In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as snr
from sklearn.preprocessing import OneHotEncoder
from sklearn.ensemble import GradientBoostingRegressor
from sklearn.metrics import r2_score
from sklearn.preprocessing import StandardScaler
```

In [2]:

```
data=pd.read_csv("C:\\Users\\Lenovo\\Desktop\\Intern\\movie ticket prediction\\IMDb
data.head(10)
```

Out[2]:

	Name	Year	Duration	Genre	Rating	Votes	Director	Actor 1	Actor 2
0		NaN	NaN	Drama	NaN	NaN	J.S. Randhawa	Manmauji	Birbal
1	#Gadhvi (He thought he was Gandhi)	(2019)	109 min	Drama	7.0	8	Gaurav Bakshi	Rasika Dugal	Vivek Ghamande
2	#Homecoming	(2021)	90 min	Drama, Musical	NaN	NaN	Soumyajit Majumdar	Sayani Gupta	Plabita Borthakur
3	#Yaaram	(2019)	110 min	Comedy, Romance	4.4	35	Ovais Khan	Prateik	Ishita Raj
4	...And Once Again	(2010)	105 min	Drama	NaN	NaN	Amol Palekar	Rajat Kapoor	Rituparna Sengupta
5	...Aur Pyaar Ho Gaya	(1997)	147 min	Comedy, Drama, Musical	4.7	827	Rahul Rawail	Bobby Deol	Aishwarya Rai Bachchan
6	...Yahaan	(2005)	142 min	Drama, Romance, War	7.4	1,086	Shoojit Sircar	Jimmy Sheirgill	Minissha Lamba
7	.in for Motion	(2008)	59 min	Documentary	NaN	NaN	Anirban Datta	NaN	NaN
8	?: A Question Mark	(2012)	82 min	Horror, Mystery, Thriller	5.6	326	Allyson Patel	Yash Dave	Muntazir Ahmad
9	@Andheri	(2014)	116 min	Action, Crime, Thriller	4.0	11	Biju Bhaskar Nair	Augustine	Fathima Babu

In [3]:

```
data.describe(include = 'all').round(3)
```

Out[3]:

	Name	Year	Duration	Genre	Rating	Votes	Director	Actor 1	Actor 2	Actor 3
count	15509	14981	7240	13632	7919.000	7920	14984	13892	13125	12365
unique	13838	102	182	485	NaN	2034	5938	4718	4891	4820
top	Anjaam	(2019)	120 min	Drama	NaN	8	Jayant Desai	Ashok Kumar	Rekha	Pran
freq	7	410	240	2780	NaN	227	58	158	83	91
mean	NaN	NaN	NaN	NaN	5.842	NaN	NaN	NaN	NaN	NaN
std	NaN	NaN	NaN	NaN	1.382	NaN	NaN	NaN	NaN	NaN
min	NaN	NaN	NaN	NaN	1.100	NaN	NaN	NaN	NaN	NaN
25%	NaN	NaN	NaN	NaN	4.900	NaN	NaN	NaN	NaN	NaN
50%	NaN	NaN	NaN	NaN	6.000	NaN	NaN	NaN	NaN	NaN
75%	NaN	NaN	NaN	NaN	6.800	NaN	NaN	NaN	NaN	NaN
max	NaN	NaN	NaN	NaN	10.000	NaN	NaN	NaN	NaN	NaN

In [4]:

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 15509 entries, 0 to 15508
Data columns (total 10 columns):
 #   Column    Non-Null Count  Dtype  
---  ------    --------------  -----  
 0   Name      15509 non-null  object 
 1   Year      14981 non-null  object 
 2   Duration  7240 non-null   object 
 3   Genre     13632 non-null  object 
 4   Rating    7919 non-null   float64
 5   Votes     7920 non-null   object 
 6   Director  14984 non-null  object 
 7   Actor 1   13892 non-null  object 
 8   Actor 2   13125 non-null  object 
 9   Actor 3   12365 non-null  object 
dtypes: float64(1), object(9)
memory usage: 1.2+ MB
```

In [5]:

```
data.shape
```

Out[5]:

```
(15509, 10)
```

In [6]:

```
data_new = data.drop(['Name','Year','Genre','Director','Actor 1','Actor 2','Actor 3
data_new.head()
```

Out[6]:

	Duration	Rating	Votes
0	NaN	NaN	NaN
1	109 min	7.0	8
2	90 min	NaN	NaN
3	110 min	4.4	35
4	105 min	NaN	NaN

In [7]:
```
data_new['Duration']=data_new['Duration'].str.replace(' min', '')
data_new['Votes']=data_new['Votes'].str.replace(',', '')
data_new['Votes']=data_new['Votes'].replace('$5.16M', 5.16)
```

In [8]:
```
data_new.head()
```

Out[8]:

	Duration	Rating	Votes
0	NaN	NaN	NaN
1	109	7.0	8
2	90	NaN	NaN
3	110	4.4	35
4	105	NaN	NaN

In [9]:
```
data_new.isnull().sum()
```

Out[9]:
```
Duration    8269
Rating      7590
Votes       7589
dtype: int64
```

In [10]:
```
data_new.dropna(subset=['Duration','Votes','Rating'], inplace=True)
```

In [11]:
```
data_new.head()
```

Out[11]:

	Duration	Rating	Votes
1	109	7.0	8
3	110	4.4	35
5	147	4.7	827
6	142	7.4	1086
8	82	5.6	326

In [12]:
```
x=data_new.drop(['Rating'], axis=1)
y=data_new['Rating']
```

In [13]:
```
print(x)
```

```
      Duration Votes
1          109     8
3          110    35
5          147   827
6          142  1086
8           82   326
...        ...   ...
15493      115   408
15494      153  1496
15503      125    44
15505      129   655
15508      130    20

[5851 rows x 2 columns]
```

In [14]:
```
print(y)
```

```
1        7.0
3        4.4
5        4.7
6        7.4
8        5.6
        ...
15493    6.1
15494    6.2
15503    5.8
15505    4.5
15508    6.2
Name: Rating, Length: 5851, dtype: float64
```

In [15]:

```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x, y, train_size=0.9, random_st
```

In [16]:

```
from sklearn.linear_model import LinearRegression
linear=LinearRegression()
```

In [17]:

```
linear.fit(x_train, y_train)
```

Out[17]:

```
▾ LinearRegression
LinearRegression()
```

In [18]:

```
lin_pred=linear.predict(x_test)
```

In [19]:

```
print(r2_score(y_test, lin_pred))
```

```
0.028032979070219066
```

In [20]:

```
GBR=GradientBoostingRegressor(n_estimators=2500, learning_rate=0.8, random_state=2
```

In [21]:

```
GBR.fit(x_train, y_train)
```

Out[21]:

```
▾                    GradientBoostingRegressor
GradientBoostingRegressor(learning_rate=0.8, n_estimators=2500, random_st
ate=22)
```

In [22]:

```
gbr_pred=GBR.predict(x_test)
```

In [23]:

```
print(r2_score(y_test, gbr_pred))
```

```
-0.6293263269082745
```

In [24]:

```
from sklearn.tree import DecisionTreeRegressor
tree=DecisionTreeRegressor(random_state=22)
```

In [27]:

```
tree.fit(x_train, y_train)
```

Out[27]:

```
▾          DecisionTreeRegressor
DecisionTreeRegressor(random_state=22)
```

In [26]:

```
tree_pred=tree.predict(x_test)
```

In [28]:

```
print(r2_score(y_test, tree_pred))
```

```
-0.8458911965167992
```

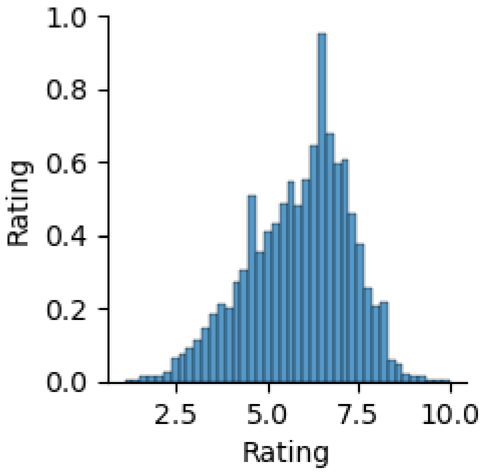
In [29]:
```
data2=data.dropna()
data2.head()
```

Out[29]:

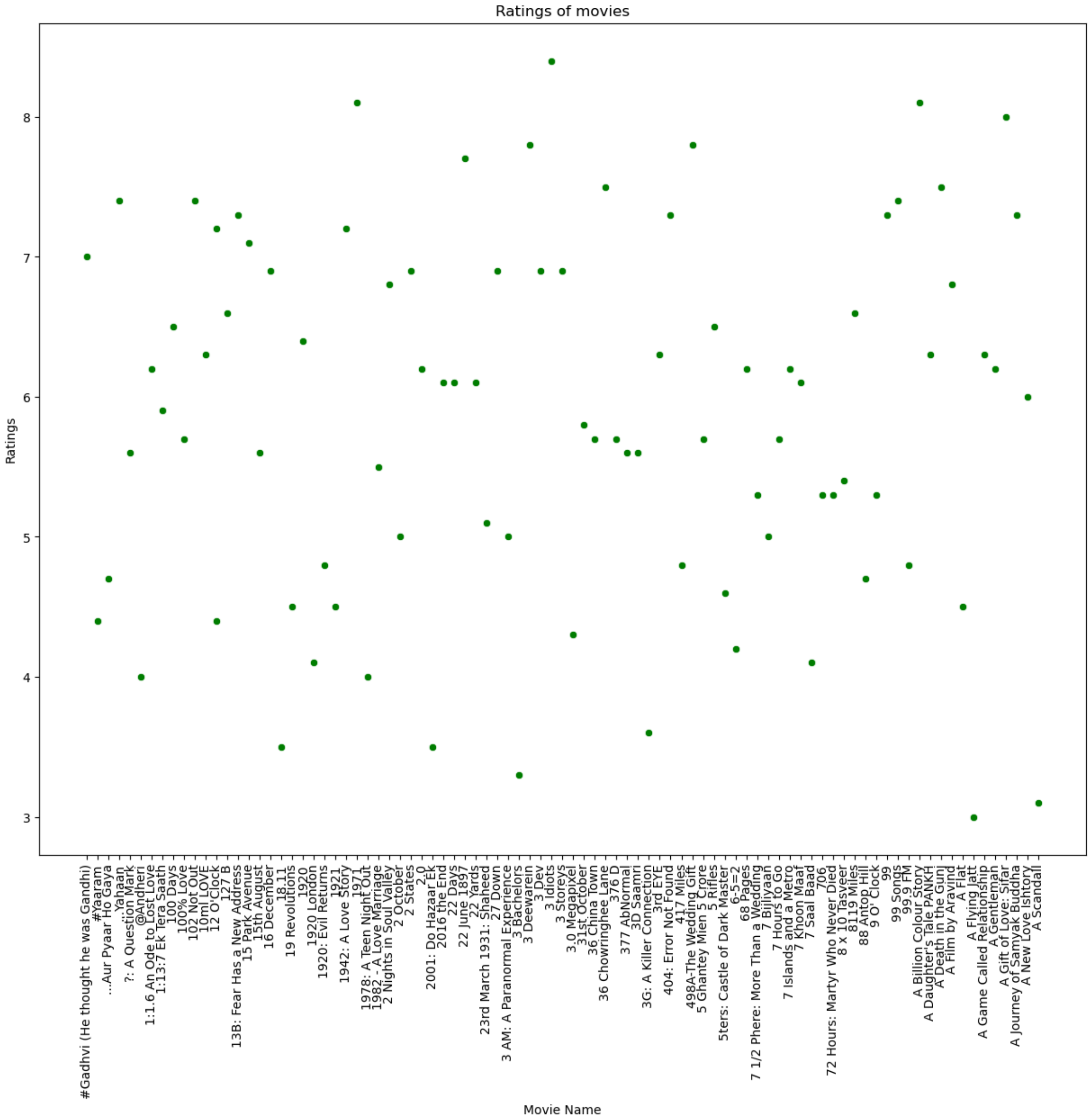
	Name	Year	Duration	Genre	Rating	Votes	Director	Actor 1	Actor 2	Actor 3
1	#Gadhvi (He thought he was Gandhi)	(2019)	109 min	Drama	7.0	8	Gaurav Bakshi	Rasika Dugal	Vivek Ghamande	Arvind Jangid
3	#Yaaram	(2019)	110 min	Comedy, Romance	4.4	35	Ovais Khan	Prateik	Ishita Raj	Siddhant Kapoor
5	...Aur Pyaar Ho Gaya	(1997)	147 min	Comedy, Drama, Musical	4.7	827	Rahul Rawail	Bobby Deol	Aishwarya Rai Bachchan	Shammi Kapoor
6	...Yahaan	(2005)	142 min	Drama, Romance, War	7.4	1,086	Shoojit Sircar	Jimmy Sheirgill	Minissha Lamba	Yashpal Sharma
8	?: A Question Mark	(2012)	82 min	Horror, Mystery, Thriller	5.6	326	Allyson Patel	Yash Dave	Muntazir Ahmad	Kiran Bhatia

In [30]:
```
plt.figure(figsize=(20,18))
snr.pairplot(data2)
plt.xticks(rotation=90)
plt.show()
```

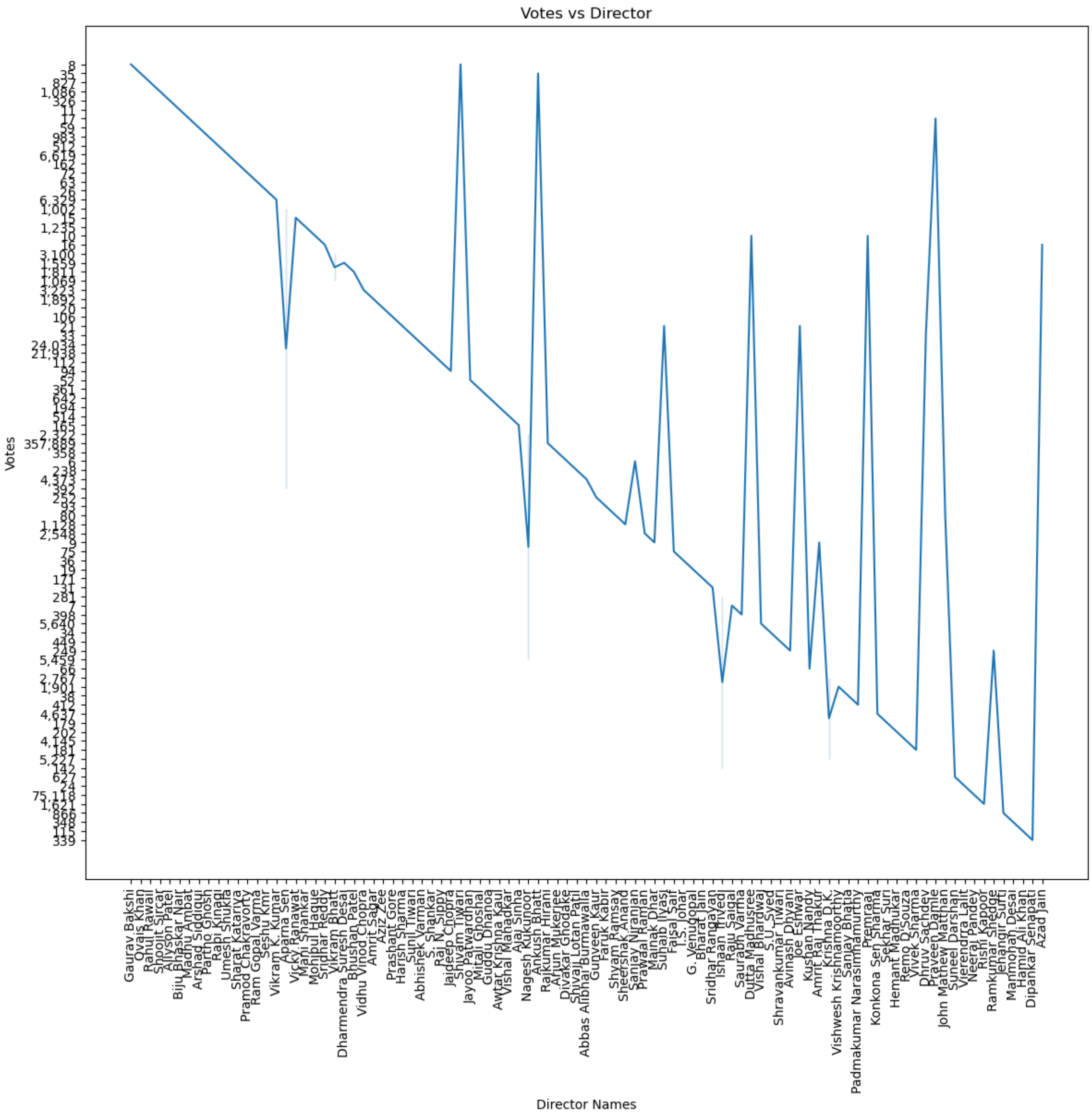
```
C:\Users\Lenovo\anaconda3\Lib\site-packages\seaborn\axisgrid.py:118: UserWarning:
The figure layout has changed to tight
  self._figure.tight_layout(*args, **kwargs)
<Figure size 2000x1800 with 0 Axes>
```



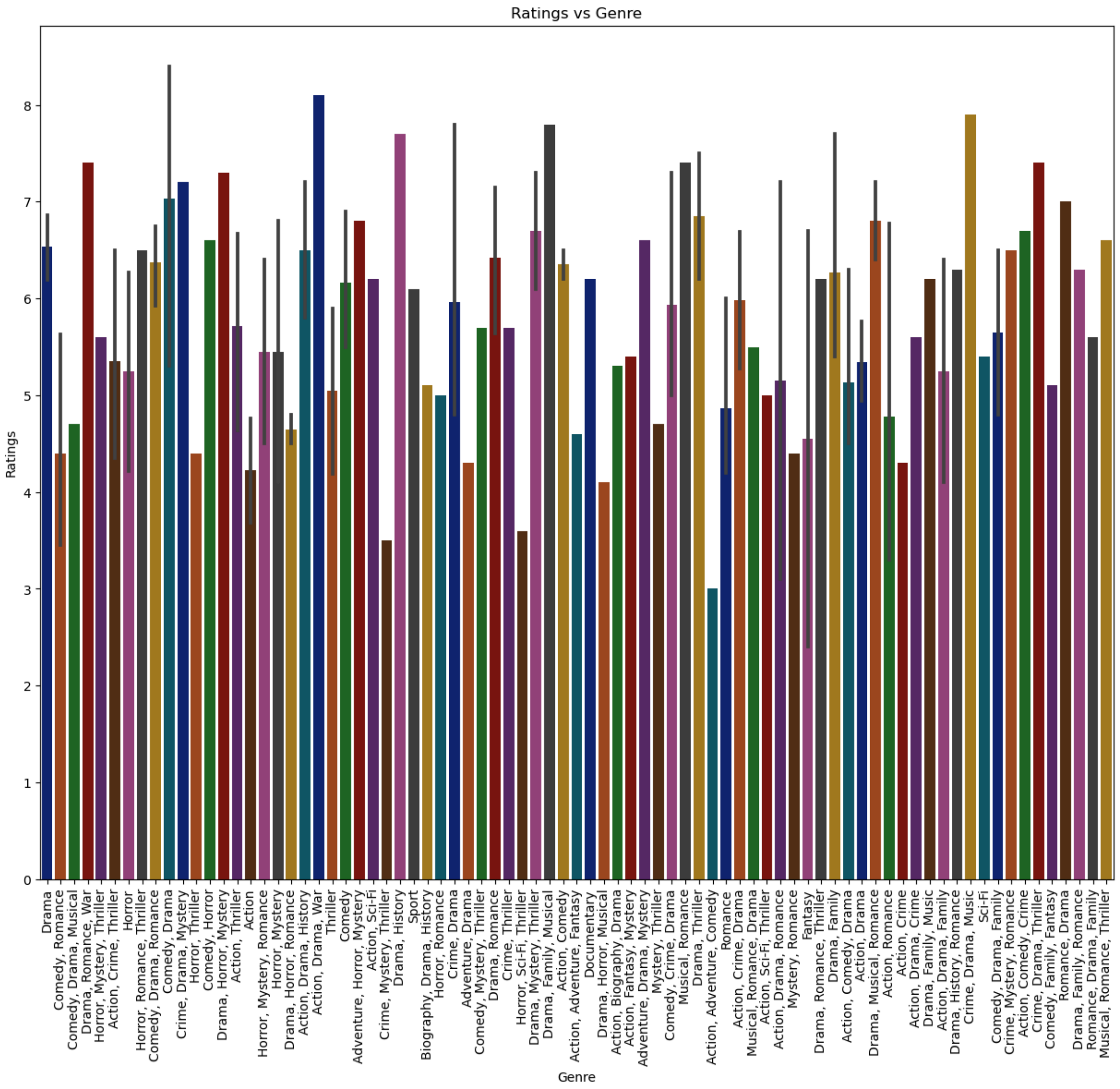
In [31]:
```
plt.figure(figsize=(15, 12))
snr.scatterplot(x='Name', y='Rating', data=data2.head(90), color='g')
plt.xticks(rotation=90)
plt.title('Ratings of movies')
plt.xlabel('Movie Name')
plt.ylabel('Ratings')
plt.show()
```



In [32]:
```
plt.figure(figsize=(14, 12))
snr.lineplot(x='Director', y='Votes', data=data2.head(100))
plt.xticks(rotation=90)
plt.title('Votes vs Director')
plt.xlabel('Director Names')
plt.ylabel('Votes')
plt.show()
```



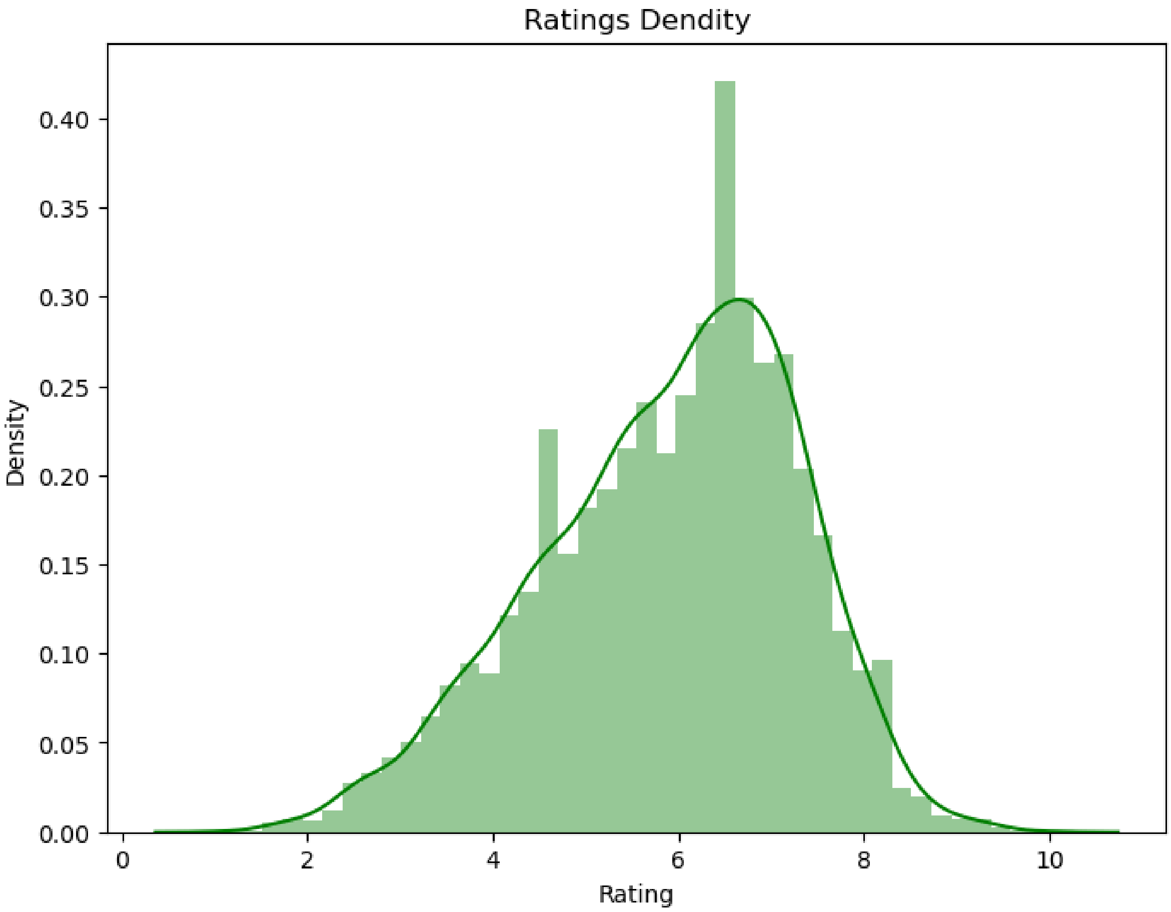
```
In [33]: plt.figure(figsize=(15, 12))
         snr.barplot(data=data2.head(200), x='Genre', y='Rating', palette='dark')
         plt.xticks(rotation=90)
         plt.title('Ratings vs Genre')
         plt.xlabel('Genre')
         plt.ylabel('Ratings')
         plt.show()
```



In [34]:

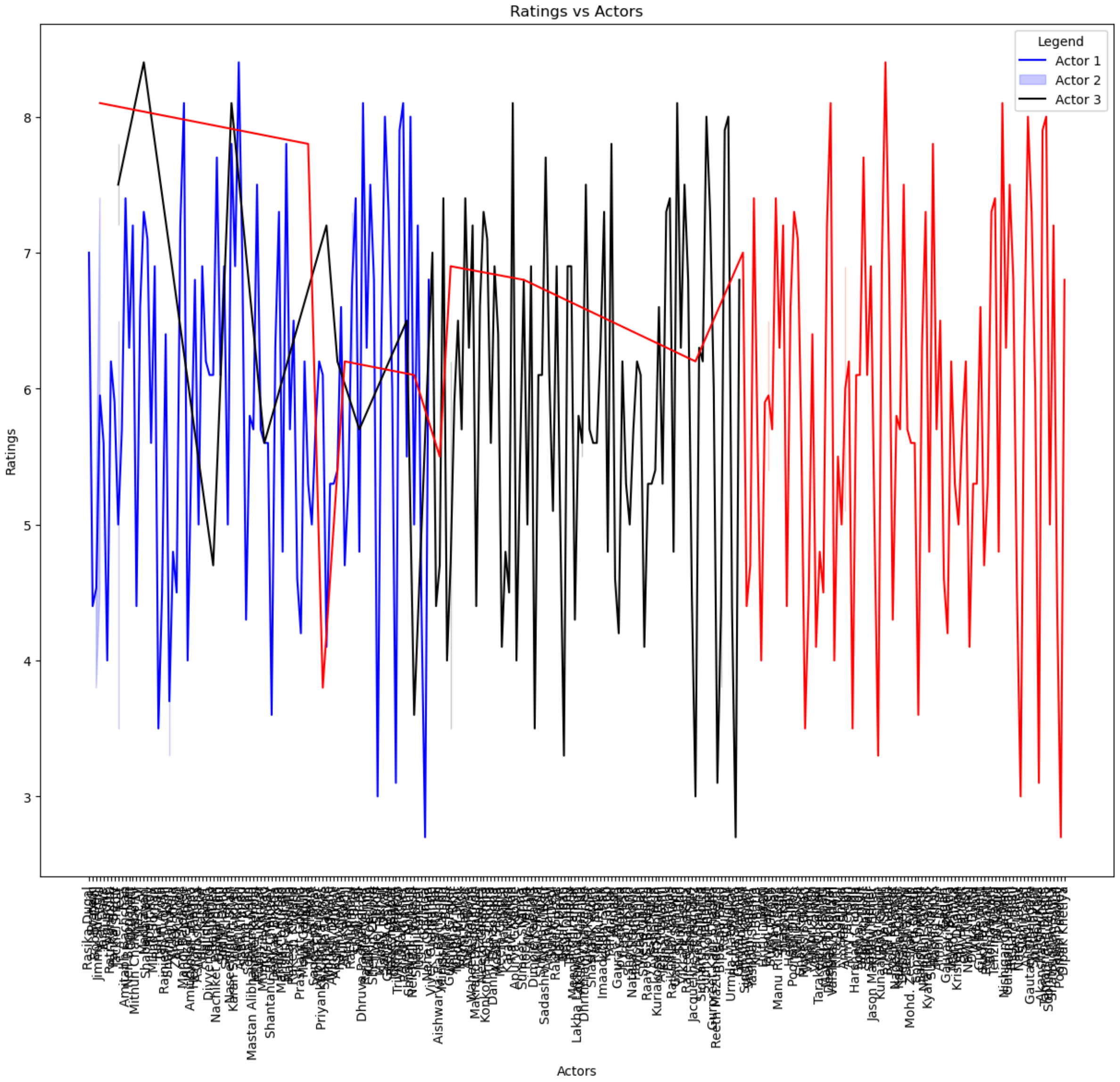
```
plt.figure(figsize=(8, 6))
snr.distplot(data2['Rating'], color='g')
plt.title('Ratings Dendity')
plt.show()
```

```
C:\Users\Lenovo\AppData\Local\Temp\ipykernel_19628\1361695506.py:2: UserWarning:

`distplot` is a deprecated function and will be removed in seaborn v0.14.0.

Please adapt your code to use either `displot` (a figure-level function with
similar flexibility) or `histplot` (an axes-level function for histograms).

For a guide to updating your code to use the new functions, please see
https://gist.github.com/mwaskom/de44147ed2974457ad6372750bbe5751

  snr.distplot(data2['Rating'], color='g')
```



In [35]:

```
plt.figure(figsize=(15, 12))
snr.lineplot(data=data2.head(100), x='Actor 1', y='Rating', color='blue')
snr.lineplot(data=data2.head(100), x='Actor 2', y='Rating', color='black')
snr.lineplot(data=data2.head(100), x='Actor 3', y='Rating', color='red')
plt.legend(title='Legend', labels=['Actor 1', 'Actor 2', 'Actor 3'])
plt.xticks(rotation=90)
plt.title('Ratings vs Actors')
plt.xlabel('Actors')
plt.ylabel('Ratings')
plt.show()
```


Ratings vs Actors
Legend
Actor 1
Actor 2
Actor 3
Ratings
8
7
6
5
4
3
Actors
Rasika Dugal
Mastan Alibhai
Manu Rishi