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```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
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  \
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                NaN
4  Adelie  Torgersen              36.7             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.shape
```

```
(344, 7)
```

```
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
```

```
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'][df['sex'] == '.'] = np.nan
```

```
<ipython-input-37-fbb324dcfac6>:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  df['sex'][df['sex'] == '.'] = np.nan
```

```
df['sex'] = df['sex'].fillna(method='ffill')
```

```
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
```

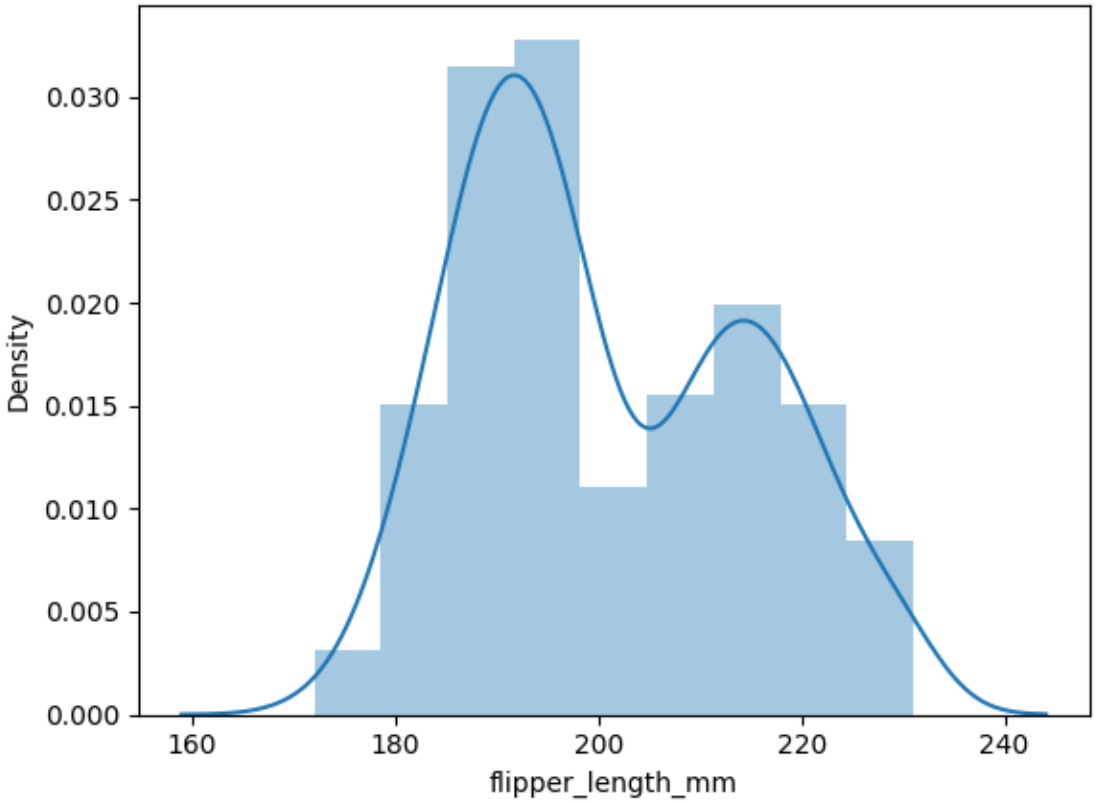
```
df.head()
```

```
  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  FEMALE
4       3450.0  FEMALE
```

```
sns.distplot(df.flipper_length_mm   )
```

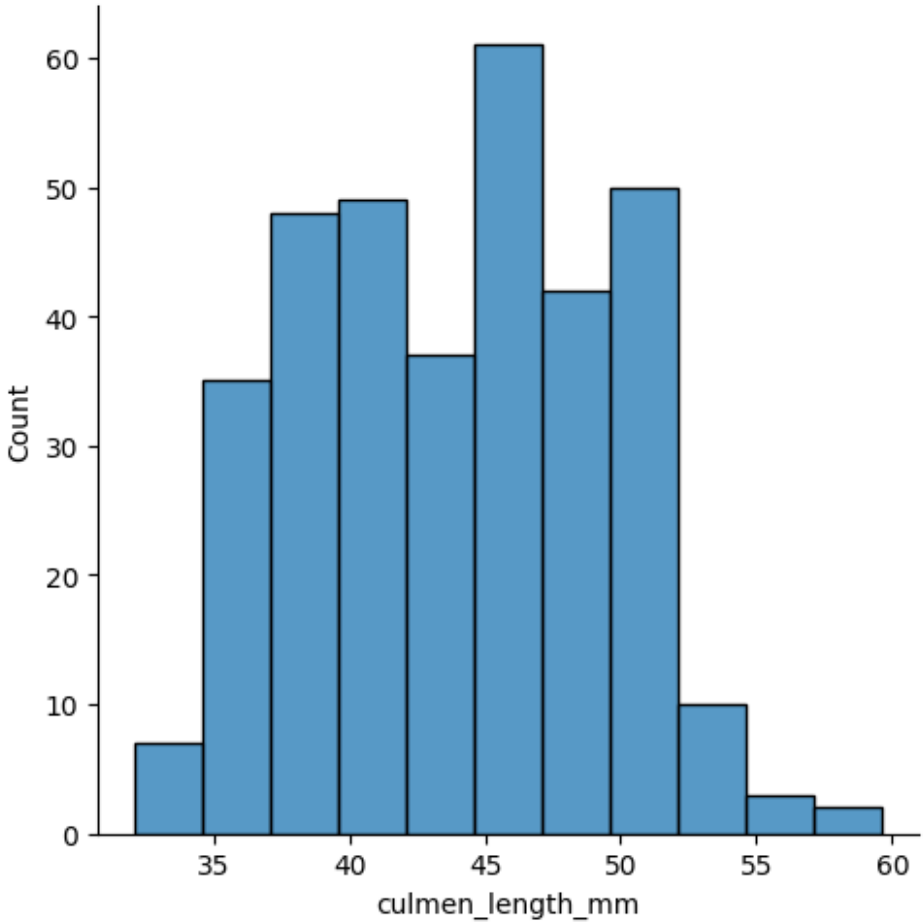
```
<ipython-input-20-ae65ebdd98e7>:1: UserWarning:

`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.flipper_length_mm )
```

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



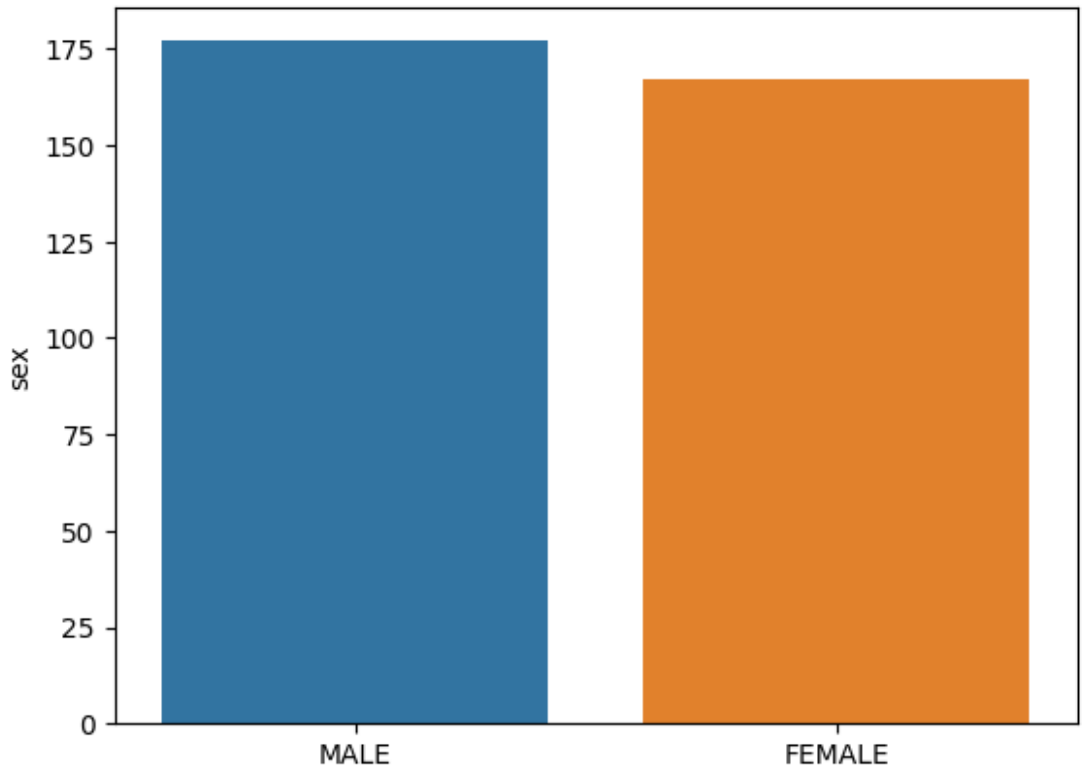

```
sns.displot(df.culmen_length_mm)
```

```
<seaborn.axisgrid.FacetGrid at 0x79f0ffb1aad0>
```



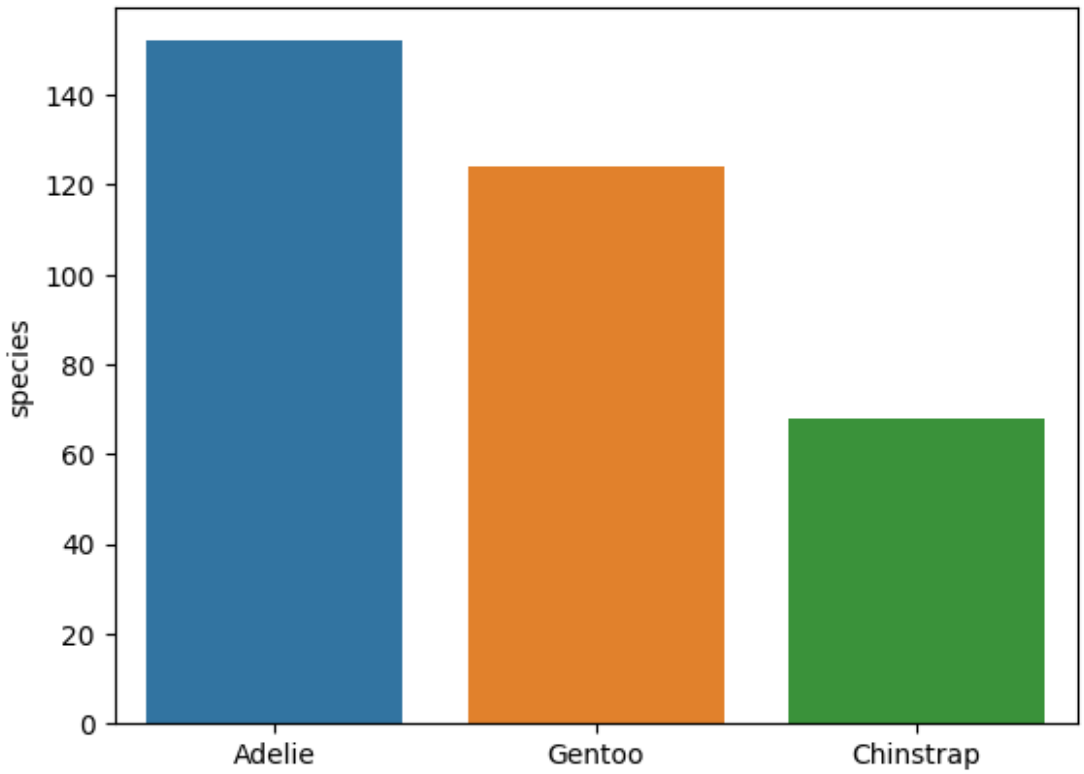

```
sns.barplot(x =df.sex.value_counts().index,y =df.sex.value_counts() )
```

```
<Axes: ylabel='sex'>
```



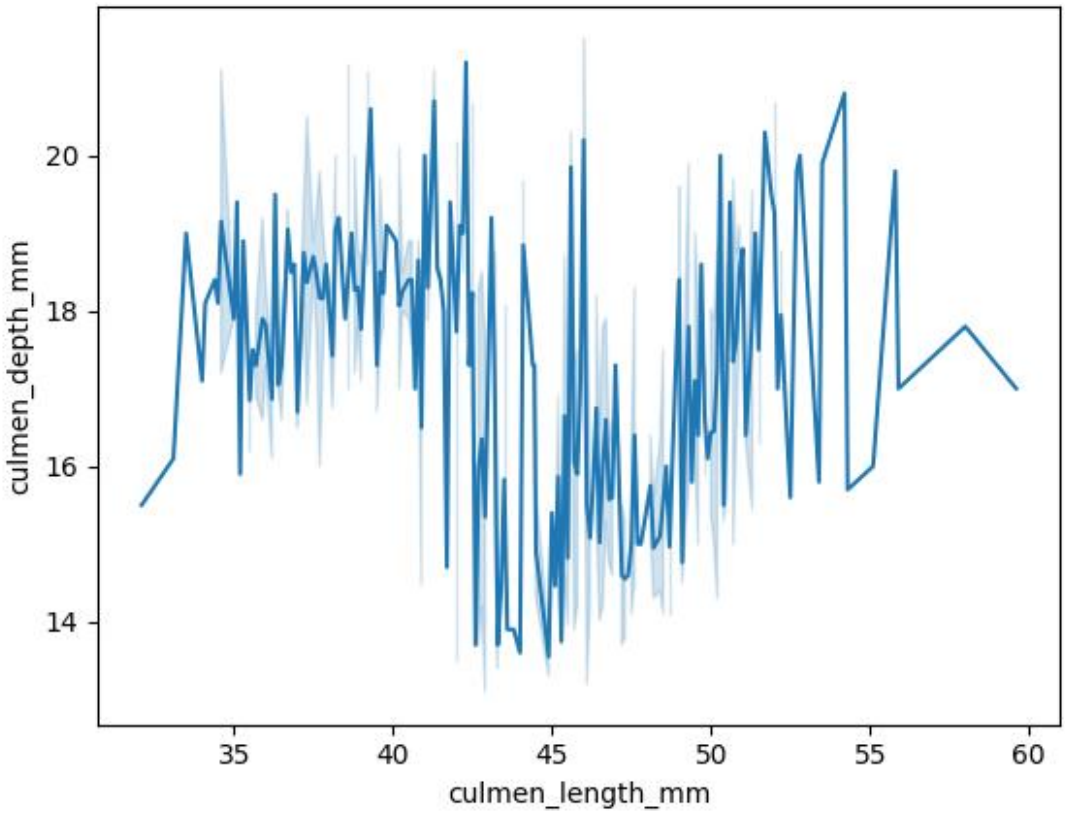

```
sns.barplot(x =df.species.value_counts().index,y =df.species.value_counts() )
```

```
<Axes: ylabel='species'>
```



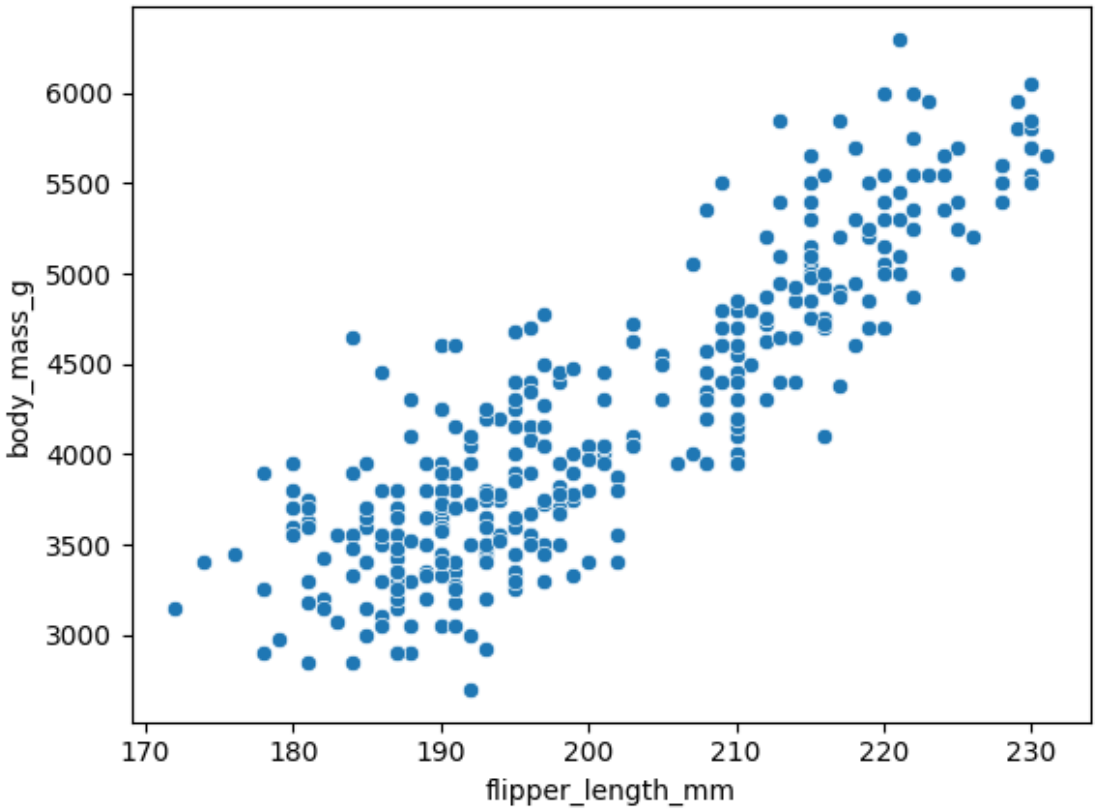

```
sns.lineplot(x = df.culmen_length_mm,y=df.culmen_depth_mm   )
```

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



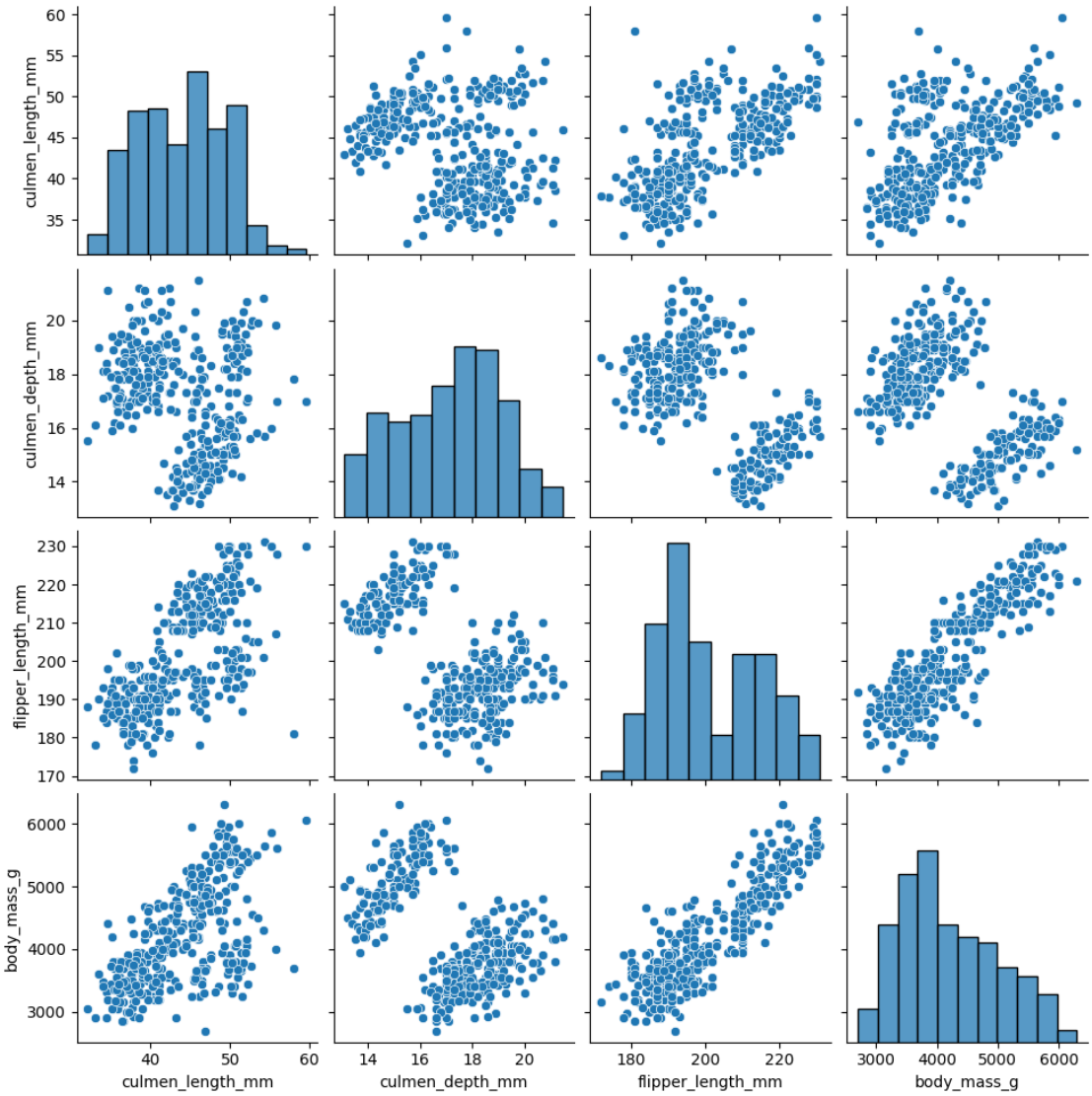

```
sns.scatterplot(x = df.flipper_length_mm,y=df.body_mass_g   )
```

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



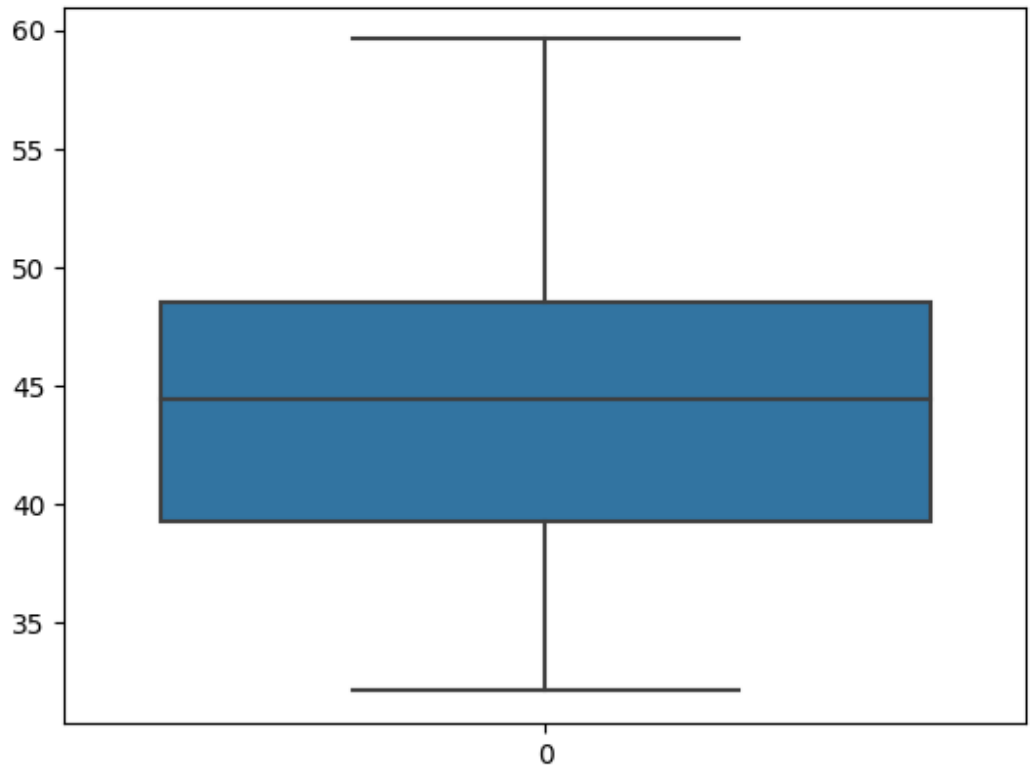

```
sns.pairplot(df)
```

```
<seaborn.axisgrid.PairGrid at 0x79f0ff62f760>
```



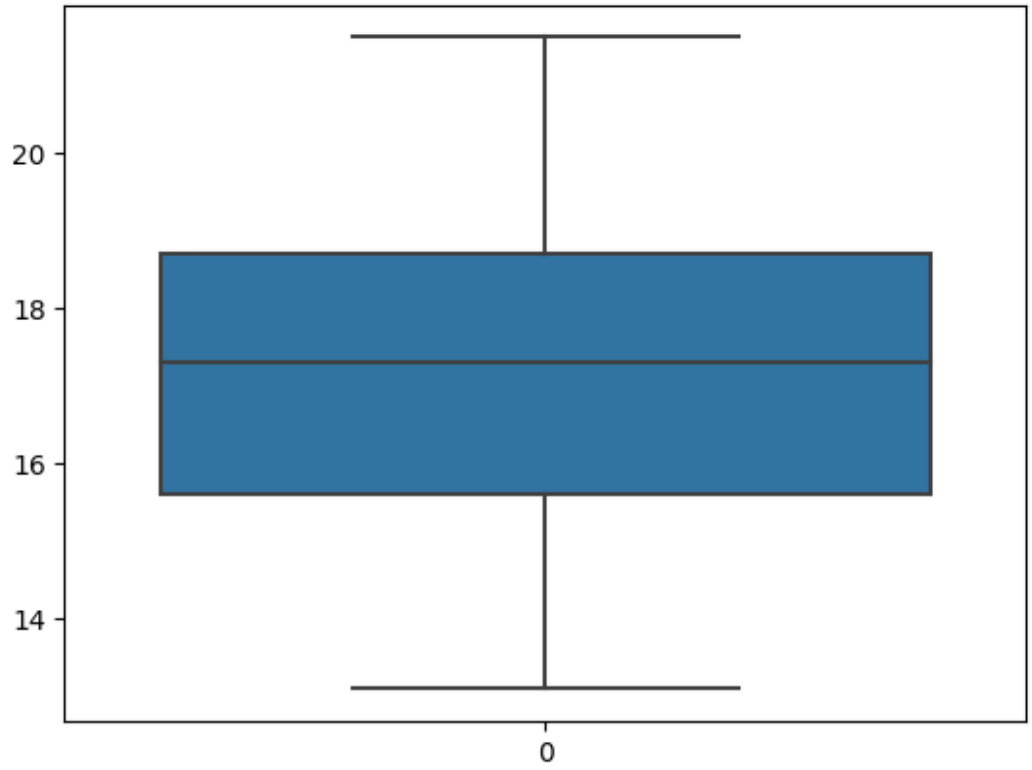

```
sns.boxplot(df.culmen_length_mm)
```

```
<Axes: >
```



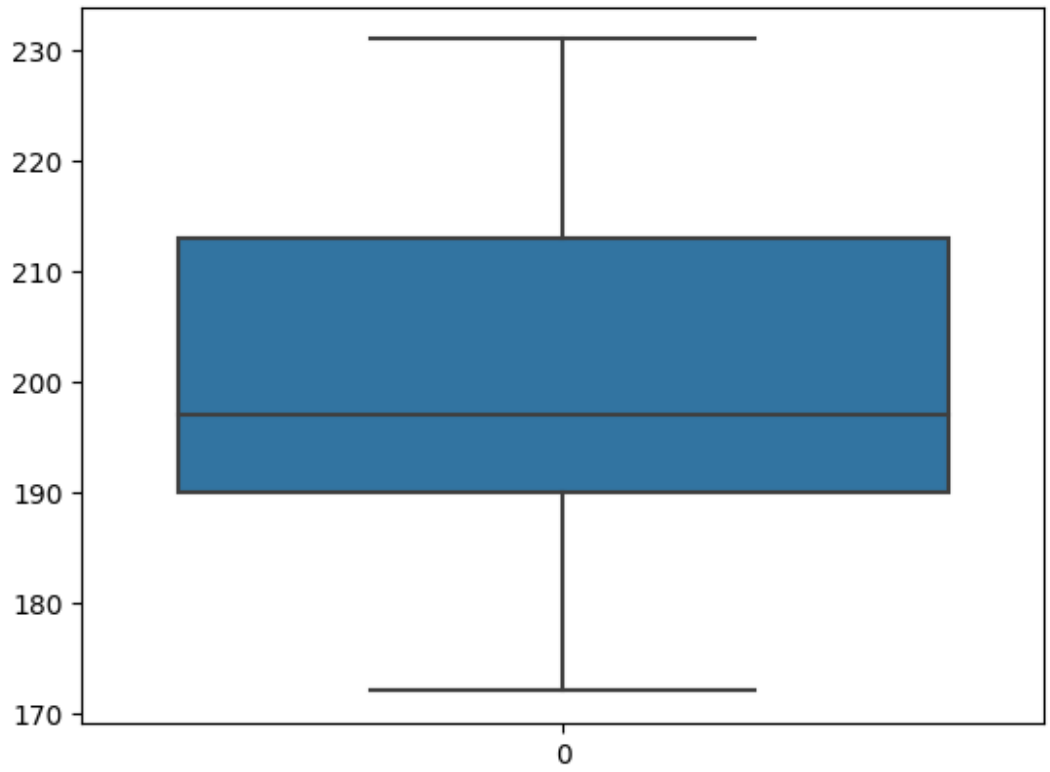

```
sns.boxplot(df.culmen_depth_mm)
```

```
<Axes: >
```



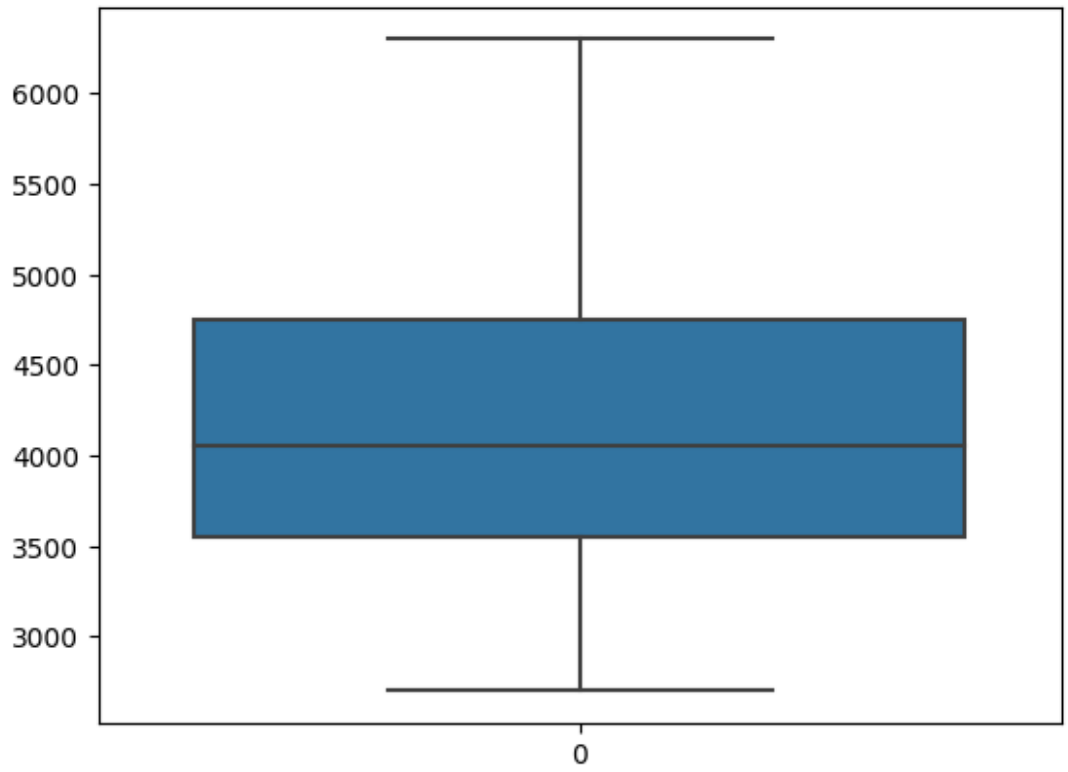

```
sns.boxplot(df.flipper_length_mm)
```

```
<Axes: >
```




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

```
<Axes: >
```




```
df.corr()
```

```
<ipython-input-34-b980d9905da1>: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

```
df.island.value_counts()
```

```
0    168
1    124
2     52
Name: island, dtype: int64
```

```
df.species.value_counts()
```

```
0    152
2    124
1     68
Name: species, dtype: int64
```

```
from sklearn.preprocessing import LabelEncoder


le = LabelEncoder()



df.sex = le.fit_transform(df.sex)
df.species = le.fit_transform(df.species)


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    1
1       3800.0    0
2       3250.0    0
3       4050.0    0
4       3450.0    0
```

```
df_main = pd.get_dummies(df,columns =['island'])
df_main.head()
```

```
   species  culmen_length_mm  culmen_depth_mm  flipper_length_mm  body_mass_g
\
0        0             39.10             18.7              181.0       3750.0
1        0             39.50             17.4              186.0       3800.0
2        0             40.30             18.0              195.0       3250.0
3        0             44.45             17.3              197.0       4050.0
4        0             36.70             19.3              193.0       3450.0

   sex  island_0  island_1  island_2
0    1         0         0         1
1    0         0         0         1
2    0         0         0         1
```

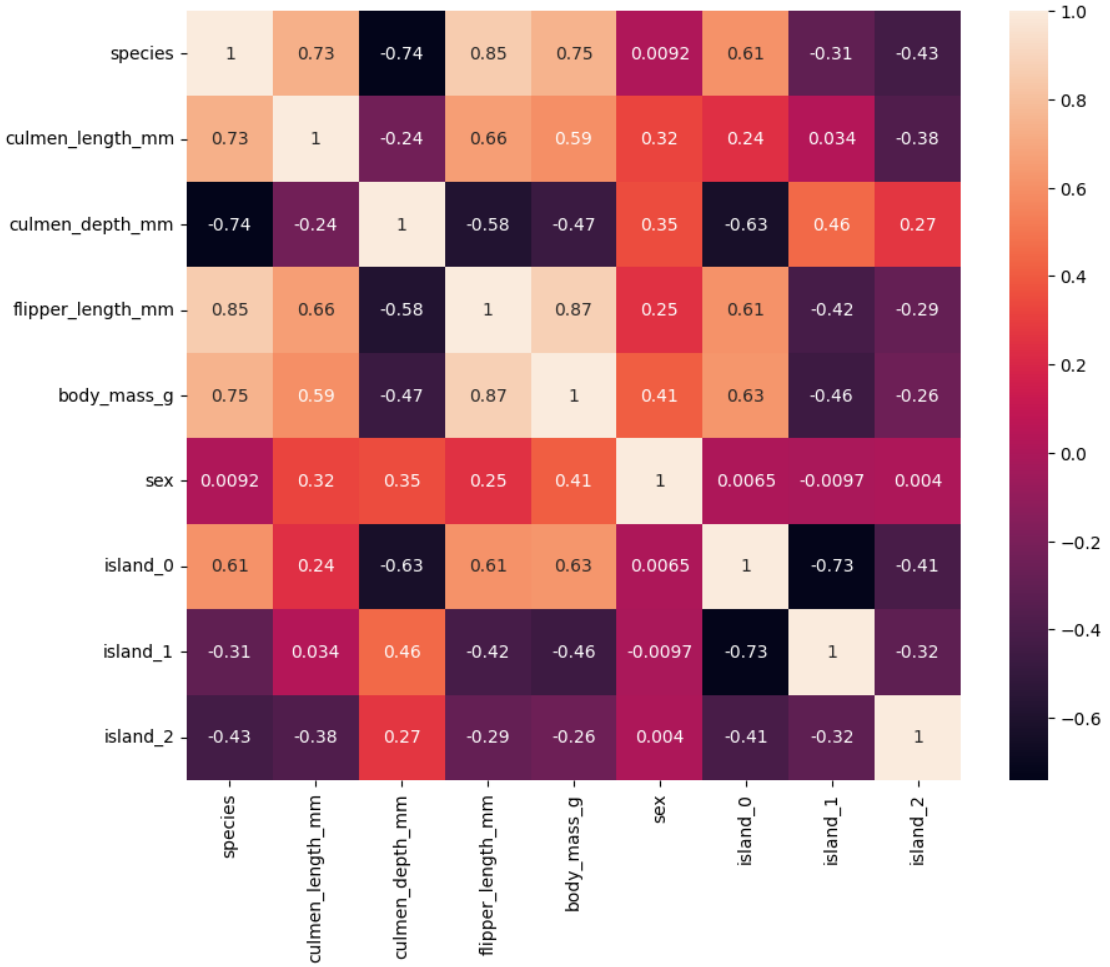
```
3    0         0         0         1
4    0         0         0         1
```

```
df_main.corr()
```

```
                    species  culmen_length_mm  culmen_depth_mm  \
species            1.000000          0.728706        -0.741282
culmen_length_mm   0.728706          1.000000        -0.235000
culmen_depth_mm   -0.741282         -0.235000         1.000000
flipper_length_mm  0.850819          0.655858        -0.583832
body_mass_g        0.747547          0.594925        -0.471942
sex                0.009174          0.321617         0.353771
island_0           0.610710          0.238628        -0.630421
island_1          -0.311589          0.033525         0.455266
island_2          -0.434574         -0.377934         0.269497

                   flipper_length_mm  body_mass_g       sex  island_0  \
species                     0.850819     0.747547  0.009174  0.610710
culmen_length_mm            0.655858     0.594925  0.321617  0.238628
culmen_depth_mm            -0.583832    -0.471942  0.353771 -0.630421
flipper_length_mm           1.000000     0.871221  0.245076  0.609679
body_mass_g                 0.871221     1.000000  0.409140  0.625432
sex                         0.245076     0.409140  1.000000  0.006494
island_0                    0.609679     0.625432  0.006494  1.000000
island_1                   -0.419241    -0.458774 -0.009719 -0.733496
island_2                   -0.288840    -0.257834  0.003965 -0.412295

                   island_1  island_2
species           -0.311589 -0.434574
culmen_length_mm   0.033525 -0.377934
culmen_depth_mm    0.455266  0.269497
flipper_length_mm -0.419241 -0.288840
body_mass_g       -0.458774 -0.257834
sex               -0.009719  0.003965
island_0          -0.733496 -0.412295
island_1           1.000000 -0.316818
island_2          -0.316818  1.000000
```

```
plt.figure(figsize=(10,8))
sns.heatmap(df_main.corr(),annot =True)
```

```
<Axes: >
```




```
y = df_main['species']
y
```

```
0      0
1      0
2      0
3      0
4      0
      ..
339    2
340    2
341    2
342    2
343    2
Name: species, Length: 344, dtype: int64
```

```
X =df_main.drop(columns =['species'],axis =1)
X.head()
```

```
   culmen_length_mm  culmen_depth_mm  flipper_length_mm  body_mass_g  sex  \
0              39.10             18.7              181.0       3750.0    1
```

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

   island_0  island_1  island_2
0         0         0         1
1         0         0         1
2         0         0         1
3         0         0         1
4         0         0         1
```

```
from sklearn.preprocessing import MinMaxScaler
scale =MinMaxScaler()


X_scaled= pd.DataFrame(scale.fit_transform(X),columns =X.columns)
X_scaled.head()
```

```
   culmen_length_mm  culmen_depth_mm  flipper_length_mm  body_mass_g  sex  \
0          0.254545         0.666667           0.152542     0.291667  1.0
1          0.269091         0.511905           0.237288     0.305556  0.0
2          0.298182         0.583333           0.389831     0.152778  0.0
3          0.449091         0.500000           0.423729     0.375000  0.0
4          0.167273         0.738095           0.355932     0.208333  0.0

   island_0  island_1  island_2
0       0.0       0.0       1.0
1       0.0       0.0       1.0
2       0.0       0.0       1.0
3       0.0       0.0       1.0
4       0.0       0.0       1.0
```

```
from sklearn.model_selection import train_test_split
X_train,X_test,y_train,y_test =
train_test_split(X_scaled,y,test_size=0.3,random_state=10)


X_train.shape
```

```
(240, 8)
```

```
X_train.head()
```

```
     culmen_length_mm  culmen_depth_mm  flipper_length_mm  body_mass_g  sex
\
258          0.432727         0.059524           0.610169     0.458333  0.0
332          0.414545         0.250000           0.694915     0.541667  0.0
121          0.203636         0.797619           0.440678     0.222222  1.0
```

```
61           0.334545         0.952381           0.389831     0.472222  1.0
70           0.050909         0.702381           0.305085     0.250000  0.0

     island_0  island_1  island_2
258       1.0       0.0       0.0
332       1.0       0.0       0.0
121       0.0       0.0       1.0
61        1.0       0.0       0.0
70        0.0       0.0       1.0
```

```
y_train.shape
```

```
(240,)
```

```
X_test.shape
```

```
(104, 8)
```