

imdb

November 2, 2024

1. IMPORTING LIBRARIES.

```
[104]: import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
```

2. IMPORTING THE DATASET

```
[105]: data = r"H:\DA. Python\9. IMDB Movie Analysis\IMDB-Movie-Data.csv"
newdata = pd.read_csv(data)
```

3. CHECKING THE DATA SET

```
[106]: newdata
```

```
[106]:
```

	Rank	Title	Genre \
0	1	Guardians of the Galaxy	Action,Adventure,Sci-Fi
1	2	Prometheus	Adventure,Mystery,Sci-Fi
2	3	Split	Horror,Thriller
3	4	Sing	Animation,Comedy,Family
4	5	Suicide Squad	Action,Adventure,Fantasy
..
995	996	Secret in Their Eyes	Crime,Drama,Mystery
996	997	Hostel: Part II	Horror
997	998	Step Up 2: The Streets	Drama,Music,Romance
998	999	Search Party	Adventure,Comedy
999	1000	Nine Lives	Comedy,Family,Fantasy

	Description	Director \
0	A group of intergalactic criminals are forced ...	James Gunn
1	Following clues to the origin of mankind, a te...	Ridley Scott
2	Three girls are kidnapped by a man with a diag...	M. Night Shyamalan
3	In a city of humanoid animals, a hustling thea...	Christophe Lourdelet
4	A secret government agency recruits some of th...	David Ayer
..
995	A tight-knit team of rising investigators, alo...	Billy Ray
996	Three American college students studying abroa...	Eli Roth
997	Romantic sparks occur between two dance studen...	Jon M. Chu
998	A pair of friends embark on a mission to reuni...	Scot Armstrong

999 A stuffy businessman finds himself trapped ins... Barry Sonnenfeld

	Actors	Year	\
0	Chris Pratt, Vin Diesel, Bradley Cooper, Zoe S...	2014	
1	Noomi Rapace, Logan Marshall-Green, Michael Fa...	2012	
2	James McAvoy, Anya Taylor-Joy, Haley Lu Richar...	2016	
3	Matthew McConaughey, Reese Witherspoon, Seth Ma...	2016	
4	Will Smith, Jared Leto, Margot Robbie, Viola D...	2016	
..	
995	Chiwetel Ejiofor, Nicole Kidman, Julia Roberts...	2015	
996	Lauren German, Heather Matarazzo, Bijou Philli...	2007	
997	Robert Hoffman, Briana Evigan, Cassie Ventura,...	2008	
998	Adam Pally, T.J. Miller, Thomas Middleditch, Sh...	2014	
999	Kevin Spacey, Jennifer Garner, Robbie Amell, Ch...	2016	

	Runtime (Minutes)	Rating	Votes	Revenue (Millions)	Metascore
0	121	8.1	757074	333.13	76.0
1	124	7.0	485820	126.46	65.0
2	117	7.3	157606	138.12	62.0
3	108	7.2	60545	270.32	59.0
4	123	6.2	393727	325.02	40.0
..
995	111	6.2	27585	NaN	45.0
996	94	5.5	73152	17.54	46.0
997	98	6.2	70699	58.01	50.0
998	93	5.6	4881	NaN	22.0
999	87	5.3	12435	19.64	11.0

[1000 rows x 12 columns]

```
[107]: newdata.shape
```

```
[107]: (1000, 12)
```

4. DISPLAY TOP 10 ROWS OF DATA

```
[108]: newdata.head(10)
```

	Rank	Title	Genre	\
0	1	Guardians of the Galaxy	Action,Adventure,Sci-Fi	
1	2	Prometheus	Adventure,Mystery,Sci-Fi	
2	3	Split	Horror,Thriller	
3	4	Sing	Animation,Comedy,Family	
4	5	Suicide Squad	Action,Adventure,Fantasy	
5	6	The Great Wall	Action,Adventure,Fantasy	
6	7	La La Land	Comedy,Drama,Music	
7	8	Mindhorn	Comedy	

8	9	The Lost City of Z	Action,Adventure,Biography
9	10	Passengers	Adventure,Drama,Romance

	Description	Director \
0	A group of intergalactic criminals are forced ...	James Gunn
1	Following clues to the origin of mankind, a te...	Ridley Scott
2	Three girls are kidnapped by a man with a diag...	M. Night Shyamalan
3	In a city of humanoid animals, a hustling thea...	Christophe Lourdelet
4	A secret government agency recruits some of th...	David Ayer
5	European mercenaries searching for black powde...	Yimou Zhang
6	A jazz pianist falls for an aspiring actress i...	Damien Chazelle
7	A has-been actor best known for playing the ti...	Sean Foley
8	A true-life drama, centering on British explor...	James Gray
9	A spacecraft traveling to a distant colony pla...	Morten Tyldum

	Actors	Year	Runtime (Minutes) \
0	Chris Pratt, Vin Diesel, Bradley Cooper, Zoe S...	2014	121
1	Noomi Rapace, Logan Marshall-Green, Michael Fa...	2012	124
2	James McAvoy, Anya Taylor-Joy, Haley Lu Richar...	2016	117
3	Matthew McConaughey,Reese Witherspoon, Seth Ma...	2016	108
4	Will Smith, Jared Leto, Margot Robbie, Viola D...	2016	123
5	Matt Damon, Tian Jing, Willem Dafoe, Andy Lau	2016	103
6	Ryan Gosling, Emma Stone, Rosemarie DeWitt, J...	2016	128
7	Essie Davis, Andrea Riseborough, Julian Barrat...	2016	89
8	Charlie Hunnam, Robert Pattinson, Sienna Mille...	2016	141
9	Jennifer Lawrence, Chris Pratt, Michael Sheen,...	2016	116

	Rating	Votes	Revenue (Millions)	Metascore
0	8.1	757074	333.13	76.0
1	7.0	485820	126.46	65.0
2	7.3	157606	138.12	62.0
3	7.2	60545	270.32	59.0
4	6.2	393727	325.02	40.0
5	6.1	56036	45.13	42.0
6	8.3	258682	151.06	93.0
7	6.4	2490	NaN	71.0
8	7.1	7188	8.01	78.0
9	7.0	192177	100.01	41.0

5. DISPLAY BOTTOM 10 ROWS OF DATA

```
[109]: newdata.tail(10)
```

[109]:	Rank	Title	Genre \
990	991	Underworld: Rise of the Lycans	Action,Adventure,Fantasy
991	992	Taare Zameen Par	Drama,Family,Music
992	993	Take Me Home Tonight	Comedy,Drama,Romance

993	994	Resident Evil: Afterlife	Action,Adventure,Horror
994	995	Project X	Comedy
995	996	Secret in Their Eyes	Crime,Drama,Mystery
996	997	Hostel: Part II	Horror
997	998	Step Up 2: The Streets	Drama,Music,Romance
998	999	Search Party	Adventure,Comedy
999	1000	Nine Lives	Comedy,Family,Fantasy

	Description	Director \
990	An origins story centered on the centuries-old...	Patrick Tatopoulos
991	An eight-year-old boy is thought to be a lazy ...	Aamir Khan
992	Four years after graduation, an awkward high s...	Michael Dowse
993	While still out to destroy the evil Umbrella C...	Paul W.S. Anderson
994	3 high school seniors throw a birthday party t...	Nima Nourizadeh
995	A tight-knit team of rising investigators, alo...	Billy Ray
996	Three American college students studying abroa...	Eli Roth
997	Romantic sparks occur between two dance studen...	Jon M. Chu
998	A pair of friends embark on a mission to reuni...	Scot Armstrong
999	A stuffy businessman finds himself trapped ins...	Barry Sonnenfeld

	Actors	Year \
990	Rhona Mitra, Michael Sheen, Bill Nighy, Steven...	2009
991	Darsheel Safary, Aamir Khan, Tanay Chheda, Sac...	2007
992	Topher Grace, Anna Faris, Dan Fogler, Teresa P...	2011
993	Milla Jovovich, Ali Larter, Wentworth Miller,K...	2010
994	Thomas Mann, Oliver Cooper, Jonathan Daniel Br...	2012
995	Chiwetel Ejiofor, Nicole Kidman, Julia Roberts...	2015
996	Lauren German, Heather Matarazzo, Bijou Philli...	2007
997	Robert Hoffman, Briana Evigan, Cassie Ventura,...	2008
998	Adam Pally, T.J. Miller, Thomas Middleditch,Sh...	2014
999	Kevin Spacey, Jennifer Garner, Robbie Amell,Ch...	2016

	Runtime (Minutes)	Rating	Votes	Revenue (Millions)	Metascore
990	92	6.6	129708	45.80	44.0
991	165	8.5	102697	1.20	42.0
992	97	6.3	45419	6.92	NaN
993	97	5.9	140900	60.13	37.0
994	88	6.7	164088	54.72	48.0
995	111	6.2	27585	NaN	45.0
996	94	5.5	73152	17.54	46.0
997	98	6.2	70699	58.01	50.0
998	93	5.6	4881	NaN	22.0
999	87	5.3	12435	19.64	11.0

- GETTING INFORMATION ABOUT OUR DATASET LIKE TOTAL NUMBER ROWS, TOTAL NUMBER OF COLUMNS, DATATYPES OF EACH COLUMN AND MEMORY REQUIREMENT

```
[110]: newdata.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 12 columns):
#   Column                Non-Null Count  Dtype
---  -
0   Rank                  1000 non-null   int64
1   Title                 1000 non-null   object
2   Genre                 1000 non-null   object
3   Description            1000 non-null   object
4   Director              1000 non-null   object
5   Actors                1000 non-null   object
6   Year                  1000 non-null   int64
7   Runtime (Minutes)     1000 non-null   int64
8   Rating                1000 non-null   float64
9   Votes                 1000 non-null   int64
10  Revenue (Millions)    872 non-null    float64
11  Metascore              936 non-null    float64
dtypes: float64(3), int64(4), object(5)
memory usage: 93.9+ KB
```

7. DROP ALL THE MISSING VALUES

```
[111]: print("Is there any missing values: ?", newdata.isnull().values.any())
```

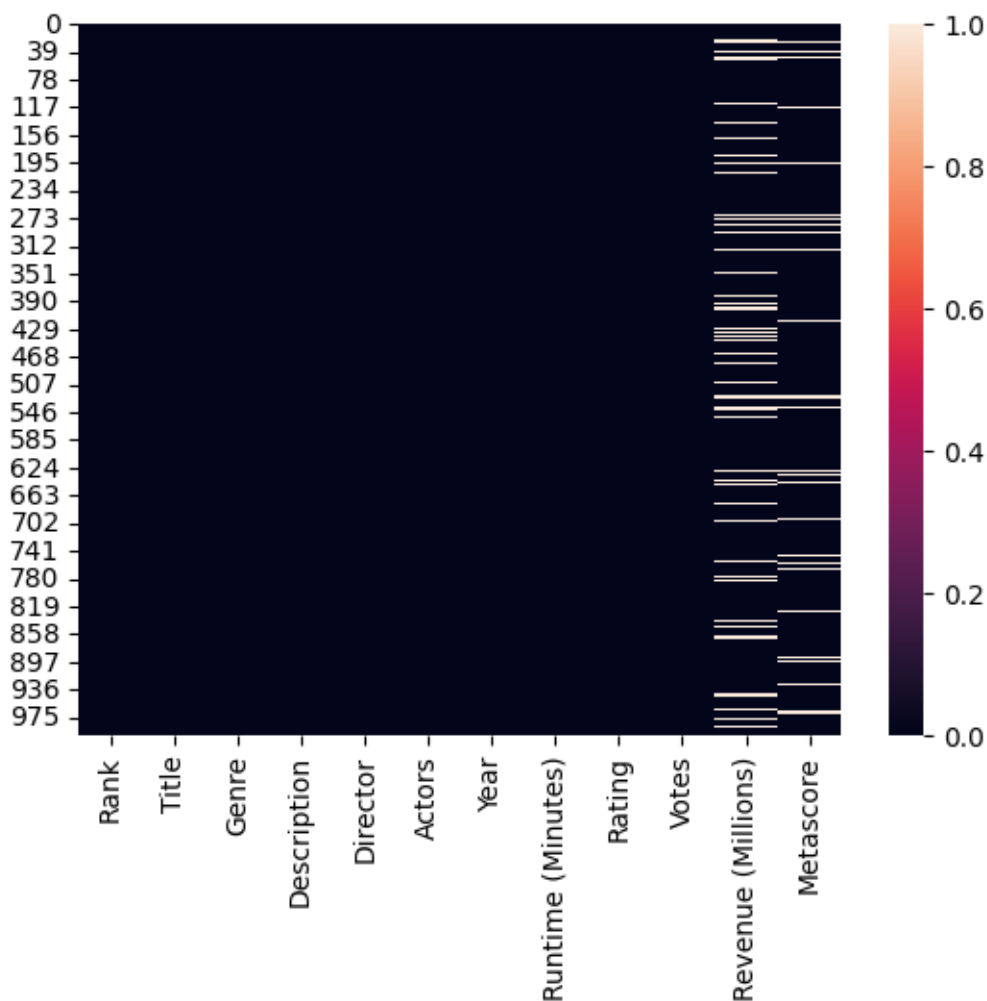
```
Is there any missing values: ? True
```

```
[112]: newdata.isnull().sum()
```

```
[112]: Rank                0
      Title                0
      Genre                0
      Description          0
      Director             0
      Actors               0
      Year                 0
      Runtime (Minutes)    0
      Rating               0
      Votes                0
      Revenue (Millions)   128
      Metascore             64
      dtype: int64
```

```
[113]: sns.heatmap(newdata.isnull())
```

```
[113]: <Axes: >
```



```
[114]: per_val = newdata.isnull().sum() * 100 / len(newdata)
print(per_val)
```

```
Rank          0.0
Title         0.0
Genre         0.0
Description    0.0
Director      0.0
Actors        0.0
Year          0.0
Runtime (Minutes) 0.0
Rating        0.0
Votes         0.0
Revenue (Millions) 12.8
Metascore     6.4
dtype: float64
```

```
[115]: newdata.dropna(axis=0)
```

```
[115]:
```

	Rank	Title	Genre \
0	1	Guardians of the Galaxy	Action,Adventure,Sci-Fi
1	2	Prometheus	Adventure,Mystery,Sci-Fi
2	3	Split	Horror,Thriller
3	4	Sing	Animation,Comedy,Family
4	5	Suicide Squad	Action,Adventure,Fantasy
..
993	994	Resident Evil: Afterlife	Action,Adventure,Horror
994	995	Project X	Comedy
996	997	Hostel: Part II	Horror
997	998	Step Up 2: The Streets	Drama,Music,Romance
999	1000	Nine Lives	Comedy,Family,Fantasy

	Description	Director \
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..
993	While still out to destroy the evil Umbrella C...	Paul W.S. Anderson
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996	Three American college students studying abroa...	Eli Roth
997	Romantic sparks occur between two dance studen...	Jon M. Chu
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..
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4	123	6.2	393727	325.02	40.0

```

..          ...      ...      ...          ...      ...
993          97      5.9    140900          60.13      37.0
994          88      6.7    164088          54.72      48.0
996          94      5.5    73152          17.54      46.0
997          98      6.2    70699          58.01      50.0
999          87      5.3    12435          19.64      11.0

```

[838 rows x 12 columns]

8. CHECK FOR DUPLICATE DATA

```
[116]: dup_val = newdata.duplicated().any()
```

```
[117]: print("Are there any duplicate values? ", newdata.duplicated().any())
```

Are there any duplicate values? False

```
[118]: newdata = newdata.drop_duplicates()
newdata
```

```
[118]:
```

	Rank	Title	Genre \
0	1	Guardians of the Galaxy	Action,Adventure,Sci-Fi
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..
995	996	Secret in Their Eyes	Crime,Drama,Mystery
996	997	Hostel: Part II	Horror
997	998	Step Up 2: The Streets	Drama,Music,Romance
998	999	Search Party	Adventure,Comedy
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	Actors	Year \
0	Chris Pratt, Vin Diesel, Bradley Cooper, Zoe S...	2014


```

1   Noomi Rapace, Logan Marshall-Green, Michael Fa... 2012
2   James McAvoy, Anya Taylor-Joy, Haley Lu Richar... 2016
3   Matthew McConaughey, Reese Witherspoon, Seth Ma... 2016
4   Will Smith, Jared Leto, Margot Robbie, Viola D... 2016
..
995 Chiwetel Ejiofor, Nicole Kidman, Julia Roberts... 2015
996 Lauren German, Heather Matarazzo, Bijou Philli... 2007
997 Robert Hoffman, Briana Evigan, Cassie Ventura,... 2008
998 Adam Pally, T.J. Miller, Thomas Middleditch,Sh... 2014
999 Kevin Spacey, Jennifer Garner, Robbie Amell,Ch... 2016

```

	Runtime (Minutes)	Rating	Votes	Revenue (Millions)	Metascore
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..
995	111	6.2	27585	NaN	45.0
996	94	5.5	73152	17.54	46.0
997	98	6.2	70699	58.01	50.0
998	93	5.6	4881	NaN	22.0
999	87	5.3	12435	19.64	11.0

[1000 rows x 12 columns]

9. GET OVERALL STATISTICS ABOUT THE DATAFRAME

```
[119]: newdata.describe(include = 'all')
```

```

[119]:
count      Rank      Title      Genre \
count    1000.000000      1000      1000
unique         NaN      999      207
top          NaN  The Host  Action,Adventure,Sci-Fi
freq         NaN        2        50
mean     500.500000      NaN      NaN
std      288.819436      NaN      NaN
min        1.000000      NaN      NaN
25%      250.750000      NaN      NaN
50%      500.500000      NaN      NaN
75%      750.250000      NaN      NaN
max      1000.000000      NaN      NaN

count      Description      Director \
count      1000      1000
unique      1000      644
top    A stuffy businessman finds himself trapped ins...  Ridley Scott

```

freq	1	8
mean	NaN	NaN
std	NaN	NaN
min	NaN	NaN
25%	NaN	NaN
50%	NaN	NaN
75%	NaN	NaN
max	NaN	NaN

	Actors	Year \
count	1000	1000.000000
unique	996	NaN
top	Shia LaBeouf, Megan Fox, Josh Duhamel, Tyrese ...	NaN
freq	2	NaN
mean	NaN	2012.783000
std	NaN	3.205962
min	NaN	2006.000000
25%	NaN	2010.000000
50%	NaN	2014.000000
75%	NaN	2016.000000
max	NaN	2016.000000

	Runtime (Minutes)	Rating	Votes	Revenue (Millions) \
count	1000.000000	1000.000000	1.000000e+03	872.000000
unique	NaN	NaN	NaN	NaN
top	NaN	NaN	NaN	NaN
freq	NaN	NaN	NaN	NaN
mean	113.172000	6.723200	1.698083e+05	82.956376
std	18.810908	0.945429	1.887626e+05	103.253540
min	66.000000	1.900000	6.100000e+01	0.000000
25%	100.000000	6.200000	3.630900e+04	13.270000
50%	111.000000	6.800000	1.107990e+05	47.985000
75%	123.000000	7.400000	2.399098e+05	113.715000
max	191.000000	9.000000	1.791916e+06	936.630000

	Metascore
count	936.000000
unique	NaN
top	NaN
freq	NaN
mean	58.985043
std	17.194757
min	11.000000
25%	47.000000
50%	59.500000
75%	72.000000
max	100.000000

10. DISPLAY TITLE OF THE MOVIE HAVING RUNTIME GREATER THAN OR EQUAL TO 180 MINUTES

```
[120]: newdata.columns
```

```
[120]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',  
        'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',  
        'Metascore'],  
        dtype='object')
```

```
[121]: newdata[newdata['Runtime (Minutes)']>=180]['Title']
```

```
[121]: 82      The Wolf of Wall Street  
      88      The Hateful Eight  
      311     La vie d'Adèle  
      828      Grindhouse  
      965     Inland Empire  
      Name: Title, dtype: object
```

11. IN WHICH YEAR THERE WAS THE HIGHEST AVERAGE VOTING?

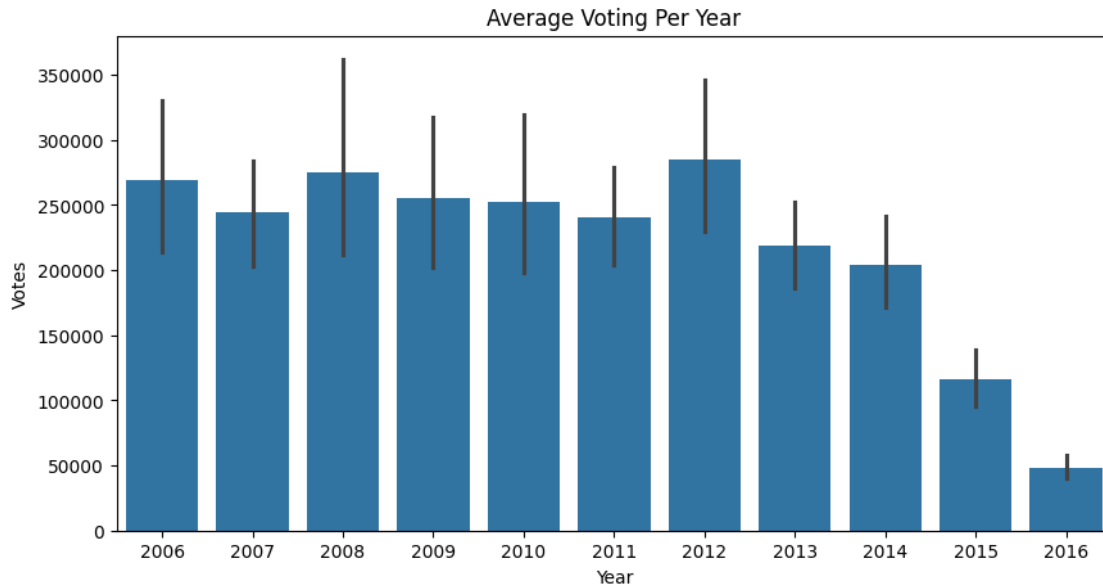
```
[122]: newdata.columns
```

```
[122]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',  
        'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',  
        'Metascore'],  
        dtype='object')
```

```
[123]: newdata.groupby('Year')['Votes'].mean().sort_values(ascending=False)
```

```
[123]: Year  
      2012    285226.093750  
      2008    275505.384615  
      2006    269289.954545  
      2009    255780.647059  
      2010    252782.316667  
      2007    244331.037736  
      2011    240790.301587  
      2013    219049.648352  
      2014    203930.224490  
      2015    115726.220472  
      2016     48591.754209  
      Name: Votes, dtype: float64
```

```
[124]: plt.figure(figsize=(10,5))  
      sns.barplot( x = 'Year', y = 'Votes' , data = newdata)  
      plt.title("Average Voting Per Year")  
      plt.show()
```



12. IN WHICH YEAR THERE WAS THE HIGHEST AVERAGE REVENUE?

```
[125]: newdata.columns
```

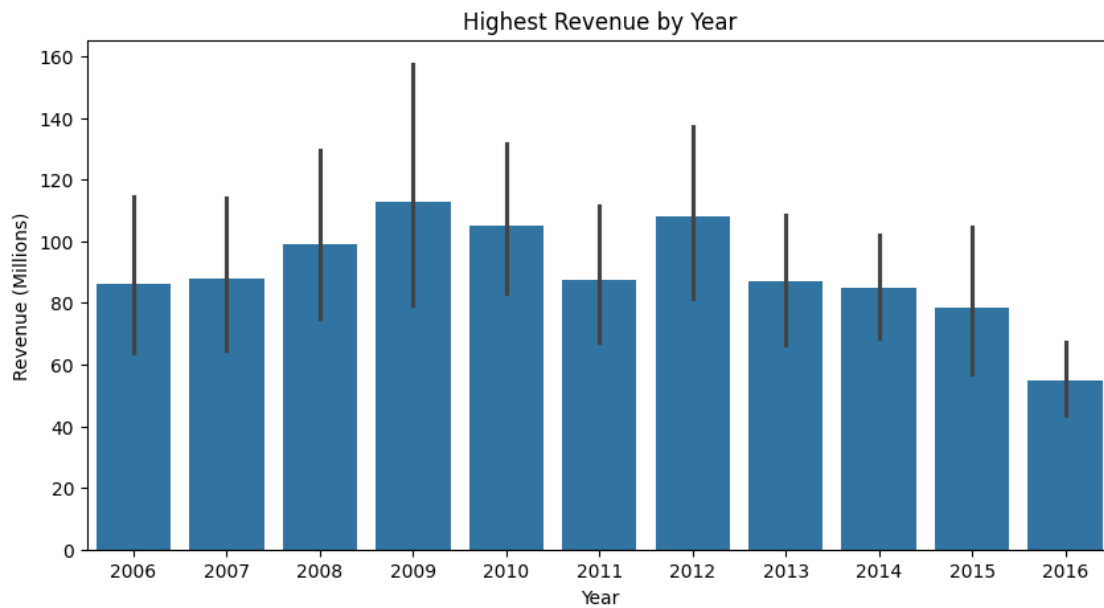
```
[125]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',
          'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',
          'Metascore'],
          dtype='object')
```

```
[126]: newdata.groupby('Year')['Revenue (Millions)'].mean().
        ↪sort_values(ascending=False)
```

```
[126]: Year
2009    112.601277
2012    107.973281
2010    105.081579
2008     99.082745
2007     87.882245
2011     87.612258
2013     87.121818
2006     86.296667
2014     85.078723
2015     78.355044
2016     54.690976
Name: Revenue (Millions), dtype: float64
```

```
[127]: plt.figure(figsize=(10,5))
        sns.barplot(x='Year', y='Revenue (Millions)', data=newdata)
```

```
plt.title("Highest Revenue by Year")
plt.show()
```



13. FIND THE AVERAGE RATING FOR EACH DIRECTOR

```
[128]: newdata.columns
```

```
[128]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',
          'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',
          'Metascore'],
          dtype='object')
```

```
[129]: newdata.groupby('Director')['Rating'].mean().sort_values(ascending=True)
```

```
[129]: Director
Jason Friedberg          1.90
Shawn Burkett            2.70
James Wong               2.70
Jonathan Holbrook       3.20
Micheal Bafaro           3.50
...
Florian Henckel von Donnersmarck  8.50
Olivier Nakache           8.60
Makoto Shinkai            8.60
Christopher Nolan         8.68
Nitesh Tiwari             8.80
Name: Rating, Length: 644, dtype: float64
```

14. DISPLAY TOP 10 LENGTHY MOVIES TITLE AND RUNTIME

```
[130]: newdata.columns
```

```
[130]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',  
         'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',  
         'Metascore'],  
        dtype='object')
```

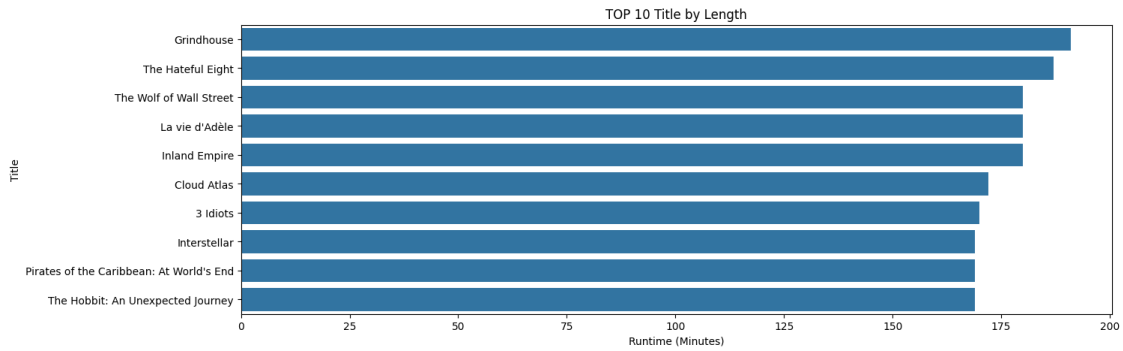
```
[131]: # nlargest method of Pandas dataframe  
  
top10_len = newdata.nlargest(10, 'Runtime (Minutes)')[['Title', 'Runtime_  
↪(Minutes)']].set_index('Title')  
  
# by using ".set_index('Title')" we are making Title column as index column
```

```
[132]: top10_len
```

```
[132]:
```

	Runtime (Minutes)
Title	
Grindhouse	191
The Hateful Eight	187
The Wolf of Wall Street	180
La vie d'Adèle	180
Inland Empire	180
Cloud Atlas	172
3 Idiots	170
Interstellar	169
Pirates of the Caribbean: At World's End	169
The Hobbit: An Unexpected Journey	169

```
[133]: # use barplot to display relationship between categorical data and atleast one_  
↪numerical variable  
  
plt.figure(figsize=(15,5))  
sns.barplot(x = 'Runtime (Minutes)', y = top10_len.index, data = top10_len)  
plt.title("TOP 10 Title by Length")  
plt.show()
```



15. DISPLAY NUMBER OF MOVIES PER YEAR

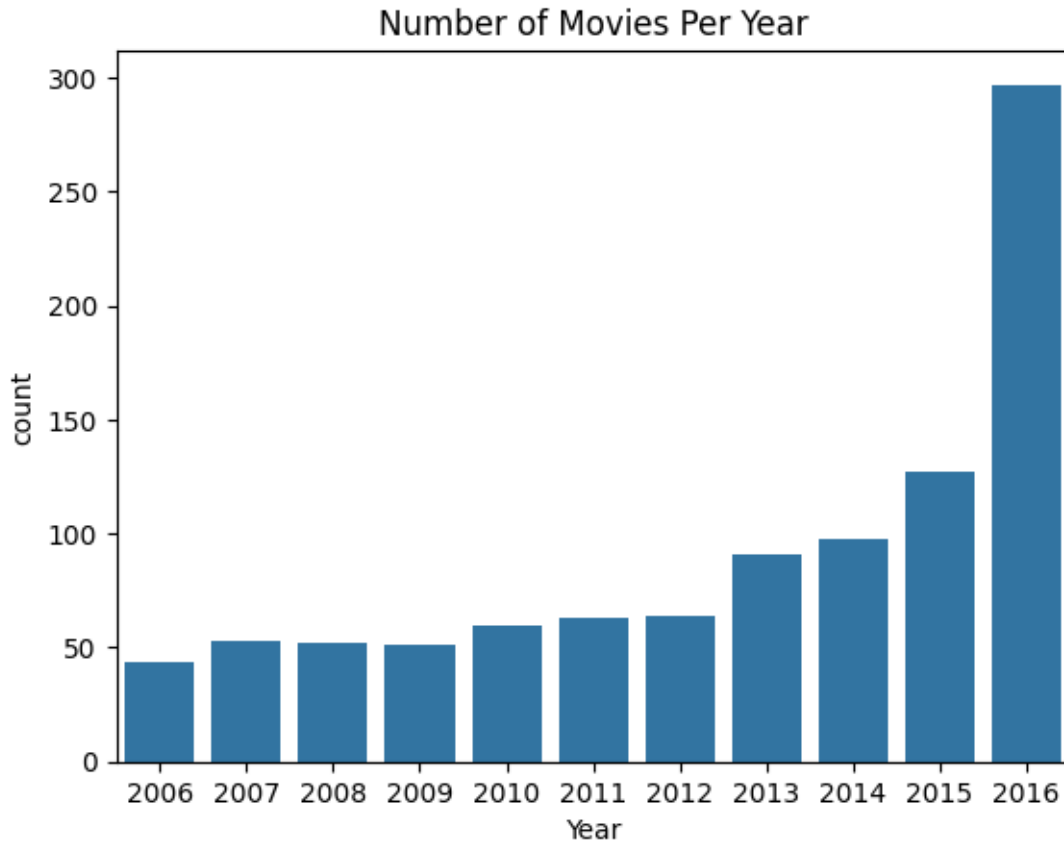
```
[134]: newdata.columns
```

```
[134]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',
          'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',
          'Metascore'],
          dtype='object')
```

```
[135]: newdata['Year'].value_counts()
```

```
[135]: Year
2016    297
2015    127
2014     98
2013     91
2012     64
2011     63
2010     60
2007     53
2008     52
2009     51
2006     44
Name: count, dtype: int64
```

```
[136]: plt.figure(figsize=(10,5))
sns.countplot(x = 'Year', data = newdata)
plt.title("Number of Movies Per Year")
plt.show()
```



16. FIND MOST POPULAR MOVIE TITLE (HIGHEST REVENUE)

```
[137]: newdata.columns
```

```
[137]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',
          'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',
          'Metascore'],
          dtype='object')
```

```
[138]: newdata.groupby('Title')['Revenue (Millions)'].sum().
        ↪sort_values(ascending=False)
```

```
[138]: Title
Star Wars: Episode VII - The Force Awakens    936.63
Avatar                                         760.51
Jurassic World                                652.18
The Avengers                                  623.28
The Dark Knight                               533.32
...
Mindhorn                                       0.00
```



```

Martyrs                                0.00
Wrecker                                0.00
Mr. Nobody                             0.00
Zipper                                  0.00
Name: Revenue (Millions), Length: 999, dtype: float64

```

17. DISPLAY TOP 10 HIGHEST RATED MOVIE TITLES AND ITS DIRECTORS

```
[139]: newdata.columns
```

```
[139]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',
          'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',
          'Metascore'],
          dtype='object')
```

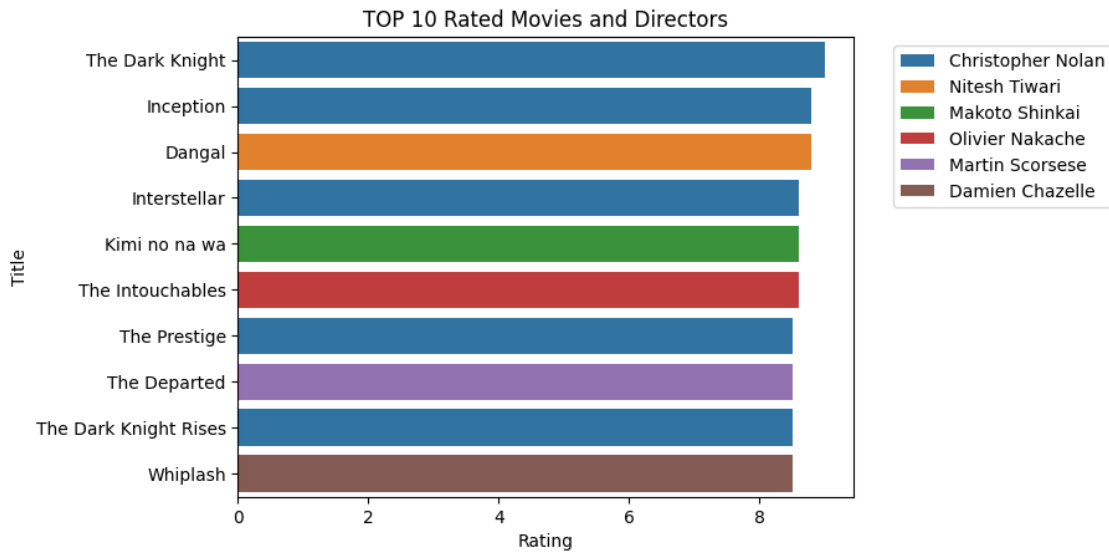
```
[144]: top10_len2 = newdata.nlargest(10, 'Rating')[['Title', 'Rating', 'Director']].
        ↪set_index('Title')
        top10_len2
```

```
[144]:
```

	Rating	Director
Title		
The Dark Knight	9.0	Christopher Nolan
Inception	8.8	Christopher Nolan
Dangal	8.8	Nitesh Tiwari
Interstellar	8.6	Christopher Nolan
Kimi no na wa	8.6	Makoto Shinkai
The Intouchables	8.6	Olivier Nakache
The Prestige	8.5	Christopher Nolan
The Departed	8.5	Martin Scorsese
The Dark Knight Rises	8.5	Christopher Nolan
Whiplash	8.5	Damien Chazelle

```
[147]: sns.barplot(x = 'Rating', y = top10_len2.index , data = top10_len2, hue =
        ↪'Director', dodge = False)
plt.legend(bbox_to_anchor=(1.05,1), loc=2)
plt.title("TOP 10 Rated Movies and Directors")
plt.show()

# "dodge=False" - this our lines look better.
# "bbox_to_anchor" - to position legend. loc means location
```



18. DISPLAY TOP 10 HIGHEST REVENUE MOVIE TITLES

```
[149]: newdata.columns
```

```
[149]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',
          'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',
          'Metascore'],
          dtype='object')
```

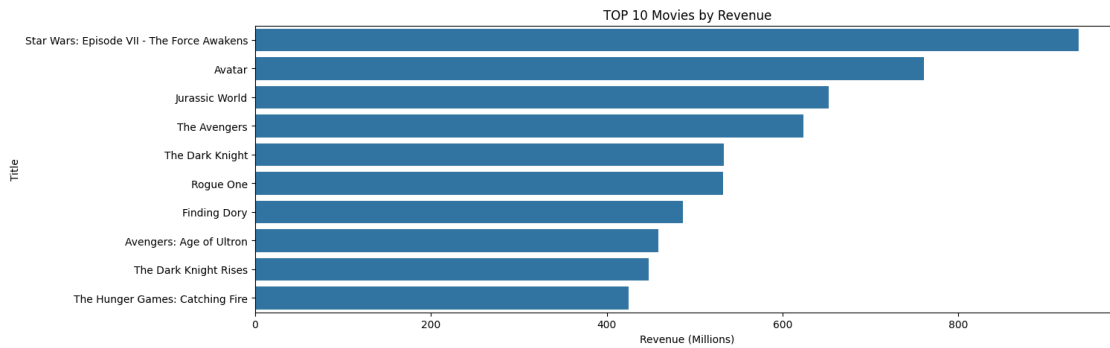
```
[152]: top10_len3 = newdata.nlargest(10, 'Revenue (Millions)')[['Title', 'Revenue_
↪(Millions)']].set_index('Title')
top10_len3
```

```
[152]:
```

Title	Revenue (Millions)
Star Wars: Episode VII - The Force Awakens	936.63
Avatar	760.51
Jurassic World	652.18
The Avengers	623.28
The Dark Knight	533.32
Rogue One	532.17
Finding Dory	486.29
Avengers: Age of Ultron	458.99
The Dark Knight Rises	448.13
The Hunger Games: Catching Fire	424.65

```
[156]: plt.figure(figsize=(15,5))
sns.barplot(x = 'Revenue (Millions)', y = top10_len3.index, data = top10_len3)
plt.title("TOP 10 Movies by Revenue")
```

```
plt.show()
```



19. FIND AVERAGE RATING OF MOVIES YEAR WISE

```
[158]: newdata.columns
```

```
[158]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',  
          'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',  
          'Metascore'],  
         dtype='object')
```

```
[162]: newdata.groupby('Year')['Rating'].mean().sort_values(ascending = True)
```

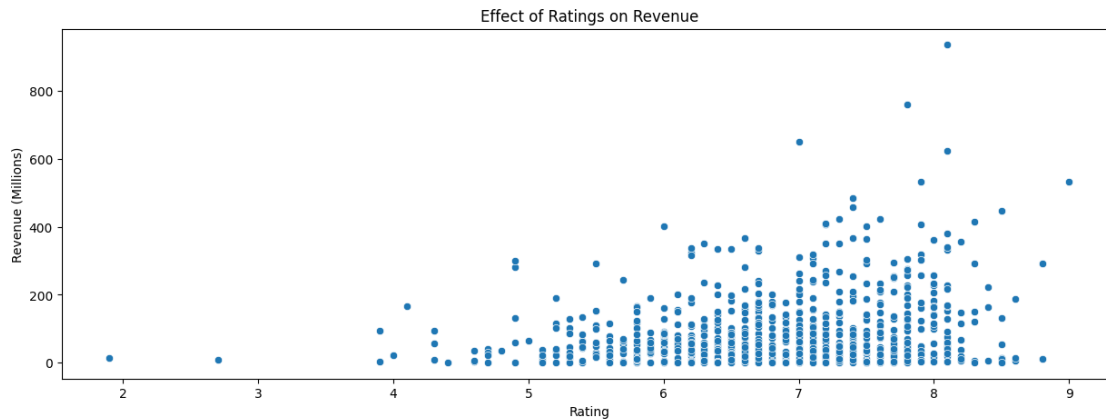
```
[162]: Year  
2016    6.436700  
2015    6.602362  
2008    6.784615  
2013    6.812088  
2010    6.826667  
2014    6.837755  
2011    6.838095  
2012    6.925000  
2009    6.960784  
2006    7.125000  
2007    7.133962  
Name: Rating, dtype: float64
```

20. DOES RATING AFFECT THE REVENUE?

```
[164]: newdata.columns
```

```
[164]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',  
          'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',  
          'Metascore'],  
         dtype='object')
```

```
[166]: plt.figure(figsize=(15,5))
sns.scatterplot(x = 'Rating', y = 'Revenue (Millions)', data = newdata)
plt.title("Effect of Ratings on Revenue")
plt.show()
```



21. CLASSIFY MOVIES BASED ON RATINGS [EXCELLENT, GOOD, AND AVERAGE]

```
[168]: newdata.columns
```

```
[168]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',
          'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',
          'Metascore'],
          dtype='object')
```

```
[170]: newdata.head(5)
```

```
[170]:
```

	Rank	Title	Genre \
0	1	Guardians of the Galaxy	Action,Adventure,Sci-Fi
1	2	Prometheus	Adventure,Mystery,Sci-Fi
2	3	Split	Horror,Thriller
3	4	Sing	Animation,Comedy,Family
4	5	Suicide Squad	Action,Adventure,Fantasy

	Description	Director \
0	A group of intergalactic criminals are forced ...	James Gunn
1	Following clues to the origin of mankind, a te...	Ridley Scott
2	Three girls are kidnapped by a man with a diag...	M. Night Shyamalan
3	In a city of humanoid animals, a hustling thea...	Christophe Lourdelet
4	A secret government agency recruits some of th...	David Ayer

	Actors	Year	Runtime (Minutes) \
0	Chris Pratt, Vin Diesel, Bradley Cooper, Zoe S...	2014	121

1	Noomi Rapace, Logan Marshall-Green, Michael Fa...	2012	124
2	James McAvoy, Anya Taylor-Joy, Haley Lu Richar...	2016	117
3	Matthew McConaughey, Reese Witherspoon, Seth Ma...	2016	108
4	Will Smith, Jared Leto, Margot Robbie, Viola D...	2016	123

	Rating	Votes	Revenue (Millions)	Metascore
0	8.1	757074	333.13	76.0
1	7.0	485820	126.46	65.0
2	7.3	157606	138.12	62.0
3	7.2	60545	270.32	59.0
4	6.2	393727	325.02	40.0

```
[178]: # We are creating our own function to classify Movies based on Ratings.
```

```
# def rating - function name
# (rating) - let me pass argument

def rating (rating):
    if rating >= 7:
        return 'Excellent'
    elif rating >= 6:
        return "Good"
    else:
        return "Average"
```

```
[182]: #lets create new column for this newly created category. "data['rating_cat']="
```

```
newdata['rating_cat'] = newdata['Rating'].apply(rating)
```

```
[181]: newdata.head(2)
```

```
[181]:
```

	Rank	Title	Genre \
0	1	Guardians of the Galaxy	Action,Adventure,Sci-Fi
1	2	Prometheus	Adventure,Mystery,Sci-Fi

	Description	Director \
0	A group of intergalactic criminals are forced ...	James Gunn
1	Following clues to the origin of mankind, a te...	Ridley Scott

	Actors	Year	Runtime (Minutes) \
0	Chris Pratt, Vin Diesel, Bradley Cooper, Zoe S...	2014	121
1	Noomi Rapace, Logan Marshall-Green, Michael Fa...	2012	124

	Rating	Votes	Revenue (Millions)	Metascore	rating_cat
0	8.1	757074	333.13	76.0	Excellent
1	7.0	485820	126.46	65.0	Excellent

22. COUNT NUMBER OF ACTION MOVIES

```
[184]: newdata.columns
```

```
[184]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',  
         'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',  
         'Metascore', 'rating_cat'],  
        dtype='object')
```

```
[186]: newdata['Genre'].dtype
```

```
[186]: dtype('O')
```

```
[190]: len(newdata[newdata['Genre'].str.contains('Action', case = False)])  
  
# newdata['Genre']  
# newdata['Genre'].str.contains()  
# case=False  
# add them to a new dataframe  
# len()
```

```
[190]: 303
```

23. FIND UNIQUE VALUES FROM GENRE

```
[193]: newdata.Genre
```

```
[193]: 0      Action,Adventure,Sci-Fi  
      1      Adventure,Mystery,Sci-Fi  
      2      Horror,Thriller  
      3      Animation,Comedy,Family  
      4      Action,Adventure,Fantasy  
      ...  
      995     Crime,Drama,Mystery  
      996     Horror  
      997     Drama,Music,Romance  
      998     Adventure,Comedy  
      999     Comedy,Family,Fantasy  
      Name: Genre, Length: 1000, dtype: object
```

```
[194]: # we are going to perform three steps to find unique values in Genre column  
      # 1. Split items with commas  
      # 2. Convert this 2D list to 1D list to find unique values  
      # 3. Find unique value in this empty list
```

```
[195]: # Step 1. Split items with commas  
  
list1 = []
```

```
for value in newdata['Genre']:
    list1.append(value.split(','))
```

#Here we split items by comma. Then append this value over empty list

```
[196]: list1
```

```
[196]: [['Action', 'Adventure', 'Sci-Fi'],
        ['Adventure', 'Mystery', 'Sci-Fi'],
        ['Horror', 'Thriller'],
        ['Animation', 'Comedy', 'Family'],
        ['Action', 'Adventure', 'Fantasy'],
        ['Action', 'Adventure', 'Fantasy'],
        ['Comedy', 'Drama', 'Music'],
        ['Comedy'],
        ['Action', 'Adventure', 'Biography'],
        ['Adventure', 'Drama', 'Romance'],
        ['Adventure', 'Family', 'Fantasy'],
        ['Biography', 'Drama', 'History'],
        ['Action', 'Adventure', 'Sci-Fi'],
        ['Animation', 'Adventure', 'Comedy'],
        ['Action', 'Comedy', 'Drama'],
        ['Animation', 'Adventure', 'Comedy'],
        ['Biography', 'Drama', 'History'],
        ['Action', 'Thriller'],
        ['Biography', 'Drama'],
        ['Drama', 'Mystery', 'Sci-Fi'],
        ['Adventure', 'Drama', 'Thriller'],
        ['Drama'],
        ['Crime', 'Drama', 'Horror'],
        ['Animation', 'Adventure', 'Comedy'],
        ['Action', 'Adventure', 'Sci-Fi'],
        ['Comedy'],
        ['Action', 'Adventure', 'Drama'],
        ['Horror', 'Thriller'],
        ['Comedy'],
        ['Action', 'Adventure', 'Drama'],
        ['Comedy'],
        ['Drama', 'Thriller'],
        ['Action', 'Adventure', 'Sci-Fi'],
        ['Action', 'Adventure', 'Comedy'],
        ['Action', 'Horror', 'Sci-Fi'],
        ['Action', 'Adventure', 'Sci-Fi'],
        ['Adventure', 'Drama', 'Sci-Fi'],
        ['Action', 'Adventure', 'Fantasy'],
        ['Action', 'Adventure', 'Western'],
        ['Comedy', 'Drama'],
```

['Animation', 'Adventure', 'Comedy'],
 ['Drama'],
 ['Horror'],
 ['Biography', 'Drama', 'History'],
 ['Drama'],
 ['Action', 'Adventure', 'Fantasy'],
 ['Drama', 'Thriller'],
 ['Adventure', 'Drama', 'Fantasy'],
 ['Action', 'Adventure', 'Sci-Fi'],
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 ['Action', 'Adventure', 'Fantasy'],
 ['Comedy', 'Drama'],
 ['Action', 'Crime', 'Thriller'],
 ['Action', 'Crime', 'Drama'],
 ['Adventure', 'Drama', 'History'],
 ['Crime', 'Horror', 'Thriller'],
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 ['Comedy', 'Drama', 'Romance'],
 ['Biography', 'Drama'],
 ['Action', 'Adventure', 'Sci-Fi'],
 ['Horror', 'Mystery', 'Thriller'],
 ['Crime', 'Drama', 'Mystery'],
 ['Drama', 'Romance', 'Thriller'],
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 ['Action', 'Adventure', 'Comedy'],
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 ['Action', 'Adventure', 'Sci-Fi'],
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 ['Drama', 'Fantasy'],
 ['Drama', 'Romance'],
 ['Animation', 'Adventure', 'Comedy'],
 ['Action', 'Adventure', 'Fantasy'],
 ['Action', 'Sci-Fi'],
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 ['Action', 'Adventure', 'Fantasy'],
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 ['Action', 'Adventure', 'Sci-Fi'],
 ['Comedy', 'Drama'],
 ['Biography', 'Comedy', 'Crime'],
 ['Crime', 'Drama', 'Mystery'],
 ['Action', 'Crime', 'Thriller'],
 ['Action', 'Adventure', 'Sci-Fi'],
 ['Crime', 'Drama'],

['Action', 'Adventure', 'Fantasy'],
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 ['Crime', 'Drama', 'Mystery'],
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 ['Action', 'Adventure', 'Drama'],
 ['Drama'],
 ['Drama', 'Mystery', 'Sci-Fi'],
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 ['Romance', 'Sci-Fi'],
 ['Action', 'Fantasy', 'War'],
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 ['Horror', 'Thriller'],
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 ['Animation', 'Adventure', 'Comedy'],
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 ['Adventure', 'Mystery', 'Sci-Fi'],
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 ['Action'],
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 ['Drama'],
 ['Adventure', 'Comedy', 'Drama'],
 ['Drama', 'Horror', 'Thriller'],
 ['Drama', 'Music'],

['Action', 'Crime', 'Thriller'],
 ['Crime', 'Drama', 'Thriller'],
 ['Crime', 'Drama', 'Thriller'],
 ['Drama', 'Romance'],
 ['Mystery', 'Thriller'],
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 ['Drama'],
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 ['Drama', 'Mystery', 'Romance'],
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 ['Comedy'],
 ['Action', 'Adventure', 'Crime'],
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 ['Action', 'Comedy', 'Crime'],
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 ['Action', 'Adventure', 'Comedy'],
 ['Comedy', 'Romance'],

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 ['Drama', 'Family', 'Fantasy'],
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 ['Drama', 'Romance'],
 ['Drama', 'War'],
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 ['Action', 'Comedy', 'Crime'],
 ['Thriller'],
 ['Action', 'Drama', 'Horror'],
 ['Comedy', 'Music', 'Romance'],
 ['Comedy'],
 ['Drama'],
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 ['Drama', 'Romance'],
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 ['Drama', 'History'],
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 ['Comedy', 'Horror', 'Thriller'],
 ['Action', 'Crime', 'Thriller'],
 ['Crime', 'Drama', 'Music'],
 ['Drama'],

['Action', 'Crime', 'Thriller'],
 ['Action', 'Sci-Fi', 'Thriller'],
 ['Biography', 'Drama'],
 ['Action', 'Adventure', 'Fantasy'],
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 ['Biography', 'Comedy', 'Drama'],
 ['Crime', 'Horror', 'Thriller'],
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 ['Biography', 'Drama'],
 ['Biography', 'Drama', 'History'],
 ['Action', 'Biography', 'Drama'],
 ['Drama', 'Fantasy', 'Horror'],
 ['Comedy', 'Drama', 'Romance'],
 ['Drama', 'Sport'],
 ['Drama', 'Romance'],
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[201]: # Step 2. In this second step, 2D list is converted to 1D list.
      # # lets create this empty list for one_d

```

```

one_d = []
for item in list1:
    for item1 in item:
        one_d.append(item1)

```

```

[202]: one_d

```

```

[202]: ['Action',
        'Adventure',
        'Sci-Fi',
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        'Adventure',

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...]

```
[203]: # Step 3 : find unique value in this empty list
```

```
uni_list = []  
for item in one_d:  
    if item not in uni_list:  
        uni_list.append(item)
```

```
[204]: uni_list
```

```
[204]: ['Action',  
        'Adventure',  
        'Sci-Fi',  
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        'Romance',  
        'History',  
        'Crime',  
        'Western',  
        'War',  
        'Musical',  
        'Sport']
```

24. HOW MANY FILMS OF EACH GENRE WERE MADE?

```
[207]: one_d = []  
for item in list1:  
    for item1 in item:  
        one_d.append(item1)
```

```
[208]: one_d
```

```
[208]: ['Action',  
        'Adventure',  
        'Sci-Fi',  
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[211]: Counter(one_d)
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