Final Project Submission

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CURRENT MOVIE ANALYSIS

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Overview

Microsoft as a company wants to start on creating original video content but do not have enough knowledge about movie creation to move forward with their plan. Using data obtained from the Box Office for analysis, it helped in discovering patterns and relationships in the data in order to make better decisions and recommendations that Microsoft will use in order for them to venture into movie crteation.

DATA UNDERSTANDING

Data that is used for this task was obtained from movie websites. I chose to work with 3 data sets that is the Box Office Mojo data, Rotten Tomatoes and IMDB data. After importing the necessary libraries to be used, we then read the data and understand its structrute,data contained and cleaning it before we go ahead to analyzing them to give us efficient information about movies before making conclusions.

Box Office Mojo Data

```
#importing the necessary libraries

import pandas as pd
import numpy as np

import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline

import sqlite3


from scipy import stats
from scipy.stats import norm

#reading the box office mojo data from the  csv file
#checking the first 5 elements of the dataframe

mojo_df = pd.read_csv("zippedData/bom.movie_gross.csv")
mojo_df.head()
```

	title	studio	domestic_gross	foreign_gross	year
0	Toy Story 3	BV	415000000.0	652000000	2010
1	Alice in Wonderland (2010)	BV	334200000.0	691300000	2010
2	Harry Potter and the Deathly Hallows Part 1	WB	296000000.0	664300000	2010
3	Inception	WB	292600000.0	535700000	2010
4	Shrek Forever After	P/DW	238700000.0	513900000	2010

```
#column names of the dataframe

mojo_df.columns
```

```
Index(['title', 'studio', 'domestic_gross', 'foreign_gross', 'year'],
dtype='object')
```

```
mojo_df.shape
```

```
(3387, 5)
```

```
#data types per column

mojo_df.dtypes
```

```
title              object
studio             object
domestic_gross    float64
foreign_gross      object
year                int64
dtype: object
```

```
#total number of NaN values in the dataset

mojo_df.isna().sum()
```

```
title                0
studio               5
domestic_gross      28
foreign_gross     1350
year                 0
dtype: int64
```

```
#the summary of the mojo dataframe

mojo_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 3387 entries, 0 to 3386
Data columns (total 5 columns):
 #   Column          Non-Null Count  Dtype  
---  ------          --------------  -----  
 0   title           3387 non-null   object 
 1   studio          3382 non-null   object 
 2   domestic_gross  3359 non-null   float64
 3   foreign_gross   2037 non-null   object 
 4   year            3387 non-null   int64  
dtypes: float64(1), int64(1), object(3)
memory usage: 132.4+ KB
```

```
# top studios

top10 = mojo_df['studio'].value_counts().head(10)
top10
```

```
IFC      166
Uni.     147
WB       140
Fox      136
```

```
Magn.    136
SPC      123
Sony     110
BV       106
LGF      103
Par.     101
Name: studio, dtype: int64
```

```
type(top10)
```

```
pandas.core.series.Series
```

```
mojo_df.groupby(['studio']).sum()
```

```
        domestic_gross   year
studio
3D           6100000.0   2010
A23           164200.0   4024
A24        324194200.0  98754
ADC           248200.0   4032
AF           2142900.0  12080
...                ...    ...
XL            458000.0   4027
YFG          1100000.0   2016
Yash        31631400.0  28194
Zee          1100000.0   2016
Zeit.        5663500.0  32206

[257 rows x 2 columns]
```

```
#summary statistics for each column

mojo_df['domestic_gross'].describe()
```

```
count    3.359000e+03
mean     2.874585e+07
std      6.698250e+07
min      1.000000e+02
25%      1.200000e+05
50%      1.400000e+06
75%      2.790000e+07
max      9.367000e+08
Name: domestic_gross, dtype: float64
```

```
#understanding the years we'll be working with
mojo_df.year.unique()
```

```
array([2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018],
dtype=int64)
```

Rotten Tomatoes Data

```
#reading ROTTEN TOMATOES data from the tsv file

rtmovie_df = pd.read_csv("zippedData/rt.movie_info.tsv", sep='\t',
header=0)
rtmovie_df.head()
```

```
   id                                           synopsis rating  \
0   1  This gritty, fast-paced, and innovative police...      R
1   3  New York City, not-too-distant-future: Eric Pa...      R
2   5  Illeana Douglas delivers a superb performance ...      R
3   6  Michael Douglas runs afoul of a treacherous su...      R
4   7                                                NaN     NR

                                genre          director  \
0  Action and Adventure|Classics|Drama  William Friedkin
1    Drama|Science Fiction and Fantasy  David Cronenberg
2    Drama|Musical and Performing Arts    Allison Anders
3          Drama|Mystery and Suspense    Barry Levinson
4                      Drama|Romance    Rodney Bennett

                           writer  theater_date      dvd_date
currency  \
0                   Ernest Tidyman   Oct 9, 1971  Sep 25, 2001
NaN
1     David Cronenberg|Don DeLillo  Aug 17, 2012   Jan 1, 2013
$
2                   Allison Anders  Sep 13, 1996  Apr 18, 2000
NaN
3  Paul Attanasio|Michael Crichton   Dec 9, 1994  Aug 27, 1997
NaN
4                     Giles Cooper           NaN           NaN
NaN

  box_office      runtime             studio
0        NaN  104 minutes                NaN
1    600,000  108 minutes  Entertainment One
2        NaN  116 minutes                NaN
3        NaN  128 minutes                NaN
4        NaN  200 minutes                NaN
```

```
#dropping unwanted columns
rtmovie_df = rtmovie_df.drop(rtmovie_df.columns[0], axis='columns')

rtmovie_df.shape
```

```
(1560, 11)
```

```
#previewing the columns in the dataframe

rtmovie_df.columns
```

```
Index(['synopsis', 'rating', 'genre', 'director', 'writer',
'theater_date',
       'dvd_date', 'currency', 'box_office', 'runtime', 'studio'],
      dtype='object')
```

```
#obtaining the summary of rotten tomatoes dataframe

rtmovie_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1560 entries, 0 to 1559
Data columns (total 11 columns):
 #   Column        Non-Null Count  Dtype 
---  ------        --------------  ----- 
 0   synopsis      1498 non-null   object
 1   rating        1557 non-null   object
 2   genre         1552 non-null   object
 3   director      1361 non-null   object
 4   writer        1111 non-null   object
 5   theater_date  1201 non-null   object
 6   dvd_date      1201 non-null   object
 7   currency      340 non-null    object
 8   box_office    340 non-null    object
 9   runtime       1530 non-null   object
 10  studio        494 non-null    object
dtypes: object(11)
memory usage: 134.2+ KB
```

```
# Checking for null values

rtmovie_df.isnull().sum()
```

```
synopsis          62
rating             3
genre              8
director         199
writer           449
theater_date     359
dvd_date         359
currency        1220
box_office      1220
runtime           30
studio          1066
dtype: int64
```

```
# getting counts for each value in genre column#

rtmovie_df['genre'].value_counts()
```

```
Drama                                                                151
Comedy                                                               110
Comedy|Drama                                                          80
Drama|Mystery and Suspense                                            67
Art House and International|Drama                                     62
                                                                    ...
Art House and International|Documentary|Drama                          1
Classics|Drama|Faith and Spirituality                                 1
Comedy|Documentary|Musical and Performing Arts|Special Interest       1
Art House and International|Documentary|Drama|Special Interest        1
Comedy|Horror|Mystery and Suspense                                    1
Name: genre, Length: 299, dtype: int64
```

```
# descriptive statistics for the genre column to determine the top
genre
rtmovie_df['genre'].describe()
```

```
count      1552
unique      299
top       Drama
freq        151
Name: genre, dtype: object
```

IMDB Data

```
#connect to SQLite IMDB database using the Python sqlite3 library

import sqlite3
conn = sqlite3.connect("zippedData\im.db")

#viewing the list of tables


df = pd.read_sql("""SELECT name FROM sqlite_master WHERE
TYPE='table';""",conn)
df
```

```
            name
0   movie_basics
1      directors
2      known_for
3     movie_akas
4  movie_ratings
5        persons
6     principals
7        writers
```

a) movie_basics

```
#information about the movie_basics records from IMDB


basics_df = pd.read_sql("""SELECT * FROM movie_basics;""", conn)
basics_df.head()
```

```
    movie_id                     primary_title
original_title  \
0  tt0063540                         Sunghursh
Sunghursh
1  tt0066787  One Day Before the Rainy Season             Ashad Ka Ek
Din
2  tt0069049       The Other Side of the Wind  The Other Side of the
Wind
3  tt0069204                  Sabse Bada Sukh             Sabse Bada
Sukh
4  tt0100275         The Wandering Soap Opera       La Telenovela
Errante

   start_year  runtime_minutes                genres
0        2013            175.0    Action,Crime,Drama
1        2019            114.0       Biography,Drama
2        2018            122.0                 Drama
3        2018              NaN          Comedy,Drama
4        2017             80.0  Comedy,Drama,Fantasy
```

```
basics_df.duplicated().value_counts()
```

```
False    146144
dtype: int64
```

```
basics_df.isna().sum()
```

```
movie_id               0
primary_title          0
original_title        21
start_year             0
runtime_minutes    31739
genres              5408
dtype: int64
```

```
#count per genre

genre_count = pd.read_sql("""SELECT genres,
                         COUNT(*) AS genres_count
                         FROM movie_basics
                         GROUP BY genres
                         ORDER BY genres_count DESC
                         LIMIT 20;""", conn)
genre_count
```

```
                          genres  genres_count
0                    Documentary         32185
1                          Drama         21486
2                         Comedy          9177
3                           None          5408
4                         Horror          4372
5                  Comedy,Drama           3519
6                      Thriller           3046
7                         Action          2219
8          Biography,Documentary          2115
9                  Drama,Romance          2079
10          Comedy,Drama,Romance          1558
11             Documentary,Drama          1554
12                Comedy,Romance          1507
13                       Romance          1454
14             Documentary,Music          1365
15                Drama,Thriller          1335
16            Documentary,History          1289
17                Horror,Thriller          1253
18  Biography,Documentary,History          1230
19    Biography,Documentary,Drama          1028
```

b) movie ratings

```
#information about the movie_ratings records from IMDB


ratings_df = pd.read_sql("""SELECT * FROM movie_ratings;""", conn)
ratings_df.head(10)
```

```
     movie_id  averagerating  numvotes
0  tt10356526            8.3        31
1  tt10384606            8.9       559
2   tt1042974            6.4        20
3   tt1043726            4.2     50352
4   tt1060240            6.5        21
5   tt1069246            6.2       326
6   tt1094666            7.0      1613
7   tt1130982            6.4       571
8   tt1156528            7.2       265
9   tt1161457            4.2       148
```

```
#viewing columns in the dataframe
ratings_df.columns
```

```
Index(['movie_id', 'averagerating', 'numvotes'], dtype='object')
```

```
ratings_df.duplicated().value_counts()
```

```
False    73856
dtype: int64
```

```
#the data has no nan values

ratings_df.isna().sum()
```

```
movie_id         0
averagerating    0
numvotes         0
dtype: int64
```

C) persons

```
#information about persons records from IMDB


persons_df = pd.read_sql("""SELECT * FROM persons;""", conn)
persons_df.head(10)
```

```
   person_id       primary_name  birth_year  death_year  \
0  nm0061671  Mary Ellen Bauder         NaN         NaN
1  nm0061865       Joseph Bauer         NaN         NaN
2  nm0062070         Bruce Baum         NaN         NaN
3  nm0062195       Axel Baumann         NaN         NaN
4  nm0062798        Pete Baxter         NaN         NaN
5  nm0062879     Ruel S. Bayani         NaN         NaN
6  nm0063198              Bayou         NaN         NaN
7  nm0063432      Stevie Be-Zet         NaN         NaN
8  nm0063618          Jeff Beal      1963.0         NaN
9  nm0063750    Lindsay Beamish         NaN         NaN

                                primary_profession
0         miscellaneous,production_manager,producer
1       composer,music_department,sound_department
2                       miscellaneous,actor,writer
3  camera_department,cinematographer,art_department
4  production_designer,art_department,set_decorator
5         director,production_manager,miscellaneous
6                                             actor
7                           composer,soundtrack
8              composer,music_department,soundtrack
9                          actress,miscellaneous
```

```
persons_df['primary_profession'].unique()
```

```
array(['miscellaneous,production_manager,producer',
       'composer,music_department,sound_department',
       'miscellaneous,actor,writer', ...,
       'music_department,sound_department,actress',
       'director,costume_department,costume_designer',
       'actress,art_director,music_department'], dtype=object)
```

```
persons_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 606648 entries, 0 to 606647
Data columns (total 5 columns):
 #   Column              Non-Null Count   Dtype  
---  ------              --------------   -----  
 0   person_id           606648 non-null  object 
 1   primary_name        606648 non-null  object 
 2   birth_year          82736 non-null   float64
 3   death_year          6783 non-null    float64
 4   primary_profession  555308 non-null  object 
dtypes: float64(2), object(3)
memory usage: 23.1+ MB
```

```
persons_df.isna().sum()
```

```
person_id                 0
primary_name              0
birth_year           523912
death_year           599865
primary_profession    51340
dtype: int64
```

Data Preparation

After choosing the preferable data sets to use, i did data preparation that involves data cleaning to prepare the data for analysIS.

During data cleaning we are going to do the following:

1. Check for and dropping irrelevant columns.
2. Standardization; Change upper case values to lower case values, rename columns and data type conversion were necessary.
3. Check for null values and dropping them.
4. Check for missing values and act on them accordingly.
5. Check for duplicate values and dropping them.

For the BOM Data:

```
#dropping columns in the dataframe that won't be needed during
analysis

mojo_df.drop(['title'], axis=1, inplace=True)

mojo_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 3387 entries, 0 to 3386
Data columns (total 5 columns):
```

```
 #   Column          Non-Null Count  Dtype  
---  ------          --------------  -----  
 0   title           3387 non-null   object 
 1   studio          3382 non-null   object 
 2   domestic_gross  3359 non-null   float64
 3   foreign_gross   2037 non-null   object 
 4   year            3387 non-null   int64  
dtypes: float64(1), int64(1), object(3)
memory usage: 132.4+ KB
```

```
# to check if there are any duplication
mojo_df.duplicated().value_counts()
```

```
False    3376
True       11
dtype: int64
```

```
#Checking for missing values
row_count = mojo_df.shape[0]
missing_count = row_count - mojo_df.count()
missing_count
```

```
title                0
studio               5
domestic_gross      28
foreign_gross     1350
year                 0
dtype: int64
```

```
# Checking for duplicates
duplicateRows = mojo_df[mojo_df.duplicated()]
duplicateRows.count()
```

```
studio            11
domestic_gross    11
foreign_gross      0
year              11
dtype: int64
```

```
# There are no null values
```

```
mojo_df.isnull().any()
```

```
studio             True
domestic_gross     True
foreign_gross      True
year              False
dtype: bool
```

```
#checking for duplicates
# the data has no duplicates
```

```
mojo_df.duplicated().sum()
```

```
11
```

For Rotten Tomatoes Data:

I started by removing columns that i will not need in the analysis

```
rtmovie_df.columns
```

```
Index(['synopsis', 'rating', 'genre', 'director', 'writer',
'theater_date',
       'dvd_date', 'currency', 'box_office', 'runtime', 'studio'],
      dtype='object')
```

```
rtmovie_df
```

```
                                                synopsis rating  \
0     This gritty, fast-paced, and innovative police...      R
1     New York City, not-too-distant-future: Eric Pa...      R
2     Illeana Douglas delivers a superb performance ...      R
3     Michael Douglas runs afoul of a treacherous su...      R
4                                                   NaN     NR
...                                                 ...    ...
1555  Forget terrorists or hijackers -- there's a ha...      R
1556  The popular Saturday Night Live sketch was exp...     PG
1557  Based on a novel by Richard Powell, when the l...      G
1558  The Sandlot is a coming-of-age story about a g...     PG
1559  Suspended from the force, Paris cop Hubert is ...      R

                                                 genre
director  \
0                  Action and Adventure|Classics|Drama    William
Friedkin
1                    Drama|Science Fiction and Fantasy    David
Cronenberg
2                    Drama|Musical and Performing Arts      Allison
Anders
3                           Drama|Mystery and Suspense      Barry
Levinson
4                                       Drama|Romance      Rodney
Bennett
...                                               ...
...
1555   Action and Adventure|Horror|Mystery and Suspense
NaN
1556                Comedy|Science Fiction and Fantasy        Steve
Barron
1557  Classics|Comedy|Drama|Musical and Performing Arts      Gordon
Douglas
```

```
1558    Comedy|Drama|Kids and Family|Sports and Fitness  David Mickey
Evans
1559  Action and Adventure|Art House and Internation...
NaN

                                                  writer
theater_date  \
0                                       Ernest Tidyman   Oct 9, 1971

1                          David Cronenberg|Don DeLillo  Aug 17, 2012

2                                       Allison Anders  Sep 13, 1996

3                        Paul Attanasio|Michael Crichton   Dec 9, 1994

4                                         Giles Cooper           NaN

...                                                ...           ...

1555                                              NaN  Aug 18, 2006

1556  Terry Turner|Tom Davis|Dan Aykroyd|Bonnie Turner  Jul 23, 1993

1557                                              NaN   Jan 1, 1962

1558                    David Mickey Evans|Robert Gunter   Apr 1, 1993

1559                                        Luc Besson  Sep 27, 2001


          dvd_date currency  box_office      runtime
studio
0     Sep 25, 2001      NaN         NaN  104 minutes
NaN
1      Jan 1, 2013        $     600,000  108 minutes  Entertainment
One
2     Apr 18, 2000      NaN         NaN  116 minutes
NaN
3     Aug 27, 1997      NaN         NaN  128 minutes
NaN
4              NaN      NaN         NaN  200 minutes
NaN
...            ...      ...         ...          ...                ..
.
1555   Jan 2, 2007        $  33,886,034  106 minutes    New Line
Cinema
1556  Apr 17, 2001      NaN         NaN   88 minutes  Paramount
Vantage
1557  May 11, 2004      NaN         NaN  111 minutes
```

```
NaN
1558  Jan 29, 2002      NaN         NaN  101 minutes
NaN
1559  Feb 11, 2003      NaN         NaN   94 minutes  Columbia
Pictures

[1560 rows x 11 columns]
```

```
#total values of NaN values in the data set
rtmovie_df.isna().sum()
```

```
synopsis          62
rating             3
genre              8
director         199
writer           449
theater_date     359
dvd_date         359
currency        1220
box_office      1220
runtime           30
studio          1066
dtype: int64
```

```
#Checking for missing values
row_count = rtmovie_df.shape[0]
missing_count = row_count - rtmovie_df.count()
missing_count
```

```
synopsis          62
rating             3
genre              8
director         199
writer           449
theater_date     359
dvd_date         359
currency        1220
box_office      1220
runtime           30
studio          1066
dtype: int64
```

Performing Data Analysis

mojo_df

Analyzing each top 10 studios against their domestic gross

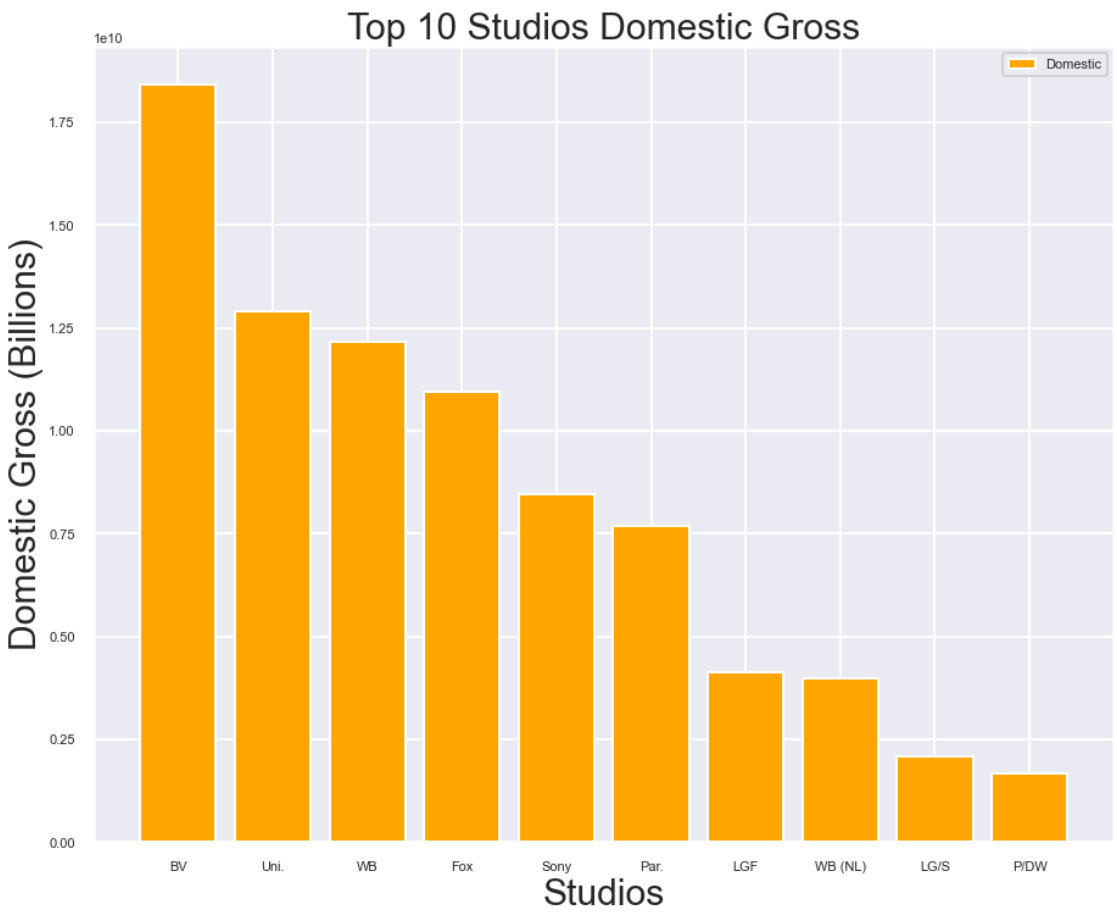
```
#sorting the data for top to studios


mojo_dfagg = mojo_df.groupby(['studio']).agg('sum')

mojo_dfagg = mojo_dfagg.sort_values('domestic_gross',
ascending=False).head(10)
mojo_dfagg
```

```
         domestic_gross    year
studio
BV         1.841903e+10  213451
Uni.       1.290239e+10  296082
WB         1.216805e+10  281941
Fox        1.094950e+10  273882
Sony       8.459683e+09  221575
Par.       7.685871e+09  203417
LGF        4.118963e+09  207437
WB (NL)    3.995700e+09   90644
LG/S       2.078200e+09   82599
P/DW       1.682900e+09   20109
```

```
mojo_dfagg.index
```

```
Index(['BV', 'Uni.', 'WB', 'Fox', 'Sony', 'Par.', 'LGF', 'WB (NL)',
'LG/S',
       'P/DW'],
      dtype='object', name='studio')
```

```
#bar graph plot for top 10 studios domestic gross


plt.figure(figsize=(15,12))

studios = mojo_dfagg.index
dom_gross = mojo_dfagg.domestic_gross


plt.bar(range(len(studios)), dom_gross, color='orange')

plt.title('Top 10 Studios Domestic Gross', fontsize=30)
plt.xlabel('Studios', fontsize=30)
plt.ylabel('Domestic Gross (Billions)', fontsize=30)
plt.xticks(range(len(studios)), studios)

plt.legend(['Domestic'])
plt.show();
```



which genre of movie is produced more?

```
#according to rtmovie_df

rtmovie_df.genre.value_counts()
```

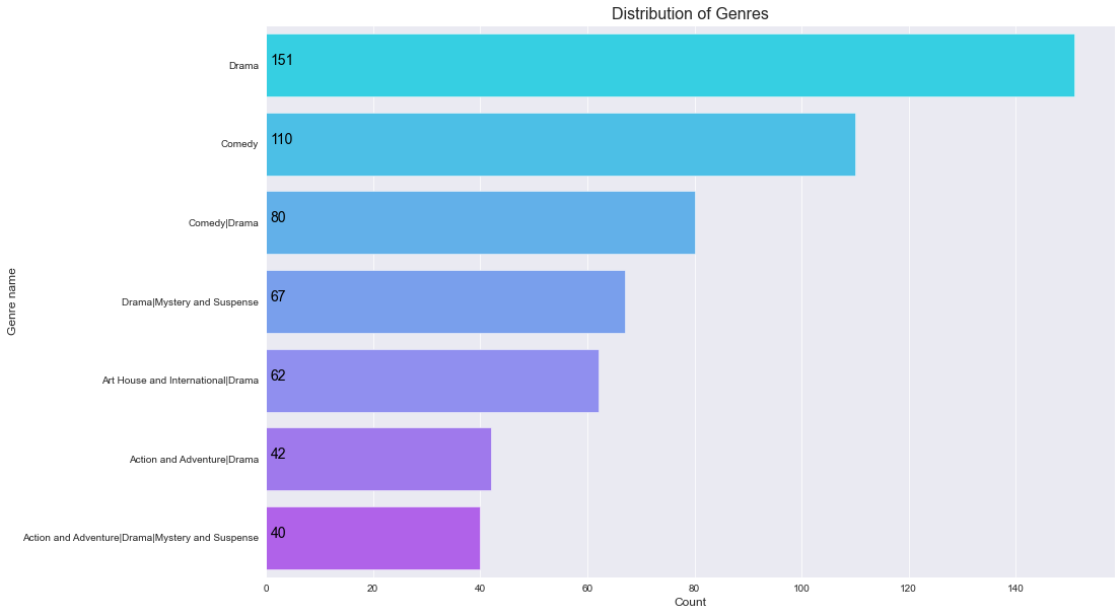
```
Drama                                                                 151
Comedy                                                                110
Comedy|Drama                                                           80
Drama|Mystery and Suspense                                             67
Art House and International|Drama                                      62
                                                                     ...
Art House and International|Documentary|Drama                           1
Classics|Drama|Faith and Spirituality                                   1
Comedy|Documentary|Musical and Performing Arts|Special Interest         1
Art House and International|Documentary|Drama|Special Interest          1
Comedy|Horror|Mystery and Suspense                                      1
Name: genre, Length: 299, dtype: int64
```

```
#Frequency of movie genres

rtmovie_df['first_genre'] = rtmovie_df['genre'].str.split(',').str[0]
```

```
a = plt.cm.cool

plt.figure(figsize=(15,10))
count = rtmovie_df['first_genre'].value_counts()[:7]
sns.barplot(count.values, count.index,
palette=[a(0.1),a(0.2),a(0.3),a(0.4),a(0.5),a(0.6),a(0.7)])
for i, v in enumerate(count.values):
    plt.text(0.8,i,v,color='k',fontsize=14)
plt.xlabel('Count', fontsize=12)
plt.ylabel('Genre name', fontsize=12)
plt.title("Distribution of Genres", fontsize=16)
```

```
C:\Users\PC\anaconda3\envs\learn-env\lib\site-packages\seaborn\
_decorators.py:36: FutureWarning: Pass the following variables as
keyword args: x, y. From version 0.12, the only valid positional
argument will be `data`, and passing other arguments without an
explicit keyword will result in an error or misinterpretation.
  warnings.warn(
```

```
Text(0.5, 1.0, 'Distribution of Genres')
```



By checking the total number movies per genre we see that Drama movies are produced more followed by comedy and the least produced being a combination of Art House and International|Classics|Comedy|Drama

```
#viewing all the unique ratings in the dataframe

rtmovie_df['rating'].unique()
```

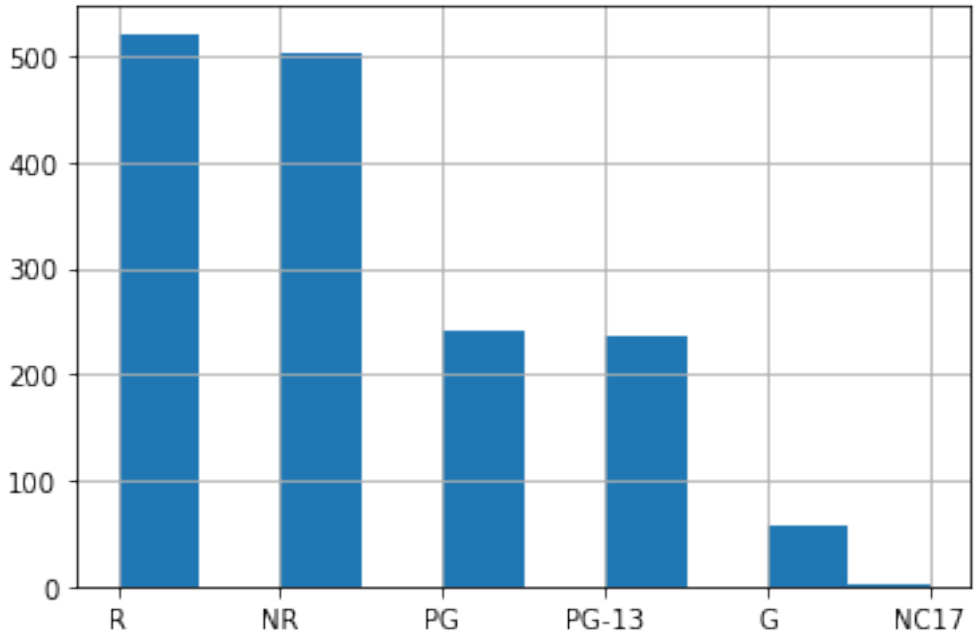
```
array(['R', 'NR', 'PG', 'PG-13', nan, 'G', 'NC17'], dtype=object)
```

```
#checking on the total number of counts per genre:

rtmovie_df['rating'].value_counts()
```

```
R        521
NR       503
PG       240
PG-13    235
G         57
NC17       1
Name: rating, dtype: int64
```

```
#visualizing this on a histogram, we'll have

rtmovie_df['rating'].hist(bins=10)
```

```
<AxesSubplot:>
```



checking the total number of movies per rating, we can see that rated movies R are being produced more and the least produced are movies with NC17 rating.

```
# convert release date column to datetime values
rtmovie_df['dvd_date'] = pd.to_datetime(rtmovie_df['dvd_date'])
# create release month column
rtmovie_df['release_month'] = rtmovie_df['dvd_date'].dt.strftime('%B')

# checking for successful column creation
rtmovie_df['release_month'].value_counts()
```

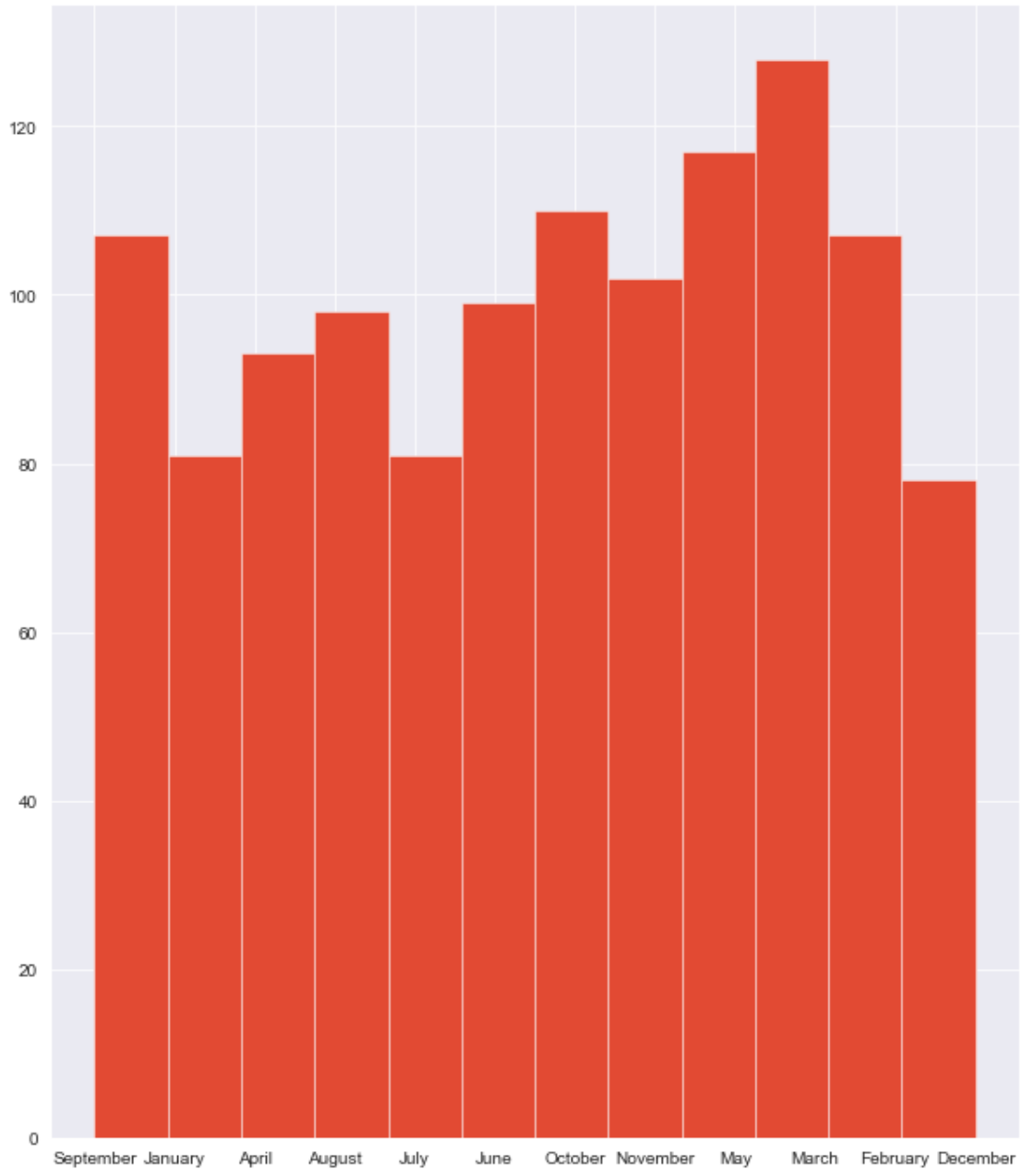
```
March        128
May          117
```

```
October      110
February     107
September    107
November     102
June          99
August        98
April         93
July          81
January       81
December      78
Name: release_month, dtype: int64
```

```
#visualizing this on a histogram, we'll have
```

```
rtmovie_df['release_month'].hist(bins=12, figsize=(10,12))
```

```
<AxesSubplot:>
```




```
rtmovie_df
```

```
                                                synopsis rating  \
0     This gritty, fast-paced, and innovative police...      R
1     New York City, not-too-distant-future: Eric Pa...      R
2     Illeana Douglas delivers a superb performance ...      R
3     Michael Douglas runs afoul of a treacherous su...      R
4                                                   NaN     NR
...                                                 ...    ...
1555  Forget terrorists or hijackers -- there's a ha...      R
1556  The popular Saturday Night Live sketch was exp...     PG
1557  Based on a novel by Richard Powell, when the l...      G
```

```
1558  The Sandlot is a coming-of-age story about a g...     PG
1559  Suspended from the force, Paris cop Hubert is ...      R

                                                    genre
director  \
0                   Action and Adventure|Classics|Drama    William
Friedkin
1                     Drama|Science Fiction and Fantasy    David
Cronenberg
2                     Drama|Musical and Performing Arts      Allison
Anders
3                            Drama|Mystery and Suspense      Barry
Levinson
4                                        Drama|Romance      Rodney
Bennett
...                                                  ...
...
1555   Action and Adventure|Horror|Mystery and Suspense
NaN
1556                 Comedy|Science Fiction and Fantasy        Steve
Barron
1557  Classics|Comedy|Drama|Musical and Performing Arts      Gordon
Douglas
1558    Comedy|Drama|Kids and Family|Sports and Fitness  David Mickey
Evans
1559  Action and Adventure|Art House and Internation...
NaN

                                                  writer
theater_date  \
0                                       Ernest Tidyman   Oct 9, 1971

1                          David Cronenberg|Don DeLillo  Aug 17, 2012

2                                       Allison Anders  Sep 13, 1996

3                        Paul Attanasio|Michael Crichton   Dec 9, 1994

4                                         Giles Cooper           NaN

...                                                ...           ...

1555                                              NaN  Aug 18, 2006

1556  Terry Turner|Tom Davis|Dan Aykroyd|Bonnie Turner  Jul 23, 1993

1557                                              NaN   Jan 1, 1962

1558                   David Mickey Evans|Robert Gunter   Apr 1, 1993
```

```
1559                                      Luc Besson  Sep 27, 2001


       dvd_date currency  box_office      runtime
studio  \
0    2001-09-25      NaN         NaN  104 minutes                NaN

1    2013-01-01        $     600,000  108 minutes  Entertainment One

2    2000-04-18      NaN         NaN  116 minutes                NaN

3    1997-08-27      NaN         NaN  128 minutes                NaN

4           NaT      NaN         NaN  200 minutes                NaN

...         ...      ...         ...          ...                ...

1555 2007-01-02        $  33,886,034  106 minutes    New Line Cinema

1556 2001-04-17      NaN         NaN   88 minutes  Paramount Vantage

1557 2004-05-11      NaN         NaN  111 minutes                NaN

1558 2002-01-29      NaN         NaN  101 minutes                NaN

1559 2003-02-11      NaN         NaN   94 minutes  Columbia Pictures


     release_month
0        September
1          January
2            April
3           August
4              NaN
...            ...
1555       January
1556         April
1557           May
1558       January
1559      February

[1560 rows x 12 columns]
```

Putting it all together:

```
# show all column names
rtmovie_df.columns
```

```
Index(['synopsis', 'rating', 'genre', 'director', 'writer',
'theater_date',
       'dvd_date', 'currency', 'box_office', 'runtime', 'studio',
       'release_month'],
      dtype='object')
```

merging rotten tomatoes data and BOM data:

```
# merging the DataFrames
merged_df = pd.merge(rtmovie_df, mojo_df, how='outer')
# previewing the new DataFrame
merged_df.shape
```

```
(9213, 16)
```

```
merged_df.head()
```

```
                                              synopsis rating  \
0  This gritty, fast-paced, and innovative police...      R
1  This gritty, fast-paced, and innovative police...      R
2  This gritty, fast-paced, and innovative police...      R
3  This gritty, fast-paced, and innovative police...      R
4  This gritty, fast-paced, and innovative police...      R

                                genre          director
writer  \
0  Action and Adventure|Classics|Drama  William Friedkin  Ernest
Tidyman
1  Action and Adventure|Classics|Drama  William Friedkin  Ernest
Tidyman
2  Action and Adventure|Classics|Drama  William Friedkin  Ernest
Tidyman
3  Action and Adventure|Classics|Drama  William Friedkin  Ernest
Tidyman
4  Action and Adventure|Classics|Drama  William Friedkin  Ernest
Tidyman

  theater_date   dvd_date currency box_office      runtime studio  \
0  Oct 9, 1971 2001-09-25      NaN        NaN  104 minutes    NaN
1  Oct 9, 1971 2001-09-25      NaN        NaN  104 minutes    NaN
2  Oct 9, 1971 2001-09-25      NaN        NaN  104 minutes    NaN
3  Oct 9, 1971 2001-09-25      NaN        NaN  104 minutes    NaN
4  Oct 9, 1971 2001-09-25      NaN        NaN  104 minutes    NaN

  release_month                          first_genre
domestic_gross  \
0     September  Action and Adventure|Classics|Drama         96900.0

1     September  Action and Adventure|Classics|Drama         70600.0
```

```
2     September  Action and Adventure|Classics|Drama             NaN

3     September  Action and Adventure|Classics|Drama          7100.0

4     September  Action and Adventure|Classics|Drama             NaN


  foreign_gross    year
0       3300000  2010.0
1       3300000  2011.0
2       4000000  2012.0
3           NaN  2014.0
4     122000000  2017.0
```

```
# show number of rows and columns
merged_df.shape
```

```
(9213, 16)
```

```
# show all column names
merged_df.columns
```

```
Index(['synopsis', 'rating', 'genre', 'director', 'writer',
'theater_date',
       'dvd_date', 'currency', 'box_office', 'runtime', 'studio',
       'release_month', 'domestic_gross', 'foreign_gross', 'year'],
      dtype='object')
```

```
 #counts per genre of the merged dataframe
```

```
count = merged_df['genre'].value_counts()
count
```

```
Drama|Mystery and Suspense
531
Drama
489
Comedy|Drama
421
Comedy
338
Art House and International|Drama
274


...
Action and Adventure|Comedy|Kids and Family|Science Fiction and
Fantasy|Romance      1
Animation|Comedy
1
Action and Adventure|Horror|Kids and Family|Science Fiction and
Fantasy              1
```

```
Art House and International|Drama|Horror|Mystery and Suspense
1
Comedy|Mystery and Suspense|Romance
1
Name: genre, Length: 299, dtype: int64
```

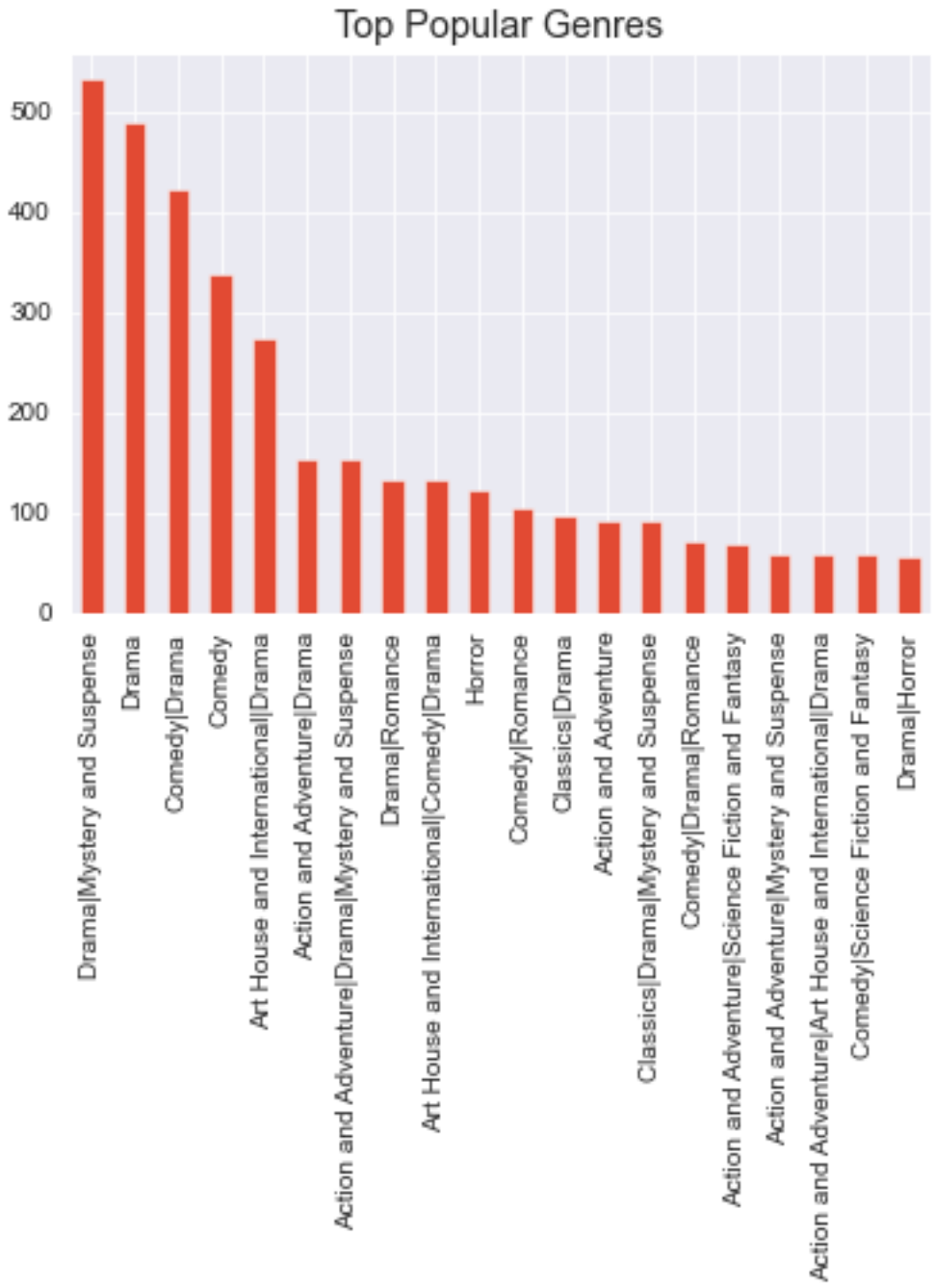
```
pop_genres = count.iloc[:20]
pop_genres
```

```
Drama|Mystery and Suspense                                531
Drama                                                     489
Comedy|Drama                                              421
Comedy                                                    338
Art House and International|Drama                         274
Action and Adventure|Drama                                152
Action and Adventure|Drama|Mystery and Suspense           152
Drama|Romance                                             133
Art House and International|Comedy|Drama                  131
Horror                                                    123
Comedy|Romance                                            104
Classics|Drama                                             97
Action and Adventure                                       91
Classics|Drama|Mystery and Suspense                        90
Comedy|Drama|Romance                                       71
Action and Adventure|Science Fiction and Fantasy           68
Action and Adventure|Mystery and Suspense                  58
Action and Adventure|Art House and International|Drama     57
Comedy|Science Fiction and Fantasy                         57
Drama|Horror                                               55
Name: genre, dtype: int64
```

```
#top 20 popular movies that is with the most value counts represented
in a graph:
```

```
pop_genres.plot.bar(x = 'genres', title = 'Top Popular Genres')
```

```
<AxesSubplot:title={'center':'Top Popular Genres'}>
```




```
# getting mean and median world domestic amounts by genre

genre_stats = merged_df.groupby('genre')
['domestic_gross'].agg(['median', 'mean'])
genre_stats.sort_values(by='mean', ascending=False)
```

genre	median	mean

```
Drama|Mystery and Suspense                              30350000.0
5.553751e+07
Art House and International|Comedy|Drama|Musica...  17048450.0
3.336243e+07
Drama|Horror|Mystery and Suspense                         70600.0
8.384258e+06
Action and Adventure|Mystery and Suspense                 70600.0
6.719047e+06
Drama|Horror                                            1500000.0
6.237862e+06
...                                                           ...
...
Horror|Kids and Family|Mystery and Suspense|Sci...            NaN
NaN
Horror|Musical and Performing Arts|Science Fict...            NaN
NaN
Horror|Mystery and Suspense|Science Fiction and...            NaN
NaN
Kids and Family|Musical and Performing Arts                   NaN
NaN
Mystery and Suspense|Science Fiction and Fantas...            NaN
NaN

[299 rows x 2 columns]
```

```
#filtering the dataframe based on Drama|Mystery and Suspense which is
the top genre

DramaMS=merged_df.loc[merged_df['genre'] == "Drama|Mystery and
Suspense"]
DramaMS
```

```
                                                synopsis rating  \
10    Michael Douglas runs afoul of a treacherous su...      R
11    Michael Douglas runs afoul of a treacherous su...      R
12    Michael Douglas runs afoul of a treacherous su...      R
13    Michael Douglas runs afoul of a treacherous su...      R
14    Michael Douglas runs afoul of a treacherous su...      R
...                                                     ...    ...
5968  Directed by Clint Eastwood, the mysterious dra...      R
6002  Abel Ferrara's cult crime drama Bad Lieutenant...      R
6212  Filmed in the California desert on Super 16mm,...     NR
6285  Frankie is a Los Angeles drug dealer. He comes...      R
6303  Texas brothers--Toby (Chris Pine), and Tanner ...      R

                          genre         director  \
10    Drama|Mystery and Suspense   Barry Levinson
11    Drama|Mystery and Suspense   Barry Levinson
12    Drama|Mystery and Suspense   Barry Levinson
13    Drama|Mystery and Suspense   Barry Levinson
```

```
14    Drama|Mystery and Suspense   Barry Levinson
...                           ...              ...
5968  Drama|Mystery and Suspense   Clint Eastwood
6002  Drama|Mystery and Suspense    Werner Herzog
6212  Drama|Mystery and Suspense        Oren Shai
6285  Drama|Mystery and Suspense  Nick Cassavetes
6303  Drama|Mystery and Suspense  David Mackenzie

                                writer  theater_date   dvd_date
currency  \
10    Paul Attanasio|Michael Crichton   Dec 9, 1994 1997-08-27
NaN
11    Paul Attanasio|Michael Crichton   Dec 9, 1994 1997-08-27
NaN
12    Paul Attanasio|Michael Crichton   Dec 9, 1994 1997-08-27
NaN
13    Paul Attanasio|Michael Crichton   Dec 9, 1994 1997-08-27
NaN
14    Paul Attanasio|Michael Crichton   Dec 9, 1994 1997-08-27
NaN
...                                ...           ...        ...      ..
.
5968                  Brian Helgeland   Oct 8, 2003 2004-06-08
$
6002                              NaN  Nov 20, 2009 2010-04-06
$
6212          Oren Shai|Webb Wilcoxen  Oct 28, 2016 2016-12-06
NaN
6285                  Nick Cassavetes  Jan 12, 2007 2007-05-01
$
6303                  Taylor Sheridan  Aug 12, 2016 2016-11-22
$

      box_office      runtime                studio release_month  \
10           NaN  128 minutes                   NaN        August
11           NaN  128 minutes                   NaN        August
12           NaN  128 minutes                   NaN        August
13           NaN  128 minutes                   NaN        August
14           NaN  128 minutes                   NaN        August
...          ...          ...                   ...           ...
5968  88,800,000  137 minutes                    WB          June
6002   1,616,556  121 minutes  First Look Pictures         April
6212         NaN   88 minutes        Rocking Films      December
6285  15,133,185  118 minutes    Universal Studios           May
6303  26,973,524  102 minutes              Film 44      November

                    first_genre  domestic_gross foreign_gross    year

10    Drama|Mystery and Suspense         96900.0       3300000  2010.0
```

```
11    Drama|Mystery and Suspense         70600.0       3300000  2011.0

12    Drama|Mystery and Suspense             NaN       4000000  2012.0

13    Drama|Mystery and Suspense          7100.0           NaN  2014.0

14    Drama|Mystery and Suspense             NaN     122000000  2017.0

...                          ...             ...           ...     ...

5968  Drama|Mystery and Suspense       3200000.0           NaN  2018.0

6002  Drama|Mystery and Suspense             NaN           NaN     NaN

6212  Drama|Mystery and Suspense             NaN           NaN     NaN

6285  Drama|Mystery and Suspense             NaN           NaN     NaN

6303  Drama|Mystery and Suspense             NaN           NaN     NaN


[531 rows x 16 columns]
```

```
#filtering out the most common director in the Drama|Mystery and
Suspense genre

DramaMS['director'].value_counts()
```

```
Clint Eastwood                  141
Gary Wheeler                    136
Joseph Ruben                     10
Mike Figgis                       6
Gary Fleder                       6
Boaz Yakin                        5
Sidney Gilliat                    5
Andrew Birkin                     5
Curtis Hanson                     5
Neil Jordan                       5
Andrew Chapman                    5
Sam Peckinpah                     5
Yves Simoneau                     5
Lewis Gilbert                     5
Michael Fields                    5
Michael Apted                     5
Fritz Lang                        5
Robert Foster                     5
Gordon Hessler                    5
Gordon Willis                     5
Steven Hilliard Stern             5
```

```
Bob Rafelson|George Bud Davis      5
Andy Wolk                          5
Paul Wendkos                       5
Nicolas Roeg                       5
Larry Elikann                      5
Uli Edel                           5
John Farrow                        5
John Sturges                       5
Peter Hyams                        5
John Badham                        5
Steven Spielberg                   5
Nathan Hope                        5
Bruce Robinson                     5
Mike Barker                        5
James Cox                          5
Spike Lee                          5
David Mamet                        5
Irving Lerner                      5
William Beaudine                   5
Barry Levinson                     5
Shawn Christensen                  5
Bryan Singer                       3
David Koepp                        1
Paul Thomas Anderson               1
Werner Herzog                      1
Simon West                         1
Will Canon                         1
David Mackenzie                    1
Perry Moore|Hunter Hill            1
Oren Shai                          1
Nicholas Racz                      1
Anton Corbijn                      1
Morten Tyldum                      1
Nick Cassavetes                    1
Craig Bolotin                      1
David Fincher                      1
Name: director, dtype: int64
```

From above Clint Eastwood was the most common director for Drama|Mystery and Suspense genre.

```
DramaMS['release_month'].value_counts()
```

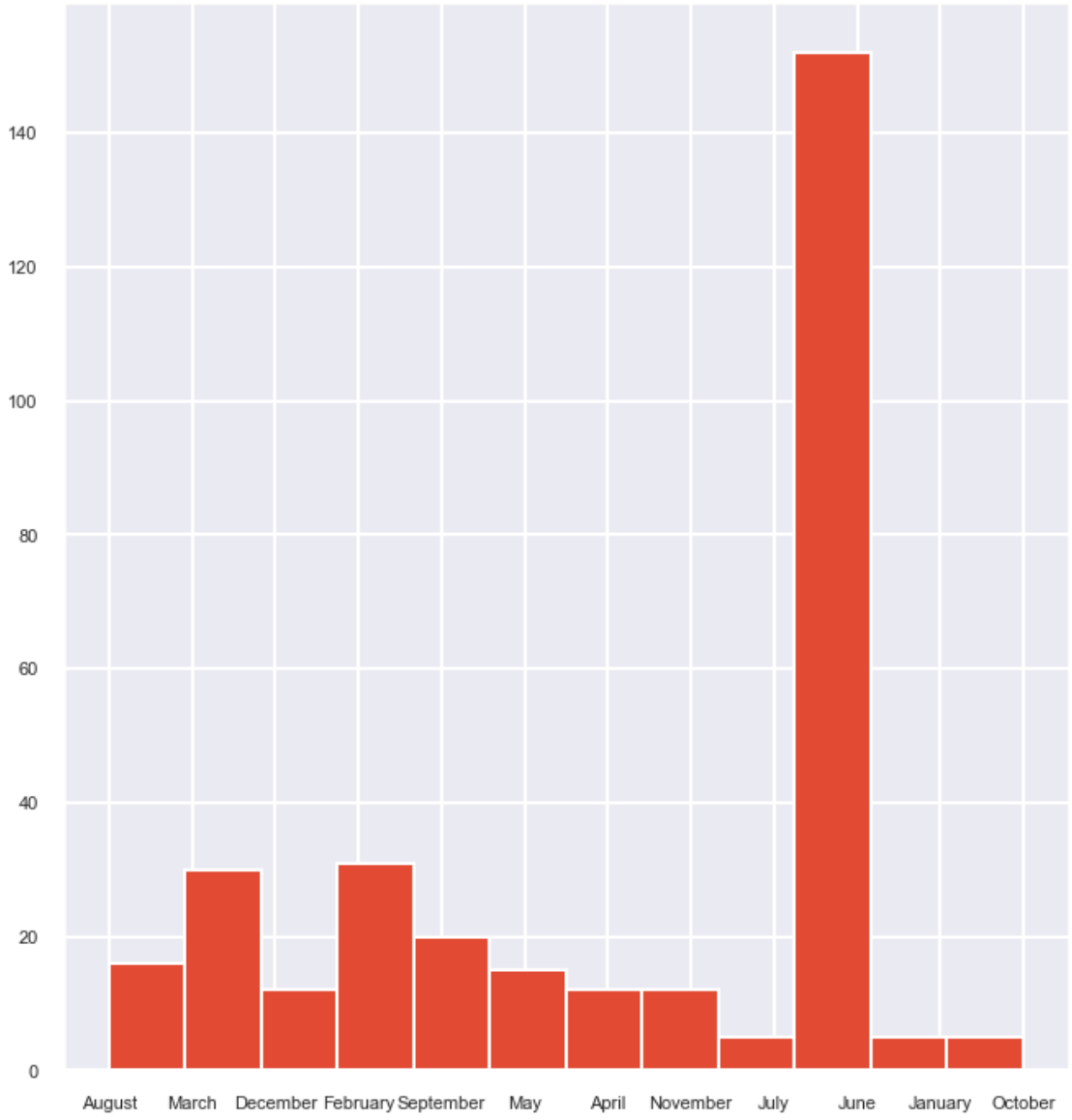
```
June         152
February      31
March         30
September     20
August        16
May           15
December      12
November      12
```

```
April          12
October         5
July            5
January         5
Name: release_month, dtype: int64
```

```
# Visualizing MONTH RELEASED using histogram
```

```
DramaMS['release_month'].hist(bins=12, figsize=(11,12))
```

```
<AxesSubplot:>
```



Most Drama|Mystery and Suspense movies were released in the month of june

```
DramaMS['rating'].value_counts()
```

```
R        293
PG-13    152
NR        76
PG         5
G          5
Name: rating, dtype: int64
```

Most Drama|Mystery and Suspense movies have a rating of R

For IMDB data:

i joined movie_basics, movie_ratings and directors

```
#joining movie_basics and movie_ratings using movie_id
imdb_df = pd.read_sql("""SELECT *
                         FROM movie_ratings
                         JOIN movie_basics
                            USING(movie_id)
                         JOIN directors
                            USING(movie_id)
                         JOIN persons
                            ON directors.person_id = persons.person_id
                         ;""", conn)
```

```
imdb_df
```

```
          movie_id  averagerating  numvotes  \
0       tt10356526            8.3        31
1       tt10356526            8.3        31
2       tt10384606            8.9       559
3       tt10384606            8.9       559
4        tt1042974            6.4        20
...            ...            ...       ...
181382   tt9844256            7.5        24
181383   tt9844256            7.5        24
181384   tt9851050            4.7        14
181385   tt9886934            7.0         5
181386   tt9894098            6.3       128

                                              primary_title  \
0                                          Laiye Je Yaarian
1                                          Laiye Je Yaarian
2                                                Borderless
3                                                Borderless
4                                                 Just Inès
...                                                     ...
181382  Code Geass: Lelouch of the Rebellion - Glorifi...
181383  Code Geass: Lelouch of the Rebellion - Glorifi...
```

```
181384                                        Sisters
181385                                The The Projectionist
181386                                         Sathru

                                       original_title
start_year  \
0                                     Laiye Je Yaarian        2019

1                                     Laiye Je Yaarian        2019

2                                           Borderless        2019

3                                           Borderless        2019

4                                            Just Inès        2010

...                                                ...         ...

181382  Code Geass: Lelouch of the Rebellion Episode III        2018

181383  Code Geass: Lelouch of the Rebellion Episode III        2018

181384                                         Sisters        2019

181385                                The The Projectionist        2019

181386                                         Sathru        2019


        runtime_minutes                    genres   person_id
person_id  \
0                 117.0                   Romance   nm8353804
nm8353804
1                 117.0                   Romance   nm8353804
nm8353804
2                  87.0               Documentary   nm9250842
nm9250842
3                  87.0               Documentary   nm9932562
nm9932562
4                  90.0                     Drama   nm1915232
nm1915232
...                 ...                       ...         ...         .
..
181382            120.0  Action,Animation,Sci-Fi   nm0849465
nm0849465
181383            120.0  Action,Animation,Sci-Fi   nm0849465
nm0849465
181384              NaN             Action,Drama   nm1272773
nm1272773
```

```
181385             81.0              Documentary   nm0001206
nm0001206
181386            129.0                 Thriller  nm10529107
nm10529107

                primary_name  birth_year  death_year  \
0              Sukh Sanghera         NaN         NaN
1              Sukh Sanghera         NaN         NaN
2           Caolan Robertson         NaN         NaN
3       George Llewelyn-John         NaN         NaN
4               Marcel Grant         NaN         NaN
...                      ...         ...         ...
181382        Gorô Taniguchi         NaN         NaN
181383        Gorô Taniguchi         NaN         NaN
181384       Prachya Pinkaew      1962.0         NaN
181385          Abel Ferrara      1951.0         NaN
181386      Naveen Nanjundan         NaN         NaN

                                  primary_profession
0       director,cinematographer,location_management
1       director,cinematographer,location_management
2                           producer,director,writer
3                   director,cinematographer,writer
4                          director,writer,producer
...                                             ...
181382                director,art_department,writer
181383                director,art_department,writer
181384                      producer,director,writer
181385                   director,writer,soundtrack
181386                                     director

[181387 rows x 14 columns]
```

```
#value counts based on genre

imdb_df['genres'].value_counts()
```

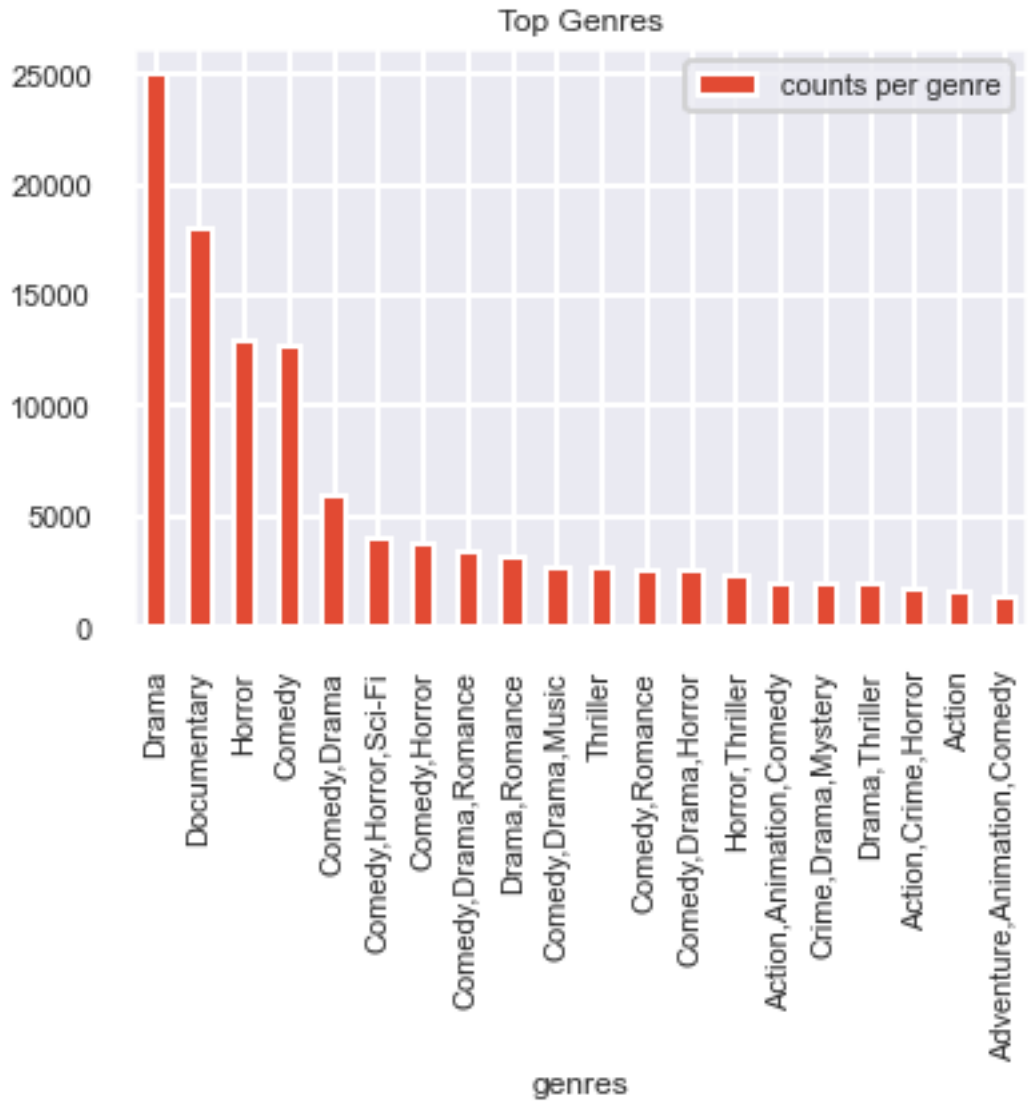
```
Drama                          25002
Documentary                    18077
Horror                         13006
Comedy                         12723
Comedy,Drama                    5903
                               ...
Fantasy,Music,Romance              1
Biography,Fantasy,Horror           1
Biography,History,Music            1
Family,War                         1
Comedy,Documentary,Fantasy         1
Name: genres, Length: 921, dtype: int64
```

```
genres_count =
imdb_df['genres'].value_counts().rename_axis('genres').reset_index(nam
e = 'counts per genre')
common_genres = genres_count.iloc[:20]
common_genres
```

	genres	counts per genre
0	Drama	25002
1	Documentary	18077
2	Horror	13006
3	Comedy	12723
4	Comedy,Drama	5903
5	Comedy,Horror,Sci-Fi	4059
6	Comedy,Horror	3814
7	Comedy,Drama,Romance	3360
8	Drama,Romance	3117
9	Comedy,Drama,Music	2726
10	Thriller	2650
11	Comedy,Romance	2604
12	Comedy,Drama,Horror	2602
13	Horror,Thriller	2344
14	Action,Animation,Comedy	2015
15	Crime,Drama,Mystery	1982
16	Drama,Thriller	1954
17	Action,Crime,Horror	1767
18	Action	1634
19	Adventure,Animation,Comedy	1418

```
#top 20 movie genres with the most value counts represented
graphically.

common_genres.plot.bar(x = 'genres', title = 'Top Genres')
```

```
<AxesSubplot:title={'center':'Top Genres'}, xlabel='genres'>
```




```
#drama being the most common genre i filtered the dataframe with the
drama genre

Drama=imdb_df.loc[imdb_df['genres'] == "Drama"]
Drama
```

```
         movie_id  averagerating  numvotes    primary_title
original_title  \
4       tt1042974            6.4        20        Just Inès
Just Inès
87      tt1325019            7.2        29  The Custom Mary  The
Custom Mary
108     tt1368858            5.4      4302       The Forger       The
Forger
109     tt1368858            5.4      4302       The Forger       The
Forger
115     tt1379736            5.7        15           Cesado
```

```
Cesado
...           ...            ...       ...              ...
...
181361  tt9642950            6.0        22      Darkhoongah
Darkhoongah
181362  tt9643092            6.3        12     Gold Carrier     Gold
Carrier
181363  tt9643092            6.3        12     Gold Carrier     Gold
Carrier
181371  tt9690762            5.6        37   On the Balcony   Yang tai
shang
181372  tt9690762            5.6        37   On the Balcony   Yang tai
shang

        start_year  runtime_minutes genres  person_id  person_id  \
4             2010             90.0  Drama  nm1915232  nm1915232
87            2011             81.0  Drama  nm2761772  nm2761772
108           2012             94.0  Drama  nm2940732  nm2940732
109           2012             94.0  Drama  nm2940732  nm2940732
115           2011             90.0  Drama  nm1509706  nm1509706
...            ...              ...    ...        ...        ...
181361        2019              NaN  Drama  nm5236091  nm5236091
181362        2019              NaN  Drama  nm1180701  nm1180701
181363        2019              NaN  Drama  nm1180701  nm1180701
181371        2019            100.0  Drama  nm4070848  nm4070848
181372        2019            100.0  Drama  nm4070848  nm4070848

            primary_name  birth_year  death_year  \
4           Marcel Grant         NaN         NaN
87       Matt Dunnerstick         NaN         NaN
108        Lawrence Roeck         NaN         NaN
109        Lawrence Roeck         NaN         NaN
115     Daniela Schneider         NaN         NaN
...                   ...         ...         ...
181361     Siavash As'adi         NaN         NaN
181362       Turaj Aslani         NaN         NaN
181363       Turaj Aslani         NaN         NaN
181371         Meng Zhang         NaN         NaN
181372         Meng Zhang         NaN         NaN

                                      primary_profession
4                                director,writer,producer
87                                  director,actor,writer
108                              director,writer,producer
109                              director,writer,producer
115     art_director,costume_designer,production_designer
...                                                   ...
181361                                  writer,director
181362                  cinematographer,writer,producer
181363                  cinematographer,writer,producer
```

```
181371                          director,producer,writer
181372                          director,producer,writer

[25002 rows x 14 columns]
```

```
#analyzing directors primary_name with the number of drama movies they
are involved in, we'll have:

director = Drama['primary_name'].value_counts().head(10)
director
```

```
Xavier Agudo           26
Prashant Sehgal        24
Neha Raheja Thakker    24
Mairtín de Barra       24
Ko-shang Shen          24
Adam Ruszkowski        24
Yango Gonzalez         24
Varun Mathur           24
Fahad Shaikh           24
Marty Shea             24
Name: primary_name, dtype: int64
```

```
#checking on which month did modt and least drama genres released

Drama['runtime_minutes'].value_counts().head(10)
```

```
90.0     1326
94.0     1136
100.0     836
105.0     674
99.0      634
93.0      618
95.0      576
85.0      565
96.0      545
98.0      530
Name: runtime_minutes, dtype: int64
```

```
#filtering out the average rating in the Drama genre

Drama['averagerating'].value_counts().head(10)
```

```
6.7    1544
6.4    1109
6.0    1106
6.2    1076
6.6    1043
7.0     942
7.2     896
6.1     869
```

```
6.5     863
5.6     847
Name: averagerating, dtype: int64
```

```
plt.figure(figsize=(10,10))
```

```
Drama['averagerating'].plot.hist()
```

```
<AxesSubplot:ylabel='Frequency'>
```