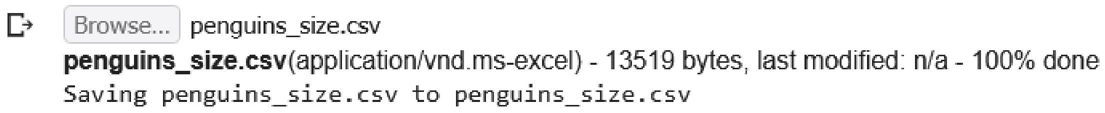
Assignment-3

Name: K Naga Sai Krishna

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
```

```
from google.colab import files
uploaded = files.upload()
```

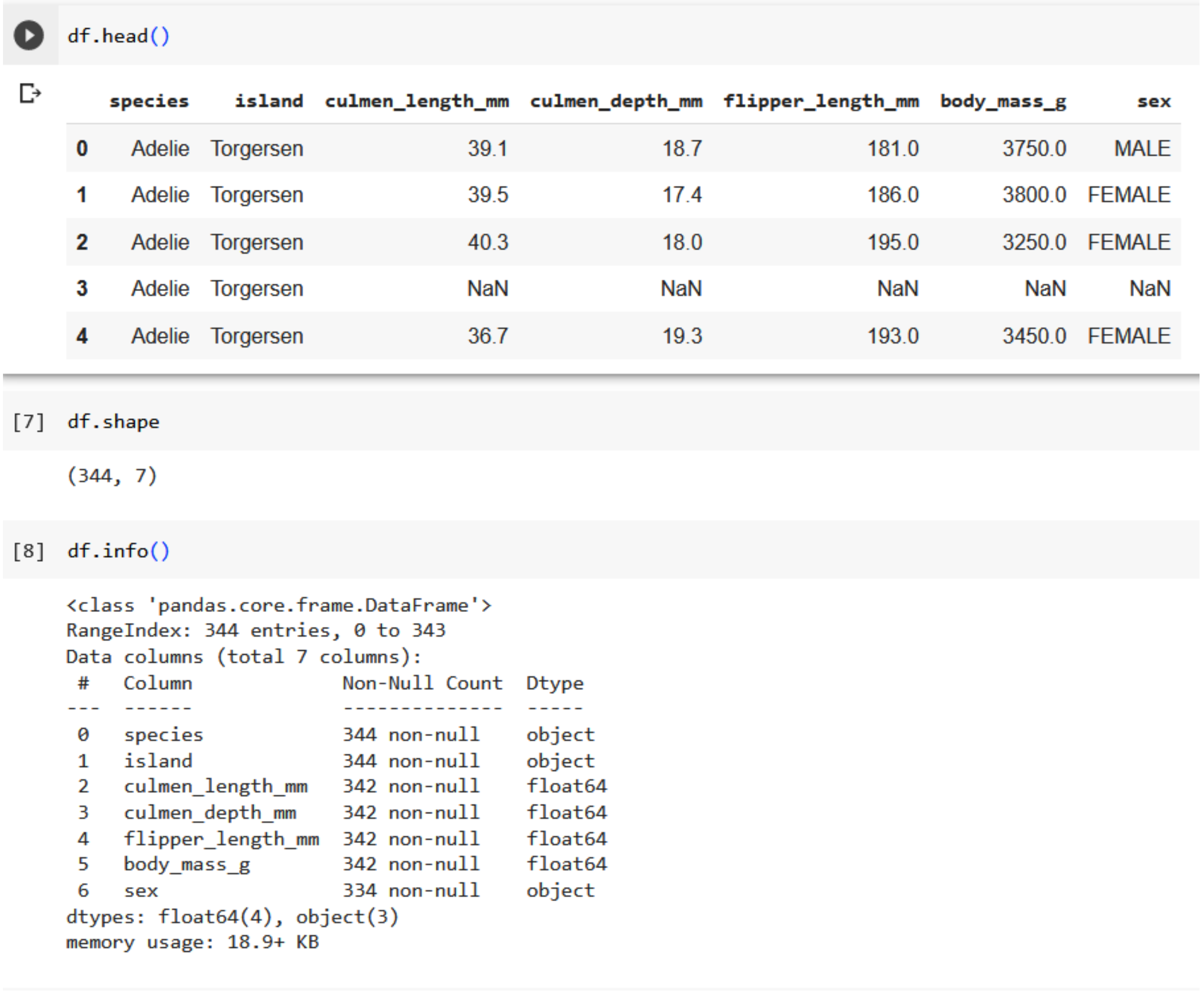


penguins_size.csv

penguins_size.csv(application/vnd.ms-excel) - 13519 bytes, last modified: n/a - 100% done

```
Saving penguins_size.csv to penguins_size.csv
```

```
import io
df = pd.read_csv(io.BytesIO(uploaded['penguins_size.csv']))
```



```
df.head()
```

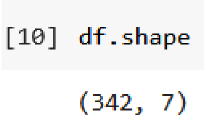
	species	island	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g	sex
0	Adelie	Torgersen	39.1	18.7	181.0	3750.0	MALE
1	Adelie	Torgersen	39.5	17.4	186.0	3800.0	FEMALE
2	Adelie	Torgersen	40.3	18.0	195.0	3250.0	FEMALE
3	Adelie	Torgersen	NaN	NaN	NaN	NaN	NaN
4	Adelie	Torgersen	36.7	19.3	193.0	3450.0	FEMALE

```
[7] df.shape

    (344, 7)
```

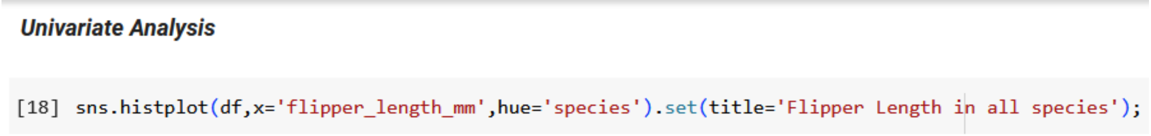
```
[8] df.info()

    <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
```

Droping the columns that have NaN in 1 to 5 Columns

```
df.dropna(subset=df.columns[:6],inplace=True)
```

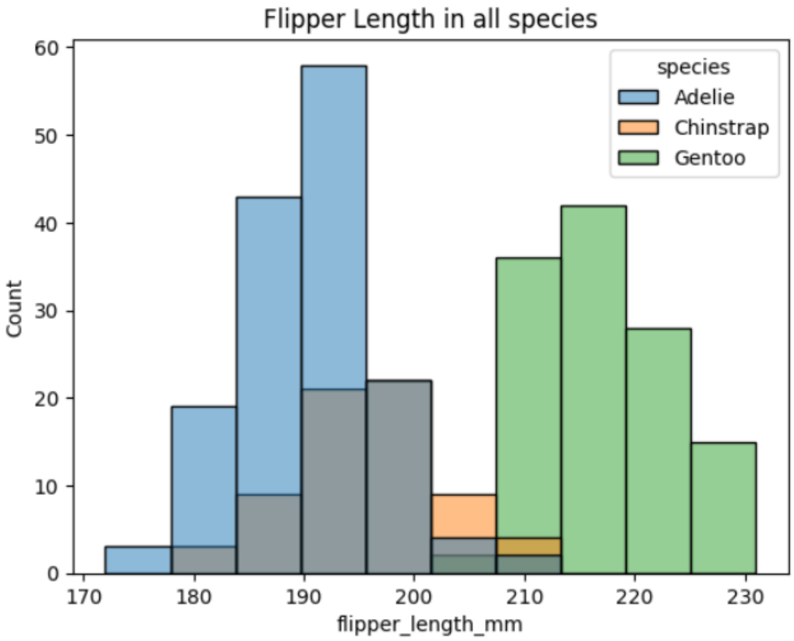


```
[10] df.shape

     (342, 7)
```

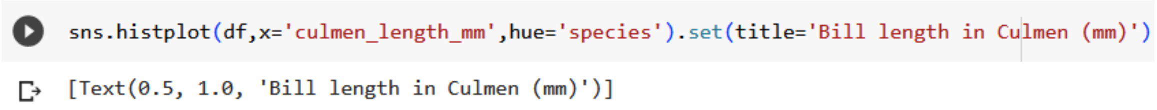


Univariate Analysis

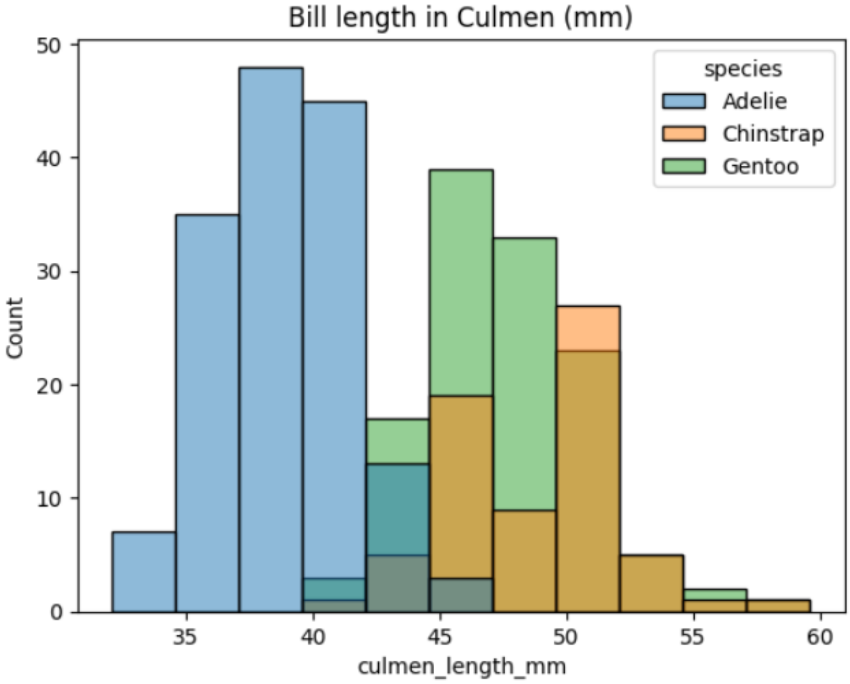
```
[18] sns.histplot(df,x='flipper_length_mm',hue='species').set(title='Flipper Length in all species');
```



Flipper Length in all species



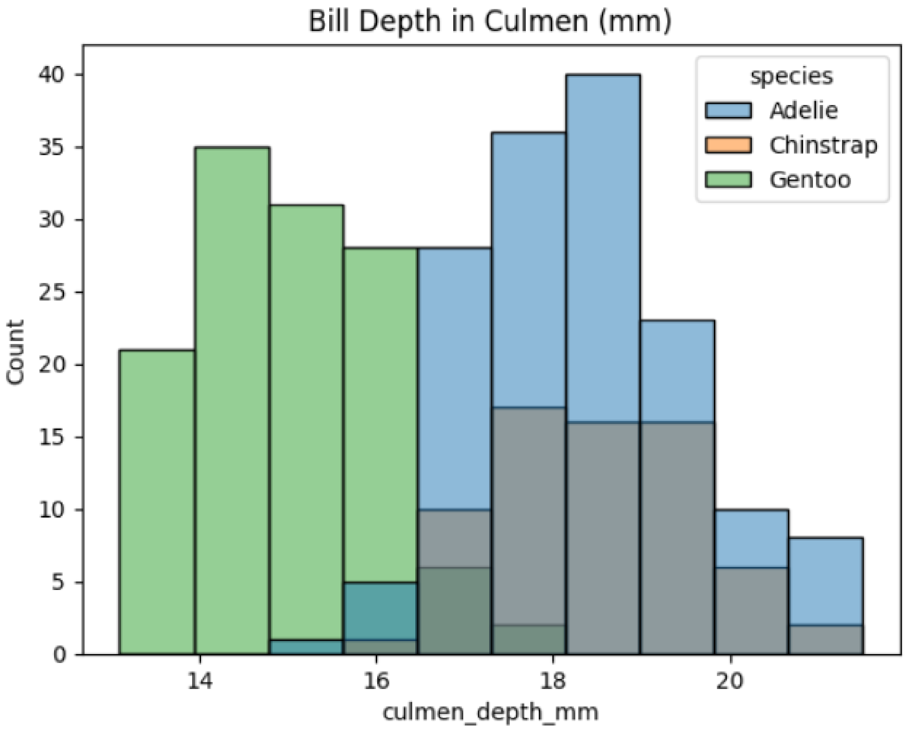
```
sns.histplot(df,x='culmen_length_mm',hue='species').set(title='Bill length in Culmen (mm)')

[Text(0.5, 1.0, 'Bill length in Culmen (mm)')]
```



Bill length in Culmen (mm)

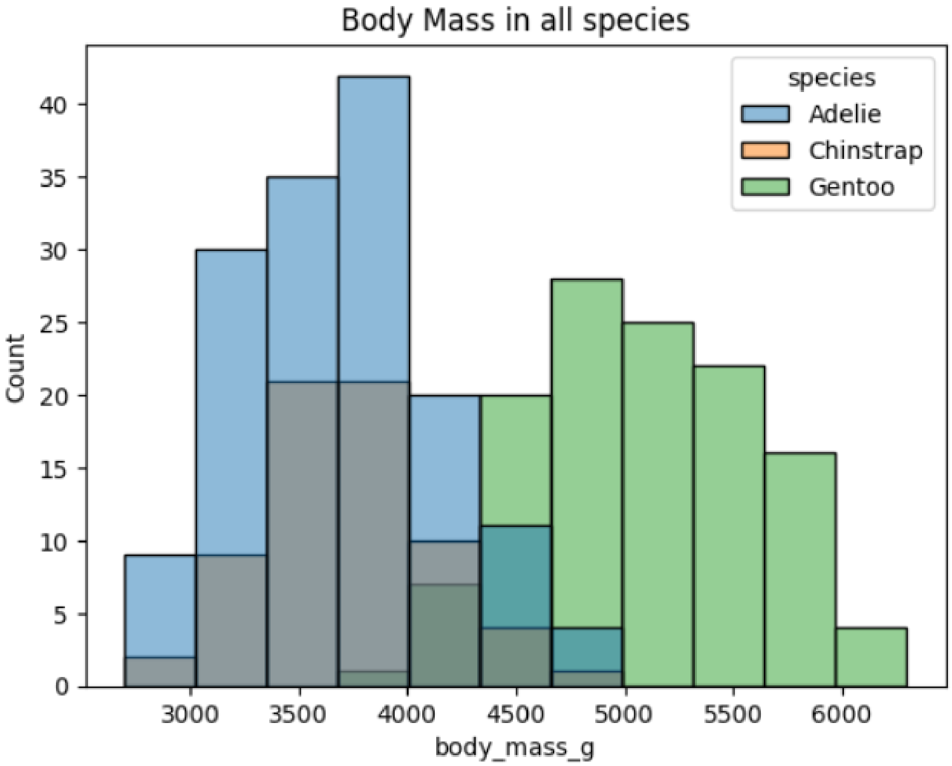
```
[20] sns.histplot(df,x='culmen_depth_mm',hue='species').set(title='Bill Depth in Culmen (mm)')
```

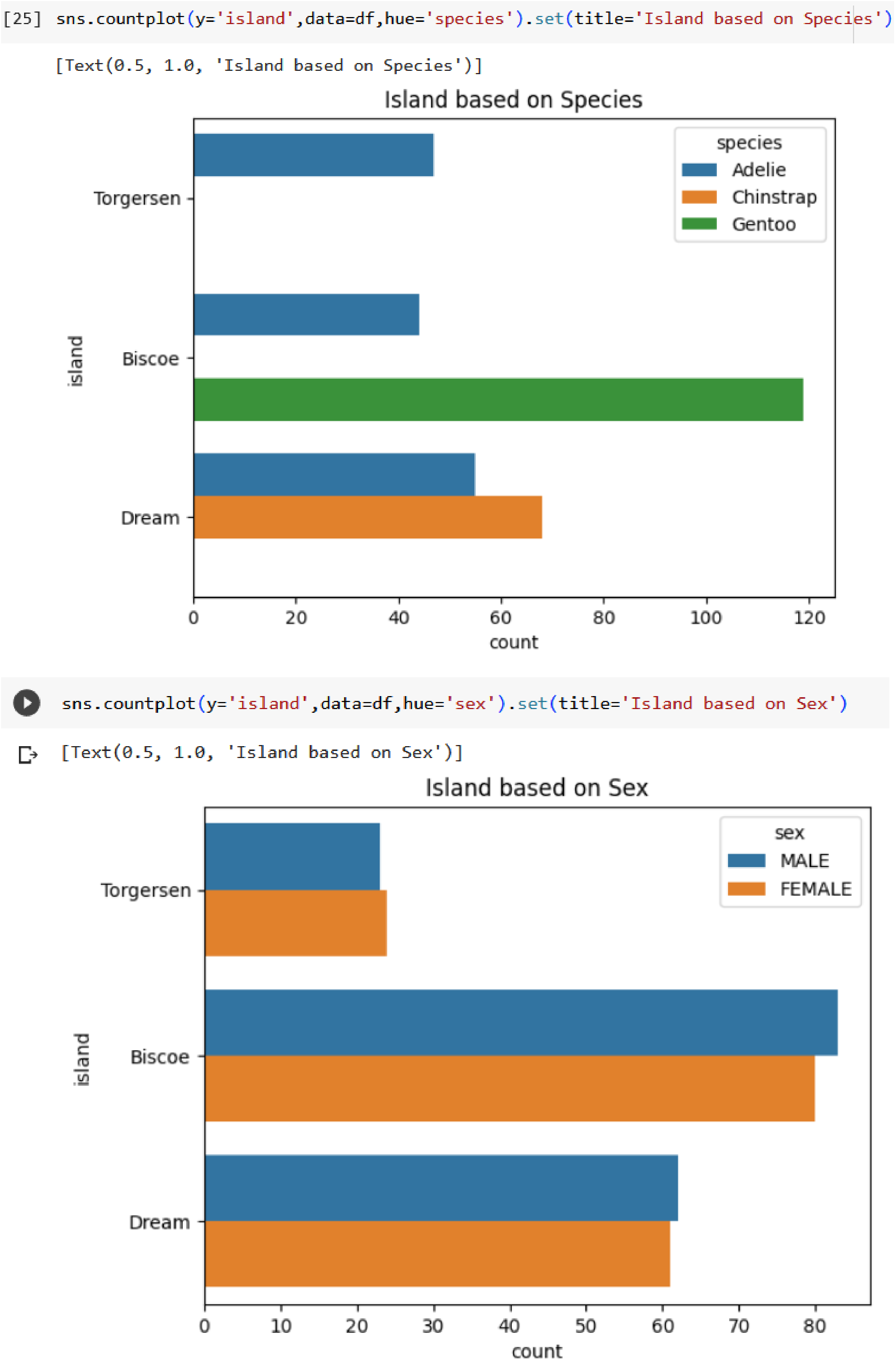
```
[Text(0.5, 1.0, 'Bill Depth in Culmen (mm)')]
```



```
[21] sns.histplot(df,x='body_mass_g',hue='species').set(title='Body Mass in all species')
```

```
[Text(0.5, 1.0, 'Body Mass in all species')]
```





```
[25] sns.countplot(y='island',data=df,hue='species').set(title='Island based on Species')
```

```
[Text(0.5, 1.0, 'Island based on Species')]
```

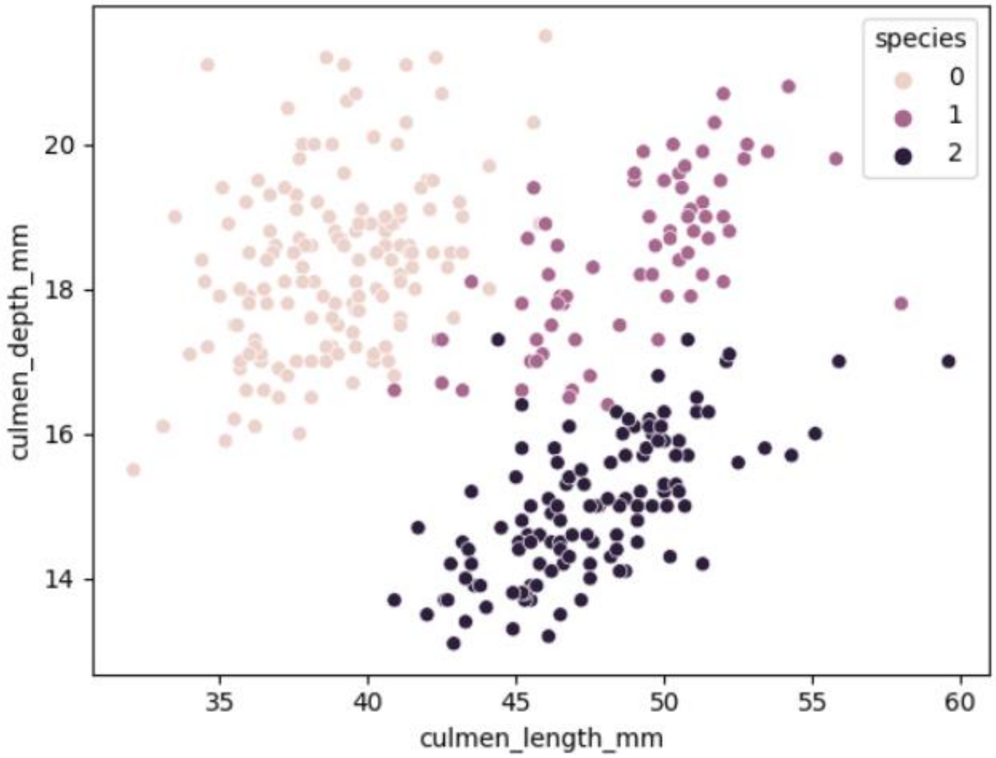
```
sns.countplot(y='island',data=df,hue='sex').set(title='Island based on Sex')
```

```
[Text(0.5, 1.0, 'Island based on Sex')]
```

Bivariate Analysis

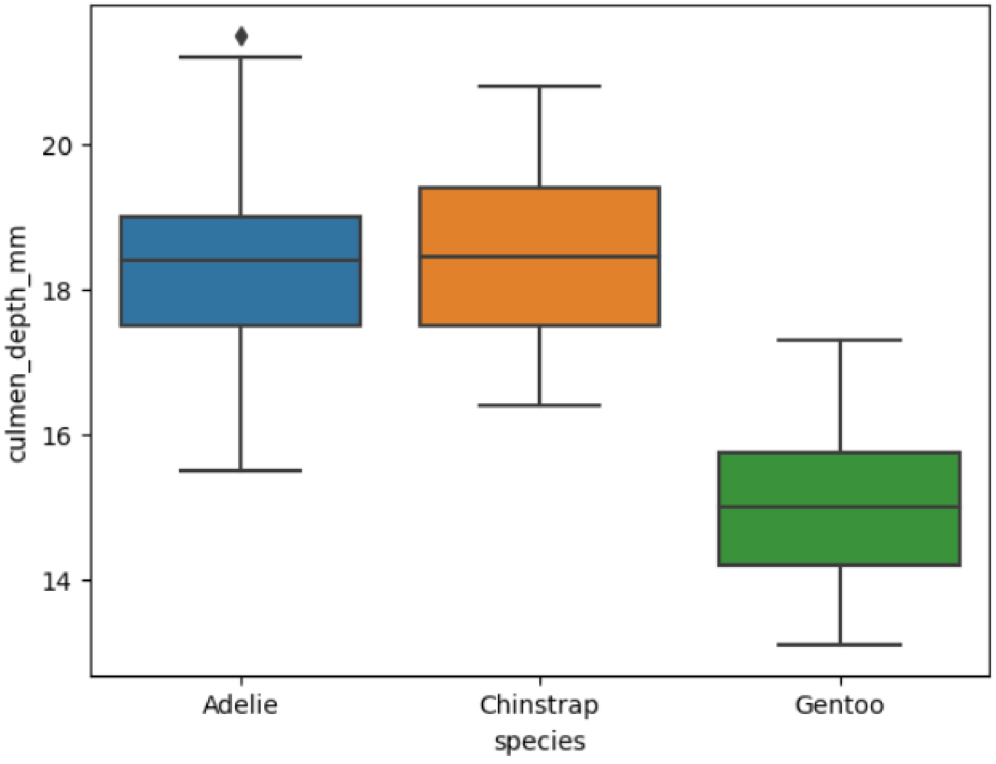
```
[76] sns.scatterplot(data=df,x='culmen_length_mm',y='culmen_depth_mm',hue='species')
```

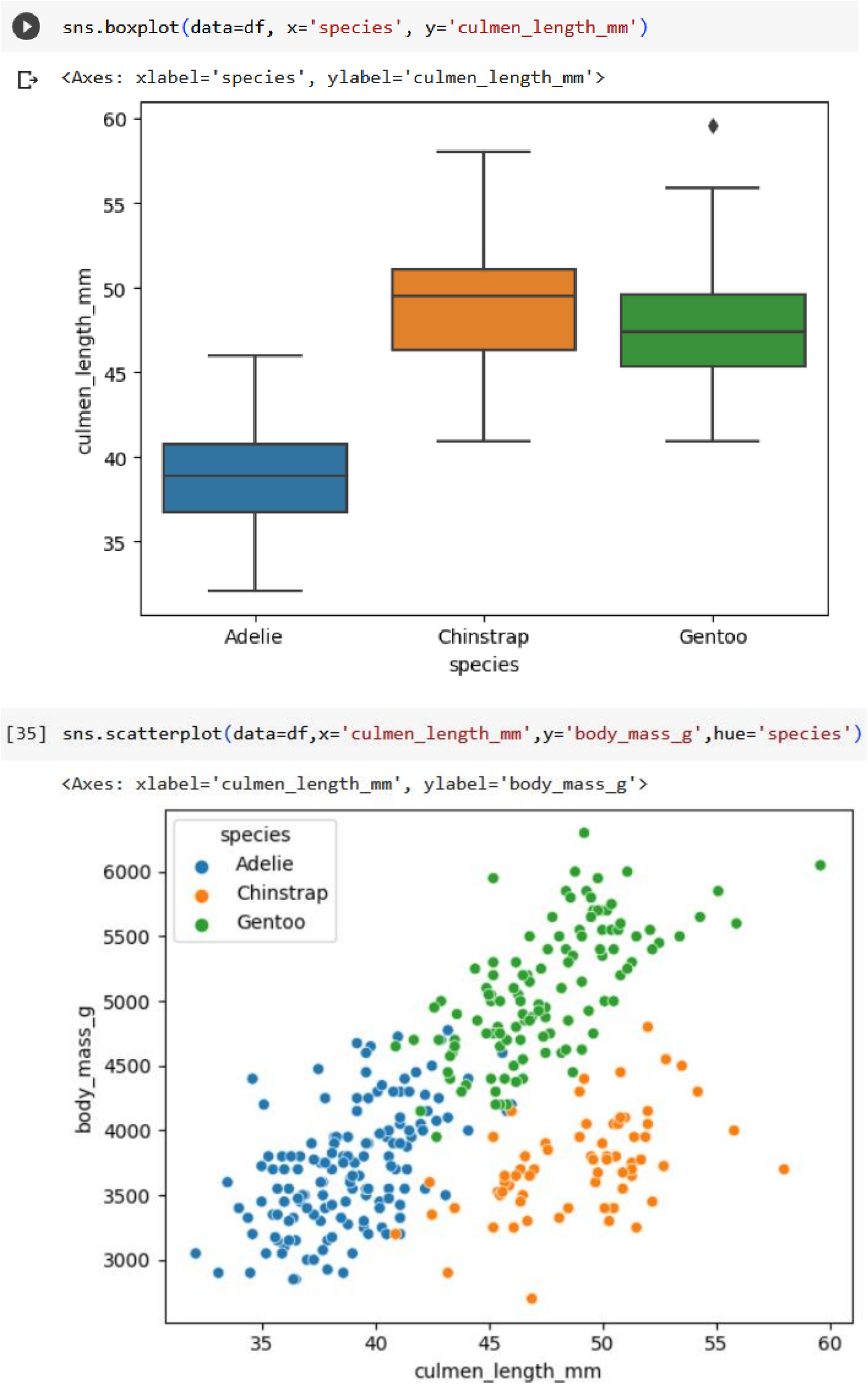
```
<Axes: xlabel='culmen_length_mm', ylabel='culmen_depth_mm'>
```



```
sns.boxplot(data=df, x='species', y='culmen_depth_mm')
```

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





```
sns.boxplot(data=df, x='species', y='culmen_length_mm')
```

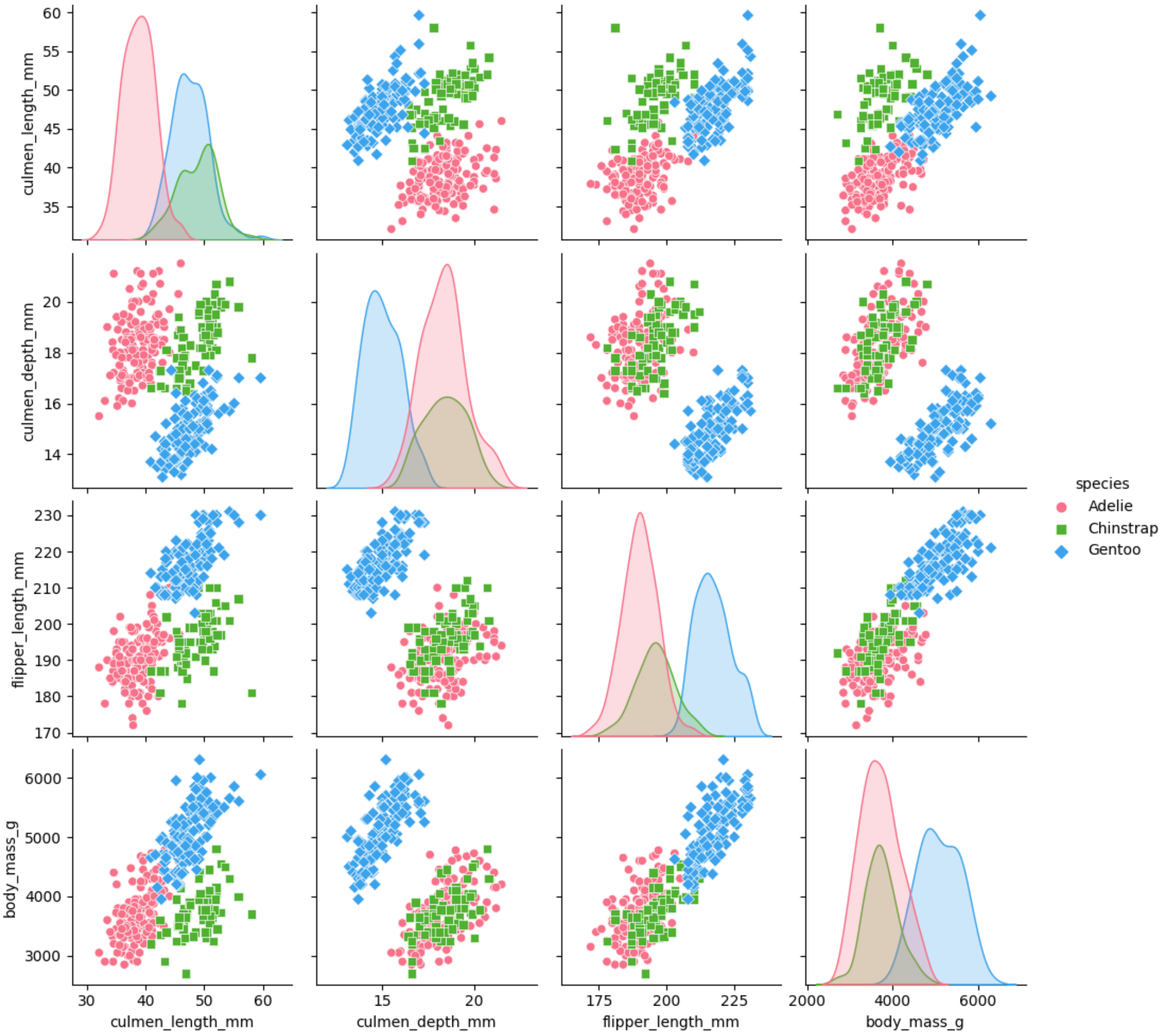
```
<Axes: xlabel='species', ylabel='culmen_length_mm'>
```

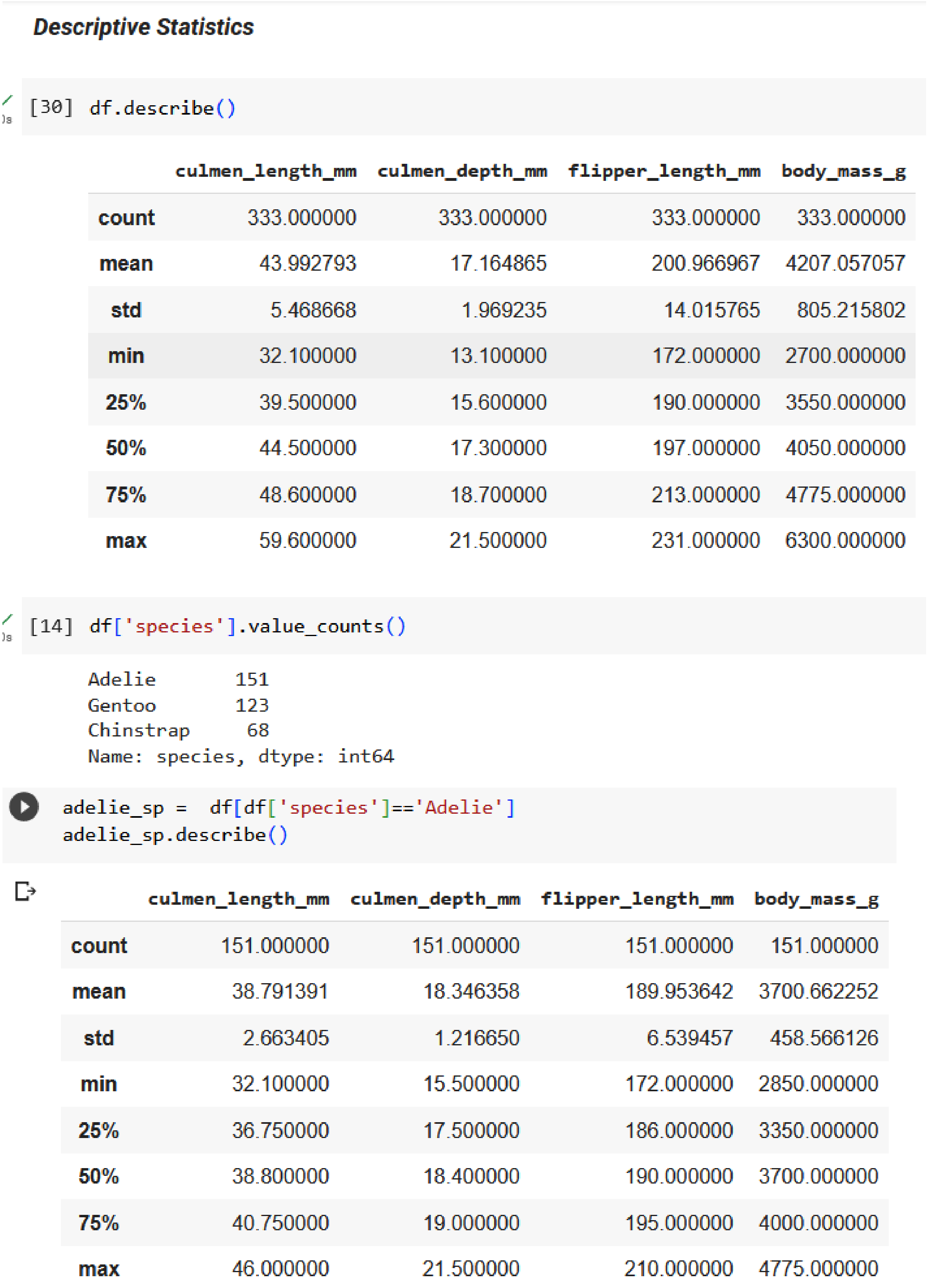
```
[35] sns.scatterplot(data=df,x='culmen_length_mm',y='body_mass_g',hue='species')
```

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

Multivariate Analysis

```
sns.pairplot(df,hue='species',palette='husl',markers=['o','s','D']);
```





Descriptive Statistics

```
[30] df.describe()
```

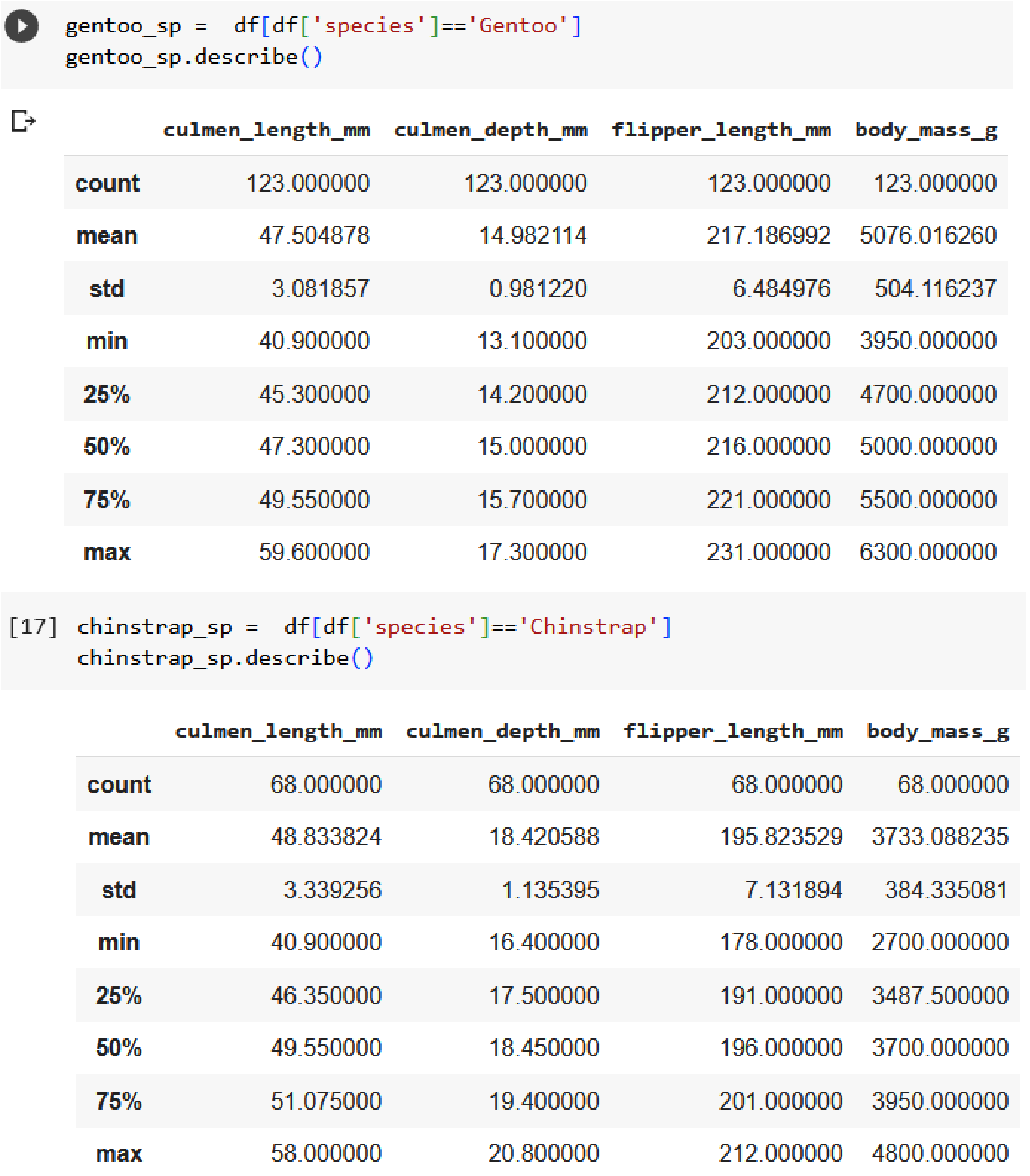
	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g
count	333.000000	333.000000	333.000000	333.000000
mean	43.992793	17.164865	200.966967	4207.057057
std	5.468668	1.969235	14.015765	805.215802
min	32.100000	13.100000	172.000000	2700.000000
25%	39.500000	15.600000	190.000000	3550.000000
50%	44.500000	17.300000	197.000000	4050.000000
75%	48.600000	18.700000	213.000000	4775.000000
max	59.600000	21.500000	231.000000	6300.000000

```
[14] df['species'].value_counts()
```

```
Adelie       151
Gentoo       123
Chinstrap     68
Name: species, dtype: int64
```

```
adelie_sp =  df[df['species']=='Adelie']
adelie_sp.describe()
```

	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g
count	151.000000	151.000000	151.000000	151.000000
mean	38.791391	18.346358	189.953642	3700.662252
std	2.663405	1.216650	6.539457	458.566126
min	32.100000	15.500000	172.000000	2850.000000
25%	36.750000	17.500000	186.000000	3350.000000
50%	38.800000	18.400000	190.000000	3700.000000
75%	40.750000	19.000000	195.000000	4000.000000
max	46.000000	21.500000	210.000000	4775.000000

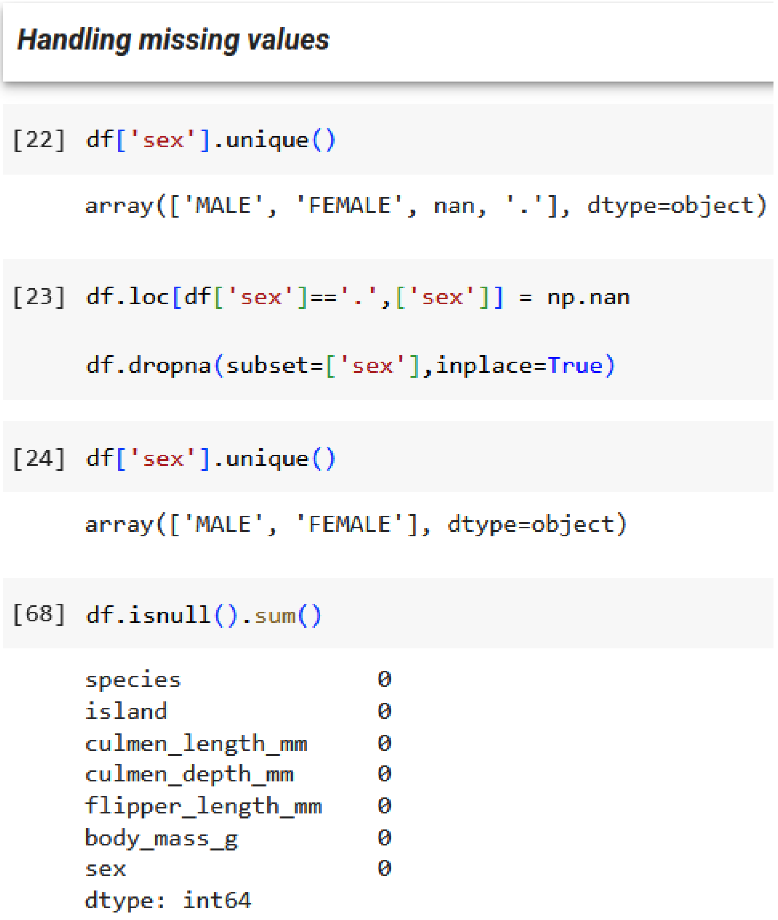


```
gentoo_sp =  df[df['species']=='Gentoo']
gentoo_sp.describe()
```

	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g
count	123.000000	123.000000	123.000000	123.000000
mean	47.504878	14.982114	217.186992	5076.016260
std	3.081857	0.981220	6.484976	504.116237
min	40.900000	13.100000	203.000000	3950.000000
25%	45.300000	14.200000	212.000000	4700.000000
50%	47.300000	15.000000	216.000000	5000.000000
75%	49.550000	15.700000	221.000000	5500.000000
max	59.600000	17.300000	231.000000	6300.000000

```
[17] chinstrap_sp =  df[df['species']=='Chinstrap']
     chinstrap_sp.describe()
```

	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g
count	68.000000	68.000000	68.000000	68.000000
mean	48.833824	18.420588	195.823529	3733.088235
std	3.339256	1.135395	7.131894	384.335081
min	40.900000	16.400000	178.000000	2700.000000
25%	46.350000	17.500000	191.000000	3487.500000
50%	49.550000	18.450000	196.000000	3700.000000
75%	51.075000	19.400000	201.000000	3950.000000
max	58.000000	20.800000	212.000000	4800.000000



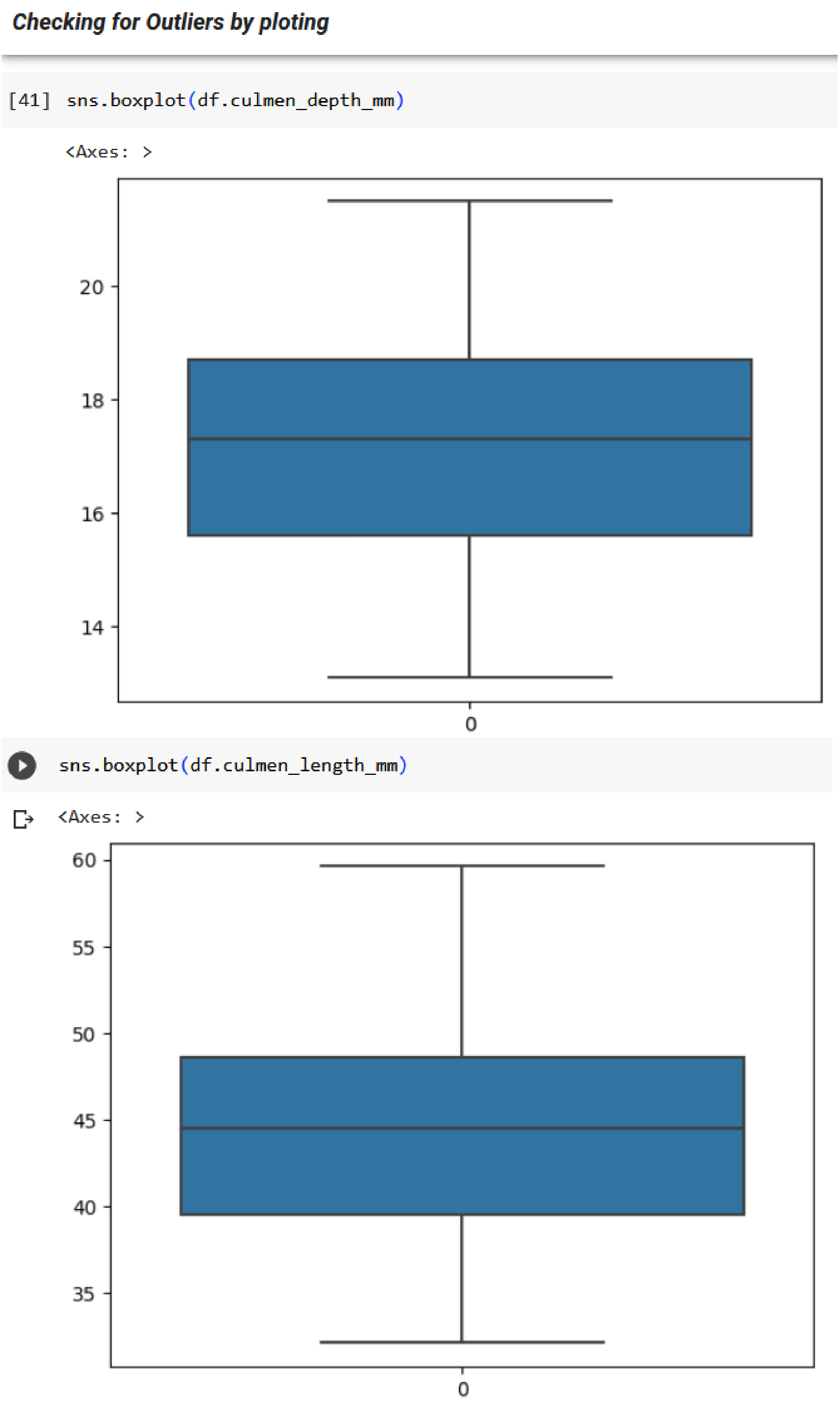
Handling missing values

```
[22] df['sex'].unique()

     array(['MALE', 'FEMALE', nan, '.'], dtype=object)
```

```
[23] df.loc[df['sex']=='.',['sex']] = np.nan

     df.dropna(subset=['sex'],inplace=True)
```

```
[24] df['sex'].unique()

     array(['MALE', 'FEMALE'], dtype=object)
```

```
[68] 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
```



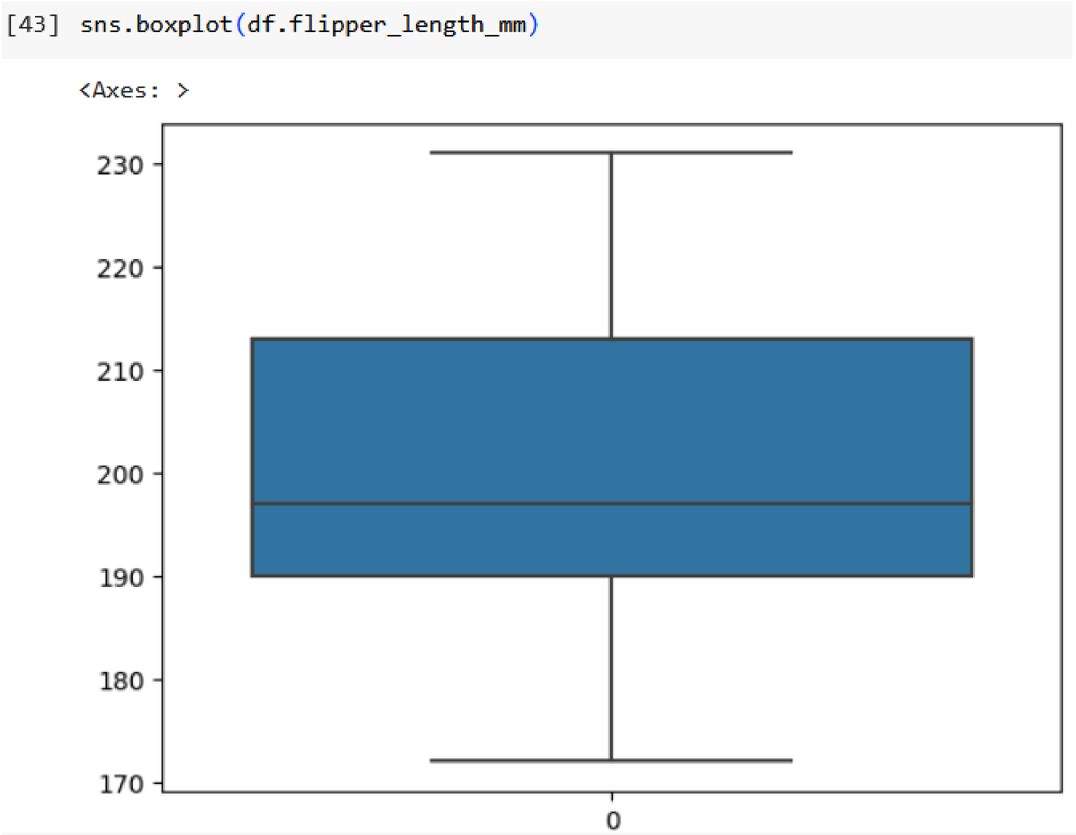
Checking for Outliers by ploting

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

```
<Axes: >
```

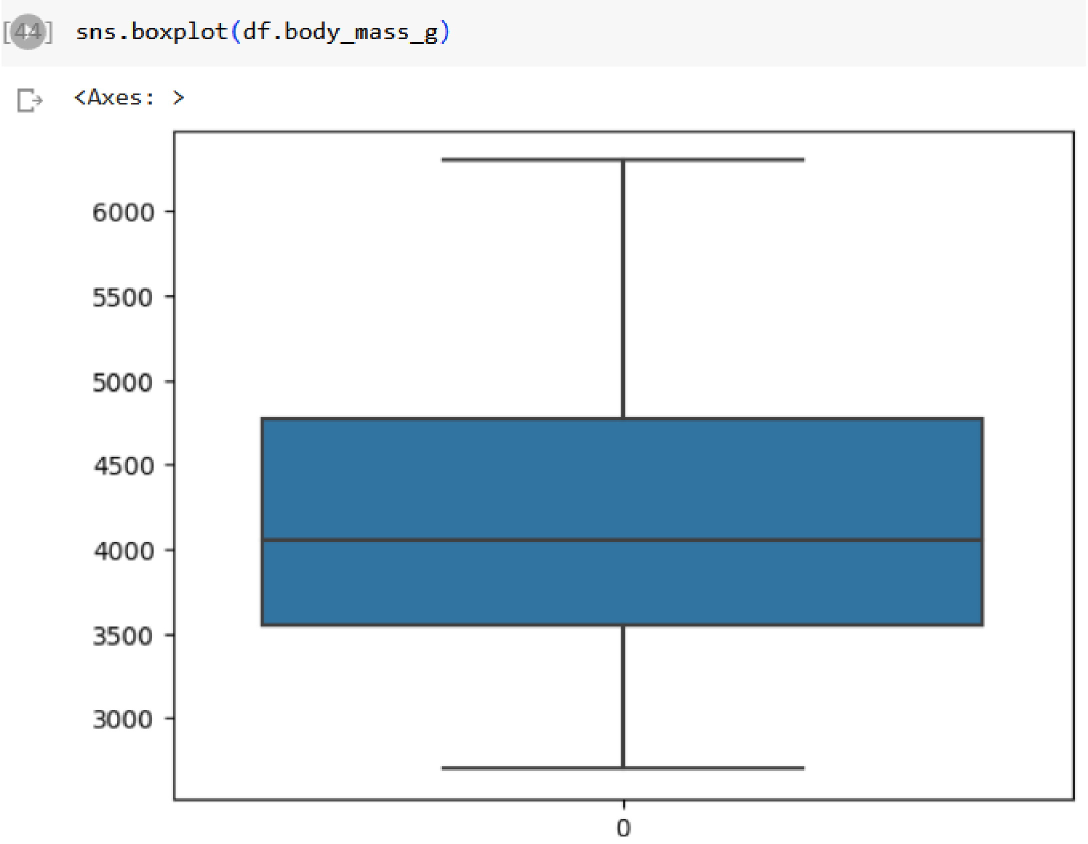
```
sns.boxplot(df.culmen_length_mm)
```

```
<Axes: >
```



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

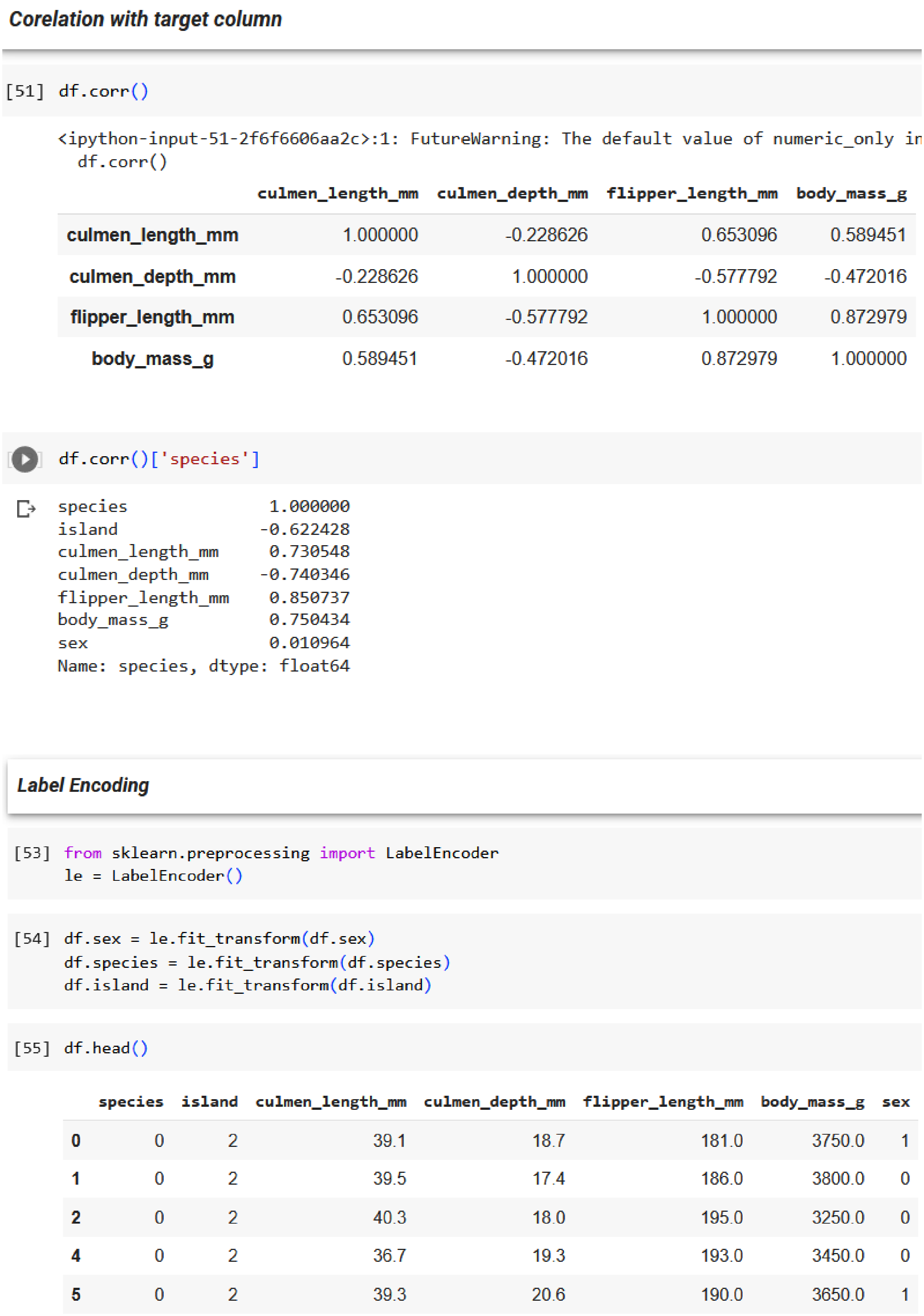
```
<Axes: >
```



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

```
<Axes: >
```

No outliers were found



Corelation with target column

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

```
<ipython-input-51-2f6f6606aa2c>:1: FutureWarning: The default value of numeric_only in
  df.corr()
```

	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g
culmen_length_mm	1.000000	-0.228626	0.653096	0.589451
culmen_depth_mm	-0.228626	1.000000	-0.577792	-0.472016
flipper_length_mm	0.653096	-0.577792	1.000000	0.872979
body_mass_g	0.589451	-0.472016	0.872979	1.000000

```
df.corr()['species']
```

```
species              1.000000
island              -0.622428
culmen_length_mm     0.730548
culmen_depth_mm     -0.740346
flipper_length_mm    0.850737
body_mass_g          0.750434
sex                  0.010964
Name: species, dtype: float64
```

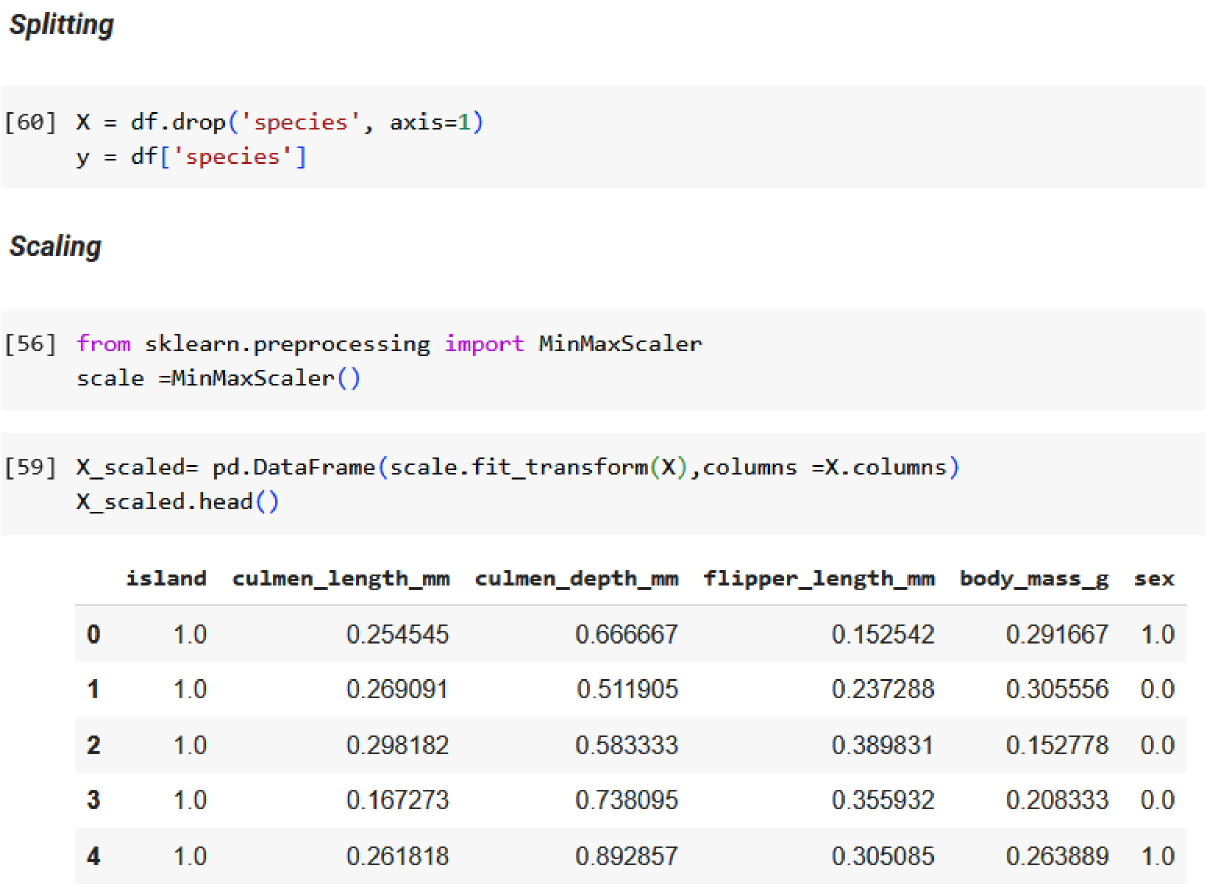
Label Encoding

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

```
[54] df.sex = le.fit_transform(df.sex)
     df.species = le.fit_transform(df.species)
     df.island = le.fit_transform(df.island)
```

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

	species	island	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g	sex
0	0	2	39.1	18.7	181.0	3750.0	1
1	0	2	39.5	17.4	186.0	3800.0	0
2	0	2	40.3	18.0	195.0	3250.0	0
4	0	2	36.7	19.3	193.0	3450.0	0
5	0	2	39.3	20.6	190.0	3650.0	1



Splitting

```
[60] X = df.drop('species', axis=1)
     y = df['species']
```

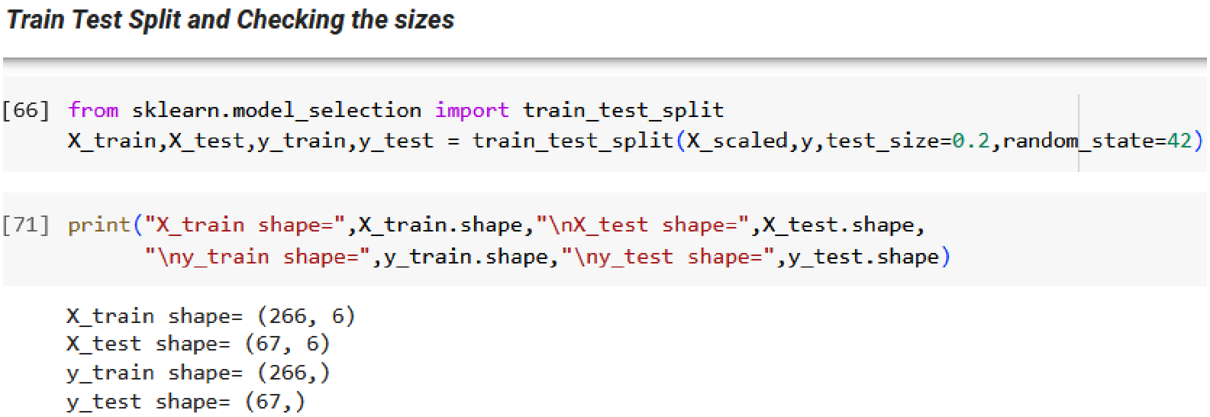
Scaling

```
[56] from sklearn.preprocessing import MinMaxScaler
     scale =MinMaxScaler()
```

```
[59] 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	0.0
2	1.0	0.298182	0.583333	0.389831	0.152778	0.0
3	1.0	0.167273	0.738095	0.355932	0.208333	0.0
4	1.0	0.261818	0.892857	0.305085	0.263889	1.0

s



Train Test Split and Checking the sizes

```
[66] 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=42)
```

```
[71] print("X_train shape=",X_train.shape,"\nX_test shape=",X_test.shape,
           "\ny_train shape=",y_train.shape,"\ny_test shape=",y_test.shape)
```

```
X_train shape= (266, 6)
X_test shape= (67, 6)
y_train shape= (266,)
y_test shape= (67,)
```