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

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

```
In [3]: 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
```
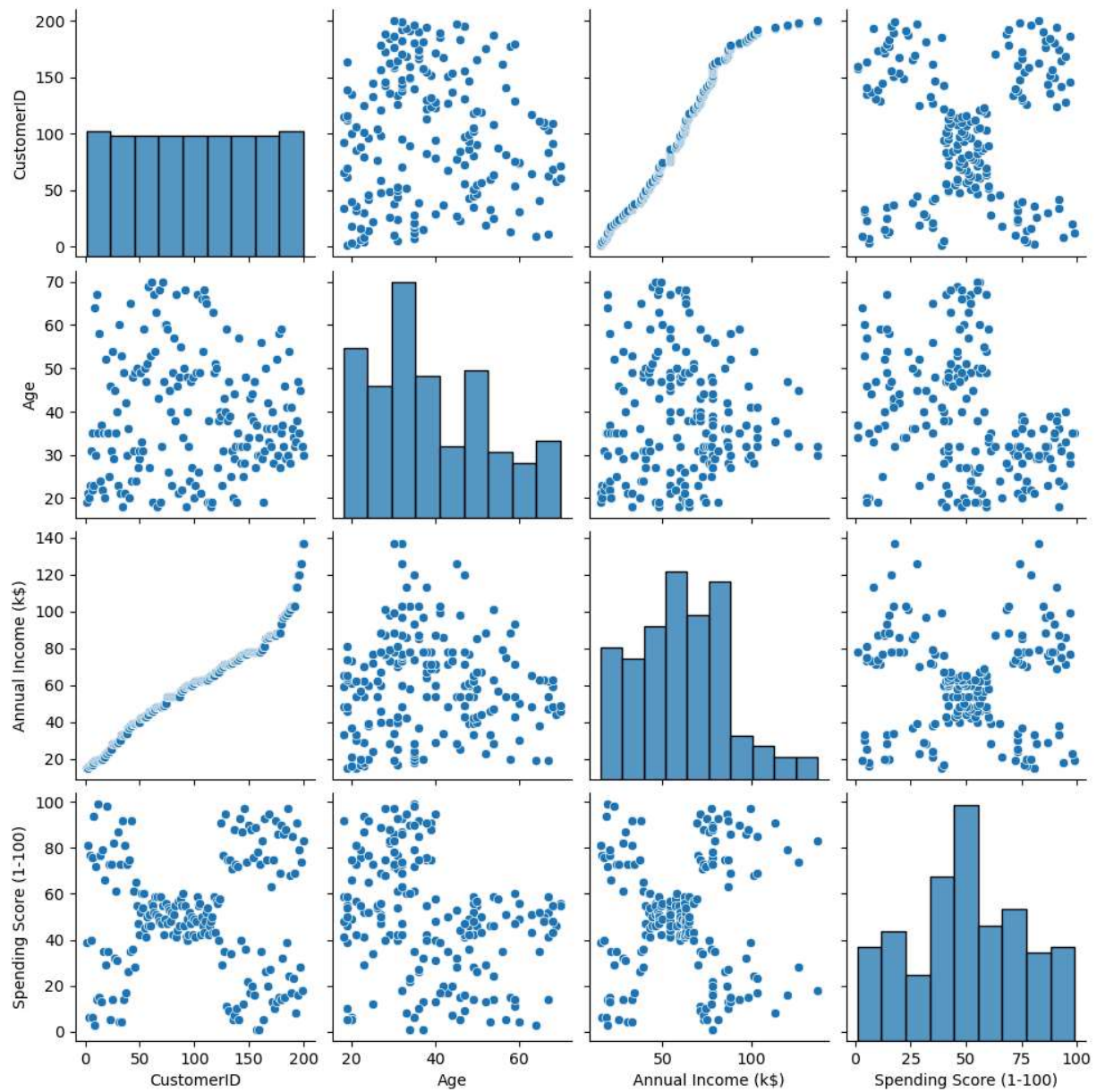
```
In [4]: df.head()
```

Out[4]:

	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 [5]: sns.pairplot(df)
```

```
Out[5]: <seaborn.axisgrid.PairGrid at 0x228a01472e0>
```



```
In [6]: features=df.iloc[:,[3,4]].values
```

```
In [7]:  from sklearn.cluster import KMeans
         model=KMeans(n_clusters=5)
         model.fit(features)
         KMeans(n_clusters=5)
```

C:\Users\lal shi\anaconda3\lib\site-packages\sklearn\cluster_kmeans.py:870: Fu
tureWarning: 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
  warnings.warn(
C:\Users\lal shi\anaconda3\lib\site-packages\sklearn\cluster_kmeans.py:1382: U
serWarning: KMeans is known to have a memory leak on Windows with MKL, when the
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ronment variable OMP_NUM_THREADS=1.
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```
Out[7]:   ▼          KMeans

          KMeans(n_clusters=5)
```

```
In [8]:  Final=df.iloc[:,[3,4]]
         Final['label']=model.predict(features)
         Final.head()
```
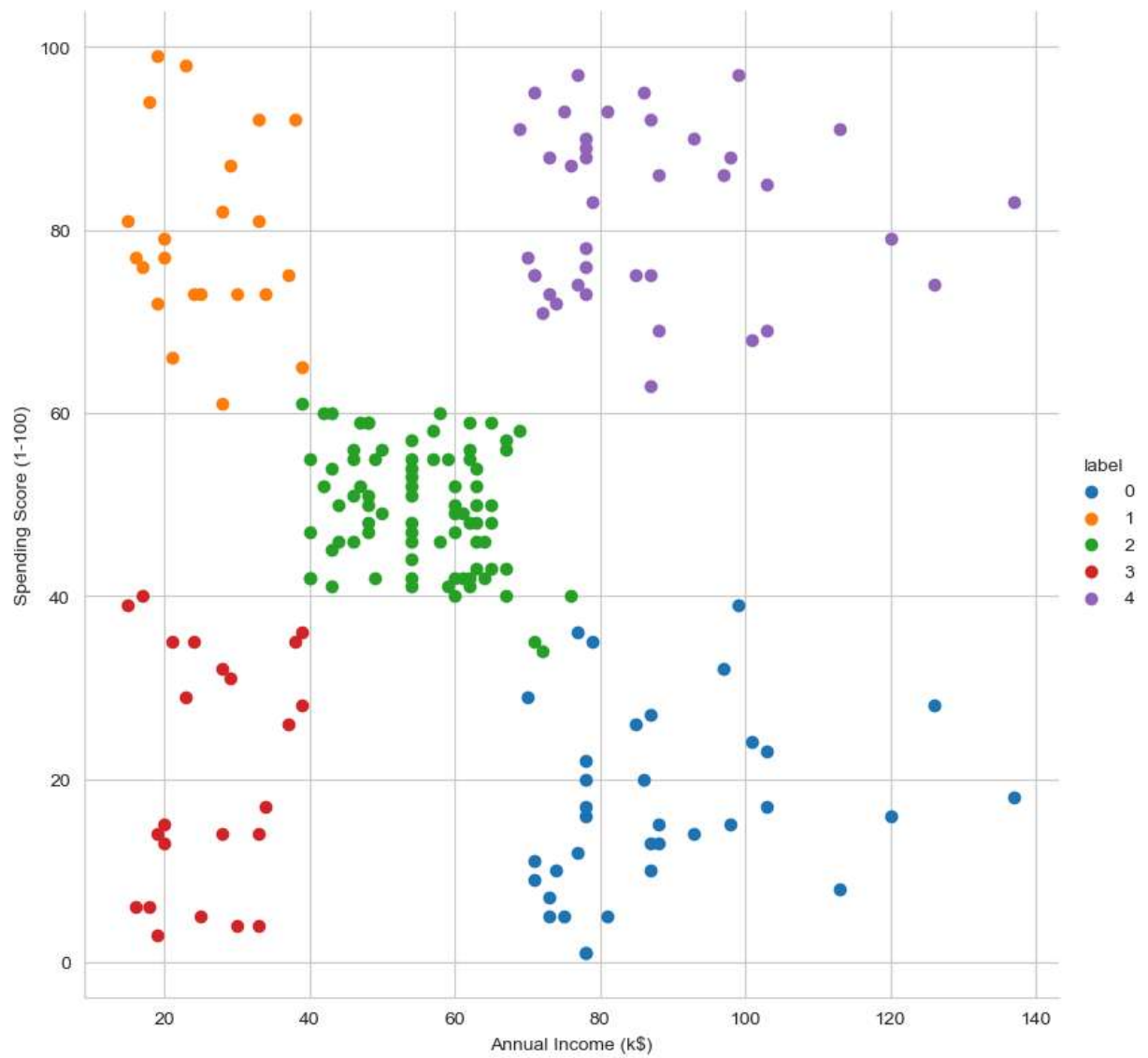
C:\Users\lal shi\AppData\Local\Temp\ipykernel_7836\470183701.py:2: SettingWithC
opyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/sta
ble/user_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pyd
ata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-c
opy)
  Final['label']=model.predict(features)

Out[8]:

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

```
In [9]: 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()
```
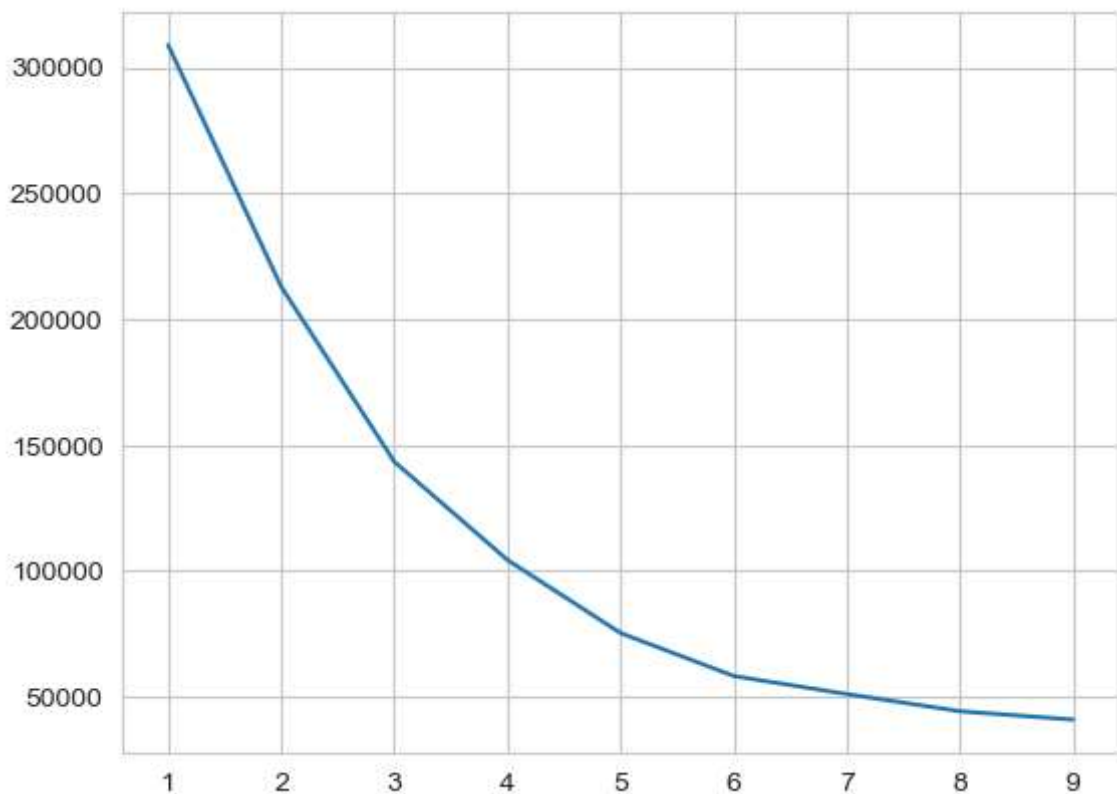
```
In [11]: features_el=df.iloc[:,[2,3,4]].values
         from sklearn.cluster import KMeans
         wcss=[]
         for i in range(1,10):
             model=KMeans(n_clusters=i)
             model.fit(features_el)
             wcss.append(model.inertia_)
         plt.plot(range(1,10),wcss)
```

```
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Out[11]: [<matplotlib.lines.Line2D at 0x228a3fa6e00>]

In [ ]: