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

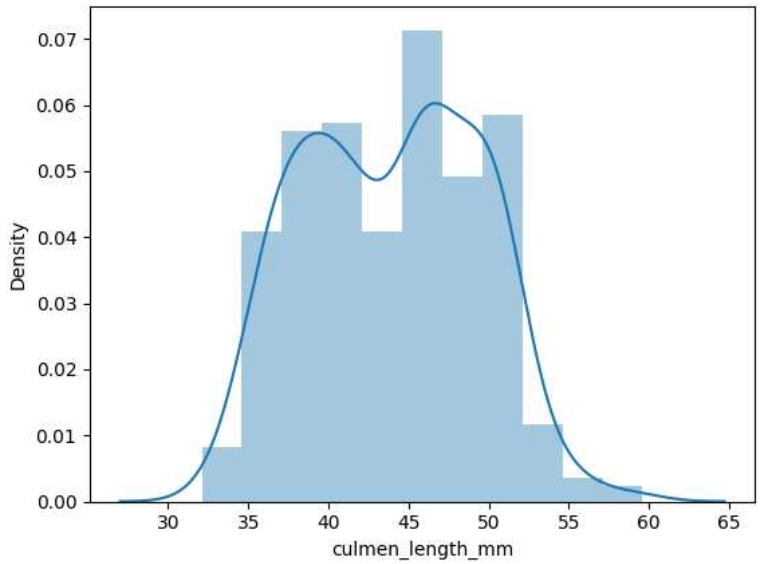
```
df=pd.read_csv('penguins_size.csv')
df.head()
```

	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

Univariate Analysis

```
sns.distplot(df.culmen_length_mm)
```

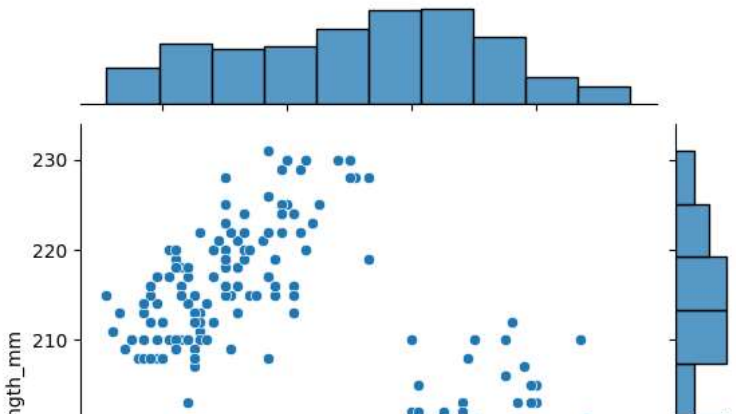
```
C:\Users\shrey\AppData\Local\Temp\ipykernel_24296\3594697359.py:1: UserWarning:

`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: xlabel='culmen_length_mm', ylabel='Density'>
```



Bi- Variate Analysis

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

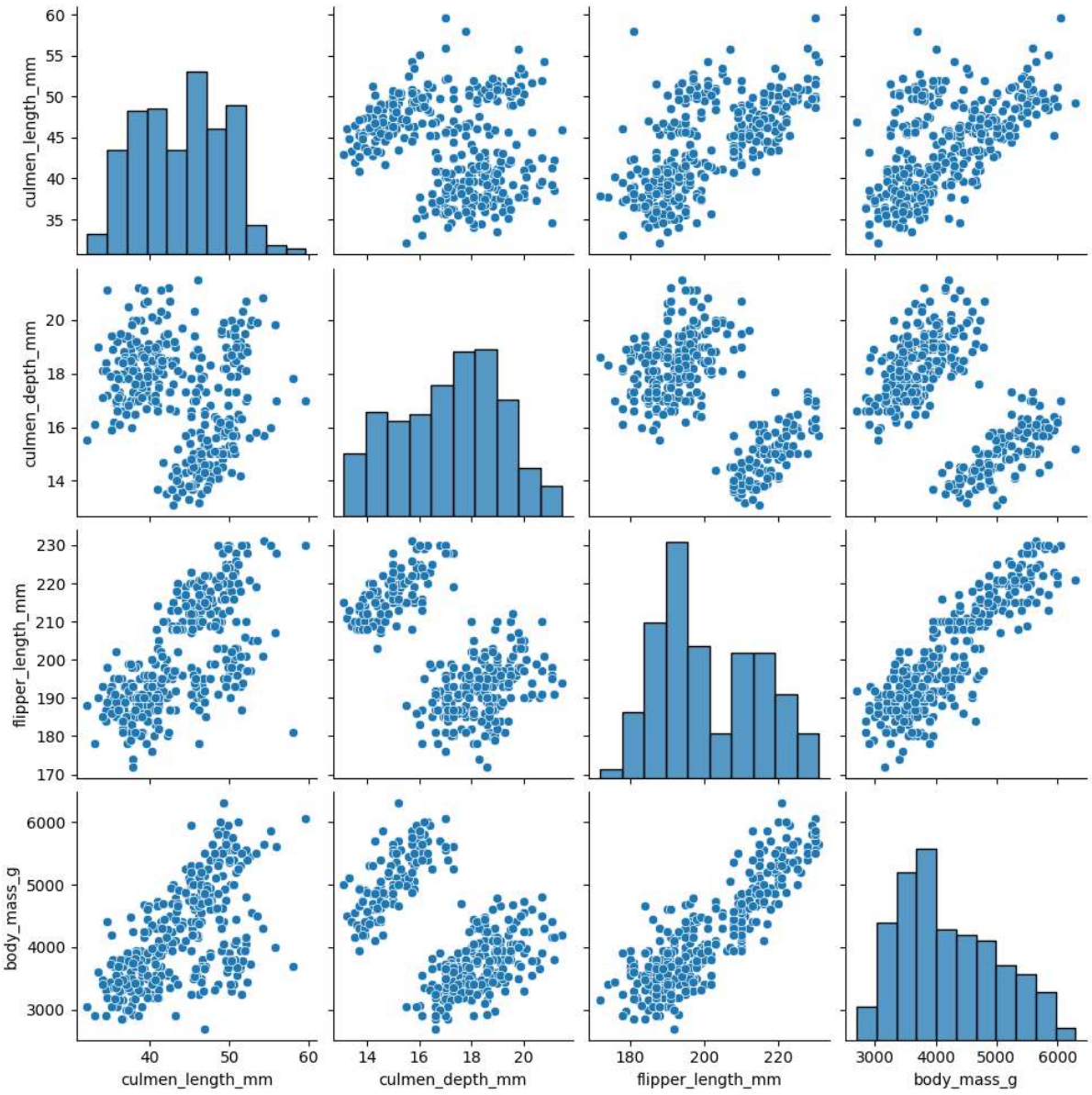
```
<seaborn.axisgrid.JointGrid at 0x2d628ff1fd0>
```



Multi-Variate Analysis

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

```
c:\Python311\Lib\site-packages\seaborn\axisgrid.py:118: UserWarning: The figure layout has changed to tight
  self._figure.tight_layout(*args, **kwargs)
<seaborn.axisgrid.PairGrid at 0x2d629088d50>
```



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

Missing values

```
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
```

Missing values

numerical columns

```
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)
```

Categorical column

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

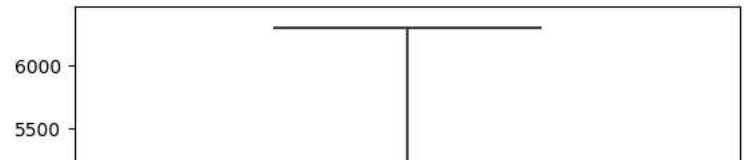
```
df.isnull().sum()
```

```
species             0
island              0
culmen_length_mm    0
culmen_depth_mm     0
flipper_length_mm   0
body_mass_g         0
sex                 0
dtype: int64
```

outliers

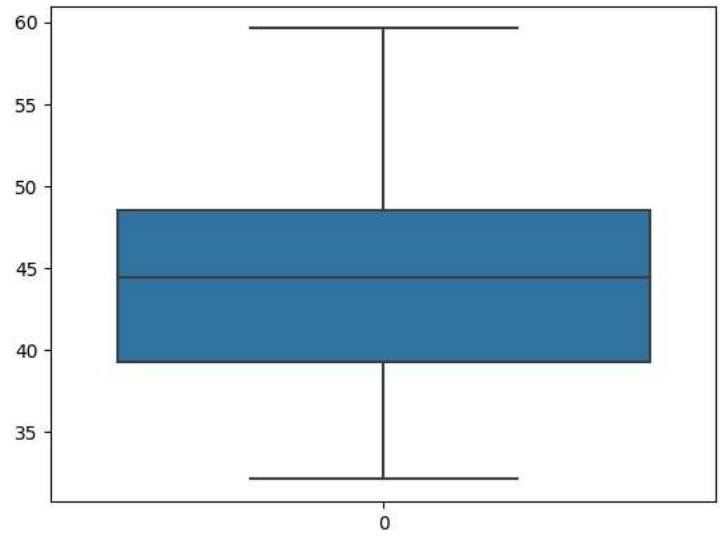
```
sns.boxplot(df.body_mass_g) #no outliers detected
```

```
<Axes: >
```



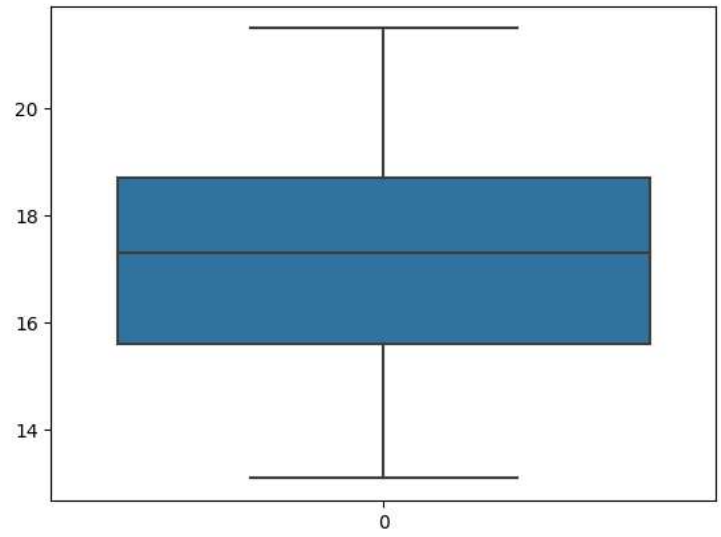

```
sns.boxplot(df.culmen_length_mm)
```

```
<Axes: >
```



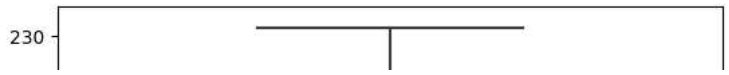

```
sns.boxplot(df.culmen_depth_mm)
```

```
<Axes: >
```




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

```
<Axes: >
```



Hence there are no outliers in the dataset.

correlation of independent variables with the target

```
df.dtypes
```

```
species               object
island                object
culmen_length_mm     float64
culmen_depth_mm      float64
flipper_length_mm    float64
body_mass_g          float64
sex                   object
dtype: object
```

```
df_m=df.select_dtypes(exclude=['object'])
```

```
df_m.corr
```

```
<bound method DataFrame.corr of      culmen_length_mm  culmen_depth_mm  flipper_length_mm  body_mass_g
0                39.10             18.7              181.0       3750.0
1                39.50             17.4              186.0       3800.0
2                40.30             18.0              195.0       3250.0
3                44.45             17.3              197.0       4050.0
4                36.70             19.3              193.0       3450.0
..                 ...              ...                ...          ...
339              44.45             17.3              197.0       4050.0
340              46.80             14.3              215.0       4850.0
341              50.40             15.7              222.0       5750.0
342              45.20             14.8              212.0       5200.0
343              49.90             16.1              213.0       5400.0

[344 rows x 4 columns]>
```

```
df.dtypes
```

```
species               object
island                object
culmen_length_mm     float64
culmen_depth_mm      float64
flipper_length_mm    float64
body_mass_g          float64
sex                   object
dtype: object
```

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

```
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: int32
```

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 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)
```

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,)
```