In [ ]:
```python
import numpy as np
import matplotlib.pyplot as mtp
import pandas as pd
```

In [ ]:
```python
dataset = pd.read_csv("datasets/Mall_Customers.csv")
dataset.head()
```

Out[ ]:

	CustomerID	Gender	Age	Annual Income (k$)	Spending Score (1-100)
0	1	Male	19	15	39
1	2	Male	21	15	81
2	3	Female	20	16	6
3	4	Female	23	16	77
4	5	Female	31	17	40

In [ ]:
```python
X= dataset.iloc[:,[3,4]].values
```

In [ ]:
```python
from sklearn.cluster import KMeans
```

In [ ]:
```python
wcss_list = []

for i in range (1,11):
    kmeans = KMeans(n_clusters=i, init='k-means++', random_state=42)
    kmeans.fit(X)
    wcss_list.append(kmeans.inertia_)
```
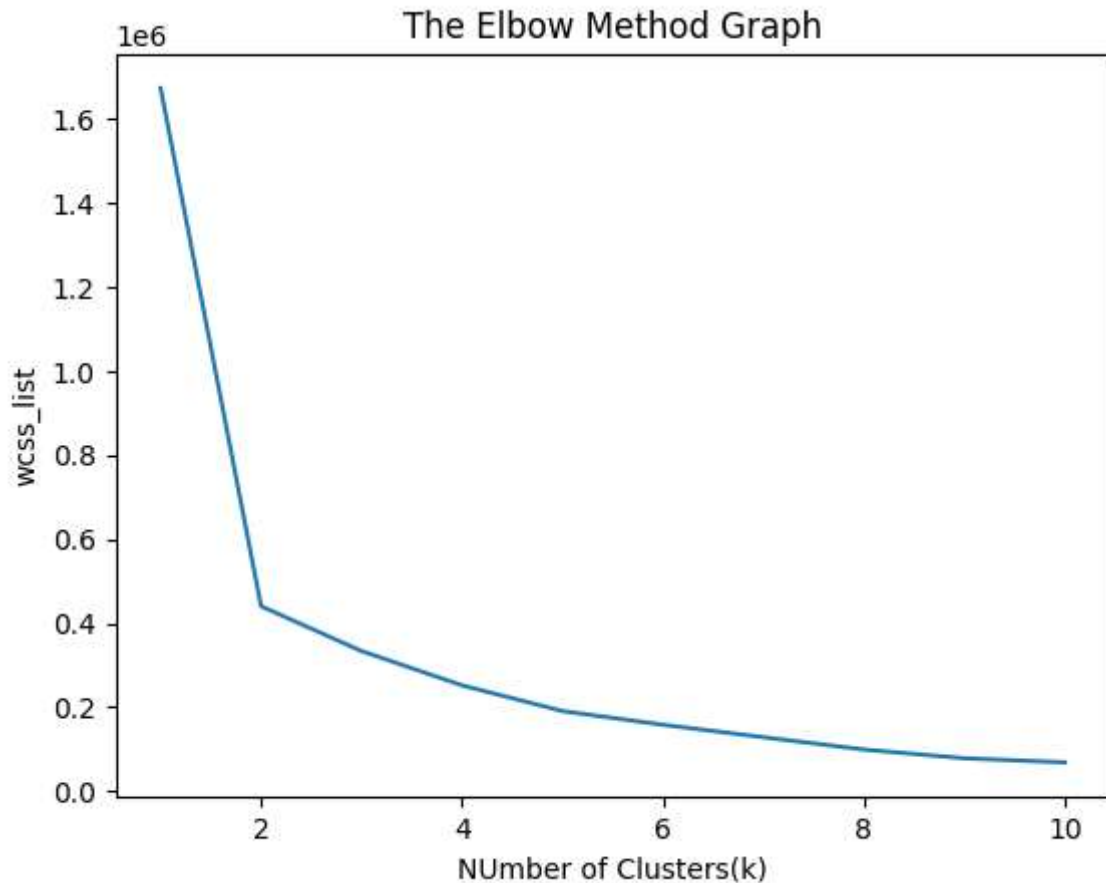
```
c:\Python311\Lib\site-packages\sklearn\cluster\_kmeans.py:1416: FutureWarning: The d
efault value of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_i
nit` explicitly to suppress the warning
  super()._check_params_vs_input(X, default_n_init=10)
c:\Python311\Lib\site-packages\sklearn\cluster\_kmeans.py:1416: FutureWarning: The d
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  super()._check_params_vs_input(X, default_n_init=10)
```

```python
In [ ]: mtp.plot(range(1,11), wcss_list)
        mtp.title("The Elbow Method Graph")
        mtp.xlabel("NUmber of Clusters(k)")
        mtp.ylabel("wcss_list")
        mtp.show()
```

The Elbow Method Graph


```
In [ ]:  #training the kmeans model on the dataset
         kmeans = KMeans(n_clusters=2,init='k-means++',random_state=42)
         y_predict = kmeans.fit_predict(X)
```

```
c:\Python311\Lib\site-packages\sklearn\cluster\_kmeans.py:1416: FutureWarning: The d
efault value of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_i
nit` explicitly to suppress the warning
  super()._check_params_vs_input(X, default_n_init=10)
```

```
In [ ]:  mtp.scatter(X[y_predict == 0,0],X[y_predict == 0,1], s = 100, c = 'blue', label = '
         mtp.scatter(X[y_predict == 1,0],X[y_predict == 1,1],s = 100, c = 'green', label = '

         mtp.scatter(kmeans.cluster_centers_[:,0],kmeans.cluster_centers_[:,1], s = 100, c =

         mtp.title("Clusters of Customers")
         mtp.xlabel("Annual income(k$)")
         mtp.ylabel("Spending score (1 -100)")
         mtp.legend()
         mtp.show()
```

Clusters of Customers