TASK 1: PREDICTION USING UNSUPERVISED LEARNING

we shall use Iris dataset for the given task # hope you like it

In [1]:

```
#Step1.0: Import the library
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
from sklearn import datasets
```

In [2]:

```
#Step1.1: Load the Iris dataset
#make sure to have the dataset in your pc

iris = datasets.load_iris()
iris_df = pd.DataFrame(iris.data, columns = iris.feature_names)
iris_df.head() # See the first 5 rows
```

Out[2]:

	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

Step 2

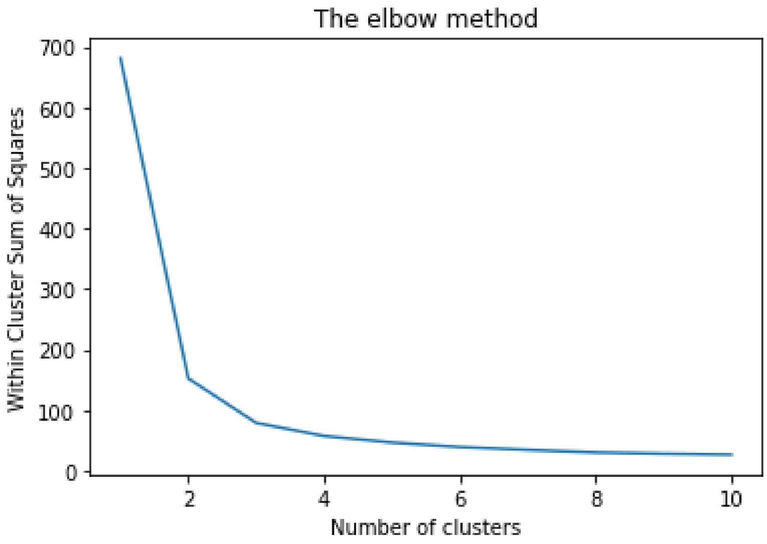
Finding the optimum number of clusters using K-means clustering algorithm

In [3]:

```
x = iris_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 [4]:

```
#here, we want to observe "The Elbow"
#Plot results into line graph

plt.plot(range(1, 11), wcss)
plt.title('The elbow method')
plt.xlabel('Number of clusters')
plt.ylabel('Within Cluster Sum of Squares')
plt.show()
```



We choose the number of clusters as 3.

In [5]:

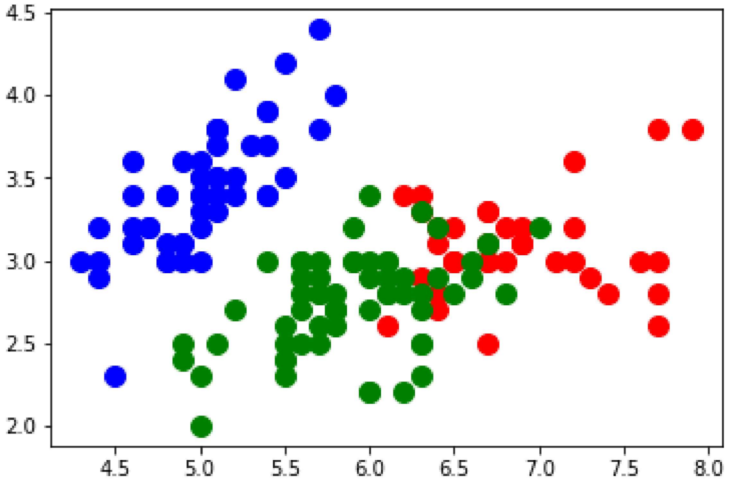
```
# Applying kmeans to the dataset and Creating the kmeans classifier
kmeans = KMeans(n_clusters = 3, init = 'k-means++',
                max_iter = 300, n_init = 10, random_state = 0)
y_kmeans = kmeans.fit_predict(x)
```

In [6]:

```
# 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 = 'Setosa')
plt.scatter(x[y_kmeans == 1, 0], x[y_kmeans == 1, 1],
            s = 100, c = 'blue', label = 'Versicolour')
plt.scatter(x[y_kmeans == 2, 0], x[y_kmeans == 2, 1],
            s = 100, c = 'green', label = 'Virginica')
```

Out[6]:

```
<matplotlib.collections.PathCollection at 0x141342d67c0>
```



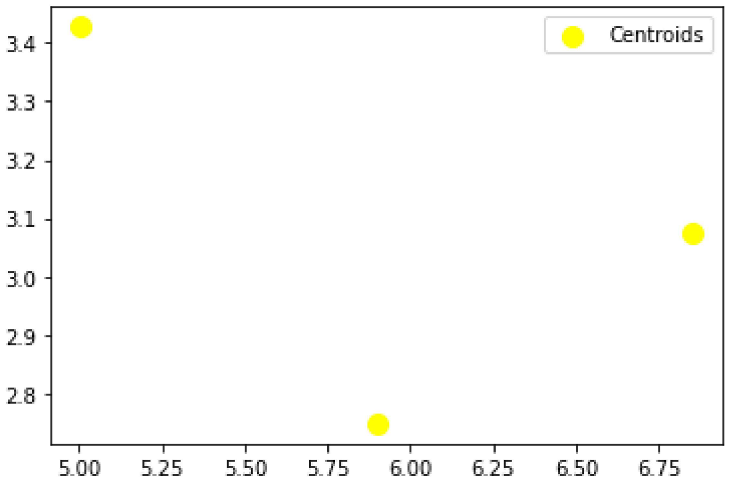
Plotting the centroids of the clusters

In [7]:

```
plt.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:,1],
            s = 100, c = 'yellow', label = 'Centroids')

plt.legend()
```

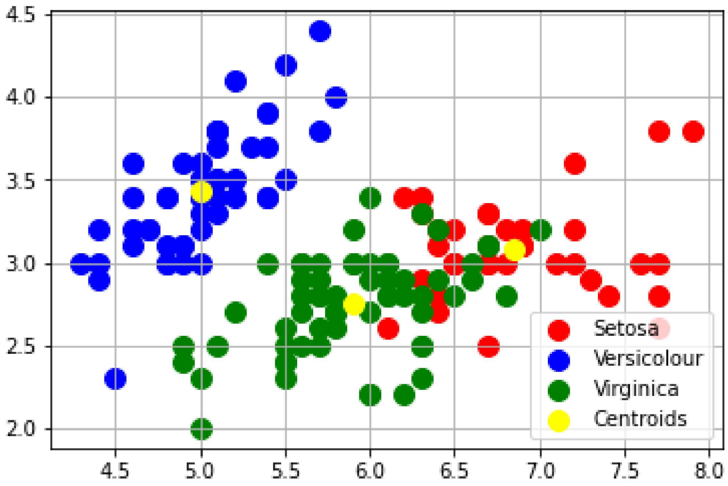
Out[7]:

```
<matplotlib.legend.Legend at 0x141342ae220>
```



Putting it together

In [9]:
```python
plt.scatter(x[y_kmeans == 0, 0], x[y_kmeans == 0, 1],
            s = 100, c = 'red', label = 'Setosa')
plt.scatter(x[y_kmeans == 1, 0], x[y_kmeans == 1, 1],
            s = 100, c = 'blue', label = 'Versicolour')
plt.scatter(x[y_kmeans == 2, 0], x[y_kmeans == 2, 1],
            s = 100, c = 'green', label = 'Virginica')

plt.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:,1],
            s = 100, c = 'yellow', label = 'Centroids')

plt.legend()
plt.grid()
```



Finally we got the visual output along with the clusters

Hope you like it

Any problems or issues, just ask

THANK YOU