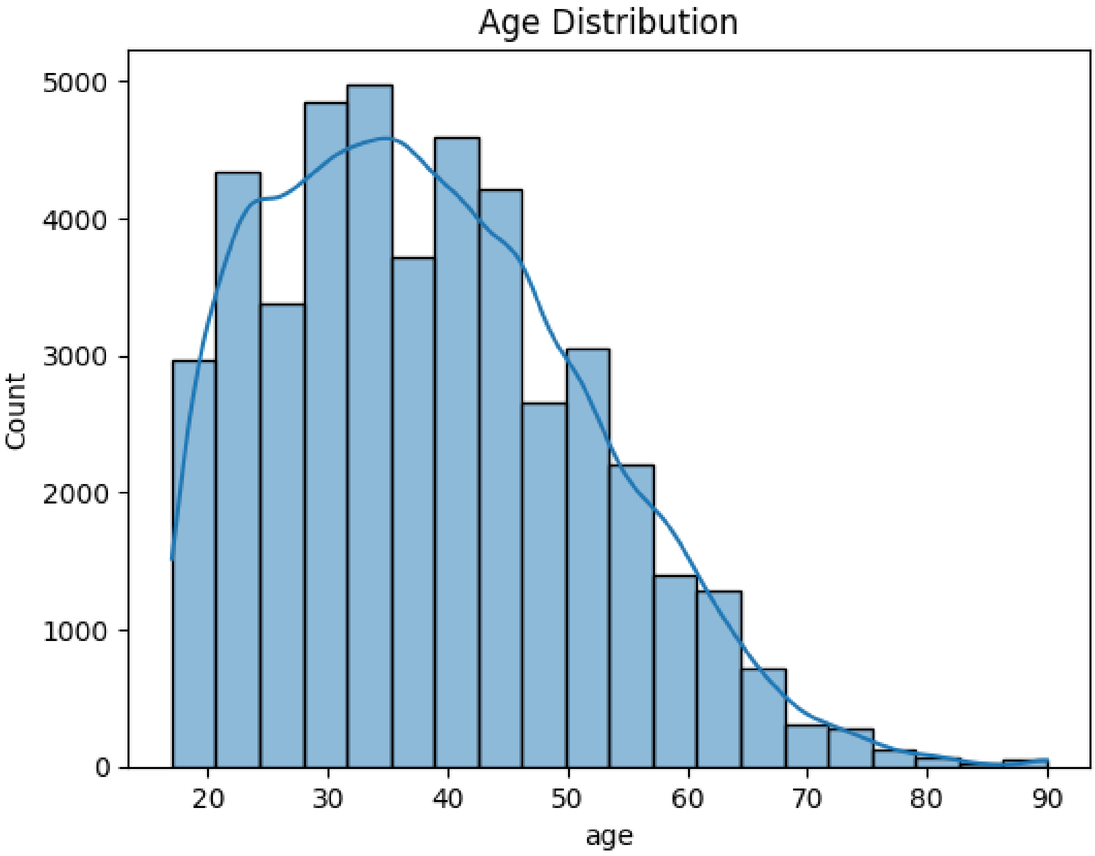
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt

df = pd.read_csv('adult_dataset.csv')

df.head()

   age  workclass  fnlwgt     education  educational-num      marital-
status  \
0   25    Private  226802          11th                7       Never-
married
1   38    Private   89814        HS-grad                9  Married-civ-
spouse
2   28  Local-gov  336951    Assoc-acdm               12  Married-civ-
spouse
3   44    Private  160323  Some-college               10  Married-civ-
spouse
4   18          ?  103497  Some-college               10       Never-
married

          occupation relationship   race  gender  capital-gain
capital-loss  \
0  Machine-op-inspct    Own-child  Black    Male             0
0
1    Farming-fishing       Husband  White    Male             0
0
2    Protective-serv       Husband  White    Male             0
0
3  Machine-op-inspct       Husband  Black    Male          7688
0
4                  ?    Own-child  White  Female             0
0

   hours-per-week native-country income
0              40  United-States  <=50K
1              50  United-States  <=50K
2              40  United-States   >50K
3              40  United-States   >50K
4              30  United-States  <=50K

df.replace('?', pd.NA, inplace=True)

# Drop rows with missing values
df.dropna(inplace=True)

# Ensure that there are no negative values in columns where they
shouldn't be
df = df[df['age'] >= 0]
df = df[df['fnlwgt'] >= 0]
df = df[df['capital-gain'] >= 0]
df = df[df['capital-loss'] >= 0]
df = df[df['hours-per-week'] >= 0]
```

Histograms Objective: To understand the distribution of a single continuous variable (e.g., age, hours-per-week). This helps identify skewness, central tendency, and spread.

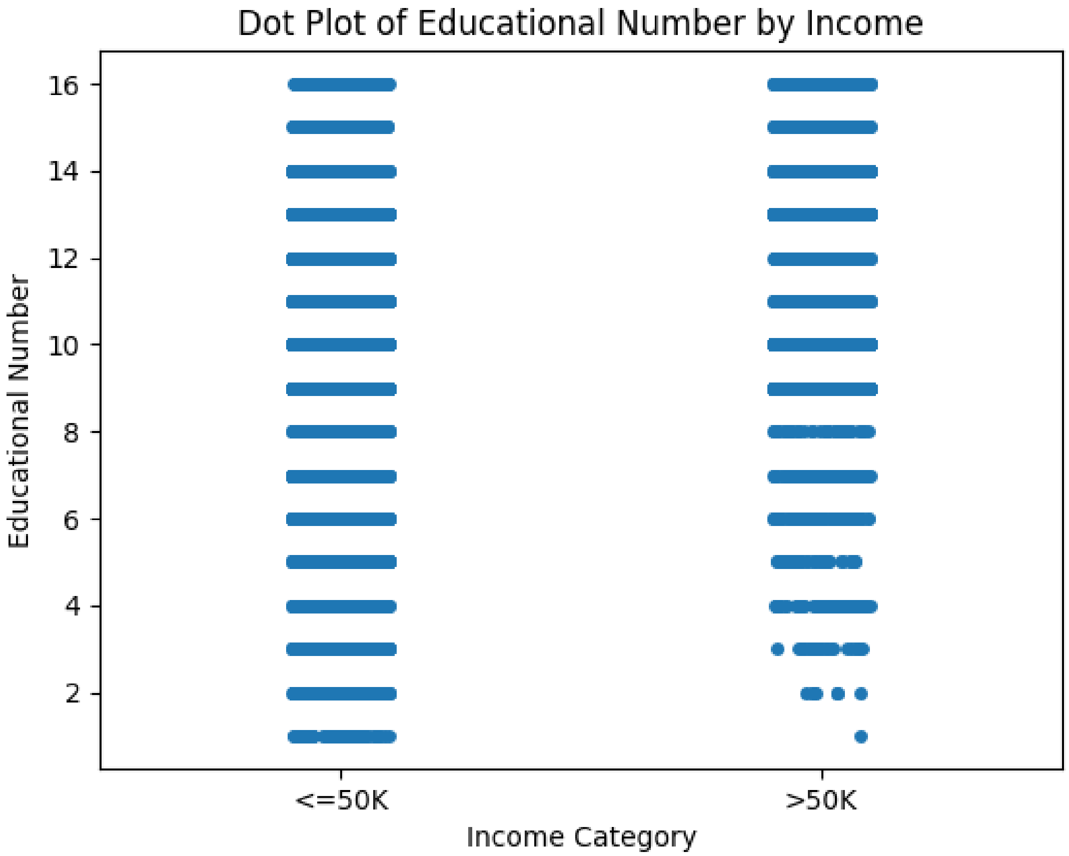
Example: Visualize how age is distributed among individuals in the dataset.

```
sns.histplot(data=df, x='age', bins=20, kde=True)
plt.title('Age Distribution')
plt.show()
```



Dot Plot: educational-num by income Objective: Show the distribution of education levels (as numbers) across income categories (<=50K vs >50K). This helps you visually compare the education level of individuals earning above and below 50K.

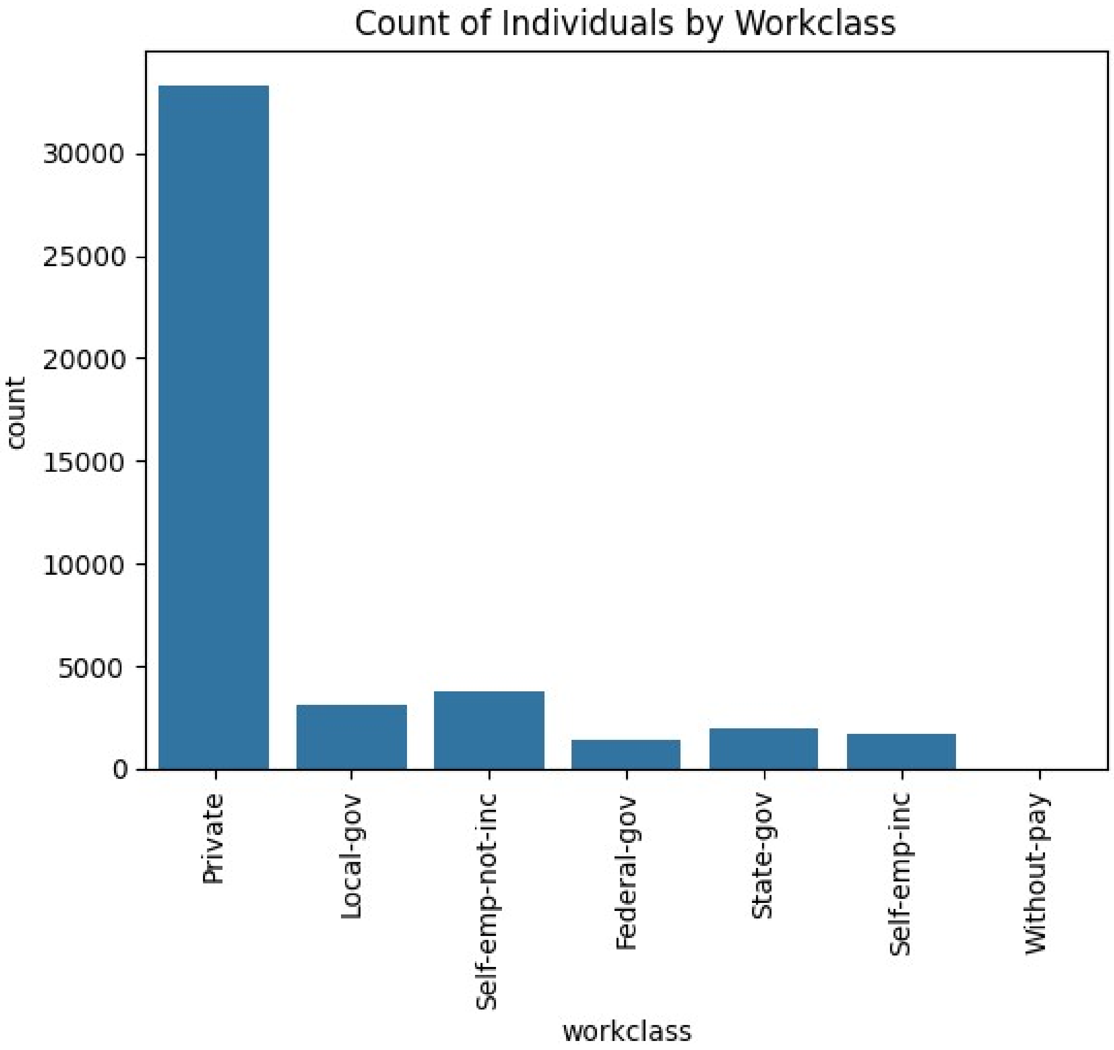
```
sns.stripplot(data=df, x='income', y='educational-num', jitter=True)
plt.title('Dot Plot of Educational Number by Income')
plt.xlabel('Income Category')
plt.ylabel('Educational Number')
plt.show()
```



Bar Plots □ Objective: To show the count or average of categories. Useful for comparing size/frequency of groups like workclass, income, etc.

Example: Compare number of people in each workclass.

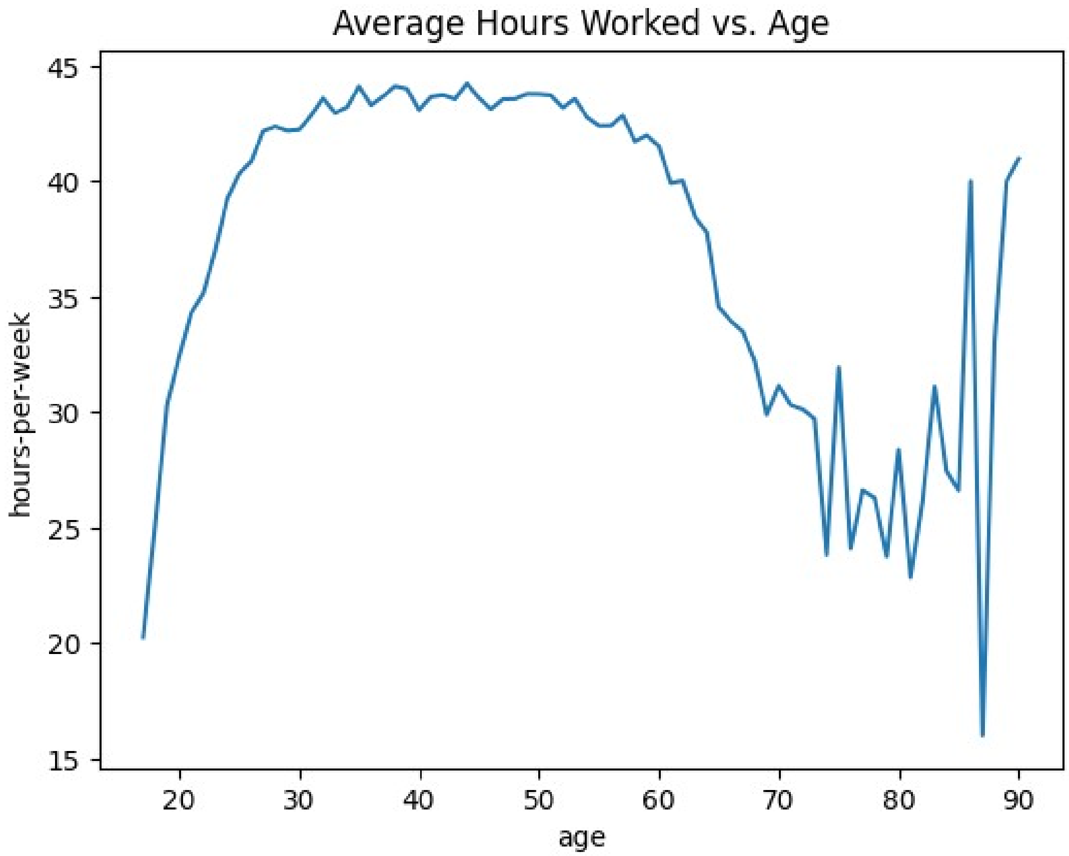
```
sns.countplot(data=df, x='workclass')
plt.xticks(rotation=90)
plt.title('Count of Individuals by Workclass')
plt.show()
```



Line Charts Objective: Best used for trends over time or ordered data. While this dataset isn't temporal, you could use it for trends like average hours-per-week over increasing age.

Example: Visualize average hours worked vs. age.

```
df_grouped = df.groupby('age')['hours-per-week'].mean().reset_index()
sns.lineplot(data=df_grouped, x='age', y='hours-per-week')
plt.title('Average Hours Worked vs. Age')
plt.show()
```

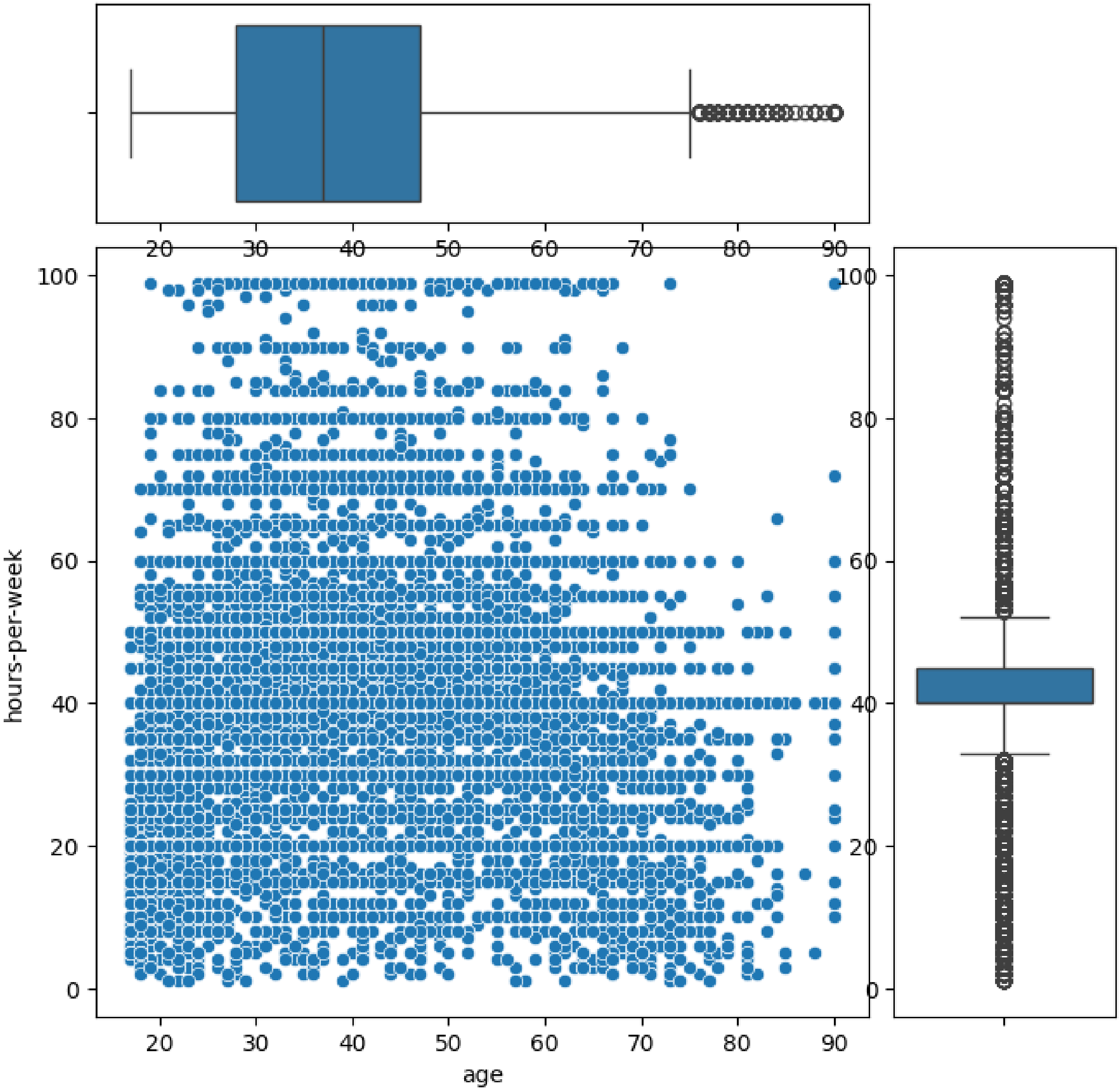


Box Plot + Histogram + Scatter Plot Combo Objective: To combine distribution, outliers, and relationships in one view. The scatter plot shows correlation, histograms show distributions, and boxplots reveal outliers.

Example: Visualize the relation between age and hours-per-week

```
import matplotlib.gridspec as gridspec

fig = plt.figure(figsize=(8, 8))
gs = gridspec.GridSpec(2, 2, width_ratios=[7, 2], height_ratios=[2,
7],
                       wspace=0.05, hspace=0.05)

ax_scatter = plt.subplot(gs[1, 0])
ax_histx = plt.subplot(gs[0, 0], sharex=ax_scatter)
ax_histy = plt.subplot(gs[1, 1], sharey=ax_scatter)

sns.scatterplot(x='age', y='hours-per-week', data=df, ax=ax_scatter)

sns.boxplot(x='age', data=df, ax=ax_histx, orient='h')
sns.boxplot(y='hours-per-week', data=df, ax=ax_histy, orient='v')

ax_histx.set(xlabel='')
ax_histy.set(ylabel='')
```

```
plt.show()
```


20
30
40
50
60
70
80
90
100
80
60
40
20
0
hours-per-week
age
100
80
60
40
20
0