In [1]:
```python
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.cluster import KMeans
import seaborn as sns
```

In [2]:
```python
# Load the dataset
file_path = 'Mall_Customers.csv'
data = pd.read_csv(file_path)
```

In [3]:
```python
X = data[['Annual Income (k$)', 'Spending Score (1-100)']]
```

In [4]:
```python
inertia = []
for n in range(1, 11):
    kmeans = KMeans(n_clusters=n, random_state=42)
    kmeans.fit(X)
    inertia.append(kmeans.inertia_)
```

```
C:\Users\vibha\Downloads\Anaconda\Lib\site-packages\sklearn\cluster\_kmeans.py:1412: FutureWarning: The default value of `n_init` will change from 10 to 'auto' in 1.4. Set the valu
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  warnings.warn(
```
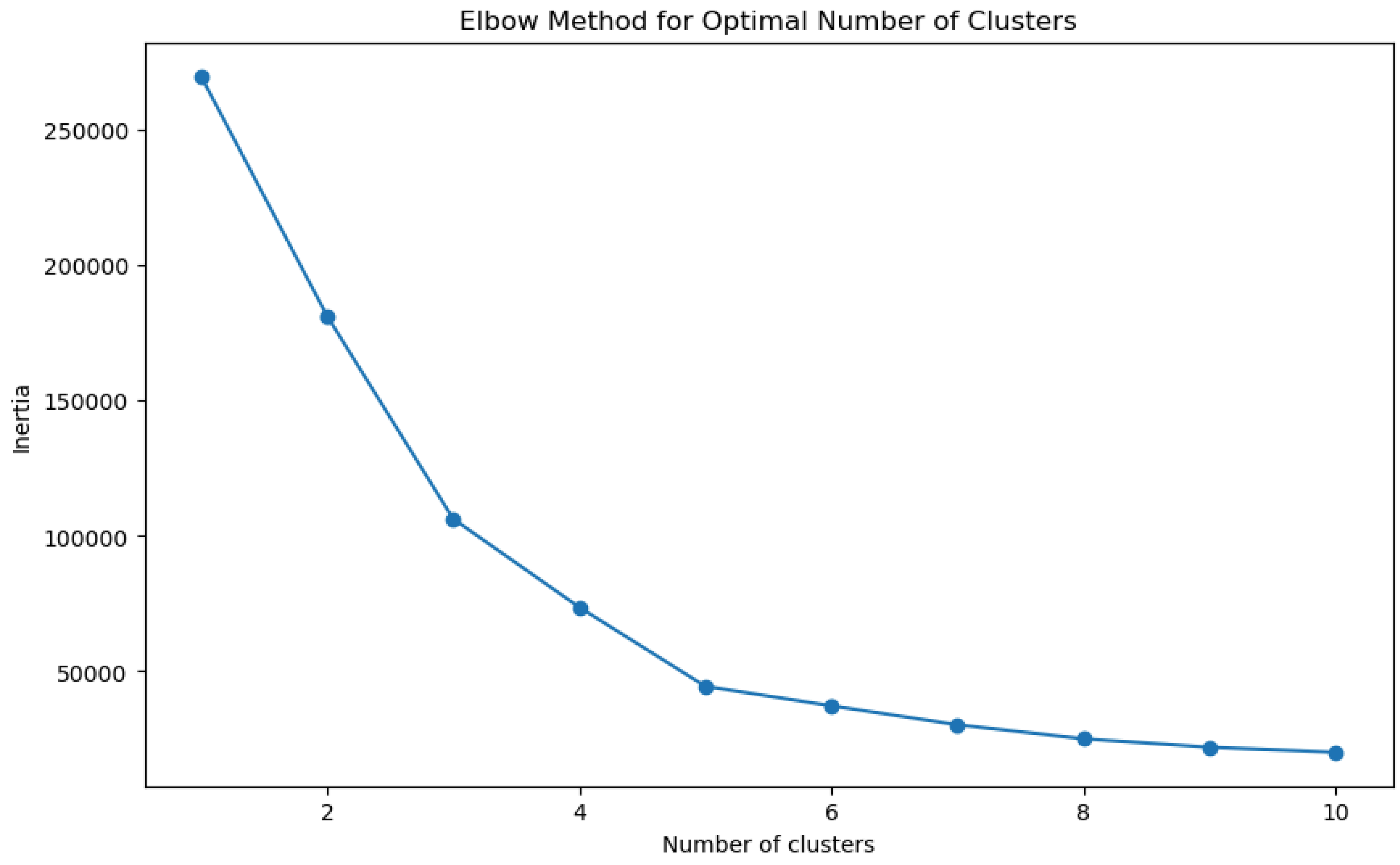

In [5]:
```python
# Plotting the elbow graph
plt.figure(figsize=(10, 6))
plt.plot(range(1, 11), inertia, marker='o')
plt.title('Elbow Method for Optimal Number of Clusters')
plt.xlabel('Number of clusters')
plt.ylabel('Inertia')
plt.show()
```



In [6]:
```python
# Applying K-means with 5 clusters
kmeans = KMeans(n_clusters=5, random_state=42)
data['Cluster'] = kmeans.fit_predict(X)
```

```
C:\Users\vibha\Downloads\Anaconda\Lib\site-packages\sklearn\cluster\_kmeans.py:1412: FutureWarning: The default value of `n_init` will change from 10 to 'auto' in 1.4. Set the valu
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nks than available threads. You can avoid it by setting the environment variable OMP_NUM_THREADS=1.
  warnings.warn(
```
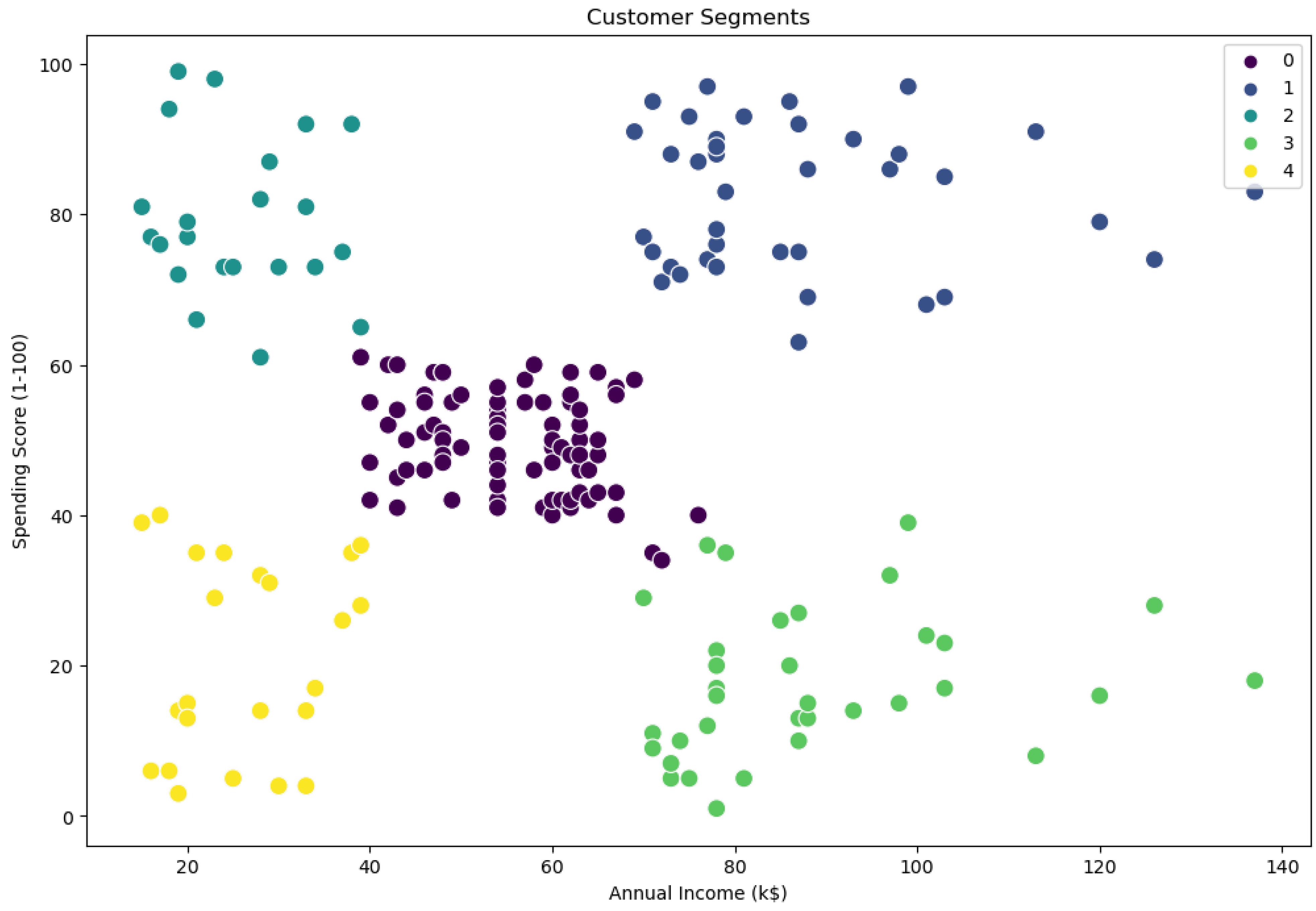

In [7]:
```python
# Visualizing the clusters
plt.figure(figsize=(12, 8))
sns.scatterplot(data=data, x='Annual Income (k$)', y='Spending Score (1-100)', hue='Cluster', palette='viridis', s=100)
plt.title('Customer Segments')
plt.xlabel('Annual Income (k$)')
plt.ylabel('Spending Score (1-100)')
plt.legend()
plt.show()
```



In [8]:
```python
# Display the first few rows with cluster labels
print(data.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

   Cluster
0        4
1        2
2        4
3        2
4        4
```

In [ ]: