In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:
```
df=pd.read_csv('customers.csv')
df.head()
```

Out[2]:

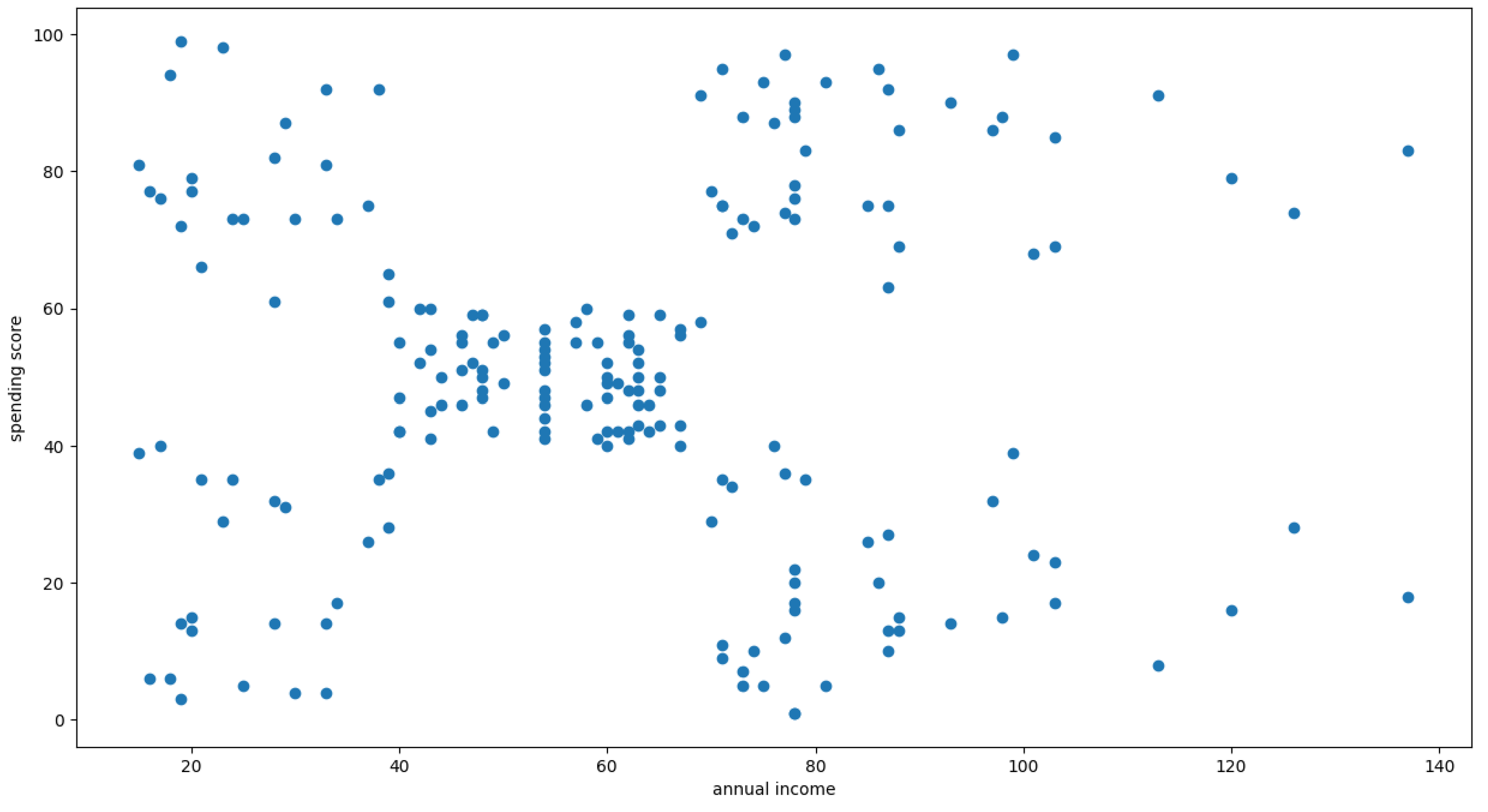
	CustomerID	Gender	Age	Annual Income (k$)	Spending Score (1-100)
0	1	Male	19	15	39
1	2	Male	21	15	81
2	3	Female	20	16	6
3	4	Female	23	16	77
4	5	Female	31	17	40

In [3]:
```
df.isnull().sum()
```

Out[3]:
```
CustomerID                0
Gender                    0
Age                       0
Annual Income (k$)        0
Spending Score (1-100)    0
dtype: int64
```

In [4]:
```
x=df.drop(columns=['CustomerID' , 'Gender' ,'Age'] , axis=1).values
```

In [9]:
```
plt.figure(figsize=(15,8))
plt.scatter(x[:,0],x[:,1])
plt.xlabel('annual income')
plt.ylabel('spending score')
plt.show()
```



In [13]:
```
from sklearn.cluster import KMeans
w=[]
for i in range(1,11):
    k=KMeans(n_clusters=i,init='k-means++',random_state=2)
    k.fit(x)
    w.append(k.inertia_)
plt.figure(figsize=(15,8))
plt.plot(range(1,11),w)
plt.title('elbow point graph')
plt.xlabel('number of clusters(k)')
plt.ylabel('wcss')
plt.show()
```

```
C:\Users\Administrator\AppData\Local\Programs\Python\Python311\Lib\site-packages\sklearn\cluster\_kmeans.py:1416: FutureWarning: The default value of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_init` explicitly to suppress the warning
  super()._check_params_vs_input(X, default_n_init=10)
C:\Users\Administrator\AppData\Local\Programs\Python\Python311\Lib\site-packages\sklearn\cluster\_kmeans.py:1416: FutureWarning: The default value of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_init` explicitly to suppress the warning
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  super()._check_params_vs_input(X, default_n_init=10)
C:\Users\Administrator\AppData\Local\Programs\Python\Python311\Lib\site-packages\sklearn\cluster\_kmeans.py:1416: FutureWarning: The default value of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_init` explicitly to suppress the warning
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  super()._check_params_vs_input(X, default_n_init=10)
```

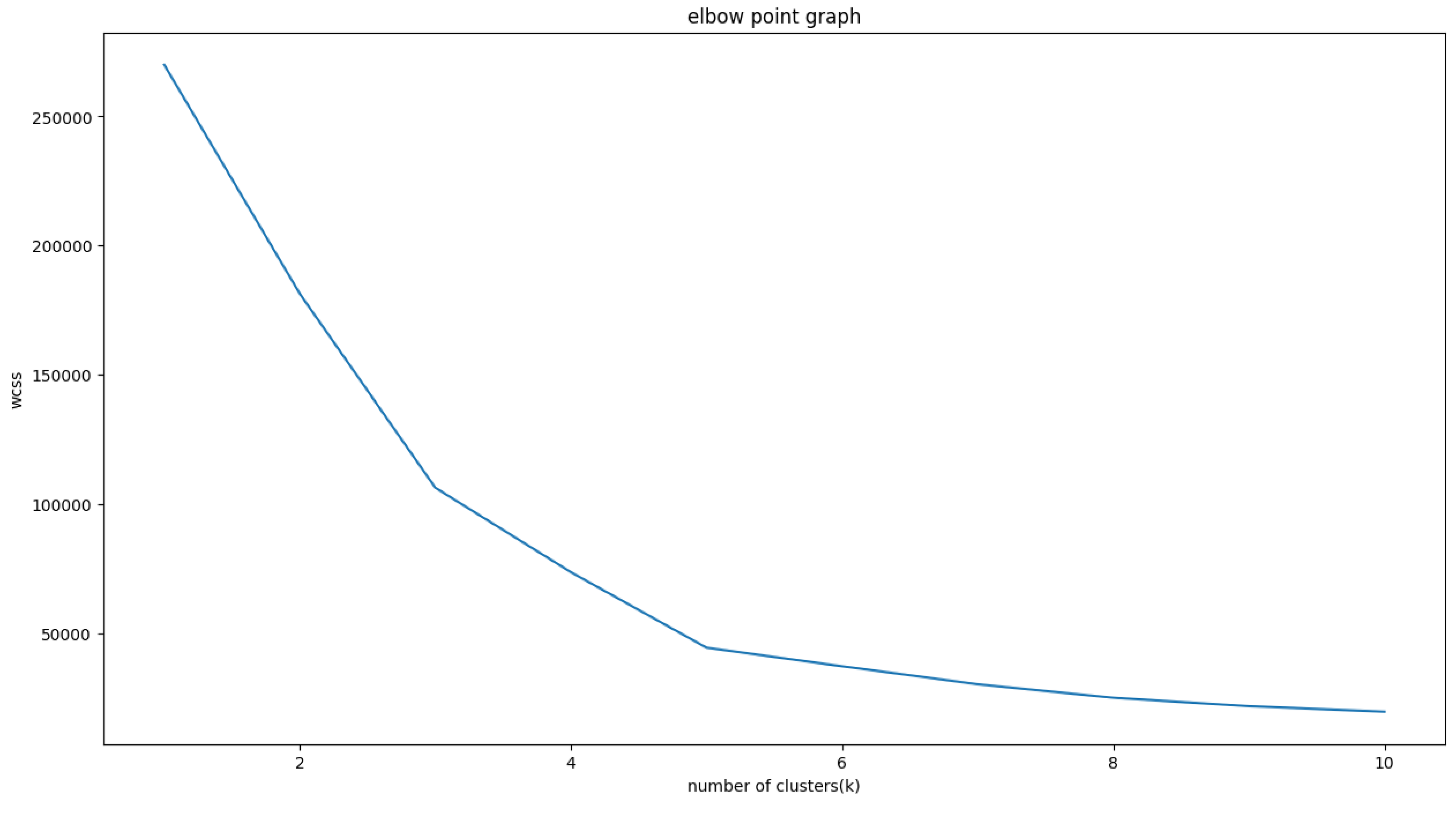

In [15]:
```
k=KMeans(n_clusters = 5,init='k-means++' ,random_state=0)
y=k.fit_predict(x)
```

```
C:\Users\Administrator\AppData\Local\Programs\Python\Python311\Lib\site-packages\sklearn\cluster\_kmeans.py:1416: FutureWarning: The default value of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_init` explicitly to suppress the warning
  super()._check_params_vs_input(X, default_n_init=10)
```

In [16]:
```
k.cluster_centers_
```

Out[16]:
```
array([[55.2962963 , 49.51851852],
       [86.53846154, 82.12820513],
       [88.2       , 17.11428571],
       [26.30434783, 20.91304348],
       [25.72727273, 79.36363636]])
```

In [ ]: