In [1]:

```
import pandas as pd
import numpy as np
import datetime as dt
from matplotlib import pyplot as plt
import seaborn as sns
import warnings
warnings.filterwarnings("ignore")
```

In [2]:

```
# reading csv file
df = pd.read_csv('Downloads/Netflix.csv')
```

In [3]:

```
df.head()
```

Out[3]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	September 25, 2021	2020	PG-13	90 min	Documentaries	As her father nears the end of his life, filmm...
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...
2	s3	TV Show	Ganglands	Julien Leclercq	Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...	NaN	September 24, 2021	2021	TV-MA	1 Season	Crime TV Shows, International TV Shows, TV Act...	To protect his family from a powerful drug lor...
3	s4	TV Show	Jailbirds New Orleans	NaN	NaN	NaN	September 24, 2021	2021	TV-MA	1 Season	Docuseries, Reality TV	Feuds, flirtations and toilet talk go down amo...
4	s5	TV Show	Kota Factory	NaN	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, Romantic TV Shows, TV ...	In a city of coaching centers known to train I...

In [4]:

```
df.tail()
```

Out[4]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
8802	s8803	Movie	Zodiac	David Fincher	Mark Ruffalo, Jake Gyllenhaal, Robert Downey J...	United States	November 20, 2019	2007	R	158 min	Cult Movies, Dramas, Thrillers	A political cartoonist, a crime reporter and a...
8803	s8804	TV Show	Zombie Dumb	NaN	NaN	NaN	July 1, 2019	2018	TV-Y7	2 Seasons	Kids' TV, Korean TV Shows, TV Comedies	While living alone in a spooky town, a young g...
8804	s8805	Movie	Zombieland	Ruben Fleischer	Jesse Eisenberg, Woody Harrelson, Emma Stone, ...	United States	November 1, 2019	2009	R	88 min	Comedies, Horror Movies	Looking to survive in a world taken over by zo...
8805	s8806	Movie	Zoom	Peter Hewitt	Tim Allen, Courteney Cox, Chevy Chase, Kate Ma...	United States	January 11, 2020	2006	PG	88 min	Children & Family Movies, Comedies	Dragged from civilian life, a former superhero...
8806	s8807	Movie	Zubaan	Mozez Singh	Vicky Kaushal, Sarah-Jane Dias, Raaghav Chanan...	India	March 2, 2019	2015	TV-14	111 min	Dramas, International Movies, Music & Musicals	A scrappy but poor boy worms his way into a ty...

In [5]:

```
# checking columns,dtype of columns and non-null count
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 [6]:

```
# Checking no. of rows and cols
df.shape
```

Out[6]:

```
(8807, 12)
```

In [7]:

```
# counting null values in each col
df.isna().sum()
```

Out[7]:

```
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 [8]:

```
df.columns
```

Out[8]:

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

In [9]:

```
# Dimension of the dataframe
df.ndim
```

Out[9]:

```
2
```

In [10]:

```
# Count of unique values in each col
for i in df.columns:
    print(i,":",df[i].nunique(),'unique values')
    print('*----------------------------------*')
```

```
show_id : 8807 unique values
*----------------------------------*
type : 2 unique values
*----------------------------------*
title : 8807 unique values
*----------------------------------*
director : 4528 unique values
*----------------------------------*
cast : 7692 unique values
*----------------------------------*
country : 748 unique values
*----------------------------------*
date_added : 1767 unique values
*----------------------------------*
release_year : 74 unique values
*----------------------------------*
rating : 17 unique values
*----------------------------------*
duration : 220 unique values
*----------------------------------*
listed_in : 514 unique values
*----------------------------------*
description : 8775 unique values
*----------------------------------*
```

In [11]:

```
# filling na values in director col with unknown
df['director'] = df['director'].fillna('Unknown')

# filling na values in cast col with unknown
df['cast'] = df['cast'].fillna('Unknown')

# changing dtype of country to string
df['country'] = df['country'].astype('str')

# splitting country list and asigning 0th element of the list to country col
df['country'] = df['country'].apply(lambda x : x.split(', ')[0])

# replacing nan with np.nan
df['country'] = df['country'].replace({'nan':np.nan})

# filling na with mode value of country col
df['country'] = df['country'].fillna(df['country'].mode()[0])

# filling na with mode value of rating col
df['rating'] = df['rating'].fillna(df['rating'].mode()[0])

# replacing mis type rating with appropriate values
df['rating'] = df['rating'].replace({'TV-Y7-FV':'TV-Y7','74 min':np.nan,'84 min':np.nan,'66 min':np.nan})

# filling na with -1 in date added col
df['date_added'] = df['date_added'].fillna(-1)
```

In [12]:

```
# checking na in dataframe
df.isna().sum()
```

Out[12]:

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

In [13]:

```
# checking duplication of rows in dataframe
df.duplicated().sum()
```

Out[13]:

```
0
```

In [14]:

```
# Changing dtype of date_added col to datetime
df['date_added'] = pd.to_datetime(df['date_added'])
```

In [15]:

```
# Extracting year
df['Year'] = df['date_added'].dt.year

# Extracting month
df['Month'] = df['date_added'].dt.month

# Extracting Month Name
df['Month_Name'] = df['date_added'].dt.strftime("%b")

# Extracting Week_Num
df['Week_Num']= df['date_added'].dt.strftime('%W')
```

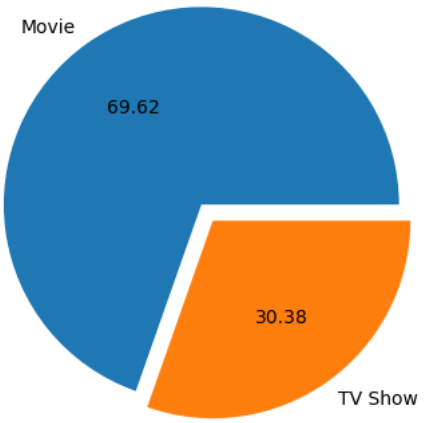
Count of Movies and TV Shows

In [16]:

```
plt.pie(x = df['type'].value_counts().values ,labels = df['type'].value_counts().index,autopct = '%.2f',explode={0.0,0.1})
```

Out[16]:

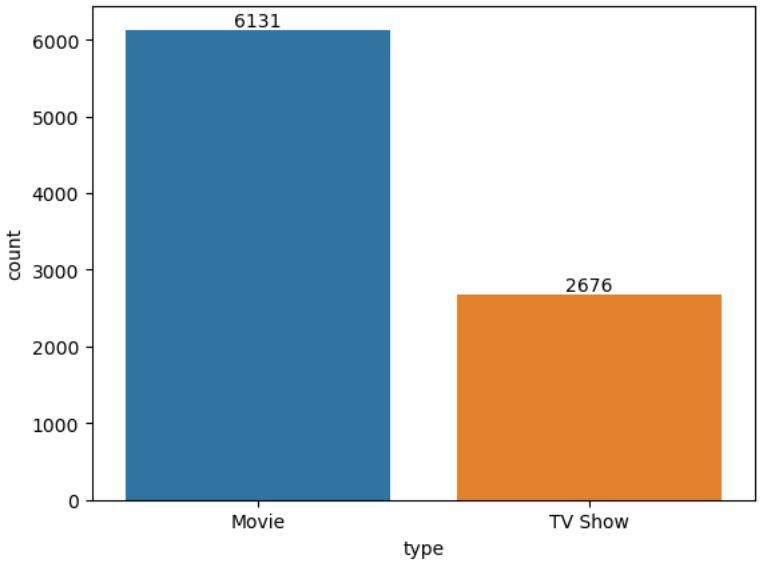
```
([<matplotlib.patches.Wedge at 0x11f979db0>,
  <matplotlib.patches.Wedge at 0x11f979cc0>],
 [Text(-0.6357552620136555, 0.897672126570692, 'Movie'),
  Text(0.6935511949239876, -0.979278683531664, 'TV Show')],
 [Text(-0.3467755974619939, 0.4896393417658319, '69.62'),
  Text(0.4045715303723261, -0.571245898726804, '30.38')])
```



Movies are more than TV shows on the platform

In [17]:

```
ax = sns.countplot(x='type',data = df)
for bars in ax.containers:
    ax.bar_label(bars)
```



Top 10 Production Countries

In [18]:

```
top10_country = df['country'].str.split(', ',expand = True).stack().reset_index()
top10_country = top10_country.groupby(0)['level_1'].count().reset_index().sort_values('level_1',ascending = False).head(10).ren
top10_country
```

Out[18]:

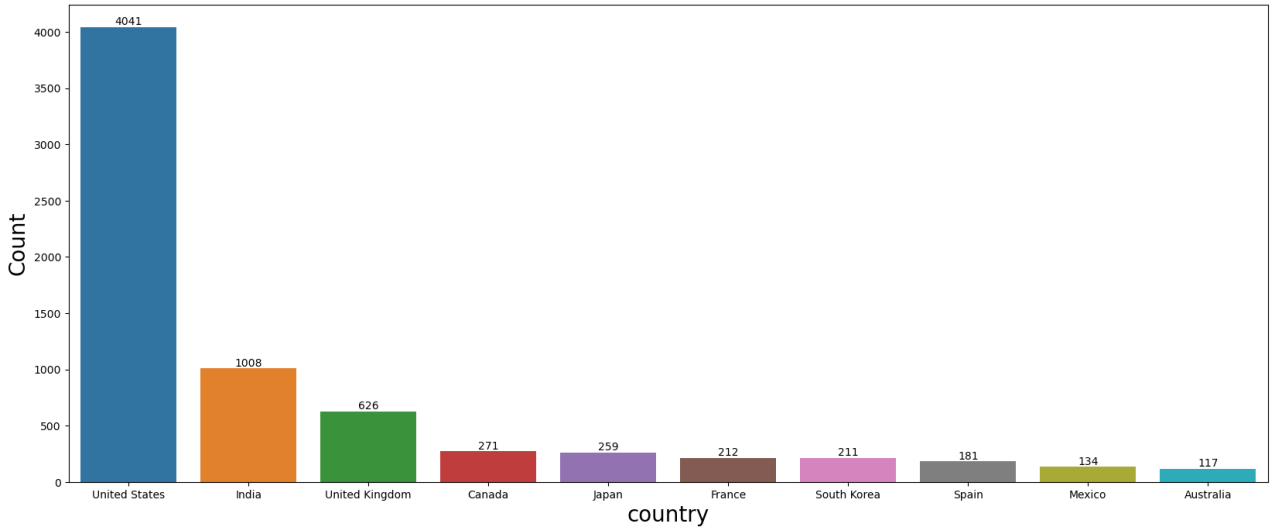
	country	cnt
82	United States	4041
30	India	1008
80	United Kingdom	626
11	Canada	271
37	Japan	259
21	France	212
69	South Korea	211
71	Spain	181
45	Mexico	134
2	Australia	117

In [19]:

```
plt.figure(figsize = (20,8))
ax = sns.barplot(y='cnt',x ='country' ,data = top10_country)
for bars in ax.containers:
    ax.bar_label(bars)
plt.xlabel('country',fontsize = 20)
plt.ylabel('Count',fontsize = 20)
```

Out[19]:

```
Text(0, 0.5, 'Count')
```




```
US has produced more movies/shows as compared to orders.
Netflix should focus on reset of the coutries to add or sponser there shows/movies.
```

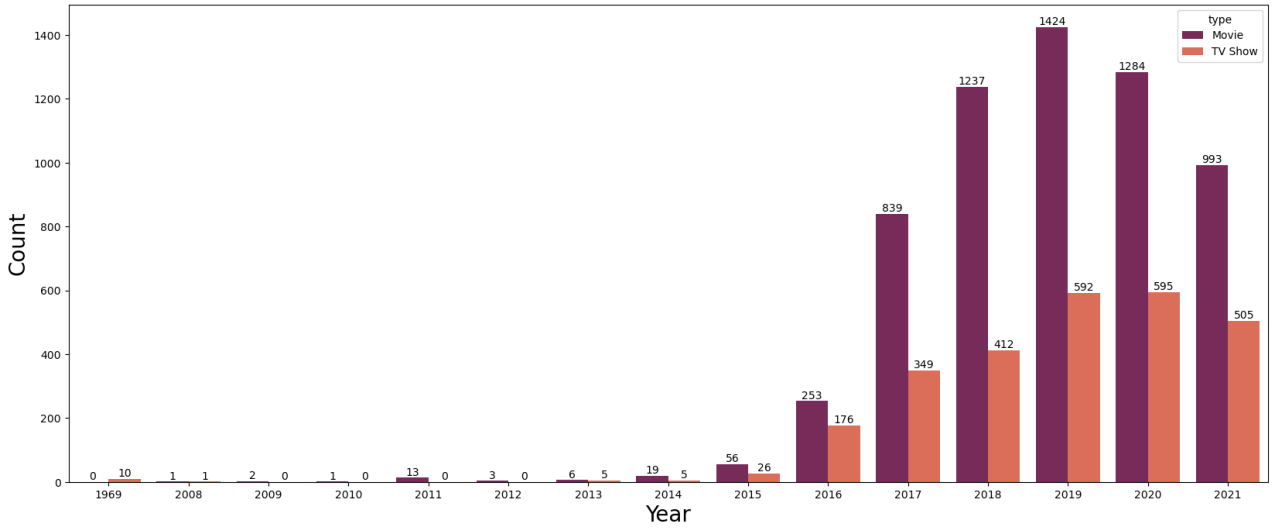
Movies and Shows added each year

In [20]:

```
plt.figure(figsize = (20,8))
ax = sns.countplot(x='Year',data = df,hue = 'type',palette = 'rocket')
for bars in ax.containers:
    ax.bar_label(bars)
plt.xlabel('Year',fontsize = 20)
plt.ylabel('Count',fontsize = 20)
```

Out[20]:

```
Text(0, 0.5, 'Count')
```




```
For 2014,more number of shows and movies were added.
```

Avg No. of Movies and Shows added each month

In [21]:

```
df1 = df.groupby(['type','Year','Month','Month_Name'])['title'].count().reset_index()
avg_add = df1.groupby(['type','Month','Month_Name'])['title'].mean().round(0).reset_index()
avg_add
```

Out[21]:

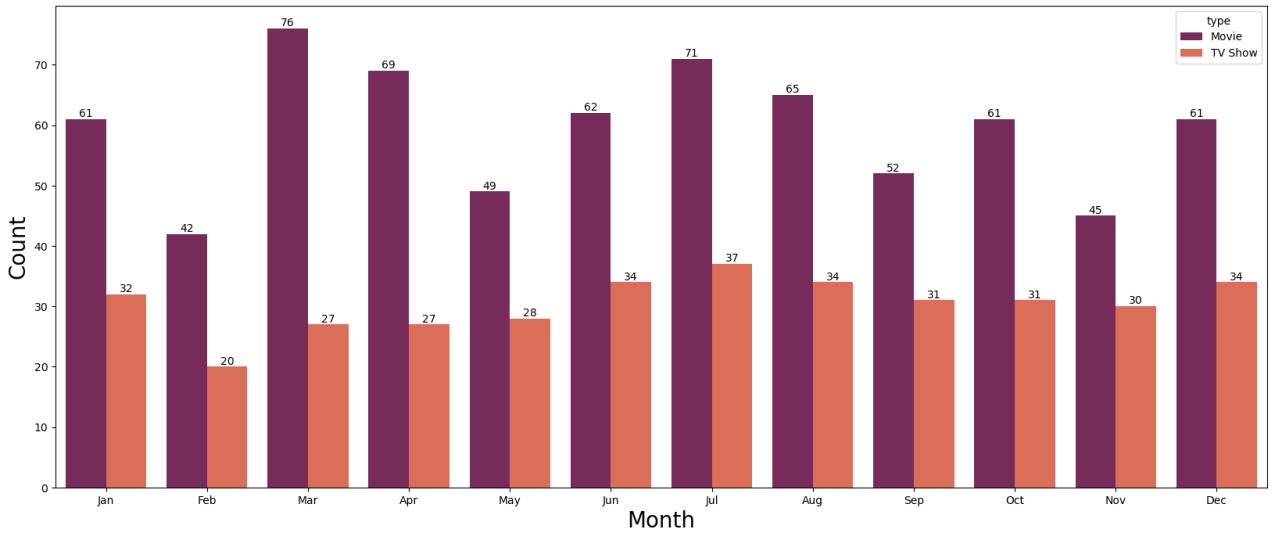
	type	Month	Month_Name	title
0	Movie	1	Jan	61.0
1	Movie	2	Feb	42.0
2	Movie	3	Mar	76.0
3	Movie	4	Apr	69.0
4	Movie	5	May	49.0
5	Movie	6	Jun	62.0
6	Movie	7	Jul	71.0
7	Movie	8	Aug	65.0
8	Movie	9	Sep	52.0
9	Movie	10	Oct	61.0
10	Movie	11	Nov	45.0
11	Movie	12	Dec	61.0
12	TV Show	1	Jan	32.0
13	TV Show	2	Feb	20.0
14	TV Show	3	Mar	27.0
15	TV Show	4	Apr	27.0
16	TV Show	5	May	28.0
17	TV Show	6	Jun	34.0
18	TV Show	7	Jul	37.0
19	TV Show	8	Aug	34.0
20	TV Show	9	Sep	31.0
21	TV Show	10	Oct	31.0
22	TV Show	11	Nov	30.0
23	TV Show	12	Dec	34.0

In [22]:

```
plt.figure(figsize = (20,8))
ax = sns.barplot(x='Month_Name',y='title',data = avg_add ,hue='type',palette = 'rocket')
for bars in ax.containers:
    ax.bar_label(bars)
plt.xlabel('Month',fontsize = 20)
plt.ylabel('Count',fontsize = 20)
```

Out[22]:

```
Text(0, 0.5, 'Count')
```




```
Netflix added 42 to 76 movies and 20 to 37 tv shows each month.
```

Top 10 Directors

In [23]:

```
top10_dir = df['director'].str.split(', ',expand = True).stack().reset_index()
top10_dir = top10_dir.groupby(0)['level_1'].count().reset_index().sort_values('level_1',ascending = False).head(10).rename(colu
top10_dir[1:11]
```

Out[23]:

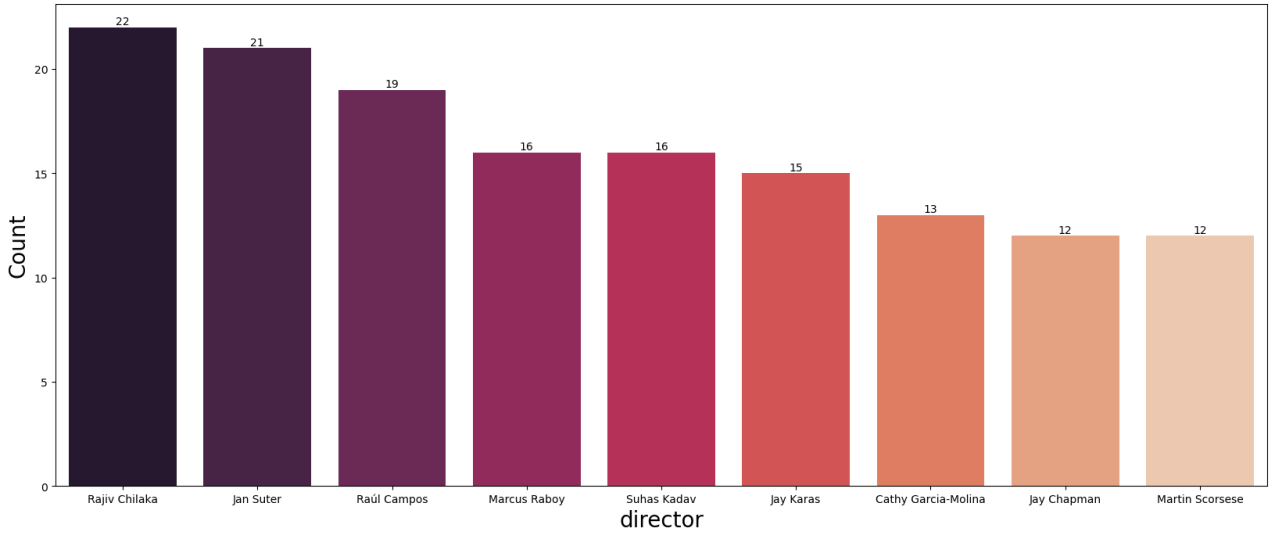
	director	cnt
3749	Rajiv Chilaka	22
1906	Jan Suter	21
3800	Raúl Campos	19
2866	Marcus Raboy	16
4457	Suhas Kadav	16
1954	Jay Karas	15
755	Cathy Garcia-Molina	13
1951	Jay Chapman	12
2945	Martin Scorsese	12

In [24]:

```
plt.figure(figsize = (20,8))
ax = sns.barplot(x='director',y='cnt',data = top10_dir[1:11],palette = 'rocket')
for bars in ax.containers:
    ax.bar_label(bars)
plt.xlabel('director',fontsize = 20)
plt.ylabel('Count',fontsize = 20)
```

Out[24]:

```
Text(0, 0.5, 'Count')
```




```
Above are the top 10 directors
```

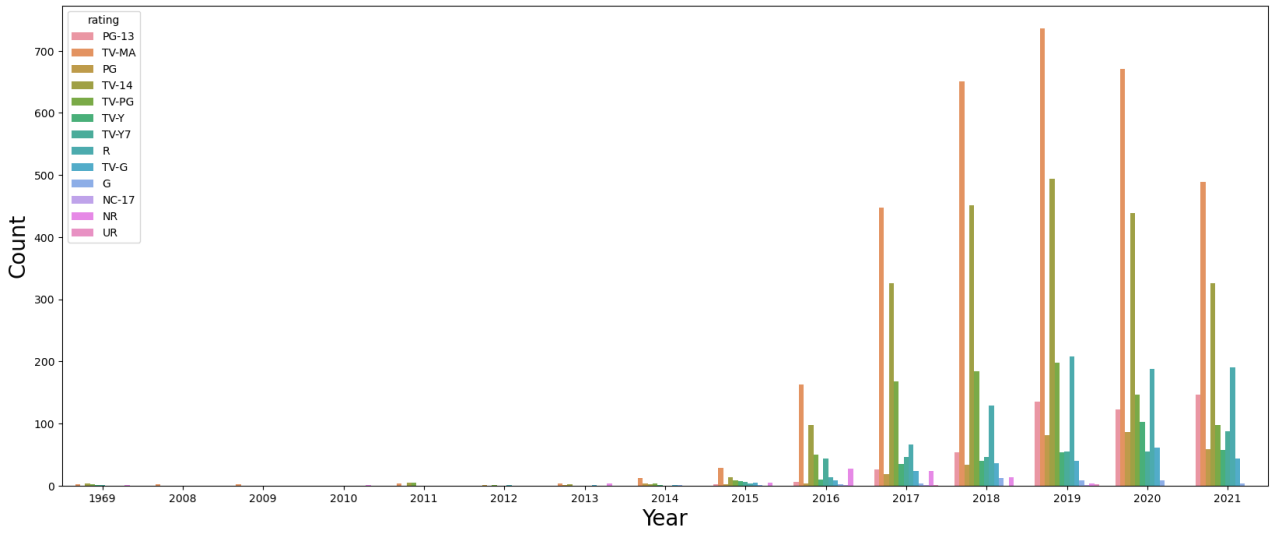
Rating Counts

In [25]:

```
plt.figure(figsize = (20,8))
ax = sns.countplot(x='Year',data=df,hue = 'rating')
plt.xlabel('Year',fontsize = 20)
plt.ylabel('Count',fontsize = 20)
```

Out[25]:

```
Text(0, 0.5, 'Count')
```



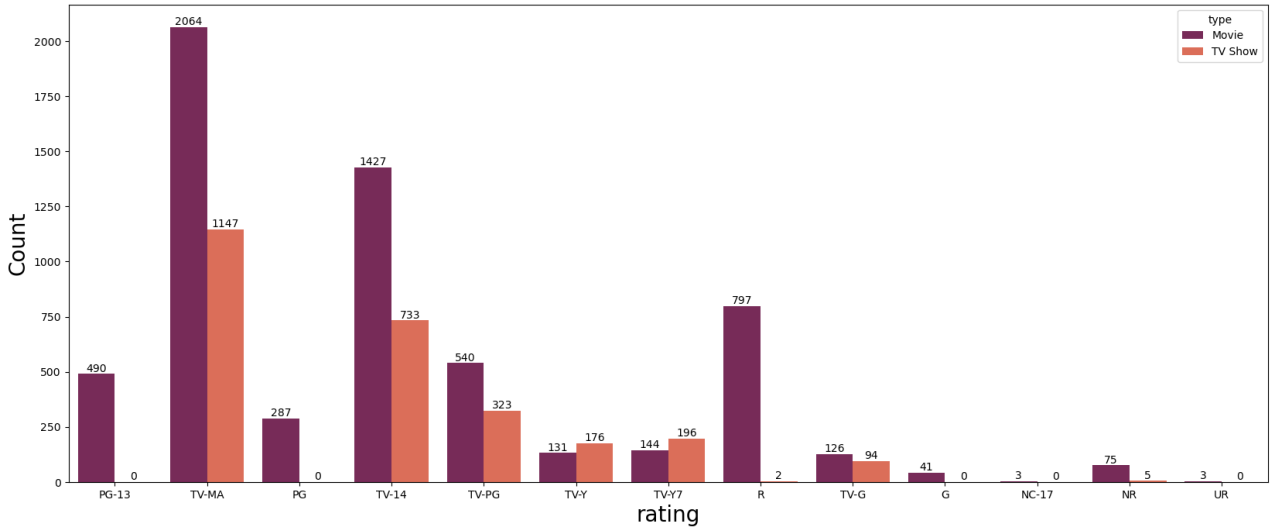
The distribution of ratings over the years offers insights into the evolving content landscape and audience reception.

In [26]:

```
plt.figure(figsize = (20,8))
ax = sns.countplot(x='rating',data=df,hue = 'type',palette = 'rocket')
for bars in ax.containers:
    ax.bar_label(bars)
plt.xlabel('rating',fontsize = 20)
plt.ylabel('Count',fontsize = 20)
```

Out[26]:

```
Text(0, 0.5, 'Count')
```



Top 10 Movie produced country

In [27]:

```
top10_country_mov = df.loc[df['type'] == 'Movie','country'].str.split(', ',expand = True).stack().reset_index()
top10_country_mov = top10_country_mov.groupby(0)['level_1'].count().reset_index().sort_values('level_1',ascending = False).hea
top10_country_mov
```

Out[27]:

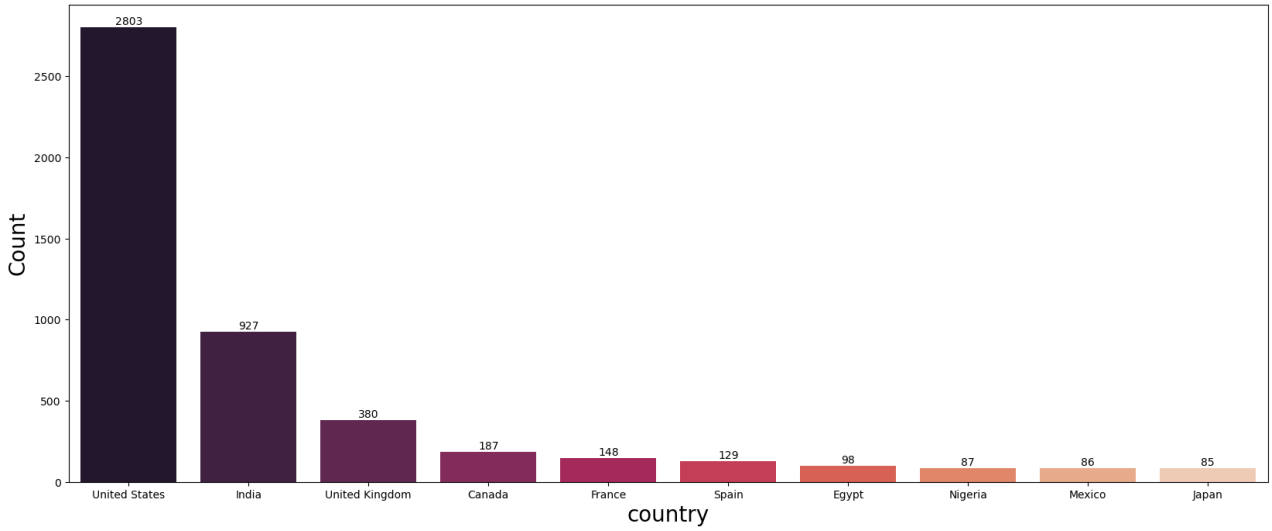
	country	cnt
75	United States	2803
28	India	927
73	United Kingdom	380
10	Canada	187
19	France	148
65	Spain	129
17	Egypt	98
46	Nigeria	87
41	Mexico	86
35	Japan	85

In [28]:

```
plt.figure(figsize = (20,8))
ax = sns.barplot(x='country',y='cnt',data=top10_country_mov,palette = 'rocket')
for bars in ax.containers:
    ax.bar_label(bars)
plt.xlabel('country',fontsize = 20)
plt.ylabel('Count',fontsize = 20)
```

Out[28]:

```
Text(0, 0.5, 'Count')
```



In [29]:

```
top10_country_show = df.loc[df['type'] == 'TV Show','country'].str.split(', ',expand = True).stack().reset_index()
top10_country_show = top10_country_show.groupby(0)['level_1'].count().reset_index().sort_values('level_1',ascending = False).he
top10_country_show
```

Out[29]:

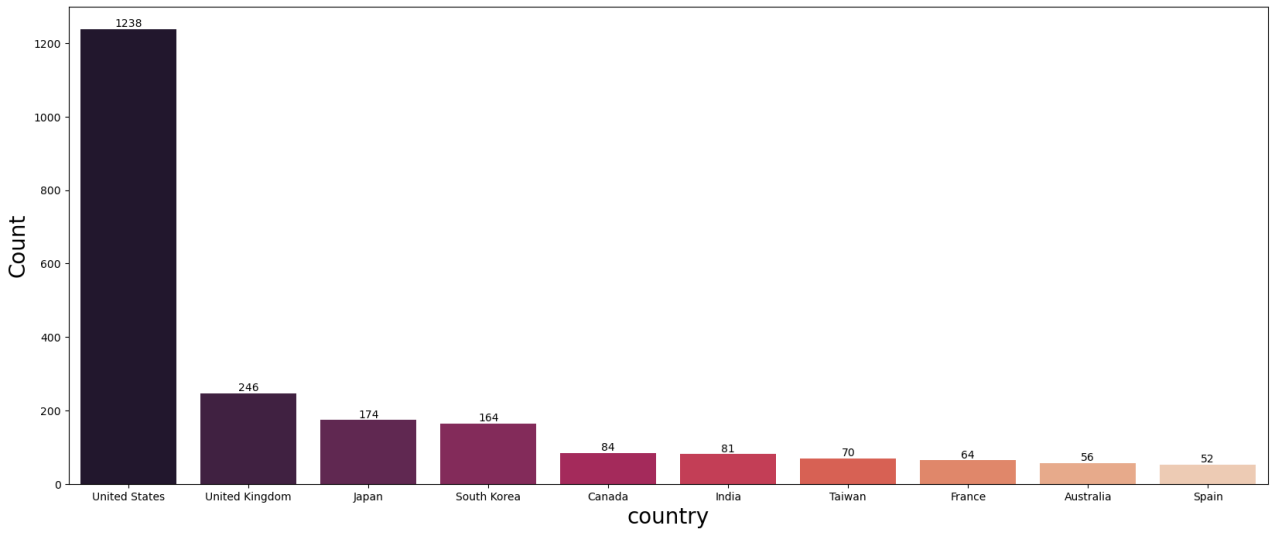
	country	cnt
57	United States	1238
56	United Kingdom	246
26	Japan	174
47	South Korea	164
7	Canada	84
21	India	81
51	Taiwan	70
17	France	64
2	Australia	56
48	Spain	52

In [30]:

```
plt.figure(figsize = (20,8))
ax = sns.barplot(x='country',y='cnt',data=top10_country_show,palette = 'rocket')
for bars in ax.containers:
    ax.bar_label(bars)
plt.xlabel('country',fontsize = 20)
plt.ylabel('Count',fontsize = 20)
```

Out[30]:

```
Text(0, 0.5, 'Count')
```




```
Movies/Shows added more above countries
```

In [31]:

```
# Creating movies df
movies = df[df['type'] == 'Movie']
```

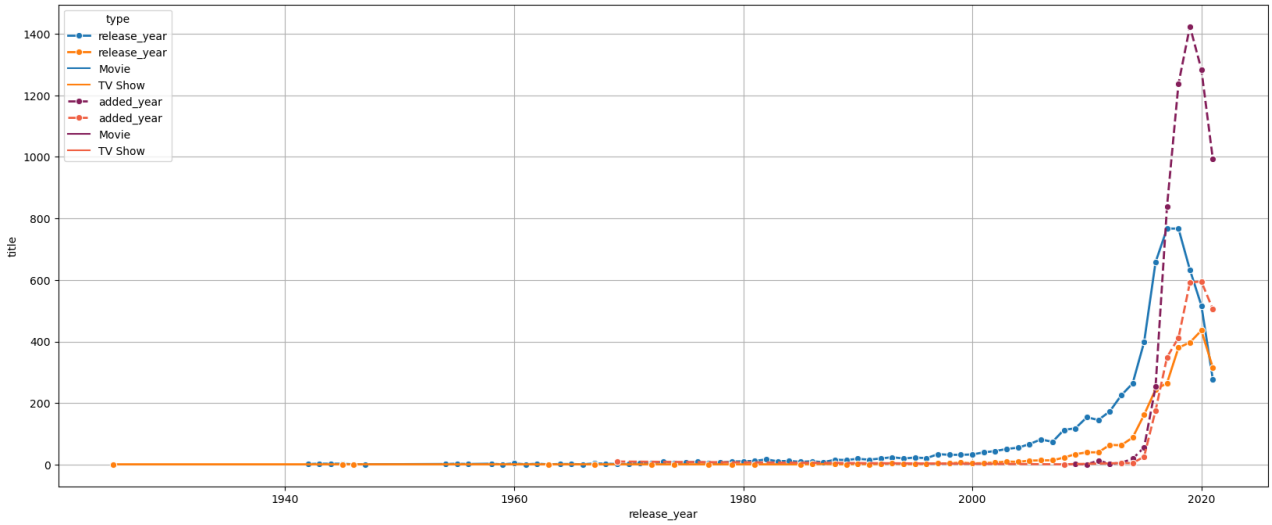
In [32]:

```
# Creating tvshows df
tvshows = df[df['type'] == 'TV Show']
```

Movies released vs. Movies added each year

In [33]:

```
t.figure(figsize=(20,8))
s.lineplot(x='release_year',y='title',data = df.groupby(['type','release_year'])['title'].count().reset_index() ,hue='type',lin
s.lineplot(x='Year',y='title',data = df.groupby(['type','Year'])['title'].count().reset_index() ,hue='type',palette = 'rocket',
t.ylim()
t.grid()
```



Avg time taken to add movies and tv shows

In [34]:

```
movies['date_diff'] = movies['Year'] - movies['release_year']
print('Avg years taken to add released movie to netflix :',movies['date_diff'].mean().round(0))
```

```
Avg years taken to add released movie to netflix : 6.0
```

In [35]:

```
tvshows['date_diff'] = tvshows['Year'] - tvshows['release_year']
print('Avg years taken to add released tv show to netflix :',tvshows['date_diff'].mean().round(0))
```

```
Avg years taken to add released tv show to netflix : 2.0
```

Top 10 genre in movies

In [36]:

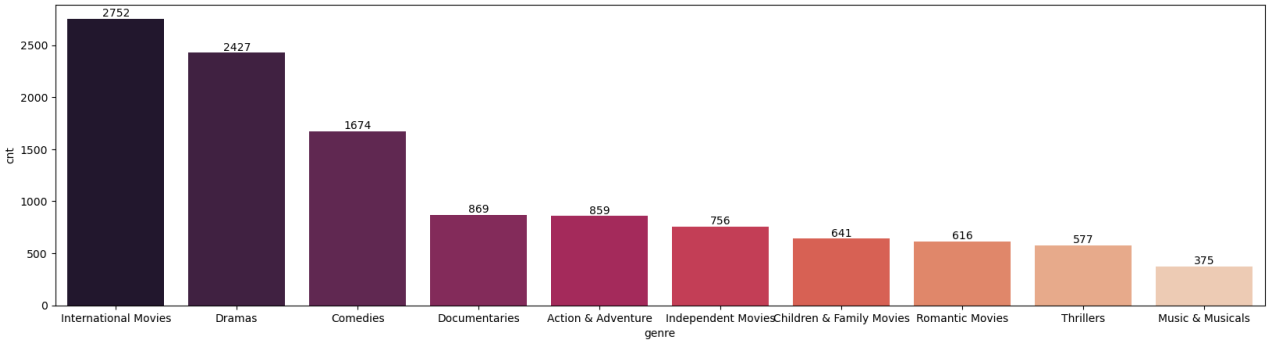
```
mov_genre = movies['listed_in'].str.split(', ',expand = True).stack().reset_index()
mov_genre = mov_genre.groupby(0)['level_1'].count().reset_index().sort_values('level_1',ascending = False).head(10).rename(colu
mov_genre
```

Out[36]:

	genre	cnt
11	International Movies	2752
7	Dramas	2427
4	Comedies	1674
6	Documentaries	869
0	Action & Adventure	859
10	Independent Movies	756
2	Children & Family Movies	641
15	Romantic Movies	616
19	Thrillers	577
14	Music & Musicals	375

In [37]:

```
plt.figure(figsize=(20,5))
ax = sns.barplot(x='genre',y='cnt',data = mov_genre,palette = 'rocket')
for bars in ax.containers:
    ax.bar_label(bars)
```



Top 10 genre in TV Shows

In [38]:

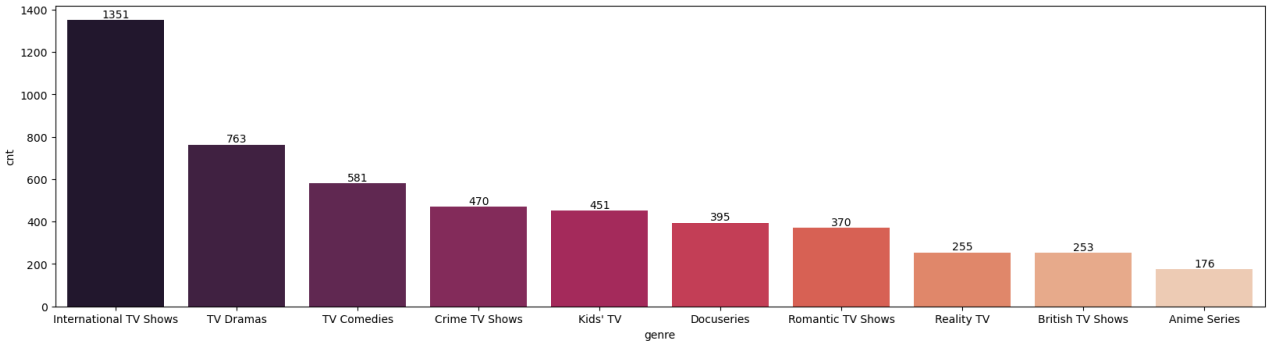
```
tvshows['listed_in'].str.split(', ',expand = True).stack().reset_index()
tv_show_genre.groupby(0)['level_1'].count().reset_index().sort_values('level_1',ascending = False).head(10).rename(columns={0:
```

Out[38]:

	genre	cnt
5	International TV Shows	1351
15	TV Dramas	763
14	TV Comedies	581
3	Crime TV Shows	470
6	Kids' TV	451
4	Docuseries	395
9	Romantic TV Shows	370
8	Reality TV	255
1	British TV Shows	253
0	Anime Series	176

In [39]:

```
plt.figure(figsize=(20,5))
ax = sns.barplot(x='genre',y='cnt',data = tv_show_genre,palette = 'rocket')
for bars in ax.containers:
    ax.bar_label(bars)
```



Movies count by week_num

In [40]:

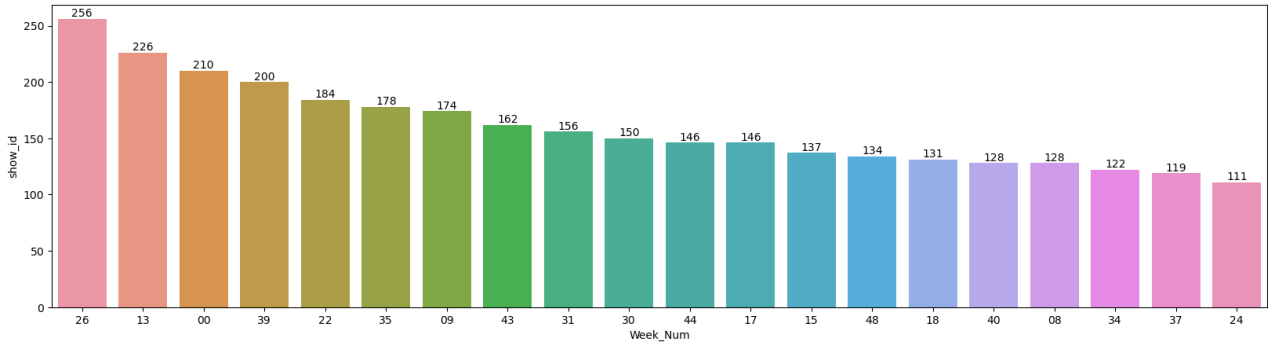
```
movies.groupby(['Week_Num'])['show_id'].count().reset_index().sort_values(by=['show_id'],ascending=False).head(10)
```

Out[40]:

	Week_Num	show_id
26	26	256
13	13	226
0	00	210
39	39	200
22	22	184
35	35	178
9	09	174
43	43	162
31	31	156
30	30	150

In [41]:

```
plt.figure(figsize=(20,5))
ax = sns.barplot(x = 'Week_Num',y = 'show_id',data = movies.groupby(['Week_Num'])['show_id'].count().reset_index().sort_values(
for bars in ax.containers:
    ax.bar_label(bars)
```



TV Show count by week_num

In [86]:

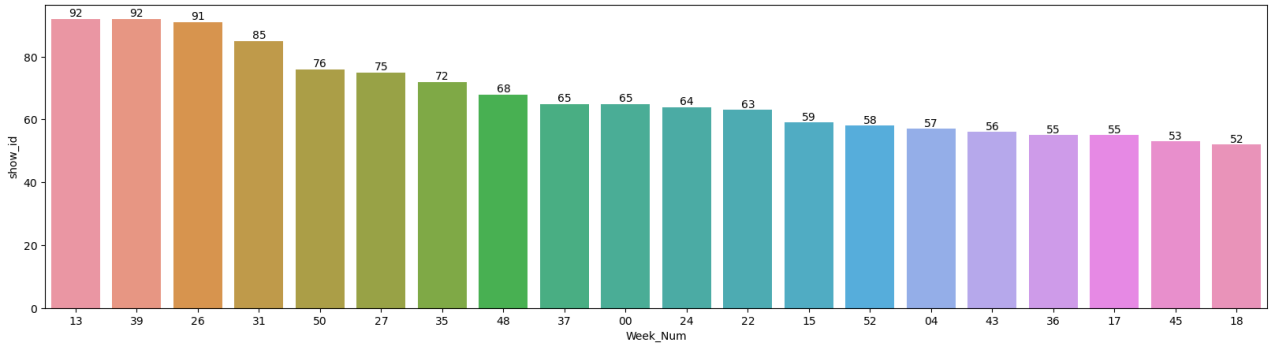
```
tvshows.groupby(['Week_Num'])['show_id'].count().reset_index().sort_values(by=['show_id'],ascending=False).head(10)
```

Out[86]:

	Week_Num	show_id
13	13	92
39	39	92
26	26	91
31	31	85
50	50	76
27	27	75
35	35	72
48	48	68
37	37	65
0	00	65

In [43]:

```
plt.figure(figsize=(20,5))
ax = sns.barplot(x = 'Week_Num',y = 'show_id',data = tvshows.groupby(['Week_Num'])['show_id'].count().reset_index().sort_values
for bars in ax.containers:
    ax.bar_label(bars)
```



Top 10 movies actors

In [44]:

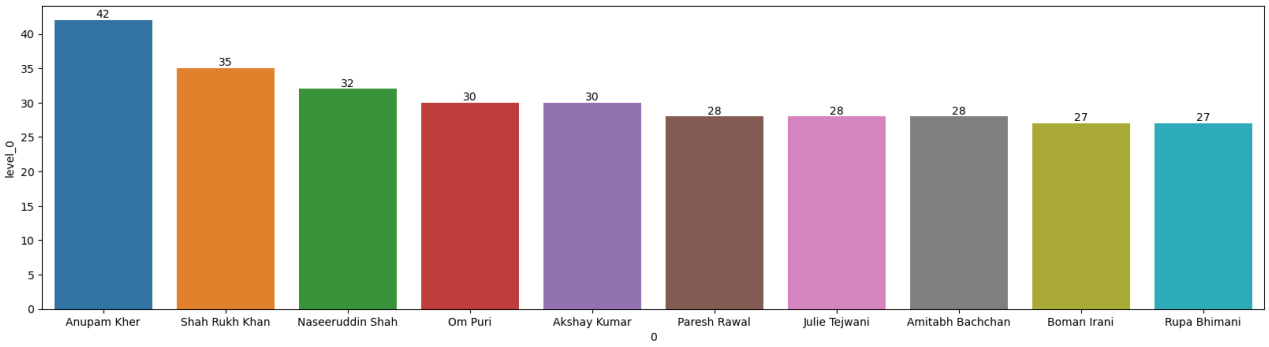
```
mov_actors = movies['cast'].str.split(', ',expand = True).stack().reset_index()
mov_actors = mov_actors.groupby(0)['level_0'].count().reset_index().sort_values('level_0',ascending = False)[1:11]
mov_actors
```

Out[44]:

	0	level_0
2105	Anupam Kher	42
21781	Shah Rukh Khan	35
17193	Naseeruddin Shah	32
18064	Om Puri	30
638	Akshay Kumar	30
18329	Paresh Rawal	28
12031	Julie Tejwani	28
1313	Amitabh Bachchan	28
3354	Boman Irani	27
20692	Rupa Bhimani	27

In [45]:

```
plt.figure(figsize=(20,5))
ax = sns.barplot(x = 0,y = 'level_0',data = mov_actors)
for bars in ax.containers:
    ax.bar_label(bars)
```



Top 10 TV Show actors

In [46]:

```
tv_actors = tvshows['cast'].str.split(', ',expand = True).stack().reset_index()
tv_actors = tv_actors[0].value_counts()[1:11].reset_index().rename({'index':'actor','0':'cnt'})
tv_actors
```

Out[46]:

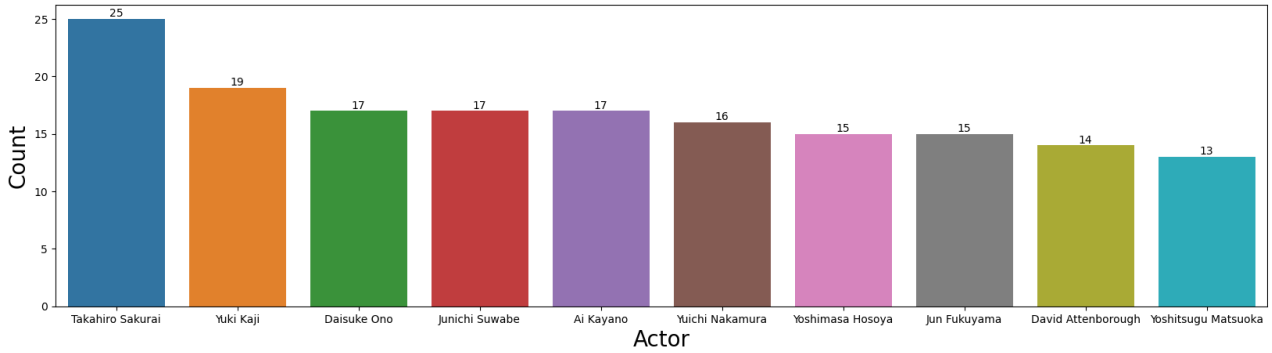
	index	0
0	Takahiro Sakurai	25
1	Yuki Kaji	19
2	Daisuke Ono	17
3	Junichi Suwabe	17
4	Ai Kayano	17
5	Yuichi Nakamura	16
6	Yoshimasa Hosoya	15
7	Jun Fukuyama	15
8	David Attenborough	14
9	Yoshitsugu Matsuoka	13

In [47]:

```
plt.figure(figsize=(20,5))
ax = sns.barplot(x = tv_actors.iloc[:,0],y=tv_actors.iloc[:,1] )
for bars in ax.containers:
    ax.bar_label(bars)
plt.xlabel('Actor',fontsize = 20)
plt.ylabel('Count',fontsize = 20)
```

Out[47]:

```
Text(0, 0.5, 'Count')
```



Duration Analysis

In [48]:

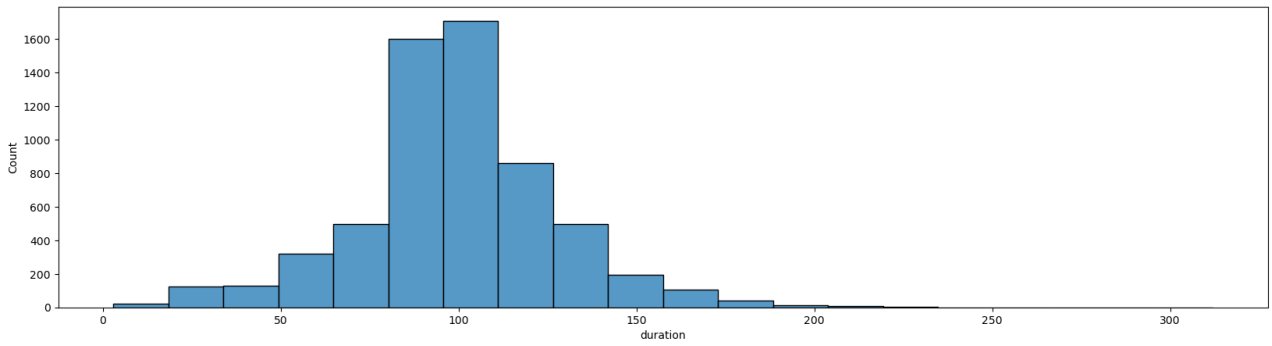
```
movies['duration'] = movies['duration'].str.split(expand = True)[0]
movies['duration'] = movies['duration'].fillna(movies['duration'].mode()[0])
movies['duration'] = movies['duration'].astype('int64')
```

In [49]:

```
plt.figure(figsize=(20,5))
sns.histplot(x='duration',data = movies,bins = 20)
```

Out[49]:

```
<Axes: xlabel='duration', ylabel='Count'>
```



In [50]:

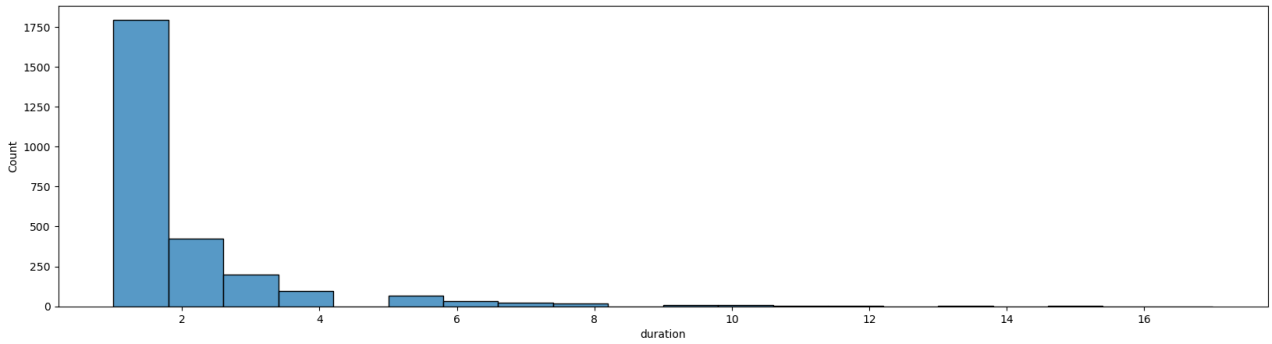
```
tvshows['duration'] = tvshows['duration'].str.split(expand = True)[0]
tvshows['duration'] = tvshows['duration'].astype('int')
```

In [51]:

```
plt.figure(figsize=(20,5))
sns.histplot(x='duration',data = tvshows,bins = 20)
```

Out[51]:

```
<Axes: xlabel='duration', ylabel='Count'>
```



Removing nested columns using split and merge

In [52]:

```
df.set_index('title',inplace = True)
```

In [53]:

```
# Splitting comma separated value using split and stacking them
cast_split = df['cast'].str.split(', ',expand = True).stack().reset_index().rename(columns = {0:'cast'})
cast_split[['title','cast']]
```

Out[53]:

	title	cast
0	Dick Johnson Is Dead	Unknown
1	Blood & Water	Ama Qamata
2	Blood & Water	Khosi Ngema
3	Blood & Water	Gail Mabalane
4	Blood & Water	Thabang Molaba
...	...	...
64946	Zubaan	Manish Chaudhary
64947	Zubaan	Meghna Malik
64948	Zubaan	Malkeet Rauni
64949	Zubaan	Anita Shabdish
64950	Zubaan	Chittaranjan Tripathy

64951 rows × 2 columns

In [54]:

```
country_split = df['country'].str.split(', ',expand = True).stack().reset_index().rename(columns = {0:'country'})
country_split[['title','country']]
```

Out[54]:

	title	country
0	Dick Johnson Is Dead	United States
1	Blood & Water	South Africa
2	Ganglands	United States
3	Jailbirds New Orleans	United States
4	Kota Factory	India
...	...	...
8802	Zodiac	United States
8803	Zombie Dumb	United States
8804	Zombieland	United States
8805	Zoom	United States
8806	Zubaan	India

8807 rows × 2 columns

In [55]:

```
listed_in_split = df['listed_in'].str.split(', ',expand = True).stack().reset_index().rename(columns = {0:'genre'})
listed_in_split[['title','genre']]
```

Out[55]:

	title	genre
0	Dick Johnson Is Dead	Documentaries
1	Blood & Water	International TV Shows
2	Blood & Water	TV Dramas
3	Blood & Water	TV Mysteries
4	Ganglands	Crime TV Shows
...	...	...
19318	Zoom	Children & Family Movies
19319	Zoom	Comedies
19320	Zubaan	Dramas
19321	Zubaan	International Movies
19322	Zubaan	Music & Musicals

19323 rows × 2 columns

In [56]:

```
dir_split = df['director'].str.split(', ',expand = True).stack().reset_index().rename(columns = {0:'director'})
dir_split[['title','director']]
```

Out[56]:

	title	director
0	Dick Johnson Is Dead	Kirsten Johnson
1	Blood & Water	Unknown
2	Ganglands	Julien Leclercq
3	Jailbirds New Orleans	Unknown
4	Kota Factory	Unknown
...	...	...
9607	Zodiac	David Fincher
9608	Zombie Dumb	Unknown
9609	Zombieland	Ruben Fleischer
9610	Zoom	Peter Hewitt
9611	Zubaan	Mozez Singh

9612 rows × 2 columns

In [57]:

```
new_df = df.merge(listed_in_split[['title','genre']],how='left',on='title').merge(country_split[['title','country']],how='left
new_df
```

Out[57]:

	title	show_id	type	director_x	cast_x	country_x	date_added	release_year	rating	duration	listed_in	description	Year	Month	M
0	Dick Johnson Is Dead	s1	Movie	Kirsten Johnson	Unknown	United States	2021-09-25	2020	PG-13	90 min	Documentaries	As her father nears the end of his life, filmm...	2021	9	
1	Blood & Water	s2	TV Show	Unknown	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...	2021	9	
2	Blood & Water	s2	TV Show	Unknown	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...	2021	9	
3	Blood & Water	s2	TV Show	Unknown	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...	2021	9	
4	Blood & Water	s2	TV Show	Unknown	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...	2021	9	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
161211	Zubaan	s8807	Movie	Mozez Singh	Vicky Kaushal, Sarah-Jane Dias, Raaghav Chanan...	India	2019-03-02	2015	TV-14	111 min	Dramas, International Movies, Music & Musicals	A scrappy but poor boy worms his way into a ty...	2019	3	
161212	Zubaan	s8807	Movie	Mozez Singh	Vicky Kaushal, Sarah-Jane Dias, Raaghav Chanan...	India	2019-03-02	2015	TV-14	111 min	Dramas, International Movies, Music & Musicals	A scrappy but poor boy worms his way into a ty...	2019	3	
161213	Zubaan	s8807	Movie	Mozez Singh	Vicky Kaushal, Sarah-Jane Dias, Raaghav Chanan...	India	2019-03-02	2015	TV-14	111 min	Dramas, International Movies, Music & Musicals	A scrappy but poor boy worms his way into a ty...	2019	3	
161214	Zubaan	s8807	Movie	Mozez Singh	Vicky Kaushal, Sarah-Jane Dias, Raaghav Chanan...	India	2019-03-02	2015	TV-14	111 min	Dramas, International Movies, Music & Musicals	A scrappy but poor boy worms his way into a ty...	2019	3	
161215	Zubaan	s8807	Movie	Mozez Singh	Vicky Kaushal, Sarah-Jane Dias, Raaghav Chanan...	India	2019-03-02	2015	TV-14	111 min	Dramas, International Movies, Music & Musicals	A scrappy but poor boy worms his way into a ty...	2019	3	

161216 rows × 20 columns

In [58]:

```
new_df[new_df['type'] == 'Movie'].groupby(['cast_y','director_y'])['title'].nunique().reset_index().sort_values('title',ascend
```

Out[58]:

	cast_y	director_y	title
34901	Rajesh Kava	Rajiv Chilaka	19

In [59]:

```
new_df[new_df['type'] == 'TV Show'].groupby(['cast_y','director_y'])['title'].nunique().reset_index().sort_values('title',ascer
```

Out[59]:

	cast_y	director_y	title
15097	Unknown	Unknown	298
14316	Takahiro Sakurai	Unknown	24
15848	Yuki Kaji	Unknown	18
15828	Yuichi Nakamura	Unknown	16
3107	Daisuke Ono	Unknown	16
...	...	...	...
5837	Ivana Lotito	Unknown	1
5838	Ivar Kants	Unknown	1
5839	Ivonne Coll	Unknown	1
5840	Ivonne Montero	Unknown	1
16147	Şükrü Özyıldız	Unknown	1

16148 rows × 3 columns

In [60]:

```
movie_new_df = new_df.loc[new_df['type'] == 'Movie']
```

In [61]:

```
tvshow_new_df = new_df.loc[new_df['type'] == 'TV Show']
```

In [62]:

```
movie_new_df['duration'] = movie_new_df['duration'].str.split(expand=True)[0]
```

In [63]:

```
movie_new_df ['duration'].mode()[0]
```

Out[63]:

```
'94'
```

In [64]:

```
movie_new_df ['duration'] = movie_new_df ['duration'].fillna(movie_new_df ['duration'].mode()[0])
```

In [65]:

```
movie_new_df ['duration'] = movie_new_df ['duration'].astype('int64')
```

In [66]:

```
movie_new_df.groupby('release_year')['duration'].mean().reset_index()
```

Out[66]:

	release_year	duration
0	1942	29.333333
1	1943	66.200000
2	1944	65.714286
3	1945	57.166667
4	1946	58.000000
...	...	...
68	2017	102.587993
69	2018	104.787703
70	2019	101.328797
71	2020	101.691947
72	2021	104.199918

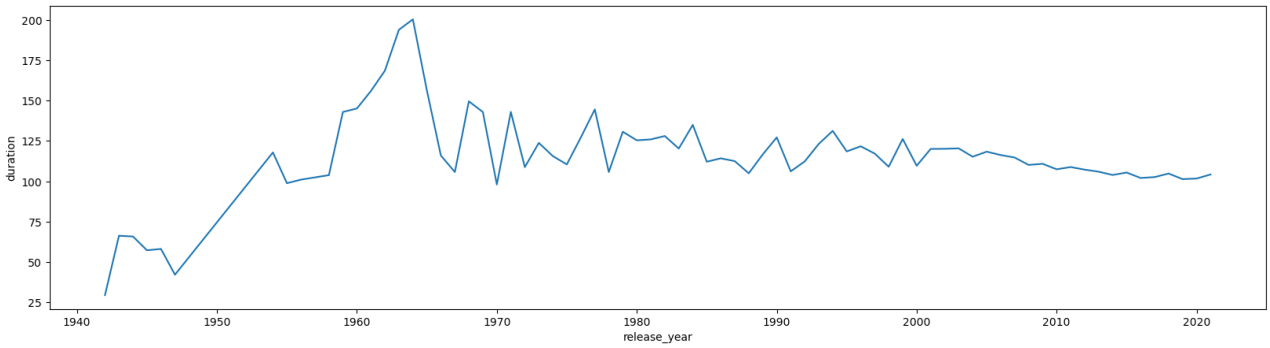
73 rows × 2 columns

In [67]:

```
plt.figure(figsize=(20,5))
sns.lineplot(x='release_year',y = 'duration',data = movie_new_df.groupby('release_year')['duration'].mean().reset_index())
```

Out[67]:

```
<Axes: xlabel='release_year', ylabel='duration'>
```



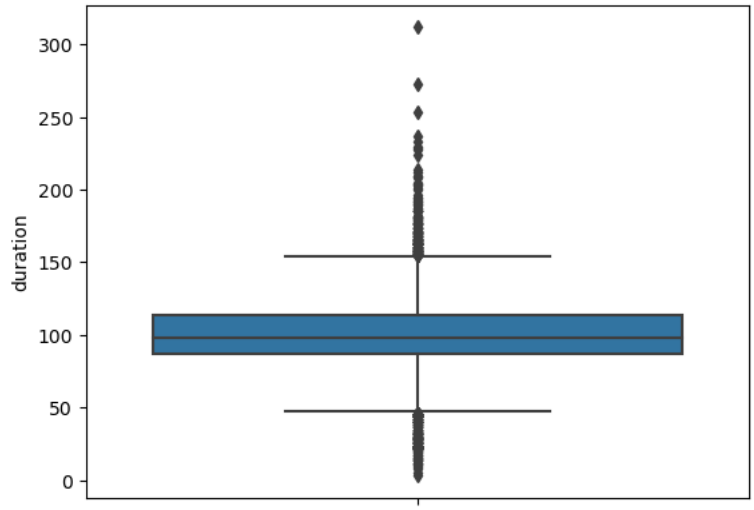
Movie durations indicated a peak around the 1960s, followed by a stabilization around 100 minutes, highlighting a trend in movie lengths over time.

In [68]:

```
sns.boxplot(y='duration',data = movie_new_df[['title','duration']].drop_duplicates())
```

Out[68]:

```
<Axes: ylabel='duration'>
```



Movies fall under 50 to 150 mins.That means movies on Netflix desgined to fit within a standard viewing time.

In [72]:

```
# Avg runtime by actors
movie_new_df.groupby('cast_y')['duration'].mean().round(2).reset_index().sort_values('duration',ascending = False)
```

Out[72]:

	cast_y	duration
2475	Asim Chaudhry	312.0
7752	Fionn Whitehead	312.0
5150	Craig Parkinson	312.0
5610	Darren Pettie	273.0
22299	Simon Prebble	273.0
...	...	...
6799	Ehab Shaaban	12.0
22809	Steven Bognar	10.0
11964	Julia Reichert	10.0
19156	President Barack Obama	10.0
23869	Timothy Ware-Hill	8.0

25952 rows × 2 columns

In [73]:

```
# Avg runtime by director and cast
movie_new_df.groupby(['director_y','cast_y'])['duration'].mean().round(2).reset_index().sort_values('duration',ascending = Fals
```

Out[73]:

	director_y	cast_y	duration
44242	Unknown	Fionn Whitehead	312.0
44183	Unknown	Craig Parkinson	312.0
44121	Unknown	Asim Chaudhry	312.0
44586	Unknown	Will Poulter	312.0
44094	Unknown	Alice Lowe	312.0
44346	Unknown	Kate Seftel	273.0
44236	Unknown	Evelyn Lewis Prieto	273.0
44187	Unknown	Darren Pettie	273.0
44111	Unknown	Andy Puddicombe	273.0
44487	Unknown	Rhiannon Mcgavin	273.0
44531	Unknown	Simon Prebble	273.0
44259	Unknown	Ginger Daniels	273.0
15749	Houssam El-Din Mustafa	Saeed Saleh	253.0
15750	Houssam El-Din Mustafa	Suhair El-Babili	253.0
15751	Houssam El-Din Mustafa	Younes Shalabi	253.0
15747	Houssam El-Din Mustafa	Hadi El-Gayyar	253.0
15746	Houssam El-Din Mustafa	Ahmad Zaki	253.0
15745	Houssam El-Din Mustafa	Adel Emam	253.0
15748	Houssam El-Din Mustafa	Hassan Moustafa	253.0
37850	Samir Al Asfory	Ahmed Zaki	237.0

In [74]:

```
tvshow_new_df['duration'] = tvshow_new_df['duration'].str.split(expand=True)[0]
```

In [75]:

```
tvshow_new_df['duration'] = tvshow_new_df['duration'].astype('int')
```

In [76]:

```
# Avg runtime by cast
tvshow_new_df.groupby('cast_y')['duration'].mean().round(2).reset_index().sort_values('duration',ascending = False).head(20)
```

Out[76]:

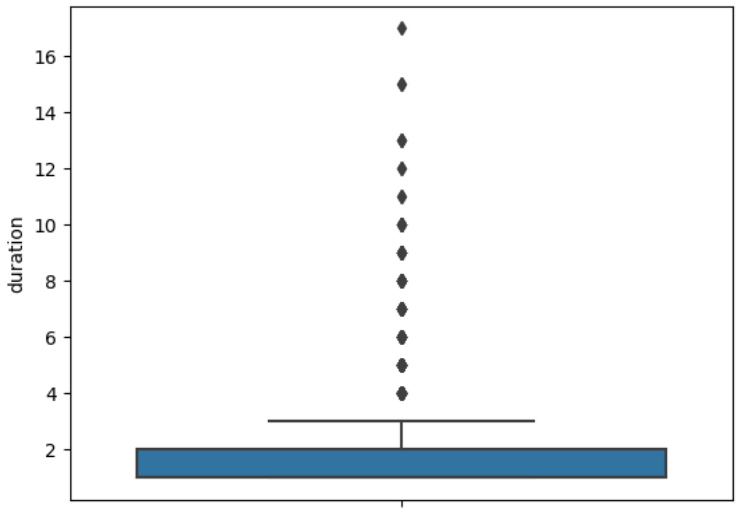
	cast_y	duration
10749	Patrick Dempsey	17.0
2248	Chandra Wilson	17.0
7325	Kevin McKidd	17.0
13189	T.R. Knight	17.0
6829	Justin Chambers	17.0
3796	Ellen Pompeo	17.0
6043	Jessica Capshaw	17.0
3959	Eric Dane	17.0
5658	James Pickens Jr.	17.0
5960	Jensen Ackles	15.0
454	Alexander Calvert	15.0
6264	Joe Spano	15.0
8925	Mark Harmon	15.0
9520	Michael Weatherly	15.0
12302	Sean Murray	15.0
791	Andrea Menard	15.0
12037	Samantha Smith	15.0
9730	Misha Collins	15.0
10860	Pauley Perrette	15.0
10621	Pancho Demmings	15.0

In [77]:

```
sns.boxplot(y='duration',data = tvshow_new_df[['title','duration']].drop_duplicates())
```

Out[77]:

```
<Axes: ylabel='duration'>
```




```
Netflix focuses only on short series 0 to 3 season
```

In [78]:

```
# Avg runtime by director and cast
tvshow_new_df.groupby(['director_y','cast_y'])['duration'].mean().round(2).reset_index().sort_values('duration',ascending = Fa
```

Out[78]:

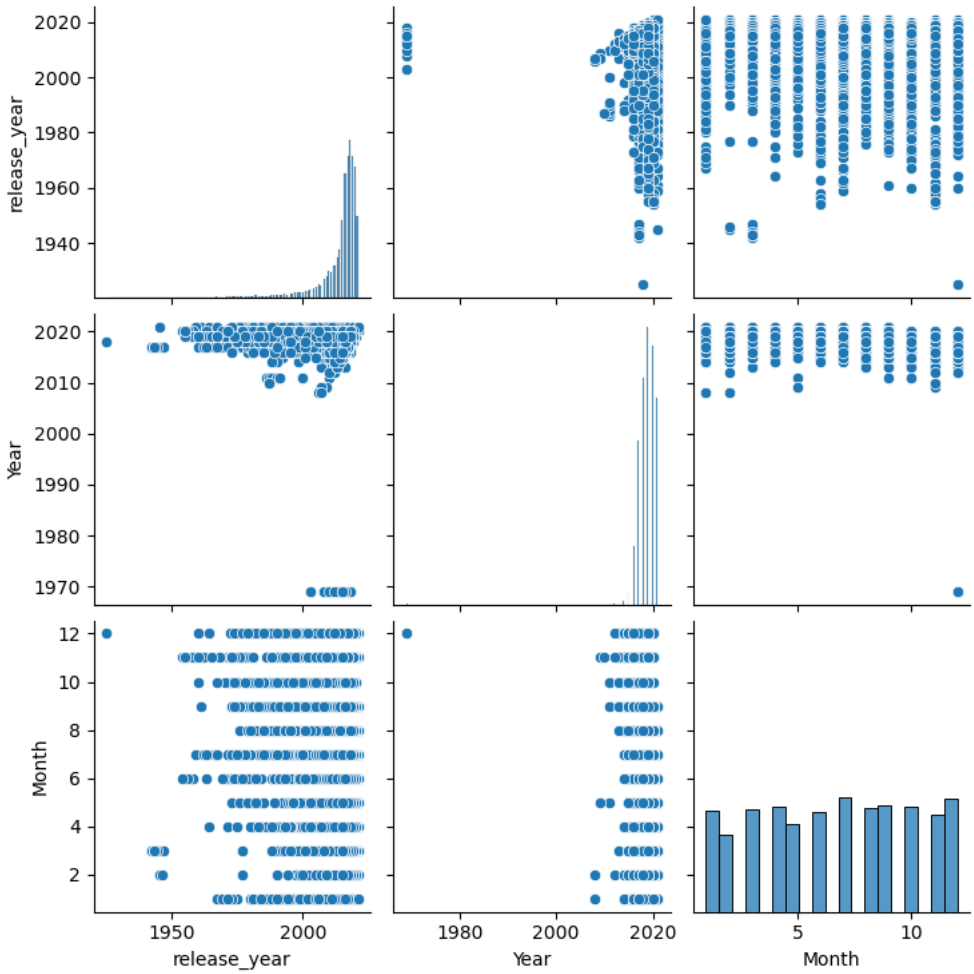
	director_y	cast_y	duration
9058	Unknown	Kevin McKidd	17.0
5770	Unknown	Ellen Pompeo	17.0
7848	Unknown	Jessica Capshaw	17.0
4687	Unknown	Chyler Leigh	17.0
5918	Unknown	Eric Dane	17.0
12212	Unknown	Patrick Dempsey	17.0
8590	Unknown	Justin Chambers	17.0
4340	Unknown	Chandra Wilson	17.0
7490	Unknown	James Pickens Jr.	17.0
14442	Unknown	T.R. Knight	17.0
1744	Phil Sgriccia	Misha Collins	15.0
4835	Unknown	Cote de Pablo	15.0
1741	Phil Sgriccia	Jim Beaver	15.0
13052	Unknown	Rocky Carroll	15.0
8058	Unknown	Joe Spano	15.0
13635	Unknown	Sean Murray	15.0
3932	Unknown	Brian Dietzen	15.0
1742	Phil Sgriccia	Mark Pellegrino	15.0
1743	Phil Sgriccia	Mark Sheppard	15.0
5843	Unknown	Emily Wickersham	15.0

In [79]:

```
sns.pairplot(df)
```

Out[79]:

```
<seaborn.axisgrid.PairGrid at 0x148d034c0>
```



Genre Correlation Analysis

In [80]:

```
genre_df = pd.read_csv('Downloads/Netflix.csv')
```

In [81]:

```
# Creating separate movie genre df
mov_genre_df = genre_df.loc[genre_df['type']=='Movie',['type','listed_in']]

# Creating list of all movie genre
mov_lst = mov_genre_df['listed_in'].str.split(', ',expand = True).stack().reset_index()[0].unique()

# Creating df with zeros of size mov_genre_df and mov_lst
df1 = pd.DataFrame(np.zeros((len(mov_genre_df),len(mov_lst))),columns = mov_lst,index = mov_genre_df.index)

# Updating values to 1 or 0 for particular cols if value present in list
for i in mov_lst:
    df1[i] = mov_genre_df['listed_in'].apply(lambda x : 1 if i in x else 0)

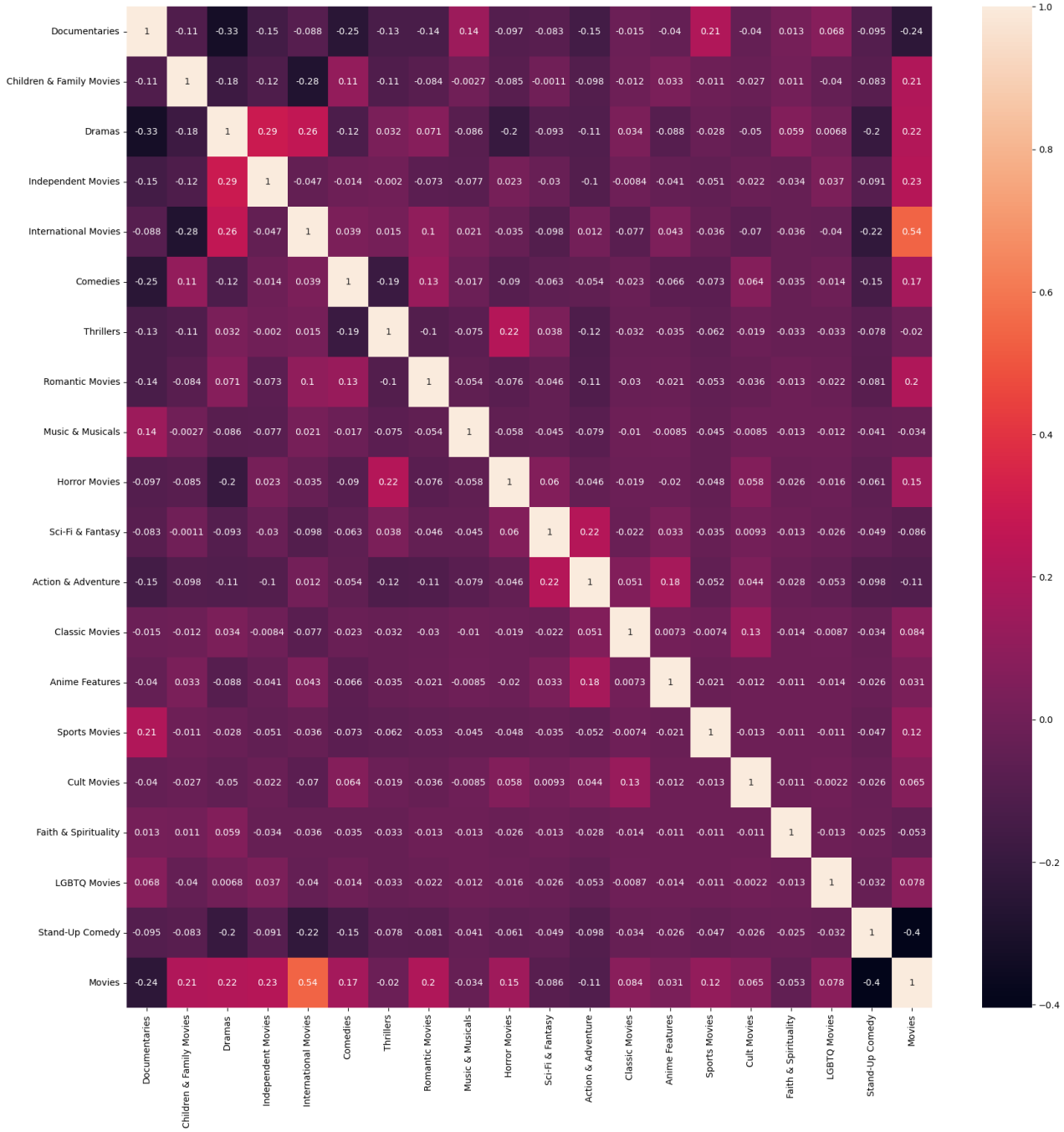
# Finally concating to mov_genre_df
mov_genre_df = pd.concat([mov_genre_df,df1],axis = 1)
```

In [82]:

```
plt.figure(figsize=(20,20))
sns.heatmap(mov_genre_df.corr(),annot = True)
```

Out[82]:

```
<Axes: >
```



In [83]:

```
# followed same steps as above
tvshow_genre_df = genre_df.loc[genre_df['type']=='TV Show',['type','listed_in']]
tvshow_lst = tvshow_genre_df['listed_in'].str.split(', ',expand = True).stack().reset_index()[0].unique()
df1 = pd.DataFrame(np.zeros((len(tvshow_genre_df),len(tvshow_lst))),columns = tvshow_lst,index = tvshow_genre_df.index)
for i in tvshow_lst:
    df1[i] = tvshow_genre_df['listed_in'].apply(lambda x : 1 if i in x else 0)
tvshow_genre_df = pd.concat([tvshow_genre_df,df1],axis = 1)
```

In [87]:

```
plt.figure(figsize=(20,20))
sns.heatmap(tvshow_genre_df.corr(),annot = True)
```

Out[87]:

```
<Axes: >
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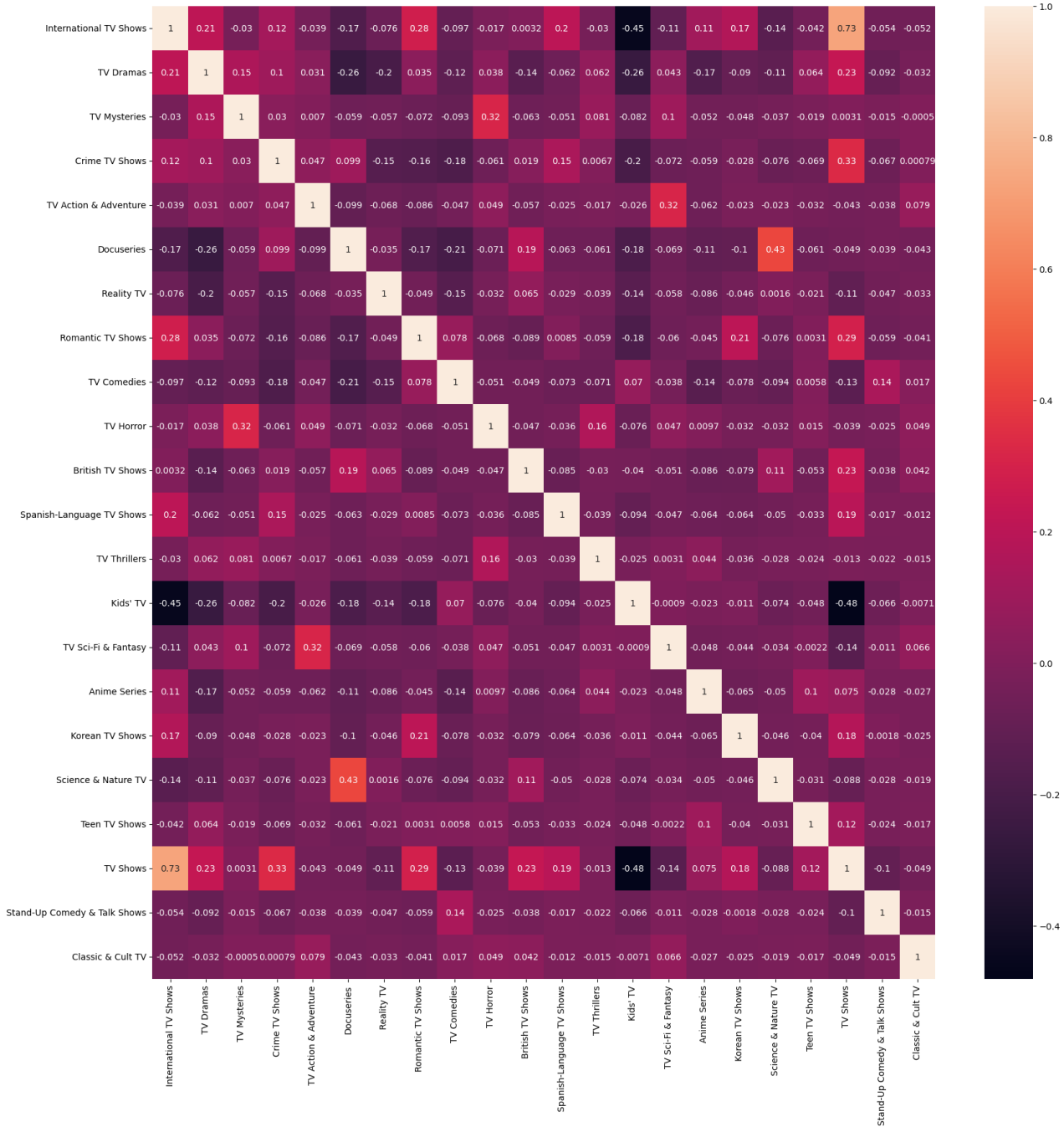

Business Insights

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1 Netflix has added more movies than tv shows.
2 Netflix started adding more content each year from 2014, most content was added in 2018,2019,2020.
3 Netflix added 42 to 76 movies and 20 to 37 tv shows each month.
4 Strong positive associations were observed between various movies genres, such as International Movies and Movies,   Horror
Movies and Thrillers, and independent movies and dramas. These correlations provide insights into viewer preferences and
content interconnections.
5 Strong positive associations were observed between various tv show genres, such as TV Shows and International TV
Shows,Docuseries and Science & Nature TV, and TV Shows and Crime TV Shows. These correlations provide insights into viewer
preferences and content interconnections.
6.Movie durations indicated a peak around the 1960s, followed by a stabilization around 100 minutes, highlighting a trend in
movie lengths over time.
7 Most TV shows on Netflix have one season, suggesting a preference for shorter series among viewers.
8 The distribution of ratings over the years offers insights into the evolving content landscape and audience reception.
9 Movies/Shows added more from US and India
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Recomendations

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1 Netflix has to focus on TV Shows also because there are people who will like to see tv shows rather than movies
2 By approaching the top director we can plan some more movies/tv shows in order to add new movies/show on platform which
will increase business.
3 The average movie adding time after release should be decreased as much as possible.
4 Mainly the release in ott should focus on the festival holidays, year end and weekends which is to be mainly focused
5 Should release movies/shows of top rated actors who has immense following.
6 Some movies can be released directly into platform which has some positive talk which may help in improving subscriptions.
7 Focus on addding movies/shows for different countries to grab users from worldwide.
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