

Import all the libraries

```
import pandas as pd      # data processing, CSV file I/O (e.g.
pd.read_csv)import
import numpy as np      # linear algebra
import matplotlib.pyplot as plt
import seaborn as sns
import time
```

```
import warnings
warnings.filterwarnings('ignore')
```

```
pd.set_option("display.max_rows",None)
```

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

	show_id	type	title	director \
0	s1	TV Show	3%	NaN
1	s2	Movie	7:19	Jorge Michel Grau
2	s3	Movie	23:59	Gilbert Chan
3	s4	Movie	9	Shane Acker
4	s5	Movie	21	Robert Luketic

	cast	country \
0	João Miguel, Bianca Comparato, Michel Gomes, R...	Brazil
1	Demián Bichir, Héctor Bonilla, Oscar Serrano, ...	Mexico
2	Tedd Chan, Stella Chung, Henley Hii, Lawrence ...	Singapore
3	Elijah Wood, John C. Reilly, Jennifer Connelly...	United States
4	Jim Sturgess, Kevin Spacey, Kate Bosworth, Aar...	United States

	date_added	release_year	rating	duration \
0	August 14, 2020	2020	TV-MA	4 Seasons
1	December 23, 2016	2016	TV-MA	93 min
2	December 20, 2018	2011	R	78 min
3	November 16, 2017	2009	PG-13	80 min
4	January 1, 2020	2008	PG-13	123 min

	listed_in \
0	International TV Shows, TV Dramas, TV Sci-Fi &...
1	Dramas, International Movies
2	Horror Movies, International Movies
3	Action & Adventure, Independent Movies, Sci-Fi...
4	Dramas

	description
0	In a future where the elite inhabit an island ...
1	After a devastating earthquake hits Mexico Cit...
2	When an army recruit is found dead, his fellow...

```
3 In a postapocalyptic world, rag-doll robots hi...
4 A brilliant group of students become card-coun...
```

```
df.columns = map(str.capitalize , df.columns)
```

```
df.rename(columns = {'Date_added' : 'Date Added', 'Release_year' :
'Release Year'} , inplace = True)
```

```
df.head(2)
```

```
   Show_id  Type Title      Director \
0      s1  TV Show   3%           NaN
1      s2   Movie  7:19  Jorge Michel Grau
```

```
                                Cast Country \
0  João Miguel, Bianca Comparato, Michel Gomes, R...  Brazil
1  Demián Bichir, Héctor Bonilla, Oscar Serrano, ...  Mexico
```

```
      Date Added  Release Year Rating  Duration \
0  August 14, 2020      2020  TV-MA   4 Seasons
1  December 23, 2016      2016  TV-MA      93 min
```

```
                                Listed_in \
0  International TV Shows, TV Dramas, TV Sci-Fi &...
1                                Dramas, International Movies
```

```
                                Description
0  In a future where the elite inhabit an island ...
1  After a devastating earthquake hits Mexico Cit...
```

```
df.describe(include='all').head()
```

```
      Show_id  Type Title      Director
Cast \
count      7787   7787   7787           5398
7069
unique      7787      2   7787           4049
6831
top      s1  Movie   3%  Raúl Campos, Jan Suter  David
Attenborough
freq      1   5377      1           18
18
mean      NaN    NaN    NaN           NaN
NaN
```

```
      Country      Date Added  Release Year Rating  Duration
\
count      7280           7777   7787.000000   7780      7787
unique      681           1565           NaN    14      216
```

top	United States	January 1, 2020	NaN	TV-MA	1 Season
freq	2555	118	NaN	2863	1608
mean	NaN	NaN	2013.93258	NaN	NaN

	Listed_in
Description	
count	7787
7787	
unique	492
7769	
top	Documentaries
missin...	Multiple women report their husbands as
freq	334
3	
mean	NaN
NaN	

The total numbers of the columns and rows of the dataset

```
df.shape
(7787, 12)
```

The total amount of values or otherwise elements in our dataset

```
df.size
93444
```

More information about the dataset

```
df.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 7787 entries, 0 to 7786
Data columns (total 12 columns):
#   Column                Non-Null Count  Dtype
---  -
0   Show_id                7787 non-null   object
1   Type                  7787 non-null   object
2   Title                 7787 non-null   object
3   Director              5398 non-null   object
4   Cast                  7069 non-null   object
5   Country               7280 non-null   object
6   Date Added            7777 non-null   object
7   Release Year          7787 non-null   int64
8   Rating                7780 non-null   object
9   Duration              7787 non-null   object
```

```
10  Listed_in      7787 non-null  object
11  Description    7787 non-null  object
dtypes: int64(1), object(11)
memory usage: 730.2+ KB
```

View all the columns name of the dataset

```
df.columns
```

```
Index(['Show_id', 'Type', 'Title', 'Director', 'Cast', 'Country',
      'Date Added',
      'Release Year', 'Rating', 'Duration', 'Listed_in',
      'Description'],
      dtype='object')
```

View the data type of each column

```
df.dtypes
```

```
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
```

Dealing with the missing data or duplicates

We check for missing data

We have missing data in five columns out of the twelve

```
df.isnull().sum()
```

```
Show_id      0
Type          0
Title         0
Director     2389
Cast         718
Country      507
Date Added    10
Release Year   0
Rating        7
Duration      0
Listed_in     0
```

```
Description      0
dtype: int64
```

```
# The percentage of the missing data
```

```
print('The percentage of the missing data in our dataset is: \n')
```

```
for i in df.columns:
    null = ( df[i].isnull().sum() / len(df) ) * 100

    if null > 0:
        print('{} null percentage is : {}'.format(i, round(null, 2)))
```

The percentage of the missing data in our dataset is:

```
Director null percentage is : 30.68%
Cast null percentage is : 9.22%
Country null percentage is : 6.51%
Date Added null percentage is : 0.13%
Rating null percentage is : 0.09%
```

```
# Check for duplicate rows, luckily we don't have any
```

```
df.duplicated().sum()
```

```
0
```

```
# I will replace blank countries with the mode (most common) country
```

```
df['Country'] = df ['Country'].fillna(df['Country'].mode()[0])
```

```
#df['Cast'].replace(np.nan , 'No Data', inplace = True)
```

```
#df['Director'].replace(np.nan , 'No Data', inplace = True)
```

```
df.dropna(inplace = True)
```

```
# Double check it to make sure that i don't have any more missing data
```

```
df.isnull().sum()
```

```
Show_id      0
Type         0
Title        0
Director     0
Cast         0
Country      0
Date Added   0
Release Year 0
Rating       0
```

```
Duration      0
Listed_in     0
Description    0
dtype: int64
```

```
df['Country'].value_counts()
```

```
United States    4975
Name: Country, dtype: int64
```

```
(df['Country'] == 'Ireland').value_counts().sum()
```

```
7787
```

Date

```
df["Date Added"] = pd.to_datetime(df['Date Added'])
```

```
df['Month_added']=df['Date Added'].dt.month
df['Month_name_added']=df['Date Added'].dt.month_name()
df['Year_added'] = df['Date Added'].dt.year
```

```
df.head()
```

	Show_id	Type	Title	Director \
1	s2	Movie	7:19	Jorge Michel Grau
2	s3	Movie	23:59	Gilbert Chan
3	s4	Movie	9	Shane Acker
4	s5	Movie	21	Robert Luketic
5	s6	TV Show	46	Serdar Akar

	Cast	Country \
1	Demián Bichir, Héctor Bonilla, Oscar Serrano, ...	United States
2	Tedd Chan, Stella Chung, Henley Hii, Lawrence ...	United States
3	Elijah Wood, John C. Reilly, Jennifer Connelly...	United States
4	Jim Sturgess, Kevin Spacey, Kate Bosworth, Aar...	United States
5	Erdal Beşikçioğlu, Yasemin Allen, Melis Birkan...	United States

	Date Added	Release	Year	Rating	Duration \
1	2016-12-23		2016	TV-MA	93 min
2	2018-12-20		2011	R	78 min
3	2017-11-16		2009	PG-13	80 min
4	2020-01-01		2008	PG-13	123 min
5	2017-07-01		2016	TV-MA	1 Season

	Listed_in \
1	Dramas, International Movies
2	Horror Movies, International Movies
3	Action & Adventure, Independent Movies, Sci-Fi...
4	Dramas
5	International TV Shows, TV Dramas, TV Mysteries

	Description	Month_added	\
1	After a devastating earthquake hits Mexico Cit...	12	
2	When an army recruit is found dead, his fellow...	12	
3	In a postapocalyptic world, rag-doll robots hi...	11	
4	A brilliant group of students become card-coun...	1	
5	A genetics professor experiments with a treatm...	7	

	Month_name_added	Year_added
1	December	2016
2	December	2018
3	November	2017
4	January	2020
5	July	2017

Split the dataset into two subset

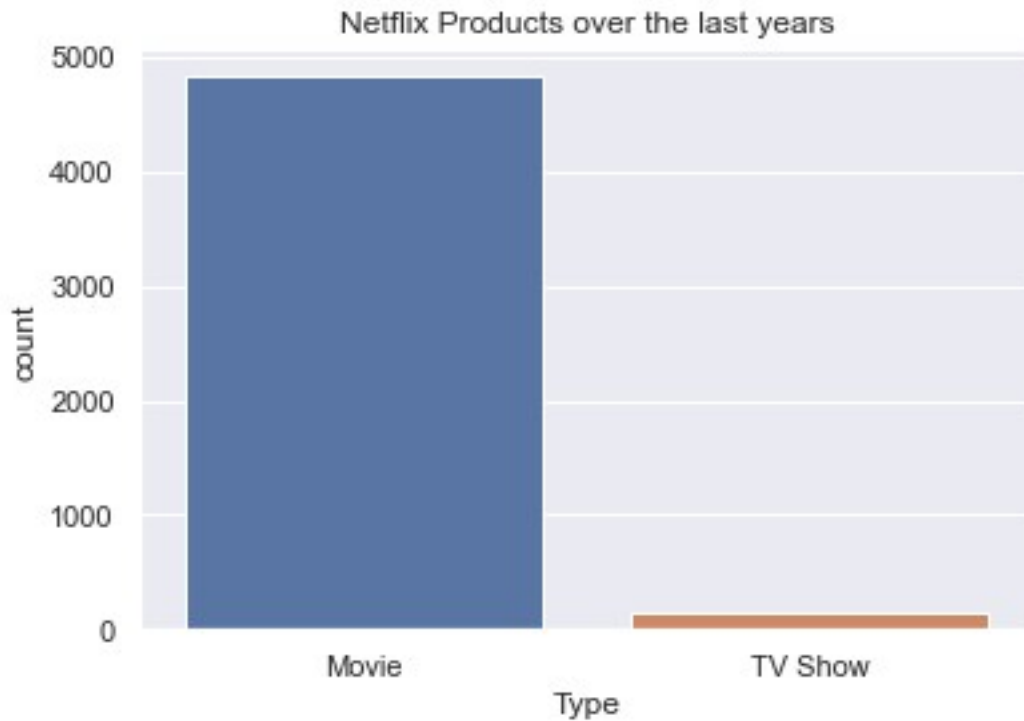
movies and tv_shows

```
movies = df[df['Type'] == 'Movie']
tv_shows = df[df['Type'] == 'TV Show']
```

```
print('Netflix has {} movies and the {} TV Shows' .format(len(movies),len(tv_shows)))
```

Netflix has 4830 movies and the 145 TV Shows

```
sns.set_theme(style="darkgrid")
sns.countplot(df['Type']).set_title('Netflix Products over the last years')
plt.show()
```



Top 20 oldest and newest Movies and TV-Shows

```
old_20_movies = movies.sort_values('Release Year' , ascending = True)
old_20_movies[['Title', "Release Year"]][:20]
```

	Title	Release Year
6117	The Battle of Midway	1942
7268	Tunisian Victory	1944
3425	Know Your Enemy - Japan	1945
3608	Let There Be Light	1946
7072	Thunderbolt	1947
7595	White Christmas	1954
6141	The Blazing Sun	1954
5122	Rebel Without a Cause	1955
5425	Scandal in Sorrento	1955
6868	The Sign of Venus	1955
1620	Dark Waters	1956
2233	Forbidden Planet	1956
1241	Cat on a Hot Tin Roof	1958
1169	Cairo Station	1958
2410	Gigi	1958
7302	Ujala	1959
3187	Jis Desh Men Ganga Behti Hai	1960
1152	Butterfield 8	1960
4563	Ocean's Eleven	1960
5624	Singapore	1960

```
old_20_shows = tv_shows.sort_values('Release Year' , ascending = True)
old_20_shows[['Title', "Release Year"]][:20]
```


	Title	Release Year
3334	Ken Burns: The Civil War	1990
6148	The Blue Planet: A Natural History of the Oceans	2001
4404	Naruto	2006
4700	Ouran High School Host Club	2006
4876	Planet Earth: The Complete Collection	2006
2058	Exclusive Edition	2008
2313	Fullmetal Alchemist: Brotherhood	2010
2299	Frozen Planet	2011
2380	Geronimo Stilton	2011
4047	Merlin	2012
2431	Girls und Panzer	2012
5163	Reply 1997	2012
6344	The Fear	2012
4604	Oliver Stone's Untold History of the United St...	2013
6077	The American Bible Challenge	2013
1079	Brave Miss World	2013
4055	Metallica: Some Kind of Monster	2014
1186	Camelia la Texana	2014
6203	The Cat in the Hat Knows a Lot About That!	2014
3613	Leyla and Mecnun	2014

```
old_20_shows = tv_shows.sort_values('Release Year' , ascending = True)
old_20_shows[['Title', "Release Year"]][:20]
```

	Title	Release Year
3334	Ken Burns: The Civil War	1990
6148	The Blue Planet: A Natural History of the Oceans	2001
4404	Naruto	2006
4700	Ouran High School Host Club	2006
4876	Planet Earth: The Complete Collection	2006
2058	Exclusive Edition	2008
2313	Fullmetal Alchemist: Brotherhood	2010
2299	Frozen Planet	2011
2380	Geronimo Stilton	2011
4047	Merlin	2012
2431	Girls und Panzer	2012
5163	Reply 1997	2012
6344	The Fear	2012
4604	Oliver Stone's Untold History of the United St...	2013
6077	The American Bible Challenge	2013
1079	Brave Miss World	2013
4055	Metallica: Some Kind of Monster	2014
1186	Camelia la Texana	2014
6203	The Cat in the Hat Knows a Lot About That!	2014
3613	Leyla and Mecnun	2014

```
new_20_movies = movies.sort_values('Release Year' , ascending =
False)
new_20_movies[['Title', "Release Year"]][:20]
```

	Title	Release Year
7644	Wish You	2021
1355	Chris Rock Total Blackout: The Tamborine Exten...	2021
7220	Tribhanga - Tedhi Medhi Crazy	2021
1285	Charming	2021
7569	What Would Sophia Loren Do?	2021
7551	What Happened to Mr. Cha?	2021
5103	Ratones Paranoicos: The Band that Rocked Argen...	2021
4710	Outside the Wire	2021
511	André & his olive tree	2020
512	Anelka: Misunderstood	2020
5385	Santana	2020
3275	Kaali Khuhi	2020
2400	Ghost Stories	2020
509	Andhaghaaram	2020
5388	Sarah Cooper: Everything's Fine	2020
1342	Chippa	2020
7246	True: Friendship Day	2020
510	Andhakaaram	2020
5872	Sugar High	2020
7255	True: Wuzzle Wegg Day	2020

```
new_20_tv_shows = tv_shows.sort_values('Release Year' , ascending =
False)
new_20_tv_shows[['Title', "Release Year"]][:20]
```

	Title	Release Year
6477	The Idhun Chronicles	2021
4724	Paava Kadhaigal	2020
2117	Fary : Hexagone	2020
3238	Julie and the Phantoms	2020
5665	Sleepless Society: Two Pillows & A Lost Soul	2020
3119	Jamtara - Sabka Number Ayega	2020
6961	The Underclass	2020
5705	Someone Has to Die	2020
1647	DC's Legends of Tomorrow	2020
1720	Detention	2020
3002	Inhuman Resources	2020
6672	The Minions of Midas	2020
5644	Six Windows in the Desert	2020
2139	Feel Good	2020
6296	The Devil Punisher	2020
6415	The Great British Baking Show	2020
2320	Futmall's.com	2020
2347	Gameboys Level-Up Edition	2020
2461	Goedam	2020
6390	The Ghost Bride	2020

View all the movies netflix added in the year 2013

```
(df [ (df['Type'] == 'Movie') & ( df['Year_added'] == 2013) ] ).head(3)
```

	Show_id	Type	Title \
220	s221	Movie	A Russell Peters Christmas
649	s650	Movie	Aziz Ansari: Buried Alive
2948	s2949	Movie	Iliza Shlesinger: War Paint

	Director \
220	Henry Sarwer-Foner
649	Will Lovelace, Dylan Southern
2948	Jay Chapman

	Cast	Country
220	Russell Peters, Pamela Anderson, Michael Bublé...	United States
649	Aziz Ansari	United States
2948	Iliza Shlesinger	United States

	Date Added	Release Year	Rating	Duration	Listed_in \
220	2013-11-01	2011	NR	44 min	Stand-Up Comedy
649	2013-11-01	2013	TV-MA	80 min	Stand-Up Comedy
2948	2013-09-01	2013	NR	75 min	Stand-Up Comedy

	Description	Month_added \
220	Inspired by the variety shows of the 1970s, "A...	11
649	"Parks and Recreation" star Aziz Ansari takes ...	11
2948	"Last Comic Standing" winner Iliza Shlesinger ...	9

	Month_name_added	Year_added
220	November	2013
649	November	2013
2948	September	2013

```
# View all the tv shows netflix added in the year 2013
# Check this show it's great
```

```
(df [ (df['Type'] == 'TV Show') & (df['Year_added'] ==
2013) ] ).head(3)
```

	Show_id	Type	Title	Director \
3098	s3099	TV Show	Jack Taylor	Stuart Orme

	Cast	Country
\		

3098 Iain Glen, Killian Scott, Nora-Jane Noone, Tar... United States

	Date Added	Release Year	Rating	Duration	\
3098	2013-03-31	2016	TV-MA	1 Season	

	Listed_in	\
3098	Crime TV Shows, International TV Shows, TV Dramas	

	Description	
Month_added	\	
3098	Ken Bruen's bestselling crime novels leap to l...	3

	Month_name_added	Year_added
3098	March	2013

Search in our dataset for a specific movie or information in general
First way

```
df[df['Title'].isin(['American History X'])]
```

	Show_id	Type	Title	Director	\
466	s467	Movie	American History X	Tony Kaye	

	Cast	Country
\		
466	Edward Norton, Edward Furlong, Beverly D'Angel...	United States

	Date Added	Release Year	Rating	Duration	Listed_in	\
466	2019-11-01	1998	R	119 min	Dramas	

	Description	Month_added	\
466	A neo-Nazi gets sent to prison for murder and ...	11	

	Month_name_added	Year_added
466	November	2019

Second way, by using the str.contains()

```
df[df['Title'].str.contains('American History X')]
```

	Show_id	Type	Title	Director	\
466	s467	Movie	American History X	Tony Kaye	

	Cast	Country
\		
466	Edward Norton, Edward Furlong, Beverly D'Angel...	United States

	Date Added	Release Year	Rating	Duration	Listed_in	\
466	2019-11-01	1998	R	119 min	Dramas	

	Description	Month_added	\
466	A neo-Nazi gets sent to prison for murder and ...	11	

	Month_name_added	Year_added
466	November	2019

All the unique titles in the dataset

```
titles = df['Title'].unique().sum()
```

*# I have comment this part of code because the results are huge.
However, if you want to view the result, just erase the # from the
last line of code in this cell*

#titles

```
df.dtypes
```

```
Show_id      object
Type         object
Title        object
Director     object
Cast         object
Country      object
Date Added   datetime64[ns]
Release Year  int64
Rating       object
Duration     object
Listed_in    object
Description  object
Month_added  int64
Month_name_added object
Year_added   int64
dtype: object
```

Year

It counts the occurrence of all individual Year_added in the data

```
df['Year_added'].value_counts()
```

```
2019    1395
2020    1284
2018    1139
2017     769
2016     209
2021      87
```

```

2015      51
2014      14
2011      13
2013       7
2012       3
2009       2
2010       1
2008       1
Name: Year_added, dtype: int64

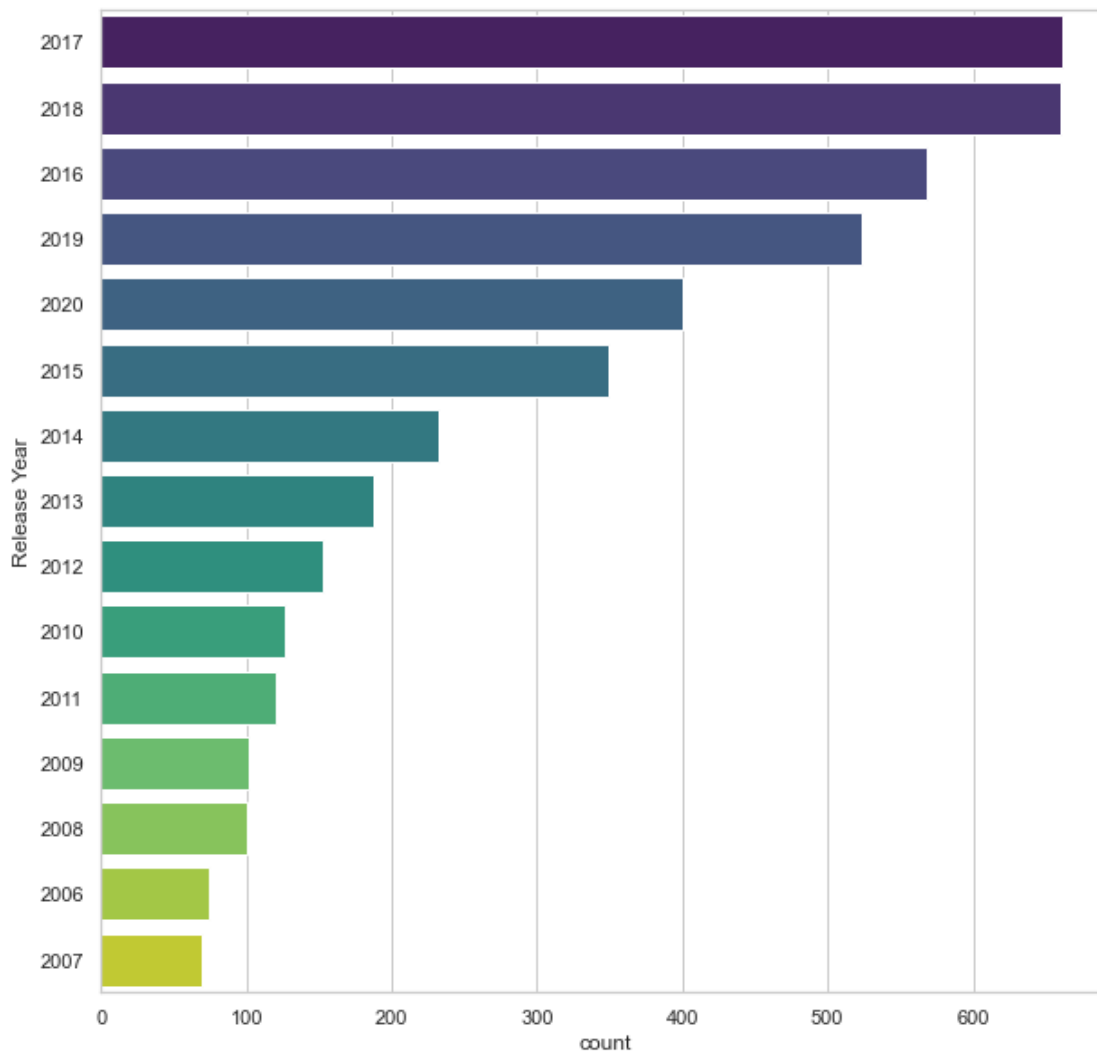
```

The amount of movies versus each year of the dataset

```

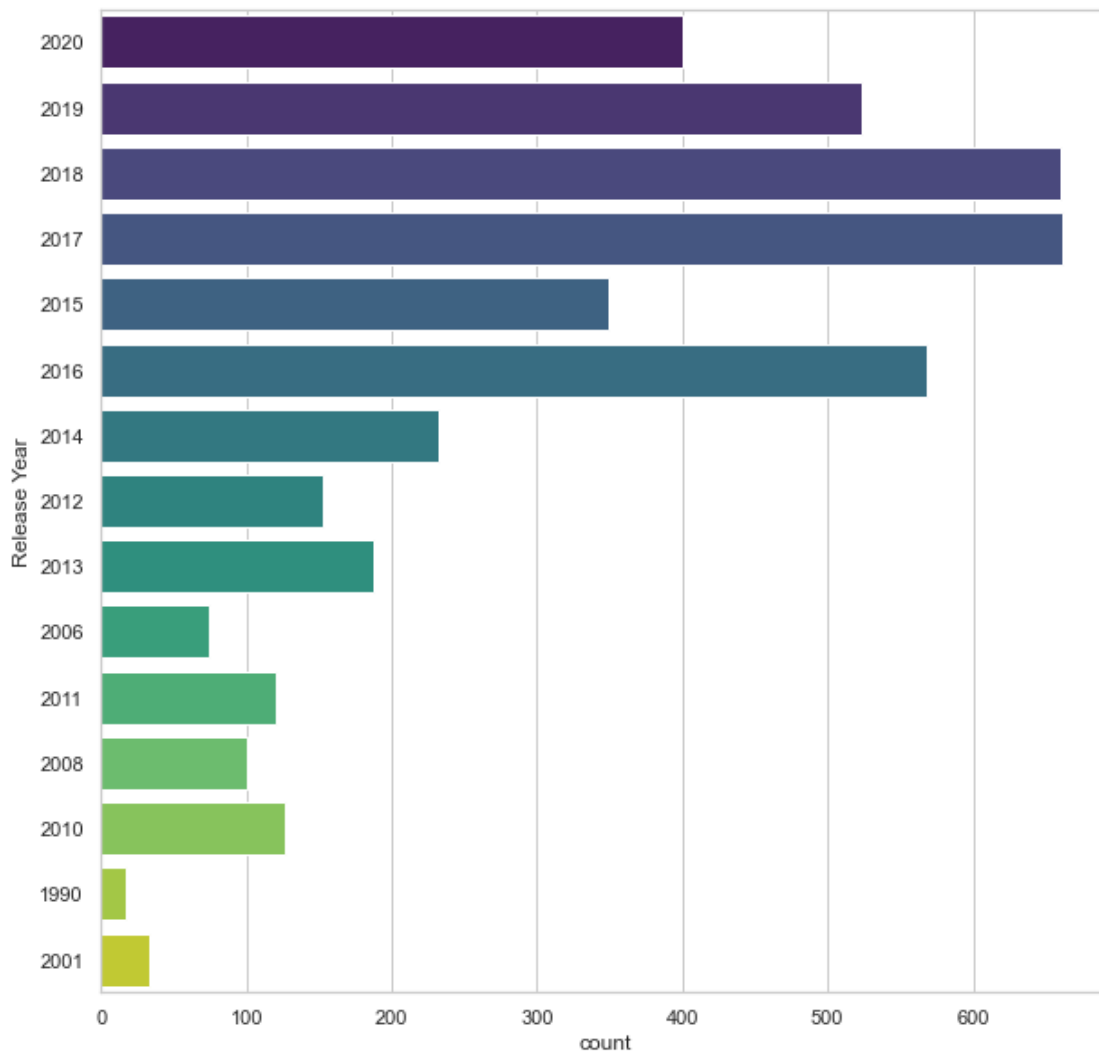
plt.figure(figsize = (10, 10))
sns.set(style = 'whitegrid')
ax = sns.countplot( y = 'Release Year' , data = df , palette =
'viridis',
                    order=movies['Release
Year'].value_counts().index[0:15])

```



The amount of tv shows versus each year of the dataset

```
plt.figure(figsize = (10, 10))
sns.set(style = 'whitegrid')
ax = sns.countplot( y = 'Release Year' , data = df , palette =
'viridis',
                    order=tv_shows['Release
Year'].value_counts().index[0:15])
```



The top 10 of the directors with the most jobs with Netflix

```
df['Director'].value_counts().head(10)
```

Raúl Campos, Jan Suter	18
Marcus Raboy	16
Jay Karas	14
Cathy Garcia-Molina	13
Jay Chapman	12

```
Martin Scorsese          12
Youssef Chahine          12
Steven Spielberg         10
David Dhawan              9
Hakan Algül              8
Name: Director, dtype: int64
```

Here are all the different kind of movies - shows our dataset contains

```
df['Listed_in'].value_counts()

Dramas, International Movies
319
Stand-Up Comedy
296
Comedies, Dramas, International Movies
240
Dramas, Independent Movies, International Movies
215
Children & Family Movies, Comedies
162
Comedies, International Movies
158
Documentaries
156
Children & Family Movies
151
Dramas, International Movies, Romantic Movies
147
Comedies, International Movies, Romantic Movies
136
Dramas
114
Action & Adventure, Dramas, International Movies
114
Dramas, International Movies, Thrillers
109
Comedies, Dramas, Independent Movies
100
Action & Adventure
99
Dramas, Independent Movies
94
Comedies
92
Action & Adventure, International Movies
86
Dramas, Thrillers
69
```


Action & Adventure, Comedies, International Movies
66
Documentaries, International Movies
65
Comedies, Romantic Movies
64
International Movies, Thrillers
59
Horror Movies, International Movies
56
Comedies, International Movies, Music & Musicals
53
Dramas, International Movies, Music & Musicals
52
Action & Adventure, Sci-Fi & Fantasy
52
Documentaries, Music & Musicals
51
Horror Movies, Thrillers
50
Thrillers
49
Horror Movies
43
Action & Adventure, Comedies
39
Dramas, Romantic Movies
37
Horror Movies, International Movies, Thrillers
35
Documentaries, Sports Movies
33
Movies
29
Dramas, Independent Movies, Thrillers
27
Action & Adventure, Dramas
27
Action & Adventure, Anime Features, International Movies
27
Dramas, International Movies, Sports Movies
25
Comedies, Dramas
25
Action & Adventure, Comedies, Dramas
24
Comedies, Independent Movies
22
Children & Family Movies, Dramas
22

Documentaries, International Movies, Sports Movies
19
Dramas, Independent Movies, Romantic Movies
19
Documentaries, International Movies, Music & Musicals
18
Comedies, Independent Movies, International Movies
17
Dramas, Faith & Spirituality
17
International Movies, Romantic Movies
17
Dramas, Sports Movies
17
Horror Movies, Independent Movies
17
Classic Movies, Dramas, International Movies
17
Crime TV Shows, International TV Shows, TV Dramas
16
Horror Movies, Independent Movies, Thrillers
16
Action & Adventure, International Movies, Sci-Fi & Fantasy
16
Dramas, Independent Movies, LGBTQ Movies
15
Children & Family Movies, Music & Musicals
15
Comedies, Dramas, Romantic Movies
14
Comedies, Horror Movies, International Movies
12
Comedies, Horror Movies
11
Action & Adventure, Dramas, Independent Movies
11
Dramas, International Movies, LGBTQ Movies
11
Independent Movies, Thrillers
11
Children & Family Movies, Comedies, Dramas
11
Dramas, International Movies, Sci-Fi & Fantasy
11
Comedies, Cult Movies
10
Children & Family Movies, Comedies, Music & Musicals
10
Classic Movies, Dramas
10

Music & Musicals

10

Action & Adventure, International Movies, Music & Musicals

10

Sci-Fi & Fantasy, Thrillers

10

Children & Family Movies, Dramas, Romantic Movies

9

Dramas, Faith & Spirituality, International Movies

9

Children & Family Movies, Dramas, Sports Movies

9

Comedies, Independent Movies, Romantic Movies

9

International Movies, Sci-Fi & Fantasy, Thrillers

9

Horror Movies, Independent Movies, International Movies

9

Dramas, Independent Movies, Sports Movies

8

Comedies, Sports Movies

8

Children & Family Movies, Dramas, International Movies

8

Documentaries, LGBTQ Movies

8

Children & Family Movies, Comedies, Romantic Movies

8

Dramas, Independent Movies, Music & Musicals

7

Comedies, International Movies, LGBTQ Movies

7

Anime Features, Children & Family Movies

7

Action & Adventure, Classic Movies, Dramas

7

Action & Adventure, Independent Movies

7

Action & Adventure, Horror Movies, Sci-Fi & Fantasy

7

International TV Shows, TV Dramas

7

Dramas, LGBTQ Movies

7

Action & Adventure, Comedies, Independent Movies

7

Action & Adventure, Comedies, Sci-Fi & Fantasy

7

Children & Family Movies, Comedies, Sci-Fi & Fantasy

7

Horror Movies, Sci-Fi & Fantasy, Thrillers
6
Dramas, Sci-Fi & Fantasy
6
Comedies, Cult Movies, Dramas
6
Docuseries
6
Music & Musicals, Stand-Up Comedy
6
Action & Adventure, International Movies, Romantic Movies
6
Comedies, International Movies, Sports Movies
6
International Movies, Music & Musicals, Romantic Movies
6
Action & Adventure, Children & Family Movies, Sci-Fi & Fantasy
6
TV Shows
6
Stand-Up Comedy & Talk Shows, TV Comedies
6
Dramas, Independent Movies, Sci-Fi & Fantasy
6
Comedies, International Movies, Sci-Fi & Fantasy
6
Classic Movies, Dramas, Independent Movies
6
Kids' TV, TV Comedies
5
Children & Family Movies, Dramas, Faith & Spirituality
5
Comedies, International Movies, Thrillers
5
International Movies, Music & Musicals
5
Action & Adventure, Dramas, Sci-Fi & Fantasy
5
Comedies, Horror Movies, Independent Movies
5
Action & Adventure, Anime Features, Sci-Fi & Fantasy
5
Children & Family Movies, Sci-Fi & Fantasy
5
International TV Shows, Korean TV Shows, Romantic TV Shows
5
Classic Movies, Documentaries
5
Crime TV Shows, International TV Shows, Spanish-Language TV Shows
5

Dramas, Music & Musicals
5
Action & Adventure, Comedies, Romantic Movies
5
Documentaries, Faith & Spirituality
5
Independent Movies, International Movies, Thrillers
5
Dramas, Sci-Fi & Fantasy, Thrillers
5
Children & Family Movies, Comedies, International Movies
5
Anime Series, International TV Shows
5
Action & Adventure, Documentaries, International Movies
5
Kids' TV
5
Action & Adventure, Independent Movies, Sci-Fi & Fantasy
5
Comedies, Music & Musicals
4
Action & Adventure, Cult Movies, International Movies
4
International TV Shows, Romantic TV Shows, TV Comedies
4
Dramas, Romantic Movies, Sci-Fi & Fantasy
4
Horror Movies, Sci-Fi & Fantasy
4
Action & Adventure, Horror Movies, International Movies
4
Comedies, Dramas, LGBTQ Movies
4
International TV Shows, TV Dramas, TV Mysteries
4
Comedies, Horror Movies, Sci-Fi & Fantasy
4
Cult Movies, Horror Movies
4
Action & Adventure, Children & Family Movies, Comedies
4
Comedies, Independent Movies, LGBTQ Movies
4
International TV Shows, TV Comedies, TV Dramas
4
Action & Adventure, Classic Movies, Cult Movies
3
Action & Adventure, Anime Features, Children & Family Movies
3

Children & Family Movies, Documentaries
3
Action & Adventure, Romantic Movies
3
Horror Movies, Independent Movies, Sci-Fi & Fantasy
3
Action & Adventure, Thrillers
3
Classic Movies, Comedies, Cult Movies
3
British TV Shows, Docuseries, International TV Shows
3
Comedies, Faith & Spirituality, International Movies
3
Comedies, Sci-Fi & Fantasy
3
Action & Adventure, Children & Family Movies, Classic Movies
3
Children & Family Movies, Comedies, Sports Movies
3
International Movies, LGBTQ Movies, Romantic Movies
3
Comedies, Cult Movies, Horror Movies
3
Dramas, Romantic Movies, Sports Movies
3
Independent Movies, Sci-Fi & Fantasy, Thrillers
3
Children & Family Movies, Dramas, Independent Movies
3
Romantic Movies
3
British TV Shows, Crime TV Shows, TV Dramas
3
Documentaries, International Movies, LGBTQ Movies
3
Action & Adventure, Comedies, Cult Movies
3
International Movies, Sci-Fi & Fantasy
3
Dramas, Music & Musicals, Romantic Movies
3
International TV Shows, Romantic TV Shows, Spanish-Language TV Shows
3
Classic Movies, Comedies, Dramas
3
Classic Movies, Comedies, International Movies
3
Action & Adventure, Horror Movies
3

Children & Family Movies, Classic Movies, Comedies
3
Action & Adventure, Classic Movies, Comedies
3
Classic Movies, Dramas, Romantic Movies
3
Classic Movies, Comedies, Independent Movies
2
Action & Adventure, Classic Movies
2
Comedies, Dramas, Faith & Spirituality
2
Comedies, Independent Movies, Thrillers
2
Action & Adventure, Cult Movies, Sci-Fi & Fantasy
2
International TV Shows, Korean TV Shows, Stand-Up Comedy & Talk Shows
2
Dramas, LGBTQ Movies, Romantic Movies
2
Classic Movies, Comedies, Music & Musicals
2
Cult Movies, Horror Movies, Independent Movies
2
Classic Movies, Cult Movies, Dramas
2
Horror Movies, International Movies, Romantic Movies
2
Action & Adventure, Dramas, Faith & Spirituality
2
Comedies, LGBTQ Movies
2
Crime TV Shows, Docuseries
2
Comedies, Dramas, Music & Musicals
2
Documentaries, Stand-Up Comedy
2
Children & Family Movies, Independent Movies
2
International Movies
2
Children & Family Movies, Documentaries, Sports Movies
2
Documentaries, LGBTQ Movies, Music & Musicals
2
Classic Movies, Dramas, Sports Movies
2
Action & Adventure, International Movies, Sports Movies
2

British TV Shows, International TV Shows, TV Action & Adventure
2
TV Comedies
2
British TV Shows, Docuseries
2
Anime Features, International Movies, Romantic Movies
2
International TV Shows, TV Dramas, TV Thrillers
2
International TV Shows, TV Dramas, TV Horror
2
Cult Movies, Dramas, Thrillers
2
Comedies, Music & Musicals, Romantic Movies
2
Classic Movies, Cult Movies, Horror Movies
2
International TV Shows, TV Dramas, Teen TV Shows
2
Action & Adventure, Children & Family Movies, Dramas
2
Comedies, Faith & Spirituality, Romantic Movies
2
International Movies, Music & Musicals, Thrillers
2
Anime Features
2
Children & Family Movies, Sports Movies
2
Anime Features, Children & Family Movies, International Movies
2
Comedies, Cult Movies, International Movies
2
Docuseries, International TV Shows
2
TV Action & Adventure, TV Sci-Fi & Fantasy
2
Action & Adventure, Independent Movies, International Movies
2
Classic Movies, Dramas, Music & Musicals
2
Comedies, LGBTQ Movies, Music & Musicals
1
Crime TV Shows, TV Dramas, TV Mysteries
1
British TV Shows, Kids' TV
1
Action & Adventure, Classic Movies, International Movies
1

Comedies, Dramas, Sports Movies
1
Children & Family Movies, Comedies, LGBTQ Movies
1
British TV Shows, Classic & Cult TV, TV Comedies
1
Reality TV
1
Action & Adventure, Cult Movies
1
Action & Adventure, Sci-Fi & Fantasy, Sports Movies
1
Action & Adventure, Documentaries, Sports Movies
1
Documentaries, Faith & Spirituality, International Movies
1
Comedies, Cult Movies, LGBTQ Movies
1
Action & Adventure, Dramas, Sports Movies
1
Horror Movies, LGBTQ Movies, Music & Musicals
1
Comedies, Romantic Movies, Sports Movies
1
Classic Movies, Dramas, LGBTQ Movies
1
International TV Shows, Korean TV Shows, TV Dramas
1
Children & Family Movies, Comedies, Cult Movies
1
Anime Series, Romantic TV Shows, Teen TV Shows
1
Comedies, Independent Movies, Music & Musicals
1
Dramas, Romantic Movies, Thrillers
1
Comedies, Music & Musicals, Sports Movies
1
Action & Adventure, Comedies, Music & Musicals
1
Classic Movies, Horror Movies, Thrillers
1
Classic Movies, Dramas, Thrillers
1
Children & Family Movies, Dramas, Music & Musicals
1
LGBTQ Movies, Thrillers
1
International TV Shows, Romantic TV Shows, TV Mysteries
1

Action & Adventure, Sports Movies

1

Crime TV Shows, TV Action & Adventure, TV Sci-Fi & Fantasy

1

Dramas, Horror Movies, Music & Musicals

1

Classic & Cult TV, TV Action & Adventure, TV Horror

1

Classic Movies, Comedies, Romantic Movies

1

British TV Shows, Classic & Cult TV, Kids' TV

1

Dramas, Faith & Spirituality, Sports Movies

1

British TV Shows, Reality TV

1

Children & Family Movies, Classic Movies, Dramas

1

Anime Features, International Movies, Sci-Fi & Fantasy

1

Anime Series, International TV Shows, Spanish-Language TV Shows

1

International TV Shows, TV Action & Adventure, TV Comedies

1

Action & Adventure, Romantic Movies, Sci-Fi & Fantasy

1

International TV Shows, Romantic TV Shows, TV Dramas

1

Action & Adventure, Comedies, Horror Movies

1

Children & Family Movies, Faith & Spirituality

1

Classic Movies, Independent Movies, Thrillers

1

TV Comedies, TV Dramas

1

Classic Movies, Comedies, Sports Movies

1

Cult Movies, Independent Movies, Thrillers

1

Action & Adventure, Cult Movies, Dramas

1

Crime TV Shows, International TV Shows, TV Action & Adventure

1

Documentaries, Dramas, International Movies

1

Anime Features, Romantic Movies

1

Cult Movies, Horror Movies, Thrillers

1

International Movies, Romantic Movies, Thrillers
1
Romantic TV Shows, TV Comedies, TV Dramas
1
International TV Shows, Stand-Up Comedy & Talk Shows, TV Comedies
1
Children & Family Movies, Comedies, Faith & Spirituality
1
Horror Movies, International Movies, Sci-Fi & Fantasy
1
Cult Movies, Dramas, International Movies
1
Dramas, Music & Musicals, Sports Movies
1
Anime Series, International TV Shows, TV Horror
1
International Movies, Sports Movies
1
Documentaries, Faith & Spirituality, Music & Musicals
1
Dramas, Faith & Spirituality, Independent Movies
1
Children & Family Movies, Classic Movies
1
Action & Adventure, International Movies, Thrillers
1
Crime TV Shows, Romantic TV Shows, Spanish-Language TV Shows
1
British TV Shows, International TV Shows, TV Dramas
1
Classic Movies, Thrillers
1
Crime TV Shows, TV Action & Adventure
1
Stand-Up Comedy & Talk Shows
1
International TV Shows, Spanish-Language TV Shows, TV Comedies
1
Action & Adventure, Dramas, Romantic Movies
1
Action & Adventure, Children & Family Movies, Independent Movies
1
Music & Musicals, Romantic Movies
1
Anime Features, International Movies
1
International TV Shows, Reality TV
1
Sci-Fi & Fantasy
1

Action & Adventure, Classic Movies, Sci-Fi & Fantasy
1
Action & Adventure, Anime Features, Horror Movies
1
Anime Series, Kids' TV
1
Action & Adventure, Faith & Spirituality, Sci-Fi & Fantasy
1
Action & Adventure, Children & Family Movies
1
Comedies, Documentaries
1
Action & Adventure, Horror Movies, Independent Movies
1
Kids' TV, TV Action & Adventure
1
Comedies, Cult Movies, Independent Movies
1
Docuseries, Science & Nature TV, TV Dramas
1
Crime TV Shows, International TV Shows, Korean TV Shows
1
Children & Family Movies, Documentaries, International Movies
1
Action & Adventure, Anime Features, Classic Movies
1
Anime Features, Music & Musicals, Sci-Fi & Fantasy
1
International Movies, Romantic Movies, Sci-Fi & Fantasy
1
British TV Shows, Crime TV Shows, International TV Shows
1
British TV Shows, Romantic TV Shows, TV Dramas
1
International TV Shows, TV Horror, TV Mysteries
1
Comedies, Cult Movies, Sports Movies
1
Anime Features, Music & Musicals
1
British TV Shows, TV Dramas, TV Sci-Fi & Fantasy
1
Dramas, Music & Musicals, Sci-Fi & Fantasy
1
British TV Shows, International TV Shows, Stand-Up Comedy & Talk Shows
1
Action & Adventure, Sci-Fi & Fantasy, Thrillers
1
Dramas, Faith & Spirituality, Romantic Movies
1

Dramas, Horror Movies, Sci-Fi & Fantasy

1

British TV Shows, TV Comedies

1

TV Horror, TV Mysteries, TV Thrillers

1

Crime TV Shows, TV Action & Adventure, TV Dramas

1

Independent Movies

1

Crime TV Shows, Romantic TV Shows, TV Dramas

1

Name: Listed_in, dtype: int64

The total amount of sport movies

```
(df['Listed_in'] == 'Sports Movies').value_counts().sum()
```

4975

The titles of all drama movies

```
df[(df['Listed_in'] == 'Dramas') & (df['Type'] == 'Movie')]['Title']
```

4

21

7

187

170

A Family Man

232

A Stoning in Fulham County

295

Across Grace Alley

308

Adam: His Song Continues

330

Aftermath

334

Agatha and the Truth of Murder

422

All Together Now

429

Alone in Berlin

455

American Beauty

466

American History X

474

American Son

476

American Warfighter

613

Atlas Shrugged: Part II

701

Badland

755

Barry

946

Black & Privileged: Volume 1

993

Blow

1034

Bombshell

1146

Burning Cane

1242

Catch Me If You Can

1256

Center Stage

1273

Change in the Air

1275

Chappaquiddick

1347

Chocolate City: Vegas Strip

1365

Christmas in the Heartland

1409	Class of '61
1501	Cops and Robbers
1575	Dad
1723	Deuces
1909	East Side Sushi
2187	First They Killed My Father
2202	Flash of Genius
2221	For Colored Girls
2351	Gangs of New York
2367	Gemini
2466	Goldie
2481	Good Kill
2487	Good Night, and Good Luck
2510	Gran Torino
2622	Hard Lessons
2702	Her Only Choice
2742	Hillbilly Elegy
2794	Honey: Rise Up and Dance
2804	Hope Springs Eternal
2816	Hostiles
2957	Imperial Dreams
2962	In Defense of a Married Man
3392	Killing Them Softly
3405	Kings
3549	Lawless
3566	Lee Daniels' The Butler
3646	Lincoln
3731	Lost Girls
3949	Marriage Story
4013	Meditation Park
4168	Molly's Game
4172	Mona Lisa Smile
4249	Mr. Church
4320	My Girl
4355	My Sister's Keeper
4542	Now and Then
4544	Nowhere Boy
4646	One Last Thing
4742	Paint It Black
4854	Pieces of a Woman
4882	Playing for Time
5032	Queen of the Desert
5127	Recall
5251	Rodney King
5288	Rounders
5290	Roxanne Roxanne
5417	Saving Zoë
5529	SGT. Will Gardner
5638	Sister Cities
5814	Steve Jobs

5832		Strange Voices
6106		The Bachelors
6111	The Ballad of Lefty Brown	
6271		The Daughter
6318		The Duel
6373		The Founder
6447		The Help
6451		The Highwaymen
6480		The Impossible
6507		The Irishman
6518	The Journey Is the Destination	
6530		The King
6558		The Last Face
6665		The Midnight Sky
6683	The Monster of Mangatiti	
6687	The Most Hated Woman in America	
6759		The Pirates of Somalia
6786		The Promise
6790	The Pursuit of Happyness	
6845		The Ryan White Story
6852		The Sea of Trees
6865		The Show
6884		The Social Network
6904		The Stolen
6940	The Trial of the Chicago 7	
6955		The Two Popes
7084		Tigertail
7149		Too Young the Hero
7214		Trespass Against Us
7244		True to the Game
7362		Unspeakable Acts
7412		Viceroy's House
7415		Victor
7420		Villain
7447		VS.
7463		Wakefield
7478		War Horse

Name: Title, dtype: object

The top 3 drama movies that netflix provides in the citizen of Mexico

```
(df [ (df['Listed_in'] == 'Dramas') & (df['Type'] == 'Movie') |
(df['Country'] == 'Mexico')]).head(3)
```

	Show_id	Type	Title	Director \
4	s5	Movie	21	Robert Luketic
7	s8	Movie	187	Kevin Reynolds
170	s171	Movie	A Family Man	Mark Williams

	Cast	Country
4	Jim Sturgess, Kevin Spacey, Kate Bosworth, Aar...	United States
7	Samuel L. Jackson, John Heard, Kelly Rowan, Cl...	United States
170	Gerard Butler, Gretchen Mol, Alison Brie, Will...	United States

	Date Added	Release Year	Rating	Duration	Listed_in	\
4	2020-01-01	2008	PG-13	123 min	Dramas	
7	2019-11-01	1997	R	119 min	Dramas	
170	2019-12-15	2016	R	110 min	Dramas	

	Description	Month_added	\
4	A brilliant group of students become card-coun...	1	
7	After one of his high school students attacks ...	11	
170	A ruthless corporate headhunter battles his ri...	12	

	Month_name_added	Year_added
4	January	2020
7	November	2019
170	December	2019

Top 5 actors with the most participations in our dataset

```
df['Cast'].value_counts().head()
```

```
Samuel West      10
Jeff Dunham      7
Kevin Hart       6
Bill Burr        5
Jim Gaffigan     5
Name: Cast, dtype: int64
```

The actor who played more in the netflix production until 2019

```
best_actor = df['Cast'].value_counts()[df['Cast'].value_counts() ==
df['Cast'].value_counts().max()]
print('The actor who played the most in Netflix production is: ',
best_actor)
```

```
The actor who played the most in Netflix production is: Samuel West
10
Name: Cast, dtype: int64
```

RATING

Our dataset has only data for United States as you can see below

```
df['Country'].value_counts()
```



```
United States      4975
Name: Country, dtype: int64
```

```
df['Rating'].value_counts()
```

```
TV-MA      1724
TV-14      1183
R           656
TV-PG      426
PG-13      378
PG          241
TV-Y        90
TV-G        85
TV-Y7       82
NR          62
G           38
UR           5
TV-Y7-FV    3
NC-17       2
Name: Rating, dtype: int64
```

```
# Let's check the rating of one of the best movies in the 21th century
```

```
df[( df['Title'] == 'American History X' )]
```

```
   Show_id  Type      Title  Director \
466    s467  Movie  American History X  Tony Kaye

                                                Cast      Country
\
466  Edward Norton, Edward Furlong, Beverly D'Angel...  United States

   Date Added  Release Year Rating Duration Listed_in \
466 2019-11-01      1998      R   119 min    Dramas

                                                Description  Month_added \
466  A neo-Nazi gets sent to prison for murder and ...      11

   Month_name_added  Year_added
466      November      2019
```

```
# All the movies Edward Norton has ever played that exist in our dataset
```

```
df[df['Cast'].str.contains('Edward Norton')]
```

```
   Show_id  Type      Title  Director \
466    s467  Movie  American History X  Tony Kaye
4969   s4970  Movie      Primal Fear  Gregory Hoblit
```

5288	s5289	Movie		Rounders	John Dahl
6427	s6428	Movie	The Guardian Brothers		Gary Wang
6851	s6852	Movie		The Score	Frank Oz

	Cast	Country
\		
466	Edward Norton, Edward Furlong, Beverly D'Angel...	United States
4969	Richard Gere, Edward Norton, Laura Linney, Joh...	United States
5288	Matt Damon, Edward Norton, John Turturro, Gret...	United States
6427	Edward Norton, Dan Fogler, Mike Birbiglia, Bel...	United States
6851	Robert De Niro, Edward Norton, Marlon Brando, ...	United States

	Date Added	Release Year	Rating	Duration	\
466	2019-11-01	1998	R	119 min	
4969	2019-12-01	1996	R	131 min	
5288	2019-11-01	1998	R	121 min	
6427	2017-09-01	2016	TV-G	86 min	
6851	2019-11-28	2001	R	124 min	

	Listed_in	\
466	Dramas	
4969	Dramas, Thrillers	
5288	Dramas	
6427	Children & Family Movies, Comedies	
6851	Dramas, Thrillers	

	Description	
Month_added	\	
466	A neo-Nazi gets sent to prison for murder and ...	11
4969	When a blood-spattered altar boy is found runn...	12
5288	A law student befriends and "befoes" a fellow ...	11
6427	When a Chinese family's soup shop is targeted ...	9
6851	Ready-to-retire safecracker Nick, flamboyant f...	11

	Month_name_added	Year_added
466	November	2019
4969	December	2019
5288	November	2019

```
6427      September      2017
6851      November      2019
```

How many tv shows got PG-13 in United States?

```
df[(df['Country'] == 'United States') & (df['Rating'] ==
'NR')].head(3)
```

```
      Show_id  Type      Title      Director \
62      s63  Movie      13 Cameras      Victor Zarcoff
115     s116  Movie      4th Man Out      Andrew Nackman
220     s221  Movie  A Russell Peters Christmas  Henry Sarwer-Foner
```

```
      Cast      Country
\
62  PJ McCabe, Brianne Moncrief, Sarah Baldwin, Ji...  United States
115  Evan Todd, Parker Young, Chord Overstreet, Jon...  United States
220  Russell Peters, Pamela Anderson, Michael Bublé...  United States
```

```
      Date Added  Release Year Rating Duration \
62  2016-08-13      2015      NR    90 min
115 2016-05-05      2015      NR    86 min
220 2013-11-01      2011      NR    44 min
```

```
      Listed_in \
62  Horror Movies, Independent Movies, Thrillers
115      Comedies, LGBTQ Movies
220      Stand-Up Comedy
```

```
      Description  Month_added \
62  Young parents-to-be Claire and Ryan move into ...      8
115  A young mechanic comes out to his extremely st...      5
220  Inspired by the variety shows of the 1970s, "A...     11
```

```
      Month_name_added  Year_added
62      August      2016
115      May      2016
220      November      2013
```

```
df[(df['Country'] == 'United States') & (df['Rating'] == 'PG-13')
& (df['Type'] == 'Movie')].head(3)
```

```
      Show_id  Type      Title      Director \
3      s4  Movie      9      Shane Acker
4      s5  Movie      21  Robert Luketic
44     s45  Movie  Æon Flux      Karyn Kusama
```

	Country \	Cast
3	Elijah Wood, John C. Reilly, Jennifer Connelly...	United States
4	Jim Sturgess, Kevin Spacey, Kate Bosworth, Aar...	United States
44	Charlize Theron, Marton Csokas, Jonny Lee Mill...	United States

	Date Added	Release Year	Rating	Duration \
3	2017-11-16	2009	PG-13	80 min
4	2020-01-01	2008	PG-13	123 min
44	2018-02-01	2005	PG-13	93 min

	Listed_in \
3	Action & Adventure, Independent Movies, Sci-Fi...
4	Dramas
44	Action & Adventure, Sci-Fi & Fantasy

	Description	Month_added \
3	In a postapocalyptic world, rag-doll robots hi...	11
4	A brilliant group of students become card-coun...	1
44	Aiming to hasten an uprising, the leader of an...	2

	Month_name_added	Year_added
3	November	2017
4	January	2020
44	February	2018

#The size of the Movies with Rating PG-13 in United States

```
size_tv14 = len(df[ (df['Country'] == 'United States') &
(df['Rating'] == 'TV-14') & (df['Type'] == 'TV Show')])
print('The size of the Movies with Rating PG-13 in United States are
', size_tv14)
```

The size of the Movies with Rating PG-13 in United States are 39

#The size of the Movies with Rating PG-13 in United States

```
size = len(df[ (df['Country'] == 'United States') & (df['Rating']
== 'PG-13') & (df['Type'] == 'Movie')])
print('The size of the Movies with Rating PG-13 in United States are
', size)
```

The size of the Movies with Rating PG-13 in United States are 378

```
(df[ (df['Country'] == 'United States') & (df['Rating'] == 'PG-13')
& (df['Type'] == 'Movie')]).shape
(378, 15)
```

```
# How many Movies Netflix got after 2016 with R Rating ?
```

```
(df[(df['Rating'] == 'R') & (df['Type'] == 'Movie') & (df['Release Year'] > 2016)]).head(3)
```

	Show_id	Type	Title	Director \
14	s15	Movie	3022	John Suits
17	s18	Movie	22-Jul	Paul Greengrass
89	s90	Movie	24 Hours to Live	Brian Smrz

	Country \	Cast
14	Omar Epps, Kate Walsh, Miranda Cosgrove, Angus...	United States
17	Anders Danielsen Lie, Jon Øigarden, Jonas Stra...	United States
89	Ethan Hawke, Xu Qing, Paul Anderson, Rutger Ha...	United States

	Date Added	Release Year	Rating	Duration \
14	2020-03-19	2019	R	91 min
17	2018-10-10	2018	R	144 min
89	2018-04-07	2017	R	93 min

	Listed_in \
14	Independent Movies, Sci-Fi & Fantasy, Thrillers
17	Dramas, Thrillers
89	Action & Adventure

	Description	Month_added \
14	Stranded when the Earth is suddenly destroyed ...	3
17	After devastating terror attacks in Norway, a ...	10
89	Revived by an experimental procedure, a hit ma...	4

	Month_name_added	Year_added
14	March	2020
17	October	2018
89	April	2018

```
after_2016 = len(df[(df['Rating'] == 'R') & (df['Type'] == 'Movie') & (df['Release Year'] > 2016)])
```

```
print('The number of Movies Netflix got after 2016 with R Rating is: ', after_2016)
```

The number of Movies Netflix got after 2016 with R Rating is: 180

```
after_2018 = len(df[(df['Rating'] == 'TV-Y7') & (df['Type'] == 'TV Show') & (df['Release Year'] > 2015)])
```

```
print('The number of Movies Netflix got after 2016 with R Rating is:
', after_2018)
```

The number of Movies Netflix got after 2016 with R Rating is: 6

Duration

What is the maximum duration of a TV-Show on Netflix?

```
df['Duration'][df['Type'] == 'TV Show'].max()
```

'9 Seasons'

What is the maximum duration of a TV-Show on Netflix?

```
df['Duration'][df['Type'] == 'TV Show'].min()
```

'1 Season'

What is the maximum duration of a TV-Show on Netflix?

```
df['Duration'][df['Type'] == 'Movie'].max()
```

'99 min'

What is the maximum duration of a TV-Show on Netflix?

```
df['Duration'][df['Type'] == 'Movie'].min()
```

'100 min'

```
((df['Type'] == 'TV Show') & (df['Type'] == 'TV Show')).value_counts()
```

False 4830

True 145

Name: Type, dtype: int64

Sort the data with two different ways

First way

From the oldest to the newest

```
df.sort_values(by = 'Release Year', ascending= True).head(3)
```

	Show_id	Type	Title \
6117	s6118	Movie	The Battle of Midway
7268	s7269	Movie	Tunisian Victory
3425	s3426	Movie	Know Your Enemy - Japan

	Director \
6117	John Ford
7268	Frank Capra, John Huston, Hugh Stewart, Roy Bo...
3425	Frank Capra, Joris Ivens

Year	\	Cast	Country	Date Added	Release
6117		Henry Fonda, Jane Darwell	United States	2017-03-31	
1942					
7268		Burgess Meredith	United States	2017-03-31	
1944					
3425		Walter Huston, Dana Andrews	United States	2017-03-31	
1945					

	Rating	Duration	Listed_in	\
6117	TV-14	18 min	Classic Movies, Documentaries	
7268	TV-14	76 min	Classic Movies, Documentaries	
3425	TV-14	63 min	Classic Movies, Documentaries	

	Description	
6117	Director John Ford captures combat footage of ...	3
7268	British and American troops join forces to lib...	3
3425	Though culturally insensitive by modern standa...	3

	Month_name_added	Year_added
6117	March	2017
7268	March	2017
3425	March	2017

Second way

From the newest to the oldest

```
df.sort_values(by = 'Release Year', ascending= False).head(3)
```

	Show_id	Type	Title
1285	s1286	Movie	Charming
7220	s7221	Movie	Tribhanga - Tedhi Medhi Crazy
1355	s1356	Movie	Chris Rock Total Blackout: The Tamborine Exten...

	Director	
Cast	\	
1285	Ross Venokur	Wilmer Valderrama, Demi Lovato, Sia, Nia Varda...
7220	Renuka Shahane	Kajol, Tanvi Azmi, Mithila Palkar, Kunaal Roy ...
1355	Chris Rock	Chris

Rock

	Country	Date Added	Release Year	Rating	Duration	\
1285	United States	2021-01-08	2021	TV-Y7	85 min	
7220	United States	2021-01-15	2021	TV-MA	96 min	
1355	United States	2021-01-12	2021	TV-MA	98 min	

	Listed_in	\
1285	Children & Family Movies, Comedies	
7220	Dramas, International Movies	
1355	Stand-Up Comedy	

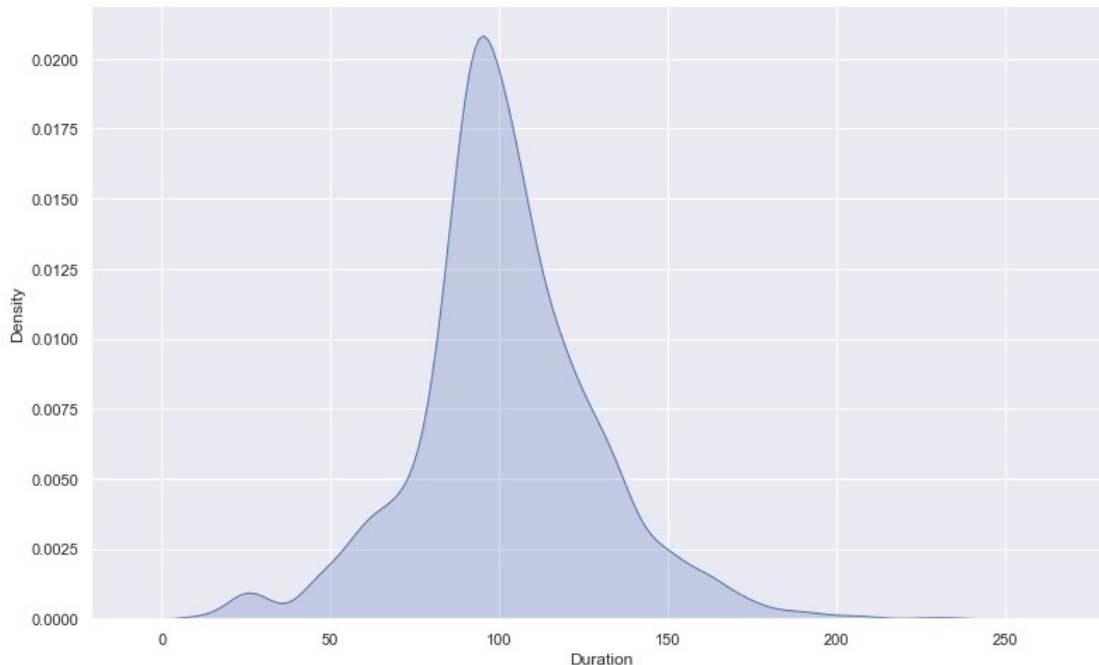
	Description	
Month_added	\	
1285	On the eve of his 21st birthday, an adored pri...	1
7220	When her estranged mother falls into a coma, a...	1
1355	In this extended cut of his 2018 special, Chri...	1

	Month_name_added	Year_added
1285	January	2021
7220	January	2021
1355	January	2021

```
movies['Duration']=movies['Duration'].apply(str).str.replace('min','')
movies['Duration']=movies['Duration'].astype(str).astype(int)
```

```
sns.set(style="darkgrid")
plt.figure(figsize=(13,8))
sns.kdeplot(data=movies['Duration'], shade=True)

<AxesSubplot:xlabel='Duration', ylabel='Density'>
```

- So, the majority of movies on Netflix are among the duration of 75-120 mins.
- It is acceptable considering the fact that a fair amount of the audience cannot watch a 3 hour movie in one sitting.
- Can you ?

Names

```
from collections import Counter
```

```
genres=list(movies['Listed_in'])
```

```
gen=[]
```

```
for i in genres:
    i=list(i.split(','))
    for j in i:
        gen.append(j.replace(' ',''))
g=Counter(gen)
```

```
from wordcloud import WordCloud, STOPWORDS, ImageColorGenerator
from PIL import Image
```

```
text = list(set(gen))
plt.rcParams['figure.figsize'] = (13, 13)
```

```
#assigning shape to the word cloud
```

```
stopwords = set(STOPWORDS)
wc =
WordCloud(max_words=10000,background_color="white").generate(str(text))
)
```

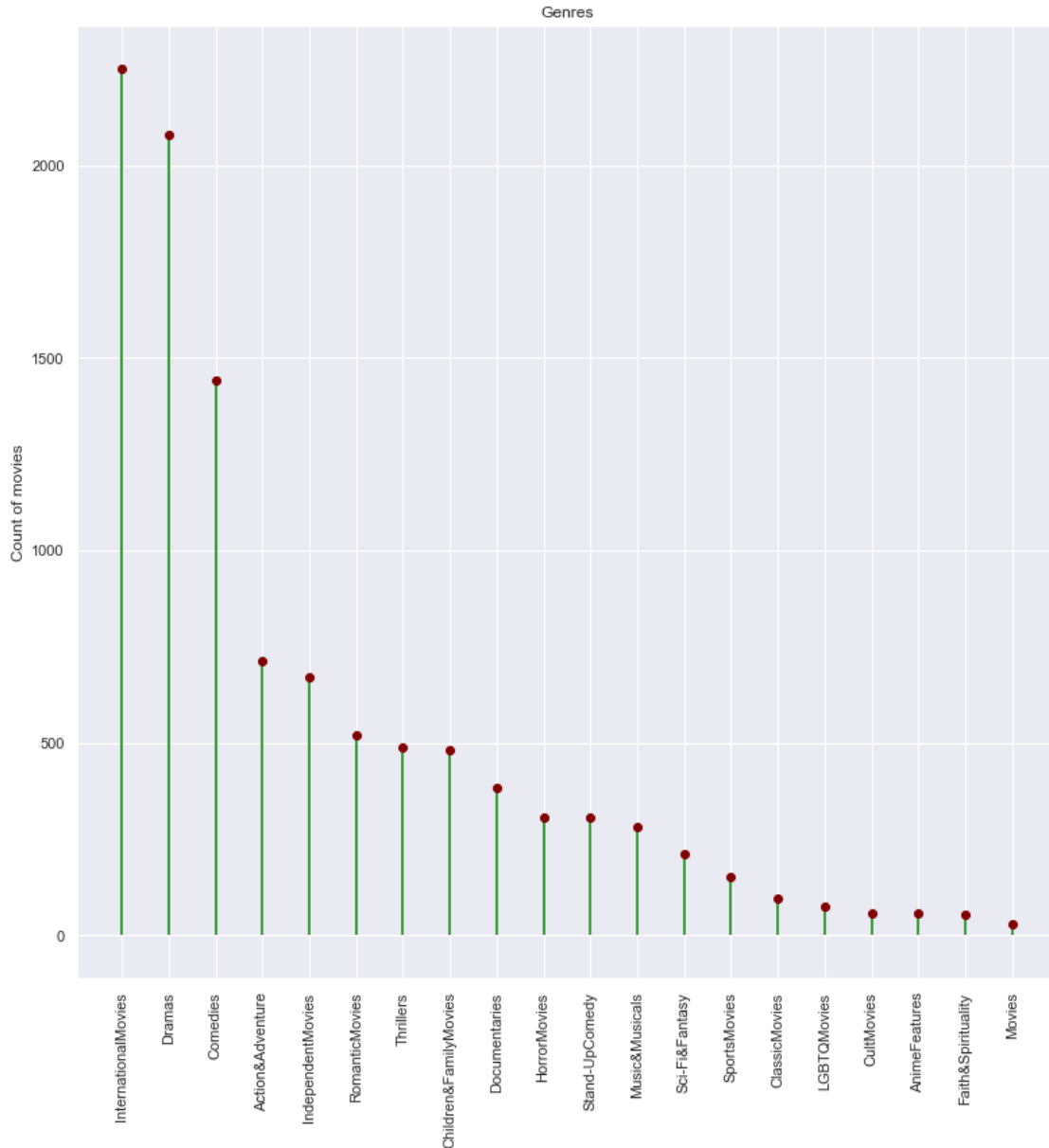
```
plt.imshow(wc,interpolation="bilinear")
plt.axis("off")
plt.show()
```



```
g={k: v for k, v in sorted(g.items(), key=lambda item: item[1],
reverse= True)}
```

```
fig, ax = plt.subplots()
```

```
fig = plt.figure(figsize = (10, 10))
x=list(g.keys())
y=list(g.values())
ax.vlines(x, ymin=0, ymax=y, color='green')
ax.plot(x,y, "o", color='maroon')
ax.set_xticklabels(x, rotation = 90)
ax.set_ylabel("Count of movies")
# set a title
ax.set_title("Genres");
```



<Figure size 720x720 with 0 Axes>

Recommendation System

- The TF-IDF(Term Frequency-Inverse Document Frequency (TF-IDF)) score is the frequency of a word occurring in a document, down-weighted by the number of documents in which it occurs.
- This is done to reduce the importance of words that occur frequently in plot overviews and therefore, their significance in computing the final similarity score.

from sklearn.feature_extraction.text import TfidfVectorizer

Removing stopwords

`tfidf = TfidfVectorizer(stop_words='english')`

```

# Replace NaN with an empty string
df['Description'] = df['Description'].fillna('')

# Construct the required TF-IDF matrix by fitting and transforming the
data
tfidf_matrix = tfidf.fit_transform(df['Description'])

# Output the shape of tfidf_matrix
tfidf_matrix.shape

(4975, 13907)

# Import linear_kernel
from sklearn.metrics.pairwise import linear_kernel

# Compute the cosine similarity matrix
cosine_sim = linear_kernel(tfidf_matrix, tfidf_matrix)

indices = pd.Series(df.index, index=df['Title']).drop_duplicates()

def get_recommendations(title, cosine_sim=cosine_sim):

    idx = indices[title]

    # Get the pairwise similarity scores of all movies with that movie
    sim_scores = list(enumerate(cosine_sim[idx]))

    # Sort the movies based on the similarity scores
    sim_scores = sorted(sim_scores, key=lambda x: x[1], reverse=True)

    # Get the scores of the 10 most similar movies
    sim_scores = sim_scores[1:11]

    # Get the movie indices
    movie_indices = [i[0] for i in sim_scores]

    # Return the top 10 most similar movies
    return df['Title'].iloc[movie_indices]

```

Let's see now, the results of our recommendation system

Here, The Cosine similarity score is used since it is independent of magnitude and is relatively easy and fast to calculate.

$$\text{similarity} = \cos(\theta) = \frac{\mathbf{A} \cdot \mathbf{B}}{\|\mathbf{A}\| \|\mathbf{B}\|} = \frac{\sum_{i=1}^n A_i B_i}{\sqrt{\sum_{i=1}^n A_i^2} \sqrt{\sum_{i=1}^n B_i^2}},$$

- We have to call the `get_recommendations()` and then write the movie or tv_shows we want to find similars

```
get_recommendations('American History X')
```

```
658          Baahubali 2: The Conclusion (Tamil Version)
657      Baahubali 2: The Conclusion (Malayalam Version)
2094                                Fakta Ladh Mhana
5078                                Raja Natwarlal
7029                                The Young Vagabond
4164                                Mohenjo Daro
944                                  Black
4754                                Panipat - The Great Betrayal
5296                                Rukh
3953                                Martial Arts of Shaolin
Name: Title, dtype: object
```

```
get_recommendations('Gangs of New York')
```

```
2994                                Indiscretion
1798                                Dolemite Is My Name
659      Baahubali: The Beginning (English Version)
660      Baahubali: The Beginning (Hindi Version)
662      Baahubali: The Beginning (Tamil Version)
661      Baahubali: The Beginning (Malayalam Version)
6360                                The Flintstones
3862                                Mahabharat
2151                                Fida
1283                                Charlotte's Web
Name: Title, dtype: object
```