

```
In [1]: import matplotlib.pyplot as plt
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```
In [2]: %matplotlib inline
import numpy as np
import pandas as pd
```

```
In [3]: customer_data = pd.read_csv("Customers.csv")
```

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

CustomerID	Genre	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

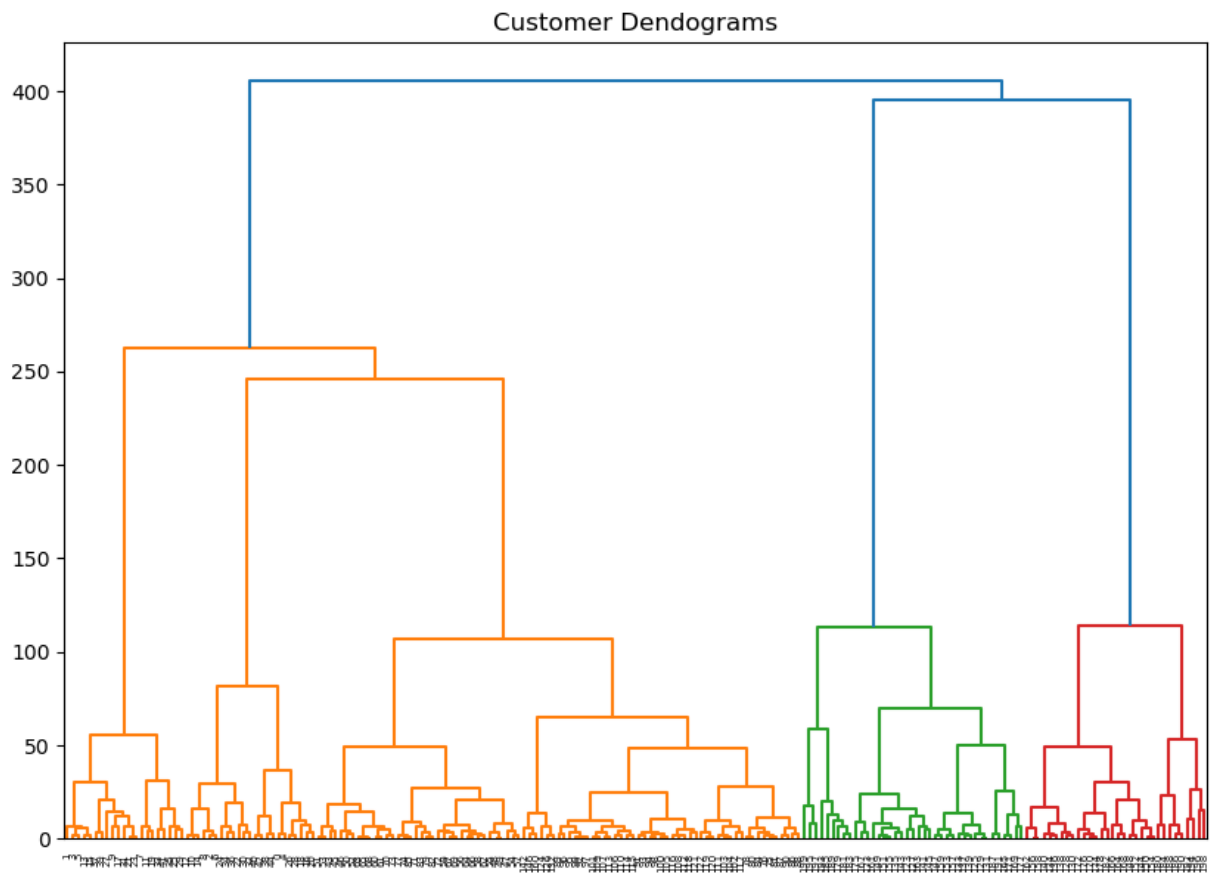
```
In [5]: data = customer_data.iloc[:, 3:5].values
```

```
In [7]: data
```

```
Out[7]: array([[ 15,  39],  
               [ 15,  81],  
               [ 16,   6],  
               [ 16,  77],  
               [ 17,  40],  
               [ 17,  76],  
               [ 18,   6],  
               [ 18,  94],  
               [ 19,   3],  
               [ 19,  72],  
               [ 19,  14],  
               [ 19,  99],  
               [ 20,  15],  
               [ 20,  77],  
               [ 20,  13],  
               [ 20,  79],  
               [ 21,  35],  
               [ 21,  66],  
               [ 23,  29],  
               [ 23,  66]]
```

```
In [8]: import scipy.cluster.hierarchy as shc
```

```
plt.figure(figsize=(10,7))
plt.title("Customer Dendograms")
dend = shc.dendrogram(shc.linkage(data, method='ward'))
```



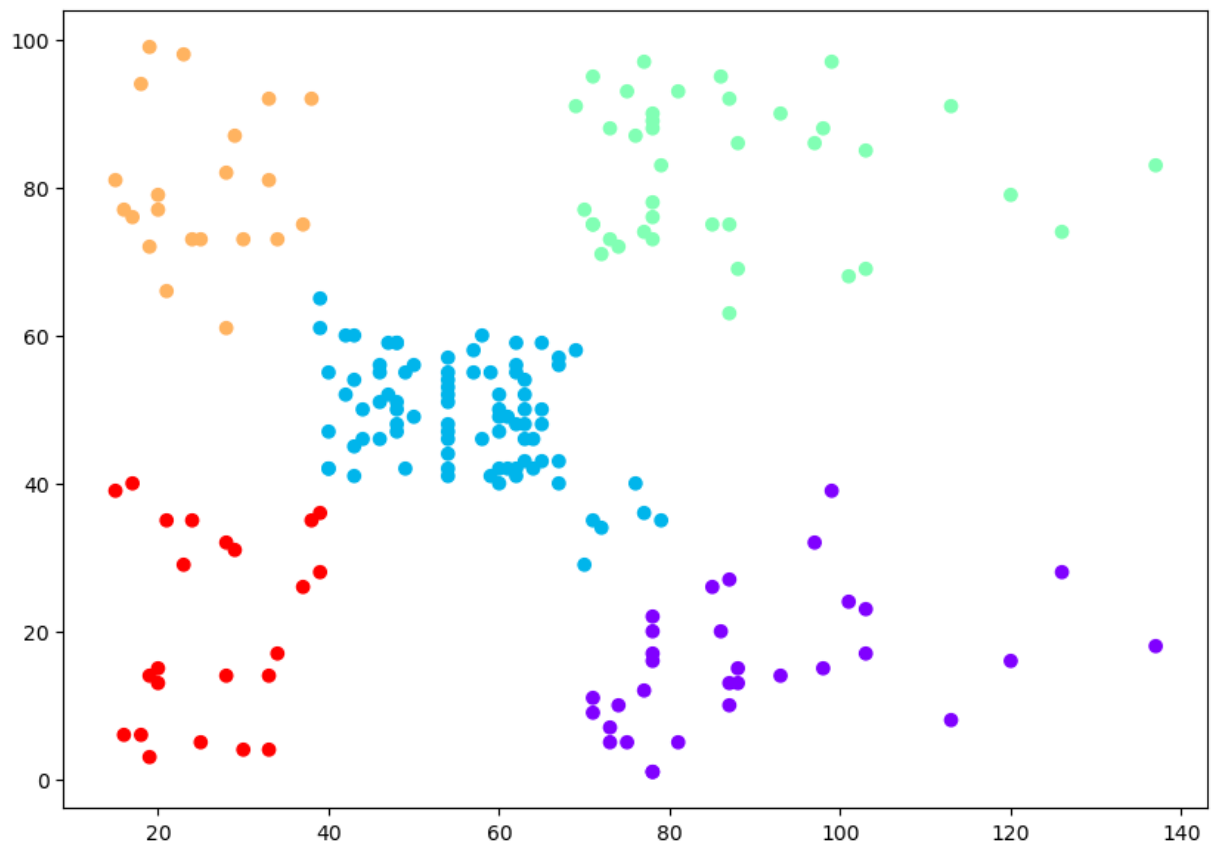
```
cluster = AgglomerativeClustering(n_clusters=5, affinity='euclidean', linkage='ward')
labels = cluster.fit_predict(data)
```

```
labels_
```

[illegible]

```
In [12]: plt.figure(figsize=(10, 7))  
plt.scatter(data[:,0], data[:,1], c=cluster.labels_, cmap='rainbow')
```

Out[12]: <matplotlib.collections.PathCollection at 0x15fbcf722b0>



In []: