IMDB Top 250 Movies Dataset

- IMDB (Internet Movie Database) is one of the largest online databases for movies and television shows, providing comprehensive information about movies, including ratings and reviews from its vast user base. The IMDB ratings are widely used as a benchmark for the popularity and success of movies.
- This dataset contains the top 250 rated movies on IMDB as of 2021, providing a snapshot of the most popular and highly rated movies of recent times. By analyzing this dataset, one can gain insights into the movie industry, such as trends in movie ratings and popular genres.

In [1]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import os
import warnings
import matplotlib.pyplot as plt
import plotly.graph_objects as go
import plotly.express as px
import plotly.graph_objs as go

warnings.filterwarnings('ignore')
sns.set(style="whitegrid")
```

Loading data

In [2]:
```
folder = './datasets'
for file in os.listdir(folder):
    print(file)
```

```
IMDB-Top-250-Movies.csv
```

In [3]:
```
df = pd.read_csv('datasets/IMDB-Top-250-Movies.csv')
df.head()
```

Out[3]:

	rank	name	year	rating	genre	certificate	run_time	tagline	budget	box_office	casts	directors	writers
0	1	The Shawshank Redemption	1994	9.3	Drama	R	2h 22m	Fear can hold you prisoner. Hope can set you f...	25000000	28884504	Tim Robbins,Morgan Freeman,Bob Gunton,William ...	Frank Darabont	Stephen King,Frank Darabont
1	2	The Godfather	1972	9.2	Crime,Drama	R	2h 55m	An offer you can't refuse.	6000000	250341816	Marlon Brando,Al Pacino,James Caan,Diane Keato...	Francis Ford Coppola	Mario Puzo,Francis Ford Coppola
2	3	The Dark Knight	2008	9.0	Action,Crime,Drama	PG-13	2h 32m	Why So Serious?	185000000	1006234167	Christian Bale,Heath Ledger,Aaron Eckhart,Mich...	Christopher Nolan	Jonathan Nolan,Christopher Nolan,David S. Goyer
3	4	The Godfather Part II	1974	9.0	Crime,Drama	R	3h 22m	All the power on earth can't change destiny.	13000000	47961919	Al Pacino,Robert De Niro,Robert Duvall,Diane K...	Francis Ford Coppola	Francis Ford Coppola,Mario Puzo
4	5	12 Angry Men	1957	9.0	Crime,Drama	Approved	1h 36m	Life Is In Their Hands -- Death Is On Their Mi...	350000	955	Henry Fonda,Lee J. Cobb,Martin Balsam,John Fie...	Sidney Lumet	Reginald Rose

Data Statistics

In [4]:
```
df.shape
```

Out[4]: (250, 13)

In [5]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 250 entries, 0 to 249
Data columns (total 13 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   rank         250 non-null    int64  
 1   name         250 non-null    object 
 2   year         250 non-null    int64  
 3   rating       250 non-null    float64
 4   genre        250 non-null    object 
 5   certificate  250 non-null    object 
 6   run_time     250 non-null    object 
 7   tagline      250 non-null    object 
 8   budget       250 non-null    object 
 9   box_office   250 non-null    object 
 10  casts        250 non-null    object 
 11  directors    250 non-null    object 
 12  writers      250 non-null    object 
dtypes: float64(1), int64(2), object(10)
memory usage: 25.5+ KB
```

These are what the column names represent:

- `rank` : The rank of the movie based on its popularity or any other criteria.
- `name` : The name of the movie.
- `year` : The year in which the movie was released.
- `rating` : The rating of the movie on IMDb's scale of 1 to 10.
- `genre` : The category or type of movie, such as action, comedy, drama, etc.
- `certificate` : The rating given to the movie by the relevant certification board, which indicates the age appropriateness of the movie and may contain information about the content.
- `run_time` : The duration of the movie.
- `tagline` : The phrase or sentence used to promote the movie.
- `budget` : The estimated cost of making the movie.
- `box_office` : The amount of revenue generated by the movie at the box office.
- `casts` : The actors who appear in the movie.
- `directors` : The person who directed the movie.
- `writers` : The people who wrote the screenplay of the movie.

In [6]:
```
df.describe()
```

Out[6]:

	rank	year	rating
count	250.000000	250.000000	250.000000
mean	125.500000	1986.360000	8.307200
std	72.312977	25.125356	0.229081
min	1.000000	1921.000000	8.000000
25%	63.250000	1966.250000	8.100000
50%	125.500000	1994.000000	8.200000
75%	187.750000	2006.000000	8.400000
max	250.000000	2022.000000	9.300000

In [7]:
```
df.isnull().sum()
```

```
rank           0
name           0
year           0
rating         0
genre          0
certificate    0
run_time       0
tagline        0
budget         0
box_office     0
casts          0
directors      0
writers        0
dtype: int64
```

In [8]:
```
# splits each cell with genres by separator
genres = df['genre'].str.split(',', expand=True).stack().reset_index(level=1, drop=True).rename('director')

# the list of genres with their respective counts
list_of_genres = genres.value_counts()
list_of_genres
```

```
director
Drama        177
Adventure     60
Crime         51
Action        50
Comedy        45
Mystery       31
Thriller      30
Biography     29
Romance       23
War           23
Animation     23
Sci-Fi        20
Fantasy       14
Family        13
History       10
Western        7
Horror         5
Sport          5
Music          4
Film-Noir      4
Musical        1
Name: count, dtype: int64
```

Data Visualization

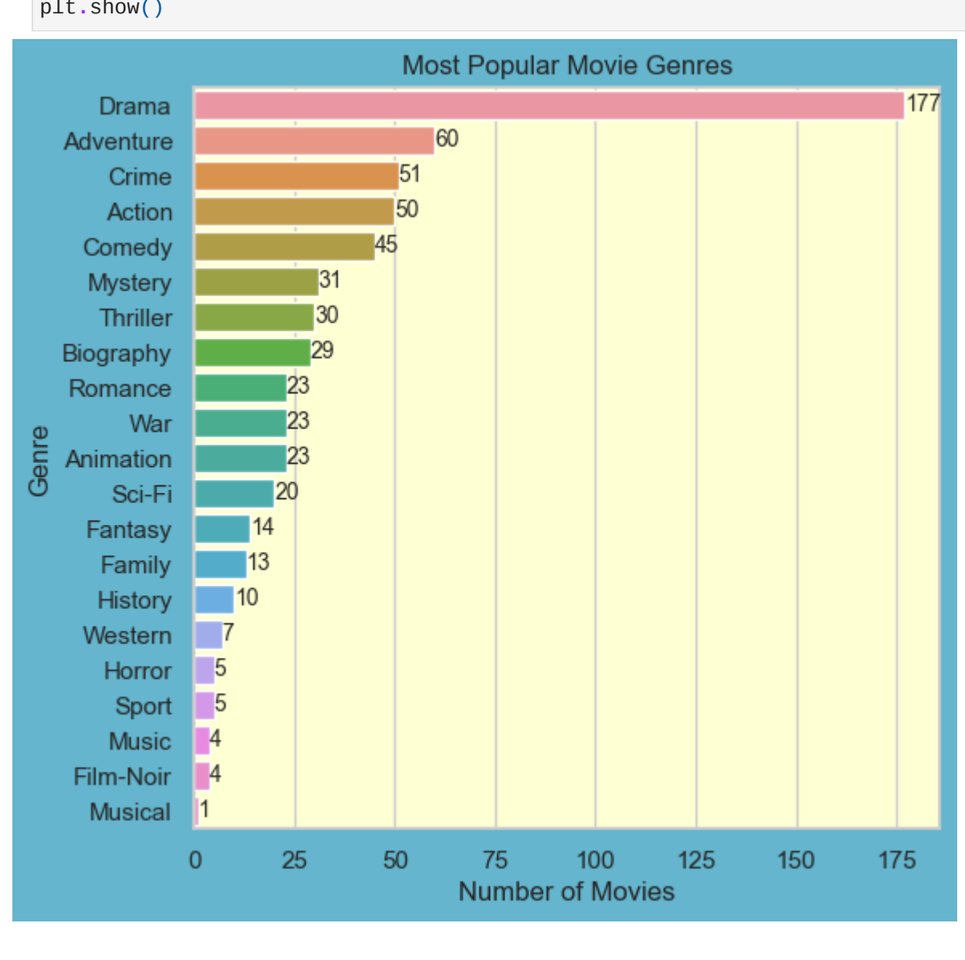
Most popular movies across different genres

In [9]:
```
plt.figure(facecolor = "c", figsize = (6, 6))

ax = sns.barplot(y = genres.value_counts().index, x = genres.value_counts().values)

ax.set(xlabel='Number of Movies',ylabel='Genre', title='Most Popular Movie Genres')
ax.set_facecolor("xkcd:eggshell")
ax.bar_label(ax.containers[0], fontsize=10)

plt.show()
```

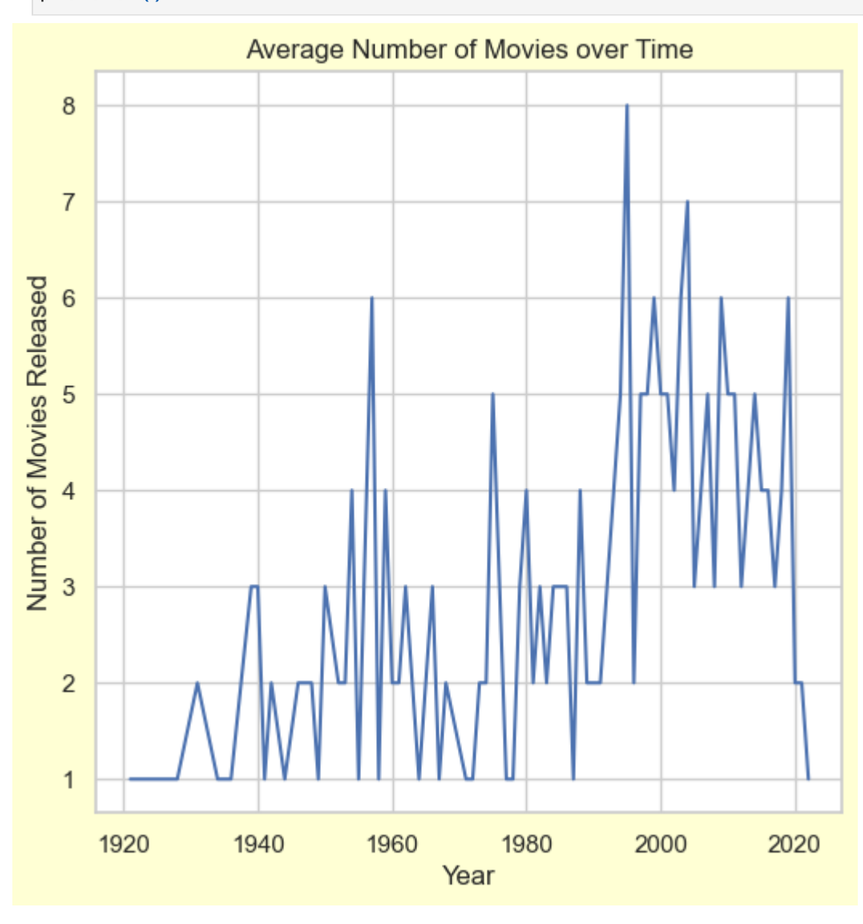


Average Number of Movies over Time

In [10]:
```
movies_year_counts = df.groupby('year')['name'].count()

plt.figure(facecolor = "xkcd:eggshell", figsize = (6, 6))
plt.plot(movies_year_counts.index, movies_year_counts.values)
plt.xlabel('Year')
plt.ylabel('Number of Movies Released')
plt.title('Average Number of Movies over Time')

plt.show()
```

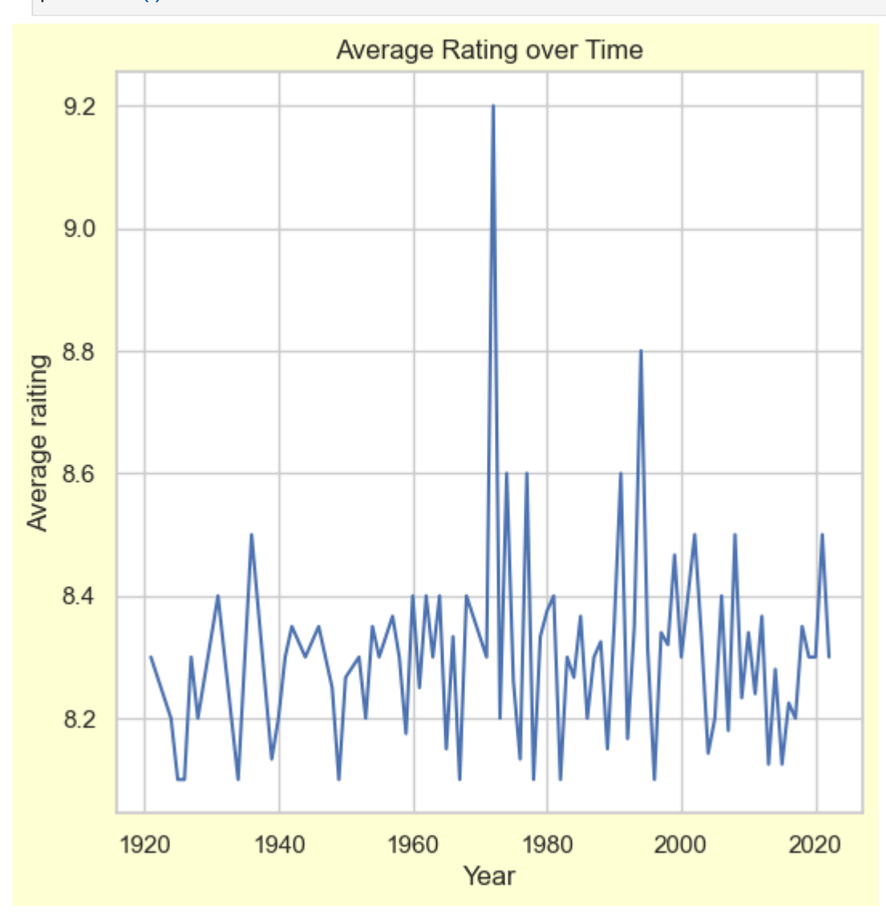


Average Rating over Time

In [11]:
```
rating_year_counts = df.groupby('year')['rating'].mean()

plt.figure(facecolor = "xkcd:eggshell", figsize = (6, 6))
plt.plot(rating_year_counts.index, rating_year_counts.values)
plt.xlabel('Year')
plt.ylabel('Average raiting')
plt.title('Average Rating over Time')

plt.show()
```



Top 10 Movies with the Longest Run Times

For now, the runtime format is not suitable for visualization:

In [12]:
```
df[['run_time']]
```

Out[12]:

	run_time
0	2h 22m
1	2h 55m
2	2h 32m
3	3h 22m
4	1h 36m
...	...
245	2h 26m
246	2h 22m
247	1h 30m
248	3h 11m
249	3h 1m

250 rows × 1 columns

Let's apply the function bellow and convert it to minutes:

In [13]:
```
def convert_to_mins(time_string):
    time_list = time_string.split()
    hours = 0
    minutes = 0
    for time_segment in time_list:
        if 'h' in time_segment:
            hours = int(time_segment[:-1])
        elif 'm' in time_segment:
            minutes = int(time_segment[:-1])
    total_minutes = hours * 60 + minutes
    return total_minutes

df['run_time'] = df['run_time'].apply(convert_to_mins)
```

In [14]:
```
df[['run_time']]
```

Out[14]:

	run_time
0	142
1	175
2	152
3	202
4	96
...	...
245	146
246	142
247	90
248	191
249	181

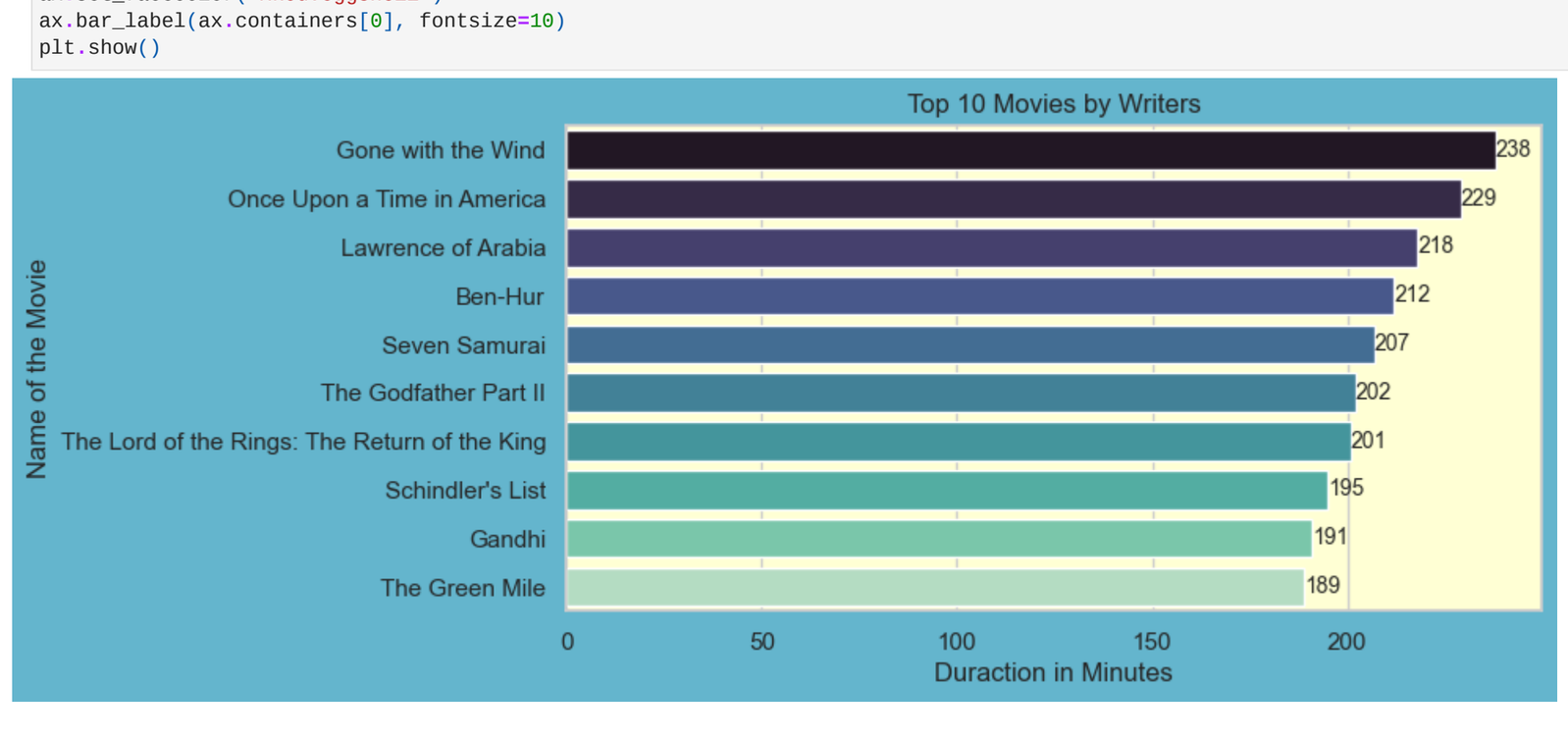
250 rows × 1 columns

In [15]:
```
top_10_budget = df.nlargest(10, 'run_time')
top_10_budget[['name', 'run_time']]
```

Out[15]:

	name	run_time
158	Gone with the Wind	238
79	Once Upon a Time in America	229
96	Lawrence of Arabia	218
182	Ben-Hur	212
19	Seven Samurai	207
3	The Godfather Part II	202
6	The Lord of the Rings: The Return of the King	201
5	Schindler's List	195
248	Gandhi	191
26	The Green Mile	189

In [16]:
```
plt.figure(facecolor = 'c', figsize = (8, 4))
ax = sns.barplot(x='run_time', y='name', data=top_10_budget, palette='mako')
plt.title('Top 10 Movies by Writers')
plt.xlabel('Duraction in Minutes')
plt.ylabel('Name of the Movie')
ax.set_facecolor("xkcd:eggshell")
ax.bar_label(ax.containers[0], fontsize=10)
plt.show()
```



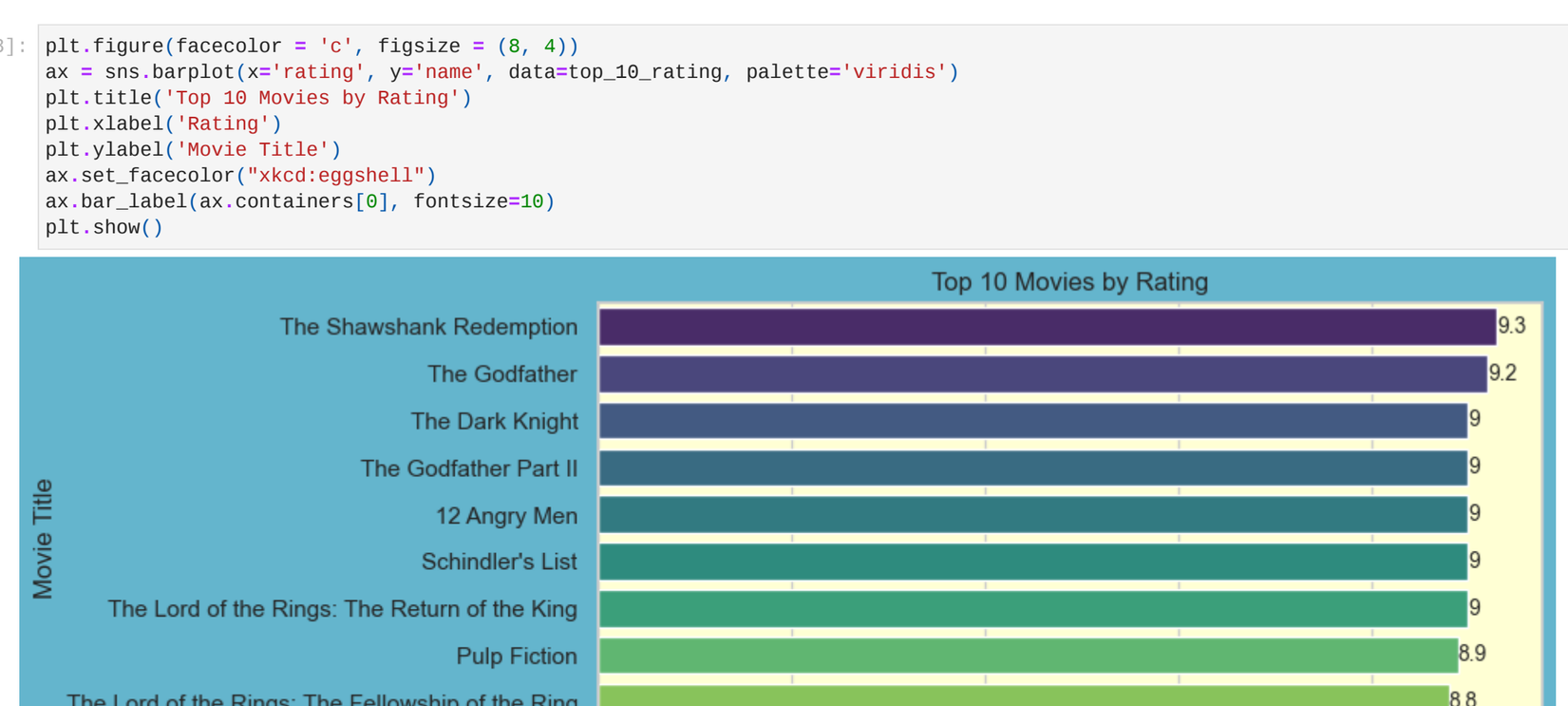
Top 10 Movies by Rating

In [17]:
```
top_10_rating = df.nlargest(10, 'rating')
top_10_rating[['name', 'rating']]
```

Out[17]:

	name	rating
0	The Shawshank Redemption	9.3
1	The Godfather	9.2
2	The Dark Knight	9.0
3	The Godfather Part II	9.0
4	12 Angry Men	9.0
5	Schindler's List	9.0
6	The Lord of the Rings: The Return of the King	9.0
7	Pulp Fiction	8.9
8	The Lord of the Rings: The Fellowship of the Ring	8.8
9	The Good, the Bad and the Ugly	8.8

In [18]:
```
plt.figure(facecolor = 'c', figsize = (8, 4))
ax = sns.barplot(x='rating', y='name', data=top_10_rating, palette='viridis')
plt.title('Top 10 Movies by Rating')
plt.xlabel('Rating')
plt.ylabel('Movie Title')
ax.set_facecolor("xkcd:eggshell")
ax.bar_label(ax.containers[0], fontsize=10)
plt.show()
```



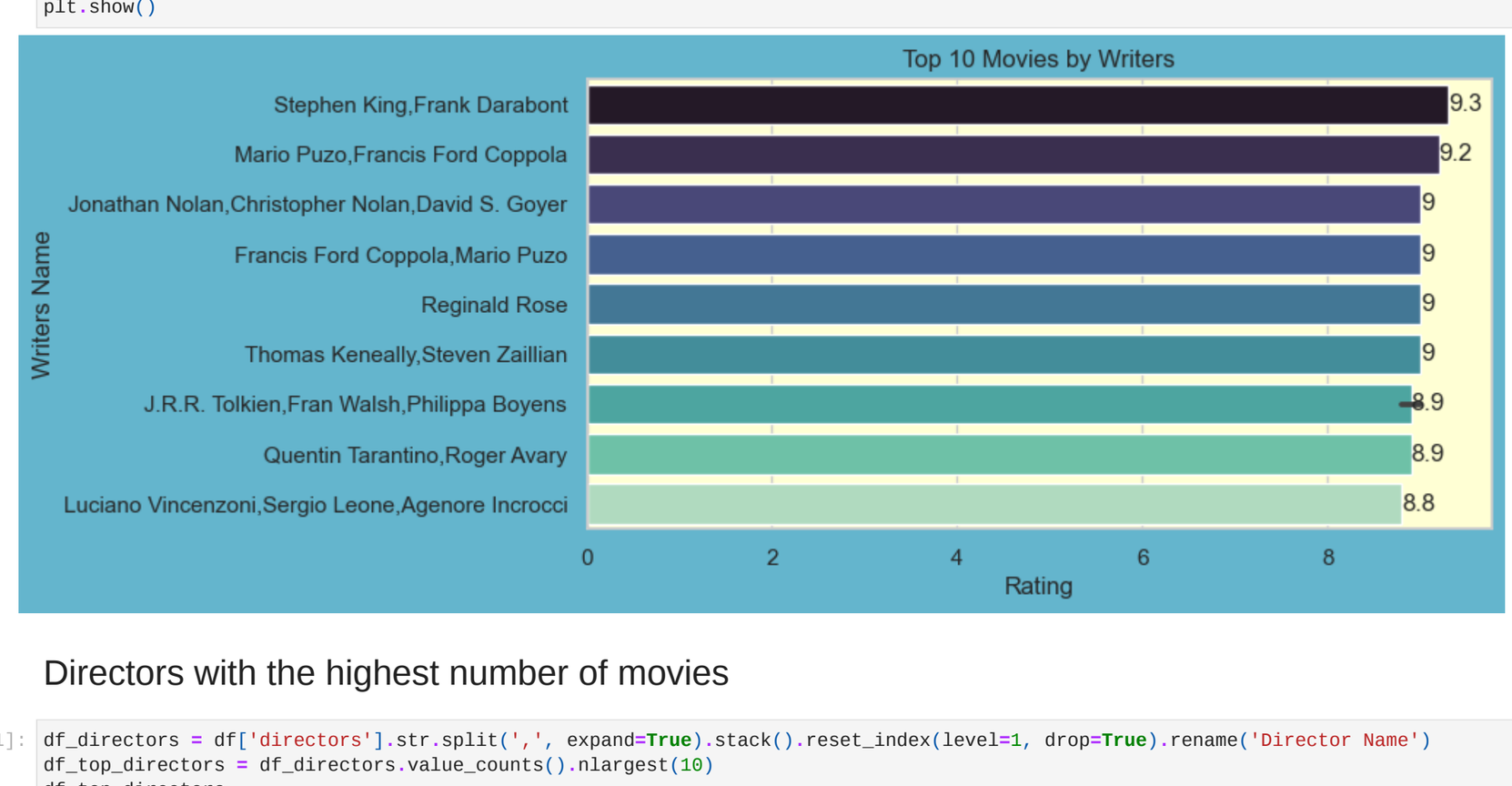
Top 10 Moviee by Writers:

In [19]:
```
top_10_writers = df.nlargest(10, 'rating')
top_10_writers[['writers', 'rating']]
```

Out[19]:

	writers	rating
0	Stephen King,Frank Darabont	9.3
1	Mario Puzo,Francis Ford Coppola	9.2
2	Jonathan Nolan,Christopher Nolan,David S. Goyer	9.0
3	Francis Ford Coppola,Mario Puzo	9.0
4	Reginald Rose	9.0
5	Thomas Keneally,Steven Zaillian	9.0
6	J.R.R. Tolkien,Fran Walsh,Philippa Boyens	9.0
7	Quentin Tarantino,Roger Avary	8.9
8	J.R.R. Tolkien,Fran Walsh,Philippa Boyens	8.8
9	Luciano Vincenzoni,Sergio Leone,Agenore Incrocci	8.8

In [20]:
```
plt.figure(facecolor = 'c', figsize = (8, 4))
ax = sns.barplot(x='rating', y='writers', data=top_10_writers, palette='mako')
plt.title('Top 10 Movies by Writers')
plt.xlabel('Rating')
plt.ylabel('Writers Name')
ax.set_facecolor("xkcd:eggshell")
ax.bar_label(ax.containers[0], fontsize=12)
plt.show()
```

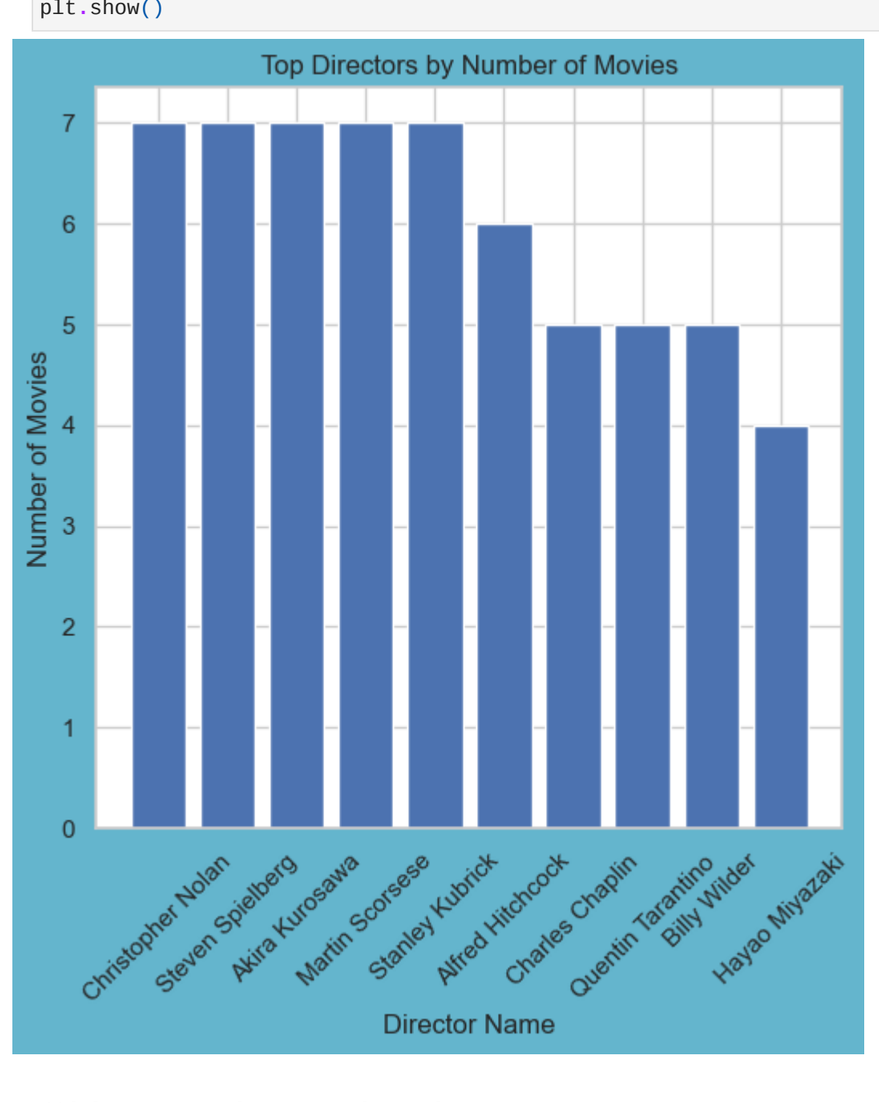


Directors with the highest number of movies

In [21]:
```
df_directors = df['directors'].str.split(',', expand=True).stack().reset_index(level=1, drop=True).rename('Director Name')
df_top_directors = df_directors.value_counts().nlargest(10)
df_top_directors
```

```
Director Name
Christopher Nolan    7
Steven Spielberg     7
Akira Kurosawa       7
Martin Scorsese      7
Stanley Kubrick      7
Alfred Hitchcock     6
Charles Chaplin      5
Quentin Tarantino    5
Billy Wilder         5
Hayao Miyazaki       4
Name: count, dtype: int64
```

In [22]:
```
plt.figure(figsize=(6, 6), facecolor = "c")
plt.bar(df_top_directors.index, df_top_directors.values)
plt.xlabel('Director Name')
plt.ylabel('Number of Movies')
plt.title('Top Directors by Number of Movies')
plt.xticks(rotation=45)  # Rotates x-axis labels by 90 degrees
plt.show()
```



Oldest movies on the charts

In [23]:
```
oldest_movies=df.sort_values(by='year')[0:10]

fig = go.Figure(data=[go.Table(header=dict(values=['Movie Name', 'Release Year'],fill_color='cyan'),
               cells=dict(values=[oldest_movies['name'],oldest_movies['year']]))
                   ])
fig.show()
```

Movie Name	Release Year
The Kid	1921
Sherlock Jr.	1924
The Gold Rush	1925
The General	1926
Metropolis	1927
The Passion of Joan of Arc	1928
M	1931
City Lights	1931
It Happened One Night	1934
Modern Times	1936

Latest movies on the chart

In [24]:
```
oldest_movies=df.sort_values(by='year', ascending=False)[0:15]

fig = go.Figure(data=[go.Table(header=dict(values=['Movie Name', 'Release Year'],fill_color='cyan'),
               cells=dict(values=[oldest_movies['name'],oldest_movies['year']]))
                   ])
fig.show()
```

Movie Name	Release Year
Top Gun: Maverick	2022
Spider-Man: No Way Home	2021
Jai Bhim	2021
The Father	2020
Hamilton	2020
1917	2019
Parasite	2019
Ford v Ferrari	2019
Avengers: Endgame	2019
Klaus	2019
Joker	2019
Capernaum	2018
Green Book	2018
Avengers: Infinity War	2018
Spider-Man: Into the Spider-Verse	2018