In [ ]:

In [16]:
```
#importing libraries for our purpose
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
df=pd.read_csv('netflix.csv')
df.head()
```

Out[16]:

	show_id	type	title	director	cast	country	date_added	release_year	ratir
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	September 25, 2021	2020	P(
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	2021	T M
2	s3	TV Show	Ganglands	Julien Leclercq	Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...	NaN	September 24, 2021	2021	T M
3	s4	TV Show	Jailbirds New Orleans	NaN	NaN	NaN	September 24, 2021	2021	T M
4	s5	TV Show	Kota Factory	NaN	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	September 24, 2021	2021	T M

In [17]:
```
#length of data
len(df)
```

Out[17]: 8807

In [6]:
```
#checking datatypes
df.dtypes
```

Out[6]:
```
show_id         object
type            object
title           object
director        object
cast            object
country         object
date_added      object
release_year     int64
rating          object
duration        object
listed_in       object
description     object
dtype: object
```

In [7]:
```
#number of unique values in our data
for i in df.columns:
  print(i,':',df[i].nunique())
```

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

In [8]:
```
#checking null values in every column of our data
df.isnull().sum()
```

Out[8]:
```
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 [9]:
```
#checking the occurences of each of the ratings
df['rating'].value_counts()
```

Out[9]:
```
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
TV-Y7-FV       6
NC-17          3
UR             3
66 min         1
74 min         1
84 min         1
Name: rating, dtype: int64
```

In [10]:
```
#unnesting the directors column, i.e- creating separate lines for e
constraint1=df['director'].apply(lambda x: str(x).split(', ')).toli
df_new1=pd.DataFrame(constraint1,index=df['title'])
df_new1=df_new1.stack()
df_new1=pd.DataFrame(df_new1.reset_index())
df_new1.rename(columns={0:'Directors'},inplace=True)
df_new1.drop(['level_1'],axis=1,inplace=True)
df_new1.head()
```

Out[10]:

	title	Directors
0	Dick Johnson Is Dead	Kirsten Johnson
1	Blood & Water	nan
2	Ganglands	Julien Leclercq
3	Jailbirds New Orleans	nan
4	Kota Factory	nan

In [11]:
```
#unnesting the cast column, i.e- creating separate lines for each c
constraint2=df['cast'].apply(lambda x: str(x).split(', ')).tolist()
df_new2=pd.DataFrame(constraint2,index=df['title'])
df_new2=df_new2.stack()
df_new2=pd.DataFrame(df_new2.reset_index())
df_new2.rename(columns={0:'Actors'},inplace=True)
df_new2.drop(['level_1'],axis=1,inplace=True)
df_new2.head()
```

Out[11]:

	title	Actors
0	Dick Johnson Is Dead	nan
1	Blood & Water	Ama Qamata
2	Blood & Water	Khosi Ngema
3	Blood & Water	Gail Mabalane
4	Blood & Water	Thabang Molaba

In [12]:
```
#unnesting the listed_in column, i.e- creating separate lines for e
constraint3=df['listed_in'].apply(lambda x: str(x).split(', ')).tol
df_new3=pd.DataFrame(constraint3,index=df['title'])
df_new3=df_new3.stack()
df_new3=pd.DataFrame(df_new3.reset_index())
df_new3.rename(columns={0:'Genre'},inplace=True)
df_new3.drop(['level_1'],axis=1,inplace=True)
df_new3.head()
```

Out[12]:

	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

In [13]:
```
#unnesting the country column, i.e- creating separate lines for eac
constraint4=df['country'].apply(lambda x: str(x).split(', ')).tolis
df_new4=pd.DataFrame(constraint4,index=df['title'])
df_new4=df_new4.stack()
df_new4=pd.DataFrame(df_new4.reset_index())
df_new4.rename(columns={0:'country'},inplace=True)
df_new4.drop(['level_1'],axis=1,inplace=True)
df_new4.head()
```

Out[13]:

	title	country
0	Dick Johnson Is Dead	United States
1	Blood & Water	South Africa
2	Ganglands	nan
3	Jailbirds New Orleans	nan
4	Kota Factory	India

In [14]:
```
#merging the unnested director data with unnested actors data
dfx
```

```
---------------------------------------------------------------------
---------
NameError                                 Traceback (most recent c
all last)
<ipython-input-14-adcc85c528a1> in <module>
      1 #merging the unnested director data with unnested actors d
ata
----> 2 dfx

NameError: name 'dfx' is not defined
```

In [ ]:
```
#merging our unnested data with the original data
df_final=df_new.merge(df[['show_id', 'type', 'title', 'date_added',
       'release_year', 'rating', 'duration']],on=['title'],how='lef
df_final.head()
```

Out[15]:

	title	Actors	Directors	Genre	country	show_id	type	date_added	relea
0	Dick Johnson Is Dead	Unknown Actor	Kirsten Johnson	Documentaries	United States	s1	Movie	September 25, 2021	
1	Blood & Water	Ama Qamata	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	
2	Blood & Water	Ama Qamata	Unknown Director	TV Dramas	South Africa	s2	TV Show	September 24, 2021	
3	Blood & Water	Ama Qamata	Unknown Director	TV Mysteries	South Africa	s2	TV Show	September 24, 2021	
4	Blood & Water	Khosi Ngema	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	

In [ ]:
```
#now checking nulls
df_final.isnull().sum()
```

Out[16]:
```
title              0
Actors             0
Directors          0
Genre              0
country        11897
show_id            0
type               0
date_added       158
release_year       0
rating            67
duration           3
dtype: int64
```

In duration column, it was observed that the nulls had values which were written in corresponding ratings column, i.e- you can't expect ratings to be in min. So the duration column nulls are replaced by corresponding values in ratings column

In [ ]:
```
df_final.loc[df_final['duration'].isnull(),'duration']=df_final.loc
df_final.loc[df_final['rating'].str.contains('min', na=False),'rati
df_final.isnull().sum()
```

Out[17]:
```
title              0
Actors             0
Directors          0
Genre              0
country        11897
show_id            0
type               0
date_added       158
release_year       0
rating            67
duration           0
dtype: int64
```

In [ ]:
```
#Ratings can't be in min, so it has been made NR(i.e- Non Rated)
df_final.loc[df_final['rating'].str.contains('min', na=False),'rati
df_final['rating'].fillna('NR',inplace=True)
pd.set_option('display.max_rows',None)
```

In [ ]:
```
#just an attempt to observe nulls in date_added column
df_final[df_final['date_added'].isnull()].head()
```

Out[19]:

	title	Actors	Directors	Genre	country	show_id	type	date_added	re
136893	A Young Doctor's Notebook and Other Stories	Daniel Radcliffe	Unknown Director	British TV Shows	United Kingdom	s6067	TV Show	NaN	
136894	A Young Doctor's Notebook and Other Stories	Daniel Radcliffe	Unknown Director	TV Comedies	United Kingdom	s6067	TV Show	NaN	
136895	A Young Doctor's Notebook and Other Stories	Daniel Radcliffe	Unknown Director	TV Dramas	United Kingdom	s6067	TV Show	NaN	
136896	A Young Doctor's Notebook and Other Stories	Jon Hamm	Unknown Director	British TV Shows	United Kingdom	s6067	TV Show	NaN	
136897	A Young Doctor's Notebook and Other Stories	Jon Hamm	Unknown Director	TV Comedies	United Kingdom	s6067	TV Show	NaN	

In [ ]:
```
e added column is imputed on the basis of release year,i.e- suppose
n release year was 2013.So below piece of code just checks the mode
d imputes in place of nulls the corresponding mode

i in df_final[df_final['date_added'].isnull()]['release_year'].uniqu
p=df_final[df_final['release_year']==i]['date_added'].mode().values
_final.loc[df_final['release_year']==i,'date_added']=df_final.loc[d
```

In [ ]:

```
#country column is imputed on the basis of director,i.e- suppose th
#when we have a director whose other movies have a country given.So
#country for the director
# and imputes in place of nulls the corresponding mode

for i in df_final[df_final['country'].isnull()]['Directors'].unique
  if i in df_final[~df_final['country'].isnull()]['Directors'].uniq
    imp=df_final[df_final['Directors']==i]['country'].mode().values
    df_final.loc[df_final['Directors']==i,'country']=df_final.loc[d
```

So we imputed the country column on the basis of directors whose other movie titles had countries given. But there might be directors who have only one occurence in our data. In that scenario, I have used Actors as a basis. i.e- for this Actor majorly acts in movies of which country? Imputation has been done on this basis. For remaining rows, country has been filled as Unknown Country

In [ ]:

```
for i in df_final[df_final['country'].isnull()]['Actors'].unique():
  if i in df_final[~df_final['country'].isnull()]['Actors'].unique(
    imp=df_final[df_final['Actors']==i]['country'].mode().values[0]
    df_final.loc[df_final['Actors']==i,'country']=df_final.loc[df_f
#If there are still nulls, I just replace it by Unknown Country
df_final['country'].fillna('Unknown Country',inplace=True)
df_final.isnull().sum()
```

Out[22]:

```
title           0
Actors          0
Directors       0
Genre           0
country         0
show_id         0
type            0
date_added      0
release_year    0
rating          0
duration        0
dtype: int64
```

In [ ]:
```
df_final.head()
```

Out[23]:

	title	Actors	Directors	Genre	country	show_id	type	date_added	relea
0	Dick Johnson Is Dead	Unknown Actor	Kirsten Johnson	Documentaries	United States	s1	Movie	September 25, 2021	
1	Blood & Water	Ama Qamata	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	
2	Blood & Water	Ama Qamata	Unknown Director	TV Dramas	South Africa	s2	TV Show	September 24, 2021	
3	Blood & Water	Ama Qamata	Unknown Director	TV Mysteries	South Africa	s2	TV Show	September 24, 2021	
4	Blood & Water	Khosi Ngema	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	

In [ ]:
```
df_final['duration'].value_counts()
```

Out[24]:
```
1 Season      35035
2 Seasons      9559
3 Seasons      5084
94 min         4343
106 min        4040
97 min         3624
95 min         3560
96 min         3484
93 min         3480
90 min         3305
105 min        3209
107 min        3103
101 min        3048
102 min        3017
103 min        2985
98 min         2984
99 min         2956
91 min         2915
92 min         2863
104 min        2822
```

In [ ]:
```
#removing mins from data
df_final['duration']=df_final['duration'].str.replace(" min","")
df_final.head()
```

Out[25]:

	title	Actors	Directors	Genre	country	show_id	type	date_added	relea
0	Dick Johnson Is Dead	Unknown Actor	Kirsten Johnson	Documentaries	United States	s1	Movie	September 25, 2021	
1	Blood & Water	Ama Qamata	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	
2	Blood & Water	Ama Qamata	Unknown Director	TV Dramas	South Africa	s2	TV Show	September 24, 2021	
3	Blood & Water	Ama Qamata	Unknown Director	TV Mysteries	South Africa	s2	TV Show	September 24, 2021	
4	Blood & Water	Khosi Ngema	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	

In [ ]:
```
df_final['duration'].unique()
```

Out[26]:
```
array(['90', '2 Seasons', '1 Season', '91', '125', '9 Seasons', '1
04',
       '127', '4 Seasons', '67', '94', '5 Seasons', '161', '61', '
166',
       '147', '103', '97', '106', '111', '3 Seasons', '110', '105'
, '96',
       '124', '116', '98', '23', '115', '122', '99', '88', '100',
       '6 Seasons', '102', '93', '95', '85', '83', '113', '13', '1
82',
       '48', '145', '87', '92', '80', '117', '128', '119', '143',
'114',
       '118', '108', '63', '121', '142', '154', '120', '82', '109'
, '101',
       '86', '229', '76', '89', '156', '112', '107', '129', '135',
'136',
       '165', '150', '133', '70', '84', '140', '78', '7 Seasons',
'64',
       '59', '139', '69', '148', '189', '141', '130', '138', '81',
'132',
       '10 Seasons', '123', '65', '68', '66', '62', '74', '131', '
39',
       '46', '38', '8 Seasons', '17 Seasons', '126', '155', '159',
'137',
       '12', '273', '36', '34', '77', '60', '49', '58', '72', '204
',
       '212', '25', '73', '29', '47', '32', '35', '71', '149', '33
', '15',
       '54', '224', '162', '37', '75', '79', '55', '158', '164', '
173',
       '181', '185', '21', '24', '51', '151', '42', '22', '134', '
177',
       '13 Seasons', '52', '14', '53', '8', '57', '28', '50', '9',
'26',
       '45', '171', '27', '44', '146', '20', '157', '17', '203', '
41',
       '30', '194', '15 Seasons', '233', '237', '230', '195', '253
',
       '152', '190', '160', '208', '180', '144', '5', '174', '170'
, '192',
       '209', '187', '172', '16', '186', '11', '193', '176', '56',
'169',
       '40', '10', '3', '168', '312', '153', '214', '31', '163', '
19',
       '12 Seasons', '179', '11 Seasons', '43', '200', '196', '167
',
       '178', '228', '18', '205', '201', '191'], dtype=object)
```

In [ ]:
```
df_final['duration_copy']=df_final['duration'].copy()
df_final1=df_final.copy()
```

In [ ]:
```
df_final1.loc[df_final1['duration_copy'].str.contains('Season'),'du
df_final1['duration_copy']=df_final1['duration_copy'].astype('int')
df_final1.head()
```

Out[28]:

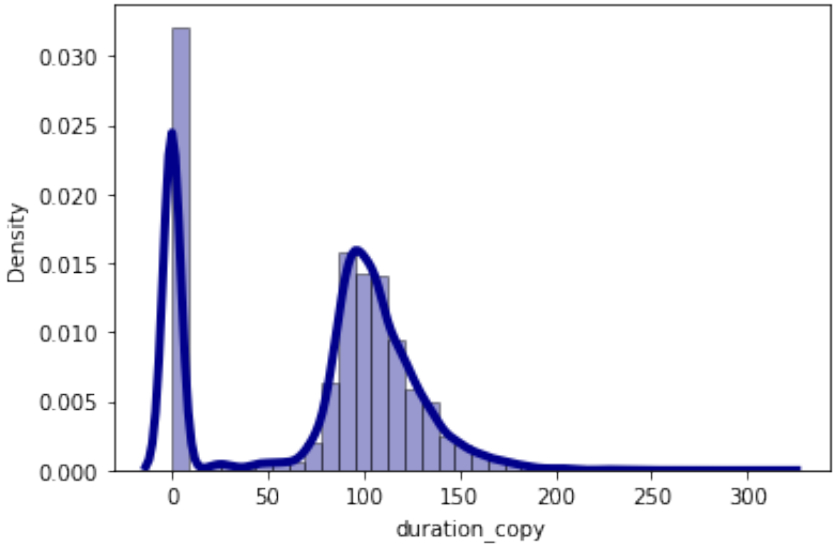
	title	Actors	Directors	Genre	country	show_id	type	date_added	relea
0	Dick Johnson Is Dead	Unknown Actor	Kirsten Johnson	Documentaries	United States	s1	Movie	September 25, 2021	
1	Blood & Water	Ama Qamata	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	
2	Blood & Water	Ama Qamata	Unknown Director	TV Dramas	South Africa	s2	TV Show	September 24, 2021	
3	Blood & Water	Ama Qamata	Unknown Director	TV Mysteries	South Africa	s2	TV Show	September 24, 2021	
4	Blood & Water	Khosi Ngema	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	

In [ ]:
```
df_final1['duration_copy'].describe()
```

Out[29]:
```
count    201991.000000
mean         77.152789
std          52.269154
min           0.000000
25%           0.000000
50%          95.000000
75%         112.000000
max         312.000000
Name: duration_copy, dtype: float64
```

In [ ]:
```
import seaborn as sns
sns.distplot(df_final1['duration_copy'], hist=True, kde=True,
bins=int(36), color = 'darkblue',
hist_kws={'edgecolor':'black'},
kde_kws={'linewidth': 4})
plt.show()
```

```
/usr/local/lib/python3.7/dist-packages/seaborn/distributions.py:2619: FutureWarning: `distplot` is a deprecated function and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```



In [ ]:
```
bins1 = [-1,1,50,80,100,120,150,200,315]
labels1 = ['<1','1-50','50-80','80-100','100-120','120-150','150-20
df_final1['duration_copy'] = pd.cut(df_final1['duration_copy'],bins
df_final1.head()
```

Out[31]:

	title	Actors	Directors	Genre	country	show_id	type	date_added	relea
0	Dick Johnson Is Dead	Unknown Actor	Kirsten Johnson	Documentaries	United States	s1	Movie	September 25, 2021	
1	Blood & Water	Ama Qamata	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	
2	Blood & Water	Ama Qamata	Unknown Director	TV Dramas	South Africa	s2	TV Show	September 24, 2021	
3	Blood & Water	Ama Qamata	Unknown Director	TV Mysteries	South Africa	s2	TV Show	September 24, 2021	
4	Blood & Water	Khosi Ngema	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	

In [ ]:
```
df_final1.loc[~df_final1['duration'].str.contains('Season'),'durati
df_final1.drop(['duration_copy'],axis=1,inplace=True)
df_final1.head()
```

Out[32]:

	title	Actors	Directors	Genre	country	show_id	type	date_added	relea
0	Dick Johnson Is Dead	Unknown Actor	Kirsten Johnson	Documentaries	United States	s1	Movie	September 25, 2021	
1	Blood & Water	Ama Qamata	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	
2	Blood & Water	Ama Qamata	Unknown Director	TV Dramas	South Africa	s2	TV Show	September 24, 2021	
3	Blood & Water	Ama Qamata	Unknown Director	TV Mysteries	South Africa	s2	TV Show	September 24, 2021	
4	Blood & Water	Khosi Ngema	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	

In [ ]:
```
df_final1['duration'].value_counts()
```

Out[33]:
```
80-100        52937
100-120       48724
1 Season      35035
120-150       26691
2 Seasons      9559
50-80          7700
150-200        6737
3 Seasons      5084
1-50           2530
4 Seasons      2134
5 Seasons      1698
7 Seasons       843
6 Seasons       633
200-315         524
8 Seasons       286
9 Seasons       257
10 Seasons      220
13 Seasons      132
12 Seasons      111
15 Seasons       96
17 Seasons       30
11 Seasons       30
Name: duration, dtype: int64
```

In [ ]:
```
from datetime import datetime
from dateutil.parser import parse
arr=[]
for i in df_final1['date_added'].values:
  dt1=parse(i)
  arr.append(dt1.strftime('%Y-%m-%d'))
df_final1['Modified_Added_date'] =arr
df_final1['Modified_Added_date']=pd.to_datetime(df_final1['Modified
df_final1['month_added']=df_final1['Modified_Added_date'].dt.month
df_final1['week_Added']=df_final1['Modified_Added_date'].dt.week
df_final1['year']=df_final1['Modified_Added_date'].dt.year
df_final1.head()
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:10: F
utureWarning: Series.dt.weekofyear and Series.dt.week have been de
precated.  Please use Series.dt.isocalendar().week instead.
  # Remove the CWD from sys.path while we load stuff.
```

Out[34]:

Actors	Directors	Genre	country	show_id	type	date_added	release_year	rating
nknown Actor	Kirsten Johnson	Documentaries	United States	s1	Movie	September 25, 2021	2020	PG-13
Ama Qamata	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	2021	TV-MA
Ama Qamata	Unknown Director	TV Dramas	South Africa	s2	TV Show	September 24, 2021	2021	TV-MA
Ama Qamata	Unknown Director	TV Mysteries	South Africa	s2	TV Show	September 24, 2021	2021	TV-MA
Khosi Ngema	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	2021	TV-MA

In [ ]:
```
#Titles such as Bahubali(Hindi Version),Bahubali(Tamil Version) wer
#presence of brackets and content between brackets is removed.
df_final1['title']=df_final1['title'].str.replace(r"\(.*\)","")
df_final1.head()
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:3: Fu
tureWarning: The default value of regex will change from True to F
alse in a future version.
  This is separate from the ipykernel package so we can avoid doin
g imports until
```

Out[35]:

	title	Actors	Directors	Genre	country	show_id	type	date_added	relea
0	Dick Johnson Is Dead	Unknown Actor	Kirsten Johnson	Documentaries	United States	s1	Movie	September 25, 2021	
1	Blood & Water	Ama Qamata	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	
2	Blood & Water	Ama Qamata	Unknown Director	TV Dramas	South Africa	s2	TV Show	September 24, 2021	
3	Blood & Water	Ama Qamata	Unknown Director	TV Mysteries	South Africa	s2	TV Show	September 24, 2021	
4	Blood & Water	Khosi Ngema	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	

Univariate Analysis in terms of counts of each column

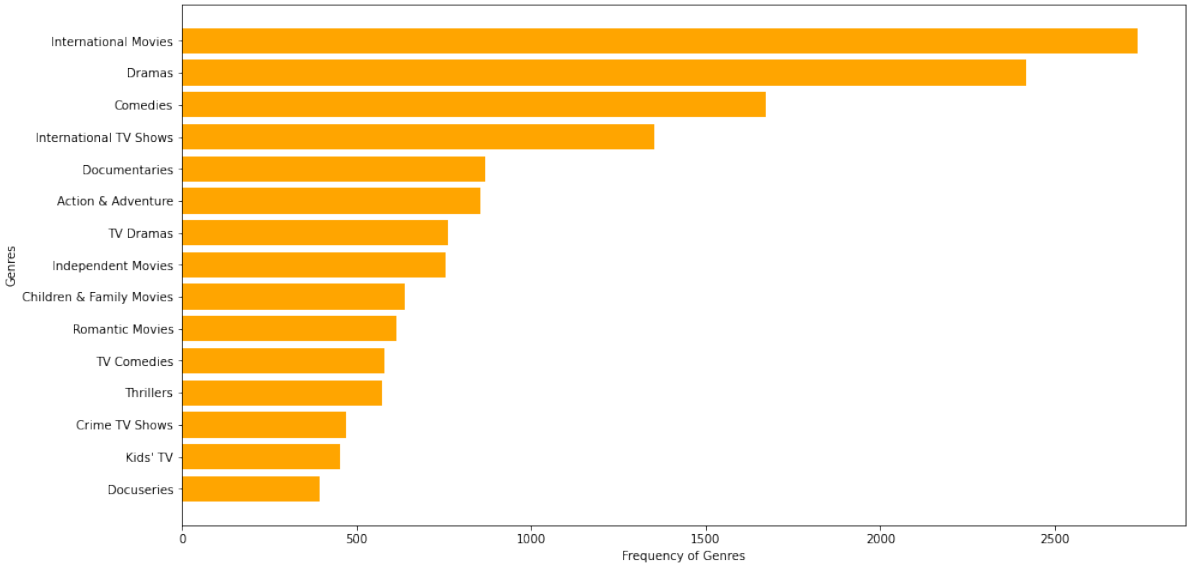
In [ ]:
```
#number of distinct titles on the basis of genre
df_final1.groupby(['Genre']).agg({"title":"nunique"})
```

Out[36]:

Genre	title
Action & Adventure	854
Anime Features	71
Anime Series	176
British TV Shows	253
Children & Family Movies	639
Classic & Cult TV	28
Classic Movies	116
Comedies	1673
Crime TV Shows	470
Cult Movies	71
Documentaries	869

Docuseries	395
Dramas	2418
Faith & Spirituality	65
Horror Movies	353
Independent Movies	756
International Movies	2738
International TV Shows	1351
Kids' TV	451
Korean TV Shows	151
LGBTQ Movies	102
Movies	57
Music & Musicals	372
Reality TV	255
Romantic Movies	615
Romantic TV Shows	370
Sci-Fi & Fantasy	243
Science & Nature TV	92
Spanish-Language TV Shows	174
Sports Movies	219
Stand-Up Comedy	343
Stand-Up Comedy & Talk Shows	56
TV Action & Adventure	168
TV Comedies	581
TV Dramas	763
TV Horror	75
TV Mysteries	98
TV Sci-Fi & Fantasy	84
TV Shows	16
TV Thrillers	57
Teen TV Shows	69
Thrillers	573

In [ ]:
```
df_genre=df_final1.groupby(['Genre']).agg({"title":"nunique"}).rese
plt.figure(figsize=(15,8))
plt.barh(df_genre[::-1]['Genre'], df_genre[::-1]['title'],color=['o
plt.xlabel('Frequency of Genres')
plt.ylabel('Genres')
plt.show()
```



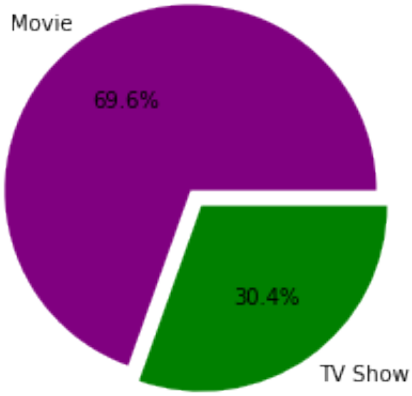
International Movies, Dramas and Comedies are the most popular .

In [ ]:
```
#number of distinct titles on the basis of type
df_final1.groupby(['type']).agg({"title":"nunique"})
```

Out[38]:

type	title
Movie	6115
TV Show	2676

In [ ]:
```
df_type=df_final1.groupby(['type']).agg({"title":"nunique"}).reset
plt.pie(df_type['title'],explode=(0.05,0.05), labels=df_type['type
plt.show()
```



We have 70:30 ratio of Movies and TV Shows in our data

In [ ]:
```
#number of distinct titles on the basis of country
df_final1.groupby(['country']).agg({"title":"nunique"})
```

Jordan	10
Kazakhstan	1
Kenya	6
Kuwait	9
Latvia	1
Lebanon	33
Liechtenstein	1
Lithuania	1
Luxembourg	12
Malawi	1
Malaysia	26
Malta	3

The above dataframe shows a flaw in which we are seeing countries, such as Cambodia and Cambodia, or United States and United States, are shown as different countries.They should have been same

In [ ]:
```
df_final1['country'] = df_final1['country'].str.replace(',', '')
df_final1.head()
```

Out[41]:

	title	Actors	Directors	Genre	country	show_id	type	date_added	relea
0	Dick Johnson Is Dead	Unknown Actor	Kirsten Johnson	Documentaries	United States	s1	Movie	September 25, 2021	
1	Blood & Water	Ama Qamata	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	
2	Blood & Water	Ama Qamata	Unknown Director	TV Dramas	South Africa	s2	TV Show	September 24, 2021	
3	Blood & Water	Ama Qamata	Unknown Director	TV Mysteries	South Africa	s2	TV Show	September 24, 2021	
4	Blood & Water	Khosi Ngema	Unknown Director	International TV Shows	South Africa	s2	TV Show	September 24, 2021	

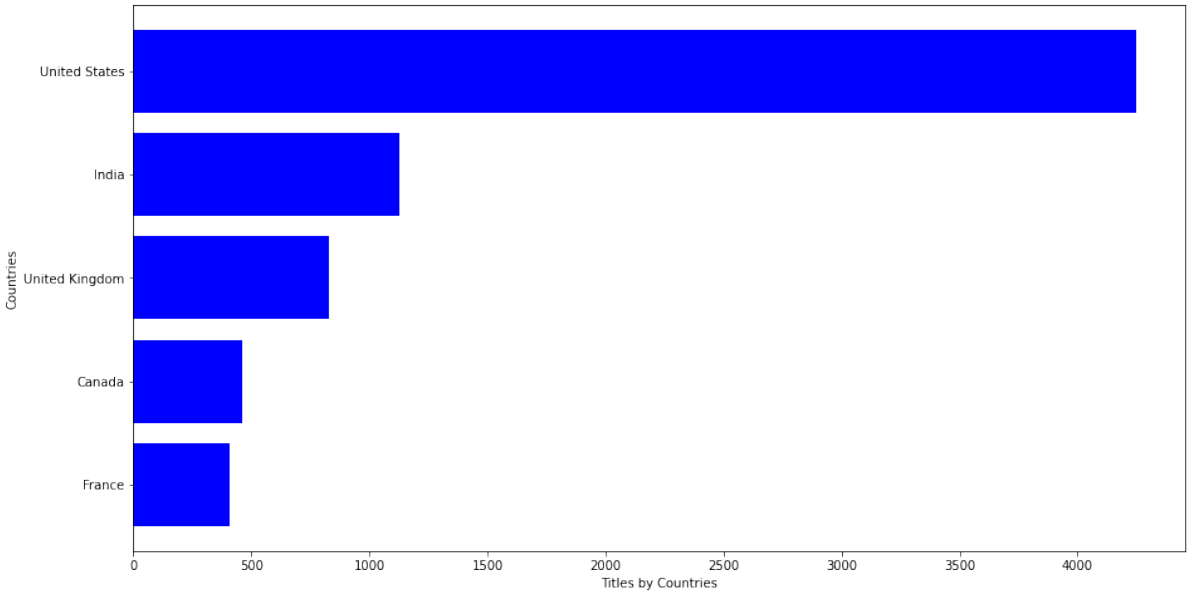
In [ ]:
```
#number of distinct titles on the basis of country
df_final1.groupby(['country']).agg({"title":"nunique"})
```

Out[42]:

country	title
	3
Afghanistan	1
Albania	1
Algeria	3
Angola	2
Argentina	94
Armenia	1
Australia	162
Austria	12
Azerbaijan	1

Now it looks great.

In [ ]:
```
df_country=df_final1.groupby(['country']).agg({"title":"nunique"}).
plt.figure(figsize=(15,8))
plt.barh(df_country[::-1]['country'], df_country[::-1]['title'],col
plt.xlabel('Titles by Countries')
plt.ylabel('Countries')
plt.show()
```



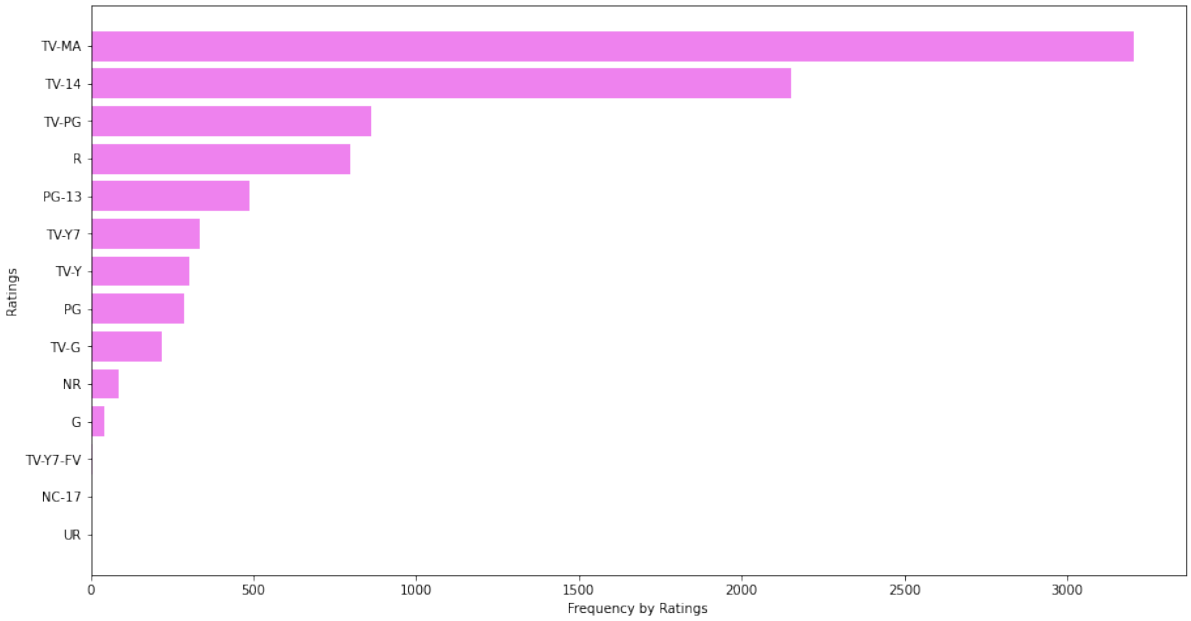
US,India,UK,Canada and France are leading countries in Content Creation on Netflix

In [ ]:
```
#number of distinct titles on the basis of rating
df_final1.groupby(['rating']).agg({"title":"nunique"})
```

Out[44]:

rating	title
G	41
NC-17	3
NR	87
PG	287
PG-13	490
R	799
TV-14	2151
TV-G	220
TV-MA	3204
TV-PG	863
TV-Y	305
TV-Y7	334
TV-Y7-FV	6
UR	3

In [ ]:
```
df_rating=df_final1.groupby(['rating']).agg({"title":"nunique"}).res
plt.figure(figsize=(15,8))
plt.barh(df_rating[::-1]['rating'], df_rating[::-1]['title'],color=
plt.xlabel('Frequency by Ratings')
plt.ylabel('Ratings')
plt.show()
```



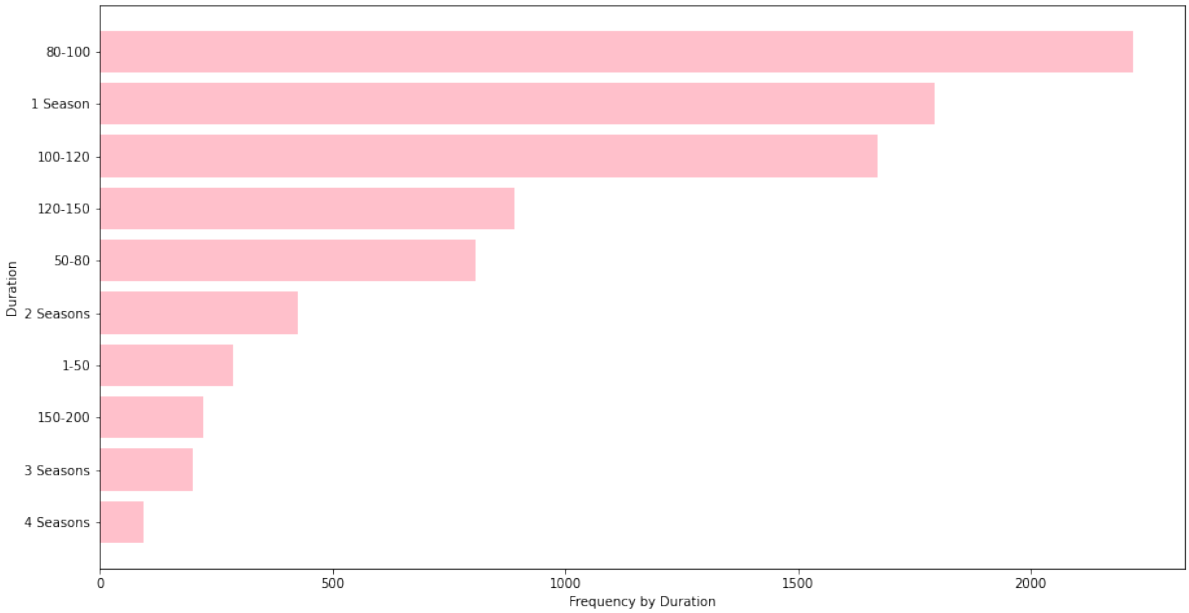
Most of the highly rated content on Netflix is intended for Mature Audiences, R Rated, content not intended for audience under 14 and those which require Parental Guidance

In [ ]:
```
#number of distinct titles on the basis of duration
df_final1.groupby(['duration']).agg({"title":"nunique"})
```

Out[46]:

duration	title
1 Season	1793
1-50	287
10 Seasons	7
100-120	1671
11 Seasons	2
12 Seasons	2
120-150	891
13 Seasons	3
15 Seasons	2
150-200	222
17 Seasons	1
2 Seasons	425
200-315	19
3 Seasons	199
4 Seasons	95
5 Seasons	65
50-80	808
6 Seasons	33
7 Seasons	23
8 Seasons	17
80-100	2220
9 Seasons	9

In [ ]:
```
df_duration=df_final1.groupby(['duration']).agg({"title":"nunique"})
plt.figure(figsize=(15,8))
plt.barh(df_duration[::-1]['duration'], df_duration[::-1]['title'],c
plt.xlabel('Frequency by Duration')
plt.ylabel('Duration')
plt.show()
```

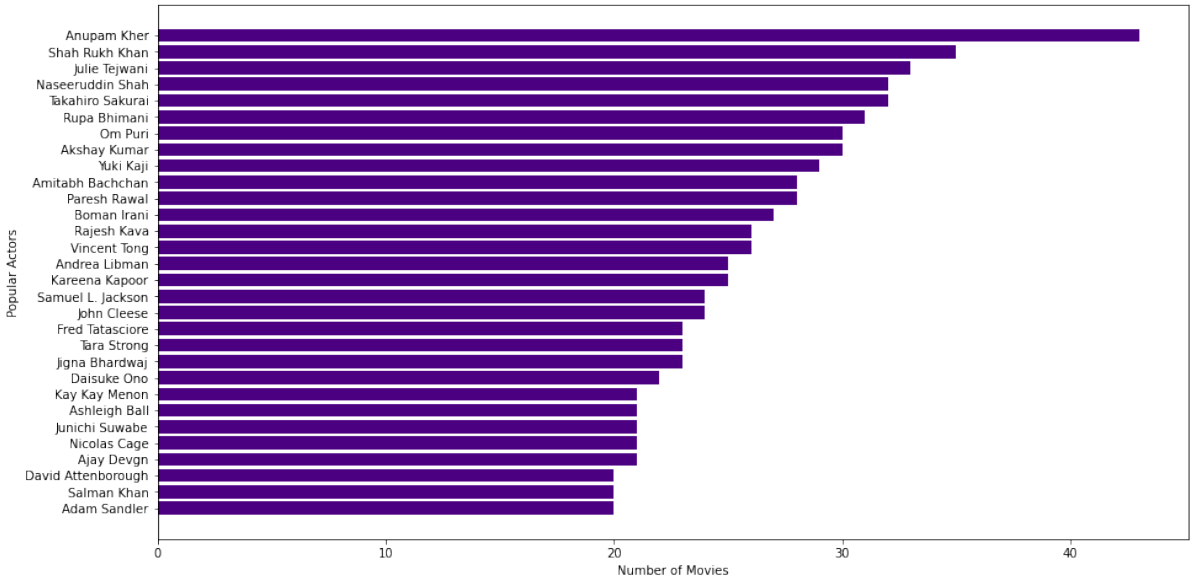


The duration of Most Watched content in our whole data is 80-100 mins.These must be movies and Shows having only 1 Season.

In [ ]:
```
#number of distinct titles on the basis of Actors
df_final1.groupby(['Actors']).agg({"title":"nunique"})
```

9m88	1
A Boogie Wit tha Hoodie	1
A. Murat Özgen	1
A.C. Peterson	1
A.D. Miles	3
A.J. Cook	2
A.J. Johnson	1
A.J. LoCascio	3
A.K. Hangal	4
A.R. Rahman	1
A.S. Sasi Kumar	1
AC Lim	1
AFRA	1

In [ ]:
```
df_actors=df_final1.groupby(['Actors']).agg({"title":"nunique"}).re
df_actors=df_actors[df_actors['Actors']!='Unknown Actor']
plt.figure(figsize=(15,8))
plt.barh(df_actors[::-1]['Actors'], df_actors[::-1]['title'],color=
plt.xlabel('Number of Movies')
plt.ylabel('Popular Actors')
plt.show()
```

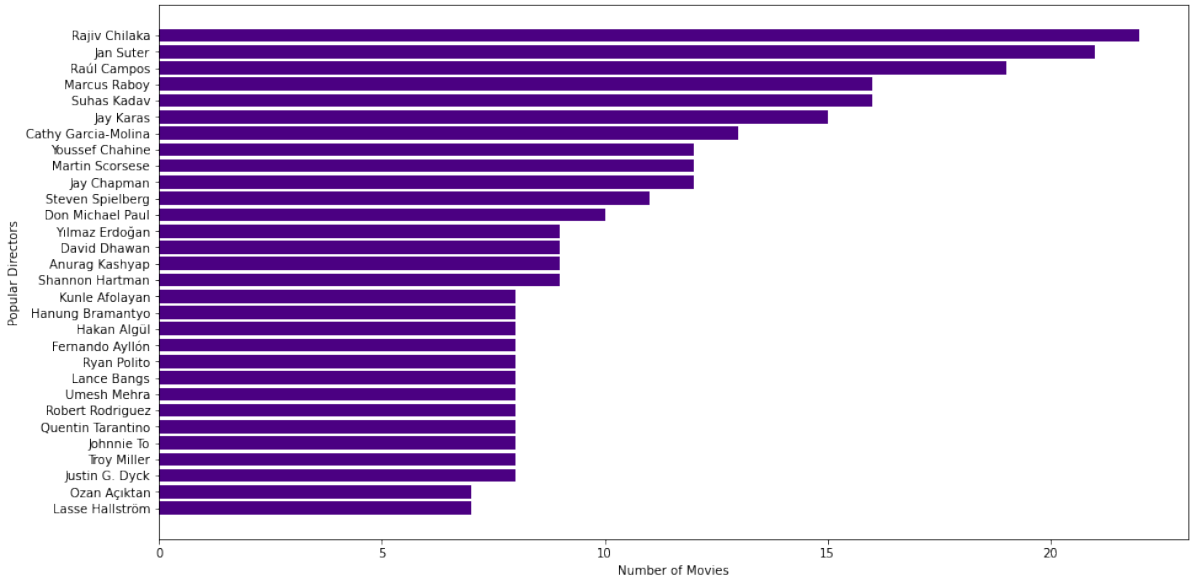


Anupam Kher,SRK,Julie Tejwani, Naseeruddin Shah and Takahiro Sakurai occupy the top stop in Most Watched content.

In [ ]:
```
#number of distinct titles on the basis of Actors
df_final1.groupby(['Directors']).agg({"title":"nunique"})
```

A. L. Vijay	2
A. Raajdheep	1
A. Salaam	1
A.R. Murugadoss	2
Aadish Keluskar	1
Aamir Bashir	1
Aamir Khan	1
Aanand Rai	1
Aaron Burns	1
Aaron Hancox	1
Aaron Hann	1
Aaron Lieber	1
Aaron Moorhead	2

In [ ]:
```
df_directors=df_final1.groupby(['Directors']).agg({"title":"nunique
df_directors=df_directors[df_directors['Directors']!='Unknown Direc
plt.figure(figsize=(15,8))
plt.barh(df_directors[::-1]['Directors'], df_directors[::-1]['title
plt.xlabel('Number of Movies')
plt.ylabel('Popular Directors')
plt.show()
```



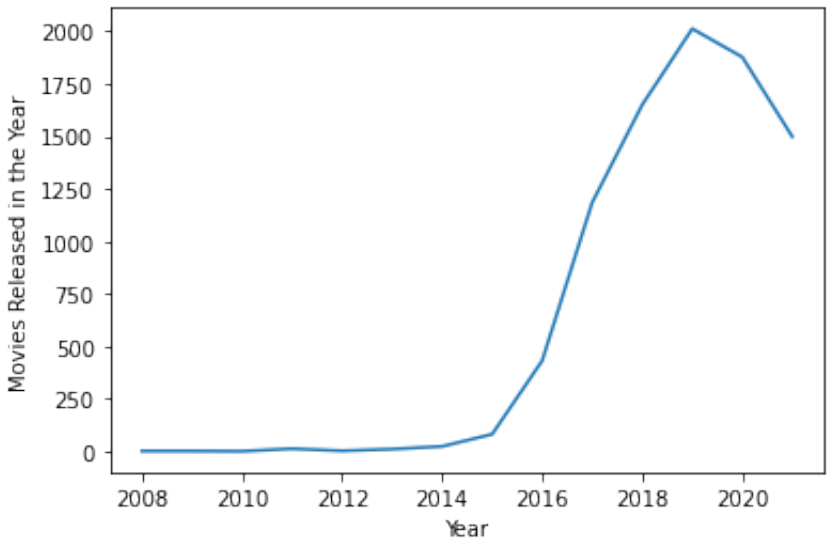
Rajiv Chilaka, Jan Suter and Raul Campos are the most popular directors across Netflix

In [ ]:
```
#number of distinct titles on the basis of year
df_final1.groupby(['year']).agg({"title":"nunique"})
```

Out[52]:

year	title
2008	2
2009	2
2010	1
2011	13
2012	3
2013	11
2014	24
2015	82
2016	432
2017	1185
2018	1650
2019	2012
2020	1877
2021	1498

In [ ]:
```
df_year=df_final1.groupby(['year']).agg({"title":"nunique"}).reset_
sns.lineplot(data=df_year, x='year', y='title')
plt.ylabel("Movies Released in the Year")
plt.xlabel("Year")
plt.show()
```



The Amount of Content across Netflix has increased from 2008 continuously till 2019. Then started decreasing from here(probably due to Covid)

In [ ]:
```
#number of distinct titles on the basis of week
df_final1.groupby(['week_Added']).agg({"title":"nunique"})
```

Out[54]:

week_Added	title
1	372
2	108
3	113
4	88
5	208
6	97
7	147
8	110
9	254
10	135
11	163
12	109
13	250
14	173
15	153
16	160
17	154
18	234
19	116
20	130
21	117
22	206
23	151
24	164
25	143
26	269
27	241

28 131

29 140

30 160

31 269

32 118

33 153

34 139

35 265

36 142

37 183

38 139

39 165

40 287

41 116

42 133

43 116

44 318

45 98

46 134

47 120

48 200

49 140

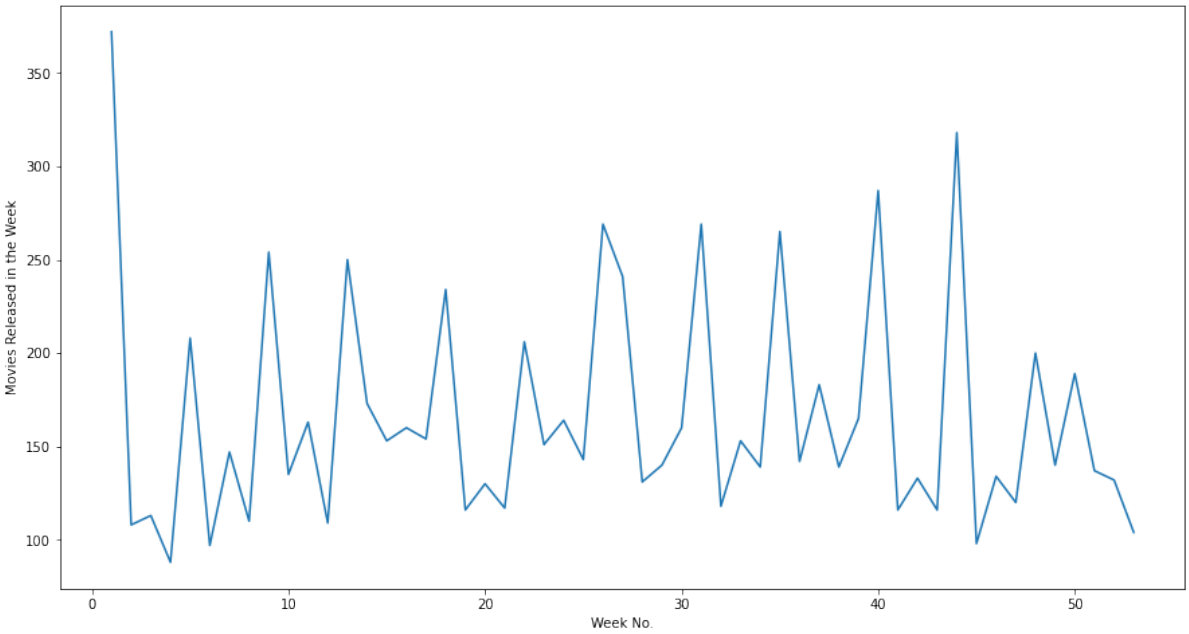
50 189

51 137

52 132

53 104

In [ ]:
```
df_week=df_final1.groupby(['week_Added']).agg({"title":"nunique"}).
plt.figure(figsize=(15,8))
sns.lineplot(data=df_week, x='week_Added', y='title')
plt.ylabel("Movies Released in the Week")
plt.xlabel("Week No.")
plt.show()
```



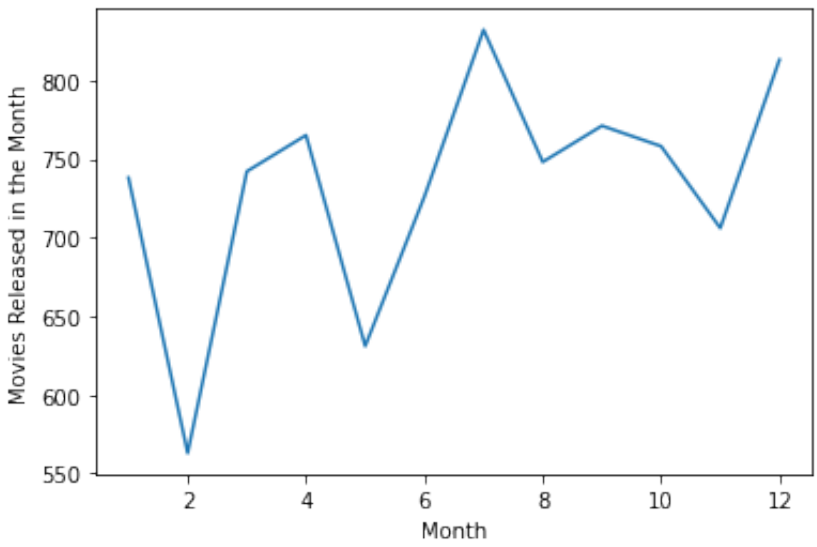
Most of the Content across Netflix is added in the first week of the year and it follows a bit of a cyclical pattern

In [ ]:
```
#number of distinct titles on the basis of week
df_final1.groupby(['month_added']).agg({"title":"nunique"})
```

Out[56]:

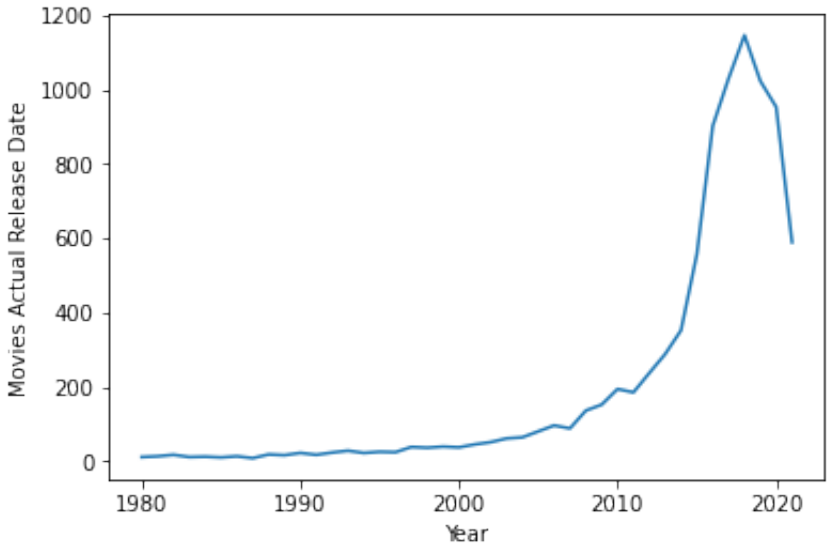
month_added	title
1	738
2	563
3	742
4	765
5	631
6	726
7	832
8	748
9	771
10	758
11	706
12	813

In [ ]:
```
df_month=df_final1.groupby(['month_added']).agg({"title":"nunique"}
sns.lineplot(data=df_month, x='month_added', y='title')
plt.ylabel("Movies Released in the Month")
plt.xlabel("Month")
plt.show()
```



Most of the content is added in the first and last months across Netflix(reinstating what we observed for first week in baove plot)

In [ ]:
```
df_release_year=df_final1[df_final1['release_year']>=1980].groupby(
sns.lineplot(data=df_release_year, x='release_year', y='title')
plt.ylabel("Movies Actual Release Date")
plt.xlabel("Year")
plt.show()
```

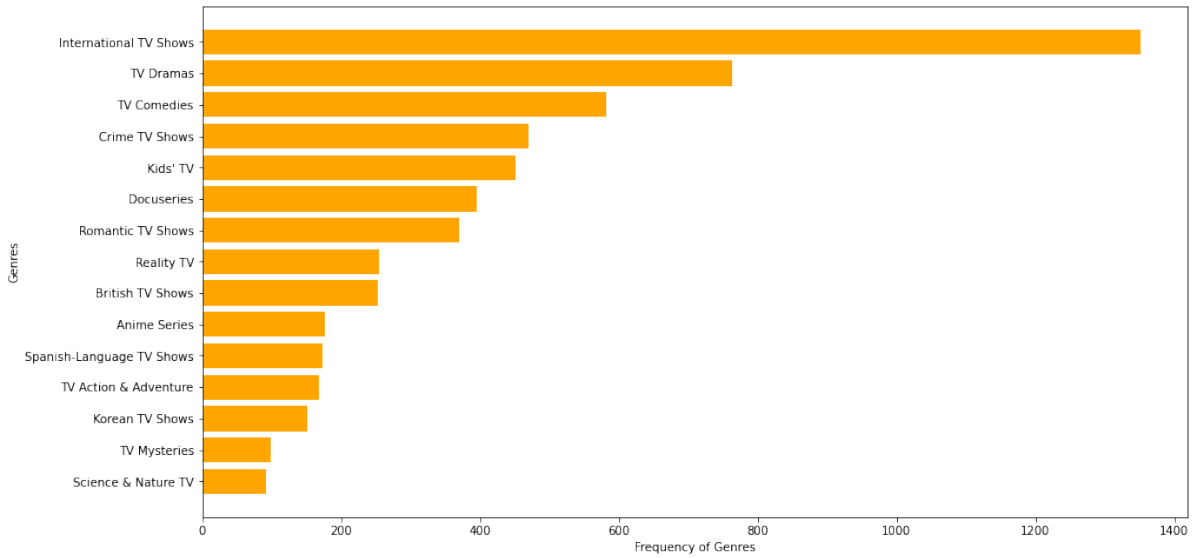


Net content release which are later uploaded to Netflix has increased since 1980 till 2020 though later reduced certainly due to COVID-19

Univariate Analysis separately for shows and movies

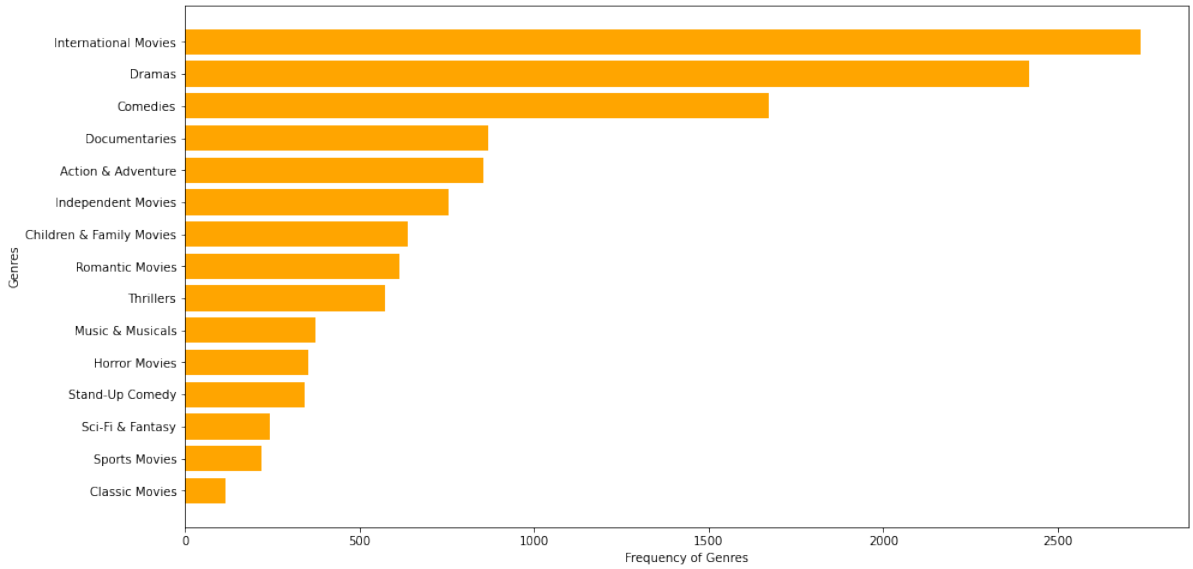
In [ ]:
```
df_shows=df_final1[df_final1['type']=='TV Show']
df_movies=df_final1[df_final1['type']=='Movie']
```

In [ ]:
```
df_genre=df_shows.groupby(['Genre']).agg({"title":"nunique"}).reset
plt.figure(figsize=(15,8))
plt.barh(df_genre[::-1]['Genre'], df_genre[::-1]['title'],color=['o
plt.xlabel('Frequency of Genres')
plt.ylabel('Genres')
plt.show()
```



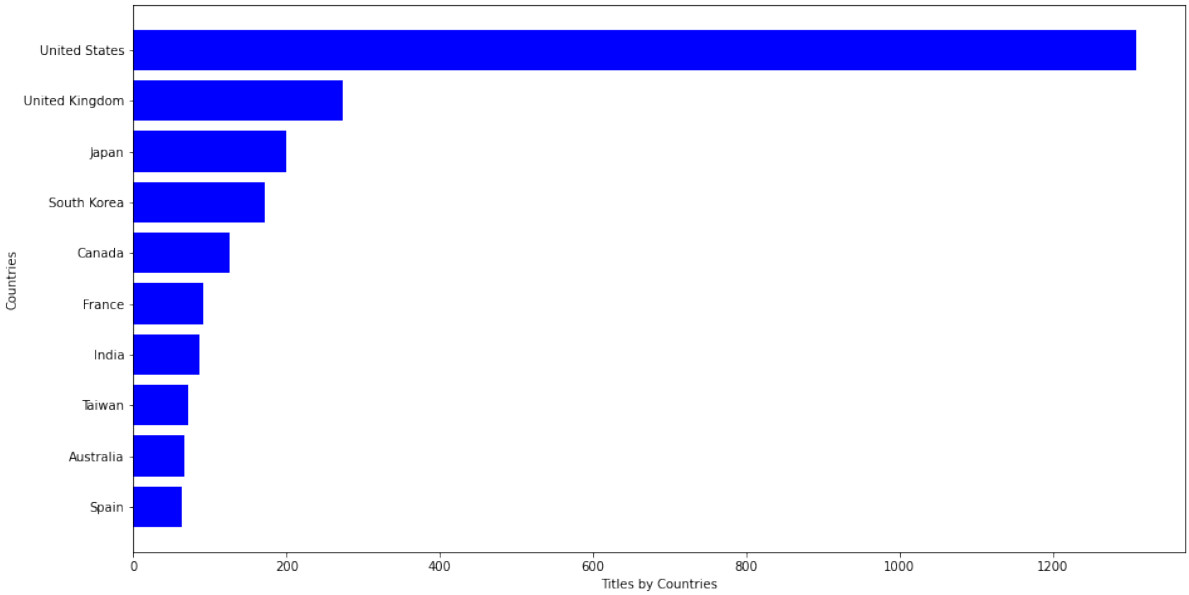
International TV Shows, Dramas and Comedy Genres are popular across TV Shows in Netflix

In [ ]:
```
df_genre=df_movies.groupby(['Genre']).agg({"title":"nunique"}).rese
plt.figure(figsize=(15,8))
plt.barh(df_genre[::-1]['Genre'], df_genre[::-1]['title'],color=['o
plt.xlabel('Frequency of Genres')
plt.ylabel('Genres')
plt.show()
```

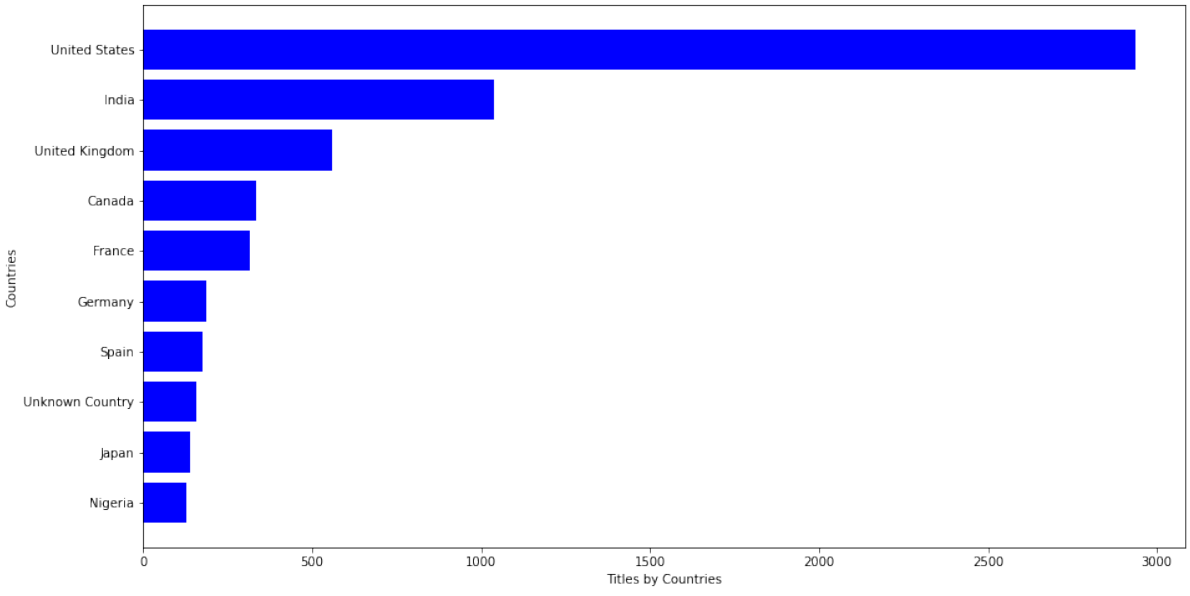


International Movies, Dramas and Comedy Genres are popular followed by Documentaries across Movies on Netflix

In [ ]:
```
df_country=df_shows.groupby(['country']).agg({"title":"nunique"}).r
plt.figure(figsize=(15,8))
plt.barh(df_country[::-1]['country'], df_country[::-1]['title'],col
plt.xlabel('Titles by Countries')
plt.ylabel('Countries')
plt.show()
```



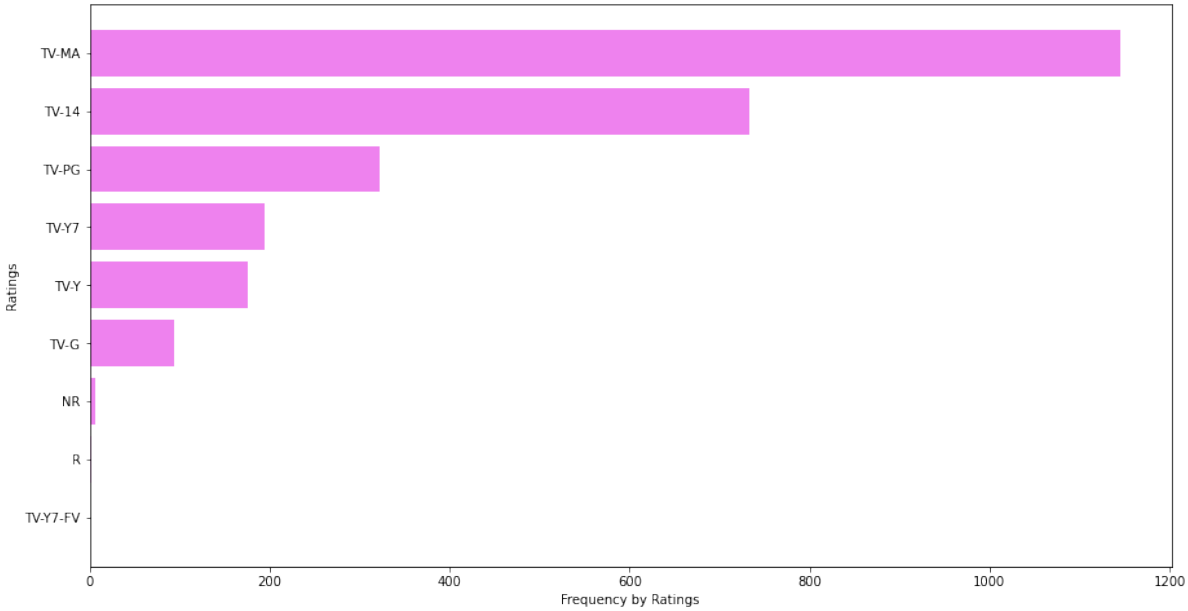
In [ ]:
```
df_country=df_movies.groupby(['country']).agg({"title":"nunique"}).
plt.figure(figsize=(15,8))
plt.barh(df_country[::-1]['country'], df_country[::-1]['title'],col
plt.xlabel('Titles by Countries')
plt.ylabel('Countries')
plt.show()
```



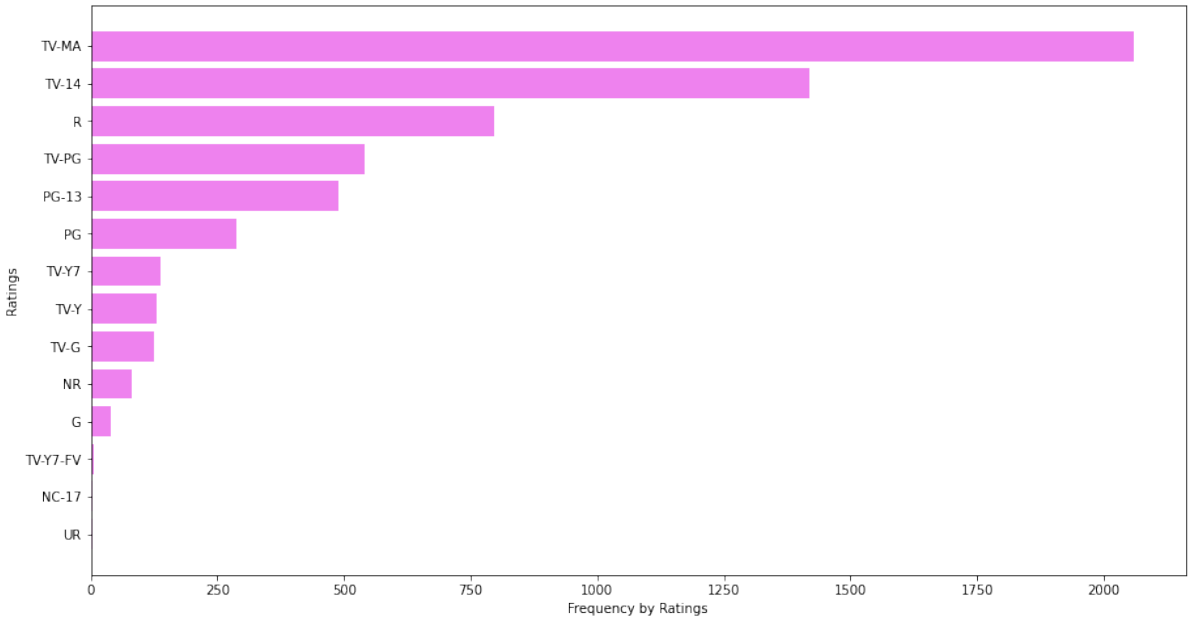
United States is leading across both TV Shows and Movies, UK also provides great content across TV Shows and Movies. Surprisingly India is much more prevalent in Movies as compared TV Shows.

Moreover the number of Movies created in India outweigh the sum of TV Shows and Movies across UK since India was rated as second in net sum of whole content across Netflix.

In [ ]:
```
df_rating=df_shows.groupby(['rating']).agg({"title":"nunique"}).res
plt.figure(figsize=(15,8))
plt.barh(df_rating[::-1]['rating'], df_rating[::-1]['title'],color=
plt.xlabel('Frequency by Ratings')
plt.ylabel('Ratings')
plt.show()
```



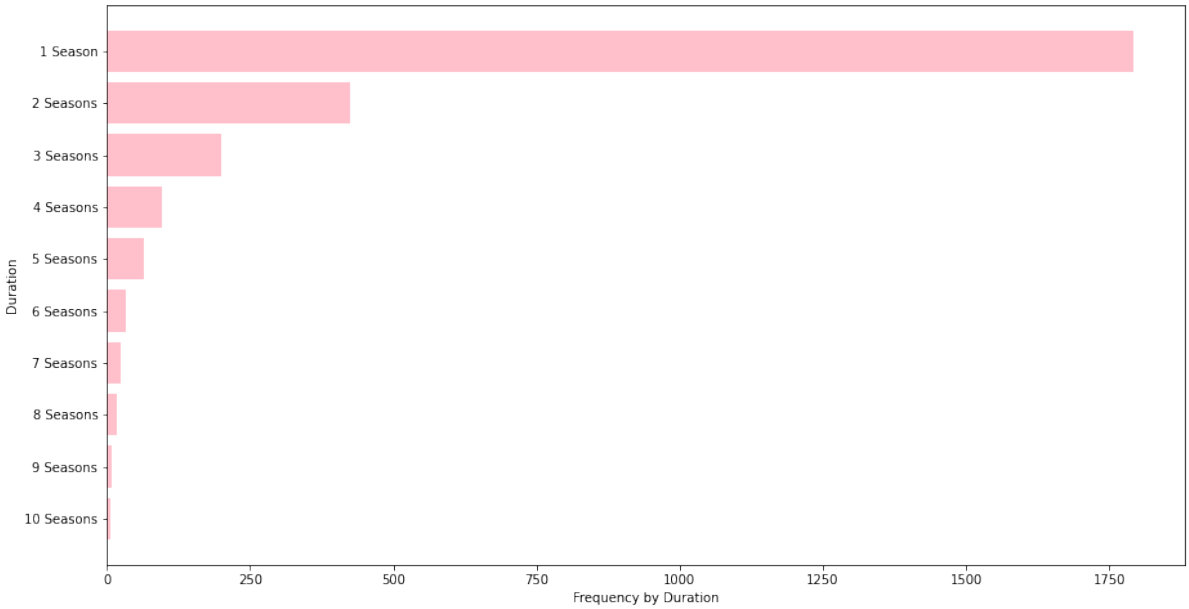
In [ ]:
```
df_rating=df_movies.groupby(['rating']).agg({"title":"nunique"}).re
plt.figure(figsize=(15,8))
plt.barh(df_rating[::-1]['rating'], df_rating[::-1]['title'],color=
plt.xlabel('Frequency by Ratings')
plt.ylabel('Ratings')
plt.show()
```



So it seems plaussible to conclude that the popular ratings across Netflix includes Mature Audiences and those appropriate for over 14/over 17 ages.

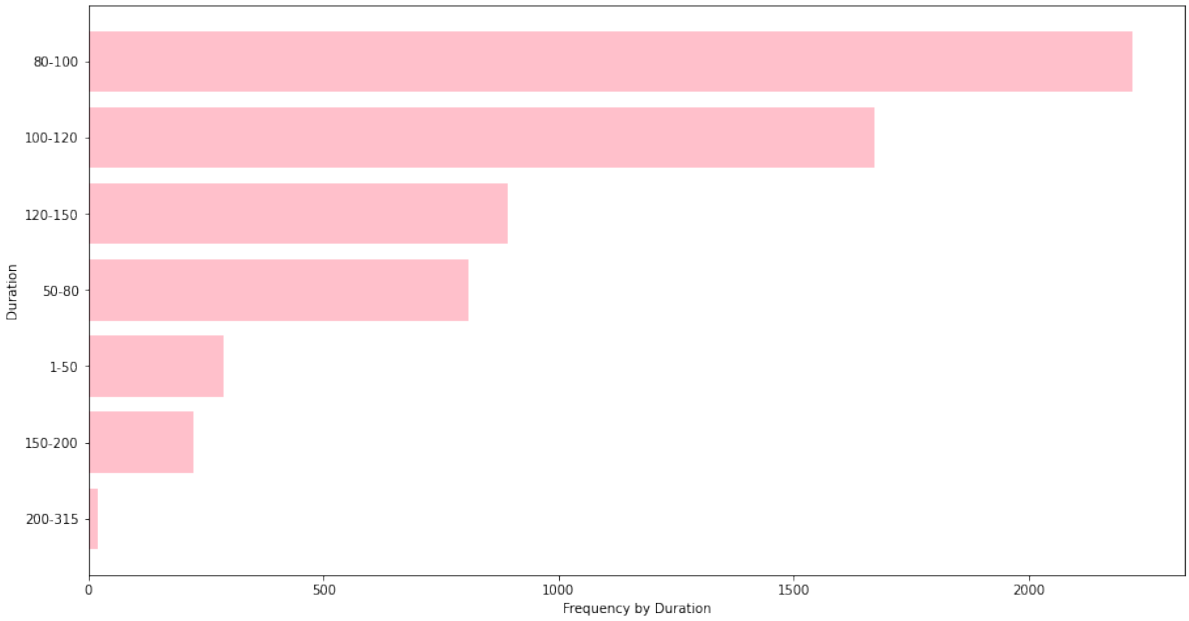
Moreover there are no TV Shows having a rating of R

In [ ]:
```
df_duration=df_shows.groupby(['duration']).agg({"title":"nunique"})
plt.figure(figsize=(15,8))
plt.barh(df_duration[::-1]['duration'], df_duration[::-1]['title'],
plt.xlabel('Frequency by Duration')
plt.ylabel('Duration')
plt.show()
```



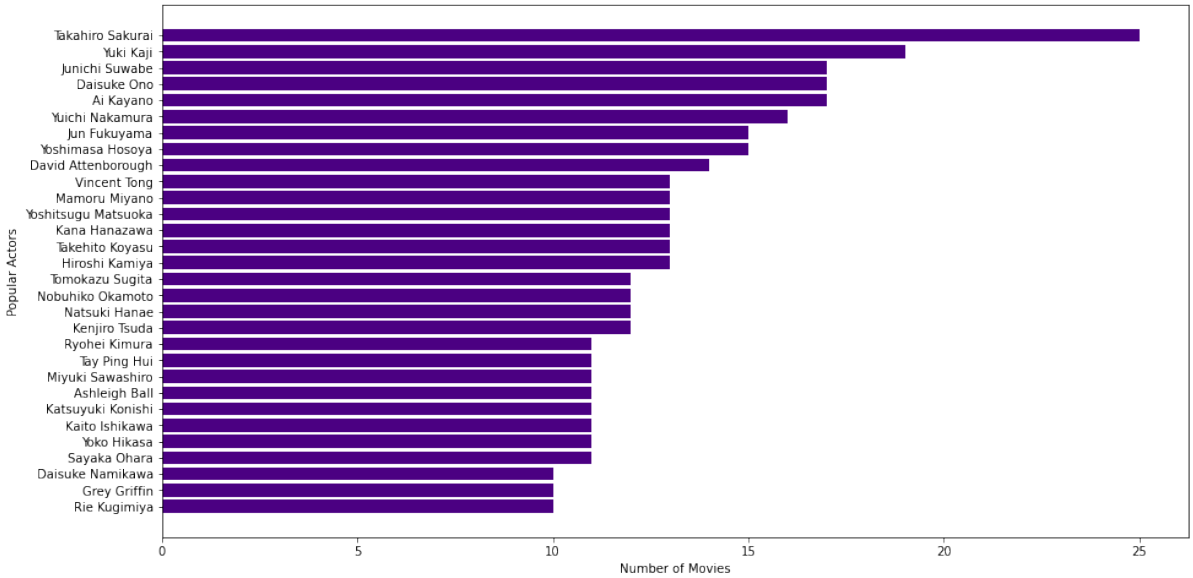
Across TV Shows, shows having only 1 Season are common as soon as the season length increases, the number of shows decrease and this definitely sounds as expected

In [ ]:
```
df_duration=df_movies.groupby(['duration']).agg({"title":"nunique"}
plt.figure(figsize=(15,8))
plt.barh(df_duration[::-1]['duration'], df_duration[::-1]['title'],
plt.xlabel('Frequency by Duration')
plt.ylabel('Duration')
plt.show()
```



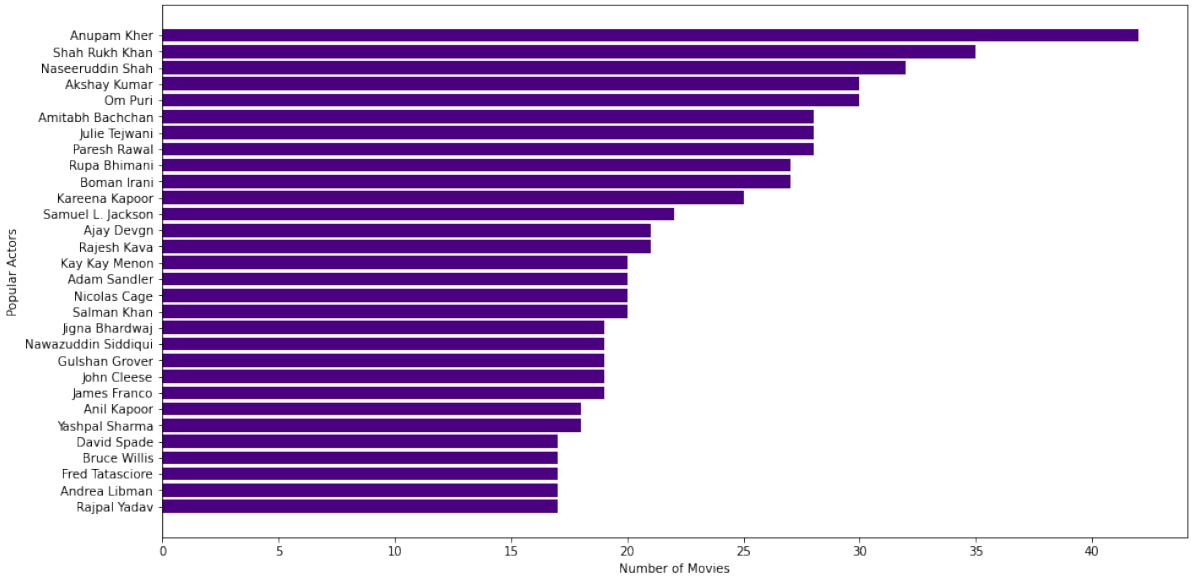
Across movies 80-100,100-120 and 120-150 is the ranges of minutes for which most movies lie. So quite possibly 80-150 mins is the sweet spot we would be wanting for movies.

In [ ]:
```
df_actors=df_shows.groupby(['Actors']).agg({"title":"nunique"}).res
df_actors=df_actors[df_actors['Actors']!='Unknown Actor']
plt.figure(figsize=(15,8))
plt.barh(df_actors[::-1]['Actors'], df_actors[::-1]['title'],color=
plt.xlabel('Number of Movies')
plt.ylabel('Popular Actors')
plt.show()
```



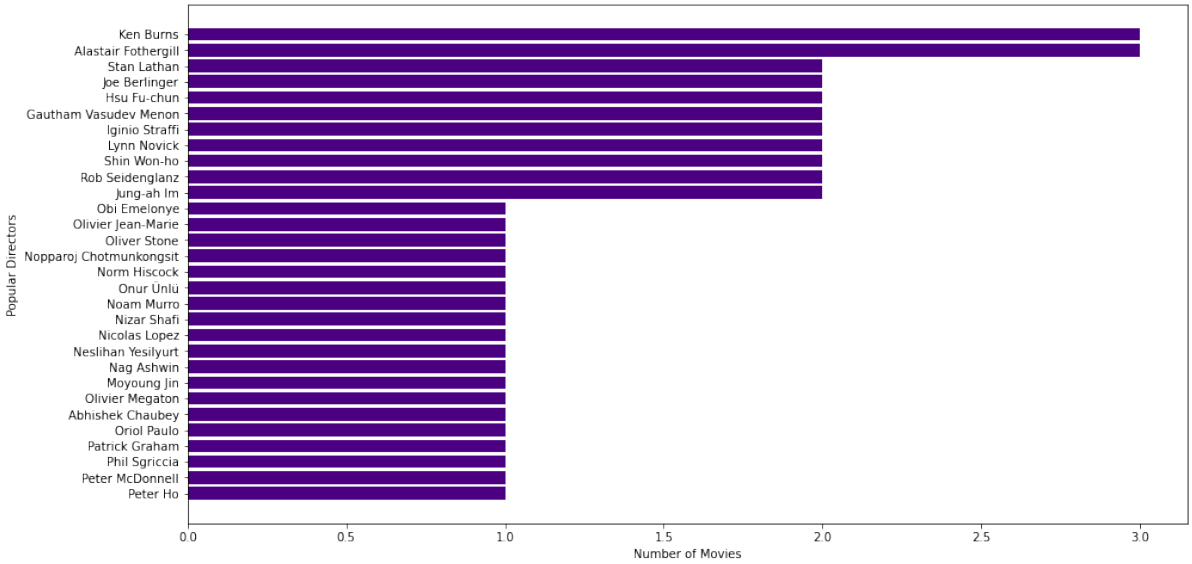
Takahiro Sakurai,Yuki Kaji and other South Korean/Japanese actors are the most popular actors across TV Shows

In [ ]:
```
df_actors=df_movies.groupby(['Actors']).agg({"title":"nunique"}).re
df_actors=df_actors[df_actors['Actors']!='Unknown Actor']
plt.figure(figsize=(15,8))
plt.barh(df_actors[::-1]['Actors'], df_actors[::-1]['title'],color=
plt.xlabel('Number of Movies')
plt.ylabel('Popular Actors')
plt.show()
```



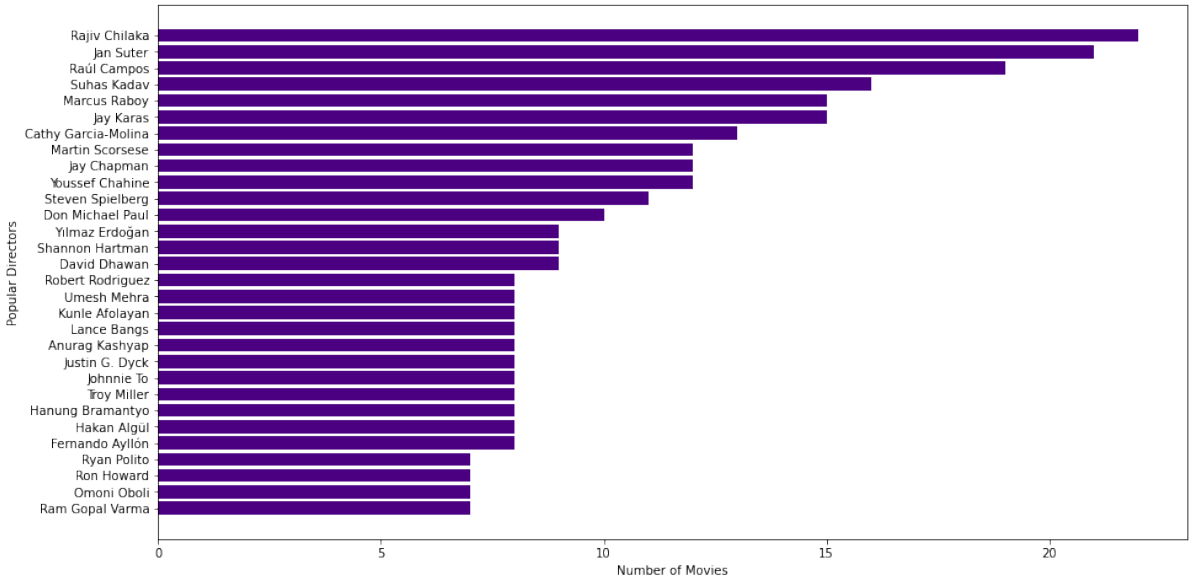
Our bollywood actors such as Anupam Kher, SRK, Naseeruddin Shah are very much popular acrossmovies on Netflix

In [ ]:
```
df_directors=df_shows.groupby(['Directors']).agg({"title":"nunique"
df_directors=df_directors[df_directors['Directors']!='Unknown Direc
plt.figure(figsize=(15,8))
plt.barh(df_directors[::-1]['Directors'], df_directors[::-1]['title
plt.xlabel('Number of Movies')
plt.ylabel('Popular Directors')
plt.show()
```



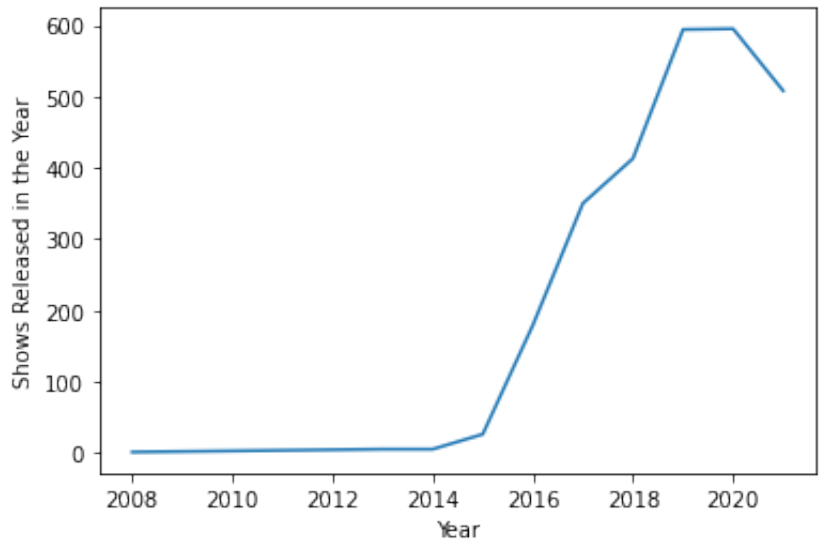
Ken Burns, Alastair Fothergill, Stan Lathan, Joe Barlinger are popular directors across TV Shows on Netflix

In [ ]:
```
df_directors=df_movies.groupby(['Directors']).agg({"title":"nunique
df_directors=df_directors[df_directors['Directors']!='Unknown Direc
plt.figure(figsize=(15,8))
plt.barh(df_directors[::-1]['Directors'], df_directors[::-1]['title
plt.xlabel('Number of Movies')
plt.ylabel('Popular Directors')
plt.show()
```

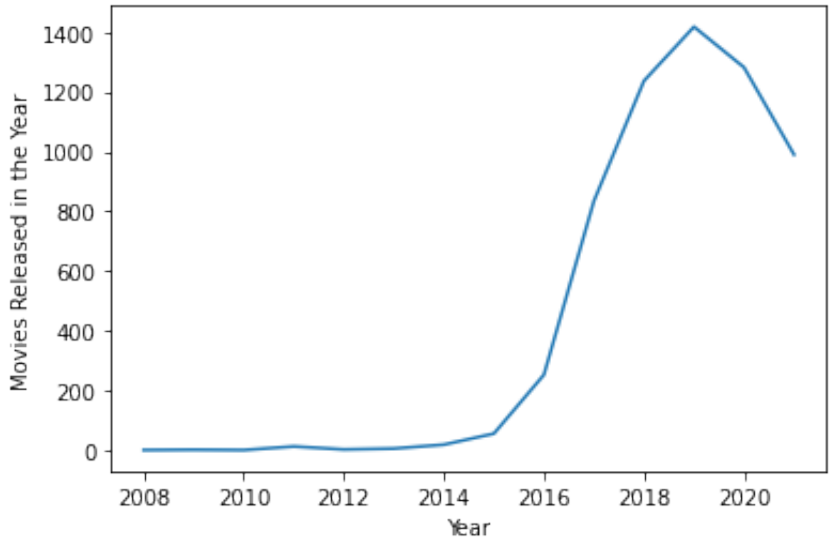


Rajiv Chilka, Jan Suter, Raul Campos, Suhas Kadav are popular directors across movies

In [ ]:
```
df_year=df_shows.groupby(['year']).agg({"title":"nunique"}).reset_i
sns.lineplot(data=df_year, x='year', y='title')
plt.ylabel("Shows Released in the Year")
plt.xlabel("Year")
plt.show()
```

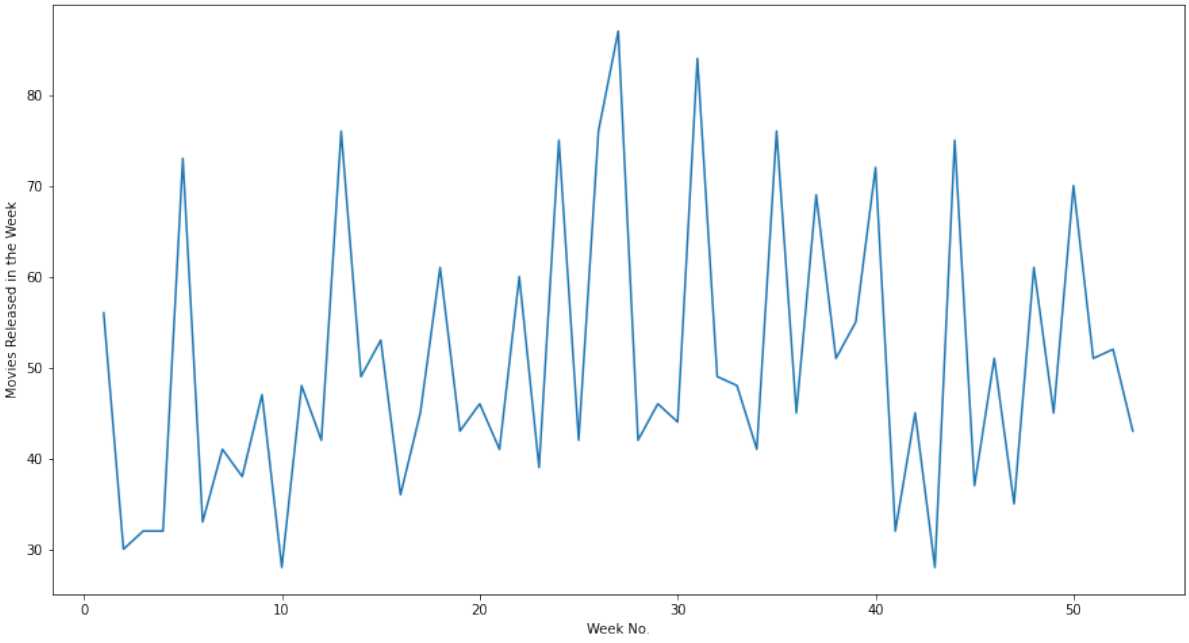


In [ ]:
```
df_year=df_movies.groupby(['year']).agg({"title":"nunique"}).reset_
sns.lineplot(data=df_year, x='year', y='title')
plt.ylabel("Movies Released in the Year")
plt.xlabel("Year")
plt.show()
```

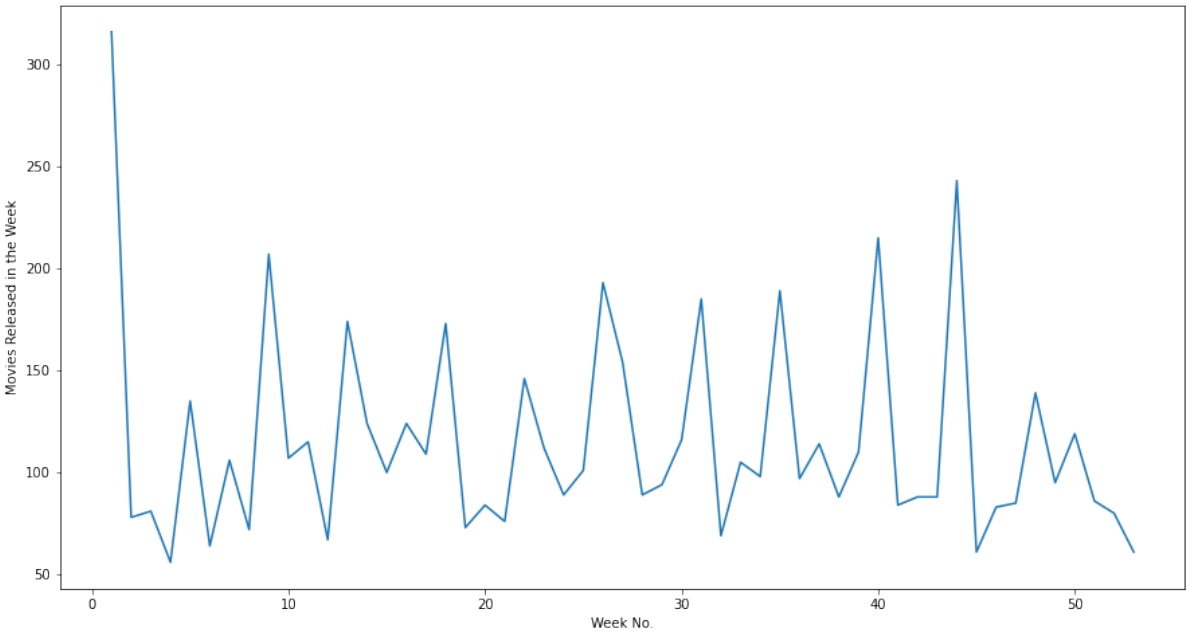


Till 2019, overall content across Netflix was increasing but due to Covid in 2020, though TV Shows didn't take a hit then Movies did take a hit. Well later in 2021, content across both was reduced significantly

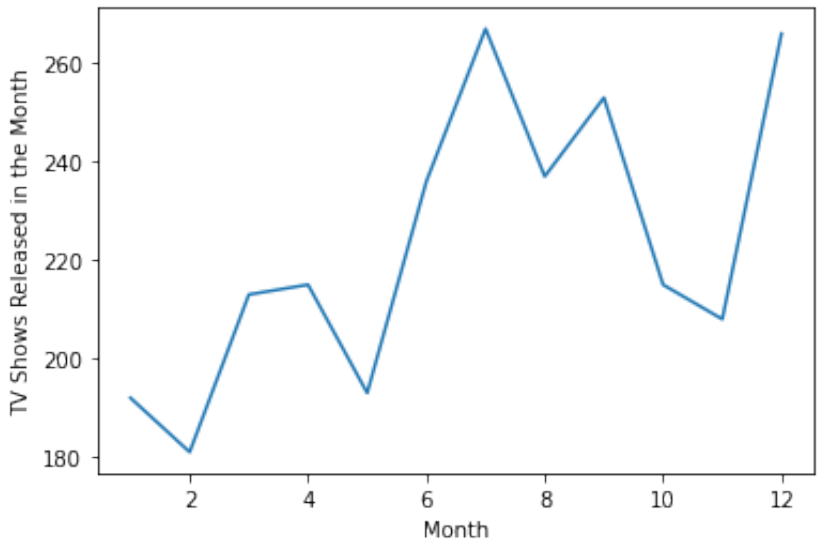
In [ ]:
```
df_week=df_shows.groupby(['week_Added']).agg({"title":"nunique"}).r
plt.figure(figsize=(15,8))
sns.lineplot(data=df_week, x='week_Added', y='title')
plt.ylabel("Movies Released in the Week")
plt.xlabel("Week No.")
plt.show()
```



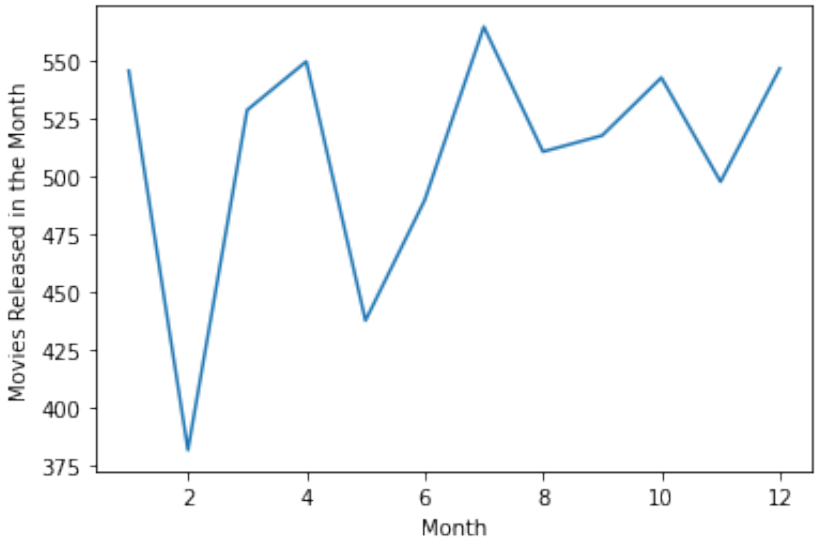
In [ ]:
```
df_week=df_movies.groupby(['week_Added']).agg({"title":"nunique"}).
plt.figure(figsize=(15,8))
sns.lineplot(data=df_week, x='week_Added', y='title')
plt.ylabel("Movies Released in the Week")
plt.xlabel("Week No.")
plt.show()
```



In [ ]:
```
df_month=df_shows.groupby(['month_added']).agg({"title":"nunique"})
sns.lineplot(data=df_month, x='month_added', y='title')
plt.ylabel("TV Shows Released in the Month")
plt.xlabel("Month")
plt.show()
```



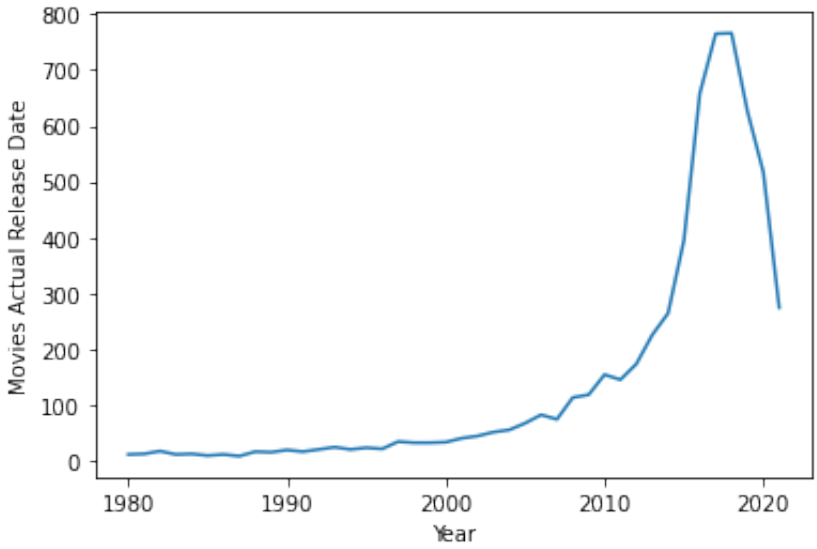
In [ ]:
```
df_month=df_movies.groupby(['month_added']).agg({"title":"nunique"}
sns.lineplot(data=df_month, x='month_added', y='title')
plt.ylabel("Movies Released in the Month")
plt.xlabel("Month")
plt.show()
```



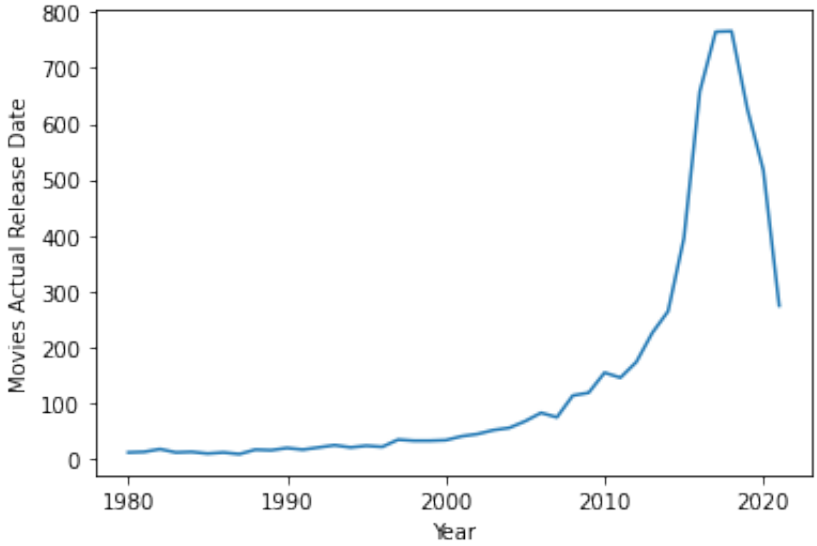
TV Shows are added in Netflix by a tremendous amount in mid weeks/months of the year, i.e- July

Movies are added in Netflix by a tremendous amount in first week/last month of current year and first month of next year

In [ ]:
```
df_release_year=df_movies[df_movies['release_year']>=1980].groupby(
sns.lineplot(data=df_release_year, x='release_year', y='title')
plt.ylabel("Movies Actual Release Date")
plt.xlabel("Year")
plt.show()
```



In [ ]:
```
df_release_year=df_movies[df_movies['release_year']>=1980].groupby(
sns.lineplot(data=df_release_year, x='release_year', y='title')
plt.ylabel("Movies Actual Release Date")
plt.xlabel("Year")
plt.show()
```



Actual Releases of both TV Shows and Movies have taken a hit after 2020

Questions to be Explored Now for Recommendations

1) So this time, the granularity level is country and analysis of TV Shows/Movies the country brings. I am going to consider only the top countries individually for TV Shows and Movies. There are definitely some common countries too which bring out quality content in both TV Shows and Movies.

2) Which Genres do these countries offer and what are the intended audiences(Ratings) which are popular in Netflix?

3)In case of Movies, what is the duration/length of movies which makes them special and depicts attention span?

4)Who are the popular actors/directors across TV Shows and Movies in these countries?

5)In what time of the year, people tend to watch movies and shows in these countries?

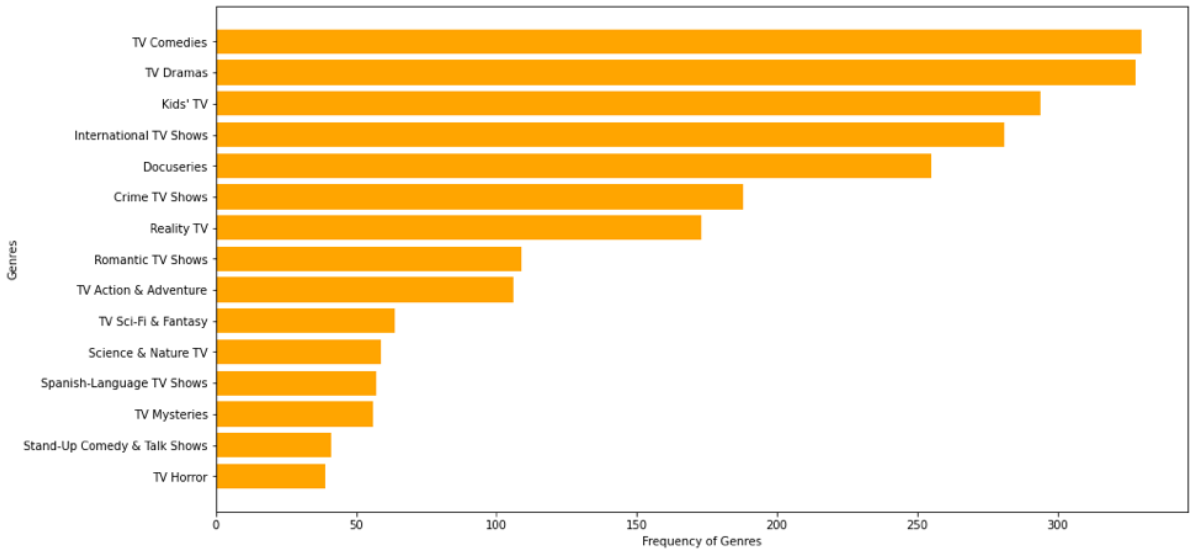
6)Popular Actor and Director Combinations in these countries

In [ ]:
```
#below countries will be analyzed for both shows and movies
shows_and_movies=['United States','India','United Kingdom']
#below countries will be only analyzed on basis of shows
only_shows=['Japan','South Korea']
```

Univariate Analysis separately for shows and movies in USA

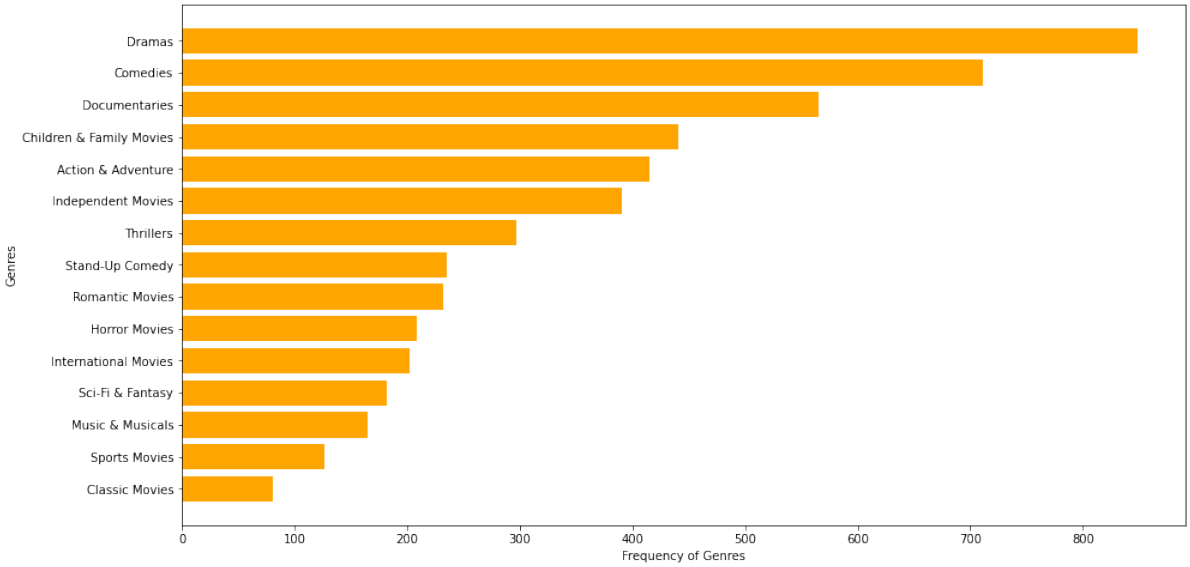
In [ ]:
```
 for both shows and movies
f_final1[df_final1['country']=='United States'][df_final1[df_final1|
df_final1[df_final1['country']=='United States'][df_final1[df_final1
```

In [ ]:
```
df_genre=df_usa_shows.groupby(['Genre']).agg({"title":"nunique"}).r
plt.figure(figsize=(15,8))
plt.barh(df_genre[::-1]['Genre'], df_genre[::-1]['title'],color=['o
plt.xlabel('Frequency of Genres')
plt.ylabel('Genres')
plt.show()
```



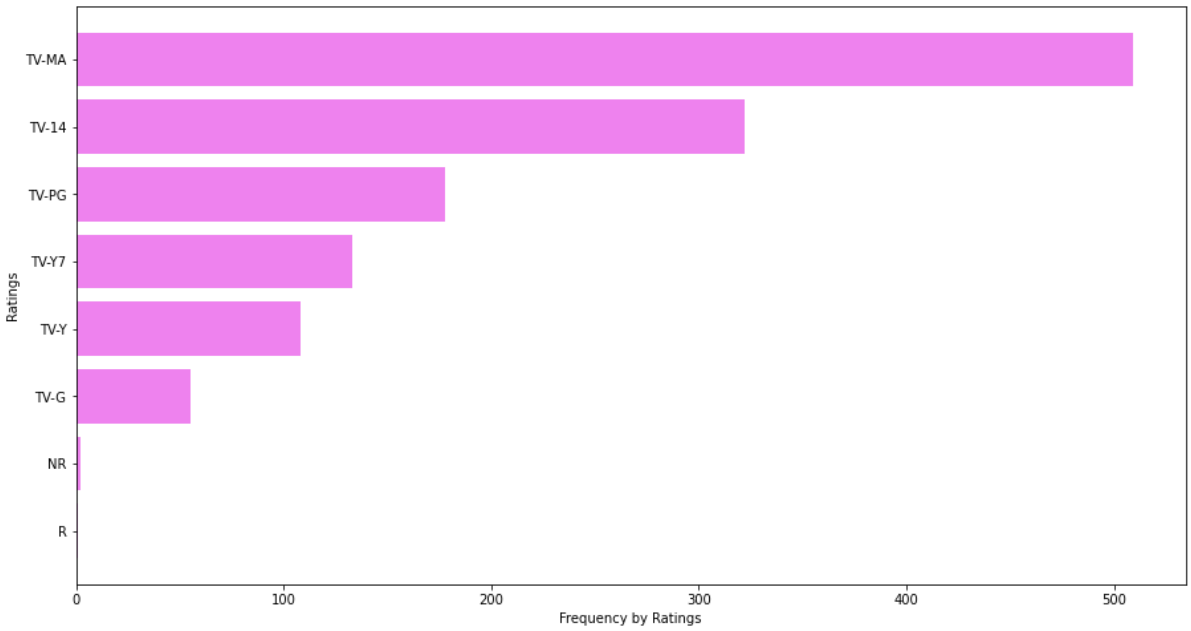
Dramas,Comedy, Kids 'TV Shows, International TV Shows and Docuseries, Genres are popular in TV Series in USA

In [ ]:
```
df_genre=df_usa_movies.groupby(['Genre']).agg({"title":"nunique"}).
plt.figure(figsize=(15,8))
plt.barh(df_genre[::-1]['Genre'], df_genre[::-1]['title'],color=['o
plt.xlabel('Frequency of Genres')
plt.ylabel('Genres')
plt.show()
```

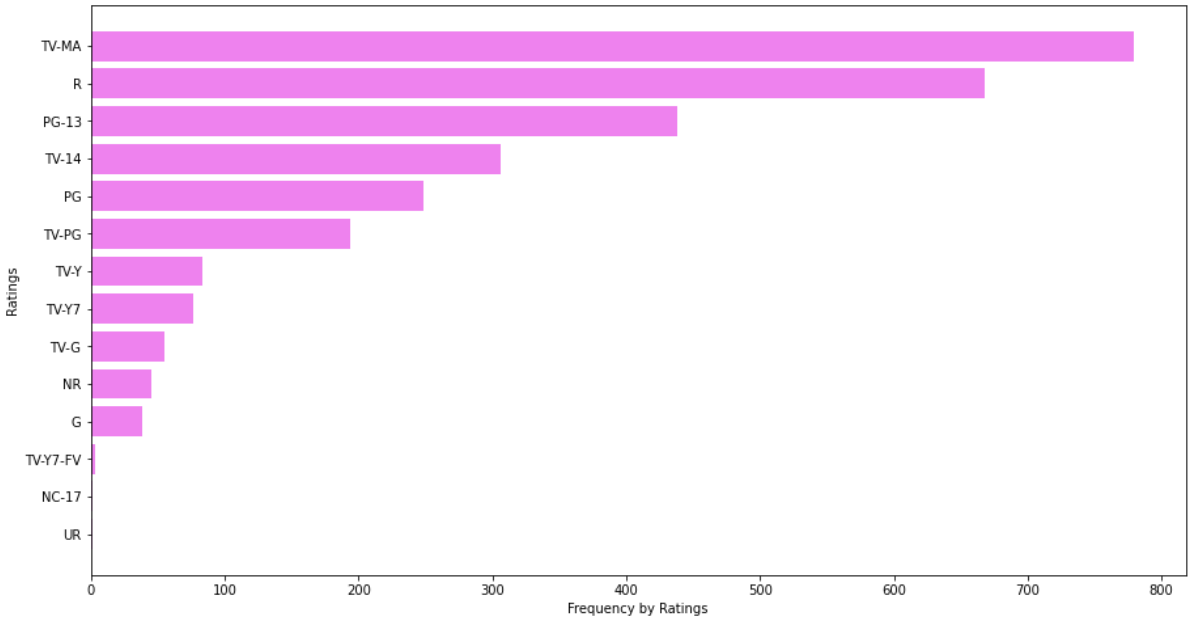


Dramas,Comedy, Documentaries, Family Movies and Action Genres in Movies are popular in USA

In [ ]:
```
df_rating=df_usa_shows.groupby(['rating']).agg({"title":"nunique"})
plt.figure(figsize=(15,8))
plt.barh(df_rating[::-1]['rating'], df_rating[::-1]['title'],color=
plt.xlabel('Frequency by Ratings')
plt.ylabel('Ratings')
plt.show()
```

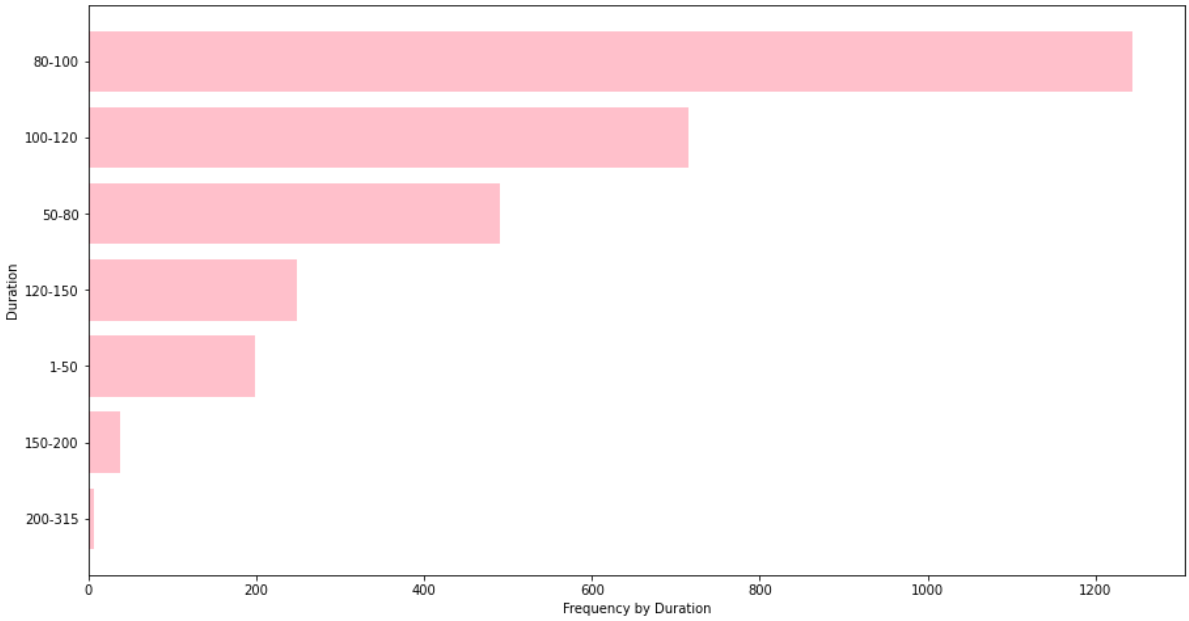


In [ ]:
```
df_rating=df_usa_movies.groupby(['rating']).agg({"title":"nunique"}
plt.figure(figsize=(15,8))
plt.barh(df_rating[::-1]['rating'], df_rating[::-1]['title'],color=
plt.xlabel('Frequency by Ratings')
plt.ylabel('Ratings')
plt.show()
```



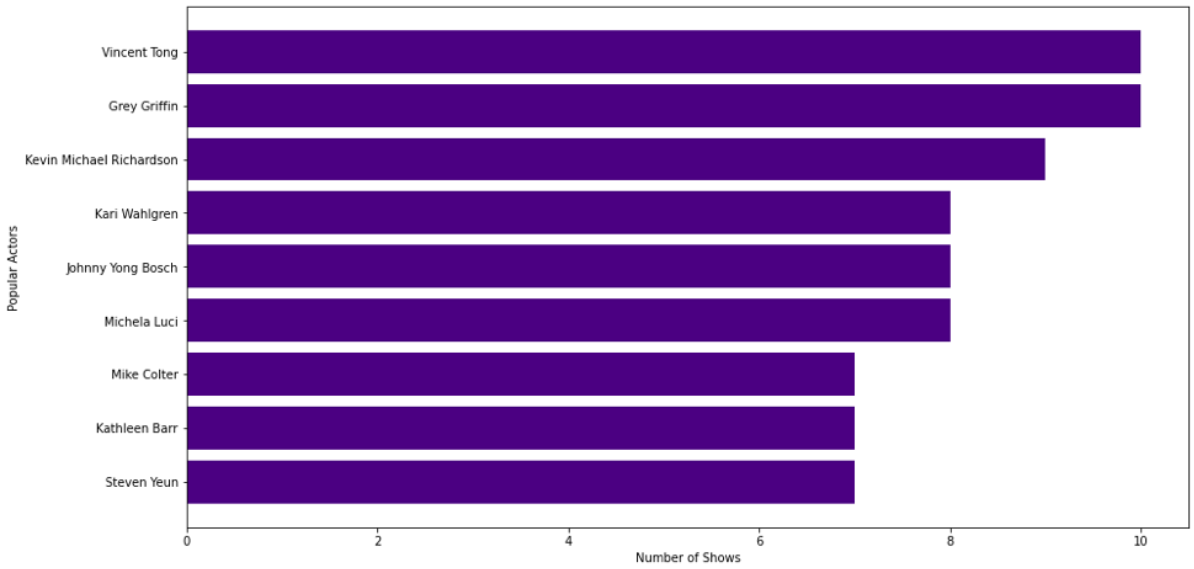
So it seems plaussible to conclude that the popular ratings across Netflix includes Mature Audiences and those appropriate for over 14/over 17 ages in both Movies and TV Shows in USA

In [ ]:
```
df_duration=df_usa_movies.groupby(['duration']).agg({"title":"nuniq
plt.figure(figsize=(15,8))
plt.barh(df_duration[::-1]['duration'], df_duration[::-1]['title'],
plt.xlabel('Frequency by Duration')
plt.ylabel('Duration')
plt.show()
```



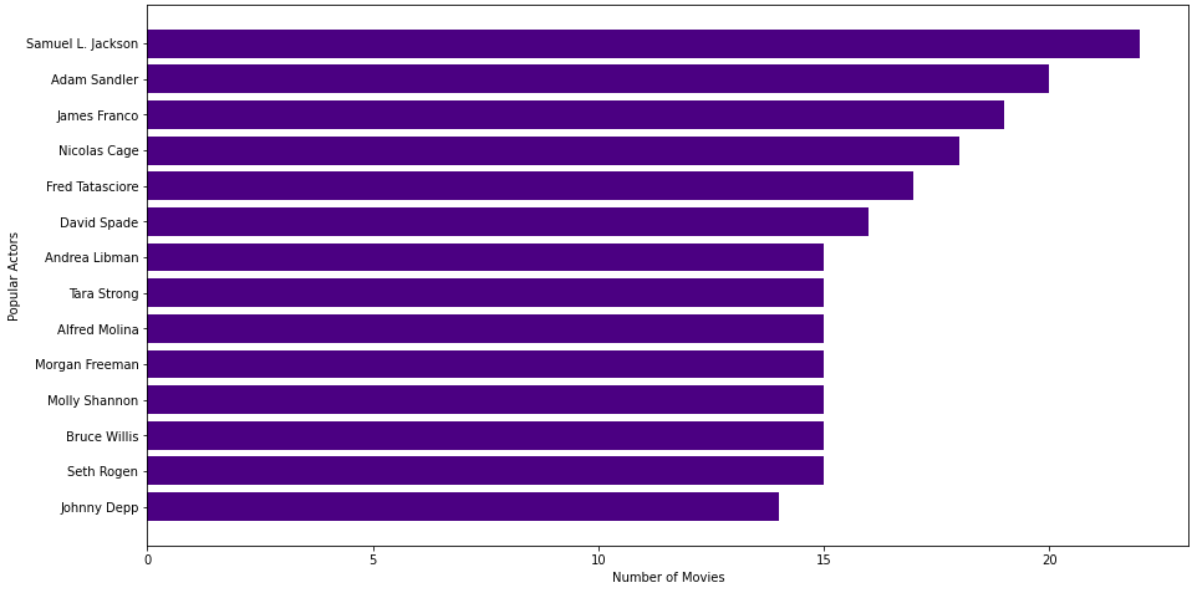
Across movies 80-100,100-120 is the ranges of minutes for which most movies lie. So quite possibly 80-120 mins is the sweet spot we would be wanting for movies in USA

In [ ]:
```
df_actors=df_usa_shows.groupby(['Actors']).agg({"title":"nunique"})
df_actors=df_actors[df_actors['Actors']!='Unknown Actor']
plt.figure(figsize=(15,8))
plt.barh(df_actors[::-1]['Actors'], df_actors[::-1]['title'],color=
plt.xlabel('Number of Shows')
plt.ylabel('Popular Actors')
plt.show()
```



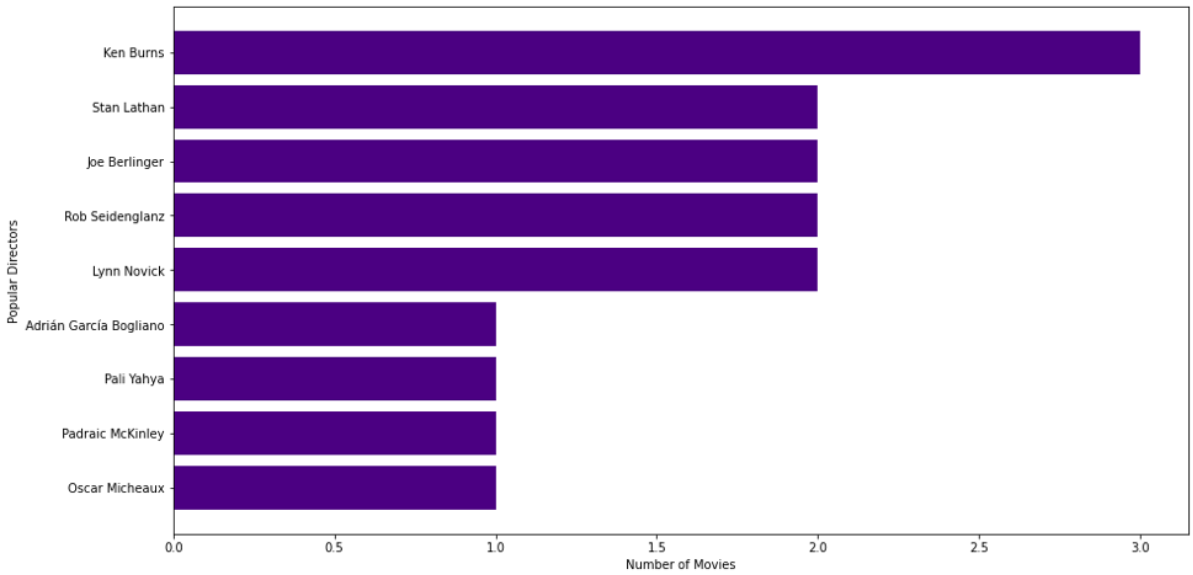
Vincent Tong,Grey Griffin and Kevin Richardson are the most popular actors across TV Shows in USA

In [ ]:
```
df_actors=df_usa_movies.groupby(['Actors']).agg({"title":"nunique"}
df_actors=df_actors[df_actors['Actors']!='Unknown Actor']
plt.figure(figsize=(15,8))
plt.barh(df_actors[::-1]['Actors'], df_actors[::-1]['title'],color=
plt.xlabel('Number of Movies')
plt.ylabel('Popular Actors')
plt.show()
```



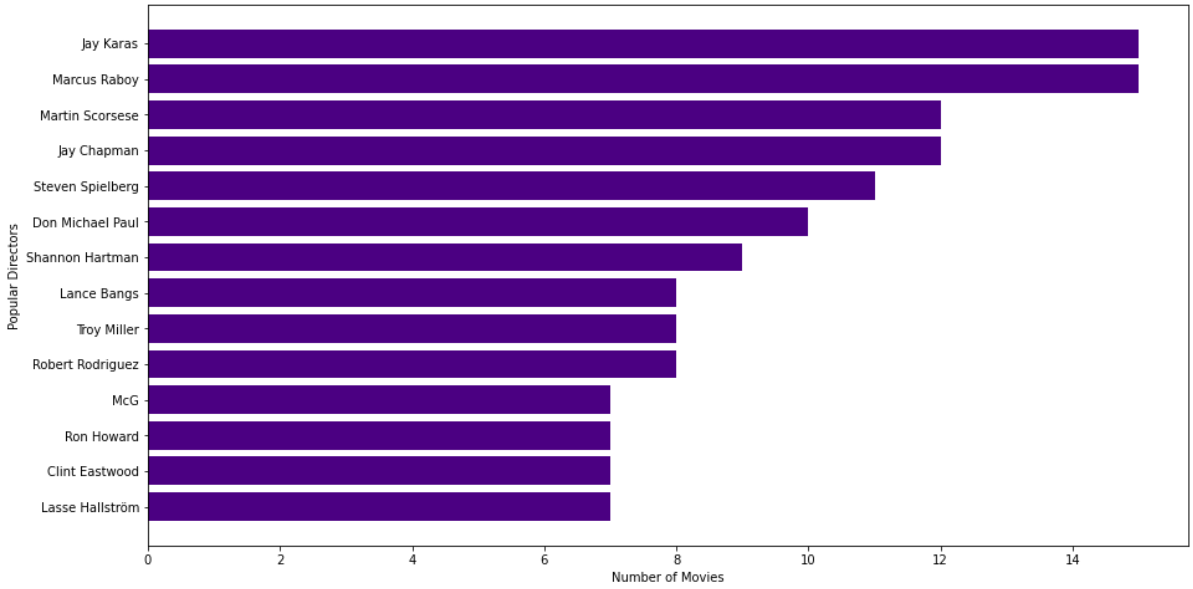
Samuel Jackson,Adam Sandler,James Franco and Nicolas Cage are very much popular across movies on Netflix in USA

In [ ]:
```
df_directors=df_usa_shows.groupby(['Directors']).agg({"title":"nuni
df_directors=df_directors[df_directors['Directors']!='Unknown Direc
plt.figure(figsize=(15,8))
plt.barh(df_directors[::-1]['Directors'], df_directors[::-1]['title
plt.xlabel('Number of Movies')
plt.ylabel('Popular Directors')
plt.show()
```



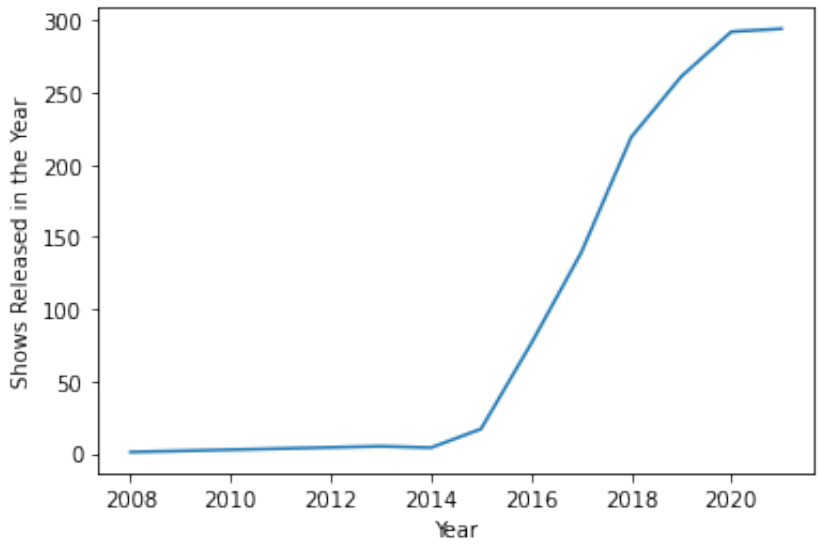
Ken Burns,Stan Lathan, Joe Barlinger are popular directors across TV Shows on Netflix in USA

In [ ]:
```
df_directors=df_usa_movies.groupby(['Directors']).agg({"title":"nun
df_directors=df_directors[df_directors['Directors']!='Unknown Direc
plt.figure(figsize=(15,8))
plt.barh(df_directors[::-1]['Directors'], df_directors[::-1]['title
plt.xlabel('Number of Movies')
plt.ylabel('Popular Directors')
plt.show()
```

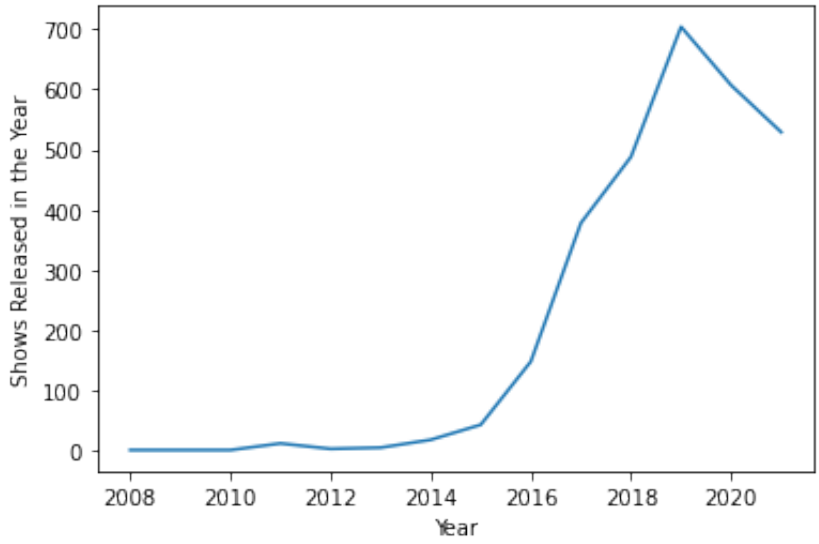


Jay Karas,Marcus Raboy,Martin Scorcese and Jay Chapman are popular directors across movies in USA

In [ ]:
```
df_year=df_usa_shows.groupby(['year']).agg({"title":"nunique"}).res
sns.lineplot(data=df_year, x='year', y='title')
plt.ylabel("Shows Released in the Year")
plt.xlabel("Year")
plt.show()
```

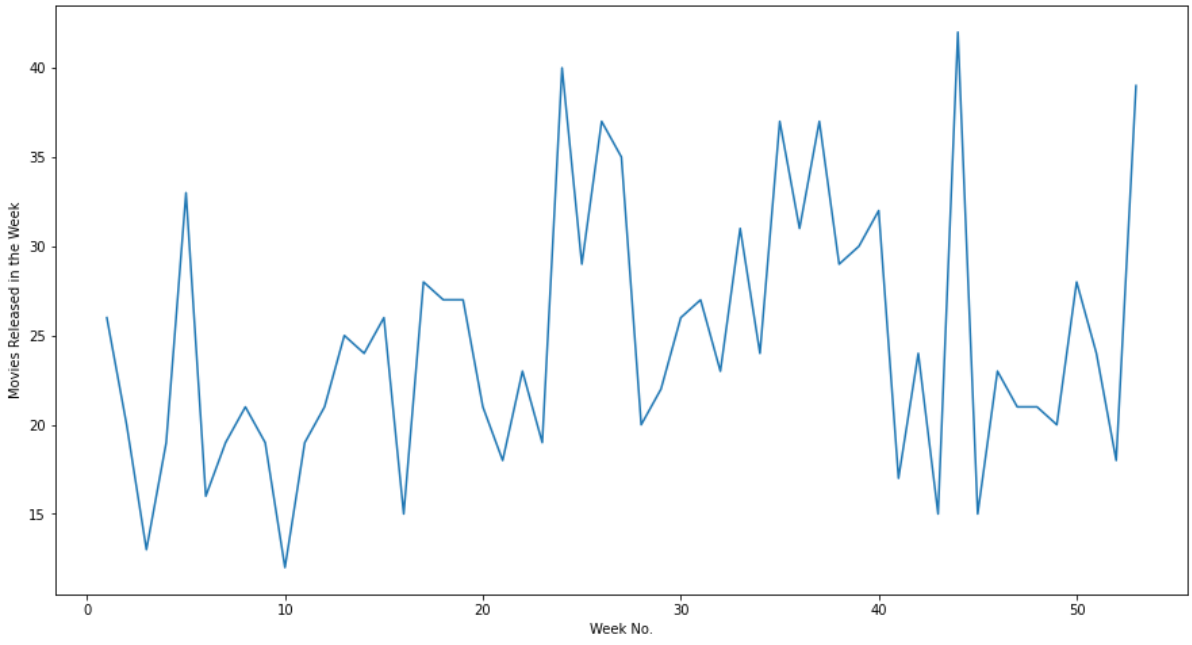


In [ ]:
```
df_year=df_usa_movies.groupby(['year']).agg({"title":"nunique"}).re
sns.lineplot(data=df_year, x='year', y='title')
plt.ylabel("Shows Released in the Year")
plt.xlabel("Year")
plt.show()
```

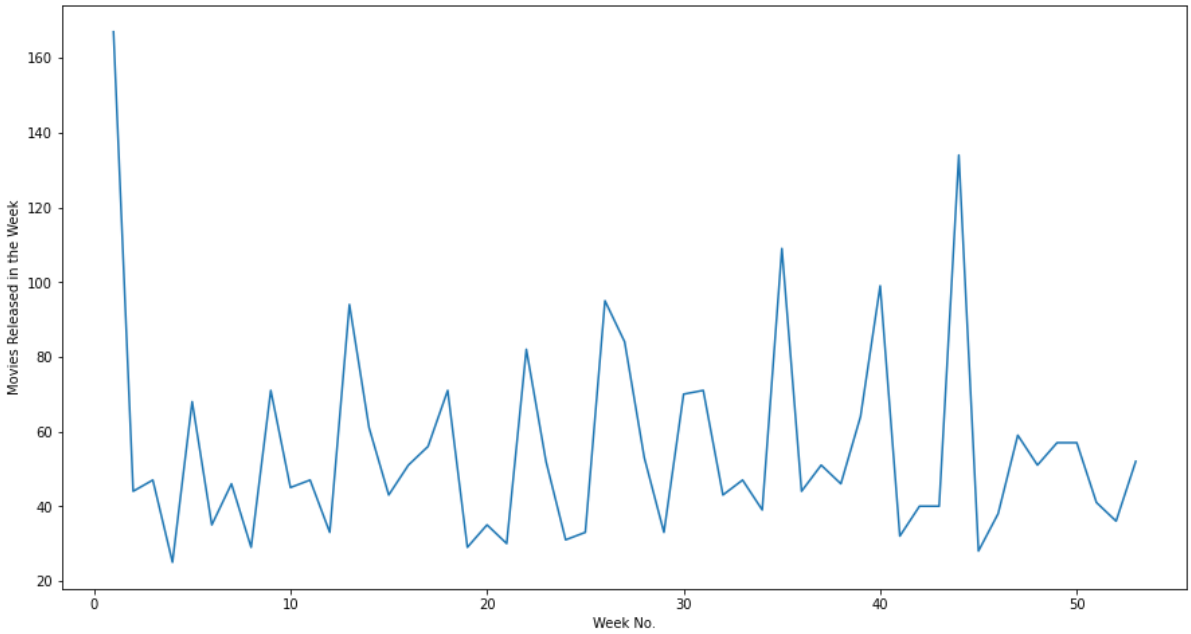


In USA, number of shows remained the same in 2021 as they were in 2020 while number of movies declined:

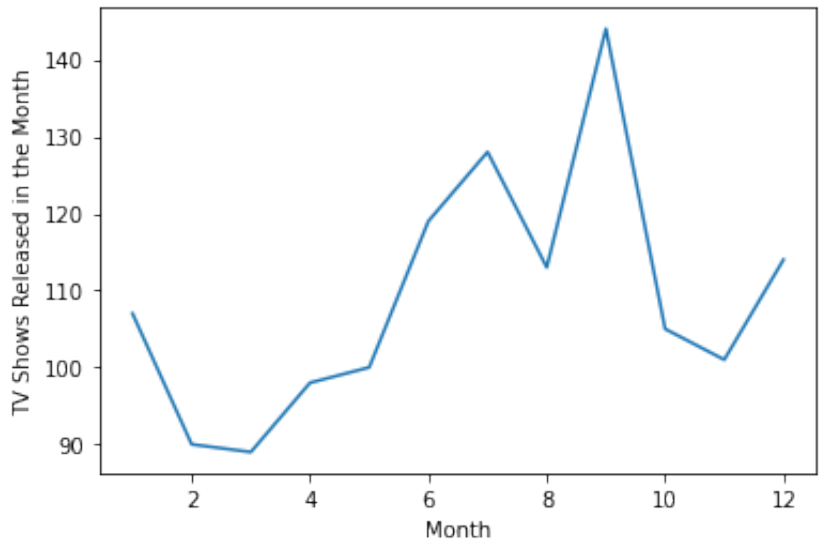
In [ ]:
```
df_week=df_usa_shows.groupby(['week_Added']).agg({"title":"nunique"
plt.figure(figsize=(15,8))
sns.lineplot(data=df_week, x='week_Added', y='title')
plt.ylabel("Movies Released in the Week")
plt.xlabel("Week No.")
plt.show()
```



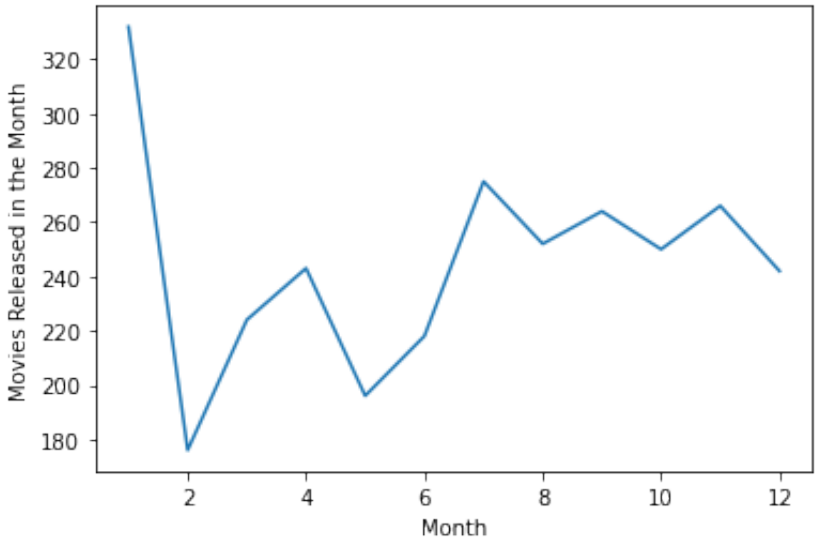
In [ ]:
```
df_week=df_usa_movies.groupby(['week_Added']).agg({"title":"nunique
plt.figure(figsize=(15,8))
sns.lineplot(data=df_week, x='week_Added', y='title')
plt.ylabel("Movies Released in the Week")
plt.xlabel("Week No.")
plt.show()
```



In [ ]:
```
df_month=df_usa_shows.groupby(['month_added']).agg({"title":"nuniqu
sns.lineplot(data=df_month, x='month_added', y='title')
plt.ylabel("TV Shows Released in the Month")
plt.xlabel("Month")
plt.show()
```



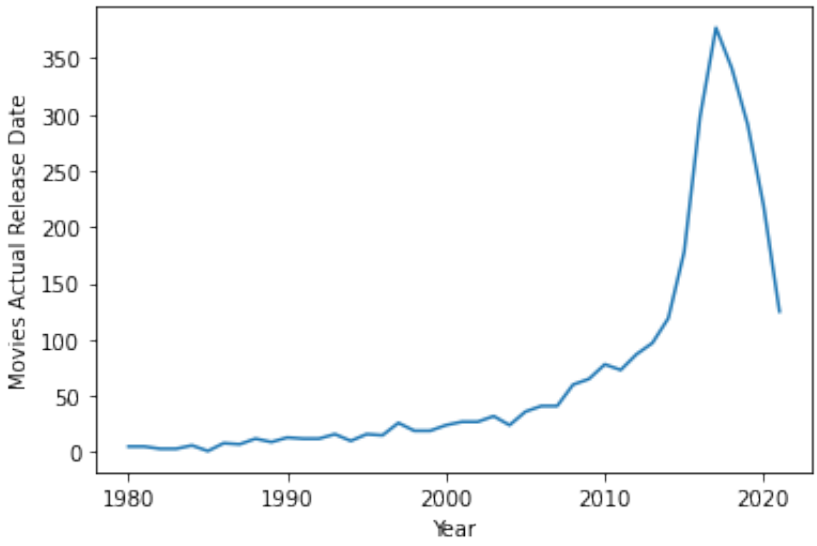
In [ ]:
```
df_month=df_usa_movies.groupby(['month_added']).agg({"title":"nuniq
sns.lineplot(data=df_month, x='month_added', y='title')
plt.ylabel("Movies Released in the Month")
plt.xlabel("Month")
plt.show()
```



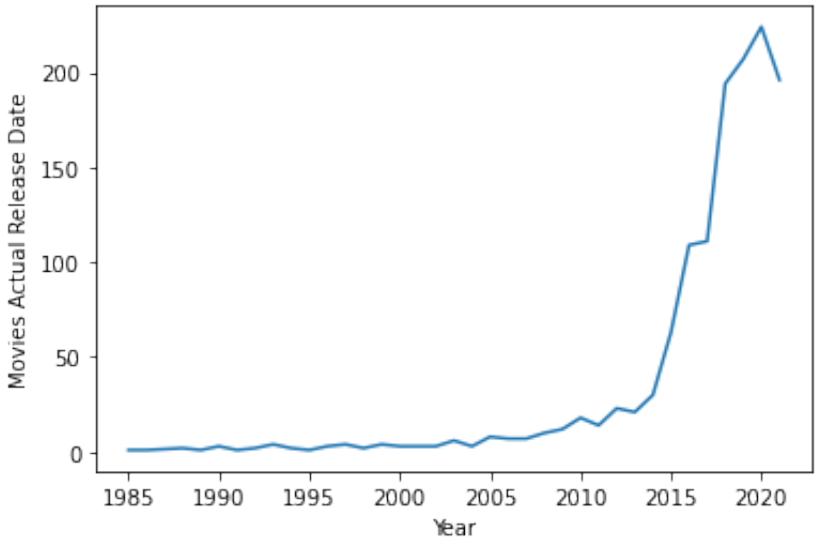
TV Shows are added in Netflix by a tremendous amount in July and September in USA

Movies are added in Netflix in USA by a tremendous amount in first week/last month of current year and first month of next year

In [ ]:
```
df_release_year=df_usa_movies[df_usa_movies['release_year']>=1980].
sns.lineplot(data=df_release_year, x='release_year', y='title')
plt.ylabel("Movies Actual Release Date")
plt.xlabel("Year")
plt.show()
```



In [ ]:
```
df_release_year=df_usa_shows[df_usa_shows['release_year']>=1980].gr
sns.lineplot(data=df_release_year, x='release_year', y='title')
plt.ylabel("Movies Actual Release Date")
plt.xlabel("Year")
plt.show()
```



In USA, though both Movies and Shows have reduced in 2021, the amount of decrease in number of TV Shows is small as compared to Movies

In [ ]:
```
df_usa_movies.head()
```

Out[99]:

	title	Actors	Directors	Genre	country	show_id	type	date_added
0	Dick Johnson Is Dead	Unknown Actor	Kirsten Johnson	Documentaries	United States	s1	Movie	September 25, 2021
159	My Little Pony: A New Generation	Vanessa Hudgens	Robert Cullen	Children & Family Movies	United States	s7	Movie	September 24, 2021
160	My Little Pony: A New Generation	Vanessa Hudgens	José Luis Ucha	Children & Family Movies	United States	s7	Movie	September 24, 2021
161	My Little Pony: A New Generation	Kimiko Glenn	Robert Cullen	Children & Family Movies	United States	s7	Movie	September 24, 2021
162	My Little Pony: A New Generation	Kimiko Glenn	José Luis Ucha	Children & Family Movies	United States	s7	Movie	September 24, 2021

In [ ]:
```
#Analysing a combination of actors and directors
df_usa_movies['Actor_Director_Combination'] = df_usa_movies.Actors.
df_usa_movies_subset=df_usa_movies[df_usa_movies['Actors']!='Unknow
df_usa_movies_subset=df_usa_movies_subset[df_usa_movies_subset['Dir
df_usa_movies_subset.head()
```

Out[100]:

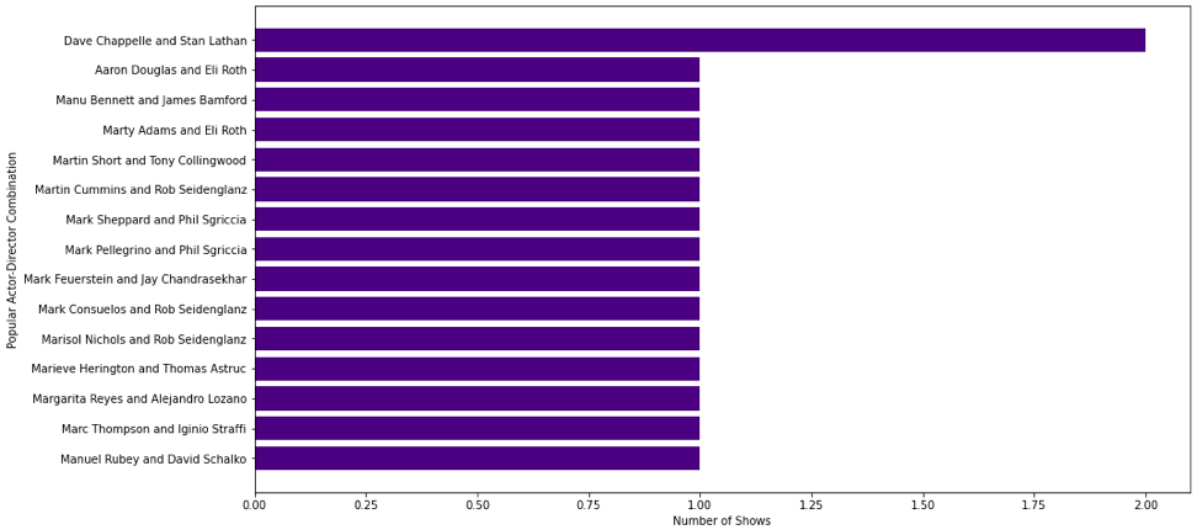
	title	Actors	Directors	Genre	country	show_id	type	date_added	releas
159	My Little Pony: A New Generation	Vanessa Hudgens	Robert Cullen	Children & Family Movies	United States	s7	Movie	September 24, 2021	
160	My Little Pony: A New Generation	Vanessa Hudgens	José Luis Ucha	Children & Family Movies	United States	s7	Movie	September 24, 2021	
161	My Little Pony: A New Generation	Kimiko Glenn	Robert Cullen	Children & Family Movies	United States	s7	Movie	September 24, 2021	
162	My Little Pony: A New Generation	Kimiko Glenn	José Luis Ucha	Children & Family Movies	United States	s7	Movie	September 24, 2021	
163	My Little Pony: A New Generation	James Marsden	Robert Cullen	Children & Family Movies	United States	s7	Movie	September 24, 2021	

In [ ]:
```
df_usa_shows['Actor_Director_Combination'] = df_usa_shows.Actors.st
df_usa_shows_subset=df_usa_shows[df_usa_shows['Actors']!='Unknown A
df_usa_shows_subset=df_usa_shows_subset[df_usa_shows_subset['Direct
df_usa_shows_subset.head()
```

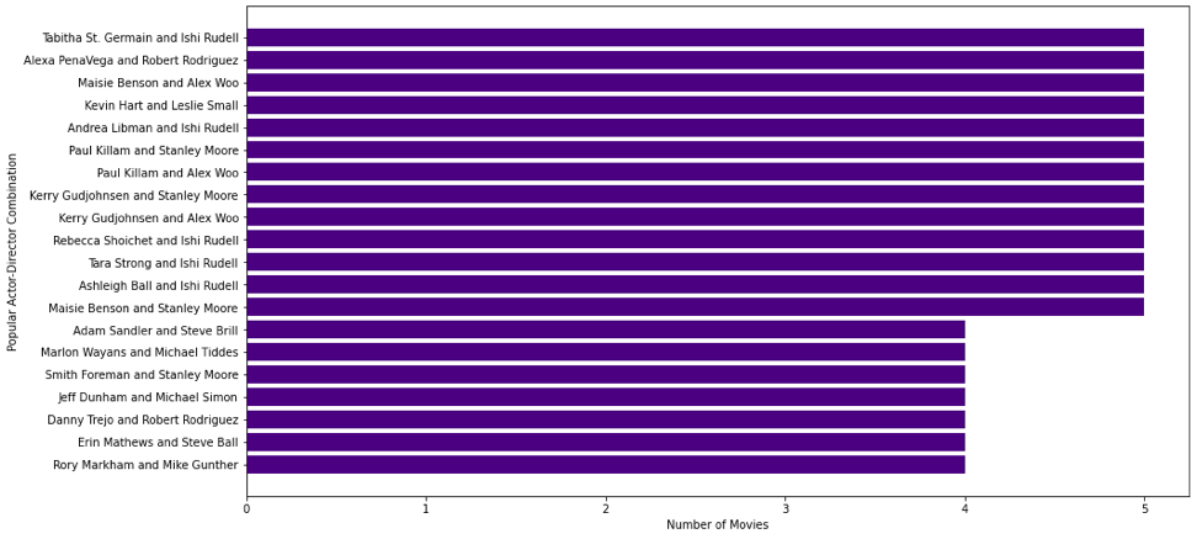
Out[101]:

	title	Actors	Directors	Genre	country	show_id	type	date_added	release_y
111	Midnight Mass	Kate Siegel	Mike Flanagan	TV Dramas	United States	s6	TV Show	September 24, 2021	2(
112	Midnight Mass	Kate Siegel	Mike Flanagan	TV Horror	United States	s6	TV Show	September 24, 2021	2(
113	Midnight Mass	Kate Siegel	Mike Flanagan	TV Mysteries	United States	s6	TV Show	September 24, 2021	2(
114	Midnight Mass	Zach Gilford	Mike Flanagan	TV Dramas	United States	s6	TV Show	September 24, 2021	2(
115	Midnight Mass	Zach Gilford	Mike Flanagan	TV Horror	United States	s6	TV Show	September 24, 2021	2(

In [ ]:
```
df_actors_directors=df_usa_shows_subset.groupby(['Actor_Director_Co
plt.figure(figsize=(15,8))
plt.barh(df_actors_directors[::-1]['Actor_Director_Combination'], d
plt.xlabel('Number of Shows')
plt.ylabel('Popular Actor-Director Combination')
plt.show()
```



In [ ]:
```
df_actors_directors=df_usa_movies_subset.groupby(['Actor_Director_C
plt.figure(figsize=(15,8))
plt.barh(df_actors_directors[::-1]['Actor_Director_Combination'], d
plt.xlabel('Number of Movies')
plt.ylabel('Popular Actor-Director Combination')
plt.show()
```



In [ ]:
```
df_actors_directors[::-1]['Actor_Director_Combination'].values
```

Out[183]:
```
array(['Rory Markham and Mike Gunther', 'Erin Mathews and Steve Ball',
       'Danny Trejo and Robert Rodriguez',
       'Jeff Dunham and Michael Simon', 'Smith Foreman and Stanley Moore',
       'Marlon Wayans and Michael Tiddes', 'Adam Sandler and Steve Brill',
       'Maisie Benson and Stanley Moore', 'Ashleigh Ball and Ishi Rudell',
       'Tara Strong and Ishi Rudell', 'Rebecca Shoichet and Ishi Rudell',
       'Kerry Gudjohnsen and Alex Woo',
       'Kerry Gudjohnsen and Stanley Moore', 'Paul Killam and Alex Woo',
       'Paul Killam and Stanley Moore', 'Andrea Libman and Ishi Rudell',
       'Kevin Hart and Leslie Small', 'Maisie Benson and Alex Woo',
       'Alexa PenaVega and Robert Rodriguez',
       'Tabitha St. Germain and Ishi Rudell'], dtype=object)
```

The Most Popular Actor Director Combination in Movies Across USA are:-

'Smith Foreman and Stanley Moore',
'Marlon Wayans and Michael Tiddes',
'Adam Sandler and Steve Brill',
'Maisie Benson and Stanley Moore',
'Ashleigh Ball and Ishi Rudell',
'Tara Strong and Ishi Rudell',
'Rebecca Shoichet and Ishi Rudell',
'Kerry Gudjohnsen and Alex Woo',
'Kerry Gudjohnsen and Stanley Moore',
'Paul Killam and Alex Woo',
'Paul Killam and Stanley Moore',
'Andrea Libman and Ishi Rudell',
'Kevin Hart and Leslie Small',
'Maisie Benson and Alex Woo',
'Alexa PenaVega and Robert Rodriguez',
'Tabitha St. Germain and Ishi Rudell'

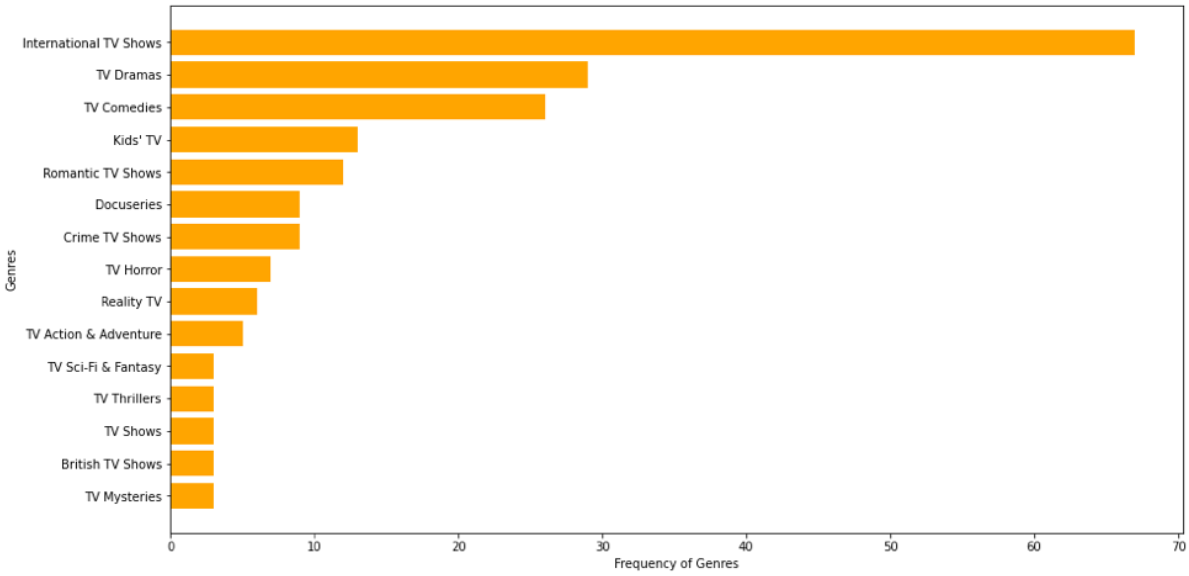
The Second Most Popular Actor Director Combination in Movies Across USA are:-

'Rory Markham and Mike Gunther',
'Erin Mathews and Steve Ball',
'Danny Trejo and Robert Rodriguez',
'Jeff Dunham and Michael Simon'

Univariate Analysis separately for shows and movies in India

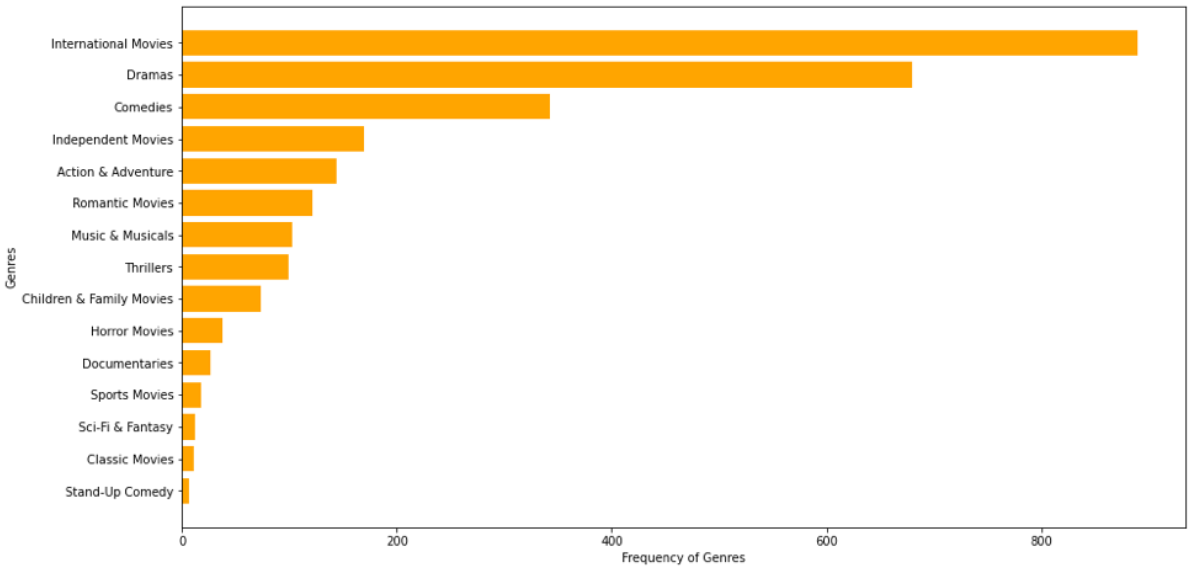
In [ ]:
```
#Analyzing India for both shows and movies
df_india_shows=df_final1[df_final1['country']=='India'][df_final1[d
df_india_movies=df_final1[df_final1['country']=='India'][df_final1[
```

In [ ]:
```
df_genre=df_india_shows.groupby(['Genre']).agg({"title":"nunique"})
plt.figure(figsize=(15,8))
plt.barh(df_genre[::-1]['Genre'], df_genre[::-1]['title'],color=['o
plt.xlabel('Frequency of Genres')
plt.ylabel('Genres')
plt.show()
```



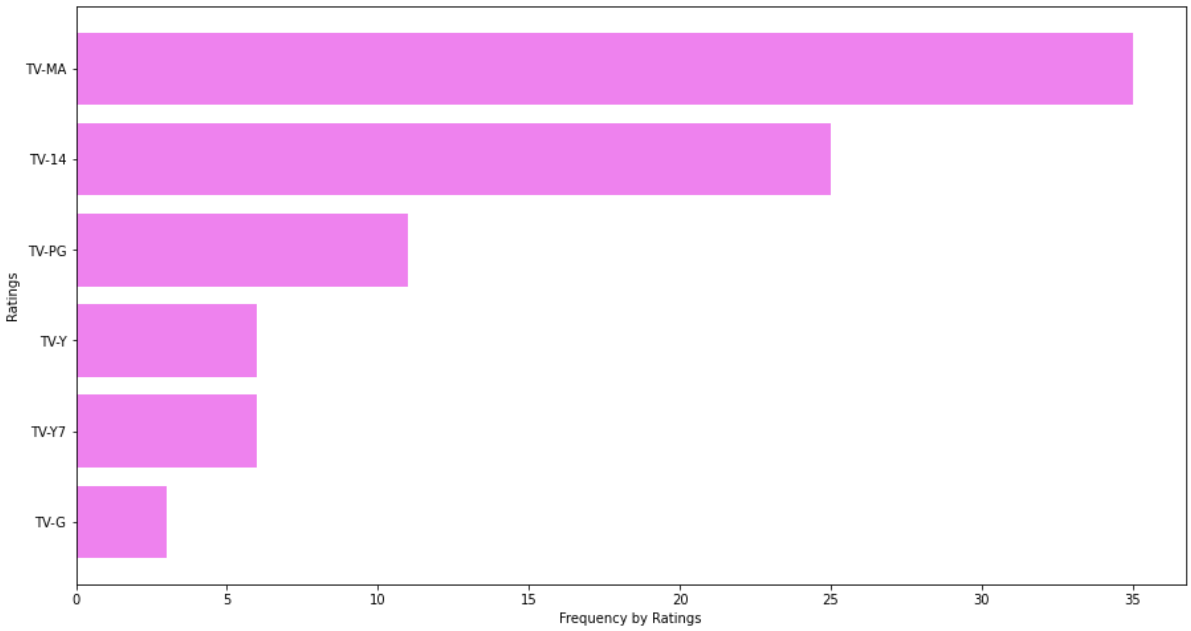
Dramas,Comedy, Kids 'TV Shows and International TV Shows Genres are popular in TV Series in India

In [ ]:
```
df_genre=df_india_movies.groupby(['Genre']).agg({"title":"nunique"}
plt.figure(figsize=(15,8))
plt.barh(df_genre[::-1]['Genre'], df_genre[::-1]['title'],color=['o
plt.xlabel('Frequency of Genres')
plt.ylabel('Genres')
plt.show()
```

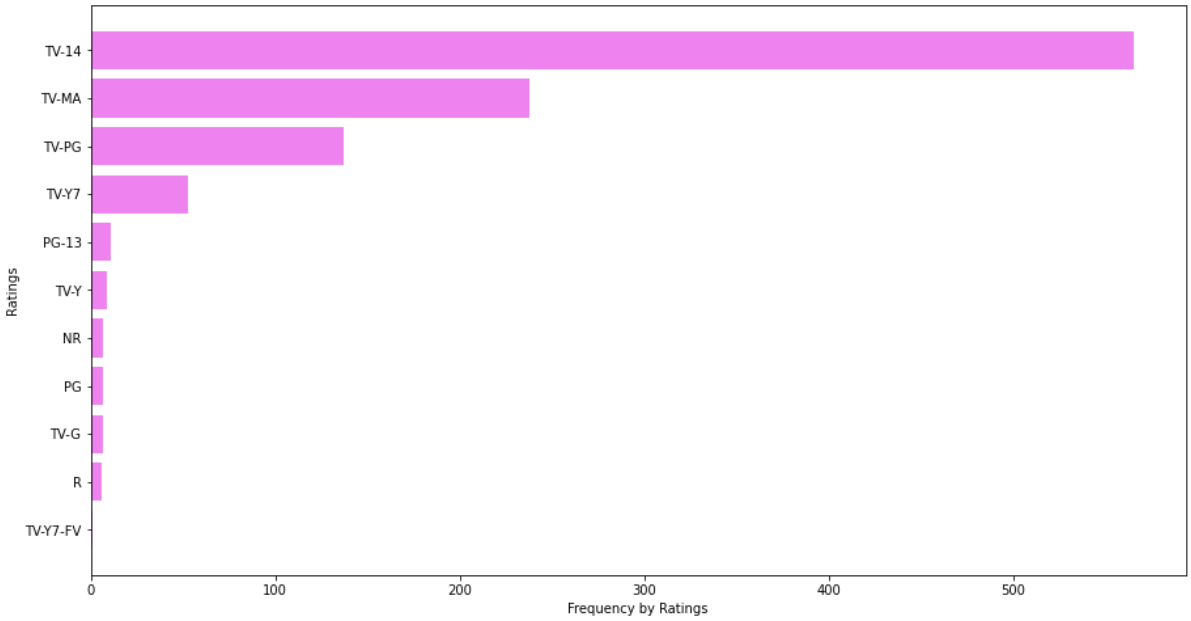


International Movies,Drama,Comedy,Indpeendent Movies and Action, Romance Genres are prevalent in India

In [ ]:
```
df_rating=df_india_shows.groupby(['rating']).agg({"title":"nunique"
plt.figure(figsize=(15,8))
plt.barh(df_rating[::-1]['rating'], df_rating[::-1]['title'],color=
plt.xlabel('Frequency by Ratings')
plt.ylabel('Ratings')
plt.show()
```



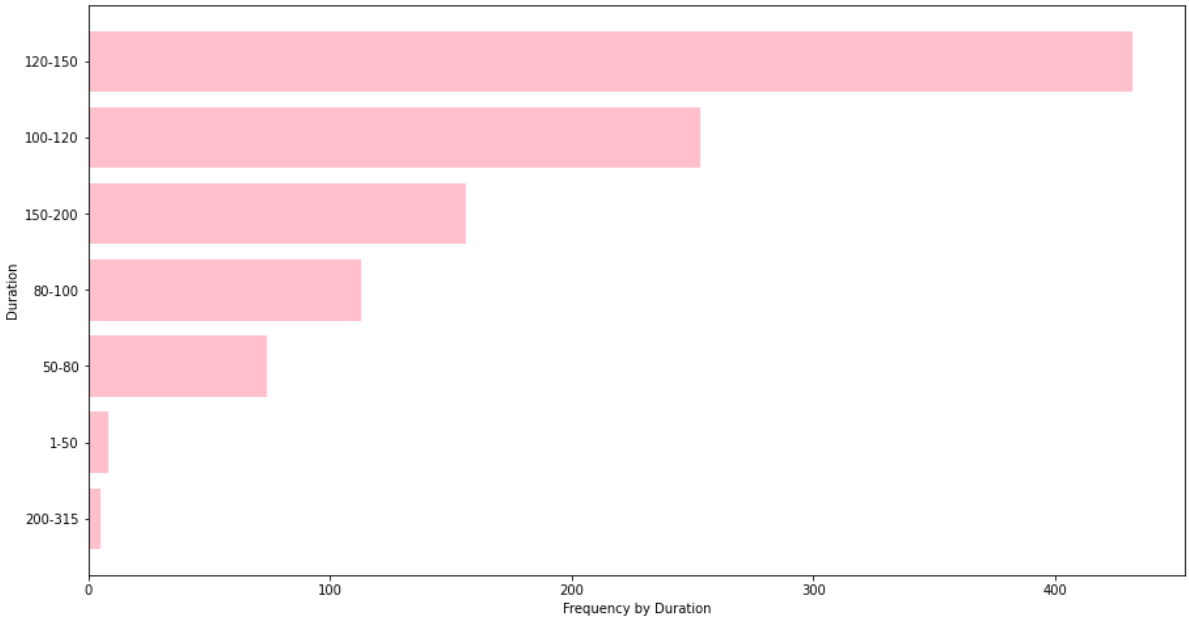
In [ ]:
```
df_rating=df_india_movies.groupby(['rating']).agg({"title":"nunique
plt.figure(figsize=(15,8))
plt.barh(df_rating[::-1]['rating'], df_rating[::-1]['title'],color=
plt.xlabel('Frequency by Ratings')
plt.ylabel('Ratings')
plt.show()
```



So it seems plaussible to conclude that the popular ratings across Netflix includes Mature Audiences in TV Shows and those appropriate for people over 14 in Movies in India.

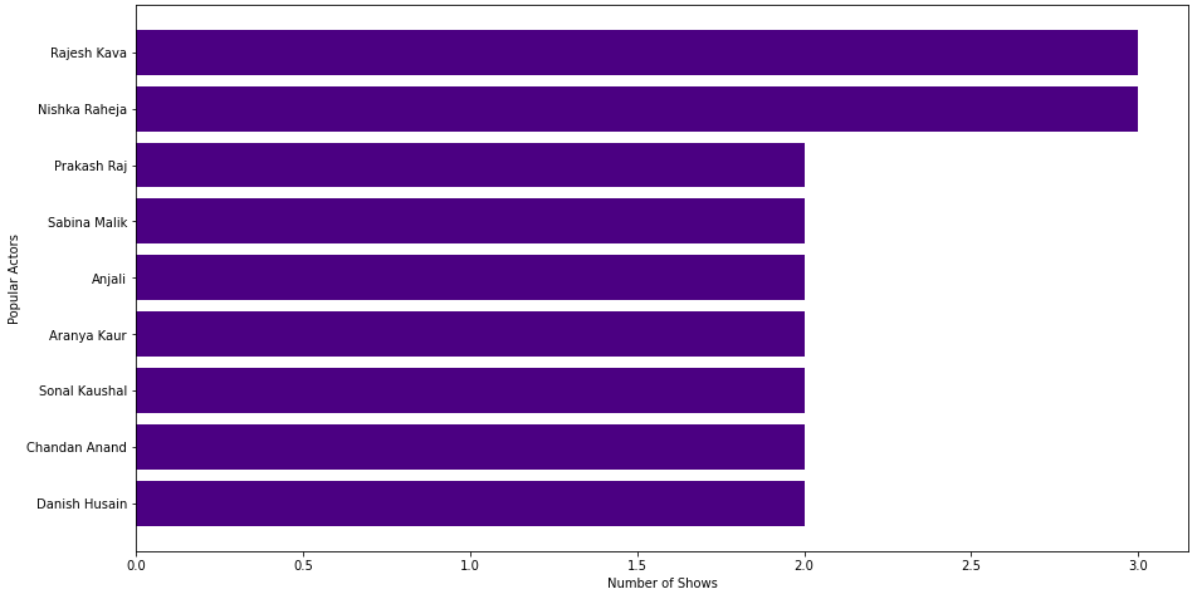
Now this indeed seems to be the case. Indian TV Shows in Netflix are without a shadow of doubt intended for Mature Audiences while Movies for over 14 years of age.

In [ ]:
```
df_duration=df_india_movies.groupby(['duration']).agg({"title":"nun
plt.figure(figsize=(15,8))
plt.barh(df_duration[::-1]['duration'], df_duration[::-1]['title'],
plt.xlabel('Frequency by Duration')
plt.ylabel('Duration')
plt.show()
```



Across movies ranges of minutes in India are comparatively greater than USA with a sweet spot at 120-150 mins.

In [ ]:
```
df_actors=df_india_shows.groupby(['Actors']).agg({"title":"nunique"
df_actors=df_actors[df_actors['Actors']!='Unknown Actor']
plt.figure(figsize=(15,8))
plt.barh(df_actors[::-1]['Actors'], df_actors[::-1]['title'],color=
plt.xlabel('Number of Shows')
plt.ylabel('Popular Actors')
plt.show()
```



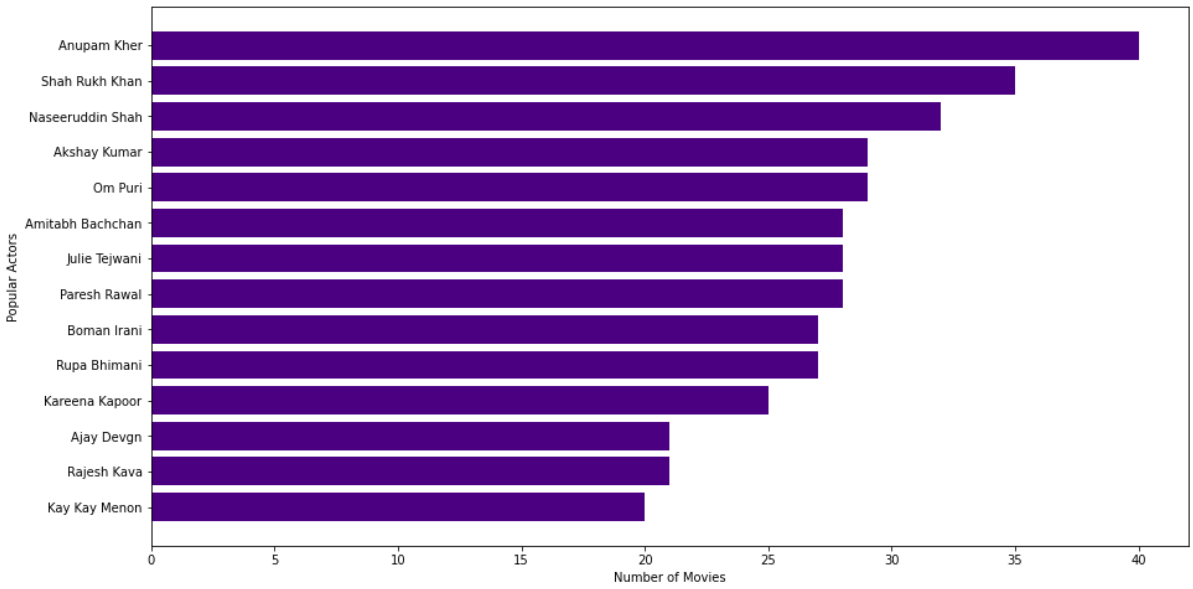
In [ ]:
```
df_actors['Actors'].values
```

Out[112]:
```
array(['Rajesh Kava', 'Nishka Raheja', 'Prakash Raj', 'Sabina Mali
k',
       'Anjali', 'Aranya Kaur', 'Sonal Kaushal', 'Chandan Anand',
       'Danish Husain'], dtype=object)
```

Popular Actors in TV Shows in India are:-

'Rajesh Kava',
'Nishka Raheja',
'Prakash Raj',
'Sabina Malik',
'Anjali',
'Aranya Kaur',
'Sonal Kaushal',
'Chandan Anand',
'Danish Husain'

In [ ]:
```
df_actors=df_india_movies.groupby(['Actors']).agg({"title":"nunique
df_actors=df_actors[df_actors['Actors']!='Unknown Actor']
plt.figure(figsize=(15,8))
plt.barh(df_actors[::-1]['Actors'], df_actors[::-1]['title'],color=
plt.xlabel('Number of Movies')
plt.ylabel('Popular Actors')
plt.show()
```



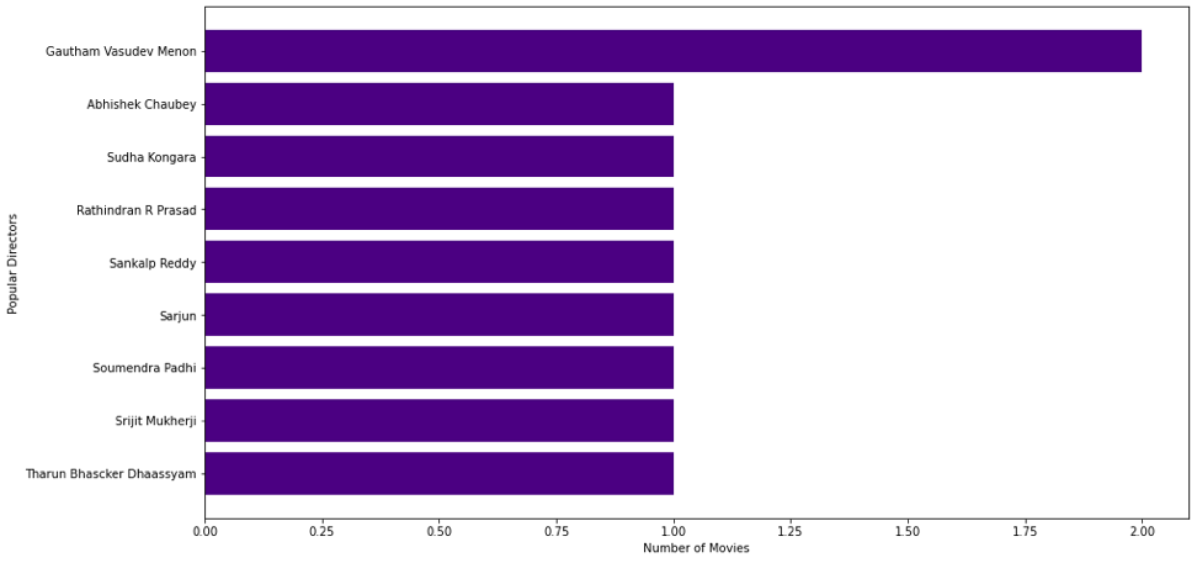
In [ ]:
```
df_actors['Actors'].values
```

Out[114]:
```
array(['Anupam Kher', 'Shah Rukh Khan', 'Naseeruddin Shah',
       'Akshay Kumar', 'Om Puri', 'Amitabh Bachchan', 'Julie Tejwa
ni',
       'Paresh Rawal', 'Boman Irani', 'Rupa Bhimani', 'Kareena Kap
oor',
       'Ajay Devgn', 'Rajesh Kava', 'Kay Kay Menon'], dtype=object
)
```

Popular actors across Movies in India:-

'Anupam Kher',
'Shah Rukh Khan',
'Naseeruddin Shah',
'Akshay Kumar',
'Om Puri',
'Paresh Rawal',
'Julie Tejwani',
'Amitabh Bachchan',
'Boman Irani',
'Rupa Bhimani',
'Kareena Kapoor',
'Ajay Devgn',
'Rajesh Kava',
'Kay Kay Menon'

In [ ]:
```
df_directors=df_india_shows.groupby(['Directors']).agg({"title":"nu
df_directors=df_directors[df_directors['Directors']!='Unknown Direc
plt.figure(figsize=(15,8))
plt.barh(df_directors[::-1]['Directors'], df_directors[::-1]['title
plt.xlabel('Number of Movies')
plt.ylabel('Popular Directors')
plt.show()
```



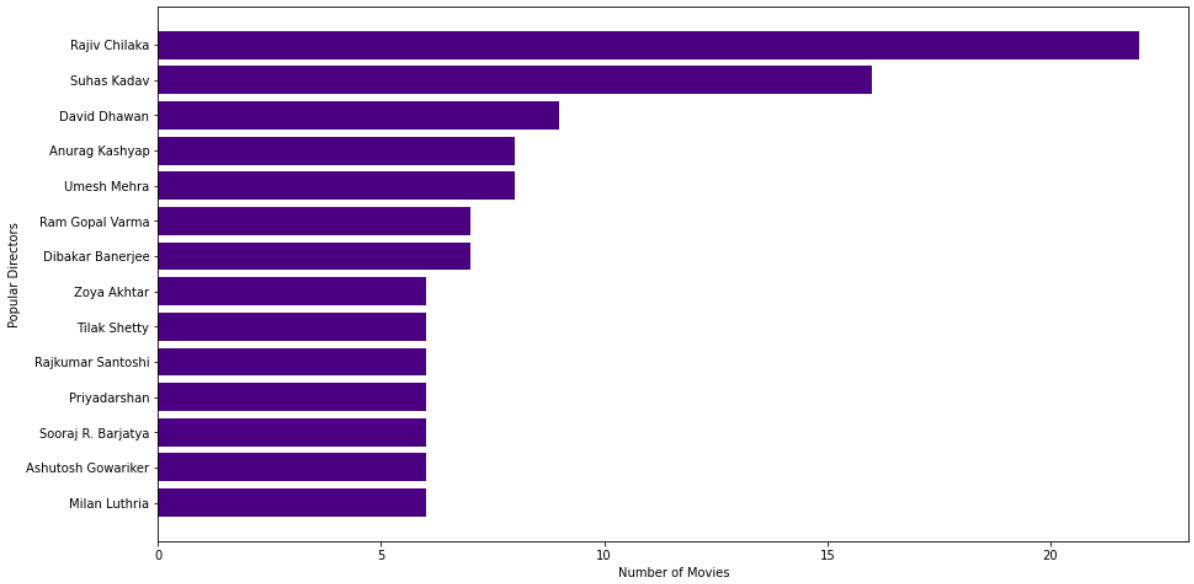
In [ ]:
```
df_directors['Directors'].values
```

Out[116]:
```
array(['Gautham Vasudev Menon', 'Abhishek Chaubey', 'Sudha Kongara
',
       'Rathindran R Prasad', 'Sankalp Reddy', 'Sarjun',
       'Soumendra Padhi', 'Srijit Mukherji', 'Tharun Bhascker Dhaa
ssyam'],
      dtype=object)
```

Popular Directors Across Movies in India:-

'Gautham Vasudev Menon',
'Abhishek Chaubey',
'Sudha Kongara',
'Rathindran R Prasad',
'Sankalp Reddy',
'Sarjun',
'Soumendra Padhi',
'Srijit Mukherji',
'Tharun Bhascker Dhaassyam'

In [ ]:
```
df_directors=df_india_movies.groupby(['Directors']).agg({"title":"n
df_directors=df_directors[df_directors['Directors']!='Unknown Direc
plt.figure(figsize=(15,8))
plt.barh(df_directors[::-1]['Directors'], df_directors[::-1]['title
plt.xlabel('Number of Movies')
plt.ylabel('Popular Directors')
plt.show()
```



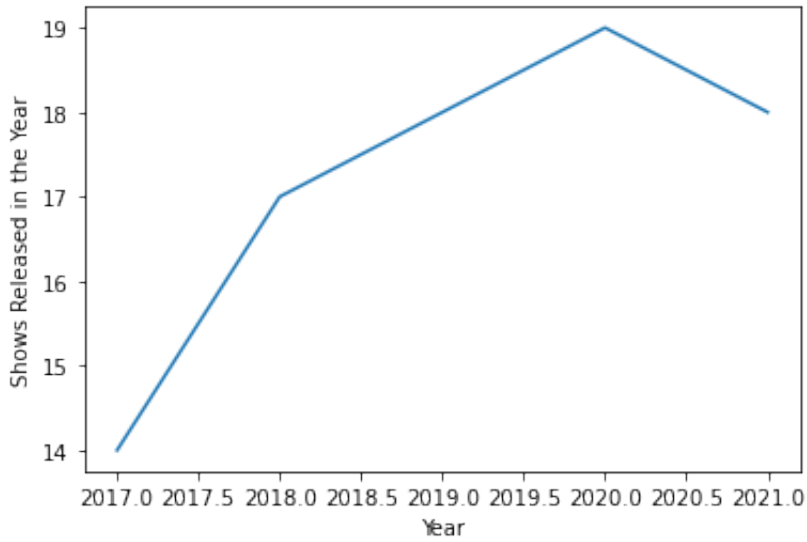
In [ ]:
```
df_directors['Directors'].values
```

Out[118]:
```
array(['Rajiv Chilaka', 'Suhas Kadav', 'David Dhawan', 'Anurag Kas
hyap',
       'Umesh Mehra', 'Ram Gopal Varma', 'Dibakar Banerjee',
       'Zoya Akhtar', 'Tilak Shetty', 'Rajkumar Santoshi', 'Priyad
arshan',
       'Sooraj R. Barjatya', 'Ashutosh Gowariker', 'Milan Luthria'
],
      dtype=object)
```

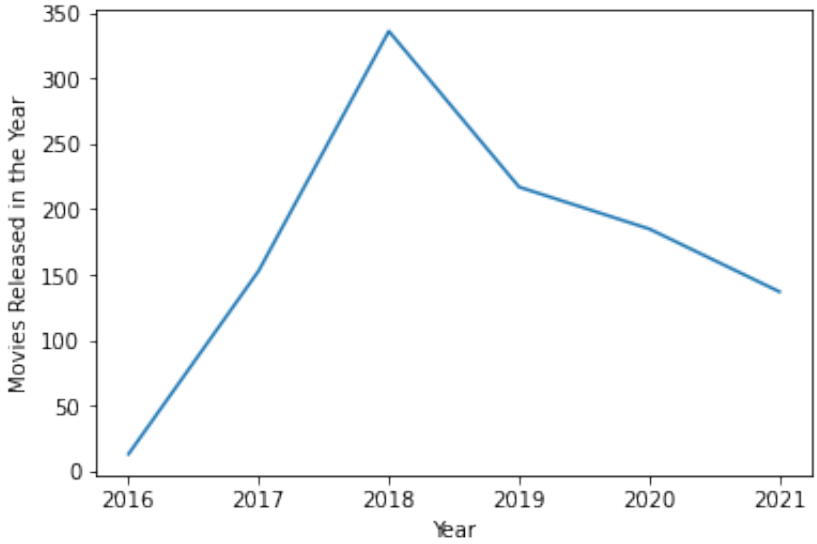
Popular directors across movies in India:-

'Rajiv Chilaka',
'Suhas Kadav',
'David Dhawan',
'Umesh Mehra',
'Anurag Kashyap',
'Ram Gopal Varma',
'Dibakar Banerjee',
'Zoya Akhtar',
'Tilak Shetty',
'Rajkumar Santoshi',
'Priyadarshan',
'Sooraj R. Barjatya',
'Ashutosh Gowariker',
'Milan Luthria'

In [ ]:
```
df_year=df_india_shows.groupby(['year']).agg({"title":"nunique"}).r
sns.lineplot(data=df_year, x='year', y='title')
plt.ylabel("Shows Released in the Year")
plt.xlabel("Year")
plt.show()
```



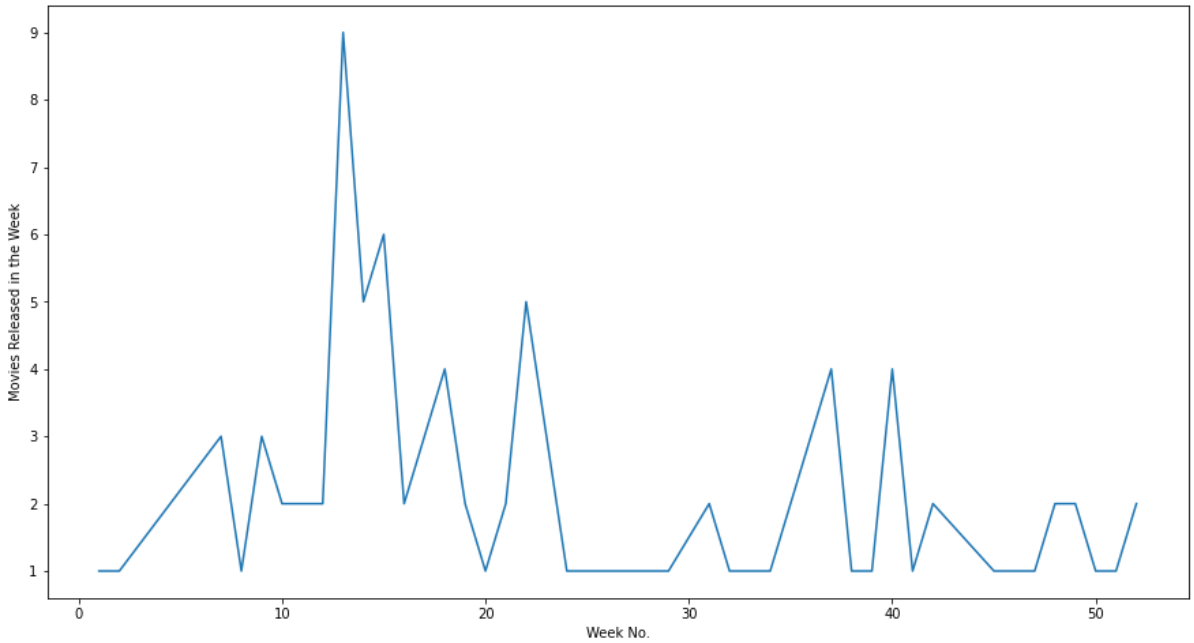
In [ ]:
```
df_year=df_india_movies.groupby(['year']).agg({"title":"nunique"}).
sns.lineplot(data=df_year, x='year', y='title')
plt.ylabel("Movies Released in the Year")
plt.xlabel("Year")
plt.show()
```



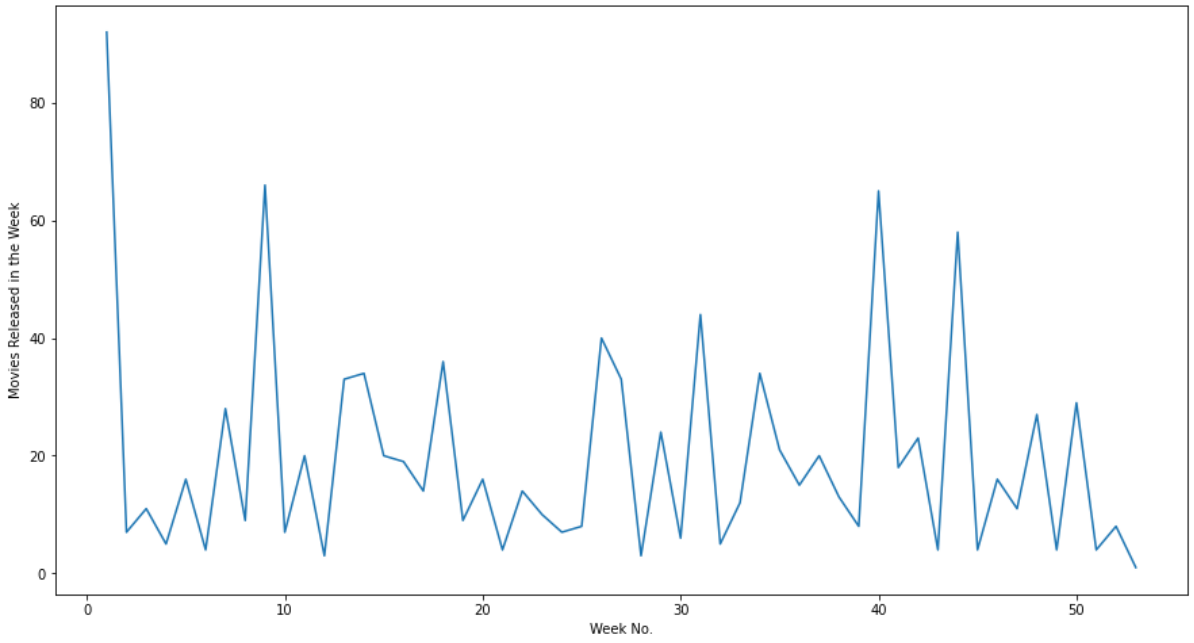
In India,TV Shows were increasingly being added till 2020, though the addition of shows reduced in 2021.

In India, Movies were increasingly added till 2018 but it has been a huge downhill since then. Now that's preposterous, since and soemthing has to be recommended to the Netflix Team with regards to that.

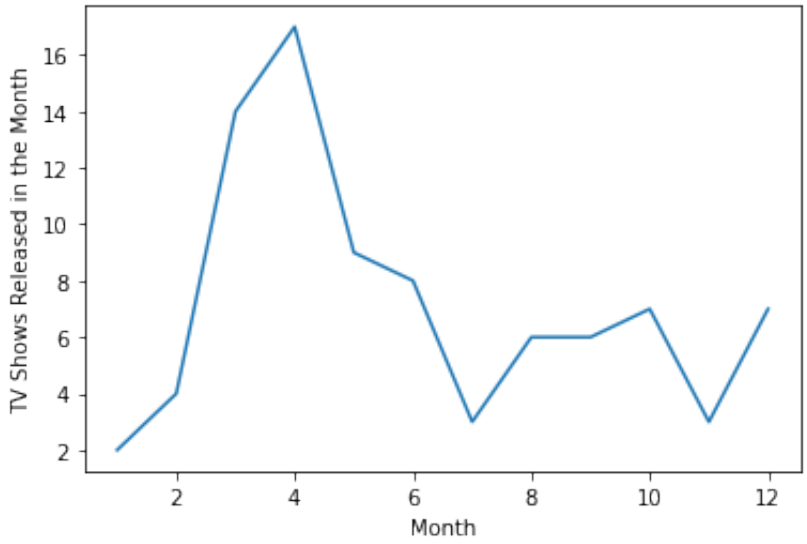
In [ ]:
```
df_week=df_india_shows.groupby(['week_Added']).agg({"title":"nuniqu
plt.figure(figsize=(15,8))
sns.lineplot(data=df_week, x='week_Added', y='title')
plt.ylabel("Movies Released in the Week")
plt.xlabel("Week No.")
plt.show()
```



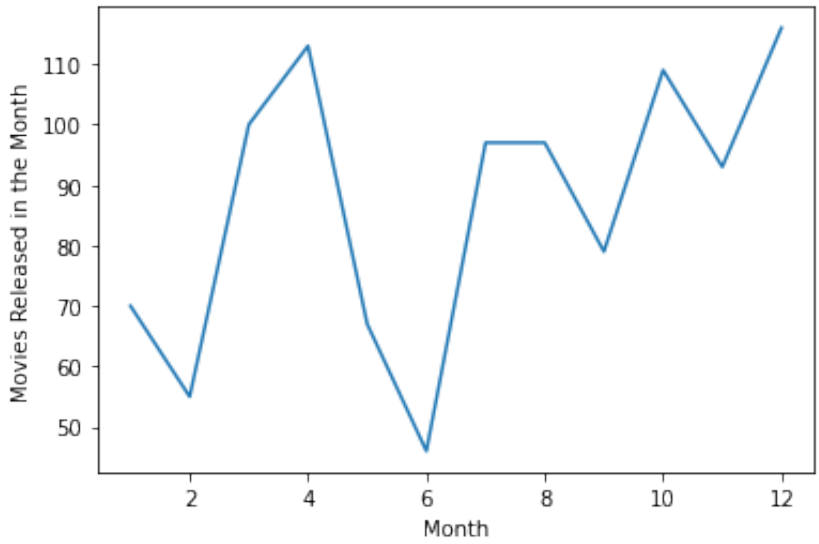
In [ ]:
```
df_week=df_india_movies.groupby(['week_Added']).agg({"title":"nuniq
plt.figure(figsize=(15,8))
sns.lineplot(data=df_week, x='week_Added', y='title')
plt.ylabel("Movies Released in the Week")
plt.xlabel("Week No.")
plt.show()
```



In [ ]:
```
df_month=df_india_shows.groupby(['month_added']).agg({"title":"nuni
sns.lineplot(data=df_month, x='month_added', y='title')
plt.ylabel("TV Shows Released in the Month")
plt.xlabel("Month")
plt.show()
```



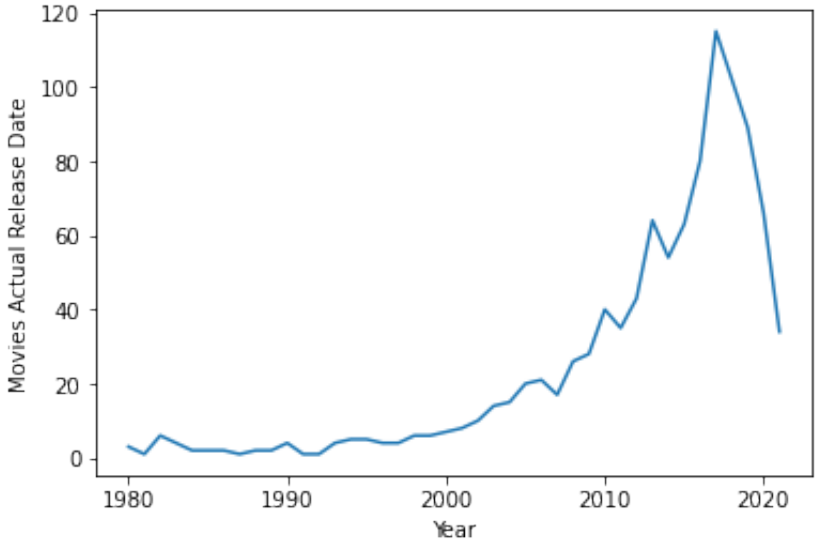
In [ ]:
```
df_month=df_india_movies.groupby(['month_added']).agg({"title":"nun
sns.lineplot(data=df_month, x='month_added', y='title')
plt.ylabel("Movies Released in the Month")
plt.xlabel("Month")
plt.show()
```



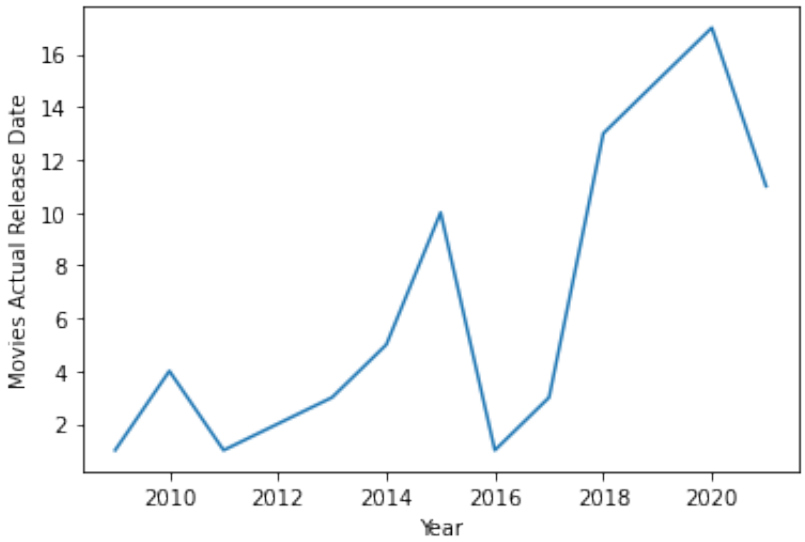
TV Shows are added in Netflix by a tremendous amount in April in India

Movies are added in Netflix in India by a tremendous amount in first week/last month of current year and first month of next year

In [ ]:
```
df_release_year=df_india_movies[df_india_movies['release_year']>=19
sns.lineplot(data=df_release_year, x='release_year', y='title')
plt.ylabel("Movies Actual Release Date")
plt.xlabel("Year")
plt.show()
```



In [ ]:
```
df_release_year=df_india_shows[df_india_shows['release_year']>=1980
sns.lineplot(data=df_release_year, x='release_year', y='title')
plt.ylabel("Movies Actual Release Date")
plt.xlabel("Year")
plt.show()
```



The understandable trend amongs movies and TV Shows across India in Netflix is the reduction of movies after 2020

In [ ]:
```
#Analysing a combination of actors and directors
df_india_movies['Actor_Director_Combination'] = df_india_movies.Act
df_india_movies_subset=df_india_movies[df_india_movies['Actors']!='
df_india_movies_subset=df_india_movies_subset[df_india_movies_subse
df_india_movies_subset.head()
```

Out[127]:

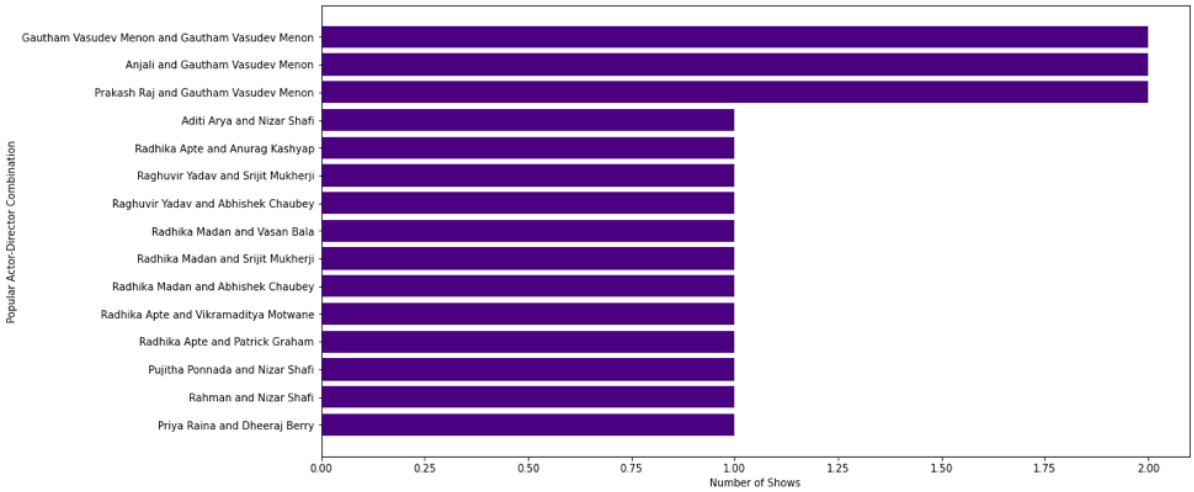
	title	Actors	Directors	Genre	country	show_id	type	date_
621	Avvai Shanmughi	Kamal Hassan	K.S. Ravikumar	Comedies	India	s23	Movie	Sep 2
622	Avvai Shanmughi	Kamal Hassan	K.S. Ravikumar	International Movies	India	s23	Movie	Sep 2
629	Avvai Shanmughi	Nassar	K.S. Ravikumar	Comedies	India	s23	Movie	Sep 2
630	Avvai Shanmughi	Nassar	K.S. Ravikumar	International Movies	India	s23	Movie	Sep 2
631	Avvai Shanmughi	S.P. Balasubrahmanyam	K.S. Ravikumar	Comedies	India	s23	Movie	Sep 2

In [ ]:
```
df_india_shows['Actor_Director_Combination'] = df_india_shows.Actor
df_india_shows_subset=df_india_shows[df_india_shows['Actors']!='Unk
df_india_shows_subset=df_india_shows_subset[df_india_shows_subset['
df_india_shows_subset.head()
```

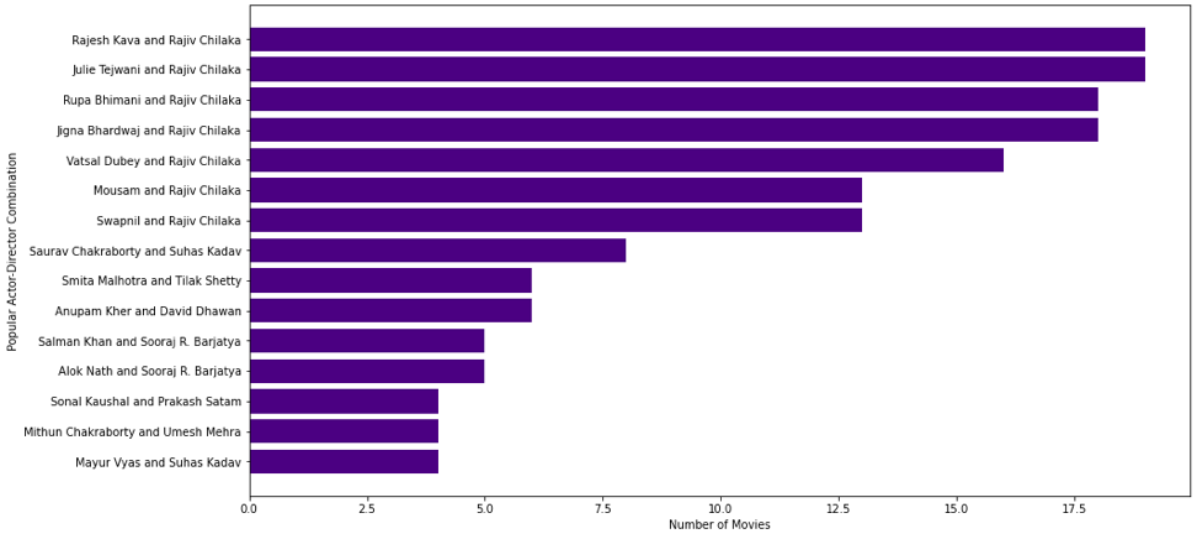
Out[128]:

	title	Actors	Directors	Genre	country	show_id	type	date_added	release
7005	Navarasa	Suriya	Bejoy Nambiar	TV Shows	India	s298	TV Show	August 6, 2021	
7006	Navarasa	Suriya	Priyadarshan	TV Shows	India	s298	TV Show	August 6, 2021	
7007	Navarasa	Suriya	Karthik Narain	TV Shows	India	s298	TV Show	August 6, 2021	
7008	Navarasa	Suriya	Vasanth Sai	TV Shows	India	s298	TV Show	August 6, 2021	
7009	Navarasa	Suriya	Karthik Subbaraj	TV Shows	India	s298	TV Show	August 6, 2021	

In [ ]:
```
df_actors_directors=df_india_shows_subset.groupby(['Actor_Director_
plt.figure(figsize=(15,8))
plt.barh(df_actors_directors[::-1]['Actor_Director_Combination'], d
plt.xlabel('Number of Shows')
plt.ylabel('Popular Actor-Director Combination')
plt.show()
```



In [ ]:
```
df_actors_directors=df_india_movies_subset.groupby(['Actor_Director
plt.figure(figsize=(15,8))
plt.barh(df_actors_directors[::-1]['Actor_Director_Combination'], d
plt.xlabel('Number of Movies')
plt.ylabel('Popular Actor-Director Combination')
plt.show()
```



In [ ]:
```
df_india_movies[df_india_movies['Directors']=='Rajiv Chilaka']
```

10067	Bheem & Ganesh	Rupa Bhimani	Rajiv Chilaka	& Family Movies	India	s408	Movie	July 22, 2021
10068	Chhota Bheem & Ganesh	Jigna Bhardwaj	Rajiv Chilaka	Children & Family Movies	India	s408	Movie	July 22, 2021
10069	Chhota Bheem & Ganesh	Rajesh Kava	Rajiv Chilaka	Children & Family Movies	India	s408	Movie	July 22, 2021
10070	Chhota Bheem & Ganesh	Mousam	Rajiv Chilaka	Children & Family Movies	India	s408	Movie	July 22, 2021
10071	Chhota Bheem & Ganesh	Swapnil	Rajiv Chilaka	Children & Family Movies	India	s408	Movie	July 22, 2021
	Chhota			Children				

It seems that Rajiv Chilaka has worked on Chota Bheem and has been able to create some good content in its movies. He can be relied on for more Chota Bheem stories

In [ ]:
```
df_actors_directors['Actor_Director_Combination'].values
```

Out[131]:
```
array(['Rajesh Kava and Rajiv Chilaka', 'Julie Tejwani and Rajiv C
hilaka',
       'Rupa Bhimani and Rajiv Chilaka',
       'Jigna Bhardwaj and Rajiv Chilaka',
       'Vatsal Dubey and Rajiv Chilaka', 'Mousam and Rajiv Chilaka
',
       'Swapnil and Rajiv Chilaka', 'Saurav Chakraborty and Suhas
Kadav',
       'Smita Malhotra and Tilak Shetty', 'Anupam Kher and David D
hawan',
       'Salman Khan and Sooraj R. Barjatya',
       'Alok Nath and Sooraj R. Barjatya',
       'Sonal Kaushal and Prakash Satam',
       'Mithun Chakraborty and Umesh Mehra', 'Mayur Vyas and Suhas
Kadav'],
      dtype=object)
```

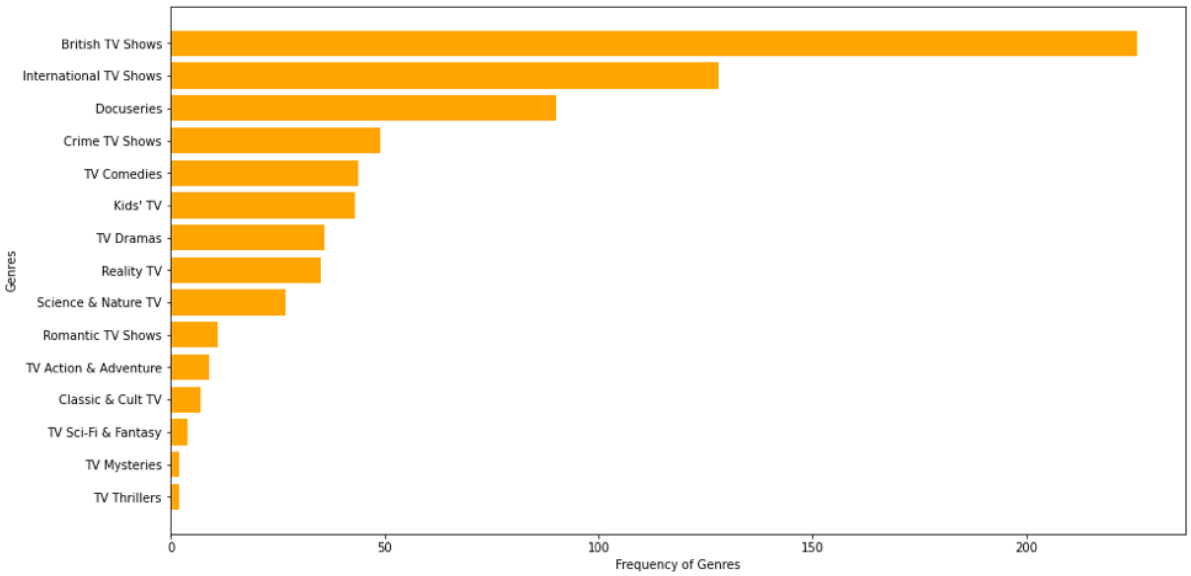
The Most Popular Actor Director Combination in Movies Across India are:-
'Rajesh Kava and Rajiv Chilaka',
'Julie Tejwani and Rajiv Chilaka',
'Rupa Bhimani and Rajiv Chilaka',
'Jigna Bhardwaj and Rajiv Chilaka',
'Vatsal Dubey and Rajiv Chilaka',
'Mousam and Rajiv Chilaka',
'Swapnil and Rajiv Chilaka',
'Saurav Chakraborty and Suhas Kadav',
'Smita Malhotra and Tilak Shetty',
'Anupam Kher and David Dhawan',
'Salman Khan and Sooraj R. Barjatya',

Univariate Analysis separately for shows and movies in United Kingdom

---

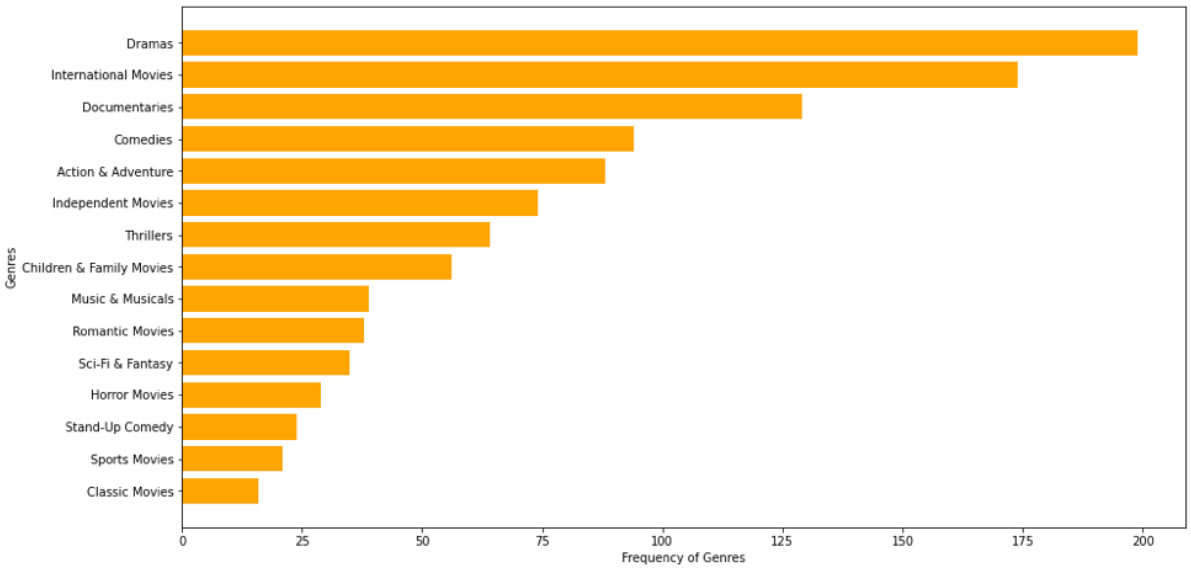
In [ ]:
```
#Analyzing India for both shows and movies
df_uk_shows=df_final1[df_final1['country']=='United Kingdom'][df_fi
df_uk_movies=df_final1[df_final1['country']=='United Kingdom'][df_f
```

In [ ]:
```
df_genre=df_uk_shows.groupby(['Genre']).agg({"title":"nunique"}).re
plt.figure(figsize=(15,8))
plt.barh(df_genre[::-1]['Genre'], df_genre[::-1]['title'],color=['o
plt.xlabel('Frequency of Genres')
plt.ylabel('Genres')
plt.show()
```



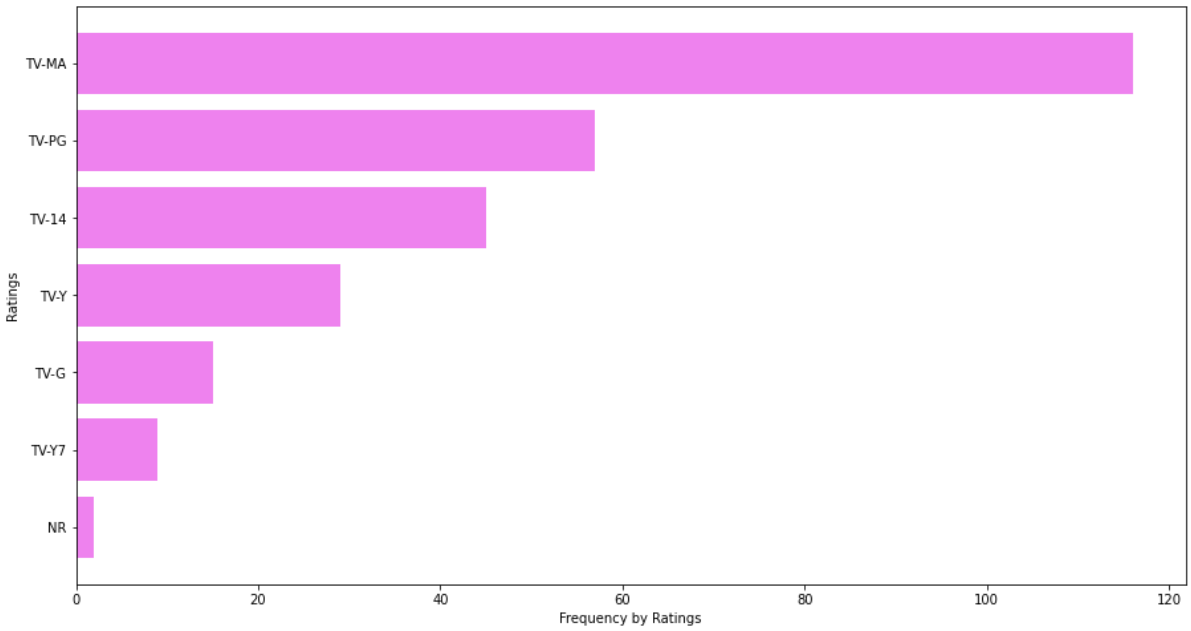
British TV Shows,International TV Shows,Docuseries, Crime, Comedy are widely watched Genres in TV Shows in UK

In [ ]:
```
df_genre=df_uk_movies.groupby(['Genre']).agg({"title":"nunique"}).r
plt.figure(figsize=(15,8))
plt.barh(df_genre[::-1]['Genre'], df_genre[::-1]['title'],color=['o
plt.xlabel('Frequency of Genres')
plt.ylabel('Genres')
plt.show()
```

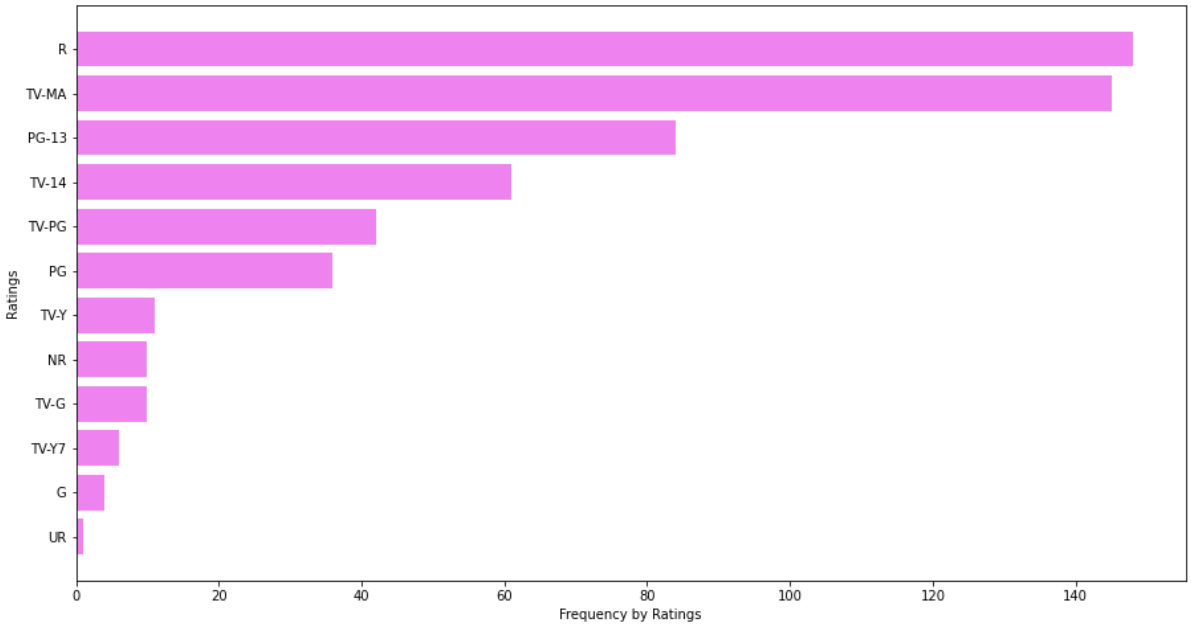


International Movies,Drama,Comedy,Indpeendent Movies and Action, Romance Genres in Movies are prevalent in UK

In [ ]:
```
df_rating=df_uk_shows.groupby(['rating']).agg({"title":"nunique"}).
plt.figure(figsize=(15,8))
plt.barh(df_rating[::-1]['rating'], df_rating[::-1]['title'],color=
plt.xlabel('Frequency by Ratings')
plt.ylabel('Ratings')
plt.show()
```

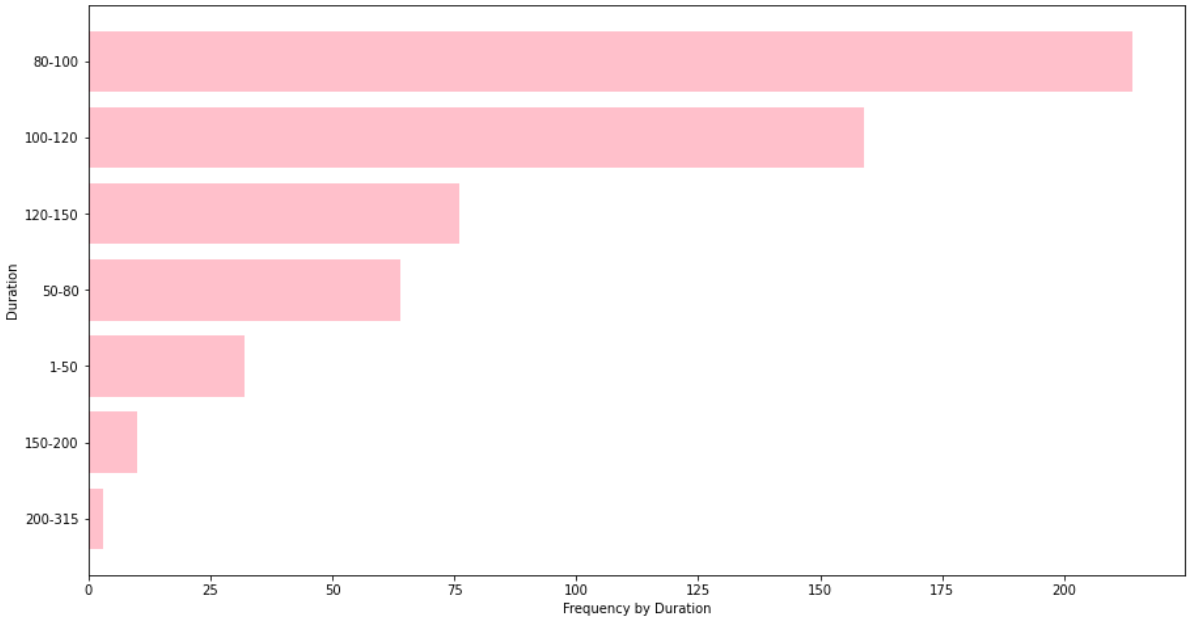


In [ ]:
```
df_rating=df_uk_movies.groupby(['rating']).agg({"title":"nunique"})
plt.figure(figsize=(15,8))
plt.barh(df_rating[::-1]['rating'], df_rating[::-1]['title'],color=
plt.xlabel('Frequency by Ratings')
plt.ylabel('Ratings')
plt.show()
```



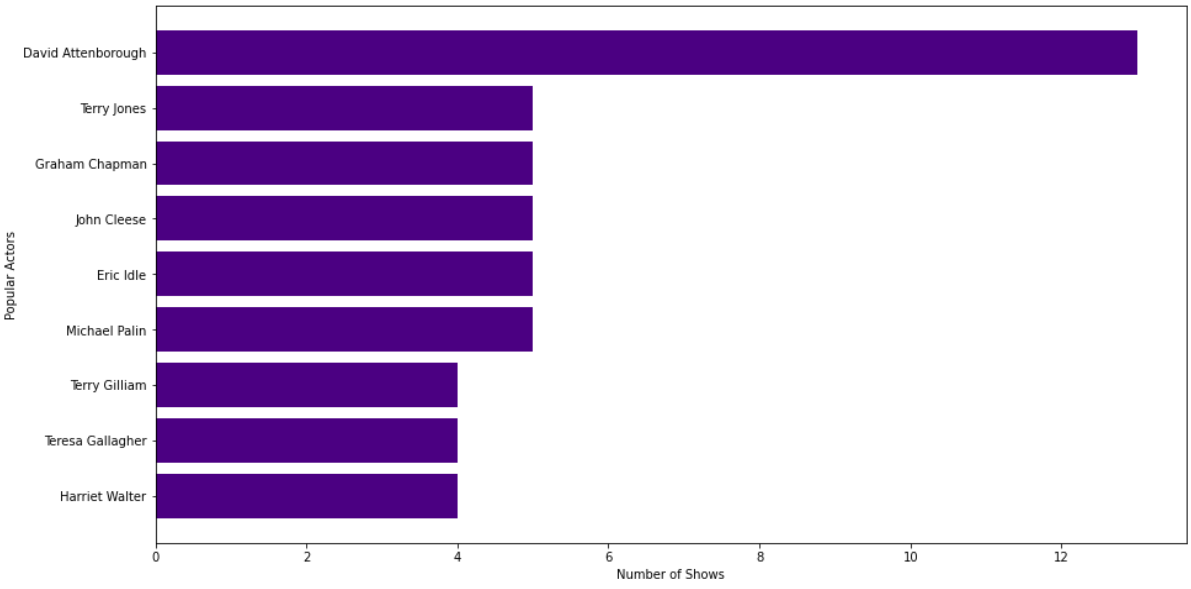
So it seems plaussible to conclude that the popular ratings across Netflix includes Parental Guidance and Mature Audiences in TV Shows and R Rated+MA Rated in Movies in UK

In [ ]:
```
df_duration=df_uk_movies.groupby(['duration']).agg({"title":"nuniqu
plt.figure(figsize=(15,8))
plt.barh(df_duration[::-1]['duration'], df_duration[::-1]['title'],
plt.xlabel('Frequency by Duration')
plt.ylabel('Duration')
plt.show()
```



Across movies ranges of minutes in UK have a sweet spot at 80-120 mins.

In [ ]:
```
df_actors=df_uk_shows.groupby(['Actors']).agg({"title":"nunique"}).
df_actors=df_actors[df_actors['Actors']!='Unknown Actor']
plt.figure(figsize=(15,8))
plt.barh(df_actors[::-1]['Actors'], df_actors[::-1]['title'],color=
plt.xlabel('Number of Shows')
plt.ylabel('Popular Actors')
plt.show()
```



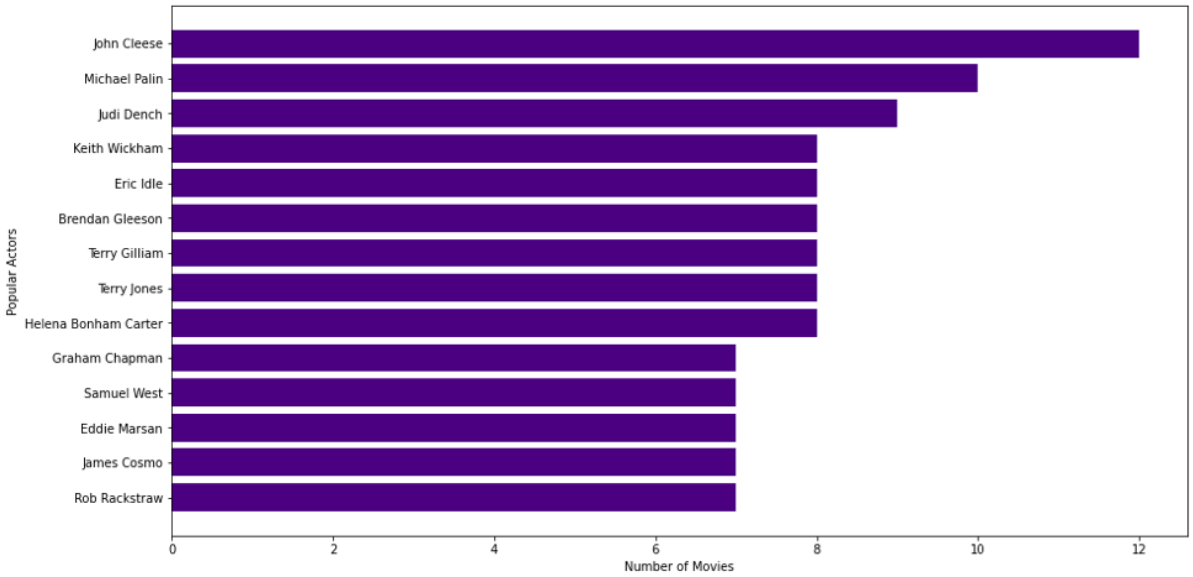
In [ ]:
```
df_actors['Actors'].values
```

Out[139]:
```
array(['David Attenborough', 'Terry Jones', 'Graham Chapman',
       'John Cleese', 'Eric Idle', 'Michael Palin', 'Terry Gilliam
',
       'Teresa Gallagher', 'Harriet Walter'], dtype=object)
```

Popular Actors in TV Shows in UK are:-

'David Attenborough',
'Terry Jones',
'Graham Chapman',
'John Cleese',
'Eric Idle',
'Michael Palin',
'Terry Gilliam',
'Teresa Gallagher',
'Harriet Walter'

In [ ]:
```
df_actors=df_uk_movies.groupby(['Actors']).agg({"title":"nunique"})
df_actors=df_actors[df_actors['Actors']!='Unknown Actor']
plt.figure(figsize=(15,8))
plt.barh(df_actors[::-1]['Actors'], df_actors[::-1]['title'],color=
plt.xlabel('Number of Movies')
plt.ylabel('Popular Actors')
plt.show()
```



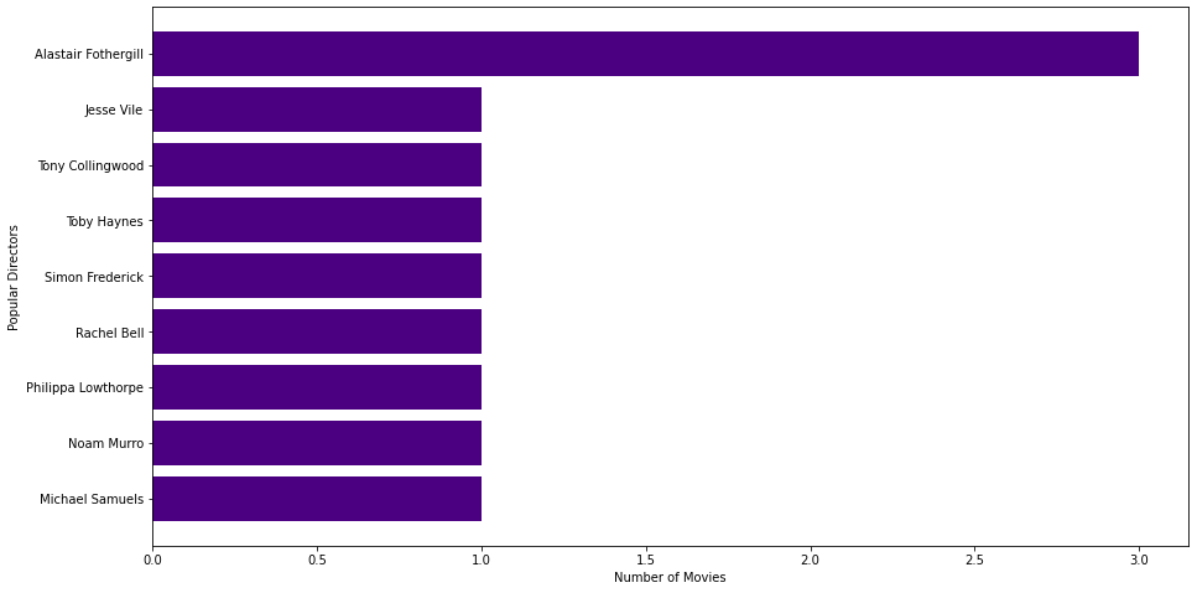
In [ ]:
```
df_actors['Actors'].values
```

Out[141]:
```
array(['John Cleese', 'Michael Palin', 'Judi Dench', 'Keith Wickham',
       'Eric Idle', 'Brendan Gleeson', 'Terry Gilliam', 'Terry Jones',
       'Helena Bonham Carter', 'Graham Chapman', 'Samuel West',
       'Eddie Marsan', 'James Cosmo', 'Rob Rackstraw'], dtype=object)
```

Popular actors across Movies in UK:-

'John Cleese',
'Michael Palin',
'Judi Dench',
'Keith Wickham',
'Eric Idle',
'Brendan Gleeson',
'Terry Gilliam',
'Terry Jones',
'Helena Bonham Carter',
'Graham Chapman',
'Samuel West',
'Eddie Marsan',
'James Cosmo',
'Rob Rackstraw'

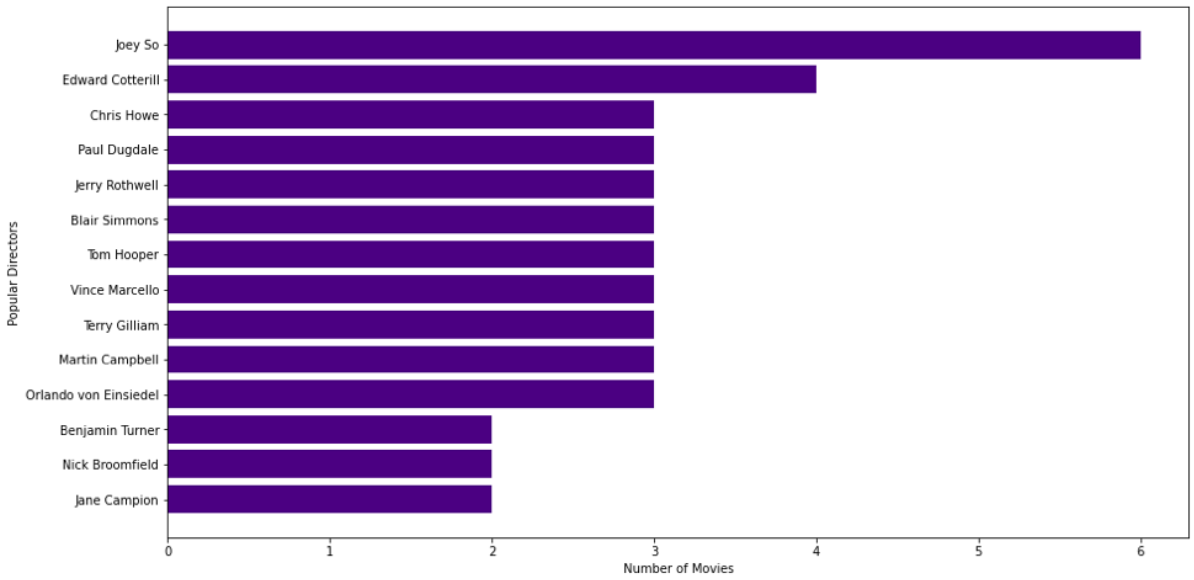
In [ ]:
```
df_directors=df_uk_shows.groupby(['Directors']).agg({"title":"nuniq
df_directors=df_directors[df_directors['Directors']!='Unknown Direc
plt.figure(figsize=(15,8))
plt.barh(df_directors[::-1]['Directors'], df_directors[::-1]['title
plt.xlabel('Number of Movies')
plt.ylabel('Popular Directors')
plt.show()
```



In [ ]:
```
df_directors['Directors'].values
```

Out[143]:
```
array(['Alastair Fothergill', 'Jesse Vile', 'Tony Collingwood',
       'Toby Haynes', 'Simon Frederick', 'Rachel Bell',
       'Philippa Lowthorpe', 'Noam Murro', 'Michael Samuels'],
      dtype=object)
```

In [ ]:
```
df_directors=df_uk_movies.groupby(['Directors']).agg({"title":"nuni
df_directors=df_directors[df_directors['Directors']!='Unknown Direc
plt.figure(figsize=(15,8))
plt.barh(df_directors[::-1]['Directors'], df_directors[::-1]['title
plt.xlabel('Number of Movies')
plt.ylabel('Popular Directors')
plt.show()
```



In [ ]:
```
df_directors['Directors'].values
```

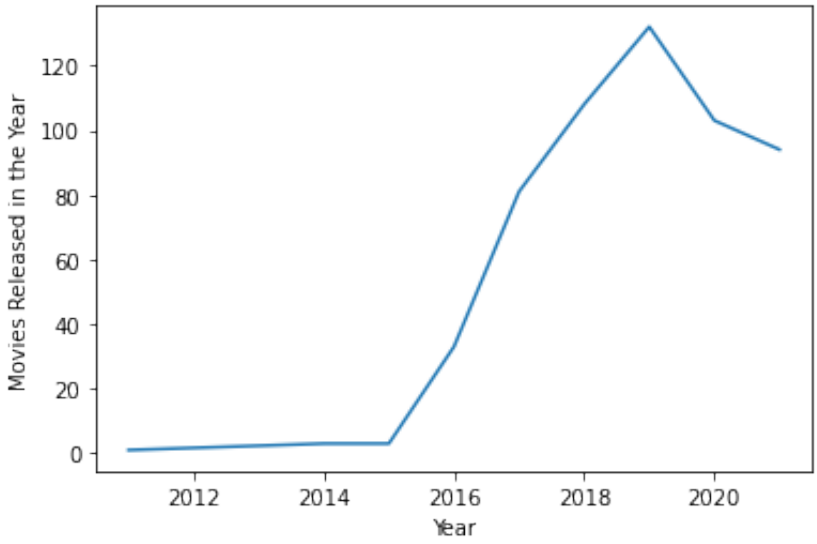
Out[145]:
```
array(['Joey So', 'Edward Cotterill', 'Chris Howe', 'Paul Dugdale'
,
       'Jerry Rothwell', 'Blair Simmons', 'Tom Hooper', 'Vince Mar
cello',
       'Terry Gilliam', 'Martin Campbell', 'Orlando von Einsiedel'
,
       'Benjamin Turner', 'Nick Broomfield', 'Jane Campion'], dtyp
e=object)
```

Popular directors across movies in UK:-

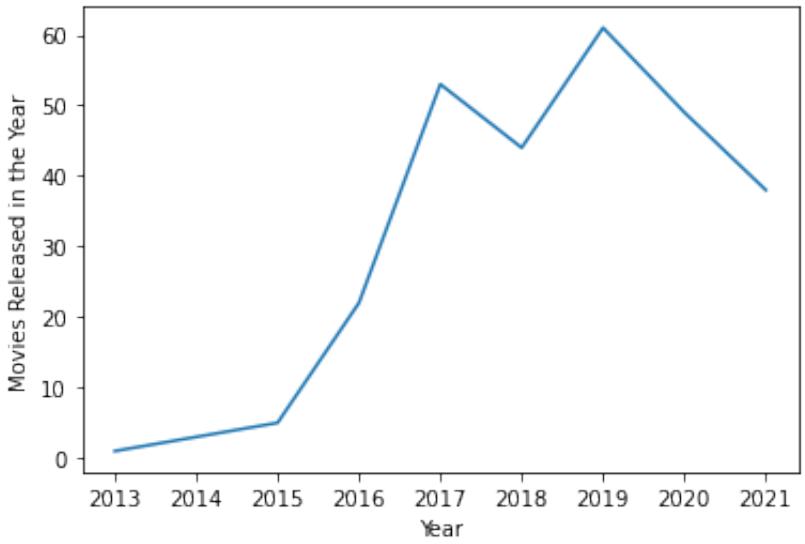
'Joey So',

'Edward Cotterill'

In [ ]:
```
df_year=df_uk_movies.groupby(['year']).agg({"title":"nunique"}).res
sns.lineplot(data=df_year, x='year', y='title')
plt.ylabel("Movies Released in the Year")
plt.xlabel("Year")
plt.show()
```



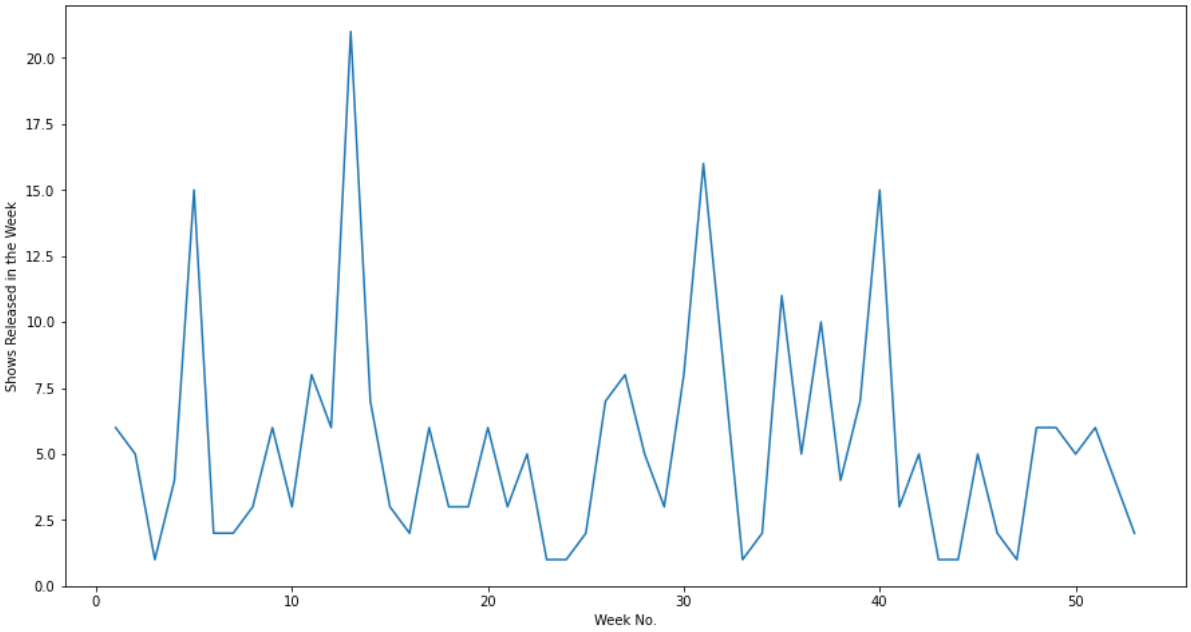
In [ ]:
```
df_year=df_uk_shows.groupby(['year']).agg({"title":"nunique"}).rese
sns.lineplot(data=df_year, x='year', y='title')
plt.ylabel("Movies Released in the Year")
plt.xlabel("Year")
plt.show()
```



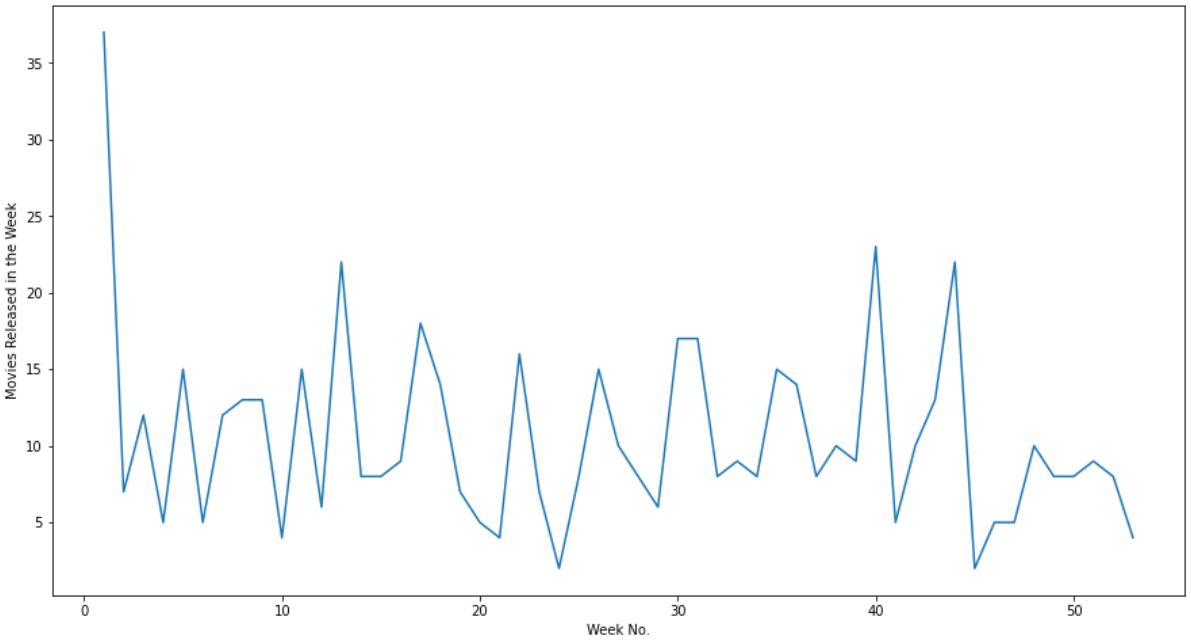
In terms of TV Shows, UK saw a downfall in 2018 from 2017, then a great increase in 2019 but has been reducing since then.

In terms of Movies,the number of popular movies in UK increased till 2019, since then it's decreasing.

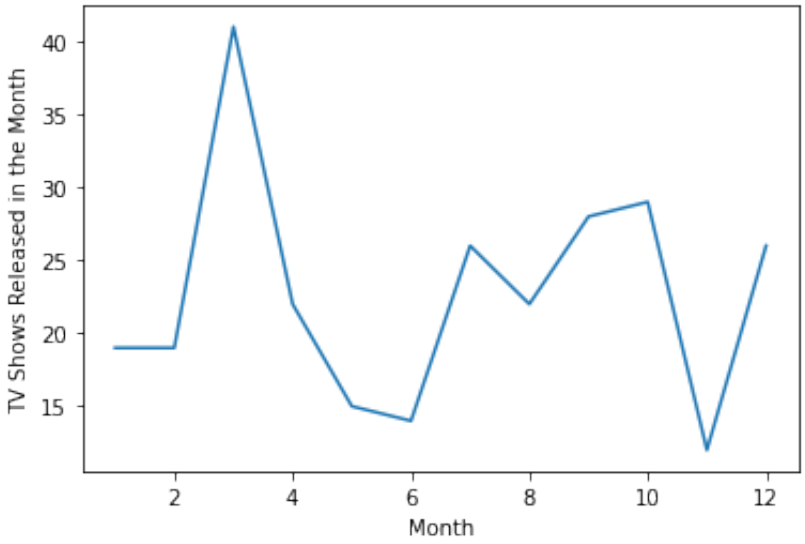
In [ ]:
```
df_week=df_uk_shows.groupby(['week_Added']).agg({"title":"nunique"}
plt.figure(figsize=(15,8))
sns.lineplot(data=df_week, x='week_Added', y='title')
plt.ylabel("Shows Released in the Week")
plt.xlabel("Week No.")
plt.show()
```



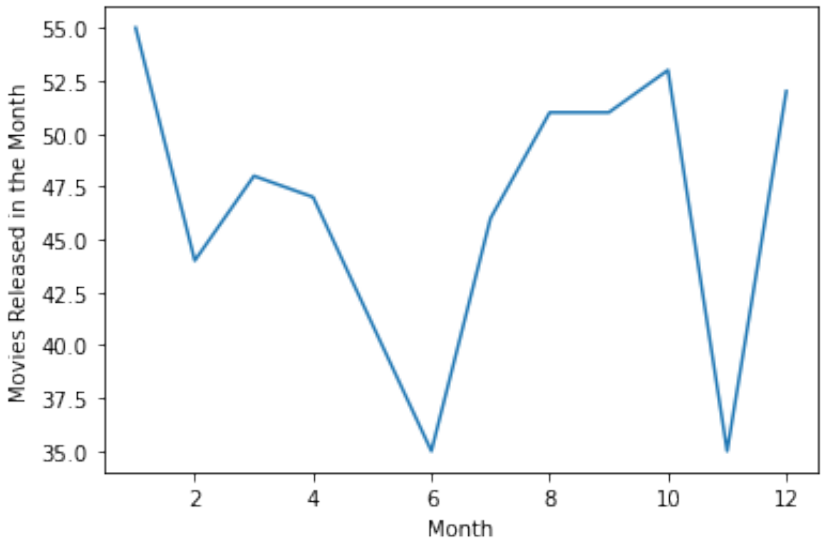
In [ ]:
```
df_week=df_uk_movies.groupby(['week_Added']).agg({"title":"nunique"
plt.figure(figsize=(15,8))
sns.lineplot(data=df_week, x='week_Added', y='title')
plt.ylabel("Movies Released in the Week")
plt.xlabel("Week No.")
plt.show()
```



In [ ]:
```
df_month=df_uk_shows.groupby(['month_added']).agg({"title":"nunique
sns.lineplot(data=df_month, x='month_added', y='title')
plt.ylabel("TV Shows Released in the Month")
plt.xlabel("Month")
plt.show()
```



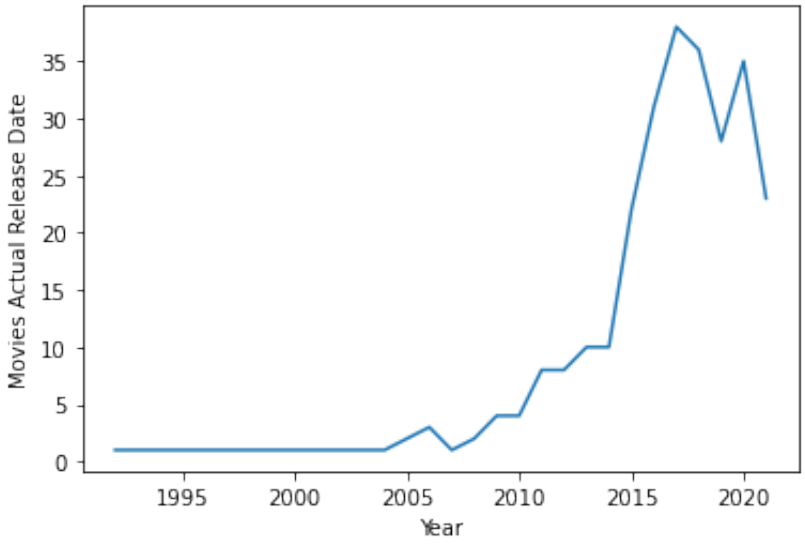
In [ ]:
```
df_month=df_uk_movies.groupby(['month_added']).agg({"title":"nuniqu
sns.lineplot(data=df_month, x='month_added', y='title')
plt.ylabel("Movies Released in the Month")
plt.xlabel("Month")
plt.show()
```



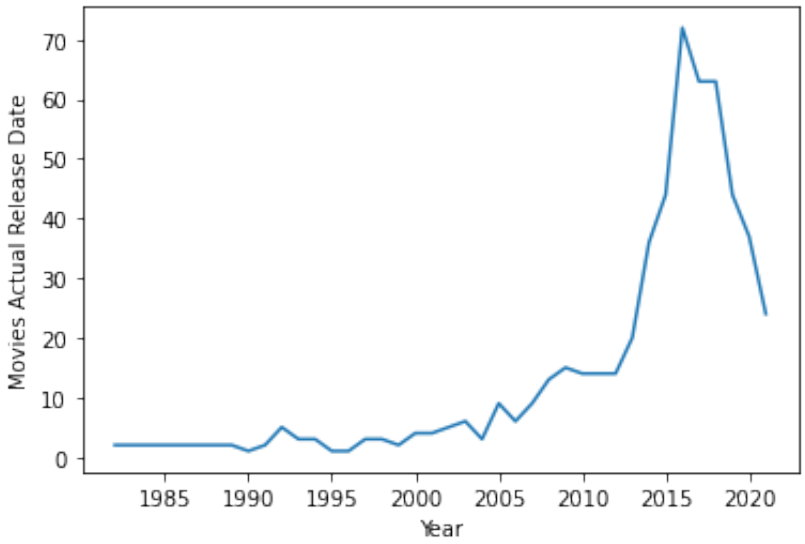
TV Shows are added in Netflix by a tremendous amount in March in UK

Movies are added in Netflix in India by a tremendous amount in first week/last month of current year and first month of next year

In [ ]:
```
df_release_year=df_uk_shows[df_uk_shows['release_year']>=1980].grou
sns.lineplot(data=df_release_year, x='release_year', y='title')
plt.ylabel("Movies Actual Release Date")
plt.xlabel("Year")
plt.show()
```



In [ ]:
```
df_release_year=df_uk_movies[df_uk_movies['release_year']>=1980].gr
sns.lineplot(data=df_release_year, x='release_year', y='title')
plt.ylabel("Movies Actual Release Date")
plt.xlabel("Year")
plt.show()
```



Same trend of reduction in movies and shows after 2020.

In [ ]:
```
#Analysing a combination of actors and directors
df_uk_movies['Actor_Director_Combination'] = df_uk_movies.Actors.st
df_uk_movies_subset=df_uk_movies[df_uk_movies['Actors']!='Unknown A
df_uk_movies_subset=df_uk_movies_subset[df_uk_movies_subset['Direct
df_uk_movies_subset.head()
```

Out[154]:

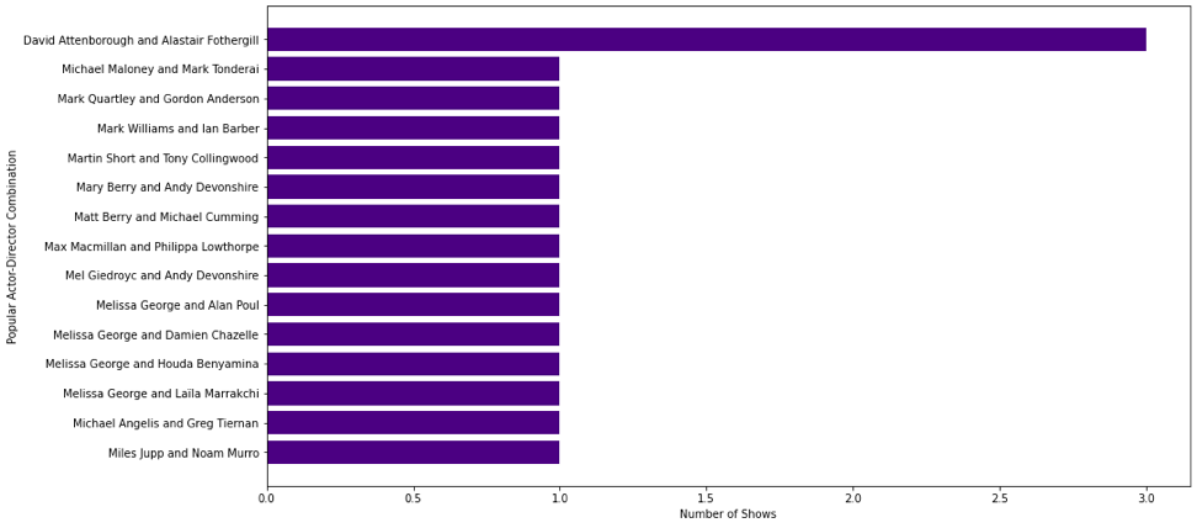
	title	Actors	Directors	Genre	country	show_id	type	date_added	re
182	Sankofa	Kofi Ghanaba	Haile Gerima	Dramas	United Kingdom	s8	Movie	September 24, 2021	
188	Sankofa	Kofi Ghanaba	Haile Gerima	Independent Movies	United Kingdom	s8	Movie	September 24, 2021	
194	Sankofa	Kofi Ghanaba	Haile Gerima	International Movies	United Kingdom	s8	Movie	September 24, 2021	
200	Sankofa	Oyafunmike Ogunlano	Haile Gerima	Dramas	United Kingdom	s8	Movie	September 24, 2021	
206	Sankofa	Oyafunmike Ogunlano	Haile Gerima	Independent Movies	United Kingdom	s8	Movie	September 24, 2021	

In [ ]:
```
df_uk_shows['Actor_Director_Combination'] = df_uk_shows.Actors.str.
df_uk_shows_subset=df_uk_shows[df_uk_shows['Actors']!='Unknown Acto
df_uk_shows_subset=df_uk_shows_subset[df_uk_shows_subset['Directors
df_uk_shows_subset.head()
```

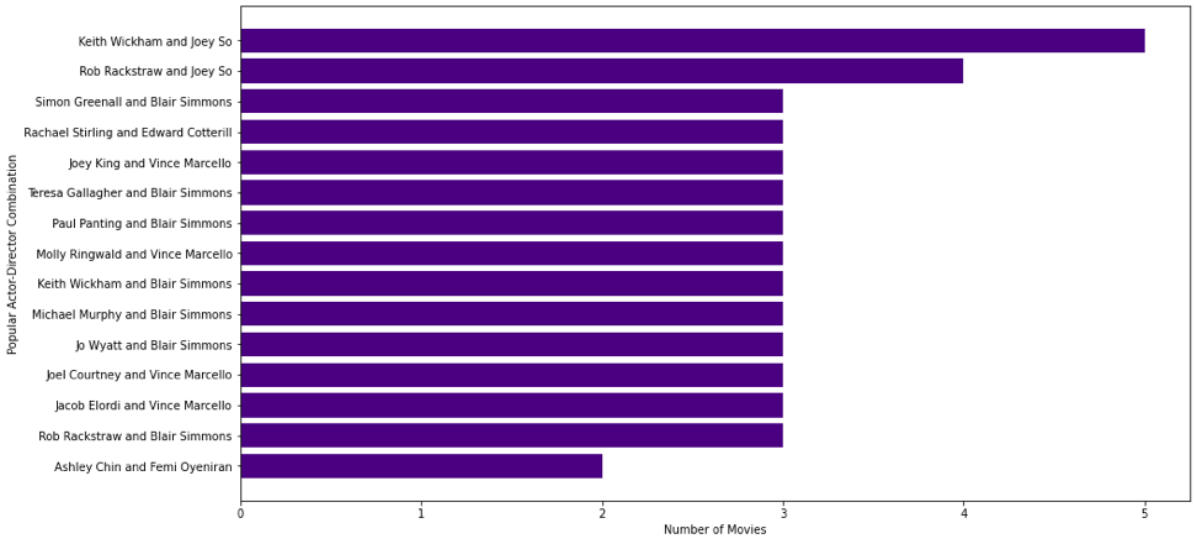
Out[155]:

	title	Actors	Directors	Genre	country	show_id	type	date_added	release_ye
323	The Great British Baking Show	Mel Giedroyc	Andy Devonshire	British TV Shows	United Kingdom	s9	TV Show	September 24, 2021	20
324	The Great British Baking Show	Mel Giedroyc	Andy Devonshire	Reality TV	United Kingdom	s9	TV Show	September 24, 2021	20
325	The Great British Baking Show	Sue Perkins	Andy Devonshire	British TV Shows	United Kingdom	s9	TV Show	September 24, 2021	20
326	The Great British Baking Show	Sue Perkins	Andy Devonshire	Reality TV	United Kingdom	s9	TV Show	September 24, 2021	20
327	The Great British Baking Show	Mary Berry	Andy Devonshire	British TV Shows	United Kingdom	s9	TV Show	September 24, 2021	20

In [ ]:
```
df_actors_directors=df_uk_shows_subset.groupby(['Actor_Director_Com
plt.figure(figsize=(15,8))
plt.barh(df_actors_directors[::-1]['Actor_Director_Combination'], d
plt.xlabel('Number of Shows')
plt.ylabel('Popular Actor-Director Combination')
plt.show()
```



In [ ]:
```
df_actors_directors=df_uk_movies_subset.groupby(['Actor_Director_Co
plt.figure(figsize=(15,8))
plt.barh(df_actors_directors[::-1]['Actor_Director_Combination'], d
plt.xlabel('Number of Movies')
plt.ylabel('Popular Actor-Director Combination')
plt.show()
```



In [ ]:
```
df_actors_directors['Actor_Director_Combination'].values
```

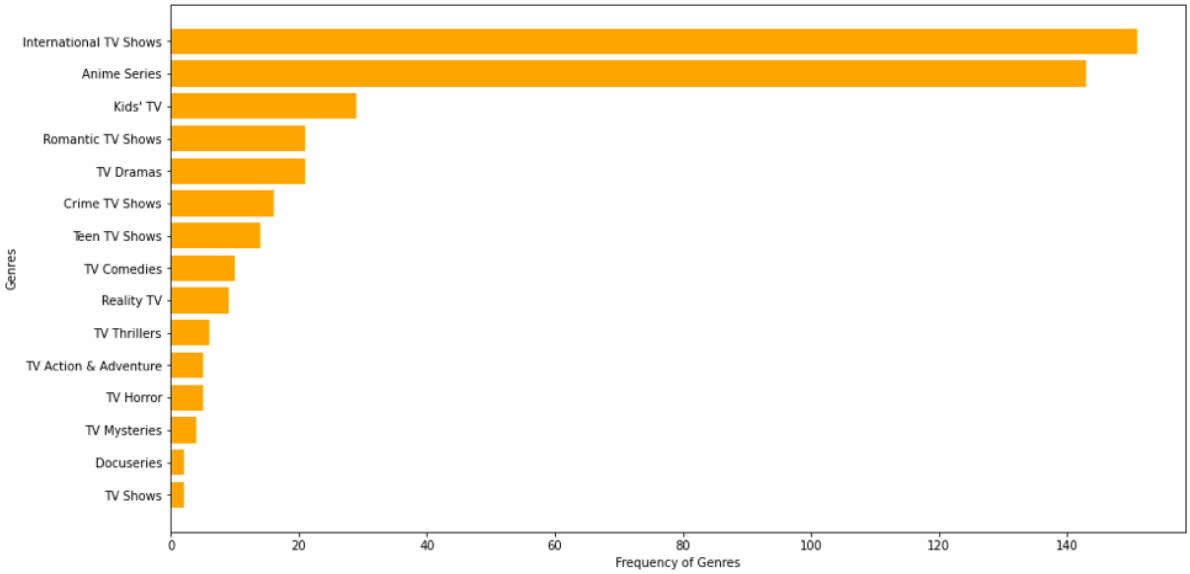
Out[158]:
```
array(['Keith Wickham and Joey So', 'Rob Rackstraw and Joey So',
       'Simon Greenall and Blair Simmons',
       'Rachael Stirling and Edward Cotterill',
       'Joey King and Vince Marcello',
       'Teresa Gallagher and Blair Simmons',
       'Paul Panting and Blair Simmons',
       'Molly Ringwald and Vince Marcello',
       'Keith Wickham and Blair Simmons',
       'Michael Murphy and Blair Simmons', 'Jo Wyatt and Blair Sim
mons',
       'Joel Courtney and Vince Marcello',
       'Jacob Elordi and Vince Marcello',
       'Rob Rackstraw and Blair Simmons', 'Ashley Chin and Femi Oy
eniran'],
      dtype=object)
```

The Most Popular Actor Director Combination in Movies Across UK are:-
'Keith Wickham and Joey So',
'Rob Rackstraw and Joey So'

Univariate Analysis separately for shows in Japan

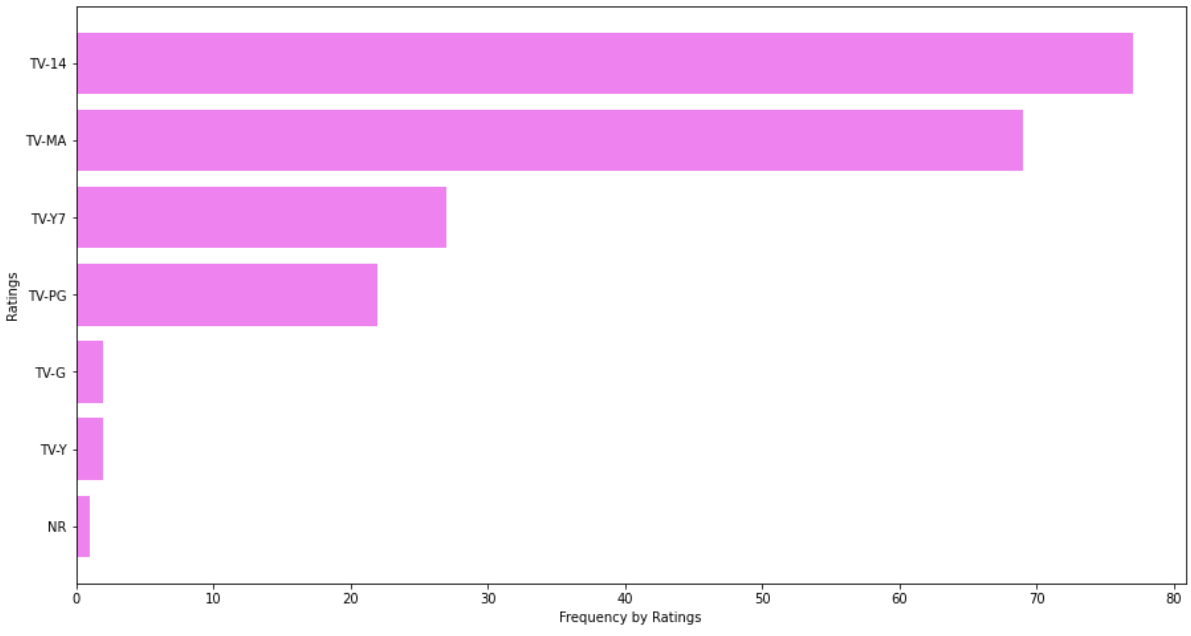
In [ ]:
```
#Analyzing India for both shows and movies
df_japan_shows=df_final1[df_final1['country']=='Japan'][df_final1[d
```

In [ ]:
```
df_genre=df_japan_shows.groupby(['Genre']).agg({"title":"nunique"})
plt.figure(figsize=(15,8))
plt.barh(df_genre[::-1]['Genre'], df_genre[::-1]['title'],color=['o
plt.xlabel('Frequency of Genres')
plt.ylabel('Genres')
plt.show()
```



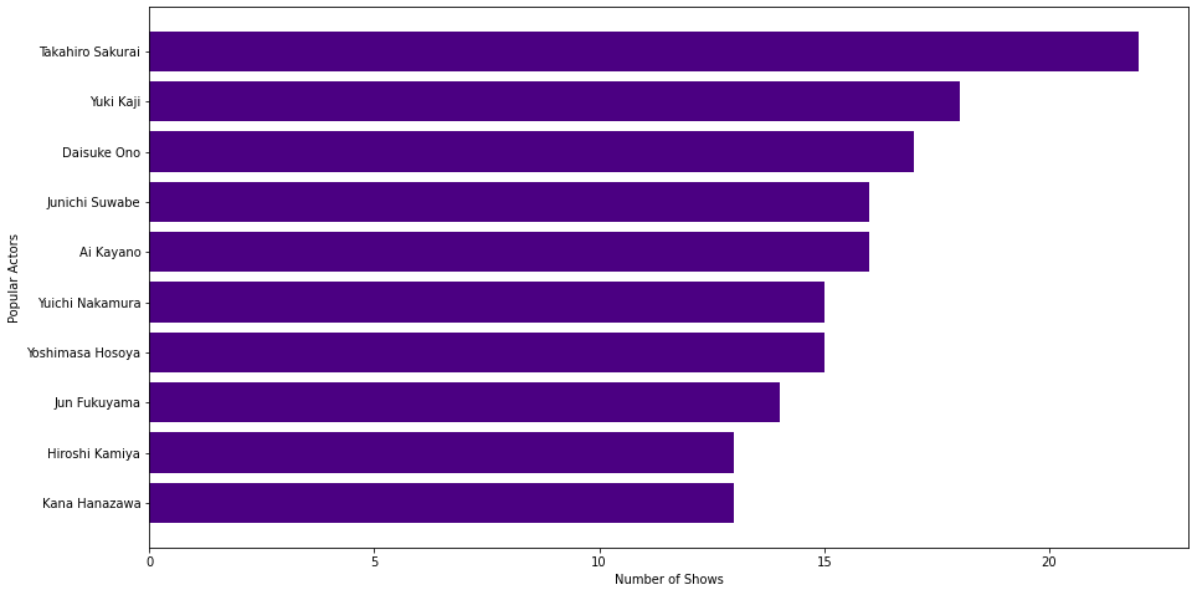
International TV Shows and Anime Genres are popular in TV Shows in Japan

In [ ]:
```
df_rating=df_japan_shows.groupby(['rating']).agg({"title":"nunique"
plt.figure(figsize=(15,8))
plt.barh(df_rating[::-1]['rating'], df_rating[::-1]['title'],color=
plt.xlabel('Frequency by Ratings')
plt.ylabel('Ratings')
plt.show()
```



So it seems plaussible to conclude that the popular ratings across Netflix includes TV-14 Mature Audiences in TV Shows

In [ ]:
```
df_actors=df_japan_shows.groupby(['Actors']).agg({"title":"nunique"
df_actors=df_actors[df_actors['Actors']!='Unknown Actor']
plt.figure(figsize=(15,8))
plt.barh(df_actors[::-1]['Actors'], df_actors[::-1]['title'],color=
plt.xlabel('Number of Shows')
plt.ylabel('Popular Actors')
plt.show()
```



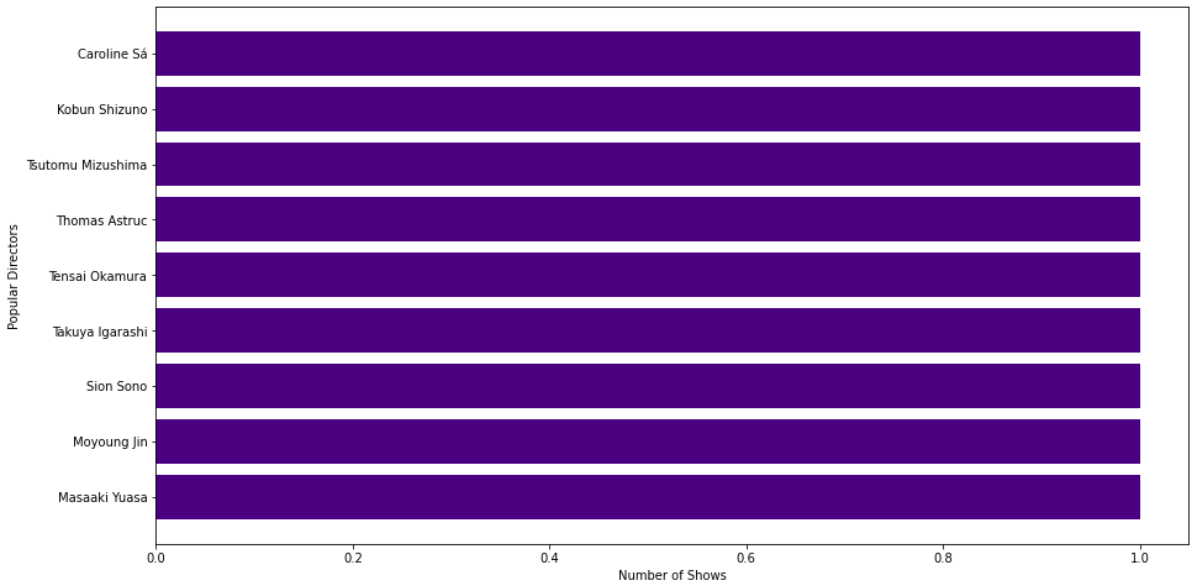
In [ ]:
```
df_actors['Actors'].values
```

Out[163]:
```
array(['Takahiro Sakurai', 'Yuki Kaji', 'Daisuke Ono', 'Junichi Su
wabe',
       'Ai Kayano', 'Yuichi Nakamura', 'Yoshimasa Hosoya', 'Jun Fu
kuyama',
       'Hiroshi Kamiya', 'Kana Hanazawa'], dtype=object)
```

Popular Actors in TV Shows in Japan are:-

'Takahiro Sakurai',
'Yuki Kaji',
'Daisuke Ono',
'Junichi Suwabe',
'Ai Kayano',
'Yuichi Nakamura',
'Yoshimasa Hosoya',
'Jun Fukuyama',
'Hiroshi Kamiya',
'Kana Hanazawa'

In [ ]:
```
df_directors=df_japan_shows.groupby(['Directors']).agg({"title":"nu
df_directors=df_directors[df_directors['Directors']!='Unknown Direc
plt.figure(figsize=(15,8))
plt.barh(df_directors[::-1]['Directors'], df_directors[::-1]['title
plt.xlabel('Number of Shows')
plt.ylabel('Popular Directors')
plt.show()
```

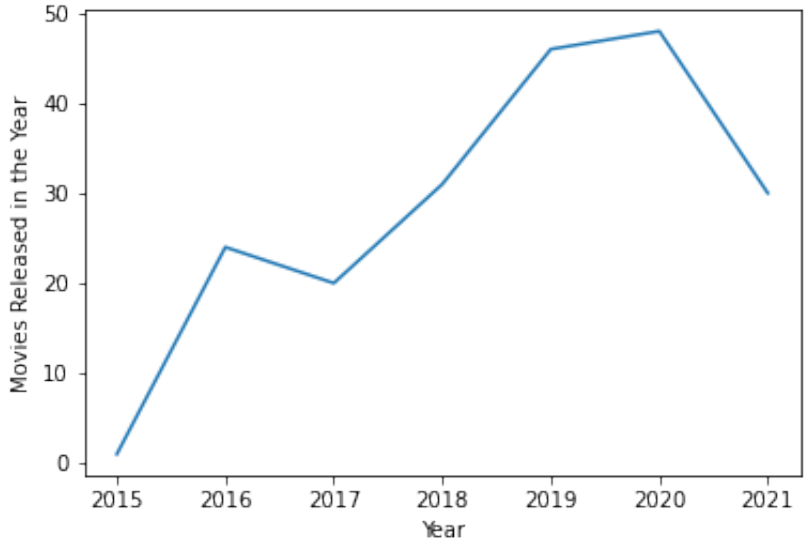


In [ ]:
```
df_directors['Directors'].values
```

Out[165]:
```
array(['Caroline Sá', 'Kobun Shizuno', 'Tsutomu Mizushima',
       'Thomas Astruc', 'Tensai Okamura', 'Takuya Igarashi', 'Sion
Sono',
       'Moyoung Jin', 'Masaaki Yuasa'], dtype=object)
```

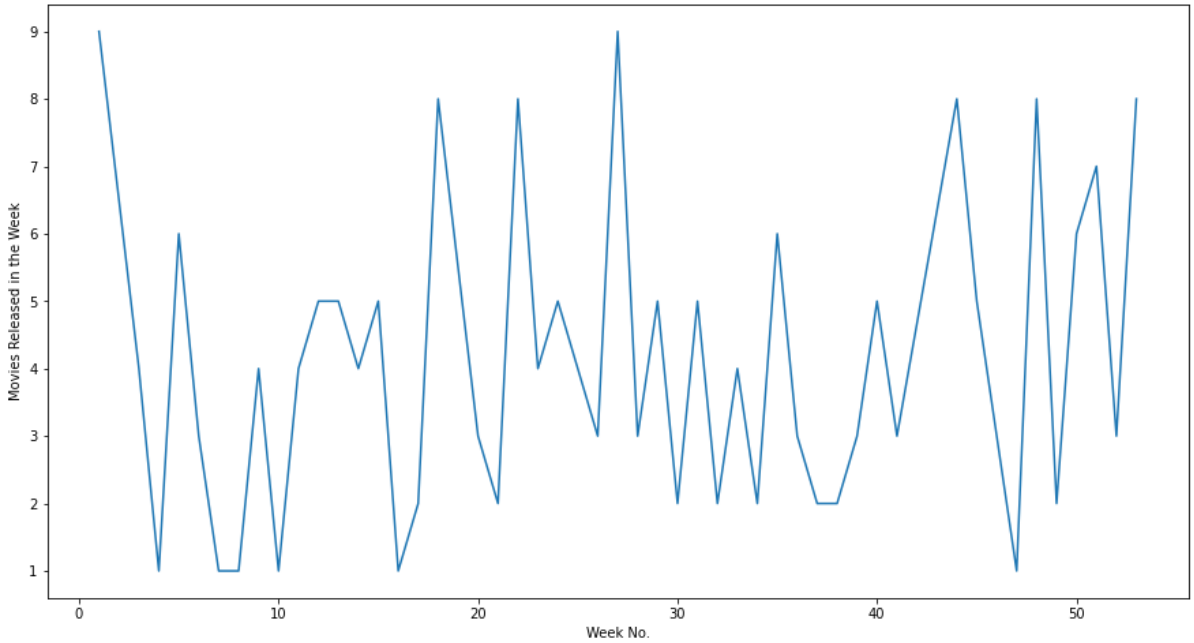
All Directors are one time directors only

In [ ]:
```
df_year=df_japan_shows.groupby(['year']).agg({"title":"nunique"}).r
sns.lineplot(data=df_year, x='year', y='title')
plt.ylabel("Movies Released in the Year")
plt.xlabel("Year")
plt.show()
```

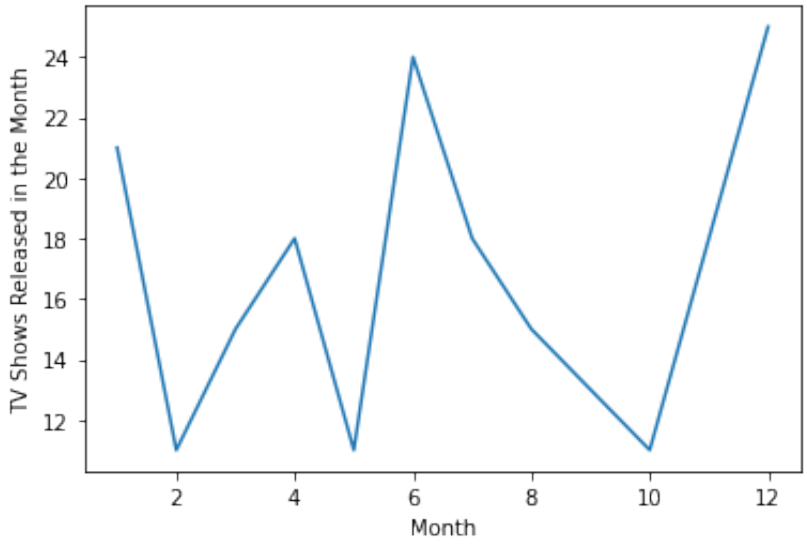


In Japan, TV Shows have diminished in 2017 from 2016 and then increased till 2020 after which it has reduced in 2021.

In [ ]:
```
df_week=df_japan_shows.groupby(['week_Added']).agg({"title":"nuniqu
plt.figure(figsize=(15,8))
sns.lineplot(data=df_week, x='week_Added', y='title')
plt.ylabel("Movies Released in the Week")
plt.xlabel("Week No.")
plt.show()
```

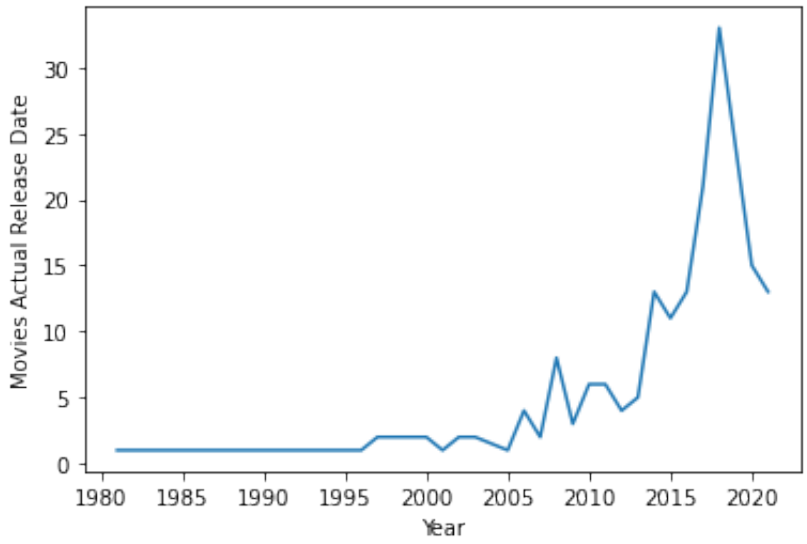


In [ ]:
```
df_month=df_japan_shows.groupby(['month_added']).agg({"title":"nuni
sns.lineplot(data=df_month, x='month_added', y='title')
plt.ylabel("TV Shows Released in the Month")
plt.xlabel("Month")
plt.show()
```



TV Shows are added in Netflix by significant numbers in April and January in Japan

In [ ]:
```
df_release_year=df_japan_shows[df_japan_shows['release_year']>=1980
sns.lineplot(data=df_release_year, x='release_year', y='title')
plt.ylabel("Movies Actual Release Date")
plt.xlabel("Year")
plt.show()
```

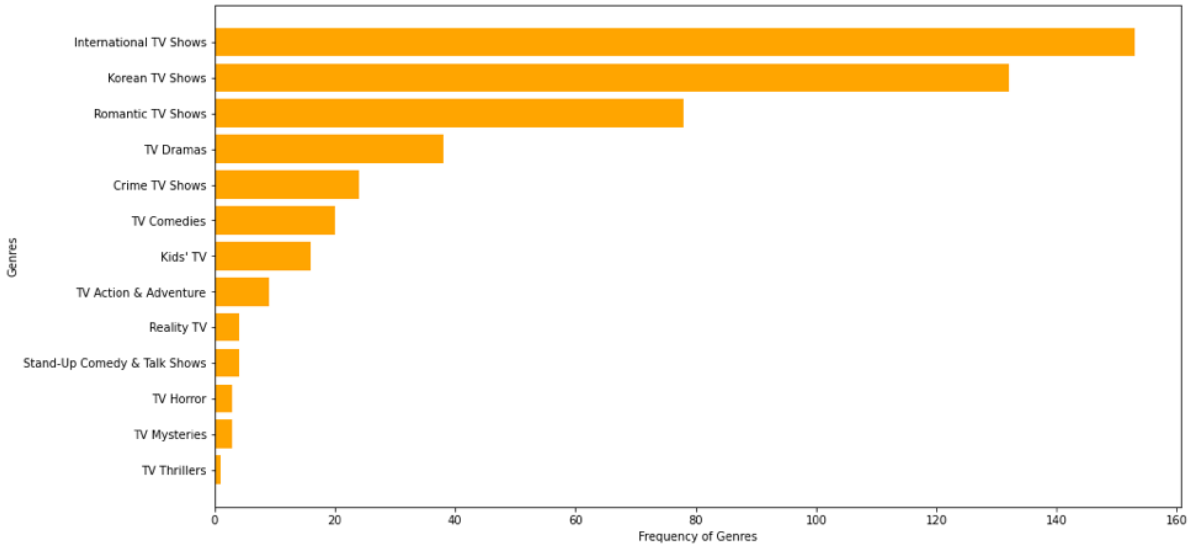


Reduction in TV Shows after 2019 in Japan

Univariate Analysis separately for shows in South Korea

In [ ]:
```
#Analyzing India for both shows and movies
df_sk_shows=df_final1[df_final1['country']=='South Korea'][df_final
```

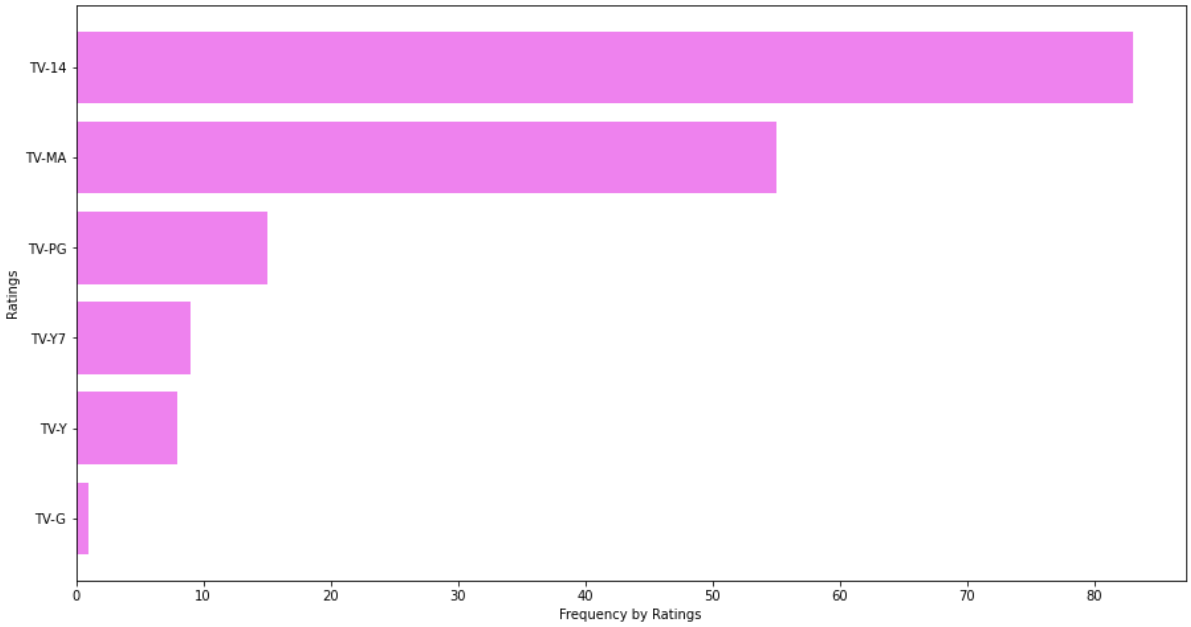
In [ ]:
```
df_genre=df_sk_shows.groupby(['Genre']).agg({"title":"nunique"}).re
plt.figure(figsize=(15,8))
plt.barh(df_genre[::-1]['Genre'], df_genre[::-1]['title'],color=['o
plt.xlabel('Frequency of Genres')
plt.ylabel('Genres')
plt.show()
```



International TV Shows,Romantic TV Shows,Drama,Crime and Comedy Genres are popular in TV Shows in S.Korea.

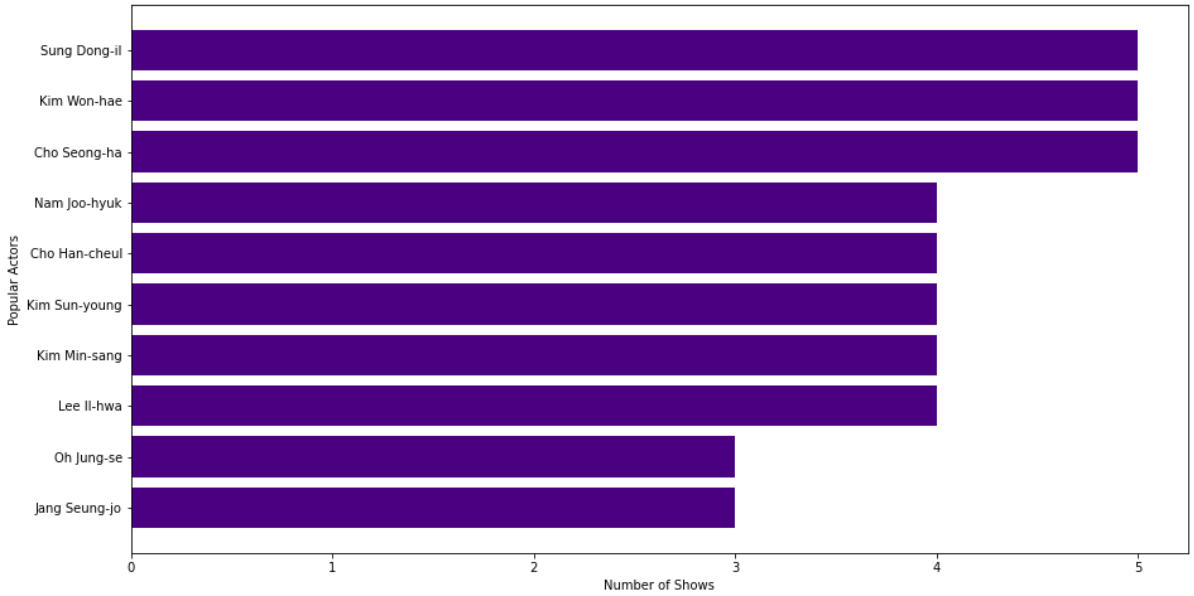
Only S.Korea has Romance as a top 3 favorable genre which depicts an inclination of their audience

In [ ]:
```
df_rating=df_sk_shows.groupby(['rating']).agg({"title":"nunique"}).
plt.figure(figsize=(15,8))
plt.barh(df_rating[::-1]['rating'], df_rating[::-1]['title'],color=
plt.xlabel('Frequency by Ratings')
plt.ylabel('Ratings')
plt.show()
```



So it seems plaussible to conclude that the popular ratings across Netflix includes TV-14 and Mature Audiences in TV Shows

In [ ]:
```
df_actors=df_sk_shows.groupby(['Actors']).agg({"title":"nunique"}).
df_actors=df_actors[df_actors['Actors']!='Unknown Actor']
plt.figure(figsize=(15,8))
plt.barh(df_actors[::-1]['Actors'], df_actors[::-1]['title'],color=
plt.xlabel('Number of Shows')
plt.ylabel('Popular Actors')
plt.show()
```



In [ ]:
```
df_actors['Actors'].values
```

Out[174]:
```
array(['Sung Dong-il', 'Kim Won-hae', 'Cho Seong-ha', 'Nam Joo-hyu
k',
       'Cho Han-cheul', 'Kim Sun-young', 'Kim Min-sang', 'Lee Il-h
wa',
       'Oh Jung-se', 'Jang Seung-jo'], dtype=object)
```

Popular Actors in TV Shows in South Korea are:-

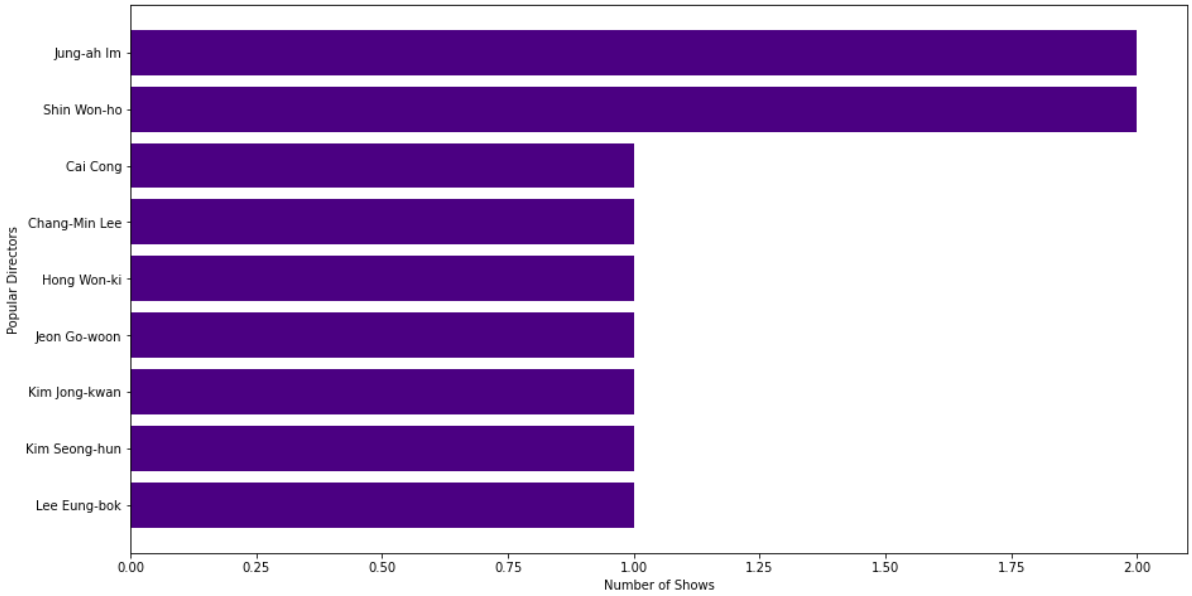
'Sung Dong-il',

'Kim Won-hae',

'Cho Seong-ha',

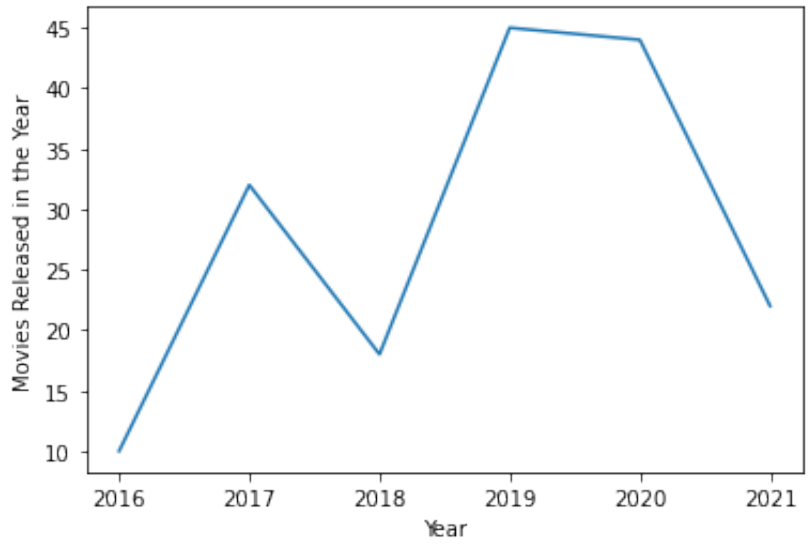
'Nam Joo-hyuk'

In [ ]:
```
df_directors=df_sk_shows.groupby(['Directors']).agg({"title":"nuniq
df_directors=df_directors[df_directors['Directors']!='Unknown Direc
plt.figure(figsize=(15,8))
plt.barh(df_directors[::-1]['Directors'], df_directors[::-1]['title
plt.xlabel('Number of Shows')
plt.ylabel('Popular Directors')
plt.show()
```



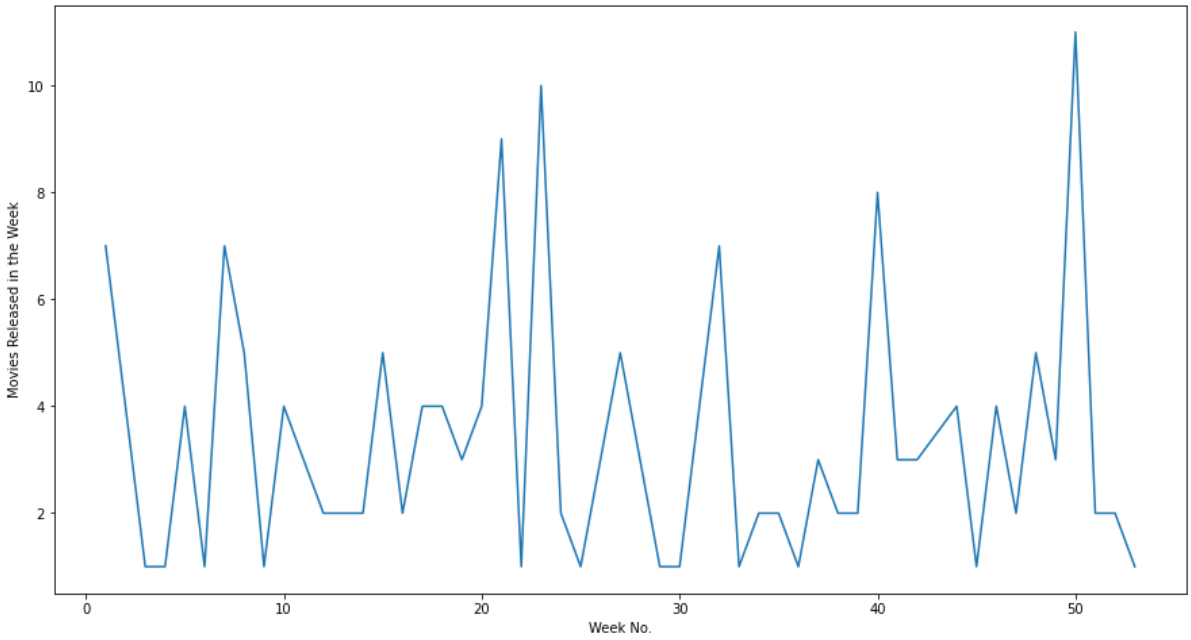
Two directors have directed 2 shows and rest all Directors are one time directors only

In [ ]:
```
df_year=df_sk_shows.groupby(['year']).agg({"title":"nunique"}).rese
sns.lineplot(data=df_year, x='year', y='title')
plt.ylabel("Movies Released in the Year")
plt.xlabel("Year")
plt.show()
```

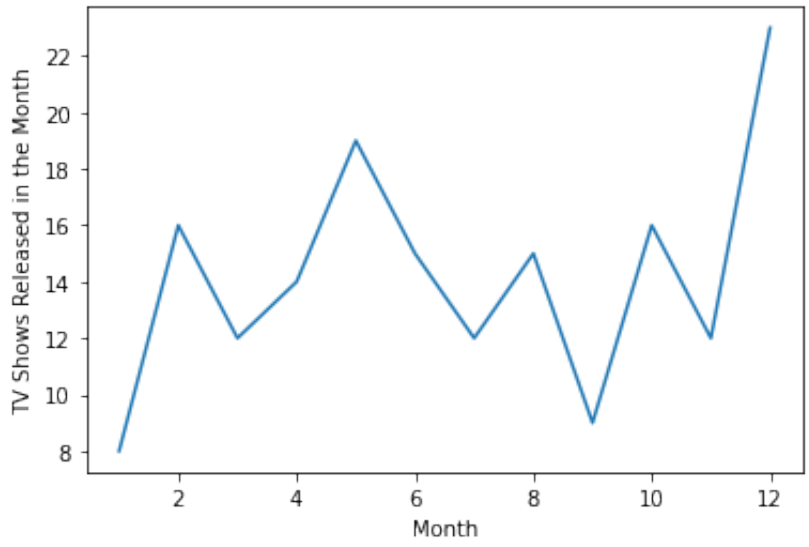


In South Korea, number of TV Shows reduced in 2018 from 2017, then increased till 2019 but have been on a heavy downfall since then

In [ ]:
```
df_week=df_sk_shows.groupby(['week_Added']).agg({"title":"nunique"}
plt.figure(figsize=(15,8))
sns.lineplot(data=df_week, x='week_Added', y='title')
plt.ylabel("Movies Released in the Week")
plt.xlabel("Week No.")
plt.show()
```

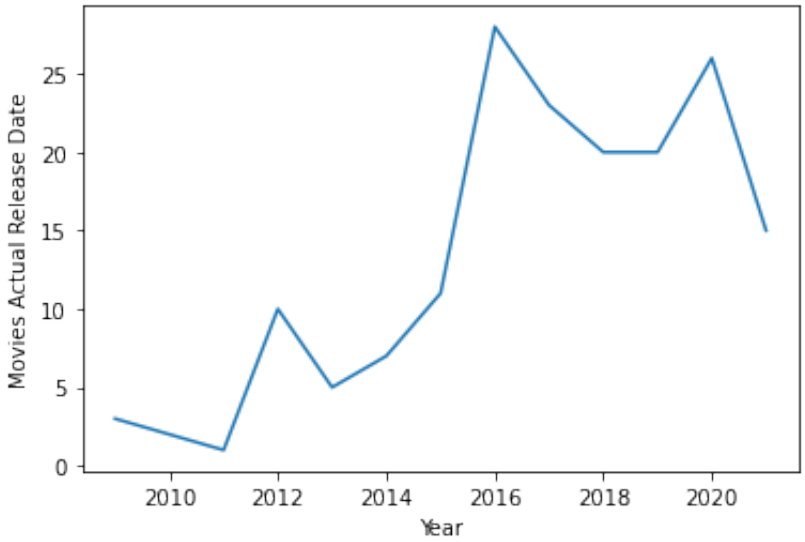


In [ ]:
```
df_month=df_sk_shows.groupby(['month_added']).agg({"title":"nunique
sns.lineplot(data=df_month, x='month_added', y='title')
plt.ylabel("TV Shows Released in the Month")
plt.xlabel("Month")
plt.show()
```



TV Shows are added in Netflix by significant numbers in May and January in South Korea

In [ ]:
```
df_release_year=df_sk_shows[df_sk_shows['release_year']>=1980].grou
sns.lineplot(data=df_release_year, x='release_year', y='title')
plt.ylabel("Movies Actual Release Date")
plt.xlabel("Year")
plt.show()
```



The number of TV Shows in S.Korea reached peak in 2016. It then reached a second peak in 2019. It has reduced in 2021 from 2020.

Recommendations

1) The most popular Genres across the countries and in both TV Shows and Movies are Drama, Comedy and International TV Shows/Movies, so content aligning to that is recommended.

2)Add TV Shows in July/August and Movies in last week of the year/first month of the next year.

3)For USA audience 80-120 mins is the recommended length for movies and Kids TV Shows are also popular along with the genres in first point, hence recommended.

4)For UK audience, recommended length for movies is same as that of USA (80-120 mins)

5)The target audience in USA and India is recommended to be 14+ and above ratings while for UK, its recommended to be completely Mature/R content .

6)Add movies for Indian Audience, it has been declining since 2018.

7)Anime Genre for Japan and Romantic Genre in TV Shows for South Korean audiences is recommended.

8) While creating content, take into consideration the popular actors/directors for that country. Also take into account the director-actor combination which is highly recommended.

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