```
# Assignment 3
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# 21BCT0125
```

```
import pandas as pd
df=pd.read_csv('/content/penguins_size.csv')
df
```

	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
...	...	...	...	...	...	...	...
339	Gentoo	Biscoe	NaN	NaN	NaN	NaN	NaN
340	Gentoo	Biscoe	46.8	14.3	215.0	4850.0	FEMALE
341	Gentoo	Biscoe	50.4	15.7	222.0	5750.0	MALE
342	Gentoo	Biscoe	45.2	14.8	212.0	5200.0	FEMALE
343	Gentoo	Biscoe	49.9	16.1	213.0	5400.0	MALE

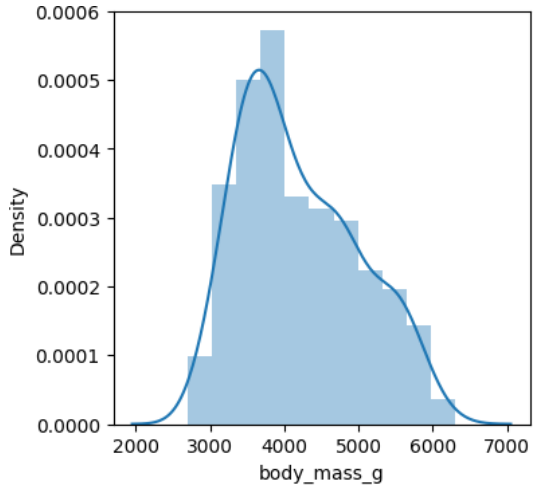
344 rows × 7 columns

```
# Univariate Analysis
# a) Pie Chart
import matplotlib.pyplot as plt
import seaborn as sns
plt.figure(figsize=(4,4))
condition=df['sex']=='MALE'
plt.pie(condition)
plt.show()
```

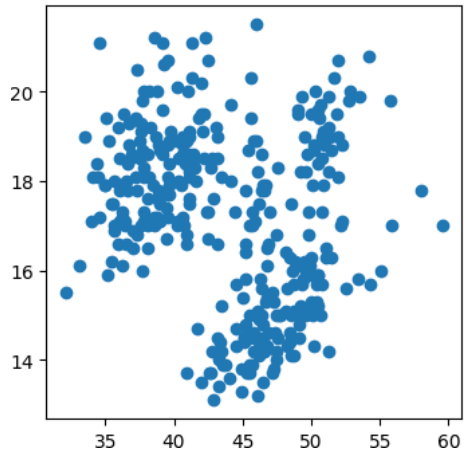
```
# Distribution Plot
plt.figure(figsize=(4,4))
sns.distplot(df['body_mass_g'])
plt.show()
```

```
<ipython-input-15-918725f44299>:3: 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
```

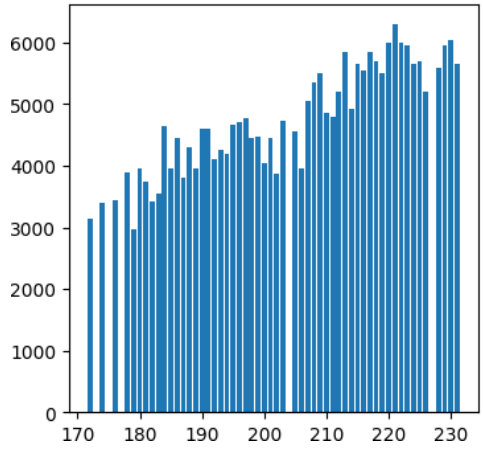
```
sns.distplot(df['body_mass_g'])
```




```
# Bivariate Anaysis
# a) Scatter graph
plt.figure(figsize=(4,4))
plt.scatter(df['culmen_length_mm'], df['culmen_depth_mm'])
plt.show()
```

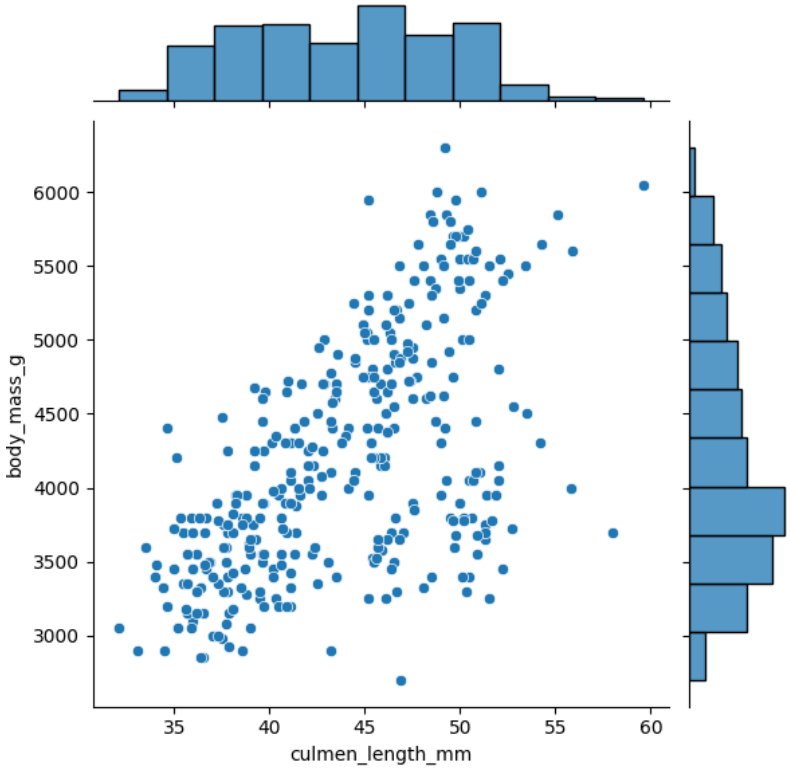



```
# b) Bar graph
plt.figure(figsize=(4,4))
plt.bar(df['flipper_length_mm'], df['body_mass_g'])
plt.show()
```



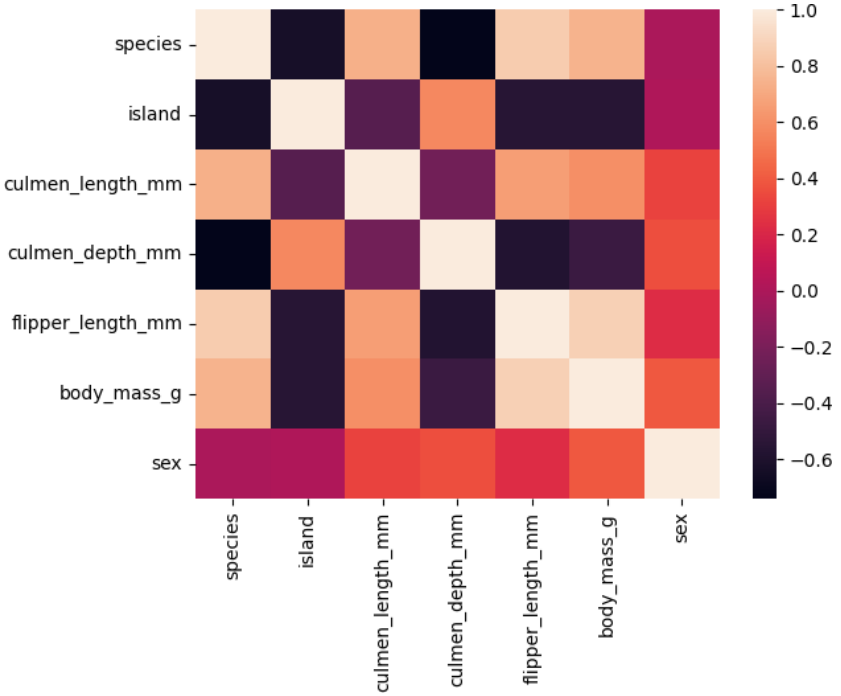
```
# c) Jointplot
sns.jointplot(x='culmen_length_mm', y='body_mass_g',data=df)
```

```
<seaborn.axisgrid.JointGrid at 0x7c6b499b6410>
```



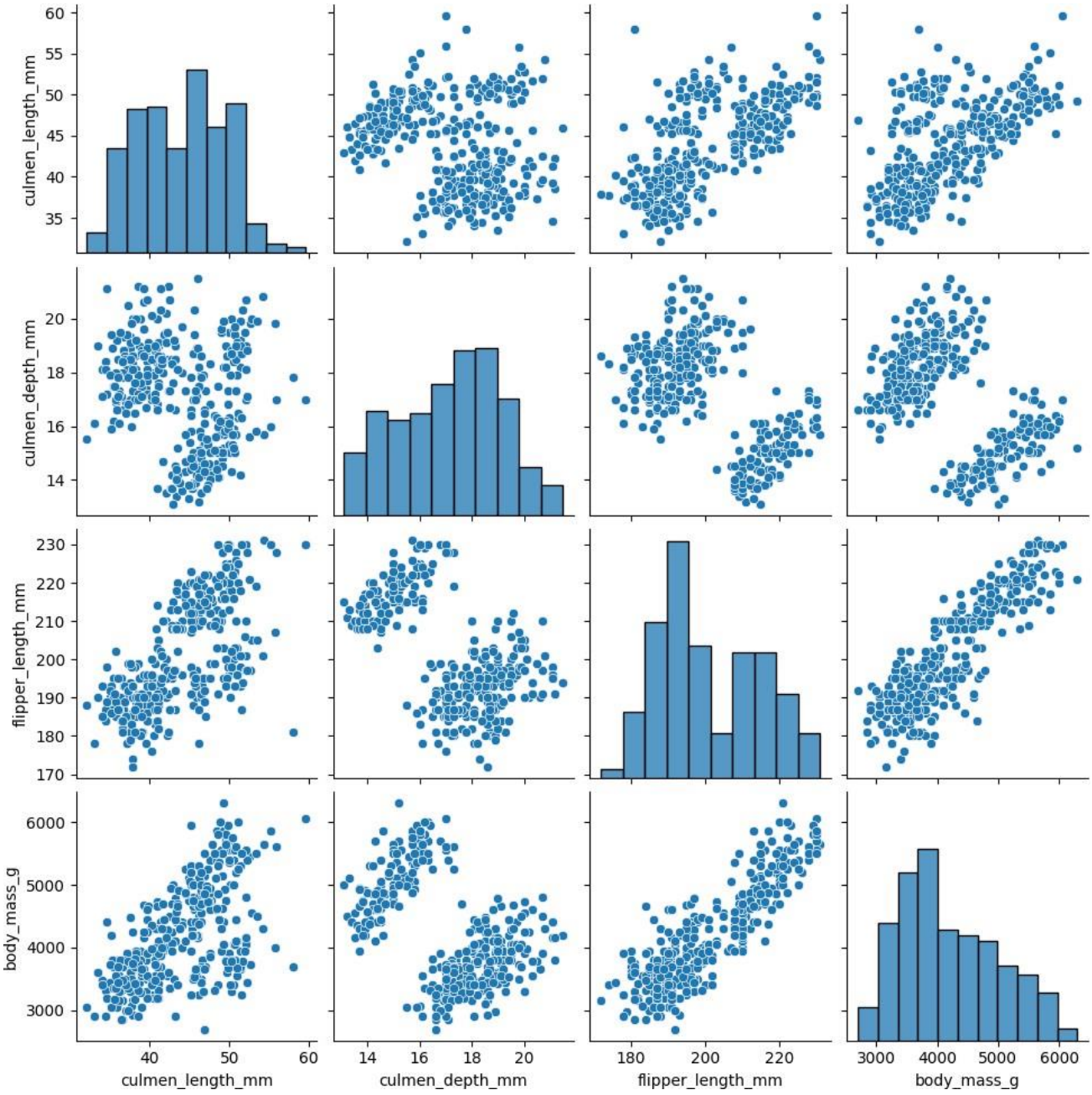

```
# Multivariate Analysis
# a) Heatmap
sns.heatmap(df.corr())
```

```
<Axes: >
```



```
# b) Pairplot
sns.pairplot(df)
```

```
<seaborn.axisgrid.PairGrid at 0x7c6b49408ee0>
```




```
# 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

```
# 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.sex.value_counts ()
```

```
MALE      168
FEMALE    165
.           1
Name: sex, dtype: int64
```

```
df['sex']=df['sex'].replace(".", "MALE")
df.sex. value_counts ()
```

```
MALE      169
FEMALE    165
Name: sex, dtype: int64
```

```
df['sex']=df['sex'].fillna ("MALE")
```

```
df.median ()
```

```
<ipython-input-83-4c9e34f27443>:1: FutureWarning: The default value of numeric_only in DataFrame.median is deprecated. I
  df.median ()
culmen_length_mm       44.45
culmen_depth_mm        17.30
flipper_length_mm     197.00
body_mass_g          4050.00
dtype: float64
```

```
df=df.fillna(df.median ( ))
df.isnull ().sum()
```

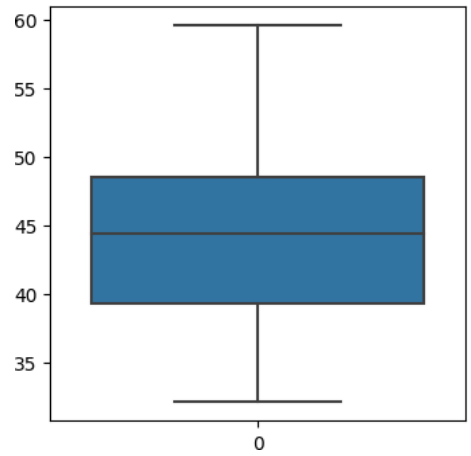
```
<ipython-input-84-fea379c4db1f>:1: FutureWarning: The default value of numeric_only in DataFrame.median is deprecated. I
  df=df.fillna(df.median ( ))
species              0
island               0
culmen_length_mm     0
culmen_depth_mm      0
flipper_length_mm    0
body_mass_g          0
sex                  0
dtype: int64
```

```
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   344 non-null    float64
 3   culmen_depth_mm    344 non-null    float64
 4   flipper_length_mm  344 non-null    float64
 5   body_mass_g        344 non-null    float64
 6   sex                344 non-null    object
dtypes: float64(4), object(3)
memory usage: 18.9+ KB
```

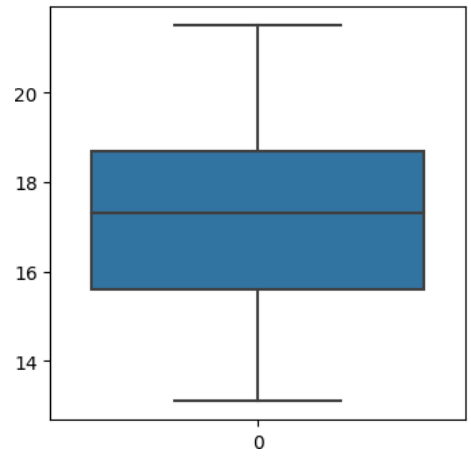
```
# Find the outliers and replace them outliers
plt.figure(figsize=(4,4))
sns.boxplot(df.culmen_length_mm)
```

```
<Axes: >
```



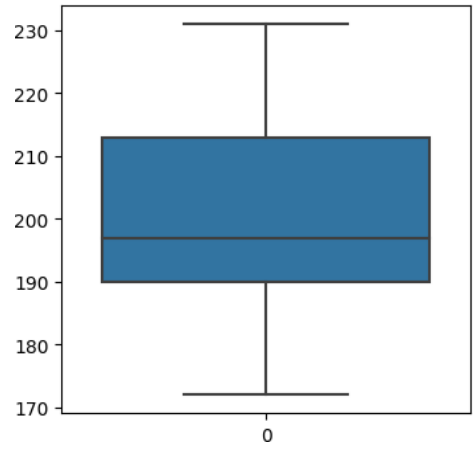

```
plt.figure(figsize=(4,4))
sns.boxplot(df.culmen_depth_mm)
```

```
<Axes: >
```



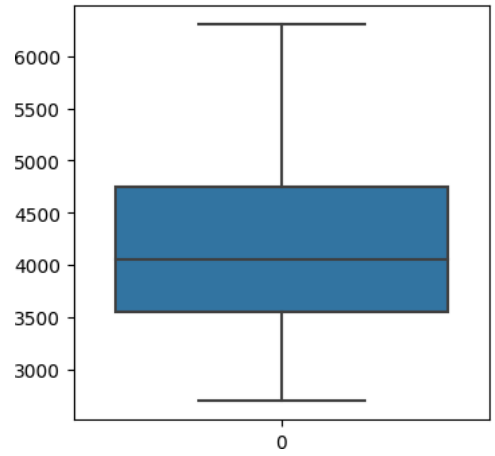

```
plt.figure(figsize=(4,4))
sns.boxplot(df.flipper_length_mm)
```

```
<Axes: >
```



```
plt.figure(figsize=(4,4))
sns.boxplot(df.body_mass_g)
```

```
<Axes: >
```




```
# no outliers
```

```
# Check for Categorical columns and perform encoding.
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   344 non-null    float64
 3   culmen_depth_mm    344 non-null    float64
 4   flipper_length_mm  344 non-null    float64
 5   body_mass_g        344 non-null    float64
 6   sex                344 non-null    object 
dtypes: float64(4), object(3)
memory usage: 18.9+ KB
```

```
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	1
1	0	2	39.50	17.4	186.0	3800.0	0
2	0	2	40.30	18.0	195.0	3250.0	0
3	0	2	44.45	17.3	197.0	4050.0	1
4	0	2	36.70	19.3	193.0	3450.0	0

```
# Check the correlation of independent variables with the target
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                  0.010240
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)
y=df.species
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	1
1	2	39.50	17.4	186.0	3800.0	0
2	2	40.30	18.0	195.0	3250.0	0
3	2	44.45	17.3	197.0	4050.0	1

```
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_s=pd.DataFrame(scale.fit_transform(x),columns=x.columns)
x_s.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	0.0
2	1.0	0.298182	0.583333	0.389831	0.152778	0.0
3	1.0	0.449091	0.500000	0.423729	0.375000	1.0
4	1.0	0.167273	0.738095	0.355932	0.208333	0.0

```
# 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_s,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,)
```

✓ 2s completed at 19:51