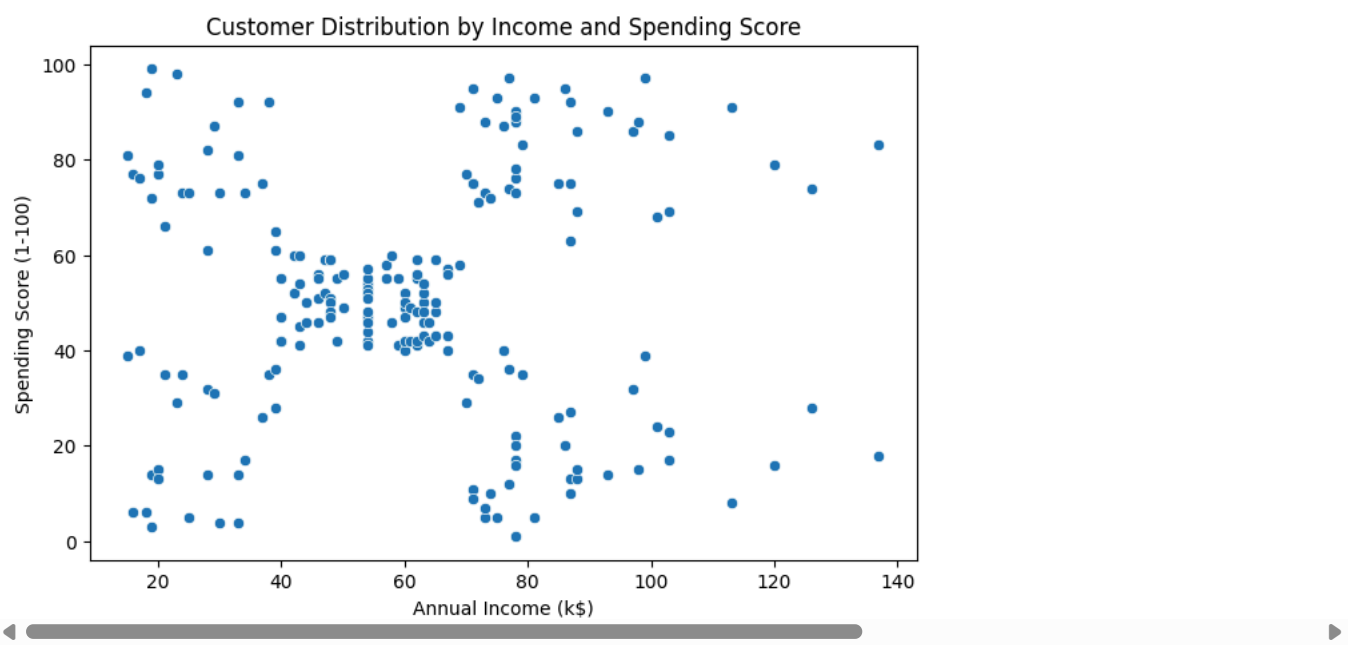
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.cluster import KMeans


data = pd.read_csv('Mall_Customers.csv')



print("Sample Data:\n", data.head())
```

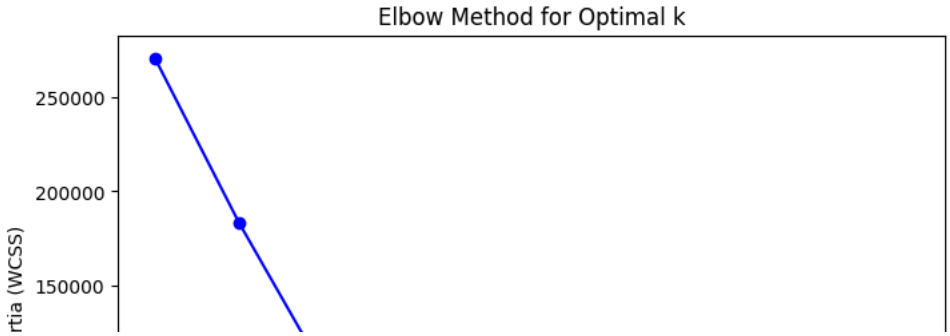
```
Sample Data:
   CustomerID  Gender  Age  Annual Income (k$)  Spending Score (1-100)
0           1    Male   19                  15                      39
1           2    Male   21                  15                      81
2           3  Female   20                  16                       6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

```
X = data[['Annual Income (k$)', 'Spending Score (1-100)']]


plt.figure(figsize=(8, 5))
sns.scatterplot(x='Annual Income (k$)', y='Spending Score (1-100)', data=X)
plt.title("Customer Distribution by Income and Spending Score")
plt.show()
```




```
inertia = []
K = range(1, 11)
for k in K:
    model = KMeans(n_clusters=k, random_state=42)
    model.fit(X)
    inertia.append(model.inertia_)


plt.figure(figsize=(8, 5))
plt.plot(K, inertia, 'bo-')
plt.xlabel('Number of Clusters')
plt.ylabel('Inertia (WCSS)')
plt.title('Elbow Method for Optimal k')
plt.show()
```

What can I help you build?




```
k_optimal = 5
kmeans = KMeans(n_clusters=k_optimal, random_state=42)
clusters = kmeans.fit_predict(X)
```

```
data['Cluster'] = clusters
```

```
plt.figure(figsize=(8, 5))
sns.scatterplot(x='Annual Income (k$)', y='Spending Score (1-100)',
                hue='Cluster', palette='Set1', data=data)
plt.title("Customer Segments")
plt.legend()
plt.show()
```