Introduction

Dataset Description

This data set contains information about 10,000 movies collected from The Movie Database (TMDb),I take this data from kaggle ,In this analysis process i will start with wrangling the data then clean it from null values and the feature that in not important fot my analysis ,I will use matplotlib library to visualize the data and use seaborn to make the visualization look better and it will help me to answer the questions that i want to get from this data

Questions for Analysis

1)what is the features that make more profit for the movies?

2)Is it good to take only the popularity or vote_avg as the final judge for the movie ?

3)what is mean of revenue and budget?

In [2]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

Data_Wrangling

I would use pandas to read my 2 datasets and then i found that they share 2 columns so i woukd merge these 2 datasets with these 2 columns

In [3]:
```
df=pd.read_csv('tmdb_5000_credits.csv')
dr=pd.read_csv('tmdb_5000_movies.csv')
```

In [4]:
```
df.head()
```

Out[4]:

	movie_id	title	cast	crew
0	19995	Avatar	[{"cast_id": 242, "character": "Jake Sully", "...	[{"credit_id": "52fe48009251416c750aca23", "de...
1	285	Pirates of the Caribbean: At World's End	[{"cast_id": 4, "character": "Captain Jack Spa...	[{"credit_id": "52fe4232c3a36847f800b579", "de...
2	206647	Spectre	[{"cast_id": 1, "character": "James Bond", "cr...	[{"credit_id": "54805967c3a36829b5002c41", "de...
3	49026	The Dark Knight Rises	[{"cast_id": 2, "character": "Bruce Wayne / Ba...	[{"credit_id": "52fe4781c3a36847f81398c3", "de...
4	49529	John Carter	[{"cast_id": 5, "character": "John Carter", "c...	[{"credit_id": "52fe479ac3a36847f813eaa3", "de...

In [5]:
```
dr.head()
```

Out[5]:

	budget	genres	homepage	id	keywords	original_language	original_title	overview	pop
0	237000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	http://www.avatarmovie.com/	19995	[{"id": 1463, "name": "culture clash"}, {"id":...	en	Avatar	In the 22nd century, a paraplegic Marine is di...	150.
1	300000000	[{"id": 12, "name": "Adventure"}, {"id": 14, "...	http://disney.go.com/disneypictures/pirates/	285	[{"id": 270, "name": "ocean"}, {"id": 726, "na...	en	Pirates of the Caribbean: At World's End	Captain Barbossa, long believed to be dead, ha...	139.
2	245000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	http://www.sonypictures.com/movies/spectre/	206647	[{"id": 470, "name": "spy"}, {"id": 818, "name...	en	Spectre	A cryptic message from Bond’s past sends him o...	107.
3	250000000	[{"id": 28, "name": "Action"}, {"id": 80, "nam...	http://www.thedarkknightrises.com/	49026	[{"id": 849, "name": "dc comics"}, {"id": 853,...	en	The Dark Knight Rises	Following the death of District Attorney Harve...	112.
4	260000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	http://movies.disney.com/john-carter	49529	[{"id": 818, "name": "based on novel"}, {"id":...	en	John Carter	John Carter is a war-weary, former military ca...	43.

In [6]:
```
df.movie_id.nunique()
```

Out[6]:
```
4803
```

In [7]:
```
dr.id.nunique()
```

Out[7]:
```
4803
```

chage name of movie_id col to id to make the 2 data sets have same name of this col to merge them

In [8]:
```
df.rename(columns={'movie_id': 'id'},inplace=True)
```

In [9]:
```
df.head()
```

Out[9]:

	id	title	cast	crew
0	19995	Avatar	[{"cast_id": 242, "character": "Jake Sully", "...	[{"credit_id": "52fe48009251416c750aca23", "de...
1	285	Pirates of the Caribbean: At World's End	[{"cast_id": 4, "character": "Captain Jack Spa...	[{"credit_id": "52fe4232c3a36847f800b579", "de...
2	206647	Spectre	[{"cast_id": 1, "character": "James Bond", "cr...	[{"credit_id": "54805967c3a36829b5002c41", "de...
3	49026	The Dark Knight Rises	[{"cast_id": 2, "character": "Bruce Wayne / Ba...	[{"credit_id": "52fe4781c3a36847f81398c3", "de...
4	49529	John Carter	[{"cast_id": 5, "character": "John Carter", "c...	[{"credit_id": "52fe479ac3a36847f813eaa3", "de...

In [10]:
```
dr.head()
```

Out[10]:

	budget	genres	homepage	id	keywords	original_language	original_title	overview	pop
0	237000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	http://www.avatarmovie.com/	19995	[{"id": 1463, "name": "culture clash"}, {"id":...	en	Avatar	In the 22nd century, a paraplegic Marine is di...	150.
1	300000000	[{"id": 12, "name": "Adventure"}, {"id": 14, "...	http://disney.go.com/disneypictures/pirates/	285	[{"id": 270, "name": "ocean"}, {"id": 726, "na...	en	Pirates of the Caribbean: At World's End	Captain Barbossa, long believed to be dead, ha...	139.
2	245000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	http://www.sonypictures.com/movies/spectre/	206647	[{"id": 470, "name": "spy"}, {"id": 818, "name...	en	Spectre	A cryptic message from Bond’s past sends him o...	107.
3	250000000	[{"id": 28, "name": "Action"}, {"id": 80, "nam...	http://www.thedarkknightrises.com/	49026	[{"id": 849, "name": "dc comics"}, {"id": 853,...	en	The Dark Knight Rises	Following the death of District Attorney Harve...	112.
4	260000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	http://movies.disney.com/john-carter	49529	[{"id": 818, "name": "based on novel"}, {"id":...	en	John Carter	John Carter is a war-weary, former military ca...	43.

After read 2 datasets and userd merge to make it into one to help me in analysis it will be easier like that

In [11]:
```
data=pd.merge(df,dr,on='id')
```

In [12]:
```
data.head()
```

Out[12]:

	id	title_x	cast	crew	budget	genres	homepage	keyw
0	19995	Avatar	[{"cast_id": 242, "character": "Jake Sully", "...	[{"credit_id": "52fe48009251416c750aca23", "de...	237000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	http://www.avatarmovie.com/	[1 "na "cu cla {"i
1	285	Pirates of the Caribbean: At World's End	[{"cast_id": 4, "character": "Captain Jack Spa...	[{"credit_id": "52fe4232c3a36847f800b579", "de...	300000000	[{"id": 12, "name": "Adventure"}, {"id": 14, "...	http://disney.go.com/disneypictures/pirates/	[{"id": "na "oce {"id":
2	206647	Spectre	[{"cast_id": 1, "character": "James Bond", "cr...	[{"credit_id": "54805967c3a36829b5002c41", "de...	245000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	http://www.sonypictures.com/movies/spectre/	[{"id": "na "s {"id": "nai
3	49026	The Dark Knight Rises	[{"cast_id": 2, "character": "Bruce Wayne / Ba...	[{"credit_id": "52fe4781c3a36847f81398c3", "de...	250000000	[{"id": 28, "name": "Action"}, {"id": 80, "nam...	http://www.thedarkknightrises.com/	[{"id": "na com 8
4	49529	John Carter	[{"cast_id": 5, "character": "John Carter", "c...	[{"credit_id": "52fe479ac3a36847f813eaa3", "de...	260000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	http://movies.disney.com/john-carter	[{"id": "na "base no {"i

5 rows × 23 columns

checking if they megre with view the size of the new dataset I creat with these 2 datasets

In [13]:
```
dr.shape
```

Out[13]: (4803, 20)

In [14]:
```
df.shape
```

Out[14]: (4803, 4)

In [15]:
```
data.shape
```

Out[15]: (4803, 23)

checking the null values and the types of the data in each column

In [16]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 4803 entries, 0 to 4802
Data columns (total 23 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   id                    4803 non-null   int64  
 1   title_x               4803 non-null   object 
 2   cast                  4803 non-null   object 
 3   crew                  4803 non-null   object 
 4   budget                4803 non-null   int64  
 5   genres                4803 non-null   object 
 6   homepage              1712 non-null   object 
 7   keywords              4803 non-null   object 
 8   original_language     4803 non-null   object 
 9   original_title        4803 non-null   object 
 10  overview              4800 non-null   object 
 11  popularity            4803 non-null   float64
 12  production_companies  4803 non-null   object 
 13  production_countries  4803 non-null   object 
 14  release_date          4802 non-null   object 
 15  revenue               4803 non-null   int64  
 16  runtime               4801 non-null   float64
 17  spoken_languages      4803 non-null   object 
 18  status                4803 non-null   object 
 19  tagline               3959 non-null   object 
 20  title_y               4803 non-null   object 
 21  vote_average          4803 non-null   float64
 22  vote_count            4803 non-null   int64  
dtypes: float64(3), int64(4), object(16)
memory usage: 900.6+ KB
```

checking the data in ['overview'] column to decide if I should drop it or not

In [17]:
```
data['overview'].unique()
```

Out[17]:
```
array(['In the 22nd century, a paraplegic Marine is dispatched to the moon Pandora on a unique mission, but b
ecomes torn between following orders and protecting an alien civilization.',
       'Captain Barbossa, long believed to be dead, has come back to life and is headed to the edge of the Ea
rth with Will Turner and Elizabeth Swann. But nothing is quite as it seems.',
       'A cryptic message from Bond’s past sends him on a trail to uncover a sinister organization. While M b
attles political forces to keep the secret service alive, Bond peels back the layers of deceit to reveal the
terrible truth behind SPECTRE.',
       ...,
       '"Signed, Sealed, Delivered" introduces a dedicated quartet of civil servants in the Dead Letter Offic
e of the U.S. Postal System who transform themselves into an elite team of lost-mail detectives. Their determ
ination to deliver the seemingly undeliverable takes them out of the post office into an unpredictable world
where letters and packages from the past save lives, solve crimes, reunite old loves, and change futures by a
rriving late, but always miraculously on time.',
       'When ambitious New York attorney Sam is sent to Shanghai on assignment, he immediately stumbles into
a legal mess that could end his career. With the help of a beautiful relocation specialist, a well-connected
old-timer, a clever journalist, and a street-smart legal assistant, Sam might just save his job, find romanc
e, and learn to appreciate the beauty and wonders of Shanghai. Written by Anonymous  (IMDB.com).',
       "Ever since the second grade when he first saw her in E.T. The Extraterrestrial, Brian Herzlinger has
had a crush on Drew Barrymore. Now, 20 years later he's decided to try to fulfill his lifelong dream by askin
g her for a date. There's one small problem: She's Drew Barrymore and he's, well, Brian Herzlinger, a broke 2
7-year-old aspiring filmmaker from New Jersey."],
      dtype=object)
```

Data_Cleaning

Here i droped the featurs that have alot of null values and not important featurs for my analysi

In [18]:
```
data.drop(['homepage','tagline','keywords','title_y','release_date','overview','original_title','original_lan
guage','id','cast','crew'], axis=1, inplace=True)
```

In [19]:
```
data.head()
```

Out[19]:

	title_x	budget	genres	popularity	production_companies	production_countries	revenue	runtime	spoken_language
0	Avatar	237000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	150.437577	[{"name": "Ingenious Film Partners", "id": 289...	[{"iso_3166_1": "US", "name": "United States o...	2787965087	162.0	[{"iso_639_1": "en "name": "English' {"iso
1	Pirates of the Caribbean: At World's End	300000000	[{"id": 12, "name": "Adventure"}, {"id": 14, "...	139.082615	[{"name": "Walt Disney Pictures", "id": 2}, {"...	[{"iso_3166_1": "US", "name": "United States o...	961000000	169.0	[{"iso_639_1": "en "name": "English'
2	Spectre	245000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	107.376788	[{"name": "Columbia Pictures", "id": 5}, {"nam...	[{"iso_3166_1": "GB", "name": "United Kingdom"...	880674609	148.0	[{"iso_639_1": "fr "name "Fran\u00e7ais"},
3	The Dark Knight Rises	250000000	[{"id": 28, "name": "Action"}, {"id": 80, "nam...	112.312950	[{"name": "Legendary Pictures", "id": 923}, {"...	[{"iso_3166_1": "US", "name": "United States o...	1084939099	165.0	[{"iso_639_1": "en "name": "English'
4	John Carter	260000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	43.926995	[{"name": "Walt Disney Pictures", "id": 2}]	[{"iso_3166_1": "US", "name": "United States o...	284139100	132.0	[{"iso_639_1": "en "name": "English'

In [20]:
```
data.shape
```

Out[20]: (4803, 12)

In [21]:
```
data.drop(['spoken_languages'],axis=1,inplace=True)
```

In [22]:
```
data.shape
```

Out[22]: (4803, 11)

In [23]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 4803 entries, 0 to 4802
Data columns (total 11 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   title_x               4803 non-null   object 
 1   budget                4803 non-null   int64  
 2   genres                4803 non-null   object 
 3   popularity            4803 non-null   float64
 4   production_companies  4803 non-null   object 
 5   production_countries  4803 non-null   object 
 6   revenue               4803 non-null   int64  
 7   runtime               4801 non-null   float64
 8   status                4803 non-null   object 
 9   vote_average          4803 non-null   float64
 10  vote_count            4803 non-null   int64  
dtypes: float64(3), int64(3), object(5)
memory usage: 450.3+ KB
```

In [24]:
```
data.dropna(inplace=True)
```

In [25]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 4801 entries, 0 to 4802
Data columns (total 11 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   title_x               4801 non-null   object 
 1   budget                4801 non-null   int64  
 2   genres                4801 non-null   object 
 3   popularity            4801 non-null   float64
 4   production_companies  4801 non-null   object 
 5   production_countries  4801 non-null   object 
 6   revenue               4801 non-null   int64  
 7   runtime               4801 non-null   float64
 8   status                4801 non-null   object 
 9   vote_average          4801 non-null   float64
 10  vote_count            4801 non-null   int64  
dtypes: float64(3), int64(3), object(5)
memory usage: 450.1+ KB
```

In [26]:
```
data.shape
```

Out[26]:
```
(4801, 11)
```

Exploratory_Data_Analysis

Simple analysis decribe for each numircal column data type

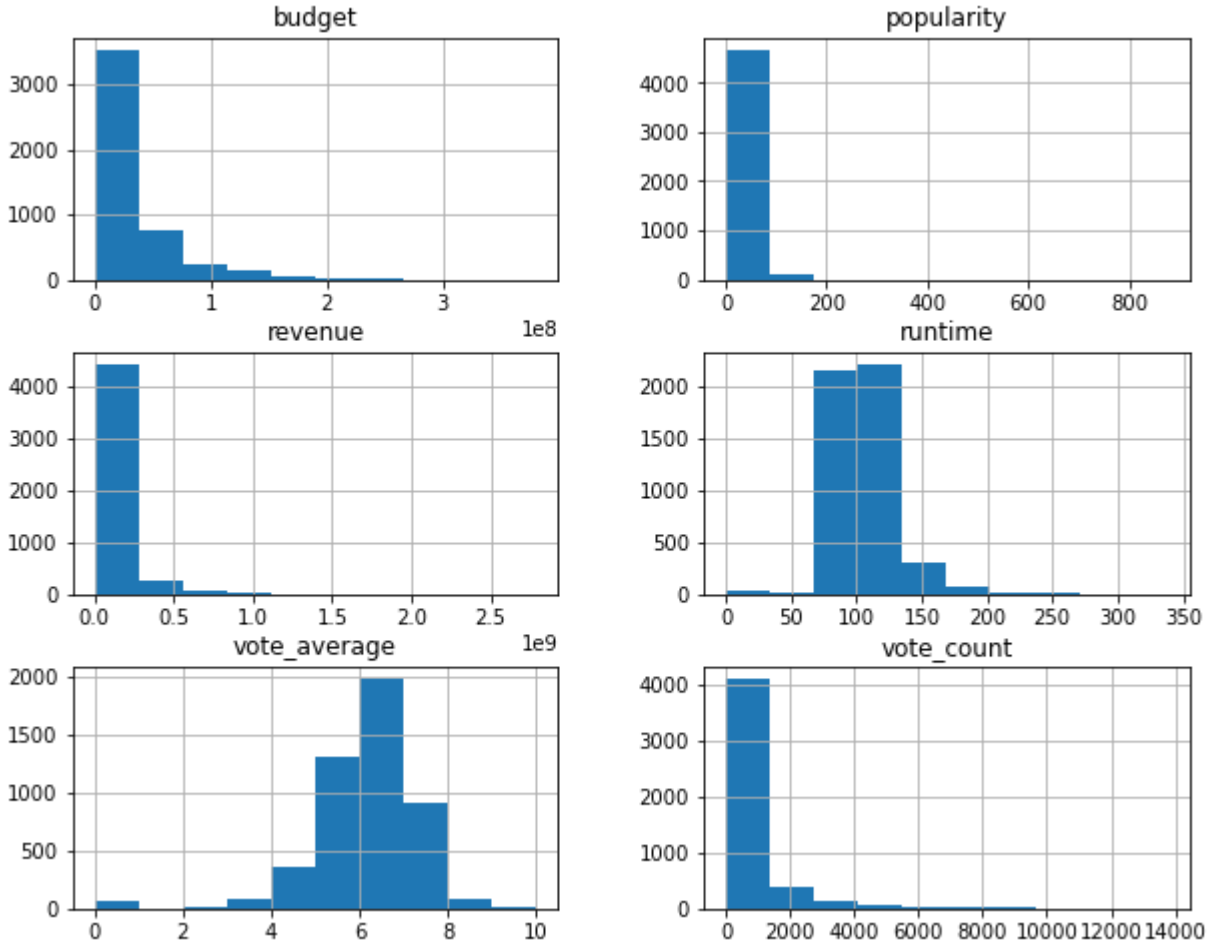
In [27]:
```
data.describe()
```

Out[27]:

	budget	popularity	revenue	runtime	vote_average	vote_count
count	4.801000e+03	4801.000000	4.801000e+03	4801.000000	4801.000000	4801.000000
mean	2.905402e+07	21.501089	8.229491e+07	106.875859	6.093189	690.503020
std	4.072821e+07	31.820361	1.628824e+08	22.611935	1.191493	1234.764044
min	0.000000e+00	0.000000	0.000000e+00	0.000000	0.000000	0.000000
25%	8.000000e+05	4.680206	0.000000e+00	94.000000	5.600000	54.000000
50%	1.500000e+07	12.928269	1.917997e+07	103.000000	6.200000	236.000000
75%	4.000000e+07	28.350529	9.292120e+07	118.000000	6.800000	737.000000
max	3.800000e+08	875.581305	2.787965e+09	338.000000	10.000000	13752.000000

histogram of all numerical data to see the distribution of this data and check for other information

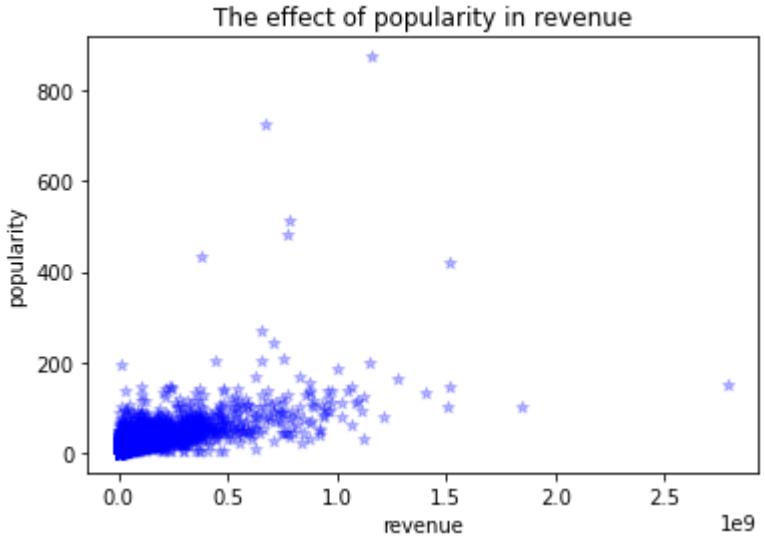
In [28]:
```
data.hist(figsize=(10,8));
```



Checking Question 1

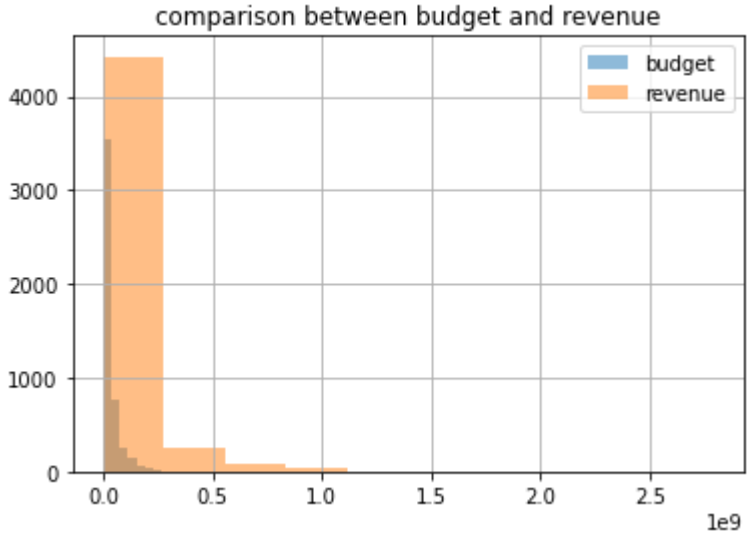
here i want to compare the budget to revenue

In [38]:
```
plt.scatter(data['revenue'],data['popularity'], color ='blue',marker='*',alpha=0.25)
plt.title('The effect of popularity in revenue')
plt.xlabel('revenue')
plt.ylabel('popularity');
```



here we found that the less the movie is populer the less it made porfit as you can see mont of the movies in the datasets has the same range of popularity and profit

In [39]:
```
data.budget.hist(alpha=0.5, label='budget')
data.revenue.hist(alpha=0.5, label='revenue')
plt.title('comparison between budget and revenue')
plt.legend();
```

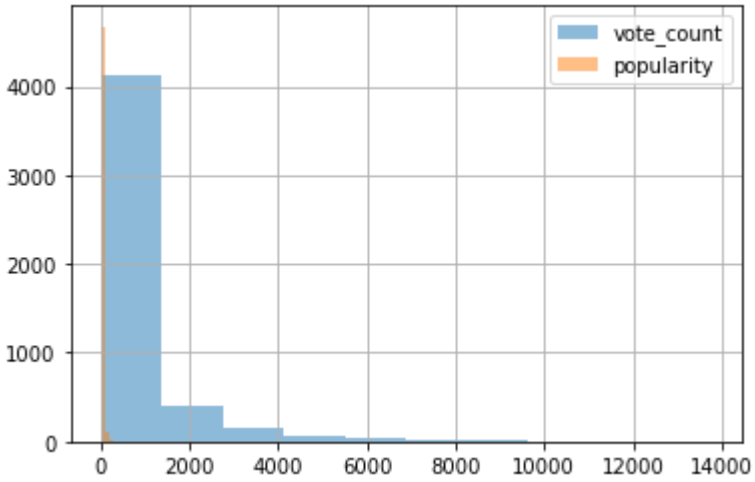


After checking this hisogram I found that most of the movies have agood profit in this data so we found that this movies made abig success and the more budget u put in the movie the more revenue you will get

Checking Question 2

checking the popularity to vote_counts

In [104]:
```
data.vote_count.hist(alpha=0.5, label='vote_count')
data.popularity.hist(alpha=0.5, label='popularity')
plt.legend();
```



After checking the histogram I found that this is not agood one because it can alot of people make votes and this movies is not that populer and give the movie a bad rate

Checking Question 3

Checking the mean of the budget and revenue

In [102]:
```
data['budget'].mean()
```

Out[102]: 29054015.10497813

In [103]:
```
data['revenue'].mean()
```

Out[103]: 82294906.77858779

checking how many released movies , rumored and post production

In [105]:
```
data.status.value_counts()
```

Out[105]:
```
Released           4793
Rumored               5
Post Production       3
Name: status, dtype: int64
```

Conclusions

For profit of the movies the more budget you put in making the movie the more revenue you get from the movie

the popularity does not effect the votes_avg that much there is abig gab in the scatter of them

there is realation between budget and revenue and it is the more budget the movie has the more revenue it will get

the popularity also effect the revenue of the movie so the producthion companies should pay attention to make the movie more popular so it can make good renvenue

the popularity effect the revenue of the movie the more populer the movie the more revenue it has,and most of the movies in this data have popularity in the small range and the movies that have big popularity have huge revenue

Limitations

The size of the two datasets is not that big, so it may cause overfit for any conclusion we take

Most of the movies are released so we can not use the status feature in our analysis and it has small movies number that rumored or post production

Not all the features in the two data sets can be used in the analysis only some of them are good to make good conclusions

most of the movies make agood profit so we can not watch what result it will be when there is movies that did not make agood one