```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import plotly.express as px
import plotly.graph_objects as go
import missingno as msno
from wordcloud import WordCloud
```

```
df = pd.read_csv('/content/sample_data/netflix_titles.csv')
```

```
df.shape
```

```
(8807, 12)
```

```
df.sample(10)
```

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
7564	s7565	Movie	National Treasure	Jon Turteltaub	Nicolas Cage, Diane Kruger, Justin Bartha, Sea...	United States	June 1, 2018	2004	PG	131 min	Action & Adventure, Children & Family Movies	Modern treasure hunters search for a chest of ...
1008	s1009	Movie	Motu Patlu VS Robo Kids	Suhas Kadav	Sourav Chakraborty, Anil Dutt	NaN	April 20, 2021	2019	TV-Y	84 min	Children & Family Movies	For Motu, facing off against three children be...
1230	s1231	Movie	Aelay	Halitha Shameem	P. Samuthirakani, Manikandan, Madhumathi Padma...	India	March 5, 2021	2021	TV-14	151 min	Comedies, Dramas, Independent Movies	A son stoically returns to his village upon hi...
8096	s8097	Movie	Stop at Nothing: The Lance Armstrong Story	Alex Holmes	NaN	Australia, United Kingdom, United States, New ...	February 15, 2015	2014	NR	100 min	Documentaries, International Movies, Sports Mo...	An athlete dupes the world with his tale of mi...
3491	s3492	TV Show	Glitch	NaN	Patrick Brammall, Genevieve O'Reilly,	Australia	September 25, 2019	2019	TV-MA	3 Seasons	International TV Shows, TV Dramas, TV Horror	A police officer and a doctor face an

```
df.columns
```

```
Index(['show_id', 'type', 'title', 'director', 'cast', 'country', 'date_added',
       'release_year', 'rating', 'duration', 'listed_in', 'description'],
      dtype='object')
```

```
df.isnull().sum()
```

```
show_id            0
type               0
title              0
director        2634
cast             825
country          831
date_added        10
release_year       0
rating             4
duration           3
listed_in          0
description        0
dtype: int64
```

```
df['director'].sample(10)
```

```
1651                    Chris Columbus
5189                 Ali Samadi Ahadi
1337           Mostofa Sarwar Farooki
3220                               NaN
```

```
6865                                    Takuya Inaba
2919    Takashi Yamazaki, Ryuichi Yagi, Makoto Hanafusa
426               Ainsley Gardiner, Briar Grace-Smith
1104                                   Vince Marcello
7631                                   Lars von Trier
1613                                   Richard Laxton
Name: director, dtype: object
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 8807 entries, 0 to 8806
Data columns (total 12 columns):
 #   Column        Non-Null Count  Dtype 
---  ------        --------------  ----- 
 0   show_id       8807 non-null   object
 1   type          8807 non-null   object
 2   title         8807 non-null   object
 3   director      6173 non-null   object
 4   cast          7982 non-null   object
 5   country       7976 non-null   object
 6   date_added    8797 non-null   object
 7   release_year  8807 non-null   int64 
 8   rating        8803 non-null   object
 9   duration      8804 non-null   object
 10  listed_in     8807 non-null   object
 11  description   8807 non-null   object
dtypes: int64(1), object(11)
memory usage: 825.8+ KB
```

```
numerical_features = df.select_dtypes(include='number')
```

```
numerical_features.describe().T
```

	count	mean	std	min	25%	50%	75%	max
release_year	8807.0	2014.180198	8.819312	1925.0	2013.0	2017.0	2019.0	2021.0

```
categorical_features = df.select_dtypes(include='object')
categorical_features.describe().T
```

	count	unique	top	freq
show_id	8807	8807	s1	1
type	8807	2	Movie	6131
title	8807	8807	Dick Johnson Is Dead	1
director	6173	4528	Rajiv Chilaka	19
cast	7982	7692	David Attenborough	19
country	7976	748	United States	2818
date_added	8797	1767	January 1, 2020	109
rating	8803	17	TV-MA	3207
duration	8804	220	1 Season	1793
listed_in	8807	514	Dramas, International Movies	362
description	8807	8775	Paranormal activity at a lush, abandoned prope...	4

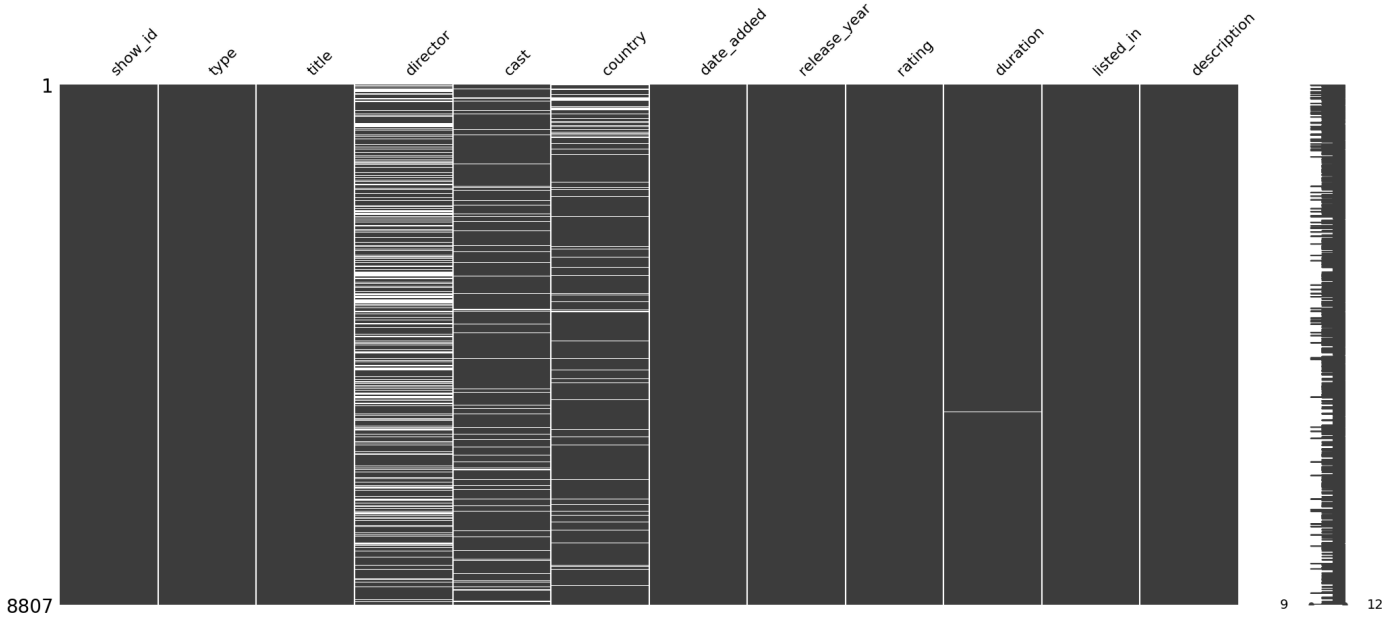
DATA CLEANING

```
df.isnull().values.any()
```

```
True
```

```
msno.matrix(df)
```

```
<Axes: >
```




```
def missing_value_table(df, get_null_columns=False):

    null_columns = [col for col in df.columns
                    if df[col].isnull().sum() > 0]


    null_counts = df[null_columns].isnull().sum().sort_values(ascending=True)


    null_value_rates = (df[null_columns].isnull().sum() / df.shape[0] * 100).sort_values(ascending=True)
    formatted_null_value_rates = null_value_rates.apply(lambda value: f"% {str(np.round(value, 2))}")


    null_df = pd.concat([null_counts, formatted_null_value_rates],
                        axis=1, keys=["Null Value Count", "Null Value Rates"])
    print(null_df, end="\n")

    if get_null_columns:
        return null_columns


missing_value_table(df)
```

```
             Null Value Count Null Value Rates
duration                    3           % 0.03
rating                      4           % 0.05
date_added                 10           % 0.11
cast                      825           % 9.37
country                   831           % 9.44
director                 2634          % 29.91
```

```
columns_to_fill = missing_value_table(df, get_null_columns=True)
df[columns_to_fill] = df[columns_to_fill].fillna('missing')
```

```
             Null Value Count Null Value Rates
duration                    3           % 0.03
rating                      4           % 0.05
date_added                 10           % 0.11
cast                      825           % 9.37
country                   831           % 9.44
director                 2634          % 29.91
```

```
df.isnull().sum()
```

```
show_id         0
type            0
title           0
director        0
cast            0
country         0
date_added      0
release_year    0
rating          0
duration        0
listed_in       0
description     0
dtype: int64
```

2. Checking Dublicate Values

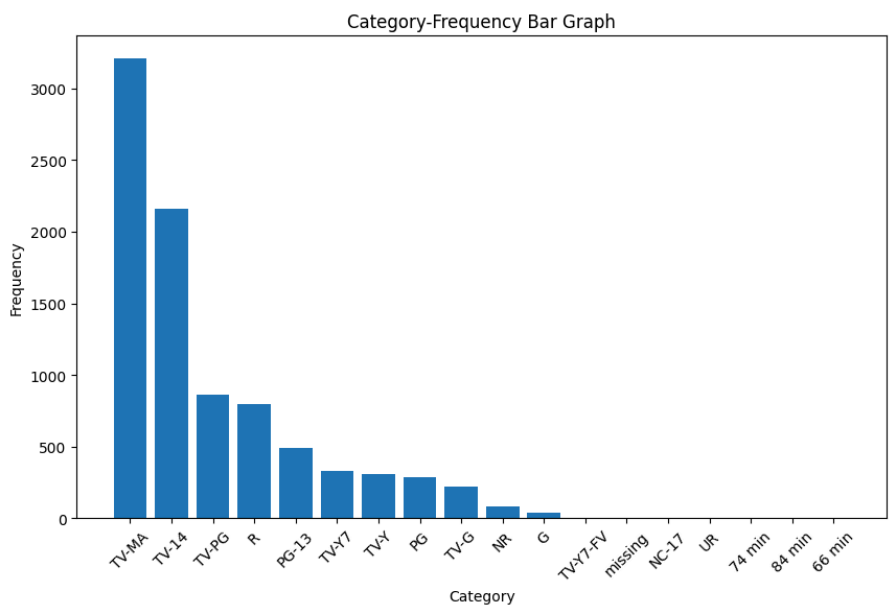
```
duplicated_rows = df[df.duplicated()]
print(f"Dublicates value number in dataset: {duplicated_rows.shape[0]}")
```

```
Dublicates value number in dataset: 0
```

3. Handling inconsistent or incorrect data

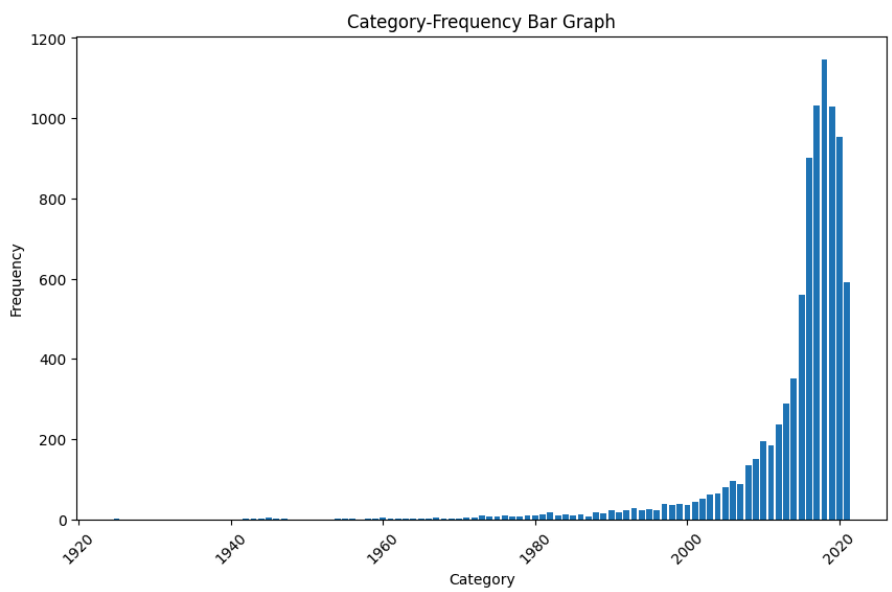
```
def plot_categorical_frequency(data, x_label, y_label, title):
    """Show Bar Frequency for categorical Features"""
    frequency_counts = data.value_counts()

    plt.figure(figsize=(10, 6))
    plt.bar(frequency_counts.index, frequency_counts.values)
    plt.xlabel(x_label)
    plt.ylabel(y_label)
    plt.title(title)
    plt.xticks(rotation=45)
    plt.show()
```

```
plot_categorical_frequency(df["rating"], "Category", "Frequency", "Category-Frequency Bar Graph")
```




```
df['rating'] = np.where(np.isin(df['rating'], ['74 min', '84 min', '66 min', 'missing']), 'UR', df['rating'])
```

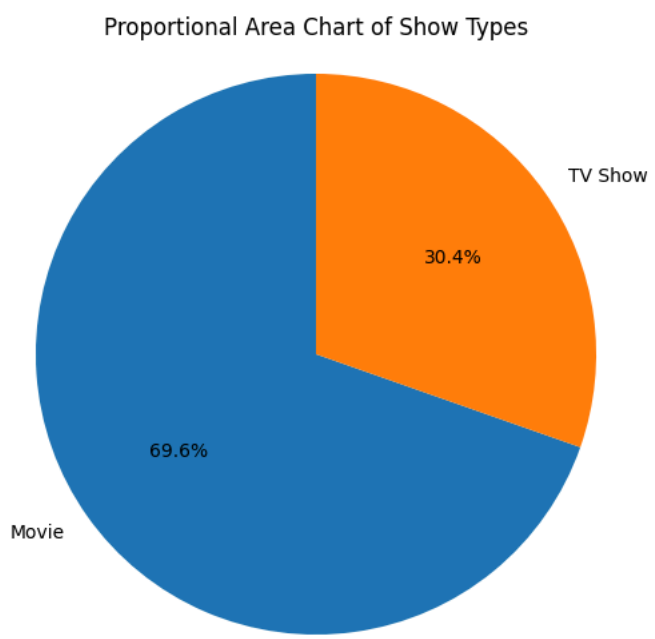
```
plot_categorical_frequency(df["release_year"], "Category", "Frequency", "Category-Frequency Bar Graph")
```



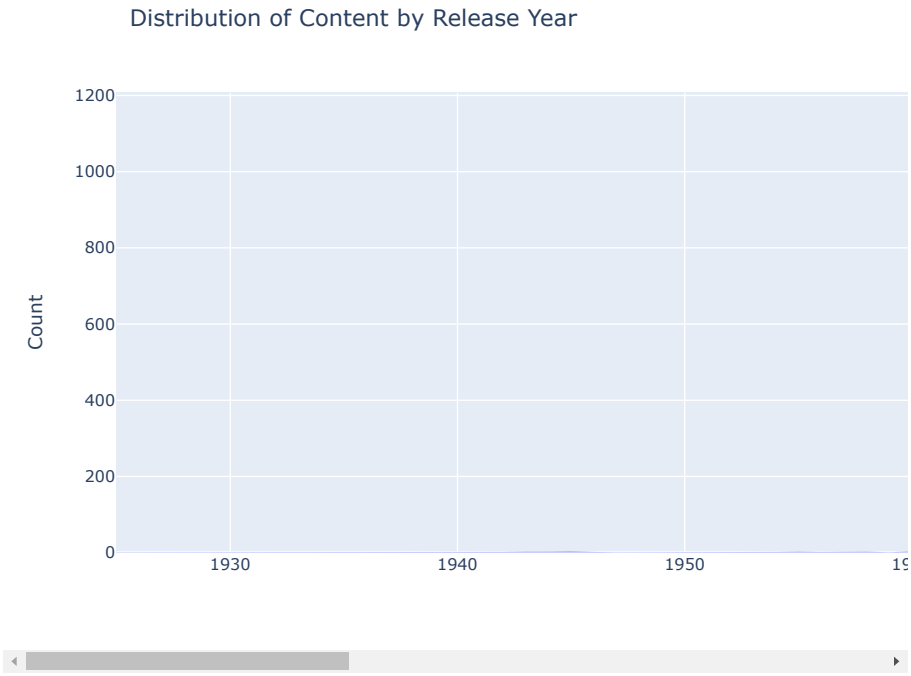
EDA

Generate | create a dataframe with 2 columns and 10 rows | Close

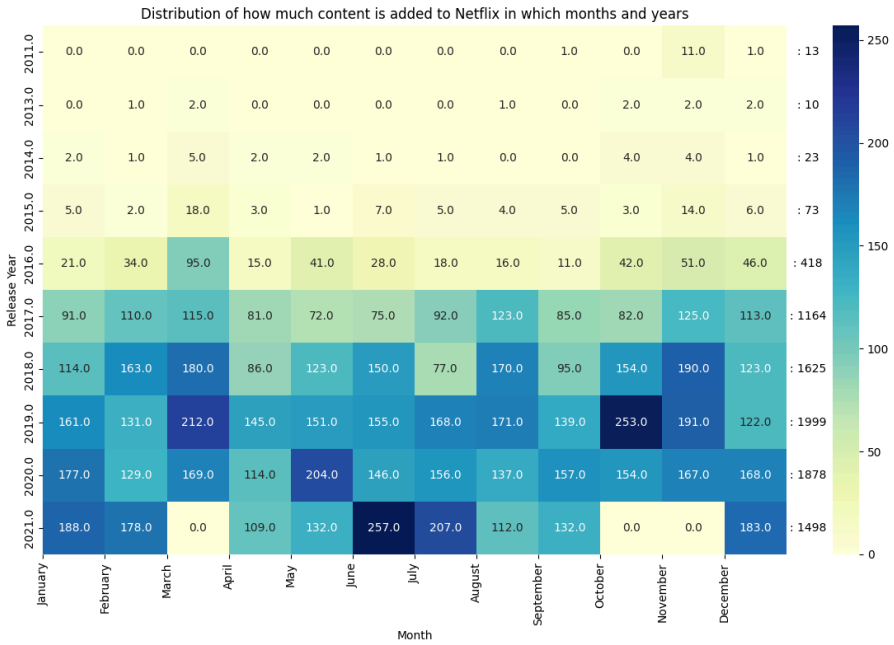
```
type_counts = df['type'].value_counts()
total_shows = type_counts.sum()

# Calculate proportions
proportions = type_counts / total_shows

# Plotting the proportional area chart
plt.figure(figsize=(8, 6))
plt.pie(proportions, labels=proportions.index, autopct='%1.1f%%', startangle=90)
plt.axis('equal')
plt.title('Proportional Area Chart of Show Types')
plt.show()
```




```
# Count the occurrences of each year
year_counts = df['release_year'].value_counts().sort_index()

# Create a stacked area graph using Plotly
fig = go.Figure()

fig.add_trace(go.Scatter(
    x=year_counts.index,
    y=year_counts.values,
    mode='none',
    fill='tozeroy',
    hovertemplate='Year: %{x}<br>Count: %{y}<extra></extra>',
    name='Count'
))

# Customize the axes labels and title
fig.update_layout(
    xaxis=dict(title='Year'),
    yaxis=dict(title='Count'),
    title='Distribution of Content by Release Year'
)

# Show the stacked area graph
fig.show()
```

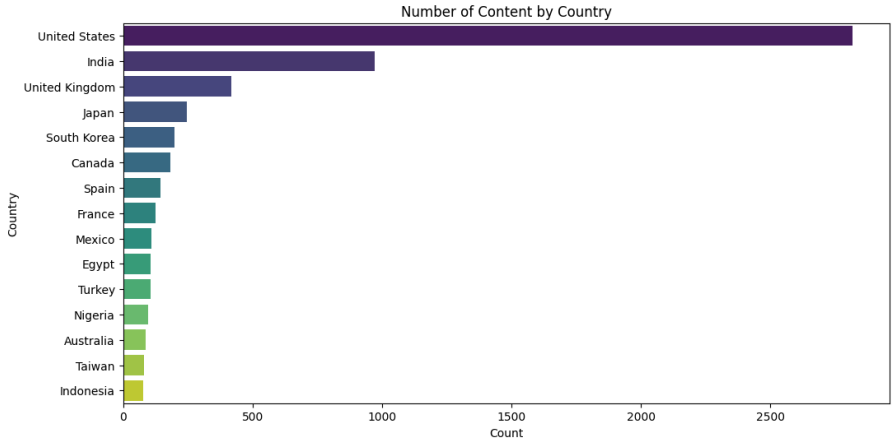

Distribution of Content by Release Year
Count
1200
1000
800
600
400
200
0
1930
1940
1950

```
from datetime import datetime

# Helper function to parse date with varying formats
def parse_date(date_string):
    formats = ["%B %d, %Y", "%B %Y", "%Y"]
    for fmt in formats:
        try:
            return datetime.strptime(date_string, fmt).date()
        except ValueError:
            pass
    return None

# Filter out rows with 'missing' in the 'date_added' column
filtered_df = df[df['date_added'] != 'missing'].copy()

filtered_df['release_date'] = filtered_df['date_added'].apply(parse_date)
filtered_df['release_date'] = pd.to_datetime(filtered_df['release_date'])

filtered_df['release_day'] = filtered_df['release_date'].dt.day
filtered_df['release_month'] = filtered_df['release_date'].dt.month_name()
filtered_df['release_year'] = filtered_df['release_date'].dt.year

# Count the occurrences of each release year
year_counts = filtered_df['release_year'].value_counts()

# Select the years with the most movies
top_years = year_counts.head(10).index

# Filter the data for the selected years
filtered_df = filtered_df[filtered_df['release_year'].isin(top_years)].copy()

# Count the occurrences of each release year and month combination
release_counts = filtered_df.groupby(['release_year', 'release_month']).size().unstack().fillna(0)

# Create a heatmap plot
plt.figure(figsize=(12, 8))  # Set the figure size
sns.heatmap(release_counts, cmap='YlGnBu', annot=True, fmt=".1f")

# Add labels and title
plt.xlabel('Month')
plt.ylabel('Release Year')
plt.title('Distribution of how much content is added to Netflix in which months and years')

# Customize x-axis tick labels to show month names
month_labels = ['January', 'February', 'March', 'April', 'May', 'June', 'July',
                'August', 'September', 'October', 'November', 'December']
plt.xticks(ticks=range(0, 12), labels=month_labels)

# Add total count annotations for each year below the bars
for i, year in enumerate(release_counts.index):
    plt.text(12.35, i + 0.5, f': {year_counts.loc[year]}', ha='center', va='center')

# Display the plot
plt.tight_layout()
plt.show()
```

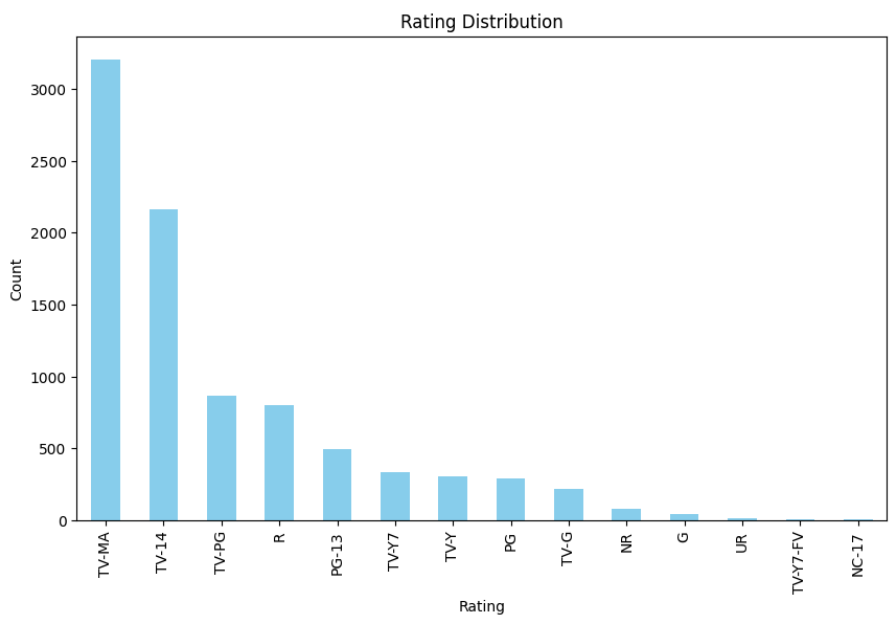



```
# Filter out rows with 'missing' in the 'country' column
filtered_df = df[df['country'] != 'missing'].copy()

# Count the occurrences of each country
country_counts = filtered_df['country'].value_counts()

# Select the top 10 countries with the most content
top_countries = country_counts.head(15)

# Create a bar plot
plt.figure(figsize=(12, 6))  # Set the figure size
sns.barplot(x=top_countries.values, y=top_countries.index, palette='viridis')

# Add labels and title
plt.xlabel('Count')
plt.ylabel('Country')
plt.title('Number of Content by Country')

# Display the plot
plt.show()
```

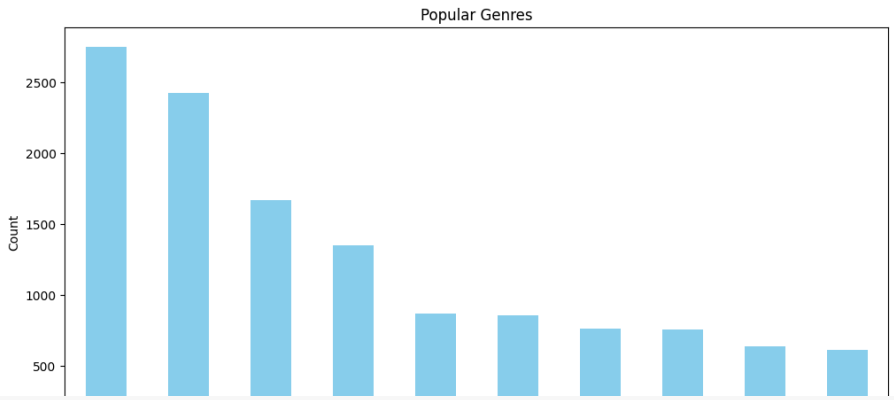
```
<ipython-input-27-7e69ae50de6a>:12: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0.
```




```
# Filter out rows with 'missing' in the 'rating' column
filtered_df = df[df['rating'] != 'missing'].copy()

# Count the occurrences of each rating
rating_counts = filtered_df['rating'].value_counts()

# Create a bar plot
plt.figure(figsize=(10, 6))
rating_counts.plot(kind='bar', color='skyblue')

# Add labels and title
plt.xlabel('Rating')
plt.ylabel('Count')
plt.title('Rating Distribution')

# Display the plot
plt.show()
```




```
# Extract the genres
genres = df['listed_in'].str.split(', ').explode()

# Count the occurrences of each genre
genre_counts = genres.value_counts()

# Select the top 10 popular genres
top_genres = genre_counts.head(10)

# Create a bar plot
plt.figure(figsize=(12, 6))
top_genres.plot(kind='bar', color='skyblue')

# Add labels and title
plt.xlabel('Genres')
plt.ylabel('Count')
plt.title('Popular Genres')

# Rotate x-axis labels for better visibility
plt.xticks(rotation=45)

# Display the plot
plt.show()
```




```
# Extract the movie durations without 'missing' values
movie_durations = df[(df['type'] == 'Movie') & (df['duration'] != 'missing')]['duration']

# Convert the durations to numeric values (remove 'min' suffix)
movie_durations = movie_durations.str.replace(' min', '').astype(int)

# Calculate summary statistics
min_duration = movie_durations.min()
max_duration = movie_durations.max()
mean_duration = movie_durations.mean()
median_duration = movie_durations.median()

# Print the summary statistics
print("Duration Summary Statistics:")
print("Minimum duration: {} min".format(min_duration))
print("Maximum duration: {} min".format(max_duration))
print("Mean duration: {:.2f} min".format(mean_duration))
print("Median duration: {:.2f} min".format(median_duration))

# Create a histogram of movie durations
plt.figure(figsize=(10, 6))  # Set the figure size
plt.hist(movie_durations, bins=20, edgecolor='black', alpha=0.7)
plt.xlabel('Duration (min)')
plt.ylabel('Count')
plt.title('Distribution of Movie Durations')
plt.grid(True)
plt.show()
```

```
Duration Summary Statistics:
Minimum duration: 3 min
Maximum duration: 312 min
Mean duration: 99.58 min
Median duration: 98.00 min
```