SCALER NETFLIX CASE STUDY : PROJECT LINK (https://www.scaler.com/academy/mentee-dashboard/class/28625/project/problems/17748?navref=cl_tt_lst_sl)

AUTHOR : MLV PRASAD | DSML MARCH 2022

EVALUATION CRITERIA AND POINTS :

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1. Defining Problem Statement and Analysing basic metrics *10 Points*

2. Observations on the shape of data, data types of all the attributes, conversion of categorical attributes to *'category'* (If required), missing value detection, statistical summary *10 Points*

3. Non-Graphical Analysis: Value counts and unique attributes *10 Points*

4. Visual Analysis - Univariate, Bivariate after pre-processing of the data

(Note: Pre-processing involves unnesting of the data in columns like Actor, Director, Country)

- **4.1 For continuous variable(s): Distplot, countplot, histogram for univariate analysis** *10 Points*
- **4.2 For categorical variable(s): Boxplot** *10 Points*
- **4.3 For correlation: Heatmaps, Pairplots** *10 Points*

5. Missing Value & Outlier check (Treatment optional) *10 Points*

6.0 Insights based on Non-Graphical and Visual Analysis *10 Points*

- **6.1 Comments on the range of attributes**
- **6.2 Comments on the distribution of the variables and relationship between them**
- **6.3 Comments for each univariate and bivariate plot**

7. Business Insights *10 Points* **Should include patterns observed in the data along with what you can infer from it**

8 Recommendations *10 Points* **- Actionable items for business. No technical jargon. No complications. Simple action items that everyone can understand.**

In [1]:

```
# importing libraries

import pandas as pd
import numpy as np
import plotly


import matplotlib as mpl
import matplotlib.pyplot as plt


import seaborn as sns


plt.rcParams['figure.dpi'] = 200
```

```
C:\Users\iampr.MS\anaconda3\envs\google\lib\site-packages\scipy\__init__.py:
146: UserWarning: A NumPy version >=1.16.5 and <1.23.0 is required for this
version of SciPy (detected version 1.23.0
  warnings.warn(f"A NumPy version >={np_minversion} and <{np_maxversion}"
```

In [2]:

```
df = pd.read_csv('netflix.csv')
df.head()
```

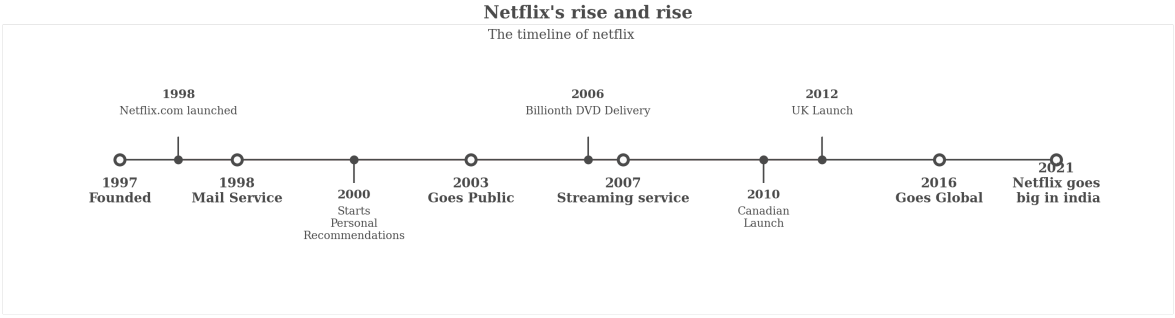
Out[2]:

	show_id	type	title	director	cast	country	date_added	release_year	rating
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	September 25, 2021	2020	PG-13
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	2021	TV-MA
2	s3	TV Show	Ganglands	Julien Leclercq	Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...	NaN	September 24, 2021	2021	TV-MA
3	s4	TV Show	Jailbirds New Orleans	NaN	NaN	NaN	September 24, 2021	2021	TV-MA
4	s5	TV Show	Kota Factory	NaN	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	September 24, 2021	2021	TV-MA

In [3]:

```
# @credit : taken information from internet
from datetime import datetime

## these go on the numbers below
tl_dates = [
    "1997\nFounded",
    "1998\nMail Service",
    "2003\nGoes Public",
    "2007\nStreaming service",
    "2016\nGoes Global",
    "2021\nNetflix goes\n big in india"
]

tl_x = [1, 2, 4, 5.3, 8,9]

## these go on the numbers
tl_sub_x = [1.5,3,5,6.5,7]


tl_sub_times = [
    "1998","2000","2006","2010","2012"
]

tl_text = [
    "Netflix.com launched",
    "Starts\nPersonal\nRecommendations","Billionth DVD Delivery","Canadian\nLaunch","UK Lau



# Set figure & Axes
fig, ax = plt.subplots(figsize=(15, 4), constrained_layout=True)
ax.set_ylim(-2, 1.75)
ax.set_xlim(0, 10)


# Timeline : line
ax.axhline(0, xmin=0.1, xmax=0.9, c='#4a4a4a', zorder=1)


# Timeline : Date Points
ax.scatter(tl_x, np.zeros(len(tl_x)), s=120, c='#4a4a4a', zorder=2)
ax.scatter(tl_x, np.zeros(len(tl_x)), s=30, c='#fafafa', zorder=3)
# Timeline : Time Points
ax.scatter(tl_sub_x, np.zeros(len(tl_sub_x)), s=50, c='#4a4a4a',zorder=4)

# Date Text
for x, date in zip(tl_x, tl_dates):
    ax.text(x, -0.55, date, ha='center',
            fontfamily='serif', fontweight='bold',
            color='#4a4a4a',fontsize=12)


# Stemplot : vertical line
levels = np.zeros(len(tl_sub_x))
levels[::2] = 0.3
levels[1::2] = -0.3
markerline, stemline, baseline = ax.stem(tl_sub_x, levels, use_line_collection=True)
plt.setp(baseline, zorder=0)
plt.setp(markerline, marker=',', color='#4a4a4a')
```

```
plt.setp(stemline, color='#4a4a4a')

# Text
for idx, x, time, txt in zip(range(1, len(tl_sub_x)+1), tl_sub_x, tl_sub_times, tl_text):
    ax.text(x, 1.3*(idx%2)-0.5, time, ha='center',
            fontfamily='serif', fontweight='bold',
            color='#4a4a4a' if idx!=len(tl_sub_x) else '#4a4a4a', fontsize=11)

    ax.text(x, 1.3*(idx%2)-0.6, txt, va='top', ha='center',
        fontfamily='serif',color='#4a4a4a' if idx!=len(tl_sub_x) else '#4a4a4a')



# Spine
for spine in ["left", "top", "right", "bottom"]:
    ax.spines[spine].set_visible(False)

# Ticks
ax.set_xticks([])
ax.set_yticks([])

# Title
ax.set_title("Netflix's rise and rise", fontweight="bold", fontfamily='serif', fontsize=16,
ax.text(2.4,1.57,"                                                The timeline of netflix"

plt.show()
```



In [401]:

```
df=df.drop_duplicates(['title','country','type','release_year'])
```

1. Defining Problem Statement and Analysing basic metrics *10 Points*

In [402]:

```
### NETFLIX IS A MULTI-NATIONAL STREAMING COMPANY WHICH PRODUCES
# MOVIES AND TV WEB SERIES ALL AROUND THE YEAR AND ALL AROUND THE GLOBE
# ANALYSING THE NETFLIX DATASET AND COMAPARING INDIA WITH DIFFERENT COUNTRIES AND
# TAKE CONCLUSION THROUGH VISUAL AND DESCRIPTIVE ANALYSIS
```

In [461]:

```
# shape of the data
df.shape
```

Out[461]:

```
(8807, 12)
```

In [ ]:

```
# the data frame has 8807 rows and 12 columns
```

In [404]:

```
#column names
df.columns # this are the columns of the netflux dataframe
```

Out[404]:

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

In [405]:

```
# data type of all the attributes
types = []
for i in df.columns :
    types.append([i,type(i)])
for i in types :
    print("data type of",i[0], "is",i[1])
```

```
data type of show_id is <class 'str'>
data type of type is <class 'str'>
data type of title is <class 'str'>
data type of director is <class 'str'>
data type of cast is <class 'str'>
data type of country is <class 'str'>
data type of date_added is <class 'str'>
data type of release_year is <class 'str'>
data type of rating is <class 'str'>
data type of duration is <class 'str'>
data type of listed_in is <class 'str'>
data type of description is <class 'str'>
```

In [462]:

```
# the list of all the needed classes of the attribute
```

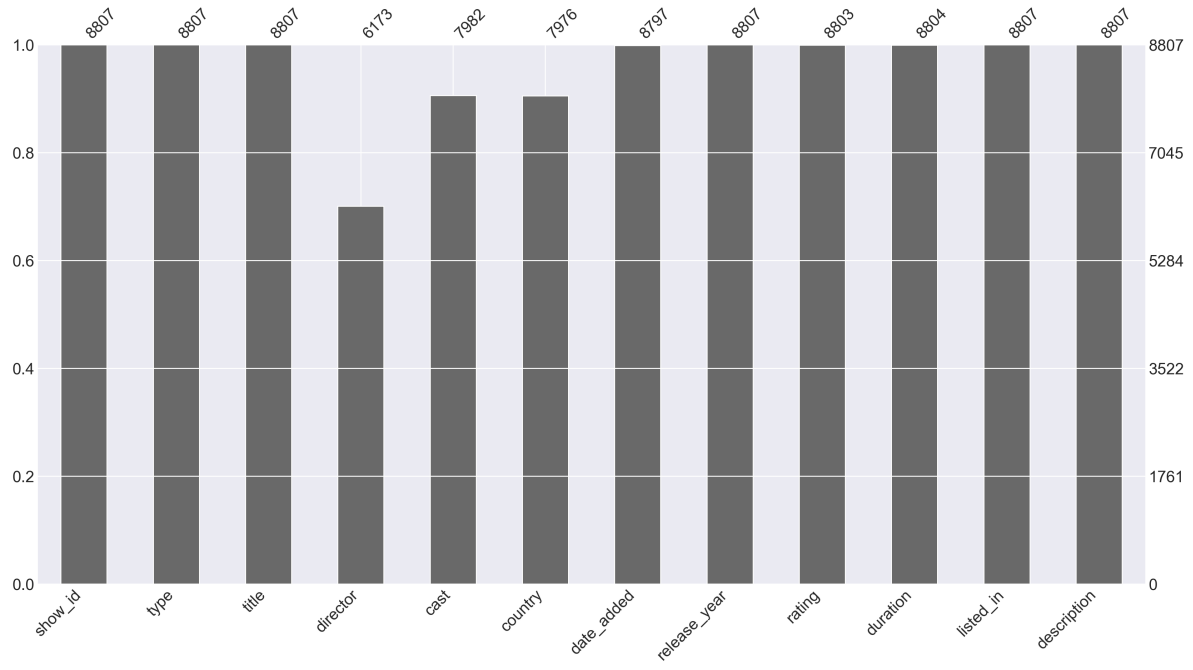
In [463]:

```
#INFO
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 8807 entries, 0 to 8806
Data columns (total 12 columns):
 #   Column        Non-Null Count  Dtype         
---  ------        --------------  -----         
 0   show_id       8807 non-null   object        
 1   type          8807 non-null   object        
 2   title         8807 non-null   object        
 3   director      6173 non-null   object        
 4   cast          7983 non-null   object        
 5   country       7976 non-null   object        
 6   date_added    8797 non-null   datetime64[ns]
 7   release_year  8807 non-null   int64         
 8   rating        8803 non-null   object        
 9   duration      8804 non-null   object        
 10  listed_in     8807 non-null   object        
 11  description   8807 non-null   object        
dtypes: datetime64[ns](1), int64(1), object(10)
memory usage: 1.1+ MB
```

In [407]:

```
#MISSING VALUES
msno.bar(df, figsize=(20,10))
plt.show()
```



In [ ]:

```
# shows the missing values in the columns
```

In [408]:

```
df.describe(include=[np.object]) #summary stats# give the statsistical summary of the objec
```

Out[408]:

	show_id	type	title	director	cast	country	date_added	rating	duration
count	8807	8807	8807	6173	7982	7976	8797	8803	8804
unique	8807	2	8807	4528	7692	748	1767	17	220
top	s7442	Movie	In Line	Rajiv Chilaka	David Attenborough	United States	January 1, 2020	TV-MA	1 Season
freq	1	6131	1	19	19	2818	109	3207	1793

In [409]:

```
df.describe(include=[np.number]# give the statsistical summary of the numerical columns
#summary stats
```

Out[409]:

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

In [410]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 8807 entries, 0 to 8806
Data columns (total 12 columns):
 #   Column        Non-Null Count  Dtype 
---  ------        --------------  ----- 
 0   show_id       8807 non-null   object
 1   type          8807 non-null   object
 2   title         8807 non-null   object
 3   director      6173 non-null   object
 4   cast          7982 non-null   object
 5   country       7976 non-null   object
 6   date_added    8797 non-null   object
 7   release_year  8807 non-null   int64 
 8   rating        8803 non-null   object
 9   duration      8804 non-null   object
 10  listed_in     8807 non-null   object
 11  description   8807 non-null   object
dtypes: int64(1), object(11)
memory usage: 894.5+ KB
```

In [411]:

```
df.head() # shows the head of the table
```

Out[411]:

	show_id	type	title	director	cast	country	date_added	release_year	rating
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	September 25, 2021	2020	PG-13
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	2021	TV-MA
2	s3	TV Show	Ganglands	Julien Leclercq	Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...	NaN	September 24, 2021	2021	TV-MA
3	s4	TV Show	Jailbirds New Orleans	NaN	NaN	NaN	September 24, 2021	2021	TV-MA
4	s5	TV Show	Kota Factory	NaN	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	September 24, 2021	2021	TV-MA

In [414]:

```
df['date_added'] = pd.to_datetime(df['date_added'])
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 8807 entries, 0 to 8806
Data columns (total 12 columns):
 #   Column        Non-Null Count  Dtype         
---  ------        --------------  -----         
 0   show_id       8807 non-null   object        
 1   type          8807 non-null   object        
 2   title         8807 non-null   object        
 3   director      6173 non-null   object        
 4   cast          7982 non-null   object        
 5   country       7976 non-null   object        
 6   date_added    8797 non-null   datetime64[ns]
 7   release_year  8807 non-null   int64         
 8   rating        8803 non-null   object        
 9   duration      8804 non-null   object        
 10  listed_in     8807 non-null   object        
 11  description   8807 non-null   object        
dtypes: datetime64[ns](1), int64(1), object(10)
memory usage: 894.5+ KB
```

In [168]:

```
print(df.type.unique(),df.type.nunique())
```

```
['Movie' 'TV Show'] 2
```

In [207]:

```
for i in df.columns:
    print("The Unique values and nuniques of ",str(i),"are",df[i].unique(),df[i].nunique())
    print("..................") # value counts and unique values of the columns
```

```
The Unique values and nuniques of  show_id are ['s1' 's2' 's3' ... 's8805'
's8806' 's8807'] 8807
..................
The Unique values and nuniques of  type are ['Movie' 'TV Show'] 2
..................
The Unique values and nuniques of  title are ['Dick Johnson Is Dead' 'Bloo
d & Water' 'Ganglands' ... 'Zombieland'
 'Zoom' 'Zubaan'] 8807
..................
The Unique values and nuniques of  director are ['Kirsten Johnson' nan 'Ju
lien Leclercq' ... 'Majid Al Ansari'
 'Peter Hewitt' 'Mozez Singh'] 4528
..................
The Unique values and nuniques of  cast are [nan
 'Ama Qamata, Khosi Ngema, Gail Mabalane, Thabang Molaba, Dillon Windvoge
l, Natasha Thahane, Arno Greeff, Xolile Tshabalala, Getmore Sithole, Cindy
Mahlangu, Ryle De Morny, Greteli Fincham, Sello Maake Ka-Ncube, Odwa Gwany
a, Mekaila Mathys, Sandi Schultz, Duane Williams, Shamilla Miller, Patrick
Mofokeng'
```

In [191]:

```
df.columns
```

Out[191]:

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

In [ ]:

```
# value counts
```

In [193]:

```
df['type'].value_counts().reset_index() # value  count of type
```

Out[193]:

	index	type
0	Movie	6131
1	TV Show	2676

In [171]:

```
df['show_id'].value_counts().reset_index() # value  count of show id
```

Out[171]:

	index	show_id
0	s7442	1
1	s8398	1
2	s1804	1
3	s7163	1
4	s4606	1
...	...	...
8802	s3810	1
8803	s7704	1
8804	s2988	1
8805	s2708	1
8806	s1879	1

8807 rows × 2 columns

In [194]:

```
df['title'].value_counts().reset_index() # value count of the title
```

Out[194]:

	index	title
0	In Line	1
1	Michael Bolton's Big, Sexy Valentine's Day Spe...	1
2	Daybreak	1
3	Wrong No.	1
4	Unriddle	1
...	...	...
8802	Running Out Of Time	1
8803	The Light of My Eyes	1
8804	Jani Dueñas: Grandes fracasos de ayer y hoy	1
8805	Ghost Rider	1
8806	Kill the Irishman	1

8807 rows × 2 columns

In [195]:

```
df['director'].value_counts().reset_index() #value count of the director
```

Out[195]:

	index	director
0	Rajiv Chilaka	19
1	Raúl Campos, Jan Suter	18
2	Suhas Kadav	16
3	Marcus Raboy	16
4	Jay Karas	14
...	...	...
4523	Ashwiny Iyer Tiwari, Abhishek Chaubey, Saket C...	1
4524	Jason Bourque	1
4525	Kader Aoun	1
4526	Hanung Bramantyo, Pandu Adjisurya	1
4527	Nathaniel Warsh	1

4528 rows × 2 columns

In [197]:

```
df['country'].value_counts().reset_index() #@value count of the country
```

Out[197]:

	index	country
0	United States	2818
1	India	972
2	United Kingdom	419
3	Japan	245
4	South Korea	199
...	...	...
743	India, Turkey	1
744	United Kingdom, Hong Kong	1
745	France, Senegal, Belgium	1
746	Finland	1
747	Netherlands, Germany, Italy, Canada	1

748 rows × 2 columns

In [198]:

```
df['date_added'].value_counts().reset_index()#value counts of the dat added column
```

Out[198]:

	index	date_added
0	January 1, 2020	109
1	November 1, 2019	89
2	March 1, 2018	75
3	December 31, 2019	74
4	October 1, 2018	71
...	...	...
1762	October 31, 2015	1
1763	November 29, 2020	1
1764	September 30, 2016	1
1765	February 3, 2019	1
1766	February 8, 2016	1

1767 rows × 2 columns

In [199]:

```
df['release_year'].value_counts().reset_index() # value count of the release year column
```

Out[199]:

	index	release_year
0	2018	1147
1	2017	1032
2	2019	1030
3	2020	953
4	2016	902
...	...	...
69	1966	1
70	1925	1
71	1947	1
72	1959	1
73	1961	1

74 rows × 2 columns

In [201]:

```
df['rating'].value_counts().reset_index()
# value count of the rating column
```

Out[201]:

	index	rating
0	TV-MA	3207
1	TV-14	2160
2	TV-PG	863
3	R	799
4	PG-13	490
5	TV-Y7	334
6	TV-Y	307
7	PG	287
8	TV-G	220
9	NR	80
10	G	41
11	TV-Y7-FV	6
12	UR	3
13	NC-17	3
14	84 min	1
15	74 min	1
16	66 min	1

In [202]:

```
df['duration'].value_counts().reset_index() # value count of the duration
```

Out[202]:

	index	duration
0	1 Season	1793
1	2 Seasons	425
2	3 Seasons	199
3	90 min	152
4	93 min	146
...	...	...
215	17 Seasons	1
216	10 min	1
217	43 min	1
218	214 min	1
219	312 min	1

220 rows × 2 columns

In [203]:

```
df['listed_in'].value_counts().reset_index() # value count of the listenin column
```

Out[203]:

	index	listed_in
0	Dramas, International Movies	362
1	Documentaries	359
2	Stand-Up Comedy	334
3	Comedies, Dramas, International Movies	274
4	Dramas, Independent Movies, International Movies	252
...	...	...
509	Classic & Cult TV, Kids' TV, TV Action & Adven...	1
510	Crime TV Shows, International TV Shows, Realit...	1
511	Horror Movies, LGBTQ Movies, Music & Musicals	1
512	Reality TV, Science & Nature TV, TV Action & A...	1
513	Comedies, LGBTQ Movies, Music & Musicals	1

514 rows × 2 columns

In [204]:

```
df['description'].value_counts().reset_index() # value count of the description column
```

Out[204]:

	index	description
0	Paranormal activity at a lush, abandoned prope...	4
1	Challenged to compose 100 songs before he can ...	3
2	A surly septuagenarian gets another chance at ...	3
3	Multiple women report their husbands as missin...	3
4	An aspiring musician battles age-old caste div...	2
...	...	...
8770	As World War I looms, an American nurse travel...	1
8771	In 1921, nurse trainees from Madrid's upper cl...	1
8772	After each of them loses a child to murder, tw...	1
8773	With rare footage and candid interviews, this ...	1
8774	Twins separated by a court order meet at camp ...	1

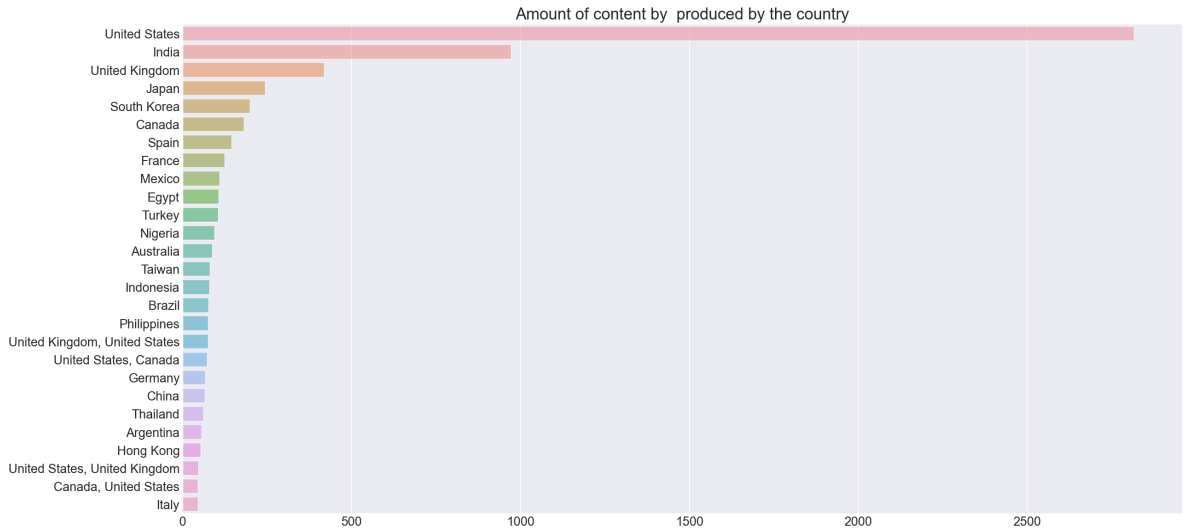
8775 rows × 2 columns

In [313]:

```
countries = df['country'].value_counts()[df['country'].value_counts(normalize=True)> 0.005]
list_countries = list(countries.index)
```

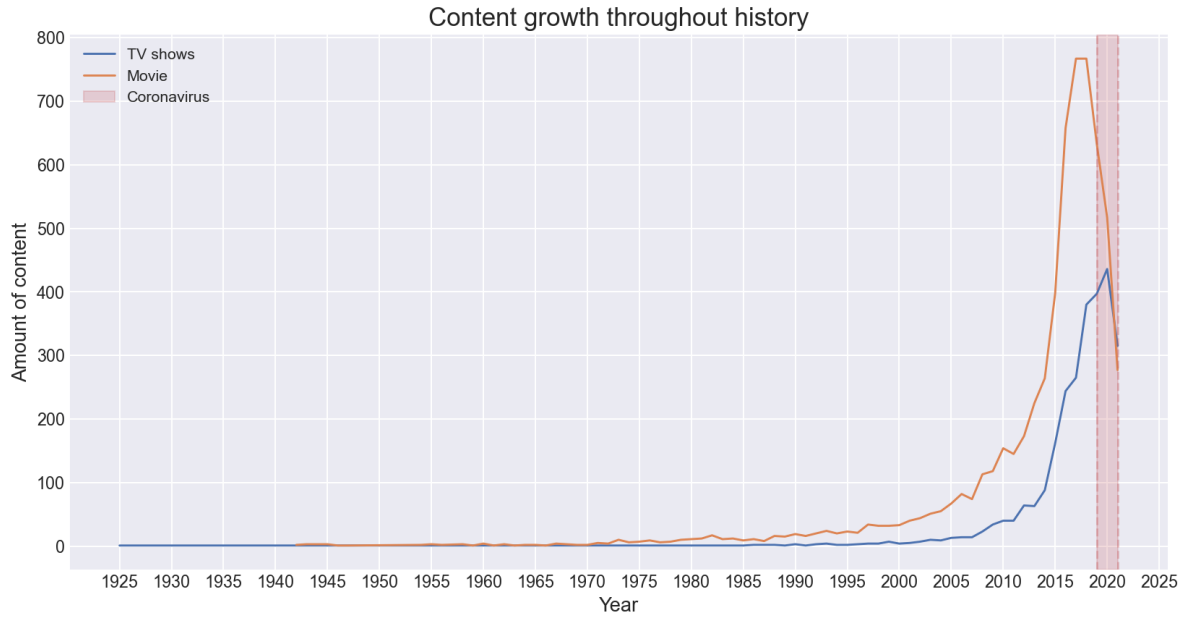
In [320]:

```
# barplotting the number of content per each country
plt.figure(figsize=(20,10))
plt.title('Amount of content by  produced by the country', fontsize=18)
plt.tick_params(labelsize=14)
sns.barplot(y=countries.index, x=countries.values, alpha=0.6)
plt.show()
```



In [324]:

```
TVshows = df[df['type'] == 'TV Show']
Movie = df[df['type'] == 'Movie']

TVshows_progress = TVshows['release_year'].value_counts().sort_index()
Movie_progress = Movie['release_year'].value_counts().sort_index()

plt.figure(figsize=(14, 7))

plt.plot(TVshows_progress.index, TVshows_progress.values, label='TV shows')
plt.plot(Movie_progress.index, Movie_progress.values, label='Movie')

plt.axvline(2019, alpha=0.3, linestyle='--', color='r')
plt.axvline(2021, alpha=0.3, linestyle='--', color='r')
plt.axvspan(2019, 2021, alpha=0.2, color='r', label='Coronavirus')

plt.xticks(list(range(1925, 2026, 5)), fontsize=12)
plt.title('Content growth throughout history', fontsize=18)
plt.xlabel('Year', fontsize=14)
plt.ylabel('Amount of content', fontsize=14)
plt.yticks(fontsize=12)
plt.legend()
plt.show()
# shows that it has its peak at 2019 and corona virus pandamic has severly affected the con
```

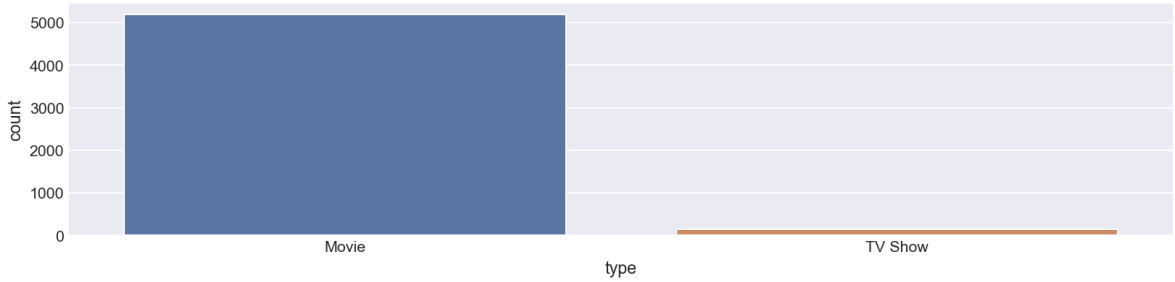


In [337]:

```
plt.figure(figsize=(14, 3))
sns.countplot(x='type',data = df)

#ratio of the movie / tv shows # there is a clear majority of movies released by netflix
```

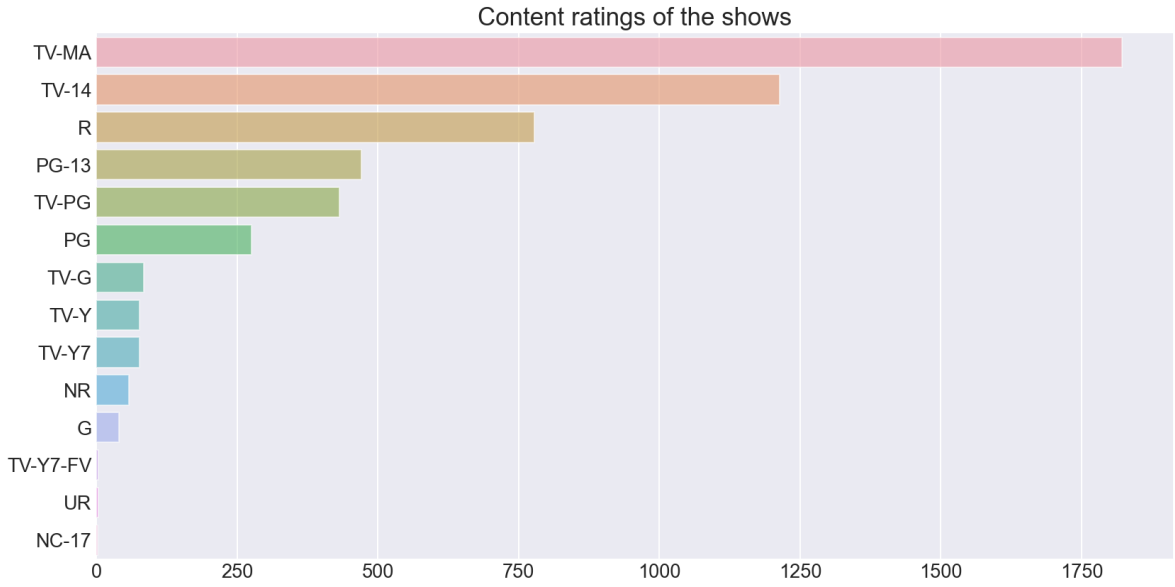
Out[337]:

```
<AxesSubplot:xlabel='type', ylabel='count'>
```



In [327]:

```
df.dropna(inplace=True)

rating = df['rating'].value_counts()

plt.figure(figsize=(14,7))
plt.title('Content ratings of the shows', fontsize=18)
plt.tick_params(labelsize=14)
sns.barplot(y=rating.index, x=rating.values, alpha=0.6)

plt.show() # most conetent is tv for matured audience and tv for 14 yrs
```

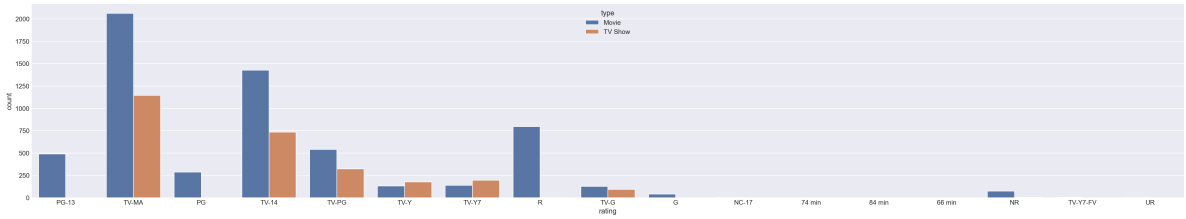


In [439]:

```
plt.figure(figsize = (35,6))
sns.countplot(x='rating',data = df,hue='type')  # most shows and movuie wit matured audienc
```

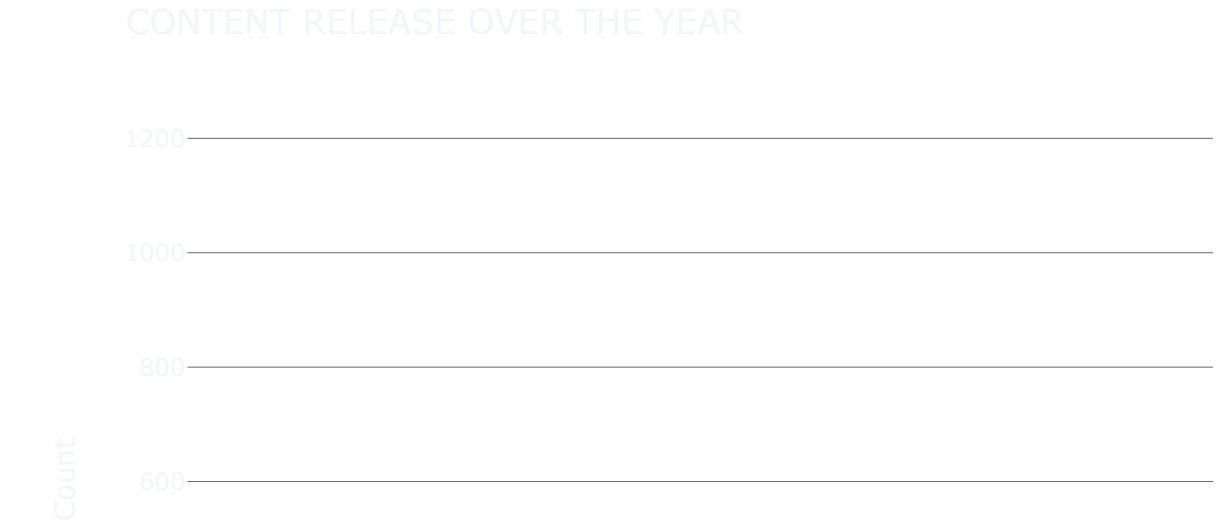
Out[439]:

```
<AxesSubplot:xlabel='rating', ylabel='count'>
```



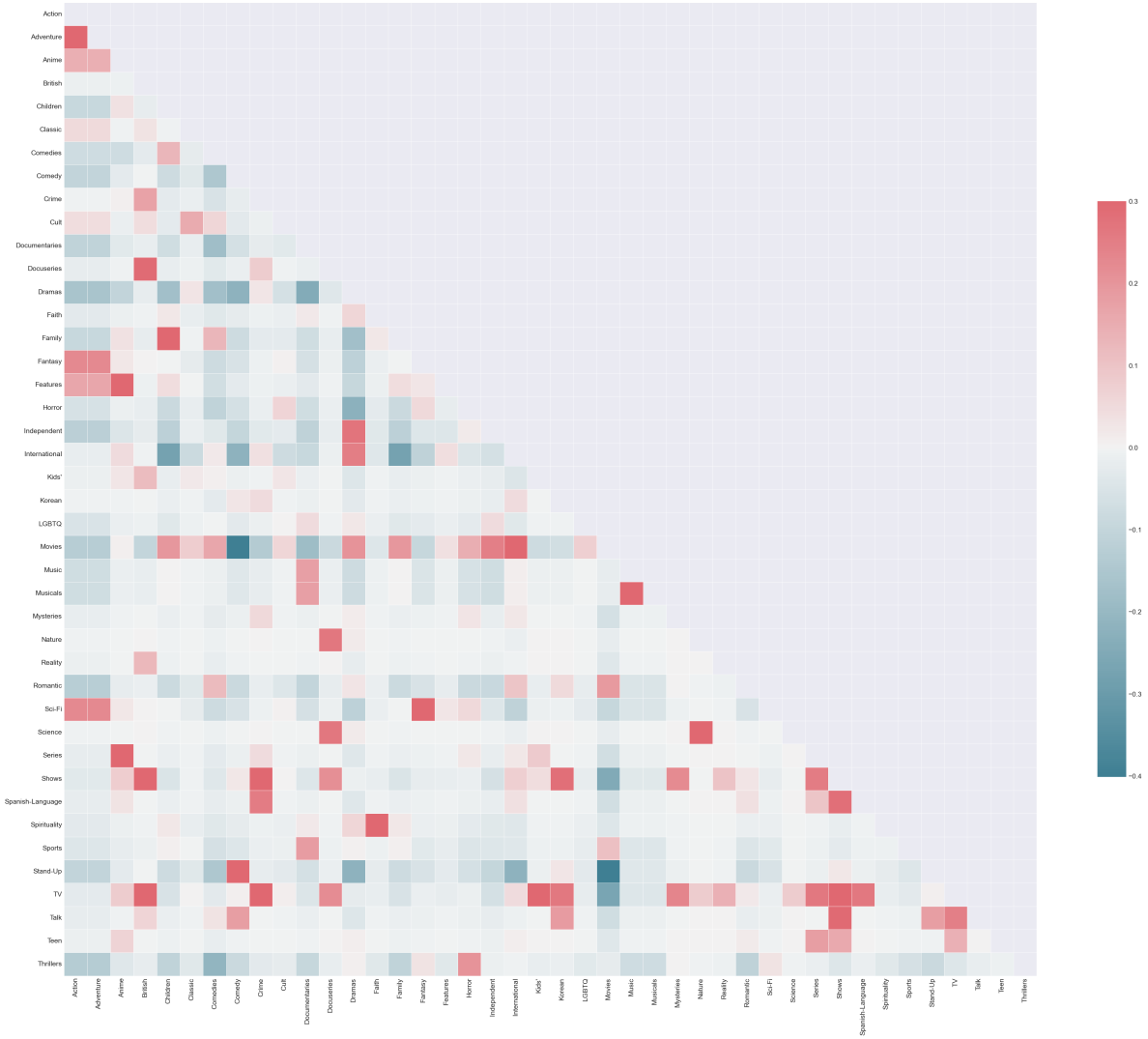
In [5]:

```
temp_df1 = df['release_year'].value_counts().reset_index()


import plotly.graph_objects as go

trace1 = go.Bar(
                x = temp_df1['index'],
                y = temp_df1['release_year'],
                marker = dict(color = 'rgb(255,165,0)',
                              line=dict(color='rgb(0,0,0)',width=1.5)))
layout = go.Layout(template= "plotly_dark",title = 'CONTENT RELEASE OVER THE YEAR' , xaxis
fig = go.Figure(data = [trace1], layout = layout)
fig.show()

# content produced over the year in histoghramic statistic
```



In [342]:

```
# bold('**HEATMAP(Correlation)**')
from sklearn.preprocessing import MultiLabelBinarizer # Similar to One-Hot Encoding

data= df['listed_in'].astype(str).apply(lambda s : s.replace('&',' ').replace(',', ' ').spl

test = data
mlb = MultiLabelBinarizer()
res = pd.DataFrame(mlb.fit_transform(test), columns=mlb.classes_)
corr = res.corr()
mask = np.zeros_like(corr, dtype=np.bool)
mask[np.triu_indices_from(mask)] = True
f, ax = plt.subplots(figsize=(35, 34))
cmap = sns.diverging_palette(220, 10, as_cmap=True)
sns.heatmap(corr, mask=mask, cmap=cmap, vmax=.3, center=0,square=True, linewidths=.5, cbar_
plt.show()

# shows that international movies with target audience children are low
```

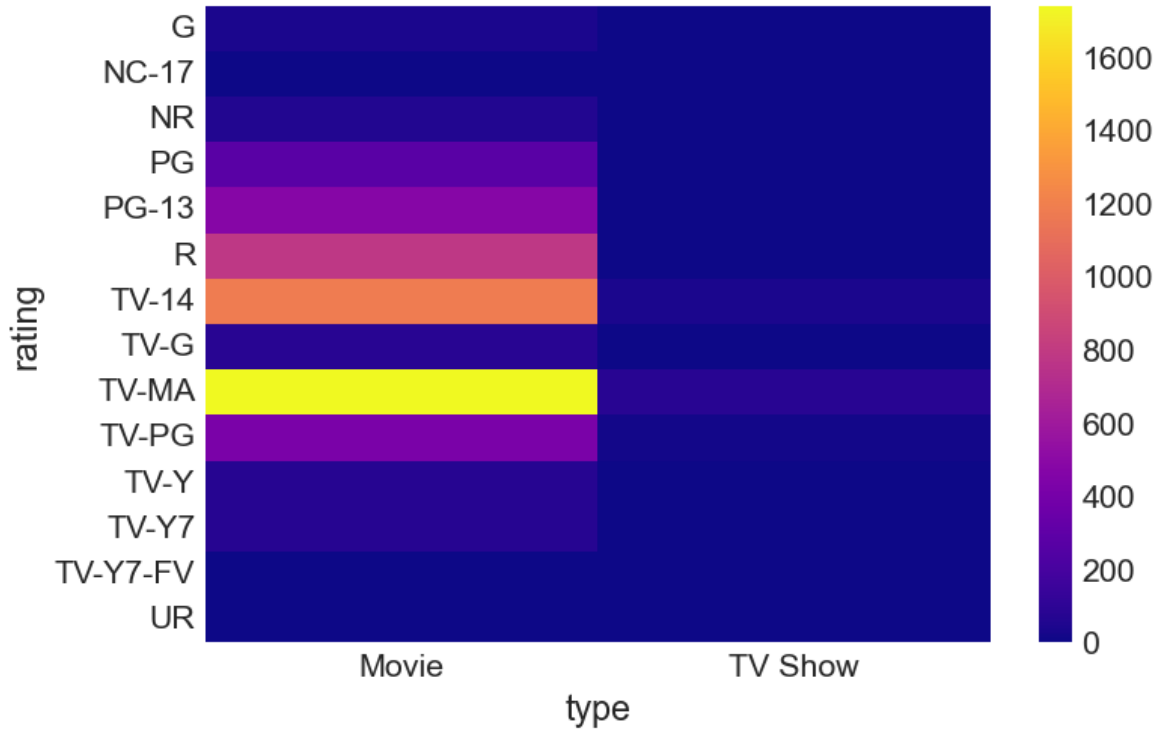


In [347]:

```
colormap = plt.cm.plasma
sns.heatmap(pd.crosstab(df["rating"], df["type"]), cmap = colormap)
```

Out[347]:

```
<AxesSubplot:xlabel='type', ylabel='rating'>
```



In [430]:

```
mf = df
mf =mf.drop(['show_id', 'title', 'director', 'cast',   'rating', 'duration', 'description',
mf.head()
```

Out[430]:

	type	country	date_added	release_year
0	Movie	United States	2021-09-25	2020
1	TV Show	South Africa	2021-09-24	2021
2	TV Show	NaN	2021-09-24	2021
3	TV Show	NaN	2021-09-24	2021
4	TV Show	India	2021-09-24	2021

In [429]:

```
mf.columns
```

Out[429]:

```
Index(['type', 'country', 'date_added', 'release_year'], dtype='object')
```

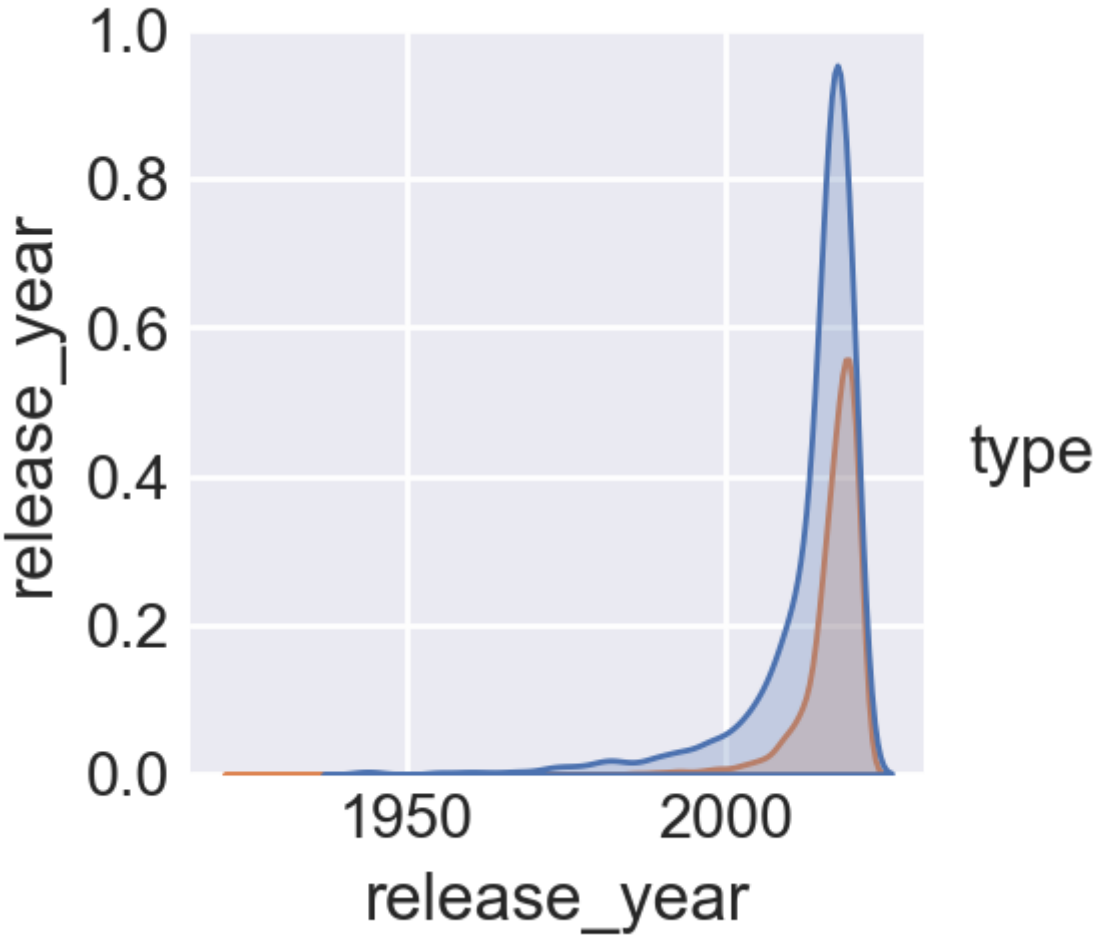
In [443]:

```
plt.figure(figsize = (35,6))
sns.pairplot(mf,hue='type') # pair plot of type and released year
```

Out[443]:

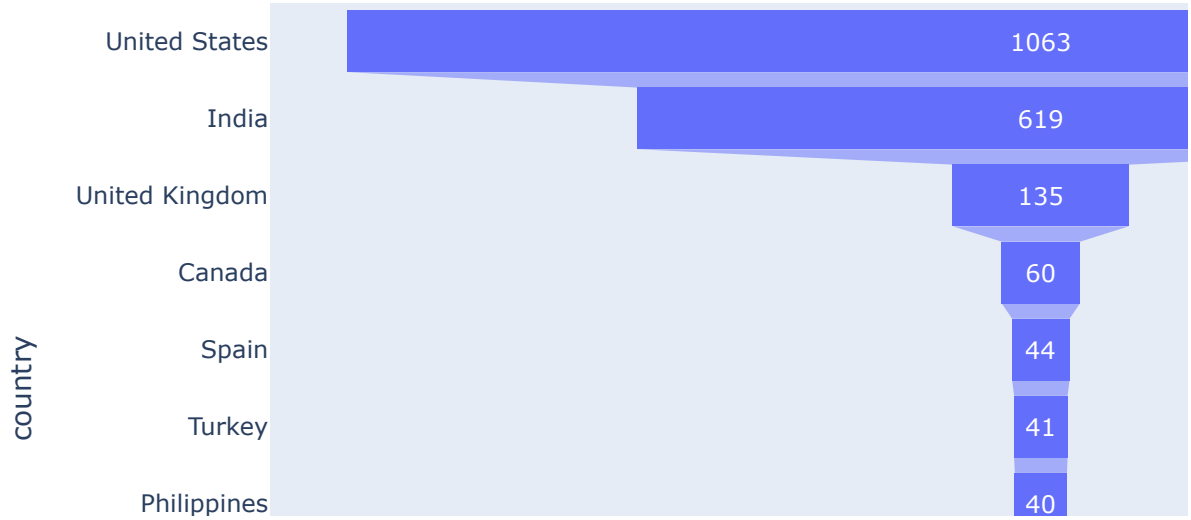
```
<seaborn.axisgrid.PairGrid at 0x15de13b9310>
```

```
<Figure size 7000x1200 with 0 Axes>
```



In [6]:

```
# plt.figure(figsize = (35,6))
df = pd.read_csv('netflix.csv')
import plotly.express as px
data = dict(    number=[1063,619,135,60,44,41,40,40,38,35],
    country=["United States", "India", "United Kingdom", "Canada", "Spain",'Turkey','Philip
fig = px.funnel(data, x='number', y='country')
fig.show()
```



In [481]:

```
# most content produced by usa followed by india
```

In [436]:

```
df.info()
```

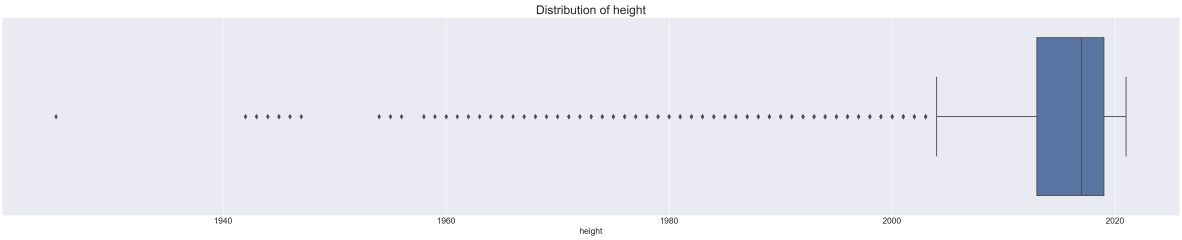
```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 8807 entries, 0 to 8806
Data columns (total 12 columns):
 #   Column        Non-Null Count  Dtype         
---  ------        --------------  -----         
 0   show_id       8807 non-null   object        
 1   type          8807 non-null   object        
 2   title         8807 non-null   object        
 3   director      6173 non-null   object        
 4   cast          7982 non-null   object        
 5   country       7976 non-null   object        
 6   date_added    8797 non-null   datetime64[ns]
 7   release_year  8807 non-null   int64         
 8   rating        8803 non-null   object        
 9   duration      8804 non-null   object        
 10  listed_in     8807 non-null   object        
 11  description   8807 non-null   object        
dtypes: datetime64[ns](1), int64(1), object(10)
memory usage: 1.1+ MB
```

In [446]:

```
plt.figure(figsize = (35,6))
# box plot of the release year
ax = sns.boxplot(df['release_year'])

# notation indicating an outlier
ax.annotate('Outlier', xy=(190,0), xytext=(186,-0.05), fontsize=14,
            arrowprops=dict(arrowstyle='->', ec='grey', lw=2), bbox = dict(boxstyle="round"

# xtick, label, and title
plt.xticks(fontsize=14)
plt.xlabel('height', fontsize=14)
plt.title('Distribution of height', fontsize=20)
```

Out[446]:

```
Text(0.5, 1.0, 'Distribution of height')
```



In [ ]:

```
# there is a lot of historical content which is not prefered by modern audience
```

In [ ]:

```

```

In [451]:

```
df['cast'].fillna(df['cast'].mode(), inplace = True)  # replacing null values
```

In [465]:

```
##############
############
##############

""" Business insights :

1 . The analsysis shows us that the there is high amt of movies produced per year than tv s
2 . corona virus has the impacted the content quantity
3 . the usa and india are the top 2 countries content wise
4 .the content targeted in india is teens while the content being targeted at usa is adult
5 lack of child content produced in india
6. india and south korean have similar taste and usa and uk audience have similar taste
7. lack of diverse conetent for indian audience
"""
```

Out[465]:

```
' Business insights :\n\n1 . The analsysis shows us that the there is high a
mt of movies produced per year than tv shows\n2 . corona virus has the impac
ted the content quantity \n3 . the usa and india are the top 2 countries con
tent wise\n4 .the content targeted in india is teens while the content being
targeted at usa is adult audience\n5 . ck of child content produced in india
\n6. india and south korean have similar taste and usa and uk audience have
similar taste\n7.\n'
```

In [ ]:

```
"""Recommendations:
1. produce more tv shows in high markets like india with diverse quantity
2. more movies targetting untapped young adult audience
3. more children quanity should be created """
```