```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline

df=pd.read_csv('Mall_Customers.csv')
df.info()
```

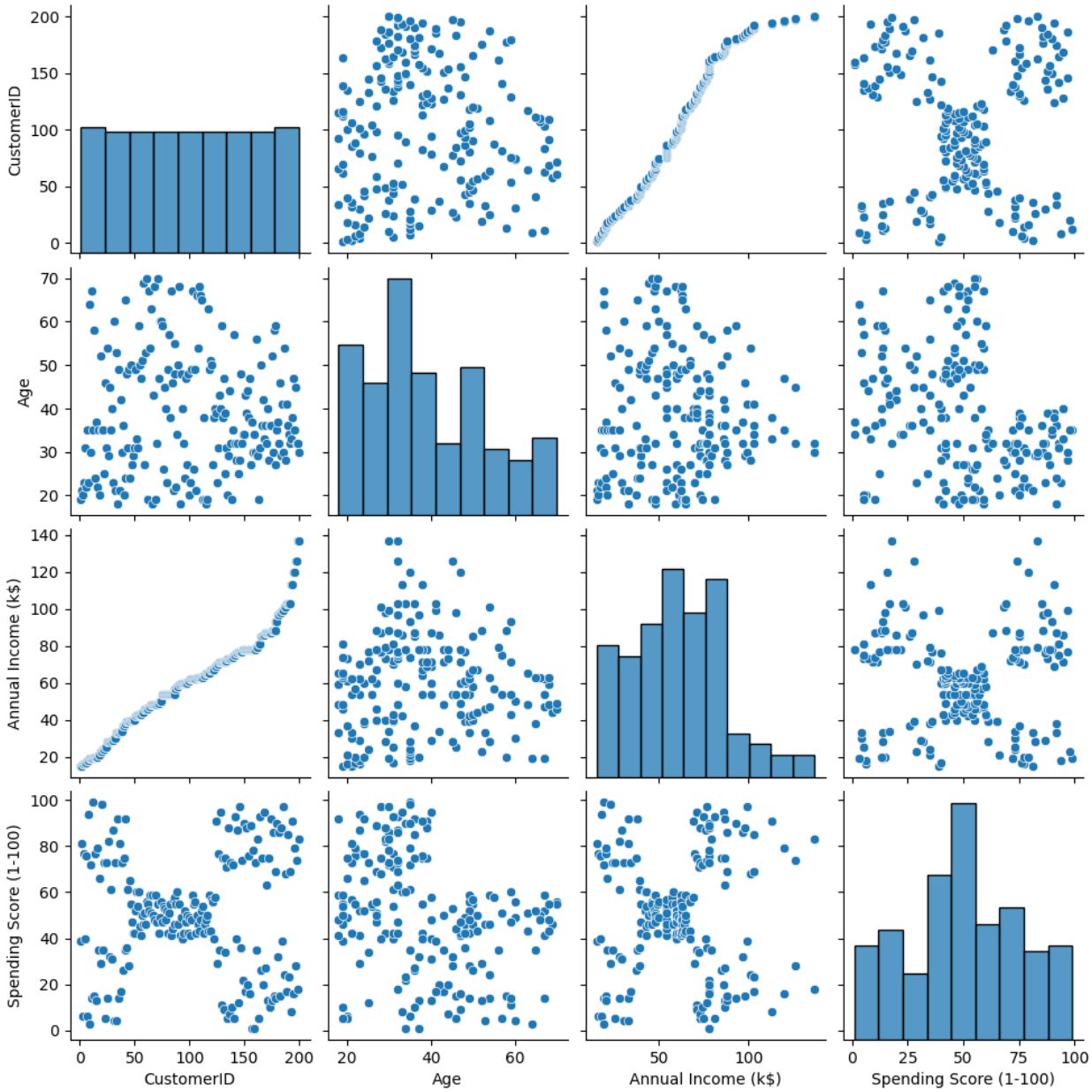
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 200 entries, 0 to 199
Data columns (total 5 columns):
 #   Column                  Non-Null Count  Dtype  
---  ------                  --------------  -----  
 0   CustomerID              200 non-null    int64  
 1   Gender                  200 non-null    object 
 2   Age                     200 non-null    int64  
 3   Annual Income (k$)      200 non-null    int64  
 4   Spending Score (1-100)  200 non-null    int64  
dtypes: int64(4), object(1)
memory usage: 7.9+ KB
```

```
df.head()
```

	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

```
sns.pairplot(df)
```

```
<seaborn.axisgrid.PairGrid at 0x11c2ceb0c48>
```

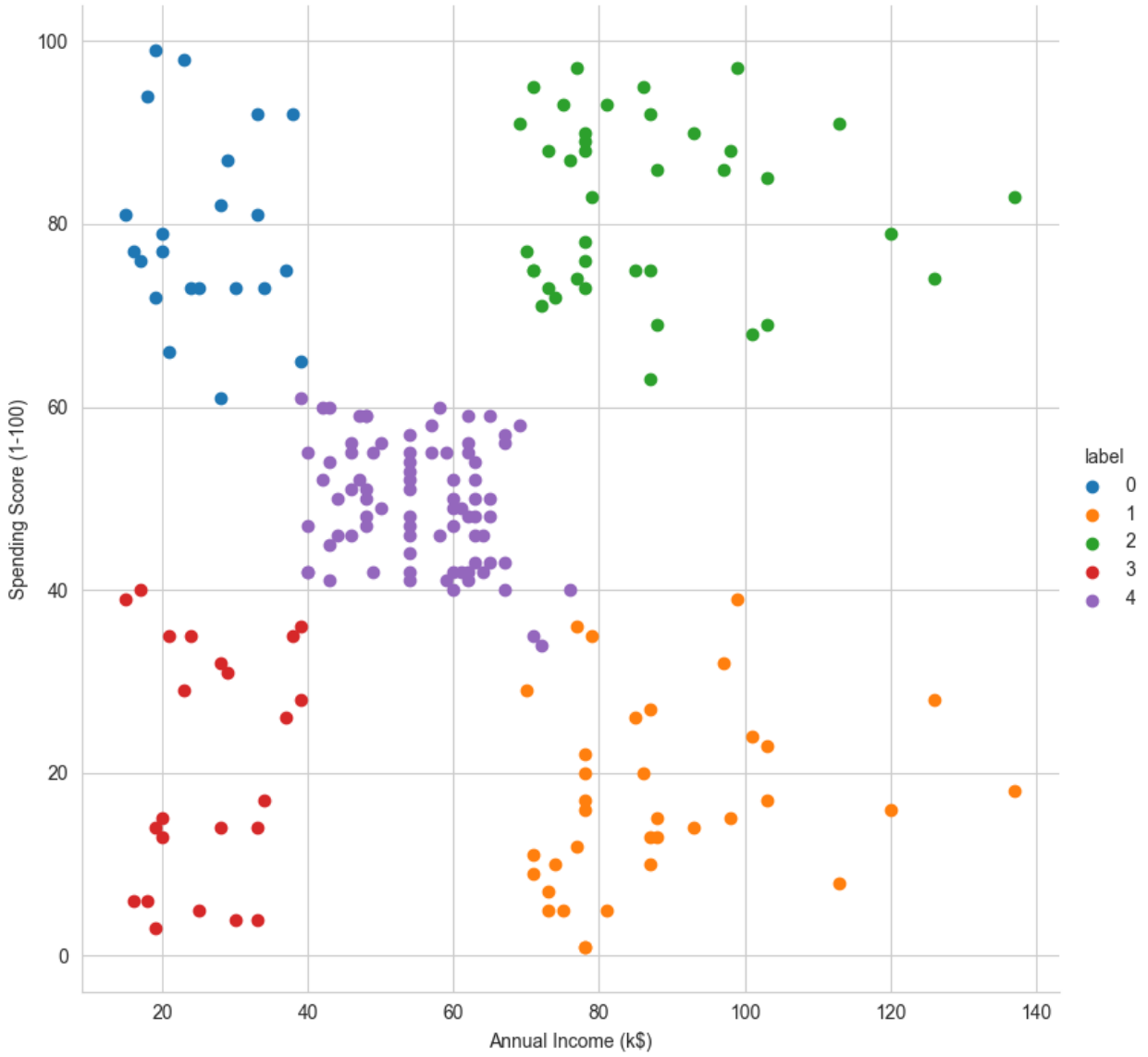



```
features=df.iloc[:,[3,4]].values

from sklearn.cluster import KMeans
model=KMeans(n_clusters=5)
model.fit(features)
KMeans(n_clusters=5)

KMeans(n_clusters=5)

Final=df.iloc[:,[3,4]]
Final['label']=model.predict(features)
Final.head()
```

```
c:\users\asus\appdata\local\programs\python\python37\lib\site-
packages\ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation:
https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#
returning-a-view-versus-a-copy
```

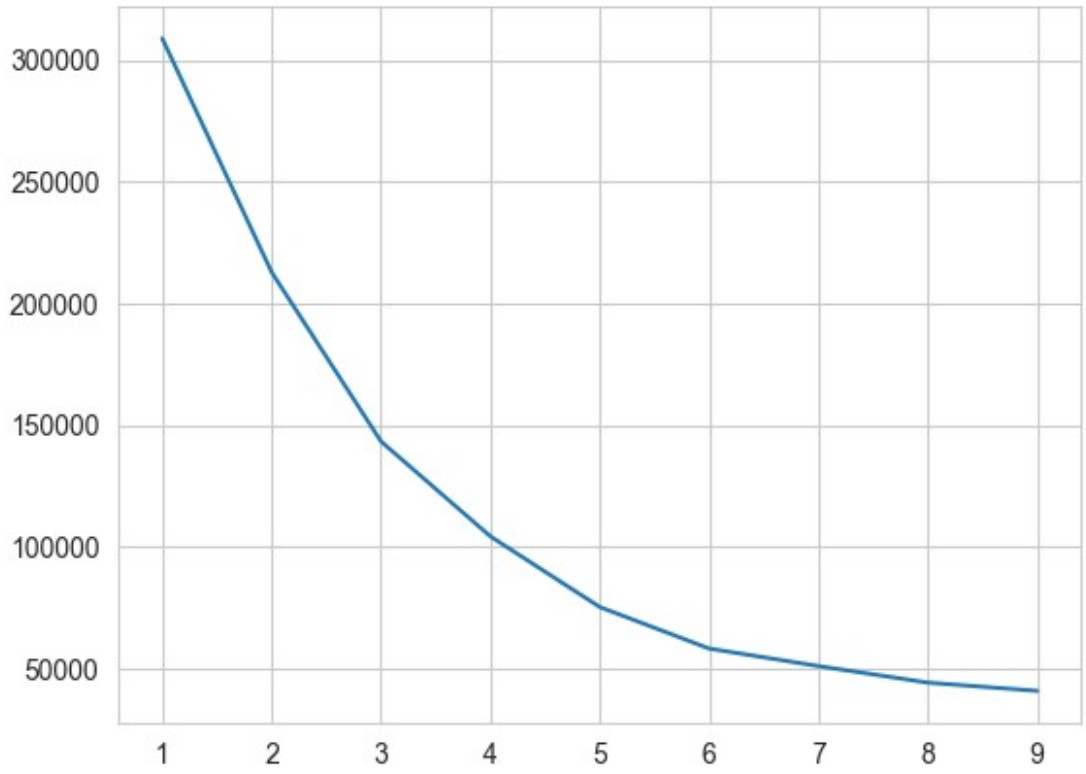
	Annual Income (k$)	Spending Score (1-100)	label
0	15	39	3
1	15	81	0
2	16	6	3
3	16	77	0
4	17	40	3

```
sns.set_style("whitegrid")
sns.FacetGrid(Final,hue="label",height=8) \
.map(plt.scatter,"Annual Income (k$)", "Spending Score (1-100)") \
.add_legend();
plt.show()
```




```
features_el=df.iloc[:,[2,3,4]].values
from sklearn.cluster import KMeans
wcss=[]
for i in range(1,10):
    model=KMeans(n_clusters=i)
    model.fit(features_el)
    wcss.append(model.inertia_)
plt.plot(range(1,10),wcss)
```

```
[<matplotlib.lines.Line2D at 0x11c30cd9a08>]
```


300000
250000
200000
150000
100000
50000
1
2
3
4
5
6
7
8
9