importing libraries

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn import datasets
```

Load iris dataset from sklearn.

In [2]:
```
iris=datasets.load_iris()
```

In [6]:
```
df=pd.DataFrame(iris.data, columns = iris.feature_names)
df.head()
```

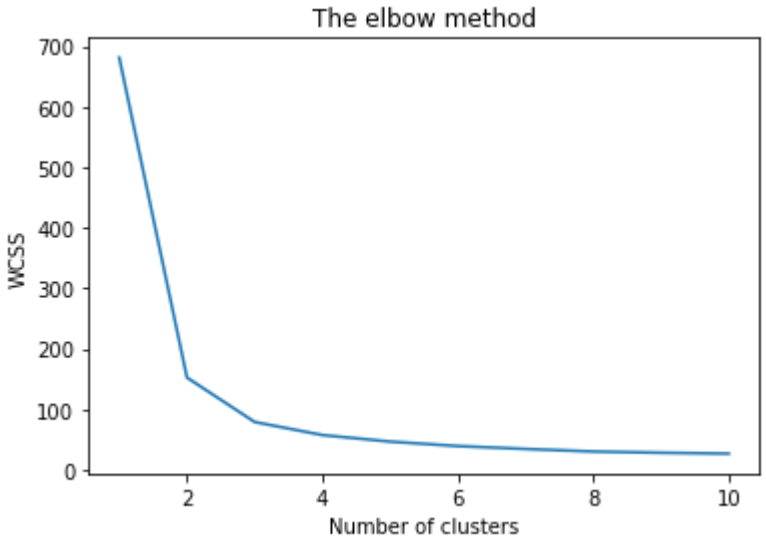
Out[6]:

	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)
0	5.1	3.5	1.4	0.2
1	4.9	3.0	1.4	0.2
2	4.7	3.2	1.3	0.2
3	4.6	3.1	1.5	0.2
4	5.0	3.6	1.4	0.2

Finding the optimum number of clusters for k-means classification

In [13]:
```
x=df.iloc[:,[0,1,2,3]].values
from sklearn.cluster import KMeans
wcss=[]
for i in range(1, 11):
    kmeans = KMeans(n_clusters = i, init = 'k-means++',
                    max_iter = 300, n_init = 10, random_state = 0)
    kmeans.fit(x)
    wcss.append(kmeans.inertia_)
```

In [15]:
```
# Plotting the results onto a line graph,
# `allowing us to observe 'The elbow'
plt.plot(range(1, 11), wcss)
plt.title('The elbow method')
plt.xlabel('Number of clusters')
plt.ylabel('WCSS') # Within cluster sum of squares
plt.show()
```



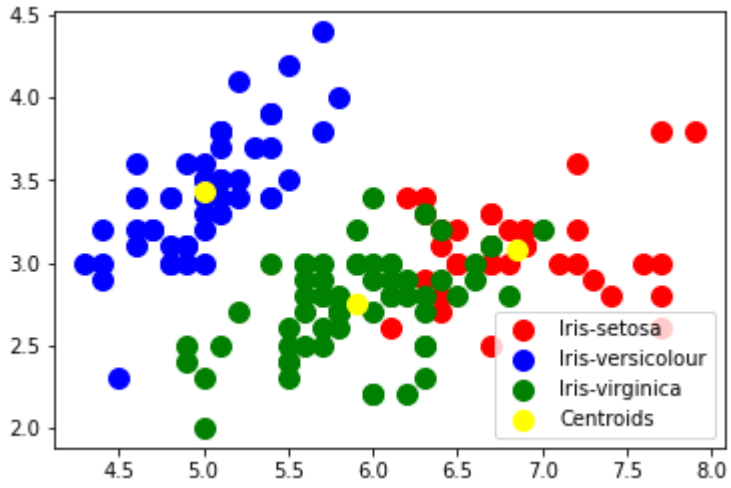
we can see the elbow is at 3 hence there are 3 clusters.

In [17]:
```
# Applying kmeans to the dataset / Creating the kmeans classifier
kmeans = KMeans (n_clusters = 3, init = 'k-means++',
                 max_iter = 300, n_init = 10, random_state = 0)
y_kmeans = kmeans.fit_predict(x)
```

In [20]:
```
# Visualising the clusters - On the first two columns
plt.scatter(x[y_kmeans == 0, 0], x[y_kmeans == 0, 1],
                s= 100, c = 'red', label = 'Iris-setosa')
plt.scatter(x[y_kmeans == 1, 0], x[y_kmeans == 1, 1],
            s = 100, c = 'blue', label = 'Iris-versicolour')
plt.scatter(x[y_kmeans == 2, 0], x[y_kmeans == 2, 1],
            s = 100, c = 'green', label = 'Iris-virginica')
# Plotting the centroids of the clusters
plt.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:,1],
            s = 100, c = 'yellow', label = 'Centroids')

plt.legend()
```

Out[20]: <matplotlib.legend.Legend at 0x1916e16e760>



In [ ]: