

IMDB MOVIE RATINGS DATASET EXPLORATORY DATA ANALYSIS

Objective of the project:

1) To get statistical insight of the dataset 2) The year having the highest average voting. 3) The year having the highest average revenue. 4) Average rating for each director. 6) Top 10 lengthy movie title and runtime. 7) Number of movies per year 8) Most popular movie title (Highest Revenue) 9) Top 10 highest rated movie titles and its directors 10) Average Rating of Movies Year Wise 11) Top 10 highets revenue movie titles 12) Whether rating affects the revenue. 13) Classify movies based on ratings (Excellent,Good,and Average) 14) Count number of Action Movies 15) Find unique values from Genre 16) How many films of each genre were made ?

Tools used in the project:

1) NumPy 2) Pandas 3) Matplotlib 4) Seaborn

Importing the dependencies

```
In [1]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
```

THE DATASET

```
In [2]: data=pd.read_csv(r'C:\Users\HP\Downloads\archive (7)\IMDB-Movie-Data.csv')
```

```
In [3]: data.head()
```

```
Out[3]:
```

	Rank	Title	Genre	Description	Director	Actors	Year	Runtime (Minutes)	Rating	Votes	Revenue (Millions)	Metas
0	1	Guardians of the Galaxy	Action,Adventure,Sci-Fi	A group of intergalactic criminals are forced ...	James Gunn	Chris Pratt, Vin Diesel, Bradley Cooper, Zoe S...	2014	121	8.1	757074	333.13	
1	2	Prometheus	Adventure,Mystery,Sci-Fi	Following clues to the origin of mankind, a te...	Ridley Scott	Noomi Rapace, Logan Marshall-Green, Michael Fa...	2012	124	7.0	485820	126.46	
2	3	Split	Horror,Thriller	Three girls are kidnapped by a man with a diag...	M. Night Shyamalan	James McAvoy, Anya Taylor-Joy, Haley Lu Richar...	2016	117	7.3	157606	138.12	
3	4	Sing	Animation,Comedy,Family	In a city of humanoid animals, a hustling thea...	Christophe Lourdelet	Matthew McConaughey,Reese Witherspoon, Seth Ma...	2016	108	7.2	60545	270.32	
4	5	Suicide Squad	Action,Adventure,Fantasy	A secret government agency recruits some of th...	David Ayer	Will Smith, Jared Leto, Margot Robbie, Viola D...	2016	123	6.2	393727	325.02	

```
In [6]: data.shape
```

```
Out[6]: (1000, 12)
```

The given dataset has 1000 rows and 12 column.

```
In [7]: data.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
```

Checking for null values

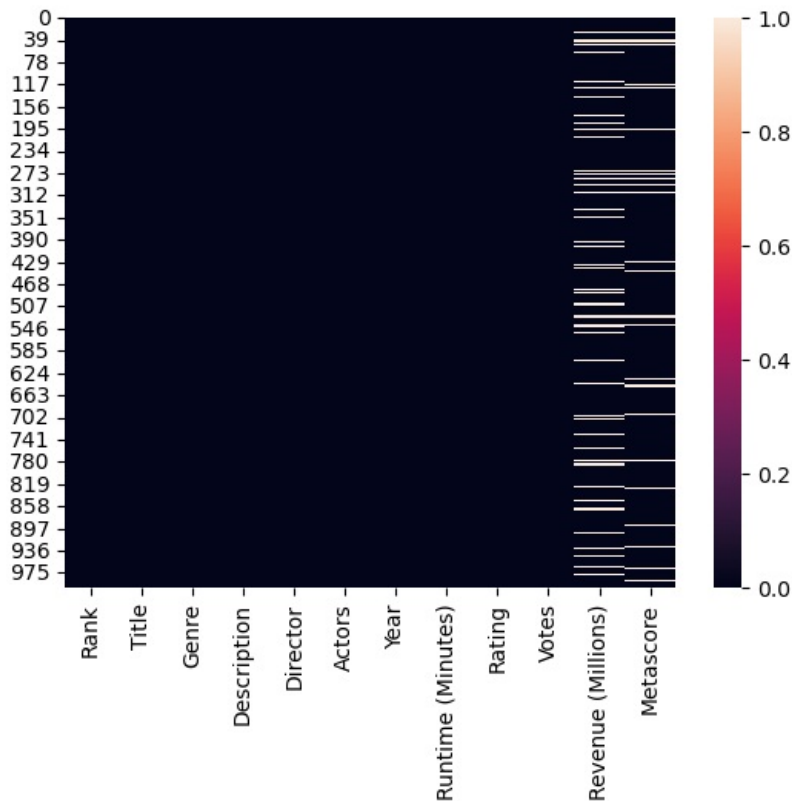
```
In [8]: data.isnull().sum()
```

```
Out[8]: 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
```

There are 128 null values in revenue column and 64 null values in metascore column.

```
In [9]: sns.heatmap(data.isnull())
```

```
Out[9]: <Axes: >
```



```
In [10]: per_missing=data.isnull().sum()*100/len(data)
```

```
In [12]: print(per_missing)
```

```
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
```

Dropping all null values

```
In [17]: data.dropna(axis=0)
```

Out[17]:

	Rank	Title	Genre	Description	Director	Actors	Year	Runtime (Minutes)	Rating	Votes	Revenue (Millions)	Me
0	1	Guardians of the Galaxy	Action,Adventure,Sci-Fi	A group of intergalactic criminals are forced ...	James Gunn	Chris Pratt, Vin Diesel, Bradley Cooper, Zoe S...	2014	121	8.1	757074	333.13	
1	2	Prometheus	Adventure,Mystery,Sci-Fi	Following clues to the origin of mankind, a te...	Ridley Scott	Noomi Rapace, Logan Marshall-Green, Michael Fa...	2012	124	7.0	485820	126.46	
2	3	Split	Horror,Thriller	Three girls are kidnapped by a man with a diag...	M. Night Shyamalan	James McAvoy, Anya Taylor-Joy, Haley Lu Richar...	2016	117	7.3	157606	138.12	
3	4	Sing	Animation,Comedy,Family	In a city of humanoid animals, a hustling thea...	Christophe Lourdelet	Matthew McConaughey,Reese Witherspoon, Seth Ma...	2016	108	7.2	60545	270.32	
4	5	Suicide Squad	Action,Adventure,Fantasy	A secret government agency recruits some of th...	David Ayer	Will Smith, Jared Leto, Margot Robbie, Viola D...	2016	123	6.2	393727	325.02	
...
993	994	Resident Evil: Afterlife	Action,Adventure,Horror	While still out to destroy the evil Umbrella C...	Paul W.S. Anderson	Milla Jovovich, Ali Larter, Wentworth Miller,K...	2010	97	5.9	140900	60.13	
994	995	Project X	Comedy	3 high school seniors throw a birthday party t...	Nima Nourizadeh	Thomas Mann, Oliver Cooper, Jonathan Daniel Br...	2012	88	6.7	164088	54.72	
996	997	Hostel: Part II	Horror	Three American college students studying abroa...	Eli Roth	Lauren German, Heather Matarazzo, Bijou Philli...	2007	94	5.5	73152	17.54	
997	998	Step Up 2: The Streets	Drama,Music,Romance	Romantic sparks occur between two dance studen...	Jon M. Chu	Robert Hoffman, Briana Evigan, Cassie Ventura,...	2008	98	6.2	70699	58.01	
999	1000	Nine Lives	Comedy,Family,Fantasy	A stuffy businessman finds himself trapped ins...	Barry Sonnenfeld	Kevin Spacey, Jennifer Garner, Robbie Amell,Ch...	2016	87	5.3	12435	19.64	

838 rows × 12 columns

Checking for Duplicate Data

```
In [18]: data.duplicated().any()
```

Out[18]: False

Statistical insight of the dataset

Statistical insight of the dataset

```
In [19]: data.describe()
```

```
Out[19]:
```

	Rank	Year	Runtime (Minutes)	Rating	Votes	Revenue (Millions)	Metascore
count	838.000000	838.00000	838.000000	838.000000	8.380000e+02	838.000000	838.000000
mean	485.247017	2012.50716	114.638425	6.814320	1.932303e+05	84.564558	59.575179
std	286.572065	3.17236	18.470922	0.877754	1.930990e+05	104.520227	16.952416
min	1.000000	2006.00000	66.000000	1.900000	1.780000e+02	0.000000	11.000000
25%	238.250000	2010.00000	101.000000	6.300000	6.127650e+04	13.967500	47.000000
50%	475.500000	2013.00000	112.000000	6.900000	1.368795e+05	48.150000	60.000000
75%	729.750000	2015.00000	124.000000	7.500000	2.710830e+05	116.800000	72.000000
max	1000.000000	2016.00000	187.000000	9.000000	1.791916e+06	936.630000	100.000000

The year having the highest average voting

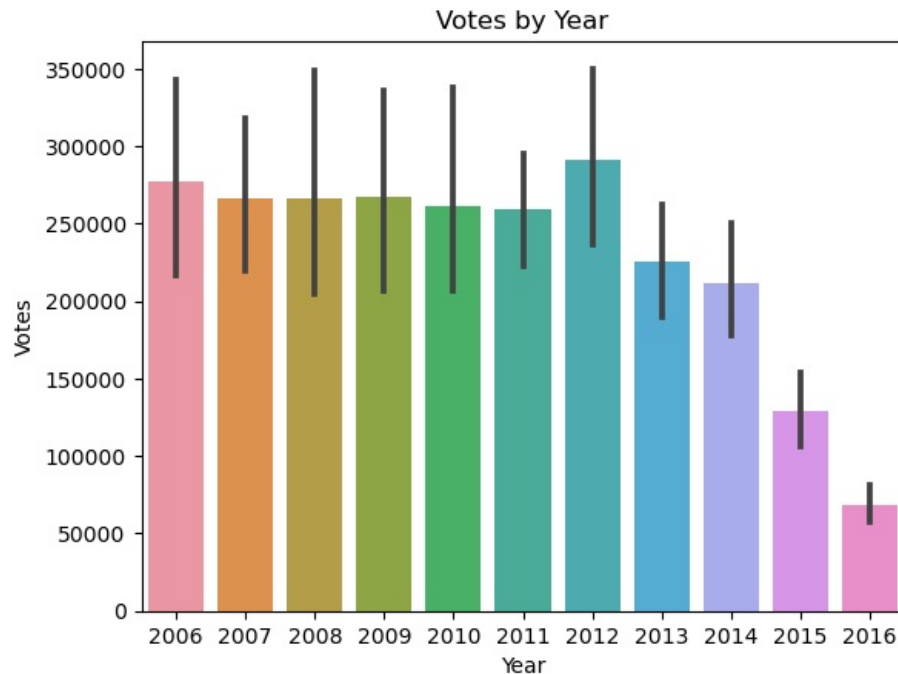
```
In [28]: data.groupby('Year')['Votes'].mean().sort_values(ascending=False)
```

```
Out[28]:
```

Year	Votes
2012	290861.483871
2006	277232.219512
2009	267180.577778
2008	266580.145833
2007	266530.704545
2010	261082.929825
2011	259254.736842
2013	225531.892857
2014	211926.881720
2015	129512.651376
2016	68437.823232

Name: Votes, dtype: float64

```
In [31]: sns.barplot(x='Year',y='Votes',data=data)  
plt.title('Votes by Year')  
plt.show()
```



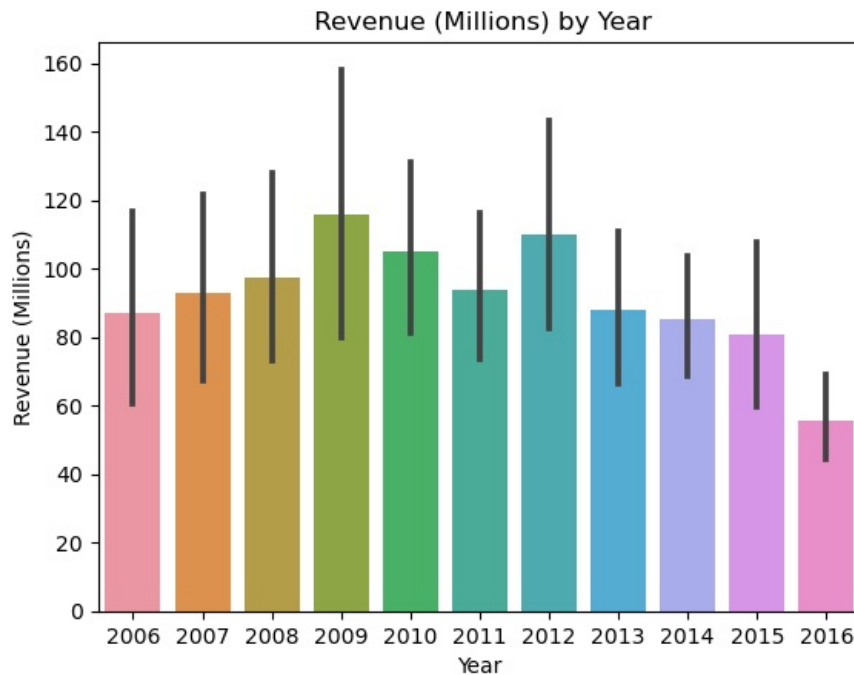
Year 2012 has the highest average voting.

The year having the highest average revenue

```
In [33]: data.groupby('Year')['Revenue (Millions)'].mean().sort_values(ascending=False)
```

```
Out[33]: Year
2009    115.742000
2012    110.103065
2010    105.081579
2008     97.525417
2011     93.703333
2007     93.074091
2013     88.084643
2006     87.255610
2014     85.433656
2015     80.725596
2016     55.566111
Name: Revenue (Millions), dtype: float64
```

```
In [34]: sns.barplot(x='Year',y='Revenue (Millions)',data=data)
plt.title(' Revenue (Millions) by Year')
plt.show()
```



Year 2009 has the highest average revenue.

Average rating for each director

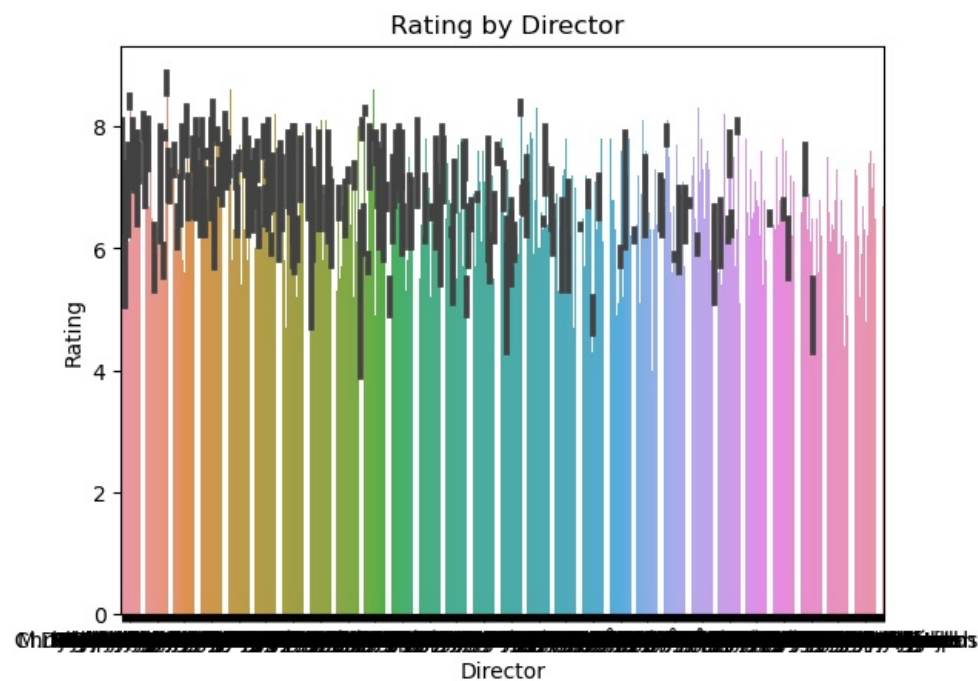
```
In [35]: data.columns
```

```
Out[35]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',
        'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',
        'Metascore'],
        dtype='object')
```

```
In [37]: data.groupby('Director')['Rating'].mean().sort_values(ascending=False)
```

```
Out[37]: Director
Christopher Nolan      8.68
Olivier Nakache        8.60
Makoto Shinkai         8.60
Florian Henckel von Donnersmarck  8.50
Aamir Khan             8.50
...
Sam Taylor-Johnson     4.10
Joey Curtis            4.00
George Nolfi           3.90
James Wong             2.70
Jason Friedberg        1.90
Name: Rating, Length: 524, dtype: float64
```

```
In [38]: sns.barplot(x='Director',y='Rating',data=data)
plt.title(' Rating by Director')
plt.show()
```



Top 10 lengthy movie title and runtime

In [39]: `data.columns`

Out[39]: `Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',
'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',
'Metascore'],
dtype='object')`

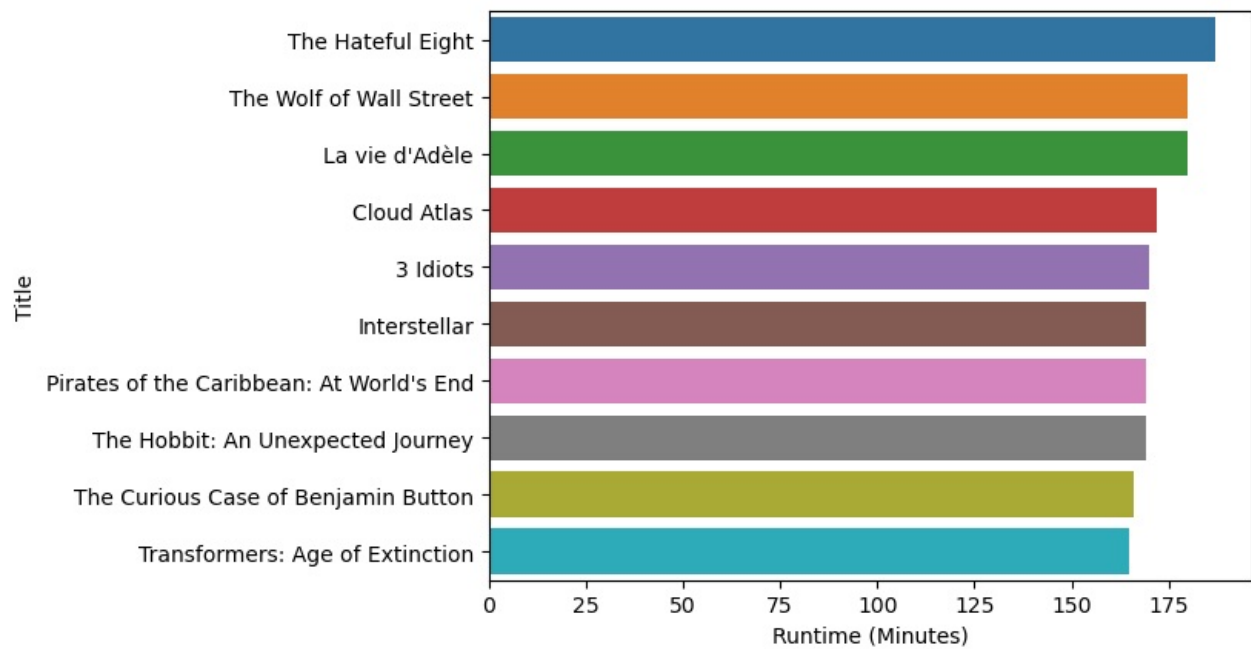
In [49]: `top10_len=data.nlargest(10,'Runtime (Minutes)')[['Title','Runtime (Minutes)']].set_index('Title')`

In [50]: `top10_len`

Out[50]:

	Runtime (Minutes)
The Hateul Eight	187
The Wolf of Wall Street	180
La vie d'Adèle	180
Cloud Atlas	172
3 Idiots	170
Interstellar	169
Pirates of the Caribbean: At World's End	169
The Hobbit: An Unexpected Journey	169
The Curious Case of Benjamin Button	166
Transformers: Age of Extinction	165

In [57]: `sns.barplot(x='Runtime (Minutes)',y=top10_len.index,data=top10_len)
plt.show()`



Number of movies per year

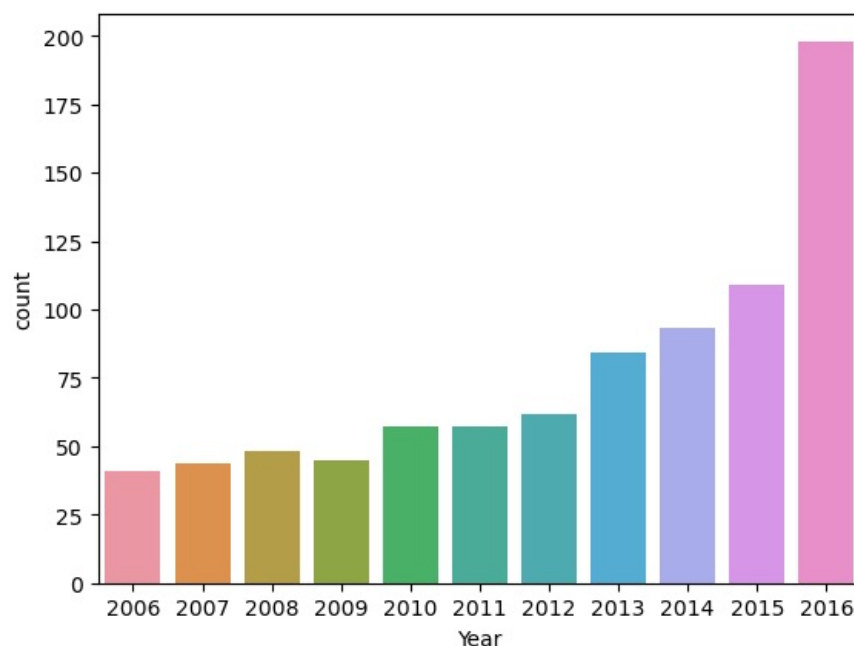
In [53]: `data.columns`

Out[53]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',
'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',
'Metascore'],
dtype='object')

In [54]: `data['Year'].value_counts()`

Out[54]: 2016 198
2015 109
2014 93
2013 84
2012 62
2011 57
2010 57
2008 48
2009 45
2007 44
2006 41
Name: Year, dtype: int64

In [56]: `sns.countplot(x='Year', data=data)`
`plt.show()`



In 2016 , maximum number (198) were released.

Most popular movie title (Highest Revenue)

most popular movie title (highest revenue)

```
In [58]: data.columns
```

```
Out[58]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',  
        'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',  
        'Metascore'],  
        dtype='object')
```

```
In [62]: data[data['Revenue (Millions)'].max()==data['Revenue (Millions)']]['Title']
```

```
Out[62]: 50    Star Wars: Episode VII - The Force Awakens  
Name: Title, dtype: object
```

'Star Wars: Episode VII - The Force Awakens' has the highest revenue.

Top 10 highest rated movie titles and its directors

```
In [63]: data.columns
```

```
Out[63]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',  
        'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',  
        'Metascore'],  
        dtype='object')
```

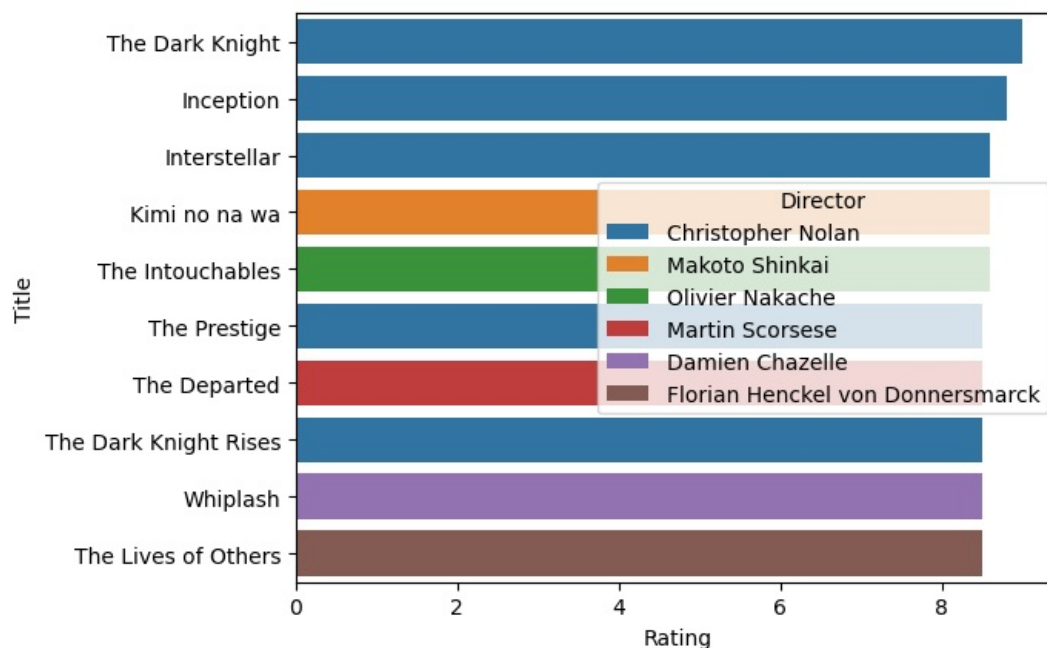
```
In [65]: top10_len=data.nlargest(10,'Rating')[['Title','Rating','Director']].set_index('Title')
```

```
In [66]: top10_len
```

```
Out[66]:
```

	Rating	Director
Title		
The Dark Knight	9.0	Christopher Nolan
Inception	8.8	Christopher Nolan
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
The Lives of Others	8.5	Florian Henckel von Donnersmarck

```
In [71]: sns.barplot(x='Rating',y=top10_len.index,data=top10_len,hue='Director',dodge=False)  
plt.show()
```



'The Dark Knight' by Christopher Nolan is the highest rated movie.

Top 10 highests revenue movie titles


```
In [75]: data.columns
```

```
Out[75]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',  
          'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',  
          'Metascore'],  
          dtype='object')
```

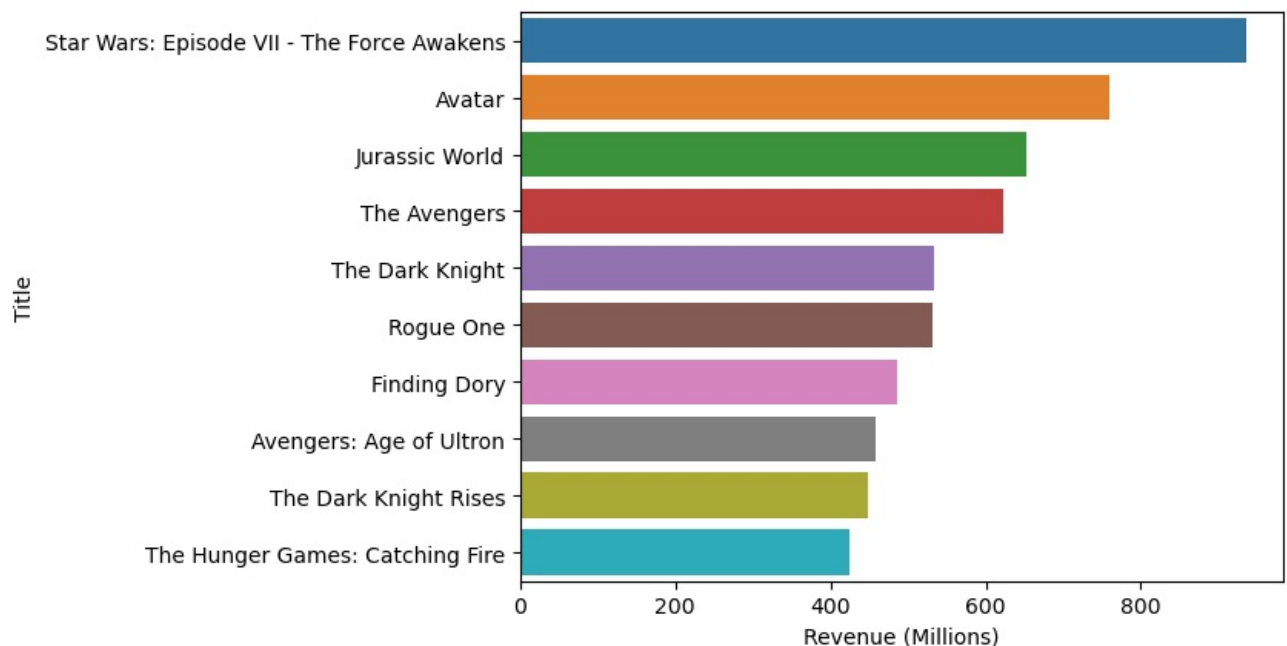
```
In [76]: top10_len=data.nlargest(10,'Revenue (Millions)')[['Title','Revenue (Millions)']].set_index('Title')
```

```
In [77]: top10_len
```

```
Out[77]:
```

	Revenue (Millions)
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
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

```
In [78]: sns.barplot(x='Revenue (Millions)',y=top10_len.index,data=top10_len)  
plt.show()
```



Average Rating of Movies Year Wise

```
In [79]: data.columns
```

```
Out[79]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',  
          'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',  
          'Metascore'],  
          dtype='object')
```

```
In [83]: data.groupby('Year')['Rating'].mean().sort_values(ascending=False)
```

```
Out[83]: Year
2006    7.143902
2007    7.140909
2011    6.945614
2012    6.933871
2009    6.911111
2010    6.894737
2013    6.832143
2014    6.822581
2008    6.708333
2015    6.674312
2016    6.644444
Name: Rating, dtype: float64
```

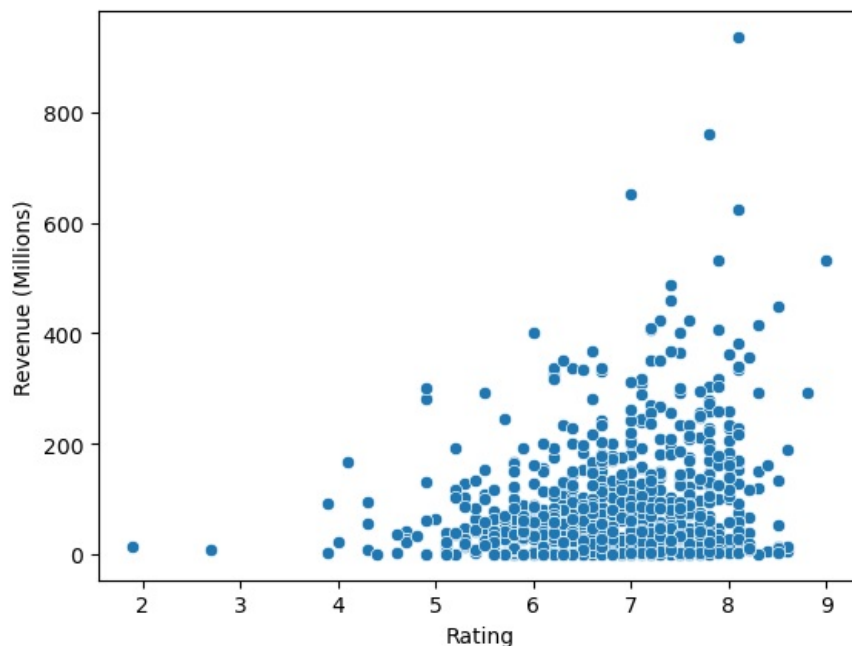
Does Rating affect the Revenue ?

```
In [84]: data.columns
```

```
Out[84]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',
        'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',
        'Metascore'],
        dtype='object')
```

```
In [85]: sns.scatterplot(x='Rating',y='Revenue (Millions)',data=data)
```

```
Out[85]: <Axes: xlabel='Rating', ylabel='Revenue (Millions)'>
```



From this scatter plot we can come to the conclusion that rating of a movie affects revenue.

Classify movies based on ratings (Excellent,Good,and Average)

```
In [87]: data.columns
```

```
Out[87]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',
        'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',
        'Metascore'],
        dtype='object')
```

```
In [88]: def rating(rating):
        if rating >=7.0:
            return "Excellent"
        elif rating>=6.0:
            return "Good"
        else:
            return "Average"
```

```
In [89]: data['rating_cat']=data['Rating'].apply(rating)
```

```
In [90]: data.head()
```

Out[90]:

	Rank	Title	Genre	Description	Director	Actors	Year	Runtime (Minutes)	Rating	Votes	Revenue (Millions)	Metascore
0	1	Guardians of the Galaxy	Action,Adventure,Sci-Fi	A group of intergalactic criminals are forced ...	James Gunn	Chris Pratt, Vin Diesel, Bradley Cooper, Zoe S...	2014	121	8.1	757074	333.13	
1	2	Prometheus	Adventure,Mystery,Sci-Fi	Following clues to the origin of mankind, a te...	Ridley Scott	Noomi Rapace, Logan Marshall-Green, Michael Fa...	2012	124	7.0	485820	126.46	
2	3	Split	Horror,Thriller	Three girls are kidnapped by a man with a diag...	M. Night Shyamalan	James McAvoy, Anya Taylor-Joy, Haley Lu Richar...	2016	117	7.3	157606	138.12	
3	4	Sing	Animation,Comedy,Family	In a city of humanoid animals, a hustling thea...	Christophe Lourdelet	Matthew McConaughey,Reese Witherspoon, Seth Ma...	2016	108	7.2	60545	270.32	
4	5	Suicide Squad	Action,Adventure,Fantasy	A secret government agency recruits some of th...	David Ayer	Will Smith, Jared Leto, Margot Robbie, Viola D...	2016	123	6.2	393727	325.02	

Count number of Action Movies

```
In [91]: data.columns
Out[91]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',
        'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',
        'Metascore', 'rating_cat'],
        dtype='object')

In [92]: data['Genre'].dtype
Out[92]: dtype('O')

In [95]: len(data['Genre'].str.contains('Action',case=False))
Out[95]: 838

There are 838 action movies in the given dataset.
```

Find unique values from Genre

```
In [96]: data.columns
Out[96]: Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',
        'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',
        'Metascore', 'rating_cat'],
        dtype='object')

In [97]: data['Genre']
Out[97]: 0      Action,Adventure,Sci-Fi
1      Adventure,Mystery,Sci-Fi
2              Horror,Thriller
3      Animation,Comedy,Family
4      Action,Adventure,Fantasy
...
993     Action,Adventure,Horror
994                   Comedy
996                   Horror
997      Drama,Music,Romance
999     Comedy,Family,Fantasy
Name: Genre, Length: 838, dtype: object

In [98]: list1=[]
        for value in data['Genre']:
            list1.append(value.split(','))

In [99]: list1
Out[99]: [['Action', 'Adventure', 'Sci-Fi'],
          ['Adventure', 'Mystery', 'Sci-Fi'],
```

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

```

In [100]: one_d=[]
          for item in list1:
              for item1 in item:
                  one_d.append(item1)

```

```

In [101]: one_d

```

```

Out[101]: ['Action',
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```

```
In [102.. uni_list=[]
for item in one_d:
    if item not in uni_list:
        uni_list.append(item)
```

```
In [103.. uni_list
```



```
Out[103]: ['Action',
           'Adventure',
           'Sci-Fi',
           'Mystery',
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           'Musical',
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```

```
In [104]: len(uni_list)
```

```
Out[104]: 20
```

How many films of each genre were made ?

```
In [105]: one_d=[]
          for item in list1:
              for item1 in item:
                  one_d.append(item1)
```

```
In [106]: one_d
```

```
Out[106]: ['Action',
           'Adventure',
           'Sci-Fi',
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In [107]: from collections import Counter
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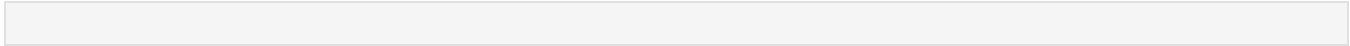
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In [108]: Counter(one_d)
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Conclusion :

Year 2012 has the highest average voting. Year 2009 has the highest average revenue. In 2016 , maximum number (198) were released. There are 838 action movies in the dataset. The Hateful Eight is the movie having longest running time (187 minutes). 'Star Wars: Episode VII - The Force Awakens' has the highest revenue. 'The Dark Knight' by Christopher Nolan is the highest rated movie.

In []:



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