About Project: IMDB Movie Analysis

Objective:

As a data analyst intern at IMDB, you have been tasked with exploring and analyzing the IMDB Movies dataset. Your goal is to answer specific business questions, gain insights into movie trends, and deliver actionable recommendations. Using Python and libraries such as Pandas, NumPy, Seaborn, and Matplotlib, perform analysis to help IMDB better understand genre popularity, rating trends, and factors influencing movie success.

Tools and Libraries Used

- `Python`
- `Pandas`: Data manipulation and analysis
- `NumPy`: Numerical computations
- `Matplotlib`: Data visualization
- `Seaborn`: Advanced visualization

About Company

IMDb (Internet Movie Database) is a comprehensive online database of information about films, television shows, video games, and online streaming content. It includes details such as cast and crew, plot summaries, user reviews, trivia, and ratings. Established in 1990, IMDb has become one of the most popular platforms for movie enthusiasts and industry professionals alike. It features user-generated content, professional critiques, and a proprietary rating system based on user votes. Owned by Amazon since 1998, IMDb also offers a subscription service, IMDbPro, providing industry-focused features like contact information and production updates.

Dataset Overview

The dataset includes the following columns:

- `names`: Movie titles
- `date_x`: Release dates
- `score`: IMDB ratings

- **genre**: Genres

- **overview**: Movie summaries

- **crew**: Cast and crew information

- **orig_title**: Original titles

- **status**: Release status (e.g., released, post-production)

- **orig_lang**: Original language

- **budget_x**: Production budgets

- **revenue**: Box office revenues

- **country**: Production country

Loading the dataset and Perform initial setup

Task: Load the dataset and perform initial setup

```
# Importing necessary libraries for the project
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

# Loading the dataset
Data ="imdb_movies.csv"
df = pd.read_csv(Data)

# Display the top 5 rows of datasets
df.head()
```

```
                         names      date_x  score  \
0                    Creed III  03/02/2023   73.0
1     Avatar: The Way of Water  12/15/2022   78.0
2  The Super Mario Bros. Movie  04/05/2023   76.0
3                      Mummies  01/05/2023   70.0
4                    Supercell  03/17/2023   61.0
```

```
                                           genre  \
0                                  Drama, Action   
1             Science Fiction, Adventure, Action   
2  Animation, Adventure, Family, Fantasy, Comedy   
3  Animation, Comedy, Family, Adventure, Fantasy   
4                                         Action   

                                            overview  \
0  After dominating the boxing world, Adonis Cree...   
1  Set more than a decade after the events of the...   
2  While working underground to fix a water main,...   
3  Through a series of unfortunate events, three ...   
4  Good-hearted teenager William always lived in ...   

                                                crew  \
0  Michael B. Jordan, Adonis Creed, Tessa Thompso...   
1  Sam Worthington, Jake Sully, Zoe Saldaña, Neyt...   
2  Chris Pratt, Mario (voice), Anya Taylor-Joy, P...   
3  Óscar Barberán, Thut (voice), Ana Esther Albor...   
4  Skeet Ulrich, Roy Cameron, Anne Heche, Dr Quin...   

                    orig_title     status            orig_lang  
budget_x  \
0                    Creed III   Released              English   
75000000.0   
1     Avatar: The Way of Water   Released              English  
460000000.0   
2  The Super Mario Bros. Movie   Released              English  
100000000.0   
3                       Momias   Released   Spanish, Castilian   
12300000.0   
4                    Supercell   Released              English   
77000000.0   

        revenue country  
0  2.716167e+08      AU  
1  2.316795e+09      AU  
2  7.244590e+08      AU  
3  3.420000e+07      AU  
4  3.409420e+08      US  
```

Data Overview and Basic Exploration

Task: Explore the structure and composition of the dataset

```python
# Display the shape and first few rows of the dataset
print("Shape of the dataset:", df.shape)

df.info()
```

```
Shape of the dataset: (10178, 12)
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 10178 entries, 0 to 10177
Data columns (total 12 columns):
 #   Column      Non-Null Count  Dtype
---  ------      --------------  -----
 0   names       10178 non-null  object
 1   date_x      10178 non-null  object
 2   score       10178 non-null  float64
 3   genre       10093 non-null  object
 4   overview    10178 non-null  object
 5   crew        10122 non-null  object
 6   orig_title  10178 non-null  object
 7   status      10178 non-null  object
 8   orig_lang   10178 non-null  object
 9   budget_x    10178 non-null  float64
 10  revenue     10178 non-null  float64
 11  country     10178 non-null  object
dtypes: float64(3), object(9)
memory usage: 954.3+ KB
```

- **Rows**: Each row represents a unique movie and contains details like its title, genre, release date, rating, and other attributes.

- **Columns**: Each column represents a feature or attribute of the movies, such as `genre`, `budget_x`, `revenue`, etc.

```
#The issue is with the date_x column as its dtype is given as object
#Convert data type of date_x into datetime
df["date_x"]= pd.to_datetime(df["date_x"])

# Checking the datatype again
df.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 10178 entries, 0 to 10177
Data columns (total 12 columns):
 #   Column      Non-Null Count  Dtype
---  ------      --------------  -----
 0   names       10178 non-null  object
 1   date_x      10178 non-null  datetime64[ns]
 2   score       10178 non-null  float64
 3   genre       10093 non-null  object
 4   overview    10178 non-null  object
 5   crew        10122 non-null  object
 6   orig_title  10178 non-null  object
 7   status      10178 non-null  object
 8   orig_lang   10178 non-null  object
 9   budget_x    10178 non-null  float64
 10  revenue     10178 non-null  float64
 11  country     10178 non-null  object
dtypes: datetime64[ns](1), float64(3), object(8)
memory usage: 954.3+ KB

# Summary statistics for numerical columns
df.describe()

                              date_x         score      budget_x
revenue
count                          10178  10178.000000  1.017800e+04
1.017800e+04
mean   2008-06-15 06:16:37.445470720     63.497052  6.488238e+07
2.531401e+08
min              1903-05-15 00:00:00      0.000000  1.000000e+00
0.000000e+00
25%              2001-12-25 06:00:00     59.000000  1.500000e+07
2.858898e+07
50%              2013-05-09 00:00:00     65.000000  5.000000e+07
1.529349e+08
75%              2019-10-17 00:00:00     71.000000  1.050000e+08
4.178021e+08
max              2023-12-31 00:00:00    100.000000  4.600000e+08
2.923706e+09
std                              NaN     13.537012  5.707565e+07
2.777880e+08

# Checking for missing values and their counts
df.isnull().sum()

names          0
date_x         0
score          0
genre         85
overview       0
crew          56
orig_title     0
status         0
orig_lang      0
budget_x       0
revenue        0
country        0
dtype: int64
```

Data Cleaning

Task: Address missing values, data types, and outliers.

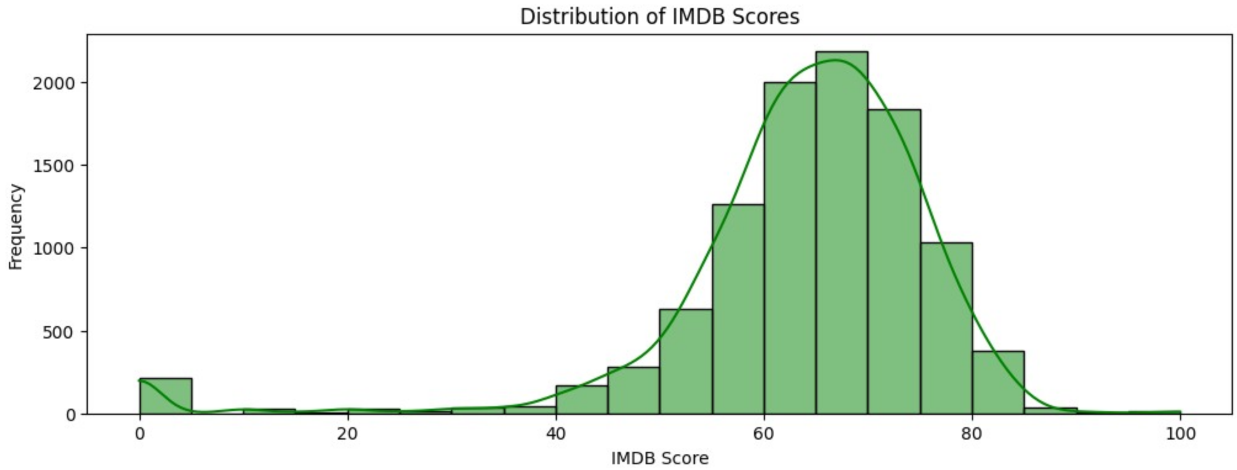
```
#Missing Values
#Genre column have 85 missing values which contains Genres of movies
```

```
#Filling Genre with "Unavaiable" as its an object type
df["genre"]=df["genre"].fillna("unavaiable")

#Crew column have 56 missing values which contains Cast and crew
information
#Filling it same with "Unavaiable" as its also an object type
df["crew"]=df["crew"].fillna("unavaiable")
```

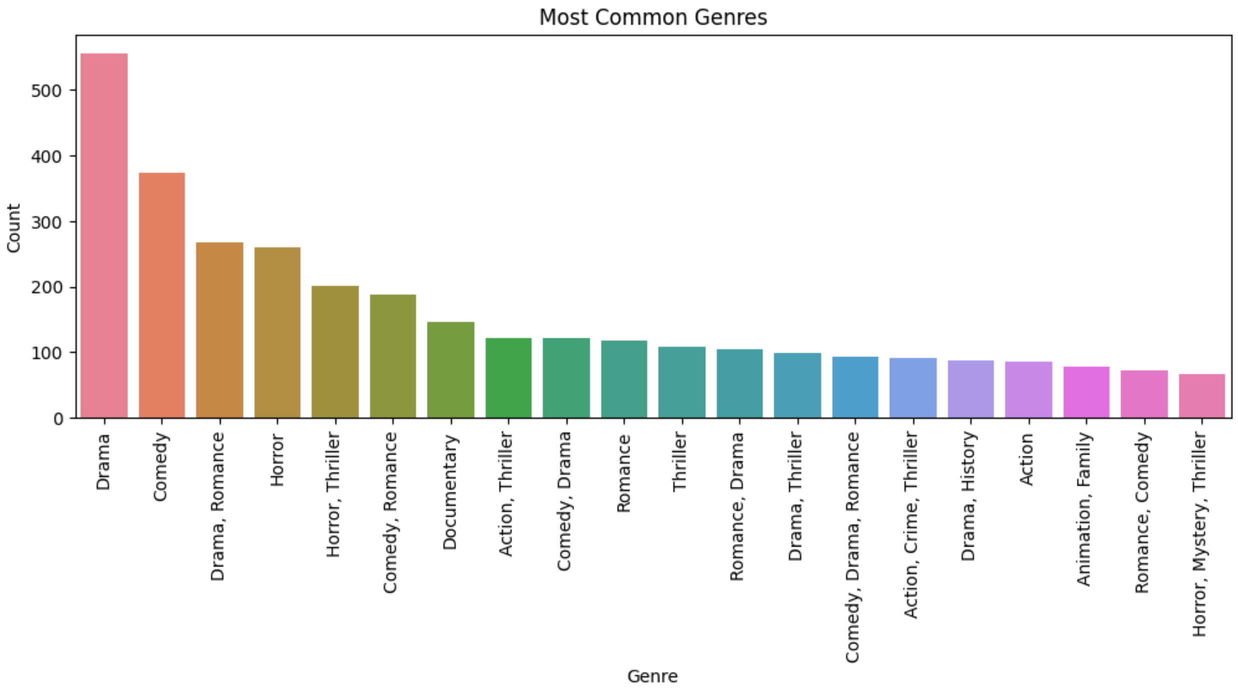
Univariate Analysis: Explore each column individually

Task: Perform univariate analysis on numerical and categorical variables

```
# Analyze the distribution of IMDB ratings (`score`) using a histogram
and describe its shape

# Plotting the distribution of IMDB scores
plt.figure(figsize=(12, 4))
sns.histplot(df["score"], kde=True, bins=20, color="green")
plt.title("Distribution of IMDB Scores")
plt.xlabel("IMDB Score")
plt.ylabel("Frequency")
plt.show()

# Description of the shape
print("The distribution of IMDB scores shows that:")
print("- It appears to be approximately normal but slightly left-
skewed (tail on the lower end).")
print("- Most scores are concentrated between 50 and 80, with a
gradual decline outside this range.")
print("- There are very few movies with extremely low or perfect
scores (0 or 100).")
```



```
The distribution of IMDB scores shows that:
- It appears to be approximately normal but slightly left-skewed (tail
on the lower end).
- Most scores are concentrated between 50 and 80, with a gradual
decline outside this range.
- There are very few movies with extremely low or perfect scores (0 or
100).

# What are the most common genres in the dataset? Use a bar chart to
show their distribution.

# Group by genre and count the number of movies
gb = df.groupby("genre").agg({"names": "count"})
gb = gb.sort_values(by="names", ascending=False)
gb = gb.head(20)

# Plotting the bar chart
plt.figure(figsize=(12, 4))
sns.barplot(x=gb.index,y=gb["names"],data=gb,hue=gb.index)
plt.title("Most Common Genres")
plt.xlabel("Genre")
plt.ylabel("Count")
plt.xticks(rotation=90)
plt.show()

# Print the most common genre
most_common_genre = gb.index[0]
print(f"The most common genre in the dataset is: {most_common_genre}")
```

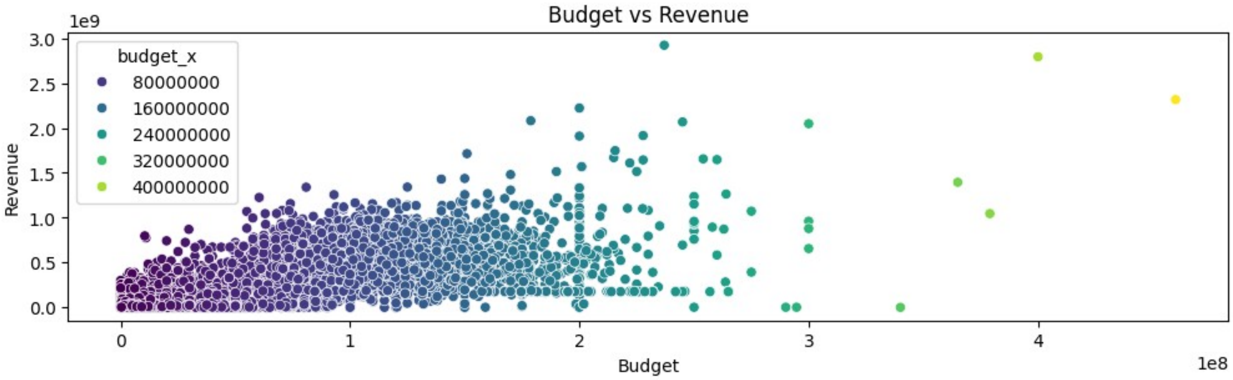


```
The most common genre in the dataset is: Drama
```

Bivariate Analysis: Explore relationships between two variables

Task: Use scatter plots, box plots, and correlation analysis

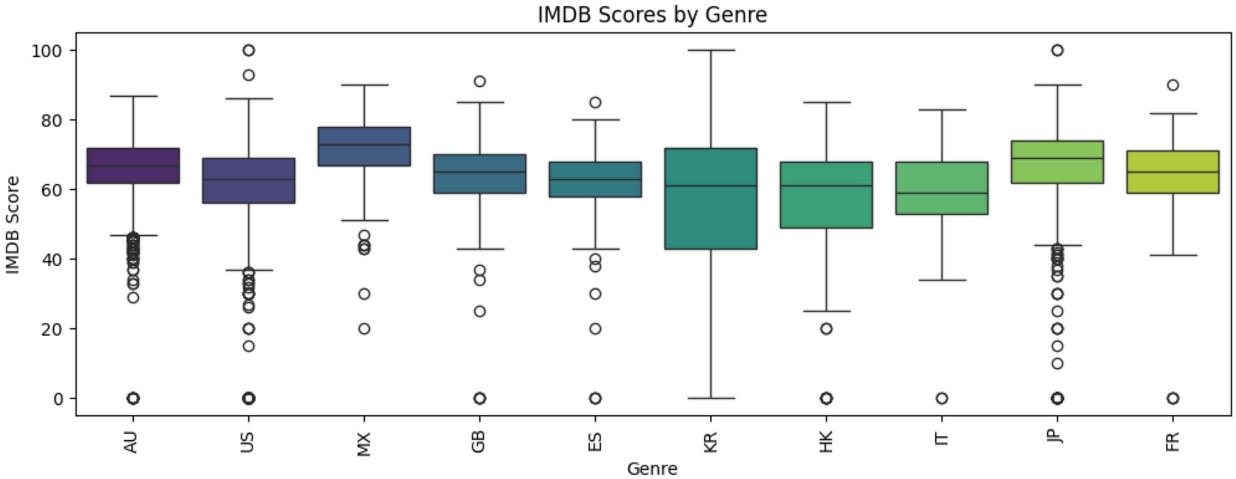
```
# Explore the relationship between `budget_x` and `revenue` using a scatter plot.
# Plotting the Scatter plot
plt.figure(figsize=(12,3))
sns.scatterplot(x="budget_x", y = "revenue",data = df, hue = "budget_x", palette = "viridis")
plt.title("Budget vs Revenue")
plt.xlabel("Budget")
plt.ylabel("Revenue")
plt.show()

# Description observed trend
print("The relationship of budget and  revenue shows that:")
print("- There is a positive correlation between budget and revenue. Movies with higher budgets tend to generate higher revenues.")
print("- Most movies are clustered around mid-range budgets (e.g., 80 million).")
print("- Outliers show both successes (high revenue, high budget) and failures (high budget, low revenue).")
```



```
The relationship of budget and  revenue shows that:
- There is a positive correlation between budget and revenue. Movies with higher budgets tend to generate higher revenues.
- Most movies are clustered around mid-range budgets (e.g., 80 million).
- Outliers show both successes (high revenue, high budget) and failures (high budget, low revenue).
```

```
# Compare IMDB ratings (`score`) across Country using a boxplot.

# Boxplot for IMDB score across countries
```

```
top_countries = df["country"].value_counts().head(10).index  # Top 10 countries by movie count
plt.figure(figsize=(12, 4))
sns.boxplot(data=df[df["country"].isin(top_countries)], x="country", y="score", hue="country", palette="viridis", legend=False)
plt.title("IMDB Scores by Genre")
plt.xlabel("Genre")
plt.ylabel("IMDB Score")
plt.xticks(rotation=90)
plt.show()

# Description
print("The IMDB score across contries:")
print("- The distribution of ratings varies significantly across countries.")
print("- Some countries exhibit tighter distributions, while others have a wider range of scores.")
print("-The median rating differs by country, providing insight into regional preferences and quality of movies.")
```



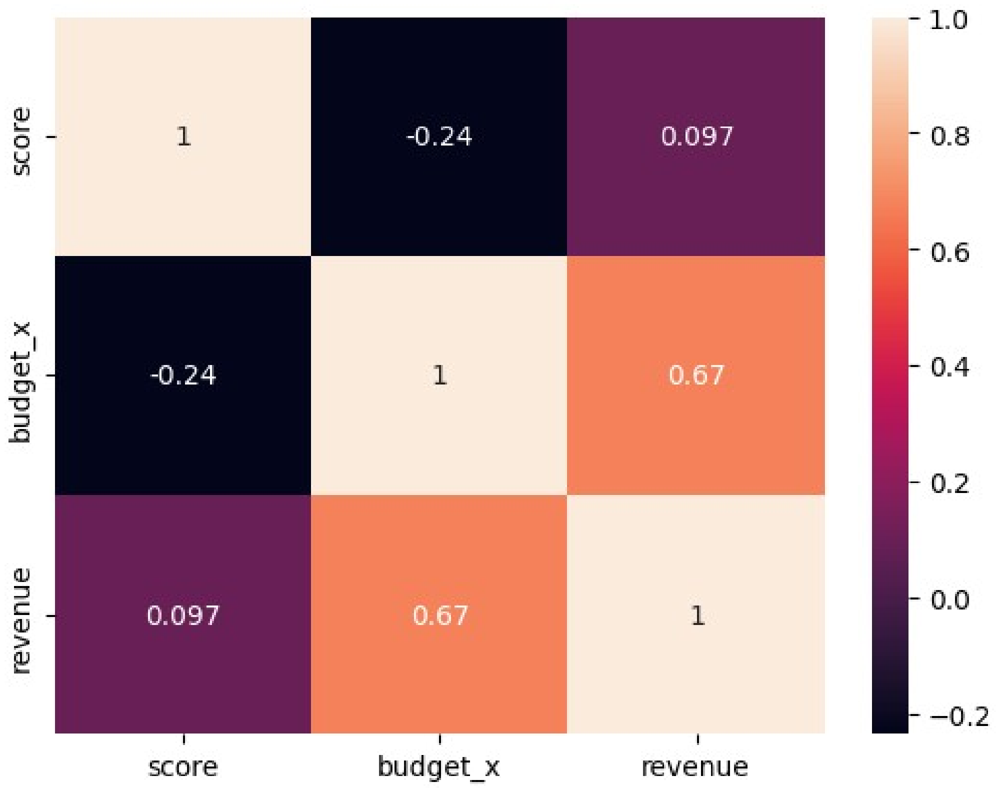
```
The IMDB score across contries:
- The distribution of ratings varies significantly across countries.
- Some countries exhibit tighter distributions, while others have a wider range of scores.
-The median rating differs by country, providing insight into regional preferences and quality of movies.
```

```
#Is there a correlation between the number of votes a movie received and its rating? Create a scatter plot and calculate the correlation coefficient.
# Create a dataframe to store score, budget and revenue and find it's correlation
df1 = df[["score", "budget_x", "revenue"]]
df1.columns = ["Score","Budget", "Revenue"]
```

```
corr = df1.corr()
corr
```

```
               Score   Budget   Revenue
Score    1.000000 -0.23547  0.096533
Budget  -0.235470  1.00000  0.673830
Revenue  0.096533  0.67383  1.000000
```

```
#correlation between `budget_x`, 'revenue' and `score`.
correlation = df[["score","budget_x","revenue"]]
data = correlation.corr()
sns.heatmap(data, annot = True)
plt.show()

# Description
print("The Correlation between budget, score and revenue:")
print("- Score and Budget: A weak negative correlation of -0.235,
meaning as the budget increases, the score slightly decreases..")
print("- Score and Revenue: A very weak positive correlation of 0.097,
suggesting little to no relationship between score and revenue.")
print("-Budget and Revenue: A moderate positive correlation of 0.674,
indicating that as the budget increases, revenue tends to increase as
well")
```



```
The Correlation between budget, score and revenue:
- Score and Budget: A weak negative correlation of -0.235, meaning as
the budget increases, the score slightly decreases..
- Score and Revenue: A very weak positive correlation of 0.097,
suggesting little to no relationship between score and revenue.
-Budget and Revenue: A moderate positive correlation of 0.674,
indicating that as the budget increases, revenue tends to increase as
well
```

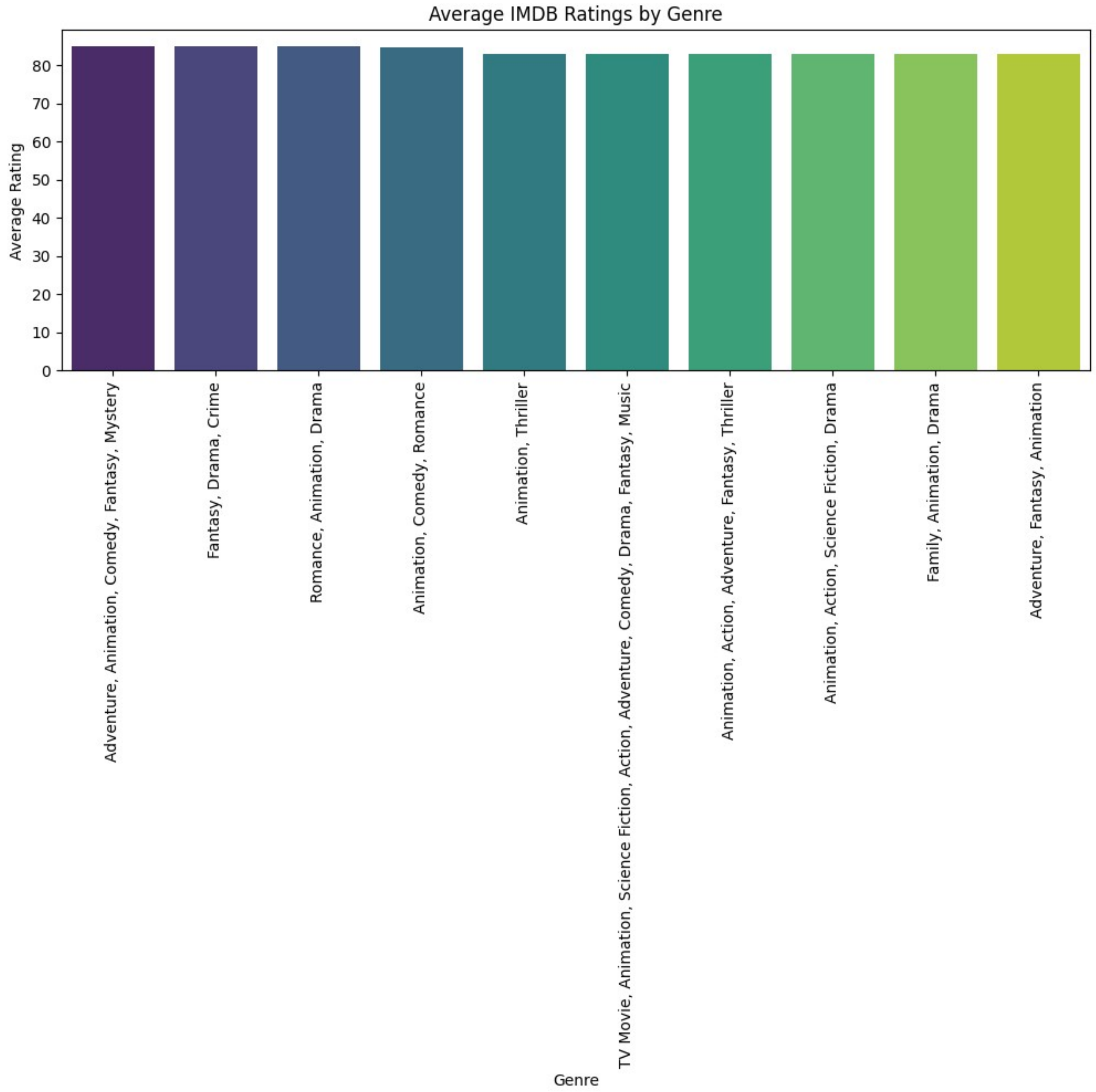
Genre-Specific Analysiss

Task: Delve deeper into the genre of movies

```
# Which genre has the highest average rating? Calculate the average
rating for each genre and plot the results.

# Calculate the average rating for each genre
avg_rating_by_genre= df.groupby("genre")
["score"].mean().sort_values(ascending=False)
avg_rating_by_genre = avg_rating_by_genre.head(10)
print("\nAverage Ratings by Genre:")
print(avg_rating_by_genre)
```

```
Average Ratings by Genre:
genre
Adventure, Animation, Comedy, Fantasy, Mystery
85.000000
Fantasy, Drama, Crime
85.000000
Romance, Animation, Drama
85.000000
Animation, Comedy, Romance
84.666667
Animation, Thriller
83.000000
TV Movie, Animation, Science
Fiction, Action, Adventure, Comedy, Drama, Fantasy, Music    83.000000
Animation, Action, Adventure, Fantasy, Thriller
83.000000
Animation, Action, Science Fiction, Drama
83.000000
Family, Animation, Drama
83.000000
Adventure, Fantasy, Animation
83.000000
Name: score, dtype: float64
```

```python
# Plot the graph of average score across genres
plt.figure(figsize=(12, 4))
sns.barplot(x=avg_rating_by_genre.index, y=avg_rating_by_genre.values,
hue=avg_rating_by_genre.index, palette='viridis', legend=False)
plt.title("Average IMDB Ratings by Genre")
plt.xlabel("Genre")
plt.ylabel("Average Rating")
plt.xticks(rotation=90)
plt.show()

# Description
print("The Average rating for each genre shows that:")
print("- It appears that (Fantasy, Drama, Crime)(Adventure, Animation,
Comedy, Fantasy, Mystery)(Romance, Animation, Drama) have highest
score.")
```

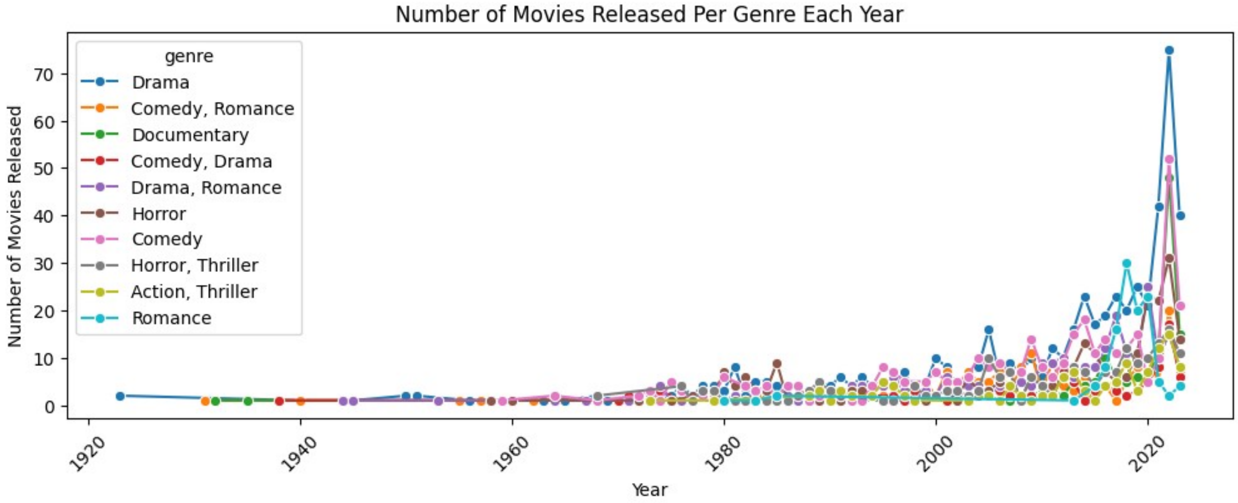


```
The Average rating for each genre shows that:
- It appears that (Fantasy, Drama, Crime)(Adventure, Animation,
Comedy, Fantasy, Mystery)(Romance, Animation, Drama) have highest
score.

# How does the popularity of genres vary over time? Plot the number of
movies released per genre each year.

# Convert 'date_x' to datetime format if it's not already
df['date_x'] = pd.to_datetime(df['date_x'], errors='coerce')

# Extract the year from the 'date_x' column
```

```
df['year'] = df['date_x'].dt.year

# Check if the 'year' column is created correctly
print(df[['date_x', 'year']].head())
```

```
      date_x  year
0 2023-03-02  2023
1 2022-12-15  2022
2 2023-04-05  2023
3 2023-01-05  2023
4 2023-03-17  2023
```

```
# Group by 'genre' and 'year', then count movies
movies_per_genre = df.groupby(['year',
'genre']).size().reset_index(name='movie_count')
top_genres = movies_per_genre.groupby('genre')
['movie_count'].sum().nlargest(10).index

# Filter the movies data to include only these top genres
filtered_movies =
movies_per_genre[movies_per_genre['genre'].isin(top_genres)]

# Plotting Line
plt.figure(figsize=(12,4))
sns.lineplot(data=filtered_movies, x='year', y='movie_count',
hue='genre', marker='o')
plt.title("Number of Movies Released Per Genre Each Year")
plt.xlabel("Year")
plt.ylabel("Number of Movies Released")
plt.xticks(rotation=45)
plt.show()
```



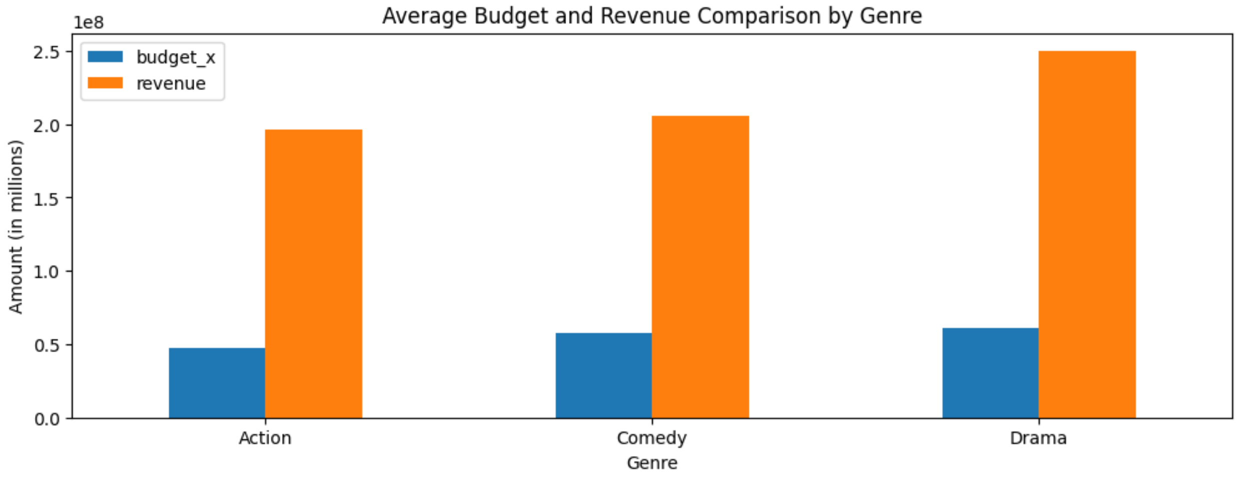
```
# Compare budgets and revenues for specific genres.
# Filter data for specific genres
selected_genres = ['Action', 'Comedy', 'Drama']
df_selected_genres = df[df['genre'].isin(selected_genres)]

# Check the first few rows of the filtered data
print(df_selected_genres[['genre', 'budget_x', 'revenue']].head())
```

```
     genre    budget_x      revenue
4   Action  77000000.0  340941958.6
22   Drama  25000000.0  622313635.0
42  Action   1000000.0   22790427.2
44   Drama   3000000.0   36752010.0
54  Comedy  51880004.0    9263009.0
```

```
# Group by 'genre' and calculate the average budget and revenue
genre_comparison = df_selected_genres.groupby('genre')[['budget_x',
'revenue']].mean()

# Check the result
print(genre_comparison)
```

```
            budget_x       revenue
genre
Action  4.698863e+07  1.962566e+08
Comedy  5.767277e+07  2.052982e+08
Drama   6.068989e+07  2.495831e+08
```

```
# Plot the comparison of average budget and revenue per genre
genre_comparison.plot(kind='bar', figsize=(12,4 ))
plt.title("Average Budget and Revenue Comparison by Genre")
plt.xlabel("Genre")
plt.ylabel("Amount (in millions)")
plt.xticks(rotation=0)
plt.show()

# Description
print("The Average Budget and revenue comparison by genre shows
that:")
print("- It shows that Drama Genre needs high budget.")
print("- It also shows Action takes less budget than comdey and drama
genre")
```

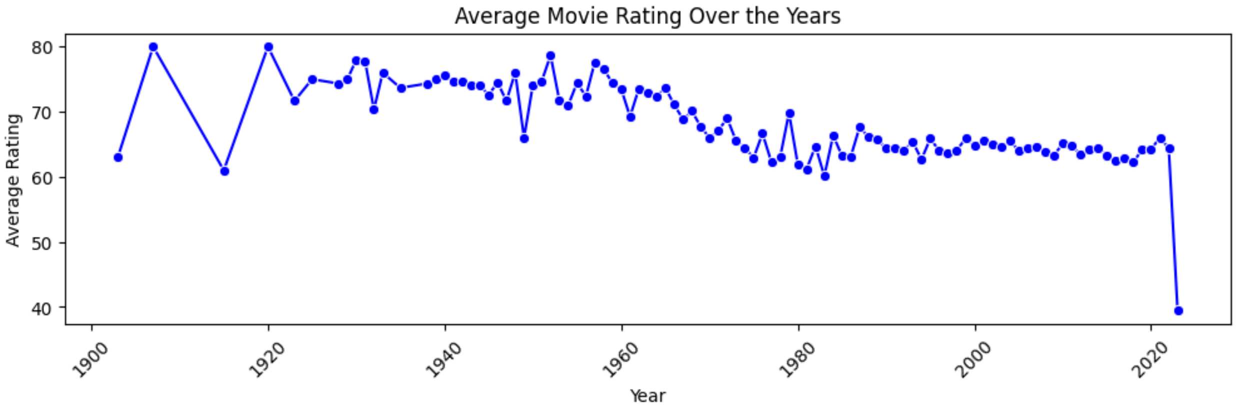


```
The Average Budget and revenue comparison by genre shows that:
- It shows that Drama Genre needs high budget.
- It also shows Action takes less budget than comdey and drama genre
```

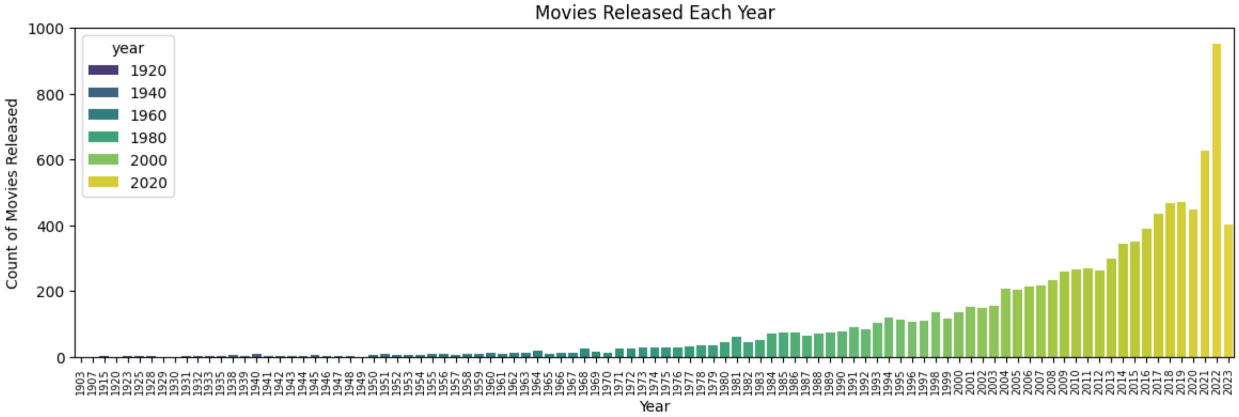
Year and Trend Analysis

Task: Analyze trends over time

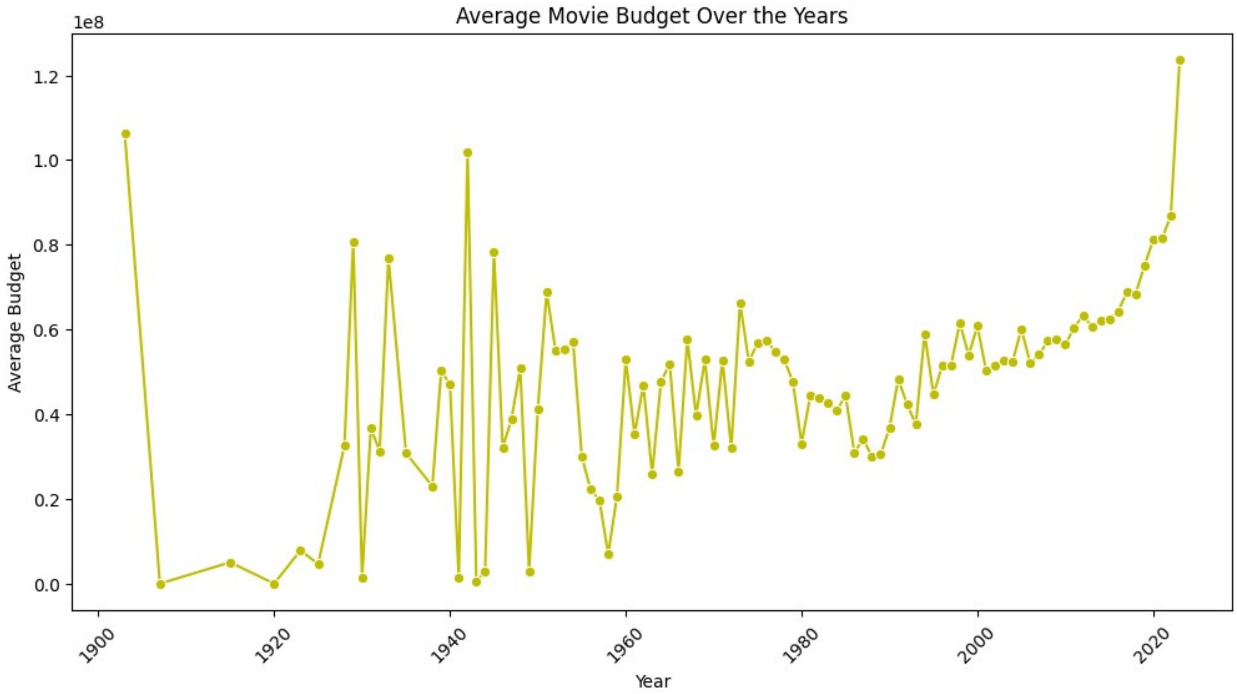
```
# How has the average movie rating changed over the years? Plot the
average rating for each year.

# Group by 'year' and calculate the average rating ('score') for each
year
average_rating_per_year = df.groupby('year')
['score'].mean().reset_index()

# Showing line plot for average movie changed over years
plt.figure(figsize=(12,3))
sns.lineplot(data=average_rating_per_year, x='year', y='score',
marker='o', color='b')
plt.title("Average Movie Rating Over the Years")
plt.xlabel("Year")
plt.ylabel("Average Rating")
plt.xticks(rotation=45)
plt.show()

# Description
print("The Average Movie Rating over the years shows that:")
print("- It shows from 1980 to 2020 the average rating Consistent
Movie Quality")
print("- There down fall after 2020 in movies may be because
expectation of audience")
```



```
The Average Movie Rating over the years shows that:
- It shows from 1980 to 2020 the average rating Consistent Movie
Quality
- There down fall after 2020 in movies may be because expectation of
audience

# Which years had the highest and lowest number of movie releases?
Plot the number of movies released each year

# Group by 'year' and count the number of movies released each year
gb = df.groupby('year').agg({'names': 'count'})

# Plot the number of movies released each year using a bar plot
plt.figure(figsize=(14,4))
sns.barplot(x=gb.index, y=gb['names'], hue=gb4.index,
palette='viridis')
plt.ylabel('Count of Movies Released')
plt.xlabel('Year')
plt.title('Movies Released Each Year')
plt.xticks(rotation=90, fontsize=7)
plt.show()

# Find the year with the highest number of movie releases
highest_releases_year = gb['names'].idxmax()  # This gives the year
with the highest releases
print(f"Year with the highest movie releases:
{highest_releases_year}")

# Find the year with the lowest number of movie releases
lowest_releases_year = gb['names'].idxmin()  # This gives the year
with the lowest releases
print(f"Year with the lowest movie releases: {lowest_releases_year}")
```



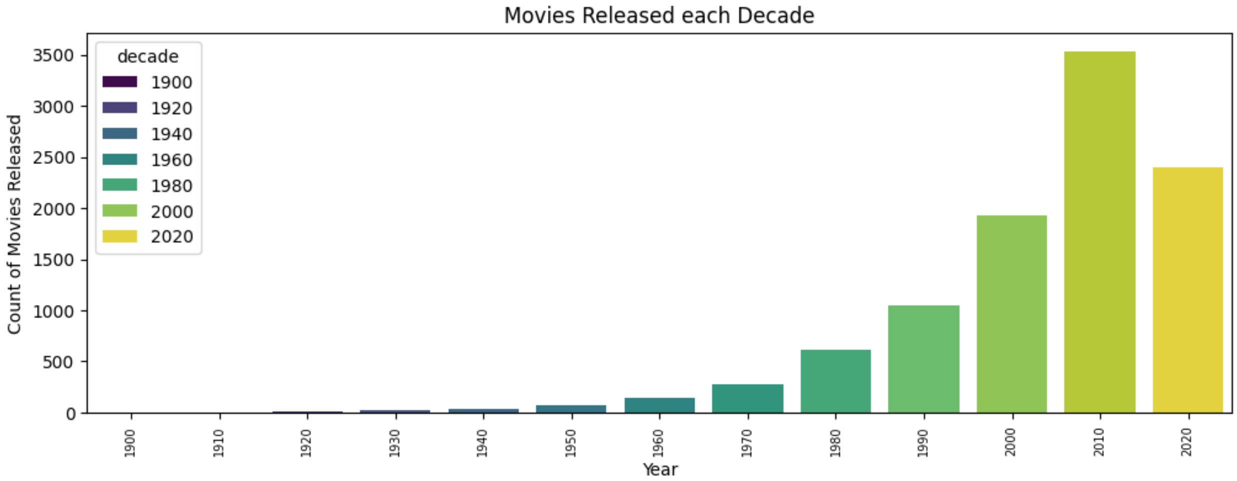
```
Year with the highest movie releases: 2022
Year with the lowest movie releases: 1903

# Do certain years show a higher average budget? Analyze the average
budget by year and observe any trends.

# Group by 'year' and calculate the average budget for each year
average_budget_per_year = df.groupby('year')['budget_x'].mean()

# Plot the average budget per year using a line plot
plt.figure(figsize=(12, 6))
sns.lineplot(x=average_budget_per_year.index,
y=average_budget_per_year.values, marker='o', color='y')
plt.title("Average Movie Budget Over the Years")
plt.xlabel("Year")
plt.ylabel("Average Budget")
plt.xticks(rotation=45)
plt.show()
```



Multivariate Analysis: Analyze multiple variables together

Combine insights from multiple columns to explore complex relationships

```python
# Which genres are most popular in each decade? Create a bar plot showing the most frequent genres by decade.

# Extract the decade from the 'year' column
df['decade'] = (df['year'] // 10) * 10  # Dividing year by 10 and multiplying by 10 to get the start of the decade

# Plot the number of movies released each decade
gb = df.groupby('decade').agg({'genre':'count'})
plt.figure(figsize = (12, 4))
sns.barplot(x = gb.index, y = gb['genre'], data = gb, hue = gb.index, palette = 'viridis')
plt.ylabel('Count of Movies Released')
plt.xlabel('Year')
plt.title('Movies Released each Decade')
plt.xticks(rotation = 90, fontsize = 7)
plt.show()

# Description
print("The Movies released each decade plot shows that:")
print("- It shows in 2010 most movies was popular ")
```

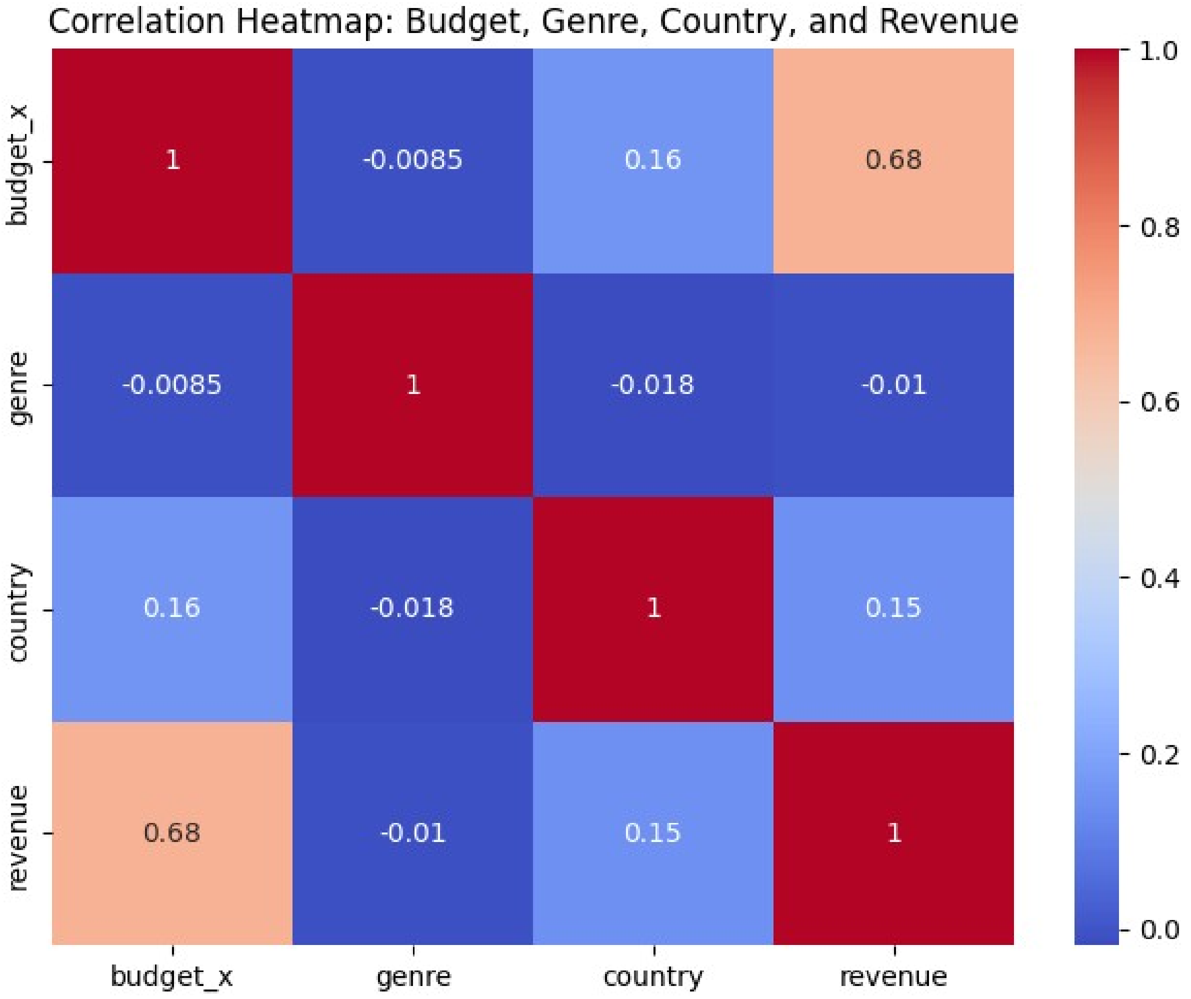


```
The Movies released each decade plot shows that:
- It shows in 2010 most movies was popular
```

```
# Analyze the influence of `budget_x`, `genre`, and `country` on
revenues using a heatmap.

# Select the relevant columns and drop any missing values
df_corr = df[['budget_x', 'genre', 'country', 'revenue']].dropna()

# Convert categorical columns into numeric values
df_corr['genre'] = pd.factorize(df_corr['genre'])[0]
df_corr['country'] = pd.factorize(df_corr['country'])[0]

# Calculate the correlation between the variables
corr_matrix = df_corr.corr()

print(corr_matrix)
```

```
           budget_x     genre   country   revenue
budget_x   1.000000 -0.008550  0.159005  0.680372
genre     -0.008550  1.000000 -0.018373 -0.010409
country    0.159005 -0.018373  1.000000  0.145098
revenue    0.680372 -0.010409  0.145098  1.000000
```

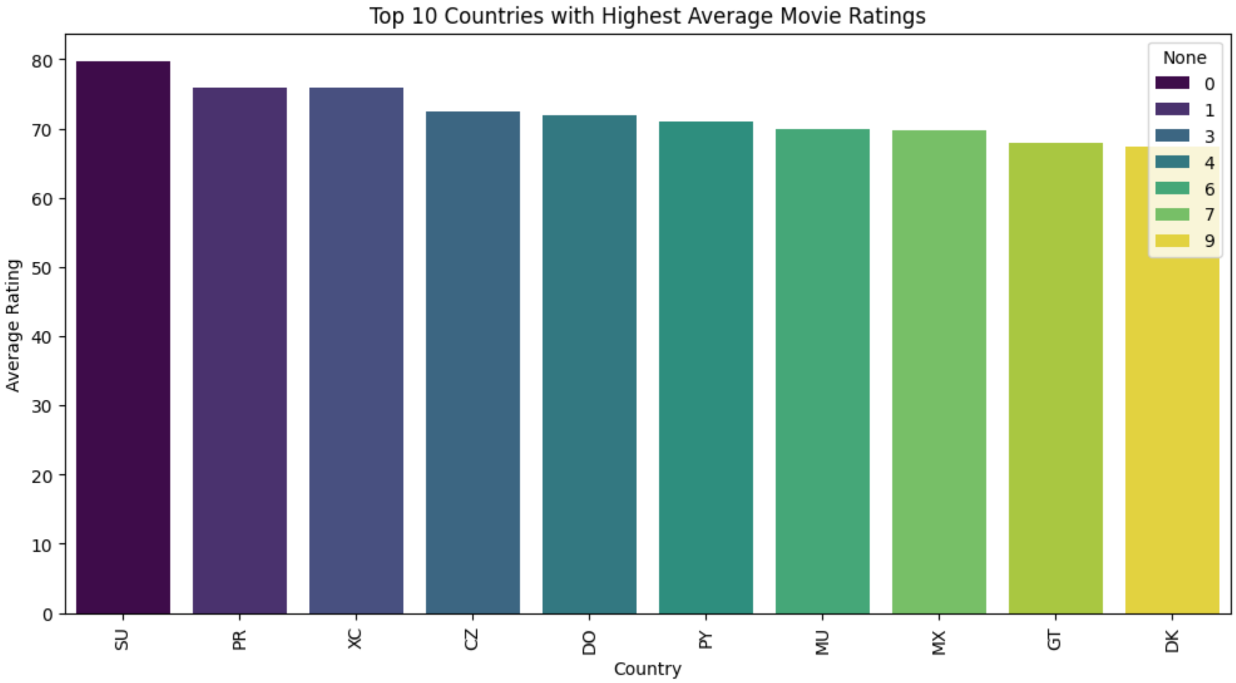
```
# Plot the heatmap
plt.figure(figsize=(8, 6))
sns.heatmap(corr_matrix, annot=True, cmap='coolwarm')
plt.title("Correlation Heatmap: Budget, Genre, Country, and Revenue")
plt.show()

# Description
print("The correlation Heatmap shows that:")
print("- Budget and revenue are positively correlated (0.67),
suggesting that higher-budget movies tend to generate more revenue")
print("- Genre and country have very weak correlations with other
variables, indicating that the genre or the country of production does
not strongly impact budget or revenue.")
print("-Country has a weak positive correlation with revenue
suggesting that movies from certain countries might tend to have
slightly higher revenue.")
```



```
The correlation Heatmap shows that:
- Budget and revenue are positively correlated (0.67), suggesting that
higher-budget movies tend to generate more revenue
- Genre and country have very weak correlations with other variables,
indicating that the genre or the country of production does not
strongly impact budget or revenue.
-Country has a weak positive correlation with revenue suggesting that
movies from certain countries might tend to have slightly higher
revenue.
```

Additional Questions Based on Dataset

```
# Which countries produce the highest-rated movies on average?

# Group by 'country' and calculate the average rating ('score') for
each country
average_rating_by_country = df.groupby('country')
['score'].mean().sort_values(ascending=False).reset_index()

# Display the top 10 countries with the highest average ratings
top_countries = average_rating_by_country.head(10)
print("Top 10 Countries with Highest Average Movie Ratings:")
print(top_countries)

Top 10 Countries with Highest Average Movie Ratings:
  country      score
0      SU  79.800000
1      PR  76.000000
2      XC  76.000000
3      CZ  72.500000
4      DO  72.000000
5      PY  71.000000
6      MU  70.000000
7      MX  69.771429
8      GT  68.000000
9      DK  67.333333

# Plot the results using a barplot
plt.figure(figsize=(12, 6))
sns.barplot(data=top_countries, x='country',
y='score',hue=top_countries.index, palette='viridis')
plt.title("Top 10 Countries with Highest Average Movie Ratings")
plt.xlabel("Country")
plt.ylabel("Average Rating")
plt.xticks(rotation=90)
plt.show()

# Description
print("The Highest Average movie ratings shows that:")
print("- It shows that SU has highest average movie ratings")
```

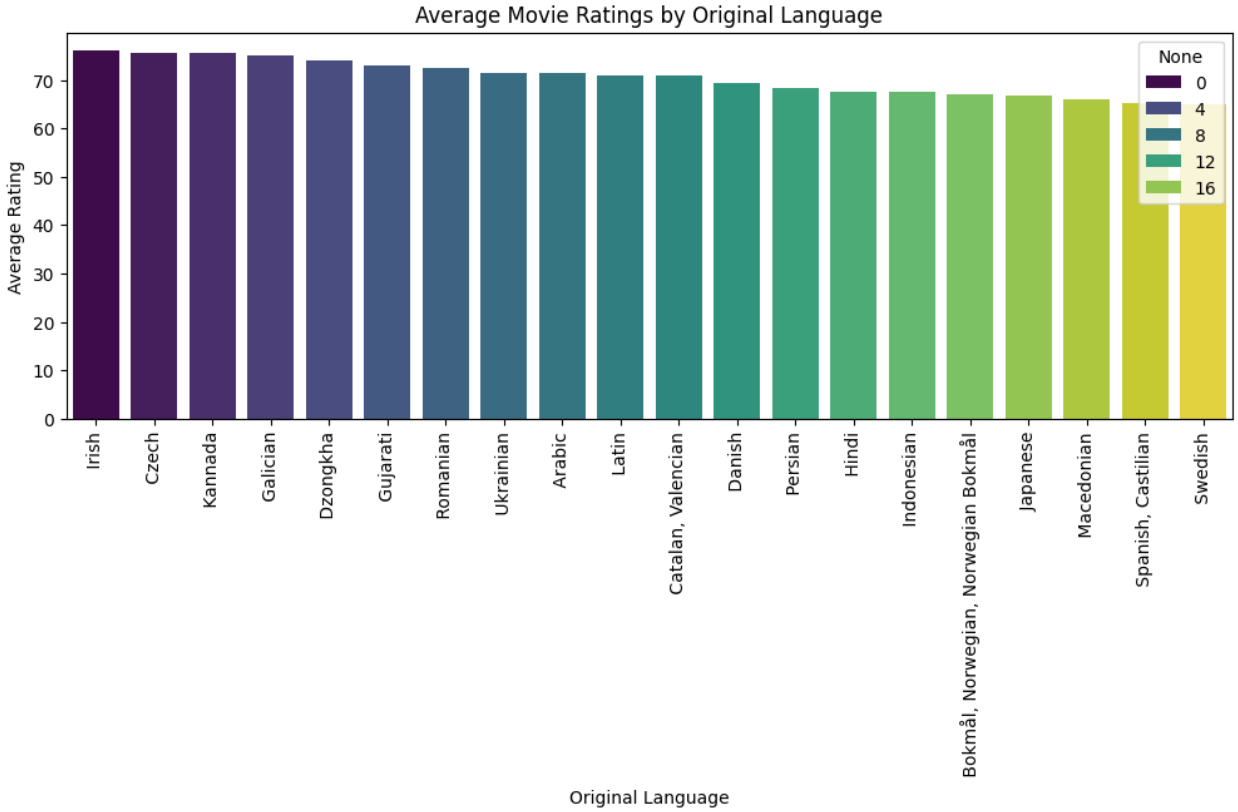


The Highest Average movie ratings shows that:
- It shows that SU has highest average movie ratings

```
# Does the original language (`orig_lang`) correlate with ratings?

# Group by 'orig_lang' and calculate the average rating for each
language
avg_rating_by_lang = df.groupby('orig_lang')
['score'].mean().sort_values(ascending=False).reset_index()

top= avg_rating_by_lang.head(20)

# Display the results
print("Average Ratings by Original Language:")
print(top)
```

```
Average Ratings by Original Language:
                               orig_lang      score
0                                  Irish  76.000000
1                                  Czech  75.500000
2                                Kannada  75.500000
3                               Galician  75.000000
4                               Dzongkha  74.000000
5                               Gujarati  73.000000
6                               Romanian  72.500000
7                              Ukrainian  71.500000
8                                 Arabic  71.500000
9                                  Latin  71.000000
10                    Catalan, Valencian  71.000000
```

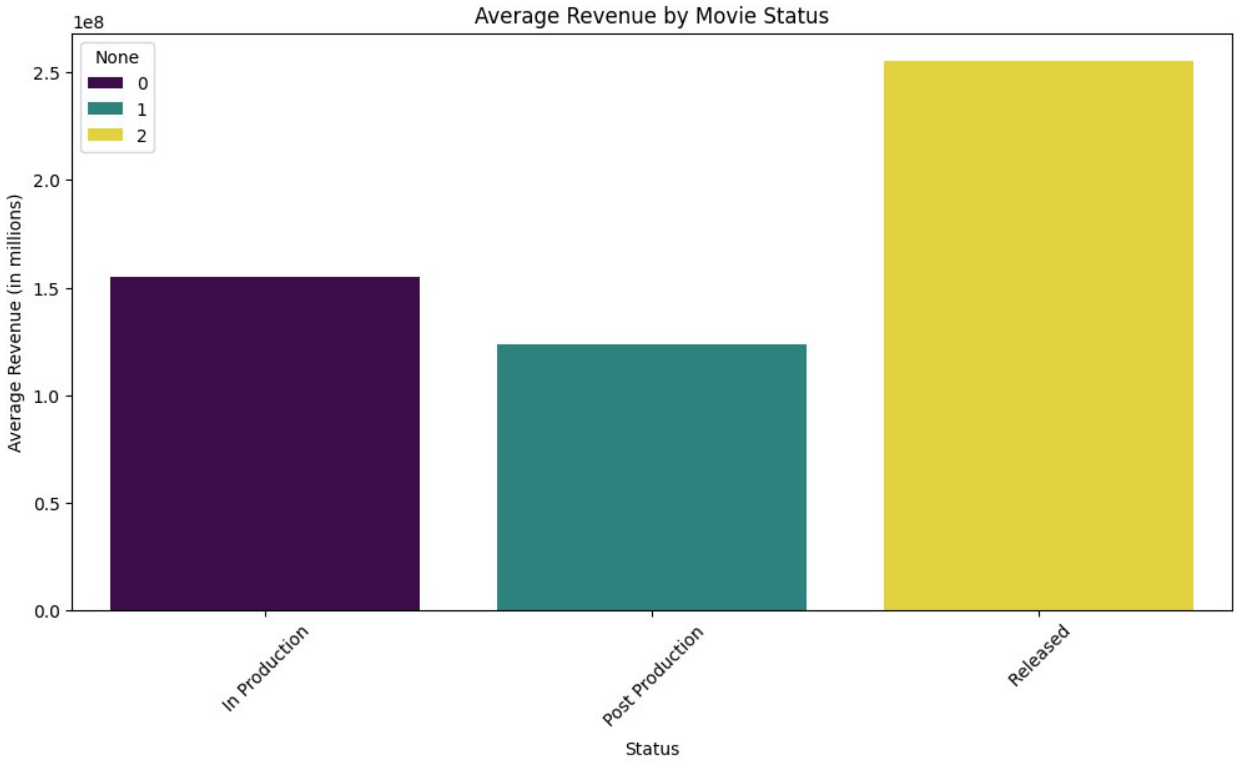
```
11                                     Danish  69.304348
12                                    Persian  68.200000
13                                      Hindi  67.653846
14                                 Indonesian  67.636364
15   Bokmål, Norwegian, Norwegian Bokmål  67.000000
16                                   Japanese  66.899160
17                                 Macedonian  66.000000
18                        Spanish, Castilian  65.188917
19                                    Swedish  65.000000

# Plot the results using a barplot
plt.figure(figsize=(12,4))
sns.barplot(data=top, x='orig_lang', y='score', hue = top.index,
palette='viridis')
plt.title("Average Movie Ratings by Original Language")
plt.xlabel("Original Language")
plt.ylabel("Average Rating")
plt.xticks(rotation=90)
plt.show()
```



```
df["status"]

0          Released
1          Released
```

```
2         Released
3         Released
4         Released
             ...
10173     Released
10174     Released
10175     Released
10176     Released
10177     Released
Name: status, Length: 10178, dtype: object
```

```
# How does `status` (e.g., released, post-production) influence
revenues?

# Filter out movies with invalid revenue values (e.g., 0 or NaN)
df_filtered_revenue = df[df['revenue'] > 0]  # Filter out rows with
zero revenue

# Group by 'status' and calculate the average revenue for each status
avg_revenue_by_status = df_filtered_revenue.groupby('status')
['revenue'].mean().reset_index()

# Plot the average revenue by status
plt.figure(figsize=(12, 6))
sns.barplot(data=avg_revenue_by_status, x='status',
y='revenue',hue=avg_revenue_by_status.index, palette='viridis')
plt.title("Average Revenue by Movie Status")
plt.xlabel("Status")
plt.ylabel("Average Revenue (in millions)")
plt.xticks(rotation=45)
plt.show()

# Description
print("The Average revenue by movie status shows that:")
print("- Status which is Released have highest avergae revenue ")
```



```
The Average revenue by movie status shows that:
- Status which is Released have highest avergae revenue
```

Insights and Summary

Task: Task: Summarize key findings

1. Budget and Revenue Correlation:

- There is a **strong positive correlation** (0.67) between **budget** and **revenue**, indicating that movies with higher budgets tend to generate more revenue. This suggests that investing more in movie production is likely to lead to higher financial returns. However, it is important to note that while a higher budget increases the chances of higher revenue, it does not guarantee success. Some high-budget films may still fail to generate expected returns, and there are mid-budget films that perform better than anticipated.

2. Consistent Movie Ratings Over Time:

- From **1980 to 2020**, the average **IMDB ratings** have remained relatively **consistent**, showing that movie quality, as measured by user ratings, has not drastically changed over time. However, there has been a **slight decline after 2020**, which could be attributed to shifting audience expectations, a decrease in movie-going experiences due to external factors (such as the pandemic), or a change in the types of content being produced. This trend suggests that while movie quality has remained stable, audience preferences and expectations are evolving.

3. Genre-Specific Trends in Budget and Ratings:

- Certain **genres** like **Fantasy**, **Drama**, and **Crime** tend to receive **higher average ratings**, while **Action** movies often have **lower budgets** compared to **Comedy** and **Drama** films. This shows that more dramatic or fantasy-driven films may receive better audience ratings, possibly due to stronger narratives or unique storytelling. In contrast, Action films often have lower production costs but can still generate significant box-office returns, showing that action-based content might be more accessible or widely popular despite its lower production costs.