Final Project Submission

Please fill out:

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- Student pace: part time
- Scheduled project review date/time: 03.06.2024
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- Blog post URL: https://github.com/Jodhiamboapiyo/Phase_one_project_dsc.git (https://github.com/Jodhiamboapiyo/Phase_one_project_dsc.git)

In [3]:
```
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
import sqlite3
import seaborn as sns
```

Importing the bom.movie_gross.csv

In [4]:
```
df = pd.read_csv('bom.movie_gross.csv')
df
```

Out[4]:

	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
...	...	...	...	...	...
3382	The Quake	Magn.	6200.0	NaN	2018
3383	Edward II (2018 re-release)	FM	4800.0	NaN	2018
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

3387 rows × 5 columns

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

Out[5]:

	title	studio	domestic_gross	foreign_gross	year
3382	The Quake	Magn.	6200.0	NaN	2018
3383	Edward II (2018 re-release)	FM	4800.0	NaN	2018
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

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

Out[6]:
```
title             3387
studio            3382
domestic_gross    3359
foreign_gross     2037
year              3387
dtype: int64
```

Checking For Duplicates and Missing Data in the Dataset

In [7]:
```
df.duplicated().value_counts()
```

Out[7]:
```
False    3387
dtype: int64
```

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

Out[8]:

	title	studio	domestic_gross	foreign_gross	year
0	False	False	False	False	False
1	False	False	False	False	False
2	False	False	False	False	False
3	False	False	False	False	False
4	False	False	False	False	False
...	...	...	...	...	...
3382	False	False	False	True	False
3383	False	False	False	True	False
3384	False	False	False	True	False
3385	False	False	False	True	False
3386	False	False	False	True	False

3387 rows × 5 columns

In [9]:
```
# code here
num_rows = df.shape[0]
num_missing = num_rows - df.count()
num_missing
```

Out[9]:
```
title               0
studio              5
domestic_gross     28
foreign_gross    1350
year                0
dtype: int64
```

Checking The percentage of Missing Date in the foreign_gross column

In [10]:
```
# Calculating the number of missing values in foreign_gross
missing_foreign_gross = df['foreign_gross'].isnull().sum()

# Calculating the total number of rows in the DataFrame
total_rows = df.shape[0]

# Calculating the percentage of missing values
percentage_missing_foreign_gross = (missing_foreign_gross / total_rows) * 100

print(f'Percentage of missing values in foreign_gross: {percentage_missing_fore
```

```
Percentage of missing values in foreign_gross: 39.86%
```

In [12]:
```
# Converting 'foreign_gross' to numeric, coercing errors to NaN
df['foreign_gross'] = pd.to_numeric(df['foreign_gross'], errors='coerce')

# Calculating the mean of 'foreign_gross'
mean_foreign_gross = df['foreign_gross'].mean()

# Filling missing values with the calculated mean
df['foreign_gross'].fillna(mean_foreign_gross, inplace=True)

# Verifying that there are no more missing values
missing_values_count = df['foreign_gross'].isnull().sum()
percentage_missing = (missing_values_count / len(df)) * 100

print(f"Number of missing values in foreign_gross after filling: {missing_value
print(f"Percentage of missing values in foreign_gross after filling: {percentag
```

```
Number of missing values in foreign_gross after filling: 0
Percentage of missing values in foreign_gross after filling: 0.00%
```

In [13]:
```
df['foreign_gross']
```

Out[13]:
```
0       6.520000e+08
1       6.913000e+08
2       6.643000e+08
3       5.357000e+08
4       5.139000e+08
              ...
3382    7.505704e+07
3383    7.505704e+07
3384    7.505704e+07
3385    7.505704e+07
3386    7.505704e+07
Name: foreign_gross, Length: 3387, dtype: float64
```

Let us now work on the other missing data in the columns with the dataset

In [14]:
```
# Filling missing 'studio' with a placeholder
df['studio'].fillna('Unknown', inplace=True)

# Filling missing 'domestic_gross' with the mean or median
mean_domestic_gross = df['domestic_gross'].mean()
df['domestic_gross'].fillna(mean_domestic_gross, inplace=True)

# Verifying the change
print(df.isnull().sum())
```

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

In [15]:
```
df['domestic_gross'].describe()
```

Out[15]:
```
count    3.387000e+03
mean     2.874585e+07
std      6.670497e+07
min      1.000000e+02
25%      1.225000e+05
50%      1.400000e+06
75%      2.874585e+07
max      9.367000e+08
Name: domestic_gross, dtype: float64
```

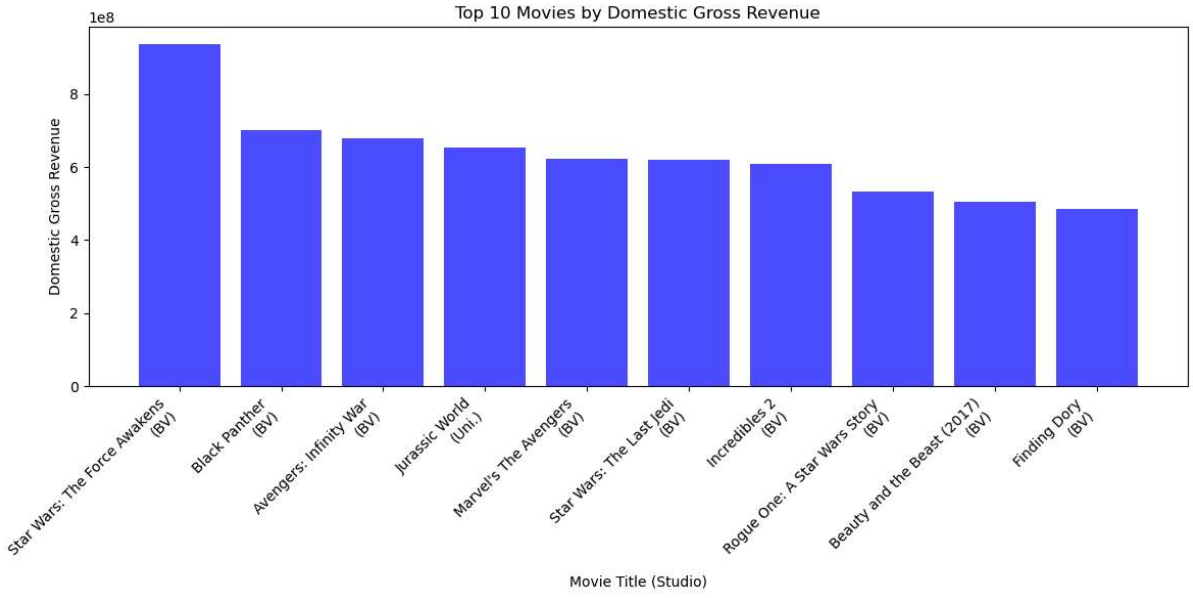
In [16]:
```
df['foreign_gross'].describe()
```

Out[16]:
```
count    3.387000e+03
mean     7.505704e+07
std      1.065140e+08
min      6.000000e+02
25%      1.175000e+07
50%      7.505704e+07
75%      7.505704e+07
max      9.605000e+08
Name: foreign_gross, dtype: float64
```

VISUALIZATION

Bar plot for the top 10 most grossing movie domestically

In [17]:
```
# Sort the DataFrame by domestic gross revenue and select the top 10 rows
top_10_domestic = df.sort_values(by='domestic_gross', ascending=False).head(10)

# Plot the comparison using a bar chart
plt.figure(figsize=(12, 6))

# Combine movie titles and studios for x-axis labels
labels = [f"{title}\n({studio})" for title, studio in zip(top_10_domestic['titl

plt.bar(labels, top_10_domestic['domestic_gross'], color='blue', alpha=0.7)

plt.title('Top 10 Movies by Domestic Gross Revenue')
plt.xlabel('Movie Title (Studio)')
plt.ylabel('Domestic Gross Revenue')
plt.xticks(rotation=45, ha='right')
plt.tight_layout()
plt.show()
```



The total of top 10 foreign gross

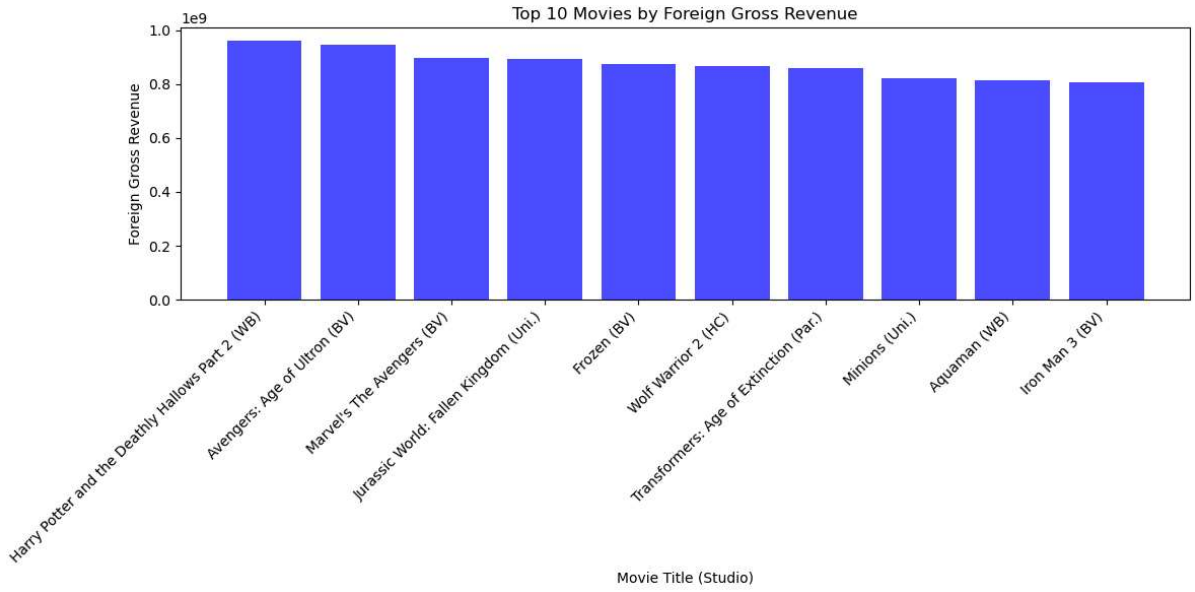
In [18]:

```
foreign_gross_list = []

for index, row in df.iterrows():
    # Appending the foreign gross to the list
    foreign_gross_list.append(row['foreign_gross'])

# foreign gross list to the DataFrame as a new column
df['foreign_gross'] = foreign_gross_list

# Sorted DataFrame of foreign gross in descending order
df_sorted_foreign = df.sort_values(by='foreign_gross', ascending=False)

top_10_foreign = df_sorted_foreign.head(10)

top_10_foreign = top_10_foreign[['title', 'studio', 'domestic_gross', 'foreign_

top_10_foreign
```

Out[18]:

	title	studio	domestic_gross	foreign_gross	year
328	Harry Potter and the Deathly Hallows Part 2	WB	381000000.0	960500000.0	2011
1875	Avengers: Age of Ultron	BV	459000000.0	946400000.0	2015
727	Marvel's The Avengers	BV	623400000.0	895500000.0	2012
3081	Jurassic World: Fallen Kingdom	Uni.	417700000.0	891800000.0	2018
1127	Frozen	BV	400700000.0	875700000.0	2013
2764	Wolf Warrior 2	HC	2700000.0	867600000.0	2017
1477	Transformers: Age of Extinction	Par.	245400000.0	858600000.0	2014
1876	Minions	Uni.	336000000.0	823400000.0	2015
3083	Aquaman	WB	335100000.0	812700000.0	2018
1128	Iron Man 3	BV	409000000.0	805800000.0	2013

In [19]:
```
# Assuming the 'top_10_foreign' contains the DataFrame of the top 10 highest-gr
plt.figure(figsize=(12, 6))

# Initializing the lists to store movie labels and gross revenues
labels = []
gross_revenues = []

# Iterate over the rows of the DataFrame
for index, row in top_10_foreign.iterrows():
    # Combine movie title and studio for the label
    label = f"{row['title']} ({row['studio']})"
    labels.append(label)
    gross_revenues.append(row['foreign_gross'])

# Plot the bar chart
plt.bar(labels, gross_revenues, color='blue', alpha=0.7)

plt.title('Top 10 Movies by Foreign Gross Revenue')
plt.xlabel('Movie Title (Studio)')
plt.ylabel('Foreign Gross Revenue')
plt.xticks(rotation=45, ha='right')
plt.tight_layout()
plt.show()
```



Most Grossing Movie Both Domestically and Foreign and the studio

In [20]:
```
# Converting domestic_gross and foreign_gross to numeric, coercing errors
df['domestic_gross'] = pd.to_numeric(df['domestic_gross'], errors='coerce')
df['foreign_gross'] = pd.to_numeric(df['foreign_gross'], errors='coerce')

# Fillin NaN values with 0 (if appropriate)
df['domestic_gross'] = df['domestic_gross'].fillna(0)
df['foreign_gross'] = df['foreign_gross'].fillna(0)
#Most grossing movie both domestically and Foreign
df['total_gross'] = df['domestic_gross'] + df['foreign_gross']
#Now let us sort this out
df_sorted_total_gross = df.sort_values(by= 'total_gross', ascending=False)
# Selecting the top row, which represents the most grossing movie both domestic
most_grossing_movie = df_sorted_total_gross.head(1)
# Printing the most grossing movie
result_df = most_grossing_movie[['title', 'studio', 'domestic_gross', 'foreign_
print("Most Grossing Movie Both Domestically and Foreign:")

result_df
```

```
Most Grossing Movie Both Domestically and Foreign:
```

Out[20]:

	title	studio	domestic_gross	foreign_gross	total_gross	year
727	Marvel's The Avengers	BV	623400000.0	895500000.0	1.518900e+09	2012

Finding the studio with the most number of movies

In [21]:
```
#  number of movies for each studio
studio_counts = df['studio'].value_counts()

# studio with the highest count
most_common_studio = studio_counts.idxmax()
most_common_studio_count = studio_counts.max()

# Display the result
print(f"Studio with the most number of movies:")
print(f"{most_common_studio}: {most_common_studio_count} movies")
```

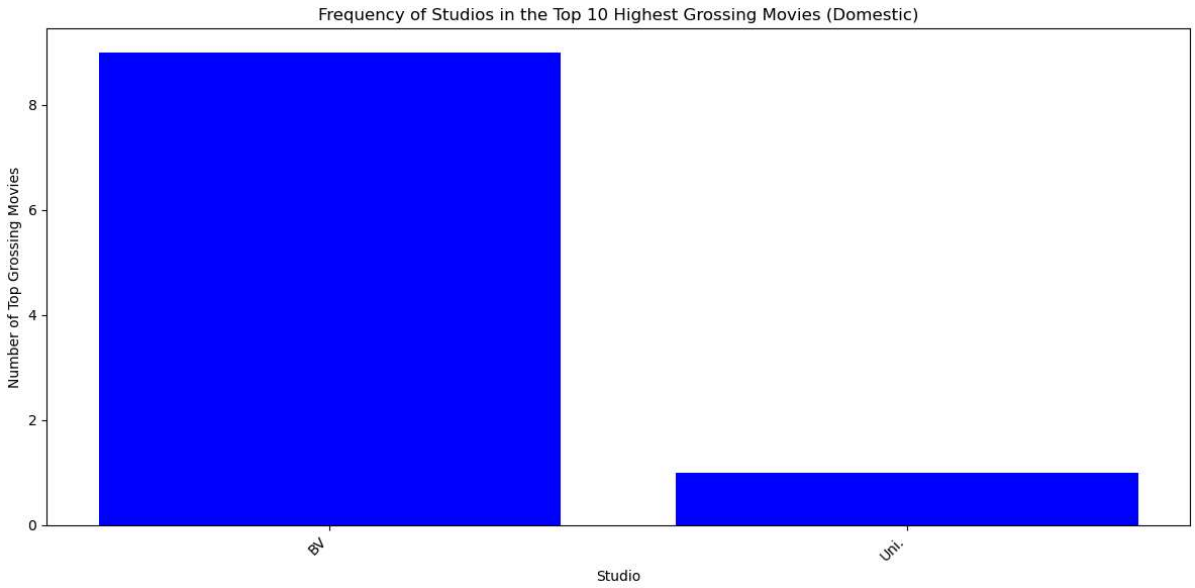
```
Studio with the most number of movies:
IFC: 166 movies
```

HISTOGRAM ANLYSIS

1.1 The studio with highest domestic gross and foreign gross

In [22]:
```
# Convert domestic_gross and foreign_gross to numeric, coercing errors
df['domestic_gross'] = pd.to_numeric(df['domestic_gross'], errors='coerce')
df['foreign_gross'] = pd.to_numeric(df['foreign_gross'], errors='coerce')

# Fill NaN values with 0 (if appropriate)
df['domestic_gross'] = df['domestic_gross'].fillna(0)
df['foreign_gross'] = df['foreign_gross'].fillna(0)

# Set the number of top movies to consider
top_n = 10  # You can adjust this number

# Get top N movies by domestic gross
top_n_domestic = df.nlargest(top_n, 'domestic_gross')

# Get top N movies by foreign gross
top_n_foreign = df.nlargest(top_n, 'foreign_gross')

# Count the number of movies for each studio in the top N domestic gross movies
studio_counts_domestic = top_n_domestic['studio'].value_counts()

# Count the number of movies for each studio in the top N foreign gross movies
studio_counts_foreign = top_n_foreign['studio'].value_counts()

# Create a frequency table for domestic gross
frequency_table_domestic = studio_counts_domestic.reset_index()
frequency_table_domestic.columns = ['Studio', 'Number of Top Grossing Movies']

# Create a frequency table for foreign gross
frequency_table_foreign = studio_counts_foreign.reset_index()
frequency_table_foreign.columns = ['Studio', 'Number of Top Grossing Movies']
```

In [23]:
```
# Plot the frequency graph for domestic gross
plt.figure(figsize=(12, 6))
plt.bar(frequency_table_domestic['Studio'], frequency_table_domestic['Number of
plt.title(f'Frequency of Studios in the Top {top_n} Highest Grossing Movies (Do
plt.xlabel('Studio')
plt.ylabel('Number of Top Grossing Movies')
plt.xticks(rotation=45, ha='right')
plt.tight_layout()
plt.show()
```



In [24]:
```
import sqlite3
conn= sqlite3.connect('im.db')
```

In [25]:
```
cursor = conn.cursor()
# Retrieve the list of tables in the database
cursor.execute("SELECT name FROM sqlite_master WHERE type='table';")
tables = cursor.fetchall()
# Print the list of tables
print("List of tables in the database:")
for table in tables:
    print(table[0])
```

```
List of tables in the database:
movie_basics
directors
known_for
movie_akas
movie_ratings
persons
principals
writers
```

In the SQL table, I will work with these two tables movie_basics and movie_ratings

In [26]:
```
# Loading the movie_basics table
movie_basics_df = pd.read_sql_query("SELECT * FROM movie_basics", conn)
movie_basics_df
```

Out[26]:

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

146144 rows × 6 columns

In [28]:
```
movie_basics_df.describe()
```

Out[28]:

	start_year	runtime_minutes
count	146144.000000	114405.000000
mean	2014.621798	86.187247
std	2.733583	166.360590
min	2010.000000	1.000000
25%	2012.000000	70.000000
50%	2015.000000	87.000000
75%	2017.000000	99.000000
max	2115.000000	51420.000000

Data frame of the movie ratings

In [29]:
```
# Load the movie_basics table
movie_ratings_df = pd.read_sql_query("SELECT * FROM movie_ratings", conn)
movie_ratings_df
```

Out[29]:

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

73856 rows × 3 columns

In [30]:
```
 #Get descriptive statistics for each column
descriptive_stats = movie_ratings_df.describe()

# Display the descriptive statistics
print(descriptive_stats)
```

```
       averagerating      numvotes
count   73856.000000  7.385600e+04
mean        6.332729  3.523662e+03
std         1.474978  3.029402e+04
min         1.000000  5.000000e+00
25%         5.500000  1.400000e+01
50%         6.500000  4.900000e+01
75%         7.400000  2.820000e+02
max        10.000000  1.841066e+06
```

In [31]:
```
# Load the movie_basics table
movie_basics_df = pd.read_sql_query("SELECT * FROM movie_basics", conn)

# Calculate the percentage of missing values for each column
missing_percentage = movie_basics_df.isnull().mean() * 100

# Display the percentage of missing values for each column
print(missing_percentage)
```

```
movie_id            0.000000
primary_title       0.000000
original_title      0.014369
start_year          0.000000
runtime_minutes    21.717621
genres              3.700460
dtype: float64
```

2.0 Movie Ratings table

Finding the percentage of missing values in each column of the movie ratings data frame

In [32]:
```
# Load the movie_basics table
movie_ratings_df = pd.read_sql_query("SELECT * FROM movie_ratings", conn)

# Calculate the percentage of missing values for each column
missing_percentage = movie_ratings_df.isnull().mean() * 100

# Display the percentage of missing values for each column
print(missing_percentage)
```

```
movie_id         0.0
averagerating    0.0
numvotes         0.0
dtype: float64
```

The movie ratings table has no missing entries. -This means that no cleaning needed.

Merging the two tables using JOIN query and filling in th missing entries for each column This will help in efficient analysis, cleansing of the data and combining data. For example, from the data base, the movie id column in the two tables, movie basics and movie rating had to be merged and the two columns from the movie ratings, (averagerating and numvotes) being only two columns merged into the tabel movie basics.

In [33]:
```
#connection to the database
conn = sqlite3.connect('im.db')

#the SQL query to join the tables
query = """
SELECT mb.movie_id,
       mb.primary_title,
       mb.original_title,
       mb.start_year,
       mb.runtime_minutes,
       mb.genres,
       mr.averagerating,
       mr.numvotes
FROM movie_basics mb
LEFT JOIN movie_ratings mr ON mb.movie_id = mr.movie_id;
"""

merged_df_sql = pd.read_sql_query(query, conn)
merged_df_sql
```

Out[33]:

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

146144 rows × 8 columns

Filling in each column on the joined table with None or NaN entries

In [35]:

```
# Replace NaN values in 'runtime_minutes' column with the mean of the column
mean_runtime = merged_df_sql['runtime_minutes'].mean()
merged_df_sql['runtime_minutes'].fillna(mean_runtime, inplace=True)

# Replace NaN values in 'averagerating' column with the mean of the column
mean_rating = merged_df_sql['averagerating'].mean()
merged_df_sql['averagerating'].fillna(mean_rating, inplace=True)

# Replace NaN values in 'numvotes' column with the mean of the column
mean_numvotes = merged_df_sql['numvotes'].mean()
merged_df_sql['numvotes'].fillna(mean_numvotes, inplace=True)

# Replace NaN values in 'genres' column with 'Unknown'
merged_df_sql['genres'].fillna('Unknown', inplace=True)

#  DataFrame after replacing NaN values
merged_df_sql
```

Out[35]:

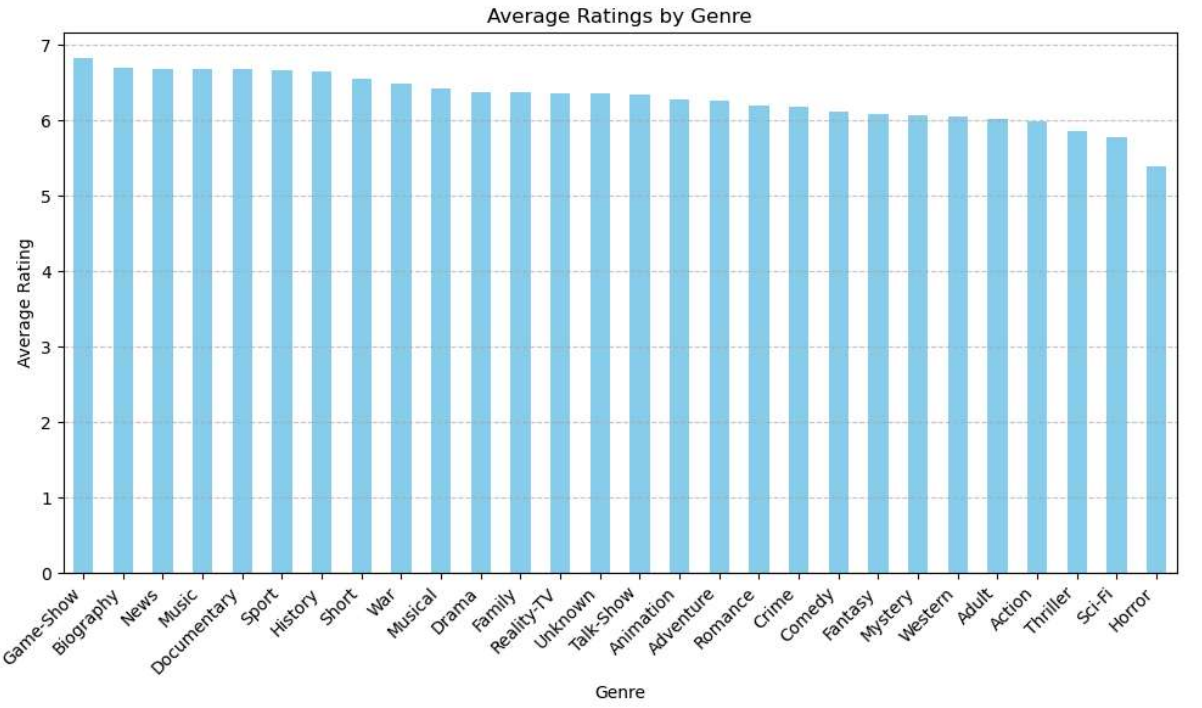
	movie_id	primary_title	original_title	start_year	runtime_minutes	genres
0	tt0063540	Sunghursh	Sunghursh	2013	175.000000	Action,Crime,Drama
1	tt0066787	One Day Before the Rainy Season	Ashad Ka Ek Din	2019	114.000000	Biography,Drama
2	tt0069049	The Other Side of the Wind	The Other Side of the Wind	2018	122.000000	Drama
3	tt0069204	Sabse Bada Sukh	Sabse Bada Sukh	2018	86.187247	Comedy,Drama
4	tt0100275	The Wandering Soap Opera	La Telenovela Errante	2017	80.000000	Comedy,Drama,Fantasy
...	...	...	...	...	...	...
146139	tt9916538	Kuambil Lagi Hatiku	Kuambil Lagi Hatiku	2019	123.000000	Drama
146140	tt9916622	Rodolpho Teóphilo - O Legado de um Pioneiro	Rodolpho Teóphilo - O Legado de um Pioneiro	2015	86.187247	Documentary
146141	tt9916706	Dankyavar Danka	Dankyavar Danka	2013	86.187247	Comedy
146142	tt9916730	6 Gunn	6 Gunn	2017	116.000000	Unknown
146143	tt9916754	Chico Albuquerque - Revelações	Chico Albuquerque - Revelações	2013	86.187247	Documentary

146144 rows × 8 columns

VISUALIZATION ON THE im.db data base

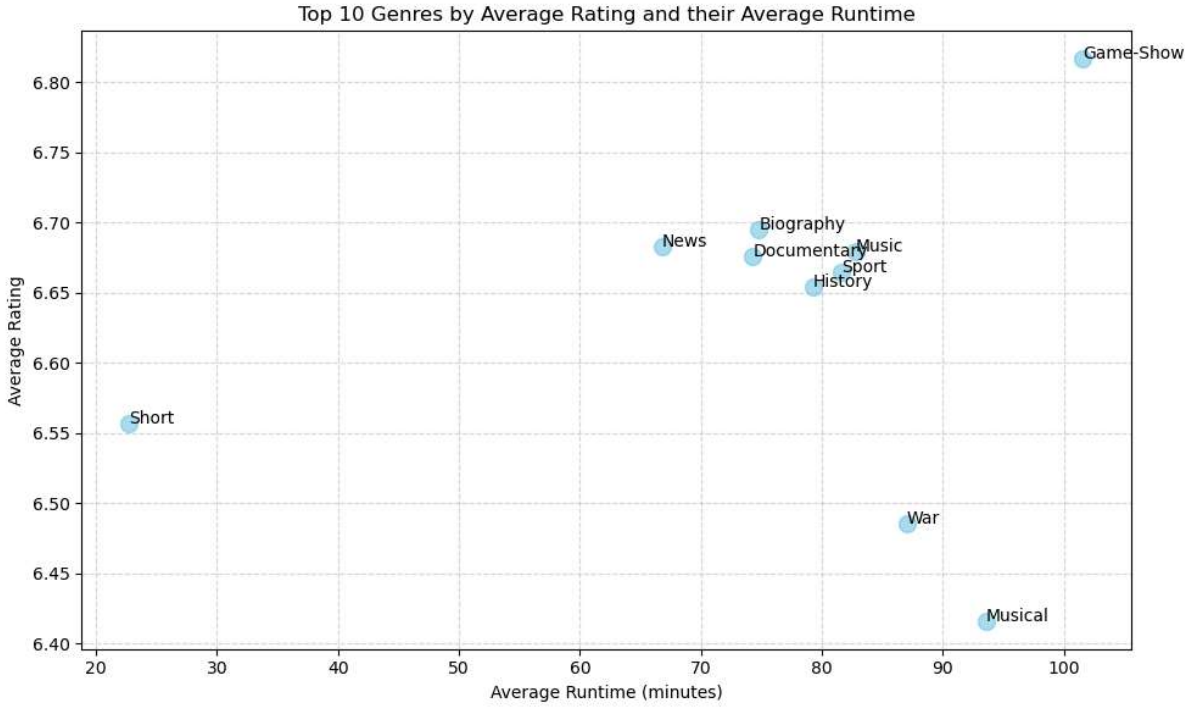
A) Bar Chart of Average Ratings by Genre

In [36]:
```
# spiliting the genres
genre_split = merged_df_sql['genres'].str.split(',', expand=True).stack().reset

# Joining the split genres back to the DataFrame
merged_df_sql_genres = merged_df_sql.drop('genres', axis=1).join(genre_split.re

# Calculating the average rating for each genre
genre_avg_rating = merged_df_sql_genres.groupby('genre')['averagerating'].mean(

# Plot the bar chart
plt.figure(figsize=(10, 6))
genre_avg_rating.plot(kind='bar', color='skyblue')
plt.title('Average Ratings by Genre')
plt.xlabel('Genre')
plt.ylabel('Average Rating')
plt.xticks(rotation=45, ha='right')
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()
plt.show()
```



B)Histogram of Runtime Visualize the distribution of movie runtimes using a histogram. This will show how many movies fall into different runtime ranges.

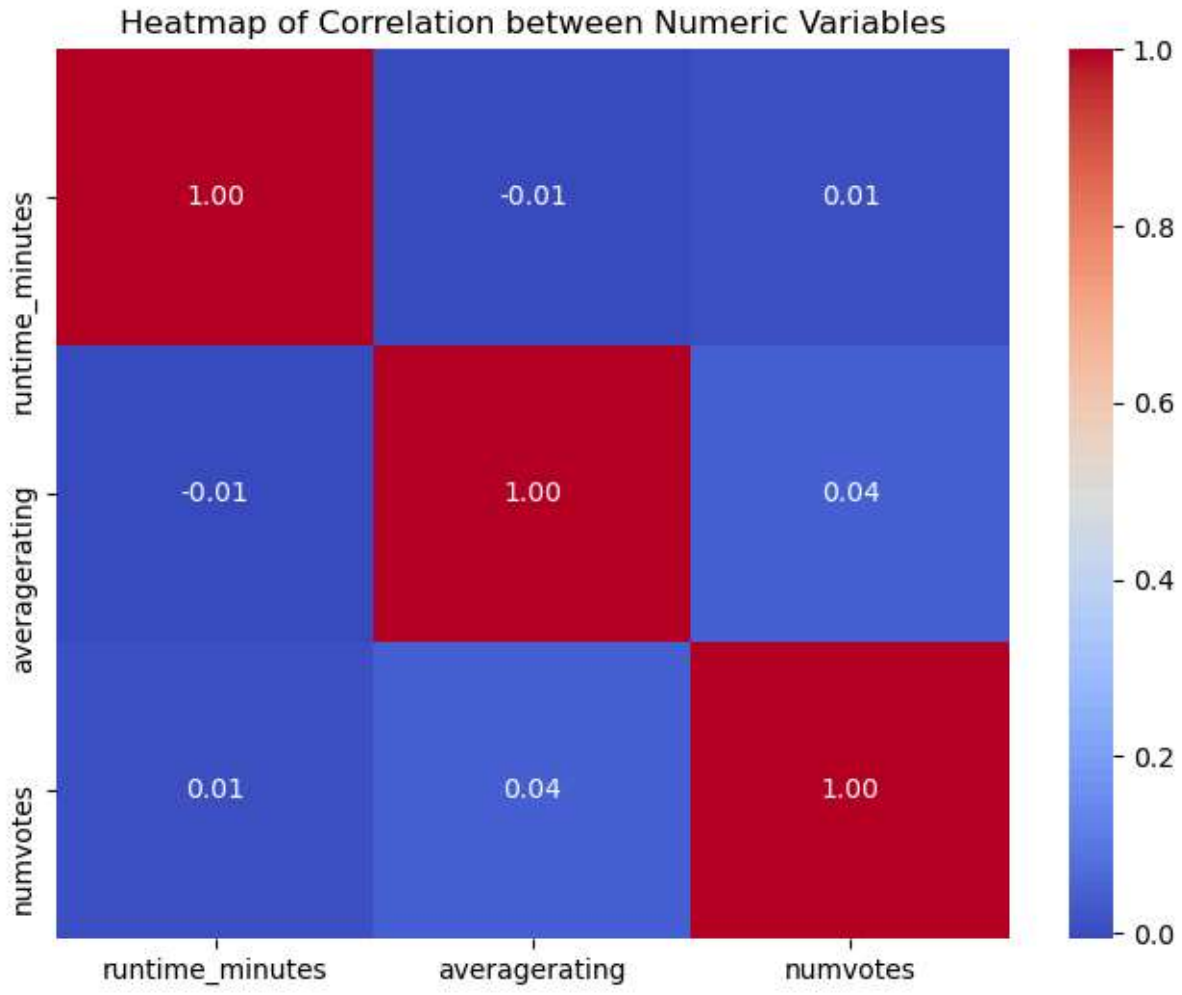
In [39]:
```
# DataFrame is named merged_df_sql and is already loaded with the given data an

genres_split = merged_df_sql['genres'].str.split(',', expand=True).stack().rese
merged_df_sql_genres = merged_df_sql.drop('genres', axis=1).join(genres_split.r

# Calculating the average rating and average runtime for each genre
genre_stats = merged_df_sql_genres.groupby('genre').agg({
    'averagerating': 'mean',
    'runtime_minutes': 'mean'
}).reset_index()

# Sorting the genres by average rating and select the top 10
top_10_genres = genre_stats.sort_values(by='averagerating', ascending=False).he

# Ploting the scatter plot
plt.figure(figsize=(10, 6))
plt.scatter(top_10_genres['runtime_minutes'], top_10_genres['averagerating'], a

for i in range(len(top_10_genres)):
    plt.annotate(top_10_genres['genre'].iloc[i],
                 (top_10_genres['runtime_minutes'].iloc[i], top_10_genres['aver

plt.title('Top 10 Genres by Average Rating and their Average Runtime')
plt.xlabel('Average Runtime (minutes)')
plt.ylabel('Average Rating')
plt.grid(True, linestyle='--', alpha=0.5)
plt.tight_layout()
plt.show()
```



C) Heatmap correlation. Visualizing the correlation between numeric variables such as runtime, average rating, and number of votes. This will help understand how these variables are related to each other.

In [40]:

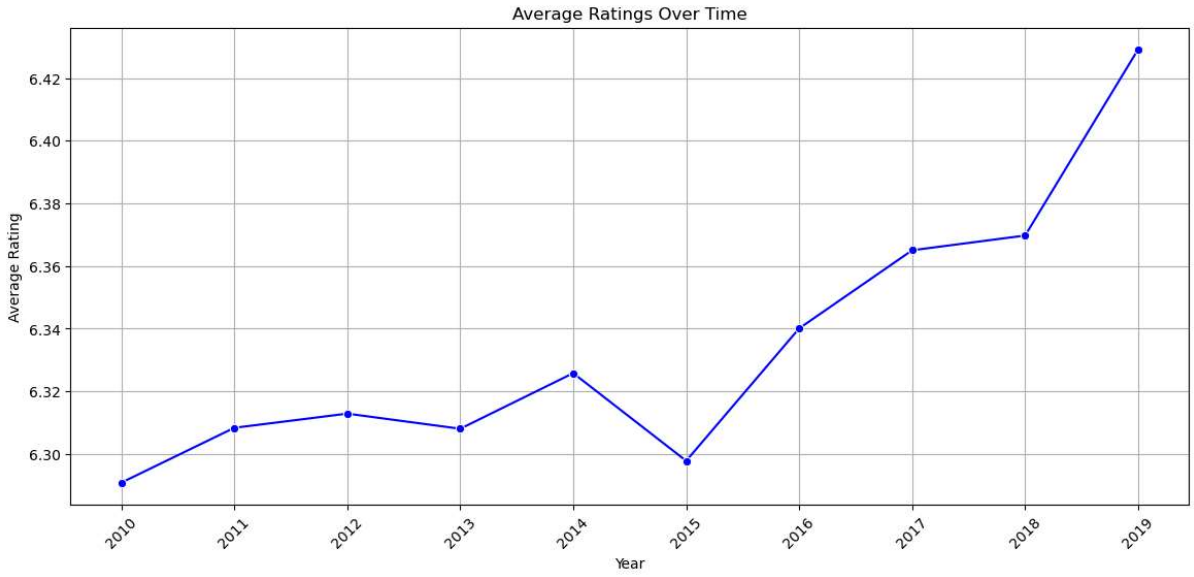
```
# Extracting numerical columns for correlation analysis
numeric_columns = ['runtime_minutes', 'averagerating', 'numvotes']
numeric_data = merged_df_sql[numeric_columns]

# Calculating the correlation matrix
correlation_matrix = numeric_data.corr()

# Plotting the heatmap
plt.figure(figsize=(8, 6))
heatmap = sns.heatmap(correlation_matrix, annot=True, fmt='.2f', cmap='coolwarm

# Setting the title
plt.title('Heatmap of Correlation between Numeric Variables')

# Displaying the plot
plt.show()
```



Line Plot of Average Ratings Over Time

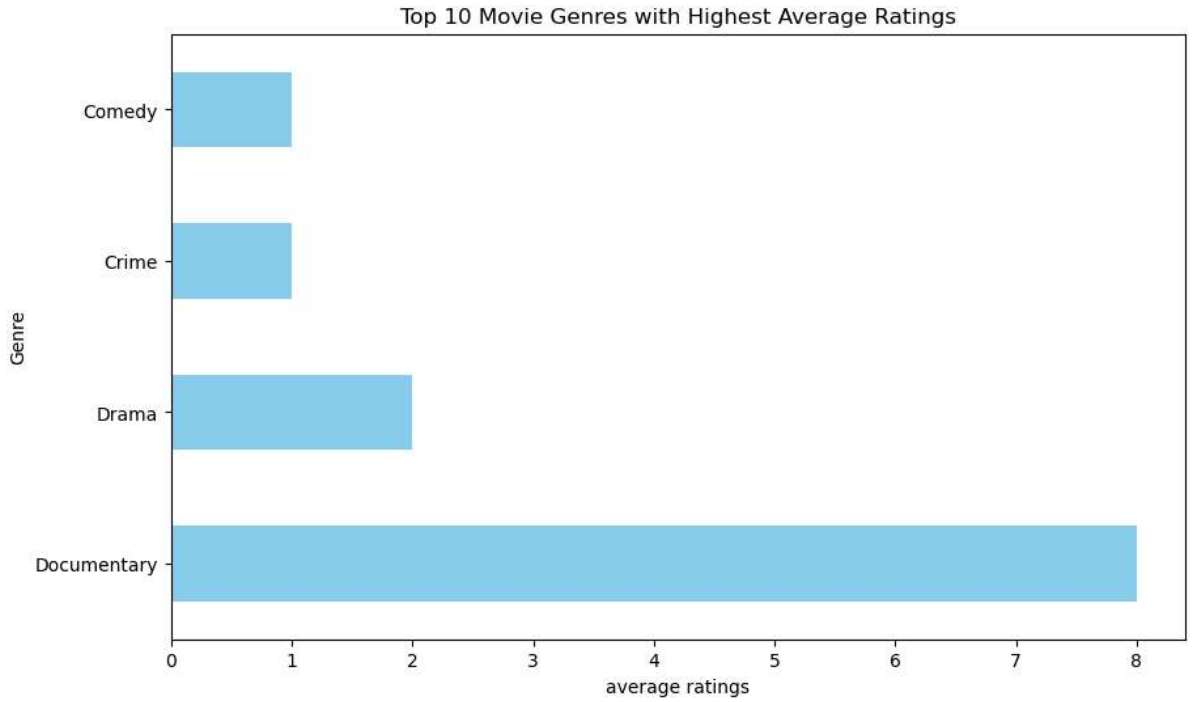
Plot the average ratings of movies over time to see if there are any trends or patterns in how ratings have changed over the years

In [49]:
```
merged_df = merged_df_sql

# Grouping the data by 'start_year' and calculating the mean of 'averagerating'
average_ratings_over_time = merged_df.groupby('start_year')['averagerating'].me

# Filtering data for the years 2010 to 2019
average_ratings_over_time = average_ratings_over_time[(average_ratings_over_tim
                                                       (average_ratings_over_tim

# Plotting the line plot
plt.figure(figsize=(14, 6))  # Adjust the figure size to accommodate all years

sns.lineplot(data=average_ratings_over_time, x='start_year', y='averagerating',

plt.title('Average Ratings Over Time')
plt.xlabel('Year')
plt.ylabel('Average Rating')
plt.grid(True)

# Set x-ticks to display every year from 2010 to 2019
years = range(2010, 2020)
plt.xticks(years, rotation=45)

plt.show()
```



Graphical representtion of the top 10 genrs with the highest rating

In [59]:
```
# Sorted data frame in by averaging the data frame in ascending order
top_movies = merged_df.nlargest(10, 'averagerating')

# Extract the genres of the top 10 movies
genres_list = top_movies['genres'].str.split(',').explode()

# Count the occurrences of each genre
genre_counts = genres_list.value_counts()

# Create a horizontal bar plot
plt.figure(figsize=(10, 6))
genre_counts.plot(kind='barh', color='skyblue')
plt.xlabel('average ratings')

plt.ylabel('Genre')
plt.title('Top 10 Movie Genres with Highest Average Ratings')

plt.show()
```



As per the im.db data set it is clear that the documentary has the highest number of ratings however, it does not directly indicate that is the most profiting genre

ANALYSIS DONE

In [1]:
```
pip install seaborn
```

```
Requirement already satisfied: seaborn in c:\users\lenovo\anaconda3\envs\lear
n-env\lib\site-packages (0.11.0)Note: you may need to restart the kernel to u
se updated packages.

Requirement already satisfied: numpy>=1.15 in c:\users\lenovo\anaconda3\envs
\learn-env\lib\site-packages (from seaborn) (1.18.5)
Requirement already satisfied: scipy>=1.0 in c:\users\lenovo\anaconda3\envs\l
earn-env\lib\site-packages (from seaborn) (1.5.0)
Requirement already satisfied: pandas>=0.23 in c:\users\lenovo\anaconda3\envs
\learn-env\lib\site-packages (from seaborn) (1.1.3)
Requirement already satisfied: matplotlib>=2.2 in c:\users\lenovo\anaconda3\e
nvs\learn-env\lib\site-packages (from seaborn) (3.3.1)
Requirement already satisfied: certifi>=2020.06.20 in c:\users\lenovo\anacond
a3\envs\learn-env\lib\site-packages (from matplotlib>=2.2->seaborn) (2024.2.
2)
Requirement already satisfied: cycler>=0.10 in c:\users\lenovo\anaconda3\envs
\learn-env\lib\site-packages (from matplotlib>=2.2->seaborn) (0.10.0)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\lenovo\anaconda3
\envs\learn-env\lib\site-packages (from matplotlib>=2.2->seaborn) (1.2.0)
Requirement already satisfied: pillow>=6.2.0 in c:\users\lenovo\anaconda3\env
s\learn-env\lib\site-packages (from matplotlib>=2.2->seaborn) (8.0.0)
Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.3 in
c:\users\lenovo\anaconda3\envs\learn-env\lib\site-packages (from matplotlib>=
2.2->seaborn) (2.4.7)
Requirement already satisfied: python-dateutil>=2.1 in c:\users\lenovo\anacon
da3\envs\learn-env\lib\site-packages (from matplotlib>=2.2->seaborn) (2.9.0)
Requirement already satisfied: pytz>=2017.2 in c:\users\lenovo\anaconda3\envs
\learn-env\lib\site-packages (from pandas>=0.23->seaborn) (2020.1)
Requirement already satisfied: six in c:\users\lenovo\anaconda3\envs\learn-en
v\lib\site-packages (from cycler>=0.10->matplotlib>=2.2->seaborn) (1.16.0)
```

Last changes done