Project: Investigate TMDb Movies Dataset

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1. Introduction

> 'TMDB Movies Data' is a data set that contains information about 10,000 movies including user ratings and revenue. In this analysis, I will try to answer to the following three questions:

1. How does the profit of movies change from year to year?**
2. What are the top 10 movies with highest and least profit?**
3. What Are Top Genres, Cast, Directors and Production Companies in Cinema History? **
4. Who are Top 5 Actors who have been casted the most?**
5. What Are the Average Runtime of Movies and how does it change over years?**
6. What is the relationship between budget & popularity, director & popularity, cast & popularity?**
7. What is the most Popular Keyword?**

In [232]:
```
# Use this cell to set up import statements for all of the packages that
you
#   plan to use.
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from datetime import datetime

%matplotlib inline
```

2. Data Wrangling

General Properties

In [233]:
```
# Load your data and print out a few lines. Perform operations to inspec
t data
#   types and look for instances of missing or possibly errant data.
df = pd.read_csv('tmdb-movies.csv')

df.shape
```

Out[233]:
```
(10866, 21)
```

In [234]:
```
df.head(5)
```

Out[234]:

	id	imdb_id	popularity	budget	revenue	original_title	cast	
0	135397	tt0369610	32.985763	150000000	1513528810	Jurassic World	Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...	
1	76341	tt1392190	28.419936	150000000	378436354	Mad Max: Fury Road	Tom Hardy|Charlize Theron|Hugh Keays-Byrne|Nic...	
2	262500	tt2908446	13.112507	110000000	295238201	Insurgent	Shailene Woodley|Theo James|Kate Winslet|Ansel...	http://ww
3	140607	tt2488496	11.173104	200000000	2068178225	Star Wars: The Force Awakens	Harrison Ford|Mark Hamill|Carrie Fisher|Adam D...	http
4	168259	tt2820852	9.335014	190000000	1506249360	Furious 7	Vin Diesel|Paul Walker|Jason Statham|Michelle ...	

5 rows × 21 columns

In [235]:
```
df.tail(5)
```

Out[235]:

	id	imdb_id	popularity	budget	revenue	original_title	cast	homepage
10861	21	tt0060371	0.080598	0	0	The Endless Summer	Michael Hynson|Robert August|Lord 'Tally Ho' B...	NaN
10862	20379	tt0060472	0.065543	0	0	Grand Prix	James Garner|Eva Marie Saint|Yves Montand|Tosh...	NaN
10863	39768	tt0060161	0.065141	0	0	Beregis Avtomobilya	Innokentiy Smoktunovskiy|Oleg Efremov|Georgi Z...	NaN
10864	21449	tt0061177	0.064317	0	0	What's Up, Tiger Lily?	Tatsuya Mihashi|Akiko Wakabayashi|Mie Hama|Joh...	NaN
10865	22293	tt0060666	0.035919	19000	0	Manos: The Hands of Fate	Harold P. Warren|Tom Neyman|John Reynolds|Dian...	NaN

5 rows × 21 columns

Observations:

1. There's no unit for currency; I assume it is USD (US Dollar)
2. There are many movies have **'0'** values on 'budget', 'revenue', 'budget_adj', 'revenue_adj' columns
3. The data format of 'release_date' column should be changed to Datetime Format

A. Data Cleaning

In this section, I will clean delete unnecessary columns, duplicated columns (if any) and change data type for release_date column.

Delete Unnecessary Columns

> First, I chose following columns, ['id','imdb__id','homepage','tagline','overview','budget_adj','revenue_adj'], to be deleted since those are not needed for this analysis.

In [236]:
```
delete_col = ['id', 'imdb_id', 'homepage', 'tagline', 'overview', 'budge
t_adj', 'revenue_adj']
df.drop(delete_col, axis=1, inplace=True)
```

In [237]:
```
df.head(5)
```

Out[237]:

	popularity	budget	revenue	original_title	cast	director	
0	32.985763	150000000	1513528810	Jurassic World	Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...	Colin Trevorrow	monste re
1	28.419936	150000000	378436354	Mad Max: Fury Road	Tom Hardy|Charlize Theron|Hugh Keays-Byrne|Nic...	George Miller	apocalypt
2	13.112507	110000000	295238201	Insurgent	Shailene Woodley|Theo James|Kate Winslet|Ansel...	Robert Schwentke	novel|revolution|dy
3	11.173104	200000000	2068178225	Star Wars: The Force Awakens	Harrison Ford|Mark Hamill|Carrie Fisher|Adam D...	J.J. Abrams	android|spaceship
4	9.335014	190000000	1506249360	Furious 7	Vin Diesel|Paul Walker|Jason Statham|Michelle ...	James Wan	car race|speed|re

Remove Duplicates

In [238]:
```
df.duplicated().sum()
```

Out[238]: 1

In [239]:
```
df.drop_duplicates(inplace=True)
```

In [240]:
```
df.shape
```

Out[240]: (10865, 14)

Change Datetime datatypes

In [241]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 10865 entries, 0 to 10865
Data columns (total 14 columns):
popularity              10865 non-null float64
budget                  10865 non-null int64
revenue                 10865 non-null int64
original_title          10865 non-null object
cast                    10789 non-null object
director                10821 non-null object
keywords                9372 non-null object
runtime                 10865 non-null int64
genres                  10842 non-null object
production_companies    9835 non-null object
release_date            10865 non-null object
vote_count              10865 non-null int64
vote_average            10865 non-null float64
release_year            10865 non-null int64
dtypes: float64(2), int64(5), object(7)
memory usage: 1.2+ MB
```

In [242]:
```
df['release_date'] = pd.to_datetime(df['release_date'])
```

In [243]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 10865 entries, 0 to 10865
Data columns (total 14 columns):
popularity              10865 non-null float64
budget                  10865 non-null int64
revenue                 10865 non-null int64
original_title          10865 non-null object
cast                    10789 non-null object
director                10821 non-null object
keywords                9372 non-null object
runtime                 10865 non-null int64
genres                  10842 non-null object
production_companies    9835 non-null object
release_date            10865 non-null datetime64[ns]
vote_count              10865 non-null int64
vote_average            10865 non-null float64
release_year            10865 non-null int64
dtypes: datetime64[ns](1), float64(2), int64(5), object(6)
memory usage: 1.2+ MB
```

Handling 0 values in 'budget', 'revenue', 'runtime' columns

In [244]:
```
row, col = df.query('budget == 0').shape
print('There are {} rows and {} columns where budget is 0'.format(row, c
ol))
```

```
There are 5696 rows and 14 columns where budget is 0
```

In [245]:
```
row, col = df.query('revenue == 0').shape
print('There are {} rows and {} columns where revenue is 0'.format(row,
col))
```

```
There are 6016 rows and 14 columns where revenue is 0
```

In [246]:
```
row, col = df.query('runtime == 0').shape
print('There are {} rows and {} columns where runtime is 0'.format(row,
col))
```

```
There are 31 rows and 14 columns where runtime is 0
```

Now, we will convert those columns to NaN values and delete them by using 'dropna' function

In [247]:
```
# Create a list of budget, revenue, runtime columns
tem_col = ['budget', 'revenue', 'runtime']

# Convert all 0 values to NaN by using np.NAN
df[tem_col] = df[tem_col].replace(0, np.NAN)

# Delete/drop all NaN values
df.dropna(inplace = True)
row, col = df.shape

print('After cleaning rows and columns, we have {} rows and {} columns'.
format(row, col-1))
```

```
After cleaning rows and columns, we have 3677 rows and 13 columns
```

In [248]:
```
df.isna().sum()
```

Out[248]:
```
popularity              0
budget                  0
revenue                 0
original_title          0
cast                    0
director                0
keywords                0
runtime                 0
genres                  0
production_companies    0
release_date            0
vote_count              0
vote_average            0
release_year            0
dtype: int64
```

In [249]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 3677 entries, 0 to 10848
Data columns (total 14 columns):
popularity              3677 non-null float64
budget                  3677 non-null float64
revenue                 3677 non-null float64
original_title          3677 non-null object
cast                    3677 non-null object
director                3677 non-null object
keywords                3677 non-null object
runtime                 3677 non-null float64
genres                  3677 non-null object
production_companies    3677 non-null object
release_date            3677 non-null datetime64[ns]
vote_count              3677 non-null int64
vote_average            3677 non-null float64
release_year            3677 non-null int64
dtypes: datetime64[ns](1), float64(5), int64(2), object(6)
memory usage: 430.9+ KB
```

Split Columns separted by '|'

In [250]:
```
def split_col(data):
    return data.str[0:].str.split('|',expand = True)
genres = split_col(df['genres'])
cast = split_col(df['cast'])
production_companies = split_col(df['production_companies'])
genres.head()
```

Out[250]:

	0	1	2	3	4
0	Action	Adventure	Science Fiction	Thriller	None
1	Action	Adventure	Science Fiction	Thriller	None
2	Adventure	Science Fiction	Thriller	None	None
3	Action	Adventure	Science Fiction	Fantasy	None
4	Action	Crime	Thriller	None	None

In [251]:
```
cast.head()
```

Out[251]:

	0	1	2	3	4
0	Chris Pratt	Bryce Dallas Howard	Irrfan Khan	Vincent D'Onofrio	Nick Robinson
1	Tom Hardy	Charlize Theron	Hugh Keays-Byrne	Nicholas Hoult	Josh Helman
2	Shailene Woodley	Theo James	Kate Winslet	Ansel Elgort	Miles Teller
3	Harrison Ford	Mark Hamill	Carrie Fisher	Adam Driver	Daisy Ridley
4	Vin Diesel	Paul Walker	Jason Statham	Michelle Rodriguez	Dwayne Johnson

In [252]:
```
production_companies.head()
```

Out[252]:

	0	1	2	3	4
0	Universal Studios	Amblin Entertainment	Legendary Pictures	Fuji Television Network	Dentsu
1	Village Roadshow Pictures	Kennedy Miller Productions	None	None	None
2	Summit Entertainment	Mandeville Films	Red Wagon Entertainment	NeoReel	None
3	Lucasfilm	Truenorth Productions	Bad Robot	None	None
4	Universal Pictures	Original Film	Media Rights Capital	Dentsu	One Race Films

3. Exploratory Data Analysis

Research Question 1: How does the profit of movies change from year to year?

In [253]:
```
#  Insert a new column for the net profit of each movie
df['net_profit'] = df['revenue'] - df['budget']
```

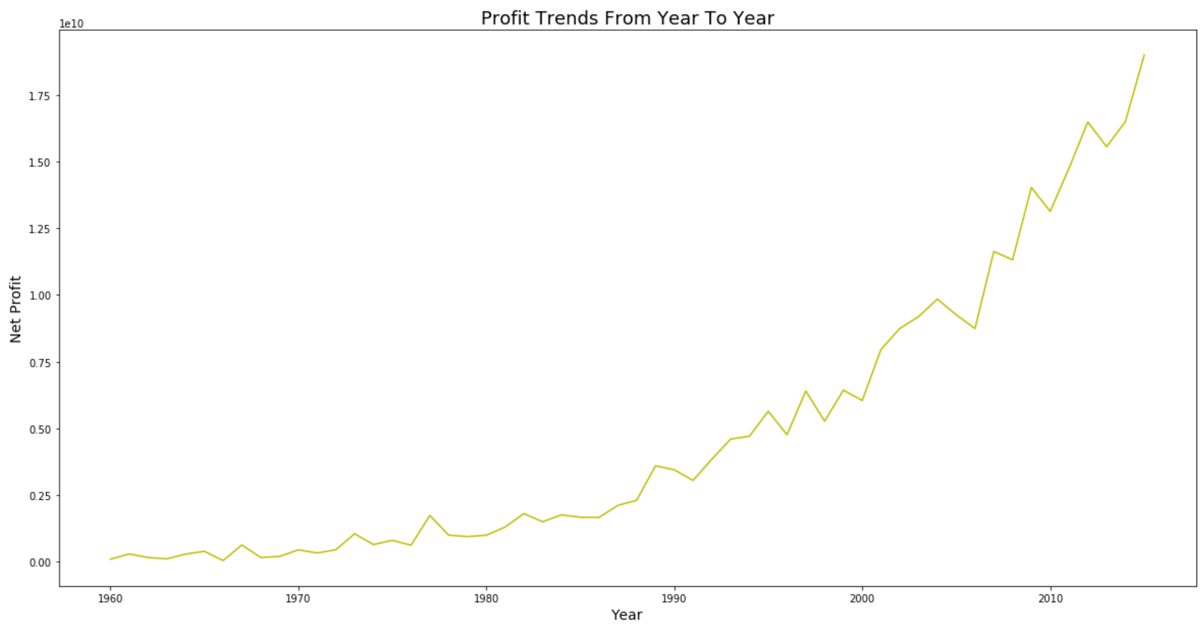
In [254]:
```
df.head(3)
```

Out[254]:

	popularity	budget	revenue	original_title	cast	director	
0	32.985763	150000000.0	1.513529e+09	Jurassic World	Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...	Colin Trevorrow	mons
1	28.419936	150000000.0	3.784364e+08	Mad Max: Fury Road	Tom Hardy|Charlize Theron|Hugh Keays-Byrne|Nic...	George Miller	apocaly
2	13.112507	110000000.0	2.952382e+08	Insurgent	Shailene Woodley|Theo James|Kate Winslet|Ansel...	Robert Schwentke	novel|revolution|(

In [255]:
```
net_profit_by_year = df.groupby('release_year').net_profit.sum()
```

In [256]:
```
net_profit_by_year.plot(kind = 'line', figsize = (20,10), color = 'y')
plt.title('Profit Trends From Year To Year', fontsize = 18)
plt.xlabel('Year', fontsize = 14)
plt.ylabel('Net Profit', fontsize = 14);
```



Analysis: The trend of net profit of movies has been gradually increasing from 1960 to 1990 and rapidly increasing from 1990 to 2015.

Research Question 2: What are the Top Ten Movies that recorded that highest profits and the least profit

In [257]:
```
df.sort_values('net_profit', ascending=False).head(10)
```

Out[257]:

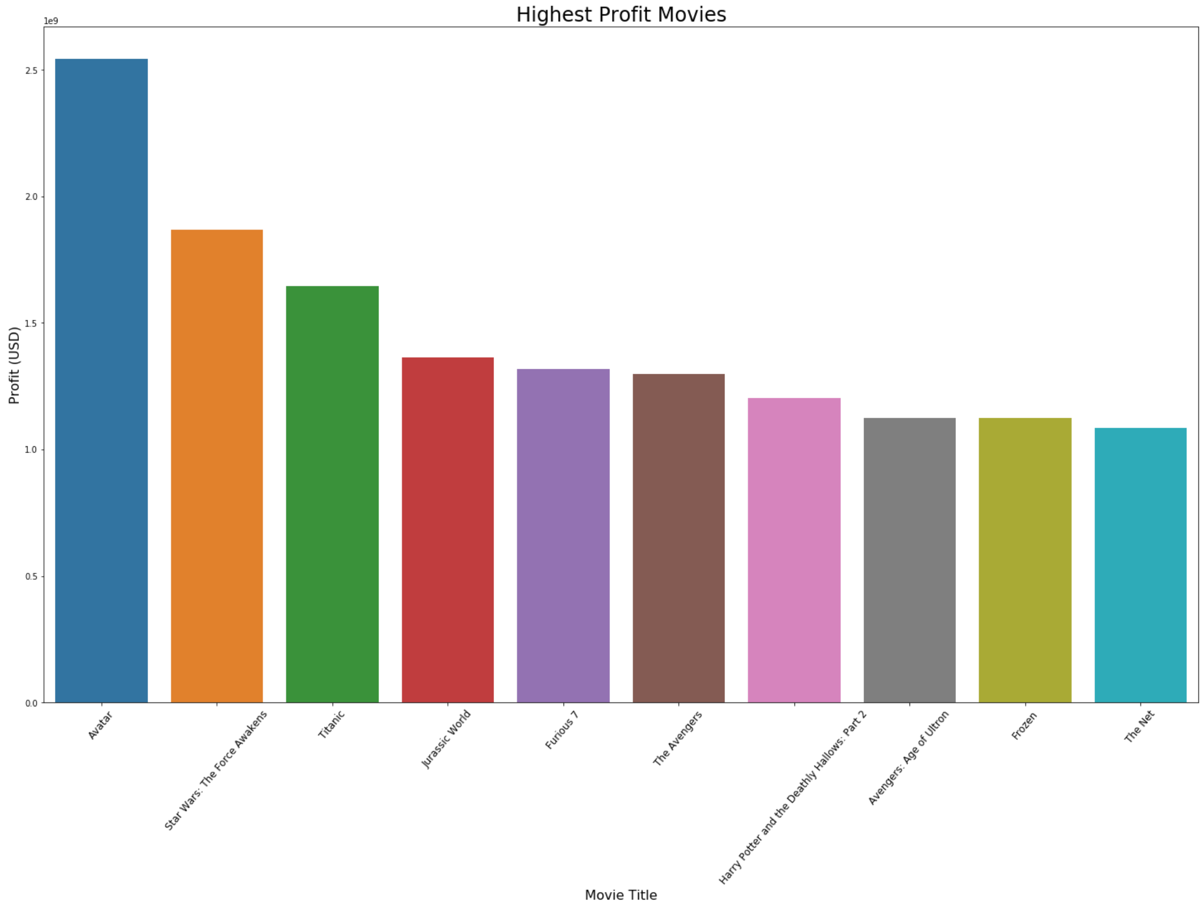
	popularity	budget	revenue	original_title	cast	director	
1386	9.432768	237000000.0	2.781506e+09	Avatar	Sam Worthington|Zoe Saldana|Sigourney Weaver|S...	James Cameron	c
3	11.173104	200000000.0	2.068178e+09	Star Wars: The Force Awakens	Harrison Ford|Mark Hamill|Carrie Fisher|Adam D...	J.J. Abrams	anc
5231	4.355219	200000000.0	1.845034e+09	Titanic	Kate Winslet|Leonardo DiCaprio|Frances Fisher|...	James Cameron	
0	32.985763	150000000.0	1.513529e+09	Jurassic World	Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...	Colin Trevorrow	
4	9.335014	190000000.0	1.506249e+09	Furious 7	Vin Diesel|Paul Walker|Jason Statham|Michelle ...	James Wan	ca
4361	7.637767	220000000.0	1.519558e+09	The Avengers	Robert Downey Jr.|Chris Evans|Mark Ruffalo|Chr...	Joss Whedon	
3374	5.711315	125000000.0	1.327818e+09	Harry Potter and the Deathly Hallows: Part 2	Daniel Radcliffe|Rupert Grint|Emma Watson|Alan...	David Yates	self
14	5.944927	280000000.0	1.405036e+09	Avengers: Age of Ultron	Robert Downey Jr.|Chris Hemsworth|Mark Ruffalo...	Joss Whedon	c
5422	6.112766	150000000.0	1.274219e+09	Frozen	Kristen Bell|Idina Menzel|Jonathan Groff|Josh ...	Chris Buck|Jennifer Lee	queen|
8094	1.136610	22000000.0	1.106280e+09	The Net	Sandra Bullock|Jeremy Northam|Dennis Miller|We...	Irwin Winkler	

1. 'Avartar',
2. 'Star Wars: The Force Awakens',
3. 'Titanic',
4. 'Jurassic World',
5. 'Furious 7'

are the top 5 movies with highest profit

In [258]:
```
movies_sorted_by_profit = df.sort_values(by = 'net_profit', ascending = False)[0:10]
movies_sorted_by_profit

plt.figure(figsize= (25,15))

ax = sns.barplot(x = 'original_title' , y = 'net_profit', data = movies_sorted_by_profit)
ax.set_xticklabels(ax.get_xticklabels(), rotation = 50, horizontalalignment = "center", fontsize = 12)

plt.title('Highest Profit Movies',fontsize = 24)
plt.xlabel('Movie Title' , fontsize = 16)
plt.ylabel('Profit (USD)' , fontsize = 16)
```

Out[258]:
```
Text(0, 0.5, 'Profit (USD)')
```



In [259]:
```
df.sort_values('net_profit', ascending=False).tail(1)
```

Out[259]:

	popularity	budget	revenue	original_title	cast	director	
2244	0.25054	425000000.0	11087569.0	The Warrior's Way	Kate Bosworth|Jang Dong-gun|Geoffrey Rush|Dann...	Sngmoo Lee	ass town|revenge|dece

'The Warrior's Way' had the lowest net_profit, -$413912431.0

In [260]:

```
def find_min_max(x):
    high_ind = df[x].idxmax()
    high = pd.DataFrame(df.loc[high_ind,:])
    min_ind = df[x].idxmin()
    low = pd.DataFrame(df.loc[min_ind,:])
    print("Movie with Highest profit is: ", df['original_title'][high_in
d])
    print("Movie with Lowest profit is: ", df['original_title'][min_ind
])
    return pd.concat([high,low],axis = 1)

find_min_max('net_profit')
```

```
Movie with Highest profit is:  Avatar
Movie with Lowest profit is:  The Warrior's Way
```

Out[260]:

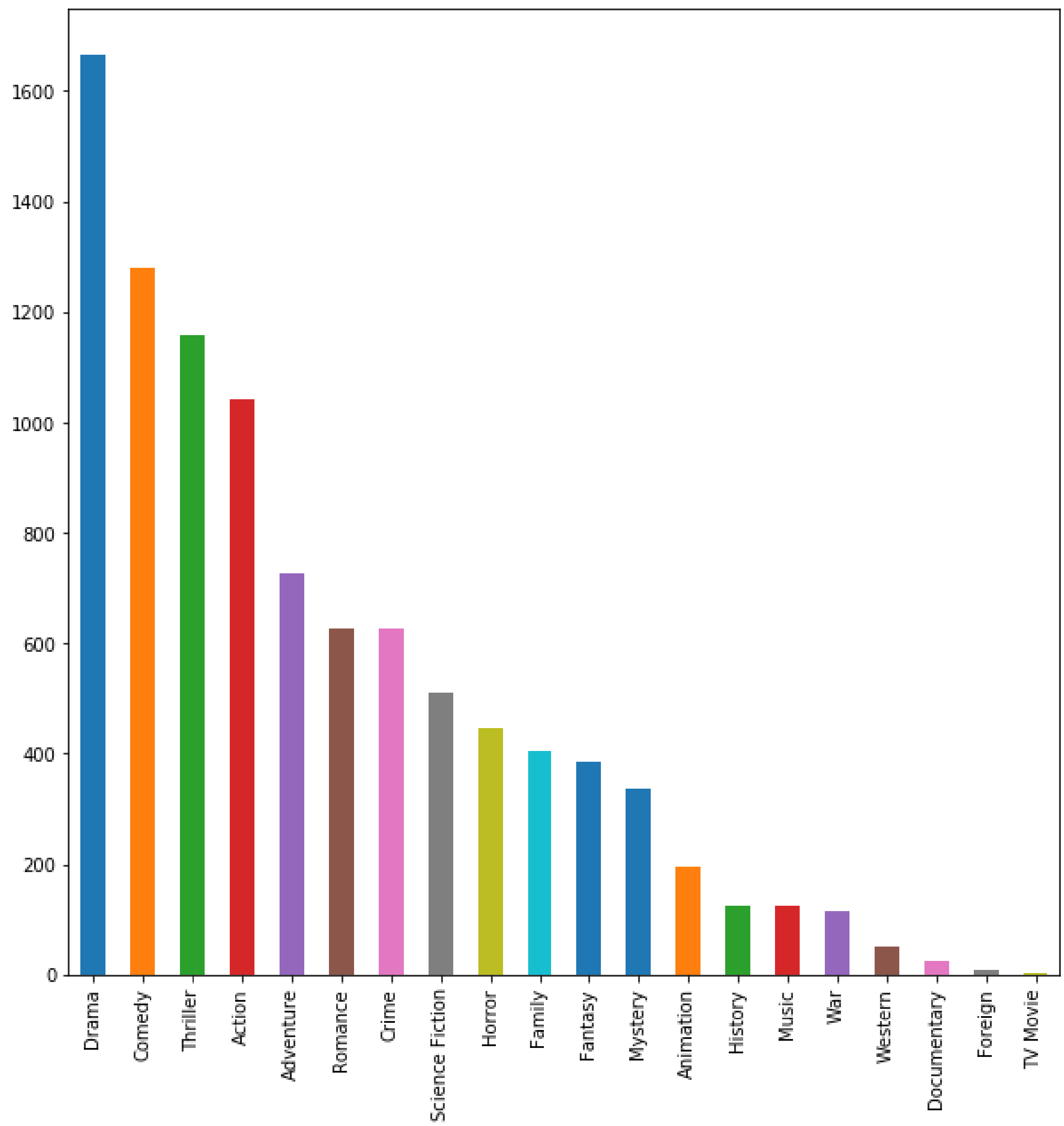
	1386	2244
popularity	9.43277	0.25054
budget	2.37e+08	4.25e+08
revenue	2.78151e+09	1.10876e+07
original_title	Avatar	The Warrior's Way
cast	Sam Worthington|Zoe Saldana|Sigourney Weaver|S...	Kate Bosworth|Jang Dong-gun|Geoffrey Rush|Dann...
director	James Cameron	Sngmoo Lee
keywords	culture clash|future|space war|space colony|so...	assassin|small town|revenge|deception|super speed
runtime	162	100
genres	Action|Adventure|Fantasy|Science Fiction	Adventure|Fantasy|Action|Western|Thriller
production_companies	Ingenious Film Partners|Twentieth Century Fox ...	Boram Entertainment Inc.
release_date	2009-12-10 00:00:00	2010-12-02 00:00:00
vote_count	8458	74
vote_average	7.1	6.4
release_year	2009	2010
net_profit	2.54451e+09	-4.13912e+08

Research Question 3. What Are Top Genres, Cast, Directors, and Production Companies in Cinema History?

In [261]:
```
#This function takes any column as argument and keep store values
def calculate_count(column):
    # Convert column to string and seperate it by '|'
    data = df[column].str.cat(sep = '|')

    # store data
    data = pd.Series(data.split('|'))
    count = data.value_counts(ascending = False)
    return count
```

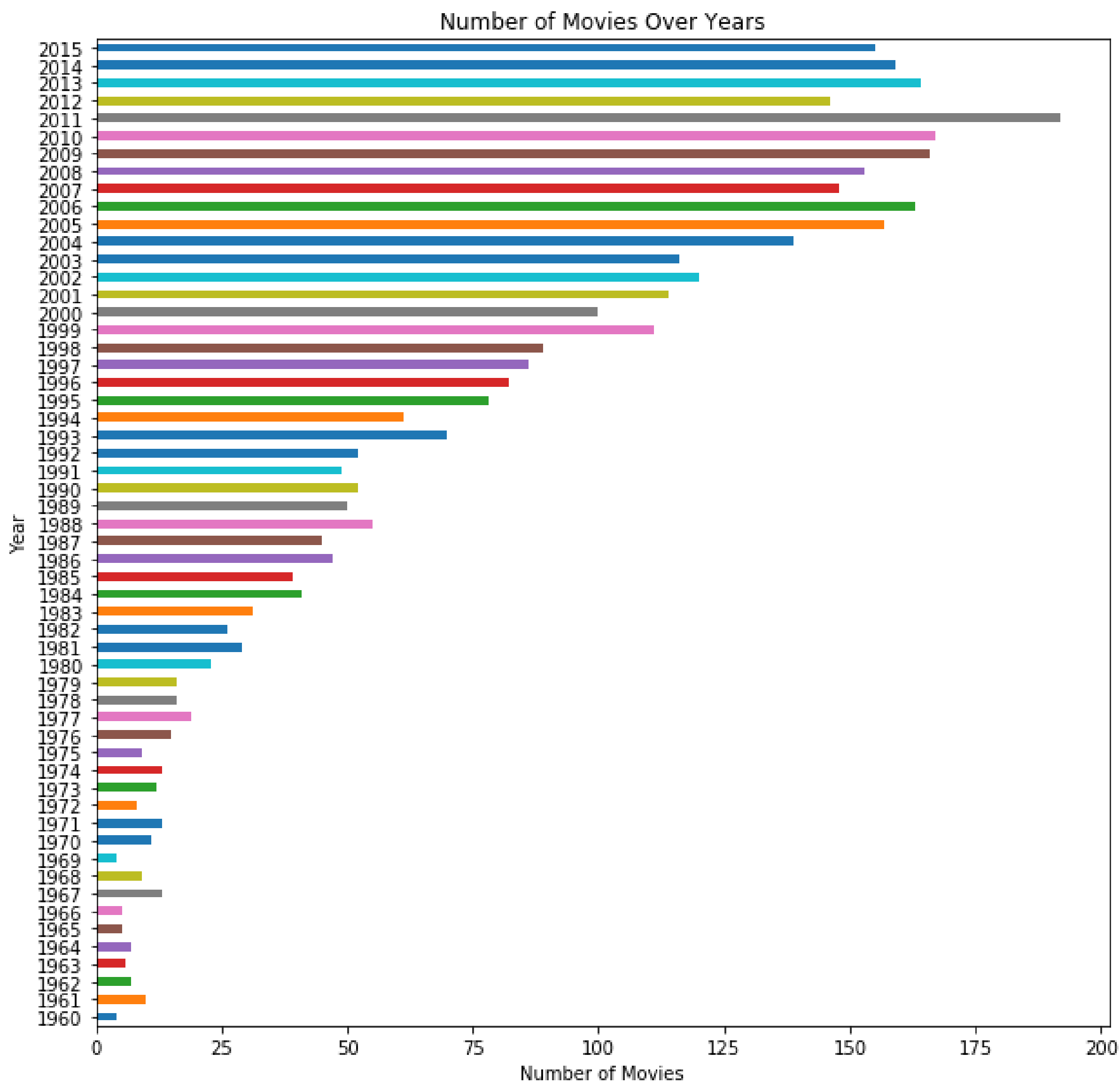
In [262]:
```
count_genres = calculate_count('genres')
count_genres.plot(kind='bar', figsize=(10,10))
```

Out[262]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x1a21834908>
```



In [263]:
```
count_movie_year = df["release_year"].value_counts().sort_index()
count_movie_year.plot(kind='barh',title='Number of Movies Over Years', f
igsize=(10,10))
plt.xlabel('Number of Movies')
plt.ylabel('Year')
```

Out[263]:
```
Text(0, 0.5, 'Year')
```



In [264]:
```
count_director = calculate_count('director')
count_director.head()
```

Out[264]:
```
Steven Spielberg     28
Clint Eastwood       23
Ridley Scott         21
Tim Burton           17
Steven Soderbergh    17
dtype: int64
```

In [265]:
```
count_production_company = calculate_count('production_companies')
count_production_company.head()
```

Out[265]:
```
Universal Pictures                        322
Warner Bros.                              318
Paramount Pictures                        266
Twentieth Century Fox Film Corporation    196
Columbia Pictures                         177
dtype: int64
```

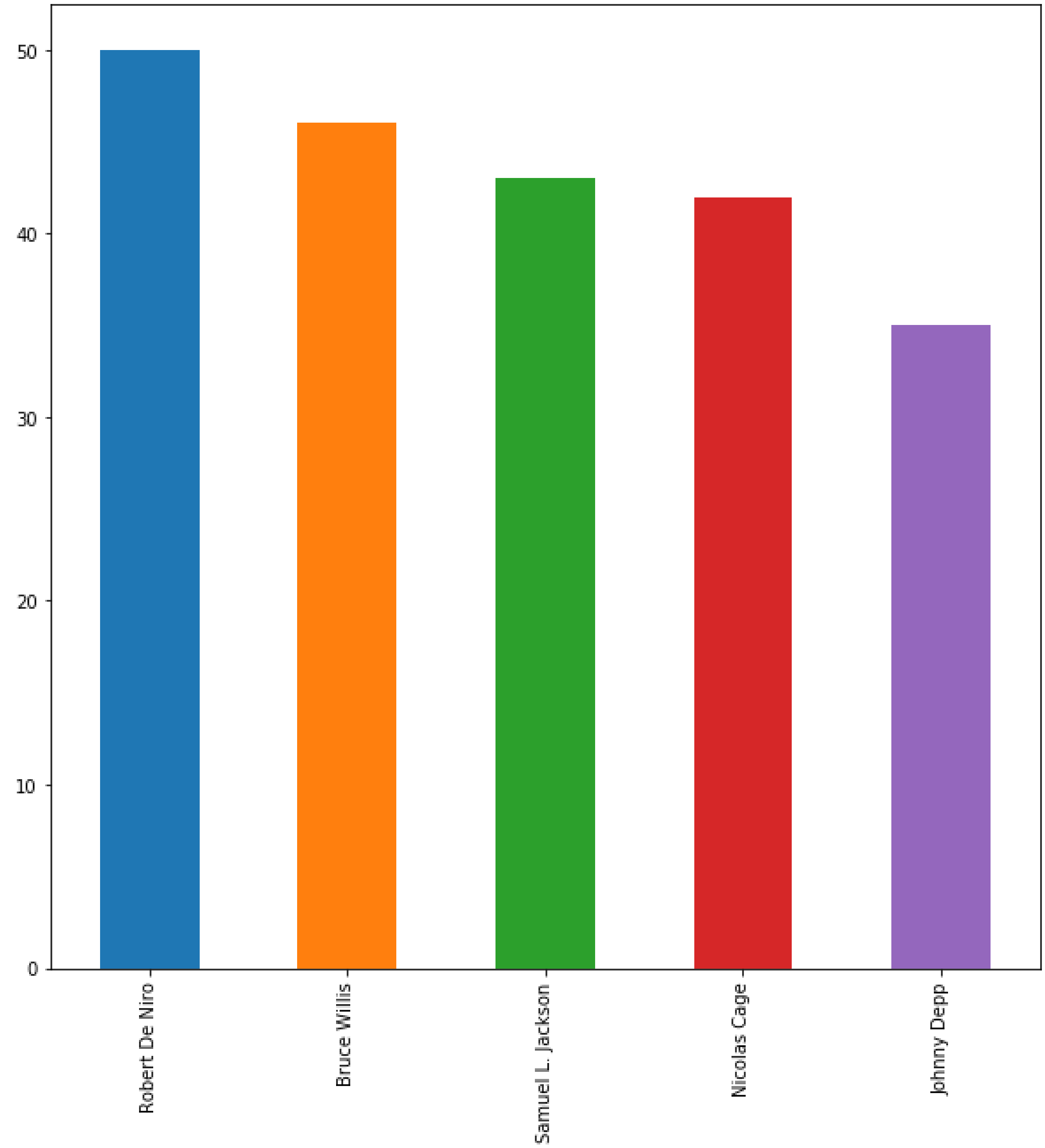
Research Question 4: Who are Top 5 Actors who have been casted the most?

In [266]:
```
count_cast = calculate_count('cast')
count_cast.head(5)
```

Out[266]:
```
Robert De Niro       50
Bruce Willis         46
Samuel L. Jackson    43
Nicolas Cage         42
Johnny Depp          35
dtype: int64
```

In [267]:
```
count_cast = calculate_count('cast')
count_cast.head(5).plot(kind='bar', figsize=(10,10))
```

Out[267]: <matplotlib.axes._subplots.AxesSubplot at 0x1a2b41c6a0>



Top 5 Actors are Robert De Niro, Bruce Willis, Samuel L. Jackson, Nicolas Cage and Johnny Depp.

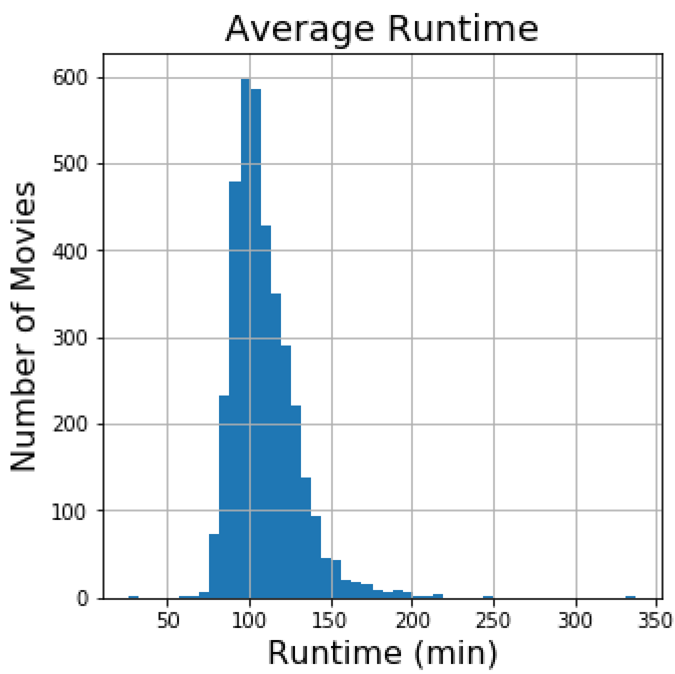
Research Question 5: What Are the Average Runtime of Movies and How Does it Change Over Years?

In [268]:
```
df['runtime'].describe()
```

Out[268]:
```
count    3677.000000
mean      109.561327
std        19.855075
min        26.000000
25%        96.000000
50%       106.000000
75%       120.000000
max       338.000000
Name: runtime, dtype: float64
```

In [269]:
```
df['runtime'].hist(figsize=(5,5), bins=50)
plt.title('Average Runtime', fontsize=18)
plt.xlabel('Runtime (min)', fontsize=16)
plt.ylabel('Number of Movies', fontsize=16)
```

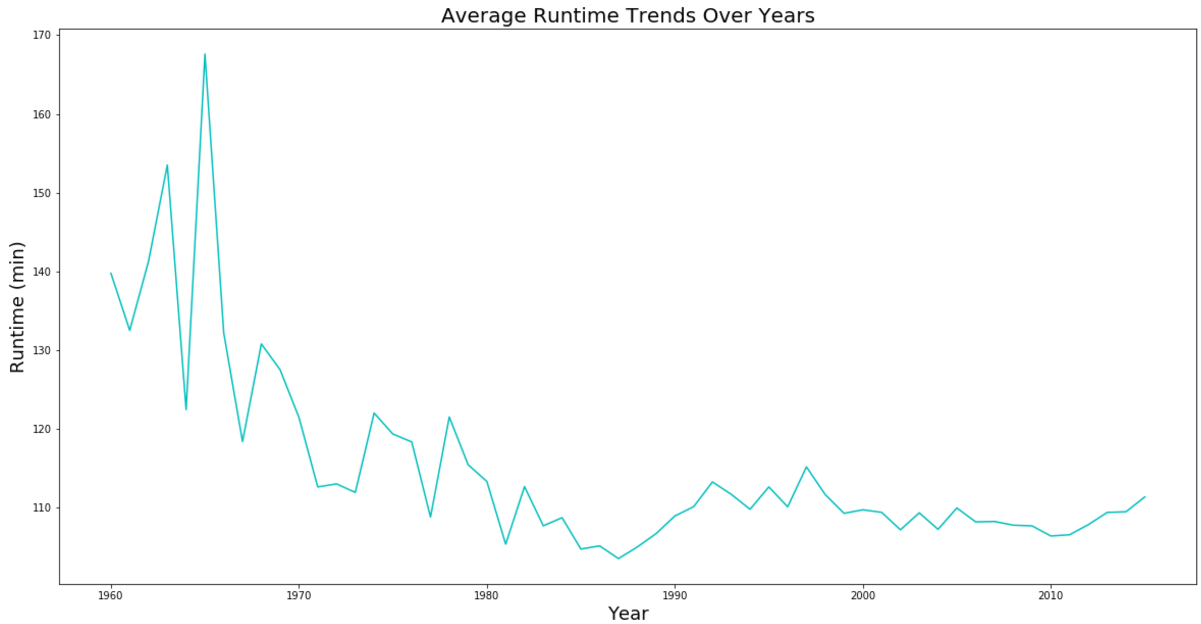
Out[269]:
```
Text(0, 0.5, 'Number of Movies')
```



Almost all movies have runtime between 80-120 min

In [270]:
```
df.groupby('release_year').runtime.mean().plot(kind='line', figsize=(20, 10), color='c')
plt.title('Average Runtime Trends Over Years', fontsize=20)
plt.xlabel('Year', fontsize=18)
plt.ylabel('Runtime (min)', fontsize=18)
```

Out[270]: Text(0, 0.5, 'Runtime (min)')



It's interesting to see that the average movie runtime was longer(130-170 min) during 1960-1970 and reduced to 90-110 these days

Research Question 6. What is the Relationship Between Budget, Revenue and Popularity?

In [271]:
```
# compute correlation of columns
df.corr()
```

Out[271]:

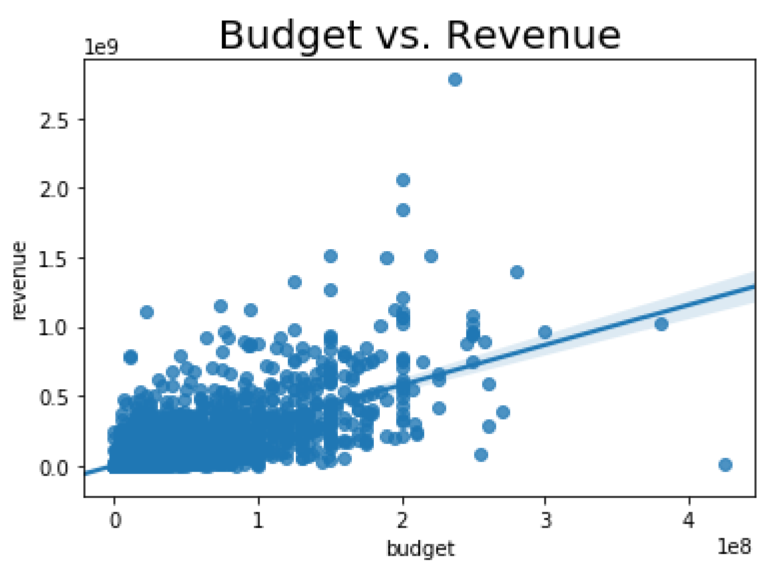
	popularity	budget	revenue	runtime	vote_count	vote_average	release_year
popularity	1.000000	0.441203	0.611755	0.212153	0.777546	0.320195	0.181827
budget	0.441203	1.000000	0.685946	0.259281	0.554653	0.021488	0.280073
revenue	0.611755	0.685946	1.000000	0.248271	0.753014	0.228692	0.147652
runtime	0.212153	0.259281	0.248271	1.000000	0.273912	0.357544	-0.114465
vote_count	0.777546	0.554653	0.753014	0.273912	1.000000	0.391735	0.216831
vote_average	0.320195	0.021488	0.228692	0.357544	0.391735	1.000000	-0.134278
release_year	0.181827	0.280073	0.147652	-0.114465	0.216831	-0.134278	1.000000
net_profit	0.593061	0.524292	0.979260	0.218346	0.726780	0.261645	0.094807

Popularity has stronger correlation with **revenue, vote_count** and **net_profit**

Budget has strong correlation with **revenue, vote_count, net_profit**

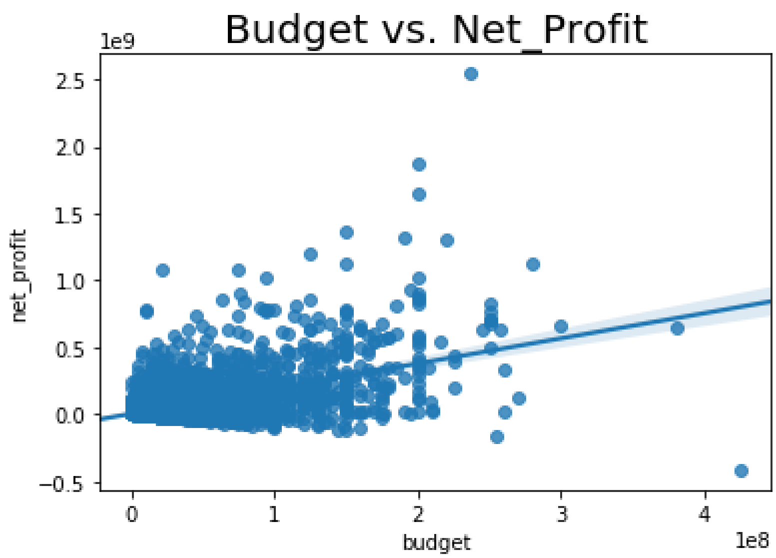
In [272]:
```
# create scatter plot for budget and popularity columns

sns.regplot(x=df['budget'], y=df['revenue']).set_title('Budget vs. Reven
ue', size=20)
```

Out[272]: `Text(0.5, 1.0, 'Budget vs. Revenue')`



In [273]:
```
# create scatter plot for budget and net_profit columns
sns.regplot(x=df['budget'],y=df['net_profit']).set_title("Budget vs. Net_Profit", size=20)
```

Out[273]: Text(0.5, 1.0, 'Budget vs. Net_Profit')

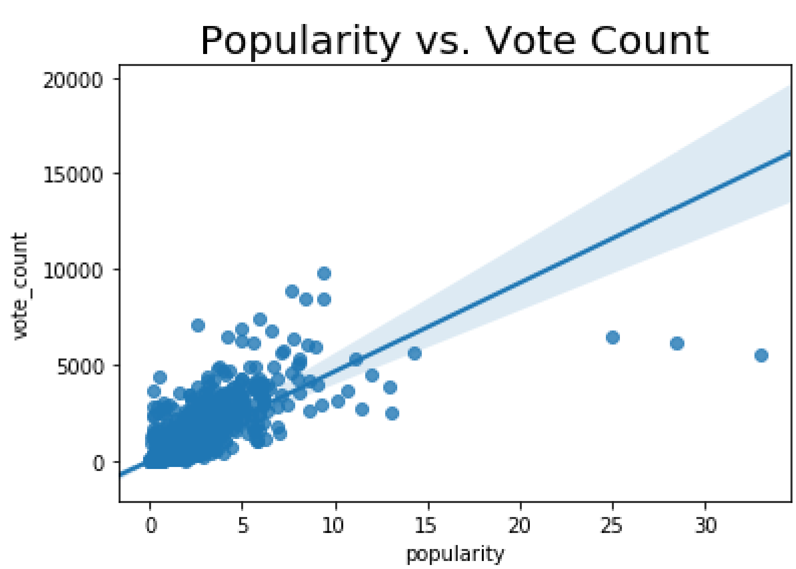


Budget vs. Revenue and **Budget vs. Net Profit** display strong correlation. Which means:

1. More budget will highly likely lead higher revenue
2. More budget will result in more profit

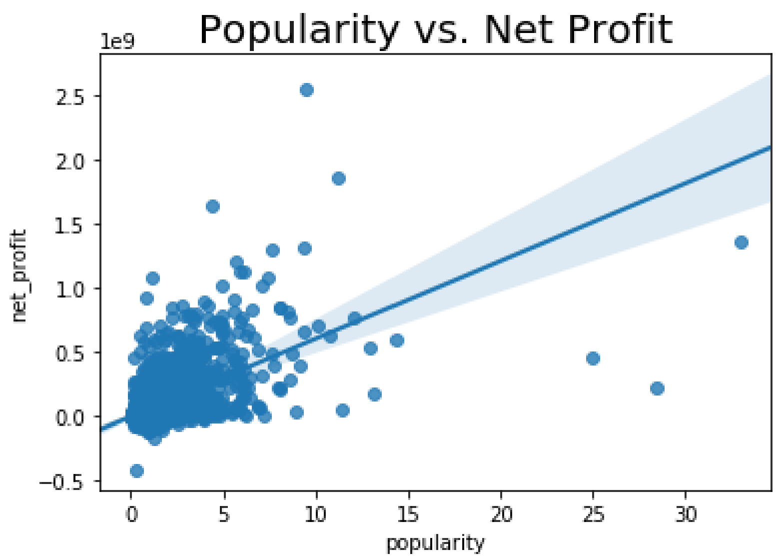
In [274]:
```
# create scatter plot for popularity and vote_count columns
sns.regplot(x=df['popularity'],y=df['vote_count']).set_title("Popularity vs. Vote Count",size=20)
```

Out[274]: Text(0.5, 1.0, 'Popularity vs. Vote Count')



In [275]:
```
# create scatter plot for popularity and net_profit columns
sns.regplot(x=df['popularity'],y=df['net_profit']).set_title("Popularity vs. Net Profit",size=20)
```

Out[275]: Text(0.5, 1.0, 'Popularity vs. Net Profit')



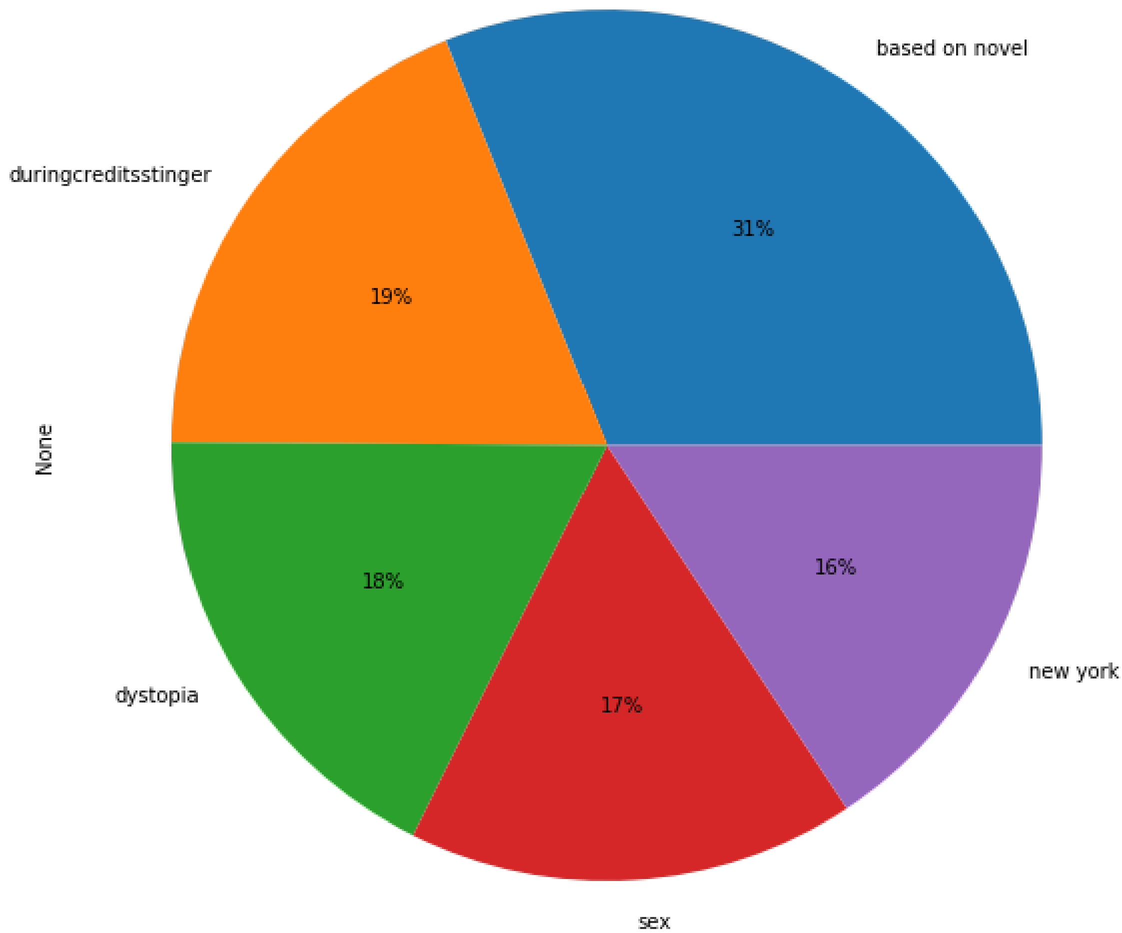
Popularity vs. Vote Count and **Popularity vs. Net Profit** clearly display strong correlation. Which means:

1. high popularity <-> high vote count
2. high popularity <-> high net profit

Research Question 7: What Are the Five Most Popular Keyword?

In [276]:
```
count_keywords = calculate_count('keywords')
count_keywords.head(5).plot(kind='pie', figsize=(10,10), autopct="%1.0f%
%")
```

Out[276]: <matplotlib.axes._subplots.AxesSubplot at 0x1a243eb7b8>



People love to watch movies **based on novel** with **credit stinger** (a.k.a end-credit or post credit scenes)

4. Conclusions

1. According to the profit trends from 1960 to 2015, the movie industry has been gradually increasing from 1960 to 1990 and rapidly increasing from 1990 to 2015. Therefore, we can make a prediction about future that the profit will keep increasing.
2. Except Titanic (1997), the top 10 movies with highest profit is released during after 2009. This can be the fact that people are watching more movies nowadays compared to before.
3. Five most popular genres are: drama, comedy, thriller, action, adventure. These genres could be considered as guaranteed box office sellers!
4. The average runtime is about 110 min. One of the interesting findings is the average movie runtime was actually longer(130-170 min range) during 1960-1970 and reduced to 90-110 these days. In my opinion, it's becasue movie writers improved their skills on writing tight, but well-summarized stories and the developent in film technology.
5. The Top 5 Actors/Actress are Robert De Niro, Bruce Willis, Samuel L. Jackson, Nicolas Cage and Johnny Depp. They are all famous movie stars so no doubt!
6. There is also interesting findings of correlation between popularity and revenue; high popularity <-> high revenue. Apprently, there is a stronger correlation between popularity and vote count. Moreover, I found that more budget highly likely brings more net profit and revenue.
7. Lastly, keyword is one of the important factor of box office hit! Over 50% audiences are interested in watching movies based on novel and ending-credit-scenes, such as MARVEL movies,

Limitation

1. There are too much columns with 0 values. After cleaning those columns, rows reduced from 10865 to 3677. So I analyzed only 33% of the dataset.
2. No currency unit given. So I just assumed that it's US Dollar amount.