NETFLIX BUSINESS CASE --> SCALER

Importing the required packages

In [1]:

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

BASIC METRICS ANALYSIS

Loading of dataset and displaying top 10 rows

In [2]:

```
df_netflix=pd.read_csv('https://d2beiqkhq929f0.cloudfront.net/public_assets/assets/000/0
df_netflix.head(10)
```

Out[2]:

	show_id	type	title	director	cast	country	date_added	release_year	r
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	September 25, 2021	2020	
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	2021	
2	s3	TV Show	Ganglands	Julien Leclercq	Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...	NaN	September 24, 2021	2021	
3	s4	TV Show	Jailbirds New Orleans	NaN	NaN	NaN	September 24, 2021	2021	
4	s5	TV Show	Kota Factory	NaN	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	September 24, 2021	2021	
5	s6	TV Show	Midnight Mass	Mike Flanagan	Kate Siegel, Zach Gilford, Hamish Linklater, H...	NaN	September 24, 2021	2021	
6	s7	Movie	My Little Pony: A New Generation	Robert Cullen, José Luis Ucha	Vanessa Hudgens, Kimiko Glenn, James Marsden, ...	NaN	September 24, 2021	2021	
7	s8	Movie	Sankofa	Haile Gerima	Kofi Ghanaba, Oyafunmike Ogunlano, Alexandra D...	United States, Ghana, Burkina Faso, United Kin...	September 24, 2021	1993	
8	s9	TV Show	The Great British Baking Show	Andy Devonshire	Mel Giedroyc, Sue Perkins, Mary Berry, Paul Ho...	United Kingdom	September 24, 2021	2021	T
9	s10	Movie	The Starling	Theodore Melfi	Melissa McCarthy, Chris O'Dowd, Kevin Kline, T...	United States	September 24, 2021	2021	

Displaying the size of data

In [3]:

```
df_netflix.shape
```

Out[3]:

```
(8807, 12)
```

Displaying dimension of dataset

In [4]:

```
df_netflix.ndim
```

Out[4]:

```
2
```

Displaying all data related to columns in our dataset

In [5]:

```
df_netflix.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
```

Displaying stats

In [6]:

```
df_netflix.describe()
```

Out[6]:

	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

Data Profiling and Cleaning

Handling duplicates amongst rows

In [7]:

```
# Handling duplicate values

df_netflix1=[df_netflix.columns[0],df_netflix.columns[2]]
new_df=df_netflix[[x for x in df_netflix.columns if x not in df_netflix1]]
new_df1=new_df[new_df.duplicated()]
new_df1
```

Out[7]:

	type	director	cast	country	date_added	release_year	rating	durati
237	Movie	Rathindran R Prasad	Aishwarya Rajesh, Vidhu, Surya Ganapathy, Madh...	NaN	August 23, 2021	2021	TV-14	122 n
238	Movie	Rathindran R Prasad	Aishwarya Rajesh, Vidhu, Surya Ganapathy, Madh...	NaN	August 23, 2021	2021	TV-14	122 n
239	Movie	Rathindran R Prasad	Aishwarya Rajesh, Vidhu, Surya Ganapathy, Madh...	NaN	August 23, 2021	2021	TV-14	122 n
852	Movie	NaN	NaN	NaN	May 21, 2021	2021	TV-14	131 n
3493	Movie	B. V. Nandini Reddy	Samantha Ruth Prabhu, Lakshmi, Rajendraprasad,...	NaN	September 25, 2019	2019	TV-14	146 n
5964	TV Show	NaN	Shahd El Yaseen, Shaila Sabt, Hala, Hanadi Al-...	NaN	March 20, 2019	2018	TV-14	Seas
5965	Movie	Paul Greengrass	Anders Danielsen Lie, Jon Øigarden, Jonas Stra...	Norway, Iceland, United States	October 10, 2018	2018	R	144 n
5966	Movie	Swapnaneel Jayakar	Rahul Pethe, Mrunmayee Deshpande, Adinath Koth...	India	March 29, 2019	2019	TV-14	124 n
6529	Movie	Ozan Açıktan	Nehir Erdoğan, Tardu Flordun, İlker Kaleli, Se...	Turkey	October 25, 2019	2014	TV-MA	106 n
8052	Movie	Ron Howard	Alden Ehrenreich, Woody Harrelson, Emilia Clar...	United States	January 9, 2019	2018	PG-13	135 n

In [8]:

```
# Checking presence of duplicates after execution of above query (no duplicates now)

duplicate_rows = df_netflix.iloc[:, 1:]
duplicate_rows1=duplicate_rows[duplicate_rows.duplicated()]
duplicate_rows1
```

Out[8]:

type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	de

Finding null values and handling it

In [9]:

```
#Checking counts of occurrences of null values across cols

df_netflix.isna().sum().sort_values(ascending=False)
```

Out[9]:

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

In [10]:

```
# Handling cols other than datetime and duration by setting to Not-Available

df_netflix.fillna({'rating':'Not-Available','cast':'Not-Available','country':'Not-Availa
```

In [11]:

```
# Checking rest nulls after executing above query

df_netflix.isna().sum().sort_values(ascending=False)
```

Out[11]:

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

In [12]:

```
# Dtype conversion for date_added field to timestamp, to handle nulls & inc accuracy of 

df_netflix['date_added']=pd.to_datetime(df_netflix['date_added'])
```

In [13]:

```
# Checking rows where date_added is null

df_netflix.loc[df_netflix['date_added'].isna()]
```

Out[13]:

	show_id	type	title	director	cast	country	date_added	release_year
6066	s6067	TV Show	A Young Doctor's Notebook and Other Stories	Not-Available	Daniel Radcliffe, Jon Hamm, Adam Godley, Chris...	United Kingdom	NaT	2013
6174	s6175	TV Show	Anthony Bourdain: Parts Unknown	Not-Available	Anthony Bourdain	United States	NaT	2018
6795	s6796	TV Show	Frasier	Not-Available	Kelsey Grammer, Jane Leeves, David Hyde Pierce...	United States	NaT	2003
6806	s6807	TV Show	Friends	Not-Available	Jennifer Aniston, Courteney Cox, Lisa Kudrow, ...	United States	NaT	2003
6901	s6902	TV Show	Gunslinger Girl	Not-Available	Yuuka Nanri, Kanako Mitsuhashi, Eri Sendai, Am...	Japan	NaT	2008
7196	s7197	TV Show	Kikoriki	Not-Available	Igor Dmitriev	Not-Available	NaT	2010
7254	s7255	TV Show	La Familia P. Luche	Not-Available	Eugenio Derbez, Consuelo Duval, Luis Manuel Áv...	United States	NaT	2012
7406	s7407	TV Show	Maron	Not-Available	Marc Maron, Judd Hirsch, Josh Brener, Nora Zeh...	United States	NaT	2016
7847	s7848	TV Show	Red vs. Blue	Not-Available	Burnie Burns, Jason Saldaña, Gustavo Sorola, G...	United States	NaT	2015
8182	s8183	TV Show	The Adventures of Figaro Pho	Not-Available	Luke Jurevicius, Craig Behenna, Charlotte Haml...	Australia	NaT	2015

In [14]:

```
#Handling date_added column, null values [by placing max dttm value]

most_recent=df_netflix['date_added'].max()
#mst_rctim
df_netflix['date_added'].fillna(most_recent,inplace=True)
```

In [15]:

```
#Handling duration column and rating column ambiguity simultaneously

df_netflix[df_netflix.duration.isnull()]
```

Out[15]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	d
5541	s5542	Movie	Louis C.K. 2017	Louis C.K.	Louis C.K.	United States	2017-04-04	2017	74 min	
5794	s5795	Movie	Louis C.K.: Hilarious	Louis C.K.	Louis C.K.	United States	2016-09-16	2010	84 min	
5813	s5814	Movie	Louis C.K.: Live at the Comedy Store	Louis C.K.	Louis C.K.	United States	2016-08-15	2015	66 min	

In [16]:

```
#Swapping values of both cols after checking consistency and feasibility

df_netflix.loc[df_netflix['director']=='Louis C.K.','duration']=df_netflix['rating']
df_netflix.loc[df_netflix['director']=='Louis C.K.','rating']='Not-Available'
```

In [17]:

```
#Now here data is swapped and both rating and duration columns have proper data

df_netflix[df_netflix.director=='Louis C.K.'].head()
```

Out[17]:

	show_id	type	title	director	cast	country	date_added	release_year	rating
5541	s5542	Movie	Louis C.K. 2017	Louis C.K.	Louis C.K.	United States	2017-04-04	2017	Not-Available
5794	s5795	Movie	Louis C.K.: Hilarious	Louis C.K.	Louis C.K.	United States	2016-09-16	2010	Not-Available
5813	s5814	Movie	Louis C.K.: Live at the Comedy Store	Louis C.K.	Louis C.K.	United States	2016-08-15	2015	Not-Available

In [18]:

```
# Checking if any other null values are left in dataset (Data clean)

df_netflix.isna().sum().sort_values(ascending=False)
```

Out[18]:

```
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
```

Non-Graphical Analysis

In [19]:

```
pd.DataFrame(df_netflix['type'].value_counts())
```

Out[19]:

	type
Movie	6131
TV Show	2676

In [20]:

```
pd.DataFrame(df_netflix['date_added'].value_counts())
```

Out[20]:

	date_added
2020-01-01	110
2019-11-01	91
2018-03-01	75
2019-12-31	74
2018-10-01	71
...	...
2017-01-29	1
2017-01-25	1
2017-01-24	1
2017-01-23	1
2020-01-11	1

1714 rows × 1 columns

In [21]:

```
pd.DataFrame(df_netflix['release_year'].value_counts())
```

Out[21]:

	release_year
2018	1147
2017	1032
2019	1030
2020	953
2016	902
...	...
1959	1
1925	1
1961	1
1947	1
1966	1

74 rows × 1 columns

In [22]:

```
pd.DataFrame(df_netflix['rating'].value_counts())
```

Out[22]:

	rating
TV-MA	3207
TV-14	2160
TV-PG	863
R	799
PG-13	490
TV-Y7	334
TV-Y	307
PG	287
TV-G	220
NR	80
G	41
Not-Available	7
TV-Y7-FV	6
NC-17	3
UR	3

In [23]:

```
pd.DataFrame(df_netflix['duration'].value_counts())
```

Out[23]:

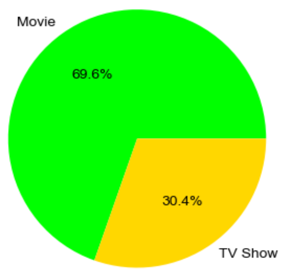
	duration
1 Season	1793
2 Seasons	425
3 Seasons	199
90 min	152
94 min	146
...	...
16 min	1
186 min	1
193 min	1
189 min	1
191 min	1

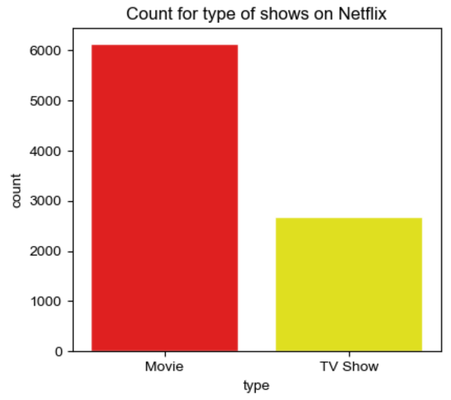
220 rows × 1 columns

EDA & Visualizations

In [24]:

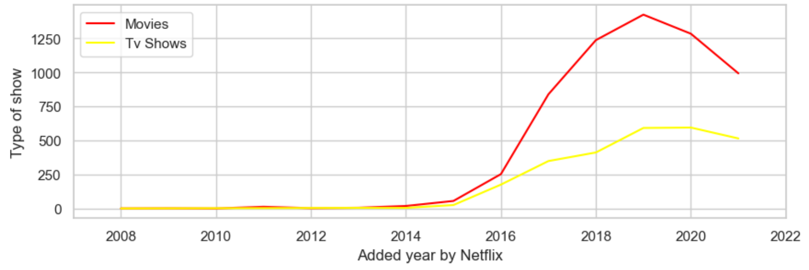
```
#Types of shows watched on Netflix and its comparison

#plotting the size of graph
plt.figure(figsize=(10, 4))

#plot1 (to show percentages)
#plotting the subplot-1
plt.subplot(1, 2, 1)
#plotting the graph-1 based on their percentage
plt.pie(df_netflix.type.value_counts(), labels=df_netflix.type.value_counts().index,colo


#plot2 (to show counts )
#plotting the subplot-2
plt.subplot(1, 2, 2)

#plotting the graph-2 based on their counts
df_netflix.type.value_counts()
sns.set(style="whitegrid")
color=['Red','Yellow']
sns.set_palette(color)
sns.countplot(x='type',data=df_netflix)
plt.title('Count for type of shows on Netflix')

plt.show()
```





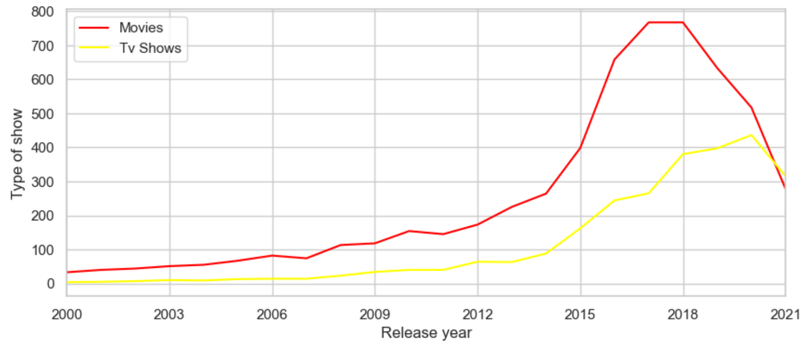
In [25]:

```
# Does Netflix has more focus on TV Shows than movies in recent years?

#Making a new col which contain year data extracted from date_added col
df_netflix['date_added_year']=df_netflix['date_added'].dt.year

#df_netflix['type'].value_counts()
#Filtering out shows based on type of show
d2 = df_netflix[df_netflix["type"] == "TV Show"]
d3 = df_netflix[df_netflix["type"] == "Movie"]
#Grouping the data extracted based on year criteria(taken out above)
d4=d3.groupby('date_added_year')['type'].count().reset_index()
d5=d2.groupby('date_added_year')['type'].count().reset_index()

#Plotting the graph size
plt.figure(figsize=(10,3))
plt.xlim(left=2007,right=2022) #Putting limit on number of values to be on x-axis
plt.xlabel('Added year by Netflix')
plt.ylabel('Type of show')
#Plotting the graph
sns.lineplot(data=d4,x='date_added_year',y='type',label='Movies')
sns.lineplot(data=d5,x='date_added_year',y='type',label='Tv Shows')
plt.show()
```



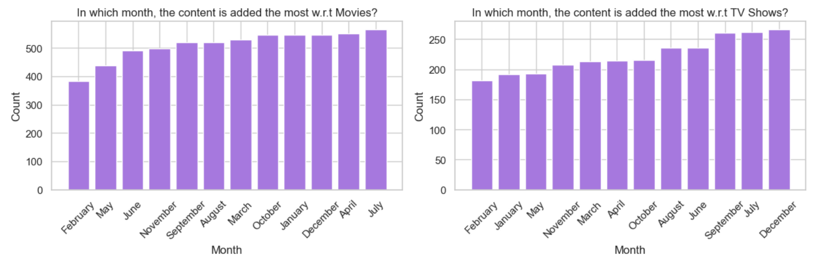
In [27]:

```
#How has the number of movies released per year changed over the last 20 years?

d2 = df_netflix[df_netflix["type"] == "TV Show"]
d3 = df_netflix[df_netflix["type"] == "Movie"]
d4=d3.groupby('release_year')['type'].count().reset_index()
d5=d2.groupby('release_year')['type'].count().reset_index()
#Plotting the graph size
plt.figure(figsize=(10,4))
plt.xlim(left=2000,right=2021) #Putting limit on number of values to be on x-axis
plt.xticks(range(2000, 2023, 3)) #Putting gap between values along with start-end on x-a
plt.xlabel('Release year')
plt.ylabel('Type of show')
sns.lineplot(data=d4,x='release_year',y='type',label='Movies') #Data collected for plott
sns.lineplot(data=d5,x='release_year',y='type',label='Tv Shows')
plt.show()
```



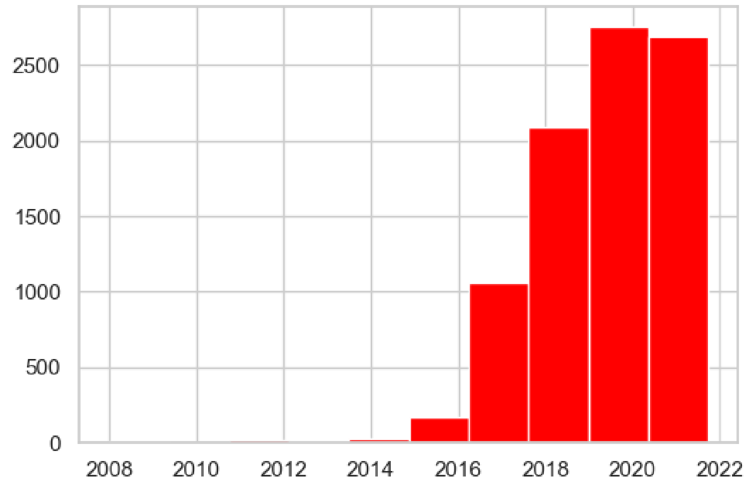
In [28]:

```
#Month wise segregation of shows added onto Netflix platform

month_names = {i: calendar.month_name[i] for i in range(1, 13)} #Passing int values to m

#Making a new col which contain month data extracted from date_added col
df_netflix['month_added'] = df_netflix['date_added'].dt.month
col = 'month_added'

#plot2 (For movies )
d1 = df_netflix[df_netflix["type"] == "Movie"] #Value extraction
vc1 = d1[col].value_counts().reset_index() #resetting index based on counts
vc1 = vc1.rename(columns={col: "count", "index": col}) #Renaming the column
vc1['month_name'] = vc1[col].map(month_names) #mapping the month names with the integer
vc1['percent'] = vc1['count'].apply(lambda x: 100 * x / sum(vc1['count'])) #Calculating

vc1 = vc1.sort_values("count", ascending=True) #Sorting graph to be displayed in inc ord

plt.figure(figsize=(12, 4))
plt.subplot(1, 2, 1)
plt.bar(vc1['month_name'], vc1["count"], color="#a678de") #Making the plot & applying co
plt.title("In which month, the content is added the most w.r.t Movies?")
plt.xlabel("Month")
plt.ylabel("Count")
plt.xticks(rotation=45)
plt.tight_layout() #to make the graph fit properly

#plot2 (For Tv-shows)

d1 = df_netflix[df_netflix["type"] == "TV Show"]

vc1 = d1[col].value_counts().reset_index()
vc1 = vc1.rename(columns={col: "count", "index": col})
vc1['month_name'] = vc1[col].map(month_names)
vc1['percent'] = vc1['count'].apply(lambda x: 100 * x / sum(vc1['count']))

vc1 = vc1.sort_values("count", ascending=True)

plt.subplot(1, 2, 2)
plt.bar(vc1['month_name'], vc1["count"], color="#a678de")
plt.title("In which month, the content is added the most w.r.t TV Shows?")
plt.xlabel("Month")
plt.ylabel("Count")
plt.xticks(rotation=45)
plt.tight_layout()

plt.show()
```



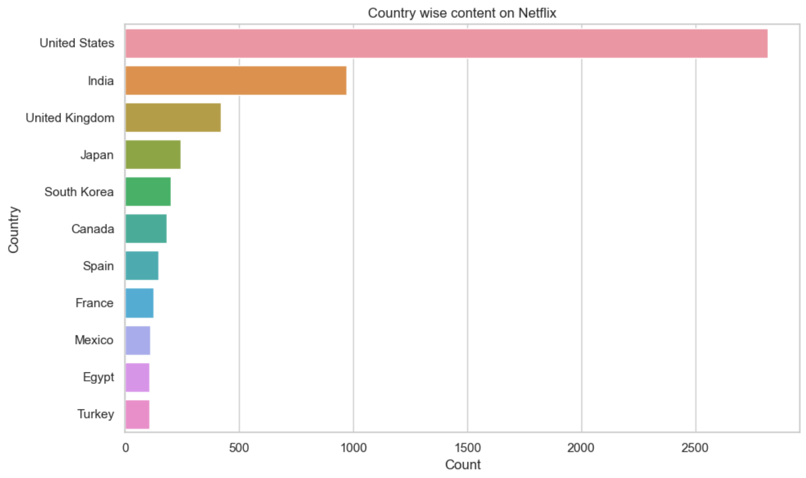
In [29]:

```
#Plot for Aggregate date added stuff onto netflix for all type of shows
plt.figure(figsize=(6, 4))
df_netflix['date_added'].hist()
plt.show()
```



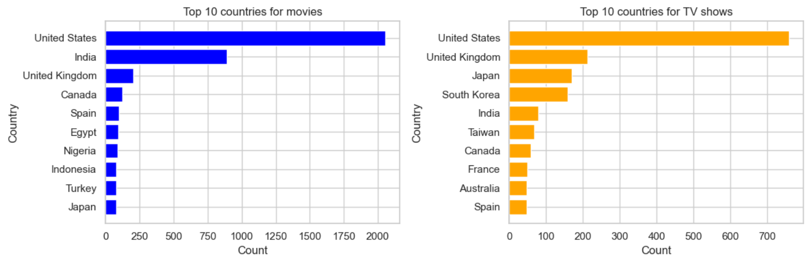
In [30]:

```
#Group-country Analysis based on particular content released by them(countries) together

df_filtered = df_netflix[df_netflix['country'] != "Not-Available"] #Taking out those row

plt.figure(figsize=(10,6))
sns.countplot(y='country', order=df_filtered['country'].value_counts().index[0:11], data
plt.title('Country wise content on Netflix')
plt.xlabel('Count')
plt.ylabel('Country')
plt.tight_layout()

plt.show()
```



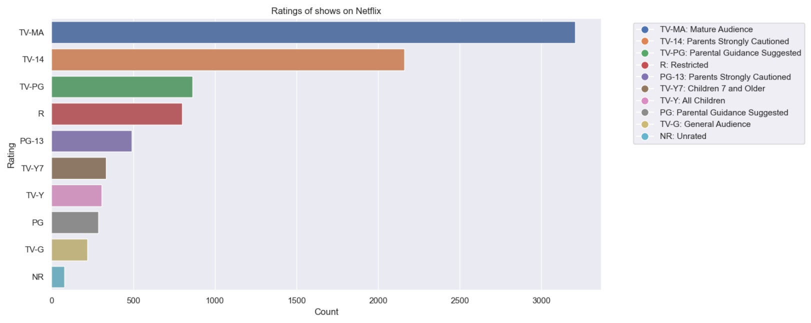
In [31]:

```
#Top content generated countries (indivually and not grouped ones)

#data filtering
mov = df_netflix[df_netflix['type'] == 'Movie']
tv = df_netflix[df_netflix['type'] == 'TV Show']

#Excluding 'Not-Available' rows data
mov_1 = mov[mov['country'] != 'Not-Available'].copy()
tv_1 = tv[tv['country'] != 'Not-Available'].copy()

# Reset the index of mov_1 and tv_1
mov_1.reset_index(drop=True, inplace=True)
tv_1.reset_index(drop=True, inplace=True)

plt.figure(figsize=(12, 4))

#plot1 (to show counts of Movie )
plt.subplot(1, 2, 1)
top_countries = mov_1['country'].value_counts().index[:10] #Only top 10 country
plt.barh(top_countries, mov_1['country'].value_counts()[top_countries], color='blue')
plt.xlabel('Count')
plt.ylabel('Country')
plt.title('Top 10 countries for movies')
plt.gca().invert_yaxis()  # Inverting y-axis to have the highest count at the top
plt.tight_layout()

#plot2 (to show counts of Tv)
plt.subplot(1, 2, 2)
top_countries1 = tv_1['country'].value_counts().index[:10]
plt.barh(top_countries1, tv_1['country'].value_counts()[top_countries1], color='orange')
plt.xlabel('Count')
plt.ylabel('Country')
plt.title('Top 10 countries for TV shows')
plt.gca().invert_yaxis()
plt.tight_layout()

plt.show()
```



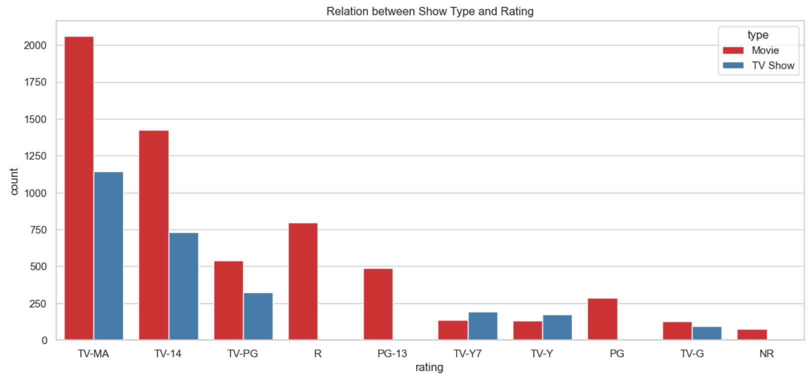
In [57]:

```
#Major rating given on Netflix

#Specifying meaning of each rating after finding from Google
rating_labels = {
    'G': 'General Audiences',
    'TV-Y': 'All Children',
    'TV-G': 'General Audience',
    'PG': 'Parental Guidance Suggested',
    'TV-Y7': 'Children 7 and Older',
    'TV-Y7-FV': 'Directed to Older Children',
    'TV-PG': 'Parental Guidance Suggested',
    'PG-13': 'Parents Strongly Cautioned',
    'TV-14': 'Parents Strongly Cautioned',
    'R': 'Restricted',
    'NC-17': 'Adults Only',
    'TV-MA': 'Mature Audience',
    'NR': 'Unrated'
}

fig, (ax1) = plt.subplots(nrows=1, ncols=1, figsize=(15, 6))

sns.countplot(y='rating', order=df_netflix['rating'].value_counts().index[0:10], data=df
ax1.set_xlabel('Count')
ax1.set_ylabel('Rating')
ax1.set_title('Ratings of shows on Netflix')

# Create custom legend markers for each rating
legend_markers = [plt.Line2D([0], [0], marker='o', color='w', markerfacecolor='C{}'.form

# Position the legend outside the plot
ax1.legend(handles=legend_markers, bbox_to_anchor=(1.05, 1), loc='upper left')

plt.tight_layout()

plt.show()
```



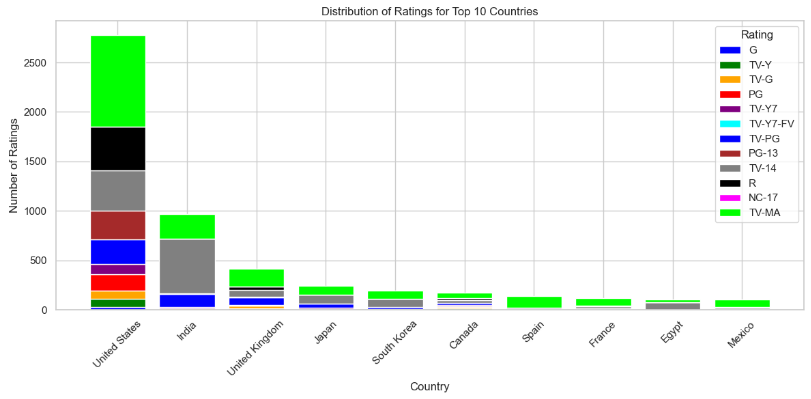
In [33]:

```
#Comparison of Rating based on type of shows

color_palette = sns.color_palette("Set1")
plt.figure(figsize=(14,6))
sns.countplot(x='rating',hue='type',order=df_netflix['rating'].value_counts().index[0:10
plt.title('Relation between Show Type and Rating')
plt.show()
```



In [34]:

```
#Ratings  based on country-wise
ratings = ['G', 'TV-Y', 'TV-G', 'PG', 'TV-Y7', 'TV-Y7-FV', 'TV-PG', 'PG-13', 'TV-14', 'R

df_netflix_filtered = df_netflix[df_netflix['country'] != 'Not-Available']

#Using stacks to stack the ratings for a particular country
rating_counts = df_netflix_filtered.groupby(['country', 'rating']).size().unstack(fill_v
rating_counts = rating_counts.reindex(columns=ratings, fill_value=0)

top_10_countries = rating_counts.sum(axis=1).nlargest(10).index
top_10_rating_counts = rating_counts.loc[top_10_countries]


plt.figure(figsize=(12, 6))
bottom = [0] * len(top_10_countries) #Top 10 countries
custom_colors = ['blue', 'green', 'orange', 'red', 'purple', 'cyan', 'blue', 'brown', 'g

for i, rating in enumerate(ratings):
    plt.bar(top_10_countries, top_10_rating_counts[rating], bottom=bottom, label=rating,
    bottom = [bottom[i] + top_10_rating_counts[rating][i] for i in range(len(top_10_coun

plt.xlabel('Country')
plt.ylabel('Number of Ratings')
plt.title('Distribution of Ratings for Top 10 Countries')
plt.xticks(rotation=45)
plt.legend(title='Rating', loc='upper right')
plt.tight_layout()

plt.show()
```

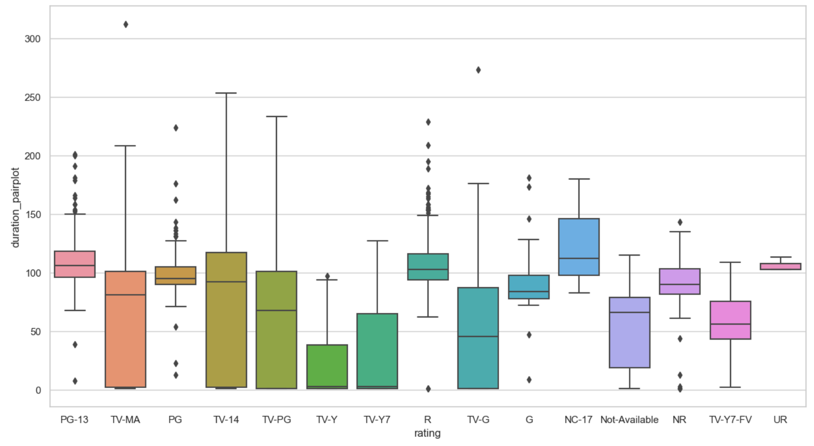


In [35]:

```
# Plotting duration of shows vs ratings [boxplot] {To take out ratings median}

#conversion of duration to a numeric dtype for plotting
df_netflix['duration_pairplot'] = df_netflix['duration'].str.split(' ').str.get(0)
df_netflix['duration_pairplot'] = df_netflix['duration_pairplot'].astype(float)

plt.figure(figsize=(15,8))
sns.boxplot(x = df_netflix['rating'], y = df_netflix['duration_pairplot'])
```

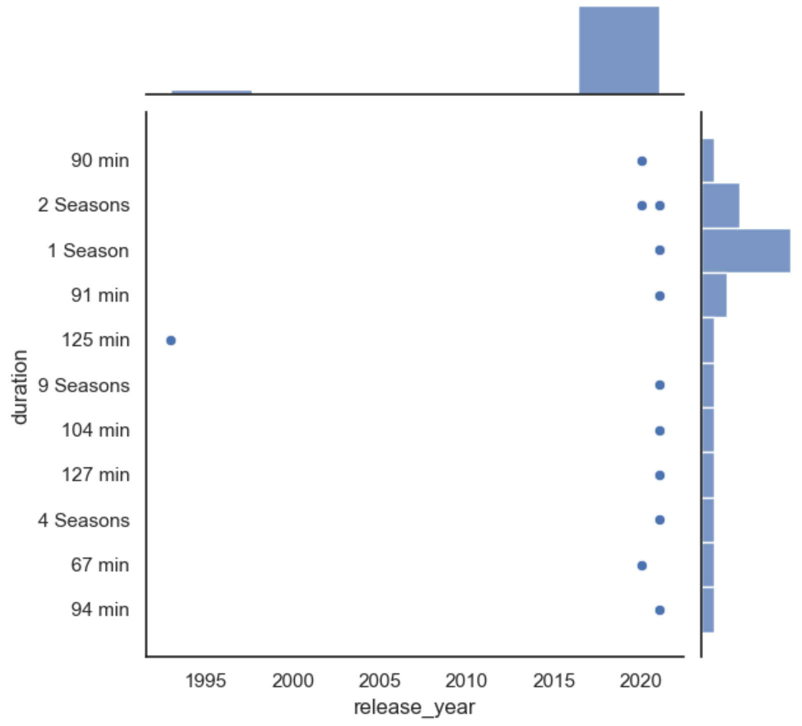
Out[35]:

```
<Axes: xlabel='rating', ylabel='duration_pairplot'>
```



In [36]:

```
# Duration and Release year correlation
columns_to_plot = ['release_year', 'duration']

top_10 = df_netflix.head(20)

# Creating a jointplot for the top 20 records
sns.set(style="white")
sns.jointplot(data=top_10, x=columns_to_plot[0], y=columns_to_plot[1], kind="scatter")
plt.show()
```



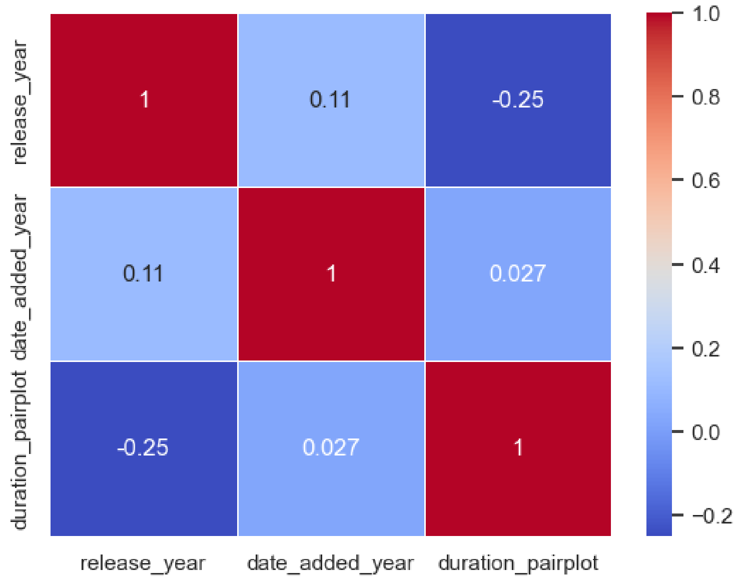
In [59]:

```
# Correlation between different kinds of time-series data and show types
df_new=df_netflix[['type','release_year','date_added_year','duration_pairplot']]
sns.heatmap( df_new.corr() , annot=True,linewidth = 0.5 , cmap = 'coolwarm' )
```

```
C:\Users\Dell\AppData\Local\Temp\ipykernel_13320\3835558794.py:3: FutureWa
rning: The default value of numeric_only in DataFrame.corr is deprecated.
In a future version, it will default to False. Select only valid columns o
r specify the value of numeric_only to silence this warning.
  sns.heatmap( df_new.corr() , annot=True,linewidth = 0.5 , cmap = 'coolwa
rm' )
```

Out[59]:

```
<Axes: >
```

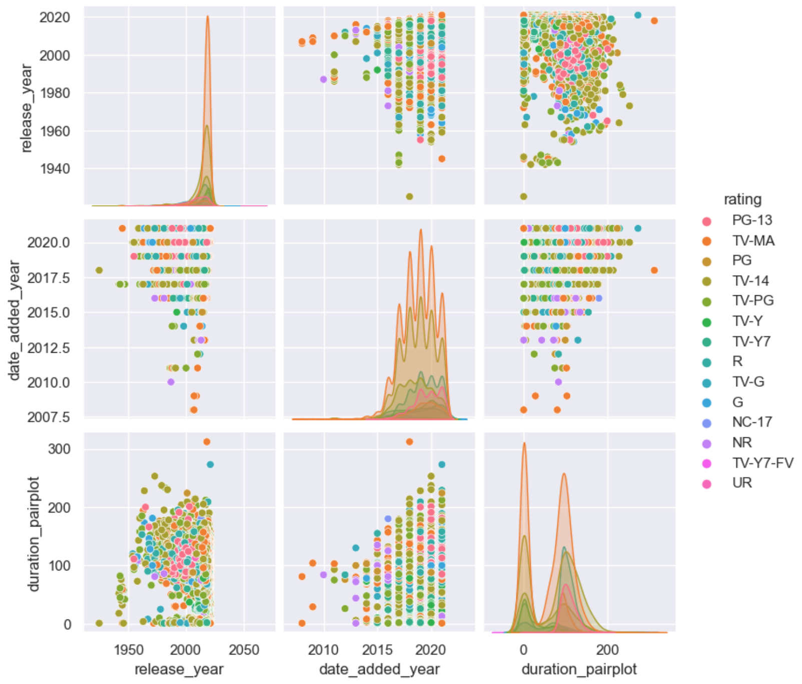


In [60]:

```
#Pairplots for plotting relation between ratings and different kinds of time-related dat
df_new=df_netflix[['rating','release_year','date_added_year','duration_pairplot']]
df_netflix_filtered = df_new[df_new['rating'] != 'Not-Available']
sns.pairplot(df_netflix_filtered, hue = 'rating')
```

Out[60]:

```
<seaborn.axisgrid.PairGrid at 0x1d1a26c4e80>
```

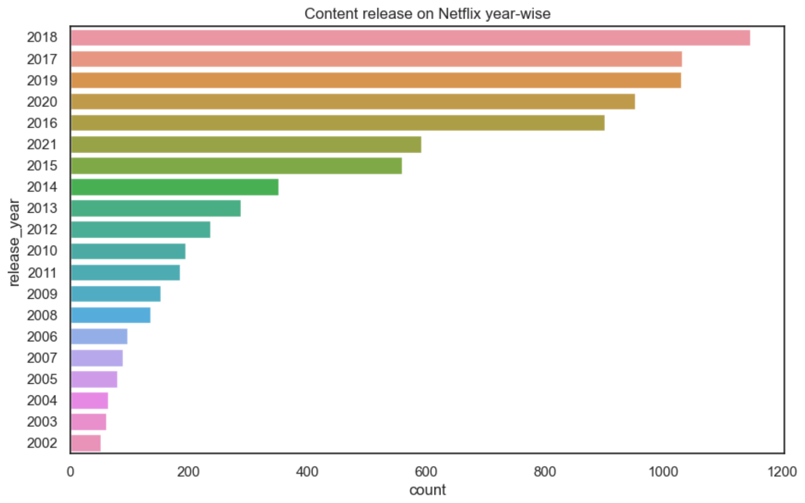


In [39]:

```
#Which year max content released
df_netflix.release_year.value_counts().head(20)
plt.figure(figsize=(10,6))
sns.countplot(y='release_year',order=df_netflix['release_year'].value_counts().index[0:2
plt.title('Content release on Netflix year-wise')
```

Out[39]:

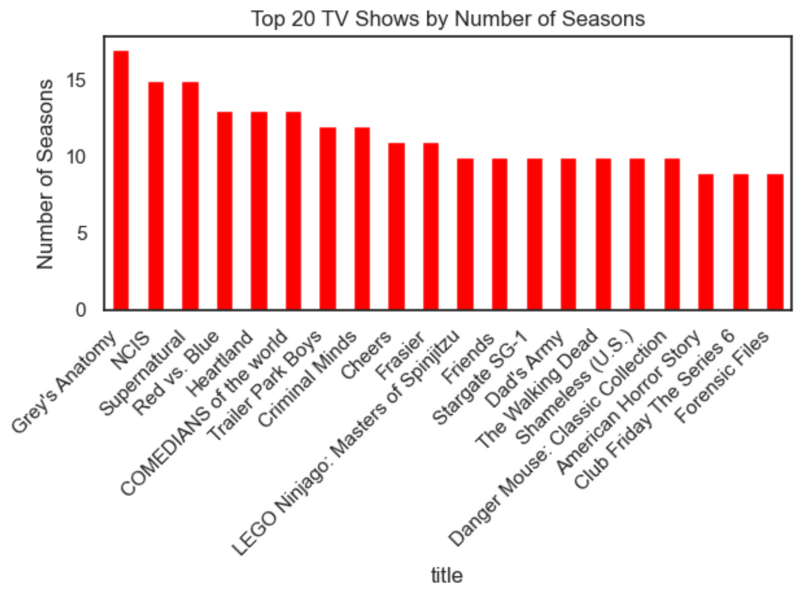
```
Text(0.5, 1.0, 'Content release on Netflix year-wise')
```



In [40]:

```
#TV shows with largest number of seasons

features = ['title', 'duration']
durations = df_netflix[features]

# Convert 'duration' values to appropriate format
durations['no_of_seasons'] = durations['duration'].str.extract('(\d+)').astype(float)
durations['no_of_seasons'] = durations['no_of_seasons'].fillna(0)  # Handle movies ('90 
durations.loc[durations['duration'].str.contains('min'), 'no_of_seasons'] = 0  # Set mov

t = ['title', 'no_of_seasons']
top = durations[t]

top = top.sort_values(by='no_of_seasons', ascending=False)
top20 = top.head(20)

top20.plot(kind='bar', x='title', y='no_of_seasons', color='red', legend=None)
plt.ylabel('Number of Seasons')
plt.title('Top 20 TV Shows by Number of Seasons')
plt.xticks(rotation=45, ha='right')
plt.tight_layout()
plt.show()
```

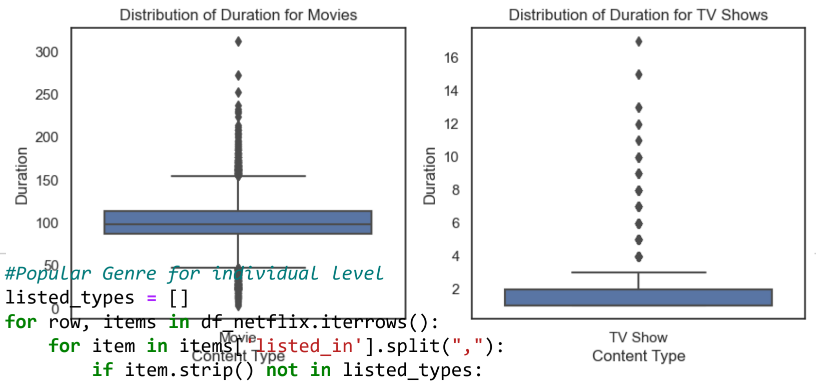
```
C:\Users\Dell\AppData\Local\Temp\ipykernel_13320\2115306291.py:7: SettingW
ithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-doc
s/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://
pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-
view-versus-a-copy)
  durations['no_of_seasons'] = durations['duration'].str.extract('(\d+)').
astype(float)
C:\Users\Dell\AppData\Local\Temp\ipykernel_13320\2115306291.py:8: SettingW
ithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-doc
s/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://
pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-
view-versus-a-copy)
  durations['no_of_seasons'] = durations['no_of_seasons'].fillna(0)  # Han
dle movies ('90 min' case)
```



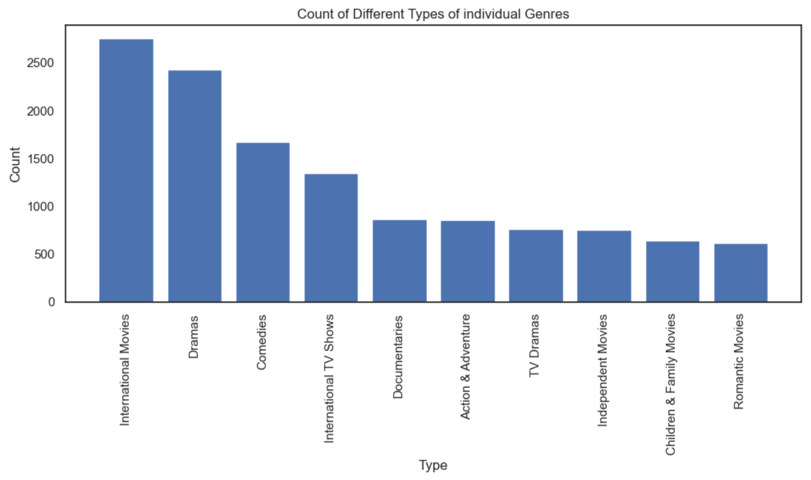
In [41]:

```python
#Duration of movies distribution

netflix_movies_df = df_netflix[df_netflix.type.str.contains("Movie")]
netflix_shows_df = df_netflix[df_netflix.type.str.contains("TV Show")]
netflix_movies_df['duration'] = netflix_movies_df['duration'].str.extract('(\d+)',expand
netflix_shows_df['duration'] = netflix_shows_df['duration'].str.extract('(\d+)',expand=F

plt.figure(figsize=(10, 4))

#plot1 (to show percentages)
plt.subplot(1, 2, 1)
# Creating a boxplot for movie duration

sns.boxplot(data=netflix_movies_df, x='type', y='duration')
plt.xlabel('Content Type')
plt.ylabel('Duration')
plt.title('Distribution of Duration for Movies')

#plot2 (to show counts )
plt.subplot(1, 2, 2)
# Creating a boxplot for movie duration
sns.boxplot(data=netflix_shows_df, x='type', y='duration')
plt.xlabel('Content Type')
plt.ylabel('Duration')
plt.title('Distribution of Duration for TV Shows')

plt.show()
```

```
C:\Users\Dell\AppData\Local\Temp\ipykernel_13320\3890908672.py:5: SettingW
ithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-doc
s/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://
pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-
view-versus-a-copy)
  netflix_movies_df['duration'] = netflix_movies_df['duration'].str.extrac
t('(\d+)',expand=False).astype(int)
C:\Users\Dell\AppData\Local\Temp\ipykernel_13320\3890908672.py:6: SettingW
ithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-doc
s/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://
pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-
view-versus-a-copy)
  netflix_shows_df['duration'] = netflix_shows_df['duration'].str.extract
('(\d+)',expand=False).astype(int)
```



```python
#Popular Genre for individual level
listed_types = []
for row, items in df_netflix.iterrows():
    for item in items['listed_in'].split(","):
        if item.strip() not in listed_types:
            listed_types.append(item.strip())

nums = [0] * len(listed_types)
for row, items in df_netflix.iterrows():
    for item in items['listed_in'].split(","):
        index = listed_types.index(item.strip())
        nums[index] += 1

df_listing = pd.DataFrame({"Type": listed_types, "Count": nums})

# Sort the DataFrame in descending order based on Count
df_listing_sorted = df_listing.sort_values(by="Count", ascending=False).head(10)

# Plotting the sorted bar chart
plt.figure(figsize=(10, 6))
plt.bar(df_listing_sorted['Type'], df_listing_sorted['Count'])
plt.xticks(rotation=90)
plt.xlabel('Type')
plt.ylabel('Count')
plt.title('Count of Different Types of individual Genres')
plt.tight_layout()
plt.show()
```

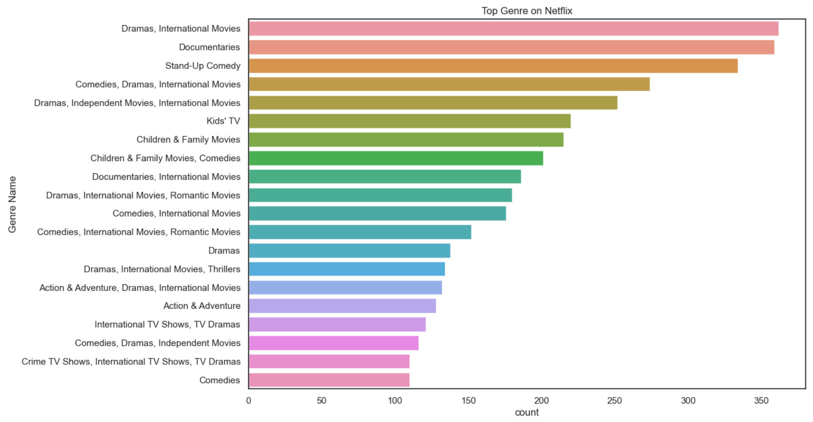


In [43]:

```
#Popular Genre groups

plt.figure(figsize=(12,8))
sns.countplot(y='listed_in',order=df_netflix['listed_in'].value_counts().index[0:20],dat
plt.title('Top Genre on Netflix')
plt.ylabel("Genre Name")
```

Out[43]:

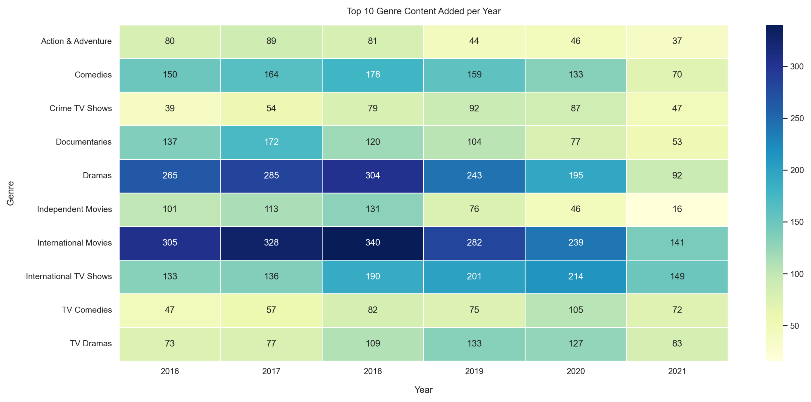
```
Text(0, 0.5, 'Genre Name')
```



In [44]:

```
#What are the most popular genres added mostly per year on Netflix?

#Exploding the data/splitting the nested data to use in plots
def explode_data(df_netflix, column_to_explode, new_column_name):
    exploded_data = df_netflix.copy()
    exploded_data[new_column_name] = exploded_data[column_to_explode].str.split(', ')
    exploded_data = exploded_data.explode(new_column_name)
    return exploded_data

genre_data = explode_data(df_netflix, 'listed_in', 'genre')
genre_data = genre_data[genre_data['release_year'] > 2015]

# Group by genre and release year, then summing the values
genre_data = genre_data.groupby(['genre', 'release_year']).size().reset_index(name='coun

# Get the top 10 genres based on total counts across all years
top_genres = genre_data.groupby('genre')['count'].sum().nlargest(10).index
genre_data = genre_data[genre_data['genre'].isin(top_genres)]

# Create the heatmap
plt.figure(figsize=(18, 8), dpi=200)
ax = sns.heatmap(
    genre_data.pivot('genre', 'release_year', 'count'),
    annot=True,
    fmt="d",
    cmap='YlGnBu',  # Choose an appropriate color map
    linewidths=.5
)

ax.set_xlabel('Year', labelpad=14)
ax.set_ylabel('Genre', labelpad=14)
ax.set_title('Top 10 Genre Content Added per Year', pad=14)

plt.show()
```

```
C:\Users\Dell\AppData\Local\Temp\ipykernel_13320\3690345487.py:23: FutureW
arning: In a future version of pandas all arguments of DataFrame.pivot wil
l be keyword-only.
  genre_data.pivot('genre', 'release_year', 'count'),
```

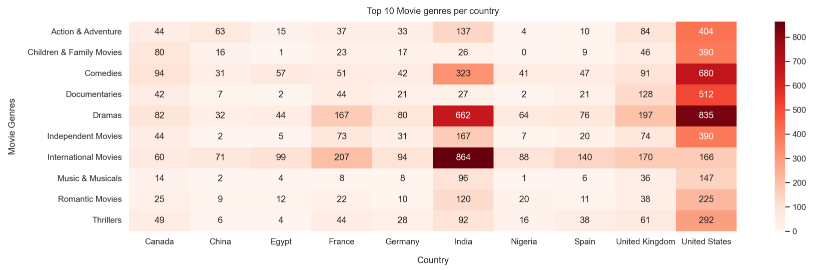


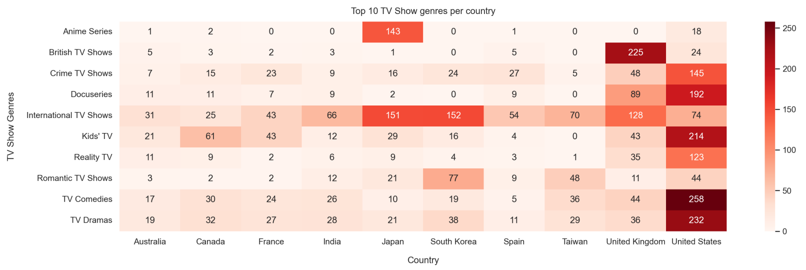
In [45]:

```
#What are the most popular genres added mostly in Top 10 country on Netflix?
#df_netflix_filtered = df_netflix[df_netflix['country'] != 'Not-Available']


#Exploding the data/splitting the nested data to use in plots
def explode_data(df_netflix, col: str, name: str, along: str = 'release_year'):
    return (
        df_netflix  # Corrected to use df_netflix instead of data
        [col]
        .apply(lambda x: x.replace(', ', ',').replace(' ,', ',').split(','))
        .to_frame()
        .set_index(df_netflix[along])
        .explode(col)
        .replace('', np.nan)
        .replace('NA', np.nan)
        .dropna()
        .stack()
        .to_frame()
        .reset_index()
        .drop('level_1', axis=1)
        .rename(columns={0: name})
    )

country_data = explode_data(df_netflix, 'country', 'country', 'title')
genre_data = explode_data(df_netflix, 'listed_in', 'genre', 'title')
genre_data_type = explode_data(df_netflix, 'listed_in', 'genre', 'type')

genre_data_type = genre_data_type.value_counts().reset_index(level=1)
top_movie_genres = list(genre_data_type.loc['Movie'].head(10)['genre'].values)
top_tv_genres = list(genre_data_type.loc['TV Show'].head(10)['genre'].values)

df = country_data.merge(genre_data).drop('title', axis=1)
df1 = df[df['genre'].isin(top_movie_genres)]
df2 = df[df['genre'].isin(top_tv_genres)]
#df=df[df['country']!= 'Not-Available']

def make_data(df):
    return (
        df
        [df['country'].isin(df['country'].value_counts().head(11).index)]
        .value_counts()
        .reset_index()
        .pivot("genre", "country", 0)
        .fillna(0)
        .apply(lambda x: x.astype('int'))
    )

df1 = make_data(df1)
df2 = make_data(df2)
df1.drop(['Not-Available'],axis=1,inplace=True)
df2.drop(['Not-Available'],axis=1,inplace=True)

fig, (ax1, ax2) = plt.subplots(2, 1, figsize=(18, 12), dpi=200)
fig.subplots_adjust(hspace=0.4)

sns.heatmap(df1, annot=True, fmt="d", cmap='Reds', ax=ax1)
ax1.set_xlabel('Country', labelpad=14)
ax1.set_ylabel('Movie Genres', labelpad=14)
ax1.set_title('Top 10 Movie genres per country', pad=10)
```

```
sns.heatmap(df2, annot=True, fmt="d", cmap='Reds', ax=ax2)
ax2.set_xlabel('Country', labelpad=14)
ax2.set_ylabel('TV Show Genres', labelpad=14)
ax2.set_title('Top 10 TV Show genres per country', pad=10)
plt.show()
```

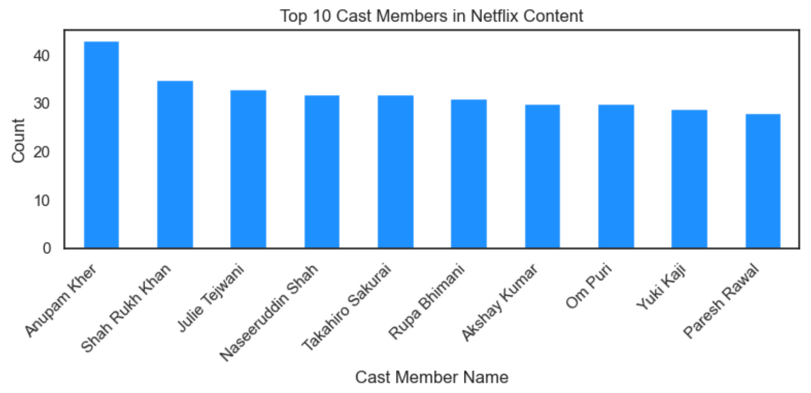
```
C:\Users\Dell\AppData\Local\Temp\ipykernel_13320\2073509036.py:43: FutureW
arning: In a future version of pandas all arguments of DataFrame.pivot wil
l be keyword-only.
  .pivot("genre", "country", 0)
C:\Users\Dell\AppData\Local\Temp\ipykernel_13320\2073509036.py:43: FutureW
arning: In a future version of pandas all arguments of DataFrame.pivot wil
l be keyword-only.
  .pivot("genre", "country", 0)
```





In [46]:

```
#Top 10 casts

cast_data = explode_data(df_netflix, 'cast', 'cast')
top_cast=cast_data[(cast_data['cast']!='Not-Available')]['cast'].value_counts().head(10)

plt.figure(figsize=(8, 4))
top_cast.plot(kind='bar', color='dodgerblue')
plt.title('Top 10 Cast Members in Netflix Content')
plt.xlabel('Cast Member Name')
plt.ylabel('Count')
plt.xticks(rotation=45, ha='right')

plt.tight_layout()
plt.show()
```



In [47]:

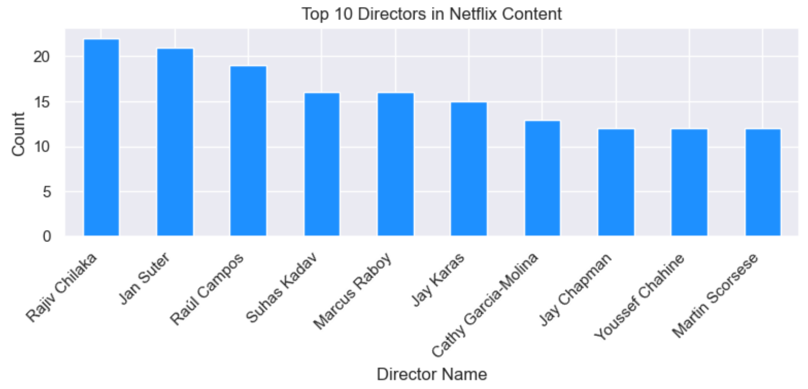
```
df_netflix['director'].value_counts().sort_values(ascending=False)[:30]
```

Out[47]:

```
Not-Available             2634
Rajiv Chilaka               19
Raúl Campos, Jan Suter      18
Suhas Kadav                 16
Marcus Raboy                16
Jay Karas                   14
Cathy Garcia-Molina         13
Youssef Chahine             12
Martin Scorsese             12
Jay Chapman                 12
Steven Spielberg            11
Don Michael Paul            10
David Dhawan                 9
Kunle Afolayan               8
Robert Rodriguez             8
Fernando Ayllón              8
Hakan Algül                  8
Johnnie To                   8
Ryan Polito                  8
Troy Miller                  8
Lance Bangs                  8
Yılmaz Erdoğan               8
Quentin Tarantino            8
Shannon Hartman              8
Hidenori Inoue               7
Omoni Oboli                  7
Ron Howard                   7
Ozan Açıktan                 7
Ram Gopal Varma              7
Clint Eastwood               7
Name: director, dtype: int64
```

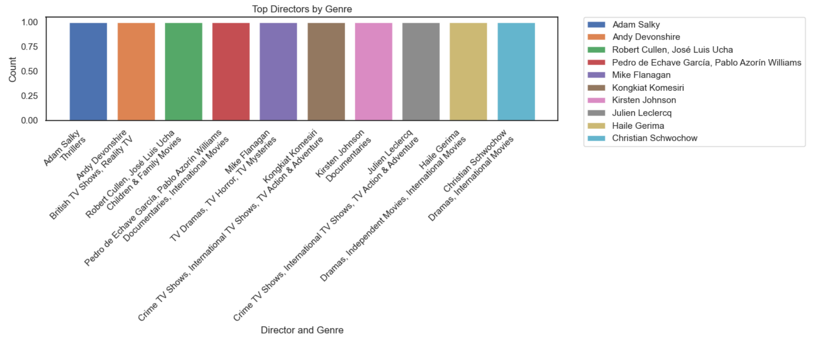
In [61]:

```
#Top 10 directors

director_data = (
    df_netflix
    .assign(director=df_netflix['director'].str.split(', '))
    .explode('director')
    .query("(director != 'Not-Available')")
)

# Getting the top 10 directors
top_directors = director_data['director'].value_counts().head(10)

# Plotting the top 10 directors
plt.figure(figsize=(8, 4))
top_directors.plot(kind='bar', color='dodgerblue')
plt.title('Top 10 Directors in Netflix Content')
plt.xlabel('Director Name')
plt.ylabel('Count')
plt.xticks(rotation=45, ha='right')

plt.tight_layout()
plt.show()
```



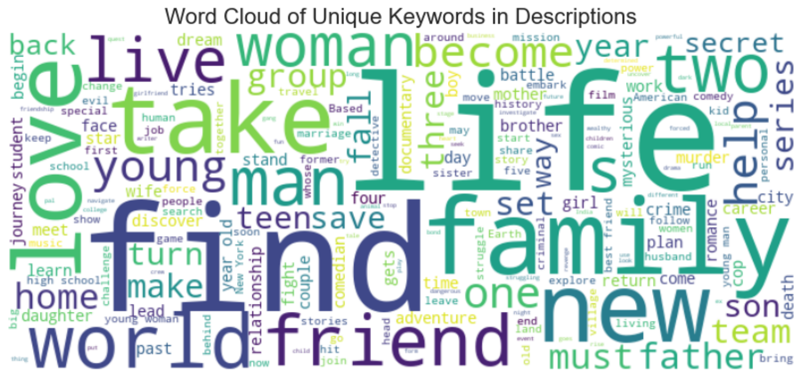
In [49]:

```
#Top Directors grouped by Genre

#df_netf=df_netflix.groupby('director')[['director','listed_in']]
#df_netf.head(10)

df_netflix['genre_list'] = df_netflix['listed_in'].str.split('|')
director_genre_df = df_netflix.explode('genre_list').head(20)

top_director_genre_pairs = director_genre_df.groupby(['director', 'genre_list']).size().
top_director_genre_pairs = top_director_genre_pairs.sort_values(by='count', ascending=Fa
top_director_genre_pairs = top_director_genre_pairs.loc[top_director_genre_pairs['direct

top_directors = top_director_genre_pairs['director'].unique()[:10]

plt.figure(figsize=(14, 6))
for director in top_directors:
    data_subset = top_director_genre_pairs[top_director_genre_pairs['director'] == direc
    plt.bar(data_subset['director'] + '\n' + data_subset['genre_list'], data_subset['cou

plt.xlabel('Director and Genre')
plt.ylabel('Count')
plt.title('Top Directors by Genre')
plt.xticks(rotation=45, ha='right')
plt.legend(bbox_to_anchor=(1.05, 1), loc='upper left', borderaxespad=0)
plt.tight_layout()
plt.show()
```



In [50]:

```
#Wordcloud of Description of shows
from wordcloud import WordCloud
combined_description = ' '.join(df_netflix['description'])

# Generate a WordCloud with unique keywords
wordcloud = WordCloud(width=700, height=300, background_color='white', colormap='viridis

plt.figure(figsize=(12, 4))
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis('off')
plt.title('Word Cloud of Unique Keywords in Descriptions', fontsize=16)

sns.set()
plt.tight_layout()
plt.show()
```



In [51]:

```
#Wordcloud of Description of Genres
from wordcloud import WordCloud
combined_description = ' '.join(df_netflix['listed_in'])

# Generate a WordCloud with unique keywords
wordcloud = WordCloud(width=700, height=300, background_color='white', colormap='viridis

plt.figure(figsize=(12, 4))
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis('off')
plt.title('Word Cloud of Unique Keywords in Genres', fontsize=16)

sns.set()
plt.tight_layout()
plt.show()
```

Word Cloud of Unique Keywords in Genres

In [ ]: