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

```
# Set random seed for reproducibility
np.random.seed(42)

# Generate sample data
data = {
    'Age Group': np.random.choice(['18-25', '26-35', '36-45', '46-60'], size=100),
    'Income': np.random.randint(20000, 120000, size=100),
    'Spending Score': np.random.randint(1, 100, size=100)
}

# Create DataFrame
df = pd.DataFrame(data)

# Display first few rows
df.head()
```

	Age Group	Income	Spending Score
0	36-45	65758	44
1	46-60	92409	84
2	18-25	91211	30
3	36-45	85697	62
4	36-45	57065	75

```
summary = df.groupby('Age Group')['Income'].describe()
print(summary)
```

```
           count          mean           std      min       25%      50%  \
Age Group
18-25       20.0  83053.850000  30924.536900  22695.0  58732.00  95393.0
26-35       26.0  66780.653846  30907.652141  20206.0  42389.75  63071.0
36-45       24.0  75108.708333  30968.890335  21016.0  56088.50  79689.5
46-60       30.0  69561.566667  27153.724324  22568.0  44938.50  72624.0

                75%       max
Age Group
18-25      107175.00  119299.0
26-35       86683.25  118806.0
36-45      104083.25  118018.0
46-60       92284.25  113426.0
```

```
stats = df.groupby('Age Group')['Income'].agg(['mean', 'median', 'min', 'max', 'std'])
print(stats)
```

```
                   mean   median    min     max           std
Age Group
18-25      83053.850000  95393.0  22695  119299  30924.536900
26-35      66780.653846  63071.0  20206  118806  30907.652141
36-45      75108.708333  79689.5  21016  118018  30968.890335
46-60      69561.566667  72624.0  22568  113426  27153.724324
```

```
age_income_list = df.groupby('Age Group')['Income'].apply(list).to_dict()
print(age_income_list)
```

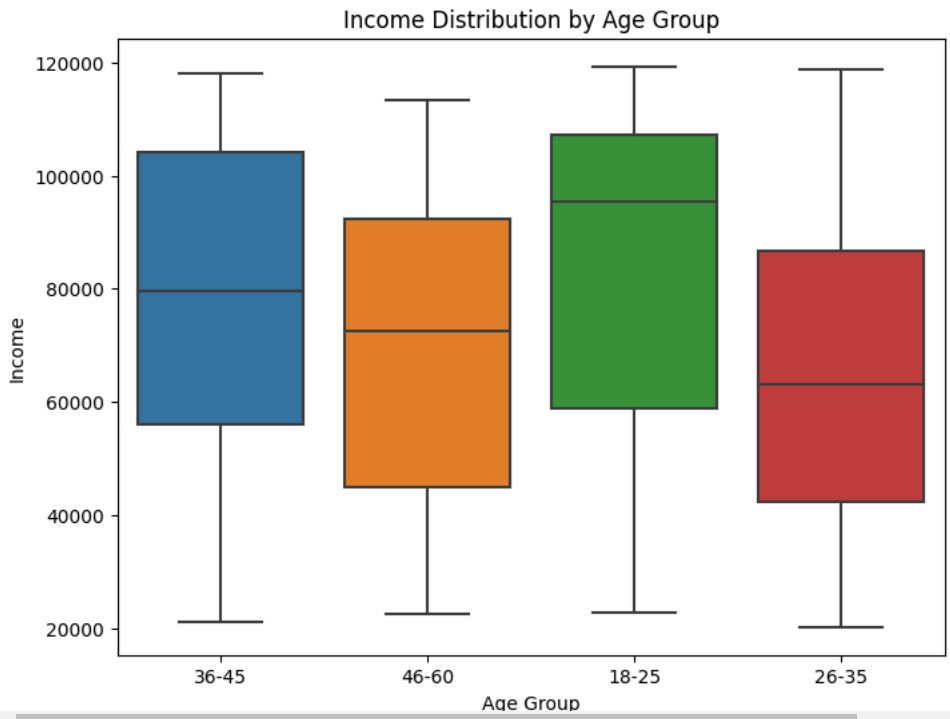
```
{'18-25': [91211, 119299, 52606, 109812, 106807, 68984, 60774, 22695, 25258, 107538, 99575, 104651, 44538, 90592, 47266, 110982, 107
```

```
spending_stats = df.groupby('Age Group')['Spending Score'].agg(['mean', 'std', lambda x: np.percentile(x, 25), lambda x: np.percentile(
spending_stats.columns = ['Mean', 'Std Dev', '25th Percentile', '75th Percentile']
print(spending_stats)
```

```
                Mean    Std Dev  25th Percentile  75th Percentile
Age Group
18-25      54.350000  26.886261            32.25            70.50
26-35      51.538462  31.877554            31.25            78.25
36-45      53.416667  32.388829            33.75            75.50
```

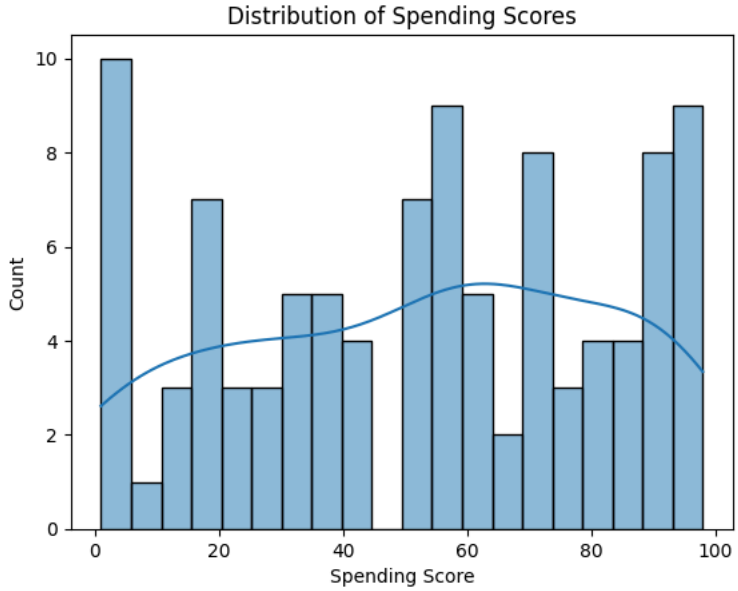
```
       46-60      51.366667  30.690314           23.25            81.25
```

```
plt.figure(figsize=(8,6))
sns.boxplot(x='Age Group', y='Income', data=df)
plt.title('Income Distribution by Age Group')
plt.show()
```




```
sns.histplot(df['Spending Score'], kde=True, bins=20)
plt.title('Distribution of Spending Scores')
plt.show()
```

```
/usr/local/lib/python3.10/dist-packages/seaborn/_oldcore.py:1119: FutureWarning: use_inf_as_na option is deprecated and will be remo
  with pd.option_context('mode.use_inf_as_na', True):
```




```
stats.to_csv('/kaggle/working/summary_statistics.csv', index=True)
```