im2_db

In [83]:
```
import os
# set working directory
working_directory =  r"C:/Users/PC/Documents/moringa/Project Phase
os.chdir(working_directory)
```

Objectives

1. what are the popular genres in the Movie Industry?
2. What is the relationship between average rating and number of votes?
3. What is the trend of the number of votes over the years
4. What is the trend of the average rating over the years
5. Why average rating and number of votes are moving in different direction with respect to time

In [84]:
```
# importing relevant libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
import sqlite3
import csv
import os
import zipfile
```

In [85]:
```
im=os.path.join('im2.db')
conn=sqlite3.connect(im)
cursor=conn.cursor()
```

In [45]:
```
table_name_query="""SELECT name
                    AS 'Table Names'
                    From sqlite_master
                    WHERE type='table';"""
pd.read_sql(table_name_query,conn)
```

Out[45]:

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

In [46]:
```
# Query the relevant tables
movie_basics_query = """
SELECT *
FROM movie_basics;
"""

movie_ratings_query = """
SELECT *
FROM movie_ratings;
"""
df_movie_basics_query = pd.read_sql(movie_basics_query, conn)
df_movie_ratings_query = pd.read_sql(movie_ratings_query, conn)
```

In [47]:
```
# Display the tables above each other
df_movie_basics = pd.read_sql(movie_basics_query, conn)
df_movie_ratings = pd.read_sql(movie_ratings_query, conn)
```

In [48]:
```
df_movie_basics = pd.DataFrame(df_movie_basics)
df_movie_basics.columns
```

Out[48]:
```
Index(['movie_id', 'primary_title', 'original_title', 'start_year',
       'runtime_minutes', 'genres'],
      dtype='object')
```

In [49]:
```
print(df_movie_basics.shape)
print(df_movie_ratings.shape)
```

```
(146144, 6)
(73856, 3)
```

In [50]:
```
df_movie_ratings = pd.DataFrame(df_movie_ratings)
df_movie_ratings.columns
```

Out[50]:
```
Index(['movie_id', 'averagerating', 'numvotes'], dtype='object')
```

In [51]:
```
df_combined = pd.concat([df_movie_basics, df_movie_ratings], axis =
# print(df_combined)
df_combined = pd.DataFrame(df_combined)
df_combined.tail()
```

Out[51]:

	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

In [52]:
```
pd.merge(df_movie_basics, df_movie_ratings, how = 'left', on = 'mo
```

Out[52]:

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

In [53]:
```
print(df_movie_basics.info())
print(df_movie_ratings.info())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 146144 entries, 0 to 146143
Data columns (total 6 columns):
 #   Column           Non-Null Count   Dtype  
---  ------           --------------   -----  
 0   movie_id         146144 non-null  object 
 1   primary_title    146144 non-null  object 
 2   original_title   146123 non-null  object 
 3   start_year       146144 non-null  int64  
 4   runtime_minutes  114405 non-null  float64
 5   genres           140736 non-null  object 
dtypes: float64(1), int64(1), object(4)
memory usage: 6.7+ MB
None
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 73856 entries, 0 to 73855
Data columns (total 3 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   movie_id       73856 non-null  object 
 1   averagerating  73856 non-null  float64
 2   numvotes       73856 non-null  int64  
dtypes: float64(1), int64(1), object(1)
memory usage: 1.7+ MB
None
```

In [54]:
```
# check missing values
print(df_movie_basics.isnull().sum())
print(df_movie_ratings.isnull().sum())
```

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

In [55]:

```
# handle missing values
df_movie_basics =df_movie_basics.dropna()
df_movie_ratings =df_movie_ratings.dropna()
df_movie_basics
df_movie_ratings
```

Out[55]:

	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 [56]:

```
df_movie_basics.describe()

```

Out[56]:

	start_year	runtime_minutes
count	112232.000000	112232.000000
mean	2014.402078	86.261556
std	2.639042	167.896646
min	2010.000000	1.000000
25%	2012.000000	70.000000
50%	2014.000000	87.000000
75%	2017.000000	99.000000
max	2022.000000	51420.000000

In [57]:
```
1 df_movie_ratings.describe()
```

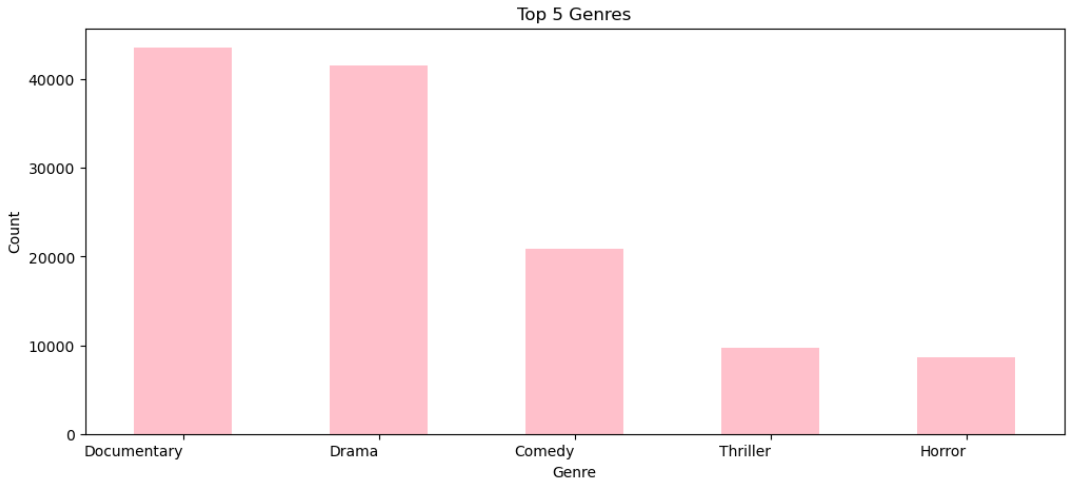
Out[57]:

	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 [58]:
```
1 merged_df = pd.merge(df_movie_basics, df_movie_ratings, on='movie_
2 # identify top 10 genres
3 all_genres = merged_df['genres'].str.split(',', expand = True).sta
4 top_genres = all_genres.value_counts().head(5)
5 # display the list of the first top 10 genres
6 print("top 5 Genres:")
7 print(top_genres.index.tolist())
8
```

```
top 5 Genres:
['Documentary', 'Drama', 'Comedy', 'Thriller', 'Horror']
```

In [59]:
```
1 # visualize the most common genres
2 plt.figure(figsize = (12, 5))
3 ax = top_genres.plot(kind ='bar', color = 'pink')
4 ax.set_xticklabels(ax.get_xticklabels(), rotation = 0, ha ='right'
5 plt.title('Top 5 Genres')
6 plt.xlabel('Genre')
7 plt.ylabel('Count')
8 plt.savefig('fig1.png')
9 plt.show()
```



In [60]:

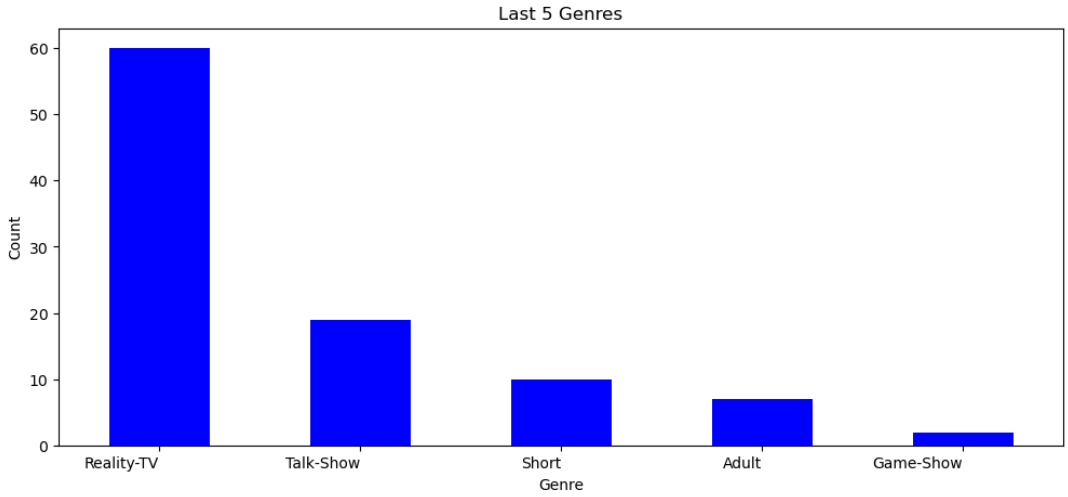
```
merged_df = pd.merge(df_movie_basics, df_movie_ratings, on='movie_
# identify last 5 genres
all_genres = merged_df['genres'].str.split(',', expand = True).sta
last_genres = all_genres.value_counts().tail(5)
# display the list of the first last 5 genres
print("last 5 Genres:")
print(last_genres.index.tolist())

```

```
last 5 Genres:
['Reality-TV', 'Talk-Show', 'Short', 'Adult', 'Game-Show']
```

In [61]:

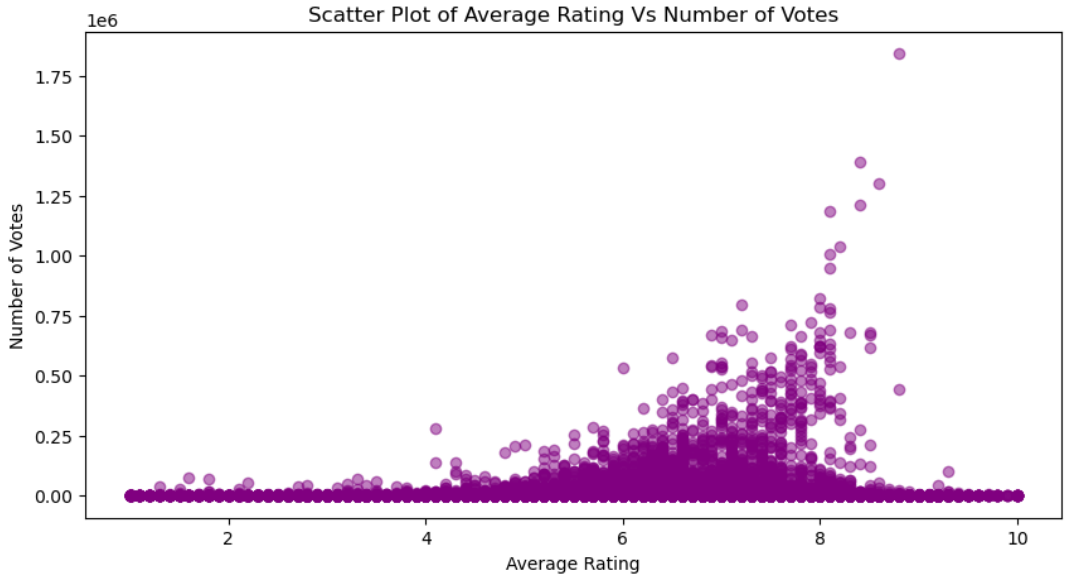
```
# visualize the last genres
plt.figure(figsize = (12, 5))
ax = last_genres.plot(kind ='bar', color = 'blue')
ax.set_xticklabels(ax.get_xticklabels(), rotation = 0, ha ='right'
plt.title('Last 5 Genres')
plt.xlabel('Genre')
plt.ylabel('Count')
plt.savefig('fig2.png')
plt.show()
```



In [62]:

```
# select relevant columns for the scatter plot
scatter_data = merged_df[['averagerating', 'numvotes']]
# create a scatter plot
plt.figure(figsize = (10, 5))
plt.scatter(scatter_data['averagerating'], scatter_data['numvotes'
plt.title('Scatter Plot of Average Rating Vs Number of Votes')
plt.xlabel('Average Rating')
plt.ylabel('Number of Votes')
plt.savefig('fig3.png')
plt.show()


```



In [63]:

```
print(df_movie_basics.genres.unique())
# print(df_movie_ratings.genres.unique())
```

```
['Action,Crime,Drama' 'Biography,Drama' 'Drama' ...
 'Mystery,Reality-TV,Thriller' 'Music,Musical,Reality-TV' 'Family,Wa
r']
```

In [64]:

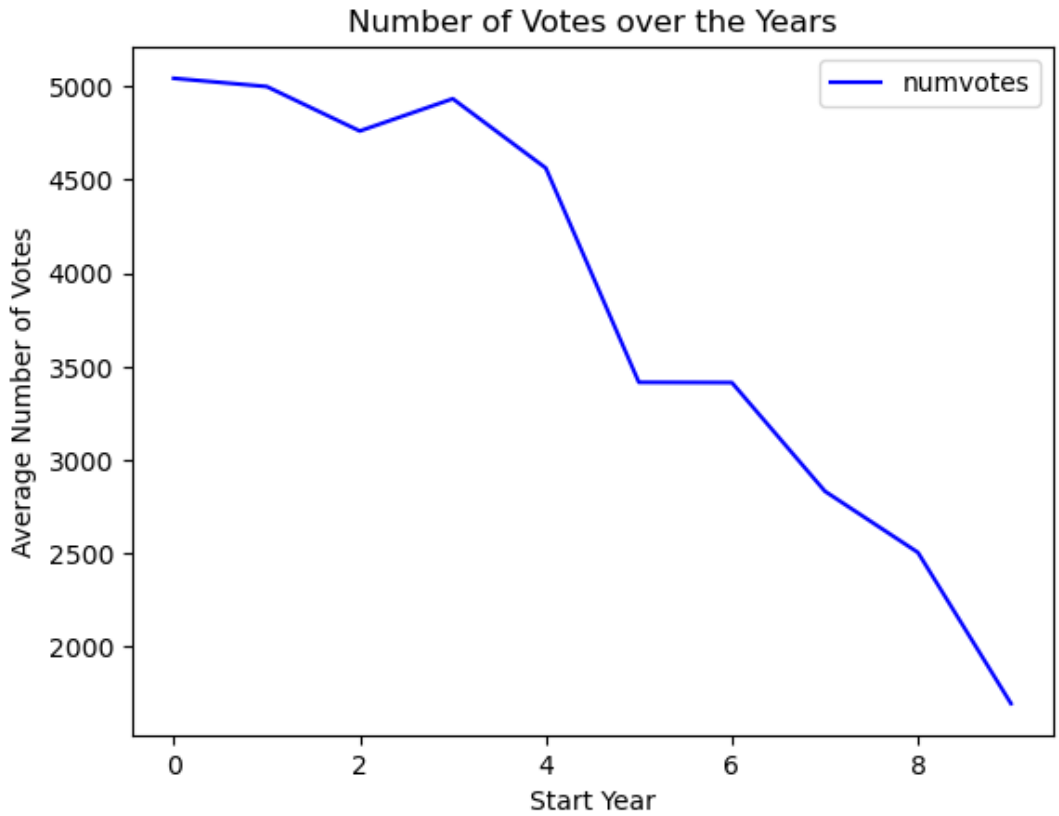
```
# Group the data by start_year and calculating the average rating c
grouped_data = merged_df.groupby('start_year').agg({'averagerating
# Sorting the data by start_ year in ascending order
grouped_data = grouped_data.sort_values('start_year')
print(grouped_data)
```

```
            averagerating     numvotes
start_year
2010             6.267108  5043.330407
2011             6.290523  4999.282024
2012             6.291509  4761.220652
2013             6.292406  4933.784507
2014             6.321108  4562.855340
2015             6.265817  3415.804183
2016             6.328285  3414.603597
2017             6.363825  2832.789971
2018             6.375993  2505.006998
2019             6.653492  1696.149113
2020                  NaN          NaN
2021                  NaN          NaN
2022                  NaN          NaN
```

In [65]:

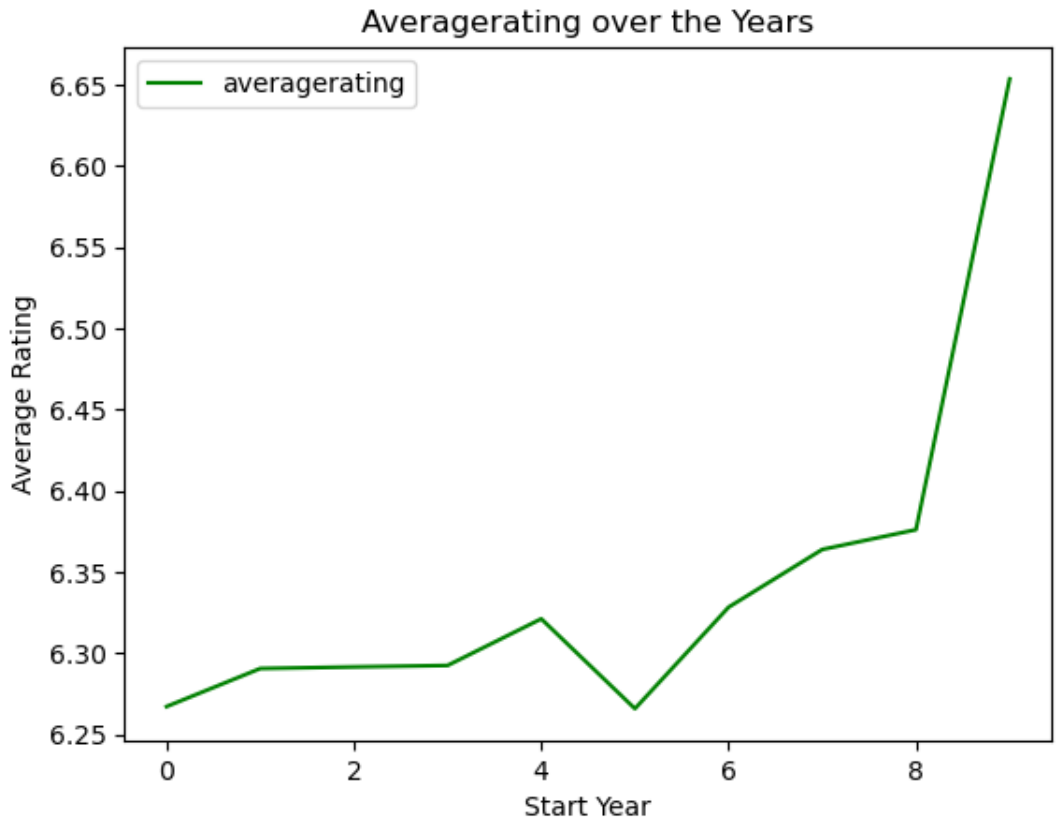
```

C=grouped_data
plt.plot(np.arange(0,len(C)),C["numvotes"],color="blue",label="numv
# plt a line graph
plt.title("Number of Votes over the Years")
plt.xlabel("Start Year")
plt.ylabel("Average Number of Votes")
plt.legend()
plt.savefig('fig4.png')
plt.show()
```



In [66]:

```
C=grouped_data
plt.plot(np.arange(0,len(C)),C["averagerating"],color="green",label
# plt a line graph
plt.title("Averagerating over the Years")
plt.xlabel("Start Year")
plt.ylabel("Average Rating")
plt.legend()
plt.savefig('fig5.png')
plt.show()
```



bom_movie_gross_csv

Objectives for bom_movie_gross_csv

1. what is the realtionship between domestic gross and foreign gross?
2. What is the trend for domestic gross and foreign gross over the years
3. Is theer any outliers in the gross revenue?
4. Is there any significant difference between the domestic and foreign revenue over the years?

In [67]:
```
# load the data
df =pd.read_csv('bom.movie1_gross.csv')
df
```

Out[67]:

	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 [68]:
```
df.shape
```

Out[68]:
```
(3387, 5)
```

In [69]:
```
df.columns
```

Out[69]:
```
Index(['title', 'studio', 'domestic_gross', 'foreign_gross', 'year'],
dtype='object')
```

In [70]:
```
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
```

In [71]:
```
df.dtypes
```

Out[71]:
```
title             object
studio            object
domestic_gross    float64
foreign_gross      object
year                int64
dtype: object
```

In [72]:
```
df.dtypes
```

Out[72]:
```
title             object
studio            object
domestic_gross    float64
foreign_gross      object
year                int64
dtype: object
```

In [73]:
```
# check missing values
print(df.isnull().sum())
```

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

In [74]:
```
# handle missing values
df =df.dropna()
df
```

Out[74]:

	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
...	...	...	...	...	...
3275	I Still See You	LGF	1400.0	1500000	2018
3286	The Catcher Was a Spy	IFC	725000.0	229000	2018
3309	Time Freak	Grindstone	10000.0	256000	2018
3342	Reign of Judges: Title of Liberty - Concept Short	Darin Southa	93200.0	5200	2018
3353	Antonio Lopez 1970: Sex Fashion & Disco	FM	43200.0	30000	2018

2007 rows × 5 columns

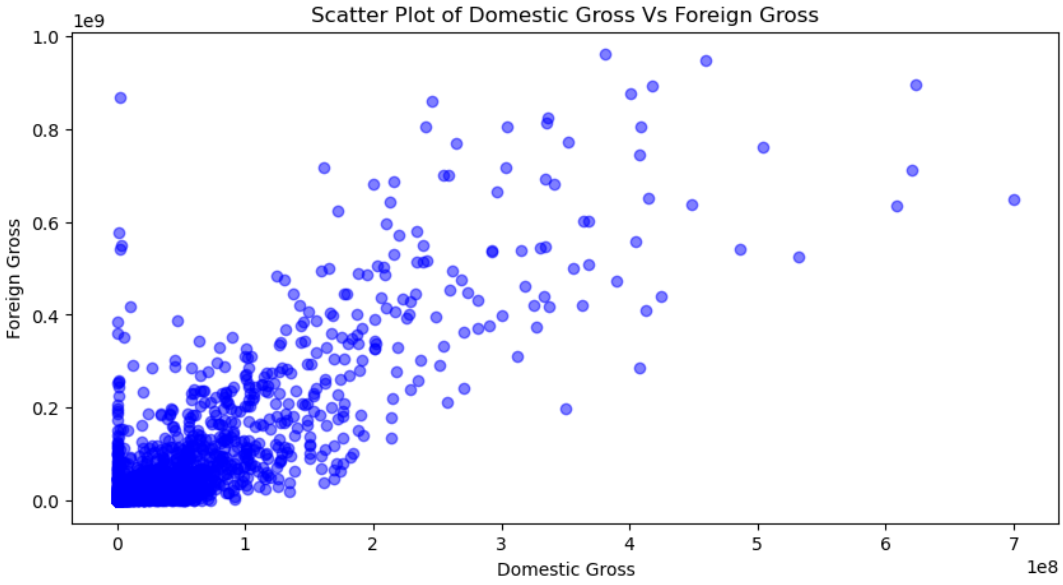
In [75]:
```
import warnings
warnings.filterwarnings('ignore')
```

In [76]:
```
df.describe()
```

Out[76]:

	domestic_gross	year
count	2.007000e+03	2007.000000
mean	4.701984e+07	2013.506228
std	8.162689e+07	2.597997
min	4.000000e+02	2010.000000
25%	6.700000e+05	2011.000000
50%	1.670000e+07	2013.000000
75%	5.605000e+07	2016.000000
max	9.367000e+08	2018.000000

In [77]:
```
df ['domestic_gross'] = pd.to_numeric(df['domestic_gross'], errors
df ['foreign_gross'] = pd.to_numeric(df['foreign_gross'], errors =
# create a scatter plot
plt.figure(figsize = (10, 5))
plt.scatter(df['domestic_gross'], df['foreign_gross'], alpha=0.5, 
plt.title('Scatter Plot of Domestic Gross Vs Foreign Gross')
plt.xlabel('Domestic Gross')
plt.ylabel('Foreign Gross')
plt.savefig('fig3.png')
plt.show()
```



In [78]:

```
# DataFrame for domestic_gross and foreign_gross
domestic_data = df.domestic_gross
foreign_data = df.foreign_gross
# display the data for the domestic_gross column
print("Domestic Gross Data:")
print(domestic_data)
# display the data for foreign_gross column
print("\nForeign Gross Data:")
print(foreign_data)

```

```
Domestic Gross Data:
0       415000000.0
1       334200000.0
2       296000000.0
3       292600000.0
4       238700000.0
           ...
3275         1400.0
3286       725000.0
3309        10000.0
3342        93200.0
3353        43200.0
Name: domestic_gross, Length: 2007, dtype: float64

Foreign Gross Data:
0       652000000.0
1       691300000.0
2       664300000.0
3       535700000.0
4       513900000.0
           ...
3275      1500000.0
3286       229000.0
3309       256000.0
3342         5200.0
3353        30000.0
Name: foreign_gross, Length: 2007, dtype: float64
```

In [79]:

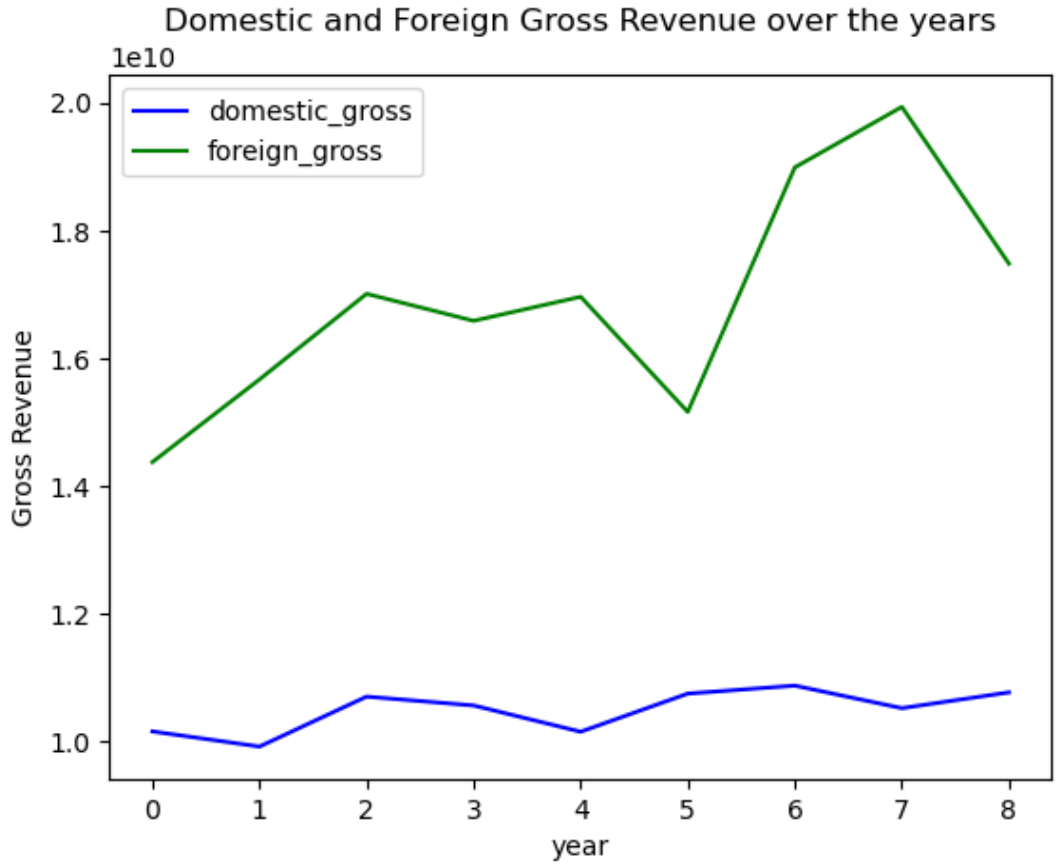
```
df1 = df.groupby(['year'])[['domestic_gross', 'foreign_gross']].su
df1.head()
```

Out[79]:

	year	domestic_gross	foreign_gross
0	2010	1.015274e+10	1.436937e+10
1	2011	9.915690e+09	1.566287e+10
2	2012	1.069786e+10	1.700298e+10
3	2013	1.055885e+10	1.658024e+10
4	2014	1.014798e+10	1.695667e+10

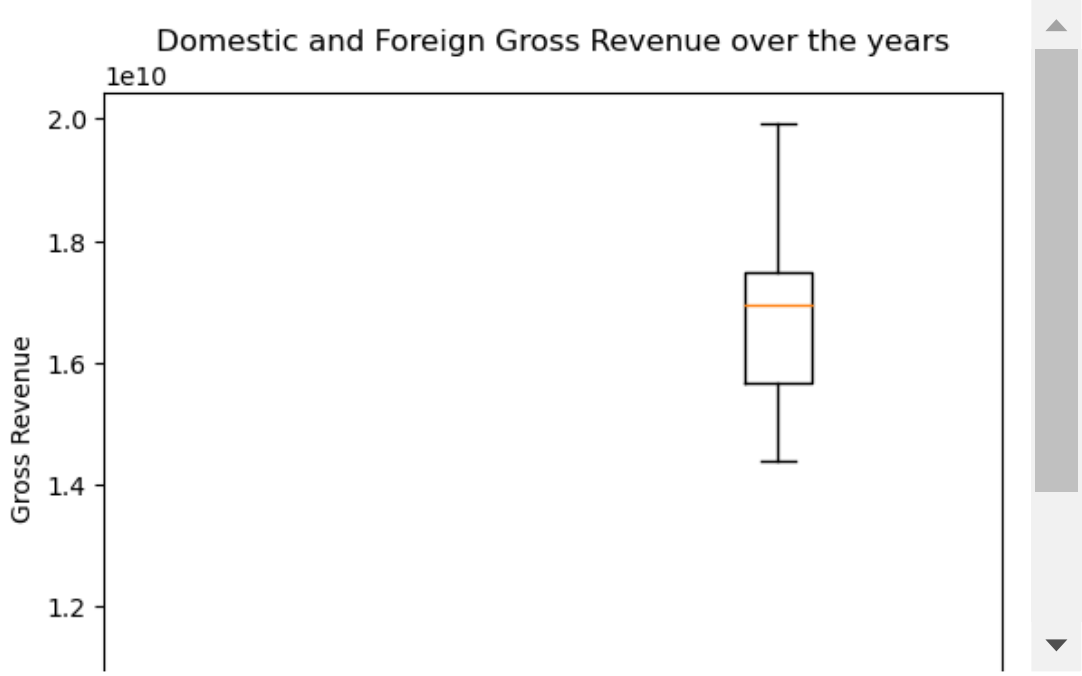
In [80]:

```
C=df1
plt.plot(np.arange(0,len(C)),C["domestic_gross"],color="blue",label
plt.plot(np.arange(0,len(C)),C["foreign_gross"],color="green",label
# plt a line graph
plt.title("Domestic and Foreign Gross Revenue over the years")
plt.xlabel("year")
plt.ylabel("Gross Revenue")
plt.legend()
plt.savefig('fig7.png')
plt.show()
```



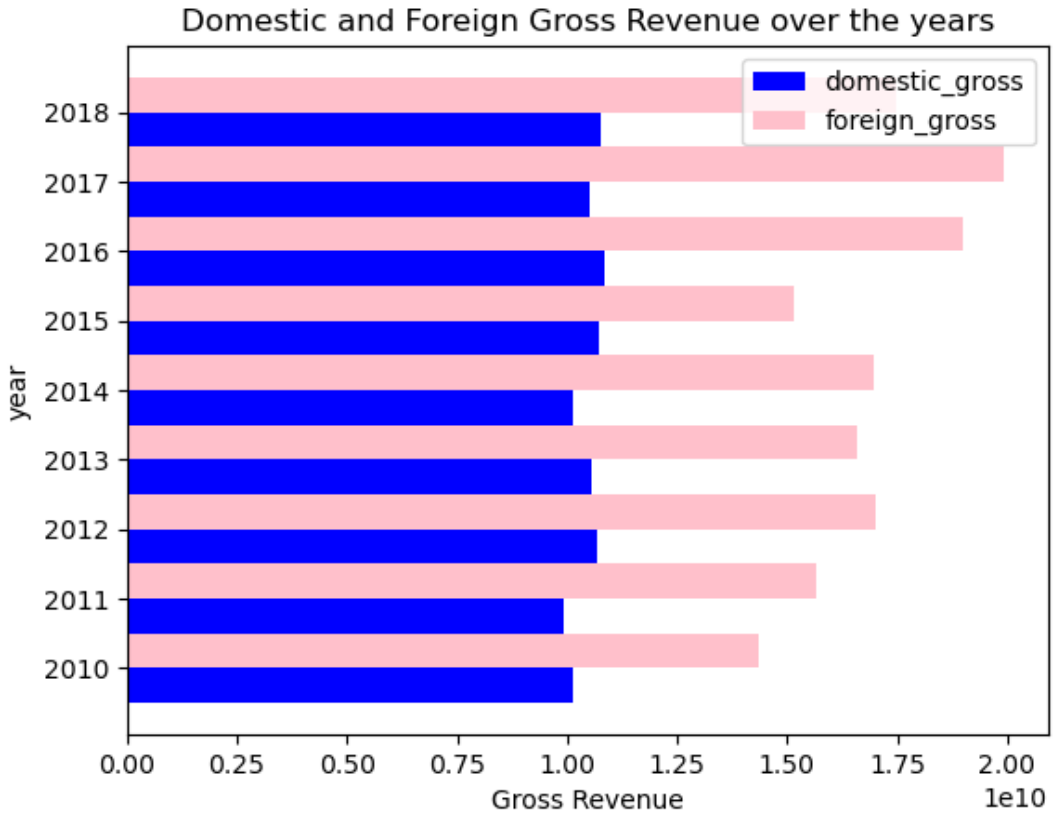
In [81]:

```
C=df1
plt.boxplot([df1["domestic_gross"], df1["foreign_gross"]], labels =
# plt.boxplot
plt.title("Domestic and Foreign Gross Revenue over the years")
plt.xlabel("Variable")
plt.ylabel("Gross Revenue")
plt.savefig('fig8.png')
plt.show()
```



In [82]:

```
df1 = df.groupby(['year'])[['domestic_gross', 'foreign_gross']].sum
C=df1
# convert the "year" column to datetime and extract the year
bar_width = 0.5
plt.barh(np.arange(len(df1)), df1["domestic_gross"], height = bar_
plt.barh(np.arange(len(df1)) + bar_width, df1["foreign_gross"], he
# set y-axis ticks and labels
plt.yticks(np.arange(len(df1)) + bar_width / 2, df1["year"])
plt.title("Domestic and Foreign Gross Revenue over the years")
plt.xlabel("Gross Revenue")
plt.ylabel("year")
plt.legend()
plt.savefig('fig9.png')
plt.show()
```



In [ ]:

```
1
```