In [1127]:

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

In [1185]:

```
netflix=pd.read_csv('C:/Users/asus/Downloads/netflix.csv')
netflix.head()
```

Out[1185]:

	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...

Basic checks on data

In [1186]:

```
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
```

In [1187]:

```
netflix.shape
```

Out[1187]:

```
(8807, 12)
```

In [1188]:

```
netflix.describe()
```

Out[1188]:

	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

In [1189]:

```
netflix.describe(include='all')
```

Out[1189]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
count	8807	8807	8807	6173	7982	7976	8797	8807.000000	8803	8804	8807	8807
unique	8807	2	8807	4528	7692	748	1767	NaN	17	220	514	8775
top	s1	Movie	Dick Johnson Is Dead	Rajiv Chilaka	David Attenborough	United States	January 1, 2020	NaN	TV-MA	1 Season	Dramas, International Movies	Paranormal activity at a lush, abandoned prope...
freq	1	6131	1	19	19	2818	109	NaN	3207	1793	362	4
mean	NaN	NaN	NaN	NaN	NaN	NaN	NaN	2014.180198	NaN	NaN	NaN	NaN
std	NaN	NaN	NaN	NaN	NaN	NaN	NaN	8.819312	NaN	NaN	NaN	NaN
min	NaN	NaN	NaN	NaN	NaN	NaN	NaN	1925.000000	NaN	NaN	NaN	NaN
25%	NaN	NaN	NaN	NaN	NaN	NaN	NaN	2013.000000	NaN	NaN	NaN	NaN
50%	NaN	NaN	NaN	NaN	NaN	NaN	NaN	2017.000000	NaN	NaN	NaN	NaN
75%	NaN	NaN	NaN	NaN	NaN	NaN	NaN	2019.000000	NaN	NaN	NaN	NaN
max	NaN	NaN	NaN	NaN	NaN	NaN	NaN	2021.000000	NaN	NaN	NaN	NaN

In [1190]:

```
netflix.describe(include='object').T
```

Out[1190]:

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

In [1191]:

```
netflix.isnull().sum()/len(netflix)*100
```

Out[1191]:

```
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 [1192]:

```
netflix.isnull().sum()
```

Out[1192]:

```
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
```

Unnesting of the data, whichever columns are nested

In [1193]:

```
# Checking if the "director" column is nested
netflix[netflix["director"].apply(lambda x: "," in str(x))].head()
```

Out[1193]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
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	PG	91 min	Children & Family Movies	Equestria's divided. But a bright-eyed hero be...
16	s17	Movie	Europe's Most Dangerous Man: Otto Skorzeny in ...	Pedro de Echave García, Pablo Azorín Williams	NaN	NaN	September 22, 2021	2020	TV-MA	67 min	Documentaries, International Movies	Declassified documents reveal the post-WWII li...
23	s24	Movie	Go! Go! Cory Carson: Chrissy Takes the Wheel	Alex Woo, Stanley Moore	Maisie Benson, Paul Killam, Kerry Gudjohnsen, ...	NaN	September 21, 2021	2021	TV-Y	61 min	Children & Family Movies	From arcade games to sled days and hiccup cure...
30	s31	Movie	Ankahi Kahaniya	Ashwiny Iyer Tiwari, Abhishek Chaubey, Saket C...	Abhishek Banerjee, Rinku Rajguru, Delzad Hiwal...	NaN	September 17, 2021	2021	TV-14	111 min	Dramas, Independent Movies, International Movies	As big city life buzzes around them, lonely so...
68	s69	Movie	Schumacher	Hanns-Bruno Kammertöns, Vanessa Nöcker, Michae...	Michael Schumacher	NaN	September 15, 2021	2021	TV-14	113 min	Documentaries, International Movies, Sports Mo...	Through exclusive interviews and archival foot...

In [1194]:

```
# Assigning new variable "new_df" for "netflix"

import copy

new_df = copy.deepcopy(netflix)


new_df['director'] = new_df['director'].apply(lambda x: str(x).split(', '))
new_df = new_df.explode('director')
new_df.head()
```

Out[1194]:

	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 [1195]:

```
new_df[new_df['director'].apply(lambda x: "," in str(x))].head()
```

Out[1195]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description

In [1196]:

```
new_df['cast'] = new_df['cast'].apply(lambda x: str(x).split(', '))
new_df = new_df.explode('cast')
new_df.head()
```

Out[1196]:

	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	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...
1	s2	TV Show	Blood & Water	nan	Khosi Ngema	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...
1	s2	TV Show	Blood & Water	nan	Gail Mabalane	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...
1	s2	TV Show	Blood & Water	nan	Thabang Molaba	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...

In [1197]:

```
new_df[new_df['cast'].apply(lambda x: "," in str(x))].head()
```

Out[1197]:

show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description

In [1198]:

```
new_df['country'] = new_df['country'].apply(lambda x: str(x).split(', '))
new_df = new_df.explode('country')
new_df.head()
```

Out[1198]:

	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	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...
1	s2	TV Show	Blood & Water	nan	Khosi Ngema	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...
1	s2	TV Show	Blood & Water	nan	Gail Mabalane	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...
1	s2	TV Show	Blood & Water	nan	Thabang Molaba	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...

In [1199]:

```
new_df[new_df['country'].apply(lambda x: "," in str(x))].head()
```

Out[1199]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
1192	s1193	Movie	The Present	Farah Nabulsi	Saleh Bakri	United Kingdom,	March 18, 2021	2020	TV-MA	24 min	Dramas, International Movies	Yusuf and his daughter set out to buy his wife...
1192	s1193	Movie	The Present	Farah Nabulsi	Maryam Kanj	United Kingdom,	March 18, 2021	2020	TV-MA	24 min	Dramas, International Movies	Yusuf and his daughter set out to buy his wife...
1192	s1193	Movie	The Present	Farah Nabulsi	Maryam Kamiel Basha	United Kingdom,	March 18, 2021	2020	TV-MA	24 min	Dramas, International Movies	Yusuf and his daughter set out to buy his wife...
1192	s1193	Movie	The Present	Farah Nabulsi	Ameer Khlawe	United Kingdom,	March 18, 2021	2020	TV-MA	24 min	Dramas, International Movies	Yusuf and his daughter set out to buy his wife...
1192	s1193	Movie	The Present	Farah Nabulsi	Ala' Hanani	United Kingdom,	March 18, 2021	2020	TV-MA	24 min	Dramas, International Movies	Yusuf and his daughter set out to buy his wife...

In [1200]:

```
new_df['country'] = new_df['country'].apply(lambda x: str(x).split(','))
new_df = new_df.explode('country')
new_df.head()
```

Out[1200]:

	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	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...
1	s2	TV Show	Blood & Water	nan	Khosi Ngema	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...
1	s2	TV Show	Blood & Water	nan	Gail Mabalane	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...
1	s2	TV Show	Blood & Water	nan	Thabang Molaba	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...

In [1201]:

```
new_df[new_df['country'].apply(lambda x: "," in str(x))].head()
```

Out[1201]:

show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description

In [1202]:

```
new_df['listed_in'] = new_df['listed_in'].apply(lambda x: str(x).split(', '))
new_df = new_df.explode('listed_in')
new_df.head()
```

Out[1202]:

	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	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows	After crossing paths at a party, a Cape Town t...
1	s2	TV Show	Blood & Water	nan	Ama Qamata	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	TV Dramas	After crossing paths at a party, a Cape Town t...
1	s2	TV Show	Blood & Water	nan	Ama Qamata	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	TV Mysteries	After crossing paths at a party, a Cape Town t...
1	s2	TV Show	Blood & Water	nan	Khosi Ngema	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows	After crossing paths at a party, a Cape Town t...

In [1203]:

```
new_df[new_df['listed_in'].apply(lambda x: "," in str(x))].head()
```

Out[1203]:

show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description

In [1204]:

```
new_df.shape
```

Out[1204]:

```
(202065, 12)
```

In [1205]:

```
new_df.isnull().sum()
```

Out[1205]:

```
show_id           0
type              0
title             0
director          0
cast              0
country           0
date_added      158
release_year      0
rating           67
duration          3
listed_in         0
description       0
dtype: int64
```

In [1206]:

```
# Assigning new variable "df2" for "new_df" and replacing the string 'nan' with np.nan
new_df = new_df.replace("nan", np.nan)
new_df.head()
```

Out[1206]:

	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	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows	After crossing paths at a party, a Cape Town t...
1	s2	TV Show	Blood & Water	NaN	Ama Qamata	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	TV Dramas	After crossing paths at a party, a Cape Town t...
1	s2	TV Show	Blood & Water	NaN	Ama Qamata	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	TV Mysteries	After crossing paths at a party, a Cape Town t...
1	s2	TV Show	Blood & Water	NaN	Khosi Ngema	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows	After crossing paths at a party, a Cape Town t...

In [1207]:

```
new_df.isna().sum()
```

Out[1207]:

```
show_id           0
type              0
title             0
director      50643
cast           2149
country       11897
date_added      158
release_year      0
rating           67
duration          3
listed_in         0
description       0
dtype: int64
```

In [1208]:

```
new_df.loc[new_df["duration"].isnull()]
```

Out[1208]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
5541	s5542	Movie	Louis C.K. 2017	Louis C.K.	Louis C.K.	United States	April 4, 2017	2017	74 min	NaN	Movies	Louis C.K. muses on religion, eternal love, gi...
5794	s5795	Movie	Louis C.K.: Hilarious	Louis C.K.	Louis C.K.	United States	September 16, 2016	2010	84 min	NaN	Movies	Emmy-winning comedy writer Louis C.K. brings h...
5813	s5814	Movie	Louis C.K.: Live at the Comedy Store	Louis C.K.	Louis C.K.	United States	August 15, 2016	2015	66 min	NaN	Movies	The comic puts his trademark hilarious/thought...

Fixing the 'duration and rating' columns

In [1216]:

```
# Replacing the 3 NaN values in 'Duration' column with the values present in 'Rating' column.(As seen above)
new_df.loc[new_df['duration'].isnull(), 'duration'] = new_df.loc[new_df['duration'].isnull(), 'rating']

# Replacing those 3 "min" values in "Rating" column with "NR" (Not Rated)
new_df.loc[new_df['rating'].str.contains('min'), 'rating']='NR'

# Replacing all the NaN values in "Rating" column with "NR" (Not Rated)
new_df['rating'].fillna('NR', inplace=True)
```

In [1217]:

```
new_df.isna().sum()
# Column "Rating" and "Duration" is fixed
```

Out[1217]:

```
show_id            0
type               0
title              0
director       50643
cast            2149
country        11897
date_added         0
release_year       0
rating             0
duration           0
listed_in          0
description        0
dtype: int64
```

Fixing the "date_added" column

In [1214]:

```
# Imputing the column "date_added" with - the mode value of 'date added' for all the unique "release_year".
# Suppose for "release_year"=2013, mode "date_added"=April 9,2015, is imputed in missing "date_added" column for 2013

for year in new_df[new_df["date_added"].isnull()]['release_year'].unique():
    fill_value = new_df.loc[new_df["release_year"]==year]['date_added'].mode().values[0]
    new_df.loc[new_df["release_year"]==year,'date_added']=new_df.loc[new_df["release_year"]==year, 'date_added'].fillna(fill_
```

In [1264]:

```
new_df.isna().sum()
```

Out[1264]:

```
show_id            0
type               0
title              0
director       50643
cast            2149
country        11897
date_added         0
release_year       0
rating             0
duration           0
genre              0
description        0
dtype: int64
```

Fixing the'director' column

In [ ]:

```
# Renaming 'listed_in' column as 'genre'
new_df.rename(columns={"listed_in" : "genre"}, inplace=True)
```

In [1430]:

```
# Checking the data with groupby()
ab=new_df.groupby(['genre', 'country'])['director'].apply(lambda x: x.mode().head(1))
ab.reset_index().drop('level_2', axis=1)
```

Out[1430]:

	genre	country	director
0	Action & Adventure	Angola	Chris Roland
1	Action & Adventure	Argentina	Pietro Scappini
2	Action & Adventure	Australia	Simon Wincer
3	Action & Adventure	Bahamas	Martin Campbell
4	Action & Adventure	Belgium	Esteban Crespo
...	...	...	...
1094	Thrillers	United Kingdom	Paul Katis
1095	Thrillers	United States	David Fincher
1096	Thrillers	Venezuela	Sebastián Schindel
1097	Thrillers	Vietnam	Van M. Pham
1098	Thrillers	West Germany	Jacek Koprowicz

1099 rows × 3 columns

In [1445]:

```
# Defining a function to use above code on the data
def fill_value(df,a):
    x = df.groupby(['genre', 'country'])[a].apply(lambda x: x.mode().head(1))
    x.reset_index().drop("level_2", axis= 1)
    return df.merge(x, on=["genre", 'country'], how='left')
```

In [1446]:

```
# Calling the above function on my data and 'director' column
df = new_df
a= 'director'
df_1 = fill_value(df, a)
```

In [1447]:

```
df_1.loc[df_1['director_x'].isnull(), 'director_x']= df_1['director_y']
```

In [1448]:

```
# Renaming columns 'director_x' as 'director' and droping 'director_y'
df_1 = df_1.rename(columns={'director_x': 'director'})
df_1 = df_1.drop('director_y', axis=1)
```

In [1449]:

```
df_1.isnull().sum()
```

Out[1449]:

```
show_id            0
type               0
title              0
director       12678
cast            2149
country        11897
date_added         0
release_year       0
rating             0
duration           0
genre              0
description        0
dtype: int64
```

In [1455]:

```
# Imputing the rest of missing values in "director" with --- the most frequent(mode) director of the associated genre.

for k in df_1[df_1["director"].isnull()]['genre'].unique():

    if k in df_1[~df_1["director"].isnull()]['genre'].unique():

        fill_value = df_1.loc[df_1["genre"] == k]['director'].mode().values[0]

        df_1.loc[df_1["genre"] == k, 'director'] = df_1.loc[df_1["genre"]==k, 'director'].fillna(fill_value)
```

In [1456]:

```
df_1.isnull().sum()
```

Out[1456]:

```
show_id            0
type               0
title              0
director           0
cast            2149
country        11897
date_added         0
release_year       0
rating             0
duration           0
genre              0
description        0
dtype: int64
```

Fixing the 'cast' column

In [1458]:

```
# Defining the same function again and calling it on 'cast' column now.
def fill_value(df,a):
    x = df.groupby(['genre', 'country'])[a].apply(lambda x: x.mode().head(1))
    x.reset_index().drop("level_2", axis= 1)
    return df.merge(x, on=["genre", 'country'], how='left')

df = df_1
a= 'cast'
df_2 = fill_value(df, a)
```

In [1459]:

```
df_2.loc[df_2['cast_x'].isnull(), 'cast_x']= df_2['cast_y']
```

In [1460]:

```
# Renaming columns 'cast' as 'cast' and droping 'cast'
df_2 = df_2.rename(columns={'cast_x': 'cast'})
df_2 = df_2.drop('cast_y', axis=1)
```

In [1461]:

```
df_2.isnull().sum()
```

Out[1461]:

```
show_id            0
type               0
title              0
director           0
cast             394
country        11897
date_added         0
release_year       0
rating             0
duration           0
genre              0
description        0
dtype: int64
```

In [1462]:

```
# Still some NaN values, eplacing the rest missing values with 'Unknown Cast'
df_2["cast"].fillna("Unknown Cast", inplace=True)
```

In [1463]:

```
df_2.isnull().sum()
```

Out[1463]:

```
show_id            0
type               0
title              0
director           0
cast               0
country        11897
date_added         0
release_year       0
rating             0
duration           0
genre              0
description        0
dtype: int64
```

Fixing the "Country" column

In [1464]:

```
# Defining the same function again for 'country' column, this time groupby([['genre', 'director']])
def fill_value(df,a):
    x = df.groupby(['genre', 'director'])[a].apply(lambda x: x.mode().head(1))
    x.reset_index().drop("level_2", axis= 1)
    return df.merge(x, on=["genre", 'director'], how='left')

df = df_2
a= 'country'
df_final = fill_value(df, a)
```

In [1466]:

```
df_final.loc[df_final['country_x'].isnull(), 'country_x']= df_final['country_y']
# Renaming columns 'cast' as 'cast' and droping 'cast'
df_final = df_final.rename(columns={'country_x': 'country'})
df_final = df_final.drop('country_y', axis=1)
```

In [1467]:

```
df_final.isnull().sum()
```

Out[1467]:

```
show_id            0
type               0
title              0
director           0
cast               0
country         5068
date_added         0
release_year       0
rating             0
duration           0
genre              0
description        0
dtype: int64
```

In [1468]:

```
# Imputing the rest of missing values in "country" with --- the most frequent(mode) country of the associated director.

for i in df_final[df_final["country"].isnull()]['director'].unique():

    if i in df_final[~df_final["country"].isnull()]['director'].unique():

        fill_value = df_final.loc[df_final["director"]==i]['country'].mode().values[0]

        df_final.loc[df_final["director"]==i, 'country'] = df_final.loc[df_final["director"]==i, 'country'].fillna(fill_value
```

In [1470]:

```
df_final.isnull().sum()
```

Out[1470]:

```
show_id            0
type               0
title              0
director           0
cast               0
country         4276
date_added         0
release_year       0
rating             0
duration           0
genre              0
description        0
dtype: int64
```

In [1471]:

```
# Imputing the rest of missing values in "country" with --- the most frequent(mode) country of the associated cast.

for i in df_final[df_final["country"].isnull()]['cast'].unique():

    if i in df_final[~df_final["country"].isnull()]['cast'].unique():

        fill_value = df_final.loc[df_final["cast"]==i]['country'].mode().values[0]

        df_final.loc[df_final["cast"]==i, 'country'] = df_final.loc[df_final["cast"]==i, 'country'].fillna(fill_value)
```

In [1473]:

```
# Still missing values in "Country" column, replacing them with "Unknown Country"
df_final["country"].fillna("Unknown Country", inplace=True)
```

In [1475]:

```
df_final.isnull().sum()
```

Out[1475]:

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

EDA on final data which is 'df_final'

In [1537]:

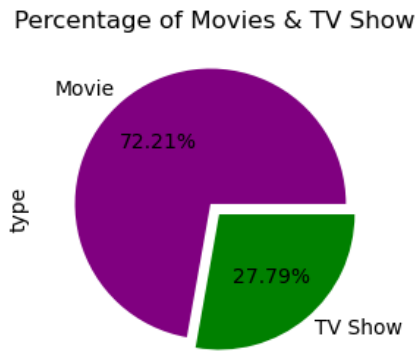
```
df_final['type'].value_counts(normalize=True)*100
```

Out[1537]:

```
Movie      72.212902
TV Show    27.787098
Name: type, dtype: float64
```

In [1795]:

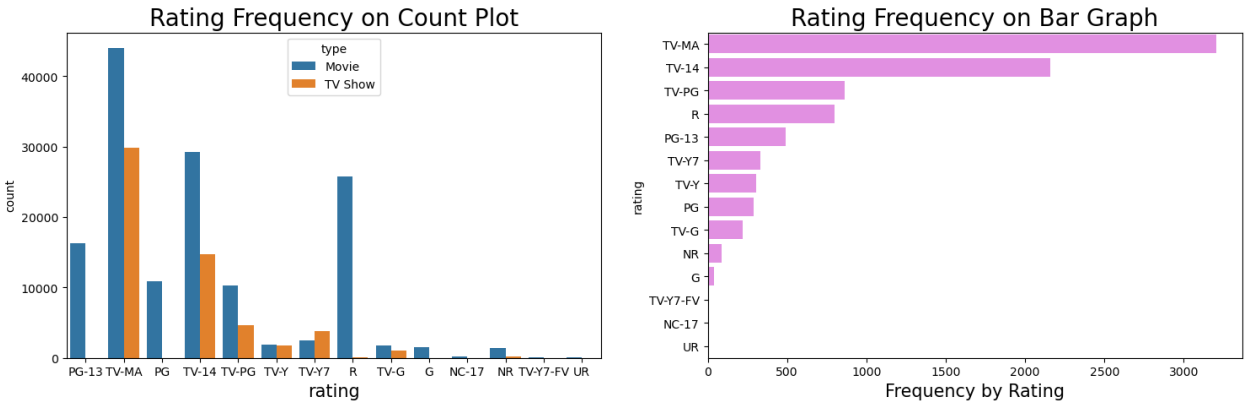
```
plt.figure(figsize=(8,3))
df_final['type'].value_counts().plot(kind='pie',autopct="%.2f%%", explode=(0.05,0.05), colors=['purple', 'green'])
plt.title('Percentage of Movies & TV Show')
plt.show()
```



Overall more than 2-3rd of the contents is movie and less than 1-3rd is tv show

In [1915]:

```
df_rating = df_final.groupby('rating').agg({'title':'nunique'}).reset_index().sort_values(by=['title'], ascending=False)

fig, axes = plt.subplots(1, 2, figsize=(18,5))

sns.countplot(data = df_final, x='rating', hue = 'type', ax=axes[0])
axes[0].set_title('Rating Frequency on Count Plot', fontsize=20)
axes[0].set_xlabel('rating', fontsize=15)

sns.barplot(data = df_rating, x='title', y='rating', orient='h', color='violet', ax=axes[1])
axes[1].set_title('Rating Frequency on Bar Graph', fontsize=20)
axes[1].set_xlabel('Frequency by Rating', fontsize=15)

plt.subplots_adjust(wspace=0.2)
plt.show()
```

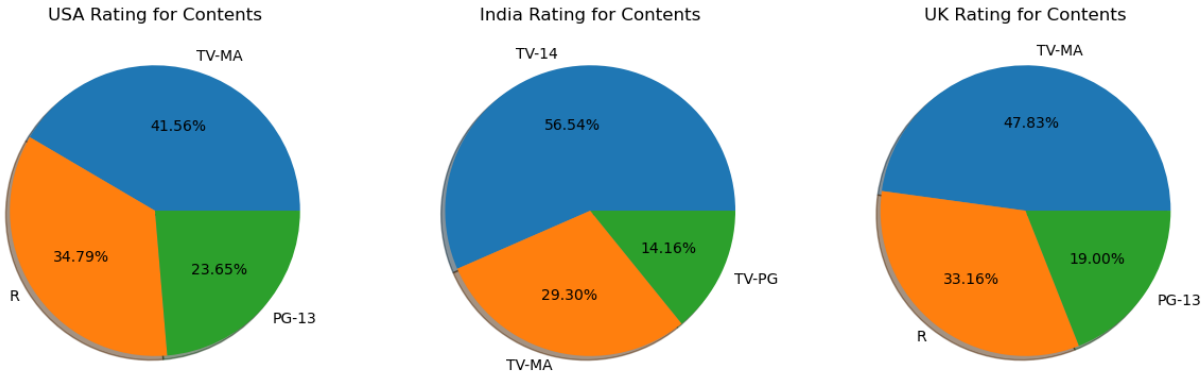


So it is apparent that the popular ratings across Netflix include Mature Audience and those appropriate for over 14 age.

There are almost no TV show having the rating of R

In [1985]:

```
USA = df_final.loc[df_final['country']=='United States']
USA_rating = (USA['rating'].value_counts(normalize =True)*100).head(3)

India = df_final.loc[df_final['country']=='India']
India_rating = (India['rating'].value_counts(normalize =True)*100).head(3)

UK = df_final.loc[df_final['country']=='United Kingdom']
UK_rating = (UK['rating'].value_counts(normalize =True)*100).head(3)

fig, axes = plt.subplots(1, 3, figsize=(15,5))

axes[0].pie(USA_rating, labels=USA_rating.index, autopct='%.2f%%', shadow=True)
axes[0].set_title('USA Rating for Contents')

axes[1].pie(India_rating, labels=India_rating.index, autopct='%.2f%%', shadow=True)
axes[1].set_title('India Rating for Contents')

axes[2].pie(UK_rating, labels=UK_rating.index,  autopct='%.2f%%', shadow=True)
axes[2].set_title('UK Rating for Contents')
plt.show()
```



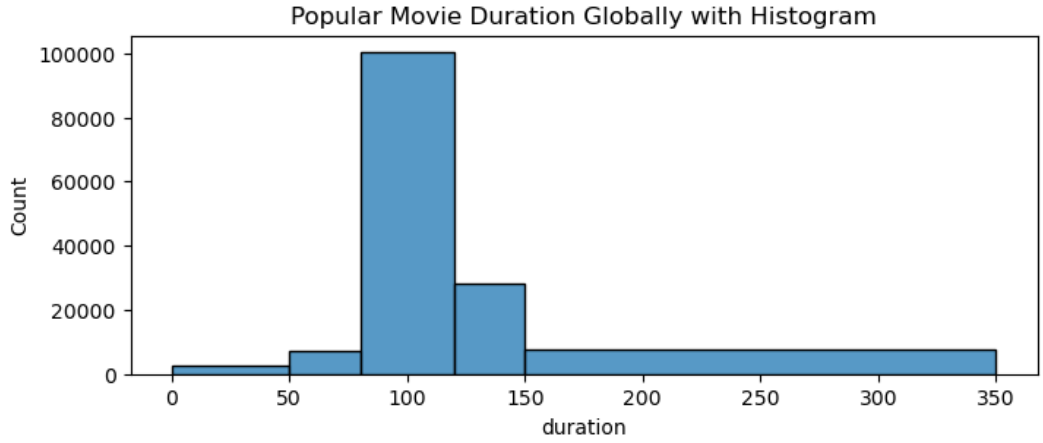
Net sum of MA and R rating is high in USA and Uk whereas there is no significance of R rating in India.

In [ ]:

```
# New variable for all the movies and removing "min from duration" and converting the data type to 'int'

df_movie = df_final.loc[df_final['type']=='Movie'].copy()
df_movie['duration'] = df_movie['duration'].str.replace(" min", "")
df_movie['duration'] = df_movie['duration'].astype('int')
```

In [1952]:

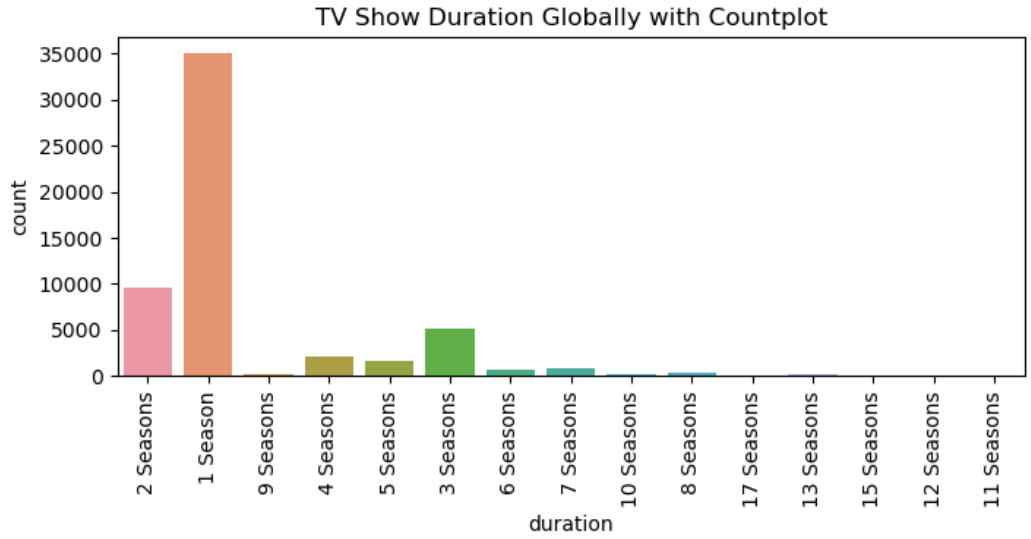
```
plt.figure(figsize=(8,3))
sns.histplot(x = 'duration', data = df_movie, bins = [0, 50, 80, 120, 150, 350])
plt.title('Popular Movie Duration Globally with Histogram')
plt.show()
```



Most of the movies' duration lies in the range of 80-120 followed by 120-150 minutes. It is quite ok to say the 80-150 minutes is the sweet spot we would want for movies

In [1953]:

```
df_TV_show = df_final.loc[df_final['type']=='TV Show'].copy()

plt.figure(figsize=(8,3))
sns.countplot(x = 'duration', data = df_TV_show)
plt.title('TV Show Duration Globally with Countplot')
plt.xticks(rotation=90)
plt.show()
```



TV shows of 1 season only is the most prevalent followed by 2 seasons

In [1745]:

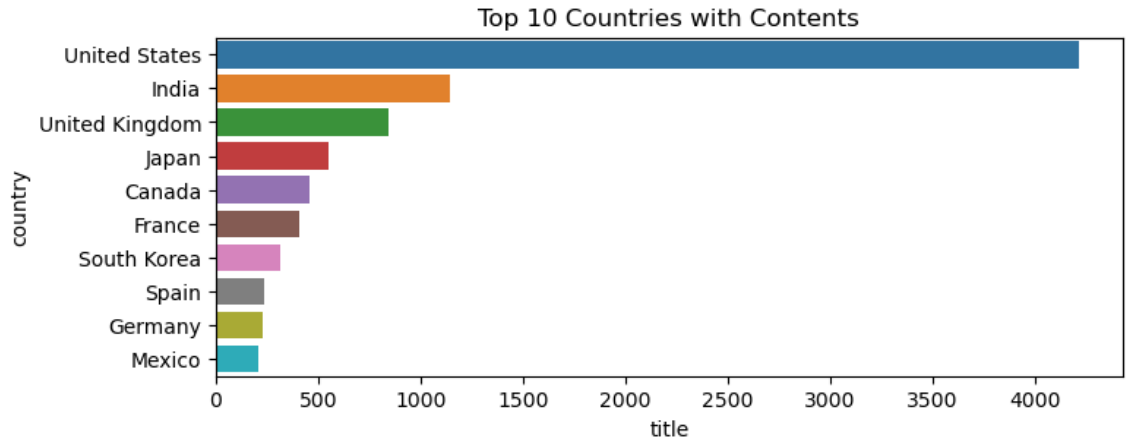
```
# No. of disticnct titles based on 'Country'

df_final.groupby('country').agg({'title':'nunique'}).head()
```

Out[1745]:

country	title
	8
Afghanistan	1
Albania	1
Algeria	3
Angola	2

In [1803]:

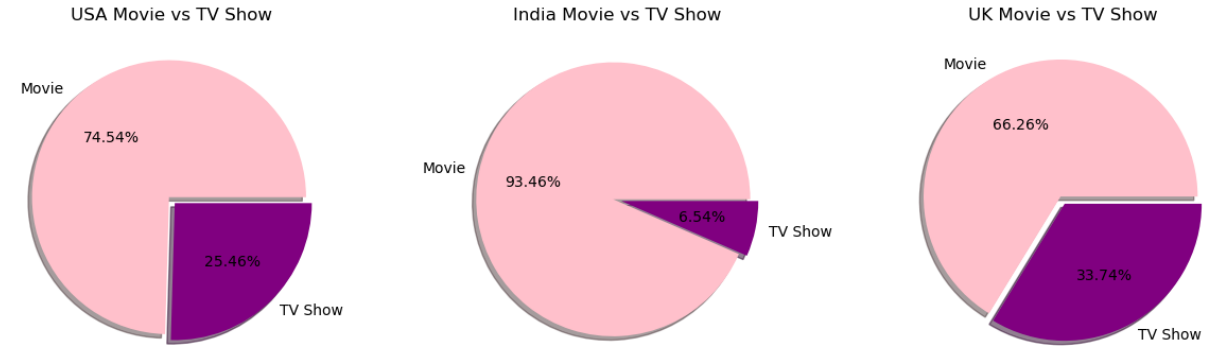
```
df_country = df_final.groupby('country').agg({'title':'nunique'}).reset_index().sort_values(by=['title'],
                                                                                            ascending=False).head(10)
plt.figure(figsize=(8,3))
sns.barplot(data=df_country,
            x='title', y='country', orient='h')
plt.title('Top 10 Countries with Contents')
plt.show()
```



Most of the content added on Netflix are from USA and India, USA is leading with huge margins

In [1917]:

```
US_only = df_final.loc[df_final['country']=='United States']
US_movie_TV = US_only['type'].value_counts(normalize =True)*100

India_only = df_final.loc[df_final['country']=='India']
India_movie_TV = India_only['type'].value_counts(normalize =True)*100

UK_only = df_final.loc[df_final['country']=='United Kingdom']
UK_movie_TV = UK_only['type'].value_counts(normalize =True)*100

label1 = ['Movie', 'TV Show']
color1 = ['pink', 'purple']
fig, axes = plt.subplots(1, 3, figsize=(15,5))

axes[0].pie(US_movie_TV, labels=label1, colors=color1, explode=[0.03,0.03], autopct='%.2f%%', shadow=True)
axes[0].set_title('USA Movie vs TV Show')

axes[1].pie(India_movie_TV, labels=label1, colors=color1, explode=[0.03,0.03], autopct='%.2f%%', shadow=True)
axes[1].set_title('India Movie vs TV Show')

axes[2].pie(UK_movie_TV, labels=label1, colors=color1, explode=[0.03,0.03], autopct='%.2f%%', shadow=True)
axes[2].set_title('UK Movie vs TV Show')

plt.subplots_adjust(wspace=0.3)
plt.show()
```



US is leading across both Movies & TV Shows, UK also provides great content across TV & Movie. Surprisingly India is much more prevalent in Movies as compared to TV Shows.

Moreover the number of Movies created in India outweigh the sum of Movies & TV in the UK as India is rated second highest in net sum of whole content on Netflix

In [1698]:

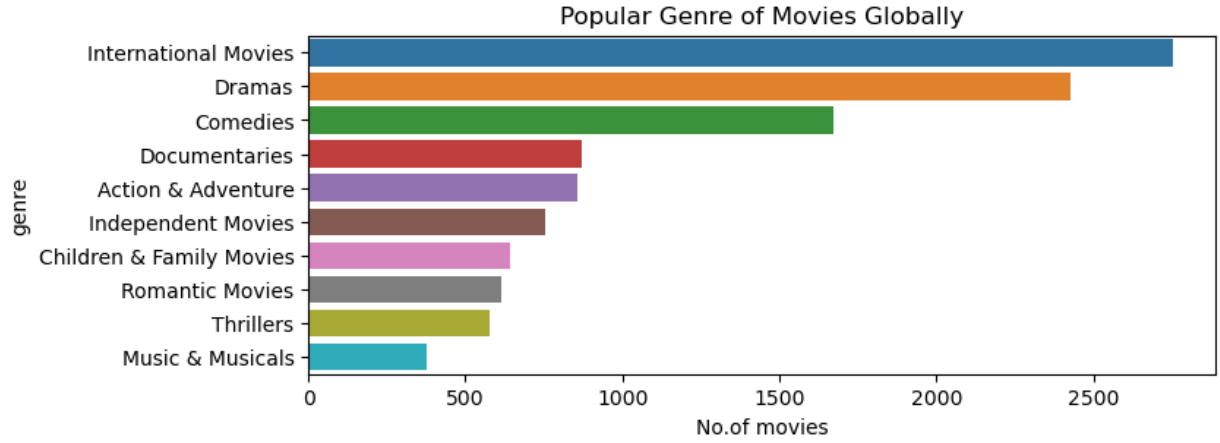
```
# No. of disticnct titles based on 'Genre'

df_final.groupby('genre').agg({'title':'nunique'}).head()
```

Out[1698]:

genre	title
Action & Adventure	859
Anime Features	71
Anime Series	176
British TV Shows	253
Children & Family Movies	641

In [1951]:

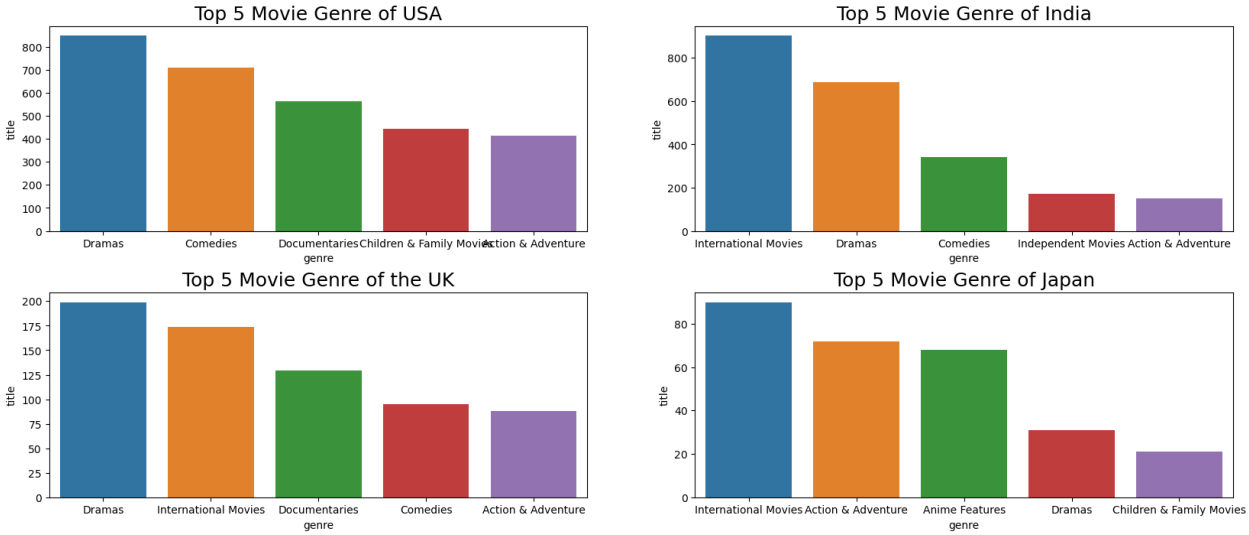
```
movie = df_final.loc[df_final['type']=='Movie']
movie_genre = movie.groupby('genre').agg({'title':'nunique'}).reset_index().sort_values(by=['title'], ascending=False).head(1

plt.figure(figsize=(8,3))
sns.barplot(data=movie_genre, x='title', y='genre', orient='h')
plt.title('Popular Genre of Movies Globally')
plt.xlabel('No.of movies')
plt.show()
```



Top 5 genres for movies are International Movies, Dramas, Comedies, Documentaries and Action & Adventure

In [1930]:

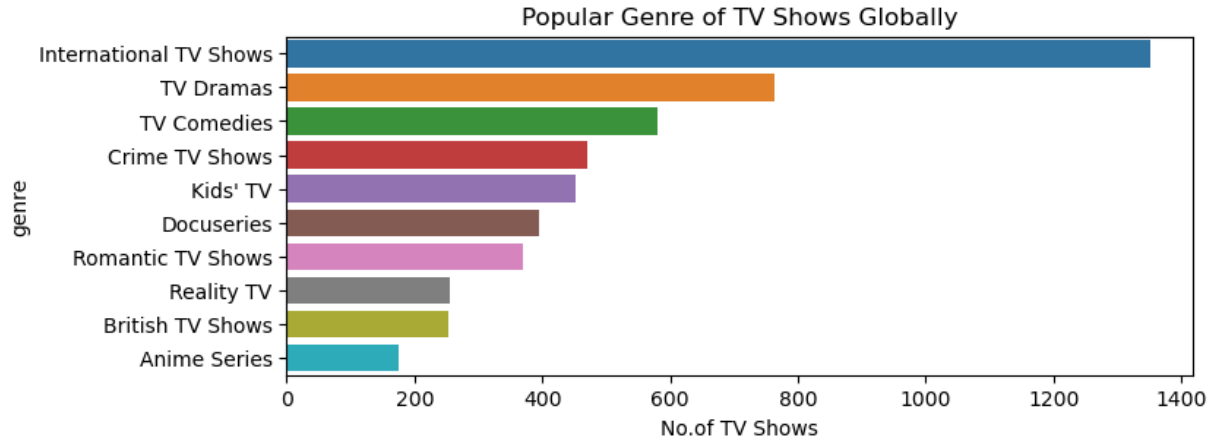
```
USA_mov = movie.loc[movie['country']== 'United States']
IND_mov = movie.loc[movie['country']== 'India']
UK_mov = movie.loc[movie['country']== 'United Kingdom']
JPN_mov = movie.loc[movie['country']== 'Japan']

US_mov_genre =USA_mov.groupby('genre').agg({'title':'nunique'}).reset_index().sort_values(by=['title'],ascending=False).head(
IND_mov_genre=IND_mov.groupby('genre').agg({'title':'nunique'}).reset_index().sort_values(by=['title'],ascending=False).head(
UK_mov_genre = UK_mov.groupby('genre').agg({'title':'nunique'}).reset_index().sort_values(by=['title'],ascending=False).head(
JPN_mov_genre =JPN_mov.groupby('genre').agg({'title':'nunique'}).reset_index().sort_values(by=['title'],ascending=False).head

fig, axes = plt.subplots(2, 2, figsize=(20,8))
sns.barplot(data = US_mov_genre, x='genre', y='title', orient='v', ax=axes[0, 0])
axes[0, 0].set_title('Top 5 Movie Genre of USA', fontsize=18)

sns.barplot(data = IND_mov_genre, x='genre', y='title', orient='v', ax=axes[0, 1])
axes[0, 1].set_title('Top 5 Movie Genre of India', fontsize=18)

sns.barplot(data = UK_mov_genre, x='genre', y='title', orient='v', ax=axes[1, 0])
axes[1, 0].set_title('Top 5 Movie Genre of the UK', fontsize=18)

sns.barplot(data = JPN_mov_genre, x='genre', y='title', orient='v', ax=axes[1, 1])
axes[1, 1].set_title('Top 5 Movie Genre of Japan', fontsize=18)

plt.subplots_adjust(hspace=0.3)
plt.show()
```



Drama, Comedy, Documentary & International Movies seems to be the most popular in all the countries. However, in Japan, Anime Features genre is 3rd most popular

In [1950]:

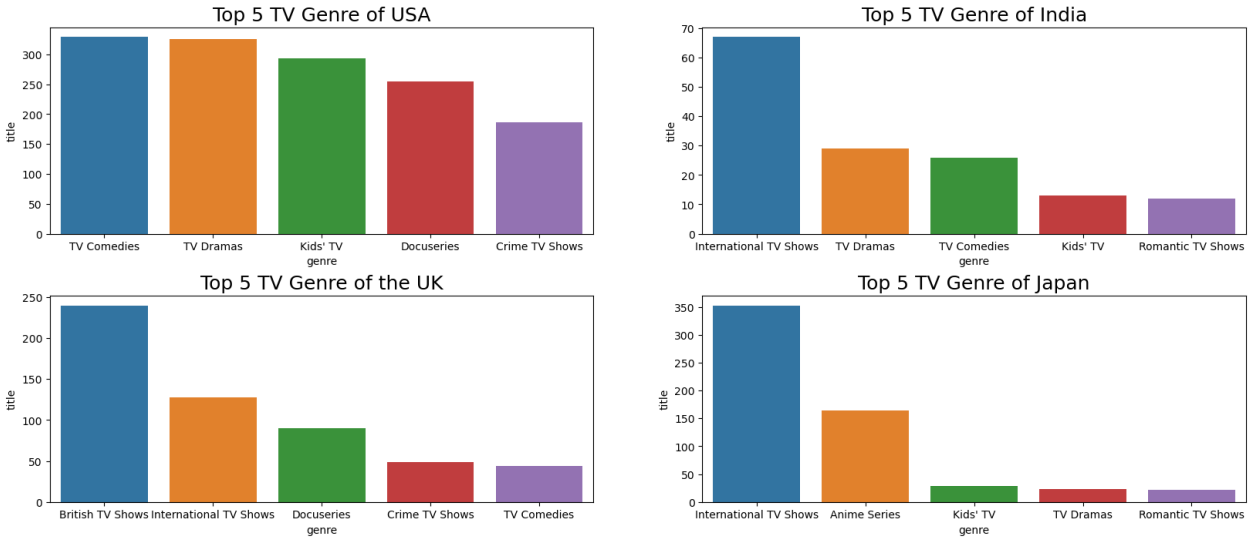
```
TV = df_final.loc[df_final['type']=='TV Show']
TV_genre = TV.groupby('genre').agg({'title':'nunique'}).reset_index().sort_values(by=['title'], ascending=False).head(10)

plt.figure(figsize=(8,3))
sns.barplot(data=TV_genre, x='title', y='genre', orient='h')
plt.title('Popular Genre of TV Shows Globally')
plt.xlabel('No.of TV Shows')
plt.show()
```



Top 5 genres for TV are International TV, Dramas, Comedies, Crime and Kids' TV

In [1932]:

```
USA_TV = TV.loc[TV['country']== 'United States']
IND_TV = TV.loc[TV['country']== 'India']
UK_TV = TV.loc[TV['country']== 'United Kingdom']
JPN_TV = TV.loc[TV['country']== 'Japan']

US_TV_genre =USA_TV.groupby('genre').agg({'title':'nunique'}).reset_index().sort_values(by=['title'],ascending=False).head()
IND_TV_genre=IND_TV.groupby('genre').agg({'title':'nunique'}).reset_index().sort_values(by=['title'],ascending=False).head()
UK_TV_genre = UK_TV.groupby('genre').agg({'title':'nunique'}).reset_index().sort_values(by=['title'],ascending=False).head()
JPN_TV_genre =JPN_TV.groupby('genre').agg({'title':'nunique'}).reset_index().sort_values(by=['title'],ascending=False).head()

fig, axes = plt.subplots(2, 2, figsize=(20,8))
sns.barplot(data = US_TV_genre, x='genre', y='title', orient='v', ax=axes[0, 0])
axes[0, 0].set_title('Top 5 TV Genre of USA', fontsize=18)

sns.barplot(data = IND_TV_genre, x='genre', y='title', orient='v', ax=axes[0, 1])
axes[0, 1].set_title('Top 5 TV Genre of India', fontsize=18)

sns.barplot(data = UK_TV_genre, x='genre', y='title', orient='v', ax=axes[1, 0])
axes[1, 0].set_title('Top 5 TV Genre of the UK', fontsize=18)

sns.barplot(data = JPN_TV_genre, x='genre', y='title', orient='v', ax=axes[1, 1])
axes[1, 1].set_title('Top 5 TV Genre of Japan', fontsize=18)

plt.subplots_adjust(hspace=0.3)
plt.show()
```



Same as movie, TV Shows are also popular across International, Drama, and Comedy. Anime genre in Japan is the 2nd most popular for TV shows

In [1696]:

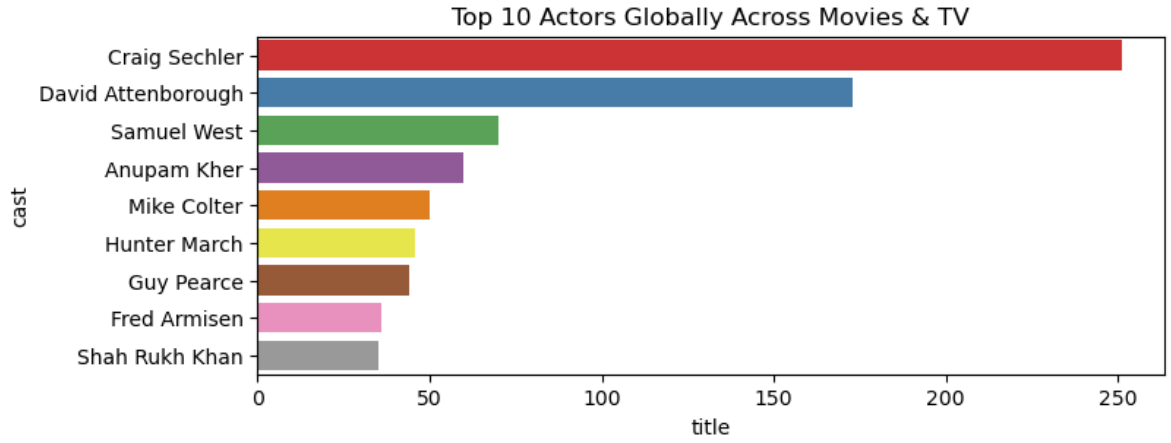
```
# No. of disticnct titles based on 'cast'

df_final.groupby('cast').agg({'title':'nunique'}).head()
```

Out[1696]:

cast	title
Jr.	2
"Riley" Lakdhar Dridi	1
'Najite Dede	2
2 Chainz	1
2Mex	1

In [1954]:

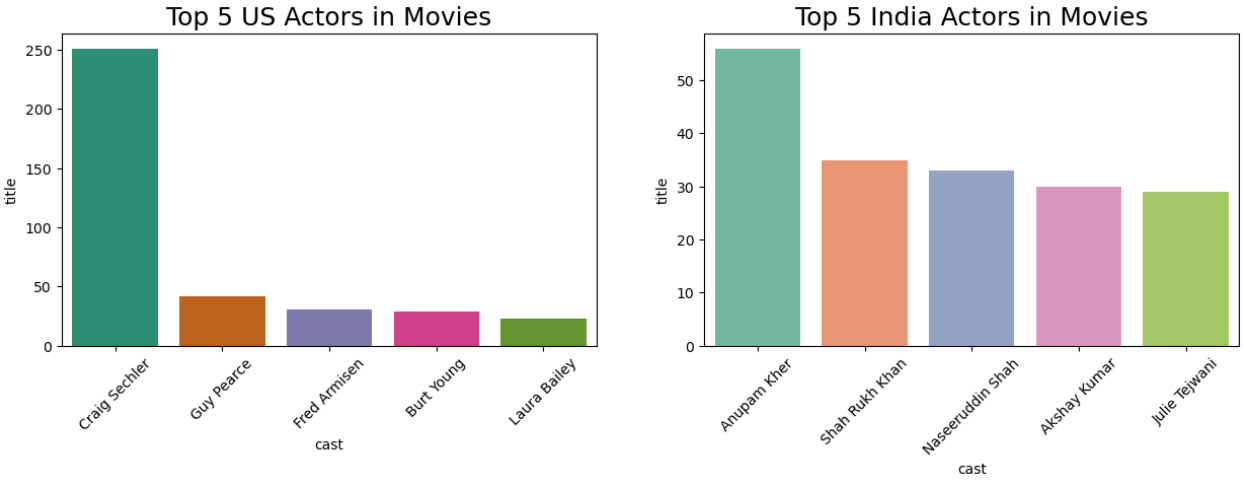
```
df_Actor = df_final.groupby('cast').agg({'title':'nunique'}).reset_index().sort_values(by=['title'], ascending=False).head(10
df_Actor = df_Actor[df_Actor['cast']!= 'Unknown Cast']

plt.figure(figsize=(8,3))
sns.barplot(data=df_Actor, x='title', y='cast', orient='h', palette='Set1')
plt.title('Top 10 Actors Globally Across Movies & TV')
plt.show()
```



Craig Sechler, David Atttenborough & Samuel West are the most popular actors for the contents on Netflix

In [1946]:

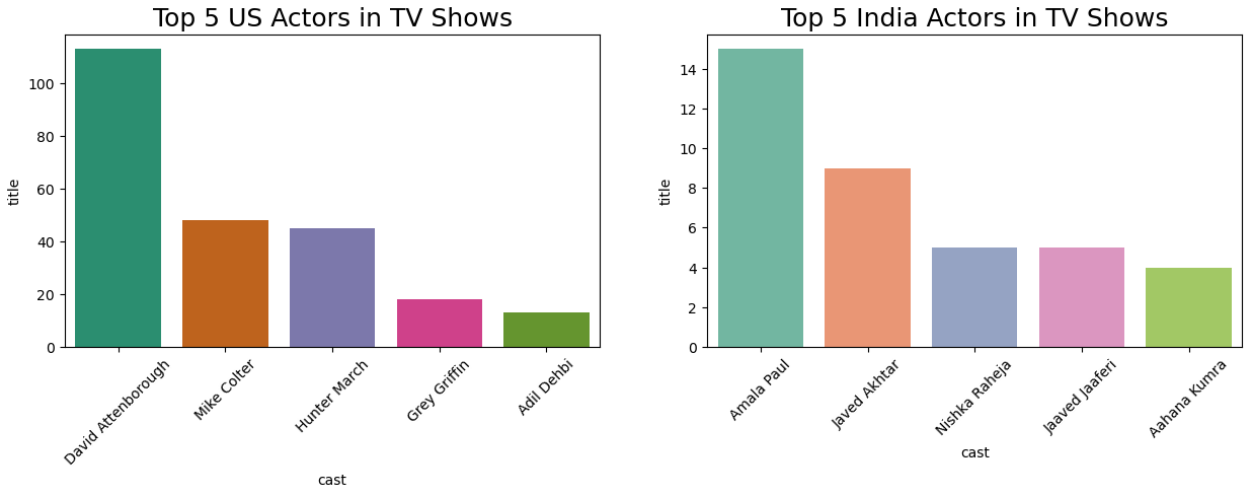
```
df_Cast = df_final.groupby(['cast', 'country', 'type']).agg({'title':'nunique'}).reset_index().sort_values(by=['title'],ascen
df_Cast = df_Cast[df_Cast['cast']!= 'Unknown Cast']

Mov_cast_US = df_Cast.loc[(df_Cast['country']== 'United States') & (df_Cast['type']== 'Movie')].head()
Mov_cast_IND = df_Cast.loc[(df_Cast['country']== 'India') & (df_Cast['type']== 'Movie')].head()

fig, axes = plt.subplots(1, 2, figsize=(15,4))
sns.barplot(data=Mov_cast_US, x='cast', y='title', ax=axes[0], palette='Dark2')
sns.barplot(data=Mov_cast_IND, x='cast', y='title', ax=axes[1], palette='Set2')

axes[0].set_title('Top 5 US Actors in Movies', fontsize=18)
axes[1].set_title('Top 5 India Actors in Movies', fontsize=18)
axes[0].set_xticklabels(axes[0].get_xticklabels(), rotation=45)
axes[1].set_xticklabels(axes[1].get_xticklabels(), rotation=45)
plt.show()
```



Craig Sechler and 'Anupam Kher, Shah Rukh Khan' are the most popular movie actors for the top 2 countries USA & India respectively

In [1947]:

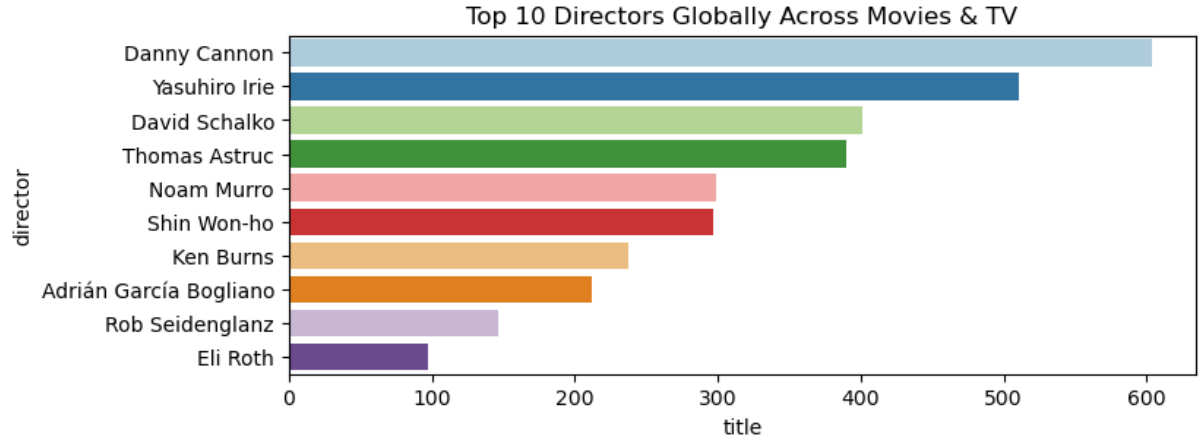
```
df_Cast = df_final.groupby(['cast', 'country', 'type']).agg({'title':'nunique'}).reset_index().sort_values(by=['title'],ascen
df_Cast = df_Cast[df_Cast['cast']!= 'Unknown Cast']

TV_cast_US = df_Cast.loc[(df_Cast['country']== 'United States') & (df_Cast['type']== 'TV Show')].head()
TV_cast_IND = df_Cast.loc[(df_Cast['country']== 'India') & (df_Cast['type']== 'TV Show')].head()

fig, axes = plt.subplots(1, 2, figsize=(15,4))
sns.barplot(data = TV_cast_US, x='cast', y='title', ax=axes[0], palette='Dark2')
sns.barplot(data = TV_cast_IND, x='cast', y='title', ax=axes[1], palette='Set2')

axes[0].set_title('Top 5 US Actors in TV Shows', fontsize=18)
axes[1].set_title('Top 5 India Actors in TV Shows', fontsize=18)
axes[0].set_xticklabels(axes[0].get_xticklabels(), rotation=45)
axes[1].set_xticklabels(axes[1].get_xticklabels(), rotation=45)
plt.show()
```



David Attenborough, Mike Colter in USA and Amala Paul, Javed Akhtar in India are the most popular TV actors

In [1956]:

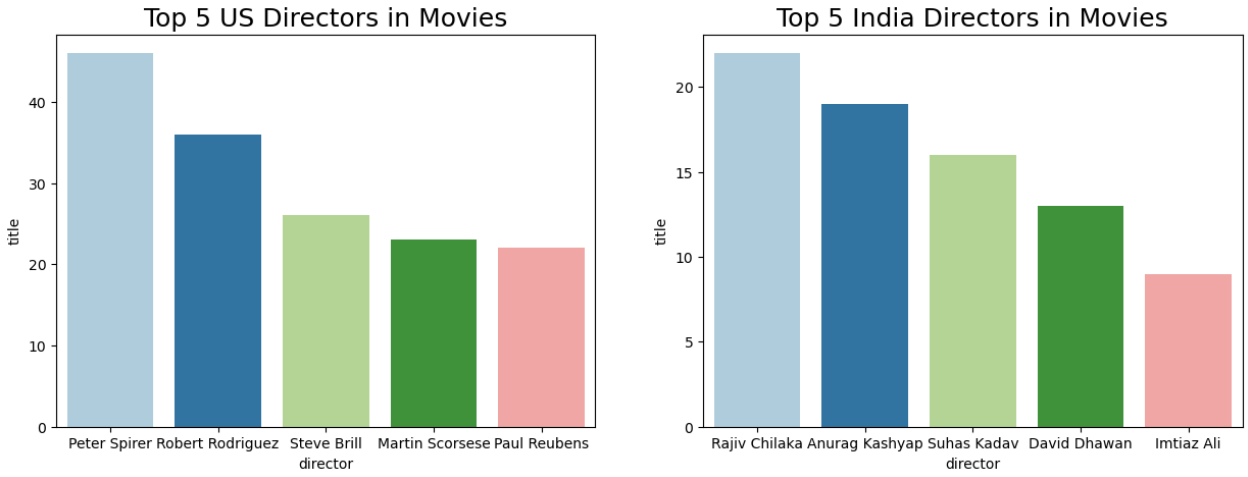
```
df_director = df_final.groupby('director').agg({'title':'nunique'}).reset_index().sort_values(by=['title'],
                                                                                              ascending=False).head(10)

plt.figure(figsize=(8,3))
sns.barplot(data=df_director,
            x='title',
            y='director', orient='h', palette = 'Paired')
plt.title('Top 10 Directors Globally Across Movies & TV')
plt.show()
```



Danny Cannon, Yasuhiro Irie, David Schalko & Thomas Astruc are the top 4 popular directors for the contents on Netflix

In [1957]:

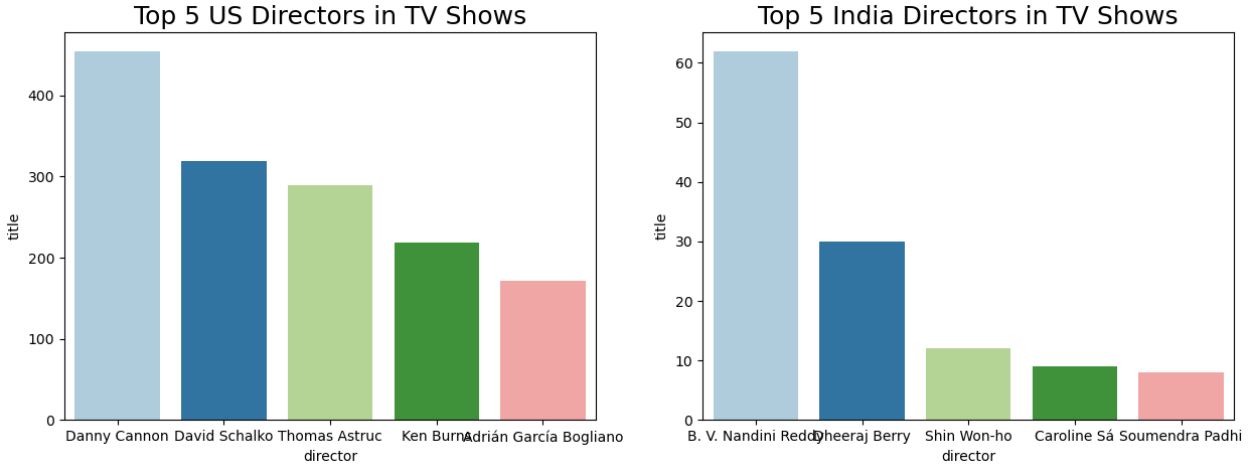
```
df_Dir=df_final.groupby(['director','country','type']).agg({'title':'nunique'}).reset_index().sort_values(by=['title'],ascend

Mov_Dir_US = df_Dir.loc[(df_Dir['country']== 'United States') & (df_Dir['type']== 'Movie')].head()
Mov_Dir_IND = df_Dir.loc[(df_Dir['country']== 'India') & (df_Dir['type']== 'Movie')].head()

fig, axes = plt.subplots(1, 2, figsize=(15,5))
sns.barplot(data=Mov_Dir_US, x='director', y='title', ax=axes[0], palette='Paired')
sns.barplot(data=Mov_Dir_IND, x='director', y='title', ax=axes[1], palette='Paired')

axes[0].set_title('Top 5 US Directors in Movies', fontsize=18)
axes[1].set_title('Top 5 India Directors in Movies', fontsize=18)
plt.show()
```



Peter Spiree, Robert Rodriguez in USA and Rajiv Chilaka, Anurag Kashyam are the 2 most popular movie directors on Netflix

In [1959]:

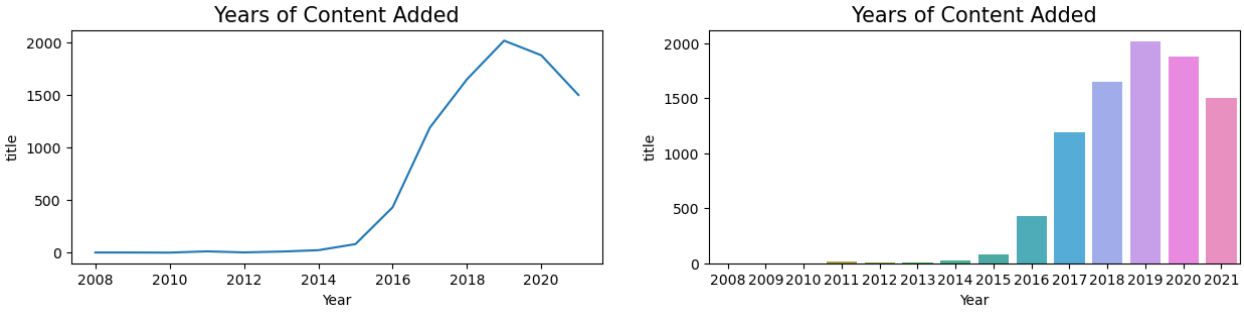
```
df_Dir=df_final.groupby(['director','country','type']).agg({'title':'nunique'}).reset_index().sort_values(by=['title'],ascend

TV_Dir_US = df_Dir.loc[(df_Dir['country']== 'United States') & (df_Dir['type']== 'TV Show')].head()
TV_Dir_IND = df_Dir.loc[(df_Dir['country']== 'India') & (df_Dir['type']== 'TV Show')].head()

fig, axes = plt.subplots(1, 2, figsize=(15,5))
sns.barplot(data=TV_Dir_US, x='director', y='title', ax=axes[0], palette='Paired')
sns.barplot(data=TV_Dir_IND, x='director', y='title', ax=axes[1], palette='Paired')

axes[0].set_title('Top 5 US Directors in TV Shows', fontsize=18)
axes[1].set_title('Top 5 India Directors in TV Shows', fontsize=18)
plt.show()
```



Danny Cannon, David Schalko in USA and B. V. Nandini Reddy, Dheeraj Berry are the 2 most popular TV shows directors on Netflix

In [1961]:

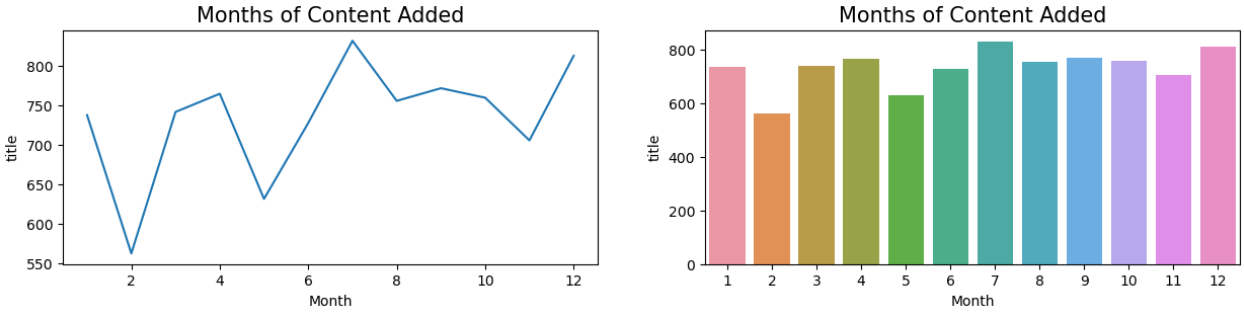
```
df_final["date_added"] = pd.to_datetime(df_final["date_added"])
df_final["Year"] = df_final["date_added"].dt.year
df_final["Month"] = df_final["date_added"].dt.month


# No. of disticnct titles based on year and month

df_year = df_final.groupby('Year').agg({'title':'nunique'}).reset_index().sort_values(by=['title'], ascending=False)

fig, axes = plt.subplots(1, 2, figsize=(15,3))
sns.lineplot(data = df_year, x= 'Year', y= 'title', ax=axes[0])
sns.barplot(data = df_year, x= 'Year', y= 'title', ax=axes[1])
axes[0].set_title('Years of Content Added', fontsize=15)
axes[1].set_title('Years of Content Added', fontsize=15)
plt.show()
```



Most of the contents were added on th eplatform in 2019 followed by 2020, 2018, 2021 and 2017

In [1912]:

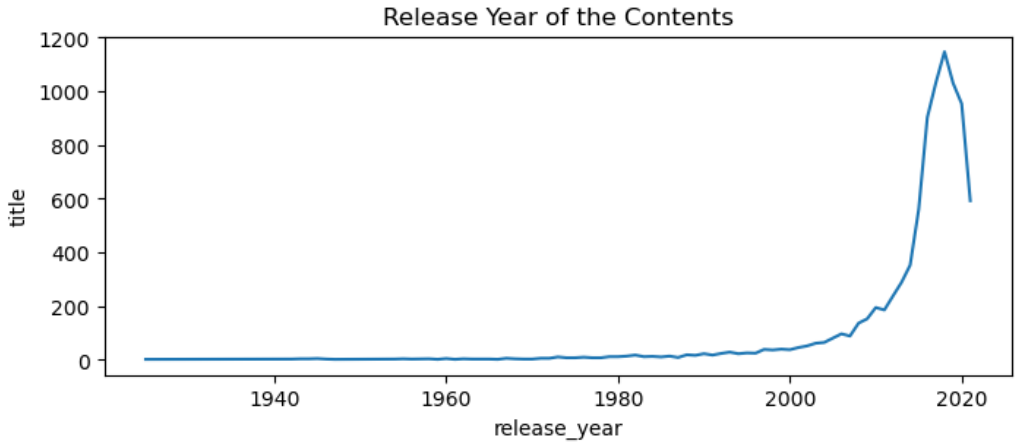
```
df_month = df_final.groupby('Month').agg({'title':'nunique'}).reset_index().sort_values(by=['title'], ascending=False)

fig, axes = plt.subplots(1, 2, figsize=(15,3))
sns.lineplot(data = df_month, x= 'Month', y= 'title', ax=axes[0])
sns.barplot(data = df_month, x= 'Month', y= 'title', ax=axes[1])
axes[0].set_title('Months of Content Added', fontsize=15)
axes[1].set_title('Months of Content Added', fontsize=15)
plt.show()
```



Most of the content were added on Netflix in the month of January, July and December

In [1911]:

```
df_year = df_final.groupby('release_year').agg({'title':'nunique'}).reset_index().sort_values(by=['title'], ascending=False)

plt.figure(figsize=(8,3))
sns.lineplot(data = df_year, x= 'release_year', y= 'title')
plt.title('Release Year of the Contents')
plt.show()
```



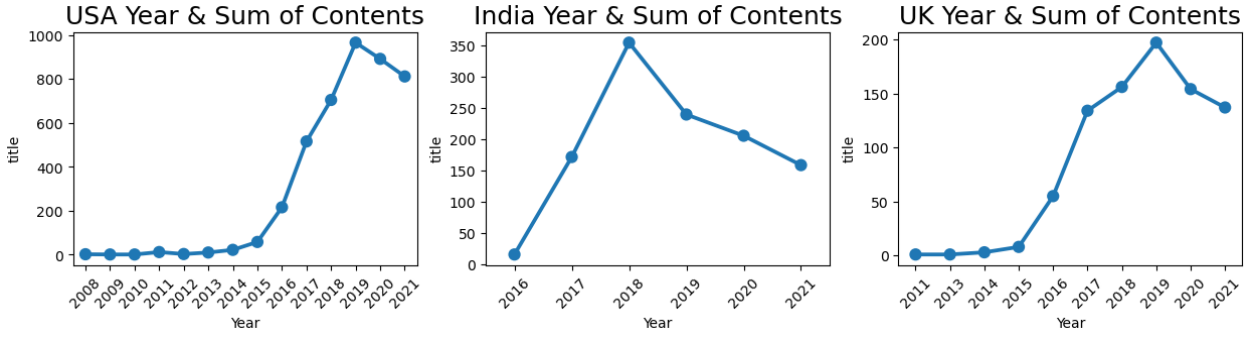
Net content realease which are later uploaded on Netflix has increased since 2000 till 2020 and then reduced most probably because of COVID-19

Release of both Movies and TV Shows have taken hit after 2020

👇Showing the number of movies released based on each year

In [2007]:

```
USA_contents = USA.groupby('Year').agg({'title':'nunique'}).reset_index()
India_contents = India.groupby('Year').agg({'title':'nunique'}).reset_index()
UK_contents = UK.groupby('Year').agg({'title':'nunique'}).reset_index()

fig, axes = plt.subplots(1, 3, figsize=(15,3))
sns.pointplot(data=USA_contents, x='Year', y='title', ax=axes[0])
sns.pointplot(data=India_contents, x='Year', y='title', ax=axes[1])
sns.pointplot(data=UK_contents, x='Year', y='title', ax=axes[2])

axes[0].set_xticklabels(axes[0].get_xticklabels(), rotation=45)
axes[1].set_xticklabels(axes[1].get_xticklabels(), rotation=45)
axes[2].set_xticklabels(axes[2].get_xticklabels(), rotation=45)

axes[0].set_title('USA Year & Sum of Contents', fontsize=18)
axes[1].set_title('India Year & Sum of Contents', fontsize=18)
axes[2].set_title('UK Year & Sum of Contents', fontsize=18)
plt.show()
```



Insights:

Undoubtedly the USA and India are the 2 countries which bring the most contents on Netflix with USA being the market leader. United Kingdom and Japan are on 3rd and 4th rank in providing contents on Netflix.

Net sum of TV shows in India is very low(6.5%) as compared to the top countries USA(25.5%) and UK(33.7%)while overall part of the TV Shows is 27.8%

Duration

Around 100 minutes for Movies and 1 season for TV Shows are the most common duration across the globe.

Rating

Rating of TV-MA(Mature Audience) and TV-14 is most popular among both types and all the countries.

Genre

The USA and the UK are producing Drama genre the most, India is most ahead in International Movie with Drama on the second most. Japan has International Movie on top and on the second highest is Action & Adventure with Anime on the 3rd.

When it comes to TV Shows, Comedy, Drama and International TV are the winners of all which has bee inferred from the top 4 countries.

Actors & Directors

From the exploration of data, it is visible that there are a few Actors and Director who are there in most of the contents for all the countries such as 'Craig Sechler' in USA and 'Anupam Kher' in India are the most common Actors for Movies with huge margin. Same is the case for other countries and for TV Shows as well. It is also the case for Directors of Movies and TV Shows at least for the top 4 countries that have been visualized.

Release Year & Date Added

It is plausible to say that the contents are mostly released in the recent years with the peak in graph from 2015 with 2019 being the highest for 'release' and 'date_added' both. However, after 2020, there is a sharp decline due to COVID-19.

Recommendation:

1) Contents aligning with the most popular genres across countries and for both Movie & Tv Shows are recommended, i.e. Drama, Comedy & International.

2) TV Shows should be added in the month of July/August and movies during the last/first month of the year.

3) 80-120 minutes is recommended length of movie for almost all the countries especially in the USA where kids TV show is also popular along with the genres in first places, hence recommended.

4) The target audience in USA and India is recommended to be 14+ and above rating while for the UK it is suggested to be completely Mature/R rating

5) Advisable to add more movies for Indian audience since there is a decline after 2018.

6) Anime genre for Japan and romantic TV show for South Korea is recommended.

7) While creating content, the popular director/actor combination and individually of a particular country should be considered.

In [ ]:

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