steam-games-2023

August 19, 2023

[82]:
```
import warnings
warnings.filterwarnings('ignore')
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
```

[83]:
```
df = pd.read_csv("steamspy_data.csv")
df.head()
```

[83]:

	appid	name	developer	publisher	positive	negative	owners	price	initialprice	discount	languages	genre	ccu	tags
0	10	Counter-Strike	Valve	Valve	216345	5530	10000000 - 20000000	999	999	0	English,French,German,Italian,Spanish,Chinese,…	Action	10775	{'Action': 5448 'FPS': 4862 'Multiplayer': 341…
1	20	Team Fortress Classic	Valve	Valve	6472	990	5000000 - 10000000	499	499	0	English,French,German,Italian,Spanish,Korean,R…	Action	77	{'Action': 759 'FPS': 320 'Multiplayer': 272 '…
2	30	Day of Defeat	Valve	Valve	5686	634	5000000 - 10000000	499	499	0	English,French,German,Italian,Spanish	Action	89	{'FPS': 794 'World War II': 261 'Multiplayer':…
3	40	Deathmatch Classic	Valve	Valve	2242	490	5000000 - 10000000	499	499	0	English,French,German,Italian,Spanish,Korean,R…	Action	8	{'Action': 633 'FPS': 147 'Classic': 113 'Mult…
4	50	Half-Life: Opposing Force	Gearbox Software	Valve	17468	890	2000000 - 5000000	499	499	0	English,French,German,Korean	Action	162	

```
4  {'FPS': 905 'Action': 343 'Classic': 271 'Sci-…
```

[84]:
```
df.shape
```

[84]:
```
(1000, 14)
```

[85]:
```
df.dtypes
```

[85]:
```
appid            int64
name            object
developer       object
publisher       object
positive         int64
negative         int64
owners          object
price            int64
initialprice     int64
discount         int64
languages       object
genre           object
ccu              int64
tags            object
dtype: object
```

Q1. Is there is a duplicate records in this dataset ? if yes, then remove them

[86]:
```
df.duplicated().sum()  # if we found any dublicate date then will use "df.
↪drop_duplicates(inplace=True)"
```

[86]:
```
0
```

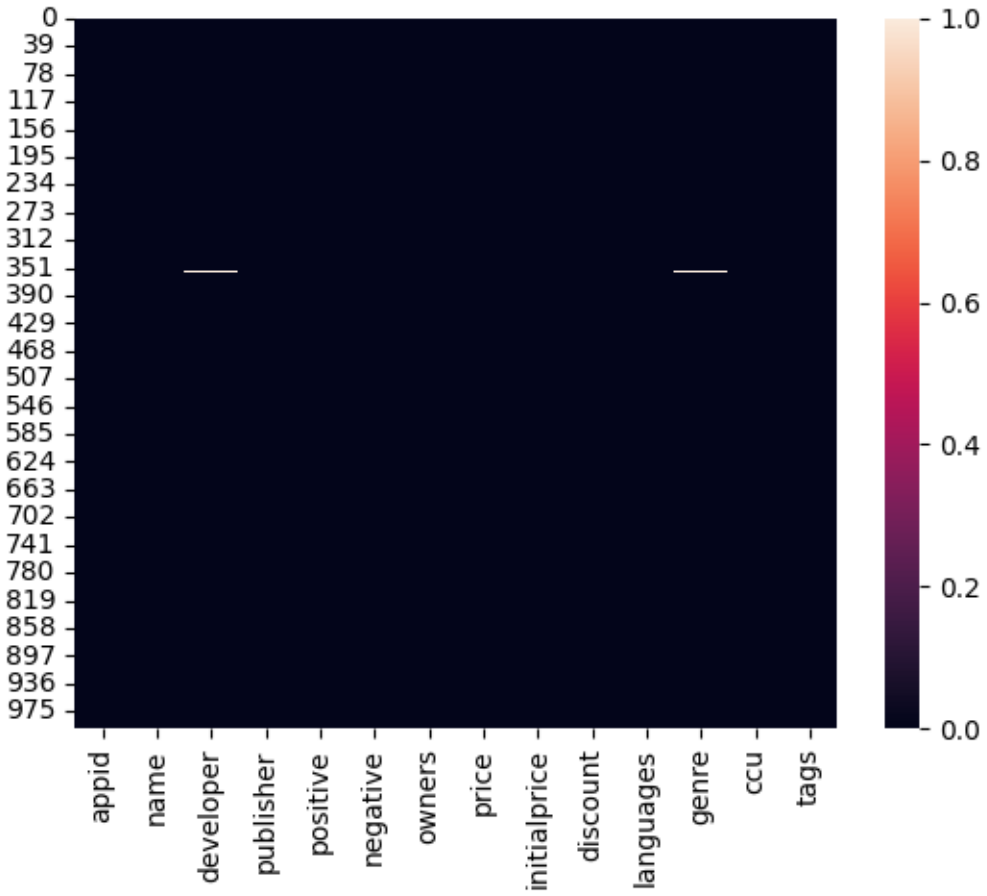
Q2. Is there is a null values in this data ? If yes then show it in the heatmap

[87]:
```
df.isnull().sum()
```

[87]:
```
appid           0
name            0
developer       1
publisher       0
positive        0
negative        0
owners          0
price           0
initialprice    0
discount        0
languages       0
genre           3
ccu             0
```

```
tags              0
dtype: int64
```

[88]:
```
sns.heatmap(df.isnull())
plt.show()
```



Q3. For 'Left 4 Dead 2' Game what is the appid and who is the developer of this Game ?

[89]:
```
df.loc[df['name']=="Left 4 Dead 2",['appid','developer']]
```

[89]:
```
    appid developer
21    550     Valve
```

Top Selling Games: What are the top 10 best-selling games based on the number of owners?

[90]:
```
# 'positive' and 'negative' represent user ratings or reviews
df['total_reviews'] = df['positive'] + df['negative']
```

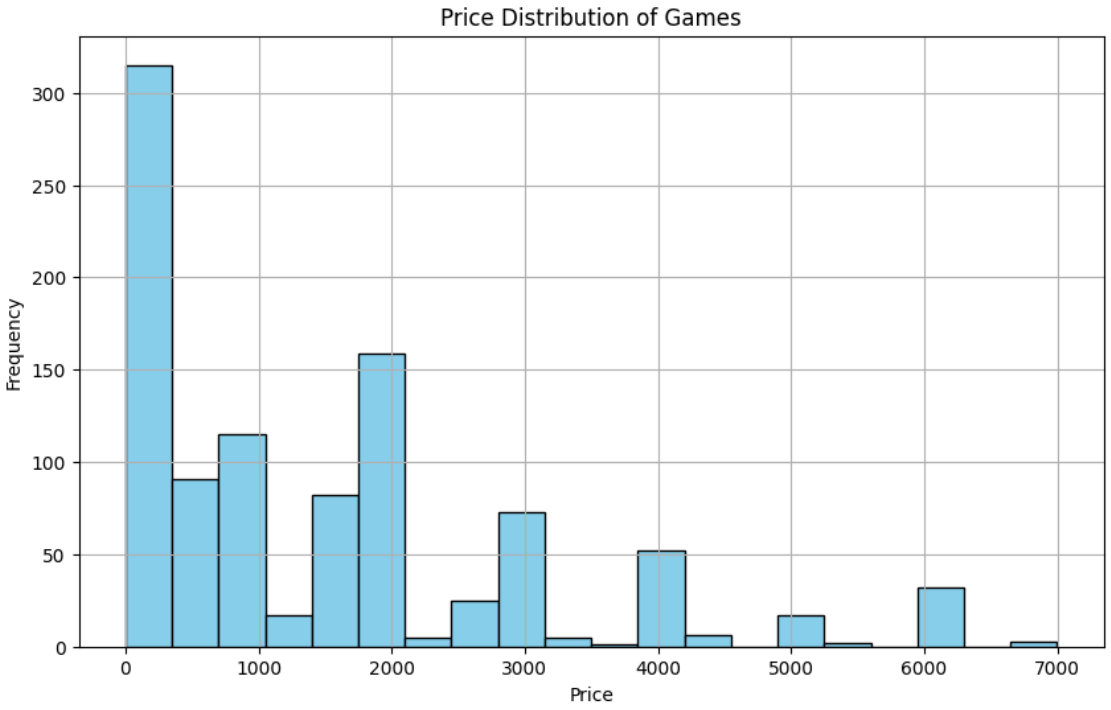
```
#'price' represents the current price of the game after discounts
df['revenue'] = df['price'] * df['owners']

# Sort the DataFrame by revenue to find the top selling games
top_selling_games = df.sort_values(by='revenue', ascending=False)

# Display the top selling games
top_selling_games[['appid', 'name', 'revenue', 'total_reviews']].head()
```

[90]:

	appid	name	revenue	total_reviews
869	1063730	New World	50000000 - 100000000500000…	258104
401	271590	Grand Theft Auto V	50000000 - 100000000500000…	1583872
986	1811260	EA SPORTS FIFA 23	5000000 - 100000005000000 - …	126489
808	814380	Sekiro: Shadows Die Twice - GOTY Edition	5000000 - 100000005000000 - …	239316
546	374320	DARK SOULS III	5000000 - 100000005000000 - …	354770

Price Distribution: What is the distribution of game prices in database?

[91]:
```
# df with the 'price' variable
# Create a histogram of game prices
plt.figure(figsize=(10, 6))
plt.hist(df['price'], bins=20, color='skyblue', edgecolor='black')
plt.title('Price Distribution of Games')
plt.xlabel('Price')
plt.ylabel('Frequency')
plt.grid(True)
plt.show()
```



Genre Analysis: Which game genre has the highest average positive review score?

[92]:
```
# Group the data by genre and calculate the average positive review score for each genre
genre_avg_positive = df.groupby('genre')['positive'].mean()

# Find the genre with the highest average positive review score
highest_avg_positive_genre = genre_avg_positive.idxmax()
highest_avg_positive_score = genre_avg_positive.max()

print(f"The genre with the highest average positive review score is '{highest_avg_positive_genre}' with a score of {highest_avg_positive_score:.2f}")
```

```
The genre with the highest average positive review score is 'Action Adventure
Free to Play Massively Multiplayer' with a score of 687870.00
```

Developer Success: Which developer has the highest number of games in the database?

[93]:
```
# Group the data by developer and count the number of games for each developer
developer_game_counts = df['developer'].value_counts()

# Find the developer with the highest number of games
highest_game_count_developer = developer_game_counts.idxmax()
highest_game_count = developer_game_counts.max()
```

```
print(f"The developer with the highest number of games is␣
  ↪'{highest_game_count_developer}' with {highest_game_count} games.")
```

```
The developer with the highest number of games is 'Valve' with 27 games.
```

Publisher Influence: What is the correlation between the number of games published by a publisher and their average review scores?

[94]:
```
# Group the data by publisher and calculate the number of games and the average␣
  ↪positive review score for each publisher
publisher_stats = df.groupby('publisher')['positive'].agg(['count', 'mean'])

# Calculate the correlation between the number of games and average review␣
  ↪scores
correlation = publisher_stats['count'].corr(publisher_stats['mean'])

print(f"The correlation between the number of games published and average␣
  ↪review scores is: {correlation:.2f}")
```

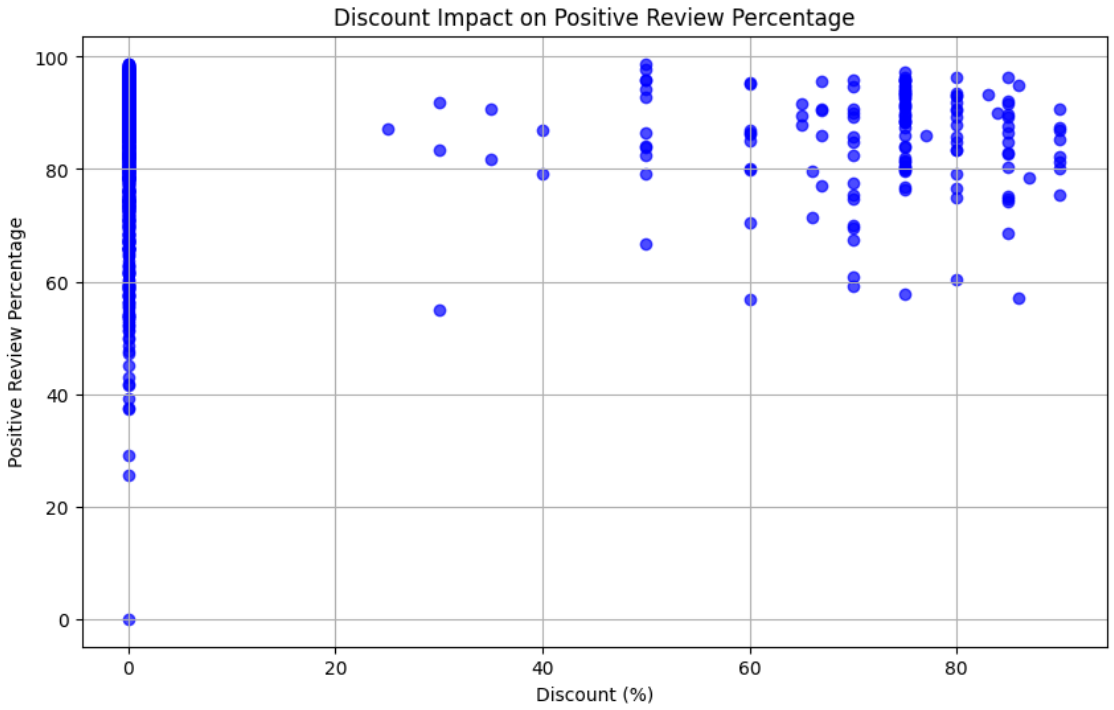
```
The correlation between the number of games published and average review scores
is: 0.04
```

Price vs. Reviews: Is there a relationship between game price and review scores (positive/negative)?

[95]:
```
# Create a scatter plot to visualize the relationship between game price and␣
  ↪positive review scores
plt.figure(figsize=(10, 6))
plt.scatter(df['price'], df['positive'], color='green', label='Positive␣
  ↪Reviews', alpha=0.7)
plt.scatter(df['price'], df['negative'], color='red', label='Negative Reviews',␣
  ↪alpha=0.7)
plt.title('Price vs. Review Scores')
plt.xlabel('Price')
plt.ylabel('Review Scores')
plt.legend()
plt.grid(True)
plt.show()
```

Discount Impact: Do games with higher discounts tend to have more positive reviews?

[96]:
```
# Calculate the percentage of positive reviews for each game
df['positive_percentage'] = (df['positive'] / (df['positive'] +␣
 ↪df['negative'])) * 100

# Create a scatter plot to visualize the relationship between discount and␣
 ↪positive review percentage
plt.figure(figsize=(10, 6))
plt.scatter(df['discount'], df['positive_percentage'], color='blue', alpha=0.7)
plt.title('Discount Impact on Positive Review Percentage')
plt.xlabel('Discount (%)')
plt.ylabel('Positive Review Percentage')
plt.grid(True)
plt.show()
```



Language Diversity: How many different languages are supported by the games in the database on average?

[97]:
```
# Split the languages column into a list of languages for each game
df['languages'] = df['languages'].str.split(',')

# Calculate the average number of different languages
average_languages = df['languages'].apply(lambda x: len(set(x))).mean()

print(f"Average number of different languages supported by games:␣
↪{average_languages:.2f}")
```

```
Average number of different languages supported by games: 9.80
```

Average Game Price: What is the average price of games in each genre?

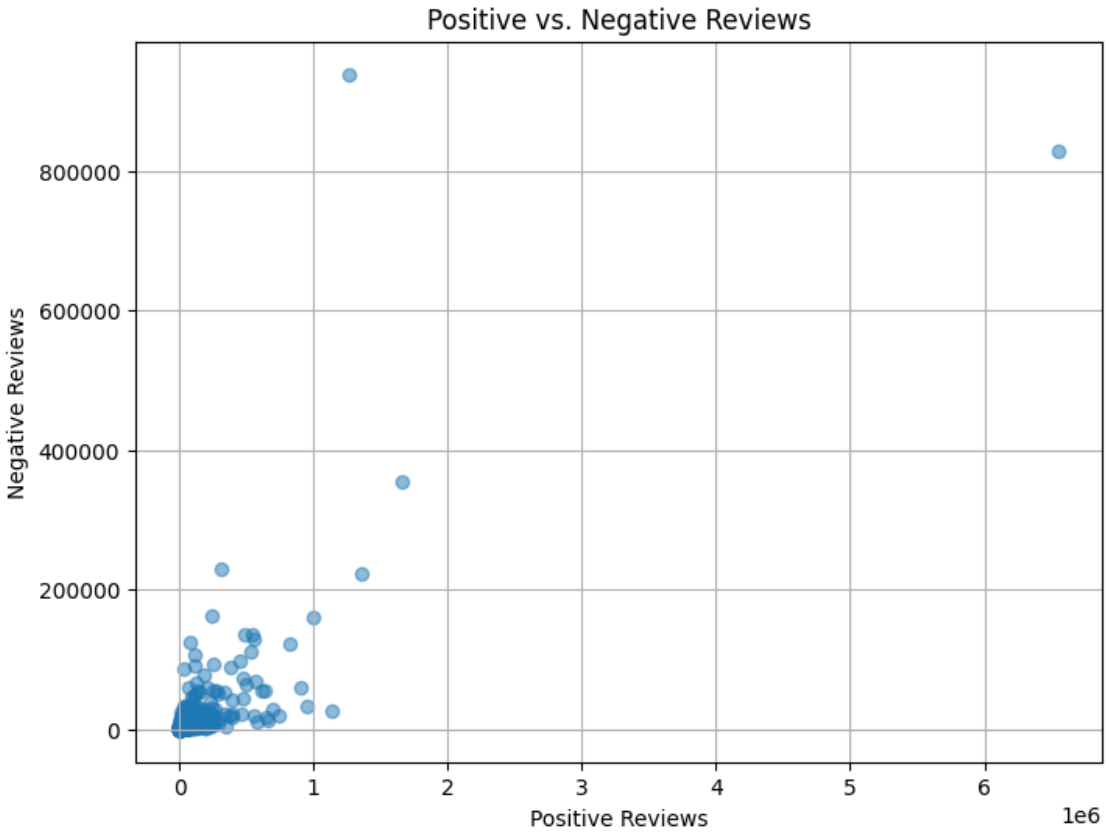
[98]:
```
# Calculate the average price of games in each genre
average_price_by_genre = df.groupby('genre')['price'].mean()
average_price_by_genre.head()
```

[98]:
```
genre
Action                                          1896.635135
Action Adventure                                1862.785714
Action Adventure Casual                         4249.000000
Action Adventure Casual Free to Play Indie         0.000000
```

```
Action Adventure Casual Free to Play Indie Massively Multiplayer       0.000000
Name: price, dtype: float64
```

Positive vs. Negative Reviews: Is there a correlation between the number of positive reviews and the number of negative reviews for a game?

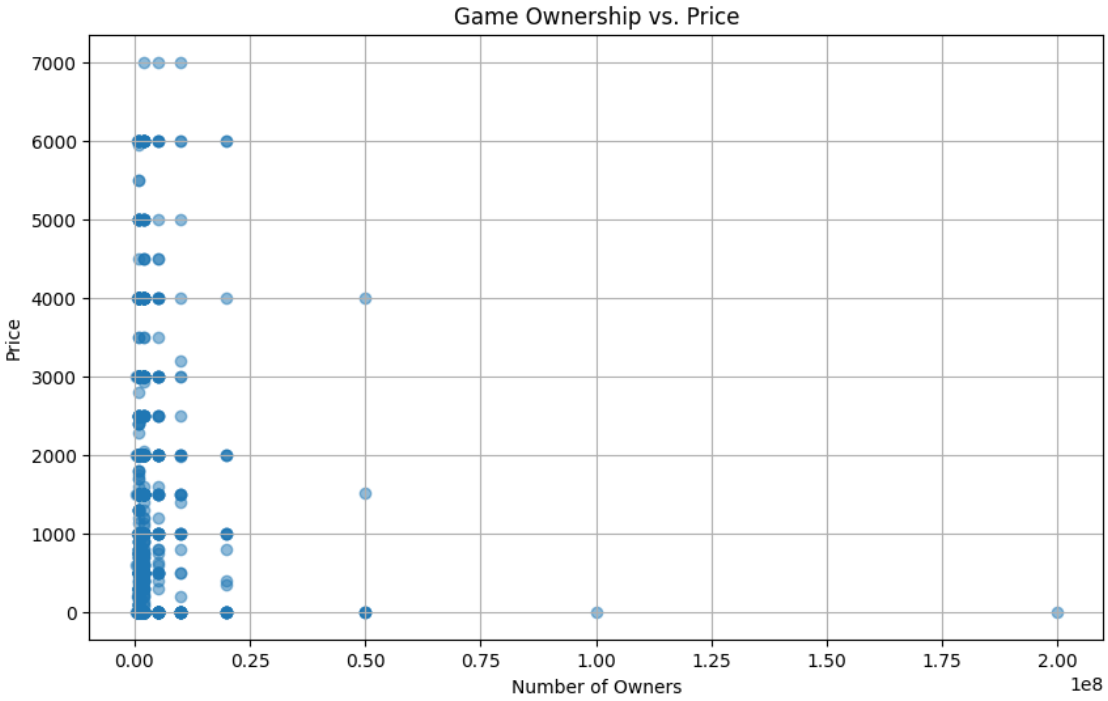
[99]:
```
# Calculate the correlation between positive and negative reviews
correlation = df['positive'].corr(df['negative'])

# Create a scatter plot
plt.figure(figsize=(8, 6))
plt.scatter(df['positive'], df['negative'], alpha=0.5)
plt.title('Positive vs. Negative Reviews')
plt.xlabel('Positive Reviews')
plt.ylabel('Negative Reviews')
plt.grid(True)
plt.show()

print(f"Correlation between positive and negative reviews: {correlation:.2f}")
```




```
Correlation between positive and negative reviews: 0.77
```

Game Ownership vs. Price: Is there a relationship between the number of owners and the game price?

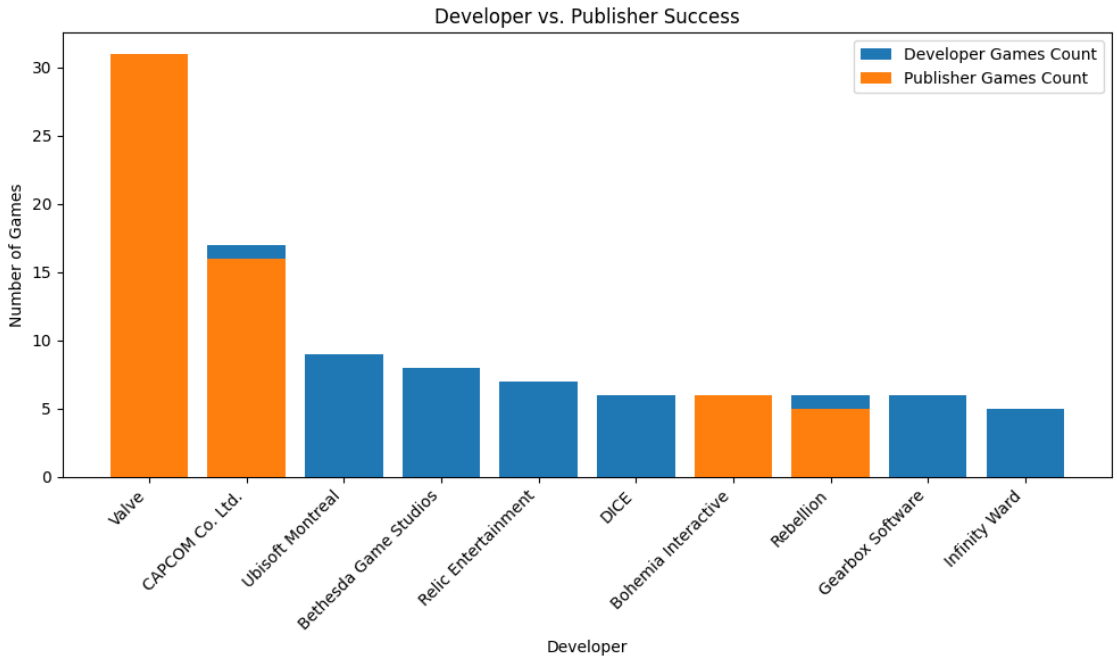
[100]:
```
# Modifying the 'owners' column to use the lower bound of the range
df['owners'] = df['owners'].str.split(' - ').str[0].str.replace(',', '').
 ↪astype(int)

# Filtering out rows with missing values in the selected columns
selected_columns = ['owners', 'price']
filtered_df = df[selected_columns].dropna()

# Scatter plot to visualize the relationship
plt.figure(figsize=(10, 6))
plt.scatter(filtered_df['owners'], filtered_df['price'], alpha=0.5)
plt.title('Game Ownership vs. Price')
plt.xlabel('Number of Owners')
plt.ylabel('Price')
plt.grid(True)
plt.show()
```



Developer vs. Publisher Success: Are there any patterns between a developer's success (number of games) and the publisher they work with?

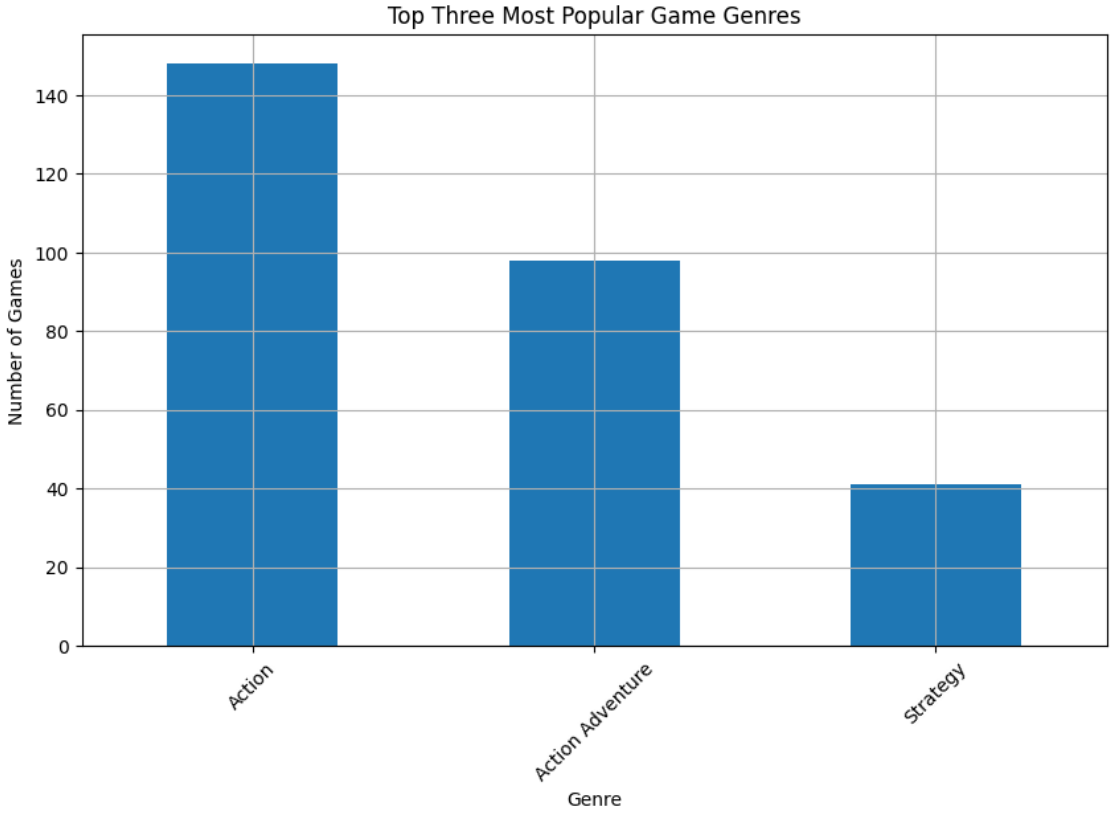
[101]:
```
# Grouping the data by developer and publisher to count the number of games
developer_counts = df.groupby('developer')['name'].count()
```

```
publisher_counts = df.groupby('publisher')['name'].count()

# Creating a DataFrame to compare developer and publisher success
success_df = pd.DataFrame({
    'Developer': developer_counts.index,
    'Developer Games Count': developer_counts.values,
    'Publisher Games Count': [publisher_counts.get(publisher, 0) for publisher␣
 ↪in developer_counts.index]
})

# Sorting the DataFrame by Developer Games Count in descending order
success_df = success_df.sort_values(by='Developer Games Count', ascending=False)

# Plotting the data
plt.figure(figsize=(10, 6))
plt.bar(success_df['Developer'][:10], success_df['Developer Games Count'][:10],␣
 ↪label='Developer Games Count')
plt.bar(success_df['Developer'][:10], success_df['Publisher Games Count'][:10],␣
 ↪label='Publisher Games Count')
plt.xlabel('Developer')
plt.ylabel('Number of Games')
plt.title('Developer vs. Publisher Success')
plt.xticks(rotation=45, ha='right')
plt.legend()
plt.tight_layout()
plt.show()
```



Popular Genres: What are the top three most popular game genres based on the number of games in the database?

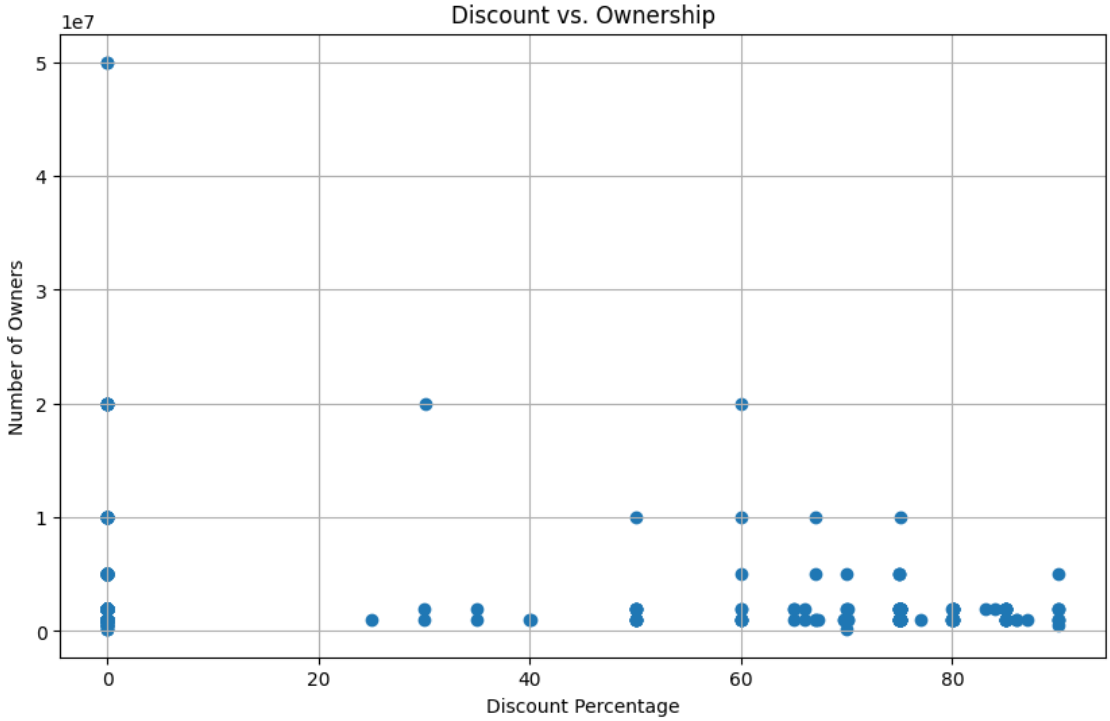
[108]:
```
# Count the number of games in each genre
genre_counts = df['genre'].value_counts()

# Get the top three most popular genres
top_genres = genre_counts.head(3)

# Plotting the results
plt.figure(figsize=(10, 6))
top_genres.plot(kind='bar')
plt.xlabel('Genre')
plt.ylabel('Number of Games')
plt.title('Top Three Most Popular Game Genres')
plt.xticks(rotation=45)
plt.grid(True)
plt.show()
```



Discount and Ownership: Is there a relationship between the discount percentage and the

number of owners a game has?

[109]:
```
# Convert 'owners' column to numeric, treating non-numeric entries as NaN
df['owners'] = pd.to_numeric(df['owners'], errors='coerce')

# Calculate the discount percentage
df['discount_percentage'] = ((df['initialprice'] - df['price']) /␣
 ↪df['initialprice']) * 100

# Plotting the results
plt.figure(figsize=(10, 6))
plt.scatter(df['discount_percentage'], df['owners'])
plt.xlabel('Discount Percentage')
plt.ylabel('Number of Owners')
plt.title('Discount vs. Ownership')
plt.grid(True)
plt.show()
```



Developer Performance: Which developer has the highest average review score?

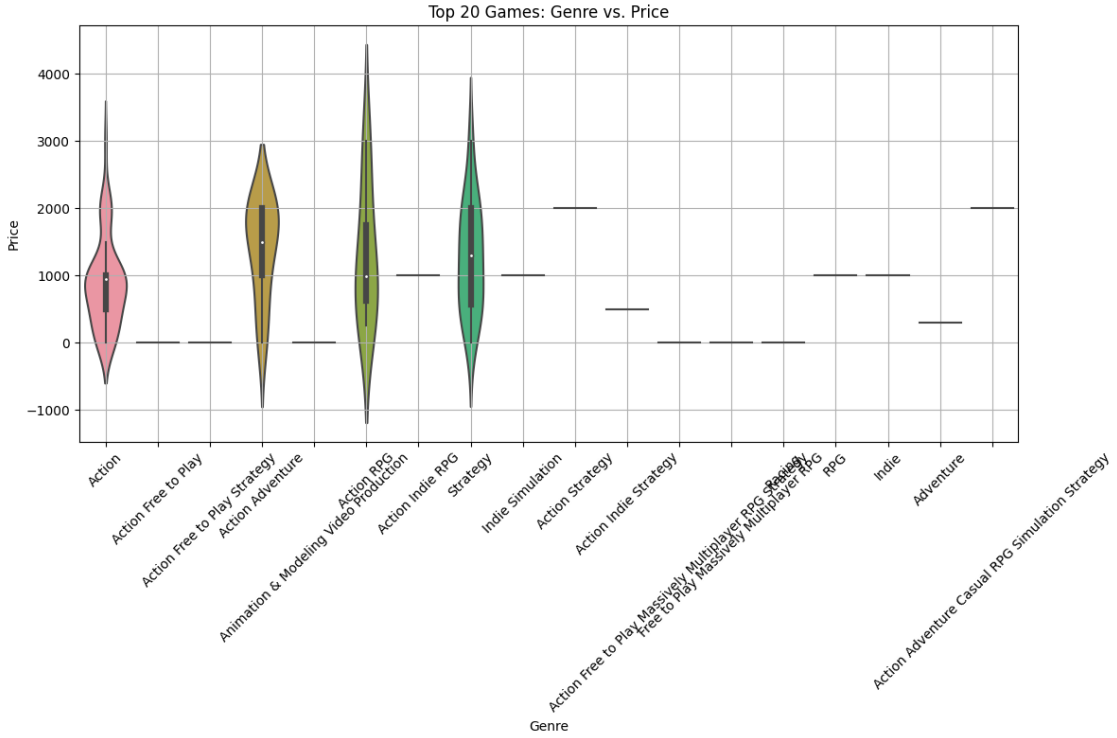
[110]:
```
# Convert 'positive' column to numeric, treating non-numeric entries as NaN
df['positive'] = pd.to_numeric(df['positive'], errors='coerce')

# Group by developer and calculate the average review score for each
```

```
average_review_scores = df.groupby('developer')['positive'].mean()

# Find the developer with the highest average review score
highest_avg_review_developer = average_review_scores.idxmax()
highest_avg_review_score = average_review_scores.max()

print(f"The developer with the highest average review score is␣
 ↪{highest_avg_review_developer} with an average score of␣
 ↪{highest_avg_review_score:.2f}")
```

```
The developer with the highest average review score is Valve Hidden Path
Entertainment with an average score of 6547618.00
```

Genre and Price: Is there a correlation between the game genre and its price?

[116]:
```
# Convert 'price' column to numeric, treating non-numeric entries as NaN
df['price'] = pd.to_numeric(df['price'], errors='coerce')

# Assuming you have a 'genre' column representing the game genre

# Select the top 20 data entries based on some criteria (you can replace this␣
 ↪with your actual criteria)
top_20_entries = df.head(100)

# Plotting the results using a violin plot
plt.figure(figsize=(12, 8))
sns.violinplot(x='genre', y='price', data=top_20_entries)
plt.xlabel('Genre')
plt.ylabel('Price')
plt.title('Top 20 Games: Genre vs. Price')
plt.xticks(rotation=45)
plt.grid(True)
plt.tight_layout()
plt.show()
```


Top 20 Games: Genre vs. Price
Price
4000
3000
2000
1000
0
−1000
Action
Action Free to Play
Action Free to Play Strategy
Action Adventure
Action RPG
Animation & Modeling Video Production
Action Indie RPG
Strategy
Indie Simulation
Action Strategy
Action Indie Strategy
Action Free to Play Massively Multiplayer RPG Strategy
Free to Play Massively Multiplayer RPG
RPG
Indie
Adventure
Action Adventure Casual RPG Simulation Strategy
Genre