```
In [3]: import numpy as np
        import pandas as pd
        import matplotlib as plt
        import seaborn as sns
```

```
In [14]: df.head()
```

Out[14]:

	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	https://image.tmdb.org/t/p/original/1g0dhYtq4i...
1	2022-03-01	The Batman	In his second year of fighting crime, Batman u...	3827.658	1151	8.1	en	Crime, Mystery, Thriller	https://image.tmdb.org/t/p/original/74xTEgt7R3...
2	2022-02-25	No Exit	Stranded at a rest stop in the mountains durin...	2618.087	122	6.3	en	Thriller	https://image.tmdb.org/t/p/original/vDHsLnOWKl...
3	2021-11-24	Encanto	The tale of an extraordinary family, the Madri...	2402.201	5076	7.7	en	Animation, Comedy, Family, Fantasy	https://image.tmdb.org/t/p/original/4j0PNHkMr5...
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	https://image.tmdb.org/t/p/original/aq4Pwv5Xeu...

```
In [15]: df = pd.read_csv('mymoviedb.csv', lineterminator='\n')
         df.head()
```

Out[15]:

	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	https://image.tmdb.org/t/p/original/1g0dhYtq4i...
1	2022-03-01	The Batman	In his second year of fighting crime, Batman u...	3827.658	1151	8.1	en	Crime, Mystery, Thriller	https://image.tmdb.org/t/p/original/74xTEgt7R3...
2	2022-02-25	No Exit	Stranded at a rest stop in the mountains durin...	2618.087	122	6.3	en	Thriller	https://image.tmdb.org/t/p/original/vDHsLnOWKl...
3	2021-11-24	Encanto	The tale of an extraordinary family, the Madri...	2402.201	5076	7.7	en	Animation, Comedy, Family, Fantasy	https://image.tmdb.org/t/p/original/4j0PNHkMr5...
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	https://image.tmdb.org/t/p/original/aq4Pwv5Xeu...

```
In [18]: # viewing dataset info
         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 [19]: # exploring genres column
         df['Genre'].head()
```

```
Out[19]: 0    Action, Adventure, Science Fiction
         1              Crime, Mystery, Thriller
         2                              Thriller
         3    Animation, Comedy, Family, Fantasy
         4      Action, Adventure, Thriller, War
         Name: Genre, dtype: object
```

```
In [20]:  # check for duplicated rows
         df.duplicated().sum()
```

```
Out[20]: np.int64(0)
```

```
In [21]:  # exploring summary statistics
         df.describe()
```

Out[21]:

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

```
In [ ]: • Exploration Summary • we have a dataframe consisting of 9827 rows and 9 columns.
        • our dataset looks a bit tidy with no NaNs nor duplicated values.
        • Release_Date column needs to be casted into date time and to extract only the
        • Overview, Original_Languege and Poster-Url wouldn't be so useful during analys
        • there is noticable outliers in Popularity column
        • Vote_Average bettter be categorised for proper analysis.
        • Genre column has comma saperated values and white spaces that needs to be handled.
```

```
In [ ]: # Data Cleaning
```

Casting Release_Date column and extracing year values

```
In [22]: df.head()
```

Out[22]:

	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	https://image.tmdb.org/t/p/original/1g0dhYtq4i...
1	2022-03-01	The Batman	In his second year of fighting crime, Batman u...	3827.658	1151	8.1	en	Crime, Mystery, Thriller	https://image.tmdb.org/t/p/original/74xTEgt7R3...
2	2022-02-25	No Exit	Stranded at a rest stop in the mountains durin...	2618.087	122	6.3	en	Thriller	https://image.tmdb.org/t/p/original/vDHsLnOWKl...
3	2021-11-24	Encanto	The tale of an extraordinary family, the Madri...	2402.201	5076	7.7	en	Animation, Comedy, Family, Fantasy	https://image.tmdb.org/t/p/original/4j0PNHkMr5...
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	https://image.tmdb.org/t/p/original/aq4Pwv5Xeu...

```
In [23]: # casting column a
         df['Release_Date'] = pd.to_datetime(df['Release_Date'])
         # confirming changes
         print(df['Release_Date'].dtypes)
```

```
datetime64[ns]
```

```
In [24]: df['Release_Date'] = df['Release_Date'].dt.year
         df['Release_Date'].dtypes
```

```
Out[24]: dtype('int32')
```

```
In [25]: 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   int32
 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), int32(1), int64(1), object(5)
memory usage: 652.7+ KB
```

```
In [26]: df.head()
```

Out[26]:

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

Dropping Overview, Original_Languege and Poster-Url

```
In [28]: # making list of column to be dropped
         cols = ['Overview', 'Original_Language', 'Poster_Url']
```

```
In [29]: # dropping columns and confirming changes
         df.drop(cols, axis = 1, inplace = True)
         df.columns
```

```
Out[29]: Index(['Release_Date', 'Title', 'Popularity', 'Vote_Count', 'Vote_Average',
                'Genre'],
               dtype='object')
```

```
In [30]: df.head()
```

Out[30]:

	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

categorizing Vote_Average column

We would cut the Vote_Average values and make 4 categories: popular average below_avg not_popular to describe it more using catigorize_col() function provided above.

```
In [32]: def catigorize_col (df, col, labels):
             """
             catigorizes a certain column based on its quartiles

             Args:
                 (df)     df   - dataframe we are proccesing
                 (col)    str  - to be catigorized column's name
                 (labels) list - list of labels from min to max

             Returns:
                 (df)     df   - dataframe with the categorized col
             """

             # setting the edges to cut the column accordingly
             edges = [df[col].describe()['min'],
                      df[col].describe()['25%'],
                      df[col].describe()['50%'],
                      df[col].describe()['75%'],
                      df[col].describe()['max']]
             df[col] = pd.cut(df[col], edges, labels = labels, duplicates='drop')
             return df
          # define labels for edges
         labels = ['not_popular', 'below_avg', 'average', 'popular']
          # categorize column based on labels and edges
         catigorize_col(df, 'Vote_Average', labels)
          # confirming changes
         df['Vote_Average'].unique()
```

```
Out[32]: ['popular', 'below_avg', 'average', 'not_popular', NaN]
         Categories (4, object): ['not_popular' < 'below_avg' < 'average' < 'popular']
```

```
In [33]:  df.head()
```

Out[33]:

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

```
In [34]: # exploring column
         df['Vote_Average'].value_counts()
```

```
Out[34]: Vote_Average
         not_popular    2467
         popular        2450
         average        2412
         below_avg      2398
         Name: count, dtype: int64
```

```
In [35]: # dropping NaNs
         df.dropna(inplace = True)
         # confirming
         df.isna().sum()
```

```
Out[35]: Release_Date    0
         Title           0
         Popularity      0
         Vote_Count      0
         Vote_Average    0
         Genre           0
         dtype: int64
```

```
In [36]: df.head()
```

Out[36]:

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

we'd split genres into a list and then explode our dataframe to have only one genre per row for ezch movie

```
In [37]: # split the strings into lists
         df['Genre'] = df['Genre'].str.split(', ')
         # explode the lists
         df = df.explode('Genre').reset_index(drop=True)
         df.head()
```

Out[37]:

	Release_Date	Title	Popularity	Vote_Count	Vote_Average	Genre
0	2021	Spider-Man: No Way Home	5083.954	8940	popular	Action
1	2021	Spider-Man: No Way Home	5083.954	8940	popular	Adventure
2	2021	Spider-Man: No Way Home	5083.954	8940	popular	Science Fiction
3	2022	The Batman	3827.658	1151	popular	Crime
4	2022	The Batman	3827.658	1151	popular	Mystery

```
In [38]: # casting column into category
         df['Genre'] = df['Genre'].astype('category')
         # confirming changes
         df['Genre'].dtypes
```

```
Out[38]: CategoricalDtype(categories=['Action', 'Adventure', 'Animation', 'Comedy', 'Crime',
                           'Documentary', 'Drama', 'Family', 'Fantasy', 'History',
                           'Horror', 'Music', 'Mystery', 'Romance', 'Science Fiction',
                           'TV Movie', 'Thriller', 'War', 'Western'],
         , ordered=False, categories_dtype=object)
```

df.info()

```
In [40]: df.nunique()
```

```
Out[40]: Release_Date     100
         Title           9415
         Popularity      8088
         Vote_Count      3265
         Vote_Average       4
         Genre             19
         dtype: int64
```

Now that our dataset is clean and tidy, we are left with a total of 6 columns and 25551 rows to dig into during our analysis

Data Visualization

here, we'd use Matplotlib and seaborn for making some informative visuals to gain insights abut our data.

```
In [ ]:  # setting up seaborn configurations
        sns.set_style('whitegrid')
```

Q1: What is the most frequent genre in the dataset?

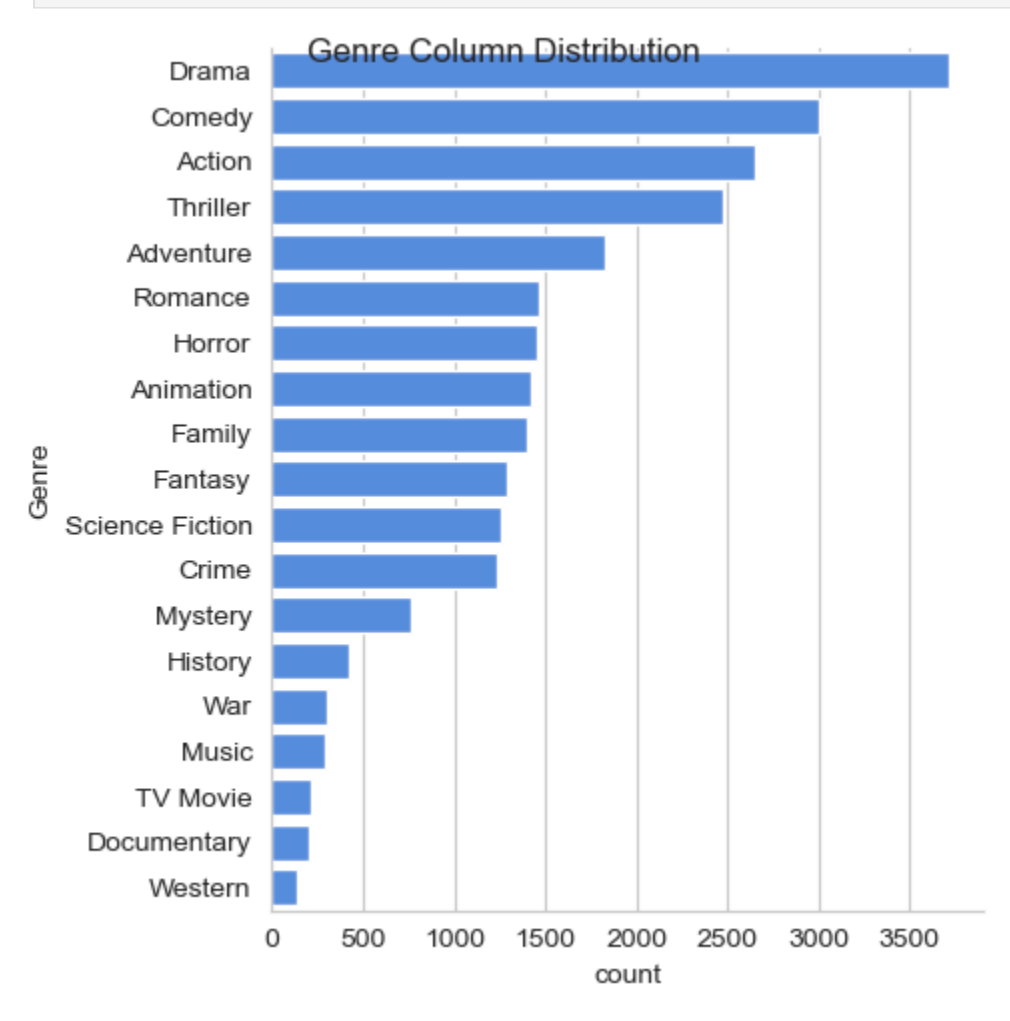
```
In [49]:  # showing stats. on genre column
         df['Genre'].describe()
```

```
Out[49]: count      25552
         unique        19
         top        Drama
         freq        3715
         Name: Genre, dtype: object
```

```
In [55]: import matplotlib.pyplot as plt
         import seaborn as sns

         # visualizing genre column
         g = sns.catplot(
             y='Genre',
             data=df,
             kind='count',
             order=df['Genre'].value_counts().index,
             color='#4287f5'
         )

         g.fig.suptitle('Genre Column Distribution')
         plt.show()
```



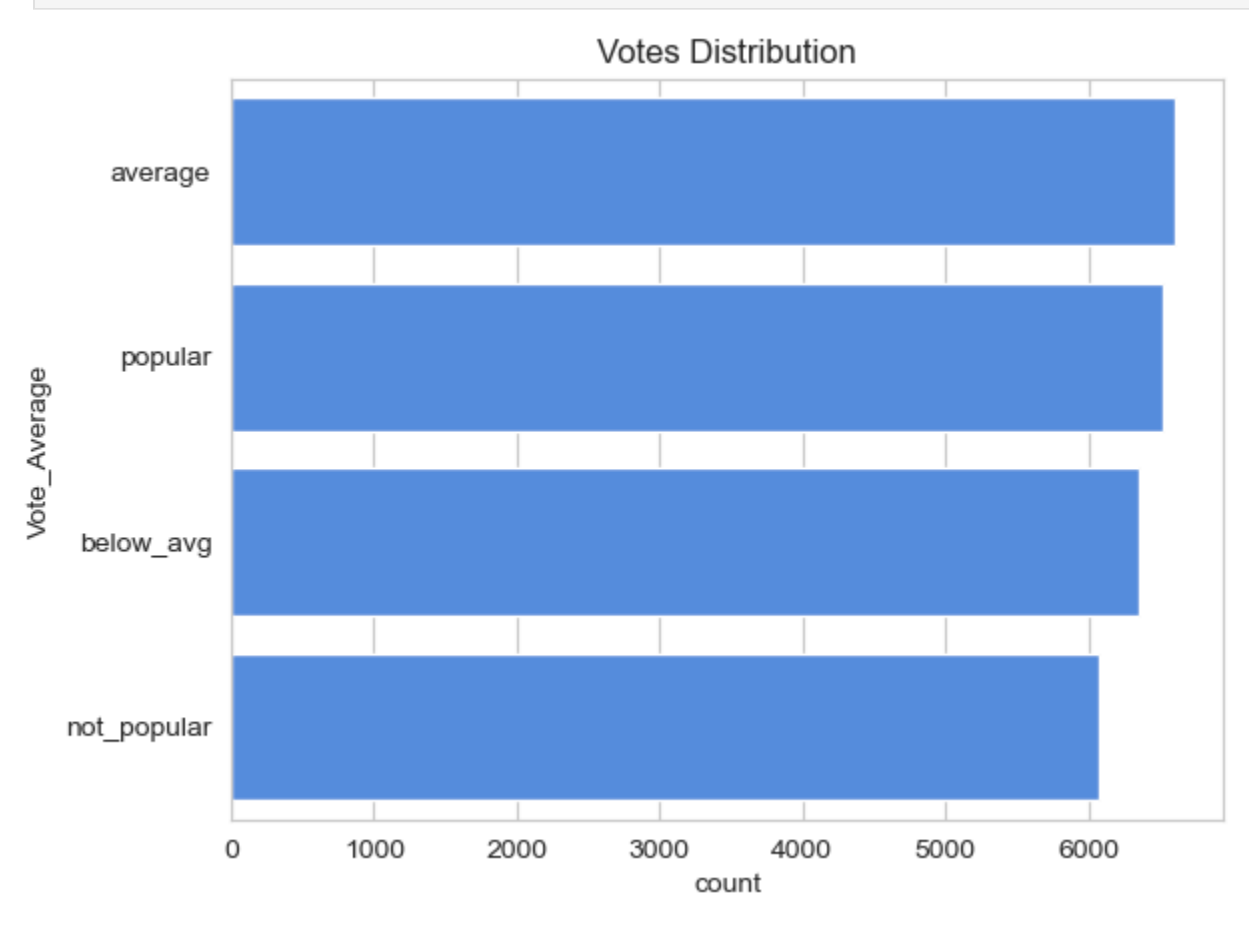
we can notice from the above visual that Drama genre is the most frequent genre in our dataset and has appeared more than 14% of the times among 19 other genres.

Q2: What genres has highest votes ?

```
In [58]: import matplotlib.pyplot as plt
         import seaborn as sns

         # visualizing vote_average column
         sns.countplot(
             y='Vote_Average',
             data=df,
             order=df['Vote_Average'].value_counts().index,
             color='#4287f5'
         )

         plt.title('Votes Distribution')
         plt.show()
```



Q3: What movie got the highest genre ?

```
In [59]:  # checking max popularity in dataset
         df[df['Popularity'] == df['Popularity'].max()]
```

Out[59]:

	Release_Date	Title	Popularity	Vote_Count	Vote_Average	Genre
0	2021	Spider-Man: No Way Home	5083.954	8940	popular	Action
1	2021	Spider-Man: No Way Home	5083.954	8940	popular	Adventure
2	2021	Spider-Man: No Way Home	5083.954	8940	popular	Science Fiction

Q4: What movie got the lowest popularity? what's its genre?

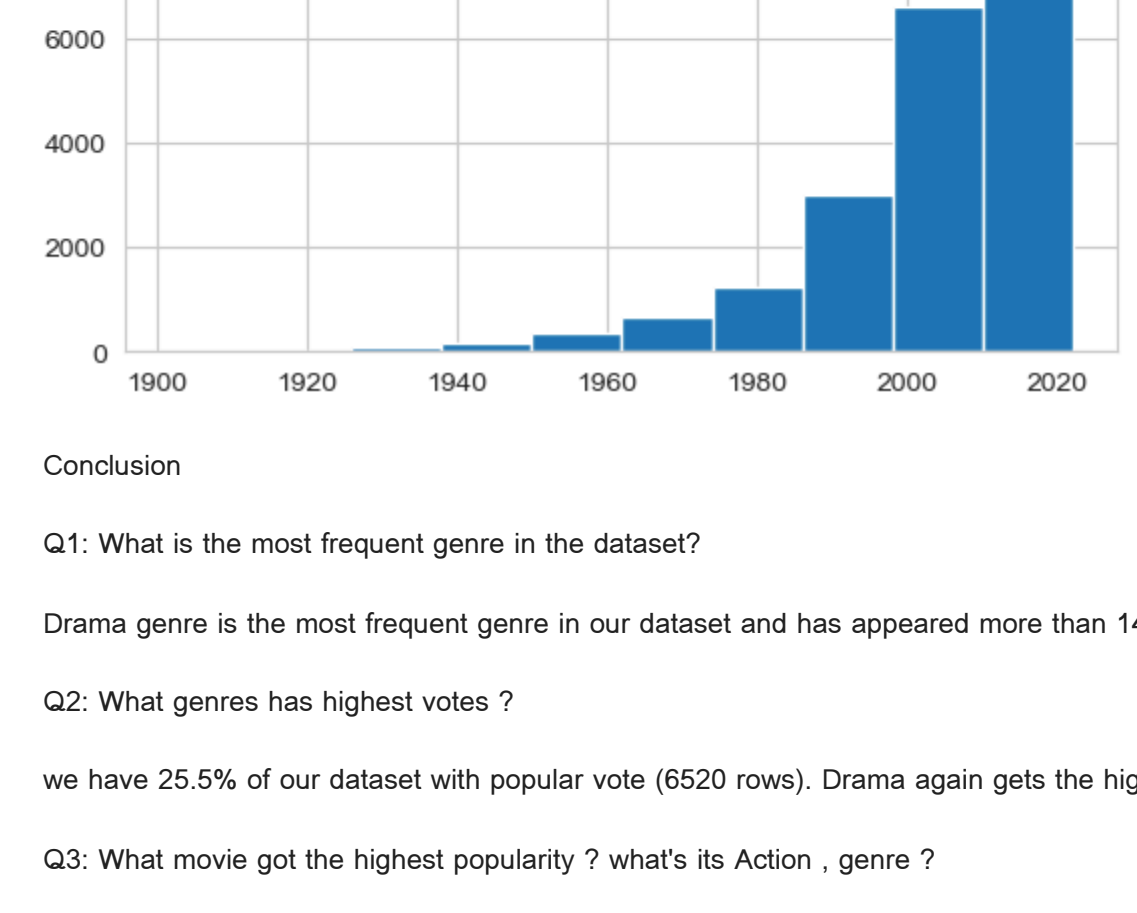
```
In [60]: # checking max popularity in dataset
         df[df['Popularity'] == df['Popularity'].min()]
```

Out[60]:

	Release_Date	Title	Popularity	Vote_Count	Vote_Average	Genre
25546	2021	The United States vs. Billie Holiday	13.354	152	average	Music
25547	2021	The United States vs. Billie Holiday	13.354	152	average	Drama
25548	2021	The United States vs. Billie Holiday	13.354	152	average	History
25549	1984	Threads	13.354	186	popular	War
25550	1984	Threads	13.354	186	popular	Drama
25551	1984	Threads	13.354	186	popular	Science Fiction

Q5: Which year has the most filmmed movies?

```
In [61]: df['Release_Date'].hist()
         plt.title('Release_Date column distribution')
         plt.show()
```



Conclusion

Q1: What is the most frequent genre in the dataset?

Drama genre is the most frequent genre in our dataset and has appeared more than 14% of the times among 19 other genres.

Q2: What genres has highest votes ?

we have 25.5% of our dataset with popular vote (6520 rows). Drama again gets the highest popularity among fans by being having more than 18.5% of movies popularities.

Q3: What movie got the highest popularity ? what's its Action , genre ?

Spider-Man: No Way Home has the highest popularity rate in our dataset and it has genres of Adventure and Sience Fiction .

Q3: What movie got the lowest popularity ? what's its genre ?

The united states, thread' has the highest lowest rate in our dataset and it has genres of music , drama , 'war', 'sci-fi' and history`.

Q4: Which year has the most filmmed movies?

year 2020 has the highest filmming rate in our dataset.