

Hierarchical cluster

```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd

dataset=pd.read_csv('Mall_Customers.csv')
x=dataset.iloc[:,[3,4]].values
print(x)

from sklearn.cluster import AgglomerativeClustering
hc= AgglomerativeClustering(n_clusters=5, affinity='euclidean',
linkage='ward')
y_pred= hc.fit_predict(x)
print(y_pred)

plt.scatter(x[y_pred==0,0],x[y_pred==0,1],s=50,c='red',label='Cluster 1')
plt.scatter(x[y_pred==1,0],x[y_pred==1,1],s=50,c='blue',label='Cluster 2')
plt.scatter(x[y_pred==2,0],x[y_pred==2,1],s=50,c='green',label='Cluster 3')
plt.scatter(x[y_pred==3,0],x[y_pred==3,1],s=50,c='cyan',label='Cluster 4')
plt.scatter(x[y_pred==4,0],x[y_pred==4,1],s=50,c='magenta',label='Cluster 5')
plt.title('Cluster of customers')
plt.xlabel('Annual income(k$)')
plt.ylabel('Spending Score(1-100)')
plt.legend()
plt.show()
```

k-mans cluster:

```
import matplotlib.pyplot as plt
import pandas as pd
dataset=pd.read_csv('Mall_Customers.csv')
x=dataset.iloc[:,[3,4]].values
print(x)

from sklearn.cluster import KMeans
kmeans=KMeans(n_clusters=5,init='k-means++',random_state=42)
y_kmeans=kmeans.fit_predict(x)
print(y_kmeans)
```

```
plt.scatter(x[y_kmeans==0,0],x[y_kmeans==0,1],s=50,c='red',label='Cluster 1')
plt.scatter(x[y_kmeans==1,0],x[y_kmeans==1,1],s=50,c='blue',label='Cluster 2')
plt.scatter(x[y_kmeans==2,0],x[y_kmeans==2,1],s=50,c='green',label='Cluster 3')
plt.scatter(x[y_kmeans==3,0],x[y_kmeans==3,1],s=50,c='cyan',label='Cluster 4')
plt.scatter(x[y_kmeans==4,0],x[y_kmeans==4,1],s=50,c='magenta',label='Cluster 5')
plt.scatter(kmeans.cluster_centers_[0,0],kmeans.cluster_centers_[0,1],s=200,c='yellow',label='Centroids')
plt.title('Cluster of customers')
plt.xlabel('Annual income(k$)')
plt.ylabel('Spending Score(1-100)')
plt.legend()
plt.show()
```