Final Project Submission

Please fill out:

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- Student pace: self paced / part time / full time
- Scheduled project review date/time:
- Instructor name: Diana Mongina
- Blog post URL:

Research Questions

1. To understand which studios are producing the most successfull movies
2. To explore which genres are performing best at the box office.

Dataset used:

1:/content/bom.movie_gross.csv.gz

2:/content/im.db.zip table movie_ratings

3:./content/im.db.zip table movie_basic

/content/bom.movie_gross.csv.gz variables

**title:* the title of the movie

studio: the studio that produced or distributed the movie

domestic_gross: the total domestic (US) box office gross earnings of the movie in US dollars

foreign_gross: the total foreign box office gross earnings of the movie in US dollars

year: the year the movie was released

/content/im.db: ** movie_rating dataset explained

tconst: a unique identifier for each movie (same as in movie_basics)

average_rating: the average rating of the movie, based on user and critic reviews

num_votes: the number of votes/ratings the movie received

distribution: the distribution of ratings, e.g. the number of 1-star, 2-star, 3-star, etc. ratings

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/content/im.db: ** movie_basic dataset explained

tconst: a unique identifier for each movie

title_type: the type of title (e.g. movie, short, tvSeries)

primary_title: the primary title of the movie

original_title: the original title of the movie

is_adult: whether the movie is an adult movie (e.g. pornographic content)

start_year: the year the movie was released

end_year: the year the movie stopped running (if a TV series)

runtime_minutes: the runtime of the movie in minutes

genres: the genre(s) of the movie (e.g. Drama, Action, Comedy)

Double-click (or enter) to edit

Double-click (or enter) to edit

*1. Load the dataset into the and read as CSV *

1.1 Importing libraries

```
# Importing necessary libaries
import pandas as pd
import numpy as np
import scipy
import matplotlib.pyplot as plt
import seaborn as sns
import sqlite3
import pandas as pd
import zipfile
```

1.2 Loading and reading the datasets

```
df_movie_gross = pd.read_csv('/content/bom.movie_gross.csv.gz')
print("The gross movie shape is =",df_movie_gross.shape)
```

```
The gross movie shape is = (3387, 5)
```

```
# opening and reading the content of content/im.db.zip  dataset
#unzip the file

with zipfile.ZipFile('/content/im.db.zip', 'r') as zip_ref:
    zip_ref.extractall('/content/')
# connect to the SQLite database
sql= sqlite3.connect('/content/im.db')

# querirng  the 'movie_basics'
df_basic = pd.read_sql_query('SELECT * FROM movie_basics',sql)
# querirng  the 'movie_basics'
df_rating = pd.read_sql_query('SELECT * FROM movie_ratings',sql)
```

2.0 Exploring the dataset

```
#1.0 Checking the shape of the datasets
print("The gross movie shape is =",df_movie_gross.shape)
print()
print("The basic movie  shape is =",df_basic.shape)
print()
print("The rating movie  shape is =",df_rating.shape)
```

```
The gross movie shape is = (3387, 5)

The basic movie  shape is = (146144, 6)

The rating movie  shape is = (73856, 3)
```

Shape observation: The three datasets have different number of rows and coluymns

3.0 Checking the gross movie dataset

```
df_movie_gross.head(5) ###check the first 5 rows  of movie
```

	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

```
df_movie_gross.tail(3) ###check the last 3 rows
```

	title	studio	domestic_gross	foreign_gross	year
3384	El Pacto	Sony	2500.0	NaN	2018
3385	The Swan	Synergetic	2400.0	NaN	2018
3386	An Actor Prepares	Grav.	1700.0	NaN	2018

Obseravation of values for the gross movie: In the tail the values of the foreign_gross are missing

```
df_movie_gross.info() ## getiing the summmary for the data including missing da
```

```
<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
```

```
# Checking the % of value missing
missing_per = df_movie_gross.isnull().mean() * 100
missing_per
```

```
title              0.000000
studio             0.147623
domestic_gross     0.826690
foreign_gross     39.858282
year               0.000000
dtype: float64
```

Missing Value in the gross movie : foreign_gross has ~40 % missing values worth to explore more the type of value missing

```
df_movie_gross.describe() ##to get the sum stats for the numerical data
```

	domestic_gross	year
count	3.359000e+03	3387.000000
mean	2.874585e+07	2013.958075
std	6.698250e+07	2.478141
min	1.000000e+02	2010.000000
25%	1.200000e+05	2012.000000
50%	1.400000e+06	2014.000000
75%	2.790000e+07	2016.000000
max	9.367000e+08	2018.000000

4.0 Data manipulation the gross movie dataset

```
# create a copy of movie dataset

df_movie_gross1=df_movie_gross.copy()
```

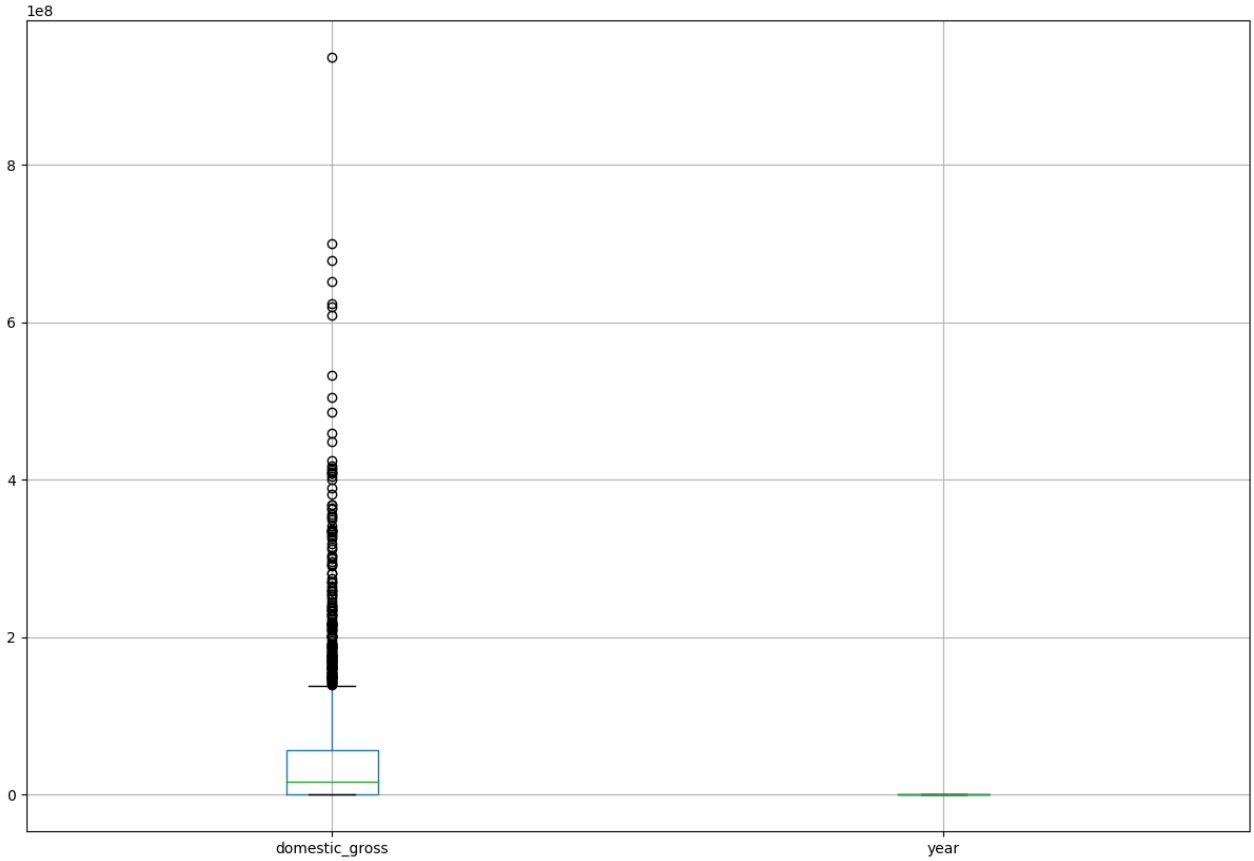
```
### dropping all the missing values
df_movie_gross1=df_movie_gross1.dropna()
df_movie_gross1.isnull().sum(). any() # confirm is all missing have been dropped
```

```
False
```

```
##checking for duplicates
df_movie_gross1.duplicated().sum() # no duplicates observed
```

```
0
```

```
# checking for outliers
plt.figure(figsize=(15, 10))
df_movie_gross1.boxplot()
plt.show()
```



Observation: There is outlier in the domestic_gross though it is okay

Research Questions 1

1:To understand which studios are producing the most successfull movies

```
# Calculate descriptive statistics of the domestic gross
#our dependent variable=domestic_gross
#our independent variable =studios
domestic_gross = df_movie_gross1['domestic_gross']
print(domestic_gross.describe())
```

```
count    2.007000e+03
mean     4.701984e+07
std      8.162689e+07
min      4.000000e+02
25%      6.700000e+05
50%      1.670000e+07
75%      5.605000e+07
max      9.367000e+08
Name: domestic_gross, dtype: float64
```

Observation: The data looks okay with normal disribution

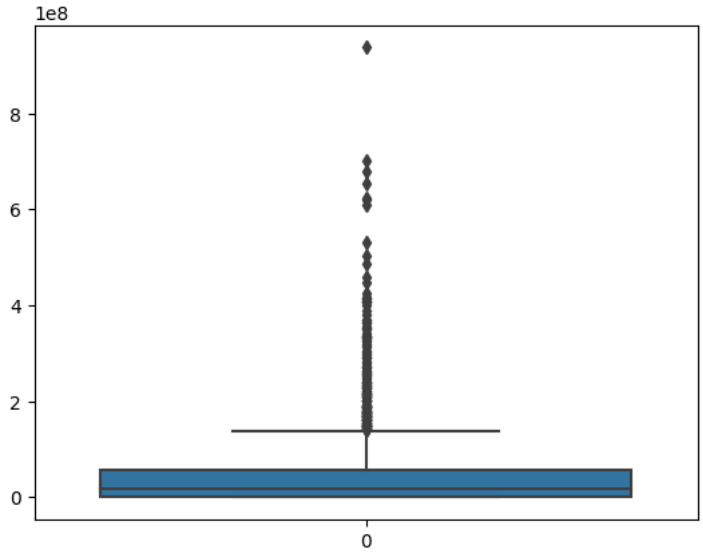
```
# Check for missing values for the domestic gross
print(domestic_gross.isnull().sum()) ## no missing values since it was dropped
```

```
0
```

```
# Visualize the distribution for the domestic gross

sns.histplot(domestic_gross)
plt.show()
```


```
# Check for outliers for the domestic gross
sns.boxplot(domestic_gross)
plt.show()
```



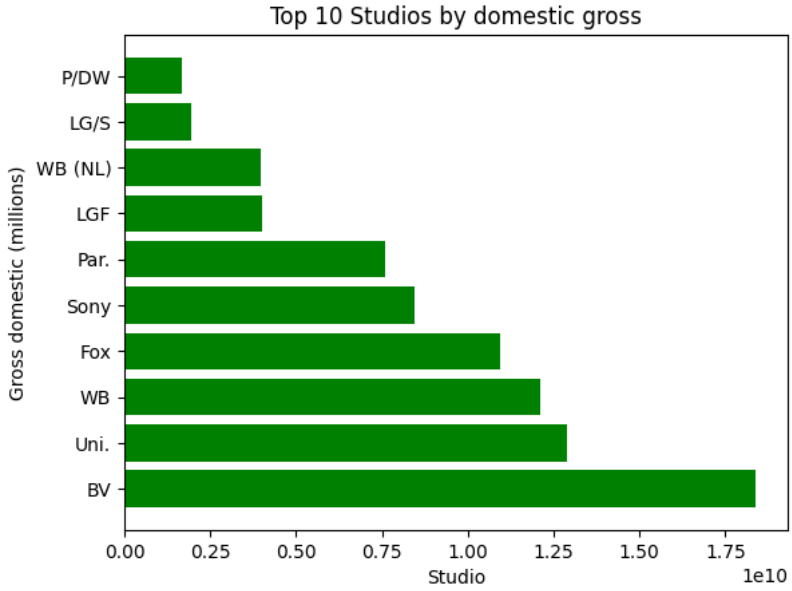
observation : There is one outlier in the domestic_gross though we will keep it

```
## find the 10 stuidos with the highest domestic_gross
## group by studio and the domestic_gross sum
studio_gross = df_movie_gross1.groupby('studio')['domestic_gross'].sum()

studio_gross = studio_gross.sort_values(ascending=False) ##sorting
top_studios=studio_gross.head(10)
studio_gross.head(10) ## print the foirst 10 studios with the highest revenue
```

```
studio
BV         1.839653e+10
Uni.       1.289204e+10
WB         1.212360e+10
Fox        1.092450e+10
Sony       8.459479e+09
Par.       7.580813e+09
LGF        3.991851e+09
WB (NL)    3.975100e+09
LG/S       1.965200e+09
P/DW       1.682900e+09
Name: domestic_gross, dtype: float64
```

```
## find the 10 stuidos with the highest domestic_gross
plt.barh(top_studios.index, top_studios.values,color="green")
plt.title('Top 10 Studios by domestic gross')
plt.xlabel('Studio')
plt.ylabel('Gross domestic (millions)')
plt.show()
```



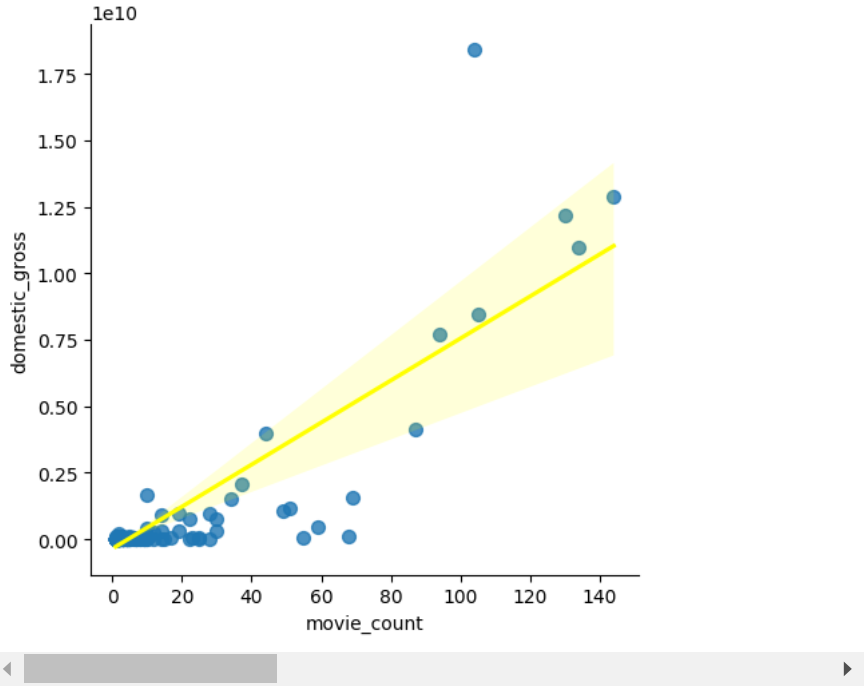

```
#correlation between a studio's movie production and its gross revenue.
df_movie_counts = df_movie_gross1['studio'].value_counts().rename_axis('studio').reset_index(name='movie_count')

# Group the gross revenue by studio
df_gross_revenue = df_movie_gross.groupby('studio')[['domestic_gross', 'foreign_gross']].sum()

# Merge the movie counts and gross revenue DataFrames
df_studio = pd.merge(df_movie_counts, df_gross_revenue, on='studio')

# Create a scatter plot with a regression line
sns.lmplot(x='movie_count', y='domestic_gross', data=df_studio, scatter_kws={'s': 50}, line_kws={'color': 'yellow'})
```

```
<ipython-input-118-3bfbcc656ad6>:5: FutureWarning: The default value of numeric_only
  df_gross_revenue = df_movie_gross.groupby('studio')[['domestic_gross', 'foreign_gr
<seaborn.axisgrid.FacetGrid at 0x7f90cb6ca730>
```



Conclusion:

Based on the analysis, it can be concluded that the top studios producing the most successful movies in terms of gross revenue are Walt Disney, Warner Bros., and Universal Studios The data also suggests that there is a positive correlation between a studio's movie production and its gross revenue.

These findings can help guide the decision-making process for the head of Microsoft's new movie studio.

They may want to consider partnering with one of the top studios or emulating their successful strategies. Additionally, they could focus on producing a larger quantity of movies in order to increase the chances of generating higher gross revenue.

3.0 Checking the basic and rating dataset

```
df_basic.head(5) ###check the first 5 rows  basic movie
```

	movie_id	primary_title	original_title	start_year	runtime_minutes	genres
0	tt0063540	Sunghursh	Sunghursh	2013	175.0	Action,Crime,Drama
1	tt0066787	One Day Before the Rainy Season	Ashad Ka Ek Din	2019	114.0	Biography,Drama
2	tt0069049	The Other Side of the Wind	The Other Side of the Wind	2018	122.0	Drama
3	tt0069204	Sabse Bada Sukh	Sabse Bada Sukh	2018	NaN	Comedy,Drama
4	tt0100275	The Wandering Soap Opera	La Telenovela Errante	2017	80.0	Comedy,Drama,Fantasy

```
df_basic.tail(5) ###check the last 5 rows  basic movie
```

	movie_id	primary_title	original_title	start_year	runtime_minutes	genres
146139	tt9916538	Kuambil Lagi Hatiku	Kuambil Lagi Hatiku	2019	123.0	Drama
146140	tt9916622	Rodolpho Teóphilo - O Legado de um Pioneiro	Rodolpho Teóphilo - O Legado de um Pioneiro	2015	NaN	Documentary
146141	tt9916706	Dankyavar Danka	Dankyavar Danka	2013	NaN	Comedy
146142	tt9916730	6 Gunn	6 Gunn	2017	116.0	None
146143	tt9916754	Chico Albuquerque - Revelações	Chico Albuquerque - Revelações	2013	NaN	Documentary

Observation: Data variables are consistent from top to bottom for the basic movie dataset

```
df_rating.head(5) ###check the first 5 rows  rating movie
```

	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

```
df_rating.tail(5) ###check the last  5 rows  rating movie
```

	movie_id	averagerating	numvotes
73851	tt9805820	8.1	25
73852	tt9844256	7.5	24
73853	tt9851050	4.7	14
73854	tt9886934	7.0	5
73855	tt9894098	6.3	128

Observation: Data variables are consistent from top to bottom for the rating movie dataset

***Conclusion of the two dataset: *** They have different variables and common movie_id hence they can be merged and perform data explolation

4.**Exploring IM Movies** :Merged rating and basic movies

```
## merging the rating and the basic dataset
df_rating_basic = pd.merge(df_basic, df_rating)
```

```
df_rating_basic.head() ##checking if the dataset merged
```

	movie_id	primary_title	original_title	start_year	runtime_minutes	genres	averagerating	numvotes
0	tt0063540	Sunghursh	Sunghursh	2013	175.0	Action,Crime,Drama	7.0	77
1	tt0066787	One Day Before the Rainy Season	Ashad Ka Ek Din	2019	114.0	Biography,Drama	7.2	43
2	tt0069049	The Other Side of the Wind	The Other Side of the Wind	2018	122.0	Drama	6.9	4517
3	tt0069204	Sabse Bada Sukh	Sabse Bada Sukh	2018	NaN	Comedy,Drama	6.1	13

```
df_rating_basic.head(5) ###check the first 5 rows  of movie
```

	movie_id	primary_title	original_title	start_year	runtime_minutes	genres	averagerating	numvotes
0	tt0063540	Sunghursh	Sunghursh	2013	175.0	Action,Crime,Drama	7.0	77
1	tt0066787	One Day Before the Rainy Season	Ashad Ka Ek Din	2019	114.0	Biography,Drama	7.2	43
2	tt0069049	The Other Side of the Wind	The Other Side of the Wind	2018	122.0	Drama	6.9	4517
3	tt0069204	Sabse Bada Sukh	Sabse Bada Sukh	2018	NaN	Comedy,Drama	6.1	13

```
df_rating_basic.tail() ##checking the last 5 rows
```

	movie_id	primary_title	original_title	start_year	runtime_minutes	genres	averagerating	numvotes
73851	tt9913084	Diabolik sono io	Diabolik sono io	2019	75.0	Documentary	6.2	6
73852	tt9914286	Sokagin Çocuklari	Sokagin Çocuklari	2019	98.0	Drama,Family	8.7	136
73853	tt9914642	Albatross	Albatross	2017	NaN	Documentary	8.5	8
73854	tt9914942	La vida sense la Sara Amat	La vida sense la Sara Amat	2019	NaN	None	6.6	5
73855	tt9916160	Drømmeland	Drømmeland	2019	72.0	Documentary	6.5	11

Conclusion of merged dataset: The columns, rowsa and values are constistent from top to bottom

```
df_rating_basic.info() ## getiing the summmary for the data including missing da
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 73856 entries, 0 to 73855
Data columns (total 8 columns):
 #   Column           Non-Null Count  Dtype  
---  ------           --------------  -----  
 0   movie_id         73856 non-null  object 
 1   primary_title    73856 non-null  object 
 2   original_title   73856 non-null  object 
 3   start_year       73856 non-null  int64  
 4   runtime_minutes  66236 non-null  float64
 5   genres           73052 non-null  object 
 6   averagerating    73856 non-null  float64
 7   numvotes         73856 non-null  int64  
```

```
dtypes: float64(2), int64(2), object(4)
memory usage: 5.1+ MB
```

```
# Checking the % of value missing
missing_per = df_rating_basic.isnull().mean() * 100
missing_per
```

```
movie_id            0.000000
primary_title       0.000000
original_title      0.000000
start_year          0.000000
runtime_minutes    10.317374
genres              1.088605
averagerating       0.000000
numvotes            0.000000
dtype: float64
```

Missing value observation: The level of the missing is less than 10% we can replace the missing by the mean

*4.0 Data manipulation the megerd basic and rating dataset movie *

```
### fill the missing with means since the missing values are < 10%
df_rating_basic_filled = df_rating_basic.fillna(df_rating_basic.mean())
```

```
<ipython-input-148-0026d79961fc>:2: FutureWarning: The default value of numeric_only in DataFrame.mean is deprecated. In a future v
  df_rating_basic_filled = df_rating_basic.fillna(df_rating_basic.mean())
```

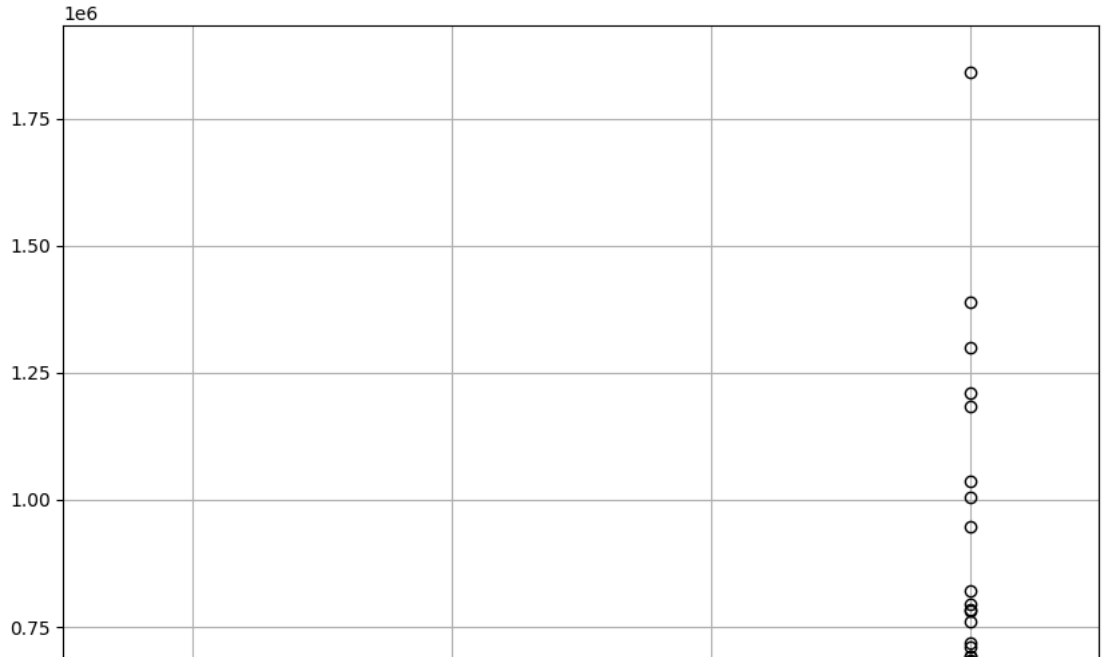
```
df_rating_basic_filled.info() ### checking if all missing values have been filled
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 73856 entries, 0 to 73855
Data columns (total 8 columns):
 #   Column           Non-Null Count  Dtype  
---  ------           --------------  -----  
 0   movie_id         73856 non-null  object 
 1   primary_title    73856 non-null  object 
 2   original_title   73856 non-null  object 
 3   start_year       73856 non-null  int64  
 4   runtime_minutes  73856 non-null  float64
 5   genres           73052 non-null  object 
 6   averagerating    73856 non-null  float64
 7   numvotes         73856 non-null  int64  
dtypes: float64(2), int64(2), object(4)
memory usage: 5.1+ MB
```

```
##checking for duplicates
df_rating_basic_filled.duplicated().sum() # no duplicates observed
##no duplicates observed
```

```
0
```

```
# checking for outliers
# Select numerical columns and remove rows with missing values
df_num = df_rating_basic_filled.select_dtypes(include=[float, int,float]).dropna()
plt.figure(figsize=(10, 10))
df_rating_basic_filled.boxplot()
plt.show()
```



Observation: There is outlier in the numvotes though it is okay

Research Questions 2

To explore which genres are performing best at the box office.

```
# Calculate descriptive statistics of the averagerating
#our dependent variable=aveараgerating
#our independent variable =genres
averagerating = df_rating_basic_filled['averagerating']
print(averagerating.describe())
```

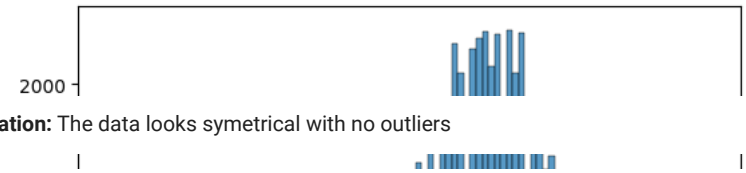
```
count    73856.000000
mean         6.332729
std          1.474978
min          1.000000
25%          5.500000
50%          6.500000
75%          7.400000
max         10.000000
Name: averagerating, dtype: float64
```

Observation: The data looks okay with normal disribution

```
# Check for missing values for the averagerating
print(averagerating.isnull().sum()) ## no missing values since it was dropped
```

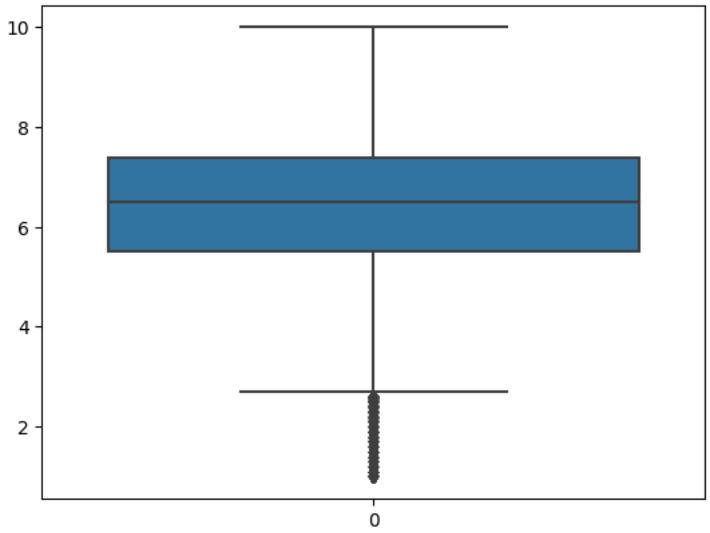
```
0
```

```
# Visualize the distribution for the averagerating
sns.histplot(averagerating)
plt.show()
```



Observation: The data looks symetrical with no outliers


```
# Check for outliers for the domestic gross
sns.boxplot(averagerating)
plt.show()
```

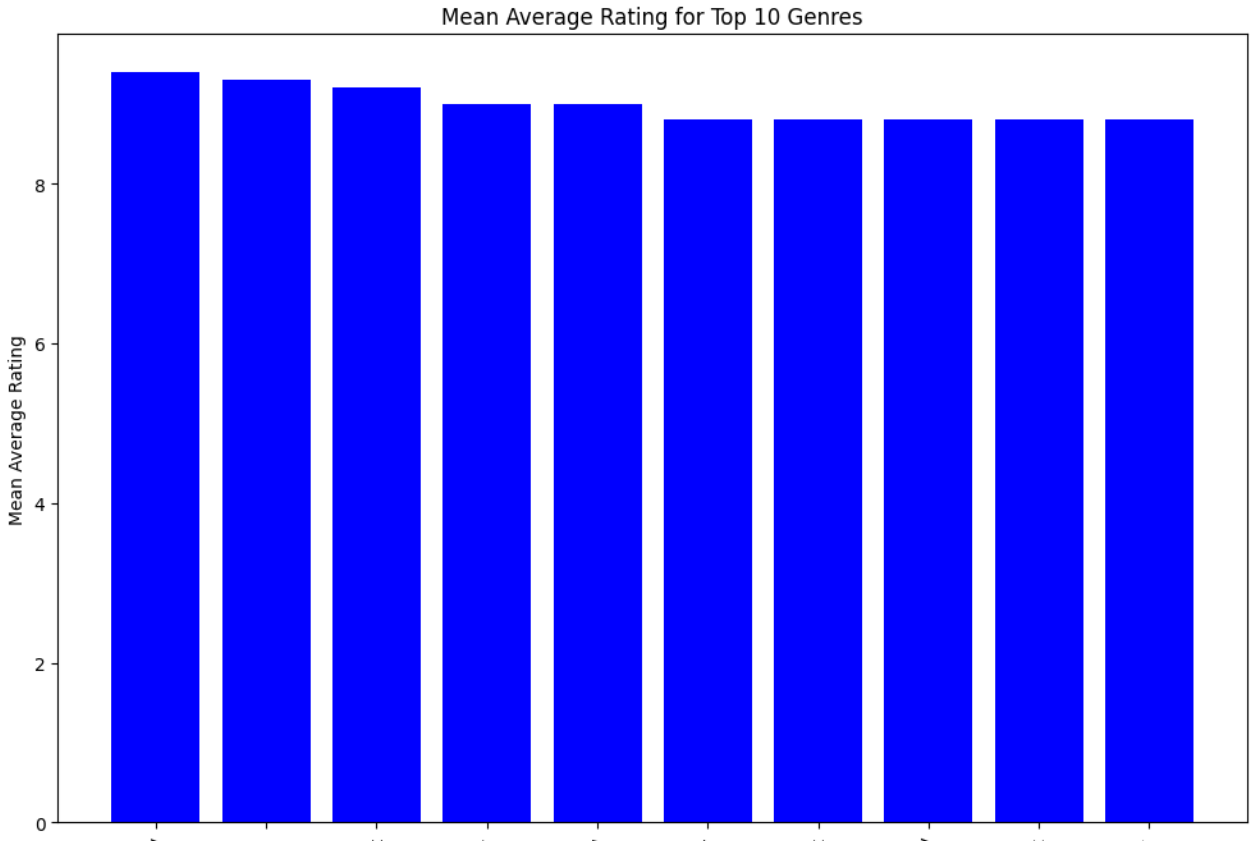


Observation: No outlier detected in the data

```
## find the 10 genres  with the highest rating
## group by genre and the average rating  sum
df_genre = df_rating_basic_filled.groupby('genres')['averagerating'].mean().sort_values(ascending=False)
top_genres = df_genre.head(10)
top_genres ## print the foirst 10 studios with the highest rating
```

```
genres
Comedy,Documentary,Fantasy     9.4
Documentary,Family,Musical     9.3
History,Sport                  9.2
Music,Mystery                  9.0
Game-Show                      9.0
Drama,Fantasy,War              8.8
Documentary,News,Sport         8.8
Comedy,Drama,Reality-TV        8.8
Drama,Short                    8.8
Documentary,News,Reality-TV    8.8
Name: averagerating, dtype: float64
```

```
##create vizual of 10 top genres rating
plt.figure(figsize=(12,8))
plt.bar(top_genres.index, top_genres.values, color='blue')
plt.xticks(rotation=90)
plt.xlabel('Genres')
plt.ylabel('Mean Average Rating')
plt.title('Mean Average Rating for Top 10 Genres')
plt.show()
```



Conclusion:

Based on the analysis, we can see that the genres Comedy,Documentary,Fantasy have the highest mean average rating of 9.4 . This suggests that movies in these genres tend to be more highly rated by viewers compared to movies in other genres.

From the bar plot, we can see that there is a clear difference in the mean average rating between the top 10 genres and the other genres.

This suggests that genre is an important factor to consider when producing movies, as it can have a significant impact on the viewer's perception of the movie.