

# NETFLIX Project

```
In [1]: import pandas as pd  
import matplotlib.pyplot as plt
```

## Problem Statements

- Q1. What is the most frequent genre of movies released on Netflix?
- Q2. Which has highest votes in vote avg column?
- Q3. What movie has got the highest popularity? What's its genre?
- Q4. What movie has got the lowest popularity? What's its genre?
- Q5. Which year has the most filmmed movies?

## Data collection

```
In [2]: df = pd.read_csv("mymoviedb.csv", lineterminator="\n")
```

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

	Release_Date	Title	Overview	Popularity	Vote_Count	Vote_Average	Original_Language	Genre	Poster_Url
0	2021-12-15	Spider-Man: No Way Home	Peter Parker is unmasked and no longer able to...	5083.954	8940	8.3	en	Action, Adventure, Science Fiction	<a href="https://image.tmdb.org/t/p/original/1g0dhYtq4i...">https://image.tmdb.org/t/p/original/1g0dhYtq4i...</a>
1	2022-03-01	The Batman	In his second year of fighting crime, Batman u...	3827.658	1151	8.1	en	Crime, Mystery, Thriller	<a href="https://image.tmdb.org/t/p/original/74xTEgt7R3...">https://image.tmdb.org/t/p/original/74xTEgt7R3...</a>
2	2022-02-25	No Exit	Stranded at a rest stop in the mountains durin...	2618.087	122	6.3	en	Thriller	<a href="https://image.tmdb.org/t/p/original/vDHsLnOWKI...">https://image.tmdb.org/t/p/original/vDHsLnOWKI...</a>
3	2021-11-24	Encanto	The tale of an extraordinary family, the Madri...	2402.201	5076	7.7	en	Animation, Comedy, Family, Fantasy	<a href="https://image.tmdb.org/t/p/original/4j0PNHkMr5...">https://image.tmdb.org/t/p/original/4j0PNHkMr5...</a>
4	2021-12-22	The King's Man	As a collection of history's worst tyrants and...	1895.511	1793	7.0	en	Action, Adventure, Thriller, War	<a href="https://image.tmdb.org/t/p/original/aq4Pwv5Xeu...">https://image.tmdb.org/t/p/original/aq4Pwv5Xeu...</a>

```
In [4]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9827 entries, 0 to 9826
Data columns (total 9 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   Release_Date     9827 non-null    object  
 1   Title            9827 non-null    object  
 2   Overview          9827 non-null    object  
 3   Popularity        9827 non-null    float64 
 4   Vote_Count        9827 non-null    int64  
 5   Vote_Average      9827 non-null    float64 
 6   Original_Language 9827 non-null    object  
 7   Genre             9827 non-null    object  
 8   Poster_Url         9827 non-null    object  
dtypes: float64(2), int64(1), object(6)
memory usage: 691.1+ KB
```

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

Out[5]:

	Popularity	Vote_Count	Vote_Average
<b>count</b>	9827.000000	9827.000000	9827.000000
<b>mean</b>	40.326088	1392.805536	6.439534
<b>std</b>	108.873998	2611.206907	1.129759
<b>min</b>	13.354000	0.000000	0.000000
<b>25%</b>	16.128500	146.000000	5.900000
<b>50%</b>	21.199000	444.000000	6.500000
<b>75%</b>	35.191500	1376.000000	7.100000
<b>max</b>	5083.954000	31077.000000	10.000000

## Data Cleaning

### Removing NaNs

In [6]: `pd.notnull(df)`

Out[6]:

	Release_Date	Title	Overview	Popularity	Vote_Count	Vote_Average	Original_Language	Genre	Poster_Url
0	True	True	True	True	True	True	True	True	True
1	True	True	True	True	True	True	True	True	True
2	True	True	True	True	True	True	True	True	True
3	True	True	True	True	True	True	True	True	True
4	True	True	True	True	True	True	True	True	True
...	...	...	...	...	...	...	...	...	...
9822	True	True	True	True	True	True	True	True	True
9823	True	True	True	True	True	True	True	True	True
9824	True	True	True	True	True	True	True	True	True
9825	True	True	True	True	True	True	True	True	True
9826	True	True	True	True	True	True	True	True	True

9827 rows × 9 columns

In [7]: `df.dropna()`

Out[7]:

	Release_Date	Title	Overview	Popularity	Vote_Count	Vote_Average	Original_Language	Genre	Poster_Url
0	2021-12-15	Spider-Man: No Way Home	Peter Parker is unmasked and no longer able to...	5083.954	8940	8.3	en	Action, Adventure, Science Fiction	<a href="https://image.tmdb.org/t/p/original/1g0dhYtq4i...">https://image.tmdb.org/t/p/original/1g0dhYtq4i...</a>
1	2022-03-01	The Batman	In his second year of fighting crime, Batman u...	3827.658	1151	8.1	en	Crime, Mystery, Thriller	<a href="https://image.tmdb.org/t/p/original/74xTEgt7R3...">https://image.tmdb.org/t/p/original/74xTEgt7R3...</a>
2	2022-02-25	No Exit	Stranded at a rest stop in the mountains durin...	2618.087	122	6.3	en	Thriller	<a href="https://image.tmdb.org/t/p/original/vDHsLnOWKI...">https://image.tmdb.org/t/p/original/vDHsLnOWKI...</a>
3	2021-11-24	Encanto	The tale of an extraordinary family, the Madri...	2402.201	5076	7.7	en	Animation, Comedy, Family, Fantasy	<a href="https://image.tmdb.org/t/p/original/4j0PNHkMr5...">https://image.tmdb.org/t/p/original/4j0PNHkMr5...</a>
4	2021-12-22	The King's Man	As a collection of history's worst tyrants and...	1895.511	1793	7.0	en	Action, Adventure, Thriller, War	<a href="https://image.tmdb.org/t/p/original/aq4Pwv5Xeu...">https://image.tmdb.org/t/p/original/aq4Pwv5Xeu...</a>
...	...	...	...	...	...	...	...	...	...
9822	1973-10-15	Badlands	A dramatization of the Starkweather-Fugate kil...	13.357	896	7.6	en	Drama, Crime	<a href="https://image.tmdb.org/t/p/original/z81rBzHNgi...">https://image.tmdb.org/t/p/original/z81rBzHNgi...</a>
9823	2020-10-01	Violent Delights	A female vampire falls in love with a man she ...	13.356	8	3.5	es	Horror	<a href="https://image.tmdb.org/t/p/original/4b6HY7rud6...">https://image.tmdb.org/t/p/original/4b6HY7rud6...</a>
9824	2016-05-06	The Offering	When young and successful reporter Jamie finds...	13.355	94	5.0	en	Mystery, Thriller, Horror	<a href="https://image.tmdb.org/t/p/original/h4uMM1wOhz...">https://image.tmdb.org/t/p/original/h4uMM1wOhz...</a>
9825	2021-03-31	The United States vs. Billie Holiday	Billie Holiday spent much of her career being ...	13.354	152	6.7	en	Music, Drama, History	<a href="https://image.tmdb.org/t/p/original/vEzkxuE2sJ...">https://image.tmdb.org/t/p/original/vEzkxuE2sJ...</a>
9826	1984-09-23	Threads	Documentary style account of a nuclear holocau...	13.354	186	7.8	en	War, Drama, Science Fiction	<a href="https://image.tmdb.org/t/p/original/lBhU4U9Eeh...">https://image.tmdb.org/t/p/original/lBhU4U9Eeh...</a>

9827 rows × 9 columns

The above dataset has no NaN values

## Removing Duplicates

```
In [8]: df.duplicated()
```

```
Out[8]: 0      False
1      False
2      False
3      False
4      False
...
9822    False
9823    False
9824    False
9825    False
9826    False
Length: 9827, dtype: bool
```

```
In [9]: df.drop_duplicates(keep='first')
```

Out[9]:

	Release_Date	Title	Overview	Popularity	Vote_Count	Vote_Average	Original_Language	Genre	Poster_Url
0	2021-12-15	Spider-Man: No Way Home	Peter Parker is unmasked and no longer able to...	5083.954	8940	8.3	en	Action, Adventure, Science Fiction	<a href="https://image.tmdb.org/t/p/original/1g0dhYtq4i...">https://image.tmdb.org/t/p/original/1g0dhYtq4i...</a>
1	2022-03-01	The Batman	In his second year of fighting crime, Batman u...	3827.658	1151	8.1	en	Crime, Mystery, Thriller	<a href="https://image.tmdb.org/t/p/original/74xTEgt7R3...">https://image.tmdb.org/t/p/original/74xTEgt7R3...</a>
2	2022-02-25	No Exit	Stranded at a rest stop in the mountains durin...	2618.087	122	6.3	en	Thriller	<a href="https://image.tmdb.org/t/p/original/vDHsLnOWKI...">https://image.tmdb.org/t/p/original/vDHsLnOWKI...</a>
3	2021-11-24	Encanto	The tale of an extraordinary family, the Madri...	2402.201	5076	7.7	en	Animation, Comedy, Family, Fantasy	<a href="https://image.tmdb.org/t/p/original/4j0PNHkMr5...">https://image.tmdb.org/t/p/original/4j0PNHkMr5...</a>
4	2021-12-22	The King's Man	As a collection of history's worst tyrants and...	1895.511	1793	7.0	en	Action, Adventure, Thriller, War	<a href="https://image.tmdb.org/t/p/original/aq4Pwv5Xeu...">https://image.tmdb.org/t/p/original/aq4Pwv5Xeu...</a>
...	...	...	...	...	...	...	...	...	...
9822	1973-10-15	Badlands	A dramatization of the Starkweather-Fugate kil...	13.357	896	7.6	en	Drama, Crime	<a href="https://image.tmdb.org/t/p/original/z81rBzHNgi...">https://image.tmdb.org/t/p/original/z81rBzHNgi...</a>
9823	2020-10-01	Violent Delights	A female vampire falls in love with a man she ...	13.356	8	3.5	es	Horror	<a href="https://image.tmdb.org/t/p/original/4b6HY7rud6...">https://image.tmdb.org/t/p/original/4b6HY7rud6...</a>
9824	2016-05-06	The Offering	When young and successful reporter Jamie finds...	13.355	94	5.0	en	Mystery, Thriller, Horror	<a href="https://image.tmdb.org/t/p/original/h4uMM1wOhz...">https://image.tmdb.org/t/p/original/h4uMM1wOhz...</a>
9825	2021-03-31	The United States vs. Billie Holiday	Billie Holiday spent much of her career being ...	13.354	152	6.7	en	Music, Drama, History	<a href="https://image.tmdb.org/t/p/original/vEzkxuE2sJ...">https://image.tmdb.org/t/p/original/vEzkxuE2sJ...</a>
9826	1984-09-23	Threads	Documentary style account of a nuclear holocau...	13.354	186	7.8	en	War, Drama, Science Fiction	<a href="https://image.tmdb.org/t/p/original/lBhU4U9Eeh...">https://image.tmdb.org/t/p/original/lBhU4U9Eeh...</a>

9827 rows × 9 columns

The above dataset has no duplicate rows

## Removing unwanted columns

Columns like 'Overview', 'Original\_Language' and 'Poster\_Url' are not required for Data Analysis

```
In [10]: df = df.drop(labels=['Overview', 'Original_Language', 'Poster_Url'], axis=1)
```

```
In [11]: df.head()
```

```
Out[11]:
```

	Release_Date	Title	Popularity	Vote_Count	Vote_Average	Genre
0	2021-12-15	Spider-Man: No Way Home	5083.954	8940	8.3	Action, Adventure, Science Fiction
1	2022-03-01	The Batman	3827.658	1151	8.1	Crime, Mystery, Thriller
2	2022-02-25	No Exit	2618.087	122	6.3	Thriller
3	2021-11-24	Encanto	2402.201	5076	7.7	Animation, Comedy, Family, Fantasy
4	2021-12-22	The King's Man	1895.511	1793	7.0	Action, Adventure, Thriller, War

## Changing the type of data in 'Release\_Date' column

'2021-12-15' is inefficient for data analysis. So it is changed to '2021' only.

```
In [12]: df['Release_Date'] = pd.to_datetime(df['Release_Date']).dt.year.astype(int)
```

```
In [13]: df.head()
```

```
Out[13]:
```

	Release_Date	Title	Popularity	Vote_Count	Vote_Average	Genre
0	2021	Spider-Man: No Way Home	5083.954	8940	8.3	Action, Adventure, Science Fiction
1	2022	The Batman	3827.658	1151	8.1	Crime, Mystery, Thriller
2	2022	No Exit	2618.087	122	6.3	Thriller
3	2021	Encanto	2402.201	5076	7.7	Animation, Comedy, Family, Fantasy
4	2021	The King's Man	1895.511	1793	7.0	Action, Adventure, Thriller, War

## Problem in Genre

The above dataset is required for some task

```
In [14]: df2 = df.copy()
```

The genres are comma-separated. We need to separate all the genres in different rows.

```
In [15]: df['Genre'] = df['Genre'].str.split(',')
df = df.explode('Genre')
```

```
In [16]: df
```

```
Out[16]:
```

	Release_Date	Title	Popularity	Vote_Count	Vote_Average	Genre
0	2021	Spider-Man: No Way Home	5083.954	8940	8.3	Action
0	2021	Spider-Man: No Way Home	5083.954	8940	8.3	Adventure
0	2021	Spider-Man: No Way Home	5083.954	8940	8.3	Science Fiction
1	2022	The Batman	3827.658	1151	8.1	Crime
1	2022	The Batman	3827.658	1151	8.1	Mystery
...	...	...	...	...	...	...
9825	2021	The United States vs. Billie Holiday	13.354	152	6.7	Drama
9825	2021	The United States vs. Billie Holiday	13.354	152	6.7	History
9826	1984	Threads	13.354	186	7.8	War
9826	1984	Threads	13.354	186	7.8	Drama
9826	1984	Threads	13.354	186	7.8	Science Fiction

25793 rows × 6 columns

## Final Data for Analysis

```
In [17]: df.head()
```

```
Out[17]:
```

	Release_Date	Title	Popularity	Vote_Count	Vote_Average	Genre
0	2021	Spider-Man: No Way Home	5083.954	8940	8.3	Action
0	2021	Spider-Man: No Way Home	5083.954	8940	8.3	Adventure
0	2021	Spider-Man: No Way Home	5083.954	8940	8.3	Science Fiction
1	2022	The Batman	3827.658	1151	8.1	Crime
1	2022	The Batman	3827.658	1151	8.1	Mystery

```
In [18]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 25793 entries, 0 to 9826
Data columns (total 6 columns):
 #   Column      Non-Null Count  Dtype  
---  --  
 0   Release_Date 25793 non-null   int64  
 1   Title        25793 non-null   object  
 2   Popularity   25793 non-null   float64 
 3   Vote_Count   25793 non-null   int64  
 4   Vote_Average 25793 non-null   float64 
 5   Genre        25793 non-null   object  
dtypes: float64(2), int64(2), object(2)
memory usage: 1.4+ MB
```

## Data Analysis

What is the most frequent genre of movies released on Netflix?

```
In [19]: df['Genre'].value_counts()
```

```
Out[19]: Genre
Drama           3744
Comedy          3031
Action           2686
Thriller         2488
Adventure        1853
Romance          1476
Horror            1470
Animation         1439
Family            1414
Fantasy           1308
Science Fiction  1273
Crime             1242
Mystery           773
History           427
War                308
Music              295
Documentary       215
TV Movie          214
Western            137
Name: count, dtype: int64
```

```
In [20]: print(f"The most frequent genre of movies released on Netflix is: {df['Genre'].value_counts().idxmax()} ({df['Genre'].value_counts().max()})")
```

The most frequent genre of movies released on Netflix is: Drama (3744)

```
In [21]: fig, ax = plt.subplots(figsize=(25, 8))

genre = pd.Series(df['Genre'].unique())
genre_count = pd.Series(df['Genre'].value_counts(sort=False))
```

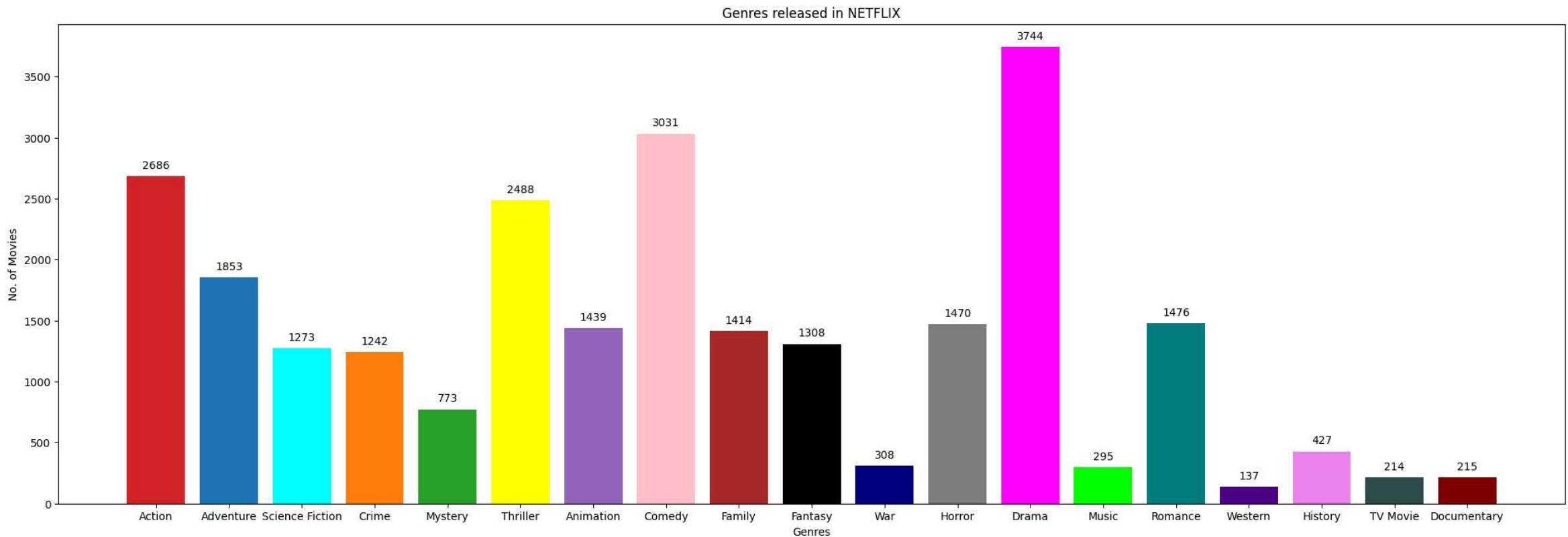
```

bar_colors = ['tab:red', 'tab:blue', 'cyan', 'tab:orange', 'tab:green', 'yellow', 'tab:purple', 'pink', 'brown', 'black', 'navy', 'gray', 'magenta', 'lime', 'tea
bars = ax.bar(genre, genre_count, color=bar_colors)
ax.bar_label(bars, labels=genre_count, padding=5)

ax.set_xlabel('Genres')
ax.set_ylabel('No. of Movies')
ax.set_title('Genres released in NETFLIX')

plt.show()

```



Which has highest votes in vote avg column?

```
In [22]: df2.loc[df2['Vote_Average'] == df2['Vote_Average'].max()]
```

```
Out[22]:
```

	Release_Date	Title	Popularity	Vote_Count	Vote_Average	Genre
9391	2020	Kung Fu Master Huo Yuanjia	13.745	1	10.0	Action, Drama

What movie has got the highest popularity? What's its genre?

```
In [23]: df2.loc[df2['Popularity'] == df2['Popularity'].max()]
```

Out[23]:

	Release_Date	Title	Popularity	Vote_Count	Vote_Average	Genre
0	2021	Spider-Man: No Way Home	5083.954	8940	8.3	Action, Adventure, Science Fiction

What movie has got the lowest popularity? What's its genre?

In [24]: `df2.loc[df2['Popularity'] == df2['Popularity'].min()]`

Out[24]:

	Release_Date	Title	Popularity	Vote_Count	Vote_Average	Genre
9825	2021	The United States vs. Billie Holiday	13.354	152	6.7	Music, Drama, History
9826	1984	Threads	13.354	186	7.8	War, Drama, Science Fiction

Which year has the most filmmmed movies?

In [25]: `df2['Release_Date'].value_counts()`

Out[25]:

```
Release_Date
2021    714
2018    530
2017    510
2019    500
2016    470
...
1925     1
1902     1
1920     1
1929     1
1930     1
Name: count, Length: 102, dtype: int64
```

In [26]: `print(f"df2['Release_Date'].value_counts().idxmax() is the most filmmmed year in Netflix with {df2['Release_Date'].value_counts().max()} films")`

2021 is the most filmmmed year in Netflix with 714 films

In [27]:

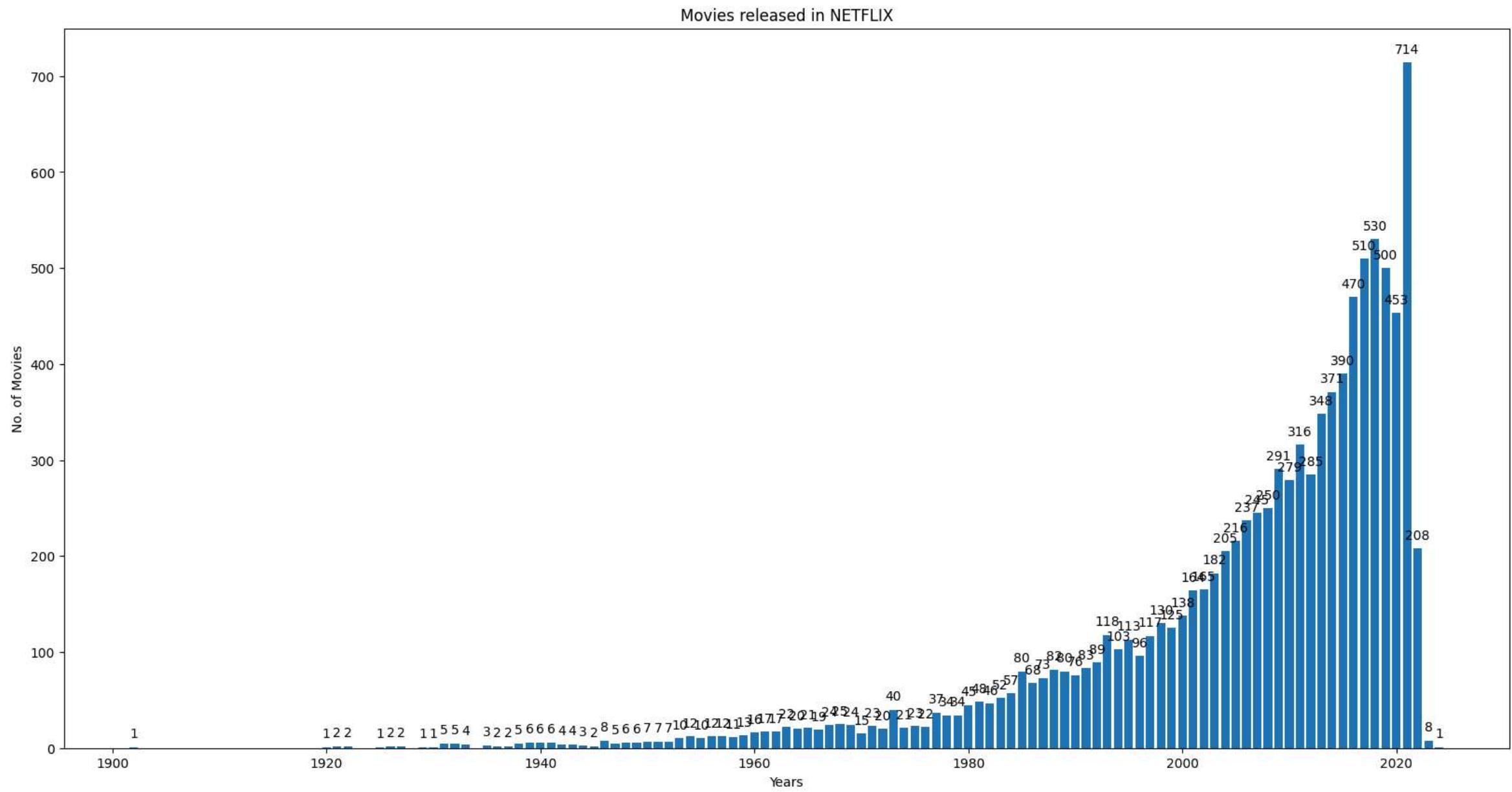
```
fig, ax = plt.subplots(figsize=(20, 10))

years = pd.Series(df2['Release_Date'].unique())
movie_count = pd.Series(df2['Release_Date'].value_counts(sort=False))

bars = ax.bar(years, movie_count)
ax.bar_label(bars, labels=movie_count, padding=5)

ax.set_xlabel('Years')
ax.set_ylabel('No. of Movies')
ax.set_title('Movies released in NETFLIX')

plt.show()
```



### Decade-Wise Movie Count in Netflix

```
In [28]: bins = list(range(1900, 2031, 10))
labels = [f"{start}-{start+9}" for start in bins[:-1]]

series1 = pd.Series(labels, name='Time_Periods')

counts = pd.cut(df2['Release_Date'], bins=bins, labels=labels, include_lowest=True, right=False).value_counts().sort_index()
series2 = pd.Series(counts.values, index=labels, name='Movie_Count')
```

```
In [29]: fig, ax = plt.subplots(figsize=(20, 10))
bar_colors = ['tab:red', 'tab:blue', 'cyan', 'tab:orange', 'tab:green', 'yellow', 'tab:purple', 'pink', 'brown', 'black', 'navy', 'gray', 'magenta'][::-1]
```

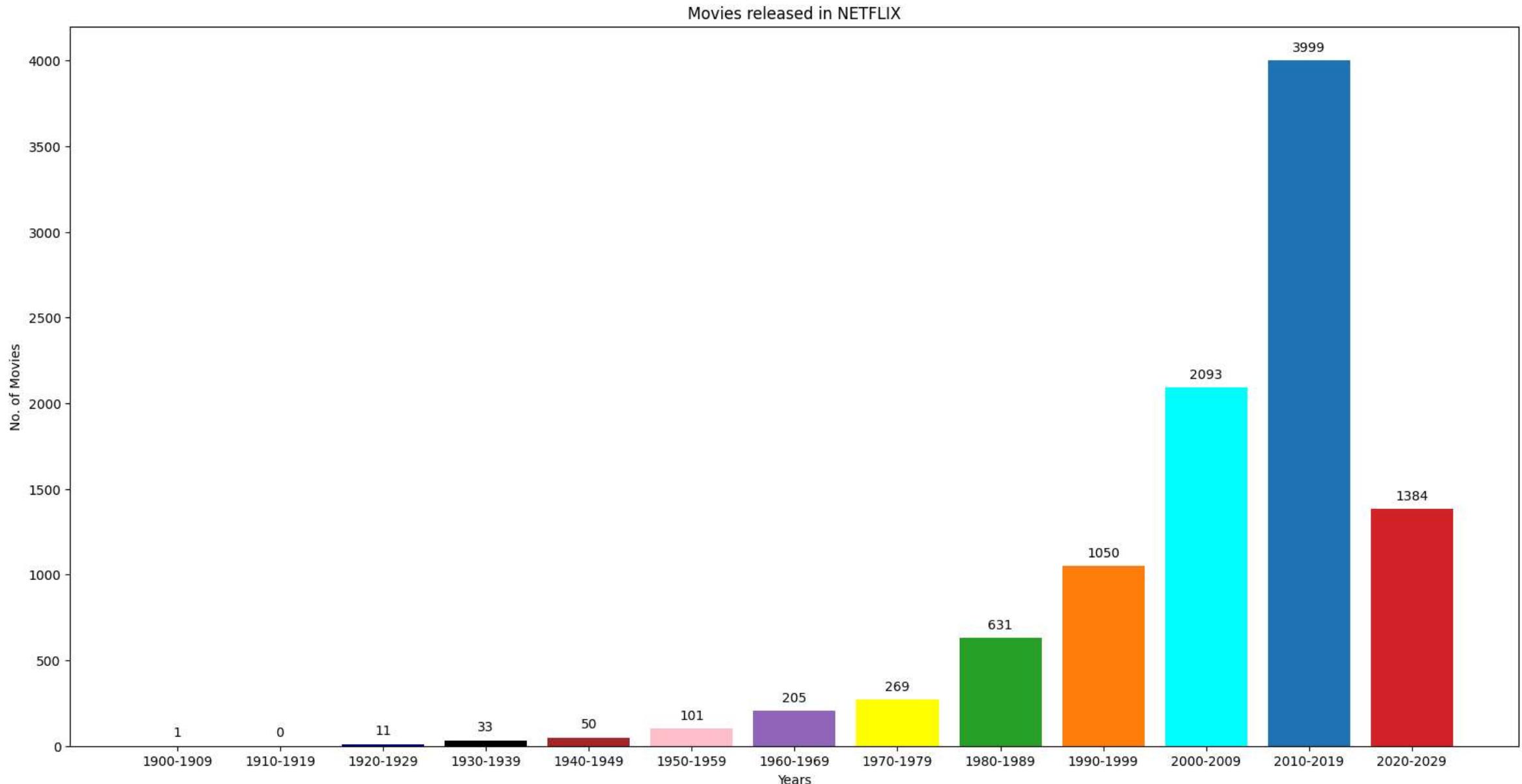
```

bars = ax.bar(series1, series2, color=bar_colors)
ax.bar_label(bars, labels=series2, padding=5)

ax.set_xlabel('Years')
ax.set_ylabel('No. of Movies')
ax.set_title('Movies released in NETFLIX')

plt.show()

```



## CONCLUSION

## **Q1. What is the most frequent genre of movies released on Netflix?**

In the given dataset, the most frequent genre of movies that released on Netflix is **Drama** with **3744 movies**.

## **Q2. Which has highest votes in vote avg column?**

**Kung Fu Master Huo Yuanjia**, released on **09 April 2020**, has the highest votes, i.e., **10.0**, in `Vote_Average` column

## **Q3. What movie has got the highest popularity? What's its genre?**

**Spider-Man: No Way Home**, released on **15 December 2021**, is a *Action, Adventure, Science Fiction* movie, which is the most popular movie in Netflix.

## **Q4. What movie has got the lowest popularity? What's its genre?**

There are **two** movies which got the lowest popularity in Netflix:-

1. **The United States vs. Billie Holiday**, released on **31 March 2021**
2. **Threads**, released on **23 September 1984**

## **Q5. Which year has the most filimmed movies?**

In **2021, 714 movies** got released on Netflix, making it the most filimmed year.