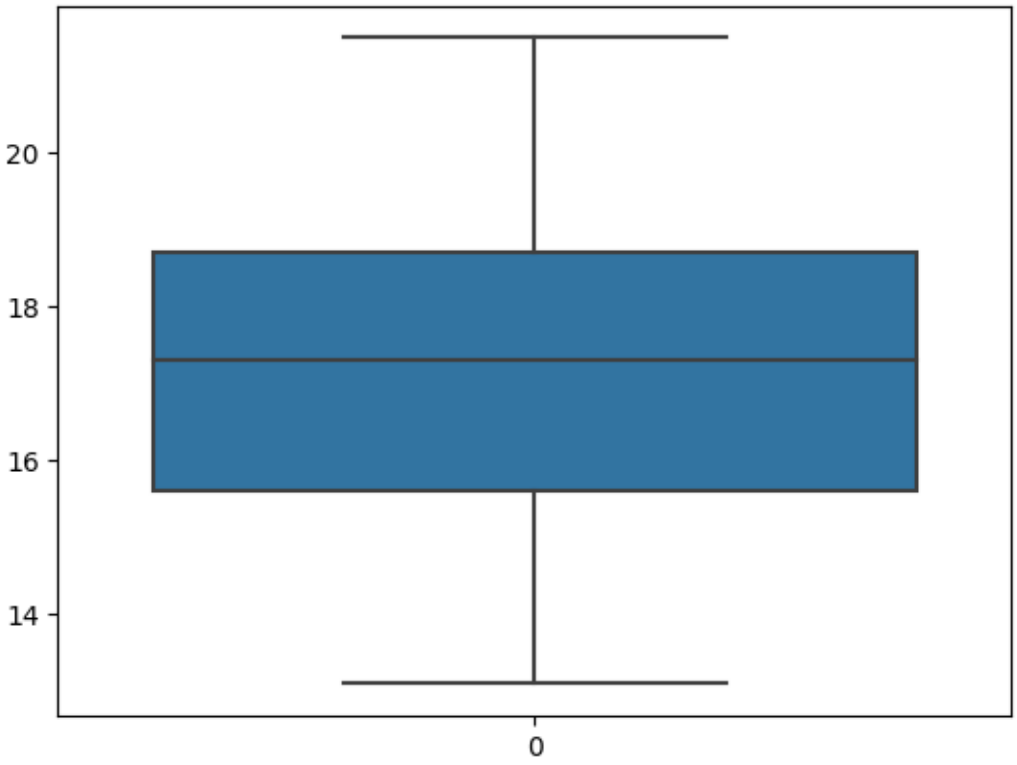
[ ]:
```
sns.boxplot(df.culmen_length_mm)
```

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



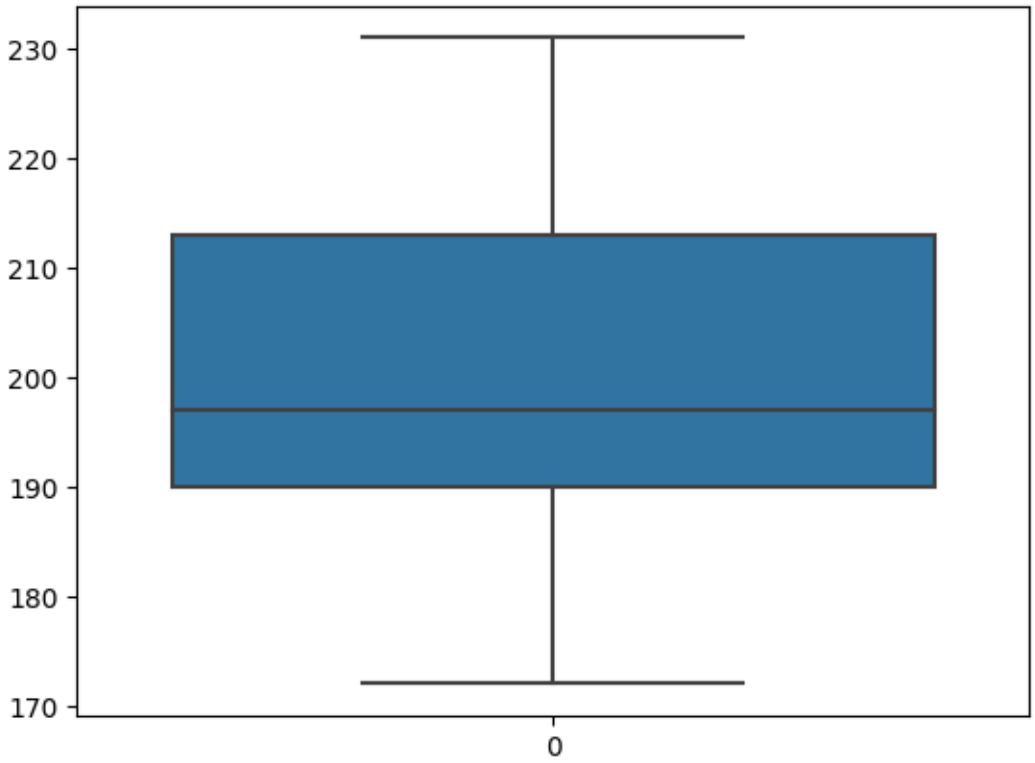
[ ]:
```
sns.boxplot(df.culmen_depth_mm)
```

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



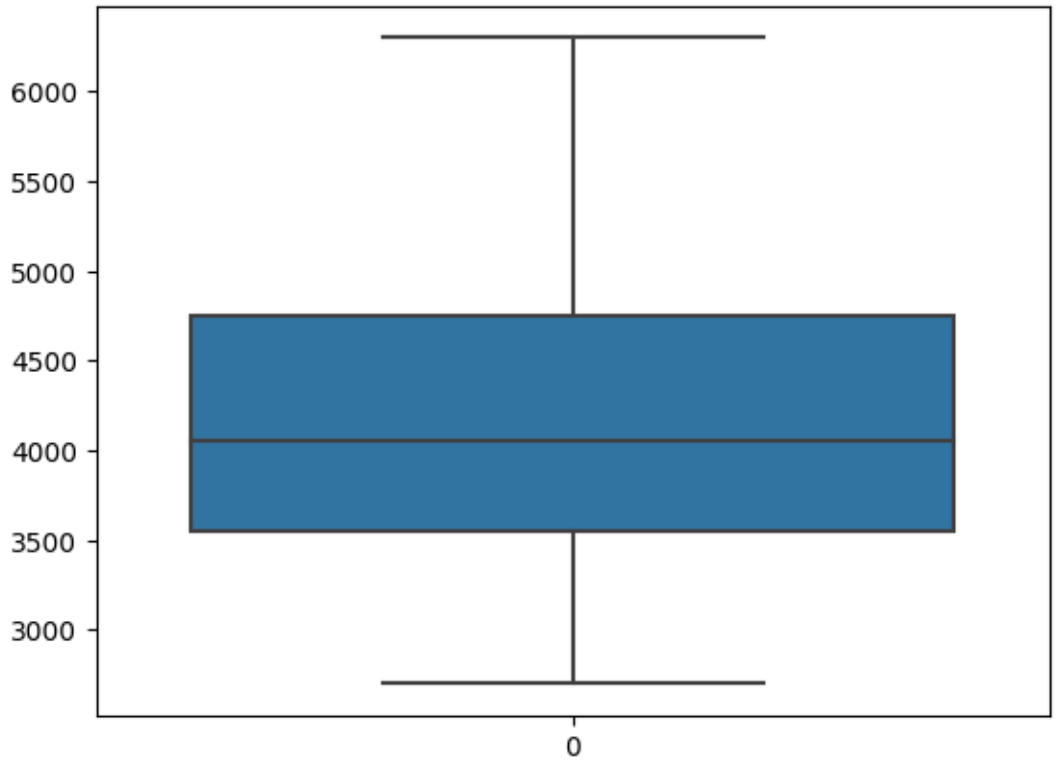
[ ]:
```
sns.boxplot(df.flipper_length_mm)
```

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



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

[ ]: <Axes: >



No outliers found 7. Check the correlation of independent variables with the target

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

```
<ipython-input-23-2f6f6606aa2c>:1: FutureWarning: The default value of
numeric_only in DataFrame.corr is deprecated. In a future version, it will
default to False. Select only valid columns or specify the value of numeric_only
to silence this warning.
  df.corr()
```

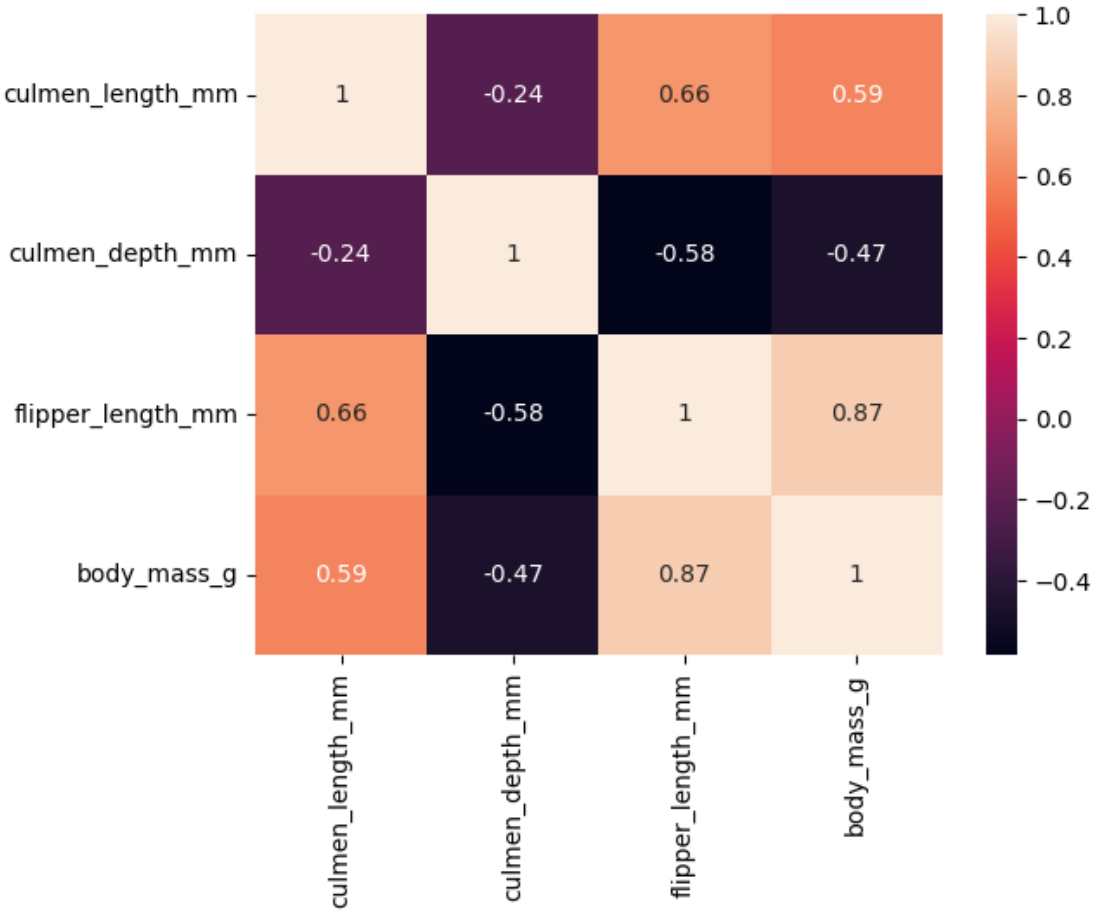
[ ]:

	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g
culmen_length_mm	1.000000	-0.235000	0.655858	0.594925
culmen_depth_mm	-0.235000	1.000000	-0.583832	-0.471942
flipper_length_mm	0.655858	-0.583832	1.000000	0.871221
body_mass_g	0.594925	-0.471942	0.871221	1.000000

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

```
<ipython-input-24-8df7bcac526d>:1: FutureWarning: The default value of
numeric_only in DataFrame.corr is deprecated. In a future version, it will
default to False. Select only valid columns or specify the value of numeric_only
to silence this warning.
  sns.heatmap(df.corr(),annot=True)
```

[ ]: <Axes: >



"Species" is the target value

[ ]:
```
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
```

8. Check for Categorical columns and perform encoding.

```
[ ]: from sklearn.preprocessing import LabelEncoder
     le = LabelEncoder()
```

"sex" column is categorical

```
[ ]: 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
```

The "sex , species , island" column has been encoded

9.Split the data into dependent and independent variables.

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

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

```
[ ]: 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
```

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,y,test_size=0.
 ↪2,random_state=10)
```

12.check the training and testing data shape.

[ ]:
```
X_train.shape
(275, 6)
X_train.head()
```

[ ]:
```
     island  culmen_length_mm  culmen_depth_mm  flipper_length_mm  \
315       0              50.8             15.7              226.0
181       1              52.8             20.0              205.0
25        0              35.3             18.9              187.0
```

```
164       1              47.0             17.3              185.0
247       0              47.8             15.0              215.0

     body_mass_g  sex
315       5200.0    2
181       4550.0    2
25        3800.0    1
164       3700.0    1
247       5650.0    2
```

[ ]:
```
y_train.shape
(275,)
y_train.head()
```

[ ]:
```
315    2
181    1
25     0
164    1
247    2
Name: species, dtype: int64
```

[ ]:
```
X_test.shape
(69, 6)
X_test.head()
```

[ ]:
```
     island  culmen_length_mm  culmen_depth_mm  flipper_length_mm  \
229       0              46.8             15.4              215.0
80        2              34.6             17.2              189.0
327       0              53.4             15.8              219.0
6         2              38.9             17.8              181.0
309       0              52.1             17.0              230.0

     body_mass_g  sex
229       5150.0    2
80        3200.0    1
327       5500.0    2
6         3625.0    1
309       5550.0    2
```

[ ]:
```
y_test.shape
(69,)
y_test.head()
```

[ ]:
```
229    2
80     0
327    2
6      0
```

```
309    2
Name: species, dtype: int64
```