

# Lab: Exploratory Data Analysis

Estimated time needed: **30** minutes

In this lab, you will work with a cleaned dataset to perform Exploratory Data Analysis or EDA.

## Objectives

In this lab, you will perform the following:

- Examine the structure of a dataset.
- Handle missing values effectively.
- Conduct summary statistics on key columns.
- Analyze employment status, job satisfaction, programming language usage, and trends in remote work.

## Hands on Lab

### Step 1: Install and Import Libraries

Install the necessary libraries for data manipulation and visualization.

```
In [1]: !pip install pandas
!pip install matplotlib
!pip install seaborn
!pip install numpy

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

Requirement already satisfied: pandas in /opt/conda/lib/python3.12/site-packages (2.3.0)  
Requirement already satisfied: numpy>=1.26.0 in /opt/conda/lib/python3.12/site-packages (from pandas) (2.3.0)  
Requirement already satisfied: python-dateutil>=2.8.2 in /opt/conda/lib/python3.12/site-packages (from pandas) (2.9.0.post0)  
Requirement already satisfied: pytz>=2020.1 in /opt/conda/lib/python3.12/site-packages (from pandas) (2024.2)  
Requirement already satisfied: tzdata>=2022.7 in /opt/conda/lib/python3.12/site-packages (from pandas) (2025.2)  
Requirement already satisfied: six>=1.5 in /opt/conda/lib/python3.12/site-packages (from python-dateutil>=2.8.2->pandas) (1.17.0)  
Requirement already satisfied: matplotlib in /opt/conda/lib/python3.12/site-packages (3.10.3)  
Requirement already satisfied: contourpy>=1.0.1 in /opt/conda/lib/python3.12/site-packages (from matplotlib) (1.3.2)  
Requirement already satisfied: cycler>=0.10 in /opt/conda/lib/python3.12/site-packages (from matplotlib) (0.12.1)  
Requirement already satisfied: fonttools>=4.22.0 in /opt/conda/lib/python3.12/site-packages (from matplotlib) (4.58.4)  
Requirement already satisfied: kiwisolver>=1.3.1 in /opt/conda/lib/python3.12/site-packages (from matplotlib) (1.4.8)  
Requirement already satisfied: numpy>=1.23 in /opt/conda/lib/python3.12/site-packages (from matplotlib) (2.3.0)  
Requirement already satisfied: packaging>=20.0 in /opt/conda/lib/python3.12/site-packages (from matplotlib) (24.2)  
Requirement already satisfied: pillow>=8 in /opt/conda/lib/python3.12/site-packages (from matplotlib) (11.2.1)  
Requirement already satisfied: pyparsing>=2.3.1 in /opt/conda/lib/python3.12/site-packages (from matplotlib) (3.2.3)  
Requirement already satisfied: python-dateutil>=2.7 in /opt/conda/lib/python3.12/site-packages (from matplotlib) (2.9.0.post0)  
Requirement already satisfied: six>=1.5 in /opt/conda/lib/python3.12/site-packages (from python-dateutil>=2.7->matplotlib) (1.17.0)  
Requirement already satisfied: seaborn in /opt/conda/lib/python3.12/site-packages (0.13.2)  
Requirement already satisfied: numpy!=1.24.0,>=1.20 in /opt/conda/lib/python3.12/site-packages (from seaborn) (2.3.0)  
Requirement already satisfied: pandas>=1.2 in /opt/conda/lib/python3.12/site-packages (from seaborn) (2.3.0)  
Requirement already satisfied: matplotlib!=3.6.1,>=3.4 in /opt/conda/lib/python3.12/site-packages (from seaborn) (3.10.3)  
Requirement already satisfied: contourpy>=1.0.1 in /opt/conda/lib/python3.12/site-packages (from matplotlib!=3.6.1,>=3.4->seaborn) (1.3.2)  
Requirement already satisfied: cycler>=0.10 in /opt/conda/lib/python3.12/site-packages (from matplotlib!=3.6.1,>=3.4->seaborn) (0.12.1)  
Requirement already satisfied: fonttools>=4.22.0 in /opt/conda/lib/python3.12/site-packages (from matplotlib!=3.6.1,>=3.4->seaborn) (4.58.4)  
Requirement already satisfied: kiwisolver>=1.3.1 in /opt/conda/lib/python3.12/site-packages (from matplotlib!=3.6.1,>=3.4->seaborn) (1.4.8)  
Requirement already satisfied: packaging>=20.0 in /opt/conda/lib/python3.12/site-packages (from matplotlib!=3.6.1,>=3.4->seaborn) (24.2)  
Requirement already satisfied: pillow>=8 in /opt/conda/lib/python3.12/site-packages (from matplotlib!=3.6.1,>=3.4->seaborn) (11.2.1)  
Requirement already satisfied: pyparsing>=2.3.1 in /opt/conda/lib/python3.12/site-packages (from matplotlib!=3.6.1,>=3.4->seaborn) (3.2.3)  
Requirement already satisfied: python-dateutil>=2.7 in /opt/conda/lib/python3.12/site-packages (from matplotlib!=3.6.1,>=3.4->seaborn) (2.9.0.post0)  
Requirement already satisfied: pytz>=2020.1 in /opt/conda/lib/python3.12/site-packages (from pandas>=1.2->seaborn) (2024.2)  
Requirement already satisfied: tzdata>=2022.7 in /opt/conda/lib/python3.12/site-packages (from pandas>=1.2->seaborn) (2025.2)  
Requirement already satisfied: six>=1.5 in /opt/conda/lib/python3.12/site-packages (from python-dateutil>=2.7->matplotlib!=3.6.1,>=3.4->seaborn) (1.17.0)  
Requirement already satisfied: numpy in /opt/conda/lib/python3.12/site-packages (2.3.0)

## Step 2: Load and Preview the Dataset

Load the dataset from the provided URL. Use `df.head()` to display the first few rows to get an overview of the structure.

```
In [2]: # Load the Stack Overflow survey dataset
data_url = 'https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/n01PQ9pSmiRX6520fluJ
df = pd.read_csv(data_url)

# Set pandas option to display all columns
pd.set_option('display.max_columns', None)
```

```
# Display the first few rows of the dataset
df.head()
```

Out [2]:

	ResponseId	MainBranch	Age	Employment	RemoteWork	Check	CodingActivities	EdLevel	
0	1	I am a developer by profession	Under 18 years old	Employed, full-time	Remote	Apples	Hobby	Primary/elementary school	E
1	2	I am a developer by profession	35-44 years old	Employed, full-time	Remote	Apples	Hobby;Contribute to open-source projects;Other...	Bachelor's degree (B.A., B.S., B.Eng., etc.)	E medi
2	3	I am a developer by profession	45-54 years old	Employed, full-time	Remote	Apples	Hobby;Contribute to open-source projects;Other...	Master's degree (M.A., M.S., M.Eng., MBA, etc.)	E medi
3	4	I am learning to code	18-24 years old	Student, full-time	NaN	Apples	NaN	Some college/university study without earning ...	vi
4	5	I am a developer by profession	18-24 years old	Student, full-time	NaN	Apples	NaN	Secondary school (e.g. American high school, G...	vi

Step 3: Handling Missing Data

Identify and manage missing values in critical columns such as `Employment` , `JobSat` , and `RemoteWork` . Implement a strategy to fill or drop these values, depending on the significance of the missing data.

```
## Write your code here
# Identify missing values for all columns by summing null (NaN) values
# Identify missing values for all columns by summing null (NaN) values
missing_employment_count = df['Employment'].isnull().sum()
missing_jobsat_count = df['JobSat'].isnull().sum()
missing_remotework_count = df['RemoteWork'].isnull().sum()

print(f"\nMissing values in 'Employment': {missing_employment_count}")
print(f"Missing values in 'JobSat': {missing_jobsat_count}")
print(f"Missing values in 'RemoteWork': {missing_remotework_count}")

#Implementing a strategy to fill these values

# Strategy: Impute categorical columns (like Employment, RemoteWork) with their most frequent value
# Impute numerical columns (like JobSat, if it's treated as numerical score) with median.

# Impute 'Employment'
if missing_employment_count > 0:
    # Ensure 'Employment' is treated as object/string for mode calculation
    df['Employment'] = df['Employment'].astype(str)
    most_frequent_employment = df['Employment'].mode()[0]
    df['Employment'].fillna(most_frequent_employment, inplace=True)
    print(f"\nImputed 'Employment' with its mode: '{most_frequent_employment}'")
else:
    print("\n'Employment' has no missing values. No imputation needed.")

# Impute 'RemoteWork'
if missing_remotework_count > 0:
    # Ensure 'RemoteWork' is treated as object/string for mode calculation
    df['RemoteWork'] = df['RemoteWork'].astype(str)
    most_frequent_remotework = df['RemoteWork'].mode()[0]
```

```

df['RemoteWork'].fillna(most_frequent_remotework, inplace=True)
print(f"Imputed 'RemoteWork' with its mode: '{most_frequent_remotework}'")
else:
    print("'RemoteWork' has no missing values. No imputation needed.")

# Impute 'JobSat' (assuming it's a numerical rating for median imputation)
if missing_jobsat_count > 0:
    # Ensure 'JobSat' is numeric before calculating median
    df['JobSat'] = pd.to_numeric(df['JobSat'], errors='coerce')
    median_jobsat = df['JobSat'].median()
    df['JobSat'].fillna(median_jobsat, inplace=True)
    print(f"Imputed 'JobSat' with its median: {median_jobsat:.2f}")
else:
    print("'JobSat' has no missing values. No imputation needed.")

# Verify missing values after handling
print("\nMissing values after Step 3 imputation for Employment, JobSat, RemoteWork:")
print(df[['Employment', 'JobSat', 'RemoteWork']].isnull().sum())

# Re-display basic DataFrame info to confirm types and non-null counts after imputation
print("\nDataFrame Info after Step 3 (Missing Data Handling):")
df.info()

```

```

Missing values in 'Employment': 0
Missing values in 'JobSat': 36311
Missing values in 'RemoteWork': 10631

```

```

'Employment' has no missing values. No imputation needed.
Imputed 'RemoteWork' with its mode: 'Hybrid (some remote, some in-person)'
Imputed 'JobSat' with its median: 7.00

```

```

Missing values after Step 3 imputation for Employment, JobSat, RemoteWork:
Employment      0
JobSat          0
RemoteWork      0
dtype: int64

```

```

DataFrame Info after Step 3 (Missing Data Handling):
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 65437 entries, 0 to 65436
Columns: 114 entries, ResponseId to JobSat
dtypes: float64(13), int64(1), object(100)
memory usage: 56.9+ MB

```

/tmp/ipykernel\_830/3583646650.py:32: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained assignment using an inplace method. The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting values always behaves as a copy.

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].method(value) instead, to perform the operation inplace on the original object.

```

df['RemoteWork'].fillna(most_frequent_remotework, inplace=True)
/tmp/ipykernel_830/3583646650.py:42: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained assignment using an inplace method.
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate
object on which we are setting values always behaves as a copy.

```

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].method(value) instead, to perform the operation inplace on the original object.

```

df['JobSat'].fillna(median_jobsat, inplace=True)

```

## Step 4: Analysis of Experience and Job Satisfaction

Analyze the relationship between years of professional coding experience ( `YearsCodePro` ) and job satisfaction ( `JobSat` ). Summarize `YearsCodePro` and calculate median satisfaction scores based on experience ranges.

- Create experience ranges for `YearsCodePro` (e.g., `0-5` , `5-10` , `10-20` , `>20` years).

- Calculate the median `JobSat` for each range.
- Visualize the relationship using a bar plot or similar visualization.

```
In [6]: ## Write your code here
# --- Step 4: Analysis of Experience and Job Satisfaction ---
print("\n--- Step 4: Analysis of Experience and Job Satisfaction ---")

# --- START FIX FOR TYPEERROR IN YearsCodePro ---
# Ensure 'YearsCodePro' is truly numeric. Coerce non-numeric to NaN, then fill NaNs.
if 'YearsCodePro' in df.columns:
    initial_years_code_pro_nans = df['YearsCodePro'].isnull().sum()
    df['YearsCodePro'] = pd.to_numeric(df['YearsCodePro'], errors='coerce')
    if df['YearsCodePro'].isnull().sum() > initial_years_code_pro_nans:
        print("Warning: Non-numeric values in 'YearsCodePro' were coerced to NaN.")

    # Fill any NaNs that might exist after coercion (or from previous steps)
    # Using median for numerical experience is robust to potential outliers.
    if df['YearsCodePro'].isnull().any():
        median_years_code_pro = df['YearsCodePro'].median()
        df['YearsCodePro'].fillna(median_years_code_pro, inplace=True)
        print(f"Missing/coerced values in 'YearsCodePro' imputed with median: {median_years_code_pro}")
else:
    print("Error: 'YearsCodePro' column not found in DataFrame. Cannot prepare for analysis.")
    # Exit or handle gracefully if the column is critical for subsequent steps
    # For now, let's proceed but the pd.cut will fail if YearsCodePro is missing.

# Ensure 'JobSat' is numeric and handle NaNs if not already done
if 'JobSat' in df.columns:
    df['JobSat'] = pd.to_numeric(df['JobSat'], errors='coerce')
    if df['JobSat'].isnull().any():
        median_jobsat = df['JobSat'].median()
        df['JobSat'].fillna(median_jobsat, inplace=True)
        print(f"Missing/coerced values in 'JobSat' imputed with median: {median_jobsat:.2f}")
else:
    print("Error: 'JobSat' column not found in DataFrame. Cannot prepare for analysis.")

if 'YearsCodePro' in df.columns and 'JobSat' in df.columns:
    # 1. Create experience ranges for YearsCodePro
    # Define bins ensuring that 'YearsCodePro' is treated as a continuous numerical variable
    bins = [-1, 5, 10, 20, np.inf] # -1 to catch 0 years, np.inf for >20
    labels = ['0-5 years', '5-10 years', '10-20 years', '>20 years']

    # Use pd.cut to categorize YearsCodePro into ranges
    # The 'right=False' means the bin interval is [left, right), e.g., [0, 5)
    df['YearsCodePro_Range'] = pd.cut(df['YearsCodePro'], bins=bins, labels=labels, right=False)
    print("\n'YearsCodePro_Range' column created:")
    print(df['YearsCodePro_Range'].value_counts().sort_index())

    # 2. Calculate the median JobSat for each range
    median_jobsat_by_experience = df.groupby('YearsCodePro_Range')['JobSat'].median()
    print("\nMedian JobSat by Experience Range:")
    print(median_jobsat_by_experience)

    # 3. Visualize the relationship using a bar plot
    plt.figure(figsize=(10, 6))
    sns.barplot(x=median_jobsat_by_experience.index, y=median_jobsat_by_experience.values, palette=
plt.title('Median Job Satisfaction by Years of Professional Coding Experience')
plt.xlabel('Years of Professional Coding Experience')
plt.ylabel('Median Job Satisfaction')
plt.xticks(rotation=45, ha='right')
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()
plt.show()

else:
    print("Required columns ('YearsCodePro' or 'JobSat') not found or are not properly prepared. Ca
```

--- Step 4: Analysis of Experience and Job Satisfaction ---  
Warning: Non-numeric values in 'YearsCodePro' were coerced to NaN.  
Missing/coerced values in 'YearsCodePro' imputed with median: 8

'YearsCodePro\_Range' column created:

```
YearsCodePro_Range
0-5 years          14115
5-10 years         29661
10-20 years        13327
>20 years          8334
```

Name: count, dtype: int64

Median JobSat by Experience Range:

```
YearsCodePro_Range
0-5 years          7.0
5-10 years          7.0
10-20 years         7.0
>20 years           7.0
```

Name: JobSat, dtype: float64

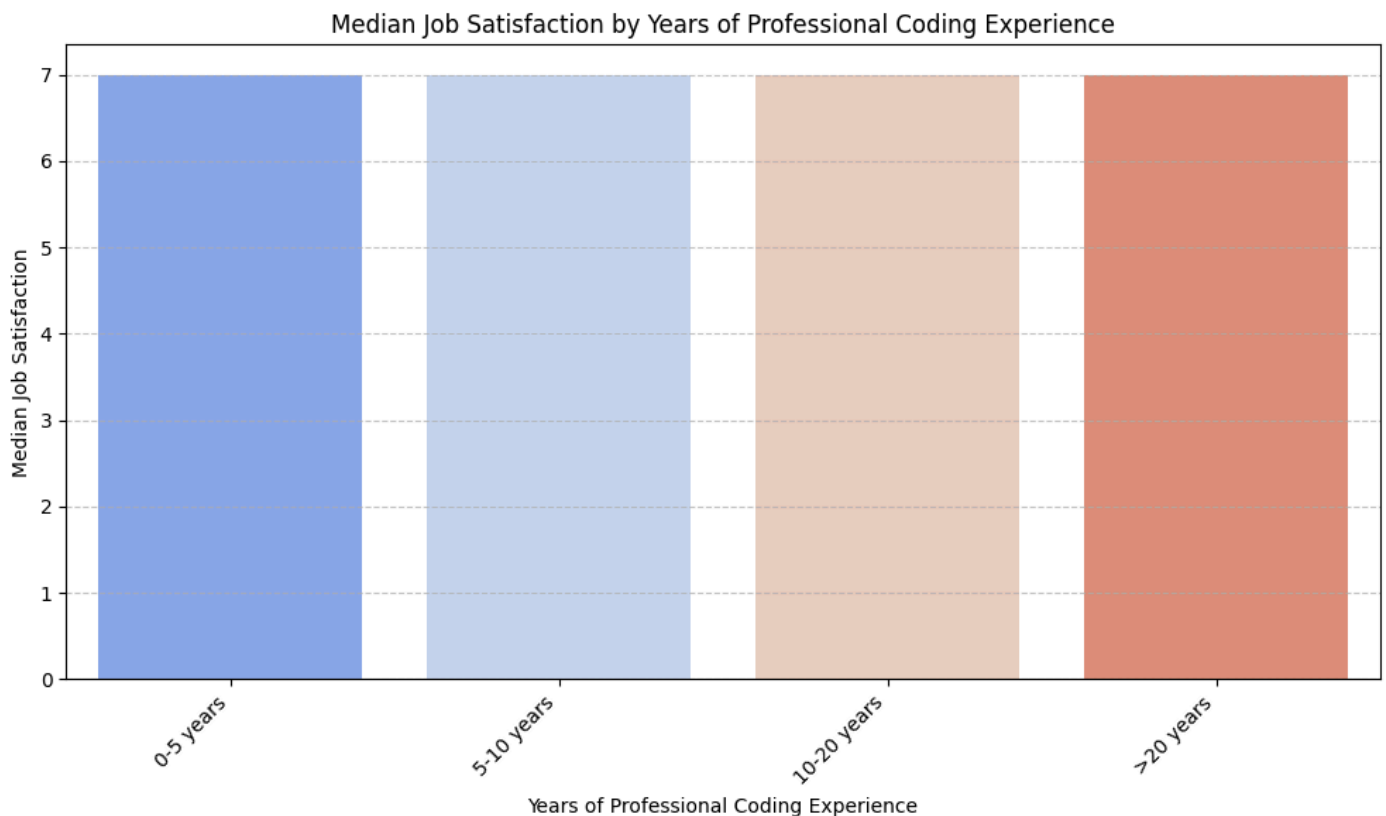
/tmp/ipykernel\_830/3802497401.py:17: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained assignment using an inplace method.  
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting values always behaves as a copy.

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].method(value) instead, to perform the operation inplace on the original object.

```
df['YearsCodePro'].fillna(median_years_code_pro, inplace=True)
/tmp/ipykernel_830/3802497401.py:48: FutureWarning: The default of observed=False is deprecated and will be changed to True in a future version of pandas. Pass observed=False to retain current behavior or observed=True to adopt the future default and silence this warning.
median_jobsat_by_experience = df.groupby('YearsCodePro_Range')['JobSat'].median()
/tmp/ipykernel_830/3802497401.py:54: FutureWarning:
```

Passing 'palette' without assigning 'hue' is deprecated and will be removed in v0.14.0. Assign the 'x' variable to 'hue' and set 'legend=False' for the same effect.

```
sns.barplot(x=median_jobsat_by_experience.index, y=median_jobsat_by_experience.values, palette='colorwarm')
```



## Step 5: Visualize Job Satisfaction

Use a count plot to show the distribution of `JobSat` values. This provides insights into the overall satisfaction levels of respondents.

```
In [7]: ## Write your code here
# --- Step 5: Visualize Job Satisfaction ---
print("\n--- Step 5: Visualize Job Satisfaction ---")

if 'JobSat' in df.columns:
    plt.figure(figsize=(10, 6))
    # Create the count plot for JobSat values
    # order=df['JobSat'].value_counts().index sorts the bars by frequency
    sns.countplot(x='JobSat', data=df, palette='viridis', order=df['JobSat'].value_counts().index)
    plt.title('Distribution of Job Satisfaction (JobSat) Values')
    plt.xlabel('Job Satisfaction Score')
    plt.ylabel('Number of Respondents')
    plt.grid(axis='y', linestyle='--', alpha=0.7)
    plt.tight_layout()
    plt.show() # <-- This ensures the plot is displayed

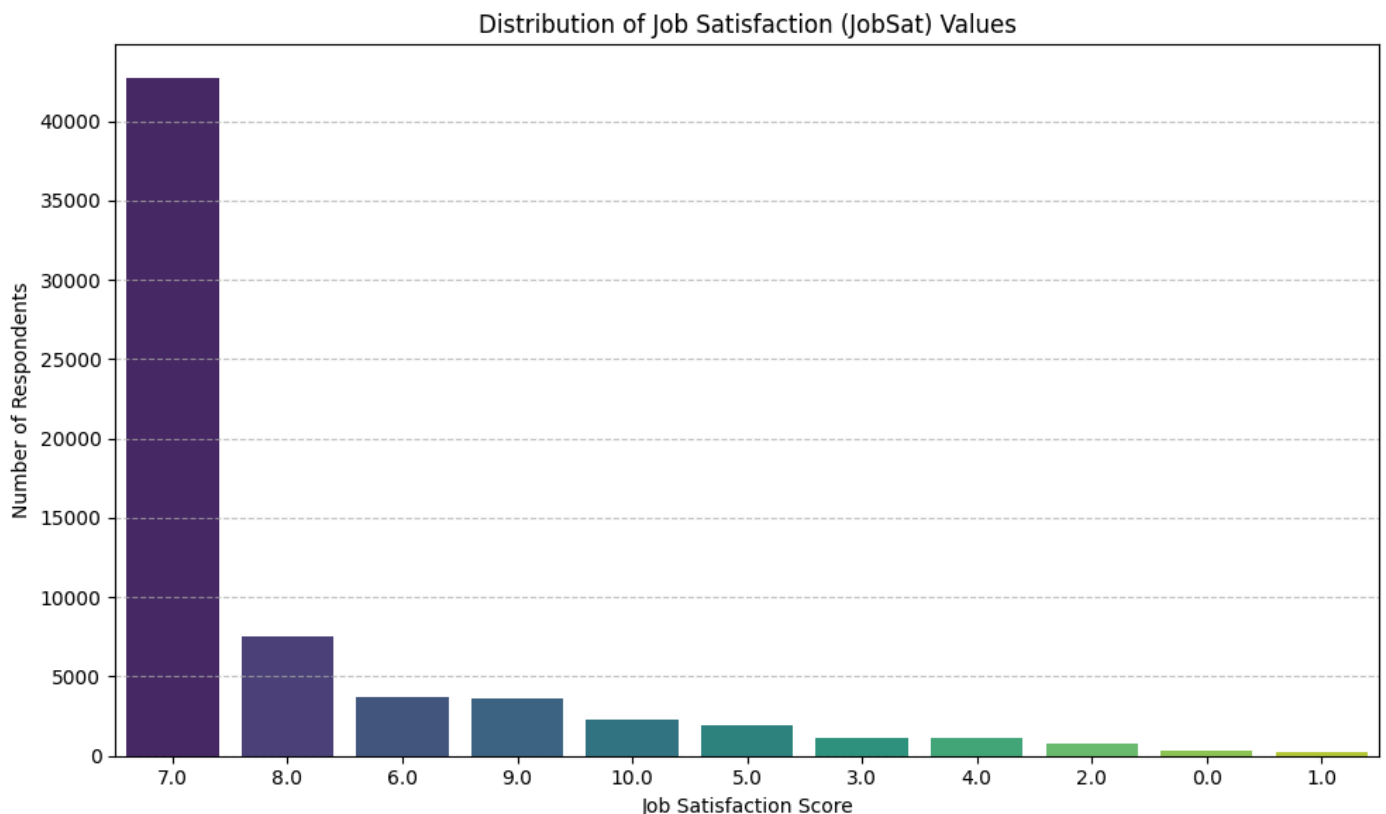
    print("\nJobSat Value Counts:")
    print(df['JobSat'].value_counts().sort_index())
else:
    print("'JobSat' column not found. Cannot visualize its distribution.")
```

--- Step 5: Visualize Job Satisfaction ---

/tmp/ipykernel\_830/2463346748.py:9: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same effect.

```
sns.countplot(x='JobSat', data=df, palette='viridis', order=df['JobSat'].value_counts().index)
```



JobSat Value Counts:

JobSat

```
0.0    311
1.0    276
2.0    772
3.0   1165
4.0   1130
5.0   1956
6.0   3751
7.0  42690
8.0   7509
9.0   3626
10.0  2251
```

Name: count, dtype: int64

Step 6: Analyzing Remote Work Preferences by Job Role



Analyze trends in remote work based on job roles. Use the `RemoteWork` and `Employment` columns to explore preferences and examine if specific job roles prefer remote work more than others.

- Use a count plot to show remote work distribution.
- Cross-tabulate remote work preferences by employment type (e.g., full-time, part-time) and job roles.

```
In [9]: ## Write your code here
print("\n--- Step 6: Analyzing Remote Work Preferences by Job Role ---")

# Ensure 'RemoteWork' and 'Employment' columns are clean and available
if 'RemoteWork' in df.columns and 'Employment' in df.columns:
    # 1. Use a count plot to show remote work distribution.
    print("\n1. Distribution of Remote Work Preferences:")
    plt.figure(figsize=(8, 6))
    sns.countplot(x='RemoteWork', data=df, palette='pastel', order=df['RemoteWork'].value_counts().index)
    plt.title('Distribution of Remote Work Preferences')
    plt.xlabel('Remote Work Type')
    plt.ylabel('Number of Respondents')
    plt.grid(axis='y', linestyle='--', alpha=0.7)
    plt.tight_layout()
    plt.show()

    print("\nRemote Work Value Counts:")
    print(df['RemoteWork'].value_counts(dropna=False)) # Include NaN counts if any are left

    # 2. Cross-tabulate remote work preferences by employment type.
    print("\n2. Cross-tabulation of Remote Work Preferences by Employment Type:")
    # Ensure both columns are string type for accurate cross-tabulation, handling any NaNs as 'nan'
    cross_tab = pd.crosstab(df['Employment'], df['RemoteWork'], margins=True, dropna=False)
    print(cross_tab)

else:
    print("Required columns ('RemoteWork' or 'Employment') not found. Cannot perform Step 6 analysis")
```

--- Step 6: Analyzing Remote Work Preferences by Job Role ---

1. Distribution of Remote Work Preferences:

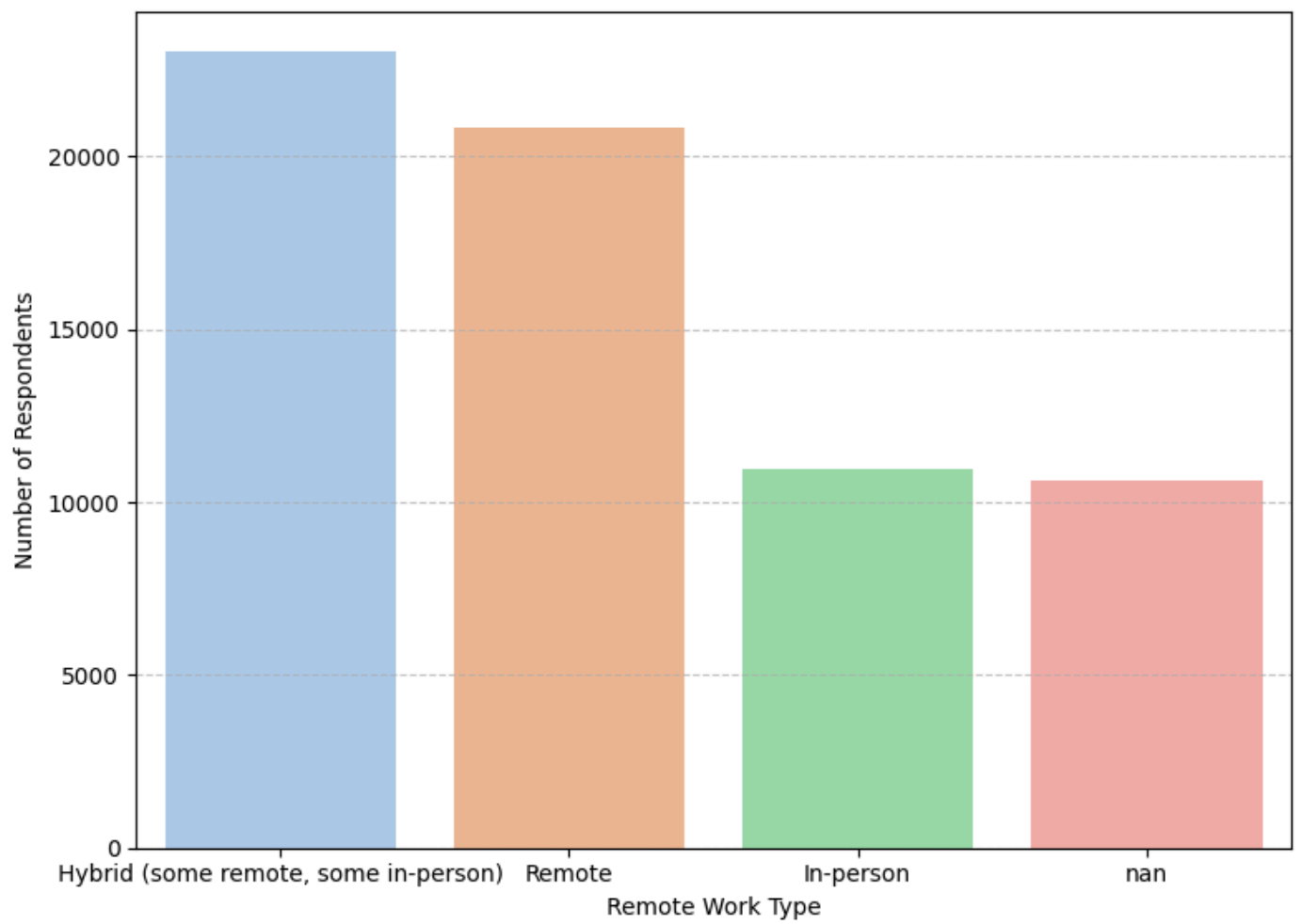
/tmp/ipykernel\_830/3119295302.py:9: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same effect.

```
sns.countplot(x='RemoteWork', data=df, palette='pastel', order=df['RemoteWork'].value_counts().index)
```



Distribution of Remote Work Preferences



Remote Work Value Counts:

```
RemoteWork
Hybrid (some remote, some in-person)    23015
Remote                                  20831
In-person                               10960
nan                                     10631
Name: count, dtype: int64
```

## 2. Cross-tabulation of Remote Work Preferences by Employment Type:

```
RemoteWork
Employment
Employed, full-time                                17281
Employed, full-time;Employed, part-time            85
Employed, full-time;Independent contractor, fre... 1330
Employed, full-time;Independent contractor, fre... 80
Employed, full-time;Independent contractor, fre... 0
...
Student, full-time;Student, part-time;Retired      0
Student, part-time                                0
Student, part-time;Employed, part-time             282
Student, part-time;Retired                         0
All                                                 23015
```

```
RemoteWork
Employment
Employed, full-time                                8552  13193  15
Employed, full-time;Employed, part-time            32    95    0
Employed, full-time;Independent contractor, fre... 366   1861   0
Employed, full-time;Independent contractor, fre... 17    87    0
Employed, full-time;Independent contractor, fre... 1     0     0
...
Student, full-time;Student, part-time;Retired      0     0     2
Student, part-time                                0     0   494
Student, part-time;Employed, part-time             179    97    0
Student, part-time;Retired                         0     0     4
All                                                 10960  20831 10631
```

```
RemoteWork
Employment
Employed, full-time                                39041
Employed, full-time;Employed, part-time            212
Employed, full-time;Independent contractor, fre... 3557
Employed, full-time;Independent contractor, fre... 184
Employed, full-time;Independent contractor, fre... 1
...
Student, full-time;Student, part-time;Retired      2
Student, part-time                                494
Student, part-time;Employed, part-time             558
Student, part-time;Retired                         4
All                                                 65437
```

[111 rows x 5 columns]

## Step 7: Analyzing Programming Language Trends by Region

Analyze the popularity of programming languages by region. Use the `LanguageHaveWorkedWith` column to investigate which languages are most used in different regions.

- Filter data by country or region.
- Visualize the top programming languages by region with a bar plot or heatmap.

```
In [10]: ## Write your code here
# --- Step 7: Analyzing Programming Language Trends by Region ---
print("\n--- Step 7: Analyzing Programming Language Trends by Region ---")

# Ensure 'LanguageHaveWorkedWith' and 'Country' are clean and available
if 'LanguageHaveWorkedWith' in df.columns and 'Country' in df.columns:
    # Clean 'Country' column first if not already standardized (e.g., lowercase, strip whitespace)
    # This section assumes 'Country' has been cleaned in previous steps, but it's good to re-ensure
    df['Country'] = df['Country'].astype(str).str.strip()

    # Create a Series of all individual languages, one entry per language.
```

```

# This handles semi-colon separated lists in 'LanguageHaveWorkedWith'.
# Drop rows where 'LanguageHaveWorkedWith' is NaN first.
languages_exploded = df.dropna(subset=['LanguageHaveWorkedWith']).assign(
    Language=df['LanguageHaveWorkedWith'].str.split(';')
).explode('Language')

# Strip whitespace from language names
languages_exploded['Language'] = languages_exploded['Language'].str.strip()

# Filter data by country/region.
# Let's select a few top countries to visualize for clarity.
# You might want to get top N countries from your full dataset.
top_countries = df['Country'].value_counts().head(5).index.tolist()
print(f"\nAnalyzing top programming languages in selected countries: {top_countries}")

# Filter the exploded languages DataFrame for these top countries
languages_by_country = languages_exploded[languages_exploded['Country'].isin(top_countries)]

# Calculate language counts per country
language_counts_by_country = languages_by_country.groupby(['Country', 'Language']).size().unstack()

# Select the top N languages for visualization (e.g., top 10 overall)
# This prevents the plot from being too crowded.
top_overall_languages = languages_exploded['Language'].value_counts().head(10).index.tolist()
language_counts_for_plot = language_counts_by_country[top_overall_languages]

# Normalize the counts to show percentage or relative popularity within each country
# (optional, but good for comparison if country sizes vary greatly)
# language_counts_for_plot_normalized = language_counts_for_plot.div(language_counts_for_plot.sum(axis=1), axis=1)

# Visualize the top programming languages by region with a heatmap.
# A heatmap is good here to show the matrix of languages vs. countries.
if not language_counts_for_plot.empty:
    plt.figure(figsize=(14, 10))
    sns.heatmap(language_counts_for_plot, annot=True, fmt='d', cmap='YlGnBu', linewidths=.5,
                cbar_kws={'label': 'Number of Respondents'})
    plt.title('Top Programming Languages by Country (Count)')
    plt.xlabel('Programming Language')
    plt.ylabel('Country')
    plt.tight_layout()
    plt.show()

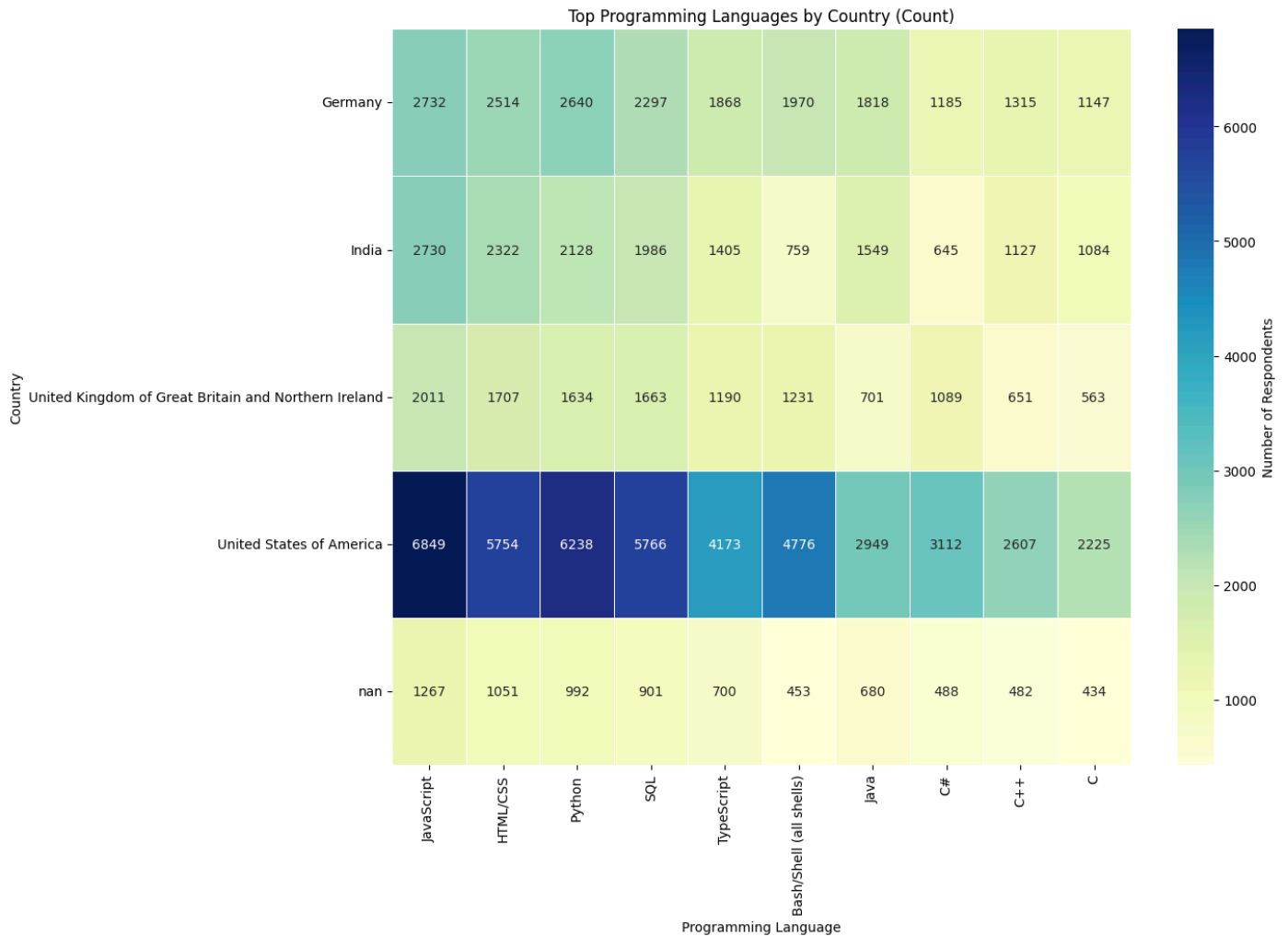
    print("\nTop 10 Languages by Country Counts (sample):")
    print(language_counts_for_plot)
else:
    print("\nNo data to visualize after filtering. Check 'LanguageHaveWorkedWith' or 'Country'")

else:
    print("Required columns ('LanguageHaveWorkedWith' or 'Country') not found. Cannot perform Step 7")

```

--- Step 7: Analyzing Programming Language Trends by Region ---

Analyzing top programming languages in selected countries: ['United States of America', 'nan', 'Germany', 'India', 'United Kingdom of Great Britain and Northern Ireland']



Top 10 Languages by Country Counts (sample):

Language	JavaScript	HTML/CSS	Python	SQL	TypeScript	Bash/Shell (all shells)	Java	C#	C++	C
Country										
Germany	2732	2514	2640	2297	1868	1970	1818	1185	1315	1147
India	2730	2322	2128	1986	1405	759	1549	645	1127	1084
United Kingdom of Great Britain and Northern Ireland	2011	1707	1634	1663	1190	1231	701	1089	651	563
United States of America	6849	5754	6238	5766	4173	4776	2949	3112	2607	2225
nan	1267	1051	992	901	700	453	680	488	482	434

Language	Python	SQL	TypeScript	Bash/Shell (all shells)	Java	C#	C++	C
Country								
Germany	2640	2297	1868	1970	1818	1185	1315	1147
India	2128	1986	1405	759	1549	645	1127	1084
United Kingdom of Great Britain and Northern Ireland	1634	1663	1190	1231	701	1089	651	563
United States of America	6238	5766	4173	4776	2949	3112	2607	2225
nan	992	901	700	453	680	488	482	434

Language	Bash/Shell (all shells)	Java	C#	C++	C
Country					
Germany	1970	1818	1185	1315	1147
India	759	1549	645	1127	1084
United Kingdom of Great Britain and Northern Ireland	1231	701	1089	651	563
United States of America	4776	2949	3112	2607	2225
nan	453	680	488	482	434

Language	Java	C#	C++	C
Country				
Germany	1818	1185	1315	1147
India	1549	645	1127	1084
United Kingdom of Great Britain and Northern Ireland	701	1089	651	563
United States of America	2949	3112	2607	2225
nan	680	488	482	434

### Step 8: Correlation Between Experience and Satisfaction

Examine how years of experience ( `YearsCodePro` ) correlate with job satisfaction ( `JobSatPoints_1` ). Use a scatter plot to visualize this relationship.

```
In [11]: ## Write your code here
# --- Step 8: Correlation Between Experience and Satisfaction ---
print("\n--- Step 8: Correlation Between Experience and Satisfaction ---")

# Ensure 'YearsCodePro' and 'JobSatPoints_1' are numeric and handle NaNs
if 'YearsCodePro' in df.columns and 'JobSatPoints_1' in df.columns:
    # Ensure 'YearsCodePro' is numeric and handle NaNs
    df['YearsCodePro'] = pd.to_numeric(df['YearsCodePro'], errors='coerce')
    if df['YearsCodePro'].isnull().any():
        median_years_code_pro = df['YearsCodePro'].median()
        df['YearsCodePro'].fillna(median_years_code_pro, inplace=True)
        print(f"Missing values in 'YearsCodePro' imputed with median: {median_years_code_pro:.0f}")

    # Ensure 'JobSatPoints_1' is numeric and handle NaNs
    df['JobSatPoints_1'] = pd.to_numeric(df['JobSatPoints_1'], errors='coerce')
    if df['JobSatPoints_1'].isnull().any():
        median_jobsat_points_1 = df['JobSatPoints_1'].median()
        df['JobSatPoints_1'].fillna(median_jobsat_points_1, inplace=True)
        print(f"Missing values in 'JobSatPoints_1' imputed with median: {median_jobsat_points_1:.2f}")

    # Create the scatter plot
    plt.figure(figsize=(10, 7))
    sns.scatterplot(x='YearsCodePro', y='JobSatPoints_1', data=df, alpha=0.7, s=100)
    plt.title('Correlation Between Years of Professional Coding Experience and Job Satisfaction (JobSatPoints_1)')
    plt.xlabel('Years of Professional Coding Experience')
    plt.ylabel('Job Satisfaction Score (JobSatPoints_1)')
    plt.grid(True, linestyle='--', alpha=0.6)
    plt.tight_layout()
    plt.show()

    # Calculate and print the correlation coefficient
    correlation = df['YearsCodePro'].corr(df['JobSatPoints_1'])
    print(f"\nPearson correlation between 'YearsCodePro' and 'JobSatPoints_1': {correlation:.2f}")

    print("\nInterpretation:")
    print("The scatter plot visually represents the relationship. The correlation coefficient quantifies the strength and direction of the linear relationship between the two variables.")
    print("- A positive correlation (close to 1) means higher experience tends to be associated with higher job satisfaction.")
    print("- A negative correlation (close to -1) means higher experience tends to be associated with lower job satisfaction.")
    print("- A correlation close to 0 suggests little to no linear relationship.")

else:
    print("Required columns ('YearsCodePro' or 'JobSatPoints_1') not found or not properly prepared")
```

--- Step 8: Correlation Between Experience and Satisfaction ---

Missing values in 'JobSatPoints\_1' imputed with median: 10.00

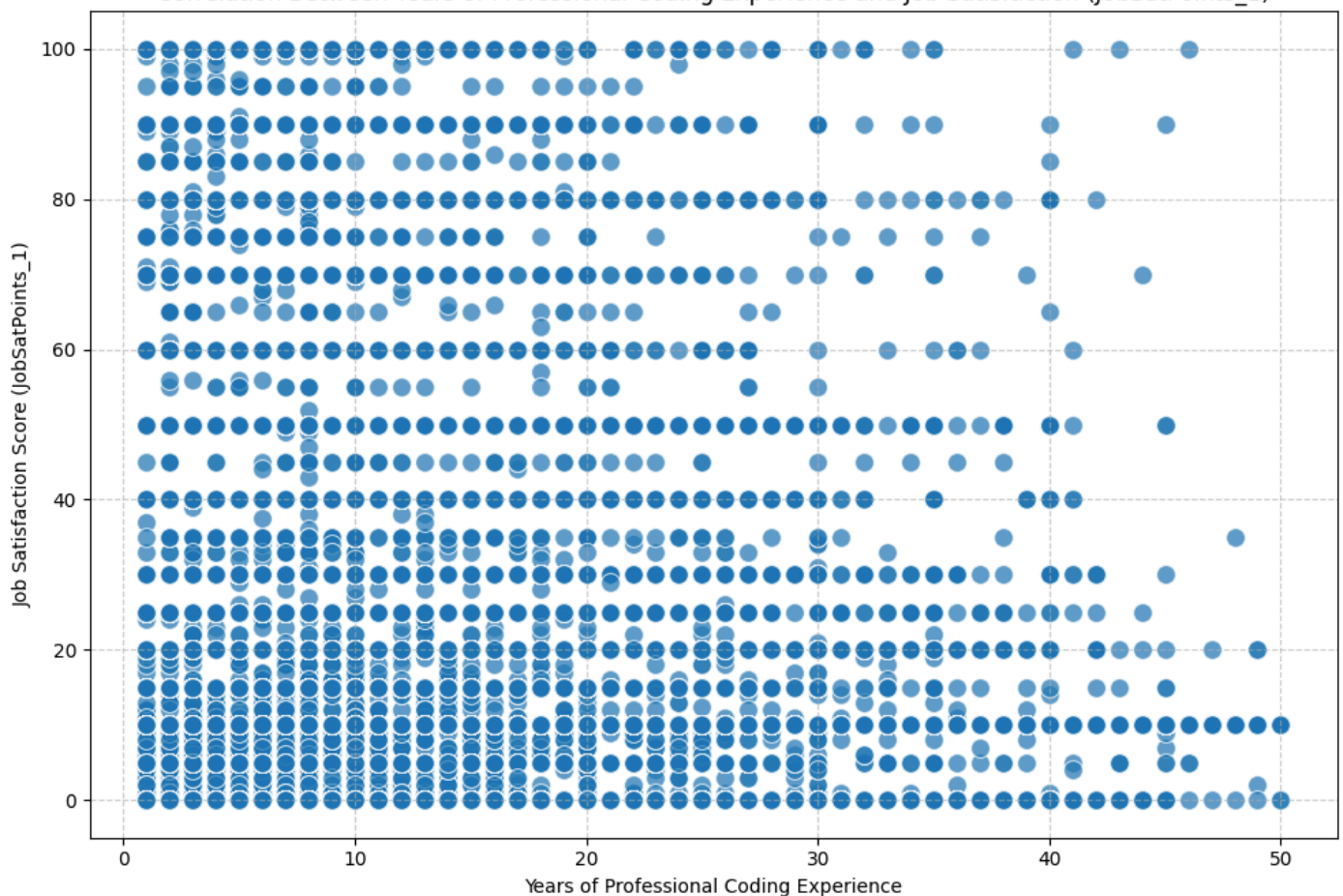
/tmp/ipykernel\_830/3800622444.py:18: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained assignment using an inplace method.

The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting values always behaves as a copy.

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].method(value) instead, to perform the operation inplace on the original object.

```
df['JobSatPoints_1'].fillna(median_jobsat_points_1, inplace=True)
```

Correlation Between Years of Professional Coding Experience and Job Satisfaction (JobSatPoints\_1)



Pearson correlation between 'YearsCodePro' and 'JobSatPoints\_1':  $-0.01$

Interpretation:

The scatter plot visually represents the relationship. The correlation coefficient quantifies it:

- A positive correlation (close to 1) means higher experience tends to be associated with higher job satisfaction.
- A negative correlation (close to -1) means higher experience tends to be associated with lower job satisfaction.
- A correlation close to 0 suggests little to no linear relationship.

## Step 9: Educational Background and Employment Type

Explore how educational background ( `EdLevel` ) relates to employment type ( `Employment` ). Use cross-tabulation and visualizations to understand if higher education correlates with specific employment types.

```
In [14]: ## Write your code here
# --- Step 9: Educational Background and Employment Type ---
print("\n--- Step 9: Educational Background and Employment Type ---")

# Ensure 'EdLevel' and 'Employment' columns are clean and available
if 'EdLevel' in df.columns and 'Employment' in df.columns:
    # Ensure both columns are string type for accurate cross-tabulation
    df['EdLevel'] = df['EdLevel'].astype(str).str.strip()
    df['Employment'] = df['Employment'].astype(str).str.strip()

    # 1. Cross-tabulation: EdLevel vs. Employment
    print("\n1. Cross-tabulation of Educational Background by Employment Type:")
    edlevel_employment_crosstab = pd.crosstab(df['EdLevel'], df['Employment'], margins=True, dropna=False)
    print(edlevel_employment_crosstab)

    # 2. Visualize the relationship using a heatmap (for counts)
    plt.figure(figsize=(14, 10))
    # Exclude 'All' row/column from heatmap for better visualization of main categories
    sns.heatmap(edlevel_employment_crosstab.iloc[:-1, :-1], annot=True, fmt='d', cmap='YlGnBu', linthresh=1,
                cbar_kws={'label': 'Count'})
    plt.title('Educational Background vs. Employment Type')
    plt.xlabel('Employment Type')
    plt.ylabel('Education Level')
    plt.tight_layout()
    plt.show()
```

```
else:  
    print("Required columns ('EdLevel' or 'Employment') not found or not properly prepared. Cannot
```



1. Cross-tabulation of Educational Background by Employment Type:

Employment	Employed, full-time \
EdLevel	
Associate degree (A.A., A.S., etc.)	1059
Bachelor's degree (B.A., B.S., B.Eng., etc.)	16806
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	11011
Primary/elementary school	160
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	2073
Secondary school (e.g. American high school, Ge...	1460
Some college/university study without earning a...	3579
Something else	377
nan	2516
All	39041

Employment	Employed, full-time;Employed, part-time \
EdLevel	
Associate degree (A.A., A.S., etc.)	9
Bachelor's degree (B.A., B.S., B.Eng., etc.)	90
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	61
Primary/elementary school	1
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	8
Secondary school (e.g. American high school, Ge...	9
Some college/university study without earning a...	15
Something else	3
nan	16
All	212

Employment	Employed, full-time;Independent contractor, free
lancer, or self-employed \	
EdLevel	
Associate degree (A.A., A.S., etc.)	10
4	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	138
1	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	96
3	
Primary/elementary school	2
5	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	15
9	
Secondary school (e.g. American high school, Ge...	18
1	
Some college/university study without earning a...	49
2	
Something else	4
1	
nan	21
1	
All	355
7	

Employment	Employed, full-time;Independent contractor, free
lancer, or self-employed;Employed, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	1
1	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	7
9	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	4
5	
Primary/elementary school	
1	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	1
0	
Secondary school (e.g. American high school, Ge...	
6	
Some college/university study without earning a...	1
4	
Something else	
2	
nan	1
6	
All	18



lancer, or self-employed;Not employed, and not looking for work;Student, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
0	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
1	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	
0	
Something else	
0	
nan	
0	
All	
1	
Employment	Employed, full-time;Independent contractor, free
lancer, or self-employed;Retired \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
0	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	
1	
Something else	
0	
nan	
0	
All	
1	
Employment	Employed, full-time;Independent contractor, free
lancer, or self-employed;Student, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
5	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	4
9	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	2
6	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
1	
Secondary school (e.g. American high school, Ge...	
6	
Some college/university study without earning a...	3
9	
Something else	
4	
nan	
9	
All	13
9	
Employment	Employed, full-time;Independent contractor, free
lancer, or self-employed;Student, part-time;Employed, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	

0  
 Bachelor's degree (B.A., B.S., B.Eng., etc.)  
 4  
 Master's degree (M.A., M.S., M.Eng., MBA, etc.)  
 2  
 Primary/elementary school  
 0  
 Professional degree (JD, MD, Ph.D, Ed.D, etc.)  
 0  
 Secondary school (e.g. American high school, Ge...  
 1  
 Some college/university study without earning a...  
 3  
 Something else  
 0  
 nan  
 1  
 All  
 1

1

Employment  
 lancer, or self-employed;Student, part-time;Retired \ Employed, full-time;Independent contractor, free  
 EdLevel  
 Associate degree (A.A., A.S., etc.)  
 0  
 Bachelor's degree (B.A., B.S., B.Eng., etc.)  
 0  
 Master's degree (M.A., M.S., M.Eng., MBA, etc.)  
 0  
 Primary/elementary school  
 0  
 Professional degree (JD, MD, Ph.D, Ed.D, etc.)  
 0  
 Secondary school (e.g. American high school, Ge...  
 0  
 Some college/university study without earning a...  
 1  
 Something else  
 0  
 nan  
 0  
 All  
 1

Employment  
 g for work \ Employed, full-time;Not employed, and not lookin  
 EdLevel  
 Associate degree (A.A., A.S., etc.)  
 0  
 Bachelor's degree (B.A., B.S., B.Eng., etc.)  
 1  
 Master's degree (M.A., M.S., M.Eng., MBA, etc.)  
 0  
 Primary/elementary school  
 0  
 Professional degree (JD, MD, Ph.D, Ed.D, etc.)  
 0  
 Secondary school (e.g. American high school, Ge...  
 0  
 Some college/university study without earning a...  
 0  
 Something else  
 0  
 nan  
 1  
 All  
 2

Employment  
 r work \ Employed, full-time;Not employed, but looking fo  
 EdLevel  
 Associate degree (A.A., A.S., etc.)  
 0  
 Bachelor's degree (B.A., B.S., B.Eng., etc.)  
 6

2

Master's degree (M.A., M.S., M.Eng., MBA, etc.)	1
8	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
4	
Some college/university study without earning a...	
0	
Something else	
1	
nan	
3	
All	5
2	

Employment	Employed, full-time;Not employed, but looking fo
r work;Employed, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
1	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
1	
Some college/university study without earning a...	
0	
Something else	
0	
nan	
0	
All	
2	

Employment	Employed, full-time;Not employed, but looking fo
r work;Independent contractor, freelancer, or self-employed \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
4	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
1	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
1	
Secondary school (e.g. American high school, Ge...	
3	
Some college/university study without earning a...	
2	
Something else	
0	
nan	
0	
All	1
1	

Employment	Employed, full-time;Not employed, but looking fo
r work;Independent contractor, freelancer, or self-employed;Employed, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
1	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
2	
Primary/elementary school	

```
0
Professional degree (JD, MD, Ph.D, Ed.D, etc.)
0
Secondary school (e.g. American high school, Ge...
0
Some college/university study without earning a...
0
Something else
0
nan
2
All
5
```

```

Employment      Employed, full-time;Not employed, but looking fo
r work;Not employed, and not looking for work;Employed, part-time \
EdLevel
Associate degree (A.A., A.S., etc.)
0
Bachelor's degree (B.A., B.S., B.Eng., etc.)
0
Master's degree (M.A., M.S., M.Eng., MBA, etc.)
1
Primary/elementary school
0
Professional degree (JD, MD, Ph.D, Ed.D, etc.)
0
Secondary school (e.g. American high school, Ge...
0
Some college/university study without earning a...
0
Something else
0
nan
0
All
1

```

0  
Secondary school (e.g. American high school, Ge...  
0  
Some college/university study without earning a...  
0  
Something else  
0  
nan  
1  
All  
1

Employment	Employed, full-time;Retired \
EdLevel	
Associate degree (A.A., A.S., etc.)	0
Bachelor's degree (B.A., B.S., B.Eng., etc.)	2
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	5
Primary/elementary school	0
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	2
Secondary school (e.g. American high school, Ge...	0
Some college/university study without earning a...	2
Something else	0
nan	2
All	13

Employment	Employed, full-time;Student, full-time \
EdLevel	
Associate degree (A.A., A.S., etc.)	30
Bachelor's degree (B.A., B.S., B.Eng., etc.)	303
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	172
Primary/elementary school	4
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	29
Secondary school (e.g. American high school, Ge...	106
Some college/university study without earning a...	152
Something else	7
nan	94
All	897

Employment	Employed, full-time;Student, full-time;Employed,
part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
1	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	1
0	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
5	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
6	
Some college/university study without earning a...	1
2	
Something else	
0	
nan	
4	
All	3
8	

Employment	Employed, full-time;Student, full-time;Independe
nt contractor, freelancer, or self-employed \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
1	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	4
0	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	1
6	
Primary/elementary school	
2	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
3	



Secondary school (e.g. American high school, Ge...	1
0	
Some college/university study without earning a...	1
0	
Something else	
0	
nan	1
0	
All	9
2	

Employment	Employed, full-time;Student, full-time;Independe
nt contractor, freelancer, or self-employed;Employed, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
2	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
1	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
5	
Some college/university study without earning a...	
0	
Something else	
0	
nan	
0	
All	
8	

Employment	Employed, full-time;Student, full-time;Independe
nt contractor, freelancer, or self-employed;Student, part-time;Employed, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
0	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
1	
Some college/university study without earning a...	
0	
Something else	
0	
nan	
1	
All	
2	

Employment	Employed, full-time;Student, full-time;Independe
nt contractor, freelancer, or self-employed;Student, part-time;Employed, part-time;Retired \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
0	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	

0	
Something else	
1	
nan	
0	
All	
1	
Employment	Employed, full-time;Student, full-time;Independe
nt contractor, freelancer, or self-employed;Student, part-time;Retired \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
0	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
1	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	
0	
Something else	
0	
nan	
0	
All	
1	
Employment	Employed, full-time;Student, full-time;Not emplo
yed, but looking for work \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
1	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	
1	
Something else	
0	
nan	
0	
All	
2	
Employment	Employed, full-time;Student, full-time;Not emplo
yed, but looking for work;Independent contractor, freelancer, or self-employed \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
1	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	
0	
Something else	
0	



Fdl level

0

1

0

1

0

0

0

9

0

2

EdLevel

0

0

0

0

0

0

0

0

1

1

EdLevel

0

0

0

0

0

0

0

1

nan

```

0
All
1

Employment                                Employed, full-time;Student, full-time;Not emplo
yed, but looking for work;Student, part-time;Employed, part-time \
EdLevel
Associate degree (A.A., A.S., etc.)
0
Bachelor's degree (B.A., B.S., B.Eng., etc.)
0
Master's degree (M.A., M.S., M.Eng., MBA, etc.)
1
Primary/elementary school
0
Professional degree (JD, MD, Ph.D, Ed.D, etc.)
0
Secondary school (e.g. American high school, Ge...
0
Some college/university study without earning a...
0
Something else
0
nan
0
All
1

```

Employment	Employed, full-time;Student, full-time;Student,
part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
1	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
1	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	
0	
Something else	
0	
nan	
0	
All	
2	

Employment	Employed, full-time;Student, full-time;Student, part-time;Employed, part-time \
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
3	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, German high school, etc.)	
1	
Some college/university study without earning a degree	
2	
Something else	
0	
nan	
0	
All	
6	

Employment	Employed, full-time;Student, part-time \
EdLevel	
Associate degree (A.A., A.S., etc.)	36
Bachelor's degree (B.A., B.S., B.Eng., etc.)	323
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	155
Primary/elementary school	2
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	22
Secondary school (e.g. American high school, Ge...	58
Some college/university study without earning a...	164
Something else	10
nan	69
All	839

Employment	Employed, full-time;Student, part-time;Employed,
part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
1	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
4	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
2	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	
2	
Something else	
0	
nan	
0	
All	
9	

Employment	Employed, part-time \
EdLevel	
Associate degree (A.A., A.S., etc.)	39
Bachelor's degree (B.A., B.S., B.Eng., etc.)	399
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	322
Primary/elementary school	26
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	83
Secondary school (e.g. American high school, Ge...	112
Some college/university study without earning a...	141
Something else	25
nan	119
All	1266

Employment	Employed, part-time;Retired \
EdLevel	
Associate degree (A.A., A.S., etc.)	0
Bachelor's degree (B.A., B.S., B.Eng., etc.)	3
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	1
Primary/elementary school	0
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	2
Secondary school (e.g. American high school, Ge...	0
Some college/university study without earning a...	2
Something else	0
nan	0
All	8

Employment	I prefer not to say \
EdLevel	
Associate degree (A.A., A.S., etc.)	9
Bachelor's degree (B.A., B.S., B.Eng., etc.)	96
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	53
Primary/elementary school	51
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	29
Secondary school (e.g. American high school, Ge...	92
Some college/university study without earning a...	51
Something else	83
nan	82

Employment	Independent contractor, freelancer, or self-empl
oyed \	
EdLevel	
Associate degree (A.A., A.S., etc.)	14
3	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	159
2	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	134
1	
Primary/elementary school	5
7	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	23
9	
Secondary school (e.g. American high school, Ge...	36
7	
Some college/university study without earning a...	72
8	
Something else	6
7	
nan	31
2	
All	484
6	

Employment	Independent contractor, freelancer, or self-empl
oyed;Employed, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	1
1	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	12
6	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	11
2	
Primary/elementary school	
7	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	3
0	
Secondary school (e.g. American high school, Ge...	2
7	
Some college/university study without earning a...	6
3	
Something else	
8	
nan	1
7	
All	40
1	

Employment	Independent contractor, freelancer, or self-empl
oyed;Employed, part-time;Retired \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
2	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
1	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
1	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	
1	
Something else	
0	
nan	
0	
All	
5	

Employment	Independent contractor, freelancer, or self-empl
------------	--



oyed;Not employed, and not looking for work \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
3	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	1
6	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	1
2	
Primary/elementary school	
4	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
3	
Secondary school (e.g. American high school, Ge...	
7	
Some college/university study without earning a...	
8	
Something else	
0	
nan	
5	
All	5
8	

Employment	Independent contractor, freelancer, or self-empl
oyed;Not employed, and not looking for work;Employed, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
0	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
1	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	
0	
Something else	
0	
nan	
0	
All	
1	

Employment	Independent contractor, freelancer, or self-empl
oyed;Not employed, and not looking for work;Retired \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
0	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
4	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	
3	
Something else	
1	
nan	
1	
All	
9	

Employment	Independent contractor, freelancer, or self-empl
oyed;Not employed, and not looking for work;Student, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	

0		
Bachelor's degree (B.A., B.S., B.Eng., etc.)		
1		
Master's degree (M.A., M.S., M.Eng., MBA, etc.)		
1		
Primary/elementary school		
0		
Professional degree (JD, MD, Ph.D, Ed.D, etc.)		
0		
Secondary school (e.g. American high school, Ge...		
1		
Some college/university study without earning a...		
0		
Something else		
0		
nan		
1		
All		
4		
Employment	Independent contractor, freelancer, or self-empl	
oyed;Not employed, and not looking for work;Student, part-time;Retired \		
EdLevel		
Associate degree (A.A., A.S., etc.)		
0		
Bachelor's degree (B.A., B.S., B.Eng., etc.)		
0		
Master's degree (M.A., M.S., M.Eng., MBA, etc.)		
0		
Primary/elementary school		
0		
Professional degree (JD, MD, Ph.D, Ed.D, etc.)		
0		
Secondary school (e.g. American high school, Ge...		
0		
Some college/university study without earning a...		
1		
Something else		
0		
nan		
0		
All		
1		
Employment	Independent contractor, freelancer, or self-empl	
oyed;Retired \		
EdLevel		
Associate degree (A.A., A.S., etc.)		
2		
Bachelor's degree (B.A., B.S., B.Eng., etc.)		1
7		
Master's degree (M.A., M.S., M.Eng., MBA, etc.)		1
3		
Primary/elementary school		
0		
Professional degree (JD, MD, Ph.D, Ed.D, etc.)		
6		
Secondary school (e.g. American high school, Ge...		
1		
Some college/university study without earning a...		
8		
Something else		
1		
nan		
3		
All		5
1		
Employment	Independent contractor, freelancer, or self-empl	
oyed;Student, part-time \		
EdLevel		
Associate degree (A.A., A.S., etc.)		
6		
Bachelor's degree (B.A., B.S., B.Eng., etc.)		3
6		

Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
7	
Primary/elementary school	
7	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
7	
Secondary school (e.g. American high school, Ge...	3
0	
Some college/university study without earning a...	2
7	
Something else	
3	
nan	
8	
All	13
1	

Employment	Independent contractor, freelancer, or self-empl
oyed;Student, part-time;Employed, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
1	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	1
9	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	1
2	
Primary/elementary school	
1	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
7	
Some college/university study without earning a...	1
4	
Something else	
2	
nan	
7	
All	6
3	

Employment	Independent contractor, freelancer, or self-empl
oyed;Student, part-time;Retired \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
2	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	
2	
Something else	
0	
nan	
0	
All	
4	

Employment	Not employed, and not looking for work \
EdLevel	
Associate degree (A.A., A.S., etc.)	9
Bachelor's degree (B.A., B.S., B.Eng., etc.)	140
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	67
Primary/elementary school	81
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	16
Secondary school (e.g. American high school, Ge...	147
Some college/university study without earning a...	87
Something else	29

nan  
All

Employment Not employed, and not looking for work;Employed,  
 part-time \

EdLevel

Associate degree (A.A., A.S., etc.)  
 1

Bachelor's degree (B.A., B.S., B.Eng., etc.)  
 1

Master's degree (M.A., M.S., M.Eng., MBA, etc.)  
 1

Primary/elementary school  
 0

Professional degree (JD, MD, Ph.D, Ed.D, etc.)  
 0

Secondary school (e.g. American high school, Ge...  
 0

Some college/university study without earning a...  
 0

Something else  
 0

nan  
 0

All  
 3

Employment Not employed, and not looking for work;Retired  
 \

EdLevel

Associate degree (A.A., A.S., etc.) 0

Bachelor's degree (B.A., B.S., B.Eng., etc.) 10

Master's degree (M.A., M.S., M.Eng., MBA, etc.) 2

Primary/elementary school 0

Professional degree (JD, MD, Ph.D, Ed.D, etc.) 1

Secondary school (e.g. American high school, Ge... 1

Some college/university study without earning a... 2

Something else 1

nan 0

All 17

Employment Not employed, and not looking for work;Student,  
 part-time \

EdLevel

Associate degree (A.A., A.S., etc.)  
 0

Bachelor's degree (B.A., B.S., B.Eng., etc.)  
 4

Master's degree (M.A., M.S., M.Eng., MBA, etc.)  
 2

Primary/elementary school  
 9

Professional degree (JD, MD, Ph.D, Ed.D, etc.)  
 0

Secondary school (e.g. American high school, Ge... 1

9

Some college/university study without earning a...  
 8

Something else  
 2

nan  
 7

All 5

1

Employment Not employed, and not looking for work;Student,  
 part-time;Employed, part-time \

EdLevel

Associate degree (A.A., A.S., etc.)  
 0

Bachelor's degree (B.A., B.S., B.Eng., etc.)  
 0

Master's degree (M.A., M.S., M.Eng., MBA, etc.)  
 0

Primary/elementary school

0  
Professional degree (JD, MD, Ph.D, Ed.D, etc.)  
0  
Secondary school (e.g. American high school, Ge...  
0  
Some college/university study without earning a...  
1  
Something else  
0  
nan  
0  
All  
1

Employment	Not employed, but looking for work \
EdLevel	
Associate degree (A.A., A.S., etc.)	74
Bachelor's degree (B.A., B.S., B.Eng., etc.)	983
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	387
Primary/elementary school	51
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	64
Secondary school (e.g. American high school, Ge...	200
Some college/university study without earning a...	317
Something else	51
nan	214
All	2341

Employment	Not employed, but looking for work;Employed, par
t-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
1	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	1
0	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
5	
Primary/elementary school	
1	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
1	
Some college/university study without earning a...	
3	
Something else	
2	
nan	
4	
All	2
7	

Employment	Not employed, but looking for work;Independent c
ontractor, freelancer, or self-employed \	
EdLevel	
Associate degree (A.A., A.S., etc.)	1
4	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	14
7	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	6
9	
Primary/elementary school	
8	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	1
1	
Secondary school (e.g. American high school, Ge...	3
5	
Some college/university study without earning a...	6
5	
Something else	
6	
nan	2
8	
All	38
3	

Employment Not employed, but looking for work;Independent contractor, freelancer, or self-employed;Employed, part-time \

EdLevel

Associate degree (A.A., A.S., etc.)

0

Bachelor's degree (B.A., B.S., B.Eng., etc.)

9

Master's degree (M.A., M.S., M.Eng., MBA, etc.)

7

Primary/elementary school

0

Professional degree (JD, MD, Ph.D, Ed.D, etc.)

1

Secondary school (e.g. American high school, Ge...

2

Some college/university study without earning a...

4

Something else

0

nan

0

All

3

2

Employment Not employed, but looking for work;Independent contractor, freelancer, or self-employed;Not employed, and not looking for work \

EdLevel

Associate degree (A.A., A.S., etc.)

1

Bachelor's degree (B.A., B.S., B.Eng., etc.)

2

Master's degree (M.A., M.S., M.Eng., MBA, etc.)

1

Primary/elementary school

0

Professional degree (JD, MD, Ph.D, Ed.D, etc.)

0

Secondary school (e.g. American high school, Ge...

0

Some college/university study without earning a...

1

Something else

0

nan

0

All

5

Employment Not employed, but looking for work;Independent contractor, freelancer, or self-employed;Not employed, and not looking for work;Employed, part-time \

EdLevel

Associate degree (A.A., A.S., etc.)

0

Bachelor's degree (B.A., B.S., B.Eng., etc.)

0

Master's degree (M.A., M.S., M.Eng., MBA, etc.)

0

Primary/elementary school

0

Professional degree (JD, MD, Ph.D, Ed.D, etc.)

0

Secondary school (e.g. American high school, Ge...

0

Some college/university study without earning a...

0

Something else

0

nan

1

All

1

Employment Not employed, but looking for work;Independent contractor, freelancer, or self-employed;Not employed, and not looking for work;Retired \

EdLevel		
Associate degree (A.A., A.S., etc.)		
0		
Bachelor's degree (B.A., B.S., B.Eng., etc.)		
0		
Master's degree (M.A., M.S., M.Eng., MBA, etc.)		
1		
Primary/elementary school		
1		
Professional degree (JD, MD, Ph.D, Ed.D, etc.)		
0		
Secondary school (e.g. American high school, Ge...		
0		
Some college/university study without earning a...		
0		
Something else		
0		
nan		
0		
All		
2		

Employment	Not employed, but looking for work;Independent c
ontractor, freelancer, or self-employed;Retired \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
1	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
1	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
2	
Primary/elementary school	
1	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
2	
Secondary school (e.g. American high school, Ge...	
1	
Some college/university study without earning a...	
1	
Something else	
0	
nan	
0	
All	
9	

Employment	Not employed, but looking for work;Independent c
ontractor, freelancer, or self-employed;Student, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
1	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	1
0	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
3	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
3	
Secondary school (e.g. American high school, Ge...	
8	
Some college/university study without earning a...	1
5	
Something else	
1	
nan	
5	
All	4
6	

Employment	Not employed, but looking for work;Independent c
ontractor, freelancer, or self-employed;Student, part-time;Employed, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	



Bachelor's degree (B.A., B.S., B.Eng., etc.)	
2	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
2	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	
0	
Something else	
0	
nan	
0	
All	
4	
Employment	Not employed, but looking for work;Independent c
ontractor, freelancer, or self-employed;Student, part-time;Retired \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
0	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	
0	
Something else	
1	
nan	
0	
All	
1	
Employment	Not employed, but looking for work;Not employed,
and not looking for work \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
2	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	1
4	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
8	
Primary/elementary school	
1	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
7	
Some college/university study without earning a...	
6	
Something else	
0	
nan	
2	
All	4
0	
Employment	Not employed, but looking for work;Not employed,
and not looking for work;Student, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
1	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	

0  
 Primary/elementary school  
 0  
 Professional degree (JD, MD, Ph.D, Ed.D, etc.)  
 0  
 Secondary school (e.g. American high school, Ge...  
 0  
 Some college/university study without earning a...  
 1  
 Something else  
 0  
 nan  
 0  
 All  
 2

Employment Not employed, but looking for work;Not employed,  
 and not looking for work;Student, part-time;Employed, part-time \

EdLevel  
 Associate degree (A.A., A.S., etc.)  
 0  
 Bachelor's degree (B.A., B.S., B.Eng., etc.)  
 1  
 Master's degree (M.A., M.S., M.Eng., MBA, etc.)  
 0  
 Primary/elementary school  
 0  
 Professional degree (JD, MD, Ph.D, Ed.D, etc.)  
 0  
 Secondary school (e.g. American high school, Ge...  
 0  
 Some college/university study without earning a...  
 0  
 Something else  
 0  
 nan  
 0  
 All  
 1

Employment Not employed, but looking for work;Retired \
 EdLevel  
 Associate degree (A.A., A.S., etc.) 0  
 Bachelor's degree (B.A., B.S., B.Eng., etc.) 3  
 Master's degree (M.A., M.S., M.Eng., MBA, etc.) 0  
 Primary/elementary school 0  
 Professional degree (JD, MD, Ph.D, Ed.D, etc.) 0  
 Secondary school (e.g. American high school, Ge... 1  
 Some college/university study without earning a... 1  
 Something else 0  
 nan 0  
 All 5

Employment Not employed, but looking for work;Student, part  
 -time \
 EdLevel  
 Associate degree (A.A., A.S., etc.)  
 6  
 Bachelor's degree (B.A., B.S., B.Eng., etc.) 3  
 9  
 Master's degree (M.A., M.S., M.Eng., MBA, etc.) 1  
 3  
 Primary/elementary school  
 6  
 Professional degree (JD, MD, Ph.D, Ed.D, etc.)  
 1  
 Secondary school (e.g. American high school, Ge... 2  
 4  
 Some college/university study without earning a... 3  
 5  
 Something else  
 1  
 nan 1  
 6  
 All 14

Employment	Not employed, but looking for work;Student, part
-time;Employed, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
3	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
1	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
3	
Some college/university study without earning a...	
0	
Something else	
0	
nan	
0	
All	
7	

Employment	Not employed, but looking for work;Student, part
-time;Retired \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
0	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	
1	
Something else	
1	
nan	
0	
All	
2	

Employment	Retired \
EdLevel	
Associate degree (A.A., A.S., etc.)	18
Bachelor's degree (B.A., B.S., B.Eng., etc.)	158
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	117
Primary/elementary school	6
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	96
Secondary school (e.g. American high school, Ge...	18
Some college/university study without earning a...	77
Something else	11
nan	24
All	525

Employment	Student, full-time \
EdLevel	
Associate degree (A.A., A.S., etc.)	81
Bachelor's degree (B.A., B.S., B.Eng., etc.)	916
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	239
Primary/elementary school	417
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	37
Secondary school (e.g. American high school, Ge...	1716
Some college/university study without earning a...	729
Something else	107
nan	467
All	4709

Employment	Student, full-time;Employed, part-time \
EdLevel	
Associate degree (A.A., A.S., etc.)	30
Bachelor's degree (B.A., B.S., B.Eng., etc.)	342
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	75
Primary/elementary school	26
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	7
Secondary school (e.g. American high school, Ge...	299
Some college/university study without earning a...	247
Something else	10
nan	79
All	1115

Employment	Student, full-time;Independent contractor, freel
ancer, or self-employed \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
9	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	8
9	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	2
5	
Primary/elementary school	2
4	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
5	
Secondary school (e.g. American high school, Ge...	12
3	
Some college/university study without earning a...	7
2	
Something else	
4	
nan	2
4	
All	37
5	

Employment	Student, full-time;Independent contractor, freel
ancer, or self-employed;Employed, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
4	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	3
7	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
6	
Primary/elementary school	
6	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	3
4	
Some college/university study without earning a...	2
6	
Something else	
1	
nan	
8	
All	12
2	

Employment	Student, full-time;Independent contractor, freel
ancer, or self-employed;Employed, part-time;Retired \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
1	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	

Secondary school (e.g. American high school, Ge...  
0  
Some college/university study without earning a...  
0  
Something else  
0  
nan  
0  
All  
1

Employment Student, full-time;Independent contractor, freel  
ancer, or self-employed;Not employed, and not looking for work \

EdLevel  
Associate degree (A.A., A.S., etc.)  
0  
Bachelor's degree (B.A., B.S., B.Eng., etc.)  
5  
Master's degree (M.A., M.S., M.Eng., MBA, etc.)  
0  
Primary/elementary school  
1  
Professional degree (JD, MD, Ph.D, Ed.D, etc.)  
0  
Secondary school (e.g. American high school, Ge...  
9  
Some college/university study without earning a...  
2  
Something else  
0  
nan  
0  
All  
7

1

Employment Student, full-time;Independent contractor, freel  
ancer, or self-employed;Student, part-time \

EdLevel  
Associate degree (A.A., A.S., etc.)  
1  
Bachelor's degree (B.A., B.S., B.Eng., etc.)  
0  
Master's degree (M.A., M.S., M.Eng., MBA, etc.)  
0  
Primary/elementary school  
0  
Professional degree (JD, MD, Ph.D, Ed.D, etc.)  
0  
Secondary school (e.g. American high school, Ge...  
4  
Some college/university study without earning a...  
6  
Something else  
0  
nan  
0  
All  
1

1

Employment Student, full-time;Independent contractor, freel  
ancer, or self-employed;Student, part-time;Employed, part-time \

EdLevel  
Associate degree (A.A., A.S., etc.)  
1  
Bachelor's degree (B.A., B.S., B.Eng., etc.)  
2  
Master's degree (M.A., M.S., M.Eng., MBA, etc.)  
1  
Primary/elementary school  
0  
Professional degree (JD, MD, Ph.D, Ed.D, etc.)  
0  
Secondary school (e.g. American high school, Ge...  
2  
Some college/university study without earning a...

2		
Something else		
0		
nan		
1		
All		
9		
Employment	Student, full-time;Not employed, and not looking	
for work \		
EdLevel		
Associate degree (A.A., A.S., etc.)		
3		
Bachelor's degree (B.A., B.S., B.Eng., etc.)		2
5		
Master's degree (M.A., M.S., M.Eng., MBA, etc.)		
7		
Primary/elementary school		5
0		
Professional degree (JD, MD, Ph.D, Ed.D, etc.)		
2		
Secondary school (e.g. American high school, Ge...		13
9		
Some college/university study without earning a...		4
6		
Something else		1
1		
nan		2
8		
All		31
1		

Employment	Student, full-time;Not employed, and not looking
for work;Employed, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
0	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
1	
Some college/university study without earning a...	
1	
Something else	
0	
nan	
0	
All	
2	

Employment	Student, full-time;Not employed, and not looking
for work;Student, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
1	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
2	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
5	
Some college/university study without earning a...	
0	
Something else	
0	

```

nan
0
All
8

Employment                                Student, full-time;Not employed, but looking for
work \
EdLevel
Associate degree (A.A., A.S., etc.)                2
3
Bachelor's degree (B.A., B.S., B.Eng., etc.)        20
2
Master's degree (M.A., M.S., M.Eng., MBA, etc.)     3
0
Primary/elementary school                          3
4
Professional degree (JD, MD, Ph.D, Ed.D, etc.)
2
Secondary school (e.g. American high school, Ge...  20
4
Some college/university study without earning a...  13
0
Something else                                     1
6
nan                                                4
5
All                                                68
6

```

```

Employment                                Student, full-time;Not employed, but looking for
work;Employed, part-time \
EdLevel
Associate degree (A.A., A.S., etc.)
0
Bachelor's degree (B.A., B.S., B.Eng., etc.)
3
Master's degree (M.A., M.S., M.Eng., MBA, etc.)
0
Primary/elementary school
0
Professional degree (JD, MD, Ph.D, Ed.D, etc.)
0
Secondary school (e.g. American high school, Ge...
2
Some college/university study without earning a...
3
Something else
0
nan
0
All
8

```

```

Employment                                Student, full-time;Not employed, but looking for
work;Independent contractor, freelancer, or self-employed \
EdLevel
Associate degree (A.A., A.S., etc.)
1
Bachelor's degree (B.A., B.S., B.Eng., etc.)        2
5
Master's degree (M.A., M.S., M.Eng., MBA, etc.)
1
Primary/elementary school
6
Professional degree (JD, MD, Ph.D, Ed.D, etc.)
0
Secondary school (e.g. American high school, Ge...  2
7
Some college/university study without earning a...  1
6
Something else
1
nan
9
All
8

```

Employment Student, full-time;Not employed, but looking for  
work;Independent contractor, freelancer, or self-employed;Employed, part-time \

EdLevel

Associate degree (A.A., A.S., etc.)

0

Bachelor's degree (B.A., B.S., B.Eng., etc.)

1

Master's degree (M.A., M.S., M.Eng., MBA, etc.)

0

Primary/elementary school

0

Professional degree (JD, MD, Ph.D, Ed.D, etc.)

0

Secondary school (e.g. American high school, Ge...

1

Some college/university study without earning a...

2

Something else

0

nan

1

All

5

Employment Student, full-time;Not employed, but looking for  
work;Independent contractor, freelancer, or self-employed;Not employed, and not looking for work \

EdLevel

Associate degree (A.A., A.S., etc.)

0

Bachelor's degree (B.A., B.S., B.Eng., etc.)

0

Master's degree (M.A., M.S., M.Eng., MBA, etc.)

0

Primary/elementary school

1

Professional degree (JD, MD, Ph.D, Ed.D, etc.)

0

Secondary school (e.g. American high school, Ge...

0

Some college/university study without earning a...

0

Something else

0

nan

0

All

1

Employment Student, full-time;Not employed, but looking for  
work;Independent contractor, freelancer, or self-employed;Not employed, and not looking for work;Stu  
dent, part-time \

EdLevel

Associate degree (A.A., A.S., etc.)

0

Bachelor's degree (B.A., B.S., B.Eng., etc.)

1

Master's degree (M.A., M.S., M.Eng., MBA, etc.)

0

Primary/elementary school

0

Professional degree (JD, MD, Ph.D, Ed.D, etc.)

0

Secondary school (e.g. American high school, Ge...

0

Some college/university study without earning a...

0

Something else

0

nan

1

All

2



Employment	Student, full-time;Not employed, but looking for
work;Independent contractor, freelancer, or self-employed;Student, part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
3	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
1	
Some college/university study without earning a...	
1	
Something else	
0	
nan	
0	
All	
5	

Employment	Student, full-time;Not employed, but looking for
work;Independent contractor, freelancer, or self-employed;Student, part-time;Employed, part-time;Ret	
ired \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
0	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	
1	
Something else	
0	
nan	
0	
All	
1	

Employment	Student, full-time;Not employed, but looking for
work;Not employed, and not looking for work \	
EdLevel	
Associate degree (A.A., A.S., etc.)	
0	
Bachelor's degree (B.A., B.S., B.Eng., etc.)	
0	
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	
0	
Primary/elementary school	
0	
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	
0	
Secondary school (e.g. American high school, Ge...	
0	
Some college/university study without earning a...	
5	
Something else	
0	
nan	
1	
All	
6	

Employment	Student, full-time;Not employed, but looking for
work;Not employed, and not looking for work;Student, part-time \	

EdLevel  
Associate degree (A.A., A.S., etc.)  
0  
Bachelor's degree (B.A., B.S., B.Eng., etc.)  
1  
Master's degree (M.A., M.S., M.Eng., MBA, etc.)  
0  
Primary/elementary school  
0  
Professional degree (JD, MD, Ph.D, Ed.D, etc.)  
0  
Secondary school (e.g. American high school, Ge...  
0  
Some college/university study without earning a...  
0  
Something else  
0  
nan  
0  
All  
1

Employment Student, full-time;Not employed, but looking for  
work;Retired \

EdLevel  
Associate degree (A.A., A.S., etc.)  
0  
Bachelor's degree (B.A., B.S., B.Eng., etc.)  
0  
Master's degree (M.A., M.S., M.Eng., MBA, etc.)  
1  
Primary/elementary school  
0  
Professional degree (JD, MD, Ph.D, Ed.D, etc.)  
0  
Secondary school (e.g. American high school, Ge...  
0  
Some college/university study without earning a...  
0  
Something else  
0  
nan  
0  
All  
1

Employment Student, full-time;Not employed, but looking for  
work;Student, part-time \

EdLevel  
Associate degree (A.A., A.S., etc.)  
0  
Bachelor's degree (B.A., B.S., B.Eng., etc.)  
3  
Master's degree (M.A., M.S., M.Eng., MBA, etc.)  
0  
Primary/elementary school  
0  
Professional degree (JD, MD, Ph.D, Ed.D, etc.)  
0  
Secondary school (e.g. American high school, Ge...  
2  
Some college/university study without earning a...  
4  
Something else  
1  
nan  
2  
All  
2

Employment Student, full-time;Retired \

EdLevel  
Associate degree (A.A., A.S., etc.) 0  
Bachelor's degree (B.A., B.S., B.Eng., etc.) 0  
Master's degree (M.A., M.S., M.Eng., MBA, etc.) 0

Primary/elementary school	0
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	0
Secondary school (e.g. American high school, Ge...	0
Some college/university study without earning a...	0
Something else	0
nan	1
All	1

Employment	Student, full-time;Student, part-time \
EdLevel	
Associate degree (A.A., A.S., etc.)	2
Bachelor's degree (B.A., B.S., B.Eng., etc.)	12
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	2
Primary/elementary school	5
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	0
Secondary school (e.g. American high school, Ge...	12
Some college/university study without earning a...	7
Something else	5
nan	6
All	51

Employment	Student, full-time;Student, part-time;Employed,
part-time \	
EdLevel	
Associate degree (A.A., A.S., etc.)	0
Bachelor's degree (B.A., B.S., B.Eng., etc.)	1
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	1
Primary/elementary school	1
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	0
Secondary school (e.g. American high school, Ge...	0
Some college/university study without earning a...	4
Something else	0
nan	0
All	7

Employment	Student, full-time;Student, part-time;Retired \
EdLevel	
Associate degree (A.A., A.S., etc.)	0
Bachelor's degree (B.A., B.S., B.Eng., etc.)	0
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	0
Primary/elementary school	1
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	0
Secondary school (e.g. American high school, Ge...	1
Some college/university study without earning a...	0
Something else	0
nan	0
All	2

Employment	Student, part-time \
EdLevel	
Associate degree (A.A., A.S., etc.)	12
Bachelor's degree (B.A., B.S., B.Eng., etc.)	105
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	26
Primary/elementary school	48
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	5
Secondary school (e.g. American high school, Ge...	140
Some college/university study without earning a...	75
Something else	17
nan	66
All	494

Employment	Student, part-time;Employed, part-time \
EdLevel	
Associate degree (A.A., A.S., etc.)	24
Bachelor's degree (B.A., B.S., B.Eng., etc.)	184

Master's degree (M.A., M.S., M.Eng., MBA, etc.)	85
Primary/elementary school	4
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	5
Secondary school (e.g. American high school, Ge...	100
Some college/university study without earning a...	103
Something else	14
nan	39
All	558

Employment	Student, part-time;Retired \
EdLevel	
Associate degree (A.A., A.S., etc.)	0
Bachelor's degree (B.A., B.S., B.Eng., etc.)	0
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	2
Primary/elementary school	0
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	0
Secondary school (e.g. American high school, Ge...	0
Some college/university study without earning a...	1
Something else	1
nan	0
All	4

Employment	All
EdLevel	
Associate degree (A.A., A.S., etc.)	1793
Bachelor's degree (B.A., B.S., B.Eng., etc.)	24942
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	15557
Primary/elementary school	1146
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	2970
Secondary school (e.g. American high school, Ge...	5793
Some college/university study without earning a...	7651
Something else	932
nan	4653
All	65437

/tmp/ipykernel\_830/1008096514.py:24: UserWarning: Tight layout not applied. The bottom and top margins cannot be made large enough to accommodate all Axes decorations.  
plt.tight\_layout()



Employment Type

```
In [13]: ## Write your code here
# --- Step 10: Save the Cleaned and Analyzed Dataset ---
print("\n--- Step 10: Save the Cleaned and Analyzed Dataset ---")
```

```
# Define the filename for the cleaned dataset
output_filename = 'cleaned_analyzed_dataset.csv'

try:
    # Save the DataFrame to a CSV file.
    # index=False prevents pandas from writing the DataFrame index as a column in the CSV.
    df.to_csv(output_filename, index=False)
    print(f"\nDataset successfully saved to '{output_filename}'")
    print(f"You can find the file in your current working directory.")
except Exception as e:
    print(f"\nError saving dataset: {e}")
    print("Please ensure you have write permissions in the current directory.")
```

--- Step 10: Save the Cleaned and Analyzed Dataset ---

Dataset successfully saved to 'cleaned\_analyzed\_dataset.csv'  
You can find the file in your current working directory.

## Summary

In this revised lab, you:

- Loaded and explored the structure of the dataset.
- Handled missing data effectively.
- Analyzed key variables, including working hours, job satisfaction, and remote work trends.
- Investigated programming language usage by region and examined the relationship between experience and satisfaction.
- Used cross-tabulation to understand educational background and employment type.

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