```
!pip install -q seaborn wordcloud nltk
import nltk
nltk.download('stopwords')
nltk.download('punkt')
```

```
[nltk_data] Downloading package stopwords to /root/nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
[nltk_data] Downloading package punkt to /root/nltk_data...
[nltk_data]   Package punkt is already up-to-date!
True
```

```
# STEP 2: Import libraries
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from wordcloud import WordCloud
import re
from nltk.corpus import stopwords
```

```
df=pd.read_csv('/content/netflix_titles.csv')
```

```
# STEP 4: Preview the data
print("\nPreview:")
df.head()
```

```
Preview:
```

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	September 25, 2021	2020	PG-13	90 min	Documentaries	As her father nears the end of his life, filmm...
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...

Next steps: Generate code with df | View recommended plots | New interactive sheet

```
# STEP 5: Clean missing values
print("\nMissing values:")
print(df.isnull().sum())

df['director'].fillna('Unknown', inplace=True)
df['cast'].fillna('Unknown', inplace=True)
df['country'].fillna('Unknown', inplace=True)
df['date_added'].fillna('Unknown', inplace=True)
df['rating'].fillna('Unknown', inplace=True)
df['duration'].fillna('Unknown', inplace=True)
df['description'].fillna('Unknown', inplace=True)
```

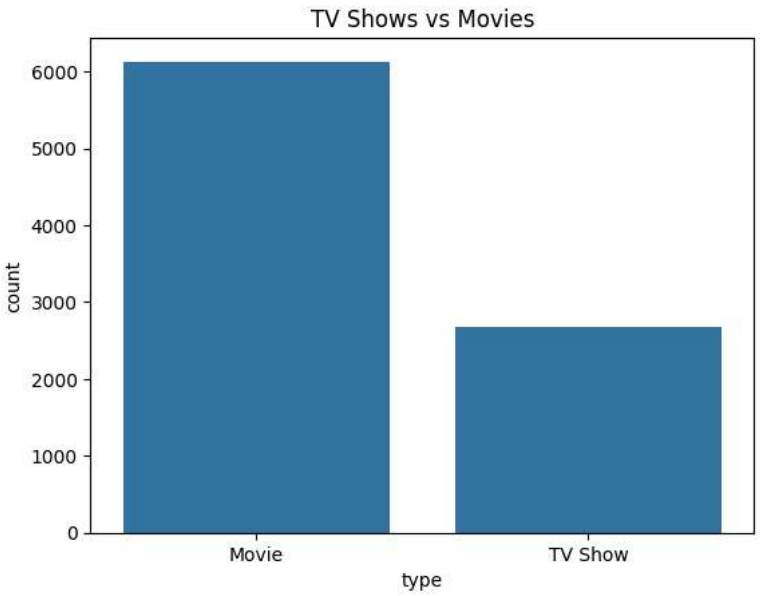
```
country          831
date_added        10
release_year       0
rating             4
duration           3
listed_in          0
description        0
```

```
  df['director'].fillna('Unknown', inplace=True)
/tmp/ipython-input-24-1840788449.py:6: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained a
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting va

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].


  df['cast'].fillna('Unknown', inplace=True)
/tmp/ipython-input-24-1840788449.py:7: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained a
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting va

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].


  df['country'].fillna('Unknown', inplace=True)
/tmp/ipython-input-24-1840788449.py:8: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained a
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting va

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].


  df['date_added'].fillna('Unknown', inplace=True)
/tmp/ipython-input-24-1840788449.py:9: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained a
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting va

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].


  df['rating'].fillna('Unknown', inplace=True)
/tmp/ipython-input-24-1840788449.py:10: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting va

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].


  df['duration'].fillna('Unknown', inplace=True)
/tmp/ipython-input-24-1840788449.py:11: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting va

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].


  df['description'].fillna('Unknown', inplace=True)
```

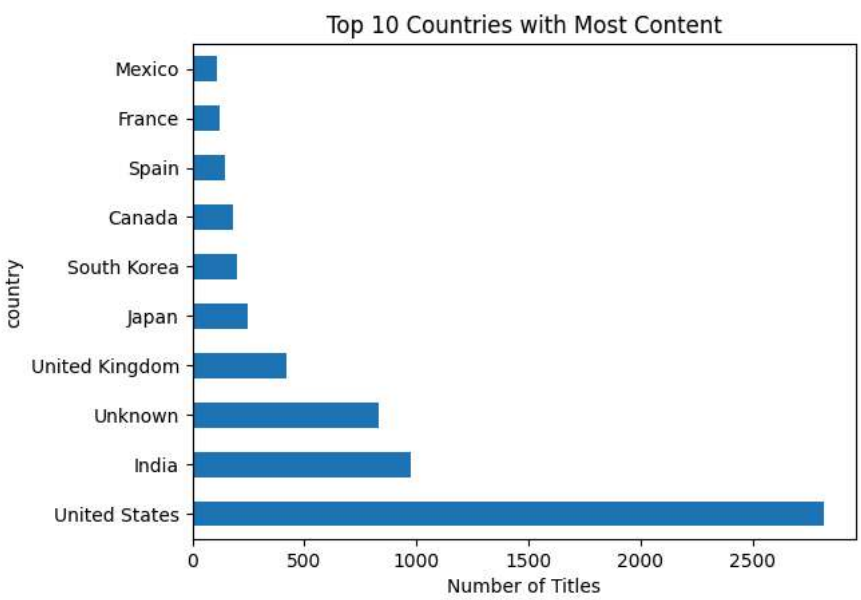
```
print(df.isnull().sum())
```

```
show_id         0
type            0
title           0
director        0
cast            0
country         0
date_added      0
release_year    0
rating          0
duration        0
listed_in       0
description     0
dtype: int64
```

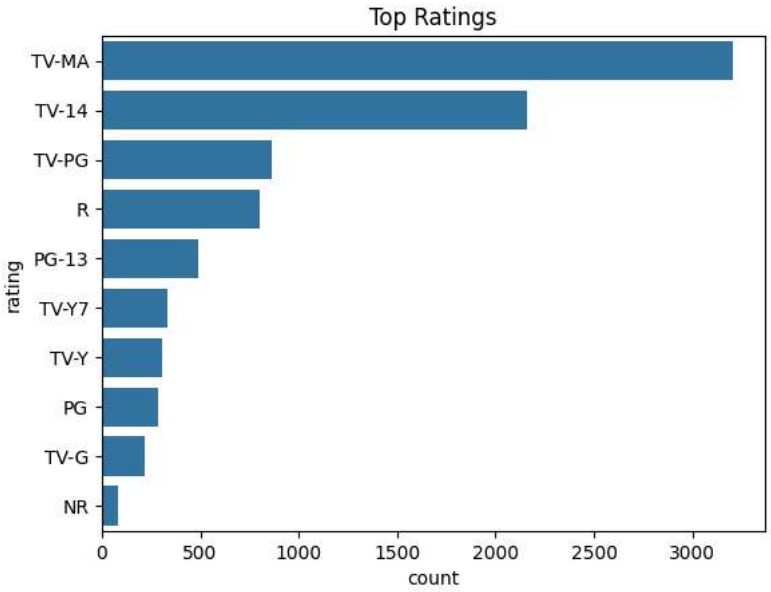
```
# STEP 6: TV vs Movie count
sns.countplot(data=df, x='type')
plt.title("TV Shows vs Movies")
plt.show()
```



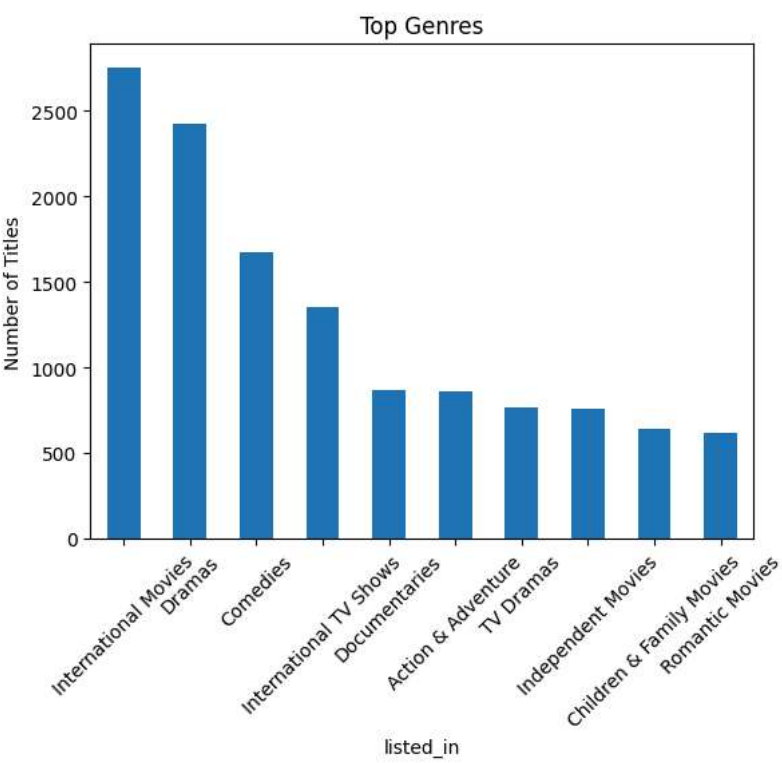

```
# STEP 7: Top 10 countries by content count
top_countries = df['country'].value_counts().head(10)
top_countries.plot(kind='barh', title='Top 10 Countries with Most Content')
plt.xlabel("Number of Titles")
plt.show()
```




```
# STEP 8: Rating distribution
sns.countplot(data=df, y='rating', order=df['rating'].value_counts().index[:10])
plt.title("Top Ratings")
plt.show()
```




```
# STEP 9: Genre analysis
all_genres = df['listed_in'].str.split(', ').explode()
top_genres = all_genres.value_counts().head(10)
top_genres.plot(kind='bar', title='Top Genres')
plt.ylabel("Number of Titles")
plt.xticks(rotation=45)
plt.show()
```




```
# STEP 10: Word Cloud from Descriptions
text = " ".join(df['description'].dropna())
stop_words = set(stopwords.words('english'))
# Download punkt_tab resource
nltk.download('punkt_tab')
filtered_words = " ".join([word for word in nltk.word_tokenize(text.lower()) if word.isalpha() and word not in stop_words])

wordcloud = WordCloud(width=800, height=400, background_color='white').generate(filtered_words)
plt.figure(figsize=(15, 7))
plt.imshow(wordcloud, interpolation='bilinear')
```

```
plt.axis('off')
plt.title("Most Common Words in Descriptions")
plt.show()
```

```
[nltk_data] Downloading package punkt_tab to /root/nltk_data...
[nltk_data]   Unzipping tokenizers/punkt_tab.zip.
```


```
# STEP 10: Word Cloud from Descriptions
text = " ".join(df['description'].dropna())
stop_words = set(stopwords.words('english'))
filtered_words = " ".join([word for word in nltk.word_tokenize(text.lower()) if word.isalpha() and word not in stop_words])

wordcloud = WordCloud(width=800, height=400, background_color='white').generate(filtered_words)
plt.figure(figsize=(15, 7))
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis('off')
plt.title("Most Common Words in Descriptions")
plt.show()
```


```
# STEP 11: Predict Content Type Using Descriptions (Classification)
X = df['description']
y = df['type']

vectorizer = TfidfVectorizer(stop_words='english', max_features=1000)
X_tfidf = vectorizer.fit_transform(X)

X_train, X_test, y_train, y_test = train_test_split(X_tfidf, y, test_size=0.2, random_state=42)

model = MultinomialNB()
model.fit(X_train, y_train)

preds = model.predict(X_test)
print("\nClassification Report:\n")
print(classification_report(y_test, preds))
```

```
Classification Report:

              precision    recall  f1-score   support

       Movie       0.74      0.98      0.84      1214
     TV Show       0.82      0.22      0.35       548

    accuracy                           0.74      1762
   macro avg       0.78      0.60      0.60      1762
weighted avg       0.76      0.74      0.69      1762
```

✦ Gemini

```
 #STEP 12: Cluster Content Based on Description (Unsupervised Learning)
from sklearn.cluster import KMeans

kmeans = KMeans(n_clusters=5, random_state=42)
kmeans.fit(X_tfidf)
df['cluster'] = kmeans.labels_

print("\nCluster Sample Counts:")
print(df['cluster'].value_counts())

# Export clustered samples
for i in range(5):
    print(f"\nCluster {i} Samples:")
    print(df[df['cluster'] == i][['title', 'description']].head(3))
```

```
Cluster Sample Counts:
cluster
4    5864
2    1518
3     523
0     467
1     435
Name: count, dtype: int64

Cluster 0 Samples:
                              title  \
14  Crime Stories: India Detectives
41                             Jaws
42                           Jaws 2
```