Final Project Submission

Please fill out:

- Student name: Sammy Kinyanjui Macharia
- Student pace: part time
- Scheduled project review date/time:
- Instructor name:
- Blog post URL:

In [2]:
```
# Importing the packages used in this project

import pandas as pd
import numpy as np
import seaborn as sns

import matplotlib.pyplot as plt
import matplotlib.mlab as mlab
import matplotlib
plt.style.use('ggplot')
from matplotlib.pyplot import figure
matplotlib.rcParams['figure.figsize'] = (12,8)

pd.options.mode.chained_assignment = None

# Reading in the data
df = pd.read_csv('tn.movie_budgets.csv')
```

In [3]:
```
#Looking at the data
df.head()
```

Out[3]:

	id	release_date	movie	production_budget	domestic_gross	worldwide_gross
0	1	Dec 18, 2009	Avatar	$425,000,000	$760,507,625	$2,776,345,279
1	2	May 20, 2011	Pirates of the Caribbean: On Stranger Tides	$410,600,000	$241,063,875	$1,045,663,875
2	3	Jun 7, 2019	Dark Phoenix	$350,000,000	$42,762,350	$149,762,350
3	4	May 1, 2015	Avengers: Age of Ultron	$330,600,000	$459,005,868	$1,403,013,963
4	5	Dec 15, 2017	Star Wars Ep. VIII: The Last Jedi	$317,000,000	$620,181,382	$1,316,721,747

Data cleaning

In [5]:
```
# Checking if there are any duplicated data

len(df)-len(df.drop_duplicates())
```

Out[5]:
```
0
```

In [6]:
```
# Dropping all duplicates

df.drop_duplicates(inplace=True)
```

In [8]:
```
#checking misssing data
df.isna().sum()
```

Out[8]:
```
id                  0
release_date        0
movie               0
production_budget   0
domestic_gross      0
worldwide_gross     0
dtype: int64
```

In [9]:
```
# missing data in percent

for col in df.columns:
    pct_missing = np.mean(df[col].isnull())
    print('{} - {}%'.format(col, round(pct_missing*100, 1)))
```

```
id - 0.0%
release_date - 0.0%
movie - 0.0%
production_budget - 0.0%
domestic_gross - 0.0%
worldwide_gross - 0.0%
```

In [14]:
```
#checking data types(collumns)
df.dtypes
```

Out[14]:
```
id                   int64
release_date        object
movie               object
production_budget   object
domestic_gross      object
worldwide_gross     object
dtype: object
```

In [26]:
```
#remove $ sign from the collumns
df.production_budget = df.production_budget.str.replace('$','')
df.domestic_gross = df.domestic_gross.str.replace('$','')
df.worldwide_gross = df.worldwide_gross.str.replace('$','')
df.production_budget = df.production_budget.str.replace(',','')
df.domestic_gross = df.domestic_gross.str.replace(',','')
df.worldwide_gross = df.worldwide_gross.str.replace(',','')
# Changing numeric data to integer format
df = df.astype({'production_budget': 'int64','domestic_gross': 'int64','worldwide_gros
```

In [27]:
```
df.head()
```

Out[27]:

	id	release_date	movie	production_budget	domestic_gross	worldwide_gross
0	1	Dec 18, 2009	Avatar	425000000	760507625	2776345279
1	2	May 20, 2011	Pirates of the Caribbean: On Stranger Tides	410600000	241063875	1045663875
2	3	Jun 7, 2019	Dark Phoenix	350000000	42762350	149762350
3	4	May 1, 2015	Avengers: Age of Ultron	330600000	459005868	1403013963
4	5	Dec 15, 2017	Star Wars Ep. VIII: The Last Jedi	317000000	620181382	1316721747

In [49]:
```
#spliting the year and month from the release date
df['year'] = df['release_date'].str[-5:].str.strip()
df['month'] = df['release_date'].str[:4].str.strip()
df.head()
```

Out[49]:

	id	release_date	movie	production_budget	domestic_gross	worldwide_gross	year	month
0	1	Dec 18, 2009	Avatar	425000000	760507625	2776345279	2009	Dec
1	2	May 20, 2011	Pirates of the Caribbean: On Stranger Tides	410600000	241063875	1045663875	2011	May
2	3	Jun 7, 2019	Dark Phoenix	350000000	42762350	149762350	2019	Jun
3	4	May 1, 2015	Avengers: Age of Ultron	330600000	459005868	1403013963	2015	May
4	5	Dec 15, 2017	Star Wars Ep. VIII: The Last Jedi	317000000	620181382	1316721747	2017	Dec

In [50]:
```
#dropping the release_date collumn
df.drop(['release_date','id'], axis=1, inplace=True)
df.head()
```

Out[50]:

	id	movie	production_budget	domestic_gross	worldwide_gross	year	month
0	1	Avatar	425000000	760507625	2776345279	2009	Dec
1	2	Pirates of the Caribbean: On Stranger Tides	410600000	241063875	1045663875	2011	May
2	3	Dark Phoenix	350000000	42762350	149762350	2019	Jun
3	4	Avengers: Age of Ultron	330600000	459005868	1403013963	2015	May
4	5	Star Wars Ep. VIII: The Last Jedi	317000000	620181382	1316721747	2017	Dec

In [51]:
```
#sorting data by the worldwide gross
df = df.sort_values(by=['worldwide_gross'], ascending=False)
df.head()
```

Out[51]:

	id	movie	production_budget	domestic_gross	worldwide_gross	year	month
0	1	Avatar	425000000	760507625	2776345279	2009	Dec
42	43	Titanic	200000000	659363944	2208208395	1997	Dec
5	6	Star Wars Ep. VII: The Force Awakens	306000000	936662225	2053311220	2015	Dec
6	7	Avengers: Infinity War	300000000	678815482	2048134200	2018	Apr
33	34	Jurassic World	215000000	652270625	1648854864	2015	Jun

Exploring data

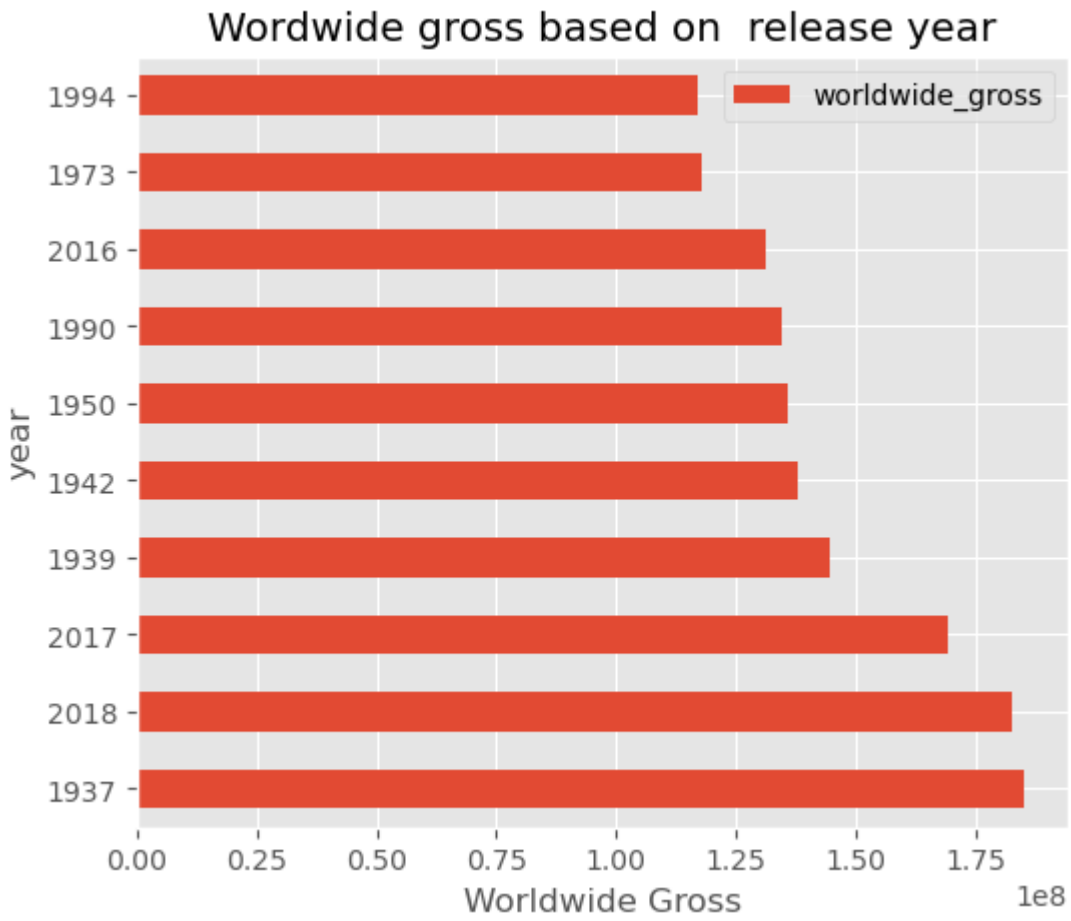
In [53]:
```
# get details about production_budget and worldwide gross
df[['production_budget','worldwide_gross']].describe()
```

Out[53]:

	production_budget	worldwide_gross
count	5.782000e+03	5.782000e+03
mean	3.158776e+07	9.148746e+07
std	4.181208e+07	1.747200e+08
min	1.100000e+03	0.000000e+00
25%	5.000000e+06	4.125415e+06
50%	1.700000e+07	2.798445e+07
75%	4.000000e+07	9.764584e+07
max	4.250000e+08	2.776345e+09

In [75]:
```
#Top 10 perfoming years(Average Worldwide gross)
dfy = df.groupby(['year'])[['worldwide_gross']].mean().sort_values(['worldwide_gross']
dfy.plot(kind = 'barh',title= 'Wordwide gross based on  release year',xlabel='Worldwic
```

Out[75]:
```
<Axes: title={'center': 'Wordwide gross based on  release year'}, xlabel='Worldwide G
ross', ylabel='year'>
```



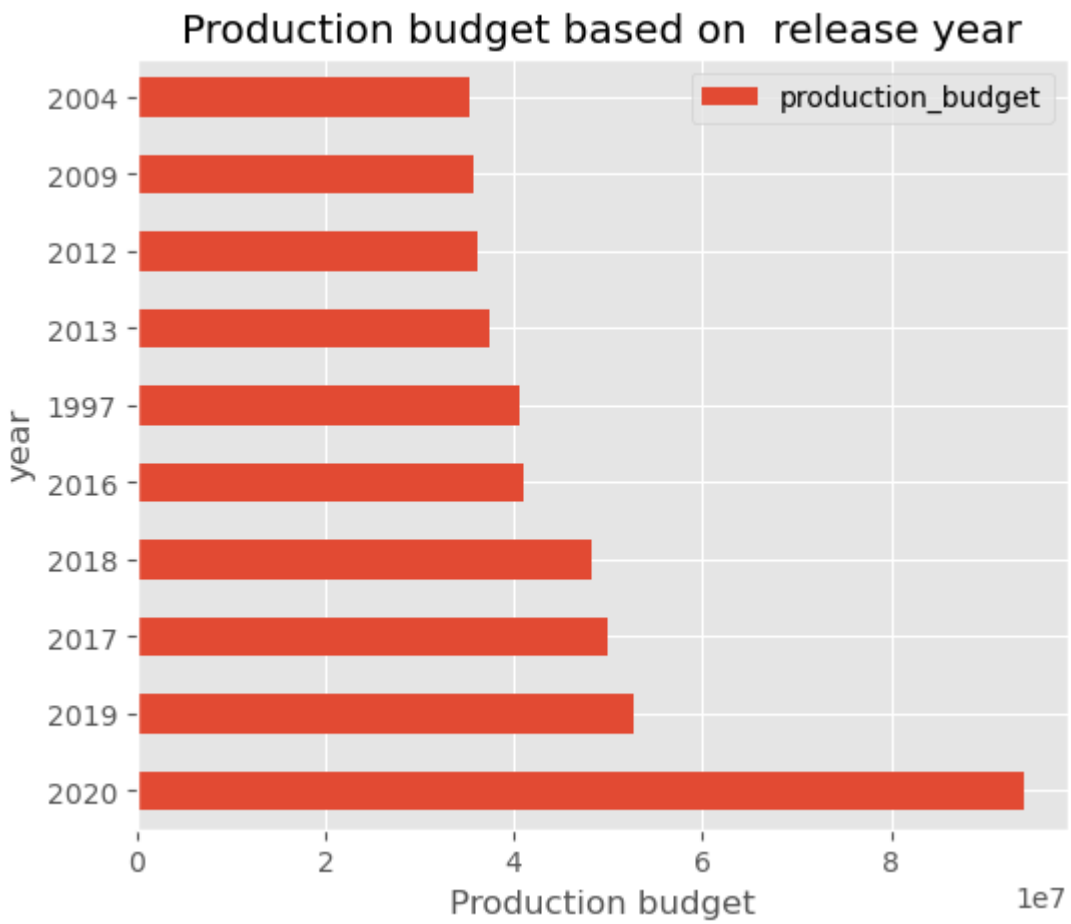
In [81]:
```
#movies produced in 1937
df.loc[df['year']=='1937']
```

Out[81]:

	movie	production_budget	domestic_gross	worldwide_gross	year	month
5117	Snow White and the Seven Dwarfs	1488000	184925486	184925486	1937	Dec

In [76]:
```
#Top 10 years average budget spent on movies
dfb = df.groupby(['year'])[['production_budget']].mean().sort_values(['production_budg
dfb.plot(kind = 'barh',title= 'Production budget based on  release year',xlabel='Produ
```

Out[76]:
```
<Axes: title={'center': 'Production budget based on  release year'}, xlabel='Producti
on budget', ylabel='year'>
```



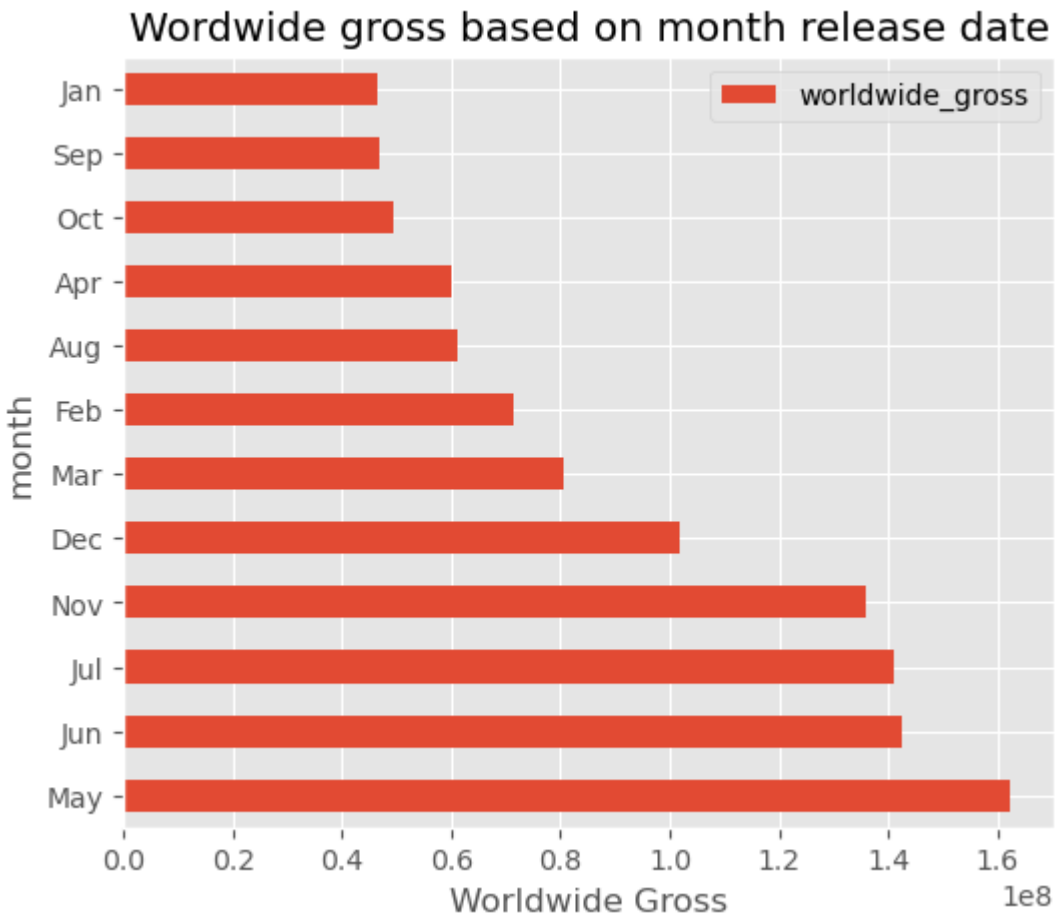
In [86]:
```
df.loc[df['year']=='2020']
```

Out[86]:

	movie	production_budget	domestic_gross	worldwide_gross	year	month
1205	Hannibal the Conqueror	50000000	0	0	2020	Dec
194	Moonfall	150000000	0	0	2020	Dec
535	Call of the Wild	82000000	0	0	2020	Feb

In [72]:
```
#Average perfomance of movies based on release month
dfg = df.groupby(['month'])[['worldwide_gross']].mean().sort_values(['worldwide_gross'
dfg.plot(kind = 'barh',title= 'Wordwide gross based on month release date',xlabel='Wor
```

Out[72]:
```
<Axes: title={'center': 'Wordwide gross based on month release date'}, xlabel='Worldw
ide Gross', ylabel='month'>
```



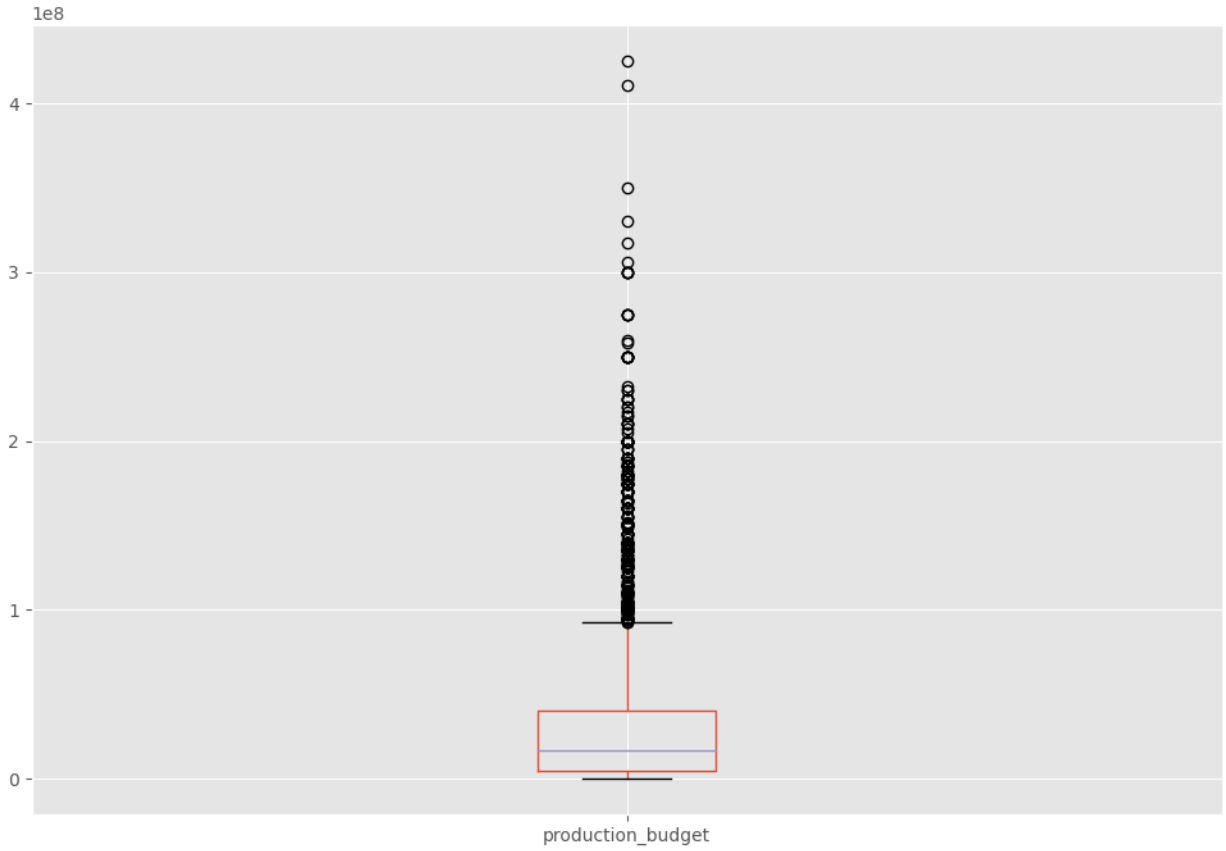
In [74]:
```
df.drop(['id'], axis=1, inplace=True)
df.head()
```

Out[74]:

	movie	production_budget	domestic_gross	worldwide_gross	year	month
0	Avatar	425000000	760507625	2776345279	2009	Dec
42	Titanic	200000000	659363944	2208208395	1997	Dec
5	Star Wars Ep. VII: The Force Awakens	306000000	936662225	2053311220	2015	Dec
6	Avengers: Infinity War	300000000	678815482	2048134200	2018	Apr
33	Jurassic World	215000000	652270625	1648854864	2015	Jun

In [96]:
```
# Looking for outliers

df.boxplot(column=['production_budget'])
plt.show()
```

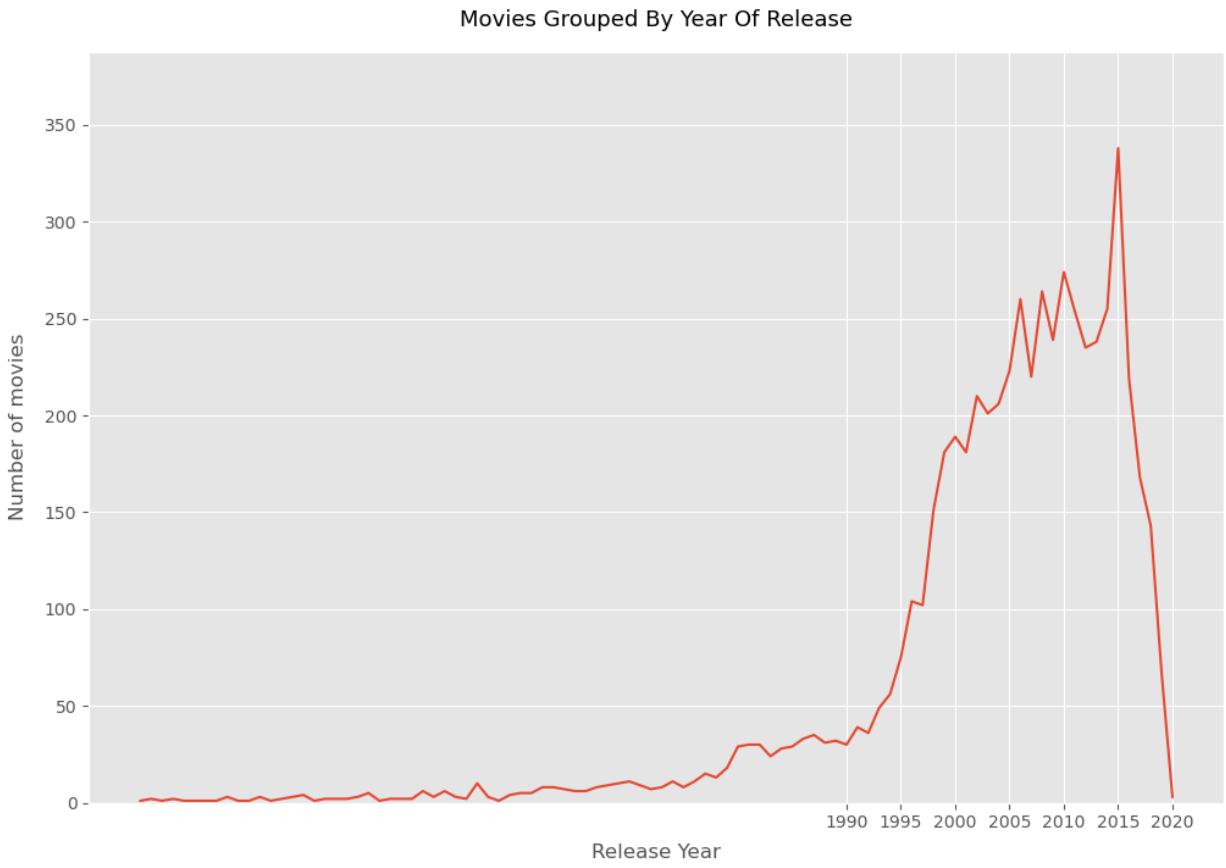


In [93]:
```
data = df['year'].value_counts().sort_index()

plt.plot(data.index, data.values)

plt.title('Movies Grouped By Year Of Release',y=1.02, fontsize=13)
plt.xlabel('Release Year', labelpad=7, fontsize=12)
plt.ylabel('Number of movies', labelpad=10, fontsize=12)

plt.ylim(0, max(data.values)+50)
plt.xticks(['1990','1995','2000','2005','2010','2015','2020'])
plt.show()
```



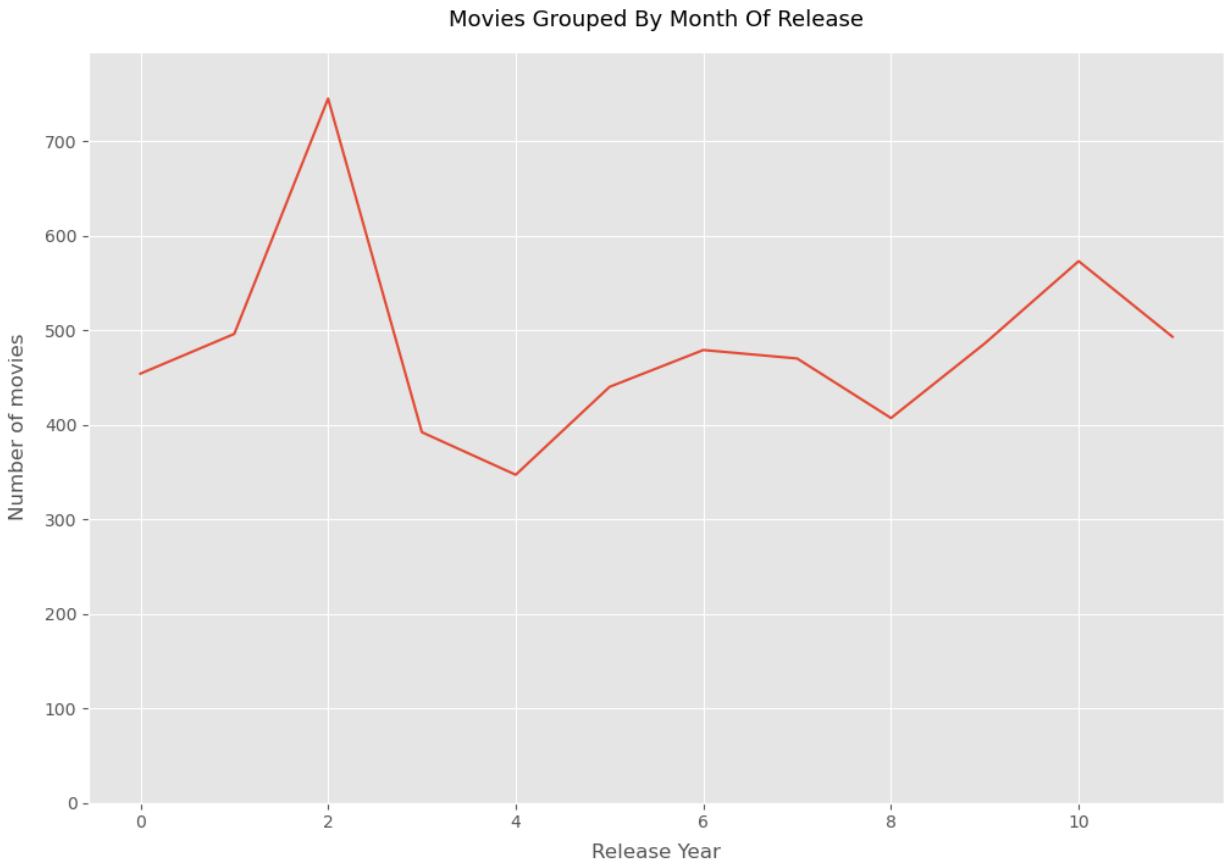
In [112…

```
data = df['month'].value_counts().sort_index()

plt.plot(data.index, data.values)

plt.title('Movies Grouped By Month Of Release',y=1.02, fontsize=13)
plt.xlabel('Release Year', labelpad=7, fontsize=12)
plt.ylabel('Number of movies', labelpad=10, fontsize=12)

plt.ylim(0, max(data.values)+50)
#plt.xticks(['1990','1995','2000','2005','2010','2015','2020'])
plt.show()
```

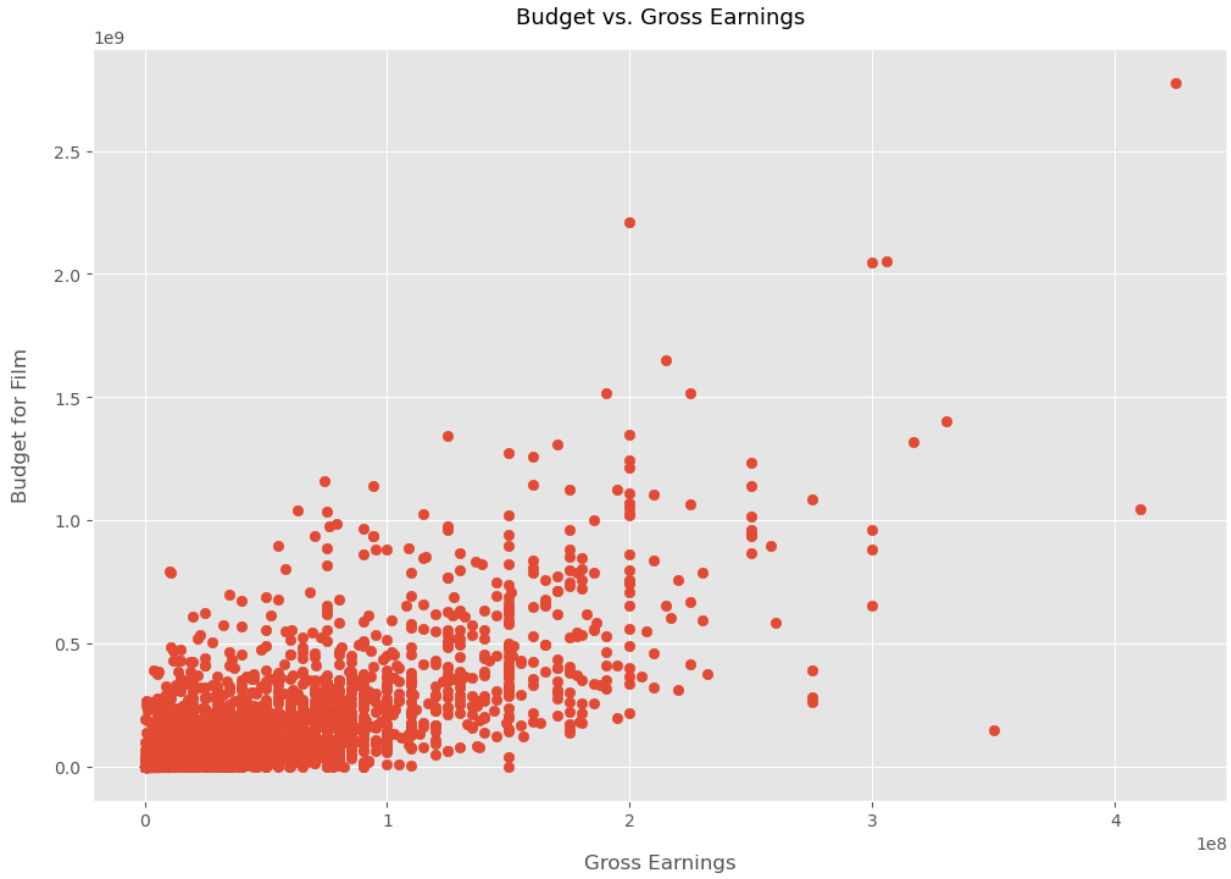


In [97]:
```
# Scatter plot with production budget vs worldwide gross

plt.scatter(x=df['production_budget'], y=df['worldwide_gross'])

plt.title('Budget vs. Gross Earnings', y=1.02, fontsize=13)

plt.xlabel('Gross Earnings', labelpad=14, fontsize=12)
plt.ylabel('Budget for Film', labelpad=14, fontsize=12)
plt.show()
```



In [99]:
```
df.head()
```

Out[99]:

	movie	production_budget	domestic_gross	worldwide_gross	year	month
0	Avatar	425000000	760507625	2776345279	2009	Dec
42	Titanic	200000000	659363944	2208208395	1997	Dec
5	Star Wars Ep. VII: The Force Awakens	306000000	936662225	2053311220	2015	Dec
6	Avengers: Infinity War	300000000	678815482	2048134200	2018	Apr
33	Jurassic World	215000000	652270625	1648854864	2015	Jun

In [106…
```
df.corr(numeric_only = True)
```

Out[106]:

	production_budget	domestic_gross	worldwide_gross
production_budget	1.000000	0.685682	0.748306
domestic_gross	0.685682	1.000000	0.938853
worldwide_gross	0.748306	0.938853	1.000000

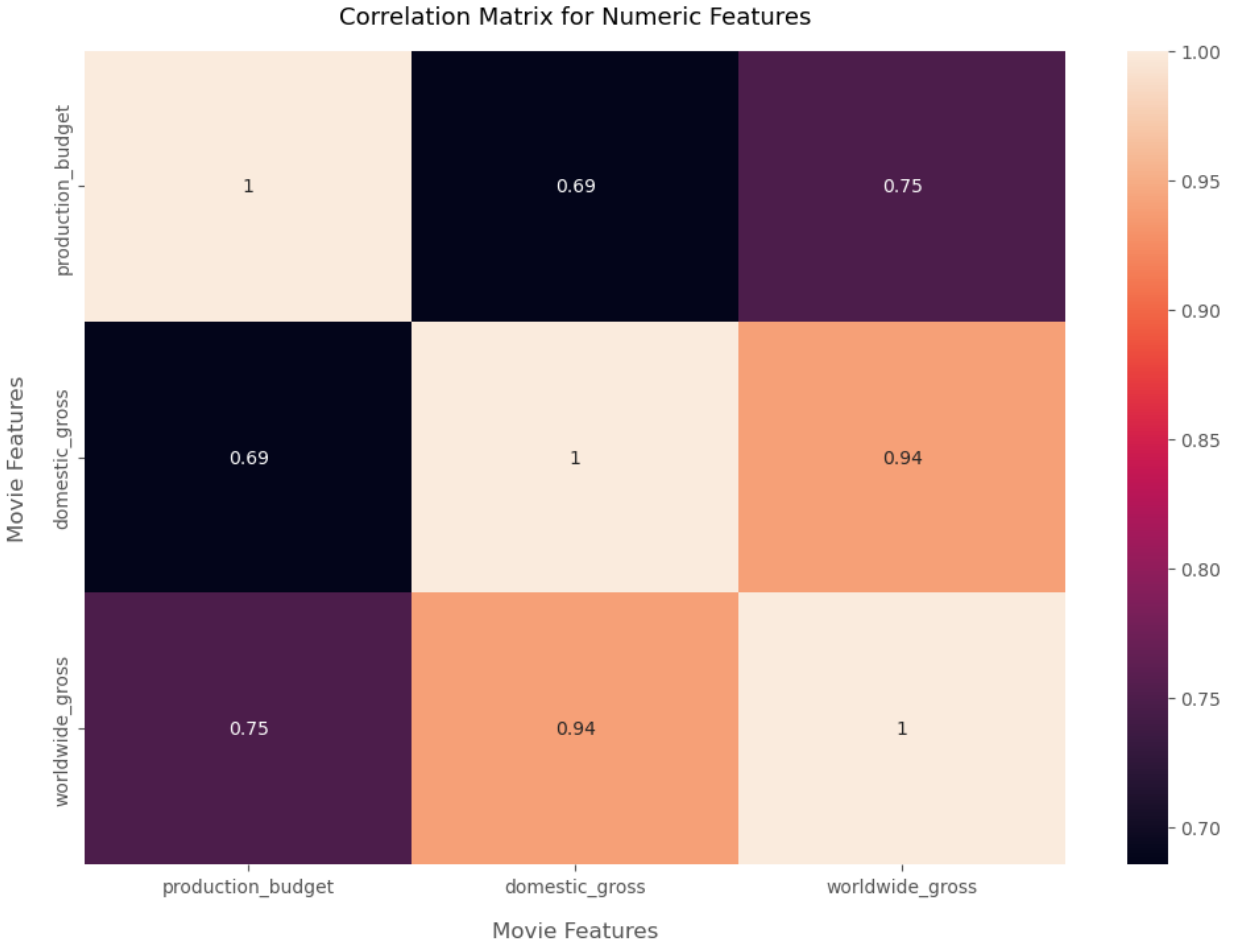
In [107…
```
# High correlation between budget and gross

correlation_matrix = df.corr(numeric_only = True)

sns.heatmap(correlation_matrix, annot=True)
```

```
plt.title('Correlation Matrix for Numeric Features', y=1.02, fontsize=13)

plt.xlabel('Movie Features', labelpad=14, fontsize=12)
plt.ylabel('Movie Features', labelpad=14, fontsize=12)
plt.show()
```



In [108…

```
# Unstacked correlation between numeric features

correlation_mat = df.corr(numeric_only = True)

corr_pairs = correlation_mat.unstack()

corr_pairs
```

Out[108]:

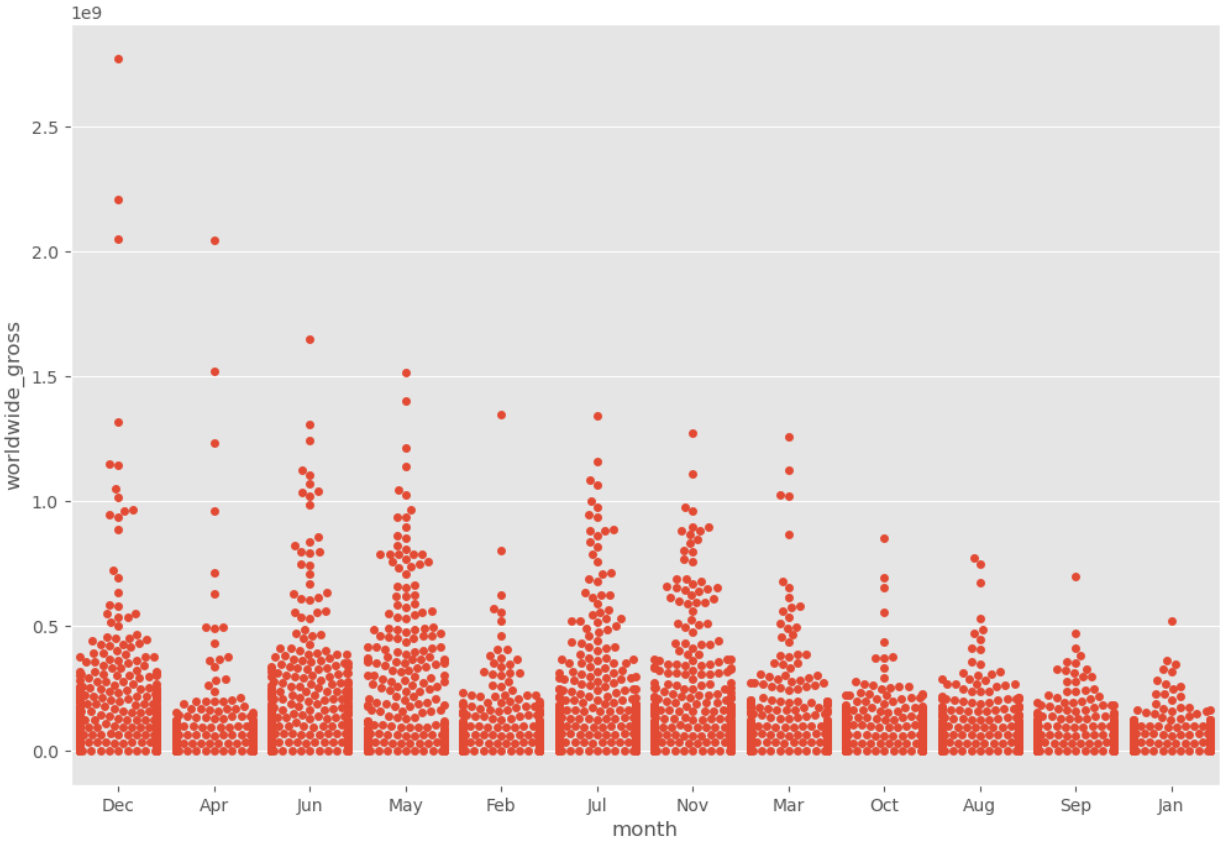
```
production_budget  production_budget    1.000000
                   domestic_gross       0.685682
                   worldwide_gross      0.748306
domestic_gross     production_budget    0.685682
                   domestic_gross       1.000000
                   worldwide_gross      0.938853
worldwide_gross    production_budget    0.748306
                   domestic_gross       0.938853
                   worldwide_gross      1.000000
dtype: float64
```

In [109…

```
#Coorelation between month of movie release and Worldwide gross
sns.stripplot(x="month", y="worldwide_gross", data=df)

plt.show()
```

```
C:\Users\Admin\anaconda3\Lib\site-packages\seaborn\categorical.py:3544: UserWarning:
81.5% of the points cannot be placed; you may want to decrease the size of the marker
s or use stripplot.
  warnings.warn(msg, UserWarning)
C:\Users\Admin\anaconda3\Lib\site-packages\seaborn\categorical.py:3544: UserWarning:
83.5% of the points cannot be placed; you may want to decrease the size of the marker
s or use stripplot.
  warnings.warn(msg, UserWarning)
C:\Users\Admin\anaconda3\Lib\site-packages\seaborn\categorical.py:3544: UserWarning:
70.4% of the points cannot be placed; you may want to decrease the size of the marker
s or use stripplot.
  warnings.warn(msg, UserWarning)
C:\Users\Admin\anaconda3\Lib\site-packages\seaborn\categorical.py:3544: UserWarning:
63.1% of the points cannot be placed; you may want to decrease the size of the marker
s or use stripplot.
  warnings.warn(msg, UserWarning)
C:\Users\Admin\anaconda3\Lib\site-packages\seaborn\categorical.py:3544: UserWarning:
78.3% of the points cannot be placed; you may want to decrease the size of the marker
s or use stripplot.
  warnings.warn(msg, UserWarning)
C:\Users\Admin\anaconda3\Lib\site-packages\seaborn\categorical.py:3544: UserWarning:
68.0% of the points cannot be placed; you may want to decrease the size of the marker
s or use stripplot.
  warnings.warn(msg, UserWarning)
C:\Users\Admin\anaconda3\Lib\site-packages\seaborn\categorical.py:3544: UserWarning:
71.2% of the points cannot be placed; you may want to decrease the size of the marker
s or use stripplot.
  warnings.warn(msg, UserWarning)
C:\Users\Admin\anaconda3\Lib\site-packages\seaborn\categorical.py:3544: UserWarning:
78.9% of the points cannot be placed; you may want to decrease the size of the marker
s or use stripplot.
  warnings.warn(msg, UserWarning)
C:\Users\Admin\anaconda3\Lib\site-packages\seaborn\categorical.py:3544: UserWarning:
86.0% of the points cannot be placed; you may want to decrease the size of the marker
s or use stripplot.
  warnings.warn(msg, UserWarning)
C:\Users\Admin\anaconda3\Lib\site-packages\seaborn\categorical.py:3544: UserWarning:
82.5% of the points cannot be placed; you may want to decrease the size of the marker
s or use stripplot.
  warnings.warn(msg, UserWarning)
C:\Users\Admin\anaconda3\Lib\site-packages\seaborn\categorical.py:3544: UserWarning:
84.2% of the points cannot be placed; you may want to decrease the size of the marker
s or use stripplot.
  warnings.warn(msg, UserWarning)
C:\Users\Admin\anaconda3\Lib\site-packages\seaborn\categorical.py:3544: UserWarning:
82.4% of the points cannot be placed; you may want to decrease the size of the marker
s or use stripplot.
  warnings.warn(msg, UserWarning)
```



In [110…

```
df_numerized = df


for col_name in df_numerized.columns:
    if(df_numerized[col_name].dtype == 'object'):
        df_numerized[col_name]= df_numerized[col_name].astype('category')
        df_numerized[col_name] = df_numerized[col_name].cat.codes

df_numerized
```

Out[110]:

	movie	production_budget	domestic_gross	worldwide_gross	year	month
0	438	425000000	760507625	2776345279	84	2
42	5230	200000000	659363944	2208208395	72	2
5	3933	306000000	936662225	2053311220	90	2
6	440	300000000	678815482	2048134200	93	0
33	2314	215000000	652270625	1648854864	90	6
...	...	...	...	...	...	...
5474	2175	500000	0	0	80	2
5473	1731	500000	0	0	87	5
5472	1383	500000	0	0	87	0
5471	1289	500000	0	0	85	2
4068	4645	7000000	0	0	83	2

5782 rows × 6 columns

In [111…

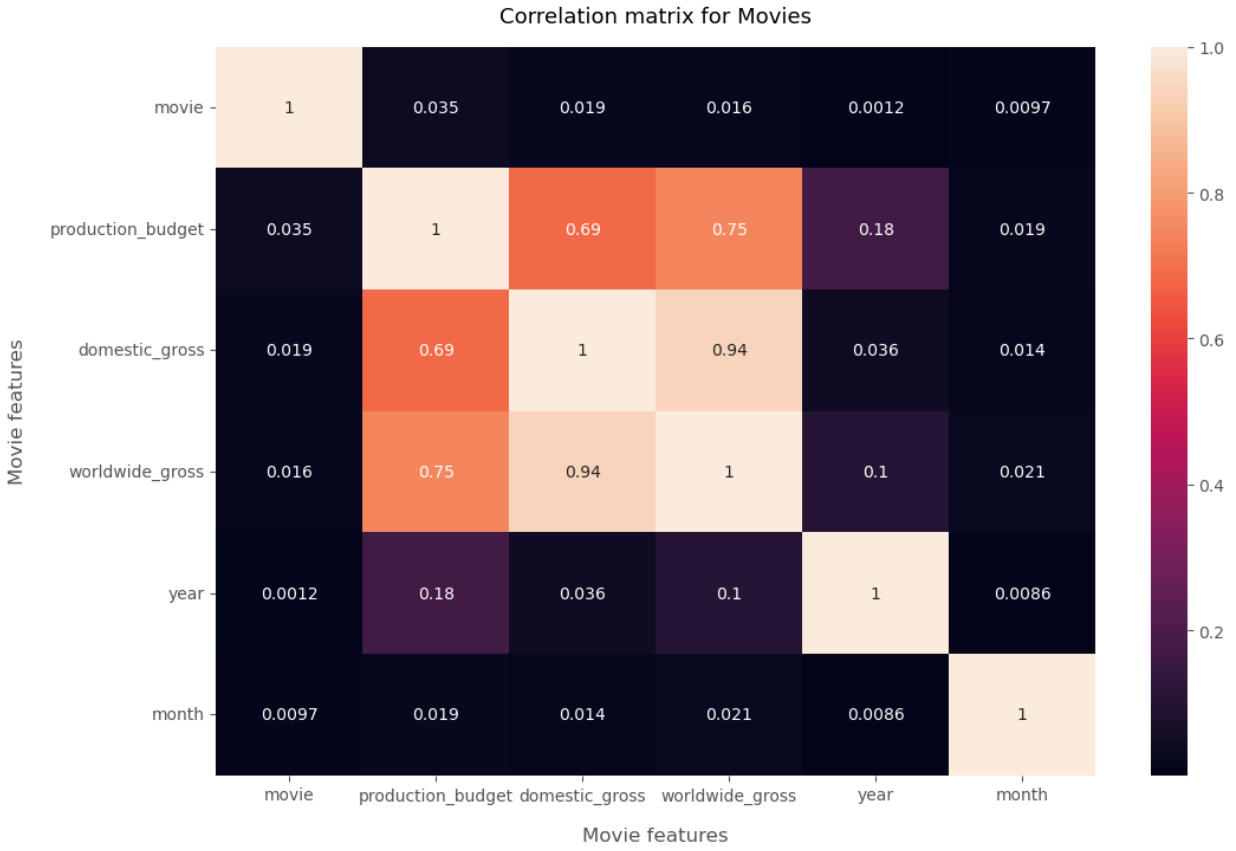
```
correlation_matrix = df_numerized.corr()

sns.heatmap(correlation_matrix, annot = True)

plt.title("Correlation matrix for Movies", y=1.02, fontsize=13)

plt.xlabel("Movie features", labelpad=14, fontsize=12)
plt.ylabel("Movie features", labelpad=14, fontsize=12)

plt.show()
```



In [55]:
```
#reading the second dataset
df2 = pd.read_csv('tmdb.csv')
```

In [34]:
```
df2.head()
```

Out[34]:

	Unnamed: 0	genre_ids	id	original_language	original_title	popularity	release_date	title	v
0	0	[12, 14, 10751]	12444	en	Harry Potter and the Deathly Hallows: Part 1	33.533	11/19/2010	Harry Potter and the Deathly Hallows: Part 1	
1	1	[14, 12, 16, 10751]	10191	en	How to Train Your Dragon	28.734	3/26/2010	How to Train Your Dragon	
2	2	[12, 28, 878]	10138	en	Iron Man 2	28.515	5/7/2010	Iron Man 2	
3	3	[16, 35, 10751]	862	en	Toy Story	28.005	11/22/1995	Toy Story	
4	4	[28, 878, 12]	27205	en	Inception	27.920	7/16/2010	Inception	

Data Cleaning

In [35]:
```
# Checking if there are any duplicated data

len(df2)-len(df2.drop_duplicates())
```

Out[35]:
```
0
```

In [36]:
```
# Checking if there are any missing data
df2.isna().sum()
```

Out[36]:
```
Unnamed: 0          0
genre_ids           0
id                  0
original_language   0
original_title      0
popularity          0
release_date        0
title               0
vote_average        0
vote_count          0
dtype: int64
```

In [56]:
```
df2.shape
```

Out[56]:
```
(26517, 10)
```

In [58]:
```
df2.shape
```

Out[58]:
```
(12859, 10)
```

In [14]:
```
df2.dtypes
```

Out[14]:
```
Unnamed: 0            int64
genre_ids            object
id                    int64
original_language    object
original_title       object
popularity          float64
release_date         object
title                object
vote_average        float64
vote_count            int64
dtype: object
```

In [66]:
```
df2.head()
```

Out[66]:

	Unnamed: 0	genre_ids	id	original_language	popularity	title	vote_average	vote_count	y
0	0	12, 14, 10751	12444	en	33.533	Harry Potter and the Deathly Hallows: Part 1	7.7	10788	2(
1	1	14, 12, 16, 10751	10191	en	28.734	How to Train Your Dragon	7.7	7610	2(
2	2	12, 28, 878	10138	en	28.515	Iron Man 2	6.8	12368	2(
3	3	16, 35, 10751	862	en	28.005	Toy Story	7.9	10174	1(
4	4	28, 878, 12	27205	en	27.920	Inception	8.3	22186	2(

In [57]:
```
#split release date to month and year column
df2['year'] = df2['release_date'].str[-4:].str.strip()
df2['month'] = df2['release_date'].str[:2].str.strip()
df2.month = df2.month.str.replace('/','')
#Remove special characters from the genre id column
df2.genre_ids = df2.genre_ids.str.replace('[','')
df2.genre_ids = df2.genre_ids.str.replace(']','')
df2.head()
#drop the release date and original title column
df2.drop(['release_date','original_title'], axis=1, inplace=True)
df2.head()
#drop rows that have vote count of less than 5
df2 = df2.drop(df2.loc[df2['vote_count']<=5].index)
```

In [11]:
```
df2.dtypes
```

Out[11]:
```
Unnamed: 0             int64
genre_ids             object
id                     int64
original_language     object
popularity           float64
title                 object
vote_average         float64
vote_count             int64
year                  object
month                 object
dtype: object
```

In [59]:
```
# Changing columns data type

df2 = df2.astype({'year': 'int64','month': 'int64' })
```

Exploring the Data

In [60]:
```
df2[['popularity', 'vote_average']].describe()
```

Out[60]:

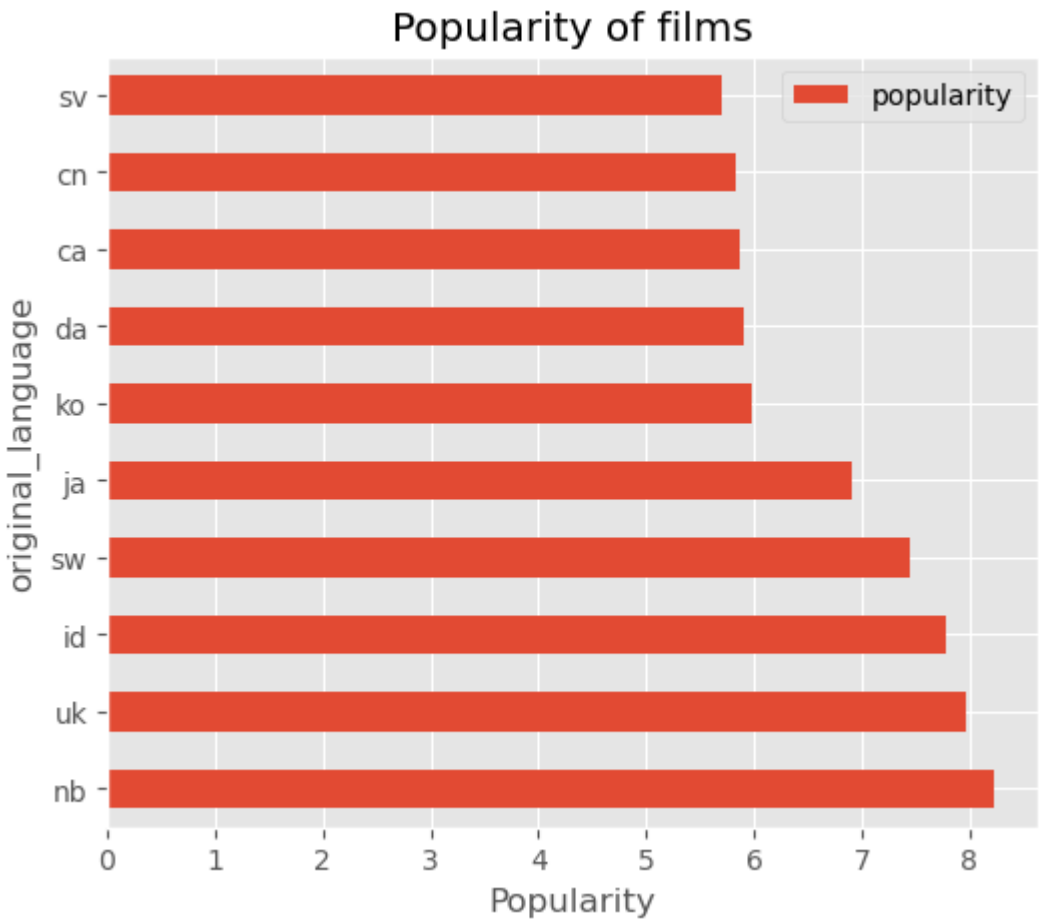
	popularity	vote_average
count	12859.000000	12859.000000
mean	5.495700	5.965246
std	5.274757	1.188820
min	0.600000	0.000000
25%	1.925000	5.200000
50%	3.787000	6.100000
75%	7.493000	6.800000
max	80.773000	10.000000

In [61]:
```
df2['vote_count'].describe()
```

Out[61]:
```
count    12859.000000
mean       398.330119
std       1350.354994
min          6.000000
25%         12.000000
50%         30.000000
75%        135.500000
max      22186.000000
Name: vote_count, dtype: float64
```

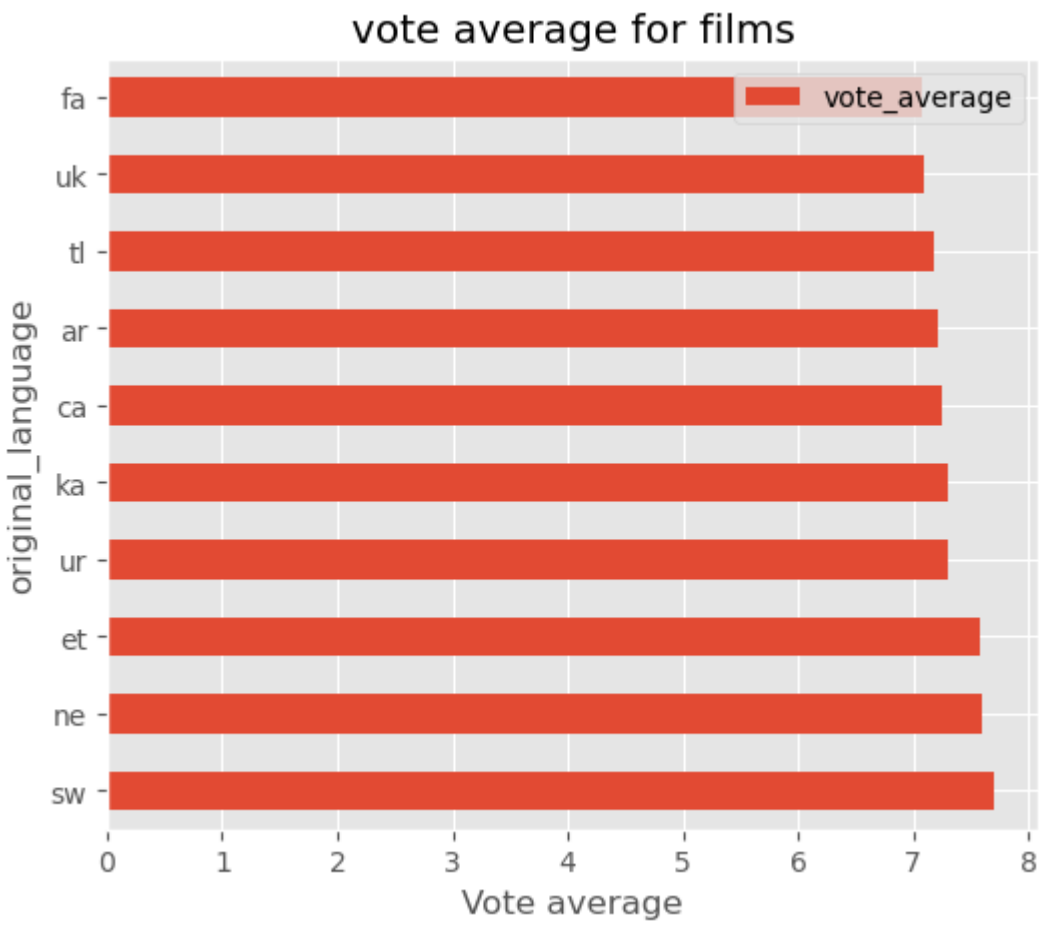
In [74]:
```
#Average popularity of films as per the original language(top 10 films)
dff = df2.groupby('original_language')[['popularity']].mean().sort_values('popularity'
dff.plot(kind = 'barh',title= 'Popularity of films',xlabel='Popularity',figsize=(6,5))
```

Out[74]:
```
<Axes: title={'center': 'Popularity of films'}, xlabel='Popularity', ylabel='original
_language'>
```



In [76]:
```
#top 10 vote average for films as per original language
df1 = df2.groupby('original_language')[['vote_average']].mean().sort_values('vote_aver
df1.plot(kind = 'barh',title= 'vote average for films',xlabel='Vote average',figsize=(
```

Out[76]:
```
<Axes: title={'center': 'vote average for films'}, xlabel='Vote average', ylabel='ori
ginal_language'>
```

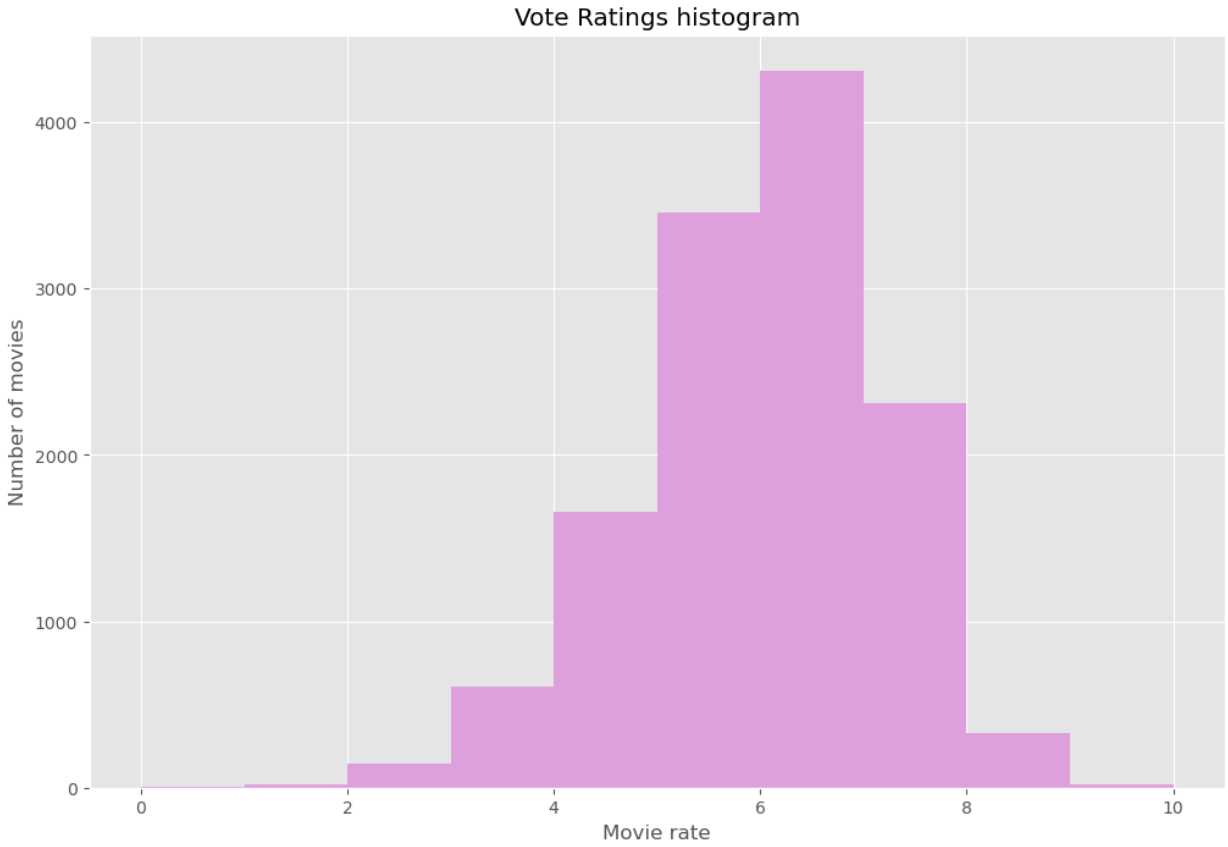


In [77]:
```
#Finding the correlation between numeric variables
df2.corr(numeric_only = True)
```

Out[77]:

	Unnamed: 0	id	popularity	vote_average	vote_count	year	month
Unnamed: 0	1.000000	0.907114	0.089454	0.081070	-0.011632	0.599037	-0.047068
id	0.907114	1.000000	-0.046761	0.043138	-0.118205	0.657047	0.020466
popularity	0.089454	-0.046761	1.000000	0.206692	0.710348	0.019086	0.074241
vote_average	0.081070	0.043138	0.206692	1.000000	0.204192	-0.011592	0.041922
vote_count	-0.011632	-0.118205	0.710348	0.204192	1.000000	-0.033221	0.069487
year	0.599037	0.657047	0.019086	-0.011592	-0.033221	1.000000	-0.038062
month	-0.047068	0.020466	0.074241	0.041922	0.069487	-0.038062	1.000000

In [78]:
```
plt.hist(x=df2['vote_average'], bins=10, color='plum')
plt.xlabel('Movie rate')
plt.ylabel('Number of movies')
plt.title("Vote Ratings histogram")
plt.show()
```

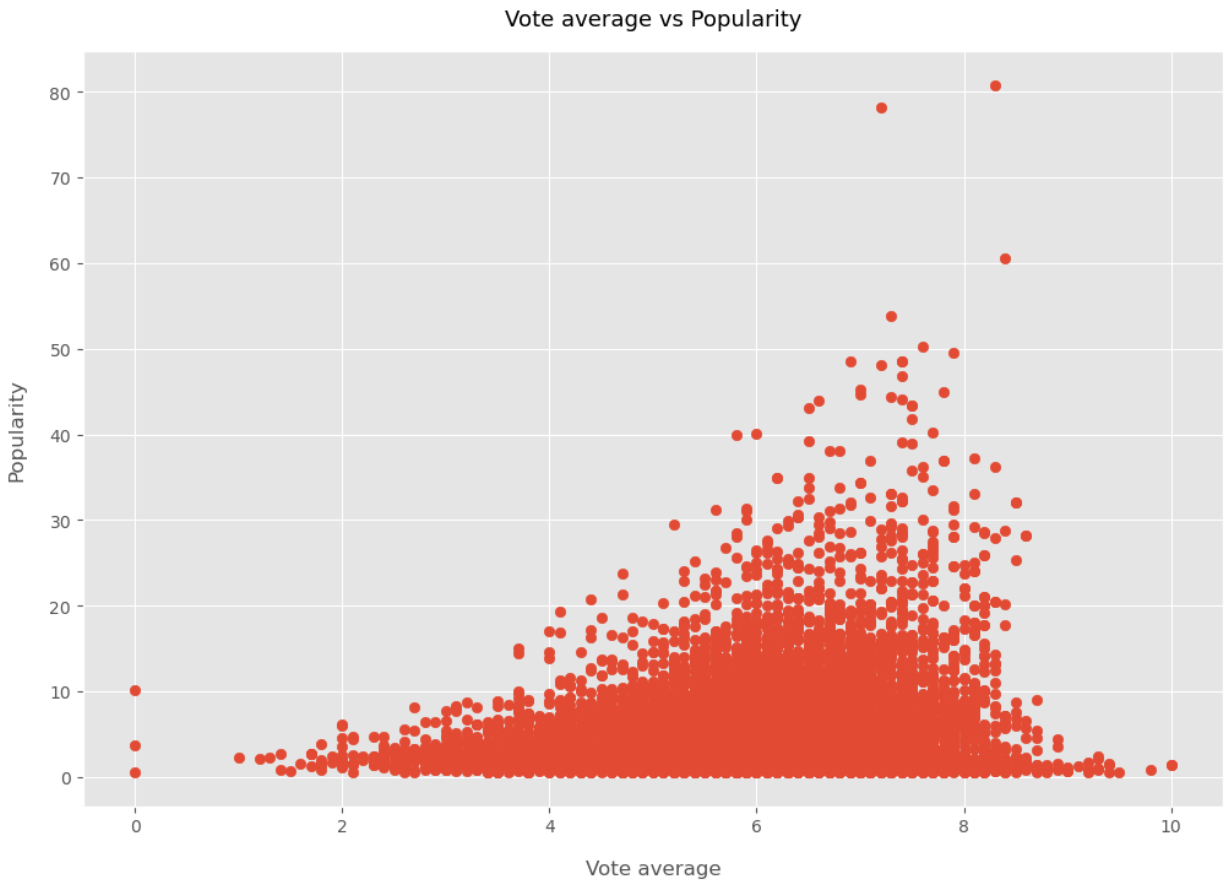


In [81]:
```
# Scatter plot with Vote average vs Popularity

plt.scatter(x=df2['vote_average'], y=df2['popularity'])

plt.title('Vote average vs Popularity', y=1.02, fontsize=13)

plt.xlabel('Vote average', labelpad=14, fontsize=12)
plt.ylabel('Popularity', labelpad=14, fontsize=12)
plt.show()
```



In [82]:
```
df2.head()
```

Out[82]:

	Unnamed: 0	genre_ids	id	original_language	popularity	title	vote_average	vote_count	y
0	0	12, 14, 10751	12444	en	33.533	Harry Potter and the Deathly Hallows: Part 1	7.7	10788	2(
1	1	14, 12, 16, 10751	10191	en	28.734	How to Train Your Dragon	7.7	7610	2(
2	2	12, 28, 878	10138	en	28.515	Iron Man 2	6.8	12368	2(
3	3	16, 35, 10751	862	en	28.005	Toy Story	7.9	10174	1(
4	4	28, 878, 12	27205	en	27.920	Inception	8.3	22186	2(

In [83]:
```
#Preprocessing the genre_ids collumn
#splitting a column to a list
df2["genre_ids"] = df2["genre_ids"].str.split(",")
df2
```

Out[83]:

	Unnamed: 0	genre_ids	id	original_language	popularity	title	vote_average	vote_cou
0	0	[12, 14, 10751]	12444	en	33.533	Harry Potter and the Deathly Hallows: Part 1	7.7	107
1	1	[14, 12, 16, 10751]	10191	en	28.734	How to Train Your Dragon	7.7	76
2	2	[12, 28, 878]	10138	en	28.515	Iron Man 2	6.8	123
3	3	[16, 35, 10751]	862	en	28.005	Toy Story	7.9	101
4	4	[28, 878, 12]	27205	en	27.920	Inception	8.3	221
...	...	...	...	...	...	...	...	
26122	26122	[99]	492184	en	0.695	Ladies First	8.2	
26140	26140	[28, 80, 18]	510819	en	0.673	Dirty Dead Con Men	4.1	
26181	26181	[878, 28]	571937	en	0.622	Vader: Episode 1 - Shards of the Past	8.5	
26438	26438	[878, 18]	347030	en	0.600	Native	5.2	
26464	26464	[53]	505039	en	0.600	Illicit Desires	4.3	

12859 rows × 10 columns

In [84]:
```
#Convert the genre_ids column with a list-type value to multiple rows
df2 = df2.explode("genre_ids")
df2
```

Out[84]:

	Unnamed: 0	genre_ids	id	original_language	popularity	title	vote_average	vote_cour
0	0	12	12444	en	33.533	Harry Potter and the Deathly Hallows: Part 1	7.7	1078
0	0	14	12444	en	33.533	Harry Potter and the Deathly Hallows: Part 1	7.7	1078
0	0	10751	12444	en	33.533	Harry Potter and the Deathly Hallows: Part 1	7.7	1078
1	1	14	10191	en	28.734	How to Train Your Dragon	7.7	761
1	1	12	10191	en	28.734	How to Train Your Dragon	7.7	761
...	...	...	...	...	...	...	...	
26181	26181	878	571937	en	0.622	Vader: Episode 1 - Shards of the Past	8.5	
26181	26181	28	571937	en	0.622	Vader: Episode 1 - Shards of the Past	8.5	
26438	26438	878	347030	en	0.600	Native	5.2	
26438	26438	18	347030	en	0.600	Native	5.2	
26464	26464	53	505039	en	0.600	Illicit Desires	4.3	1

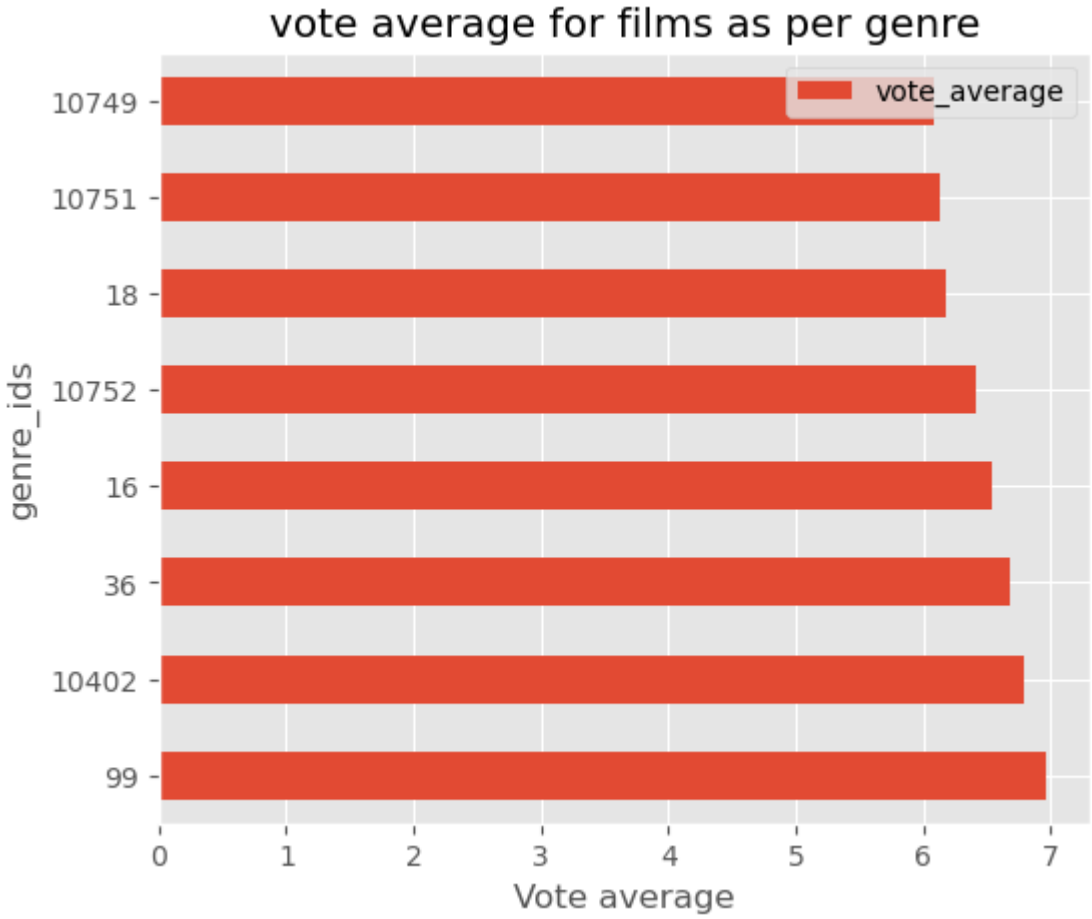
27084 rows × 10 columns

In [93]:
```
#remove any white spaces
df2['genre_ids'] = df2['genre_ids'].apply(lambda x: x.strip())
```

Out[93]:
```
array(['12', '14', '10751', '16', '28', '878', '35', '53', '27', '80',
       '18', '10749', '10402', '9648', '36', '37', '10770', '10752', '99',
       ''], dtype=object)
```

In [97]:
```
#top 10 vote average for films as per genre
dfgn = df2.groupby('genre_ids')[['vote_average']].mean().sort_values('vote_average', a
dfgn.plot(kind = 'barh',title= 'vote average for films as per genre',xlabel='Vote aver
```

Out[97]:
```
<Axes: title={'center': 'vote average for films as per genre'}, xlabel='Vote averag
e', ylabel='genre_ids'>
```



In [ ]:

In [ ]: