my-business-casestudy-netflix-1

March 28, 2024

```
[3]: # uploading the python libraries for analysis
     import pandas as pd
     import numpy as np
     import matplotlib.pyplot as plt
     import seaborn as sns
[4]: # read the csv file in colab
     df = pd.read_csv('netflix.csv')
     df.head()
[4]:
       show_id
                                         title
                                                       director \
                   type
                  Movie
                          Dick Johnson Is Dead Kirsten Johnson
     0
            s1
     1
            s2
               TV Show
                                 Blood & Water
                                     Ganglands Julien Leclercq
            s3
               TV Show
            s4 TV Show Jailbirds New Orleans
     3
                                                            NaN
            s5 TV Show
                                  Kota Factory
                                                            NaN
                                                                  country \
                                                      cast
     0
                                                      NaN United States
       Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...
                                                          South Africa
        Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...
     2
     3
                                                      NaN
                                                                      NaN
     4 Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...
                                                                  India
                date_added release_year rating
                                                  duration \
     0 September 25, 2021
                                    2020 PG-13
                                                    90 min
     1 September 24, 2021
                                    2021 TV-MA
                                                 2 Seasons
     2 September 24, 2021
                                    2021 TV-MA
                                                  1 Season
     3 September 24, 2021
                                    2021 TV-MA
                                                  1 Season
     4 September 24, 2021
                                    2021 TV-MA
                                                2 Seasons
                                                listed in \
     0
                                            Documentaries
          International TV Shows, TV Dramas, TV Mysteries
     1
     2
        Crime TV Shows, International TV Shows, TV Act...
     3
                                   Docuseries, Reality TV
      International TV Shows, Romantic TV Shows, TV ...
```

description

- O As her father nears the end of his life, filmm...
- 1 After crossing paths at a party, a Cape Town t...
- 2 To protect his family from a powerful drug lor...
- 3 Feuds, flirtations and toilet talk go down amo ...
- 4 In a city of coaching centers known to train I ...
- [5]: # finding count of rows len(df)
- [5]: 8807
- [6]: # chacking the data types of every columns value df.dtypes
- [6]: show_id object type object title object director object cast object country object date_added object release_year int64 object rating duration object listed in object description object dtype: object
- [7]: # checking the numbers of unique values of every columns in the dataset
 for i in df.columns:
 print(i,':',df[i].nunique())

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

listed_in : 514
description : 8775

```
[8]: # checking the numbers of null values of every columns in our dataset
     df.isnull().sum()
[8]: show_id
                        0
                        0
     type
     title
                        0
     director
                     2634
     cast
                      825
     country
                      831
     date_added
                       10
     release_year
                        0
    rating
                        4
     duration
                        3
    listed_in
                        0
     description
     dtype: int64
[9]: # checking the occarance of each of the ratings
     # in this scenario, I can choose to remove the last 3 vales to make the series_
      →homogeneous
     df['rating'].value_counts()
[9]: TV-MA
                 3207
     TV-14
                 2160
     TV-PG
                  863
                  799
    R
    PG-13
                  490
     TV-Y7
                  334
     TV-Y
                  307
    PG
                  287
    TV-G
                  220
    NR
                   80
                   41
     TV-Y7-FV
                    6
    NC-17
                    3
    UR
                    3
     74 min
                    1
     84 min
                    1
     66 min
                    1
     Name: rating, dtype: int64
    0.1 Unnesting director column
```

[10]: df['director'].apply(lambda x: str(x).split(', '))

```
[10]: 0
               [Kirsten Johnson]
                           [nan]
      2
               [Julien Leclercq]
      3
                           [nan]
      4
                           [nan]
      8802
                 [David Fincher]
      8803
                           [nan]
      8804
               [Ruben Fleischer]
                  [Peter Hewitt]
      8805
      8806
                   [Mozez Singh]
      Name: director, Length: 8807, dtype: object
[11]: ko1 = df['director'].apply(lambda x: str(x).split(', ')).tolist()
      ko1
[11]: [['Kirsten Johnson'],
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['Takashi Shimizu'],
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['Joe Penna'],
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```

```
[12]: df_n1 = pd.DataFrame(ko1, index = df['title'])
      df_n1
[12]:
                                            0
                                                        2
                                                              3
                                                  1
                                                                     4
                                                                           5
                                                                                 6
      title
      Dick Johnson Is Dead
                              Kirsten Johnson
                                                None
                                                      None
                                                            None
                                                                  None
                                                                         None
                                                                               None
      Blood & Water
                                                None
                                                      None
                                                            None
                                                                  None
                                                                         None
                                                                               None
                                          nan
      Ganglands
                              Julien Leclercq
                                                None
                                                      None
                                                            None
                                                                  None
                                                                         None
                                                                               None
      Jailbirds New Orleans
                                                None
                                                      None
                                                            None
                                                                  None
                                                                         None
                                                                               None
                                          nan
      Kota Factory
                                          nan
                                                None
                                                      None
                                                            None
                                                                  None
                                                                         None
                                                                               None
      •••
      Zodiac
                                David Fincher None
                                                      None
                                                            None
                                                                  None
                                                                         None
                                                                               None
      Zombie Dumb
                                          nan None
                                                      None
                                                                  None
                                                                         None
                                                                               None
                                                            None
      Zombieland
                              Ruben Fleischer None
                                                      None
                                                            None
                                                                  None
                                                                         None
                                                                               None
      Zoom
                                 Peter Hewitt None
                                                      None
                                                            None
                                                                  None
                                                                         None
                                                                               None
      Zubaan
                                  Mozez Singh None None
                                                            None
                                                                  None
                                                                         None
                                                                               None
                                7
                                      8
                                             9
                                                   10
                                                         11
                                                               12
      title
      Dick Johnson Is Dead
                              None
                                    None
                                          None
                                                 None
                                                       None
                                                             None
      Blood & Water
                              None
                                    None
                                          None
                                                 None
                                                       None
                                                             None
      Ganglands
                              None
                                    None
                                          None
                                                 None
                                                       None
                                                             None
      Jailbirds New Orleans
                              None
                                    None
                                          None
                                                 None
                                                       None
                                                             None
      Kota Factory
                              None
                                    None
                                          None
                                                 None
                                                       None
                                                             None
      Zodiac
                              None
                                   None None
                                                None
                                                       None
                                                             None
      Zombie Dumb
                              None
                                    None
                                          None
                                                None
                                                       None
                                                             None
      Zombieland
                              None
                                    None
                                          None
                                                 None
                                                       None
                                                             None
      7.00m
                              None
                                    None
                                          None
                                                 None
                                                       None
                                                             None
      Zubaan
                              None None
                                          None
                                                None
                                                       None
                                                             None
      [8807 rows x 13 columns]
[13]: | ## unnesting the directors column, creating separate lines for each director_
       ⇔for a movie
      df_n1 = df_n1.stack()
      df_n1
[13]: title
      Dick Johnson Is Dead
                              0
                                   Kirsten Johnson
      Blood & Water
                              0
                                                nan
      Ganglands
                              0
                                   Julien Leclercq
      Jailbirds New Orleans
                              0
                                                nan
      Kota Factory
                              0
                                                nan
                              0
                                     David Fincher
      Zodiac
                              0
      Zombie Dumb
                                                nan
```

```
Zoom
                              0
                                      Peter Hewitt
      Zubaan
                              0
                                       Mozez Singh
      Length: 9612, dtype: object
[15]: df_n1= pd.DataFrame(df_n1.reset_index())
      df_n1
[15]:
            index
                                    title level 1
                0
                    Dick Johnson Is Dead
                                                  0
                                                     Kirsten Johnson
                1
                            Blood & Water
                                                  0
      1
                                                                  nan
      2
                2
                                Ganglands
                                                     Julien Leclercq
      3
                3
                   Jailbirds New Orleans
                                                  0
                                                                  nan
      4
                4
                             Kota Factory
                                                                  nan
      9607
             9607
                                   Zodiac
                                                       David Fincher
                                                  0
                              Zombie Dumb
      9608
             9608
                                                  0
                                                                  nan
                               Zombieland
      9609
             9609
                                                  0
                                                     Ruben Fleischer
                                     Zoom
                                                        Peter Hewitt
      9610
             9610
                                                  0
      9611
             9611
                                   Zubaan
                                                  0
                                                         Mozez Singh
      [9612 rows x 4 columns]
[16]: df_n1.rename(columns={0:'directors'}, inplace = True)
      df_n1
                                    title level 1
[16]:
            index
                                                           directors
                    Dick Johnson Is Dead
      0
                0
                                                    Kirsten Johnson
                            Blood & Water
                1
                                                  0
      1
                2
                                Ganglands
                                                  0
                                                    Julien Leclercq
      3
                3
                   Jailbirds New Orleans
                                                  0
                                                                  nan
      4
                4
                             Kota Factory
                                                  0
                                                                  nan
      9607
             9607
                                   Zodiac
                                                  0
                                                       David Fincher
                              Zombie Dumb
      9608
             9608
                                                  0
      9609
             9609
                               Zombieland
                                                     Ruben Fleischer
      9610
                                     Zoom
             9610
                                                  0
                                                        Peter Hewitt
      9611
             9611
                                   Zubaan
                                                  0
                                                         Mozez Singh
      [9612 rows x 4 columns]
[17]: df_n1.drop(['level_1'], axis = 1, inplace = True)
      df_n1
[17]:
                                    title
            index
                                                  directors
      0
                0
                    Dick Johnson Is Dead Kirsten Johnson
      1
                1
                            Blood & Water
                                                        nan
```

Ruben Fleischer

0

Zombieland

```
2
          2
                          Ganglands
                                     Julien Leclercq
3
          3 Jailbirds New Orleans
4
          4
                      Kota Factory
                                                  nan
9607
       9607
                             Zodiac
                                       David Fincher
                       Zombie Dumb
9608
       9608
                                                  nan
9609
       9609
                         Zombieland Ruben Fleischer
9610
       9610
                               Zoom
                                        Peter Hewitt
9611
       9611
                             Zubaan
                                         Mozez Singh
```

[9612 rows x 3 columns]

0.2 unnesting cast column

```
[18]: ## unnesting the cast column, creating separate lines for each cast member for a movie ko2=df['cast'].apply(lambda x: str(x).split(', ')).tolist() ko2
```

```
[18]: [['nan'],
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        'Natasha Thahane',
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        'Xolile Tshabalala',
        'Getmore Sithole',
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        'Ryle De Morny',
        'Greteli Fincham',
        'Sello Maake Ka-Ncube',
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        'Samuel Jouy',
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 'Kittipong Khamsat',
 'Arisara Wongchalee',
 'Jaytiya Naiwattanakul',
 'Pantipa Arunwattanachai',
 'Panupan Jantanawong',
 'Kungtap Saelim',
 'Phumphat Chartsuriyakiat',
 'Issara Veranitinunt',
 'Keerati Sivakuae',
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      df_n2.head()
         mousam,
        'Swapnil'],
[19]:
                                          0
                                                           1
                                                                           2
                                                                               \
      t{t¥atsal Dubey',
      Dickulinasenwasibead
                                         nan
                                                         None
                                                                         None
      BloBupa Whimani',
                                  Ama Qamata
                                                  Khosi Ngema
                                                               Gail Mabalane
      GandignasBhardwaj',
                              Sami Bouajila
                                                 Tracy Gotoas
                                                                  Samuel Jouy
      Jaikbieak Wewaorleans
                                                                         None
                                         nan
                                                         None
      KotMoraamory
                                  Mayur More
                                               Jitendra Kumar
                                                                   Ranjan Raj
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                                           3
                                                               4
                                                                                  5
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'Jigna Bhardwaj',

	title										
	Dick Johnson Is Dead		N	one		N	one		N	one	
	Blood & Water	Thaba	ng Mol	aba I	Dillon	Windvo	gel	l Natasha Thahane			
	Ganglands	Nabi	ha Akk	ari	Sofia	Lesaf	fre S	e Salim Kechiouche			
	Jailbirds New Orleans		None None		one	None					
	Kota Factory		Alam Khan Ahsaas Channa			nna	Revathi Pillai				
		6				7 \					
	title										
	Dick Johnson Is Dead		None Arno Greeff Xolile Tsh				None				
	Blood & Water										
	Ganglands	Noure	Noureddine Farihi Geert Van Ram			Rampe	_				
	Jailbirds New Orleans		None Urvi Singh Aru			A T	None n Kumar				
	Kota Factory					Arun r					
				8			9	40	41	42	\
	title			J				10		12	`
	Dick Johnson Is Dead			None		No	ne	None	None	None	
	Blood & Water	Getmo	re Sit	hole	Cindy	Mahlan	.gu	None	None	None	
	Ganglands		y Diom		v		ne	None	None	None	
	Jailbirds New Orleans		•	None		No	ne	None	None	None	
	Kota Factory			None		No	ne	None	None	None	
		43	44	45	46	47	48	49			
	title										
	Dick Johnson Is Dead	None	None	None	None	None	None	None			
	Blood & Water	None	None	None	None	None	None	None			
	Ganglands	None	None	None	None	None	None	None			
	Jailbirds New Orleans	None	None	None	None	None	None	None			
	Kota Factory	None	None	None	None	None	None	None			
	[5 rows x 50 columns]										
	[O 10WS X OO COTUMINS]										
[20]:	<pre>df_n2 = df_n2.stack()</pre>										
	df_n2										
[20]:	title										
	Dick Johnson Is Dead	0			n	an					
	Blood & Water	O Ama Qamata									
		1 Khosi Ngema									
		2 Gail Mabalane 3 Thabang Molaba 3 Manish Chaudhary 4 Meghna Malik 5 Malkeet Rauni 6 Anita Shabdish									
	7										
	Zubaan										
		6 Anita Shabdish									

7 Chittaranjan Tripathy

Length: 64951, dtype: object

```
[21]: df_n2= pd.DataFrame(df_n2.reset_index())
      df_n2
[21]:
                                    level 1
                                                                    0
                             title
      0
             Dick Johnson Is Dead
                                           0
                                                                  nan
                                           0
      1
                     Blood & Water
                                                          Ama Qamata
      2
                     Blood & Water
                                           1
                                                         Khosi Ngema
      3
                                           2
                     Blood & Water
                                                       Gail Mabalane
      4
                     Blood & Water
                                           3
                                                      Thabang Molaba
      64946
                            Zubaan
                                           3
                                                    Manish Chaudhary
      64947
                            Zubaan
                                           4
                                                        Meghna Malik
                                           5
                                                       Malkeet Rauni
      64948
                            Zubaan
                                                      Anita Shabdish
      64949
                            Zubaan
                                           6
      64950
                            Zubaan
                                              Chittaranjan Tripathy
      [64951 rows x 3 columns]
[22]: df_n2.rename(columns={0:'actors'}, inplace= True)
      df_n2
[22]:
                             title
                                    level_1
                                                              actors
      0
             Dick Johnson Is Dead
                                           0
                                                                  nan
                     Blood & Water
                                           0
      1
                                                          Ama Qamata
      2
                     Blood & Water
                                           1
                                                         Khosi Ngema
      3
                     Blood & Water
                                           2
                                                       Gail Mabalane
      4
                     Blood & Water
                                           3
                                                      Thabang Molaba
      64946
                                           3
                                                    Manish Chaudhary
                            Zubaan
      64947
                            Zubaan
                                           4
                                                        Meghna Malik
```

[64951 rows x 3 columns]

64948

64949

64950

```
[23]: df_n2.drop(['level_1'], axis = 1, inplace = True)
df_n2
```

5

6

Malkeet Rauni

Anita Shabdish

Chittaranjan Tripathy

```
[23]: title actors

0 Dick Johnson Is Dead nan

1 Blood & Water Ama Qamata
2 Blood & Water Khosi Ngema
3 Blood & Water Gail Mabalane
```

Zubaan

Zubaan

Zubaan

4	Blood & Water	Thabang Molaba
•••	•••	***
64946	Zubaan	Manish Chaudhary
64947	Zubaan	Meghna Malik
64948	Zubaan	Malkeet Rauni
64949	Zubaan	Anita Shabdish
64950	Zubaan	Chittaranjan Tripathy

[64951 rows x 2 columns]

0.3 unnesting the listed_in

[24]:	df	.head()							
[24]:		show_id	type		title	dir	rector	\	
	0	s1	Movie	Dick Johnson I	s Dead	Kirsten Jo	hnson		
	1	s2	TV Show	Blood &	Water		NaN		
	2	s3	TV Show	Gan	glands	Julien Lec	clercq		
	3	s4	TV Show	Jailbirds New O	rleans		NaN		
	4	s 5	TV Show	Kota F	actory		NaN		
						cast		country	\
	0	NaN United States							
	1	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban South Africa							
	2	_							
	3								
	4	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K India							
		date_added release_year rating duration \							
	0	Septemb	er 25, 20	_ v	•	90 min			
	1	-	er 24, 20						
	2	-	er 24, 20						
	3	-	er 24, 20			1 Season	ı		
	4	Septemb	er 24, 20	21 2021	TV-MA	2 Seasons	3		
	0				Doc	listed_in umentaries	\		
	1	Inter	national '	TV Shows, TV Dra					
	2			International TV	-	•			
	3		,						
	4	Docuseries, Reality TV International TV Shows, Romantic TV Shows, TV							
	0	description As her father nears the end of his life, filmm							
	1	After crossing paths at a party, a Cape Town t							
	2	To protect his family from a powerful drug lor							
	3	_		ns and toilet ta		_			
	3	Feuds,	flirtatio	ns and toilet ta	lk go d	own amo			

4 In a city of coaching centers known to train I...

```
[25]: #unnesting the listed in column, i.e- creating separate lines for each genre in \Box
      ⊶a movie
      ko3 = df['listed_in'].apply(lambda x: str(x).split(', ')).tolist()
      ko3
[25]: [['Documentaries'],
       ['International TV Shows', 'TV Dramas', 'TV Mysteries'],
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       ...]
[26]: # convert to dataframe
      df_n3 = pd.DataFrame(ko3 , index=df['title'])
      df n3
[26]:
                                                     0
                                                                             1 \
      title
      Dick Johnson Is Dead
                                        Documentaries
                                                                          None
      Blood & Water
                               International TV Shows
                                                                     TV Dramas
                                       Crime TV Shows International TV Shows
      Ganglands
      Jailbirds New Orleans
                                           Docuseries
                                                                    Reality TV
      Kota Factory
                               International TV Shows
                                                             Romantic TV Shows
      Zodiac
                                           Cult Movies
                                                                        Dramas
      Zombie Dumb
                                             Kids' TV
                                                               Korean TV Shows
      Zombieland
                                             Comedies
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      Zoom
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      Zubaan
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```

['Dramas', 'Independent Movies', 'International Movies'],

title Dick Johnson Is Dead None Blood & Water TV Mysteries TV Action & Adventure Ganglands Jailbirds New Orleans None TV Comedies Kota Factory Zodiac Thrillers Zombie Dumb TV Comedies Zombieland None Zoom None Zubaan Music & Musicals [8807 rows x 3 columns] [27]: df_n3 = df_n3.stack() df_n3 [27]: title Dick Johnson Is Dead 0 Documentaries Blood & Water International TV Shows TV Dramas 1 2 TV Mysteries Ganglands Crime TV Shows 0 Zoom 0 Children & Family Movies Comedies 1 Zubaan 0 Dramas 1 International Movies Music & Musicals Length: 19323, dtype: object [28]: df_n3= pd.DataFrame(df_n3.reset_index()) df_n3 [28]: title level_1 0 Dick Johnson Is Dead 0 Documentaries Blood & Water 0 International TV Shows 1 2 Blood & Water TV Dramas 1 3 Blood & Water 2 TV Mysteries 4 Crime TV Shows Ganglands 0 19318 Zoom Children & Family Movies Zoom Comedies 19319 1 19320 Zubaan 0 Dramas 19321 Zubaan 1 International Movies

Music & Musicals

2

Zubaan

19322

[19323 rows x 3 columns]

[31]: df.head()

0

1

2

show_id

s1

s2

s3

type

Movie

TV Show

TV Show

[31]:

```
[29]: df_n3.rename(columns={0:'genre'}, inplace = True)
      df_n3
[29]:
                             title
                                    level 1
                                                                  genre
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             Dick Johnson Is Dead
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                     Blood & Water
                                           0
      1
                                                International TV Shows
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                                                               Comedies
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                            Zubaan
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                                                                 Dramas
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                                                  International Movies
                                                       Music & Musicals
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                            Zubaan
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      [19323 rows x 3 columns]
[30]: df_n3.drop(['level_1'], axis= 1, inplace = True)
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[30]:
                             title
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                                                Documentaries
      0
                                       International TV Shows
                     Blood & Water
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      2
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                                                    TV Dramas
                     Blood & Water
      3
                                                 TV Mysteries
      4
                         Ganglands
                                               Crime TV Shows
      19318
                                    Children & Family Movies
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                                                     Comedies
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                                         International Movies
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                            Zubaan
                                             Music & Musicals
      [19323 rows x 2 columns]
     0.4 unnesting country column
```

126

title

Blood & Water

Ganglands

Dick Johnson Is Dead Kirsten Johnson

director

Julien Leclercq

NaN

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4
             s5 TV Show
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                                                            South Africa
         Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...
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                                      2020 PG-13
                                                      90 min
      1 September 24, 2021
                                      2021 TV-MA
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                                                    1 Season
                                      2021 TV-MA
      3 September 24, 2021
                                                    1 Season
      4 September 24, 2021
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      2
        Crime TV Shows, International TV Shows, TV Act...
                                     Docuseries, Reality TV
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      4 International TV Shows, Romantic TV Shows, TV ...
                                                description
      O As her father nears the end of his life, filmm...
      1 After crossing paths at a party, a Cape Town t...
      2 To protect his family from a powerful drug lor...
      3 Feuds, flirtations and toilet talk go down amo...
      4 In a city of coaching centers known to train I...
     0.5 unnesting country column
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s4 TV Show Jailbirds New Orleans

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['United States'],
['nan'],
['United States'],
['nan'],
['United States'],
['United States'],
['United Kingdom', 'France', 'Spain', 'United States'],
['United Kingdom', 'United States'],
['United Kingdom', 'Canada', 'United States'],
['United States'],
['nan'],
['nan'],
['nan'],
['nan'],
['nan'],
['nan'],
['United States', 'Australia'],
['United States'],
['China'],
['United Kingdom'],
```

```
['United States', 'France'],
['United States', 'United Kingdom', 'France'],
['United States'],
['United States', 'Russia'],
['United States', 'United Kingdom', 'New Zealand'],
['United States'],
['United States'],
['United States'],
['Canada'],
['France', 'United States'],
['United States'],
['nan'],
['nan'],
['India'],
['nan'],
['nan'],
['United States', 'United Kingdom'],
['nan'],
['nan'],
['nan'],
['Brazil'],
['nan'],
['Poland'],
['United States'],
['United States'],
['Spain'],
['Turkey'],
['India'],
['India'],
['United States'],
['Turkey'],
['Turkey'],
['Turkey'],
['Turkey'],
['Turkey'],
['Turkey'],
['Turkey'],
['Spain'],
['Turkey'],
['Turkey'],
['Turkey'],
['nan'],
['Thailand'],
['Turkey'],
['Turkey'],
['Egypt'],
['nan'],
```

```
['United States'],
       ['Nigeria'],
       ['Turkey'],
       ['Japan'],
       ['Australia', 'United Kingdom'],
       ['India'],
       ['Germany', 'United States'],
       ...]
[33]: df_n4 = pd.DataFrame(ko4, index = df['title'])
      df n4
                                         0
                                                      2
                                                            3
                                                                         5
[33]:
                                                1
                                                                  4
                                                                               6
                                                                                   \
      title
      Dick Johnson Is Dead
                              United States
                                             None
                                                    None
                                                          None
                                                                None
                                                                     None
                                                                             None
      Blood & Water
                               South Africa
                                             None
                                                    None
                                                                None None
                                                                             None
                                                          None
      Ganglands
                                             None
                                                    None
                                                          None
                                                                None None
                                                                             None
                                        nan
      Jailbirds New Orleans
                                             None
                                                    None
                                                          None
                                                                None
                                                                      None
                                                                             None
                                        nan
      Kota Factory
                                      India
                                                                       None
                                                                             None
                                             None
                                                    None
                                                          None
                                                                None
      Zodiac
                              United States
                                             None
                                                    None
                                                          None None
                                                                      None
                                                                             None
      Zombie Dumb
                                             None
                                                    None
                                                          None
                                                                None
                                                                      None
                                                                             None
                                        nan
      Zombieland
                              United States
                                             None
                                                    None
                                                          None
                                                                None
                                                                      None
                                                                             None
      Zoom
                              United States
                                                    None
                                                          None
                                                                None
                                                                       None
                                                                             None
                                             None
      Zubaan
                                      India
                                             None
                                                    None
                                                          None
                                                                None
                                                                       None
                                                                             None
                                7
                                      8
                                             9
                                                   10
                                                         11
      title
      Dick Johnson Is Dead
                              None
                                    None
                                          None
                                                 None
                                                       None
      Blood & Water
                              None
                                    None
                                          None
                                                 None
                                                       None
                              None
      Ganglands
                                    None
                                          None
                                                 None
                                                       None
      Jailbirds New Orleans
                              None
                                                       None
                                    None
                                          None
                                                 None
      Kota Factory
                              None
                                    None
                                          None
                                                 None
                                                       None
      Zodiac
                              None
                                    None
                                          None
                                                 None
                                                       None
      Zombie Dumb
                              None
                                    None
                                          None
                                                 None
                                                       None
      Zombieland
                              None
                                    None
                                          None
                                                None
                                                       None
      Zoom
                              None
                                    None
                                          None
                                                 None
                                                       None
      Zubaan
                              None None
                                          None
                                                 None
                                                       None
      [8807 rows x 12 columns]
[34]: df_n4 = df_n4.stack()
      df_n4
[34]: title
      Dick Johnson Is Dead
                              0
                                   United States
```

```
Ganglands
                              0
                                              nan
      Jailbirds New Orleans
                                              nan
      Kota Factory
                              0
                                            India
      Zodiac
                              0
                                   United States
      Zombie Dumb
                              0
                                              nan
      Zombieland
                              0
                                   United States
                                   United States
      Zoom
                              0
      Zubaan
                              0
                                            India
      Length: 10845, dtype: object
[35]: df_n4 = pd.DataFrame(df_n4.reset_index())
      df_n4
[35]:
                              title level_1
                                                            0
              Dick Johnson Is Dead
                                              United States
      0
      1
                      Blood & Water
                                            0
                                                South Africa
      2
                          Ganglands
                                            0
                                                         nan
      3
             Jailbirds New Orleans
                                                         nan
      4
                       Kota Factory
                                            0
                                                       India
                              •••
      10840
                             Zodiac
                                            0 United States
      10841
                        Zombie Dumb
                                            0
                                                         nan
      10842
                         Zombieland
                                            0
                                              United States
      10843
                               Zoom
                                               United States
      10844
                                                       India
                             Zubaan
      [10845 rows x 3 columns]
     df_n4.rename(columns= {0:'country'}, inplace = True)
[36]:
[37]: df_n4
[37]:
                              title level 1
                                                     country
              Dick Johnson Is Dead
      0
                                            0 United States
      1
                      Blood & Water
                                            0
                                                South Africa
      2
                          Ganglands
                                            0
                                                         nan
      3
             Jailbirds New Orleans
                                            0
                                                         nan
      4
                       Kota Factory
                                            0
                                                       India
                                               United States
      10840
                             Zodiac
                                            0
      10841
                        Zombie Dumb
                                            0
                                                         nan
      10842
                         Zombieland
                                            0
                                              United States
      10843
                               Zoom
                                              United States
      10844
                             Zubaan
                                            0
                                                       India
```

Blood & Water

0

South Africa

[10845 rows x 3 columns]

[70812 rows x 4 columns]

n2_df

[41]: # merging above merge datta with the unnested genre data

n2_df = n1_df.merge(df_n3, on = 'title')

```
df_n4.drop(['level_1'], axis = 1, inplace = True)
[39]: df_n4
[39]:
                             title
                                           country
              Dick Johnson Is Dead
      0
                                   United States
                     Blood & Water
      1
                                      South Africa
      2
                         Ganglands
      3
             Jailbirds New Orleans
                                               nan
      4
                      Kota Factory
                                             India
                            Zodiac United States
      10840
      10841
                       Zombie Dumb
                                               nan
                        Zombieland United States
      10842
      10843
                              Zoom
                                    United States
      10844
                                             India
                            Zubaan
      [10845 rows x 2 columns]
     0.6 Merging all un-nested columns
[40]: # merging the unnested actor data with the unnested director data
      n1_df = df_n2.merge(df_n1, left_on = 'title', right_on = 'title')
      n1_df
[40]:
                                                   actors index
                                                                         directors
                            title
             Dick Johnson Is Dead
                                                                  Kirsten Johnson
      0
                                                      nan
                    Blood & Water
      1
                                               Ama Qamata
                                                                1
                                                                               nan
      2
                    Blood & Water
                                              Khosi Ngema
                                                               1
                                                                               nan
      3
                    Blood & Water
                                            Gail Mabalane
                                                                1
                                                                               nan
      4
                    Blood & Water
                                           Thabang Molaba
                                                                               nan
      70807
                           Zubaan
                                         Manish Chaudhary
                                                            9611
                                                                       Mozez Singh
      70808
                           Zubaan
                                                            9611
                                                                       Mozez Singh
                                             Meghna Malik
      70809
                           Zubaan
                                            Malkeet Rauni
                                                            9611
                                                                       Mozez Singh
      70810
                           Zubaan
                                           Anita Shabdish
                                                             9611
                                                                       Mozez Singh
      70811
                           Zubaan Chittaranjan Tripathy
                                                                       Mozez Singh
                                                            9611
```

```
[41]:
                              title
                                                              index
                                                                            directors \
                                                      actors
              Dick Johnson Is Dead
      0
                                                         nan
                                                                  0
                                                                     Kirsten Johnson
      1
                      Blood & Water
                                                 Ama Qamata
                                                                  1
                                                                                  nan
      2
                      Blood & Water
                                                 Ama Qamata
                                                                  1
                                                                                  nan
      3
                      Blood & Water
                                                                  1
                                                 Ama Qamata
                                                                                  nan
      4
                      Blood & Water
                                                Khosi Ngema
                                                                                  nan
                                             Anita Shabdish
      161211
                             Zubaan
                                                               9611
                                                                          Mozez Singh
                                                                          Mozez Singh
      161212
                             Zubaan
                                             Anita Shabdish
                                                               9611
      161213
                             Zubaan
                                      Chittaranjan Tripathy
                                                               9611
                                                                          Mozez Singh
                                                                          Mozez Singh
      161214
                             Zubaan
                                      Chittaranjan Tripathy
                                                               9611
      161215
                                      Chittaranjan Tripathy
                                                               9611
                                                                          Mozez Singh
                             Zubaan
                                genre
      0
                        Documentaries
      1
              International TV Shows
      2
                            TV Dramas
      3
                         TV Mysteries
              International TV Shows
      4
      161211
                 International Movies
                     Music & Musicals
      161212
      161213
                               Dramas
                 International Movies
      161214
      161215
                     Music & Musicals
      [161216 rows x 5 columns]
[42]: # merging above data with unnested country data
      new_df = n2_df.merge(df_n4, on = 'title')
      new_df
[42]:
                              title
                                                      actors
                                                              index
                                                                            directors
      0
              Dick Johnson Is Dead
                                                                  0
                                                                      Kirsten Johnson
                                                         nan
      1
                      Blood & Water
                                                 Ama Qamata
                                                                   1
                                                                                  nan
      2
                      Blood & Water
                                                 Ama Qamata
                                                                   1
                                                                                  nan
      3
                      Blood & Water
                                                 Ama Qamata
                                                                   1
                                                                                  nan
      4
                      Blood & Water
                                                Khosi Ngema
                                                                                  nan
                              •••
      201986
                             Zubaan
                                             Anita Shabdish
                                                               9611
                                                                          Mozez Singh
                                                               9611
                                                                          Mozez Singh
      201987
                             Zubaan
                                             Anita Shabdish
      201988
                                      Chittaranjan Tripathy
                                                               9611
                                                                          Mozez Singh
                             Zubaan
      201989
                             Zubaan
                                      Chittaranjan Tripathy
                                                               9611
                                                                          Mozez Singh
                                      Chittaranjan Tripathy
                                                                          Mozez Singh
      201990
                             Zubaan
                                                               9611
                                genre
                                              country
      0
                        Documentaries United States
```

1	International TV Shows	South Africa
2	TV Dramas	South Africa
3	TV Mysteries	South Africa
4	International TV Shows	South Africa
	•••	•••
201986	International Movies	India
201987	Music & Musicals	India
201988	Dramas	India
201989	International Movies	India
201990	Music & Musicals	India

[201991 rows x 6 columns]

0.7 replacing nan values

```
[43]: # replacing nan values of actors with 'unknown actor'
new_df['actors'].replace(['nan'],['unknown actor'], inplace = True)
new_df
```

[43]:		title	actors	index	directors	\
	0	Dick Johnson Is Dead	unknown actor	0	Kirsten Johnson	
	1	Blood & Water	Ama Qamata	1	nan	
	2	Blood & Water	Ama Qamata	1	nan	
	3	Blood & Water	Ama Qamata	1	nan	
	4	Blood & Water	Khosi Ngema	1	nan	
	•••	•••			•••	
	201986	Zubaan	Anita Shabdish	9611	Mozez Singh	
	201987	Zubaan	Anita Shabdish	9611	Mozez Singh	
	201988	Zubaan	Chittaranjan Tripathy	9611	Mozez Singh	
	201989	Zubaan	Chittaranjan Tripathy	9611	Mozez Singh	
	201990	Zubaan	Chittaranjan Tripathy	9611	Mozez Singh	
		genr	ce country			

0	Documentaries	United States
1	International TV Shows	South Africa
2	TV Dramas	South Africa
3	TV Mysteries	South Africa
4	International TV Shows	South Africa
•••	•••	•••
201986	International Movies	India
201987	Music & Musicals	India
201988	Dramas	India
201989	International Movies	India
201990	Music & Musicals	India

[201991 rows x 6 columns]

```
[44]: # replacing nan values of directors with 'unknown actor'
      new_df['directors'].replace(['nan'],['unknown directors'], inplace = True)
      new_df
[44]:
                              title
                                                     actors
                                                             index
                                                                             directors
              Dick Johnson Is Dead
                                             unknown actor
                                                                       Kirsten Johnson
                      Blood & Water
                                                 Ama Qamata
                                                                     unknown directors
      1
      2
                      Blood & Water
                                                 Ama Qamata
                                                                     unknown directors
      3
                      Blood & Water
                                                 Ama Qamata
                                                                    unknown directors
                      Blood & Water
                                                Khosi Ngema
                                                                    unknown directors
      201986
                             Zubaan
                                             Anita Shabdish
                                                              9611
                                                                           Mozez Singh
                                                              9611
                             Zubaan
                                             Anita Shabdish
                                                                           Mozez Singh
      201987
                                     Chittaranjan Tripathy
      201988
                             Zubaan
                                                               9611
                                                                           Mozez Singh
      201989
                             Zubaan
                                     Chittaranjan Tripathy
                                                               9611
                                                                           Mozez Singh
                                                                           Mozez Singh
                                     Chittaranjan Tripathy
                                                               9611
      201990
                             Zubaan
                                              country
                                genre
      0
                        Documentaries
                                       United States
      1
              International TV Shows
                                        South Africa
      2
                            TV Dramas
                                        South Africa
      3
                        TV Mysteries
                                        South Africa
              International TV Shows
                                        South Africa
      201986
                International Movies
                                                India
      201987
                     Music & Musicals
                                                India
                                                India
      201988
                               Dramas
      201989
                International Movies
                                                India
                     Music & Musicals
                                                India
      201990
      [201991 rows x 6 columns]
[45]: new_df['country'].replace(['nan'],[np.nan], inplace =True)
[46]: new_df.head()
[46]:
                        title
                                       actors
                                               index
                                                               directors \
         Dick Johnson Is Dead
                                unknown actor
                                                         Kirsten Johnson
                Blood & Water
      1
                                   Ama Qamata
                                                    1
                                                       unknown directors
      2
                Blood & Water
                                   Ama Qamata
                                                    1
                                                       unknown directors
      3
                Blood & Water
                                   Ama Qamata
                                                       unknown directors
                Blood & Water
                                  Khosi Ngema
                                                       unknown directors
                           genre
                                        country
                  Documentaries
                                  United States
      1
         International TV Shows
                                   South Africa
                       TV Dramas
                                   South Africa
```

```
4 International TV Shows
                                  South Africa
[47]: df.head()
[47]:
        show_id
                                           title
                                                         director
                    type
                           Dick Johnson Is Dead Kirsten Johnson
      0
             s1
                   Movie
                 TV Show
                                  Blood & Water
      1
             s2
      2
                 TV Show
                                       Ganglands
             s3
                                                  Julien Leclercq
      3
             s4
                 TV Show
                          Jailbirds New Orleans
      4
                 TV Show
                                   Kota Factory
                                                              NaN
             s5
                                                       cast
                                                                   country
      0
                                                        NaN
                                                            United States
        Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...
                                                            South Africa
      1
         Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...
      3
                                                        NaN
                                                                       NaN
      4 Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...
                                                                   India
                 date added
                            release_year rating
                                                    duration
         September 25, 2021
                                     2020 PG-13
                                                      90 min
      1 September 24, 2021
                                     2021 TV-MA
                                                   2 Seasons
      2 September 24, 2021
                                     2021 TV-MA
                                                    1 Season
      3 September 24, 2021
                                     2021 TV-MA
                                                    1 Season
      4 September 24, 2021
                                     2021 TV-MA
                                                  2 Seasons
                                                  listed_in \
      0
                                              Documentaries
           International TV Shows, TV Dramas, TV Mysteries
      1
      2
        Crime TV Shows, International TV Shows, TV Act...
                                    Docuseries, Reality TV
      3
       International TV Shows, Romantic TV Shows, TV ...
                                                description
      O As her father nears the end of his life, filmm...
      1 After crossing paths at a party, a Cape Town t...
      2 To protect his family from a powerful drug lor...
      3 Feuds, flirtations and toilet talk go down amo...
      4 In a city of coaching centers known to train I...
     0.8 merging the new data with the original data
[48]: final_df = new_df.
       →merge(df[['show_id','type','title','date_added','release_year','rating',

    duration']], on = 'title', how = 'left')

      final_df
```

South Africa

TV Mysteries

```
[48]:
                              title
                                                             index
                                                                             directors
                                                     actors
      0
              Dick Johnson Is Dead
                                              unknown actor
                                                                  0
                                                                       Kirsten Johnson
                      Blood & Water
                                                                  1 unknown directors
      1
                                                 Ama Qamata
      2
                      Blood & Water
                                                 Ama Qamata
                                                                     unknown directors
                      Blood & Water
                                                                     unknown directors
      3
                                                 Ama Qamata
                      Blood & Water
                                                Khosi Ngema
                                                                  1 unknown directors
      4
      201986
                             Zubaan
                                             Anita Shabdish
                                                              9611
                                                                           Mozez Singh
                                                              9611
      201987
                             Zubaan
                                             Anita Shabdish
                                                                           Mozez Singh
      201988
                             Zubaan
                                     Chittaranjan Tripathy
                                                               9611
                                                                           Mozez Singh
      201989
                                     Chittaranjan Tripathy
                                                               9611
                                                                           Mozez Singh
                             Zubaan
                                     Chittaranjan Tripathy
                                                                           Mozez Singh
      201990
                             Zubaan
                                                               9611
                                genre
                                              country show_id
                                                                   type \
      0
                        Documentaries
                                       United States
                                                           s1
                                                                  Movie
      1
              International TV Shows
                                        South Africa
                                                           s2
                                                               TV Show
      2
                            TV Dramas
                                        South Africa
                                                           s2
                                                               TV Show
                                                           s2
      3
                         TV Mysteries
                                        South Africa
                                                               TV Show
      4
              International TV Shows
                                        South Africa
                                                           s2
                                                               TV Show
      201986
                International Movies
                                                India
                                                        s8807
                                                                  Movie
                     Music & Musicals
                                                India
                                                                  Movie
      201987
                                                        s8807
      201988
                               Dramas
                                                India
                                                        s8807
                                                                  Movie
                International Movies
      201989
                                                India
                                                        s8807
                                                                  Movie
      201990
                    Music & Musicals
                                                India
                                                        s8807
                                                                  Movie
                                  release_year rating
                       date_added
                                                          duration
      0
              September 25, 2021
                                            2020
                                                PG-13
                                                            90 min
              September 24, 2021
      1
                                            2021
                                                  TV-MA
                                                         2 Seasons
      2
              September 24, 2021
                                            2021
                                                 TV-MA
                                                         2 Seasons
      3
              September 24, 2021
                                            2021
                                                 TV-MA
                                                         2 Seasons
      4
              September 24, 2021
                                            2021
                                                 TV-MA
                                                         2 Seasons
                   March 2, 2019
                                            2015
                                                 TV-14
                                                           111 min
      201986
                   March 2, 2019
                                                           111 min
      201987
                                            2015
                                                 TV-14
                   March 2, 2019
      201988
                                            2015
                                                 TV-14
                                                           111 min
                   March 2, 2019
                                                           111 min
      201989
                                            2015
                                                 TV-14
      201990
                   March 2, 2019
                                            2015
                                                 TV-14
                                                           111 min
      [201991 rows x 12 columns]
[49]: # now checking the null of the final data
      final_df.isnull().sum()
```

156

[49]: title

actors index

0

0

```
directors
                     0
                      0
genre
country
                 11897
show_id
                      0
type
date_added
                    158
release_year
                     0
rating
                    67
duration
                      3
dtype: int64
```

In duration column, we can't expect ratings to be in min. So the duration column nulls are replaced by corresponding values in ratings column

```
[50]: final_df.loc[final_df['duration'].isnull(), 'duration']
[50]: 126537
                NaN
      131603
                NaN
      131737
                NaN
      Name: duration, dtype: object
[51]: final_df.loc[final_df['duration'].isnull(), 'duration'].

→fillna(final_df['rating'])
                74 min
[51]: 126537
                84 min
      131603
      131737
                66 min
      Name: duration, dtype: object
[52]: final df.loc[final df['duration'].isnull(), 'duration'] = final df.
       →loc[final_df['duration'].isnull(), 'duration'].fillna(final_df['rating'])
[53]: #Ratings can't be in min, so it has been made NR
      final_df.loc[final_df['rating'].str.contains('min', na=False), 'rating'] = 'NR'
[54]: final_df['rating'].fillna('NR', inplace = True)
[55]: final_df['rating'].isnull().sum()
[55]: 0
[56]: # checking if there are any nan value in the whole final data set
      final df.isnull().sum()
[56]: title
                          0
      actors
                          0
      index
                          0
```

```
0
      genre
      country
                      11897
      show_id
                          0
                          0
      type
      date_added
                        158
      release_year
                         0
      rating
                          0
      duration
                          0
      dtype: int64
[57]: #checking nulls in date_added column
      final df[final df['date added'].isnull()].head()
[57]:
                                                                             index \
                                                    title
                                                                     actors
      136893 A Young Doctor's Notebook and Other Stories Daniel Radcliffe
                                                                              6559
      136894 A Young Doctor's Notebook and Other Stories Daniel Radcliffe
                                                                              6559
      136895 A Young Doctor's Notebook and Other Stories Daniel Radcliffe
                                                                              6559
      136896 A Young Doctor's Notebook and Other Stories
                                                                   Jon Hamm
                                                                              6559
      136897 A Young Doctor's Notebook and Other Stories
                                                                   Jon Hamm
                                                                              6559
                                                          country show id
                      directors
                                                                              type \
                                           genre
      136893 unknown directors British TV Shows United Kingdom
                                                                    s6067
                                                                          TV Show
      136894 unknown directors
                                     TV Comedies United Kingdom
                                                                    s6067
                                                                          TV Show
      136895 unknown directors
                                        TV Dramas United Kingdom
                                                                    s6067
                                                                           TV Show
      136896 unknown directors British TV Shows United Kingdom
                                                                    s6067
                                                                           TV Show
             unknown directors
                                      TV Comedies United Kingdom
      136897
                                                                    s6067
                                                                          TV Show
            date_added release_year rating
                                               duration
      136893
                   NaN
                                 2013 TV-MA
                                             2 Seasons
      136894
                    NaN
                                2013 TV-MA 2 Seasons
                   NaN
                                 2013 TV-MA 2 Seasons
      136895
                                 2013 TV-MA 2 Seasons
      136896
                   NaN
      136897
                   NaN
                                 2013 TV-MA 2 Seasons
[58]: # this code fills in missing values in the 'date_added' column based on the
       →mode(most friquent value) value of 'date_added' for each unique_
       → 'release_year'
      for i in final_df[final_df['date_added'].isnull()]['release_year'].unique():
        a = final_df[final_df['release_year']==i]['date_added'].mode().values[0]
        final_df.loc[final_df['release_year']==i,'date_added']=final_df.

¬loc[final_df['release_year']==i,'date_added'].fillna(a)

[59]:
```

directors

0

```
for each unique 'directors' value where 'country' is null, filling missing ⊔
       ⇔values in 'country'
      based on the mode value of 'country' for each unique 'directors
      for i in final_df[final_df['country'].isnull()]['directors'].unique():
        if i in final df[~final df['country'].isnull()]['directors'].unique():
          imp=final_df[final_df['directors']==i]['country'].mode().values[0]
          final df.loc[final df['directors']==i,'country']=final df.
       ⇔loc[final_df['directors']==i,'country'].fillna(imp)
[60]: # checking if there are any nan value in the whole final data set
      final_df.isnull().sum()
[60]: title
                         0
      actors
                         0
      index
                         0
      directors
      genre
     country
                      4276
     show_id
                         0
      type
                         0
      date_added
      release_year
                         0
      rating
      duration
      dtype: int64
[61]: '''
      for each unique 'Actors' value where 'country' is null,
      filling missing values in 'country' based on the mode(most frequint value)_{\sqcup}
       ⇒value of 'country' for each unique 'Actors'
      for i in final_df[final_df['country'].isnull()]['actors'].unique():
        if i in final df[~final df['country'].isnull()]['actors'].unique():
          imp=final_df[final_df['actors']==i]['country'].mode().values[0]
          final df.loc[final df['actors']==i,'country']=final df.
       ⇔loc[final_df['actors']==i,'country'].fillna(imp)
[62]: #If there are still nulls, I just replace it by Unknown Country
      final df['country'].fillna('unknown country',inplace=True)
[63]: final_df.isnull().sum()
[63]: title
                      0
                      0
      actors
      index
                      0
      directors
                      0
```

```
country
      show_id
      type
      date_added
                       0
      release_year
                       0
      rating
                       0
                       0
      duration
      dtype: int64
[64]: final df.head()
[64]:
                         title
                                                                directors \
                                        actors
                                                index
         Dick Johnson Is Dead
                                unknown actor
                                                         Kirsten Johnson
      1
                Blood & Water
                                   Ama Qamata
                                                    1
                                                       unknown directors
                                   Ama Qamata
                                                       unknown directors
      2
                Blood & Water
                                                    1
      3
                Blood & Water
                                   Ama Qamata
                                                       unknown directors
      4
                Blood & Water
                                  Khosi Ngema
                                                       unknown directors
                                         country show_id
                                                             type
                                                                            date_added \
                           genre
      0
                  Documentaries
                                  United States
                                                            Movie
                                                                    September 25, 2021
                                                      s1
         International TV Shows
                                   South Africa
                                                      s2
                                                          TV Show
                                                                    September 24, 2021
      1
      2
                       TV Dramas
                                   South Africa
                                                      s2
                                                          TV Show
                                                                    September 24, 2021
      3
                                                                    September 24, 2021
                   TV Mysteries
                                   South Africa
                                                          TV Show
                                                      s2
         International TV Shows
                                   South Africa
                                                      s2
                                                          TV Show
                                                                    September 24, 2021
                                duration
         release_year rating
      0
                 2020 PG-13
                                  90 min
                 2021
                       TV-MA
                               2 Seasons
      1
      2
                 2021
                       TV-MA
                               2 Seasons
      3
                 2021 TV-MA
                               2 Seasons
                 2021 TV-MA 2 Seasons
[65]: final_df['duration'].value_counts()
[65]: 1 Season
                   35035
      2 Seasons
                     9559
      3 Seasons
                     5084
      94 min
                     4343
      106 min
                     4040
      3 min
                        4
      5 min
                        3
      11 min
                        2
                        2
      8 min
      9 min
                        2
      Name: duration, Length: 220, dtype: int64
```

genre

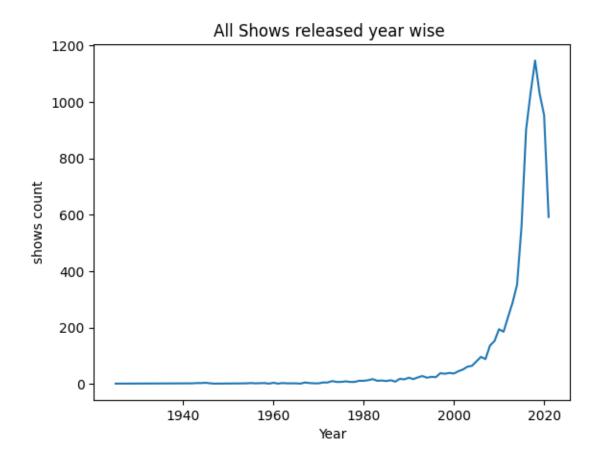
0

```
[66]: #removing mins from data
      final_df['duration'].str.replace(' min','')
[66]: 0
                       90
      1
                2 Seasons
      2
                2 Seasons
      3
                2 Seasons
      4
                2 Seasons
      201986
                      111
      201987
                      111
      201988
                      111
      201989
                      111
      201990
                      111
      Name: duration, Length: 201991, dtype: object
[67]: | final_df['duration'] = final_df['duration'].str.replace(' min','')
      final_df['duration'].unique()
[68]: array(['90', '2 Seasons', '1 Season', '91', '125', '9 Seasons', '104',
             '127', '4 Seasons', '67', '94', '5 Seasons', '161', '61', '166'
             '147', '103', '97', '106', '111', '3 Seasons', '110', '105', '96',
             '124', '116', '98', '23', '115', '122', '99', '88', '100',
             '6 Seasons', '102', '93', '95', '85', '83', '113', '13', '182',
             '48', '145', '87', '92', '80', '117', '128', '119', '143', '114',
             '118', '108', '63', '121', '142', '154', '120', '82', '109', '101',
             '86', '229', '76', '89', '156', '112', '107', '129', '135', '136',
             '165', '150', '133', '70', '84', '140', '78', '7 Seasons', '64',
             '59', '139', '69', '148', '189', '141', '130', '138', '81', '132',
             '10 Seasons', '123', '65', '68', '66', '62', '74', '131', '39',
             '46', '38', '8 Seasons', '17 Seasons', '126', '155', '159', '137',
             '12', '273', '36', '34', '77', '60', '49', '58', '72', '204',
             '212', '25', '73', '29', '47', '32', '35', '71', '149', '33', '15',
             '54', '224', '162', '37', '75', '79', '55', '158', '164', '173',
             '181', '185', '21', '24', '51', '151', '42', '22', '134', '177',
             '13 Seasons', '52', '14', '53', '8', '57', '28', '50', '9', '26',
             '45', '171', '27', '44', '146', '20', '157', '17', '203', '41',
             '30', '194', '15 Seasons', '233', '237', '230', '195', '253',
             '152', '190', '160', '208', '180', '144', '5', '174', '170', '192',
             '209', '187', '172', '16', '186', '11', '193', '176', '56', '169',
             '40', '10', '3', '168', '312', '153', '214', '31', '163', '19',
             '12 Seasons', '179', '11 Seasons', '43', '200', '196', '167',
             '178', '228', '18', '205', '201', '191'], dtype=object)
[69]: final_df['copy_duration'] = final_df['duration'].copy()
```

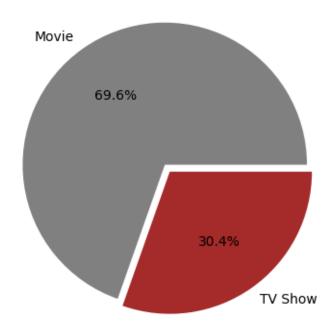
```
[70]: ## copping the final data set
      final_df2 = final_df.copy()
[71]: final_df2.head()
[71]:
                         title
                                       actors
                                               index
                                                               directors \
         Dick Johnson Is Dead
                                                         Kirsten Johnson
                               unknown actor
      1
                Blood & Water
                                   Ama Qamata
                                                    1
                                                       unknown directors
      2
                Blood & Water
                                   Ama Qamata
                                                       unknown directors
                                                    1
      3
                Blood & Water
                                   Ama Qamata
                                                       unknown directors
      4
                Blood & Water
                                  Khosi Ngema
                                                       unknown directors
                           genre
                                        country show_id
                                                             type
                                                                            date_added \
      0
                  Documentaries
                                  United States
                                                                   September 25, 2021
                                                      s1
                                                            Movie
      1
         International TV Shows
                                   South Africa
                                                      s2
                                                          TV Show
                                                                   September 24, 2021
      2
                      TV Dramas
                                   South Africa
                                                          TV Show
                                                                   September 24, 2021
                                                      s2
      3
                   TV Mysteries
                                   South Africa
                                                                   September 24, 2021
                                                          TV Show
                                                      s2
         International TV Shows
                                   South Africa
                                                      s2
                                                          TV Show
                                                                   September 24, 2021
         release_year rating
                                duration copy_duration
      0
                 2020 PG-13
                                      90
                 2021 TV-MA
                               2 Seasons
                                             2 Seasons
      1
      2
                 2021 TV-MA
                               2 Seasons
                                             2 Seasons
      3
                 2021 TV-MA
                               2 Seasons
                                             2 Seasons
      4
                 2021 TV-MA 2 Seasons
                                             2 Seasons
[72]: final_df2.loc[final_df2['copy_duration'].str.

contains('Season'), 'copy_duration']=0
[73]: final_df2['copy_duration']=final_df2['copy_duration'].astype('int')
[74]: final_df2.head()
[74]:
                         title
                                                               directors \
                                       actors
                                               index
         Dick Johnson Is Dead
                                unknown actor
                                                         Kirsten Johnson
      1
                Blood & Water
                                   Ama Qamata
                                                    1
                                                       unknown directors
      2
                Blood & Water
                                   Ama Qamata
                                                       unknown directors
                                                    1
                Blood & Water
                                                       unknown directors
      3
                                   Ama Qamata
                                                    1
      4
                Blood & Water
                                  Khosi Ngema
                                                       unknown directors
                                        country show_id
                                                                            date_added \
                           genre
                                                             type
                  Documentaries
      0
                                  United States
                                                      s1
                                                            Movie
                                                                   September 25, 2021
      1
         International TV Shows
                                   South Africa
                                                      s2
                                                          TV Show
                                                                   September 24, 2021
      2
                      TV Dramas
                                   South Africa
                                                      s2
                                                          TV Show
                                                                   September 24, 2021
      3
                                                                   September 24, 2021
                   TV Mysteries
                                   South Africa
                                                          TV Show
                                                      s2
         International TV Shows
                                   South Africa
                                                         TV Show
                                                                   September 24, 2021
                                                      s2
```

```
release_year rating
                                duration
                                           copy_duration
       0
                  2020 PG-13
                                       90
                                                      90
                  2021 TV-MA
                                                       0
       1
                               2 Seasons
       2
                  2021 TV-MA
                               2 Seasons
                                                       0
       3
                  2021 TV-MA 2 Seasons
                                                       0
                  2021 TV-MA 2 Seasons
                                                       0
[75]: final_df2['copy_duration'].describe()
[75]: count
                201991.000000
                    77.152789
      mean
       std
                    52.269154
      min
                     0.000000
       25%
                     0.000000
       50%
                    95.000000
       75%
                   112.000000
                   312.000000
       max
       Name: copy_duration, dtype: float64
[76]: #number of distinct titles on the basis of year
       df_year=final_df2.groupby(['release_year']).agg({"title":"nunique"}).
        →reset_index()
       df_year
[76]:
           release_year title
       0
                   1925
                              1
                   1942
                              2
       1
       2
                   1943
                             3
                   1944
       3
                              3
       4
                   1945
                             4
                          1032
       69
                   2017
       70
                   2018
                          1147
       71
                          1030
                   2019
       72
                   2020
                           953
       73
                   2021
                           592
       [74 rows x 2 columns]
[174]: sns.lineplot(data=df_year, x='release_year', y='title')
       plt.title('All Shows released year wise ')
       plt.ylabel("shows count")
       plt.xlabel("Year")
       plt.show()
```



above graph represents that between 2015 to 2020 maximum number of shows were released This shows that games started being highly popular in the last decades, maybe could point to increased usage of internet worldwide! and started decreasing in 2020, covid might be the reason



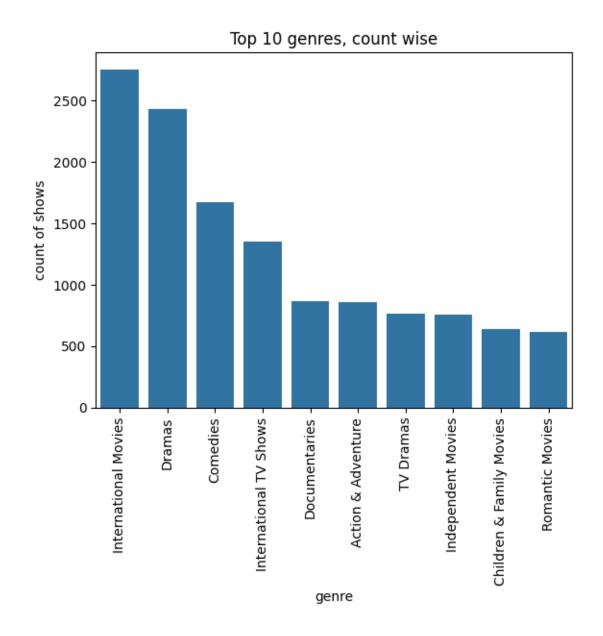
we have almost 70:30 ration of Movies and TV shows

	we have almost 70:30 fation of blovies and 1 v shows										
[81]:	fi	nal_df2.head()									
[81]:		title	ac	ctors	index		dir	ectors \			
	0	Dick Johnson Is Dead	unknown a	actor	0		Kirsten J	ohnson			
	1	Blood & Water	Ama Qa	amata	1	un	known dir	ectors			
	2	Blood & Water	Ama Qa	amata	1	un	known dir	ectors			
	3	Blood & Water	Ama Qa	amata	1	un	known dir	ectors			
	4	Blood & Water	Khosi N	Ngema	1	un	known dir	ectors			
		genre	(country	show_	_id	type	da	ate_a	dded	\
	0	Documentaries	United	States	}	s1	Movie	September	25,	2021	
	1	International TV Shows	South	Africa	L	s2	TV Show	September	24,	2021	
	2	TV Dramas	South	Africa	L	s2	TV Show	September	24,	2021	
	3	TV Mysteries	South	Africa	L	s2	TV Show	September	24,	2021	
	4	International TV Shows	South	Africa	L	s2	TV Show	September	24,	2021	
		release_year rating	duration	copy_	durati	ion					
	0	2020 PG-13	90			90					
	1	2021 TV-MA 2	Seasons			0					
	2	2021 TV-MA 2	Seasons			0					
	3	2021 TV-MA 2	Seasons			0					
	4	2021 TV-MA 2	Seasons			0					

```
[86]:
                           genre title
     0
            International Movies
                                   2752
     1
                          Dramas
                                   2427
     2
                        Comedies
                                  1674
     3
          International TV Shows
                                  1351
                   Documentaries
     4
                                   869
     5
              Action & Adventure
                                   859
     6
                       TV Dramas
                                    763
     7
              Independent Movies
                                    756
     8 Children & Family Movies
                                    641
                 Romantic Movies
                                    616
```

these are the top 10 genres that have the maximum muvies and tv showes.

```
[95]: sns.barplot(data=genre_data, x = 'genre', y = 'title')
  plt.xticks(rotation= 90)
  plt.ylabel('count of shows')
  plt.title('Top 10 genres, count wise')
  plt.show()
```



[96]:	: final_df2.head()									
[96]:			tit	le	actors	index	dire	ctors	\	
	0	Dick	Johnson Is De	ad unknow	n actor	0	Kirsten Jo	hnson		
	1		Blood & Wat	er Ama	Qamata	1	unknown dire	ctors		
	2		Blood & Wat	er Ama	Qamata	1	unknown dire	ctors		
	3		Blood & Wat	er Ama	Qamata	1	unknown dire	ctors		
	4		Blood & Wat	er Khos	i Ngema	1	unknown dire	ctors		
			ď	enre	country	ghou :	id type		date_added	\
	0		Bocumenta		ed States	_	V 2	Septeml	ber 25, 2021	`

```
International TV Shows
                                  South Africa
                                                    s2 TV Show
                                                                 September 24, 2021
      1
                                  South Africa
                                                                 September 24, 2021
      2
                      TV Dramas
                                                       TV Show
                                                    s2
      3
                   TV Mysteries
                                  South Africa
                                                    s2
                                                       TV Show
                                                                 September 24, 2021
         International TV Shows
                                  South Africa
                                                    s2
                                                       TV Show
                                                                 September 24, 2021
         release_year rating
                               duration
                                         copy_duration
      0
                 2020 PG-13
                                     90
                 2021 TV-MA
                                                     0
      1
                              2 Seasons
      2
                 2021 TV-MA
                              2 Seasons
                                                     0
      3
                 2021 TV-MA
                              2 Seasons
                                                     0
      4
                 2021 TV-MA 2 Seasons
                                                     0
[98]: bins 1 = [-1, 1, 50, 80, 100, 120, 150, 200, 315]
      labels_1 =_
       final_df2['copy_duration'] = pd.

cut(final_df2['copy_duration'],bins=bins_1,labels=labels_1)

      final df2.head()
[98]:
                        title
                                      actors
                                              index
                                                             directors
         Dick Johnson Is Dead unknown actor
                                                       Kirsten Johnson
      1
                Blood & Water
                                  Ama Qamata
                                                  1
                                                     unknown directors
      2
                Blood & Water
                                  Ama Qamata
                                                     unknown directors
                                                  1
                Blood & Water
                                  Ama Qamata
                                                    unknown directors
      3
                                                  1
      4
                Blood & Water
                                 Khosi Ngema
                                                    unknown directors
                                       country show_id
                                                                        date_added \
                          genre
                                                           type
                                                                 September 25, 2021
      0
                                 United States
                  Documentaries
                                                    s1
                                                          Movie
      1
         International TV Shows
                                  South Africa
                                                    s2
                                                       TV Show
                                                                 September 24, 2021
      2
                      TV Dramas
                                  South Africa
                                                    s2
                                                       TV Show
                                                                 September 24, 2021
                                  South Africa
                                                       TV Show
                                                                 September 24, 2021
      3
                   TV Mysteries
                                                    s2
         International TV Shows
                                  South Africa
                                                    s2
                                                       TV Show
                                                                 September 24, 2021
         release_year rating
                               duration copy_duration
      0
                 2020 PG-13
                                     90
                                               80-100
      1
                 2021 TV-MA
                              2 Seasons
                                                   <1
                 2021 TV-MA
                              2 Seasons
                                                   <1
      3
                 2021 TV-MA
                              2 Seasons
                                                   <1
                 2021 TV-MA 2 Seasons
      4
                                                   <1
[99]: final df2.loc[~final df2['duration'].str.
        ocontains('Season'), 'duration']=final_df2.loc[~final_df2['duration'].str.

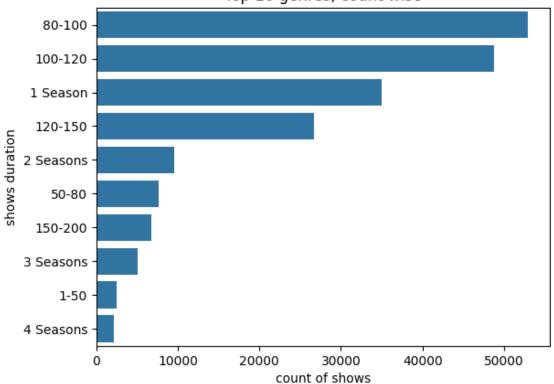
¬contains('Season'), 'copy_duration']
[100]: final_df2.drop(['copy_duration'],axis=1,inplace=True)
      final_df2.head()
```

```
[100]:
                          title
                                                 index
                                                                 directors \
                                         actors
       0
          Dick Johnson Is Dead
                                 unknown actor
                                                      0
                                                           Kirsten Johnson
       1
                 Blood & Water
                                     Ama Qamata
                                                      1
                                                         unknown directors
       2
                 Blood & Water
                                     Ama Qamata
                                                      1
                                                         unknown directors
       3
                 Blood & Water
                                                         unknown directors
                                     Ama Qamata
                 Blood & Water
                                    Khosi Ngema
                                                         unknown directors
                            genre
                                          country show_id
                                                               type
                                                                              date_added \
                                                                      September 25, 2021
       0
                    Documentaries
                                   United States
                                                              Movie
                                                        s1
       1
          International TV Shows
                                     South Africa
                                                        s2
                                                            TV Show
                                                                      September 24, 2021
       2
                        TV Dramas
                                     South Africa
                                                                      September 24, 2021
                                                        s2
                                                            TV Show
       3
                     TV Mysteries
                                     South Africa
                                                            TV Show
                                                                      September 24, 2021
                                                        s2
                                                                      September 24, 2021
          International TV Shows
                                     South Africa
                                                            TV Show
                                                        s2
          release_year rating
                                 duration
       0
                   2020 PG-13
                                    80-100
       1
                   2021
                         TV-MA
                                2 Seasons
       2
                   2021
                        TV-MA
                                2 Seasons
                        TV-MA
       3
                   2021
                                2 Seasons
       4
                   2021
                        TV-MA
                                2 Seasons
      final_df2['duration'].value_counts()
[105]: 80-100
                      52937
       100-120
                      48724
       1 Season
                      35035
       120-150
                      26691
       2 Seasons
                       9559
       50-80
                       7700
       150-200
                       6737
       3 Seasons
                       5084
       1-50
                       2530
       4 Seasons
                       2134
       5 Seasons
                       1698
       7 Seasons
                        843
       6 Seasons
                        633
       200-315
                        524
       8 Seasons
                        286
       9 Seasons
                        257
       10 Seasons
                        220
       13 Seasons
                        132
       12 Seasons
                        111
       15 Seasons
                         96
       17 Seasons
                         30
       11 Seasons
                         30
       Name: duration, dtype: int64
```

netfix has maximum movies, duration 80 to 120 mins

```
[107]: a = final_df2['duration'].value_counts().reset_index()[:10]
    sns.barplot(data=a, x = 'duration', y = 'index')
    plt.ylabel('shows duration')
    plt.xlabel('count of shows')
    plt.show()
```

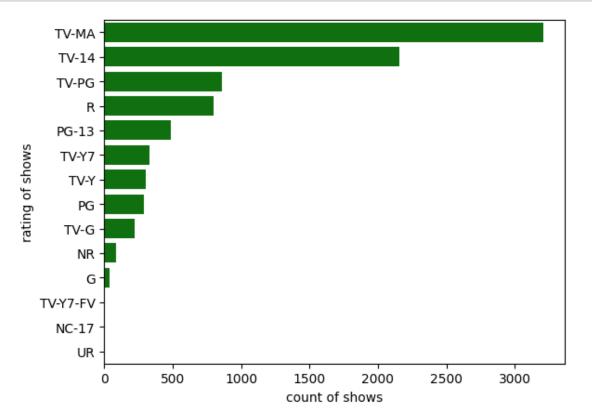
Top 10 genres, count wise



```
[111]:
              rating title
       0
               TV-MA
                        3207
       1
               TV-14
                        2160
       2
               TV-PG
                        863
       3
                        799
                   R
       4
               PG-13
                         490
       5
               TV-Y7
                         334
       6
                TV-Y
                         307
```

```
7
            PG
                   287
8
         TV-G
                   220
9
            NR
                    87
10
                    41
11
    TV-Y7-FV
                     6
12
        NC-17
                     3
13
           UR
                     3
```

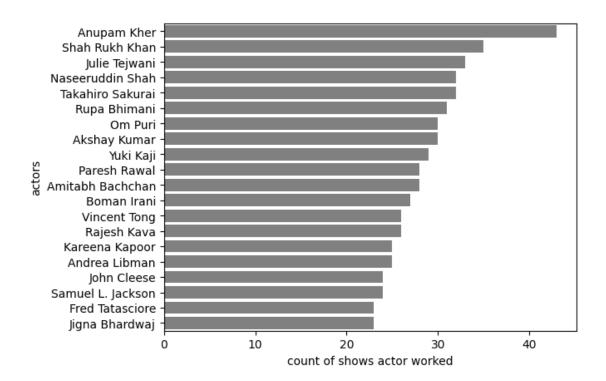
```
[113]: sns.barplot(data=b, x = 'title', y = 'rating', color='green')
  plt.ylabel('rating of shows')
  plt.xlabel('count of shows')
  plt.show()
```



above chart shows that maximum contants of netfilx are for mature adult, under 14, R rated

```
[115]: final_df2.head(2)
[115]:
                         title
                                        actors
                                                index
                                                                directors \
          Dick Johnson Is Dead
                                                         Kirsten Johnson
       0
                                 unknown actor
                 Blood & Water
                                                       unknown directors
                                    Ama Qamata
                                                    1
                           genre
                                         country show_id
                                                              type
                                                                            date_added \
```

```
0
                  Documentaries United States
                                                          Movie
                                                                 September 25, 2021
                                                    s1
       1 International TV Shows
                                  South Africa
                                                        TV Show
                                                                 September 24, 2021
                                                    s2
         release_year rating
                               duration
       0
                 2020 PG-13
                                 80-100
                 2021 TV-MA
                             2 Seasons
       1
[121]: #number of distinct titles on the basis of Actors
       c = final_df2.groupby(['actors']).agg({"title":"nunique"}).sort_values(by =__
       С
[121]:
                     actors
                            title
       1
                Anupam Kher
                                43
       2
             Shah Rukh Khan
                                35
       3
               Julie Tejwani
                                33
           Naseeruddin Shah
       4
                                32
       5
           Takahiro Sakurai
                                32
       6
               Rupa Bhimani
                                31
       7
                    Om Puri
                                30
       8
               Akshay Kumar
                                30
       9
                                29
                  Yuki Kaji
       10
               Paresh Rawal
                                28
           Amitabh Bachchan
       11
                                28
       12
                Boman Irani
                                27
       13
               Vincent Tong
                                26
                Rajesh Kava
       14
                                26
       15
             Kareena Kapoor
                                25
       16
              Andrea Libman
                                25
                 John Cleese
       17
                                24
          Samuel L. Jackson
       18
                                24
            Fred Tatasciore
       19
                                23
       20
              Jigna Bhardwaj
                                23
[122]: | sns.barplot(data=c, x = 'title', y = 'actors', color='gray')
       plt.xlabel('count of shows actor worked')
       plt.show()
```

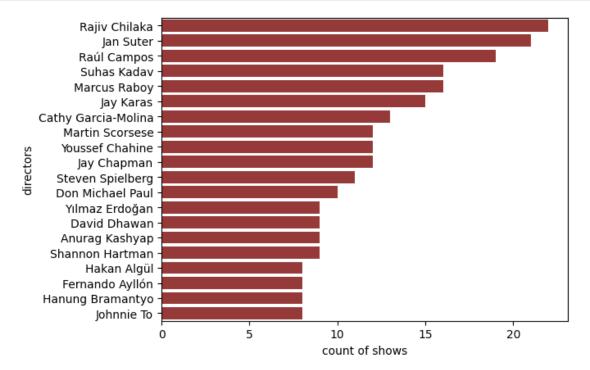


above chart shows that the Anupom kher, Shah Rukh Khan have worked on maximum numbers of shows in netflix

```
[126]:
                       directors
                                  title
       1
                  Rajiv Chilaka
                                      22
       2
                       Jan Suter
                                      21
       3
                    Raúl Campos
                                      19
       4
                    Suhas Kadav
                                      16
       5
                   Marcus Raboy
                                      16
       6
                       Jay Karas
                                      15
       7
           Cathy Garcia-Molina
                                      13
                Martin Scorsese
                                      12
       8
       9
                Youssef Chahine
                                      12
       10
                    Jay Chapman
                                      12
       11
               Steven Spielberg
                                      11
       12
               Don Michael Paul
                                      10
       13
                 Yılmaz Erdoğan
                                       9
       14
                                       9
                   David Dhawan
       15
                 Anurag Kashyap
                                       9
```

```
16 Shannon Hartman 9
17 Hakan Algül 8
18 Fernando Ayllón 8
19 Hanung Bramantyo 8
20 Johnnie To 8
```

```
[128]: sns.barplot(data=d, x = 'title', y = 'directors', color='brown')
plt.xlabel('count of shows')
plt.show()
```

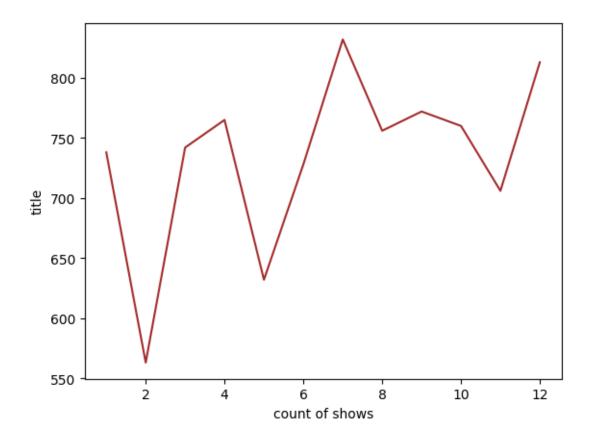


Rajiv Chilaka, jan Suter, Raul Campos have the highest number of shows on netflix that they have directed

```
[129]:
      final_df2.head()
[129]:
                          title
                                         actors
                                                 index
                                                                 directors
       0
          Dick Johnson Is Dead
                                 unknown actor
                                                     0
                                                          Kirsten Johnson
       1
                 Blood & Water
                                    Ama Qamata
                                                     1
                                                        unknown directors
       2
                 Blood & Water
                                                        unknown directors
                                    Ama Qamata
       3
                 Blood & Water
                                    Ama Qamata
                                                        unknown directors
       4
                 Blood & Water
                                   Khosi Ngema
                                                        unknown directors
                                                                             date_added \
                                          country show_id
                            genre
                                                               type
       0
                   Documentaries
                                   United States
                                                              Movie
                                                                     September 25, 2021
                                                       s1
          International TV Shows
                                    South Africa
                                                                     September 24, 2021
                                                       s2
                                                            TV Show
```

```
2
                       TV Dramas
                                   South Africa
                                                      s2 TV Show
                                                                   September 24, 2021
       3
                    TV Mysteries
                                   South Africa
                                                          TV Show
                                                                   September 24, 2021
                                                      s2
         International TV Shows
                                   South Africa
                                                          TV Show
                                                                   September 24, 2021
          release_year rating
                                duration
       0
                  2020 PG-13
                                  80-100
                  2021 TV-MA
       1
                               2 Seasons
       2
                  2021 TV-MA
                               2 Seasons
       3
                               2 Seasons
                  2021 TV-MA
                  2021 TV-MA
                              2 Seasons
[132]: from datetime import datetime
       from dateutil.parser import parse
       arr=[]
       for i in final df2['date added'].values:
         dt1=parse(i)
         arr.append(dt1.strftime('%Y-%m-%d'))
       final_df2['Modified_date'] =arr
       final_df2['Modified_date']=pd.to_datetime(final_df2['Modified_date'])
       final_df2['month_added']=final_df2['Modified_date'].dt.month
       final_df2['week_Added']=final_df2['Modified_date'].dt.week
       final_df2['year']=final_df2['Modified_date'].dt.year
       final_df2.head()
      <ipython-input-132-8a65afda21b0>:10: FutureWarning: Series.dt.weekofyear and
      Series.dt.week have been deprecated. Please use Series.dt.isocalendar().week
      instead.
        final_df2['week_Added']=final_df2['Modified_date'].dt.week
[132]:
                                                               directors \
                         title
                                        actors
                                               index
         Dick Johnson Is Dead
                               unknown actor
                                                    0
                                                         Kirsten Johnson
       1
                 Blood & Water
                                   Ama Qamata
                                                    1
                                                       unknown directors
       2
                                                       unknown directors
                 Blood & Water
                                   Ama Qamata
                                                    1
       3
                                                       unknown directors
                 Blood & Water
                                   Ama Qamata
                 Blood & Water
                                  Khosi Ngema
                                                      unknown directors
                           genre
                                        country show_id
                                                             type
                                                                           date_added \
       0
                   Documentaries
                                  United States
                                                                   September 25, 2021
                                                      s1
                                                            Movie
       1
          International TV Shows
                                   South Africa
                                                      s2
                                                         TV Show
                                                                   September 24, 2021
       2
                                   South Africa
                                                                   September 24, 2021
                       TV Dramas
                                                      s2
                                                          TV Show
       3
                    TV Mysteries
                                   South Africa
                                                      s2
                                                          TV Show
                                                                   September 24, 2021
          International TV Shows
                                   South Africa
                                                      s2
                                                          TV Show
                                                                   September 24, 2021
                                duration Modified_Added_date
          release_year rating
                                                              month_added \
                                  80-100
       0
                  2020 PG-13
                                                   2021-09-25
                  2021 TV-MA
                              2 Seasons
                                                   2021-09-24
                                                                         9
       1
       2
                  2021 TV-MA 2 Seasons
                                                   2021-09-24
                                                                         9
```

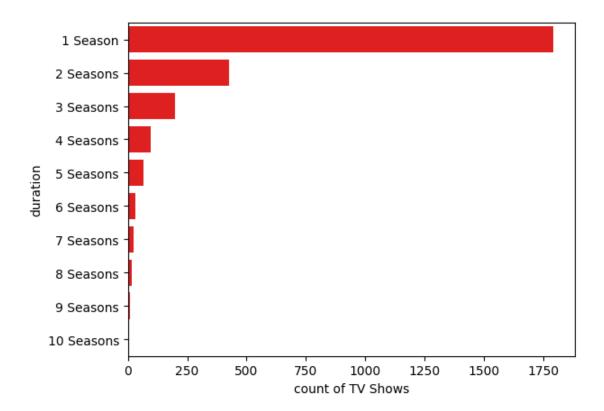
```
2021 TV-MA 2 Seasons
                                                  2021-09-24
       3
                                                                         9
       4
                  2021 TV-MA 2 Seasons
                                                   2021-09-24
                                                                         9
          week_Added year Modified_date
       0
                  38
                     2021
                              2021-09-25
                              2021-09-24
                  38 2021
       1
       2
                  38 2021
                              2021-09-24
       3
                  38 2021
                              2021-09-24
       4
                  38 2021
                              2021-09-24
[139]: #number of unique shows on the basis of week
       e = final_df2.groupby(['month_added']).agg({"title":"nunique"}).reset_index()
[139]:
           month_added title
                     1
                          738
       1
                     2
                          563
       2
                     3
                          742
       3
                     4
                          765
       4
                     5
                          632
       5
                     6
                          728
                     7
       6
                          832
       7
                     8
                          756
                          772
       8
                     9
       9
                    10
                          760
                          706
       10
                    11
                          813
       11
                    12
[141]: sns.lineplot(data=e, x = 'month_added', y = 'title', color='brown')
       plt.xlabel('count of shows')
       plt.show()
```



above chart shows that the most shows are added in july month , and 1st and last months of the year, contents are being added to the netflix

```
[155]: tv_df = final_df2.loc[final_df2['type']=='TV Show']
       tv_df.head()
[155]:
                  title
                               actors
                                       index
                                                       directors
       1 Blood & Water
                           Ama Qamata
                                              unknown directors
                                            1
         Blood & Water
                           Ama Qamata
                                           1
                                              unknown directors
       3 Blood & Water
                           Ama Qamata
                                              unknown directors
                                           1
          Blood & Water
                         Khosi Ngema
                                              unknown directors
                                           1
          Blood & Water
                         Khosi Ngema
                                            1
                                              unknown directors
                                                                            date_added \
                            genre
                                        country show_id
                                                             type
                                   South Africa
                                                                    September 24, 2021
       1
          International TV Shows
                                                      s2
                                                          TV Show
       2
                        TV Dramas
                                   South Africa
                                                      s2
                                                          TV Show
                                                                    September 24, 2021
       3
                    TV Mysteries
                                   South Africa
                                                      s2
                                                          TV Show
                                                                    September 24, 2021
       4
          International TV Shows
                                   South Africa
                                                      s2
                                                          TV Show
                                                                    September 24, 2021
       5
                        TV Dramas
                                   South Africa
                                                                    September 24, 2021
                                                          TV Show
                                                      s2
          release_year rating
                                 duration Modified_Added_date month_added \
```

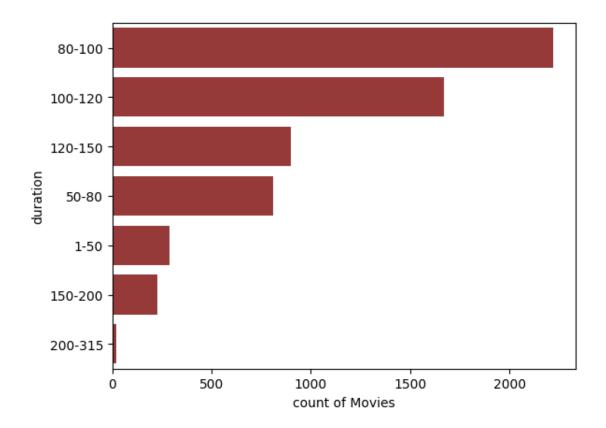
```
2021 TV-MA 2 Seasons
       1
                                                  2021-09-24
                                                                         9
       2
                  2021 TV-MA 2 Seasons
                                                  2021-09-24
                                                                         9
       3
                              2 Seasons
                                                                         9
                  2021 TV-MA
                                                  2021-09-24
                                                                         9
       4
                  2021 TV-MA 2 Seasons
                                                  2021-09-24
       5
                  2021 TV-MA 2 Seasons
                                                  2021-09-24
                                                                         9
          week_Added year Modified_date
                  38 2021
                              2021-09-24
       1
       2
                  38 2021
                              2021-09-24
       3
                  38 2021
                              2021-09-24
                              2021-09-24
       4
                  38 2021
       5
                  38 2021
                              2021-09-24
[156]: f =tv_df.groupby(['duration']).agg({"title":"nunique"}).reset_index().
       ⇔sort_values(by=['title'],ascending=False)[:10]
       f
[156]:
             duration title
            1 Season
                        1793
       0
       7
            2 Seasons
                         425
            3 Seasons
       8
                         199
       9
            4 Seasons
                          95
       10
           5 Seasons
                          65
            6 Seasons
                          33
       11
       12
            7 Seasons
                          23
       13
           8 Seasons
                          17
       14
            9 Seasons
                           9
       1
           10 Seasons
                           7
[157]: sns.barplot(data=f, x = 'title', y = 'duration', color='red')
       plt.xlabel('count of TV Shows')
       plt.show()
```



it shows that as the number of seasons become 2 of TV shows, count of shows decreases significantly

```
[159]: movie_df = final_df2.loc[final_df2['type']=='Movie']
       movie_df.head()
[159]:
                                       title
                                                                index
                                                       actors
                        Dick Johnson Is Dead
                                                unknown actor
                                                                    0
            My Little Pony: A New Generation Vanessa Hudgens
                                                                    6
            My Little Pony: A New Generation Vanessa Hudgens
                                                                    7
            My Little Pony: A New Generation
                                                 Kimiko Glenn
                                                                    6
       162 My Little Pony: A New Generation
                                                 Kimiko Glenn
                  directors
                                                              country show_id
                                                genre
                                                                                type \
       0
            Kirsten Johnson
                                        Documentaries
                                                       United States
                                                                           s1
                                                                               Movie
       159
              Robert Cullen Children & Family Movies
                                                       United States
                                                                               Movie
                                                                           s7
       160
             José Luis Ucha Children & Family Movies
                                                       United States
                                                                               Movie
       161
              Robert Cullen
                             Children & Family Movies
                                                       United States
                                                                           s7
                                                                               Movie
             José Luis Ucha Children & Family Movies
       162
                                                       United States
                                                                               Movie
                                                                           s7
                    date_added release_year rating duration Modified_Added_date
       0
            September 25, 2021
                                        2020 PG-13
                                                       80-100
                                                                       2021-09-25
            September 24, 2021
       159
                                        2021
                                                 PG
                                                       80-100
                                                                       2021-09-24
            September 24, 2021
       160
                                        2021
                                                 PG
                                                      80-100
                                                                       2021-09-24
```

```
161 September 24, 2021
                                       2021
                                                     80-100
                                                PG
                                                                     2021-09-24
       162 September 24, 2021
                                       2021
                                                PG
                                                     80-100
                                                                     2021-09-24
           month_added week_Added year Modified_date
       0
                                38
                                    2021
                                            2021-09-25
       159
                     9
                                38 2021
                                            2021-09-24
       160
                                38 2021
                     9
                                            2021-09-24
       161
                     9
                                38 2021
                                            2021-09-24
       162
                     9
                                38 2021
                                            2021-09-24
[167]: g = movie_df.groupby(['duration']).agg({'title':'nunique'}).
        sort_values(by='title', ascending=False).reset_index()
       g
[167]:
        duration title
          80-100
                   2222
       1 100-120
                  1672
       2 120-150
                   897
       3
           50-80
                   808
       4
            1-50
                    287
       5 150-200
                    226
       6 200-315
                    19
[168]: sns.barplot(data=g, x = 'title', y = 'duration', color='brown')
       plt.xlabel('count of Movies')
       plt.show()
```

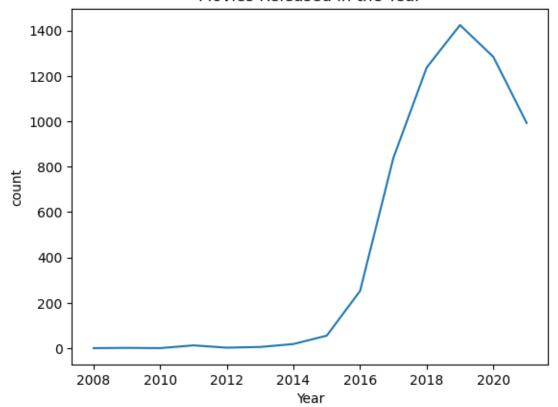


movies 80-100,100-120 and 120-150 is the ranges of minutes for which most movies lie. so movies duration with 80-150 are the most preferrable

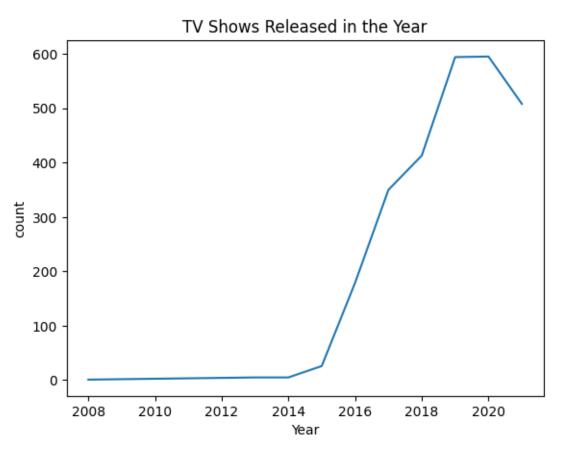
```
final_df2.head()
[173]:
[173]:
                          title
                                                 index
                                                                directors
                                        actors
          Dick Johnson Is Dead
                                unknown actor
       0
                                                     0
                                                          Kirsten Johnson
       1
                 Blood & Water
                                    Ama Qamata
                                                        unknown directors
                                                     1
       2
                 Blood & Water
                                    Ama Qamata
                                                        unknown directors
                 Blood & Water
                                    Ama Qamata
                                                        unknown directors
       3
       4
                 Blood & Water
                                   Khosi Ngema
                                                        unknown directors
                                                                             date_added \
                            genre
                                         country show_id
                                                              type
       0
                                                                     September 25, 2021
                   Documentaries
                                   United States
                                                       s1
                                                             Movie
       1
          International TV Shows
                                    South Africa
                                                       s2
                                                           TV Show
                                                                     September 24, 2021
       2
                        TV Dramas
                                    South Africa
                                                           TV Show
                                                                     September 24, 2021
                                                       s2
       3
                    TV Mysteries
                                    South Africa
                                                           TV Show
                                                                     September 24, 2021
                                                       s2
          International TV Shows
                                                           TV Show
                                                                     September 24, 2021
                                    South Africa
                                                       s2
                                 duration Modified_Added_date
          release_year rating
                                                                month_added
       0
                  2020 PG-13
                                   80-100
                                                    2021-09-25
                                                    2021-09-24
                                                                           9
       1
                  2021 TV-MA 2 Seasons
```

```
2
                              2 Seasons
                                                   2021-09-24
                  2021 TV-MA
                                                                         9
       3
                  2021 TV-MA
                               2 Seasons
                                                   2021-09-24
                                                                         9
                                                                         9
       4
                  2021 TV-MA
                               2 Seasons
                                                   2021-09-24
          week_Added year Modified_date
       0
                  38
                      2021
                              2021-09-25
                  38 2021
                              2021-09-24
       1
       2
                  38 2021
                              2021-09-24
       3
                              2021-09-24
                  38 2021
       4
                  38
                      2021
                              2021-09-24
[192]: i =movie_df.groupby(['year']).agg({"title":"nunique"}).reset_index()
       sns.lineplot(data= i , x='year', y='title')
       plt.title("Movies Released in the Year")
       plt.ylabel('count')
       plt.xlabel("Year")
       plt.show()
```

Movies Released in the Year

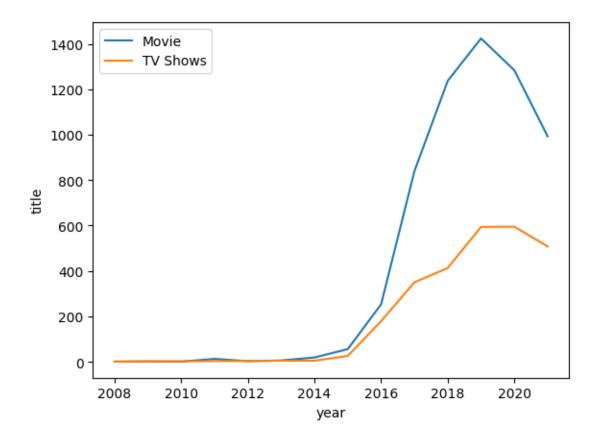


```
[191]: k =tv_df.groupby(['year']).agg({"title":"nunique"}).reset_index()
    sns.lineplot(data= k , x='year', y='title')
    plt.title("TV Shows Released in the Year")
    plt.ylabel("count")
    plt.xlabel("Year")
    plt.show()
```



```
[190]: sns.lineplot(x='year', y='title', data=i, label='Movie')
sns.lineplot(x='year', y='title', data=k, label='TV Shows')

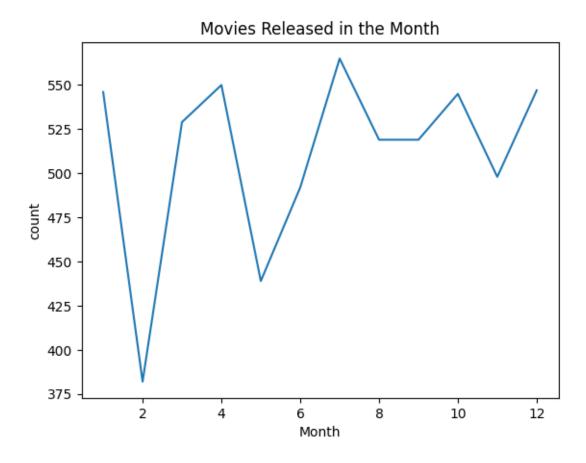
[190]: <Axes: xlabel='year', ylabel='title'>
```



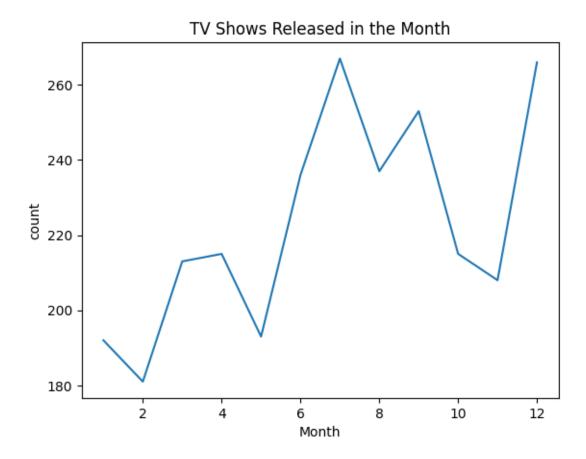
it shows that from 2016, movies and TV shows added significantly but no of TV shows almost half of the no. of movies

[177]:	movie_d	lf	
[177]:		title actors index \	
	0	Dick Johnson Is Dead unknown actor 0	
	159	My Little Pony: A New Generation Vanessa Hudgens 6	
	160	My Little Pony: A New Generation Vanessa Hudgens 7	
	161	My Little Pony: A New Generation Kimiko Glenn 6	
	162	My Little Pony: A New Generation Kimiko Glenn 7	
	201986	Zubaan Anita Shabdish 9611	
	201987	Zubaan Anita Shabdish 9611	
	201988	Zubaan Chittaranjan Tripathy 9611	
	201989	Zubaan Chittaranjan Tripathy 9611	
	201990	Zubaan Chittaranjan Tripathy 9611	
		directors genre country show_id \	
	0	Kirsten Johnson Documentaries United States s1	
	159	Robert Cullen Children & Family Movies United States s7	

```
160
                José Luis Ucha Children & Family Movies United States
                                                                               s7
       161
                                 Children & Family Movies
                 Robert Cullen
                                                           United States
                                                                               s7
       162
                José Luis Ucha
                                 Children & Family Movies
                                                           United States
                                                                               s7
       201986
                   Mozez Singh
                                     International Movies
                                                                    India
                                                                            s8807
       201987
                   Mozez Singh
                                         Music & Musicals
                                                                    India
                                                                            s8807
                   Mozez Singh
                                                                    India
       201988
                                                   Dramas
                                                                            s8807
                   Mozez Singh
       201989
                                     International Movies
                                                                    India
                                                                            s8807
                   Mozez Singh
                                         Music & Musicals
       201990
                                                                    India
                                                                            s8807
                              date_added release_year rating duration \
                type
       0
               Movie
                      September 25, 2021
                                                   2020 PG-13
                                                                  80-100
       159
               Movie
                      September 24, 2021
                                                   2021
                                                             PG
                                                                  80-100
                      September 24, 2021
       160
               Movie
                                                   2021
                                                             PG
                                                                  80-100
       161
                      September 24, 2021
                                                             PG
               Movie
                                                   2021
                                                                  80-100
       162
               Movie
                      September 24, 2021
                                                   2021
                                                             PG
                                                                  80-100
       201986
                           March 2, 2019
                                                   2015
                                                         TV-14
               Movie
                                                                 100-120
                           March 2, 2019
       201987 Movie
                                                   2015
                                                         TV-14 100-120
                           March 2, 2019
       201988 Movie
                                                   2015
                                                         TV-14
                                                                 100-120
                           March 2, 2019
       201989 Movie
                                                   2015
                                                         TV-14
                                                                 100-120
       201990 Movie
                           March 2, 2019
                                                   2015 TV-14
                                                                 100-120
              Modified Added date month added
                                                 week Added
                                                             year Modified date
       0
                       2021-09-25
                                              9
                                                          38
                                                             2021
                                                                      2021-09-25
                                              9
       159
                       2021-09-24
                                                          38
                                                             2021
                                                                      2021-09-24
                                              9
       160
                       2021-09-24
                                                          38
                                                             2021
                                                                      2021-09-24
       161
                       2021-09-24
                                              9
                                                          38
                                                             2021
                                                                      2021-09-24
       162
                       2021-09-24
                                              9
                                                          38
                                                             2021
                                                                      2021-09-24
       201986
                       2019-03-02
                                              3
                                                          9
                                                             2019
                                                                      2019-03-02
                                              3
                                                          9
                                                             2019
       201987
                       2019-03-02
                                                                      2019-03-02
                                              3
                                                          9 2019
       201988
                       2019-03-02
                                                                      2019-03-02
                                              3
                                                             2019
       201989
                       2019-03-02
                                                                      2019-03-02
       201990
                       2019-03-02
                                              3
                                                             2019
                                                                      2019-03-02
       [145843 rows x 17 columns]
[193]: m =movie_df.groupby(['month_added']).agg({"title":"nunique"}).reset_index()
       sns.lineplot(data=m, x='month_added', y='title')
       plt.title("Movies Released in the Month")
       plt.ylabel('count')
       plt.xlabel("Month")
       plt.show()
```

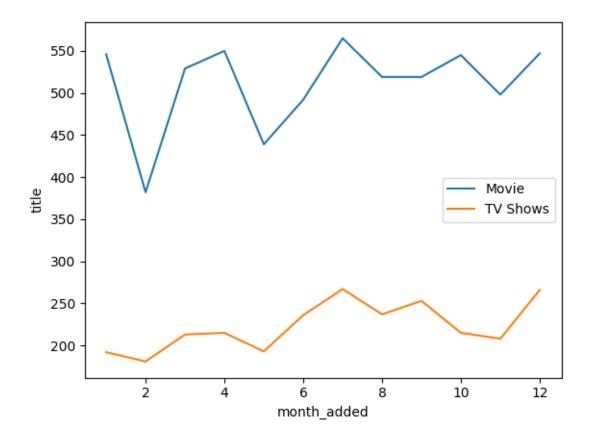


```
[194]: p =tv_df.groupby(['month_added']).agg({"title":"nunique"}).reset_index()
    sns.lineplot(data=p, x='month_added', y='title')
    plt.title("TV Shows Released in the Month")
    plt.ylabel('count')
    plt.xlabel("Month")
    plt.show()
```

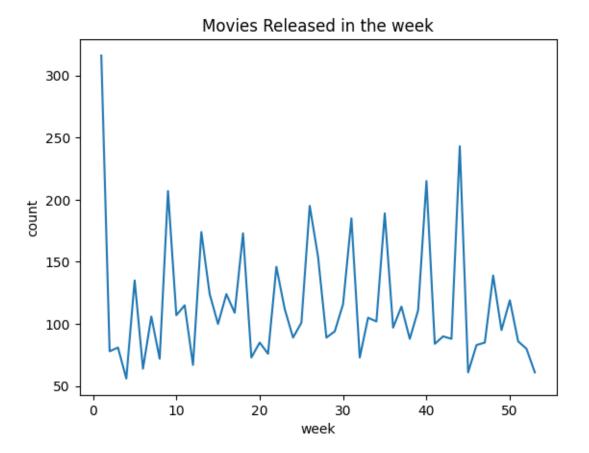


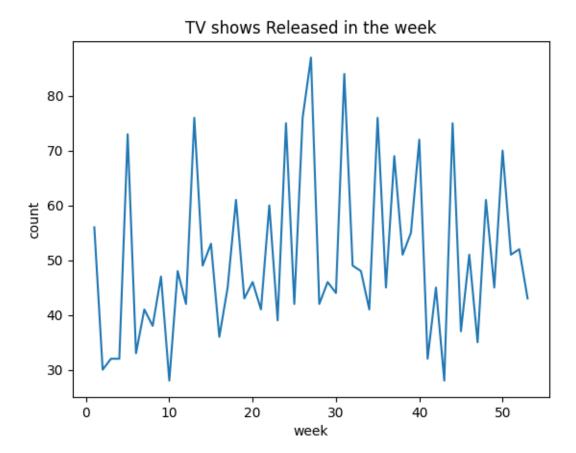
```
[182]: sns.lineplot(x='month_added', y='title', data=m, label='Movie') sns.lineplot(x='month_added', y='title', data=p, label='TV Shows')
```

[182]: <Axes: xlabel='month_added', ylabel='title'>



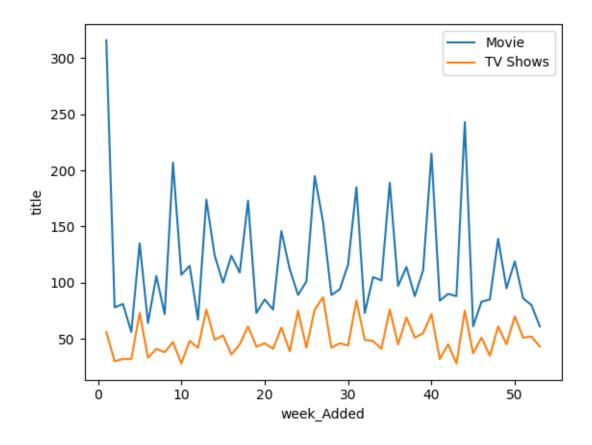
```
[195]: r =movie_df.groupby(['week_Added']).agg({"title":"nunique"}).reset_index()
    sns.lineplot(data=r, x='week_Added', y='title')
    plt.title("Movies Released in the week")
    plt.ylabel('count')
    plt.xlabel("week")
    plt.show()
```





```
[197]: sns.lineplot(x='week_Added', y='title', data=r, label='Movie') sns.lineplot(x='week_Added', y='title', data=s, label='TV Shows')
```

[197]: <Axes: xlabel='week_Added', ylabel='title'>

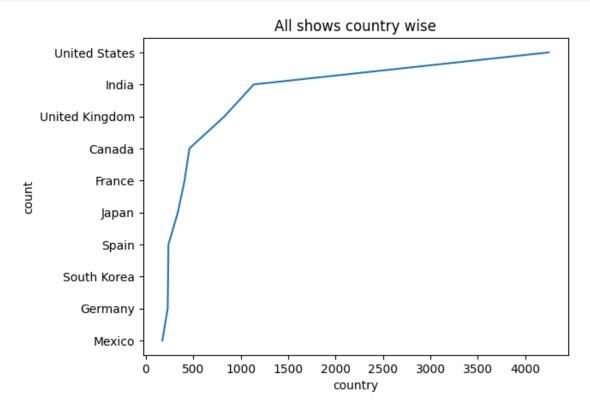


movies added during mid year is very high than the no of tv showes being added

```
[205]: ab = final_df2.groupby(['country']).agg({'title':'nunique'}).
        sort_values(by='title', ascending = False).reset_index()[:10]
       ab
```

```
[205]:
                  country
                           title
           United States
                            4248
       0
       1
                    India
                             1138
       2
          United Kingdom
                             829
                   Canada
                             460
       3
                   France
       4
                             409
       5
                    Japan
                             338
                    Spain
                             239
       6
       7
             South Korea
                             235
       8
                  Germany
                             231
                   Mexico
                             175
[210]: sns.lineplot(data= ab , x='title',y='country')
       plt.title("All shows country wise")
       plt.ylabel('count')
```

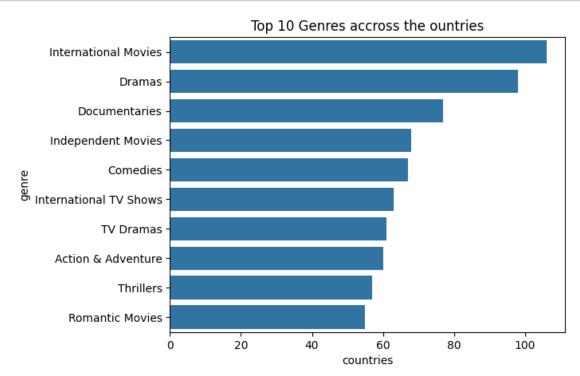
```
plt.xlabel("country")
plt.show()
```



it shows that the United States, India and UK are the 3 major content consumer

```
[219]:
                             genre
                                     country
                                         106
       0
             International Movies
       1
                            Dramas
                                          98
       2
                    Documentaries
                                          77
       3
               Independent Movies
                                          68
       4
                                          67
                          Comedies
       5
          International TV Shows
                                          63
       6
                         TV Dramas
                                          61
       7
               Action & Adventure
                                          60
       8
                         Thrillers
                                          57
       9
                  Romantic Movies
                                          55
```

```
[223]: sns.barplot(data = mm, x = 'country', y = 'genre')
plt.xlabel('countries')
plt.title('Top 10 Genres accross the ountries')
plt.show()
```



Recommendations 1)Add TV Shows and Movies in last week of the year/first month of the next year.

- 2) The most popular Genres are in both TV Shows and Movies are Drama, Comedy and International TV Shows/Movies, so content like that is recommended.
- 3) 80-150 mins is the recommended length for movies recommended.
- 4) TV shows with 1 seasons recomended
- 5) The target audience is recommended to be 14+ and above ratings while for UK, its recommended to be completely Mature/R content .

[]: