```
import pandas as pd
import numpy as np
```

Loading Up the Splitwise Data

```
splitwiseData = pd.read_csv('splitwise_reviews.csv')
```

Viewing a few rows of the data

```
splitwiseData.head()
```

```
                                  reviewId       userName  \
0  8ef0c973-1bc2-4760-8900-d9961a67dacf  A Google user
1  0be8e59c-d135-4147-8fc4-37381d583636  A Google user
2  98159b43-dff5-4e1e-aa85-682133aae9a8  A Google user
3  bfaf5cb7-ad92-449c-94ee-c4106d35ef15  A Google user
4  54217d7e-7409-434a-9c8f-4457596b5cec  A Google user

                                           userImage  \
0  https://play-lh.googleusercontent.com/EGemoI2N...
1  https://play-lh.googleusercontent.com/EGemoI2N...
2  https://play-lh.googleusercontent.com/EGemoI2N...
3  https://play-lh.googleusercontent.com/EGemoI2N...
4  https://play-lh.googleusercontent.com/EGemoI2N...

                                             content  score
thumbsUpCount  \
0  Great app(!), annoying push to try get you to ...      4
0
1         I love it, I will buy the premium version.      5
0
2  It does not make sense to be paying the same a...      1
0
3  Turned a successful free app into a shameless ...      1
0
4  The best app to record and manage your joint e...      5
0

  reviewCreatedVersion                   at replyContent repliedAt
appVersion
0              24.11.1  2024-12-11 15:39:05          NaN       NaN
24.11.1
1              24.11.1  2024-12-11 14:28:51          NaN       NaN
24.11.1
2               23.4.1  2024-12-11 13:59:58          NaN       NaN
23.4.1
3              24.11.1  2024-12-11 13:24:07          NaN       NaN
24.11.1
```

```
4              24.11.1  2024-12-11 13:16:44          NaN       NaN
24.11.1

import pandas as pd
import re
import string
from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
from sklearn.feature_extraction.text import CountVectorizer
from collections import Counter
import matplotlib.pyplot as plt
import seaborn as sns
from wordcloud import WordCloud

# Filter for positive reviews
positive_reviews = splitwiseData[splitwiseData['score'] >= 4]
['content'].dropna()

def clean_text(text):
    # Lowercase
    text = text.lower()
    # Remove URLs
    text = re.sub(r'http\S+', '', text)
    # Remove punctuation
    text = text.translate(str.maketrans('', '', string.punctuation))
    # Tokenize
    words = word_tokenize(text)
    # Remove stopwords and non-alphabetic tokens
    sw = set(stopwords.words('english'))
    words = [w for w in words if w.isalpha() and w not in sw]
    return words

# Clean the text of positive reviews
positive_reviews_tokens = positive_reviews.apply(clean_text)

# Flatten list of tokens
all_tokens = [word for tokens in positive_reviews_tokens for word in
tokens]


### 1. Bar Chart of Most Common Words in Positive Reviews ###
word_freq = Counter(all_tokens)
most_common_words = word_freq.most_common(20)

words, counts = zip(*most_common_words)
plt.figure(figsize=(10,6))
sns.barplot(x=list(counts), y=list(words), palette='viridis')
plt.title("Top 20 Most Common Words in Positive Reviews")
plt.xlabel("Frequency")
plt.ylabel("Word")
```

```
plt.tight_layout()
plt.show()
```

```
C:\Users\User\AppData\Local\Programs\Python\Python310\lib\site-
packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype
is deprecated and will be removed in a future version. Use
isinstance(dtype, CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
C:\Users\User\AppData\Local\Programs\Python\Python310\lib\site-
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C:\Users\User\AppData\Local\Programs\Python\Python310\lib\site-
packages\seaborn\_oldcore.py:1765: FutureWarning: unique with argument
that is not not a Series, Index, ExtensionArray, or np.ndarray is
deprecated and will raise in a future version.
  order = pd.unique(vector)
C:\Users\User\AppData\Local\Programs\Python\Python310\lib\site-
packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype
is deprecated and will be removed in a future version. Use
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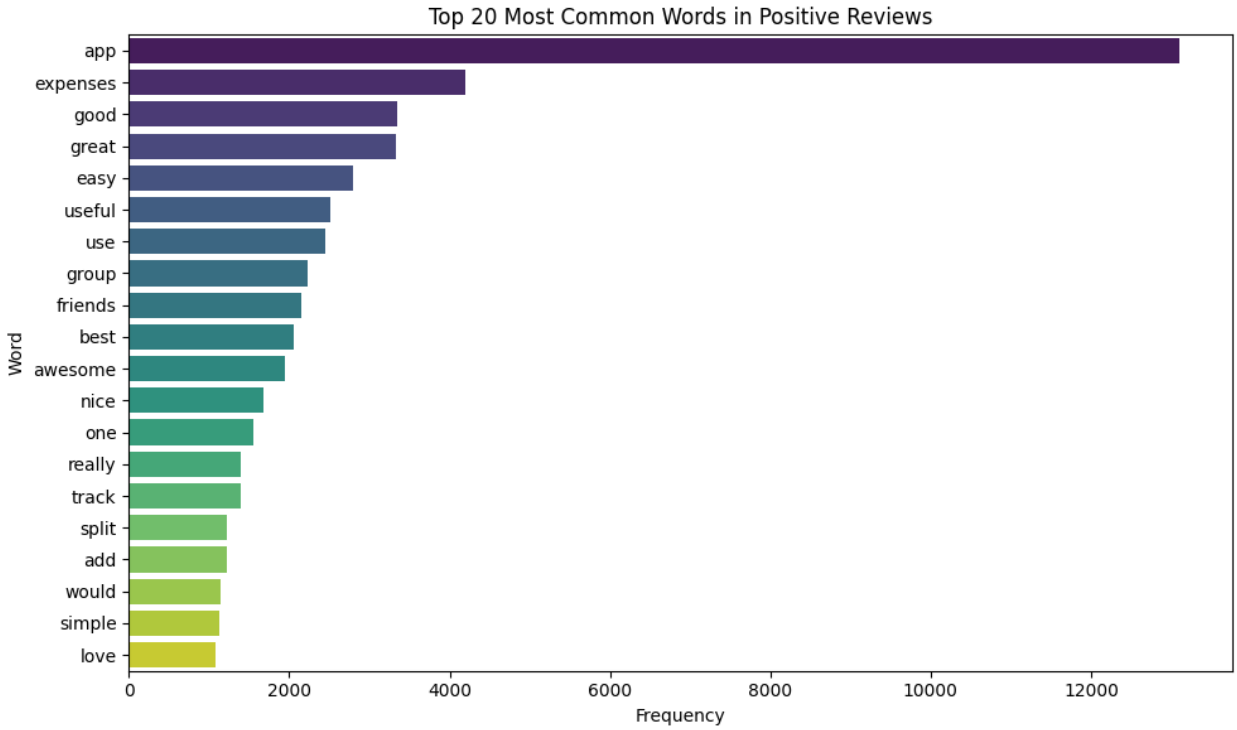
  if pd.api.types.is_categorical_dtype(vector):
```




```
### 2. Bar Chart of Most Common N-grams (e.g., Bigrams) ###
vectorizer = CountVectorizer(ngram_range=(2,2), stop_words='english')
```

```
ngram_matrix = vectorizer.fit_transform(positive_reviews)
ngram_freq = ngram_matrix.sum(axis=0)
ngram_freq = [(word, ngram_freq[0, idx]) for word, idx in
vectorizer.vocabulary_.items()]
ngram_freq = sorted(ngram_freq, key=lambda x: x[1], reverse=True)
top_ngrams = ngram_freq[:20]

ngram_words, ngram_counts = zip(*top_ngrams)
plt.figure(figsize=(10,6))
sns.barplot(x=list(ngram_counts), y=list(ngram_words),
palette='magma')
plt.title("Top 20 Most Common Bigrams in Positive Reviews")
plt.xlabel("Frequency")
plt.ylabel("Bigram")
plt.tight_layout()
plt.show()
```

```
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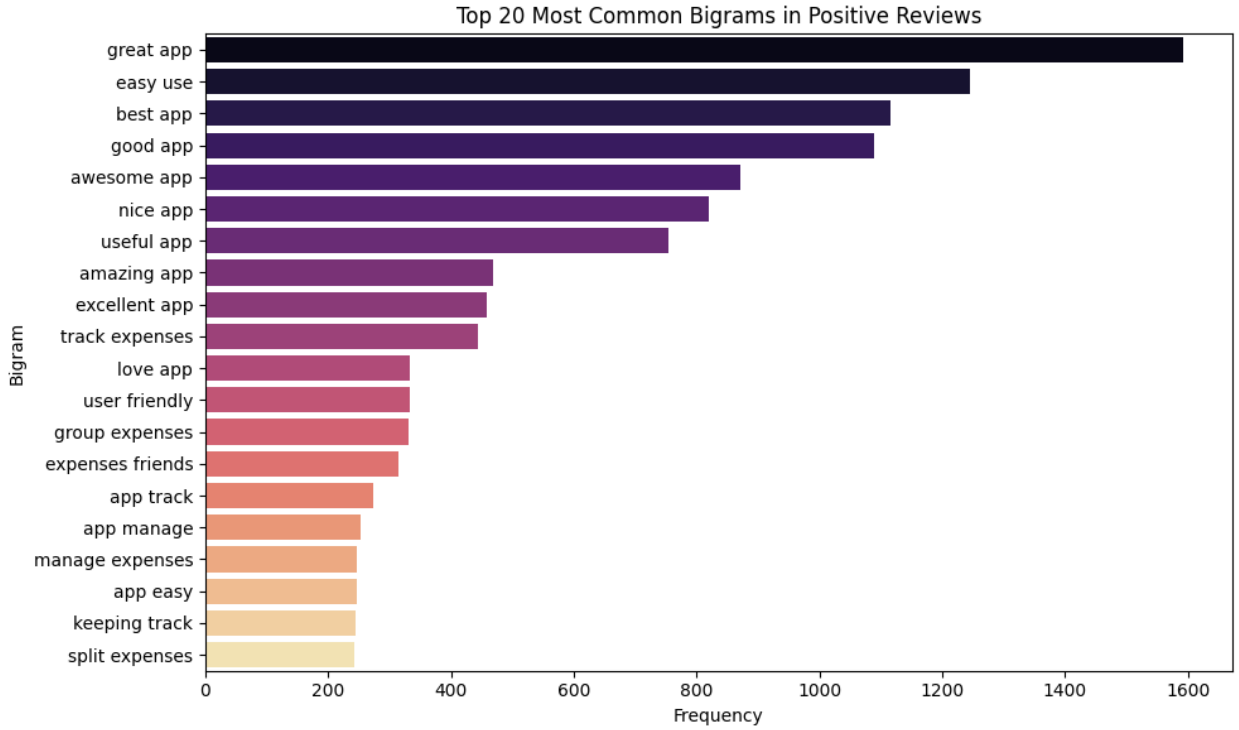


```
### 3. Word Cloud of Most Frequent Words ###
wordcloud = WordCloud(width=800, height=400, background_color='white',
stopwords=stopwords.words('english'))
wordcloud.generate(" ".join(all_tokens))

plt.figure(figsize=(10,5))
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis('off')
plt.title("Word Cloud of Positive Reviews")
plt.show()
```


```
# - Distribution chart of review scores
plt.figure(figsize=(8,5))
sns.countplot(x='score', data=splitwiseData, palette='coolwarm')
plt.title("Distribution of Review Scores")
plt.xlabel("Score")
plt.ylabel("Count")
plt.show()
```

```
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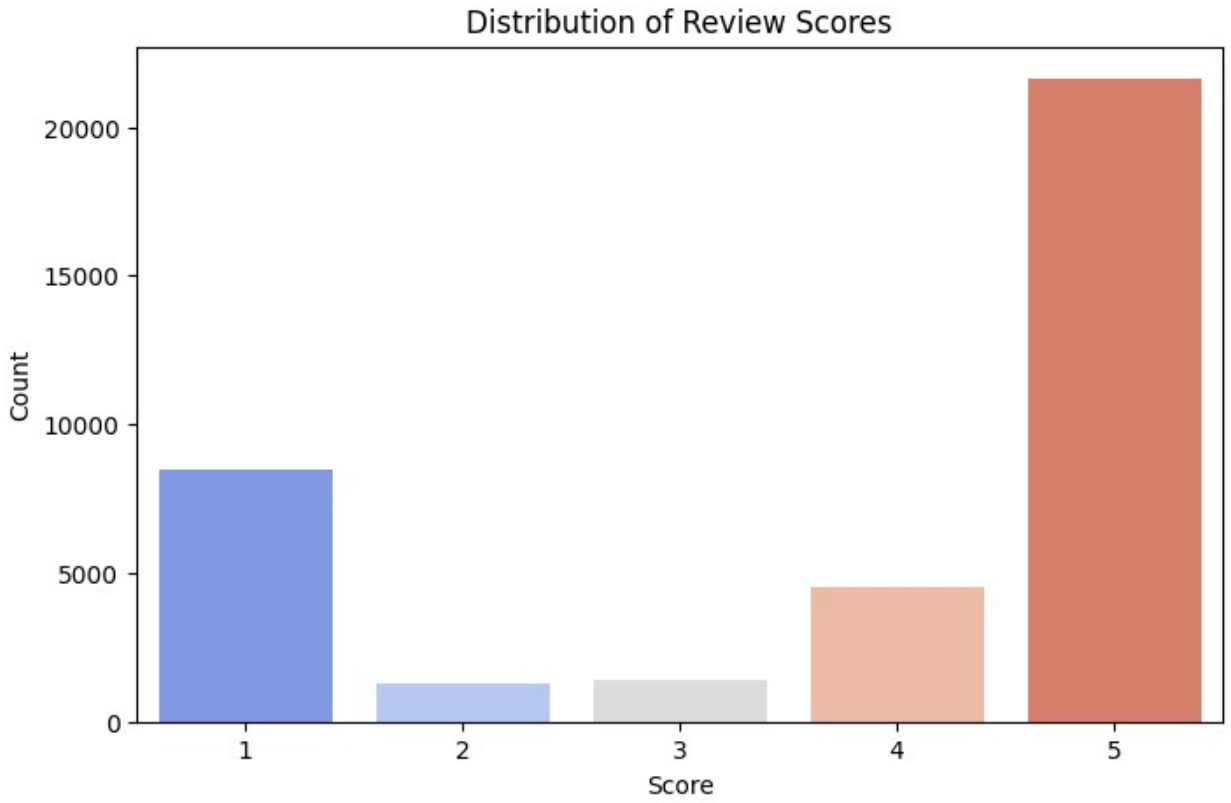
  if pd.api.types.is_categorical_dtype(vector):
```




```
# - Length of reviews as histogram
positive_lengths = positive_reviews.apply(lambda x: len(x.split()))
plt.figure(figsize=(8,5))
sns.histplot(positive_lengths, kde=True, color='green')
plt.title("Distribution of Positive Review Lengths")
plt.xlabel("Number of Words")
plt.ylabel("Frequency")
plt.show()
```

```
C:\Users\User\AppData\Local\Programs\Python\Python310\lib\site-
packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype
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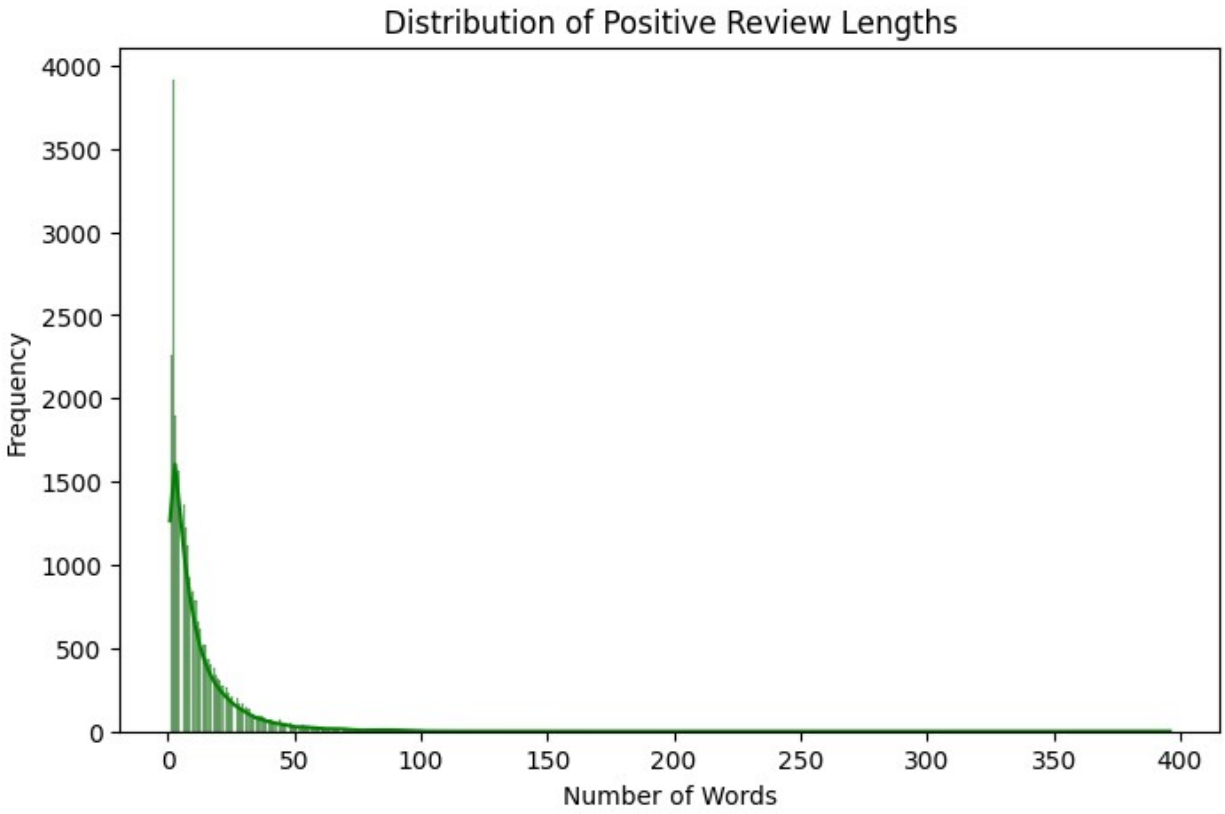
  if pd.api.types.is_categorical_dtype(vector):
C:\Users\User\AppData\Local\Programs\Python\Python310\lib\site-
packages\seaborn\_oldcore.py:1119: FutureWarning: use_inf_as_na option
is deprecated and will be removed in a future version. Convert inf
values to NaN before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
```


Distribution of Positive Review Lengths
Frequency
Number of Words
0
500
1000
1500
2000
2500
3000
3500
4000
0
50
100
150
200
250
300
350
400