In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
warnings.filterwarnings("ignore")
```

In [2]:
```
df=pd.read_csv("penguins_size.csv")
```

In [3]:
```
df
```

Out[3]:

	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

CHECKING ROWS AND COLUMNS AND DESCRIPTIVE STATISTICS

In [4]:
```
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
```

In [5]:
```
df.describe()
```

Out[5]:

	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

CHECKING ALL COLUMNS AND THEIR MISSING VALUES

In [6]:
```
df.isnull().sum()
```

Out[6]:
```
species              0
island               0
culmen_length_mm     2
culmen_depth_mm      2
flipper_length_mm    2
body_mass_g          2
sex                 10
dtype: int64
```

EXPLORATERY DATA ANALYSIS(EDA)

FILLING AND DROPING missing value rows as per the Rule

In [7]:
```
from sklearn.impute import SimpleImputer
```

In [8]:
```
si=SimpleImputer(missing_values=np.nan,strategy="most_frequent")
df["sex"]=si.fit_transform(df[["sex"]])
```

In [9]:
```
df.dropna(inplace=True)
```

In [10]:
```
df
```

Out[10]:

	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
4	Adelie	Torgersen	36.7	19.3	193.0	3450.0	FEMALE
5	Adelie	Torgersen	39.3	20.6	190.0	3650.0	MALE
...	...	...	...	...	...	...	...
338	Gentoo	Biscoe	47.2	13.7	214.0	4925.0	FEMALE
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

342 rows × 7 columns

In [11]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 342 entries, 0 to 343
Data columns (total 7 columns):
 #   Column             Non-Null Count  Dtype  
---  ------             --------------  -----  
 0   species            342 non-null    object 
 1   island             342 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                342 non-null    object 
dtypes: float64(4), object(3)
memory usage: 21.4+ KB
```

CHECKING CORELATION AND OUTLIERS

In [12]:
```
df.corr()
```

Out[12]:

	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g
culmen_length_mm	1.000000	-0.235053	0.656181	0.595110
culmen_depth_mm	-0.235053	1.000000	-0.583851	-0.471916
flipper_length_mm	0.656181	-0.583851	1.000000	0.871202
body_mass_g	0.595110	-0.471916	0.871202	1.000000

In [13]:
```
df.describe()
```

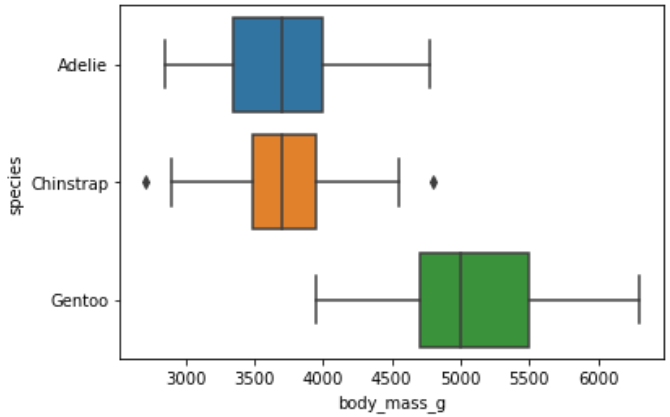
Out[13]:

	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

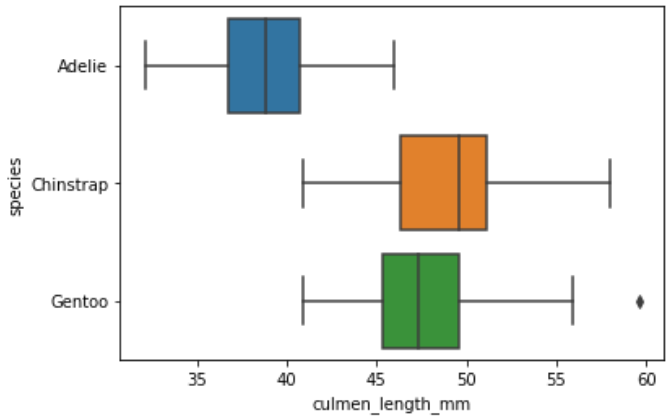
PLOTING BOX PLOT FOR DETECTING OUTLIERS

Outliers : outliers are the unusual datapoints we drop them

In [14]:
```
sns.boxplot(data=df,x=df["body_mass_g"],y=df["species"])
plt.show()
```



In [15]:
```
sns.boxplot(data=df,x=df["culmen_length_mm"],y=df["species"])
plt.show()
```



FOR CULMEN_LENGHT_MM

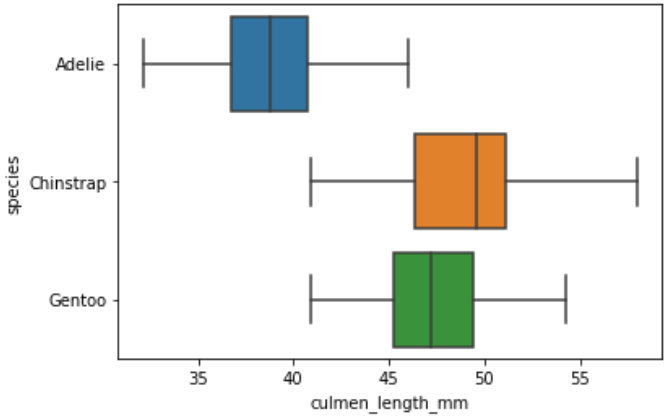
In [16]:
```
df[(df["species"]=="Gentoo")&(df["culmen_length_mm"]>55)]
```

Out[16]:

	species	island	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g	sex
253	Gentoo	Biscoe	59.6	17.0	230.0	6050.0	MALE
321	Gentoo	Biscoe	55.9	17.0	228.0	5600.0	MALE
335	Gentoo	Biscoe	55.1	16.0	230.0	5850.0	MALE

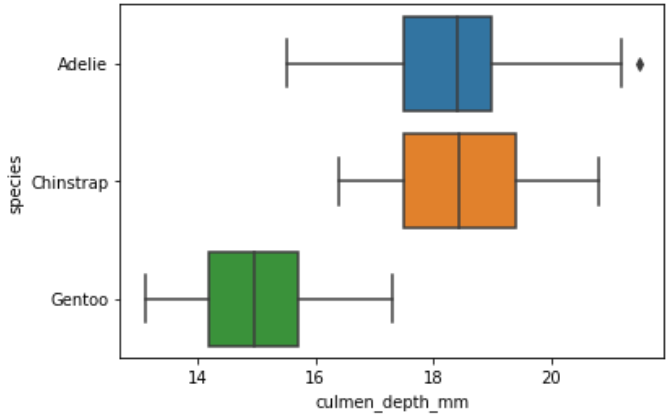
In [17]:
```
df.drop([253,321,335],inplace=True)
```

In [18]:
```
sns.boxplot(data=df,x=df["culmen_length_mm"],y=df["species"])
plt.show()
```



FOR culmen_depth_mm

In [19]:
```
sns.boxplot(data=df,x=df["culmen_depth_mm"],y=df["species"])
plt.show()
```



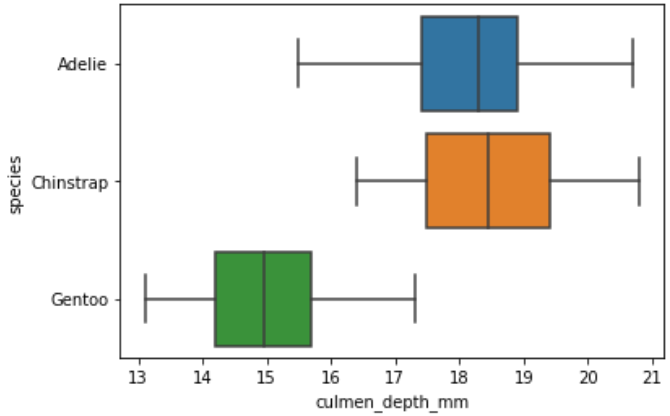
In [20]:
```
df[(df["species"]=="Adelie")&(df["culmen_depth_mm"]>21)]
```

Out[20]:

	species	island	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g	sex
13	Adelie	Torgersen	38.6	21.2	191.0	3800.0	MALE
14	Adelie	Torgersen	34.6	21.1	198.0	4400.0	MALE
19	Adelie	Torgersen	46.0	21.5	194.0	4200.0	MALE
35	Adelie	Dream	39.2	21.1	196.0	4150.0	MALE
49	Adelie	Dream	42.3	21.2	191.0	4150.0	MALE
61	Adelie	Biscoe	41.3	21.1	195.0	4400.0	MALE

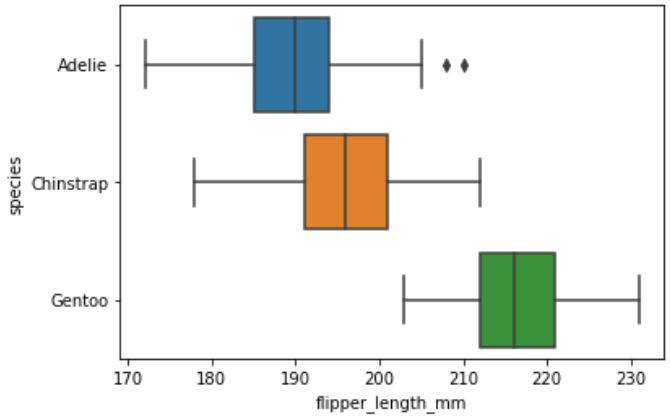
In [21]:
```
df.drop([13,14,19,35,49,61],inplace=True)
```

In [22]:
```
sns.boxplot(data=df,x=df["culmen_depth_mm"],y=df["species"])
plt.show()
```



for flipper_length_mm

In [23]:
```
sns.boxplot(data=df,x=df["flipper_length_mm"],y=df["species"])
plt.show()
```



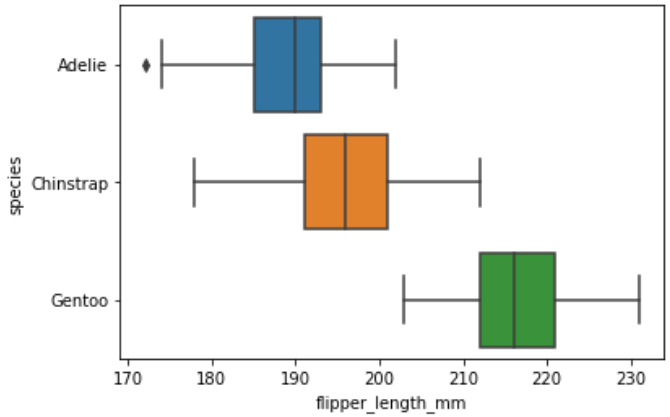
In [24]:
```
df[(df["species"]=="Adelie")&(df["flipper_length_mm"]>202)]
```

Out[24]:

	species	island	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g	sex
91	Adelie	Dream	41.1	18.1	205.0	4300.0	MALE
95	Adelie	Dream	40.8	18.9	208.0	4300.0	MALE
101	Adelie	Biscoe	41.0	20.0	203.0	4725.0	MALE
129	Adelie	Torgersen	44.1	18.0	210.0	4000.0	MALE

In [25]:
```
df.drop([91,95,101,129],inplace=True)
```

In [26]:
```
sns.boxplot(data=df,x=df["flipper_length_mm"],y=df["species"])
plt.show()
```



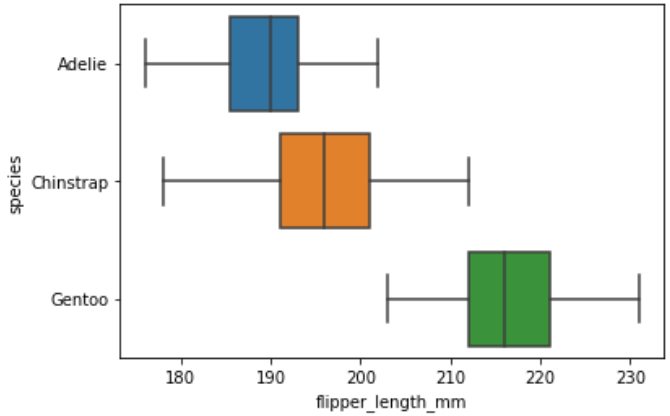
In [27]:
```
df[(df["species"]=="Adelie")&(df["flipper_length_mm"]<175)]
```

Out[27]:

	species	island	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g	sex
20	Adelie	Biscoe	37.8	18.3	174.0	3400.0	FEMALE
28	Adelie	Biscoe	37.9	18.6	172.0	3150.0	FEMALE

In [28]:
```
df.drop([20,28],inplace=True)
```

In [29]:
```
sns.boxplot(data=df,x=df["flipper_length_mm"],y=df["species"])
plt.show()
```



In [30]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 327 entries, 0 to 343
Data columns (total 7 columns):
 #   Column             Non-Null Count  Dtype  
---  ------             --------------  -----  
 0   species            327 non-null    object 
 1   island             327 non-null    object 
 2   culmen_length_mm   327 non-null    float64
 3   culmen_depth_mm    327 non-null    float64
 4   flipper_length_mm  327 non-null    float64
 5   body_mass_g        327 non-null    float64
 6   sex                327 non-null    object 
dtypes: float64(4), object(3)
memory usage: 28.5+ KB
```

Checking skewness

In [31]:
```
colname=df.select_dtypes("float64").columns
```

In [32]:
```
colname
```

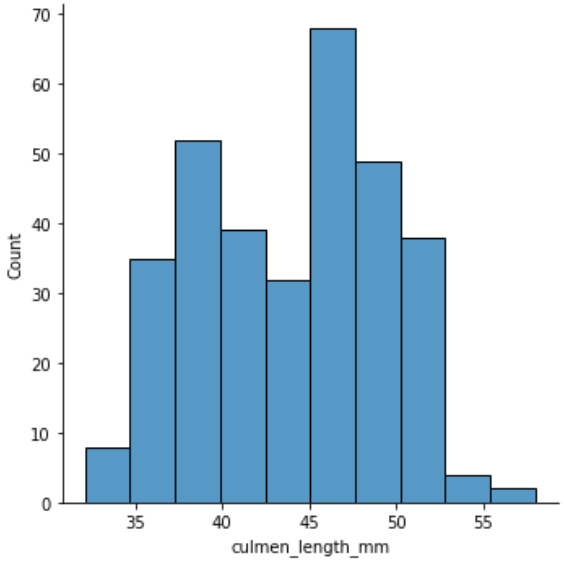
Out[32]:
```
Index(['culmen_length_mm', 'culmen_depth_mm', 'flipper_length_mm',
       'body_mass_g'],
      dtype='object')
```

In [33]:
```
from scipy.stats import skew
```

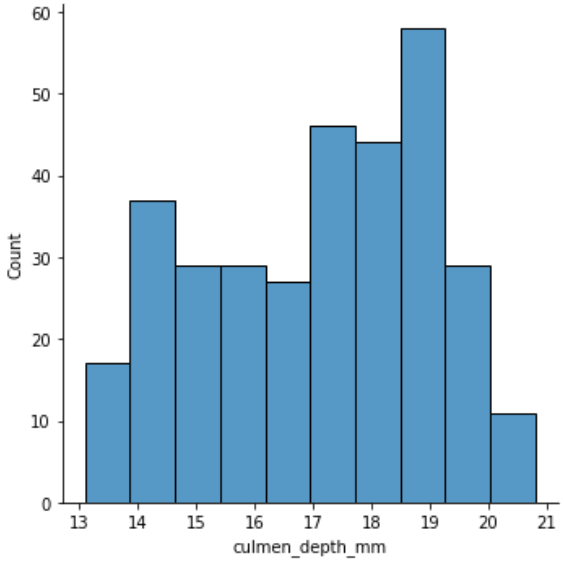
In [34]:
```
for col in df[colname]:
    print(col)
    print(skew(df[col]))

    sns.displot(df[col])
    plt.show()
```

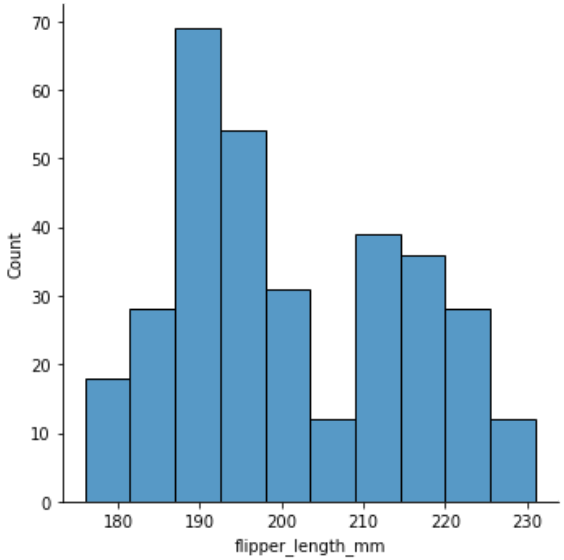
```
culmen_length_mm
-0.054334593902514015
```



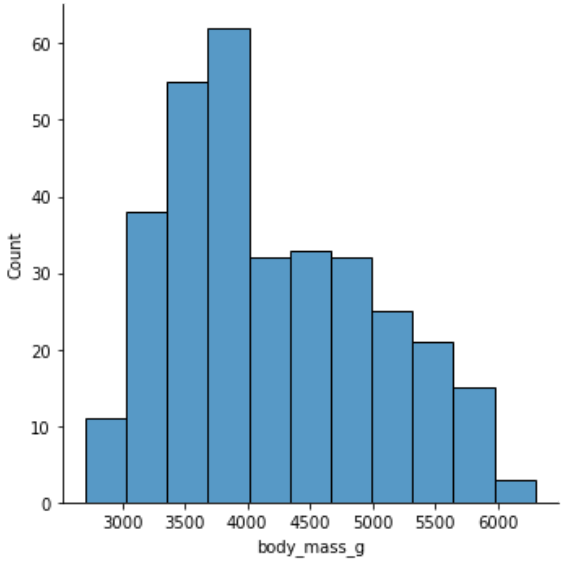

```
culmen_depth_mm
-0.19461775248220767
```




```
flipper_length_mm
0.35288548324515734
```




```
body_mass_g
0.460774564647384
```



SEPARATING X AND Y

In [35]:
```
df.head()
```

Out[35]:

	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
4	Adelie	Torgersen	36.7	19.3	193.0	3450.0	FEMALE
5	Adelie	Torgersen	39.3	20.6	190.0	3650.0	MALE

In [36]:
```
x=df.iloc[:,1:]
```

In [37]:
```
x
```

Out[37]:

	island	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g	sex
0	Torgersen	39.1	18.7	181.0	3750.0	MALE
1	Torgersen	39.5	17.4	186.0	3800.0	FEMALE
2	Torgersen	40.3	18.0	195.0	3250.0	FEMALE
4	Torgersen	36.7	19.3	193.0	3450.0	FEMALE
5	Torgersen	39.3	20.6	190.0	3650.0	MALE
...	...	...	...	...	...	...
338	Biscoe	47.2	13.7	214.0	4925.0	FEMALE
340	Biscoe	46.8	14.3	215.0	4850.0	FEMALE
341	Biscoe	50.4	15.7	222.0	5750.0	MALE
342	Biscoe	45.2	14.8	212.0	5200.0	FEMALE
343	Biscoe	49.9	16.1	213.0	5400.0	MALE

327 rows × 6 columns

In [38]:
```
y=df.iloc[:,0]
```

In [39]:
```
y
```

Out[39]:
```
0      Adelie
1      Adelie
2      Adelie
4      Adelie
5      Adelie
        ...
338    Gentoo
340    Gentoo
341    Gentoo
342    Gentoo
343    Gentoo
Name: species, Length: 327, dtype: object
```

OUR X ARE THE FEATURES AND Y IS OUR TARGET

In [40]:
```
x.head()
```

Out[40]:

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

In [41]:
```
y.head()
```

Out[41]:
```
0    Adelie
1    Adelie
2    Adelie
4    Adelie
5    Adelie
Name: species, dtype: object
```

HANDLING CATEGORICAL DATA

In [42]:
```
obj=x.select_dtypes("object").columns
```

In [43]:
```
#obj
```

In [44]:
```
from sklearn.preprocessing import OrdinalEncoder
```

In [45]:
```
oe=OrdinalEncoder()
```

In [46]:
```
x[['island','sex']]=oe.fit_transform(x[['island', 'sex']])
```

In [47]:
```
#x
```

In [48]:
```
from sklearn.preprocessing import LabelEncoder
```

In [49]:
```
le=LabelEncoder()
```

In [50]:
```
y=le.fit_transform(y)
```

In [51]:
```
y
```

Out[51]:
```
array([0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2])
```

SCALING

In [52]:
```
#x.head()
```

In [53]:
```
from sklearn.preprocessing import StandardScaler
```

In [54]:
```
#sc=StandardScaler()
```

In [55]:
```
#x=sc.fit_transform(x)
```

In [56]:
```
#x
```

In [57]:
```
y
```

Out[57]:
```
array([0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2])
```

In [61]:
```
df
```

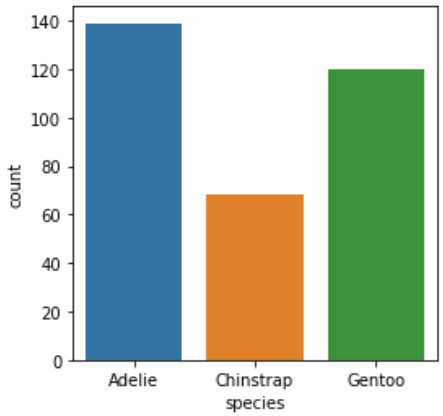
Out[61]:

	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
4	Adelie	Torgersen	36.7	19.3	193.0	3450.0	FEMALE
5	Adelie	Torgersen	39.3	20.6	190.0	3650.0	MALE
...	...	...	...	...	...	...	...
338	Gentoo	Biscoe	47.2	13.7	214.0	4925.0	FEMALE
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

327 rows × 7 columns

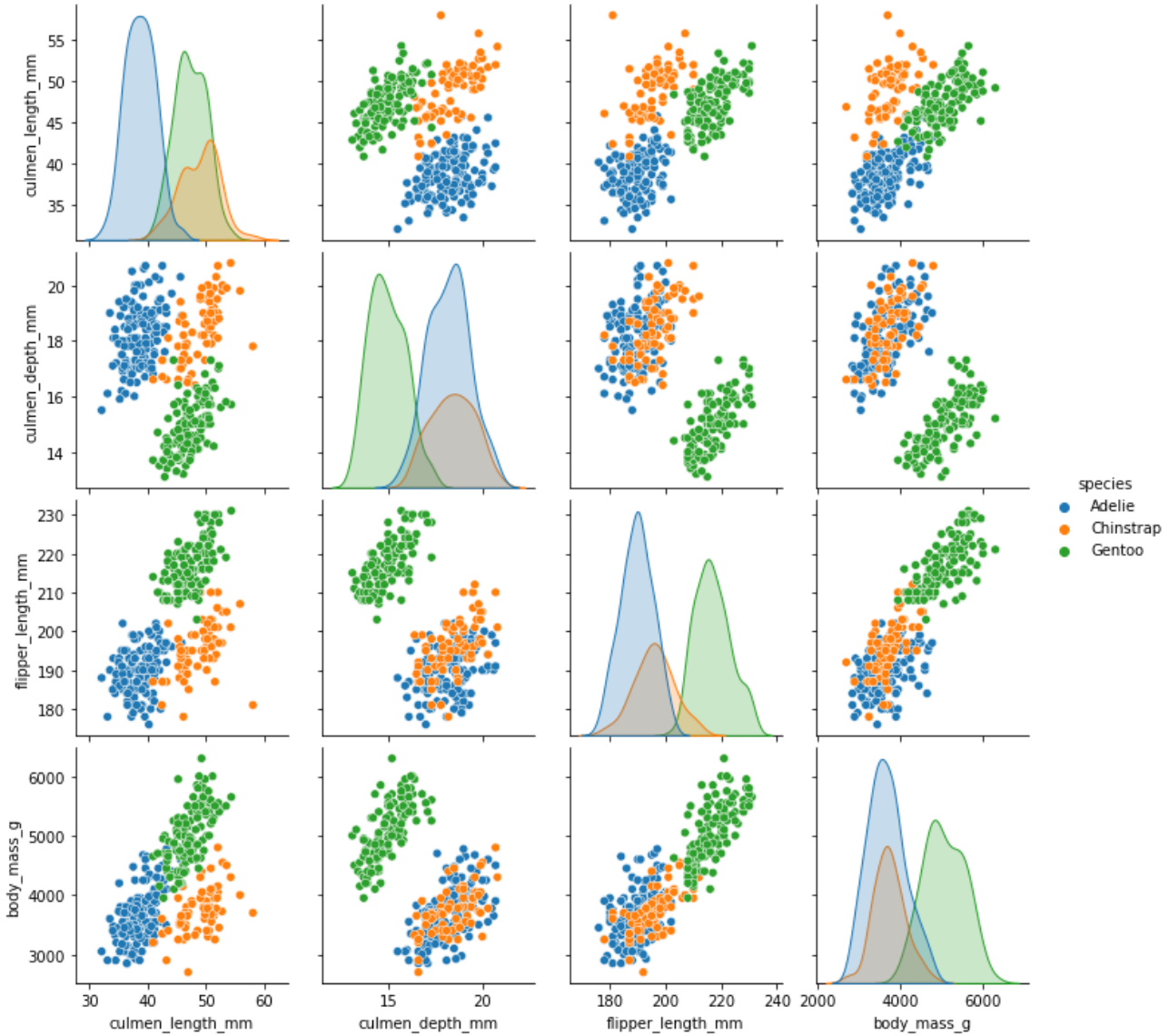
VISUALIZATION

In [67]:
```
plt.figure(figsize=(4,4))
sns.countplot(data=df,x="species")
plt.show()
```



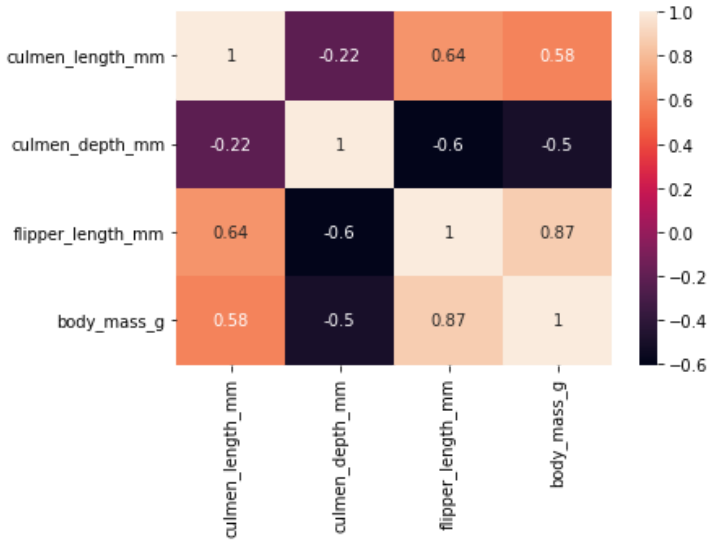
THERE ARE 3 SPECIES AND THE MAXIMUM NUMBER OF SPECIES ARE ADELIE AND MIN NUMBER OF SPECIES ARE GENTOO

In [68]:
```
sns.pairplot(df,hue="species")
plt.show()
```

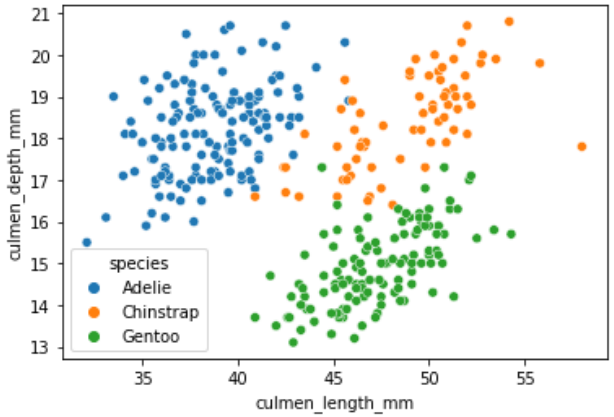


In [69]:
```
sns.heatmap(df.corr(),annot=True)
```

Out[69]: <AxesSubplot:>



In [70]:
```
sns.scatterplot(data=df,x=df["culmen_length_mm"],y=df["culmen_depth_mm"],hue="species")
plt.show()
```



1) most of the ADELIE species of penguins culmen depth lies between 16 to 21 and culmen lenght lies between 35 to 44

2) most of the CHINSTRAP species of penguins culmen depth lies between 17 to 20 and culmen lenght lies between 42 to 55

3) most of the GENTOO species of penguins culmen depth lies between 17 to 20 and culmen lenght lies between 40 to 55

NOW WE ARE GOPING TO SPLIT OUR DATA BY TRAIN_TEST_SPLIT

In [71]:
```
from sklearn.model_selection import train_test_split
from sklearn.metrics import classification_report
```

In [72]:
```
xtrain,xtest,ytrain,ytest=train_test_split(x,y,test_size=0.3,random_state=1)
```

In [73]:
```
def mymodel(model):
    model.fit(xtrain,ytrain)
    ypred=model.predict(xtest)

    train=model.score(xtrain,ytrain)
    test=model.score(xtest,ytest)

    print(f"Training Acuuracy(bias):- {train}\n Testing Accuracy(variance):- {test}")

    print(classification_report(ytest,ypred))
    return model
```

In [74]:
```
from sklearn.neighbors import KNeighborsClassifier
from sklearn.linear_model import LogisticRegression
from sklearn.svm import SVC
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier
```

In [75]:
```
knn = mymodel(KNeighborsClassifier())
```

```
Training Acuuracy(bias):- 0.8508771929824561
 Testing Accuracy(variance):- 0.8282828282828283
              precision    recall  f1-score   support

           0       0.77      0.91      0.83        44
           1       0.69      0.45      0.55        20
           2       0.97      0.94      0.96        35

    accuracy                           0.83        99
   macro avg       0.81      0.77      0.78        99
weighted avg       0.82      0.83      0.82        99
```

In [76]:
```
logreg = mymodel(LogisticRegression())
```

```
Training Acuuracy(bias):- 0.9868421052631579
 Testing Accuracy(variance):- 0.9696969696969697
              precision    recall  f1-score   support

           0       0.96      0.98      0.97        44
           1       0.95      0.90      0.92        20
           2       1.00      1.00      1.00        35

    accuracy                           0.97        99
   macro avg       0.97      0.96      0.96        99
weighted avg       0.97      0.97      0.97        99
```

In [77]:
```
s=mymodel(SVC())
```

```
Training Acuuracy(bias):- 0.7236842105263158
 Testing Accuracy(variance):- 0.7474747474747475
              precision    recall  f1-score   support

           0       0.65      0.93      0.77        44
           1       0.00      0.00      0.00        20
           2       0.92      0.94      0.93        35

    accuracy                           0.75        99
   macro avg       0.52      0.62      0.57        99
weighted avg       0.61      0.75      0.67        99
```

In [78]:
```
dt = mymodel(DecisionTreeClassifier())
```

```
Training Acuuracy(bias):- 1.0
 Testing Accuracy(variance):- 1.0
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        44
           1       1.00      1.00      1.00        20
           2       1.00      1.00      1.00        35

    accuracy                           1.00        99
   macro avg       1.00      1.00      1.00        99
weighted avg       1.00      1.00      1.00        99
```

In [79]:
```
randomf= mymodel(RandomForestClassifier())
```

```
Training Acuuracy(bias):- 1.0
 Testing Accuracy(variance):- 0.98989898989899
              precision    recall  f1-score   support

           0       0.98      1.00      0.99        44
           1       1.00      0.95      0.97        20
           2       1.00      1.00      1.00        35

    accuracy                           0.99        99
   macro avg       0.99      0.98      0.99        99
weighted avg       0.99      0.99      0.99        99
```

AFER SCAILING PERFORMANCE OF THE MODELS

In [80]:
```
sc = StandardScaler()

xtrain = sc.fit_transform(xtrain)
xtest = sc.transform(xtest)
```

In [81]:
```
knn = mymodel(KNeighborsClassifier())
```

```
Training Acuuracy(bias):- 0.9956140350877193
 Testing Accuracy(variance):- 1.0
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        44
           1       1.00      1.00      1.00        20
           2       1.00      1.00      1.00        35

    accuracy                           1.00        99
   macro avg       1.00      1.00      1.00        99
weighted avg       1.00      1.00      1.00        99
```

In [82]:
```
logreg = mymodel(LogisticRegression())
```

```
Training Acuuracy(bias):- 0.9956140350877193
 Testing Accuracy(variance):- 0.98989898989899
              precision    recall  f1-score   support

           0       0.98      1.00      0.99        44
           1       1.00      0.95      0.97        20
           2       1.00      1.00      1.00        35

    accuracy                           0.99        99
   macro avg       0.99      0.98      0.99        99
weighted avg       0.99      0.99      0.99        99
```

In [83]:
```
randomf= mymodel(RandomForestClassifier())
```

```
Training Acuuracy(bias):- 1.0
 Testing Accuracy(variance):- 0.98989898989899
              precision    recall  f1-score   support

           0       0.98      1.00      0.99        44
           1       1.00      0.95      0.97        20
           2       1.00      1.00      1.00        35

    accuracy                           0.99        99
   macro avg       0.99      0.98      0.99        99
weighted avg       0.99      0.99      0.99        99
```

FORECASTING NEW OBSERVATION

In [106]:
```
def predictspecies():
    island=int(input("enter island as 0.0=Biscoe,1.0=Dream(enter numbers),2.0=Torgersen :"))
    culmen_length_mm=int(input("enter length of culmen :"))
    culem_depth_mm=int(input("enter depth of culmen :"))
    flipper_length_mm=int(input("enter flipper length :"))
    body_mass_g=int(input("enter body mass :"))
    sex=int(input("enter gender female=1.0 and male=2.0 :"))

    newob=[island,culmen_length_mm,culem_depth_mm,flipper_length_mm,body_mass_g,sex]
    v=logreg.predict([newob])[0]

    if v==0:
        print("Adlie Species")
    elif v==1:
        print("chinsrtap species")
    else:
        print("Gento species")
```

In [ ]:

In [88]:
```
x.tail()
```

Out[88]:

	island	culmen_length_mm	culmen_depth_mm	flipper_length_mm	body_mass_g	sex
338	0.0	47.2	13.7	214.0	4925.0	1.0
340	0.0	46.8	14.3	215.0	4850.0	1.0
341	0.0	50.4	15.7	222.0	5750.0	2.0
342	0.0	45.2	14.8	212.0	5200.0	1.0
343	0.0	49.9	16.1	213.0	5400.0	2.0

In [89]:

Out[89]:
```
array(['MALE', 'FEMALE', '.'], dtype=object)
```

In [107]:
```
predictspecies()
```

```
enter island as 0.0=Biscoe,1.0=Dream(enter numbers),2.0=Torgersen :0
enter length of culmen :50
enter depth of culmen :15
enter flipper length :222
enter body mass :5000
enter gender female=1.0 and male=2.0 :2
Gento species
```

In [105]:
```
df["species"].unique()
```

Out[105]:
```
array(['Adelie', 'Chinstrap', 'Gentoo'], dtype=object)
```

In [ ]:
```
0 = adelie
1= chinsrtap
2 =Gento
```