

Exploratory Data Analysis on Netfilx Dataset by Hardeep Singh

- 1 In this project, we will be exploring and manipulating Netfilx data which includes data related to Movies & TV Shows

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1. Importing the essential Python Libraries

In [1]:

```
1 import pandas as pd
2 import numpy as np
3 import matplotlib.pyplot as plt
4 %matplotlib inline
5 import seaborn as sns
6 import warnings
7 warnings.filterwarnings('ignore')
8 import plotnine
9 import plotly.express as px
```

2. Loading the Netflix Dataset

In [2]:

```
1 df = pd.read_csv("netflix_titles.csv")
2 df.head()
3
4 # Here Show_id = ID of the show which would have been given on the website
5 # Type = Two types are available: Movie/TV Show
6 # Title = Gives us title of the Movie/TV Show
7 # Director = Gives us name of the Director or Directors
8 # Cast = Name of the Cast in Movie/TV Show
9 # Country = Origination country of Movie/TV Show
10 # Date_added = date when the Movie/TV Show been added
11 # Release_Year = Year of release of Movie/TV Show
12 # Rating = Rating of Movie/TV Show (Motion Picture Association film rating system)
13 # Duration = Duration in Minutes for Movies & No. of Seasons for TV-Shows
14 # Listed_in = Listed in which type of genre (International TV Shows, TV Dramas, TV Mysteries, Documentaries)
15 # Description = A small description about that particular Movie/TV-Show
```

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

3. Exploring Pattern in the given Data

In [3]: 1 df.head(5)

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

In [4]: 1 df.tail(5)

Out[4]:

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

In [5]: 1 df.shape

Out[5]: (8807, 12)

In [6]: 1 df.columns

Out[6]: Index(['show_id', 'type', 'title', 'director', 'cast', 'country', 'date_added', 'release_year', 'rating', 'duration', 'listed_in', 'description'], dtype='object')

In [7]: 1 df.dtypes

```
Out[7]: 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 [8]: 1 df.count()

```
Out[8]: show_id      8807
         type        8807
         title       8807
         director    6173
         cast         7982
         country      7976
         date_added   8797
         release_year 8807
         rating        8803
         duration      8804
         listed_in     8807
         description    8807
         dtype: int64
```

In [9]: 1 df.info()

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 8807 entries, 0 to 8806
Data columns (total 12 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   show_id     8807 non-null   object  
 1   type        8807 non-null   object  
 2   title       8807 non-null   object  
 3   director    6173 non-null   object  
 4   cast         7982 non-null   object  
 5   country     7976 non-null   object  
 6   date_added  8797 non-null   object  
 7   release_year 8807 non-null   int64  
 8   rating      8803 non-null   object  
 9   duration    8804 non-null   object  
 10  listed_in   8807 non-null   object  
 11  description 8807 non-null   object  
dtypes: int64(1), object(11)
memory usage: 825.8+ KB
```

In [10]:

```

1 df.describe(include='all')
2
3 # It will give statistical information of all numerical features in our dataset
4 # Count - count of the values
5 # mean - average of the values
6 # std - standard deviation
7 # min - minimum values as compared to the other values
8 # 25% - first quartile
9 # 50% - second quartile of near to the median
10 # 75% - third quartile
11 # max - maximum values as compared to the other values

```

Out[10]:

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

4. Handling of Duplicates

```
In [11]: 1 df.duplicated()
```

```
Out[11]: 0    False
         1    False
         2    False
         3    False
         4    False
         ...
        8802   False
        8803   False
        8804   False
        8805   False
        8806   False
Length: 8807, dtype: bool
```

```
In [12]: 1 df.duplicated().sum()
```

```
Out[12]: 0
```

```
In [13]: 1 # By setting keep on 'False', all duplicates are 'True'.
         2 df.duplicated(keep = False)
```

```
Out[13]: 0    False
         1    False
         2    False
         3    False
         4    False
         ...
        8802   False
        8803   False
        8804   False
        8805   False
        8806   False
Length: 8807, dtype: bool
```

```
In [14]: 1 df.duplicated(subset='title',keep = False)
```

```
Out[14]: 0    False
1    False
2    False
3    False
4    False
...
8802  False
8803  False
8804  False
8805  False
8806  False
Length: 8807, dtype: bool
```

In [15]:

```
1 # Droping duplicates  
2 df.drop_duplicates()
```

Out[15]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	September 25, 2021	2020	PG-13	90 min	Documentaries	As her father nears the end of his life, filmm...
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...
2	s3	TV Show	Ganglands	Julien Leclercq	Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...	NaN	September 24, 2021	2021	TV-MA	1 Season	Crime TV Shows, International TV Shows, TV Act...	To protect his family from a powerful drug lord...
3	s4	TV Show	Jailbirds New Orleans	NaN	NaN	NaN	September 24, 2021	2021	TV-MA	1 Season	Docuseries, Reality TV	Feuds, flirtations and toilet talk go down amo...
4	s5	TV Show	Kota Factory	NaN	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, Romantic TV Shows, TV ...	In a city of coaching centers known to train I...
...
8802	s8803	Movie	Zodiac	David Fincher	Mark Ruffalo, Jake Gyllenhaal, Robert Downey J...	United States	November 20, 2019	2007	R	158 min	Cult Movies, Dramas, Thrillers	A political cartoonist, a crime reporter and a...
8803	s8804	TV Show	Zombie Dumb	NaN	NaN	NaN	July 1, 2019	2018	TV-Y7	2 Seasons	Kids' TV, Korean TV Shows, TV Comedies	While living alone in a spooky town, a young g...
8804	s8805	Movie	Zombieland	Ruben Fleischer	Jesse Eisenberg, Woody Harrelson, Emma Stone, ...	United States	November 1, 2019	2009	R	88 min	Comedies, Horror Movies	Looking to survive in a world taken over by zo...

show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description	
8805	s8806	Movie	Zoom	Peter Hewitt	Tim Allen, Courteney Cox, Chevy Chase, Kate Ma...	United States	January 11, 2020	2006	PG	88 min	Children & Family Movies, Comedies	Dragged from civilian life, a former superhero...
8806	s8807	Movie	Zubaan	Mozez Singh	Vicky Kaushal, Sarah-Jane Dias, Raaghav Chanan...	India	March 2, 2019	2015	TV-14	111 min	Dramas, International Movies, Music & Musicals	A scrappy but poor boy worms his way into a ty...

8807 rows × 12 columns

5. Handling of Outliers

In [16]: 1 # We can also handle outliers present in the numerical attributes but here there are not much of variable numeric

In [17]: 1 df['type'].value_counts()

Out[17]: Movie 6131
TV Show 2676
Name: type, dtype: int64

In []:

In []:

6. Handle Missing Values

```
In [18]: 1 # Detecting the Missing Values
```

```
In [19]: 1 df.isnull().sum()
```

```
Out[19]: 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 [20]: 1 # Let us first see the missing from Lower in number to higher in number
```

Missing values in 'duration' column

```
In [21]: 1 # First going fot 'duration' columns
2 df[df.isnull()['duration']==True]
3
```

Out[21]:

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

```
In [22]: 1 # Here we see that there is a mismatch occurring in 'rating' and 'duration' columns.
2 # So, Let's swap them
```

```
In [23]: 1 index = list(df[df.isnull()['duration']==True].index)
2 df.loc[index,'duration'] = df.loc[index,'rating']
3 df.loc[index,'rating'] = np.nan
```

```
In [24]: 1 # So, the missing values of duration column has been recovered
2 # Now, Let's move to the next column who has missing values
```

```
In [25]: 1 df.isnull().sum()
```

```
Out[25]: show_id          0  
type            0  
title           0  
director       2634  
cast            825  
country         831  
date_added      10  
release_year    0  
rating           7  
duration         0  
listed_in        0  
description      0  
dtype: int64
```

Missing values in 'Rating' column

In [26]:

```

1 # Let us first see which values in 'rating' column are missing
2 df[df.isnull()['rating']==True]

```

Out[26]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
5541	s5542	Movie	Louis C.K. 2017	Louis C.K.	Louis C.K.	United States	April 4, 2017	2017	NaN	74 min	Movies	Louis C.K. muses on religion, eternal love, gi...
5794	s5795	Movie	Louis C.K.: Hilarious	Louis C.K.	Louis C.K.	United States	September 16, 2016	2010	NaN	84 min	Movies	Emmy-winning comedy writer Louis C.K. brings h...
5813	s5814	Movie	Louis C.K.: Live at the Comedy Store	Louis C.K.	Louis C.K.	United States	August 15, 2016	2015	NaN	66 min	Movies	The comic puts his trademark hilarious/thought...
5989	s5990	Movie	13TH: A Conversation with Oprah Winfrey & Ava ...	NaN	Oprah Winfrey, Ava DuVernay	NaN	January 26, 2017	2017	NaN	37 min	Movies	Oprah Winfrey sits down with director Ava DuVe...
6827	s6828	TV Show	Gargantia on the Verdurous Planet	NaN	Kaito Ishikawa, Hisako Kanemoto, Ai Kayano, Ka...	Japan	December 1, 2016	2013	NaN	1 Season	Anime Series, International TV Shows	After falling through a wormhole, a space-dwel...
7312	s7313	TV Show	Little Lunch	NaN	Flynn Curry, Olivia Deeble, Madison Lu, Oisín ...	Australia	February 1, 2018	2015	NaN	1 Season	Kids' TV, TV Comedies	Adopting a child's perspective, this show take...
7537	s7538	Movie	My Honor Was Loyalty	Alessandro Pepe	Leone Frisa, Paolo Vaccarino, Francesco Miglio...	Italy	March 1, 2017	2015	NaN	115 min	Dramas	Amid the chaos and horror of World War II, a c...

```
In [27]: 1 df['rating'].value_counts()
```

```
Out[27]: 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  
Name: rating, dtype: int64
```

```
In [28]: 1  
2
```

n & missing value can only be replaced with its next value. The second or third following value will not be used for r

```
In [29]: 1 df['rating'] = df['rating'].fillna(method='bfill',limit=1)  
2
```

```
In [30]: 1 df['rating'].isnull().sum()
```

```
Out[30]: 0
```

```
In [31]: 1 # So, we are dealt with the missing values of 'rating' column  
2 # Now, Let's go to the next
```

```
In [32]: 1 df.isnull().sum()
```

```
Out[32]: show_id      0  
type          0  
title         0  
director     2634  
cast          825  
country       831  
date_added    10  
release_year   0  
rating         0  
duration       0  
listed_in      0  
description    0  
dtype: int64
```

Handling missing values in 'date_added' column

```
In [33]: 1 df[df.isnull()['date_added']==True]
```

Out[33]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
6066	s6067	TV Show	A Young Doctor's Notebook and Other Stories	Nan	Daniel Radcliffe, Jon Hamm, Adam Godley, Chris...	United Kingdom	Nan	2013	TV-MA	2 Seasons	British TV Shows, TV Comedies, TV Dramas	Set during the Russian Revolution, this comic ...
6174	s6175	TV Show	Anthony Bourdain: Parts Unknown	Nan	Anthony Bourdain	United States	Nan	2018	TV-PG	5 Seasons	Docuseries	This CNN original series has chef Anthony Bour...
6795	s6796	TV Show	Frasier	Nan	Kelsey Grammer, Jane Leeves, David Hyde Pierce...	United States	Nan	2003	TV-PG	11 Seasons	Classic & Cult TV, TV Comedies	Frasier Crane is a snooty but lovable Seattle ...
6806	s6807	TV Show	Friends	Nan	Jennifer Aniston, Courteney Cox, Lisa Kudrow, ...	United States	Nan	2003	TV-14	10 Seasons	Classic & Cult TV, TV Comedies	This hit sitcom follows the merry misadventure...
6901	s6902	TV Show	Gunslinger Girl	Nan	Yuuka Nanri, Kanako Mitsuhashi, Eri Sendai, Am...	Japan	Nan	2008	TV-14	2 Seasons	Anime Series, Crime TV Shows	On the surface, the Social Welfare Agency appe...
7196	s7197	TV Show	Kikoriki	Nan	Igor Dmitriev	Nan	Nan	2010	TV-Y	2 Seasons	Kids' TV	A wacky rabbit and his gang of animal pals hav...
7254	s7255	TV Show	La Familia P. Luche	Nan	Eugenio Derbez, Consuelo Duval, Luis Manuel Áv...	United States	Nan	2012	TV-14	3 Seasons	International TV Shows, Spanish-Language TV Sh...	This irreverent sitcom features Ludovico, Feder...
7406	s7407	TV Show	Maron	Nan	Marc Maron, Judd Hirsch, Josh Brener, Nora Zeh...	United States	Nan	2016	TV-MA	4 Seasons	TV Comedies	Marc Maron stars as Marc Maron, who interviews...
7847	s7848	TV Show	Red vs. Blue	Nan	Burnie Burns, Jason Saldaña, Gustavo Sorola, G...	United States	Nan	2015	NR	13 Seasons	TV Action & Adventure, TV Comedies, TV Sci-Fi ...	This parody of first-person shooter games, mil...

show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
8182	s8183	TV Show	The Adventures of Figaro Pho	NaN	Luke Jurevicius, Craig Behenna, Charlotte Ham...	Australia	NaN	2015	TV-Y7 2 Seasons	Kids' TV, TV Comedies	Imagine your worst fears, then multiply them: ...

In [34]: 1 df['date_added']

Out[34]: 0 September 25, 2021
1 September 24, 2021
2 September 24, 2021
3 September 24, 2021
4 September 24, 2021
...
8802 November 20, 2019
8803 July 1, 2019
8804 November 1, 2019
8805 January 11, 2020
8806 March 2, 2019
Name: date_added, Length: 8807, dtype: object

In [35]:

```
1 index = list(df[df.isnull()['date_added']==True].index)
2 df.iloc[index]
```

Out[35]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
6066	s6067	TV Show	A Young Doctor's Notebook and Other Stories	Nan	Daniel Radcliffe, Jon Hamm, Adam Godley, Chris...	United Kingdom	Nan	2013	TV-MA	2 Seasons	British TV Shows, TV Comedies, TV Dramas	Set during the Russian Revolution, this comic ...
6174	s6175	TV Show	Anthony Bourdain: Parts Unknown	Nan	Anthony Bourdain	United States	Nan	2018	TV-PG	5 Seasons	Docuseries	This CNN original series has chef Anthony Bour...
6795	s6796	TV Show	Frasier	Nan	Kelsey Grammer, Jane Leeves, David Hyde Pierce...	United States	Nan	2003	TV-PG	11 Seasons	Classic & Cult TV, TV Comedies	Frasier Crane is a snooty but lovable Seattle ...
6806	s6807	TV Show	Friends	Nan	Jennifer Aniston, Courteney Cox, Lisa Kudrow, ...	United States	Nan	2003	TV-14	10 Seasons	Classic & Cult TV, TV Comedies	This hit sitcom follows the merry misadventure...
6901	s6902	TV Show	Gunslinger Girl	Nan	Yuuka Nanri, Kanako Mitsuhashi, Eri Sendai, Am...	Japan	Nan	2008	TV-14	2 Seasons	Anime Series, Crime TV Shows	On the surface, the Social Welfare Agency appe...
7196	s7197	TV Show	Kikoriki	Nan	Igor Dmitriev	Nan	Nan	2010	TV-Y	2 Seasons	Kids' TV	A wacky rabbit and his gang of animal pals hav...
7254	s7255	TV Show	La Familia P. Luche	Nan	Eugenio Derbez, Consuelo Duval, Luis Manuel Áv...	United States	Nan	2012	TV-14	3 Seasons	International TV Shows, Spanish-Language TV Sh...	This irreverent sitcom features Ludovico, Feder...
7406	s7407	TV Show	Maron	Nan	Marc Maron, Judd Hirsch, Josh Brener, Nora Zeh...	United States	Nan	2016	TV-MA	4 Seasons	TV Comedies	Marc Maron stars as Marc Maron, who interviews...
7847	s7848	TV Show	Red vs. Blue	Nan	Burnie Burns, Jason Saldaña, Gustavo Sorola, G...	United States	Nan	2015	NR	13 Seasons	TV Action & Adventure, TV Comedies, TV Sci-Fi ...	This parody of first-person shooter games, mil...

	show_id	type		title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
8182	s8183	TV Show	The Adventures of Figaro Pho	NaN	Luke Jurevicius, Craig Behenna, Charlotte Haml...	Australia	NaN	2015	TV-Y7	2 Seasons	Kids' TV, TV Comedies	Imagine your worst fears, then multiply them: ...	

```
In [36]: 1 df.loc[index, 'date_added'] = ['January 1, ' + str(i) for i in df.loc[index, 'release_year']]
```

In [37]:

```
1 df.iloc[index]  
2
```

Out[37]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
6066	s6067	TV Show	A Young Doctor's Notebook and Other Stories	NaN	Daniel Radcliffe, Jon Hamm, Adam Godley, Chris...	United Kingdom	January 1, 2013	2013	TV-MA	2 Seasons	British TV Shows, TV Comedies, TV Dramas	Set during the Russian Revolution, this comic ...
6174	s6175	TV Show	Anthony Bourdain: Parts Unknown	NaN	Anthony Bourdain	United States	January 1, 2018	2018	TV-PG	5 Seasons	Docuseries	This CNN original series has chef Anthony Bour...
6795	s6796	TV Show	Frasier	NaN	Kelsey Grammer, Jane Leeves, David Hyde Pierce...	United States	January 1, 2003	2003	TV-PG	11 Seasons	Classic & Cult TV, TV Comedies	Frasier Crane is a snooty but lovable Seattle ...
6806	s6807	TV Show	Friends	NaN	Jennifer Aniston, Courteney Cox, Lisa Kudrow, ...	United States	January 1, 2003	2003	TV-14	10 Seasons	Classic & Cult TV, TV Comedies	This hit sitcom follows the merry misadventure...
6901	s6902	TV Show	Gunslinger Girl	NaN	Yuuka Nanri, Kanako Mitsuhashi, Eri Sendai, Am...	Japan	January 1, 2008	2008	TV-14	2 Seasons	Anime Series, Crime TV Shows	On the surface, the Social Welfare Agency appe...
7196	s7197	TV Show	Kikoriki	NaN	Igor Dmitriev	NaN	January 1, 2010	2010	TV-Y	2 Seasons	Kids' TV	A wacky rabbit and his gang of animal pals hav...
7254	s7255	TV Show	La Familia P. Luche	NaN	Eugenio Derbez, Consuelo Duval, Luis Manuel Áv...	United States	January 1, 2012	2012	TV-14	3 Seasons	International TV Shows, Spanish-Language TV Sh...	This irreverent sitcom features Ludovico, Feder...
7406	s7407	TV Show	Maron	NaN	Marc Maron, Judd Hirsch, Josh Brener, Nora Zeh...	United States	January 1, 2016	2016	TV-MA	4 Seasons	TV Comedies	Marc Maron stars as Marc Maron, who interviews...
7847	s7848	TV Show	Red vs. Blue	NaN	Burnie Burns, Jason Saldaña, Gustavo Sorola, G...	United States	January 1, 2015	2015	NR	13 Seasons	TV Action & Adventure, TV Comedies, TV Sci-Fi ...	This parody of first-person shooter games, mil...

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
8182	s8183	TV Show	The Adventures of Figaro Pho	NaN	Luke Jurevicius, Craig Behenna, Charlotte Haml...	Australia	January 1, 2015	2015	TV-Y7	2 Seasons	Kids' TV, TV Comedies	Imagine your worst fears, then multiply them: ...

In [38]: 1 df.isnull().sum()

Out[38]:

show_id	0
type	0
title	0
director	2634
cast	825
country	831
date_added	0
release_year	0
rating	0
duration	0
listed_in	0
description	0
dtype: int64	

'director','cast','country'

In [39]: 1 df['director'].fillna("not given",inplace=True)

In [40]: 1 df['cast'].fillna("not given",inplace=True)

In [41]: 1 df['country'].fillna("not given", inplace = True)

```
In [42]: 1 df.isnull().sum()
```

```
Out[42]: 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
```

7. Data Pre-processing

```
In [43]: 1 df['type'].value_counts()
```

```
Out[43]: Movie      6131  
TV Show     2676  
Name: type, dtype: int64
```

```
In [44]: 1 #pd.set_option('display.max_rows', None)
2 df['release_year'].value_counts()[1:21]
```

```
Out[44]: 2017    1032
2019    1030
2020    953
2016    902
2021    592
2015    560
2014    352
2013    288
2012    237
2010    194
2011    185
2009    152
2008    136
2006     96
2007     88
2005     80
2004     64
2003     61
2002     51
2001     45
Name: release_year, dtype: int64
```

In [45]: 1 df.head()

		show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	not given	United States	September 25, 2021	2020	PG-13	90 min	Documentaries	As her father nears the end of his life, filmm...	
1	s2	TV Show	Blood & Water	not given	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...	
2	s3	TV Show	Ganglands	Julien Leclercq	Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...	not given	September 24, 2021	2021	TV-MA	1 Season	Crime TV Shows, International TV Shows, TV Act...	To protect his family from a powerful drug lor...	
3	s4	TV Show	Jailbirds New Orleans	not given	not given	not given	September 24, 2021	2021	TV-MA	1 Season	Docuseries, Reality TV	Feuds, flirtations and toilet talk go down amo...	
4	s5	TV Show	Kota Factory	not given	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, Romantic TV Shows, TV ...	In a city of coaching centers known to train I...	

In [52]: 1 df.tail()

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
8802	s8803	Movie	Zodiac	David Fincher	Mark Ruffalo, Jake Gyllenhaal, Robert Downey J...	United States	November 20, 2019	2007	R	158 min	Cult Movies, Dramas, Thrillers	A political cartoonist, a crime reporter and a...
8803	s8804	TV Show	Zombie Dumb	not given	not given	not given	July 1, 2019	2018	TV-Y7	2 Seasons	Kids' TV, Korean TV Shows, TV Comedies	While living alone in a spooky town, a young g...
8804	s8805	Movie	Zombieland	Ruben Fleischer	Jesse Eisenberg, Woody Harrelson, Emma Stone, ...	United States	November 1, 2019	2009	R	88 min	Comedies, Horror Movies	Looking to survive in a world taken over by zo...
8805	s8806	Movie	Zoom	Peter Hewitt	Tim Allen, Courteney Cox, Chevy Chase, Kate Ma...	United States	January 11, 2020	2006	PG	88 min	Children & Family Movies, Comedies	Dragged from civilian life, a former superhero...
8806	s8807	Movie	Zubaan	Mozez Singh	Vicky Kaushal, Sarah-Jane Dias, Raaghav Chanan...	India	March 2, 2019	2015	TV-14	111 min	Dramas, International Movies, Music & Musicals	A scrappy but poor boy worms his way into a ty...

```
In [53]: 1 df1 = df.copy(deep=True)
2 df1.head()
```

Out[53]:

		show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	not given	United States	September 25, 2021	2020	PG-13	90 min	Documentaries	As her father nears the end of his life, filmm...	
1	s2	TV Show	Blood & Water	not given	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...	
2	s3	TV Show	Ganglands	Julien Leclercq	Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...	not given	September 24, 2021	2021	TV-MA	1 Season	Crime TV Shows, International TV Shows, TV Act...	To protect his family from a powerful drug lor...	
3	s4	TV Show	Jailbirds New Orleans	not given	not given	not given	September 24, 2021	2021	TV-MA	1 Season	Docuseries, Reality TV	Feuds, flirtations and toilet talk go down amo...	
4	s5	TV Show	Kota Factory	not given	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, Romantic TV Shows, TV ...	In a city of coaching centers known to train I...	

```
In [54]: 1 # Extracting Months from the 'Date_added' column
2 l1 = []
3 for i in df1['date_added']:
4     i = str(i)
5     l1.append(i.strip().split(' ')[0])
6 df1.insert(loc = 7, column = 'month', value = l1)
```

In [55]: 1 df1.head()

		show_id	type	title	director	cast	country	date_added	month	release_year	rating	duration	listed_in	description
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	not given	United States	September 25, 2021	September		2020	PG-13	90 min	Documentaries	As her father nears the end of his life, filmm...
1	s2	TV Show	Blood & Water	not given	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	September		2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...
2	s3	TV Show	Ganglands	Julien Leclercq	Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...	not given	September 24, 2021	September		2021	TV-MA	1 Season	Crime TV Shows, International TV Shows, TV Act...	To protect his family from a powerful drug lor...
3	s4	TV Show	Jailbirds New Orleans	not given	not given	not given	September 24, 2021	September		2021	TV-MA	1 Season	Docuseries, Reality TV	Feuds, flirtations and toilet talk go down amo...
4	s5	TV Show	Kota Factory	not given	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	September 24, 2021	September		2021	TV-MA	2 Seasons	International TV Shows, Romantic TV Shows, TV ...	In a city of coaching centers known to train I...

In [56]:

```
1 from datetime import datetime
2 df1['date_added']= df1['date_added'].apply(lambda x : x.strip())
3 x = df1['date_added'].apply(lambda x : datetime.strptime(x, '%B %d, %Y'))
4
```

In [57]:

```
1 # Extracting day of the month
2 l = []
3 for i in x:
4     i=str(i)
5     l.append(i.strip().split("-")[2])
6 l1= []
7 for i in l:
8     i = str(i)
9     l1.append(int(i.split(" ")[0]))
```

In [58]:

```
1 df1.insert(loc=8,column='day of the month',value=l1)
```

In [59]: 1 df1.head()

Out[59]:

		show_id	type	title	director	cast	country	date_added	month	day of the month	release_year	rating	duration	listed_in	descrip
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	not given	United States	September 25, 2021	September	25		2020	PG-13	90 min	Documentaries	A father in the end of his film
1	s2	TV Show	Blood & Water	not given	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	September	24		2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	Cross paths past Cape Town
2	s3	TV Show	Ganglands	Julien Leclercq	Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...	not given	September 24, 2021	September	24		2021	TV-MA	1 Season	Crime TV Shows, International TV Shows, TV Act...	To protect his family from power drug
3	s4	TV Show	Jailbirds New Orleans	not given	not given	not given	September 24, 2021	September	24		2021	TV-MA	1 Season	Docuseries, Reality TV	Female flirtation and tactical
4	s5	TV Show	Kota Factory	not given	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	September 24, 2021	September	24		2021	TV-MA	2 Seasons	International TV Shows, Romantic TV Shows, TV ...	In a coaching center known for tra...



In [60]: # Changing the Duration of the Movie/TV Show, according to the need so that we can visualize it.

```
1 list1 = []
2 for i in df1['duration']:
3     i = str(i)
4     if 'min' in i:
5         x1 = int(int(i.split(' '))[0])/10
6         list1.append(str(x1) + '-' + str(x1 + 1))
7     else:
8         list1.append(int(int(i.split(' '))[0]))
9
10
11
```

```
In [61]: 1 df1.insert(loc = 12, column = 'Movie/TVshow dura', value = list1)
2 df1.head()
```

Out[61]:

	how_id	type	title	director	cast	country	date_added	month	day of the month	release_year	rating	duration	Movie/TVshow dura	listed_i
s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	not given	United States	September 25, 2021	September	25		2020	PG-13	90 min	9-10	Documentarie
s2	TV Show	Blood & Water	not given	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	September	24		2021	TV-MA	2 Seasons	2	International TV Shows, T Dramas, T Mysterie
s3	TV Show	Ganglands	Julien Leclercq	Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...	not given	September 24, 2021	September	24		2021	TV-MA	1 Season	1	Crime T Shows, International TV Shows, T Act.
s4	TV Show	Jailbirds New Orleans	not given	not given	not given	September 24, 2021	September	24		2021	TV-MA	1 Season	1	Docuseries Reality T
s5	TV Show	Kota Factory	not given	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	September 24, 2021	September	24		2021	TV-MA	2 Seasons	2	International TV Shows, Romantic T Shows, TV .

```
In [62]: 1 df1['type'].value_counts()
```

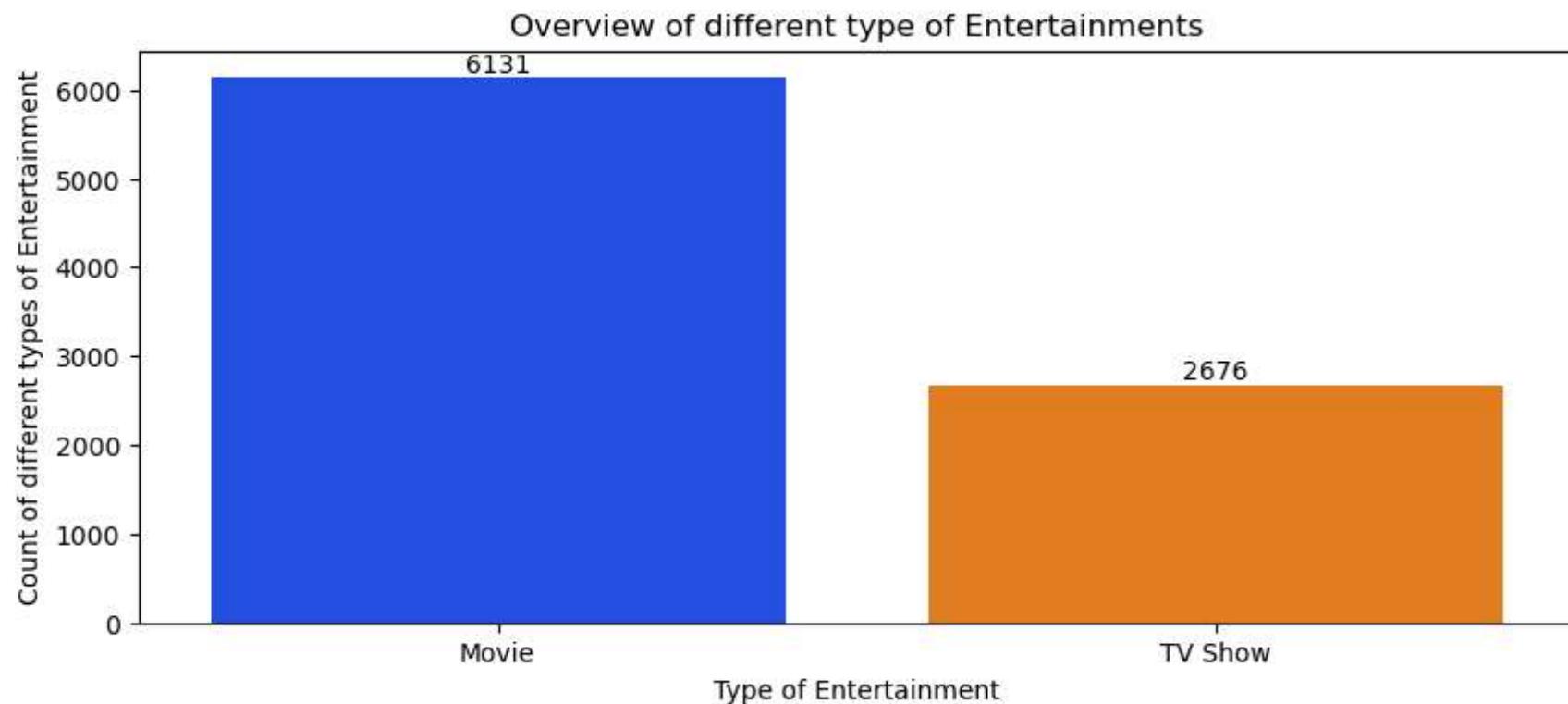
```
Out[62]: Movie      6131  
TV Show    2676  
Name: type, dtype: int64
```

```
In [63]: 1 df1.rename(columns={'type':'Types'},inplace=True)
```

8. Univariate Analysis

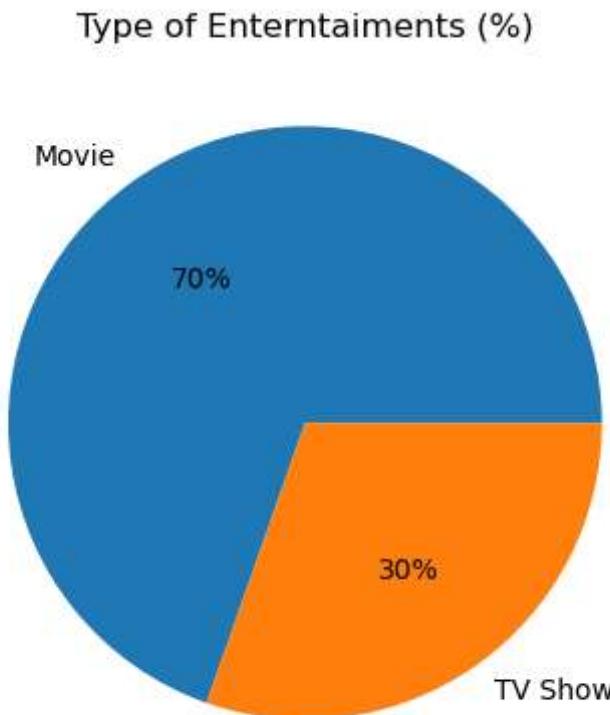
In [64]:

```
1 plt.figure(figsize=(10,4))
2 x = sns.countplot(data=df1,x='Types',palette='bright')
3 plt.xlabel('Type of Entertainment')
4 plt.ylabel("Count of different types of Entertainment")
5 plt.title("Overview of different type of Entertainments")
6 for container in x.containers:
7     x.bar_label(container)
8 plt.show()
```



In [65]:

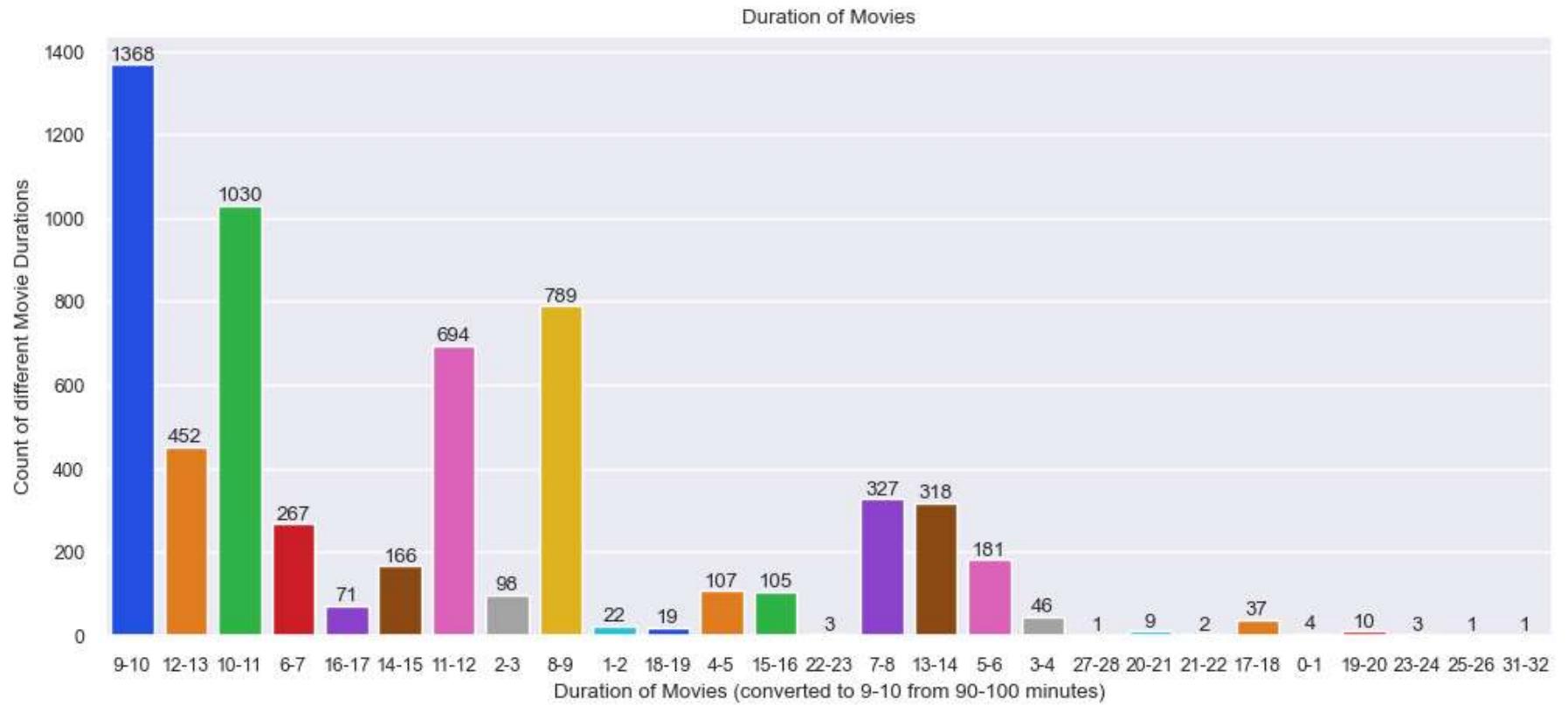
```
1 d= df1['Types'].value_counts()
2 labels = ['Movie', 'TV Show']
3 plt.pie(d,labels=labels, autopct='%.0f%%')
4 plt.title("Type of Enterntaiments (%)")
5 plt.show()
```

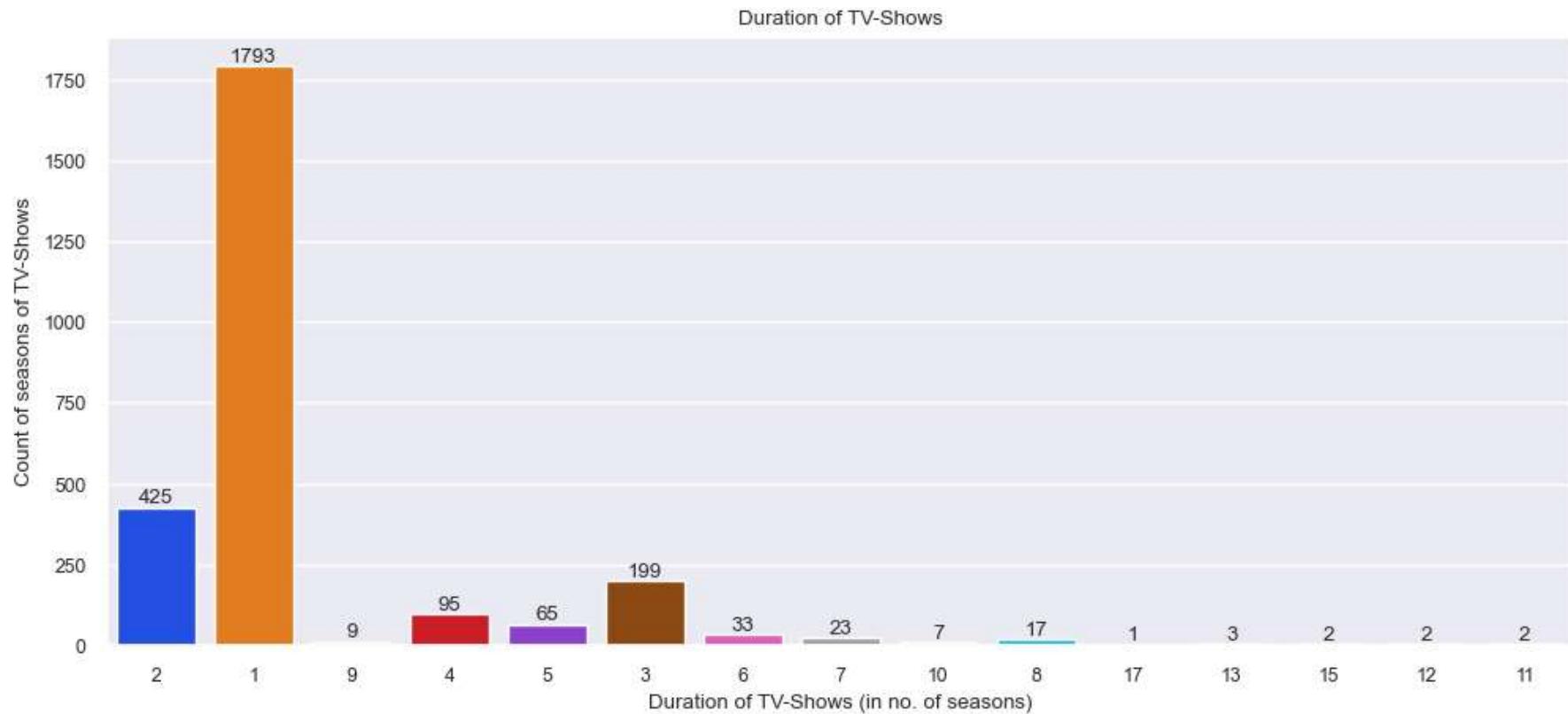


```
In [66]:  
1 # Splitting the Duration of the Movies and TV Shows  
2 list1 = list(df1['Movie/TVshow dura'])  
3 TV_shows=[]  
4 Movies=[]  
5 for i in list1:  
6     i = str(i)  
7     if '-' in i:  
8         Movies.append(i)  
9     else:  
10        TV_shows.append(i)
```

In [67]:

```
1 sns.set_theme(font_scale=0.8)
2 plt.figure(figsize=(12,5))
3 x = sns.countplot(Movies,palette = 'bright')
4 sns.set_theme(font_scale=0.8)
5 plt.xlabel('Duration of Movies (converted to 9-10 from 90-100 minutes)')
6 plt.ylabel("Count of different Movie Durations")
7 plt.title("Duration of Movies")
8 for container in x.containers:
9     x.bar_label(container)
10
11
12 plt.figure(figsize=(12,5))
13 y = sns.countplot(TV_shows,palette = 'bright')
14 plt.xlabel('Duration of TV-Shows (in no. of seasons)')
15 plt.ylabel("Count of seasons of TV-Shows")
16 plt.title("Duration of TV-Shows")
17 for container in y.containers:
18     y.bar_label(container)
19 plt.show()
```

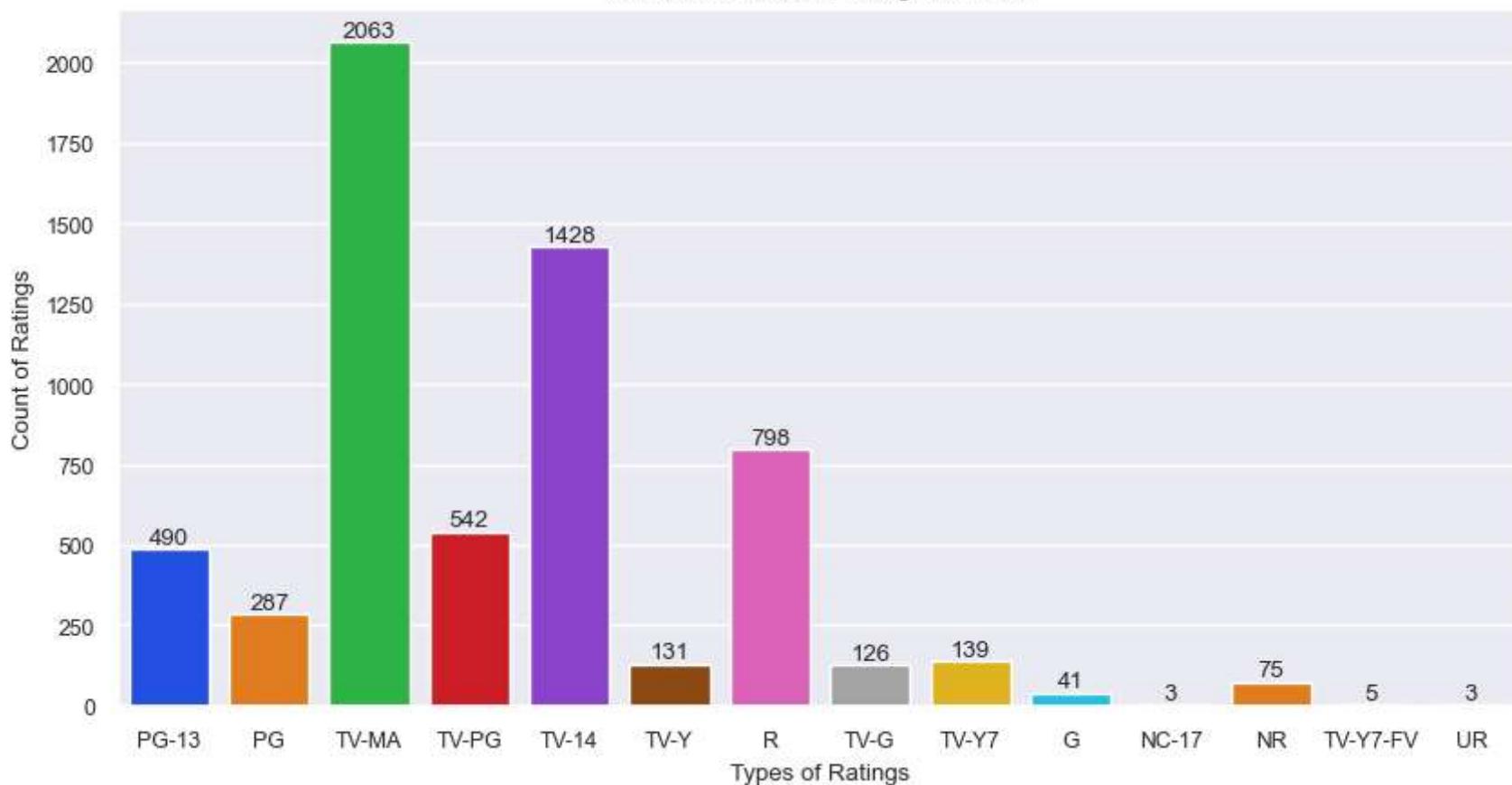


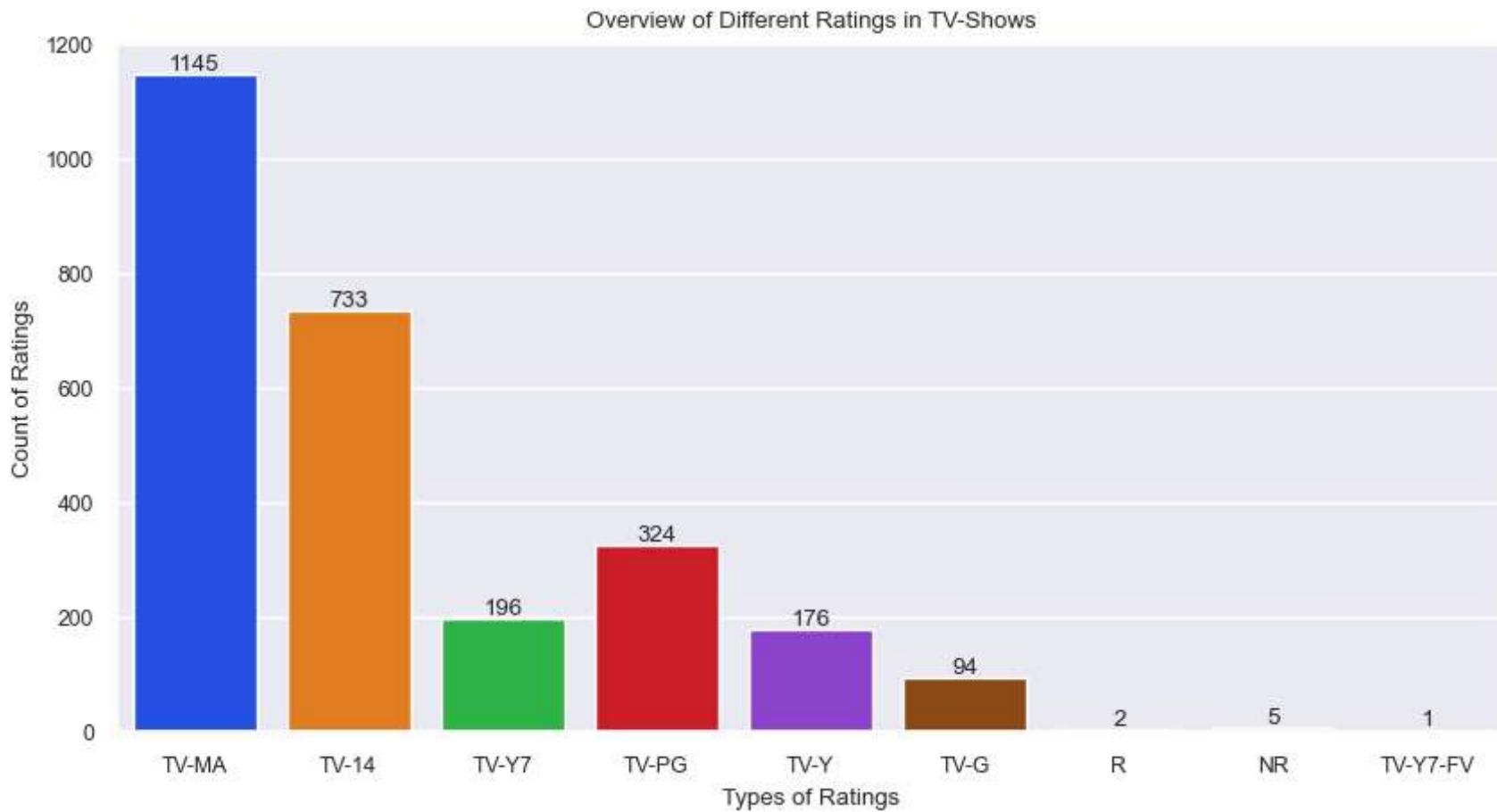


In [68]:

```
1 sns.set_theme(font_scale=0.8)
2 plt.figure(figsize=(10,5))
3 x = sns.countplot(data = df1[df1['Types']=='Movie'],x ='rating',palette = 'bright')
4 plt.xlabel('Types of Ratings')
5 plt.ylabel("Count of Ratings")
6 plt.title("Overview of Different Ratings in Movies")
7 for container in x.containers:
8     x.bar_label(container)
9
10
11 sns.set_theme(font_scale=0.8)
12 plt.figure(figsize=(10,5))
13 y = sns.countplot(data = df1[df1['Types']=='TV Show'],x ='rating',palette = 'bright')
14 plt.xlabel('Types of Ratings')
15 plt.ylabel("Count of Ratings")
16 plt.title("Overview of Different Ratings in TV-Shows")
17 for container in y.containers:
18     y.bar_label(container)
19 plt.show()
```

Overview of Different Ratings in Movies

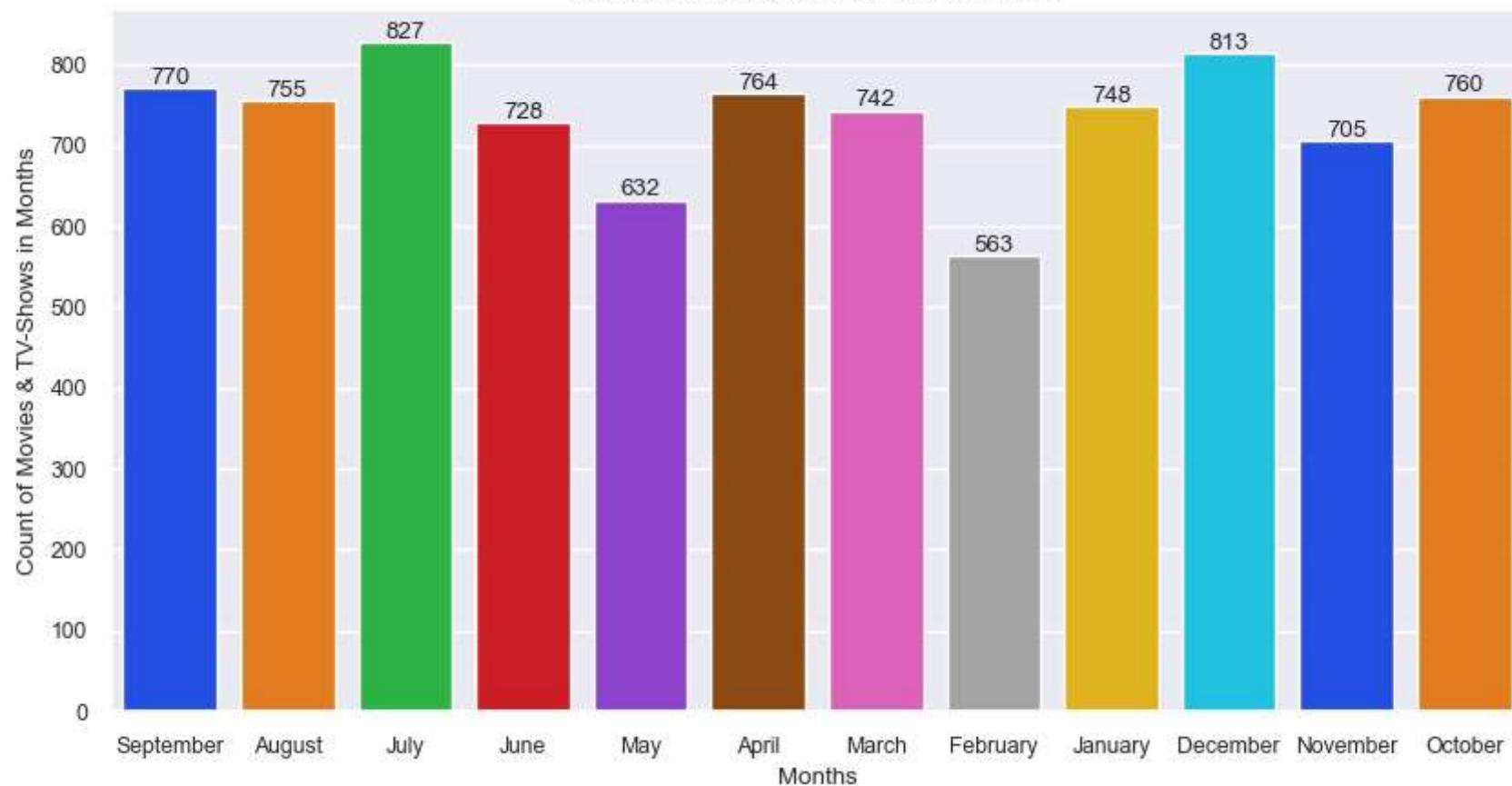




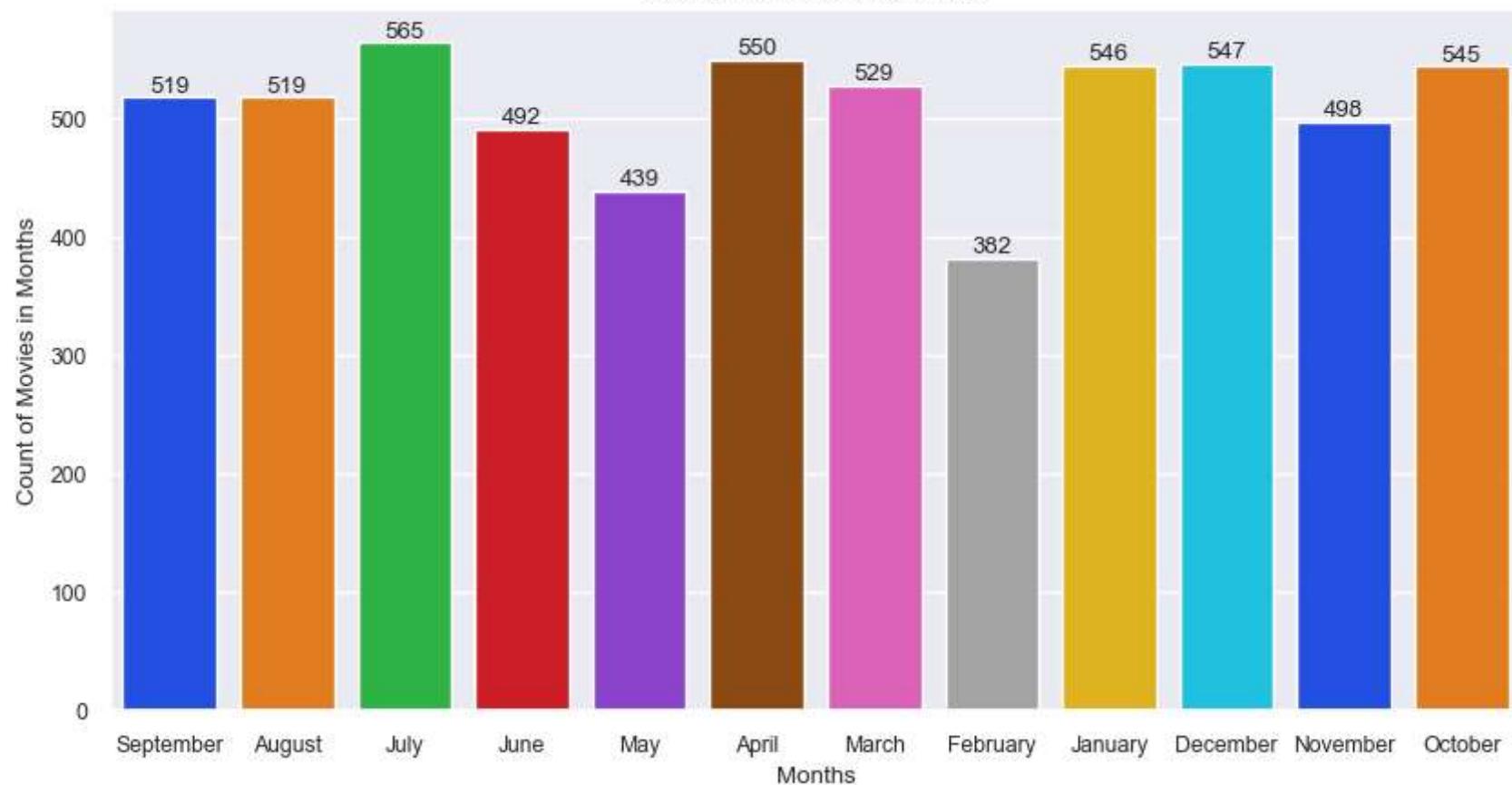
In [69]:

```
1 sns.set_theme(font_scale=0.8)
2 plt.figure(figsize=(10,5))
3 z = sns.countplot(data = df1,x ='month',palette = 'bright')
4 plt.xlabel('Months')
5 plt.ylabel("Count of Movies & TV-Shows in Months")
6 plt.title("Overview of Movies & TV-Shows Month Wise")
7 for container in z.containers:
8     z.bar_label(container)
9
10
11 sns.set_theme(font_scale=0.8)
12 plt.figure(figsize=(10,5))
13 x = sns.countplot(data = df1[df1['Types']=='Movie'],x ='month',palette = 'bright')
14 plt.xlabel('Months')
15 plt.ylabel("Count of Movies in Months")
16 plt.title("Overview of Movies Month Wise")
17 for container in x.containers:
18     x.bar_label(container)
19
20
21 sns.set_theme(font_scale=0.8)
22 plt.figure(figsize=(10,5))
23 y = sns.countplot(data = df1[df1['Types']=='TV Show'],x ='month',palette = 'bright')
24 plt.xlabel('Months')
25 plt.ylabel("Count of TV-Shows in Months")
26 plt.title("Overview of TV-Shows Month Wise")
27 for container in y.containers:
28     y.bar_label(container)
29 plt.show()
```

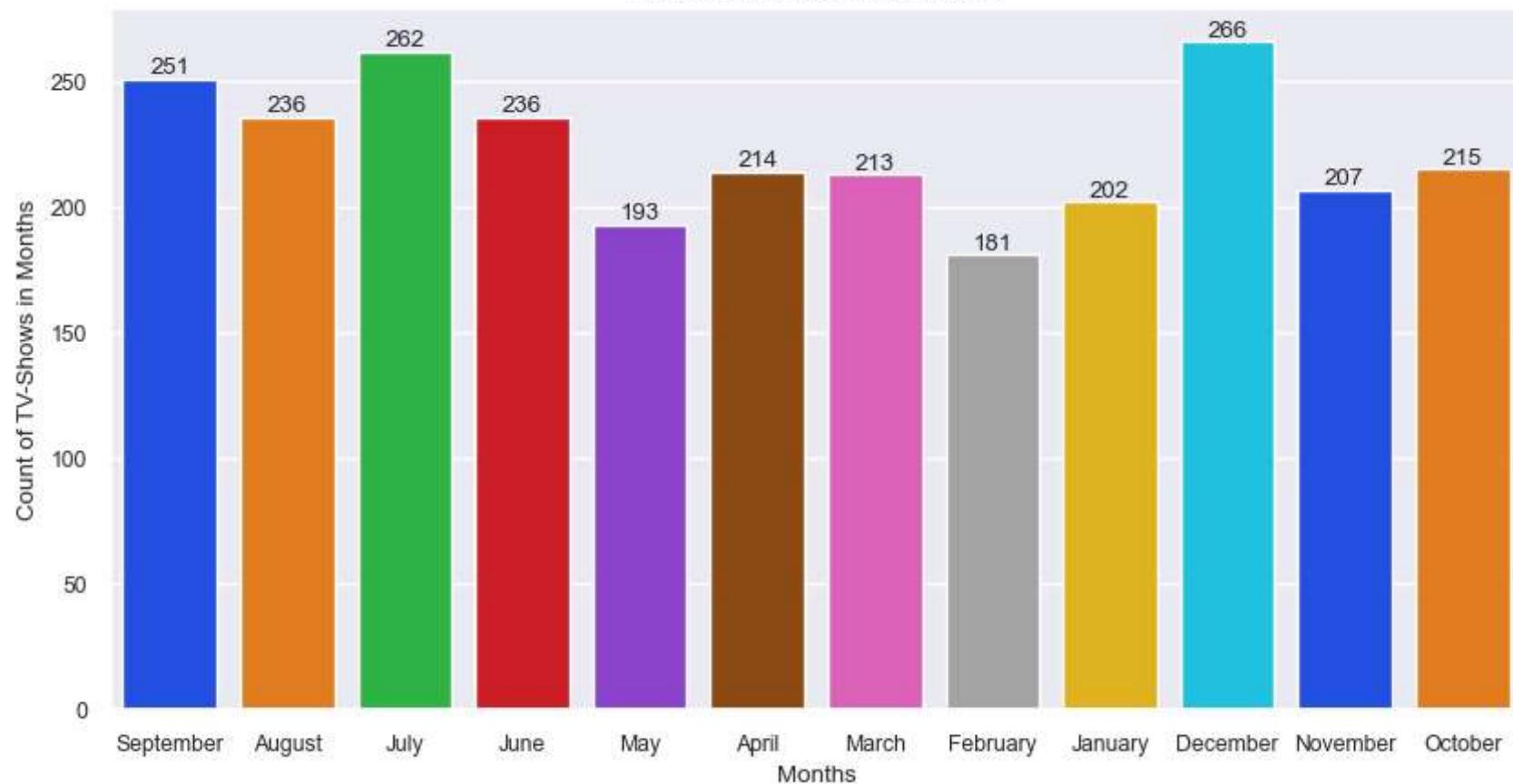
Overview of Movies & TV-Shows Month Wise



Overview of Movies Month Wise



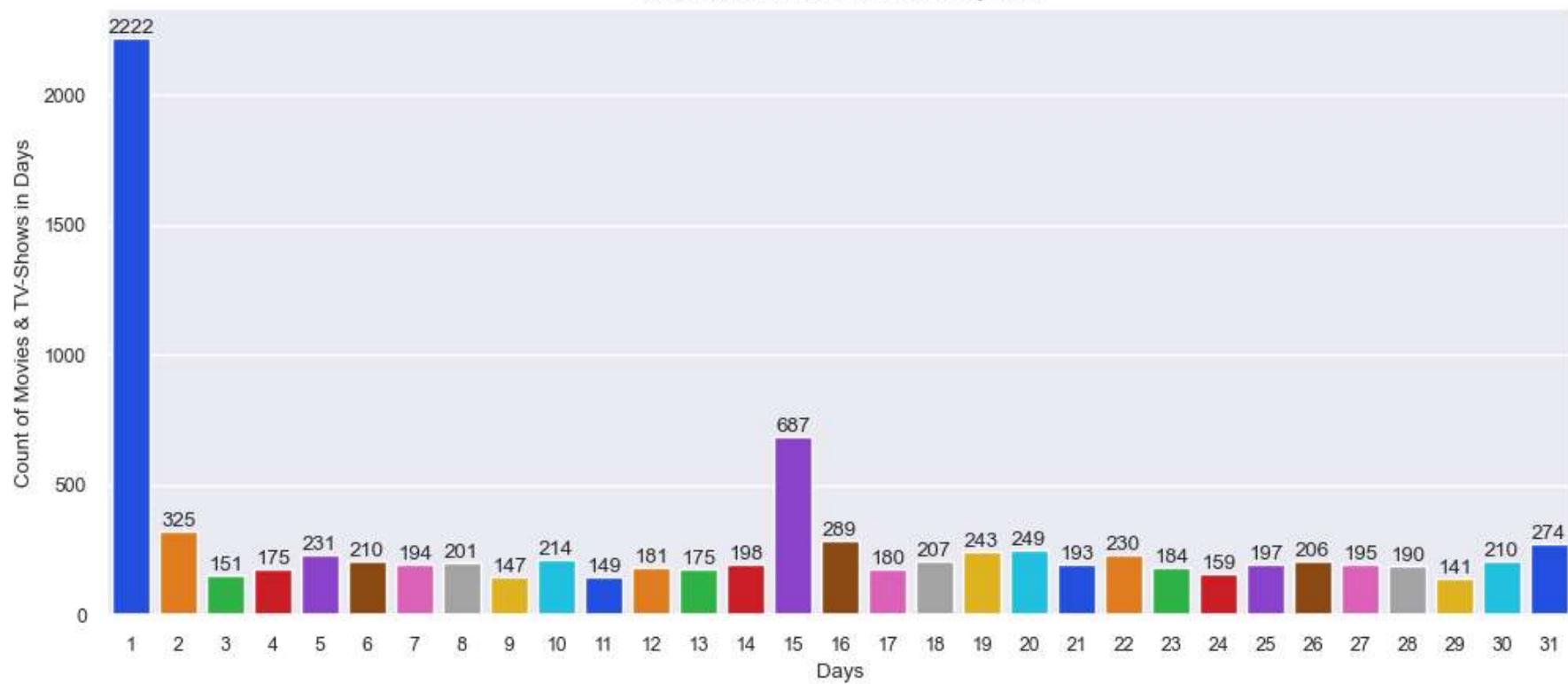
Overview of TV-Shows Month Wise



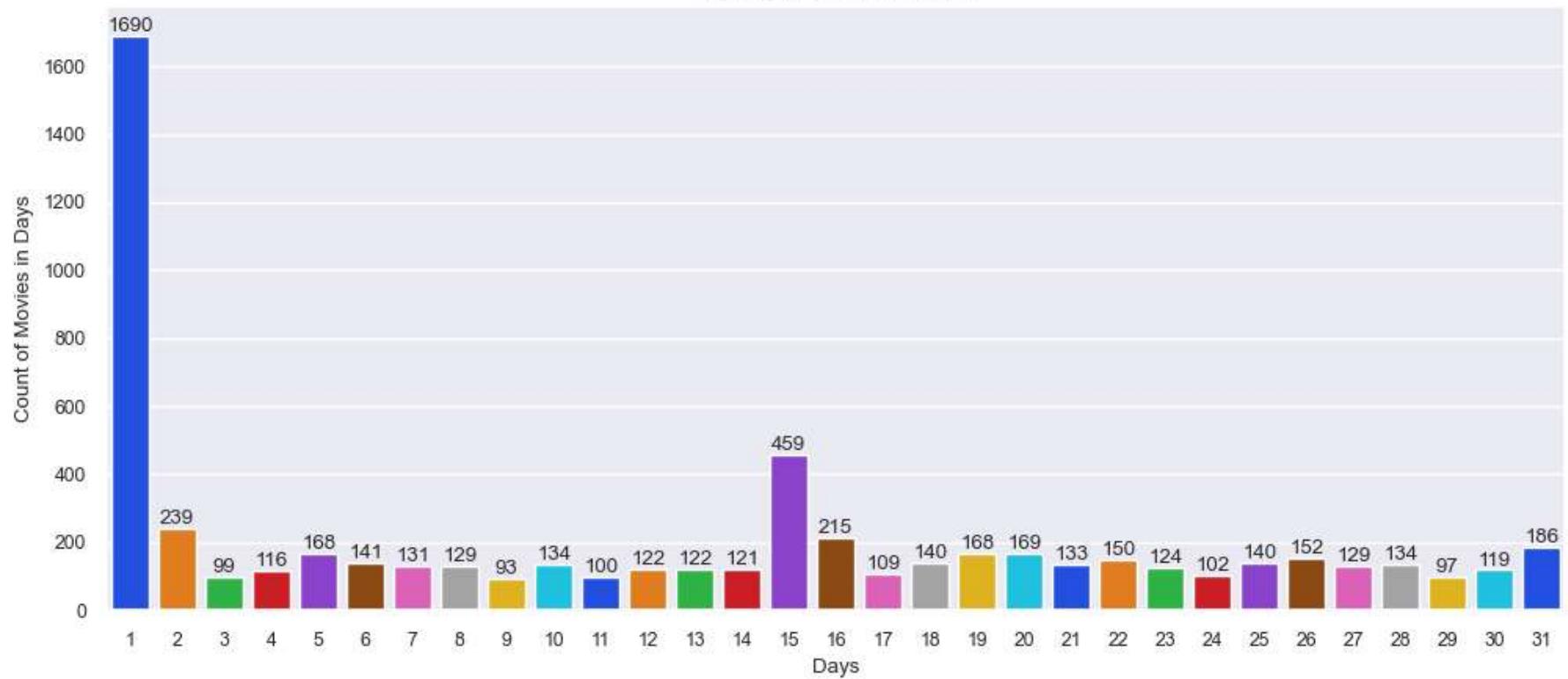
In [70]:

```
1 sns.set_theme(font_scale=0.8)
2 plt.figure(figsize=(12,5))
3 z = sns.countplot(data = df1,x ='day of the month',palette = 'bright')
4 plt.xlabel('Days')
5 plt.ylabel("Count of Movies & TV-Shows in Days")
6 plt.title("Overview of Movies & TV-Shows Day Wise")
7 for container in z.containers:
8     z.bar_label(container)
9
10
11 sns.set_theme(font_scale=0.8)
12 plt.figure(figsize=(12,5))
13 x = sns.countplot(data = df1[df1['Types']=='Movie'],x ='day of the month',palette = 'bright')
14 plt.xlabel('Days')
15 plt.ylabel("Count of Movies in Days")
16 plt.title("Overview of Movies Day Wise")
17 for container in x.containers:
18     x.bar_label(container)
19
20
21 sns.set_theme(font_scale=0.8)
22 plt.figure(figsize=(12,5))
23 y = sns.countplot(data = df1[df1['Types']=='TV Show'],x ='day of the month',palette = 'bright')
24 plt.xlabel('Months')
25 plt.ylabel("Count of TV-Shows in Days")
26 plt.title("Overview of TV-Shows Day Wise")
27 for container in y.containers:
28     y.bar_label(container)
29 plt.show()
```

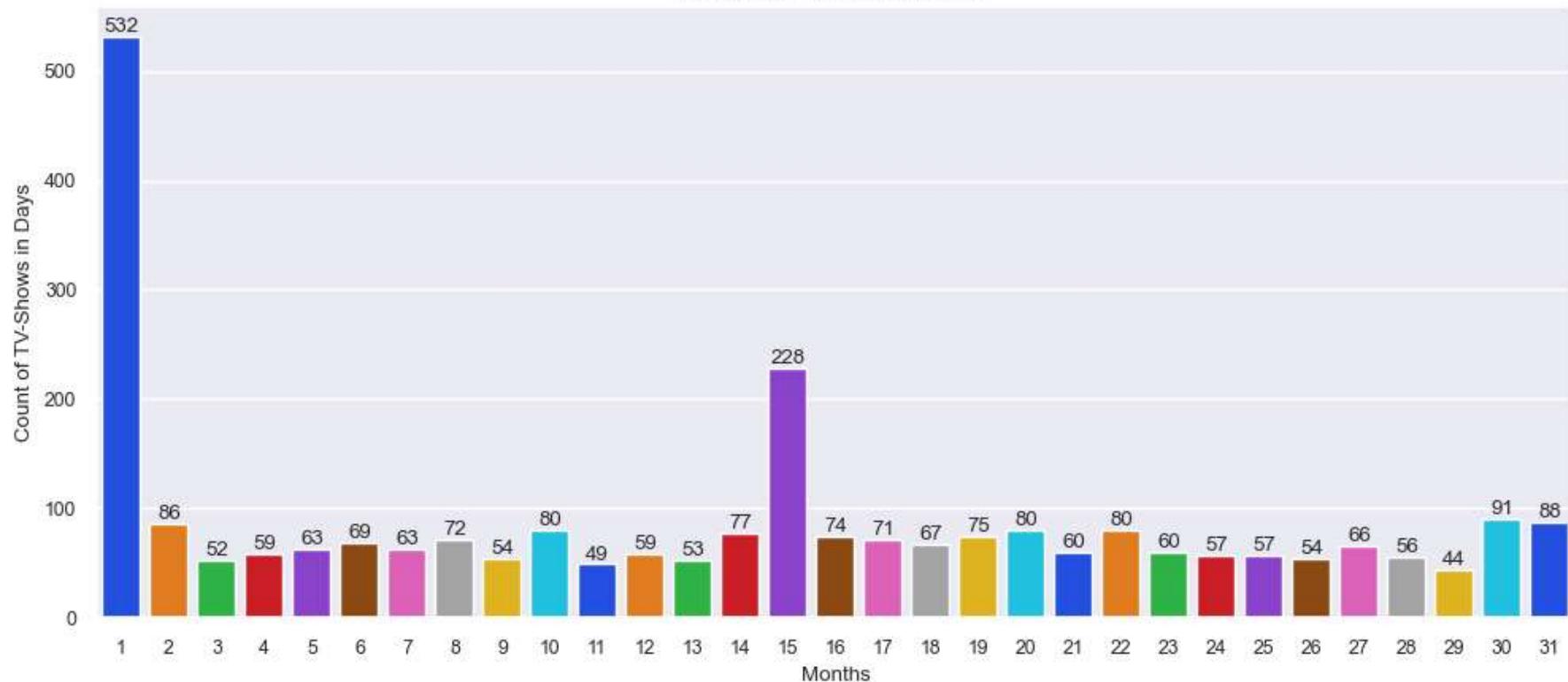
Overview of Movies & TV-Shows Day Wise



Overview of Movies Day Wise



Overview of TV-Shows Day Wise



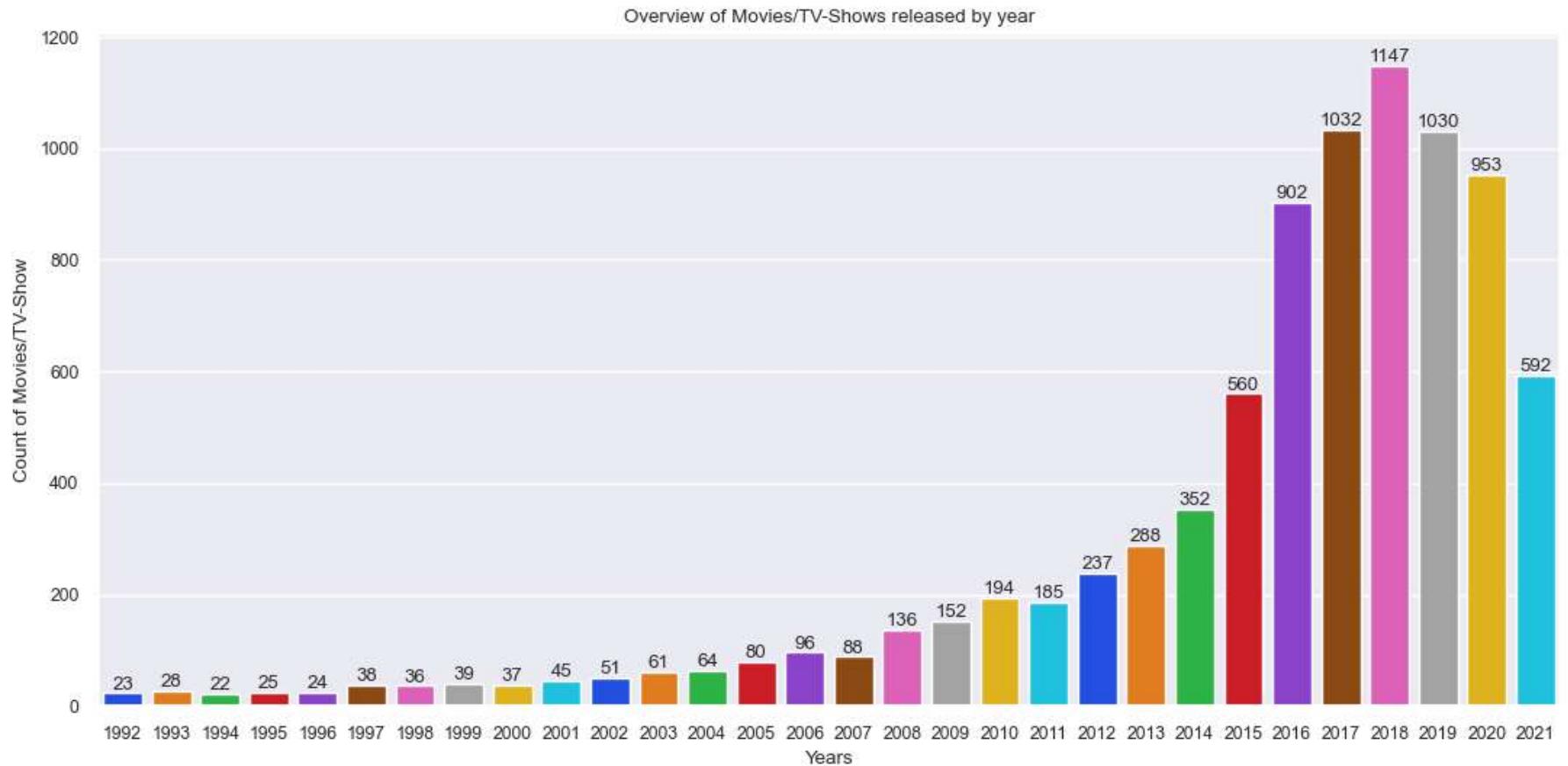
In []:

1

9. Bivariate Analysis

In [71]:

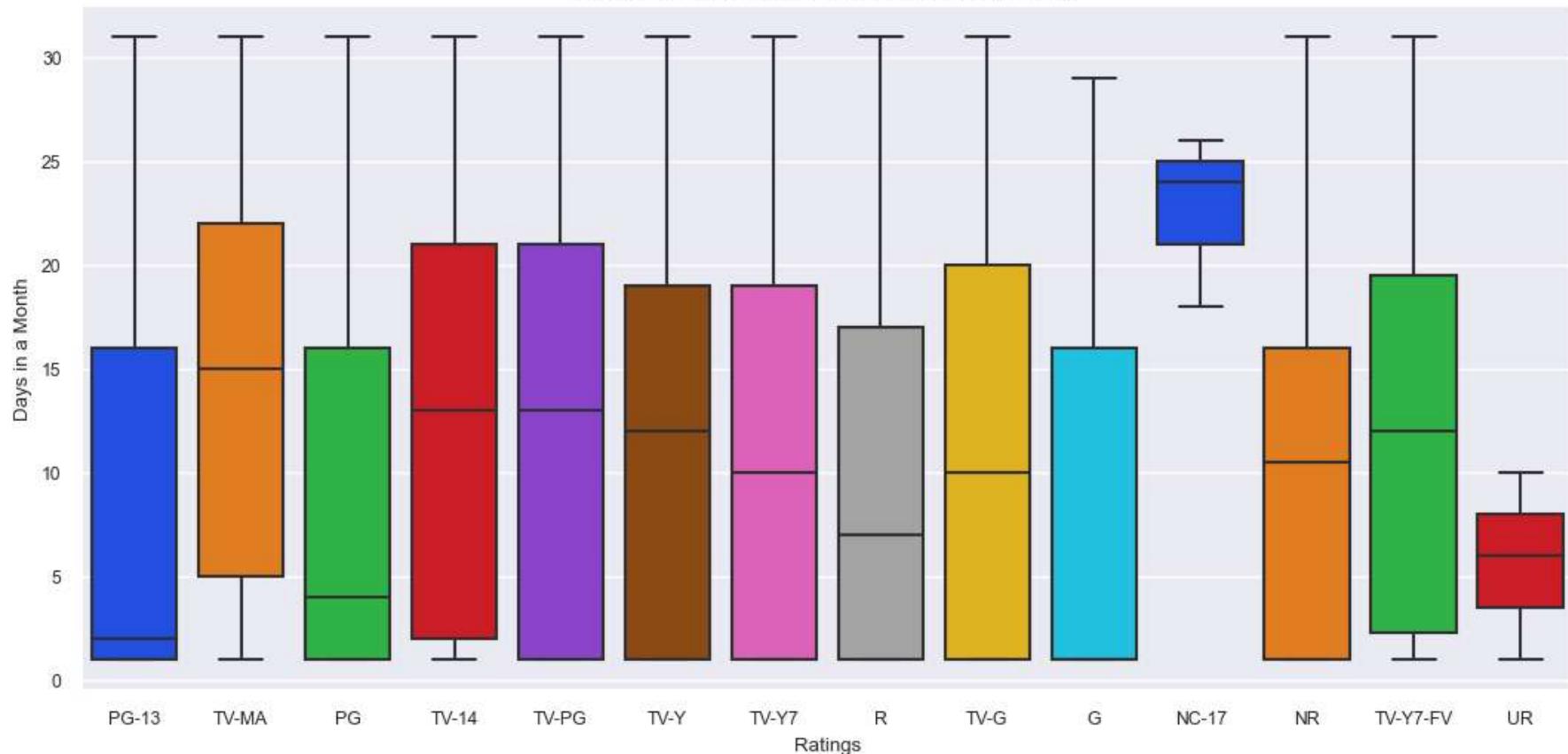
```
1 # First of all, Let's get the top 30 years based on Count of Movies/TV-Shows
2 Release_year = df1['release_year'].value_counts()[0:30].rename_axis('Year').reset_index(name='Counts')
3 sns.set_theme(font_scale=0.8)
4 plt.figure(figsize=(13,6))
5 x = sns.barplot(data = Release_year,x='Year',y='Counts',palette = 'bright')
6 plt.xlabel('Years')
7 plt.ylabel("Count of Movies/TV-Show")
8 plt.title("Overview of Movies/TV-Shows released by year")
9 for container in x.containers:
10     x.bar_label(container)
11 plt.show()
```



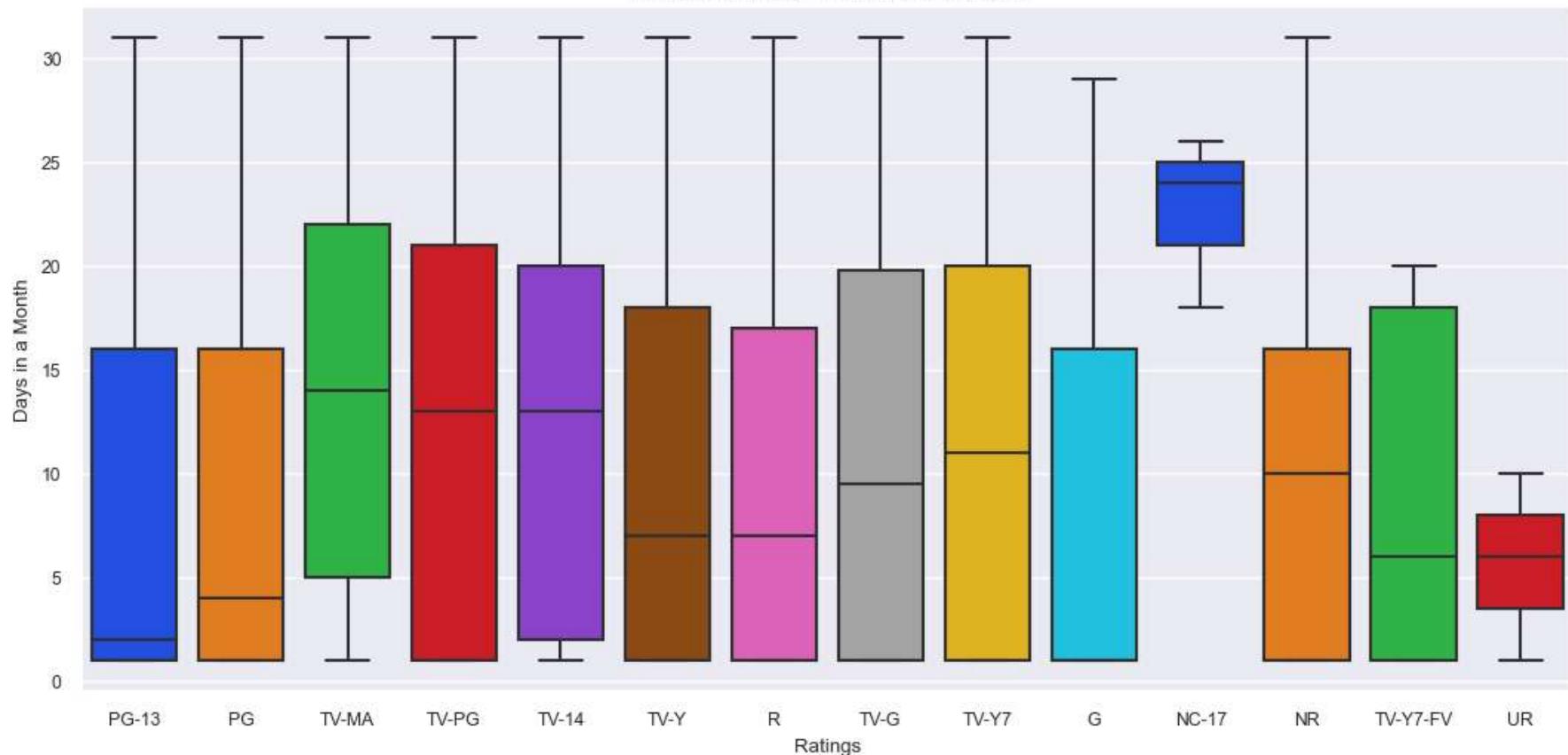
In [72]:

```
1 sns.set_theme(font_scale=0.8)
2 plt.figure(figsize=(13,6))
3 sns.boxplot(data = df1,x='rating',y='day of the month',palette = 'bright')
4 plt.xlabel('Ratings')
5 plt.ylabel("Days in a Month")
6 plt.title("Overview of Movies & TV-Shows by ratings using Boxplot")
7
8
9 sns.set_theme(font_scale=0.8)
10 plt.figure(figsize=(13,6))
11 sns.boxplot(data = df1[df1['Types']=='Movie'],x='rating',y='day of the month',palette = 'bright')
12 plt.xlabel('Ratings')
13 plt.ylabel("Days in a Month")
14 plt.title("Overview of Movies by ratings using Boxplot")
15
16
17 sns.set_theme(font_scale=0.8)
18 plt.figure(figsize=(13,6))
19 sns.boxplot(data = df1[df1['Types']=='TV Show'],x='rating',y='day of the month',palette = 'bright')
20 plt.xlabel('Ratings')
21 plt.ylabel("Days in a Month")
22 plt.title("Overview of TV-Shows by ratings using Boxplot")
23 plt.show()
```

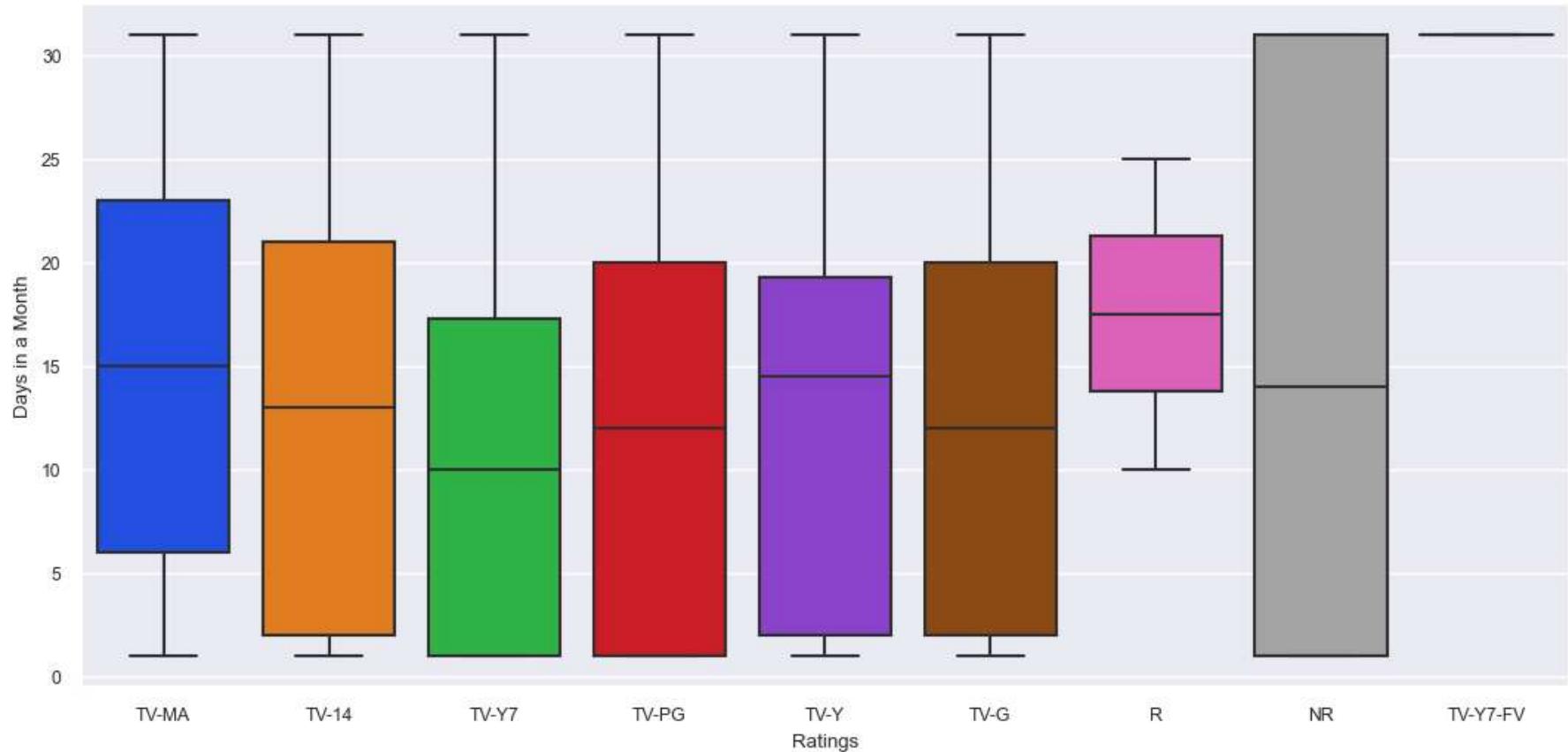
Overview of Movies & TV-Shows by ratings using Boxplot



Overview of Movies by ratings using Boxplot

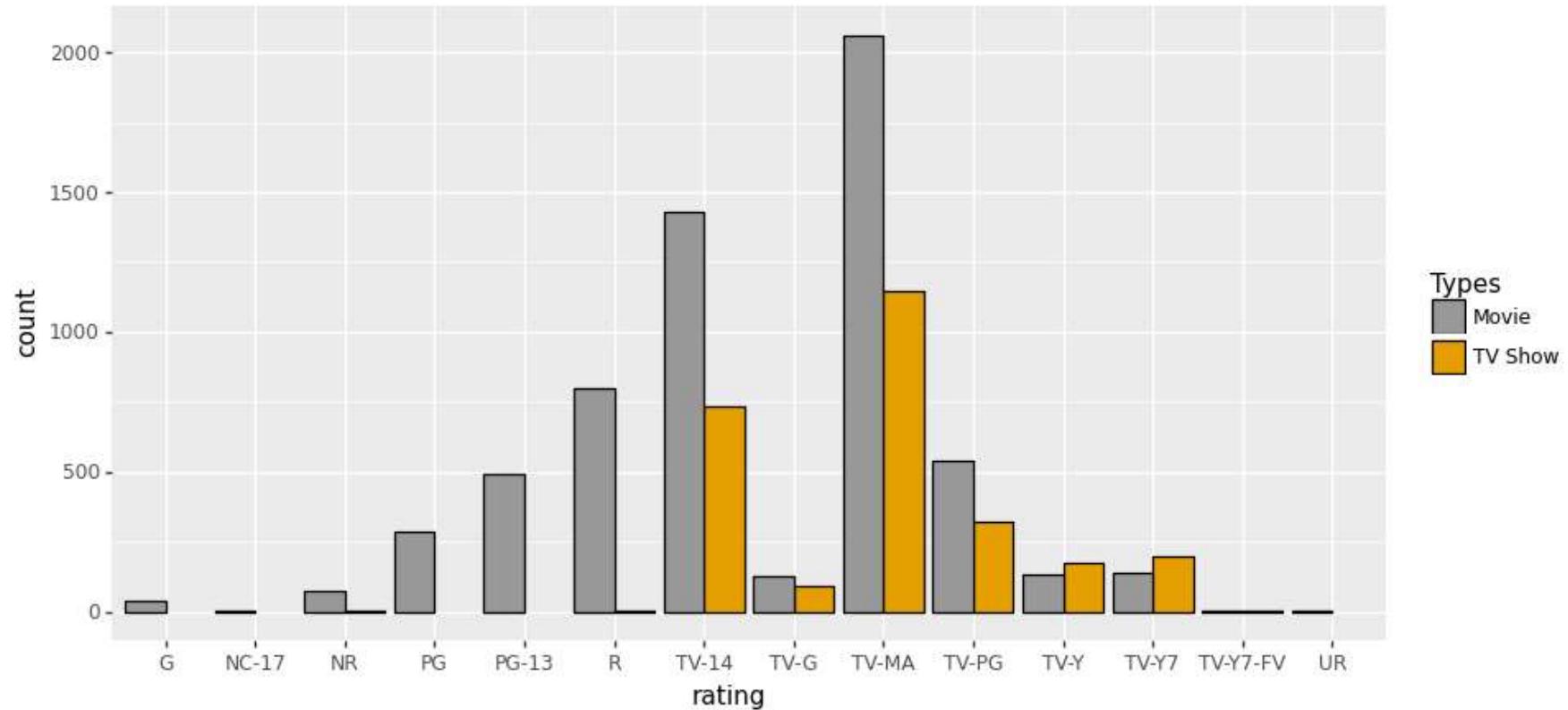


Overview of TV-Shows by ratings using Boxplot



In [82]:

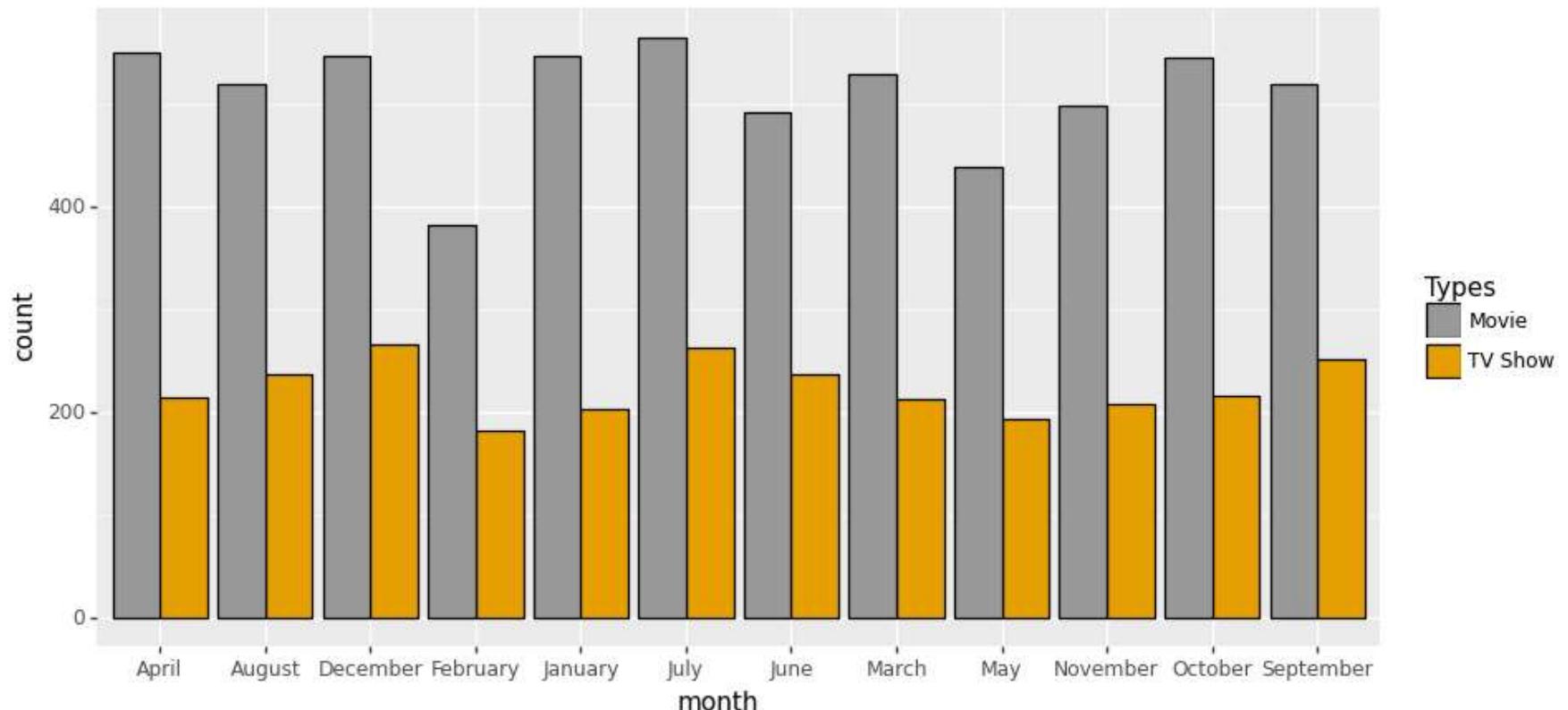
```
1 from plotnine import geom_bar,aes,ggplot,position_dodge,scale_fill_manual,theme
2 (
3     ggplot(df1) +
4         aes(x='rating',fill = 'Types')+
5         geom_bar(color="black",position = position_dodge(preserve = "single"))+
6         scale_fill_manual(values=('#999999','#E69F00'))+
7         theme(figure_size=(10,5))
8 )
```



Out[82]: <ggplot: (159756921079)>

In [83]:

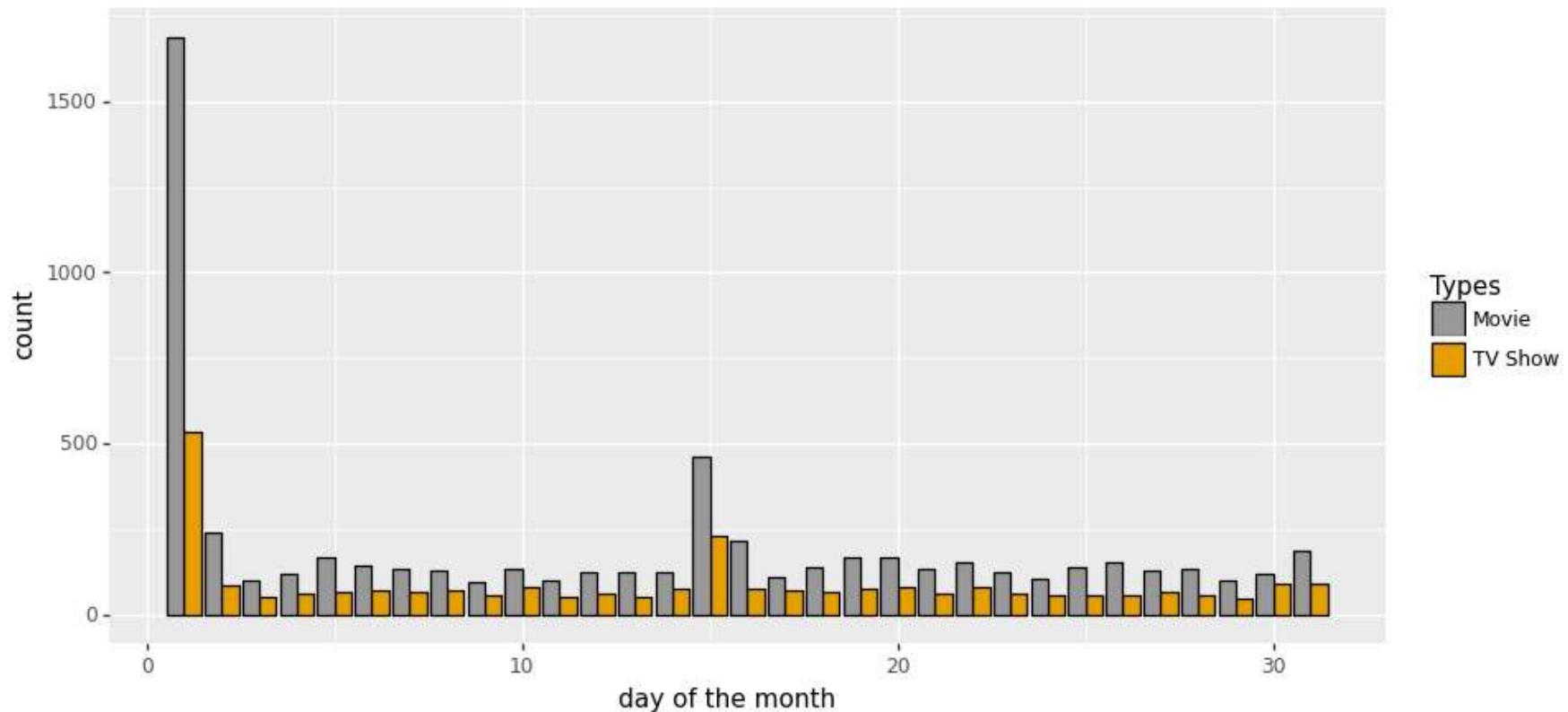
```
1 | (
2 |     ggplot(df1) +
3 |     aes(x='month',fill = 'Types')+
4 |     geom_bar(color="black",position = position_dodge(preserve = "single"))+
5 |     scale_fill_manual(values=('#999999','#E69F00'))+
6 |     theme.figure_size=(10,5))
7 | )
```



Out[83]: <ggplot: (159759252727)>

In [84]:

```
1 (
2     ggplot(df1) +
3         aes(x='day of the month',fill = 'Types')+
4             geom_bar(color="black",stat="count",position = position_dodge(preserve = "single"))+
5             scale_fill_manual(values=('#999999','#E69F00'))+
6             theme.figure_size=(10,5))
7 )
```

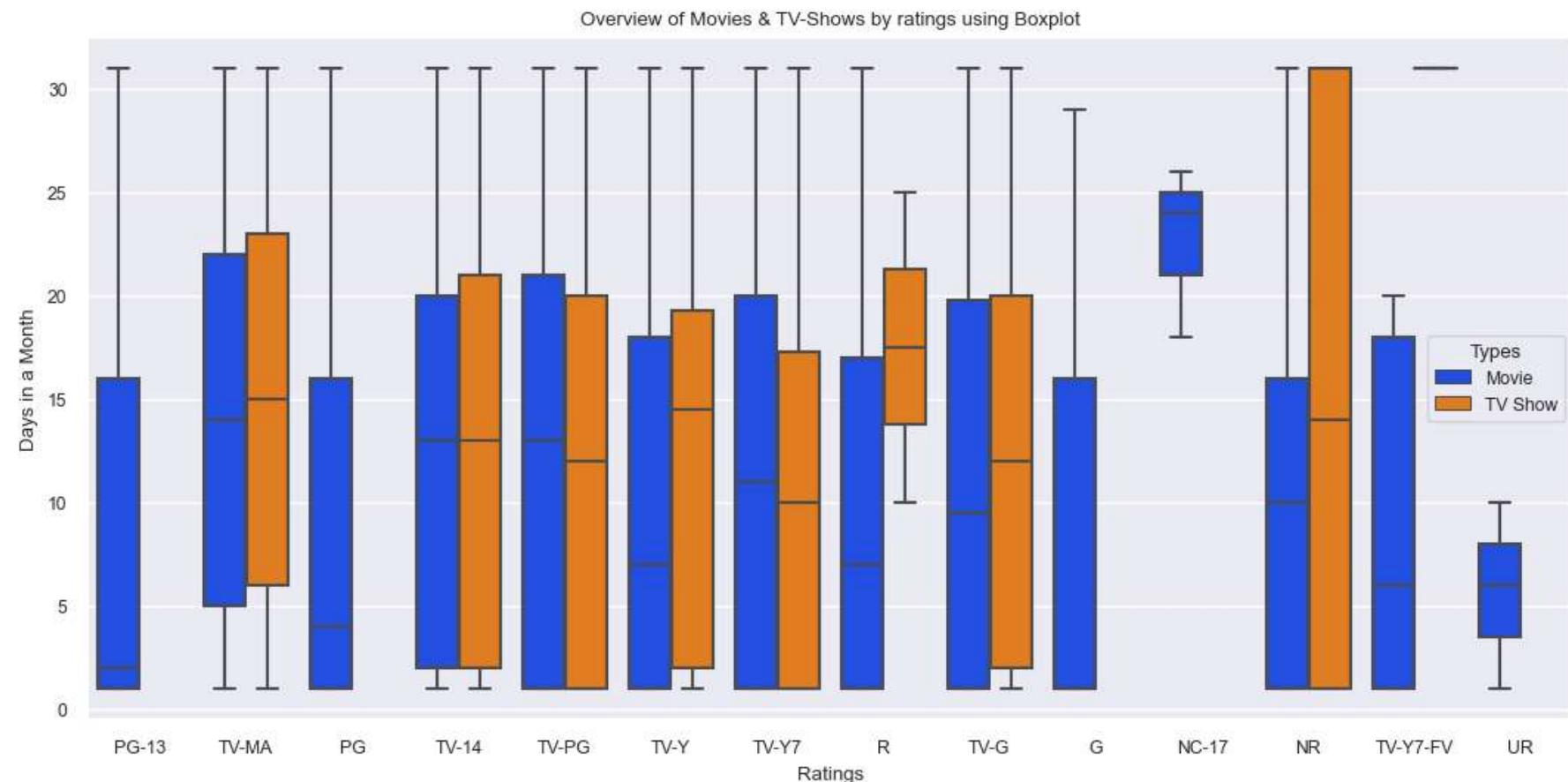


Out[84]: <ggplot: (159759193119)>

10. Multivariate Analysis

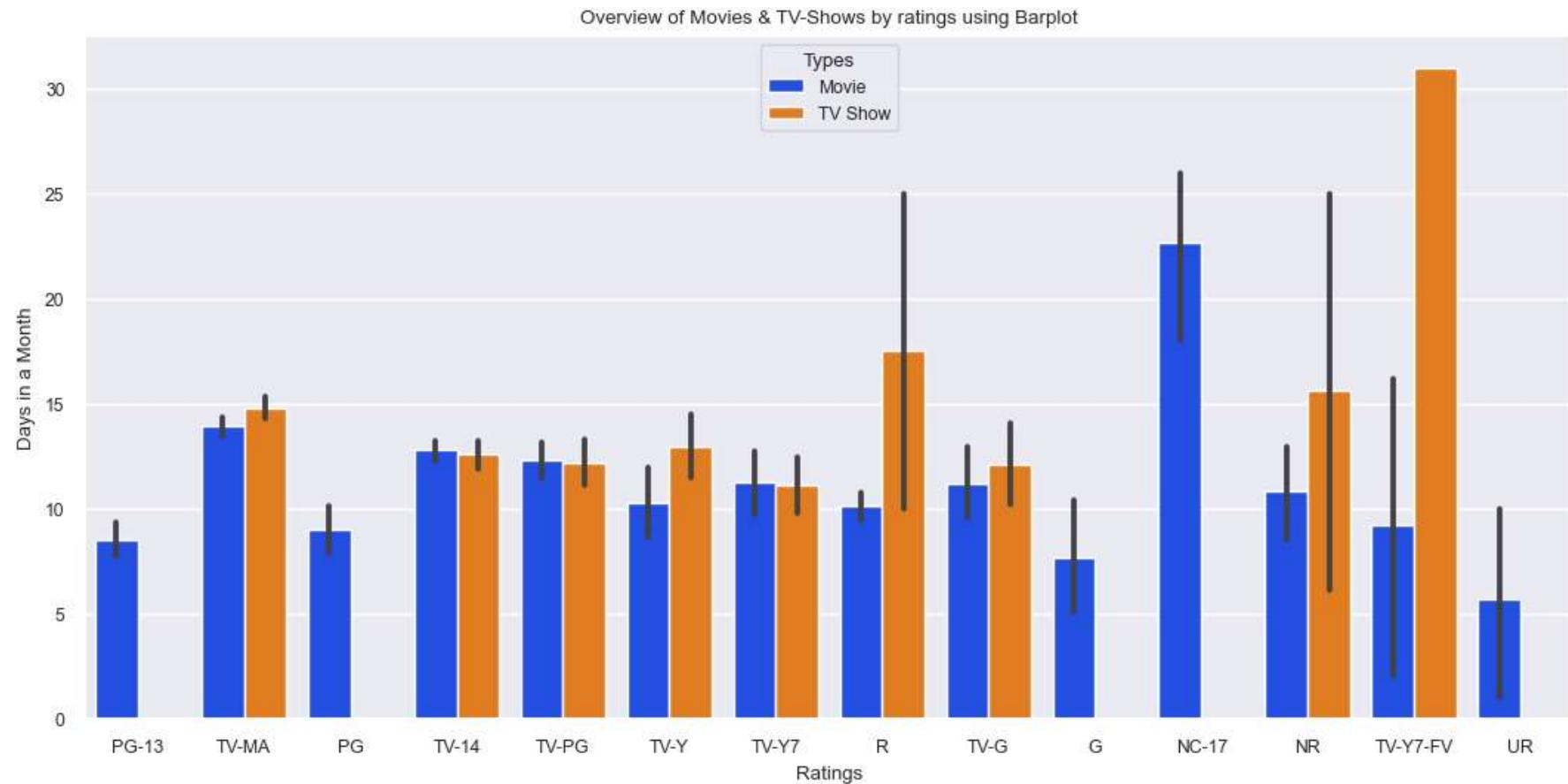
In [87]:

```
1 sns.set_theme(font_scale=0.8)
2 plt.figure(figsize=(13,6))
3 sns.boxplot(data = df1,x='rating',y='day of the month',hue='Types',palette='bright')
4 plt.xlabel('Ratings')
5 plt.ylabel("Days in a Month")
6 plt.title("Overview of Movies & TV-Shows by ratings using Boxplot")
7 plt.show()
```



In [88]:

```
1 sns.set_theme(font_scale=0.8)
2 plt.figure(figsize=(13,6))
3 sns.barplot(data = df1,x='rating',y='day of the month',hue='Types',palette='bright')
4 plt.xlabel('Ratings')
5 plt.ylabel("Days in a Month")
6 plt.title("Overview of Movies & TV-Shows by ratings using Barplot")
7 plt.show()
8
```



So, this project is completed !!!

In []:

1

In []:

1