In [1]:
```
# This Python 3 environment comes with many helpful analytics libraries instal
# It is defined by the kaggle/python Docker image: https://github.com/kaggle/d
# For example, here's several helpful packages to load

import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)

# Input data files are available in the read-only "../input/" directory
# For example, running this (by clicking run or pressing Shift+Enter) will lis

import os
for dirname, _, filenames in os.walk('/kaggle/input'):
    for filename in filenames:
        print(os.path.join(dirname, filename))

# You can write up to 20GB to the current directory (/kaggle/working/) that ge
# You can also write temporary files to /kaggle/temp/, but they won't be saved
```

In [2]:
```
df=pd.read_csv('netflix_titles.csv.zip')
```

# Data assessing

- Overview ---> head(),sample(),data card,shape,Validity issues,duplicacy check
- Seeking information ---> completness
- Seeking description ---> accuracy issues,validity issues,completeness
- Distribution ---> numerical columns,categorial(imbalancing) --> feature engg,feature selection

# Data visualisation

- Import major libraries
- Univariate analysis
- Bivariate analysis
- Multivariate analysis
- Information
- Insights

# ----> Report

# ----> Dashboarding

# Data Assessing

## About Company

Netflix, Inc. is a global streaming service and production company that provides on-demand movies, TV shows, documentaries, and original content over the internet. Founded in 1997 by Reed Hastings and Marc Randolph in the United States, Netflix started as a DVD rental-by-mail service but transitioned to online streaming in 2007.

Today, Netflix is known for its wide range of content, including popular original series like Stranger Things, The Crown, and Money Heist. It operates in over 190 countries and has millions of subscribers worldwide.

Netflix has also expanded into content production, creating films, documentaries, and series under its Netflix Originals banner, making it both a platform and a studio.

In [3]:
```
# overview data
df.head()
```

Out[3]:

| | show_id | type | title | director | cast | country | date_added | release_ |
|---|---|---|---|---|---|---|---|---|
| **0** | s1 | Movie | Dick Johnson Is Dead | Kirsten Johnson | NaN | United States | September 25, 2021 | |
| **1** | s2 | TV Show | Blood & Water | NaN | Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban... | South Africa | September 24, 2021 | |
| **2** | s3 | TV Show | Ganglands | Julien Leclercq | Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi... | NaN | September 24, 2021 | |
| **3** | s4 | TV Show | Jailbirds New Orleans | NaN | NaN | NaN | September 24, 2021 | |
| **4** | s5 | TV Show | Kota Factory | NaN | Mayur More, Jitendra Kumar, Ranjan Raj, Alam K... | India | September 24, 2021 | |

In [4]:
```
# shape
df.shape
```

Out[4]:
```
(8807, 12)
```

In [5]:
```
df.columns
```

Out[5]:
```
Index(['show_id', 'type', 'title', 'director', 'cast', 'country', 'date_adde
d',
       'release_year', 'rating', 'duration', 'listed_in', 'description'],
      dtype='object')
```

# 📌 Data Card: Netflix Movies & TV Shows Dataset (Sample)

## Dataset Name

Netflix Movies and TV Shows – Sample Content Data

---

## Dataset Description

This dataset is a **sample of movies and TV shows available on Netflix**. It contains structured metadata about Netflix content, including **title details, content type, release year, ratings, duration, country of origin, genres, and descriptions**.
The dataset is suitable for **content analysis, exploratory data analysis (EDA), and recommendation-based insights**.

---

## Number of Records

- **5 Netflix titles**

---

## Number of Features

- **12 attributes**

---

## Feature Description

| Column Name | Description |
|---|---|
| show_id | Unique identifier assigned to each Netflix title |
| type | Indicates whether the content is a Movie or a TV Show |
| title | Name of the movie or TV show |
| director | Director(s) of the content (may contain missing values) |
| cast | Main actors and actresses featured in the title |
| country | Country or countries where the content was produced |
| date_added | Date when the title was added to Netflix |
| release_year | Original year of release |
| rating | Content rating based on audience suitability |

| Column Name | Description |
|---|---|
| duration | Runtime in minutes for movies or number of seasons for TV shows |
| listed_in | Genre(s) or category classification |
| description | Short summary describing the storyline or theme |

In [6]:
```
# seeking info
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
```

In [7]:
```
# Seeking description
df.describe()
```

Out[7]:

| | release_year |
|---|---|
| **count** | 8807.000000 |
| **mean** | 2014.180198 |
| **std** | 8.819312 |
| **min** | 1925.000000 |
| **25%** | 2013.000000 |
| **50%** | 2017.000000 |
| **75%** | 2019.000000 |
| **max** | 2021.000000 |

## Accuracy Issues Identified in the Dataset

- **Mismatch between `release_year` and `year_added`**

Several records show a large gap between the content's release year and the year it was added to the platform. While some lag is expected, extreme differences (e.g., very old release years added recently) should be validated to ensure correctness.

- **Very old `release_year` values**
  The minimum `release_year` goes as far back as **1925**, which, although possible, may include data entry errors or misclassified content that needs verification.

- **Inconsistent date precision**
  The `date_added` column includes full timestamps, whereas `release_year` and `year_added` are stored only as years. This inconsistency can introduce inaccuracies during time-based comparisons or trend analysis.

- **Potential mis-typed or incorrect year values**
  Outlier years far from the interquartile range (e.g., much earlier than 2013 or later than expected) may indicate manual entry mistakes.

- **Missing variability reporting in `date_added`**
  The standard deviation for `date_added` is shown as `NaN`, which can hide dispersion-related accuracy insights and suggests the need to recheck data type handling.

- **Possible logical inconsistencies**
  In some cases, `year_added` may appear earlier than the actual `release_year`, which is logically incorrect and points to accuracy issues in year-related fields.

## 📌 Data Quality Observations

- The dataset contains **null (missing) values**.
- The dataset consists of **1 numerical features** and **11 categorical (object) features**.

---

In [8]:
```
# Completness
df.isnull().sum().sum()
# Percentage
df.isnull().mean()*100
```

Out[8]:
```
show_id          0.000000
type             0.000000
title            0.000000
director        29.908028
cast             9.367549
country          9.435676
date_added       0.113546
release_year     0.000000
rating           0.045418
duration         0.034064
listed_in        0.000000
description      0.000000
dtype: float64
```

In [9]:
```
df.isnull().sum()
```

Out[9]:
```
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
```

In [10]:
```
df['director'] = df['director'].fillna('Not Available')
```

In [11]:
```
df['cast'] = df['cast'].fillna('Not Available')
```

In [12]:
```
df['country'] = df['country'].fillna('Not Available')
```

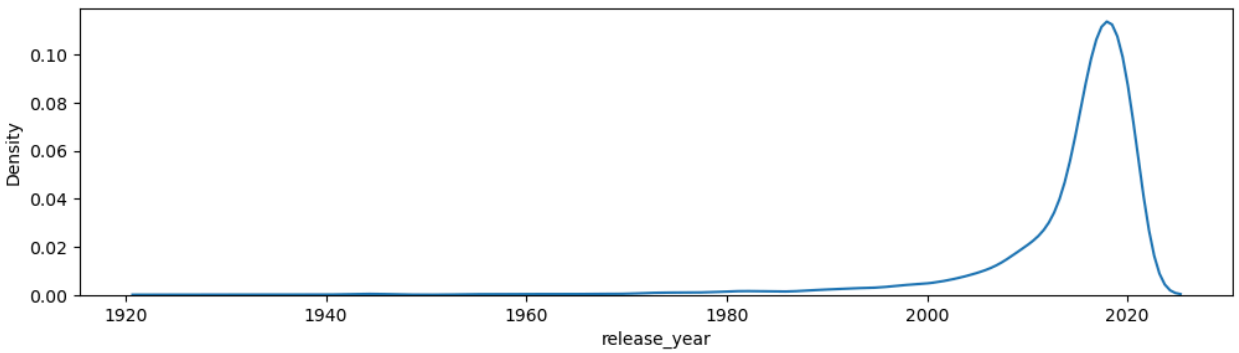
In [13]:
```
df['rating'] = df['rating'].fillna(df['rating'].mode()[0])
df['duration'] = df['duration'].fillna(df['duration'].mode()[0])
```

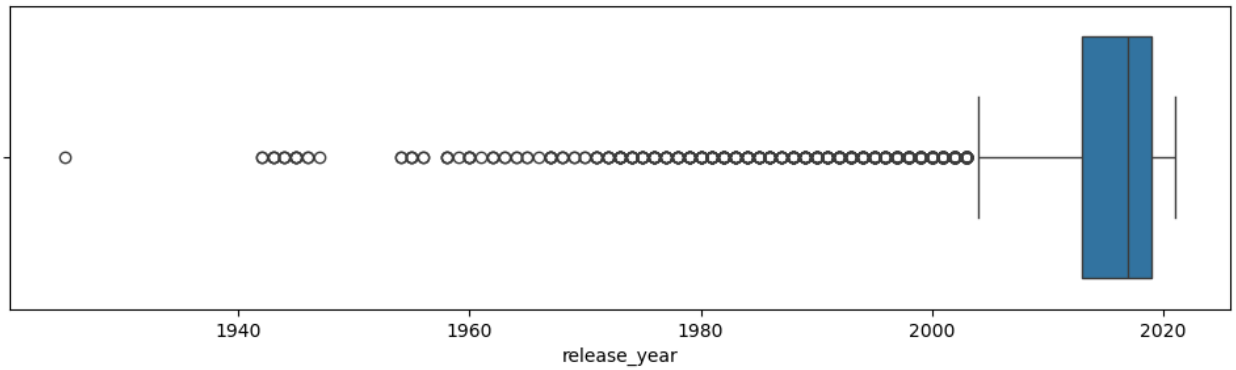
In [14]:
```
df.isnull().sum()
```

Out[14]:
```
show_id          0
type             0
title            0
director         0
cast             0
country          0
date_added      10
release_year     0
rating           0
duration         0
listed_in        0
description      0
dtype: int64
```

In [15]:
```
# importing major libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px

# additional libraries
import warnings
warnings.filterwarnings('ignore')
```

In [16]:
```
df.release_year.describe()
# Visualisation
plt.figure(figsize=(12,3))
sns.kdeplot(data=df,x='release_year')
plt.show()
plt.figure(figsize=(12,3))
sns.boxplot(data=df,x='release_year')
plt.show()

print('skewness',df.release_year.skew())
```

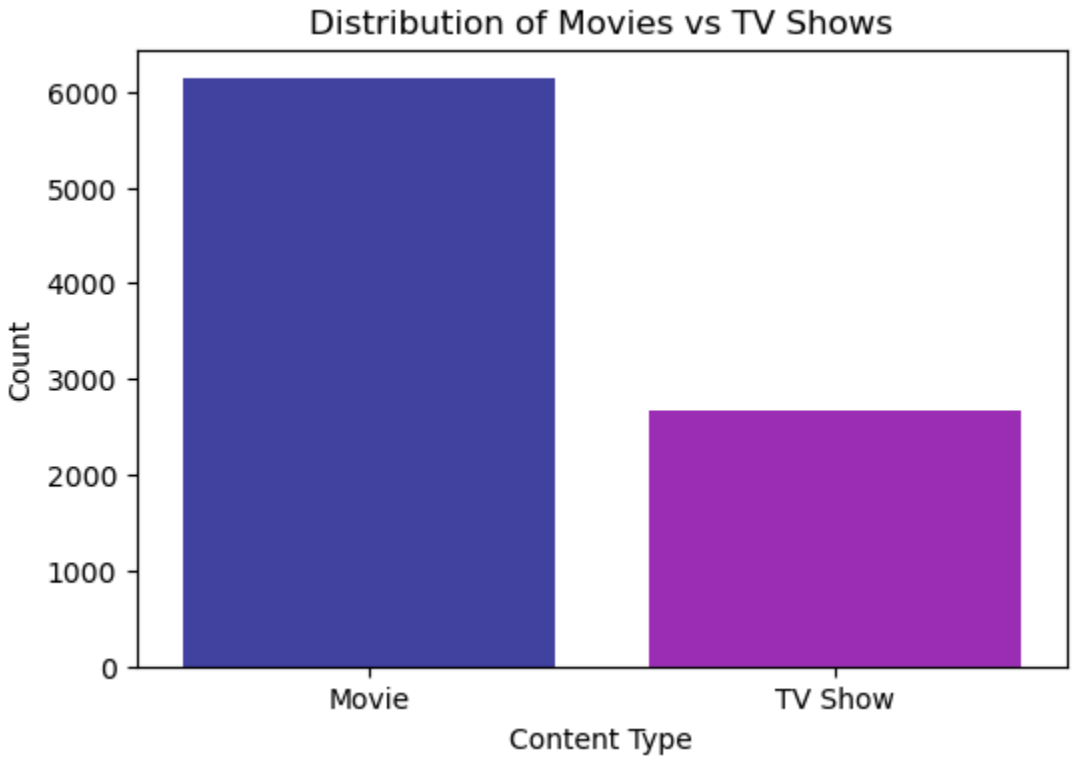





```
skewness -3.4465650403316013
```

# Univariate Analysis

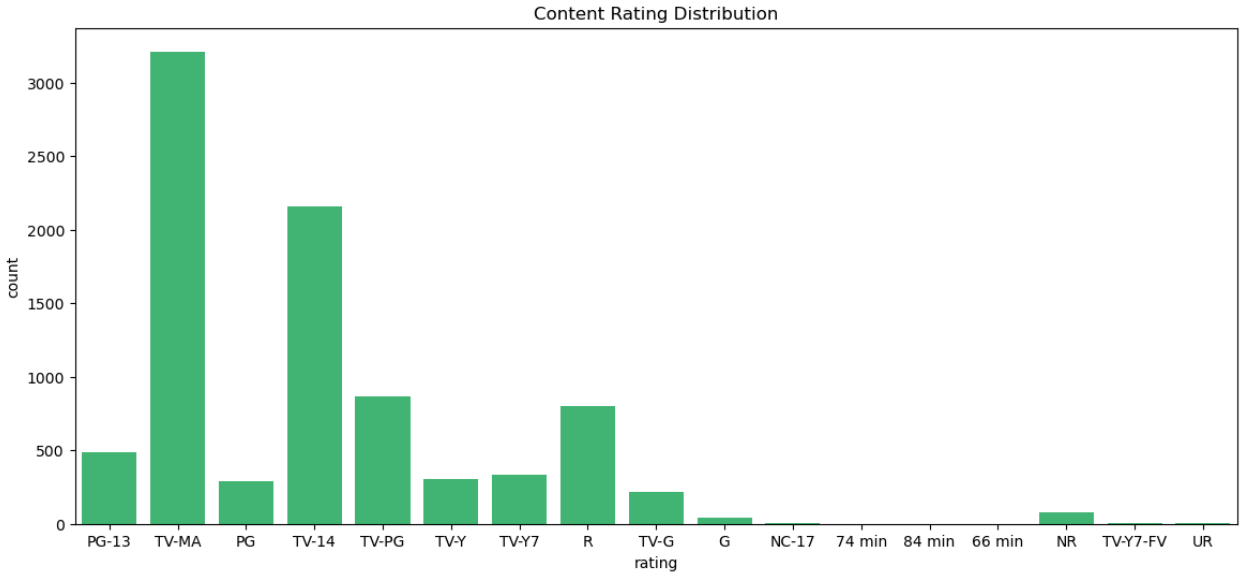
In [17]:
```
# Movies vs TV Shows Count
colors=["#3333B0","#A91BCC"]
plt.figure(figsize=(6,4))
sns.countplot(x='type',hue='type', data=df,palette=colors,legend=False)
plt.title('Distribution of Movies vs TV Shows')
plt.xlabel('Content Type')
plt.ylabel('Count')
plt.show()
```



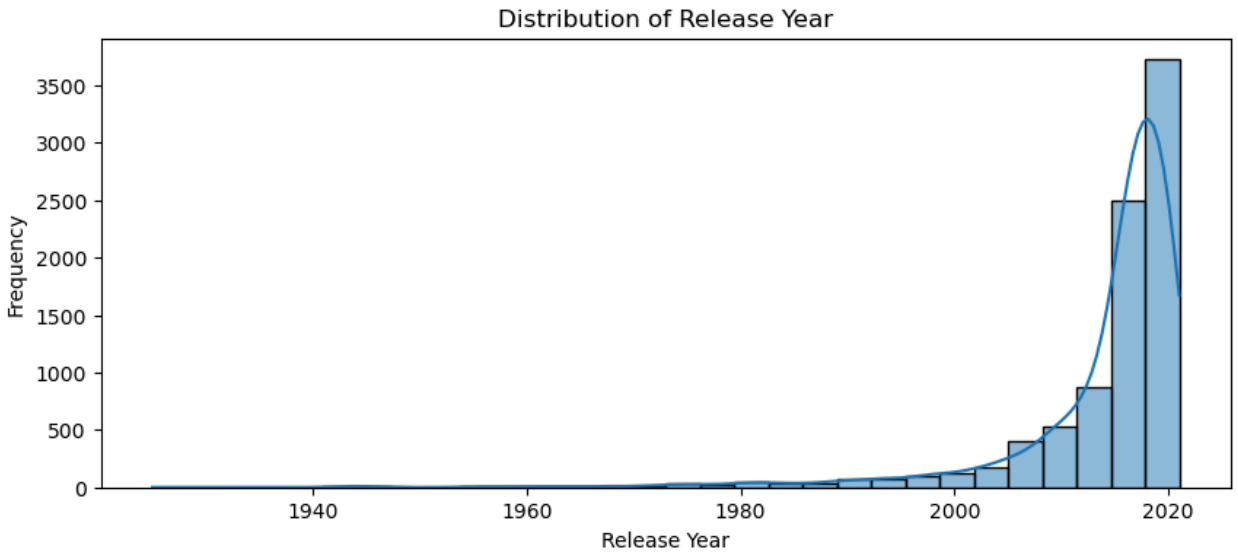
# Insight: Movies vs TV Shows

- Movies are available in **much higher numbers** than TV Shows on Netflix.
- This shows a clear preference for **movie-based content** in the platform's catalog.
- TV Shows are fewer, suggesting they are **more selective and production-intensive** compared to movies.
- The distribution reflects Netflix's strategy of offering **wide variety through movies** while maintaining a limited set of series.

In [18]:
```
# Rating Distribution
colors=["#2ECC71"]
plt.figure(figsize=(14,6))
sns.countplot(x='rating',hue="rating", data=df,palette=colors,legend=False)
plt.title('Content Rating Distribution')
plt.show()
```




In [19]:
```
#Release Year Distribution
plt.figure(figsize=(10,4))
sns.histplot(df['release_year'], bins=30, kde=True)
plt.title('Distribution of Release Year')
plt.xlabel('Release Year')
plt.ylabel('Frequency')
plt.show()
```



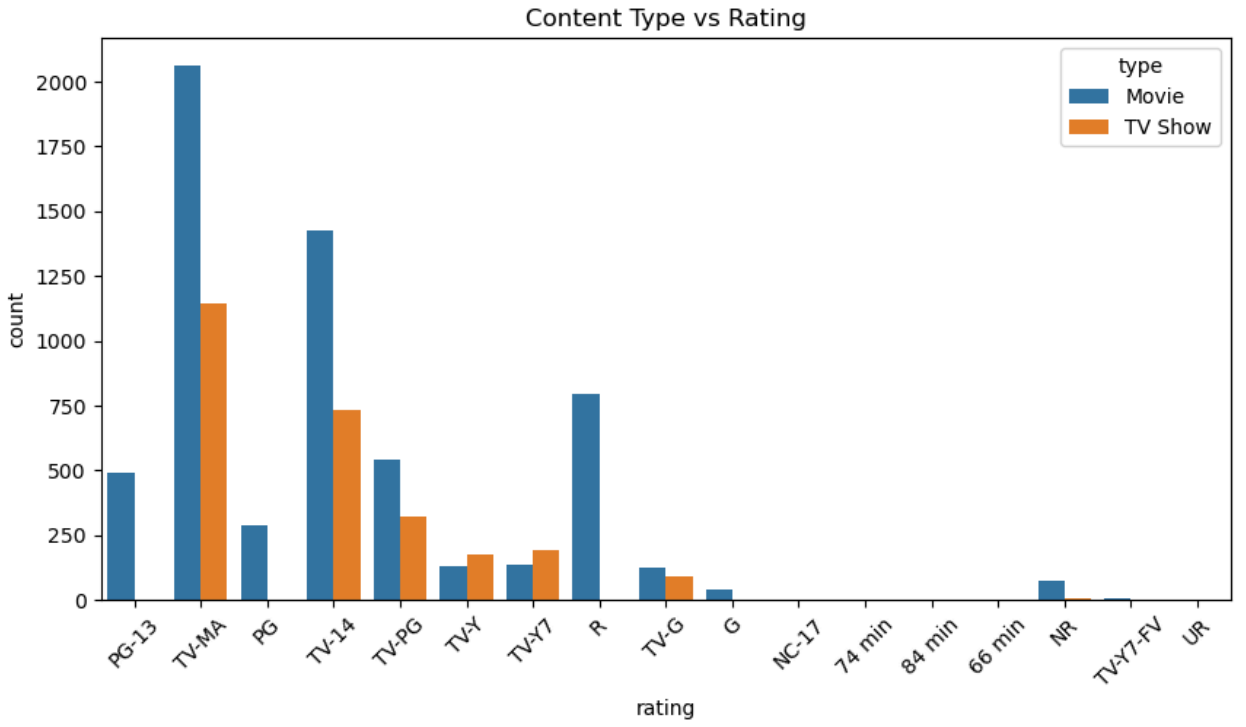

In [20]:
```
#Pie Chart Visualization
temp = df['rating'].value_counts().reset_index()
temp.columns = ['Rating', 'Count']
temp

px.pie(temp,names='Rating',values='Count',
    color_discrete_sequence=px.colors.sequential.RdBu,
    height=400,
    title='Distribution of Netflix Titles by Rating')
```

## Key Insights

- The majority of Netflix titles have ratings like TV-MA, TV-14, or PG-13, which suggests a large portion of content is targeted toward teens and adults.
- Fewer titles have ratings like NC-17 or G, indicating limited extreme content or children-only content.
- Count plots highlight the absolute number of titles per rating, while pie charts show the relative proportions clearly.
- Imbalances in rating distribution could influence recommendation strategies or content targeting.

# Bivariate Analysis

In [21]:
```
#Content type Vs Rating
plt.figure(figsize=(10,5))
sns.countplot(data=df, x='rating', hue='type')
plt.title('Content Type vs Rating')
plt.xticks(rotation=45)
plt.show()
```

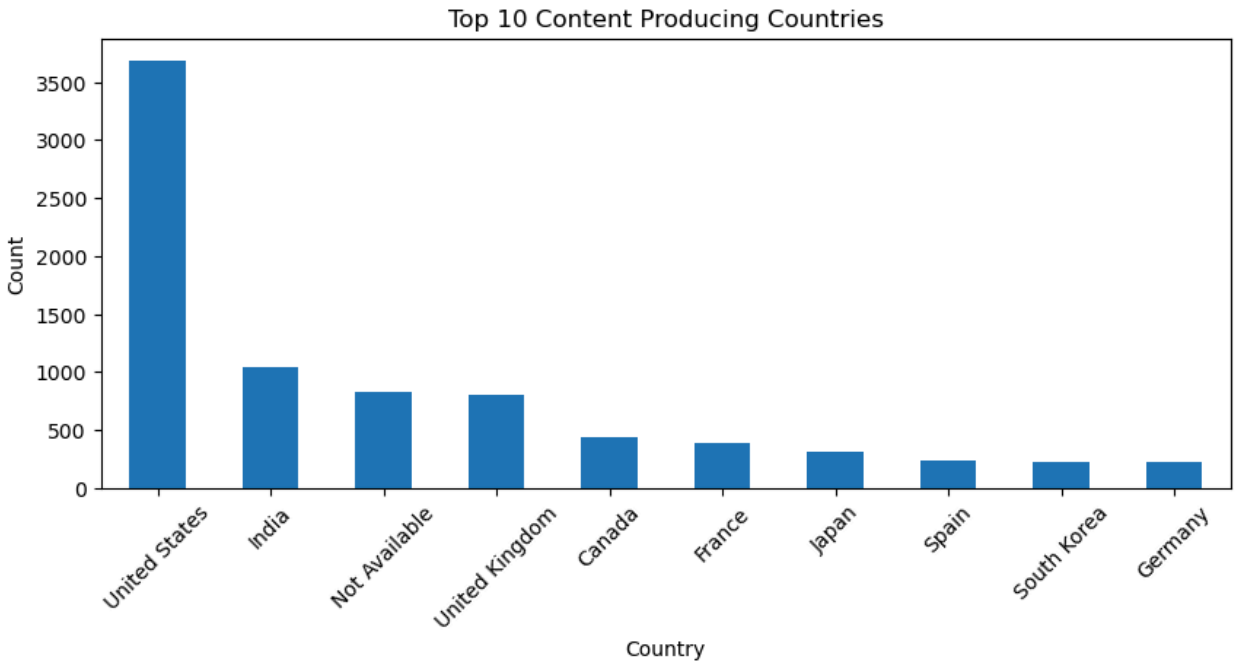



In [30]:
```
#plotly
```

```
# Release year vs duration
px.scatter(df, x='release_year', y='duration_num', color='type',
           hover_data=['title','country','rating'], height=500)
```

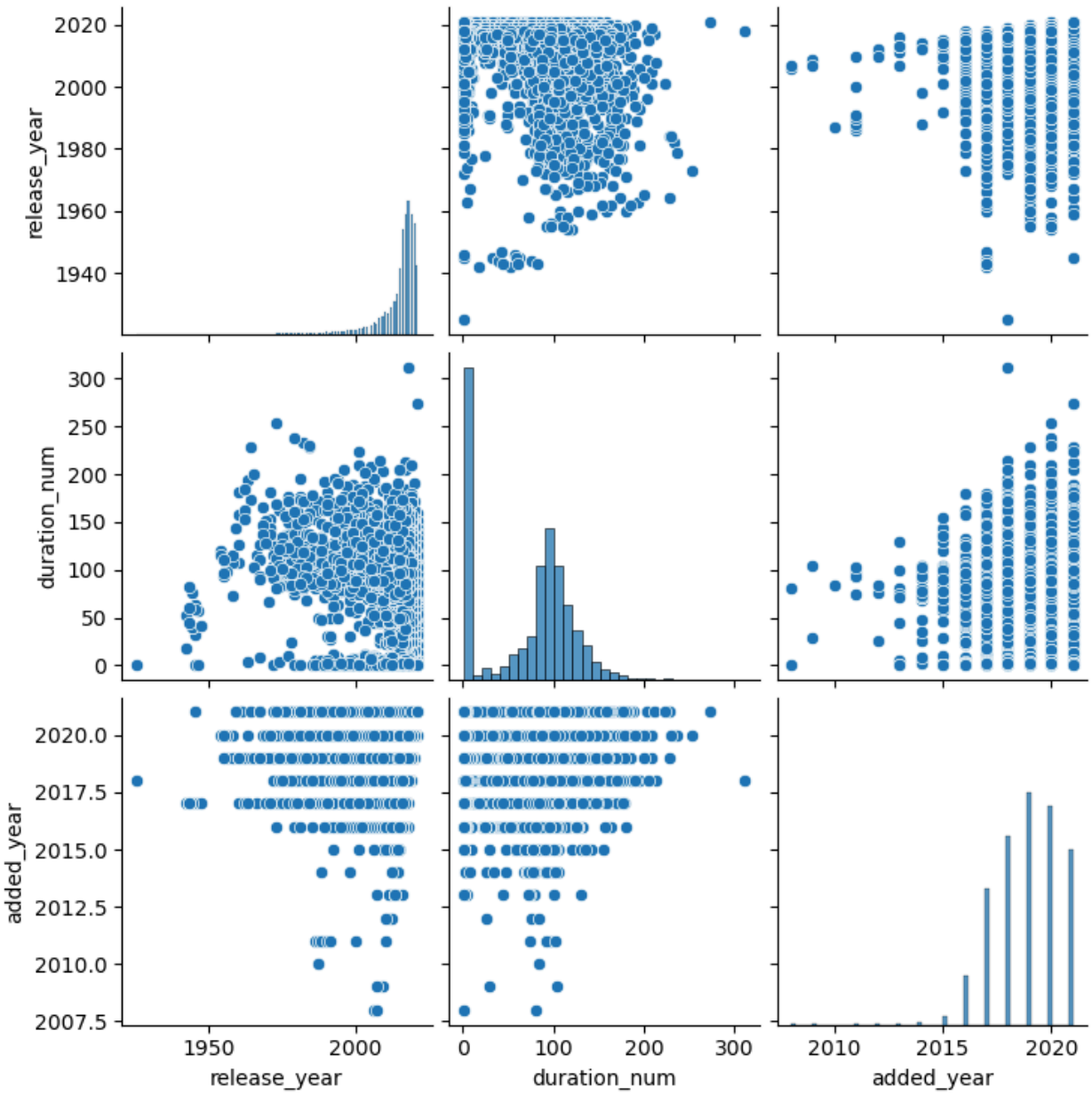
In [31]:

```
#Top 10 Countries by content count
top_countries = df['country'].str.split(', ').explode().value_counts().head(10

plt.figure(figsize=(10,4))
top_countries.plot(kind='bar')
plt.title('Top 10 Content Producing Countries')
plt.xlabel('Country')
plt.ylabel('Count')
plt.xticks(rotation=45)
plt.show()
```




# Multivariate Analysis

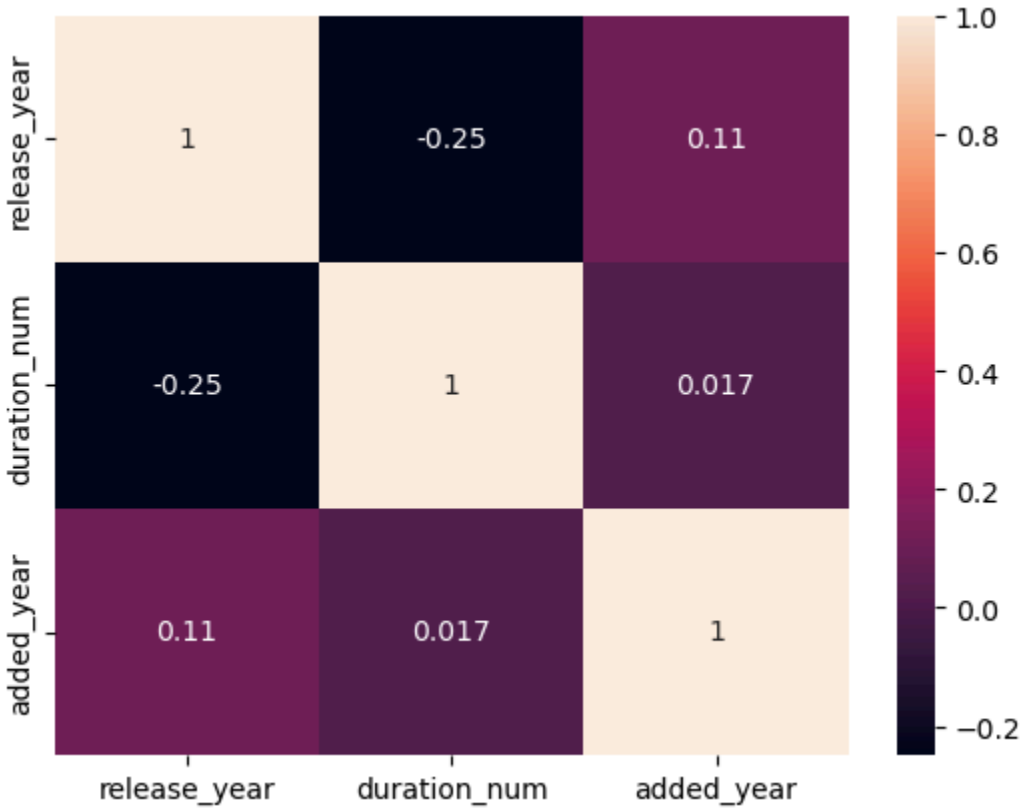
In [32]:
```
# multivariate analysis
df['duration_num'] = df['duration'].str.extract('(\d+)').astype(float)
df['added_year'] = pd.to_datetime(df['date_added'], errors='coerce').dt.year

sns.pairplot(df)
plt.show()
```




# Key Insights

- release_year vs year_added: Many older shows/movies were added recently, which shows a lag between production and platform addition.
- duration_numeric vs release_year: Movie durations don’t vary much with release year, but TV shows (number of seasons) can show trends over time.
- Correlation checks: Pairplots help spot correlations and clusters visually, which can inform content analysis or recommendation strategies.

In [33]:
```
# corr
# heat map
sns.heatmap(df[['release_year','duration_num','added_year']].corr(), annot=Tru
plt.show()
```




## Key Insights from the Correlation Heatmap

**`release_year` vs `year_added`:**

- Slight positive correlation (if any) indicates that older content was often added much later.
- Many classic titles were added recently, so the correlation is not very strong.

**`release_year` vs `duration_numeric`:**

- Very low or near-zero correlation, meaning movie length doesn't significantly change with release year.

**`year_added` vs `duration_numeric`:**

- Also low correlation, showing that Netflix adds content of varying durations regardless of the year it was added.

**Overall:**

- Netflix content addition is more driven by platform strategy than by production year or content length.
- No strong correlations exist between numeric features, which is expected because most of the dataset is categorical.

In [34]:
```
temp = df['rating'].value_counts().reset_index()
temp.columns = ['rating', 'count']

px.pie(temp,names='rating',values='count',
    title='Distribution of Ratings on Netflix',
    hole=0.4,
    color_discrete_sequence=px.colors.sequential.RdBu).show()

temp2 = df['rating'].value_counts().reset_index()
temp2.columns = ['rating', 'count']

px.bar(temp2,x='count',y='rating',
    title='Number of Netflix Titles by Rating',
    color_discrete_sequence=px.colors.sequential.RdBu).show()
```

## Insights from Netflix Rating Distribution

### Pie Chart: Distribution of Ratings

- Most Netflix titles are rated **TV-MA, TV-14, or PG-13**, indicating a focus on content for teens and adults.
- Fewer titles are rated **G** or **NC-17**, showing limited content for children or extreme adult content.
- The pie chart clearly shows the proportion of each rating category.

### Bar Chart: Number of Titles by Rating

- **TV-MA** has the highest number of titles, reflecting Netflix's emphasis on mature content.
- Ratings like **NC-17** and **G** have very few titles, highlighting content imbalance.
- This can inform content recommendations and production strategy.

**Optional: Median Release Year by Rating**

- Older ratings like **G** tend to have earlier release years.
- Most adult or teen-rated content (**TV-MA, TV-14, PG-13**) were produced in recent years.
- Shows Netflix's strategy of updating the library with modern content for the main audience.

## Conclusion

The analysis of Netflix ratings shows that the platform primarily focuses on **teen and adult audiences**, with the majority of content rated **TV-MA, TV-14, or PG-13**. There is a clear **imbalance in rating distribution**, as very few titles are aimed at children (G) or extreme adult content (NC-17).

From a temporal perspective, most popular ratings correspond to **recently produced content**, while older ratings like G appear mostly in classic titles. This indicates that Netflix's content strategy prioritizes **modern, mature, and teen-oriented content**, likely to match viewer demand and engagement trends.

Overall, Netflix's library is curated more by **audience targeting and content relevance** than by maintaining a balanced representation across all rating categories.

In [ ]: