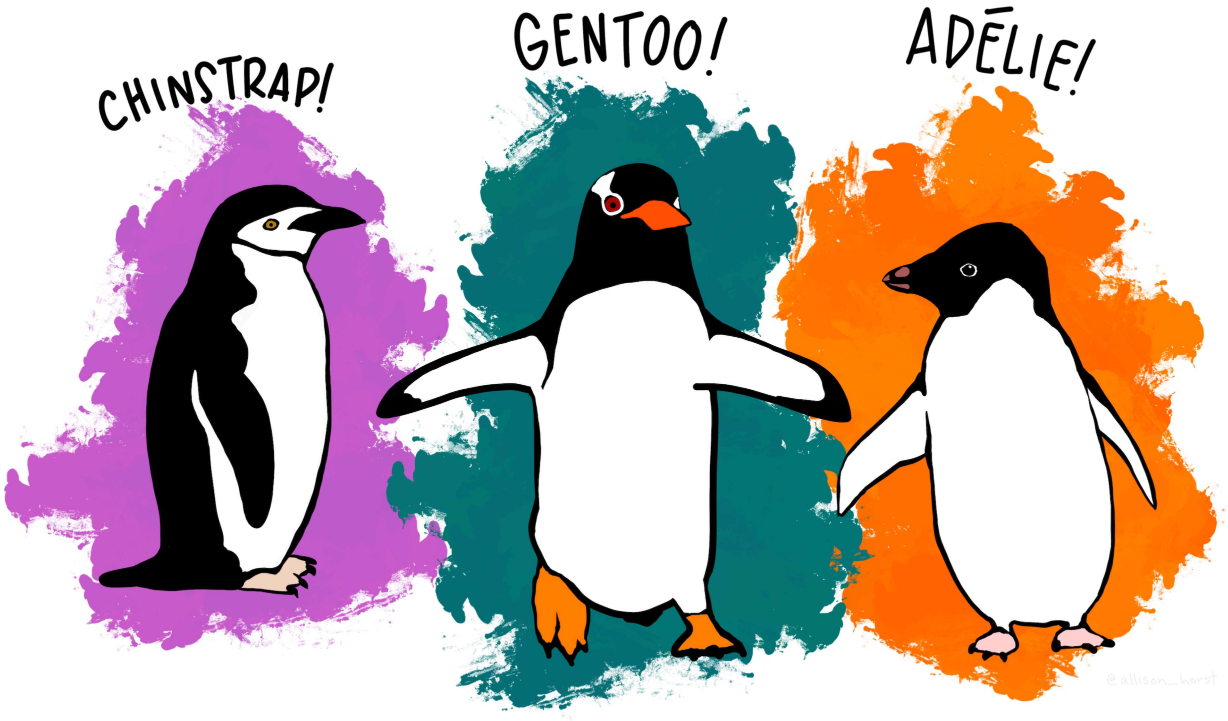
PROJECT: CLUSTERING ANTARCTIC PENGUIN SPECIES



source: @allison_horst https://github.com/allisonhorst/penguins

You have been asked to support a team of researchers who have been collecting data about penguins in Antartica! The data is available in csv-Format as `penguins.csv`

Origin of this data : Data were collected and made available by Dr. Kristen Gorman and the Palmer Station, Antarctica LTER, a member of the Long Term Ecological Research Network.

The dataset consists of 5 columns.

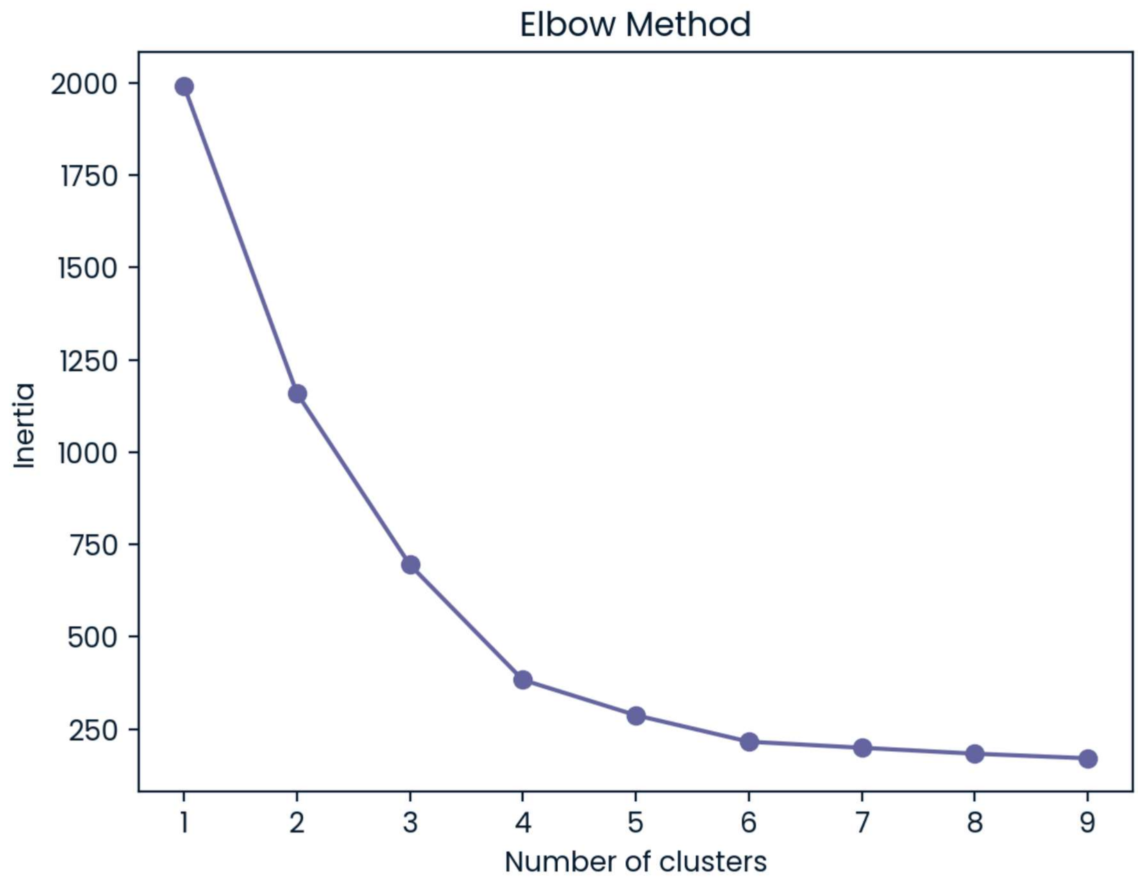
Column	Description
culmen_length_mm	culmen length (mm)
culmen_depth_mm	culmen depth (mm)
flipper_length_mm	flipper length (mm)
body_mass_g	body mass (g)
sex	penguin sex

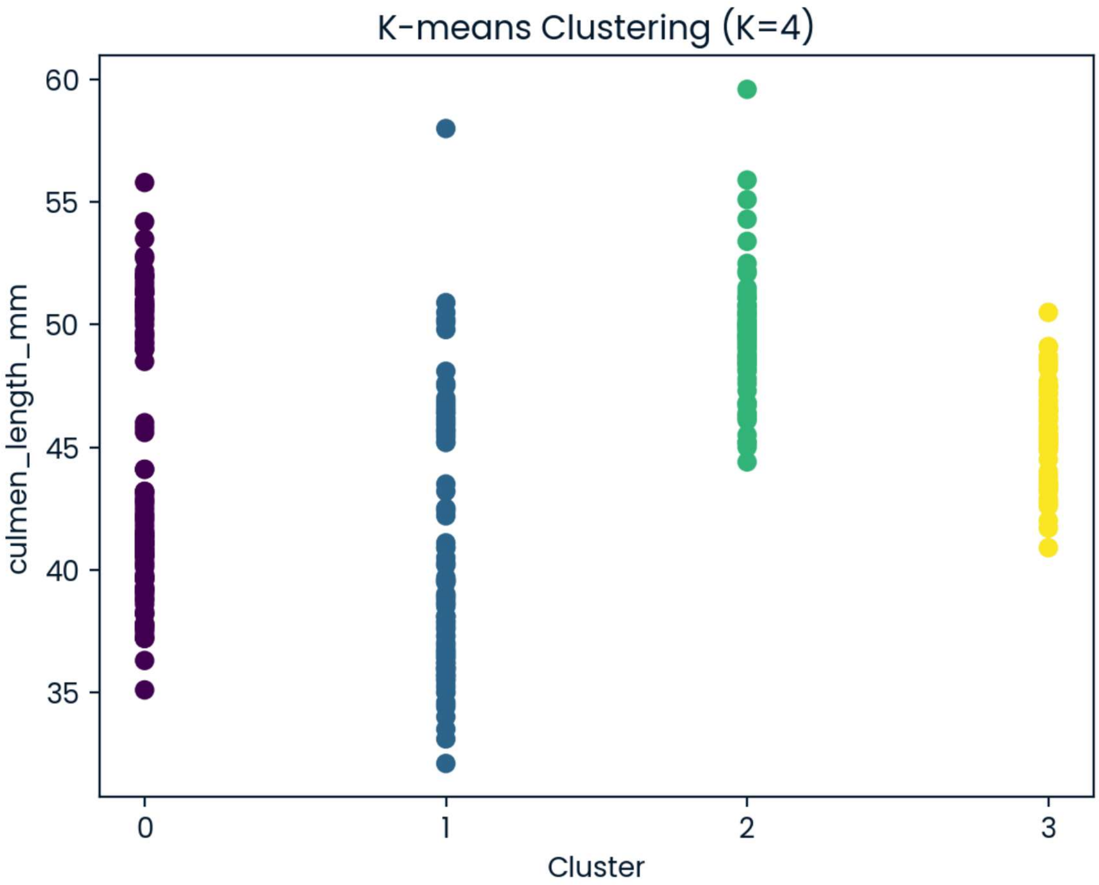
Unfortunately, they have not been able to record the species of penguin, but they know that there are **at least three** species that are native to the region: **Adelie**, **Chinstrap**, and **Gentoo**. Your task is to apply your data science skills to help them identify groups in the dataset!

```
# Import Required Packages
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.cluster import KMeans
from sklearn.preprocessing import StandardScaler

# Loading and examining the dataset
penguins_df = pd.read_csv("penguins.csv")
penguins_df.head()
penguins_df.info()

penguins_df = pd.get_dummies(penguins_df, dtype='int')

scaler = StandardScaler()
X = scaler.fit_transform(penguins_df)
penguins_preprocessed = pd.DataFrame(data=X, columns=penguins_df.columns)
penguins_preprocessed.head(10)

inertia = []
for k in range(1, 10):
    kmeans = KMeans(n_clusters=k, random_state=42).fit(penguins_preprocessed)
    inertia.append(kmeans.inertia_)
plt.plot(range(1, 10), inertia, marker='o')
plt.xlabel('Number of clusters')
plt.ylabel('Inertia')
plt.title('Elbow Method')
plt.show()
n_clusters = 4

kmeans = KMeans(n_clusters=n_clusters, random_state=42).fit(penguins_preprocessed)
penguins_df['label'] = kmeans.labels_
plt.scatter(penguins_df['label'], penguins_df['culmen_length_mm'], c=kmeans.labels_,
cmap='viridis')
plt.xlabel('Cluster')
plt.ylabel('culmen_length_mm')
plt.xticks(range(int(penguins_df['label'].min()), int(penguins_df['label'].max()) +
1))
plt.title(f'K-means Clustering (K={n_clusters})')
plt.show()

numeric_columns = ['culmen_length_mm', 'culmen_depth_mm', 'flipper_length_mm',
'label']
stat_penguins = penguins_df[numeric_columns].groupby('label').mean()
stat_penguins
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 332 entries, 0 to 331
```

```
Data columns (total 5 columns):
 #   Column             Non-Null Count  Dtype  
---  ------             --------------  -----  
 0   culmen_length_mm   332 non-null    float64
 1   culmen_depth_mm    332 non-null    float64
 2   flipper_length_mm  332 non-null    float64
 3   body_mass_g        332 non-null    float64
 4   sex                332 non-null    object 
dtypes: float64(4), object(1)
memory usage: 13.1+ KB
```





•••	culmen_len…	culmen_d…	flipper_length…
0	43.8783018868	19.1113207547	194.7641509434
1	40.2177570093	17.6112149533	189.046728972
2	49.4737704918	15.7180327869	221.5409836066
3	45.5637931034	14.2379310345	212.7068965517

Rows: 4 Expand