# in Section 1 , under Netflix capstone project  
  
# Q1: How can you load a Netflix dataset into a Pandas Data Frame, and what method will you   
# use to get basic information about the dataset  
  
  
import pandas as pd  
import numpy as np  
import matplotlib.pyplot as plt  
import seaborn as sns  
  
netflix = pd.read\_csv("netflix.csv")  
  
# checking the head  
netflix.head()  
  
# checking the shape, how many rows and columns  
netflix.shape

(9425, 29)

# checking the head  
netflix.head()

Title Genre \  
0 Lets Fight Ghost Crime, Drama, Fantasy, Horror, Romance   
1 HOW TO BUILD A GIRL Comedy   
2 The Con-Heartist Comedy, Romance   
3 Gleboka woda Drama   
4 Only a Mother Drama   
  
 Tags Languages \  
0 Comedy Programmes,Romantic TV Comedies,Horror ... Swedish, Spanish   
1 Dramas,Comedies,Films Based on Books,British English   
2 Romantic Comedies,Comedies,Romantic Films,Thai... Thai   
3 TV Dramas,Polish TV Shows,Social Issue TV Dramas Polish   
4 Social Issue Dramas,Dramas,Movies Based on Boo... Swedish   
  
 Series or Movie Hidden Gem Score \  
0 Series 4.3   
1 Movie 7.0   
2 Movie 8.6   
3 Series 8.7   
4 Movie 8.3   
  
 Country Availability Runtime \  
0 Thailand < 30 minutes   
1 Canada 1-2 hour   
2 Thailand > 2 hrs   
3 Poland < 30 minutes   
4 Lithuania,Poland,France,Italy,Spain,Greece,Bel... 1-2 hour   
  
 Director Writer ... \  
0 Tomas Alfredson John Ajvide Lindqvist ...   
1 Coky Giedroyc Caitlin Moran ...   
2 Mez Tharatorn Pattaranad Bhiboonsawade, Mez Tharatorn, Thods... ...   
3 NaN NaN ...   
4 Alf Sjöberg Ivar Lo-Johansson ...   
  
 Netflix Release Date Production House \  
0 2021-03-04 Canal+, Sandrew Metronome   
1 2021-03-04 Film 4, Monumental Pictures, Lionsgate   
2 2021-03-03 NaN   
3 2021-03-03 NaN   
4 2021-03-03 NaN   
  
 Netflix Link \  
0 https://www.netflix.com/watch/81415947   
1 https://www.netflix.com/watch/81041267   
2 https://www.netflix.com/watch/81306155   
3 https://www.netflix.com/watch/81307527   
4 https://www.netflix.com/watch/81382068   
  
 IMDb Link \  
0 https://www.imdb.com/title/tt1139797   
1 https://www.imdb.com/title/tt4193072   
2 https://www.imdb.com/title/tt13393728   
3 https://www.imdb.com/title/tt2300049   
4 https://www.imdb.com/title/tt0041155   
  
 Summary IMDb Votes \  
0 A med student with a supernatural gift tries t... 205926.0   
1 When nerdy Johanna moves to London, things get... 2838.0   
2 After her ex-boyfriend cons her out of a large... 131.0   
3 A group of social welfare workers led by their... 47.0   
4 An unhappily married farm worker struggling to... 88.0   
  
 Image \  
0 https://occ-0-4708-64.1.nflxso.net/dnm/api/v6/...   
1 https://occ-0-1081-999.1.nflxso.net/dnm/api/v6...   
2 https://occ-0-2188-64.1.nflxso.net/dnm/api/v6/...   
3 https://occ-0-2508-2706.1.nflxso.net/dnm/api/v...   
4 https://occ-0-2851-41.1.nflxso.net/dnm/api/v6/...   
  
 Poster \  
0 https://m.media-amazon.com/images/M/MV5BOWM4NT...   
1 https://m.media-amazon.com/images/M/MV5BZGUyN2...   
2 https://m.media-amazon.com/images/M/MV5BODAzOG...   
3 https://m.media-amazon.com/images/M/MV5BMTc0Nz...   
4 https://m.media-amazon.com/images/M/MV5BMjVmMz...   
  
 TMDb Trailer Trailer Site   
0 https://www.youtube.com/watch?v=LqB6XJix-dM YouTube   
1 https://www.youtube.com/watch?v=eIbcxPy4okQ YouTube   
2 https://www.youtube.com/watch?v=md3CmFLGK6Y YouTube   
3 https://www.youtube.com/watch?v=5kyF2vy63r0 YouTube   
4 https://www.youtube.com/watch?v=H0itWKFwMpQ YouTube   
  
[5 rows x 29 columns]

netflix.dtypes

Title object  
Genre object  
Tags object  
Languages object  
Series or Movie object  
Hidden Gem Score float64  
Country Availability object  
Runtime object  
Director object  
Writer object  
Actors object  
View Rating object  
IMDb Score float64  
Rotten Tomatoes Score float64  
Metacritic Score float64  
Awards Received float64  
Awards Nominated For float64  
Boxoffice object  
Release Date object  
Netflix Release Date object  
Production House object  
Netflix Link object  
IMDb Link object  
Summary object  
IMDb Votes float64  
Image object  
Poster object  
TMDb Trailer object  
Trailer Site object  
dtype: object

# Q2: What Pandas method helps you identify missing values in the dataset, and how can you   
# count the number of missing values for each column?  
  
netflix.isna().sum()

Title 0  
Genre 25  
Tags 36  
Languages 170  
Series or Movie 0  
Hidden Gem Score 10  
Country Availability 11  
Runtime 1  
Director 2305  
Writer 1810  
Actors 111  
View Rating 2598  
IMDb Score 8  
Rotten Tomatoes Score 3980  
Metacritic Score 5343  
Awards Received 4199  
Awards Nominated For 3049  
Boxoffice 5671  
Release Date 208  
Netflix Release Date 0  
Production House 5032  
Netflix Link 0  
IMDb Link 324  
Summary 5  
IMDb Votes 10  
Image 0  
Poster 938  
TMDb Trailer 0  
Trailer Site 1  
dtype: int64

# handling missing values  
  
netflix\_cleaned = netflix.dropna() # Drop rows with any missing values  
  
netflix\_cleaned

Title \  
0 Lets Fight Ghost   
9 Joker   
10 I   
11 Harrys Daughters   
17 The Closet   
... ...   
9411 50 First Dates   
9412 21   
9414 One Chance   
9415 The Twilight Saga: Breaking Dawn: Part 1   
9416 One for the Money   
  
 Genre \  
0 Crime, Drama, Fantasy, Horror, Romance   
9 Crime, Drama, Thriller   
10 Action, Adventure, Fantasy, Sci-Fi   
11 Adventure, Drama, Fantasy, Mystery   
17 Comedy   
... ...   
9411 Comedy, Drama, Romance   
9412 Crime, Drama, History, Thriller   
9414 Biography, Comedy, Drama, Music   
9415 Adventure, Drama, Fantasy, Romance, Thriller   
9416 Action, Comedy, Crime, Thriller   
  
 Tags \  
0 Comedy Programmes,Romantic TV Comedies,Horror ...   
9 Dark Comedies,Crime Comedies,Dramas,Comedies,C...   
10 Dramas,Swedish Movies   
11 Dramas,Swedish Movies   
17 Korean Movies,Horror Movies,Mysteries   
... ...   
9411 Romantic Favourites,Romantic Comedies,Comedies...   
9412 Dramas,Dramas based on a book,Police Dramas,Po...   
9414 Dramas,Biographical Dramas,Dramas based on rea...   
9415 Dramas,Romantic Dramas,Dramas based on a book,...   
9416 Romantic Comedies,Action Comedies,Comedies,Pol...   
  
 Languages Series or Movie Hidden Gem Score \  
0 Swedish, Spanish Series 4.3   
9 English Movie 3.5   
10 English, Sanskrit Movie 2.8   
11 English Movie 4.4   
17 French Movie 3.8   
... ... ... ...   
9411 English, Hawaiian, Mandarin Movie 2.7   
9412 English Movie 2.5   
9414 English, Italian Movie 3.0   
9415 English, Portuguese Movie 2.0   
9416 English Movie 1.3   
  
 Country Availability Runtime \  
0 Thailand < 30 minutes   
9 Lithuania,Poland,France,Italy,Spain,Greece,Bel... 1-2 hour   
10 Lithuania,Poland,France,Italy,Spain,Greece,Cze... 1-2 hour   
11 Lithuania,Poland,France,Italy,Spain,Greece,Cze... 1-2 hour   
17 South Korea 1-2 hour   
... ... ...   
9411 Hong Kong,South Korea,Japan,United Kingdom,Tha... 1-2 hour   
9412 South Korea,Russia,Hong Kong,Portugal,Belgium,... > 2 hrs   
9414 Japan,Malaysia 1-2 hour   
9415 Canada,Romania,Japan,Switzerland,United Kingdo... > 2 hrs   
9416 Canada 1-2 hour   
  
 Director Writer \  
0 Tomas Alfredson John Ajvide Lindqvist   
9 Todd Phillips Bob Kane, Jerry Robinson, Bill Finger, Todd Ph...   
10 George Lucas George Lucas   
11 David Yates Steve Kloves, J.K. Rowling   
17 Francis Veber Francis Veber   
... ... ...   
9411 Peter Segal George Wing   
9412 Robert Luketic Allan Loeb, Peter Steinfeld, Ben Mezrich   
9414 David Frankel Justin Zackham   
9415 Bill Condon Melissa Rosenberg, Stephenie Meyer   
9416 Julie Anne Robinson Stacy Sherman, Liz Brixius, Janet Evanovich, K...   
  
 ... Netflix Release Date \  
0 ... 2021-03-04   
9 ... 2021-03-03   
10 ... 2021-03-03   
11 ... 2021-03-03   
17 ... 2021-03-01   
... ... ...   
9411 ... 2015-04-14   
9412 ... 2015-04-14   
9414 ... 2015-04-14   
9415 ... 2015-04-14   
9416 ... 2015-04-14   
  
 Production House \  
0 Canal+, Sandrew Metronome   
9 Bron Studios, Creative Wealth Media Finance, D...   
10 Lucasfilm Ltd.   
11 Heyday Films, Moving Picture Company, Warner B...   
17 Miramax, Gaumont   
... ...   
9411 Columbia Pictures Corporation, Flower Films, A...   
9412 Trigger Street Productions, Michael De Luca   
9414 Relevant Entertainment, Weston Pictures   
9415 Temple Hill   
9416 Lakeshore Entertainment, Sidney Kimmel Enterta...   
  
 Netflix Link \  
0 https://www.netflix.com/watch/81415947   
9 https://www.netflix.com/watch/81382215   
10 https://www.netflix.com/watch/81382114   
11 https://www.netflix.com/watch/81382102   
17 https://www.netflix.com/watch/81405032   
... ...   
9411 https://www.netflix.com/watch/60033311   
9412 https://www.netflix.com/watch/70084788   
9414 https://www.netflix.com/watch/70266683   
9415 https://www.netflix.com/watch/70202142   
9416 https://www.netflix.com/watch/70205463   
  
 IMDb Link \  
0 https://www.imdb.com/title/tt1139797   
9 https://www.imdb.com/title/tt7286456   
10 https://www.imdb.com/title/tt0120915   
11 https://www.imdb.com/title/tt1201607   
17 https://www.imdb.com/title/tt0243493   
... ...   
9411 https://www.imdb.com/title/tt0343660   
9412 https://www.imdb.com/title/tt0478087   
9414 https://www.imdb.com/title/tt1196956   
9415 https://www.imdb.com/title/tt1324999   
9416 https://www.imdb.com/title/tt1598828   
  
 Summary IMDb Votes \  
0 A med student with a supernatural gift tries t... 205926.0   
9 A practical jokers fake kidnapping at a bachel... 951938.0   
10 A young man seeking his identity begins a roma... 733336.0   
11 As two sisters both experience pregnancy, trag... 766594.0   
17 A recent widowers move into a new house takes ... 16657.0   
... ... ...   
9411 After falling for a pretty art teacher who has... 327916.0   
9412 A brilliant group of students become card-coun... 230337.0   
9414 From shop worker to worldwide phenomena, this ... 11536.0   
9415 Not long after immortal soul mates Bella Swan ... 224372.0   
9416 A divorced, unemployed woman becomes a bounty ... 40841.0   
  
 Image \  
0 https://occ-0-4708-64.1.nflxso.net/dnm/api/v6/...   
9 https://occ-0-2851-41.1.nflxso.net/dnm/api/v6/...   
10 https://occ-0-2851-41.1.nflxso.net/dnm/api/v6/...   
11 https://occ-0-2851-41.1.nflxso.net/dnm/api/v6/...   
17 https://occ-0-395-988.1.nflxso.net/dnm/api/v6/...   
... ...   
9411 https://occ-0-138-38.1.nflxso.net/dnm/api/v6/e...   
9412 https://occ-0-2851-38.1.nflxso.net/dnm/api/v6/...   
9414 https://occ-0-768-769.1.nflxso.net/dnm/api/v6/...   
9415 https://occ-0-2773-2774.1.nflxso.net/dnm/api/v...   
9416 https://occ-0-2773-2774.1.nflxso.net/dnm/api/v...   
  
 Poster \  
0 https://m.media-amazon.com/images/M/MV5BOWM4NT...   
9 https://m.media-amazon.com/images/M/MV5BNGVjNW...   
10 https://m.media-amazon.com/images/M/MV5BYTRhNj...   
11 https://m.media-amazon.com/images/M/MV5BMGVmMW...   
17 https://m.media-amazon.com/images/M/MV5BMGRmNz...   
... ...   
9411 https://images-na.ssl-images-amazon.com/images...   
9412 https://images-na.ssl-images-amazon.com/images...   
9414 https://images-na.ssl-images-amazon.com/images...   
9415 https://images-na.ssl-images-amazon.com/images...   
9416 https://images-na.ssl-images-amazon.com/images...   
  
 TMDb Trailer Trailer Site   
0 https://www.youtube.com/watch?v=LqB6XJix-dM YouTube   
9 https://www.youtube.com/watch?v=t433PEQGErc YouTube   
10 https://www.youtube.com/watch?v=bD7bpG-zDJQ YouTube   
11 https://www.youtube.com/watch?v=5NYt1qirBWg YouTube   
17 https://www.youtube.com/watch?v=ou9YG0fUztA YouTube   
... ... ...   
9411 https://www.youtube.com/watch?v=Q\_2AbjYeSMI YouTube   
9412 https://www.youtube.com/watch?v=2v9z9EACSnU YouTube   
9414 https://www.youtube.com/watch?v=OdYt32WlvTY YouTube   
9415 https://www.youtube.com/watch?v=PQNLfo-SOR4 YouTube   
9416 https://www.youtube.com/watch?v=VqaDZsHnpJA YouTube   
  
[2155 rows x 29 columns]

netflix\_cleaned.isna().sum()

Title 0  
Genre 0  
Tags 0  
Languages 0  
Series or Movie 0  
Hidden Gem Score 0  
Country Availability 0  
Runtime 0  
Director 0  
Writer 0  
Actors 0  
View Rating 0  
IMDb Score 0  
Rotten Tomatoes Score 0  
Metacritic Score 0  
Awards Received 0  
Awards Nominated For 0  
Boxoffice 0  
Release Date 0  
Netflix Release Date 0  
Production House 0  
Netflix Link 0  
IMDb Link 0  
Summary 0  
IMDb Votes 0  
Image 0  
Poster 0  
TMDb Trailer 0  
Trailer Site 0  
dtype: int64

# Fill missing values with the mean  
  
# mode  
netflix['Genre'].fillna(netflix['Genre'].mode(), inplace=True)   
netflix['Tags'].fillna(netflix['Tags'].mode(), inplace=True)   
netflix['Languages'].fillna(netflix['Languages'].mode(), inplace=True)   
netflix['Boxoffice'].fillna(netflix['Boxoffice'].mode(), inplace=True)   
netflix['Release Date'].fillna(netflix['Release Date'].mode(), inplace=True)   
netflix['Production House'].fillna(netflix['Production House'].mode(), inplace=True)   
netflix['IMDb Link'].fillna(netflix['IMDb Link'].mode(), inplace=True)   
netflix['Summary'].fillna(netflix['Summary'].mode(), inplace=True)   
netflix['Country Availability'].fillna(netflix['Country Availability'].mode(), inplace=True)   
netflix['Runtime'].fillna(netflix['Runtime'].mode(), inplace=True)   
netflix['Director'].fillna(netflix['Director'].mode(), inplace=True)   
netflix['Writer'].fillna(netflix['Writer'].mode(), inplace=True)   
netflix['Actors'].fillna(netflix['Actors'].mode(), inplace=True)   
netflix['View Rating'].fillna(netflix['View Rating'].mode(), inplace=True)   
netflix['Image'].fillna(netflix['Image'].mode(), inplace=True)  
netflix['Poster'].fillna(netflix['Poster'].mode(), inplace=True)   
netflix['TMDb Trailer'].fillna(netflix['TMDb Trailer'].mode(), inplace=True)   
netflix['Trailer Site'].fillna(netflix['Trailer Site'].mode(), inplace=True)   
  
# mean  
netflix['Hidden Gem Score'].fillna(netflix['Hidden Gem Score'].mean(), inplace=True)   
netflix['IMDb Score'].fillna(netflix['IMDb Score'].mean(), inplace=True)   
netflix['Rotten Tomatoes Score'].fillna(netflix['Rotten Tomatoes Score'].mean(), inplace=True)   
netflix['Metacritic Score'].fillna(netflix['Metacritic Score'].mean(), inplace=True)   
netflix['Awards Received'].fillna(netflix['Awards Received'].mean(), inplace=True)   
netflix['Awards Nominated For'].fillna(netflix['Awards Nominated For'].mean(), inplace=True)   
netflix['IMDb Votes'].fillna(netflix['IMDb Votes'].mean(), inplace=True)   
  
  
   
  
# netflix.isna().sum()

# Q3: To get summary statistics for numerical columns, what Pandas method should you use,   
# and what insights can you gather from these statistics?  
  
netflix.describe()

Hidden Gem Score IMDb Score Rotten Tomatoes Score Metacritic Score \  
count 9425.000000 9425.000000 9425.000000 9425.000000   
mean 5.540733 6.955517 64.691276 58.113425   
std 2.446163 0.899299 19.206025 11.281250   
min 0.600000 1.600000 0.000000 6.000000   
25% 3.400000 6.500000 64.691276 58.113425   
50% 5.300000 7.000000 64.691276 58.113425   
75% 8.100000 7.500000 75.000000 58.113425   
max 9.800000 9.700000 100.000000 100.000000   
  
 Awards Received Awards Nominated For IMDb Votes   
count 9425.000000 9425.000000 9.425000e+03   
mean 9.735936 16.035602 6.014725e+04   
std 14.537740 26.491159 1.463060e+05   
min 1.000000 1.000000 5.000000e+00   
25% 3.000000 4.000000 9.720000e+02   
50% 9.735936 14.000000 6.644000e+03   
75% 9.735936 16.035602 5.112600e+04   
max 300.000000 386.000000 2.354197e+06

# Q4: Identify categorical columns using a specific Pandas function, and explain the purpose   
# of the loop iterating through these columns  
  
  
netflix.select\_dtypes(include='object').columns

Index(['Title', 'Genre', 'Tags', 'Languages', 'Series or Movie',  
 'Country Availability', 'Runtime', 'Director', 'Writer', 'Actors',  
 'View Rating', 'Boxoffice', 'Release Date', 'Netflix Release Date',  
 'Production House', 'Netflix Link', 'IMDb Link', 'Summary', 'Image',  
 'Poster', 'TMDb Trailer', 'Trailer Site'],  
 dtype='object')

# Iterate through columns and print unique values  
for col in netflix.columns:  
 unique\_values = netflix[col].unique()  
 print(f"Unique values in column '{col}':")  
 print(unique\_values)  
 print() # Add a blank line for better readability

Unique values in column 'Title':  
['Lets Fight Ghost' 'HOW TO BUILD A GIRL' 'The Con-Heartist' ...  
 'Brand New Day' 'Daniel Arends: Blessuretijd'  
 'DreamWorks Happy Holidays from Madagascar']  
  
Unique values in column 'Genre':  
['Crime, Drama, Fantasy, Horror, Romance' 'Comedy' 'Comedy, Romance' ...  
 'Action, Animation, Comedy, Romance'  
 'Animation, Action, Adventure, Fantasy, Sport, Thriller'  
 'Adventure, Drama, Fantasy, Romance, Thriller']  
  
Unique values in column 'Tags':  
['Comedy Programmes,Romantic TV Comedies,Horror Programmes,Thai TV Programmes'  
 'Dramas,Comedies,Films Based on Books,British'  
 'Romantic Comedies,Comedies,Romantic Films,Thai Comedies,Thai Films' ...  
 'Social & Cultural Documentaries,Biographical Documentaries,Documentaries,Science & Nature Documentaries,Documentaries'  
 'Australian Comedies,Romantic Comedies,Australian Films,Comedies,Romantic Films'  
 'TV Comedies,Kids TV,Animal Tales,TV Cartoons,TV Programmes,Romantic Favorites,Family Watch Together TV']  
  
Unique values in column 'Languages':  
['Swedish, Spanish' 'English' 'Thai' ...  
 'English, French, Tibetan, Mandarin, Russian, Hindi, Portuguese, Latin, Italian, Spanish'  
 'English, Ibo, Yoruba, Hausa' 'English, Hawaiian, Mandarin']  
  
Unique values in column 'Series or Movie':  
['Series' 'Movie']  
  
Unique values in column 'Hidden Gem Score':  
[4.3 7. 8.6 8.7 8.3 5.3  
 2. 7.8 8.8 3.5 2.8 4.4  
 8.5 3.8 6.7 7.1 8.4 7.6  
 7.7 6.2 9.3 7.3 4.2 4.1  
 8.2 8.1 6.4 8. 7.9 8.9  
 7.4 3.1 3.6 6.3 5.4 4.  
 2.6 9. 2.3 9.2 6.6 3.4  
 2.5 3.9 2.4 5.9 6.8 3.7  
 6.1 5.7 7.2 3. 5. 9.7  
 3.2 9.1 2.9 6. 6.9 9.8  
 7.5 2.2 5.8 5.6 1.9 4.9  
 1.7 3.3 1.4 2.7 1.5 4.5  
 1.6 1.2 6.5 2.1 5.2 5.1  
 5.5 4.6 9.4 9.6 4.7 4.8  
 9.5 1.3 1.8 5.54073287 1. 0.9  
 0.8 1.1 0.6 0.7 ]  
  
Unique values in column 'Country Availability':  
['Thailand' 'Canada' 'Poland' ...  
 'Hungary,Lithuania,Romania,United Kingdom,Belgium,Switzerland,Czech Republic,Netherlands,South Korea,Italy,Poland,Greece,Slovakia,Sweden'  
 'Hungary,Lithuania,India,Australia,United Kingdom,Canada,Russia,South Africa,Czech Republic,Iceland'  
 'Belgium,Switzerland,United States,Germany,United Kingdom,France,India,Russia,Greece,Slovakia,Singapore,Poland,Czech Republic,Lithuania,Hong Kong,Romania,South Africa,Australia,Spain,Iceland,Portugal,South Korea,Japan,Thailand,Hungary,Turkey,Mexico,Canada,Argentina,Malaysia,Brazil,Netherlands,Italy,Israel,Colombia']  
  
Unique values in column 'Runtime':  
['< 30 minutes' '1-2 hour' '> 2 hrs' '30-60 mins' nan]  
  
Unique values in column 'Director':  
['Tomas Alfredson' 'Coky Giedroyc' 'Mez Tharatorn' ...  
 'Patrick Alessandrin' 'Jason Spingarn-Koff' 'Amos Gitai']  
  
Unique values in column 'Writer':  
['John Ajvide Lindqvist' 'Caitlin Moran'  
 'Pattaranad Bhiboonsawade, Mez Tharatorn, Thodsapon Thiptinnakorn' ...  
 'Noel Clarke' 'Géla Babluani, Greg Pruss' 'Josh Goldsmith, Cathy Yuspa']  
  
Unique values in column 'Actors':  
['Lina Leandersson, Kåre Hedebrant, Per Ragnar, Henrik Dahl'  
 'Cleo, Paddy Considine, Beanie Feldstein, Dónal Finn'  
 'Kathaleeya McIntosh, Nadech Kugimiya, Pimchanok Leuwisetpaiboon, Thiti Mahayotaruk'  
 ... 'Teasa Copprue'  
 'Ryuichi Sakamoto, Clem Burke, Annie Lennox, Patrick Seymour'  
 'Jung Hyun Kim']  
  
Unique values in column 'View Rating':  
['R' nan 'PG-13' 'PG' 'TV-14' 'TV-MA' 'TV-Y7' 'Not Rated' 'Unrated'  
 'Approved' 'G' 'TV-G' 'Passed' 'TV-Y' 'TV-PG' 'GP' 'MA-17' 'TV-Y7-FV'  
 'M/PG' 'X' 'AL' 'NC-17' 'TV-13' 'NOT RATED' 'E']  
  
Unique values in column 'IMDb Score':  
[7.9 5.8 7.4 7.5 6.7 6.6  
 6.2 7.6 7.7 8.4 6.5 8.1  
 7.3 7. 7.1 7.2 6.9 8.6  
 8.3 8.2 8. 4.8 6.8 6.3  
 5.5 7.8 4.7 8.5 6.1 5.6  
 5.7 6. 5.9 5.4 6.4 9.4  
 9.7 4.9 8.7 8.8 9. 4.6  
 5.2 5.3 5. 3.7 8.9 5.1  
 2.8 9.1 4.3 4.1 3.1 4.5  
 3.3 3.6 3.4 3.2 9.5 9.2  
 4. 6.95551662 4.4 3.5 9.3 3.8  
 3.9 2.7 4.2 2.5 2.9 2.2  
 1.6 ]  
  
Unique values in column 'Rotten Tomatoes Score':  
[ 98. 79. 64.6912764 20. 92. 68.  
 52. 96. 89. 85. 51. 87.  
 86. 100. 88. 45. 83. 61.  
 90. 75. 94. 30. 56. 91.  
 77. 82. 78. 73. 44. 93.  
 72. 97. 40. 35. 42. 54.  
 46. 36. 59. 64. 69. 43.  
 60. 84. 53. 62. 74. 70.  
 66. 63. 80. 95. 12. 71.  
 99. 76. 67. 65. 81. 50.  
 13. 38. 6. 55. 11. 29.  
 41. 24. 28. 57. 58. 7.  
 26. 8. 14. 33. 25. 10.  
 47. 48. 31. 22. 32. 27.  
 37. 49. 1. 34. 23. 19.  
 15. 39. 18. 21. 16. 0.  
 17. 4. 9. 5. 3. 2. ]  
  
Unique values in column 'Metacritic Score':  
[ 82. 69. 58.11342479 36. 59.  
 51. 85. 72. 37. 67.  
 86. 90. 46. 54. 75.  
 71. 48. 63. 57. 65.  
 60. 95. 77. 50. 44.  
 40. 70. 43. 42. 52.  
 62. 78. 73. 55. 81.  
 47. 76. 79. 45. 61.  
 66. 68. 56. 80. 83.  
 58. 33. 53. 64. 41.  
 28. 30. 34. 14. 9.  
 94. 39. 84. 26. 38.  
 24. 32. 91. 29. 74.  
 93. 89. 88. 22. 96.  
 49. 35. 31. 92. 99.  
 17. 27. 87. 21. 19.  
 97. 23. 18. 12. 25.  
 13. 16. 11. 98. 100.  
 6. 20. 15. ]  
  
Unique values in column 'Awards Received':  
[ 74. 1. 9.73593571 2. 7.  
 112. 26. 46. 23. 9.  
 10. 4. 5. 19. 34.  
 3. 12. 25. 54. 6.  
 13. 31. 11. 8. 40.  
 37. 14. 232. 32. 58.  
 27. 16. 43. 22. 70.  
 21. 20. 28. 18. 15.  
 64. 44. 30. 60. 123.  
 96. 124. 17. 104. 47.  
 56. 300. 35. 38. 57.  
 29. 48. 86. 36. 61.  
 69. 24. 139. 55. 77.  
 127. 137. 75. 132. 39.  
 107. 95. 53. 79. 52.  
 97. 33. 42. 51. 251.  
 151. 129. 116. 66. 109.  
 49. 242. 68. 59. 229.  
 102. 105. 76. 65. 98.  
 41. 90. 45. 73. 241.  
 83. 82. 50. 194. 72.  
 239. 85. 134. 80. 173.  
 67. 156. 119. 63. 142.  
 84. 89. 158. 87. 164.  
 133. 111. 161. 117. 91.  
 126. 210. 154. 78. 114.  
 152. ]  
  
Unique values in column 'Awards Nominated For':  
[ 57. 16.03560226 4. 1. 2.  
 5. 228. 69. 94. 8.  
 3. 14. 11. 7. 16.  
 19. 33. 9. 27. 6.  
 48. 38. 12. 17. 42.  
 75. 29. 46. 18. 32.  
 20. 13. 22. 70. 21.  
 317. 23. 26. 43. 107.  
 39. 15. 10. 61. 45.  
 34. 47. 136. 167. 31.  
 24. 187. 50. 72. 178.  
 180. 97. 119. 37. 143.  
 28. 131. 63. 262. 71.  
 133. 54. 98. 226. 58.  
 25. 205. 86. 41. 30.  
 35. 175. 95. 51. 108.  
 65. 105. 64. 87. 355.  
 44. 81. 116. 103. 66.  
 265. 345. 49. 334. 225.  
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 55. 208. 62. 111. 92.  
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 154. 120. 89. 59. 114.  
 212. 199. 255. 52. 224.  
 79. 40. 129. 148. 251.  
 67. 85. 117. 281. 104.  
 88. 76. 263. 112. 91.  
 106. 290. 165. 134. 150.  
 248. 218. 100. 277. 78.  
 77. 157. 123. 209. 80.  
 196. 102. 156. 231. 186.  
 60. 84. 153. 159. 135.  
 185. 68. 146. 335. 83.  
 74. 93. 130. 99. 82.  
 125. 217. 179. 158. 163.  
 252. 128. 173. 193. 121.  
 169. 210. 139. 383. 101.  
 172. 149. 151. 232. 386.  
 204. 126. 124. 220. 132.  
 115. 223. 183. 238. 215.  
 138. ]  
  
Unique values in column 'Boxoffice':  
['$2,122,065' '$70,632' nan ... '$26,414,527' '$36,136' '$57,231,747']  
  
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['12 Dec 2008' '08 May 2020' '03 Dec 2020' ... '02 Jun 2010' '23 Apr 2004'  
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Unique values in column 'Netflix Release Date':  
['2021-03-04' '2021-03-03' '2021-03-02' ... '2016-04-11' '2016-02-12'  
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Unique values in column 'Production House':  
['Canal+, Sandrew Metronome' 'Film 4, Monumental Pictures, Lionsgate' nan  
 ...  
 'Unstoppable Entertainment, Atlantic Swiss Productions, Retro-Juice Productions'  
 'Overnight Films' 'Revolution Studios, Thirteen Productions LLC']  
  
Unique values in column 'Netflix Link':  
['https://www.netflix.com/watch/81415947'  
 'https://www.netflix.com/watch/81041267'  
 'https://www.netflix.com/watch/81306155' ...  
 'https://www.netflix.com/watch/70125340'  
 'https://www.netflix.com/watch/70281233'  
 'https://www.netflix.com/watch/70259784']  
  
Unique values in column 'IMDb Link':  
['https://www.imdb.com/title/tt1139797'  
 'https://www.imdb.com/title/tt4193072'  
 'https://www.imdb.com/title/tt13393728' ...  
 'https://www.imdb.com/title/tt1247640'  
 'https://www.imdb.com/title/tt0337563'  
 'https://www.imdb.com/title/tt1518809']  
  
Unique values in column 'Summary':  
['A med student with a supernatural gift tries to cash in on his abilities by facing off against ghosts, till a wandering spirit brings romance instead.'  
 'When nerdy Johanna moves to London, things get out of hand when she reinvents herself as a bad-mouthed music critic to save her poverty-stricken family.'  
 'After her ex-boyfriend cons her out of a large sum of money, a former bank employee tricks a scam artist into helping her swindle him in retaliation.'  
 ...  
 'In an idyllic port town on Australias west coast in the summer of 1969, carefree 16-year-old Willie enjoys hanging out with his pals and wooing a beautiful singer named Rosie -- until his mom ships him back to a Catholic boarding school in Perth.'  
 'In his third show, Daniël Arends argues that good deeds are a form of self interest, and evil deeds are a hobby.'  
 'Madagascar goes wild with holiday spirit in this set of Valentines Day and Christmas-themed tales featuring everyones favorite animal characters.']  
  
Unique values in column 'IMDb Votes':  
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Unique values in column 'Image':  
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Unique values in column 'Poster':  
['https://m.media-amazon.com/images/M/MV5BOWM4NTY2NTMtZDZlZS00NTgyLWEzZDMtODE3ZGI1MzI3ZmU5XkEyXkFqcGdeQXVyNzI1NzMxNzM@.\_V1\_SX300.jpg'  
 'https://m.media-amazon.com/images/M/MV5BZGUyN2ZlMjYtZTk2Yy00MWZiLWIyMDktMzFlMmEzOWVlMGNiXkEyXkFqcGdeQXVyMTE1MzI2NzIz.\_V1\_SX300.jpg'  
 'https://m.media-amazon.com/images/M/MV5BODAzOGZmNjUtMTIyMC00NGU1LTg5MTMtZWY4MDdiZjI0NGEwXkEyXkFqcGdeQXVyNzEyMTA5MTU@.\_V1\_SX300.jpg'  
 ...  
 'https://images-na.ssl-images-amazon.com/images/M/MV5BMTUyNjY5MDU4MF5BMl5BanBnXkFtZTcwNDAzNzEwMw@@.\_V1\_SX300.jpg'  
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Unique values in column 'TMDb Trailer':  
['https://www.youtube.com/watch?v=LqB6XJix-dM'  
 'https://www.youtube.com/watch?v=eIbcxPy4okQ'  
 'https://www.youtube.com/watch?v=md3CmFLGK6Y' ...  
 'https://www.youtube.com/watch?v=RnGRdaX594k'  
 'https://www.youtube.com/watch?v=vVCEm1G8Zss'  
 'https://www.youtube.com/watch?v=hOwDHUAQR9k']  
  
Unique values in column 'Trailer Site':  
['YouTube' 'Vimeo' nan]

netflix.isna().sum()

Title 0  
Genre 25  
Tags 36  
Languages 170  
Series or Movie 0  
Hidden Gem Score 0  
Country Availability 11  
Runtime 1  
Director 2305  
Writer 1810  
Actors 111  
View Rating 2598  
IMDb Score 0  
Rotten Tomatoes Score 0  
Metacritic Score 0  
Awards Received 0  
Awards Nominated For 0  
Boxoffice 5671  
Release Date 208  
Netflix Release Date 0  
Production House 5032  
Netflix Link 0  
IMDb Link 324  
Summary 5  
IMDb Votes 0  
Image 0  
Poster 938  
TMDb Trailer 0  
Trailer Site 1  
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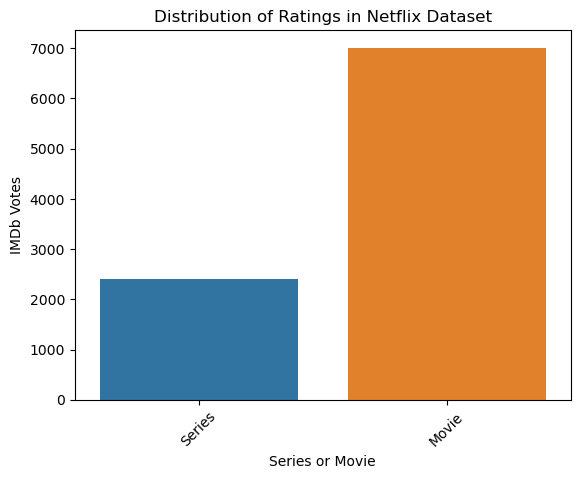
# mode  
column\_mo=['Genre','Tags','Languages','Country Availability','Runtime','Director','Writer','Actors','View Rating','Boxoffice','Release Date','Production House','IMDb Link','Summary','Poster','Trailer Site']  
for i in column\_mo:  
 mean\_value=netflix[i].mode()[0]  
 netflix[i].fillna(mean\_value,inplace=True)  
  
m\_v=netflix.isnull().sum()  
print(m\_v)  
  
# Mean   
column\_mean=['Hidden Gem Score','IMDb Score','Rotten Tomatoes Score','Metacritic Score','Awards Received','Awards Nominated For','IMDb Votes']  
for i in column\_mean:  
 mean\_value=netflix[i].mean()  
 netflix[i].fillna(mean\_value,inplace=True)  
  
m\_v=netflix.isnull().sum()  
print(m\_v)

Title 0  
Genre 0  
Tags 0  
Languages 0  
Series or Movie 0  
Hidden Gem Score 0  
Country Availability 0  
Runtime 0  
Director 0  
Writer 0  
Actors 0  
View Rating 0  
IMDb Score 0  
Rotten Tomatoes Score 0  
Metacritic Score 0  
Awards Received 0  
Awards Nominated For 0  
Boxoffice 0  
Release Date 0  
Netflix Release Date 0  
Production House 0  
Netflix Link 0  
IMDb Link 0  
Summary 0  
IMDb Votes 0  
Image 0  
Poster 0  
TMDb Trailer 0  
Trailer Site 0  
dtype: int64  
Title 0  
Genre 0  
Tags 0  
Languages 0  
Series or Movie 0  
Hidden Gem Score 0  
Country Availability 0  
Runtime 0  
Director 0  
Writer 0  
Actors 0  
View Rating 0  
IMDb Score 0  
Rotten Tomatoes Score 0  
Metacritic Score 0  
Awards Received 0  
Awards Nominated For 0  
Boxoffice 0  
Release Date 0  
Netflix Release Date 0  
Production House 0  
Netflix Link 0  
IMDb Link 0  
Summary 0  
IMDb Votes 0  
Image 0  
Poster 0  
TMDb Trailer 0  
Trailer Site 0  
dtype: int64

categorical\_columns=netflix.select\_dtypes(include=['object']).columns  
print(categorical\_columns)  
  
for column in categorical\_columns:  
 unique\_values=netflix[column].unique()  
 print(f"unique values in {column}:{unique\_values}")

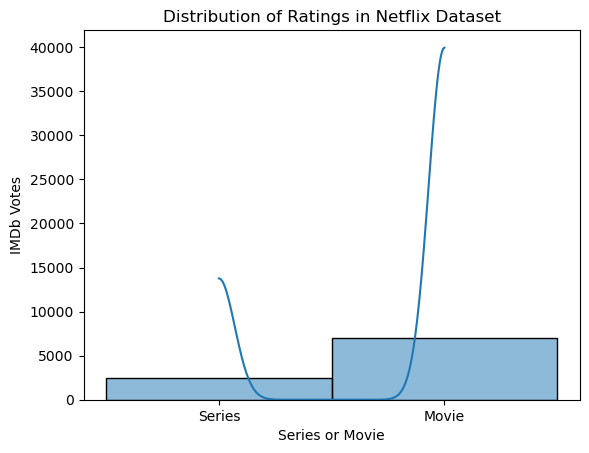
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 'Country Availability', 'Runtime', 'Director', 'Writer', 'Actors',  
 'View Rating', 'Boxoffice', 'Release Date', 'Netflix Release Date',  
 'Production House', 'Netflix Link', 'IMDb Link', 'Summary', 'Image',  
 'Poster', 'TMDb Trailer', 'Trailer Site'],  
 dtype='object')  
unique values in Title:['Lets Fight Ghost' 'HOW TO BUILD A GIRL' 'The Con-Heartist' ...  
 'Brand New Day' 'Daniel Arends: Blessuretijd'  
 'DreamWorks Happy Holidays from Madagascar']  
unique values in Genre:['Crime, Drama, Fantasy, Horror, Romance' 'Comedy' 'Comedy, Romance' ...  
 'Action, Animation, Comedy, Romance'  
 'Animation, Action, Adventure, Fantasy, Sport, Thriller'  
 'Adventure, Drama, Fantasy, Romance, Thriller']  
unique values in Tags:['Comedy Programmes,Romantic TV Comedies,Horror Programmes,Thai TV Programmes'  
 'Dramas,Comedies,Films Based on Books,British'  
 'Romantic Comedies,Comedies,Romantic Films,Thai Comedies,Thai Films' ...  
 'Social & Cultural Documentaries,Biographical Documentaries,Documentaries,Science & Nature Documentaries,Documentaries'  
 'Australian Comedies,Romantic Comedies,Australian Films,Comedies,Romantic Films'  
 'TV Comedies,Kids TV,Animal Tales,TV Cartoons,TV Programmes,Romantic Favorites,Family Watch Together TV']  
unique values in Languages:['Swedish, Spanish' 'English' 'Thai' ...  
 'English, French, Tibetan, Mandarin, Russian, Hindi, Portuguese, Latin, Italian, Spanish'  
 'English, Ibo, Yoruba, Hausa' 'English, Hawaiian, Mandarin']  
unique values in Series or Movie:['Series' 'Movie']  
unique values in Country Availability:['Thailand' 'Canada' 'Poland' ...  
 'Hungary,Lithuania,Romania,United Kingdom,Belgium,Switzerland,Czech Republic,Netherlands,South Korea,Italy,Poland,Greece,Slovakia,Sweden'  
 'Hungary,Lithuania,India,Australia,United Kingdom,Canada,Russia,South Africa,Czech Republic,Iceland'  
 'Belgium,Switzerland,United States,Germany,United Kingdom,France,India,Russia,Greece,Slovakia,Singapore,Poland,Czech Republic,Lithuania,Hong Kong,Romania,South Africa,Australia,Spain,Iceland,Portugal,South Korea,Japan,Thailand,Hungary,Turkey,Mexico,Canada,Argentina,Malaysia,Brazil,Netherlands,Italy,Israel,Colombia']  
unique values in Runtime:['< 30 minutes' '1-2 hour' '> 2 hrs' '30-60 mins']  
unique values in Director:['Tomas Alfredson' 'Coky Giedroyc' 'Mez Tharatorn' ...  
 'Patrick Alessandrin' 'Jason Spingarn-Koff' 'Amos Gitai']  
unique values in Writer:['John Ajvide Lindqvist' 'Caitlin Moran'  
 'Pattaranad Bhiboonsawade, Mez Tharatorn, Thodsapon Thiptinnakorn' ...  
 'Noel Clarke' 'Géla Babluani, Greg Pruss' 'Josh Goldsmith, Cathy Yuspa']  
unique values in Actors:['Lina Leandersson, Kåre Hedebrant, Per Ragnar, Henrik Dahl'  
 'Cleo, Paddy Considine, Beanie Feldstein, Dónal Finn'  
 'Kathaleeya McIntosh, Nadech Kugimiya, Pimchanok Leuwisetpaiboon, Thiti Mahayotaruk'  
 ... 'Teasa Copprue'  
 'Ryuichi Sakamoto, Clem Burke, Annie Lennox, Patrick Seymour'  
 'Jung Hyun Kim']  
unique values in View Rating:['R' 'PG-13' 'PG' 'TV-14' 'TV-MA' 'TV-Y7' 'Not Rated' 'Unrated' 'Approved'  
 'G' 'TV-G' 'Passed' 'TV-Y' 'TV-PG' 'GP' 'MA-17' 'TV-Y7-FV' 'M/PG' 'X'  
 'AL' 'NC-17' 'TV-13' 'NOT RATED' 'E']  
unique values in Boxoffice:['$2,122,065' '$70,632' '$474,544,677' ... '$26,414,527' '$36,136'  
 '$57,231,747']  
unique values in Release Date:['12 Dec 2008' '08 May 2020' '03 Dec 2020' ... '02 Jun 2010' '23 Apr 2004'  
 '17 Sep 1988']  
unique values in Netflix Release Date:['2021-03-04' '2021-03-03' '2021-03-02' ... '2016-04-11' '2016-02-12'  
 '2015-11-12']  
unique values in Production House:['Canal+, Sandrew Metronome' 'Film 4, Monumental Pictures, Lionsgate'  
 'Netflix' ...  
 'Unstoppable Entertainment, Atlantic Swiss Productions, Retro-Juice Productions'  
 'Overnight Films' 'Revolution Studios, Thirteen Productions LLC']  
unique values in Netflix Link:['https://www.netflix.com/watch/81415947'  
 'https://www.netflix.com/watch/81041267'  
 'https://www.netflix.com/watch/81306155' ...  
 'https://www.netflix.com/watch/70125340'  
 'https://www.netflix.com/watch/70281233'  
 'https://www.netflix.com/watch/70259784']  
unique values in IMDb Link:['https://www.imdb.com/title/tt1139797'  
 'https://www.imdb.com/title/tt4193072'  
 'https://www.imdb.com/title/tt13393728' ...  
 'https://www.imdb.com/title/tt1247640'  
 'https://www.imdb.com/title/tt0337563'  
 'https://www.imdb.com/title/tt1518809']  
unique values in Summary:['A med student with a supernatural gift tries to cash in on his abilities by facing off against ghosts, till a wandering spirit brings romance instead.'  
 'When nerdy Johanna moves to London, things get out of hand when she reinvents herself as a bad-mouthed music critic to save her poverty-stricken family.'  
 'After her ex-boyfriend cons her out of a large sum of money, a former bank employee tricks a scam artist into helping her swindle him in retaliation.'  
 ...  
 'In an idyllic port town on Australias west coast in the summer of 1969, carefree 16-year-old Willie enjoys hanging out with his pals and wooing a beautiful singer named Rosie -- until his mom ships him back to a Catholic boarding school in Perth.'  
 'In his third show, Daniël Arends argues that good deeds are a form of self interest, and evil deeds are a hobby.'  
 'Madagascar goes wild with holiday spirit in this set of Valentines Day and Christmas-themed tales featuring everyones favorite animal characters.']  
unique values in Image:['https://occ-0-4708-64.1.nflxso.net/dnm/api/v6/evlCitJPPCVCry0BZlEFb5-QjKc/AAAABcmgLCxN8dNahdY2kgd1hhcL2a6XrE92x24Bx5h6JFUvH5zMrv6lFWl\_aWMt33b6DHvkgsUeDx\_8Q1rmopwT3fuF8Rq3S1hrkvFf3uzVv2sb3zrtU-LM1Zy1FfrAKD3nKNyA\_RQWrmw.jpg?r=cd0'  
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 'https://images-na.ssl-images-amazon.com/images/M/MV5BMTYxNzkyMzU5MV5BMl5BanBnXkFtZTcwMjk4NzUxMw@@.\_V1\_SX300.jpg']  
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 'https://www.youtube.com/watch?v=eIbcxPy4okQ'  
 'https://www.youtube.com/watch?v=md3CmFLGK6Y' ...  
 'https://www.youtube.com/watch?v=RnGRdaX594k'  
 'https://www.youtube.com/watch?v=vVCEm1G8Zss'  
 'https://www.youtube.com/watch?v=hOwDHUAQR9k']  
unique values in Trailer Site:['YouTube' 'Vimeo']

# Q5: Create any plot to visualize the distribution of your choice . Which Seaborn function will   
# you use, and what information can you obtain from the plot  
  
import seaborn as sns  
import matplotlib.pyplot as plt  
  
# Assuming df is your DataFrame with a column 'cuisine\_type'  
sns.countplot(x='Series or Movie', data=netflix)  
plt.xticks(rotation=45) # Rotates the x-axis labels for better readability  
plt.title('Distribution of Ratings in Netflix Dataset')  
plt.xlabel('Series or Movie')  
plt.ylabel('IMDb Votes')  
plt.show()

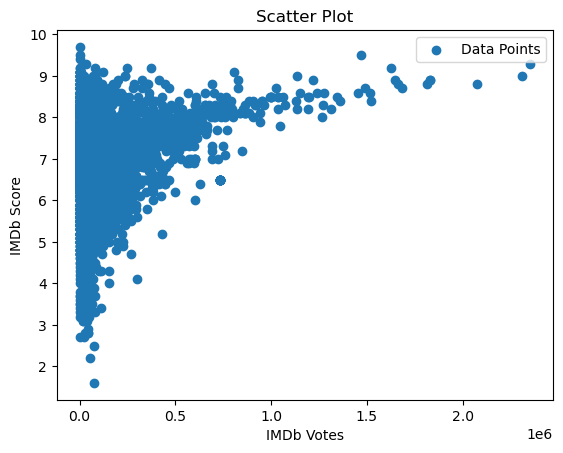


# Q6: Visualize the distribution of the 'Runtime' column using a Seaborn plot with specific   
# parameters. What insights can you gather from this visualization?  
  
import seaborn as sns  
import matplotlib.pyplot as plt  
  
# Assuming df is your DataFrame with a column 'ratings'  
sns.histplot(data=netflix, x='Series or Movie', bins=20, kde=True)  
plt.title('Distribution of Ratings in Netflix Dataset')  
plt.xlabel('Series or Movie')  
plt.ylabel('IMDb Votes')  
plt.show()

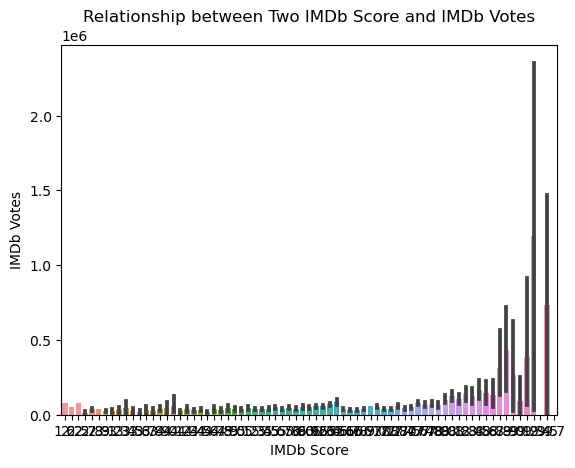
C:\Users\DELL\anaconda3\Lib\site-packages\seaborn\\_oldcore.py:1119: FutureWarning: use\_inf\_as\_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.  
 with pd.option\_context('mode.use\_inf\_as\_na', True):



# Q7: Create any plot of choice to explore the relationship between two numerical columns.   
# Which Seaborn function should you use, and what does the scatter plot reveal  
  
import matplotlib.pyplot as plt  
  
x = netflix['IMDb Votes']  
y = netflix['IMDb Score']  
  
# creating scatter plot  
plt.scatter(x,y, label = 'Data Points')  
  
# customizing the scatter plot  
plt.xlabel("IMDb Votes")  
plt.ylabel("IMDb Score")  
plt.title("Scatter Plot")  
  
# adding legend, inorder to show the text "Data Points"  
plt.legend()  
  
# Display the plot  
plt.show()

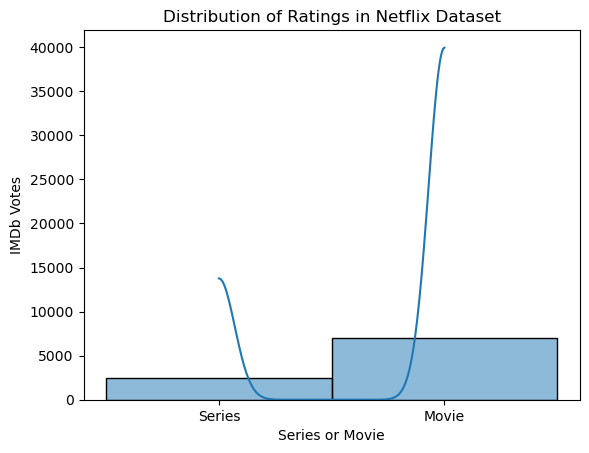


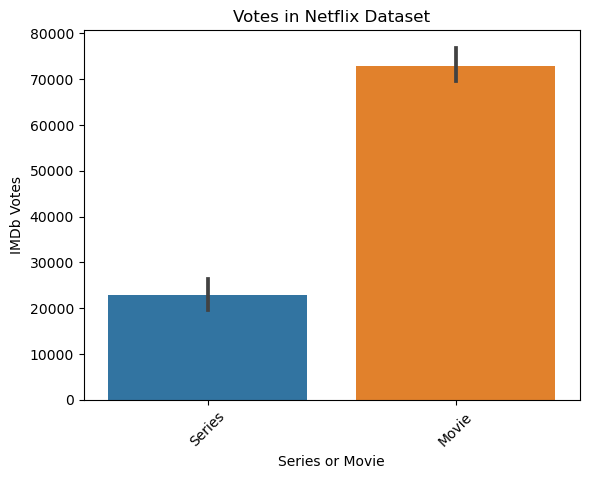
# Q8: Introduce a different type of visualization to gain more insights. What Seaborn or   
# Matplotlib function allows you to create this visualization  
  
  
import seaborn as sns  
import matplotlib.pyplot as plt  
  
# Assuming df is your DataFrame with columns 'cuisine\_type' and 'average\_rating'  
sns.barplot(x='IMDb Score', y='IMDb Votes', data=netflix)  
plt.title('Relationship between Two IMDb Score and IMDb Votes')  
plt.xlabel('IMDb Score')  
plt.ylabel('IMDb Votes')  
plt.show()



# Q9: How can you display the generated plots? Which Matplotlib function will you use to   
# showcase these visualizations  
  
import seaborn as sns  
import matplotlib.pyplot as plt  
  
  
  
#if you want to create a histogram of numerical ratings this is best  
sns.histplot(data=netflix, x='Series or Movie', bins=20, kde=True)  
plt.title('Distribution of Ratings in Netflix Dataset')  
plt.xlabel('Series or Movie')  
plt.ylabel('IMDb Votes')  
plt.show()  
  
#if you prefer a bar plot to show average ratings by cuisine type:  
sns.barplot(x='Series or Movie', y='IMDb Votes', data=netflix)  
plt.xticks(rotation=45)  
plt.title('Votes in Netflix Dataset')  
plt.xlabel('Series or Movie')  
plt.ylabel('IMDb Votes')  
plt.show()

C:\Users\DELL\anaconda3\Lib\site-packages\seaborn\\_oldcore.py:1119: FutureWarning: use\_inf\_as\_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.  
 with pd.option\_context('mode.use\_inf\_as\_na', True):





# Q10: Based on the visualizations, what conclusions or recommendations can you make about   
# the Netflix dataset? Consider patterns, trends, or interesting observations.  
  
  
# 1) Content Diversity: If analyzing genres or categories, you might observe that certain genres   
# are more prevalent than others. This could suggest Netflix's strategy in catering to diverse   
# viewer preferences while potentially focusing more on popular genres to attract a larger audience  
  
  
  
# 3) Viewer Engagement: Visualizations of viewer engagement metrics (such as viewing duration or session frequency)   
# could reveal patterns in how users interact with the platform. For instance, spikes in viewing duration during   
# weekends or evenings might indicate peak viewing times, influencing content release strategies or advertising campaigns.