```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import re
import nltk
nltk.download('stopwords')
from nltk.corpus import stopwords
```

```
[nltk_data] Downloading package stopwords to /root/nltk_data...
[nltk_data]   Unzipping corpora/stopwords.zip.
```

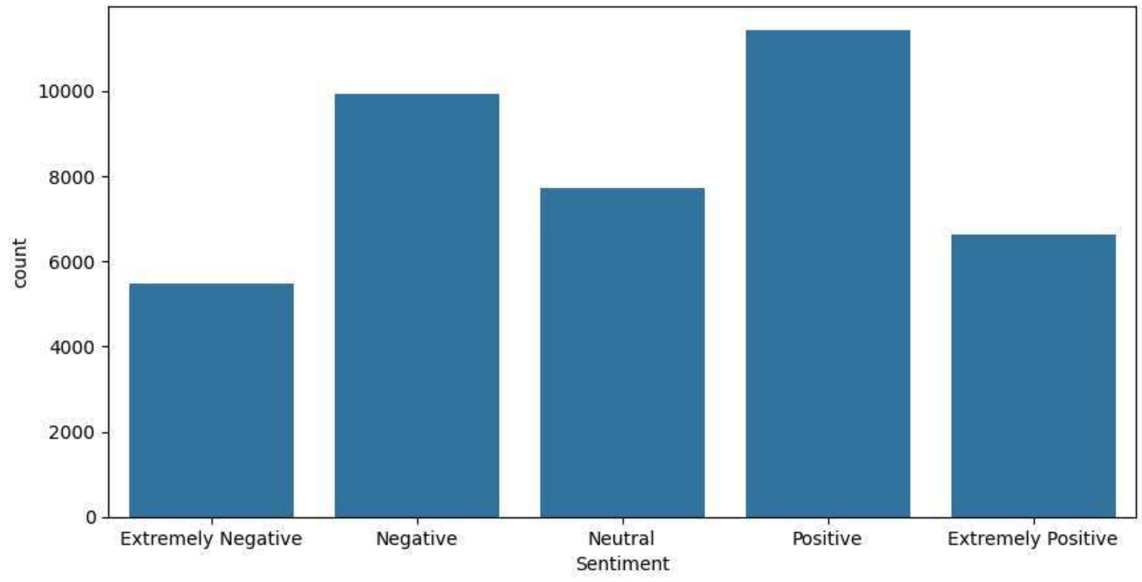
```
data = pd.read_csv("/content/Corona_NLP_train.csv",encoding='latin1')
df = pd.DataFrame(data)
df.head()
```

	UserName	ScreenName	Location	TweetAt	OriginalTweet	Sentiment
0	3799	48751	London	16-03-2020	@MeNyrbie @Phil_Gahan @Chrisitv https://t.co/i...	Neutral
1	3800	48752	UK	16-03-2020	advice Talk to your neighbours family to excha...	Positive
2	3801	48753	Vagabonds	16-03-2020	Coronavirus Australia: Woolworths to give elde...	Positive
3	3802	48754	NaN	16-03-2020	My food stock is not the only one which is emp...	Positive
4	3803	48755	NaN	16-03-2020	Me, ready to go at supermarket during the #COV...	Extremely Negative

Next steps: Generate code with df   New interactive sheet

```
plt.figure(figsize=(10,5))
sns.countplot(x='Sentiment', data=df, order=['Extremely Negative', 'Negative', 'Neutral', 'Positive', 'Extremely Positive'
```

```
<Axes: xlabel='Sentiment', ylabel='count'>
```



```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 41157 entries, 0 to 41156
Data columns (total 6 columns):
 #   Column         Non-Null Count  Dtype 
---  ------         --------------  ----- 
 0   UserName       41157 non-null  int64 
 1   ScreenName     41157 non-null  int64 
 2   Location       32567 non-null  object
 3   TweetAt        41157 non-null  object
 4   OriginalTweet  41157 non-null  object
 5   Sentiment      41157 non-null  object
dtypes: int64(2), object(4)
memory usage: 1.9+ MB
```

```
reg = re.compile("(@[A-Za-z0-9]+)|(#[A-Za-z0-9]+)|([^0-9A-Za-z t])|(w+://S+)")
tweet = []
for i in df["OriginalTweet"]:
  tweet.append(reg.sub(" ", i))
df = pd.concat([df, pd.DataFrame(tweet, columns=["CleanedTweet"])], axis=1, sort=False)
```

```
df.head()
```

	UserName	ScreenName	Location	TweetAt	OriginalTweet	Sentiment	CleanedTweet
0	3799	48751	London	16-03-2020	@MeNyrbie @Phil_Gahan @Chrisitv https://t.co/i...	Neutral	Gahan https t co iFz9FAn2Pa and https ...
1	3800	48752	UK	16-03-2020	advice Talk to your neighbours family to excha...	Positive	advice Talk to your neighbours family to excha...
2	3801	48753	Vagabonds	16-03-2020	Coronavirus Australia: Woolworths to give elde...	Positive	Coronavirus Australia Woolworths to give elde...
3	3802	48754	NaN	16-03-2020	My food stock is not the only one which is emp...	Positive	My food stock is not the only one which is emp...
4	3803	48755	NaN	16-03-2020	Me, ready to go at supermarket during the #COV...	Extremely Negative	Me ready to go at supermarket during the ou...

Next steps: Generate code with df New interactive sheet

```
from sklearn.feature_extraction.text import TfidfVectorizer
stop_words = set(stopwords.words('english'))     # make a set of stopwords
vectoriser = TfidfVectorizer(stop_words=None)
```

```
X_train = vectoriser.fit_transform(df["CleanedTweet"])
# Encoding the classes in numerical values
from sklearn.preprocessing import LabelEncoder
encoder = LabelEncoder()
y_train = encoder.fit_transform(df['Sentiment'])
from sklearn.naive_bayes import MultinomialNB
classifier = MultinomialNB()
classifier.fit(X_train, y_train)
```

```
▾ MultinomialNB ⓘ ?
MultinomialNB()
```

```
# importing the Test dataset for prediction and testing purposes
test_data = pd.read_csv("/content/Corona_NLP_test.csv",encoding='latin1')
test_df = pd.DataFrame(test_data)
test_df.head()
```

	UserName	ScreenName	Location	TweetAt	OriginalTweet	Sentiment
0	1	44953	NYC	02-03-2020	TRENDING: New Yorkers encounter empty supermar...	Extremely Negative
1	2	44954	Seattle, WA	02-03-2020	When I couldn't find hand sanitizer at Fred Me...	Positive
2	3	44955	NaN	02-03-2020	Find out how you can protect yourself and love...	Extremely Positive
3	4	44956	Chicagoland	02-03-2020	#Panic buying hits #NewYork City as anxious sh...	Negative
4	5	44957	Melbourne, Victoria	03-03-2020	#toiletpaper #dunnypaper #coronavirus #coronav...	Neutral

Next steps: Generate code with test_df New interactive sheet

```
reg1 = re.compile("(@[A-Za-z0-9]+)|(#[A-Za-z0-9]+)|([^0-9A-Za-z t])|(w+://S+)")
tweet = []
for i in test_df["OriginalTweet"]:
  tweet.append(reg1.sub(" ", i))
test_df = pd.concat([test_df, pd.DataFrame(tweet, columns=["CleanedTweet"])], axis=1, sort=False)
test_df.head()
```

	UserName	ScreenName	Location	TweetAt	OriginalTweet	Sentiment	CleanedTweet
0	1	44953	NYC	02-03-2020	TRENDING: New Yorkers encounter empty supermar...	Extremely Negative	TRENDING New Yorkers encounter empty supermar...
1	2	44954	Seattle, WA	02-03-2020	When I couldn't find hand sanitizer at Fred Me...	Positive	When I couldn t find hand sanitizer at Fred Me...
2	3	44955	NaN	02-03-2020	Find out how you can protect yourself and love...	Extremely Positive	Find out how you can protect yourself and love...
3	4	44956	Chicagoland	02-03-2020	#Panic buying hits #NewYork City as anxious sh...	Negative	buying hits City as anxious shoppers stock...
4	5	44957	Melbourne, Victoria	03-03-2020	#toiletpaper #dunnypaper #coronavirus #coronav...	Neutral	19 One week everyone...

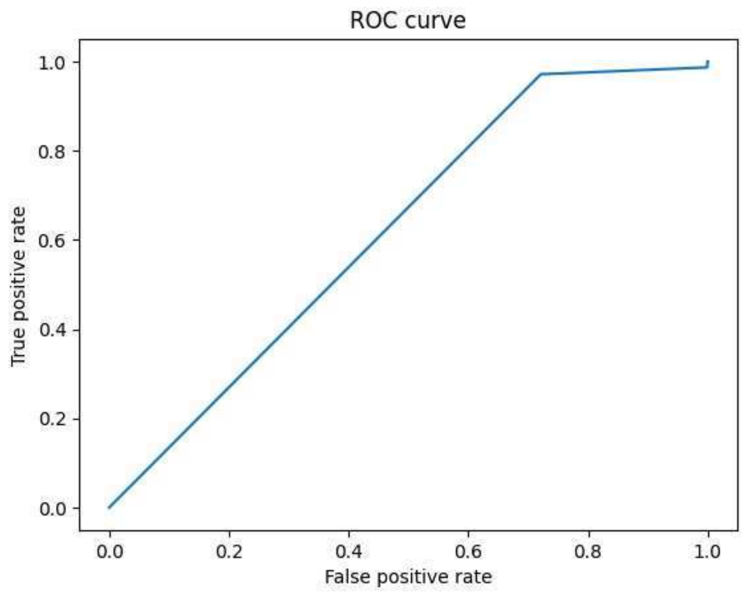
Next steps: Generate code with test_df New interactive sheet

```
X_test = vectoriser.transform(test_df["CleanedTweet"])
y_test = encoder.transform(test_df["Sentiment"])
# Prediction
y_pred = classifier.predict(X_test)
pred_df = pd.DataFrame({'Actual': y_test, 'Predicted': y_pred})
pred_df.head()
```

	Actual	Predicted
0	0	4
1	4	4
2	1	4
3	2	2
4	3	2

Next steps: Generate code with pred_df New interactive sheet

```
from sklearn import metrics
# Generate the roc curve using scikit-learn.
fpr, tpr, thresholds = metrics.roc_curve(y_test, y_pred, pos_label=1)
plt.plot(fpr, tpr)
plt.xlabel('False positive rate')
plt.ylabel('True positive rate')
plt.title('ROC curve')
plt.show()
# Measure the area under the curve. The closer to 1, the "better" the predictions.
print("AUC of the predictions: {0}".format(metrics.auc(fpr, tpr)))
```



```
AUC of the predictions: 0.6231713165790018
```