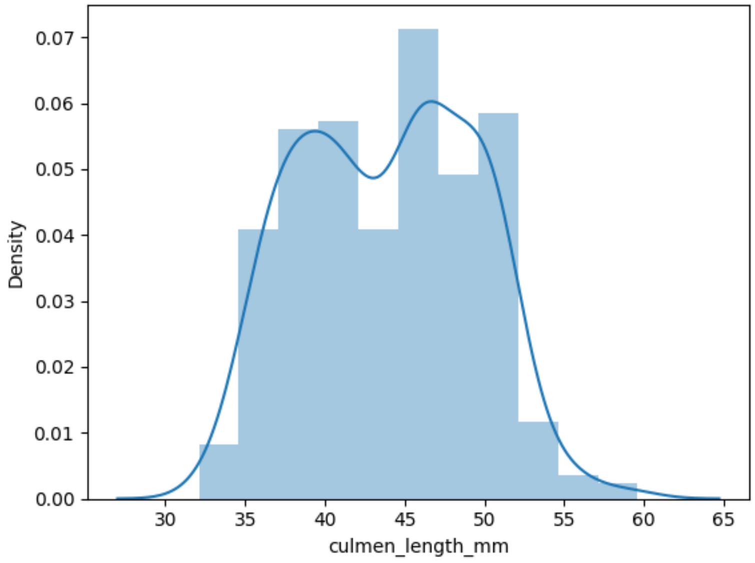
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

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

	species	island	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mas
0	Adelie	Torgersen	39.1	18.7	181.0	375
1	Adelie	Torgersen	39.5	17.4	186.0	380
2	Adelie	Torgersen	40.3	18.0	195.0	325
3	Adelie	Torgersen	NaN	NaN	NaN	N

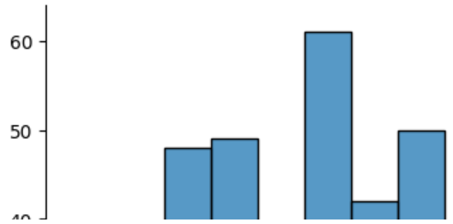
```
#UNIVARIATE ANALYSIS
sns.distplot(df.culmen_length_mm)
```

```
<ipython-input-4-d255315ac9d4>:2: 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: xlabel='culmen_length_mm', ylabel='Density'>
```



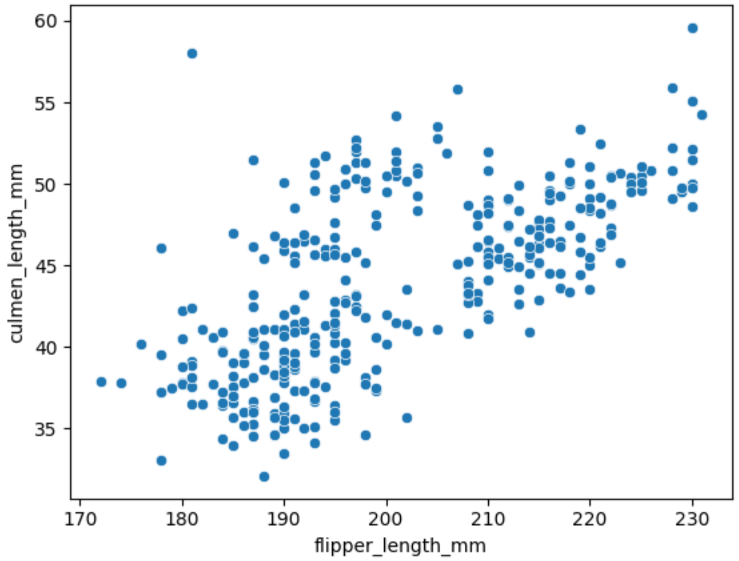
```
sns.displot(df.culmen_length_mm)
```

```
<seaborn.axisgrid.FacetGrid at 0x7fe602ada380>
```



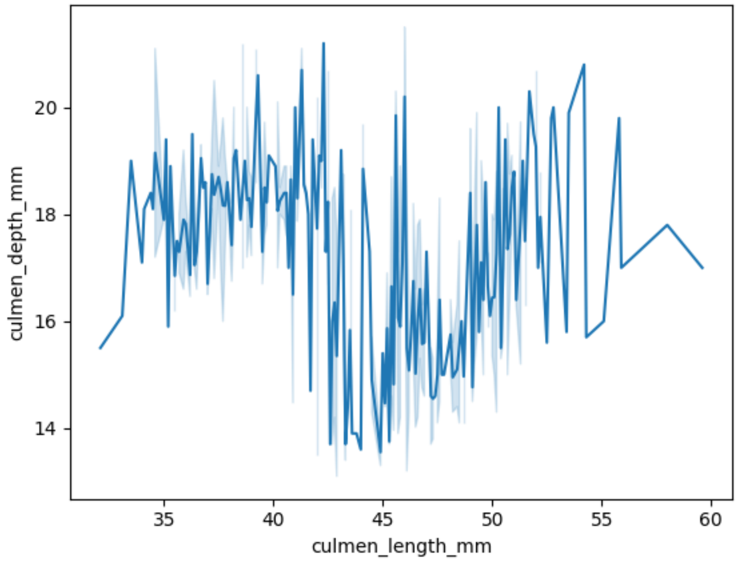
```
sns.scatterplot(x=df.flipper_length_mm,y=df.culmen_length_mm)
```

```
<Axes: xlabel='flipper_length_mm', ylabel='culmen_length_mm'>
```



```
sns.lineplot(x=df.culmen_length_mm,y=df.culmen_depth_mm)
```

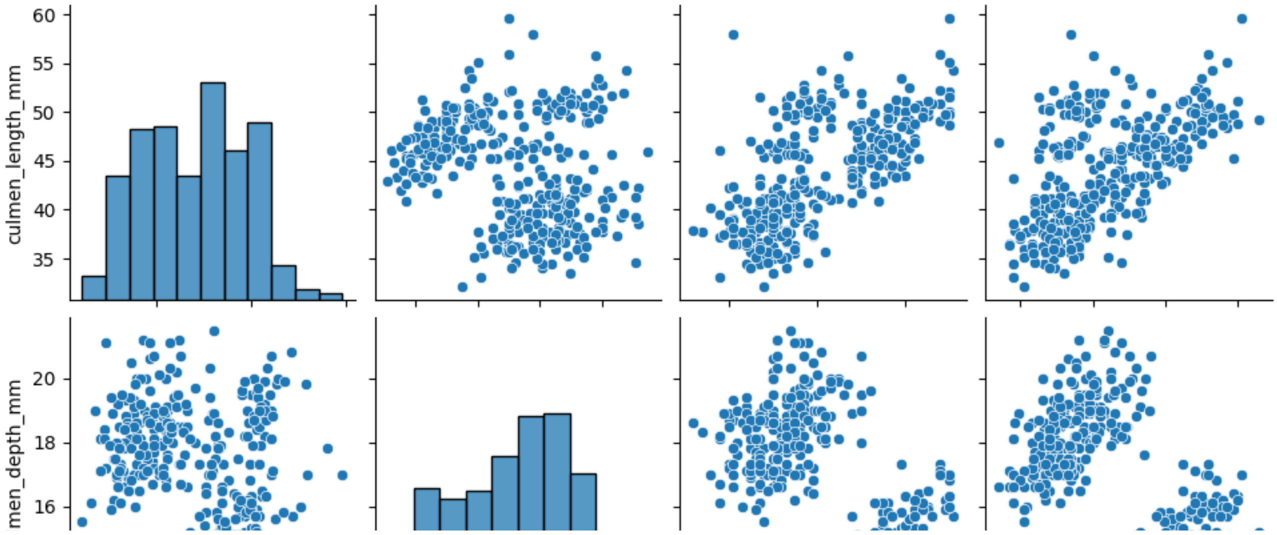
```
<Axes: xlabel='culmen_length_mm', ylabel='culmen_depth_mm'>
```



```
#MULTIVARIATE ANALYSIS
```

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

```
<seaborn.axisgrid.PairGrid at 0x7fe5fd4d9870>
```



```
#DESCRIPTIVE STATISTICS
```

```
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

```
#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
```

```
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)
```

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

```
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
```

```
df
```

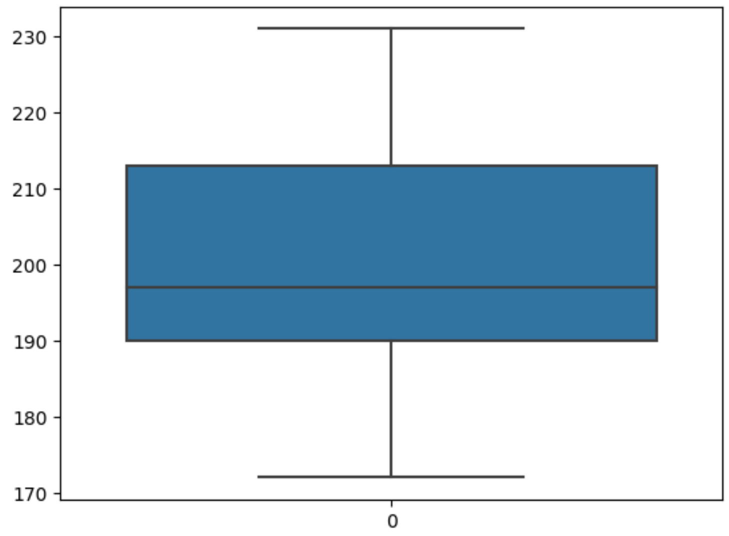
	species	island	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g	sex
0	Adelie	Torgersen	39.10	18.7	181.0	3750.0	MALE
1	Adelie	Torgersen	39.50	17.4	186.0	3800.0	FEMALE
2	Adelie	Torgersen	40.30	18.0	195.0	3250.0	FEMALE
3	Adelie	Torgersen	44.45	17.3	197.0	4050.0	MALE
4	Adelie	Torgersen	36.70	19.3	193.0	3450.0	FEMALE
...	...	...	...	...	...	...	...
339	Gentoo	Biscoe	44.45	17.3	197.0	4050.0	MALE
340	Gentoo	Biscoe	46.80	14.3	215.0	4850.0	FEMALE
341	Gentoo	Biscoe	50.40	15.7	222.0	5750.0	MALE
342	Gentoo	Biscoe	45.20	14.8	212.0	5200.0	FEMALE
343	Gentoo	Biscoe	49.90	16.1	213.0	5400.0	MALE

344 rows × 7 columns

```
#Find the outliers and replace the outliers
```

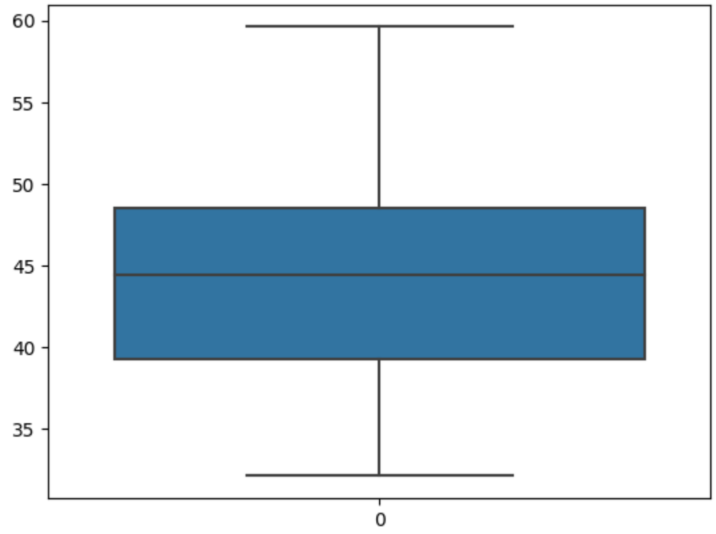
```
sns.boxplot(df.flipper_length_mm)
```

```
<Axes: >
```



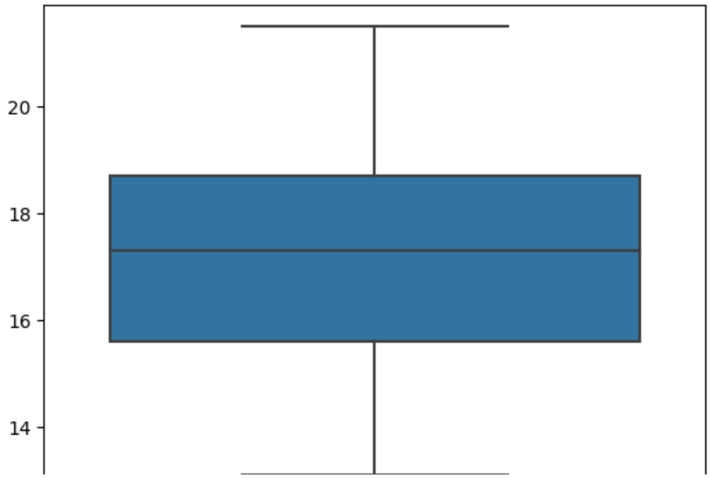
```
sns.boxplot(df.culmen_length_mm)
```

```
<Axes: >
```



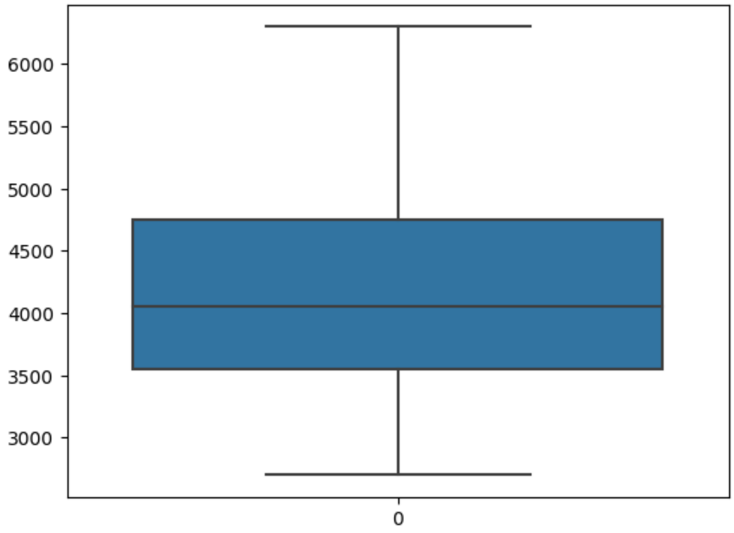
```
sns.boxplot(df.culmen_depth_mm)
```

```
<Axes: >
```



```
sns.boxplot(df.body_mass_g)
```

```
<Axes: >
```



NO OUTLIERS

```
#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	body_mass_g	sex
0	0	2	39.10	18.7	181.0	3750.0	2
1	0	2	39.50	17.4	186.0	3800.0	1
2	0	2	40.30	18.0	195.0	3250.0	1
3	0	2	44.45	17.3	197.0	4050.0	2
4	0	2	36.70	19.3	193.0	3450.0	1

```
#Check the correlation of independent variables with the target(species)

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
```

```
#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	sex
0	2	39.10	18.7	181.0	3750.0	2
1	2	39.50	17.4	186.0	3800.0	1
2	2	40.30	18.0	195.0	3250.0	1
3	2	44.45	17.3	197.0	4050.0	2
4	2	36.70	19.3	193.0	3450.0	1

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

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

```
#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	sex
0	1.0	0.254545	0.666667	0.152542	0.291667	1.0
1	1.0	0.269091	0.511905	0.237288	0.305556	0.5
2	1.0	0.298182	0.583333	0.389831	0.152778	0.5
3	1.0	0.449091	0.500000	0.423729	0.375000	1.0
4	1.0	0.167273	0.738095	0.355932	0.208333	0.5

```
#Split 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)
```

```
#Check training and testing data shape

X_train.shape
```

```
(275, 6)
```

```
X_test.shape
```

```
(69, 6)
```

```
Y_train.shape
```

```
(275,)
```

```
Y_test.shape
```

```
(69,)
```

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