```
# Importing libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.cluster import KMeans
```

```
# Load the dataset
url = "https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data"
columns = ['sepal_length', 'sepal_width', 'petal_length', 'petal_width', 'species']
data = pd.read_csv(url, header=None, names=columns)

# Check the shape of the dataset
print("Dataset shape:", data.shape)

# Display the first 5 rows
data.head()
```

```
Dataset shape: (150, 5)
```

	sepal_length	sepal_width	petal_length	petal_width	species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

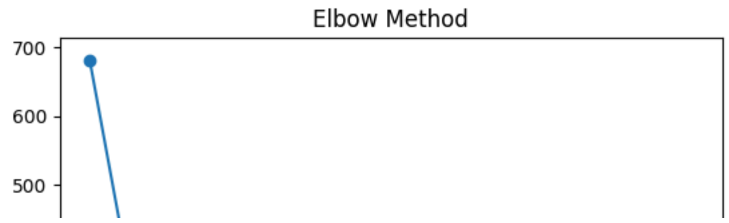
Next steps: Generate code with data | View recommended plots | New interactive sheet

```
# Remove the target column
X = data.drop(columns='species')
```

```
# Check for missing values
print("Missing values:\n", X.isnull().sum())
```

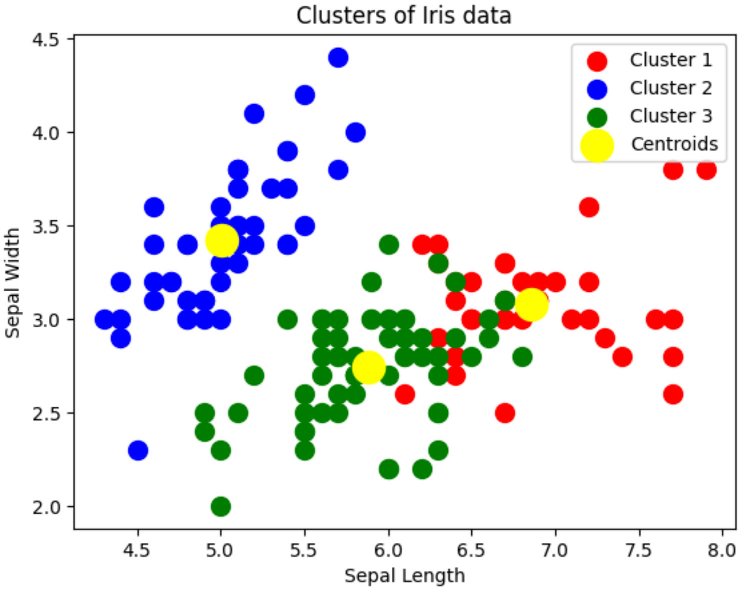
```
Missing values:
  sepal_length    0
sepal_width     0
petal_length    0
petal_width     0
dtype: int64
```

```
# Using the elbow method to find the optimal number of clusters
wcss = []
for i in range(1, 11):
    kmeans = KMeans(n_clusters=i, init='k-means++', random_state=42)
    kmeans.fit(X)
    wcss.append(kmeans.inertia_)

# Plotting the Elbow Graph
plt.plot(range(1, 11), wcss, marker='o')
plt.title('Elbow Method')
plt.xlabel('Number of clusters (K)')
plt.ylabel('WCSS')
plt.show()
```



```
# Training K-means with optimal K
kmeans = KMeans(n_clusters=3, init='k-means++', random_state=42)
y_kmeans = kmeans.fit_predict(X)
```

```
# Visualizing the clusters
plt.scatter(X.values[y_kmeans == 0, 0], X.values[y_kmeans == 0, 1], s=100, c='red', label='Cluster 1')
plt.scatter(X.values[y_kmeans == 1, 0], X.values[y_kmeans == 1, 1], s=100, c='blue', label='Cluster 2')
plt.scatter(X.values[y_kmeans == 2, 0], X.values[y_kmeans == 2, 1], s=100, c='green', label='Cluster 3')

# Centroids
plt.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:, 1], s=300, c='yellow', label='Centroids')
plt.title('Clusters of Iris data')
plt.xlabel('Sepal Length')
plt.ylabel('Sepal Width')
plt.legend()
plt.show()
```


Clusters of Iris data
Cluster 1
Cluster 2
Cluster 3
Centroids
Sepal Width
Sepal Length