Task 2- Unsupervised Learning (K Means Clustering) - Iris Dataset

K- Means Clustering Assignment - 2

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Import Libraries

In [1]:
```
# Importing the libraries
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
import seaborn as sns
%matplotlib inline
```

Import Dataset

In [3]:
```
Iris =pd.read_csv('Iris.csv')
```

In [5]:
```
Iris
```

Out[5]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa
...	...	...	...	...	...	...
145	146	6.7	3.0	5.2	2.3	Iris-virginica
146	147	6.3	2.5	5.0	1.9	Iris-virginica
147	148	6.5	3.0	5.2	2.0	Iris-virginica
148	149	6.2	3.4	5.4	2.3	Iris-virginica
149	150	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 6 columns

In [4]:
```
Iris.head()
```

Out[4]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa

In [7]:
```
Iris.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 6 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   Id             150 non-null    int64  
 1   SepalLengthCm  150 non-null    float64
 2   SepalWidthCm   150 non-null    float64
 3   PetalLengthCm  150 non-null    float64
 4   PetalWidthCm   150 non-null    float64
 5   Species        150 non-null    object 
dtypes: float64(4), int64(1), object(1)
memory usage: 7.2+ KB
```

In [8]:
```
Iris.describe()
```

Out[8]:

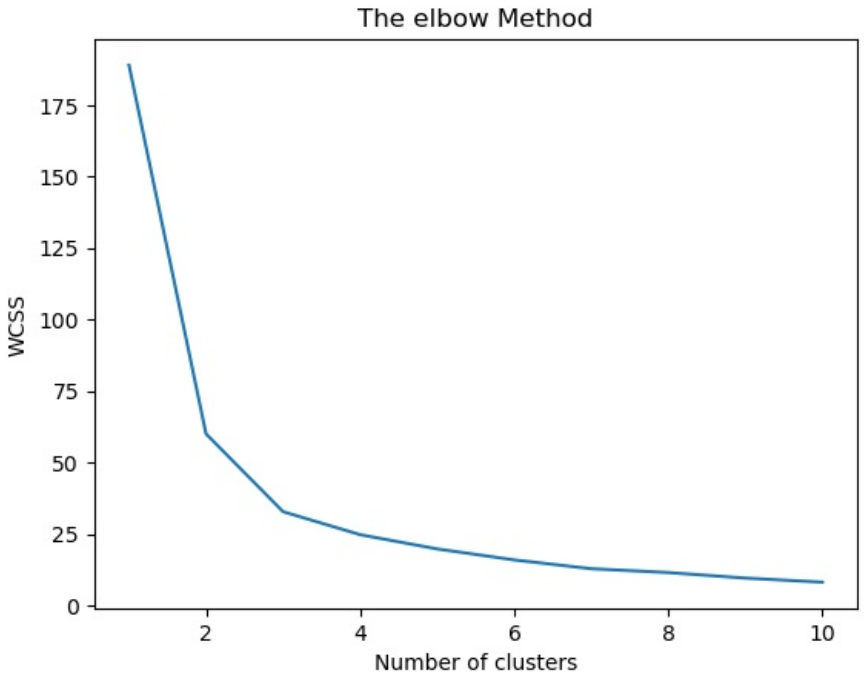
	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
count	150.000000	150.000000	150.000000	150.000000	150.000000
mean	75.500000	5.843333	3.054000	3.758667	1.198667
std	43.445368	0.828066	0.433594	1.764420	0.763161
min	1.000000	4.300000	2.000000	1.000000	0.100000
25%	38.250000	5.100000	2.800000	1.600000	0.300000
50%	75.500000	5.800000	3.000000	4.350000	1.300000
75%	112.750000	6.400000	3.300000	5.100000	1.800000
max	150.000000	7.900000	4.400000	6.900000	2.500000

In [9]:
```
### Dividig this into Independent and dependent features
x=Iris.iloc[:, [1,4]].values
```

Using the elbow method to find the optmimal number of clusters

In [10]:
```
from sklearn.cluster import KMeans
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_)
plt.plot(range(1, 11), wcss)
plt.title('The elbow Method')
plt.xlabel('Number of clusters')
plt.ylabel('WCSS')
plt.show()
```

```
C:\Users\ANIKET\anaconda3\lib\site-packages\sklearn\cluster\_kmeans.py:1036: UserWarning: KMeans is known to ha
ve a memory leak on Windows with MKL, when there are less chunks than available threads. You can avoid it by se
tting the environment variable OMP_NUM_THREADS=1.
  warnings.warn(
```



Training the KMeans model on the dataset

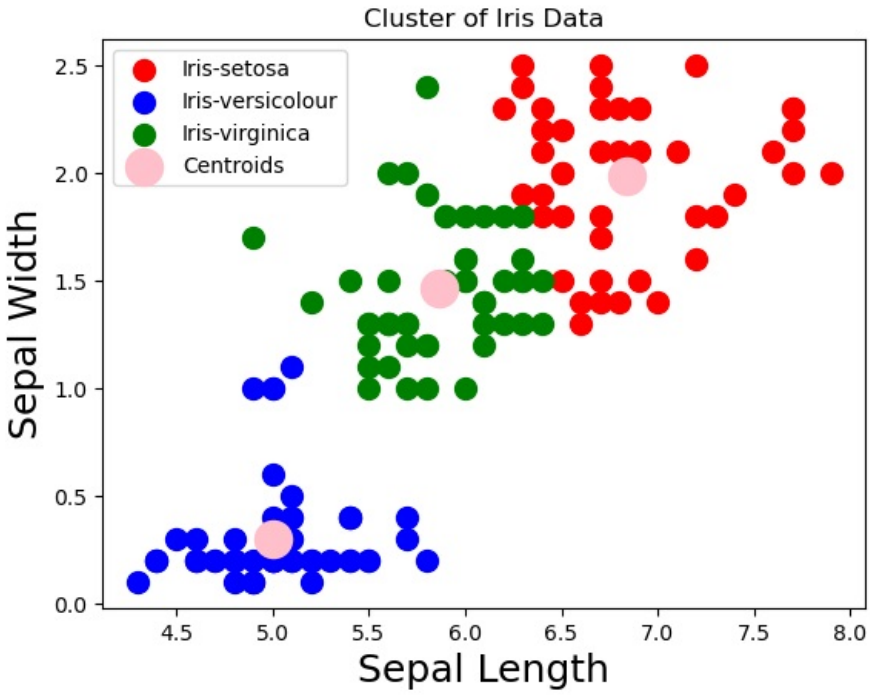
In [11]:
```
kmeans = KMeans(n_clusters = 3, init ='k-means++', random_state = 42)
```

In [12]:
```
y_kmeans=kmeans.fit_predict(x)
print(y_kmeans)
```

```
[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 0 2 0 2 0 2 2 1 0 2 1 2 2 2 2 0 2 2 2 2 2 2 2 2
 2 0 0 0 2 2 2 2 2 2 2 0 2 2 2 2 2 2 1 2 2 2 2 1 2 0 2 0 2 0 0 2 0 0 0 0
 0 0 2 2 0 0 0 0 2 0 2 0 2 0 0 2 2 0 0 0 0 2 2 0 0 0 2 0 0 0 2 0 0 0 0 0
 0 2]
```

In [13]:
```
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')
plt.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:, 1], s=300, c='pink', label ='Centroids')
plt.title('Cluster of Iris Data')
plt.xlabel('Sepal Length', fontsize =18)
```

```
plt.ylabel('Sepal Width', fontsize =18)
plt.legend()
plt.show()
```



In [ ]: