Import Libraries

In [1]:
```
import pandas as pd
import numpy as np
import warnings
warnings.filterwarnings("ignore")
```

Import datasets movies and ratings

In [2]:
```
ratings=pd.read_csv('ratings.csv')
ratings
```

Out[2]:

	userId	movieId	rating	timestamp
0	1	1	4.0	964982703
1	1	3	4.0	964981247
2	1	6	4.0	964982224
3	1	47	5.0	964983815
4	1	50	5.0	964982931
...	...	...	...	...
100831	610	166534	4.0	1493848402
100832	610	168248	5.0	1493850091
100833	610	168250	5.0	1494273047
100834	610	168252	5.0	1493846352
100835	610	170875	3.0	1493846415

100836 rows × 4 columns

In [3]:
```
movies=pd.read_csv('movies.csv')
movies
```

Out[3]:

	movieId	title	genres
0	1	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy
1	2	Jumanji (1995)	Adventure|Children|Fantasy
2	3	Grumpier Old Men (1995)	Comedy|Romance
3	4	Waiting to Exhale (1995)	Comedy|Drama|Romance
4	5	Father of the Bride Part II (1995)	Comedy
...	...	...	...
9737	193581	Black Butler: Book of the Atlantic (2017)	Action|Animation|Comedy|Fantasy
9738	193583	No Game No Life: Zero (2017)	Animation|Comedy|Fantasy
9739	193585	Flint (2017)	Drama
9740	193587	Bungo Stray Dogs: Dead Apple (2018)	Action|Animation
9741	193609	Andrew Dice Clay: Dice Rules (1991)	Comedy

9742 rows × 3 columns

Merged both the datasets

In [4]:
```
df=pd.merge(ratings,movies, on='movieId')
df
```

Out[4]:

	userId	movieId	rating	timestamp	title	genre
0	1	1	4.0	964982703	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantas
1	5	1	4.0	847434962	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantas
2	7	1	4.5	1106635946	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantas
3	15	1	2.5	1510577970	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantas
4	17	1	4.5	1305696483	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantas
...	...	...	...	...	...	
100831	610	160341	2.5	1479545749	Bloodmoon (1997)	Action|Thrill
100832	610	160527	4.5	1479544998	Sympathy for the Underdog (1971)	Action|Crime|Dran
100833	610	160836	3.0	1493844794	Hazard (2005)	Action|Drama|Thrill
100834	610	163937	3.5	1493848789	Blair Witch (2016)	Horror|Thrill
100835	610	163981	3.5	1493850155	31 (2016)	Horr

100836 rows × 6 columns

Statistical analysis of ratings

In [5]:
```
import matplotlib.pyplot as plt
import seaborn as sns
sns.set_style('white')
%matplotlib inline
```

In [6]:
```
df.groupby('title')['rating'].mean().sort_values(ascending=False).head()
```

Out[6]:
```
title
Gena the Crocodile (1969)              5.0
True Stories (1986)                    5.0
Cosmic Scrat-tastrophe (2015)          5.0
Love and Pigeons (1985)                5.0
Red Sorghum (Hong gao liang) (1987)    5.0
Name: rating, dtype: float64
```

In [7]:
```
df.groupby('title')['rating'].count().sort_values(ascending=False).head()
```

Out[7]:
```
title
Forrest Gump (1994)                        329
Shawshank Redemption, The (1994)           317
Pulp Fiction (1994)                        307
Silence of the Lambs, The (1991)           279
Matrix, The (1999)                         278
Name: rating, dtype: int64
```

In [8]:
```
ratings_1 = pd.DataFrame(df.groupby('title')['rating'].mean())
ratings_1.head()
```

Out[8]:

	rating
title	
'71 (2014)	4.0
'Hellboy': The Seeds of Creation (2004)	4.0
'Round Midnight (1986)	3.5
'Salem's Lot (2004)	5.0
'Til There Was You (1997)	4.0

In [9]:
```
ratings_1['num of ratings'] = pd.DataFrame(df.groupby('title')['rating'].count
ratings_1
```

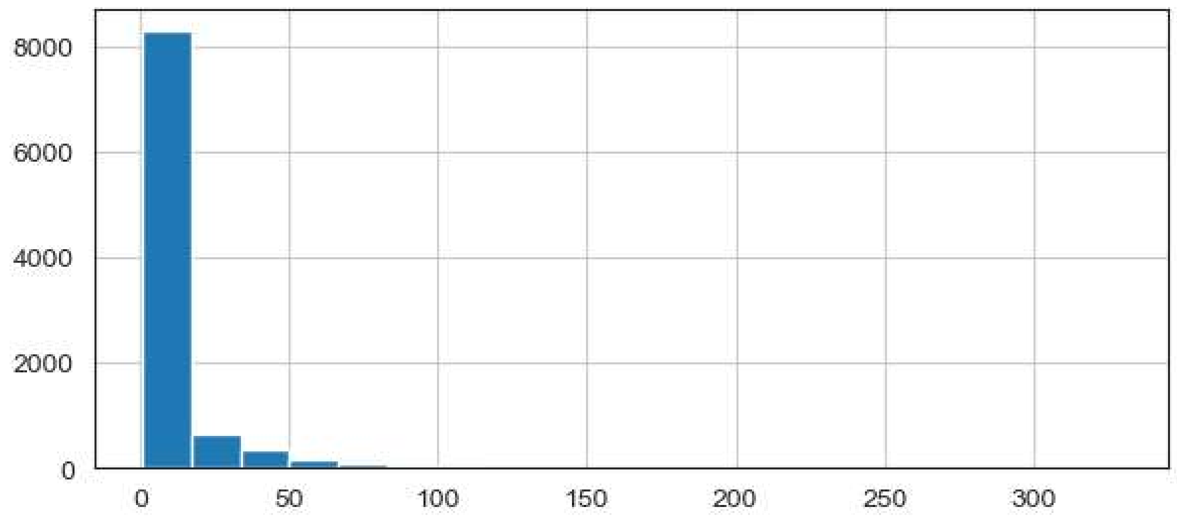
Out[9]:

	rating	num of ratings
title		
'71 (2014)	4.000000	1
'Hellboy': The Seeds of Creation (2004)	4.000000	1
'Round Midnight (1986)	3.500000	2
'Salem's Lot (2004)	5.000000	1
'Til There Was You (1997)	4.000000	2
...	...	...
eXistenZ (1999)	3.863636	22
xXx (2002)	2.770833	24
xXx: State of the Union (2005)	2.000000	5
¡Three Amigos! (1986)	3.134615	26
À nous la liberté (Freedom for Us) (1931)	1.000000	1

9719 rows × 2 columns

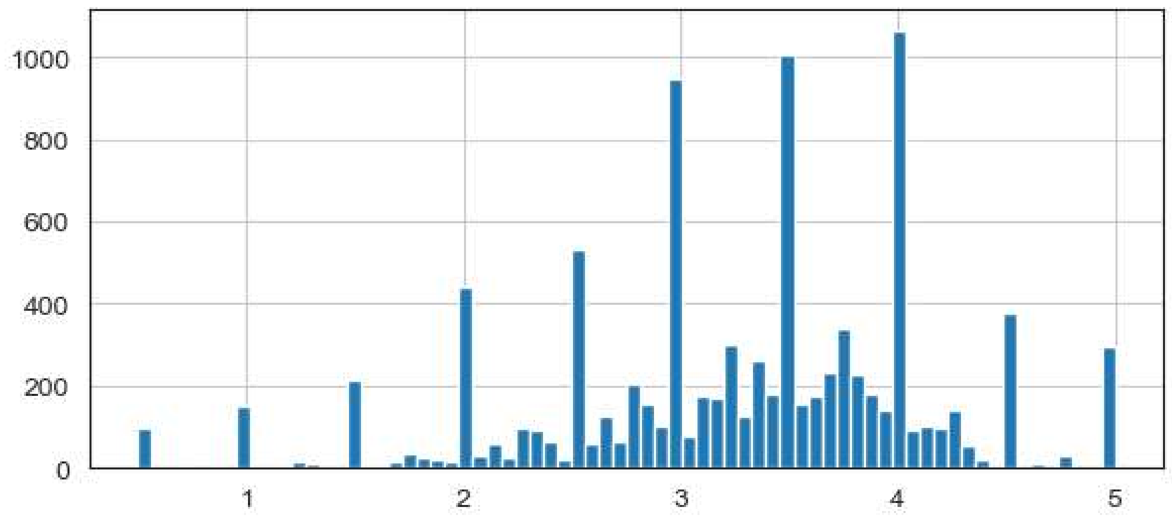
In [10]:
```
plt.figure(figsize=(7,3))
ratings_1['num of ratings'].hist(bins=20)
```

Out[10]:
```
<Axes: >
```



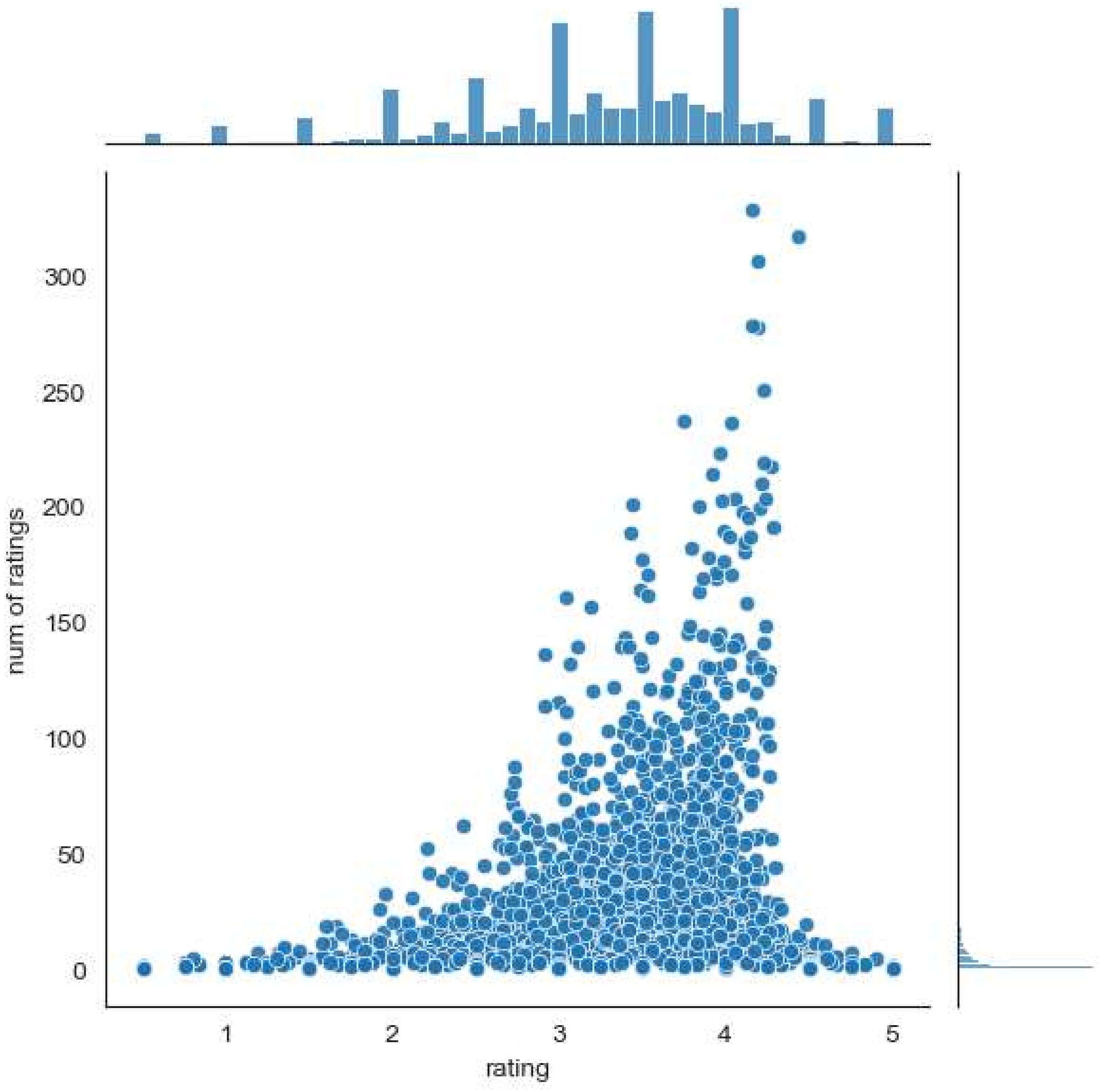
In [11]:
```
plt.figure(figsize=(7,3))
ratings_1['rating'].hist(bins=70)
```

Out[11]:
```
<Axes: >
```



```
In [12]: sns.jointplot(x='rating',y='num of ratings',data=ratings_1,alpha=0.9)
```

```
Out[12]: <seaborn.axisgrid.JointGrid at 0x2389635a610>
```



User rating frequency

```
In [13]: n_ratings= len(ratings)
         print(f"Number of ratings: {n_ratings}")
```

```
Number of ratings: 100836
```

In [14]:
```
user_freq = df[['userId', 'movieId']].groupby(
    'userId').count().reset_index()
user_freq.columns = ['userId', 'n_ratings']
user_freq.head()
```

Out[14]:

	userId	n_ratings
0	1	232
1	2	29
2	3	39
3	4	216
4	5	44

Movie rating analysis

In [15]:
```
mean_rating = df.groupby('movieId')[['rating']].mean()
```

Lowest rated movie

In [16]:
```
lowest_rated = mean_rating['rating'].idxmin()
movies.loc[movies['movieId'] == lowest_rated]
```

Out[16]:

	movieId	title	genres
2689	3604	Gypsy (1962)	Musical

Highest rated movie

In [17]:
```
highest_rated = mean_rating['rating'].idxmax()
movies.loc[movies['movieId'] == highest_rated]
```

Out[17]:

	movieId	title	genres
48	53	Lamerica (1994)	Adventure|Drama

No.of people who rated movies higest

In [18]:
```
df[df['movieId']==highest_rated]
```

Out[18]:

	userId	movieId	rating	timestamp	title	genres
86227	85	53	5.0	889468268	Lamerica (1994)	Adventure|Drama
86228	603	53	5.0	963180003	Lamerica (1994)	Adventure|Drama

No.of people who rated movies lowest

In [19]:
```
df[df['movieId']==lowest_rated]
```

Out[19]:

	userId	movieId	rating	timestamp	title	genres
86372	89	3604	0.5	1520408880	Gypsy (1962)	Musical

User Item matrix Creation

In [20]:
```
movies_1=ratings.pivot(index='movieId',columns='userId',values='rating').filln
movies_1
```

Out[20]:

userId	1	2	3	4	5	6	7	8	9	10	...	601	602	603	604	605	606	607
movieId																		
1	4.0	0.0	0.0	0.0	4.0	0.0	4.5	0.0	0.0	0.0	...	4.0	0.0	4.0	3.0	4.0	2.5	4.0
2	0.0	0.0	0.0	0.0	0.0	4.0	0.0	4.0	0.0	0.0	...	0.0	4.0	0.0	5.0	3.5	0.0	0.0
3	4.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	3.0	0.0	0.0	0.0
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
193581	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0
193583	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0
193585	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0
193587	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0
193609	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0

9724 rows × 610 columns

In [21]:
```
from scipy.sparse import csr_matrix
```

In [22]:
```
mat_movies=csr_matrix(movies_1.values)
```

Movie Recommendation using Knn

In [23]:
```
from sklearn.neighbors import NearestNeighbors
```

In [24]:
```
model=NearestNeighbors(metric='cosine',algorithm='brute',n_neighbors=20)
```

In [25]:
```
model.fit(mat_movies)
```

Out[25]:
```
▾                        NearestNeighbors
NearestNeighbors(algorithm='brute', metric='cosine', n_neighbors=20)
```

In [26]:
```
!pip install fuzzywuzzy
```

```
Requirement already satisfied: fuzzywuzzy in c:\users\amruta jadhav\anaconda3
\lib\site-packages (0.18.0)
```

In [27]:
```
from fuzzywuzzy import process
```

In [28]:
```
def recommender(movie_name,data,n):
    idx=process.extractOne(movie_name,movies['title'])[2]
    print('Movie Selected : ',movies['title'][idx],'Index : ',idx)
    print('Searching for recommendation.......')
    distance,indices=model.kneighbors(data[idx],n_neighbors=n)
    for i in indices:
        print(movies['title'][i].where(i!=idx))
```

In [29]:
```
recommender('spider man',mat_movies,10)
```

```
Movie Selected :  Spider-Man (2002) Index :  3819
Searching for recommendation.......
3819                                              NaN
1611                                Avengers, The (1998)
5564         Riki-Oh: The Story of Ricky (Lik Wong) (1991)
5386                         Christmas with the Kranks (2004)
4703                                     Project X (1987)
5205    Human Condition I, The (Ningen no joken I) (1959)
3546                          Spriggan (Supurigan) (1998)
2858                             Autumn in New York (2000)
3390                                           K-9 (1989)
3941                                   Swarm, The (1978)
Name: title, dtype: object
```

In [ ]: