In [60]:
```
# Importing necessary packages
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import r2_score
```

In [29]:
```
# Importing the CSV file into a pandas DataFrame
file_path = 'C:/Users/vinay/Desktop/Siplilearn/Python/Projects/1569582940_google
data = pd.read_csv('C:/Users/vinay/Desktop/Siplilearn/Python/Projects/1569582940
```

In [31]:
```
# Displaying the first few rows of the dataset
print(data.head())
```

```
                                                 App        Category  Rating  \
0     Photo Editor & Candy Camera & Grid & ScrapBook  ART_AND_DESIGN     4.1
1                                Coloring book moana  ART_AND_DESIGN     3.9
2  U Launcher Lite – FREE Live Cool Themes, Hide ...  ART_AND_DESIGN     4.7
3                              Sketch - Draw & Paint  ART_AND_DESIGN     4.5
4              Pixel Draw - Number Art Coloring Book  ART_AND_DESIGN     4.3

  Reviews  Size     Installs  Type Price Content Rating  \
0     159   19M      10,000+  Free     0       Everyone
1     967   14M     500,000+  Free     0       Everyone
2   87510  8.7M   5,000,000+  Free     0       Everyone
3  215644   25M  50,000,000+  Free     0           Teen
4     967  2.8M     100,000+  Free     0       Everyone

                      Genres      Last Updated         Current Ver  \
0               Art & Design   January 7, 2018               1.0.0
1  Art & Design;Pretend Play  January 15, 2018               2.0.0
2               Art & Design    August 1, 2018               1.2.4
3               Art & Design      June 8, 2018  Varies with device
4    Art & Design;Creativity     June 20, 2018                 1.1

    Android Ver
0  4.0.3 and up
1  4.0.3 and up
2  4.0.3 and up
3    4.2 and up
4    4.4 and up
```

In [33]:
```
# Checking for null values in the data
null_values = data.isnull().sum()
```

In [35]:
```
# Dsiplaying the number of null values for each column
print(null_values)
```

```
App                  0
Category             0
Rating            1474
Reviews              0
Size                 0
Installs             0
Type                 1
Price                0
Content Rating       1
Genres               0
Last Updated         0
Current Ver          8
Android Ver          3
dtype: int64
```

In [37]:
```
# Drop rows with any null values
data = data.dropna()
```

In [39]:
```
# Rechecking for null values in the data
null_values = data.isnull().sum()
print(null_values)
```

```
App               0
Category          0
Rating            0
Reviews           0
Size              0
Installs          0
Type              0
Price             0
Content Rating    0
Genres            0
Last Updated      0
Current Ver       0
Android Ver       0
dtype: int64
```

In [41]:
```
data.loc[data['Size'] == '1000+', 'Size'] = 0
```

In [43]:
```
data.loc[data['Size'] == 'Varies with device', 'Size'] = 0
```

In [45]:
```
# Convert 'k' values to numeric
data.loc[data['Size'].str.contains('k', na=False), 'Size'] = data.loc[data['Size
```

In [47]:
```
# Convert 'M' values to numeric
data.loc[data['Size'].str.contains('M', na=False), 'Size'] = data.loc[data['Size
```

In [49]:
```
# Set pandas options to display all rows and columns
pd.set_option('display.max_rows', None)
pd.set_option('display.max_columns', None)
pd.set_option('display.width', None)
pd.set_option('display.max_colwidth', None)
```

In [ ]:
```
# Replace 'M' in 'Reviews' with an empty string, convert to float, multiply by 1
mask = data ['Reviews'].str.contains('M', na=False)
data.loc[mask, 'Reviews'] = data.loc [mask, 'Reviews']. str.replace('M', '') * 1
```

In [57]:
```
data.to_csv('C:/Users/vinay/Desktop/Siplilearn/Python/Projects/1569582940_google
```

In [117…
```
# Convert the 'Reviews' column to integer type
data['Reviews'] = data['Reviews'].astype(int)
```

In [119…
```
# Convert the 'Size' column to float type
data['Size'] = data['Size'].astype(float)
```

In [121…
```
# Convert 'Installs' column to integer by removing '+' and ',' characters
def convert_installs(installs):
    if isinstance(installs, str):
        return int(installs.replace('+', '').replace(',', ''))
    return installs
data['Installs'] = data['Installs'].apply(convert_installs)
```

In [123…
```
pd.reset_option('display.max_rows')
```

In [125…
```
print(data.dtypes)
```

```
App                object
Category           object
Rating            float64
Reviews             int32
Size              float64
Installs            int64
Type               object
Price              object
Content Rating     object
Genres             object
Last Updated       object
Current Ver        object
Android Ver        object
dtype: object
```

In [127…
```
free_rows = data[data['Installs'] == 'Free']
```

In [109…
```
print (free_rows)
```

```
Empty DataFrame
Columns: [App, Category, Rating, Reviews, Size, Installs, Type, Price, Content Ra
ting, Genres, Last Updated, Current Ver, Android Ver]
Index: []
```

In [137…
```
# Convert 'Price' column to float by removing '$' character
def convert_price(price):
    if isinstance(price, str):
        return float(price.replace('$', ''))
    return price
data['Price'] = data['Price'].apply(convert_price)
```

In [34]:
```
print(data['Rating'].unique())
```

```
[4.1 3.9 4.7 4.5 4.3 4.4 3.8 4.2 4.6 4.  4.8 4.9 3.6 3.7 3.2 3.3 3.4 3.5
 3.1 5.  2.6 3.  1.9 2.5 2.8 2.7 1.  2.9 2.3 2.2 1.7 2.  1.8 2.4 1.6 2.1
 1.4 1.5 1.2]
```

In [143…
```
# Check for rows with ratings lower than 1 or greater than 5
invalid_rating = data[(data['Rating']<1) | (data['Rating']>5)]
print("Rows with invalid ratings")
print(invalid_rating)
```

```
Rows with invalid ratings
Empty DataFrame
Columns: [App, Category, Rating, Reviews, Size, Installs, Type, Price, Content Ra
ting, Genres, Last Updated, Current Ver, Android Ver]
Index: []
```

In [161…
```
# Filtering rows where the number of reviews exceeds the number of installs
data[data['Reviews'] > data['Installs']]
```

Out[161…

App	Category	Rating	Reviews	Size	Installs	Type	Price	Content Rating	Genres	La Updat

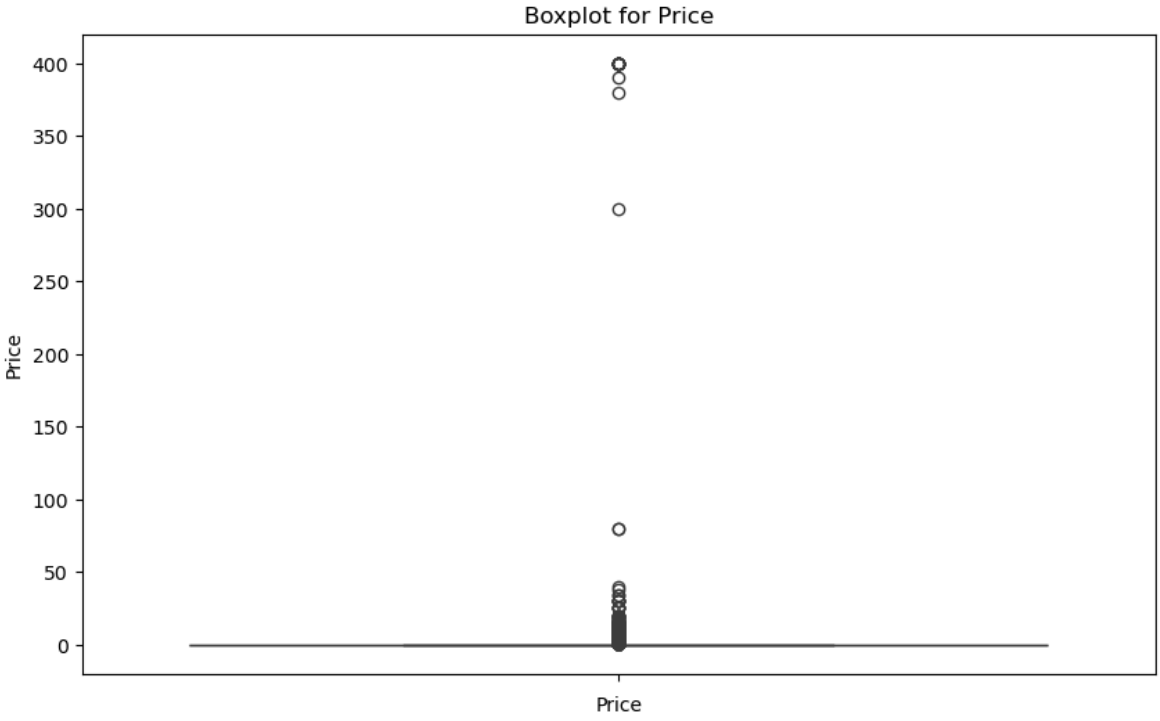
In [179…
```
# Filter rows where app type is 'Free' and price > 0
data[(data['Type'] == 'Free') & (data['Price'] > 0)]
```

Out[179…

App	Category	Rating	Reviews	Size	Installs	Type	Price	Content Rating	Genres	La Updat

In [ ]:
```
# Performing univariate analysis
```

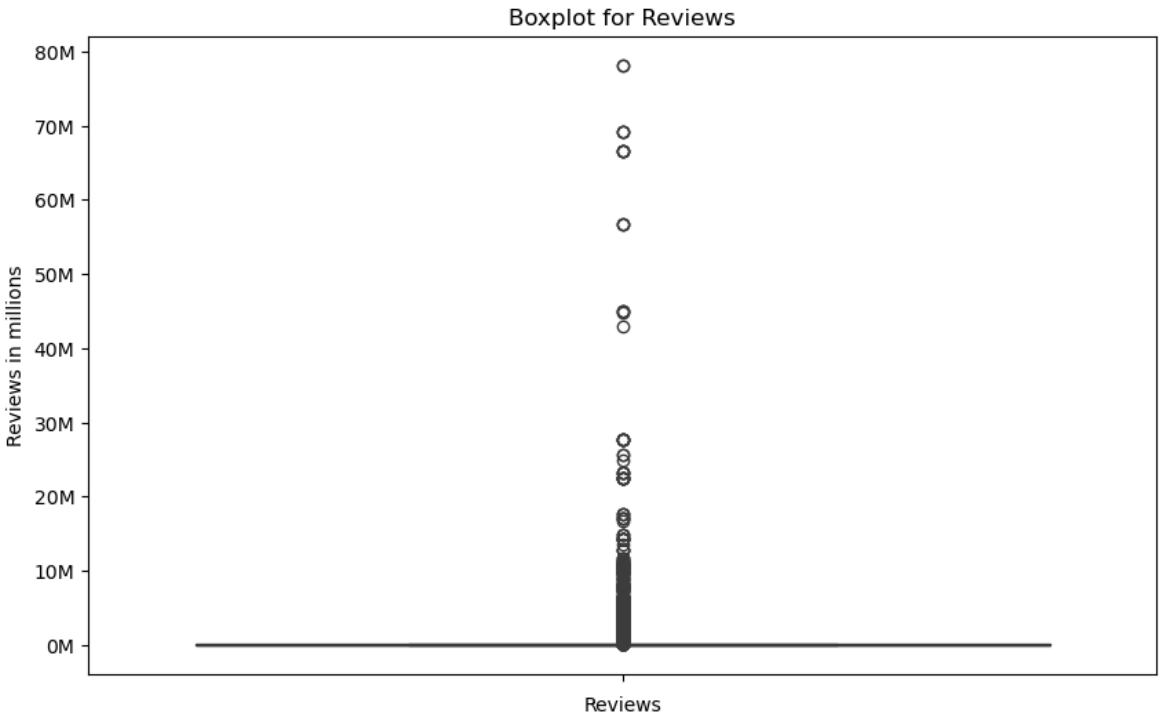
In [187…
```
# Boxplot for the Price column
plt.figure(figsize = (10,6))
sns.boxplot(data['Price'])
plt.title('Boxplot for Price')
plt.xlabel('Price')
plt.show()
```



In [104…
```
# Yes, there are outliers in the price of apps on the Play Store, with several p
```

In [44]:
```
# Boxplot for the Reviews column
plt.figure(figsize = (10,6))
```

```
sns.boxplot(data['Reviews'])
plt.title('Boxplot for Reviews')
plt.xlabel('Reviews')
plt.ylabel('Reviews in millions')
plt.yticks(ticks=range(0, 81000000, 10000000), labels=[f'{i}M' for i in range(0,
plt.show()
```

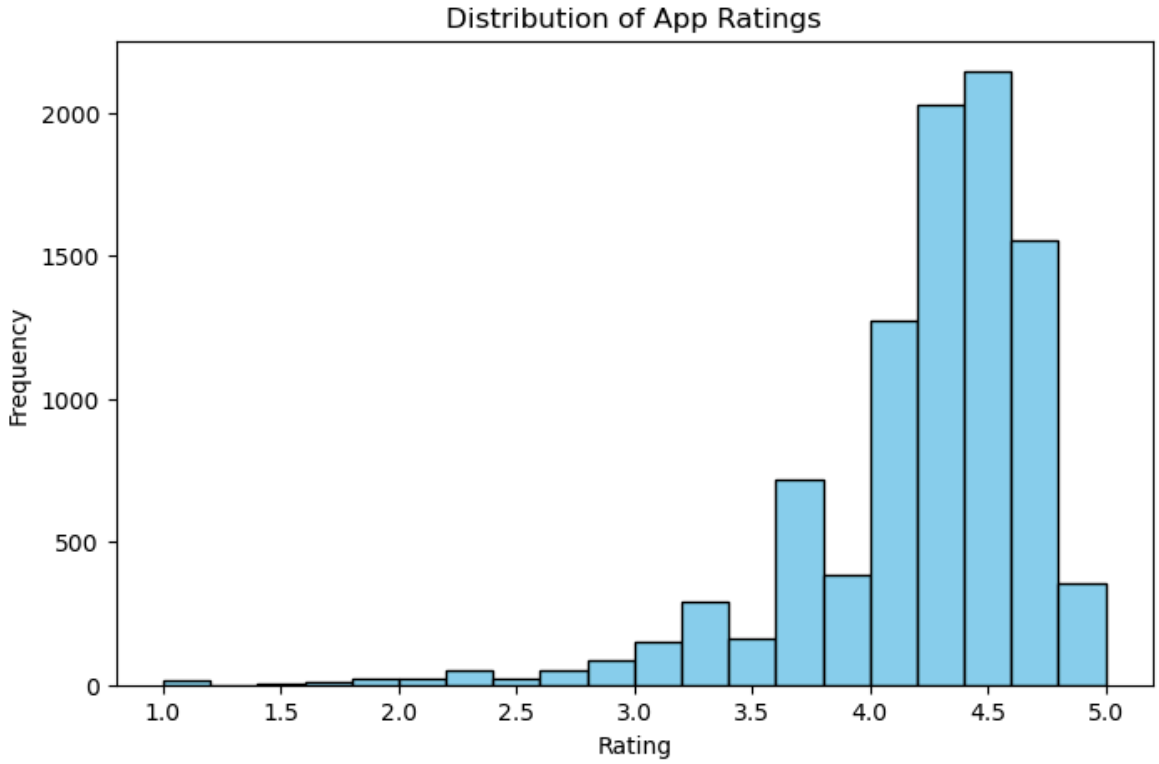


In [102…
```
#Yes, there are apps with an exceptionally high number of reviews, indicating th
```

In [200…
```
# Save the DataFrame to a CSV file
data.to_csv(r'C:\Users\vinay\Desktop\Siplilearn\Python\Projects\1569582940_googl
```

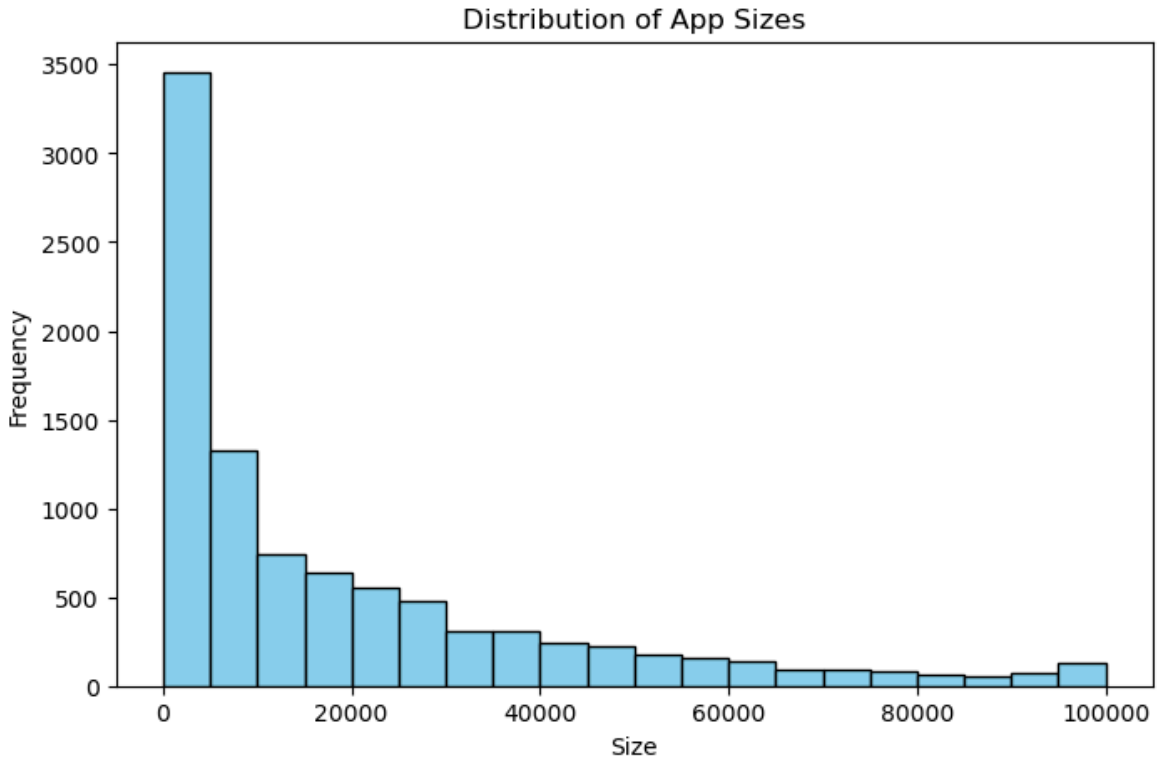
In [8]:
```
data = pd.read_csv(r'C:\Users\vinay\Desktop\Siplilearn\Python\Projects\156958294
```

In [18]:
```
# Histogram for a rating column
plt.figure(figsize=(8,5))
plt.hist(data['Rating'].dropna(), bins=20, edgecolor='black', color='skyblue')
plt.xlabel('Rating')
plt.ylabel('Frequency')
plt.title('Distribution of App Ratings')

plt.show()
```



In [100…
```
# The ratings are skewed towards higher values, with the majority of apps receiv
```

In [24]:
```
# Histogram for a size column
plt.figure(figsize=(8,5))
plt.hist(data['Size'].dropna(), bins=20, edgecolor='black', color='skyblue')
plt.xlabel('Size')
plt.ylabel('Frequency')
plt.title('Distribution of App Sizes')

plt.show()
```



In [98]:
```
# The majority of apps are smaller in size, with a significant drop in frequency
```

In [62]:
```
# Filter rows where Price > 200
High_price = data[data['Price'] > 200]
print(High_price)
```

```
                                App   Category  Rating  Reviews     Size  \
4035          most expensive app (H)     FAMILY     4.3        6   1500.0
4188                       💎 I'm rich  LIFESTYLE     3.8      718  26000.0
4193       I'm Rich - Trump Edition  LIFESTYLE     3.6      275   7300.0
5040                      I am rich  LIFESTYLE     3.8     3547   1800.0
5043                  I am Rich Plus     FAMILY     4.0      856   8700.0
5044                   I am rich VIP  LIFESTYLE     3.8      411   2600.0
5045               I Am Rich Premium    FINANCE     4.1     1867   4700.0
5046            I am extremely Rich  LIFESTYLE     2.9       41   2900.0
5047                       I am Rich!    FINANCE     3.8       93  22000.0
5048              I am rich(premium)    FINANCE     3.5      472    965.0
5051                   I Am Rich Pro     FAMILY     4.4      201   2700.0
5053  I am rich (Most expensive app)    FINANCE     4.1      129   2700.0
5055                       I Am Rich     FAMILY     3.6      217   4900.0
5058                       I am Rich    FINANCE     4.3      180   3800.0
5062              I AM RICH PRO PLUS    FINANCE     4.0       36  41000.0

      Installs  Type   Price Content Rating         Genres       Last Updated  \
4035       100  Paid  399.99       Everyone  Entertainment      July 16, 2018
4188     10000  Paid  399.99       Everyone      Lifestyle     March 11, 2018
4193     10000  Paid  400.00       Everyone      Lifestyle        May 3, 2018
5040    100000  Paid  399.99       Everyone      Lifestyle   January 12, 2018
5043     10000  Paid  399.99       Everyone  Entertainment       May 19, 2018
5044     10000  Paid  299.99       Everyone      Lifestyle      July 21, 2018
5045     50000  Paid  399.99       Everyone        Finance  November 12, 2017
5046      1000  Paid  379.99       Everyone      Lifestyle       July 1, 2018
5047      1000  Paid  399.99       Everyone        Finance  December 11, 2017
5048      5000  Paid  399.99       Everyone        Finance        May 1, 2017
5051      5000  Paid  399.99       Everyone  Entertainment       May 30, 2017
5053      1000  Paid  399.99           Teen        Finance   December 6, 2017
5055     10000  Paid  389.99       Everyone  Entertainment      June 22, 2018
5058      5000  Paid  399.99       Everyone        Finance     March 22, 2018
5062      1000  Paid  399.99       Everyone        Finance      June 25, 2018

     Current Ver   Android Ver
4035         1.0    7.0 and up
4188       1.0.0    4.4 and up
4193       1.0.1    4.1 and up
5040         2.0  4.0.3 and up
5043         3.0    4.4 and up
5044       1.1.1    4.3 and up
5045         1.6    4.0 and up
5046         1.0    4.0 and up
5047         1.0    4.1 and up
5048         3.4    4.4 and up
5051        1.54    1.6 and up
5053           2  4.0.3 and up
5055         1.5    4.2 and up
5058         1.0    4.2 and up
5062       1.0.2    4.1 and up
```

In [88]:
```
# Keep only rows where Price <= 200
data = data[~(data['Price']>200)]
```

In [90]:
```
# Rechecking rows where Price > 200
Updated_high_price = data[data['Price'] > 200]
print(Updated_high_price)
```

```
Empty DataFrame
Columns: [App, Category, Rating, Reviews, Size, Installs, Type, Price, Content Ra
ting, Genres, Last Updated, Current Ver, Android Ver]
Index: []
```

In [78]:
```
# Filter rows with more than 2 million reviews
high_reviews = data[data['Reviews'] > 2000000]
print(high_reviews)
```

```
                                                App             Category  Rating  \
131                          Wattpad 📖 Free Books  BOOKS_AND_REFERENCE     4.6
322   Messenger – Text and Video Chat for Free        COMMUNICATION     4.0
323                          WhatsApp Messenger        COMMUNICATION     4.4
325                Google Chrome: Fast & Secure        COMMUNICATION     4.3
327                                       Gmail        COMMUNICATION     4.3
...                                         ...                 ...     ...
8070               Modern Combat 5: eSports FPS                GAME     4.3
8616                                Google Earth     TRAVEL_AND_LOCAL     4.3
8877                           Farm Heroes Saga              FAMILY     4.4
8880                            Fallout Shelter              FAMILY     4.6
9009                           Garena Free Fire                GAME     4.5

       Reviews     Size    Installs  Type  Price Content Rating  \
131    2914724      0.0   100000000  Free    0.0           Teen
322   56642847      0.0  1000000000  Free    0.0       Everyone
323   69119316      0.0  1000000000  Free    0.0       Everyone
325    9642995      0.0  1000000000  Free    0.0       Everyone
327    4604324      0.0  1000000000  Free    0.0       Everyone
...        ...      ...         ...   ...    ...            ...
8070   2903386  58000.0   100000000  Free    0.0     Mature 17+
8616   2339098      0.0   100000000  Free    0.0       Everyone
8877   7615646  71000.0   100000000  Free    0.0       Everyone
8880   2721923  25000.0    10000000  Free    0.0           Teen
9009   5534114  53000.0   100000000  Free    0.0           Teen

                Genres    Last Updated         Current Ver  \
131   Books & Reference  August 1, 2018  Varies with device
322       Communication  August 1, 2018  Varies with device
323       Communication  August 3, 2018  Varies with device
325       Communication  August 1, 2018  Varies with device
327       Communication  August 2, 2018  Varies with device
...                 ...             ...                 ...
8070             Action   July 24, 2018               3.2.1c
8616     Travel & Local   June 18, 2018           9.2.17.13
8877             Casual  August 7, 2018               5.2.6
8880         Simulation   June 11, 2018             1.13.12
9009             Action  August 3, 2018              1.21.0

            Android Ver
131   Varies with device
322   Varies with device
323   Varies with device
325   Varies with device
327   Varies with device
...                  ...
8070         4.0 and up
8616         4.1 and up
8877         2.3 and up
8880         4.1 and up
9009       4.0.3 and up

[453 rows x 13 columns]
```

In [82]:
```
data = data[data['Reviews'] < 2000000]
print (data)
```

```
                                                 App             Category  \
0        Photo Editor & Candy Camera & Grid & ScrapBook       ART_AND_DESIGN
1                                   Coloring book moana       ART_AND_DESIGN
2     U Launcher Lite – FREE Live Cool Themes, Hide ...       ART_AND_DESIGN
3                                 Sketch - Draw & Paint       ART_AND_DESIGN
4                Pixel Draw - Number Art Coloring Book       ART_AND_DESIGN
...                                                ...                  ...
9348                                    FR Calculator              FAMILY
9349                                   Sya9a Maroc - FR              FAMILY
9350                    Fr. Mike Schmitz Audio Teachings              FAMILY
9351                       The SCP Foundation DB fr nn5n  BOOKS_AND_REFERENCE
9352      iHoroscope - 2018 Daily Horoscope & Astrology            LIFESTYLE

      Rating  Reviews     Size  Installs  Type  Price Content Rating  \
0        4.1      159  19000.0     10000  Free    0.0       Everyone
1        3.9      967  14000.0    500000  Free    0.0       Everyone
2        4.7    87510   8700.0   5000000  Free    0.0       Everyone
3        4.5   215644  25000.0  50000000  Free    0.0           Teen
4        4.3      967   2800.0    100000  Free    0.0       Everyone
...      ...      ...      ...       ...   ...    ...            ...
9348     4.0        7   2600.0       500  Free    0.0       Everyone
9349     4.5       38  53000.0      5000  Free    0.0       Everyone
9350     5.0        4   3600.0       100  Free    0.0       Everyone
9351     4.5      114      0.0      1000  Free    0.0     Mature 17+
9352     4.5   398307  19000.0  10000000  Free    0.0       Everyone

                       Genres      Last Updated         Current Ver  \
0                Art & Design   January 7, 2018               1.0.0
1     Art & Design;Pretend Play  January 15, 2018               2.0.0
2                Art & Design    August 1, 2018               1.2.4
3                Art & Design      June 8, 2018  Varies with device
4       Art & Design;Creativity     June 20, 2018                 1.1
...                         ...               ...                 ...
9348                Education     June 18, 2017               1.0.0
9349                Education     July 25, 2017                1.48
9350                Education      July 6, 2018                 1.0
9351          Books & Reference  January 19, 2015  Varies with device
9352                Lifestyle     July 25, 2018  Varies with device

            Android Ver
0          4.0.3 and up
1          4.0.3 and up
2          4.0.3 and up
3            4.2 and up
4            4.4 and up
...                 ...
9348         4.1 and up
9349         4.1 and up
9350         4.1 and up
9351  Varies with device
9352  Varies with device

[8885 rows x 13 columns]
```

In [92]:
```
# Rechecking rows with more than 2 million reviews
updated_high_reviews = data[data['Reviews'] > 2000000]
print(updated_high_reviews)
```

```
Empty DataFrame
Columns: [App, Category, Rating, Reviews, Size, Installs, Type, Price, Content Ra
ting, Genres, Last Updated, Current Ver, Android Ver]
Index: []
```

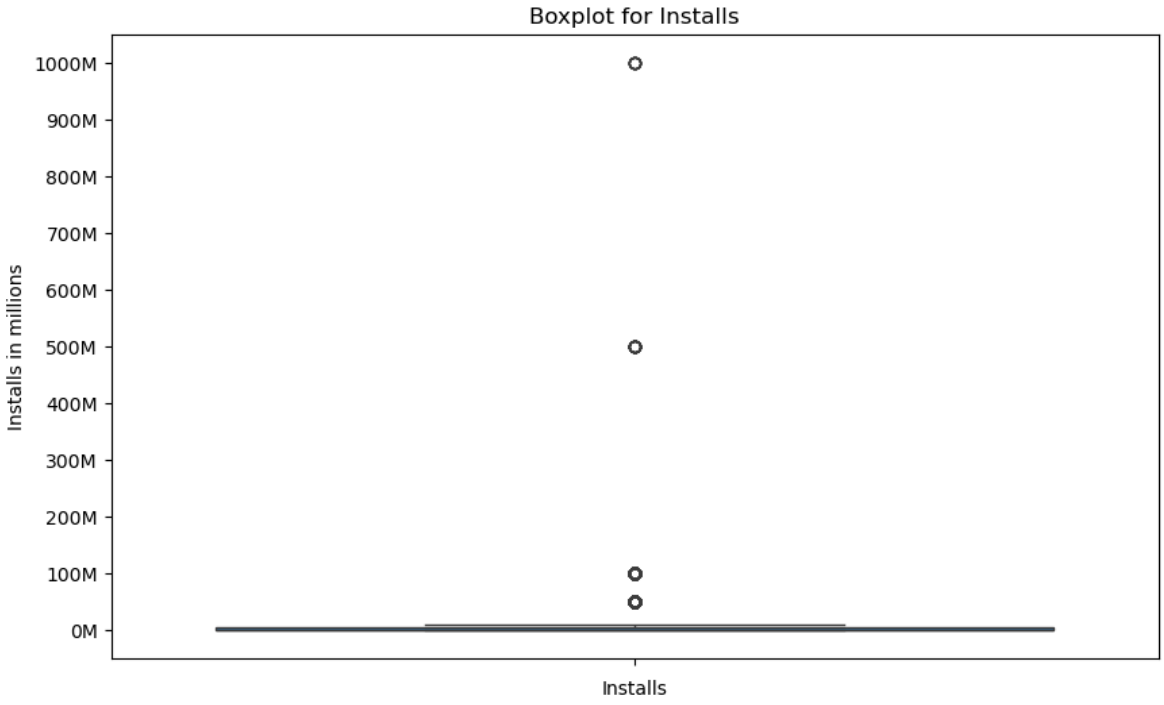
In [94]:
```
# Save the DataFrame to a CSV file
data.to_csv(r'C:\Users\vinay\Desktop\Siplilearn\Python\Projects\1569582940_googl
```

In [4]:
```
data = pd.read_csv(r'C:\Users\vinay\Desktop\Siplilearn\Python\Projects\156958294
```

In [36]:
```
print(data['Installs'].unique())
```

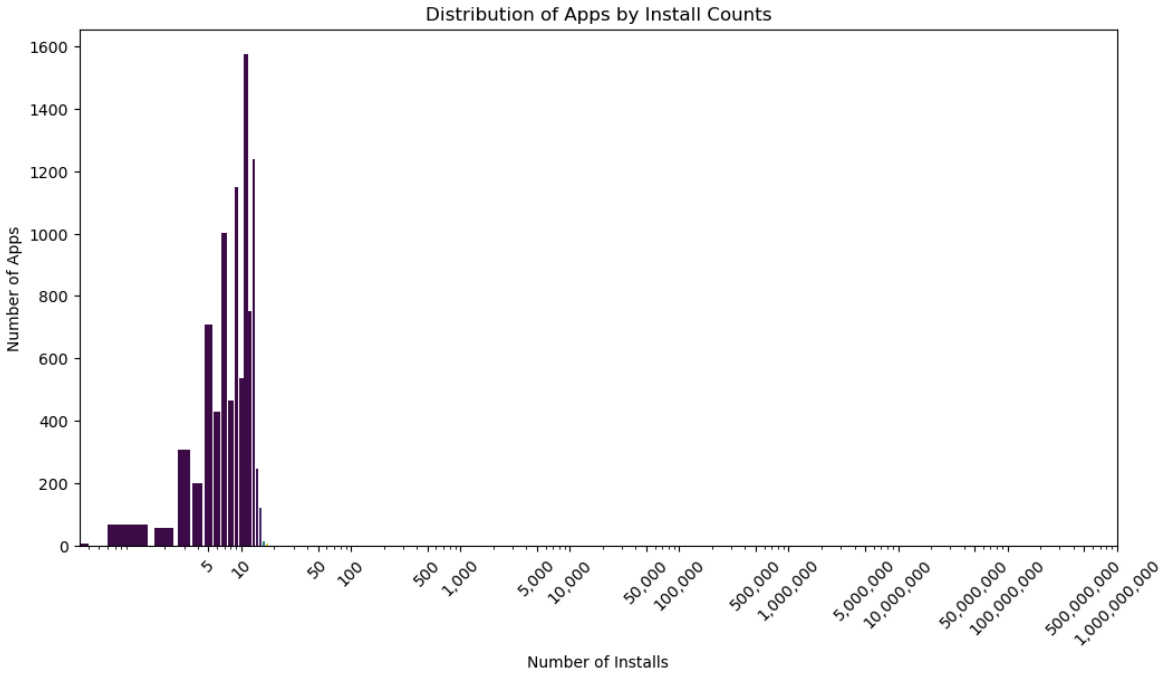
```
[     10000     500000    5000000   50000000     100000      50000
    1000000   10000000       5000  100000000 1000000000       1000
        100        500         10          5         50  500000000]
```

In [76]:
```
# Boxplot for the Installs column
plt.figure(figsize=(10,6))
sns.boxplot(data['Installs'])
plt.title('Boxplot for Installs')
plt.xlabel('Installs')
plt.ylabel('Installs in millions')

# Fixing yticks
ticks_values = range(0, 1100000000, 100000000)  # Every 100 million
ticks_labels = [f'{i//1000000}M' for i in ticks_values]  # Corrected variable na

plt.yticks(ticks=ticks_values, labels=ticks_labels)  # Apply correct ticks
plt.show()
```



In [74]:
```
# Count occurrences of each unique install value and plot bar cahrt of Installs
install_counts = data['Installs'].value_counts().sort_index()

plt.figure(figsize=(12,6))
sns.barplot(x=install_counts.index, y=install_counts.values, hue=install_counts.

plt.xscale('log')
tick_values = [10000, 500000, 5000000, 50000000, 100000, 50000, 1000000,
```

```
                10000000, 5000, 100000000, 1000000000, 1000, 100, 500, 10, 5, 50,
plt.xticks(ticks=tick_values, labels=[f"{x:,}" for x in tick_values], rotation=4


plt.xticks(rotation=45)
plt.xlabel('Number of Installs')
plt.ylabel('Number of Apps')
plt.title('Distribution of Apps by Install Counts')

plt.show()
```



In [90]:
```
# Calculate the percentiles
percentiles = [10, 25, 50, 70, 90, 95, 99]
installs_percentiles = np.percentile(data['Installs'], percentiles)

percentile_dict = {f'{p}%': installs_percentiles[i] for i, p in zip(range(len(pe

print(percentile_dict)
```

```
{'10%': 1000.0, '25%': 10000.0, '50%': 500000.0, '70%': 1000000.0, '90%': 1000000
0.0, '95%': 10000000.0, '99%': 100000000.0}
```

In [96]:
```
# Calculate the 99th percentile threshold
percentile_99 = np.percentile(data['Installs'], 99)

print(percentile_99)
```

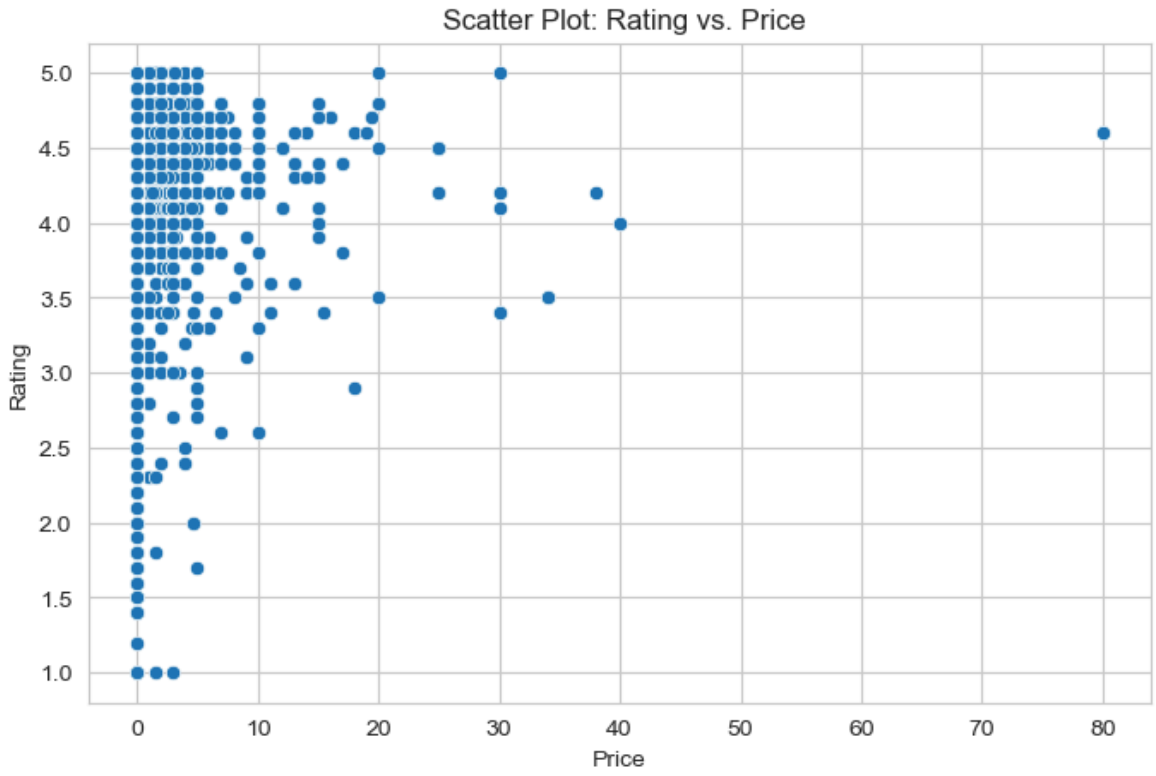
```
100000000.0
```

In [108…
```
# Remove only the rows where 'Installs' is exactly equal to the 99th percentile
data = data[data['Installs'] <= percentile_99]
```

In [114…
```
#Bivariate analysis
# Set the style for better visualization
sns.set_style('whitegrid')
```

In [116…
```
# Scatter Plot: Rating vs. Price
plt.figure(figsize=(8,5))
sns.scatterplot(x=data['Price'], y=data['Rating'])
```

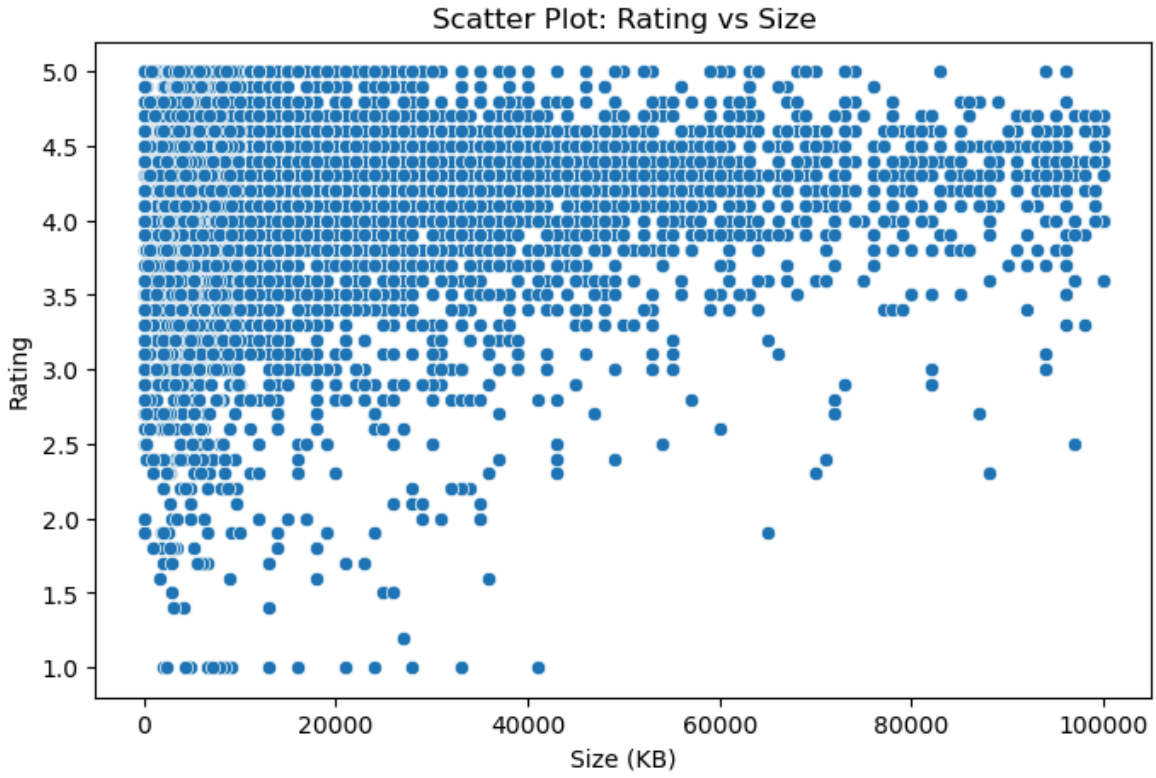
```
plt.xlabel('Price')
plt.ylabel('Rating')
plt.title(' Scatter Plot: Rating vs. Price')
plt.show()
```



In [90]:
```
# The scatter plot shows that most apps are free or low-cost, with no clear rela
# A few expensive apps exist, but they don't necessarily have higher rating
```

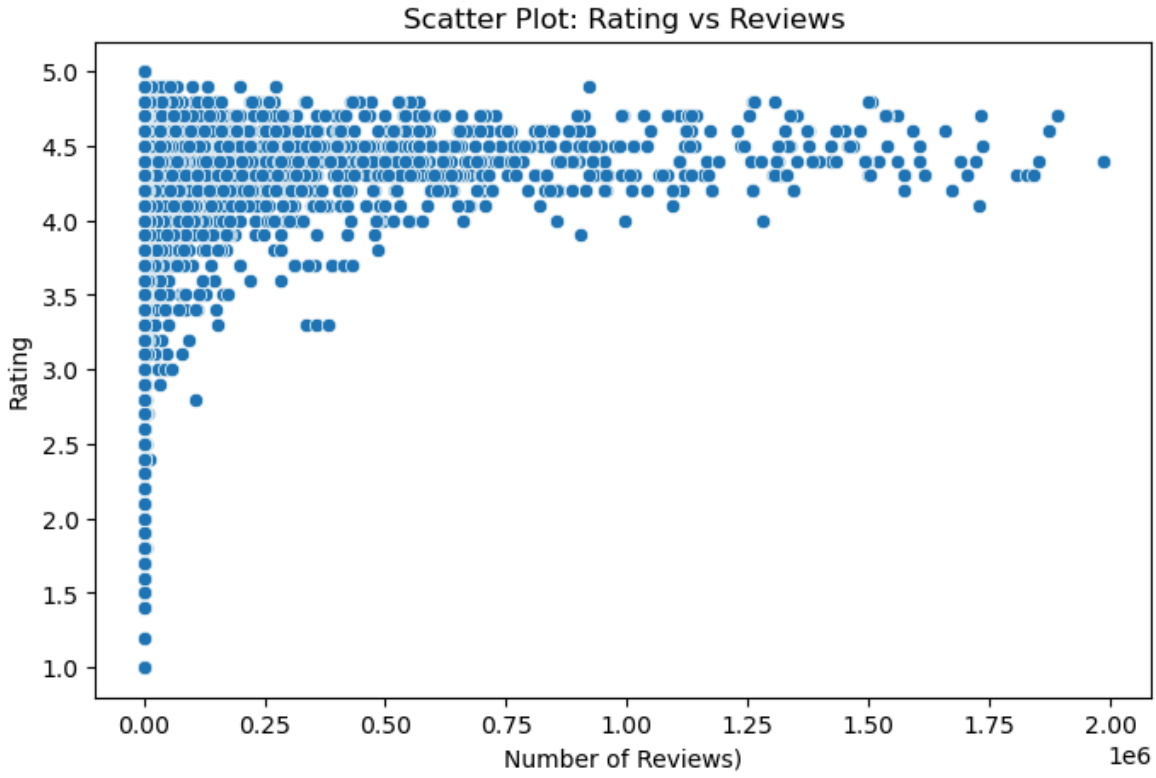
In [6]:
```
data = pd.read_csv(r'C:\Users\vinay\Desktop\Siplilearn\Python\Projects\156958294
```

In [14]:
```
# Scatter Plot: Rating vs Size
plt.figure(figsize=(8,5))
sns.scatterplot(x=data['Size'], y=data['Rating'])
plt.xlabel('Size (KB)')
plt.ylabel('Rating')
plt.title('Scatter Plot: Rating vs Size')
plt.show()
```



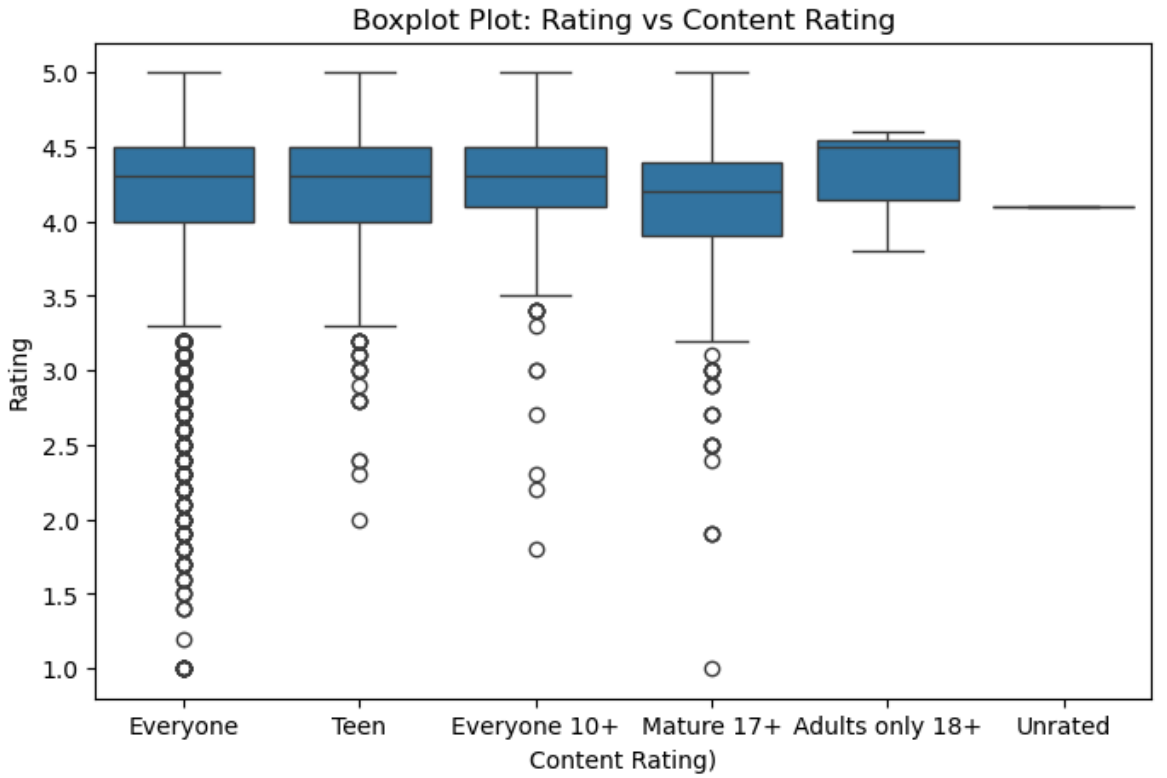
In [88]:
```
# The scatter plot shows no strong relationship between app size and rating, as
# Smaller apps tend to be more densly distributed, but larger apps still shows b
```

In [16]:
```
# Scatter Plot: Rating vs Reviews
plt.figure(figsize=(8,5))
sns.scatterplot(x=data['Reviews'], y=data['Rating'])
plt.xlabel('Number of Reviews)')
plt.ylabel('Rating')
plt.title('Scatter Plot: Rating vs Reviews')
plt.show()
```



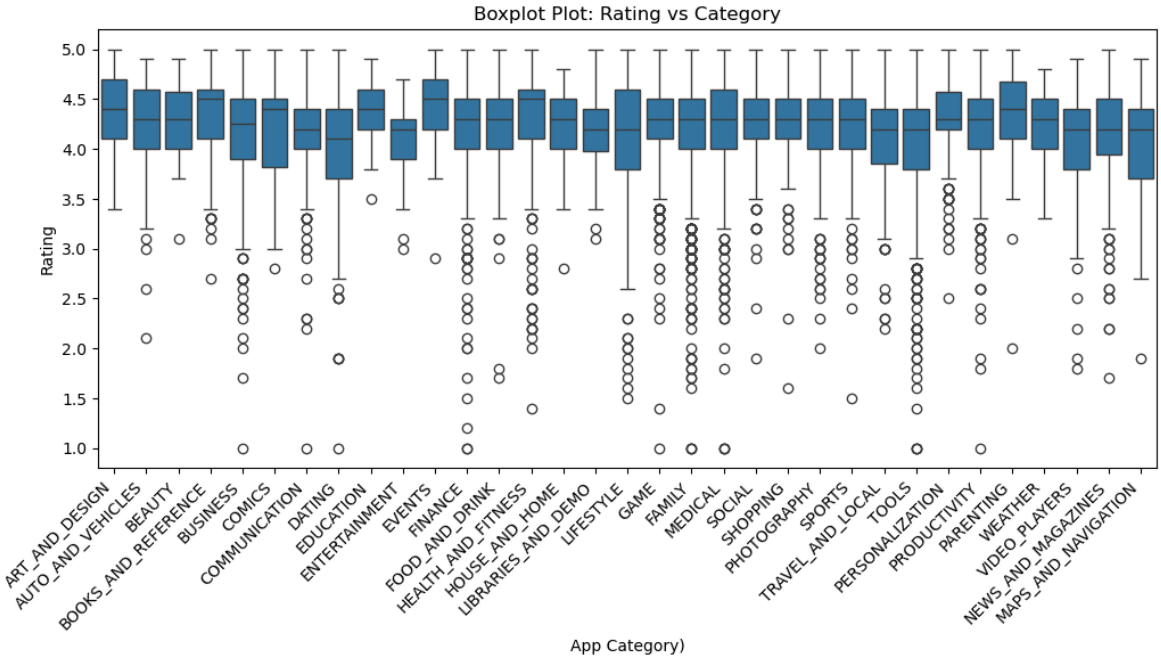
In [86]:
```
# Apps with more reviews tend to have higher ratings, but some highly reviewed a
# Most highly-rated apps have many reviews, but some low-rated apps also have a
```

In [18]:
```
# boxplot Plot: Rating vs Content Rating
plt.figure(figsize=(8,5))
sns.boxplot(x=data['Content Rating'], y=data['Rating'])
plt.xlabel('Content Rating)')
plt.ylabel('Rating')
plt.title('Boxplot Plot: Rating vs Content Rating')
plt.show()
```



In [ ]:
```
# There's no clear preference for one content rating over another in terms of ap
```

In [41]:
```
# boxplot Plot: Rating vs category
plt.figure(figsize=(12,5))
sns.boxplot(x=data['Category'], y=data['Rating'])
plt.xlabel('App Category)')
plt.ylabel('Rating')
plt.title('Boxplot Plot: Rating vs Category')
plt.xticks(rotation=45, ha="right")
plt.show()
```



In [92]:
```
# Most app categories exhibit similar median ratings around 4.0 to 4.5, with sli
```

In [46]:
```
data = pd.read_csv(r'C:\Users\vinay\Desktop\Siplilearn\Python\Projects\156958294
```

In [22]:
```
# Creates a duplicate of 'data'
imp1 = data.copy()
```

In [24]:
```
# Apply log transformation to 'Reviews' and 'Installs' to reduce skew
imp1['Reviews'] = np.log1p(imp1['Reviews'])
imp1['Installs'] = np.log1p(imp1['Installs'])

print(imp1[['Reviews', 'Installs']].head())
```

```
    Reviews   Installs
0   5.075174   9.210440
1   6.875232  13.122365
2  11.379520  15.424949
3  12.281389  17.727534
4   6.875232  11.512935
```

In [26]:
```
# Drop unnecessary columns
imp1.drop(columns=['App', 'Last Updated', 'Current Ver', 'Android Ver'], inplace

print(imp1.head)
```

```
<bound method NDFrame.head of                 Category  Rating    Reviews     Si
ze   Installs  Type  Price  \
0          ART_AND_DESIGN     4.1   5.075174  19000.0   9.210440  Free    0.0
1          ART_AND_DESIGN     3.9   6.875232  14000.0  13.122365  Free    0.0
2          ART_AND_DESIGN     4.7  11.379520   8700.0  15.424949  Free    0.0
3          ART_AND_DESIGN     4.5  12.281389  25000.0  17.727534  Free    0.0
4          ART_AND_DESIGN     4.3   6.875232   2800.0  11.512935  Free    0.0
...                   ...     ...        ...      ...        ...   ...    ...
8738               FAMILY     4.0   2.079442   2600.0   6.216606  Free    0.0
8739               FAMILY     4.5   3.663562  53000.0   8.517393  Free    0.0
8740               FAMILY     5.0   1.609438   3600.0   4.615121  Free    0.0
8741  BOOKS_AND_REFERENCE     4.5   4.744932      0.0   6.908755  Free    0.0
8742            LIFESTYLE     4.5  12.894981  19000.0  16.118096  Free    0.0

     Content Rating                     Genres
0          Everyone               Art & Design
1          Everyone  Art & Design;Pretend Play
2          Everyone               Art & Design
3              Teen               Art & Design
4          Everyone    Art & Design;Creativity
...             ...                        ...
8738       Everyone                  Education
8739       Everyone                  Education
8740       Everyone                  Education
8741     Mature 17+          Books & Reference
8742       Everyone                  Lifestyle

[8743 rows x 9 columns]>
```

In [6]:
```
data = pd.read_csv(r'C:\Users\vinay\Desktop\Siplilearn\Python\Projects\156958294
```

In [36]:
```
imp1 = pd.read_csv(r'C:\Users\vinay\Desktop\Siplilearn\Python\Projects\156958294
```

In [46]:
```
# Convert cattegorical variables into dummy/one-hot encoded variables

imp2 = pd.get_dummies(imp1, columns=['Category', 'Genres', 'Content Rating', 'Ty

print(imp2.head())
```

```
   Rating    Reviews     Size   Installs  Price  Category_ART_AND_DESIGN  \
0     4.1   5.075174  19000.0   9.210440    0.0                     True
1     3.9   6.875232  14000.0  13.122365    0.0                     True
2     4.7  11.379520   8700.0  15.424949    0.0                     True
3     4.5  12.281389  25000.0  17.727534    0.0                     True
4     4.3   6.875232   2800.0  11.512935    0.0                     True

   Category_AUTO_AND_VEHICLES  Category_BEAUTY  Category_BOOKS_AND_REFERENCE  \
0                       False            False                         False
1                       False            False                         False
2                       False            False                         False
3                       False            False                         False
4                       False            False                         False

   Category_BUSINESS  ...  Genres_Weather  Genres_Word  \
0              False  ...           False        False
1              False  ...           False        False
2              False  ...           False        False
3              False  ...           False        False
4              False  ...           False        False

   Content Rating_Adults only 18+  Content Rating_Everyone  \
0                           False                     True
1                           False                     True
2                           False                     True
3                           False                    False
4                           False                     True

   Content Rating_Everyone 10+  Content Rating_Mature 17+  \
0                        False                      False
1                        False                      False
2                        False                      False
3                        False                      False
4                        False                      False

   Content Rating_Teen  Content Rating_Unrated  Type_Free  Type_Paid
0                False                  False       True      False
1                False                  False       True      False
2                False                  False       True      False
3                 True                  False       True      False
4                False                  False       True      False

[5 rows x 161 columns]
```

In [58]:
```
imp2.to_csv(r'C:\Users\vinay\Desktop\Siplilearn\Python\Projects\1569582940_googl
```

In [64]:
```
# Separate independent (X) and dependent (y) variables
x = imp2.drop(columns=['Rating'])
y = imp2['Rating']

# Split the dataset into 70% training and 30% testing
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.30, random

# Verify the shapes
print(f'Training set size: x_train = {x_train.shape}, y_train = {y_train.shape}'
print(f'Testing set size: x_test = {x_test.shape}, y_test = {y_test.shape}')
```

```
Training set size: x_train = (6120, 160), y_train = (6120,)
Testing set size: x_test = (2623, 160), y_test = (2623,)
```

In [72]:
```
# Initialize the Linear Regression model
model = LinearRegression()

model.fit(x_train, y_train)

train_r2 = model.score(x_train, y_train)

print(f'R2 score on training set: {train_r2:.4f}')
```

```
R2 score on training set: 0.1643
```

In [ ]:
```
# R2 is relatively low which suggests that the linear regression model is not pe
```

In [76]:
```
# Still we are making pridictions on the set as its the requirement of the proje
y_pred = model.predict(x_test)

# Evaluating model performance
test_r2 = r2_score(y_test, y_pred)

print(f'R2 score on the test set: {test_r2:.4f}')
```

```
R2 score on the test set: 0.1421
```

In [106…
```
data.to_csv(r'C:\Users\vinay\Desktop\Siplilearn\Python\Projects\1569582940_googl
```

In [108…
```
imp1.to_csv(r'C:\Users\vinay\Desktop\Siplilearn\Python\Projects\1569582940_googl
```

In [110…
```
imp2.to_csv(r'C:\Users\vinay\Desktop\Siplilearn\Python\Projects\1569582940_googl
```

In [ ]:
```

```