

```
In [1]: import pandas as pd
import numpy as np
from matplotlib import pyplot as plt
import seaborn as sns
from collections import Counter

In [2]: satisfaction_df = pd.read_csv('Survey data_Inflight Satisfaction Score.csv')
comments_df = pd.read_csv('Survey data_Customer comments.csv')
```

Root Cause Analysis

```
In [3]: # Convert the scheduled_departure_date to datetime format
satisfaction_df['scheduled_departure_date'] = pd.to_datetime(satisfaction_df['scheduled_departure_date'])

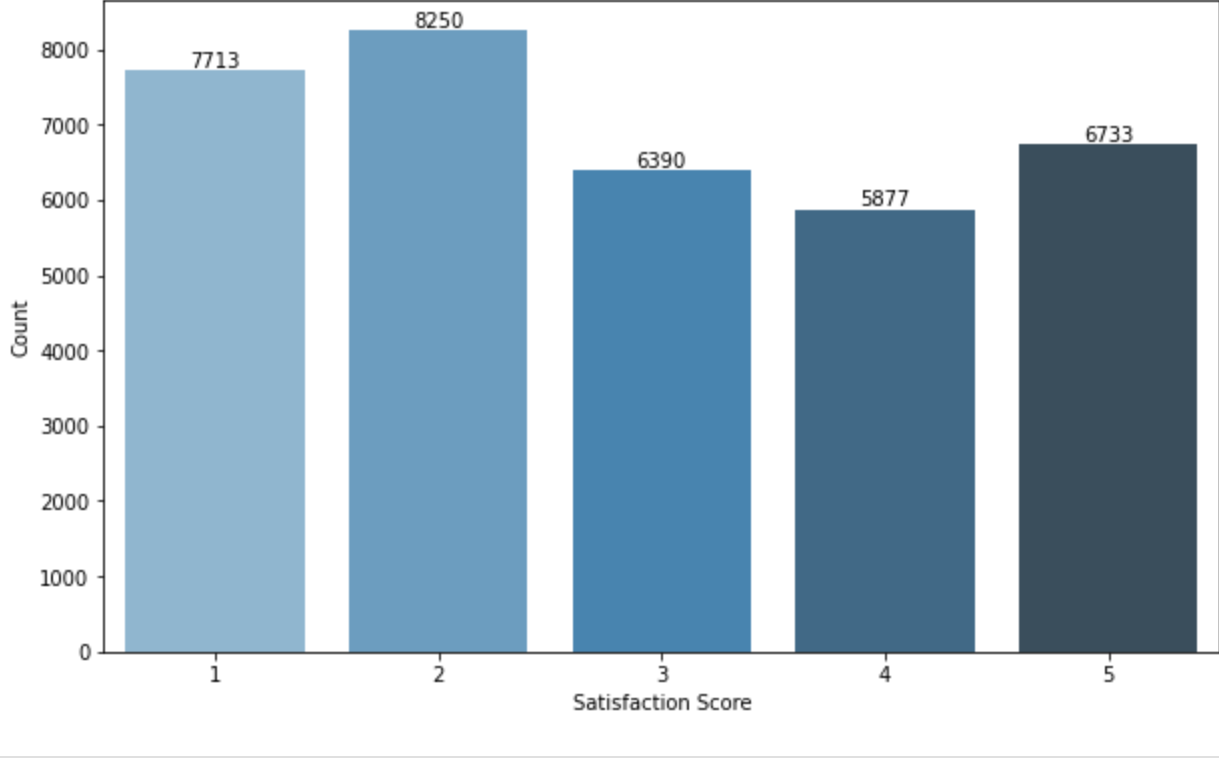
# Filter for summer months
summer_months = [6, 7, 8, 9]
filtered_satisfaction_df = satisfaction_df[satisfaction_df['scheduled_departure_date'].dt.month.isin(summer_months)]

# Filter for scores from 1 to 5
filtered_satisfaction_df = filtered_satisfaction_df[filtered_satisfaction_df['score'].isin(['1', '2', '3', '4', '5'])]
```

```
In [4]: # Plot distribution of scores for September
plt.figure(figsize=(10, 6))
ax = sns.countplot(data=satisfaction_df, x='score', order=['1', '2', '3', '4', '5'], palette="Blues_d")
plt.title('Distribution of F&B Satisfaction Scores for September')
plt.xlabel('Satisfaction Score')
plt.ylabel('Count')

for bars in ax.containers:
    ax.bar_label(bars)

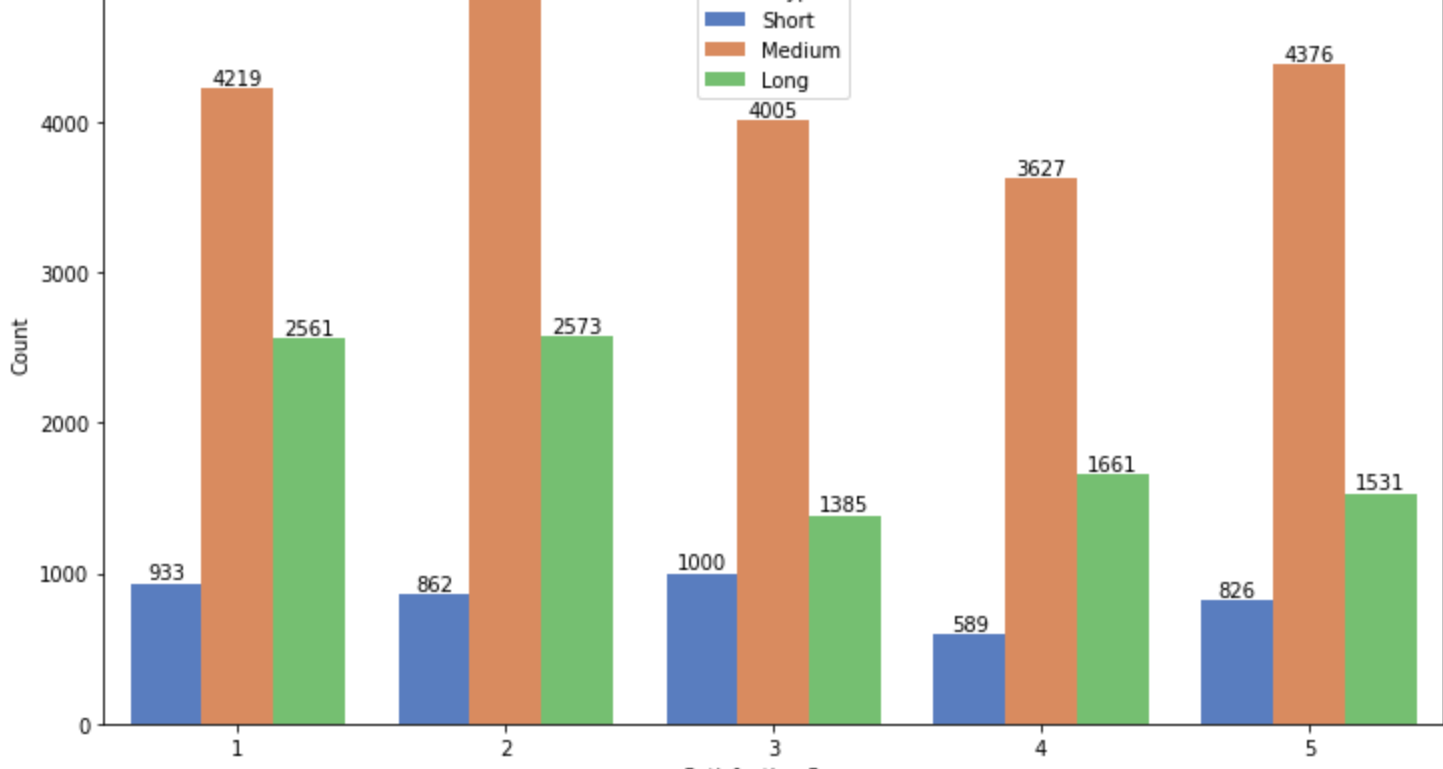
plt.show()
```



```
In [13]: # Plot distribution of scores based on haul type
plt.figure(figsize=(12, 7))
ax = sns.countplot(data=satisfaction_df, x='score', hue='haul_type', order=['1', '2', '3', '4', '5'], palette="muted")
plt.title('Distribution of F&B Satisfaction Scores by Haul Type for September')
plt.xlabel('Satisfaction Score')
plt.ylabel('Count')
plt.legend(title='Haul Type')

for bars in ax.containers:
    ax.bar_label(bars)

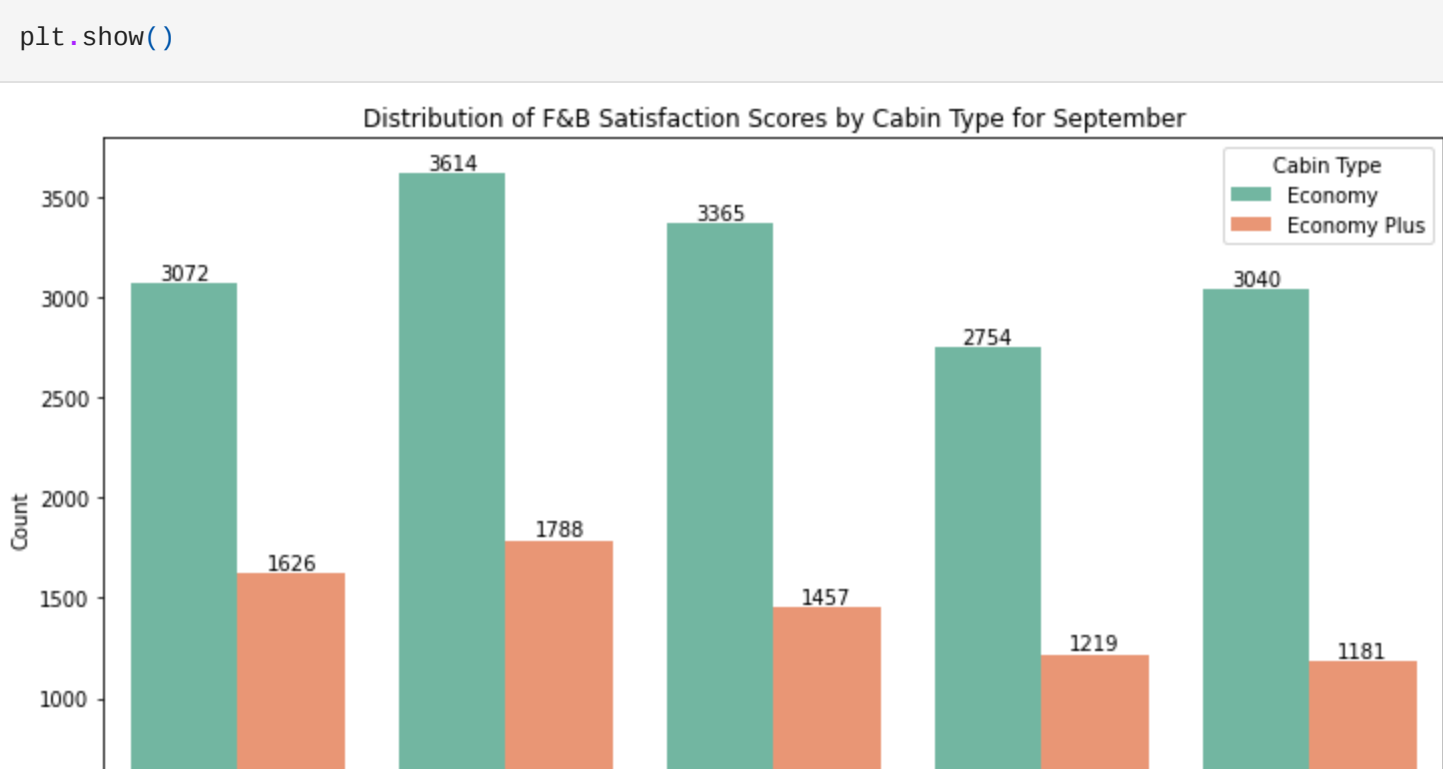
plt.show()
```



```
In [6]: # Plot distribution of scores based on cabin type
plt.figure(figsize=(12, 7))
ax = sns.countplot(data=satisfaction_df, x='score', hue='cabin_name', order=['1', '2', '3', '4', '5'], palette="Set2")
plt.title('Distribution of F&B Satisfaction Scores by Cabin Type for September')
plt.xlabel('Satisfaction Score')
plt.ylabel('Count')
plt.legend(title='Cabin Type')

for bars in ax.containers:
    ax.bar_label(bars)

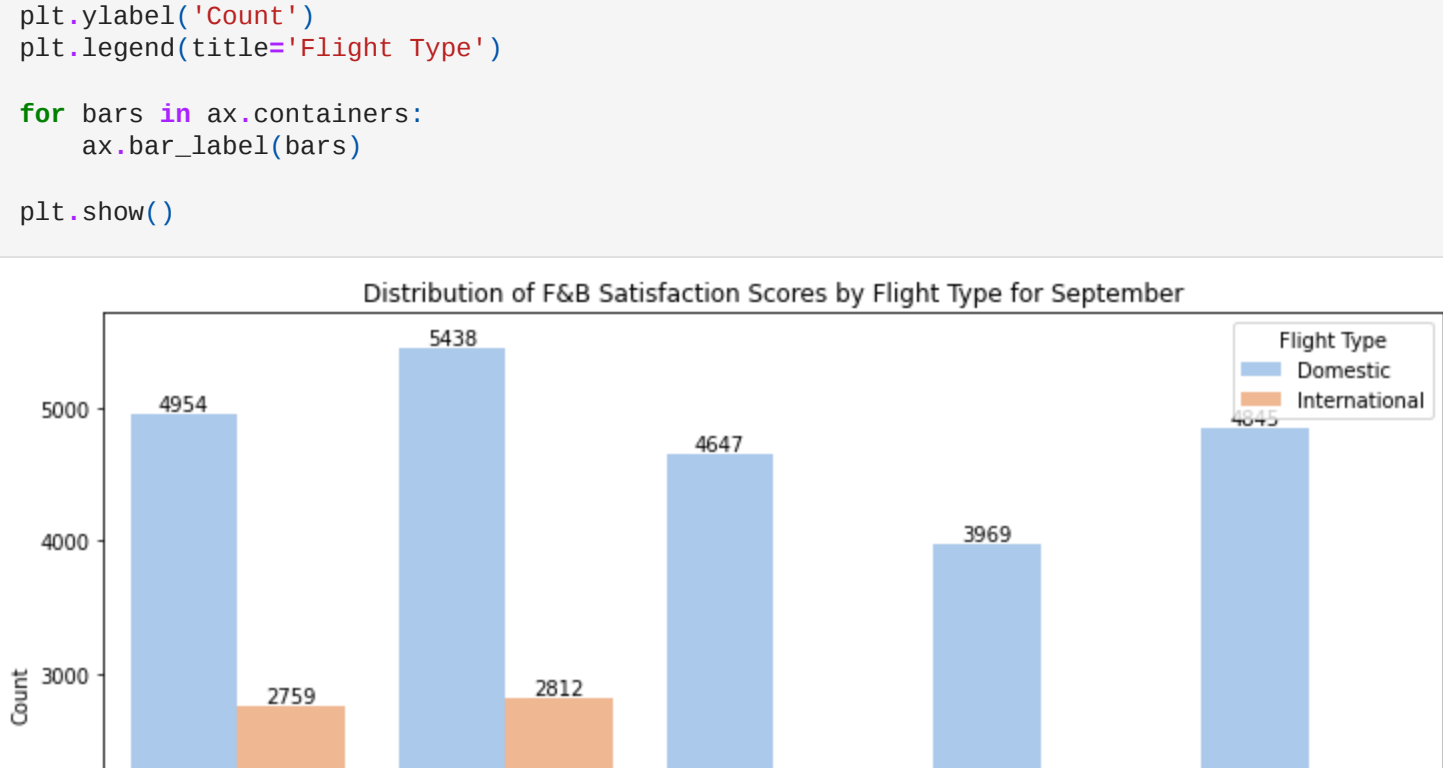
plt.show()
```



```
In [7]: # Plot distribution of scores based on flight type (Domestic vs. International)
plt.figure(figsize=(12, 7))
ax = sns.countplot(data=satisfaction_df, x='score', hue='international_domestic_indicator', order=['1', '2', '3', '4', '5'], palette="pastel")
plt.title('Distribution of F&B Satisfaction Scores by Flight Type for September')
plt.xlabel('Satisfaction Score')
plt.ylabel('Count')
plt.legend(title='Flight Type')

for bars in ax.containers:
    ax.bar_label(bars)

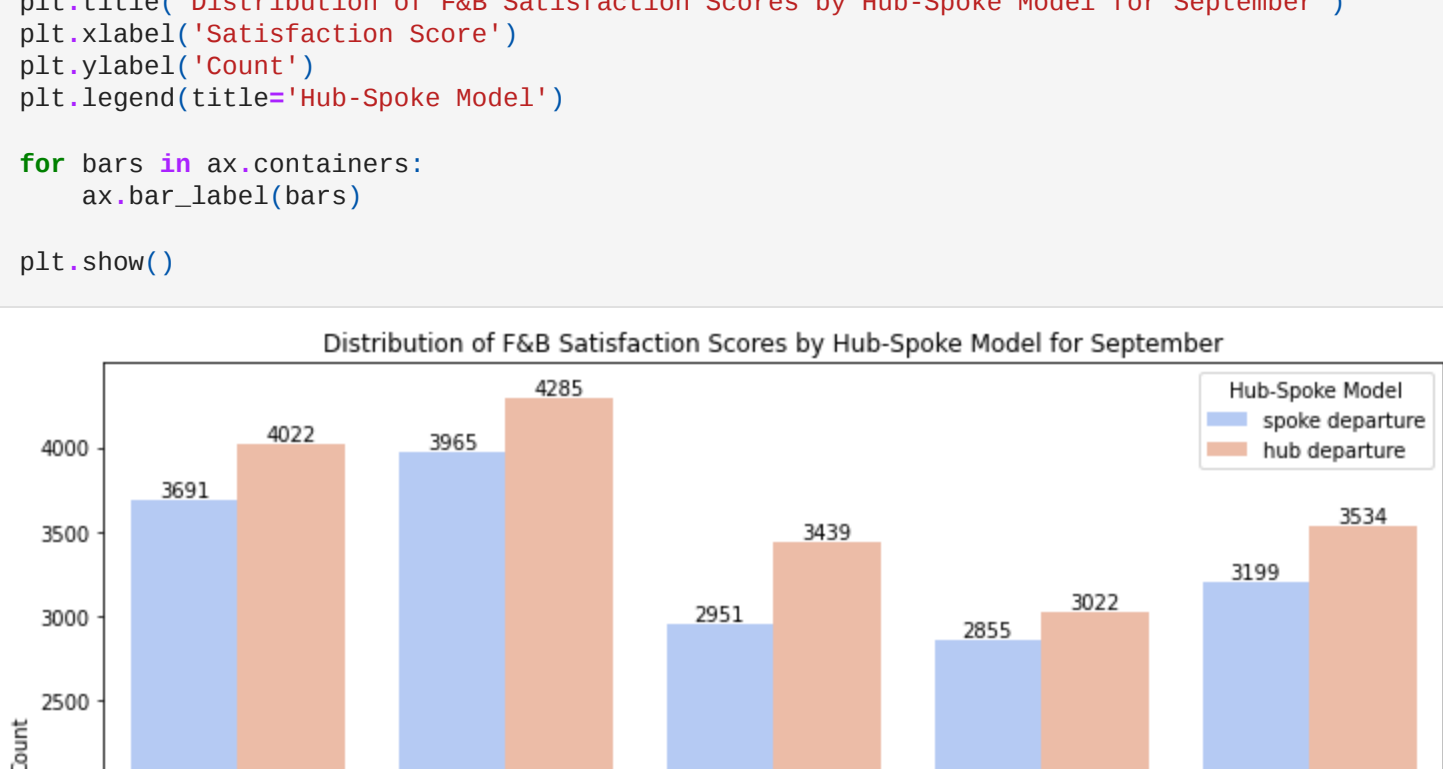
plt.show()
```



```
In [8]: # Plot distribution of scores based on Hub-Spoke model
plt.figure(figsize=(12, 7))
ax = sns.countplot(data=satisfaction_df, x='score', hue='hub_spoke', order=['1', '2', '3', '4', '5'], palette="coolwarm")
plt.title('Distribution of F&B Satisfaction Scores by Hub-Spoke Model for September')
plt.xlabel('Satisfaction Score')
plt.ylabel('Count')
plt.legend(title='Hub-Spoke Model')

for bars in ax.containers:
    ax.bar_label(bars)

plt.show()
```



Survey Trends: F&B Customer dissatisfaction

```
In [14]: # Define a set of common stopwords
stop_words = set([
    "ourselves", "hers", "between", "yourself", "but",
    "again", "there", "about", "once", "during", "out",
    "very", "having", "with", "they", "own", "an", "be",
    "some", "for", "do", "its", "yours", "such", "into",
    "of", "most", "itself", "other", "off", "is", "s", "am",
    "or", "who", "as", "from", "him", "each", "the", "themselves",
    "until", "below", "are", "we", "these", "your", "his", "through",
    "don", "nor", "me", "were", "her", "more", "himself", "this",
    "down", "should", "our", "their", "while", "above", "both", "up",
    "to", "ours", "had", "she", "all", "no", "when", "at", "any", "before",
    "them", "same", "and", "been", "have", "in", "will", "on", "does",
    "yourselves", "then", "that", "because", "what", "over", "why", "so",
    "can", "did", "not", "now", "under", "he", "you", "herself", "has",
    "just", "where", "too", "only", "myself", "which", "those", "i",
    "after", "few", "whom", "t", "being", "if", "theirs", "my",
    "against", "a", "by", "doing", "it", "how", "further", "was", "here", "than", "would", "could"
])

# Define a function to preprocess text
def simple_preprocess(text):
    # Convert to lowercase and tokenize
    tokens = text.lower().split()
    # Remove stopwords and punctuation
    tokens = [word for word in tokens if word not in stop_words and word.isalpha()]
    return tokens

# Apply the function to the verbatim_text column
simple_tokens_list = comments_df['verbatim_text'].dropna().apply(simple_preprocess)

# Flatten the list of tokens
all_simple_tokens = [token for sublist in simple_tokens_list for token in sublist]

# Get the frequency of each token
simple_word_freq = Counter(all_simple_tokens)

simple_word_freq.most_common(20)
```

```
[('food', 1294),
 ('flight', 1157),
 ('snack', 744),
 ('meal', 631),
 ('like', 598),
 ('offered', 540),
 ('options', 474),
 ('snacks', 455),
 ('first', 448),
 ('better', 425),
 ('nice', 395),
 ('good', 391),
 ('chicken', 377),
 ('class', 353),
 ('one', 350),
 ('get', 343),
 ('served', 340),
 ('offer', 328),
 ('water', 322),
 ('united', 303)]
```

```
In [18]: # Extract sample comments that mention the word "food"
food_related_comments = comments_df[comments_df['verbatim_text'].str.contains("food", case=False, na=False)]

# Display a sample of these comments - sample size of 30
sample_food_comments = food_related_comments['verbatim_text'].sample(30).tolist()
sample_food_comments
```

```
['The food seemed an odd combination of cold udon noodles as salad and a beef entree.',
 'It would be nice to offer some kind of real food versus junk food. Coffee was sour tasting.',
 'WHAT I AM NOT HAPPY ABOUT IS YOU CAN NOT PAY FOR XTRA FOOD OR SNAKS WITH CASH, I am a CAS PERSON AND DONOT CARRY MY PHONE ON MY VACATION AND WOULD PREFER TO PAY CASH NOT BY CREDIT CARD.',
 'There was only a minimal food selection.',
 'I sat in 5a and the meal I would choose was unavailable. The only in-flight snacks were chips and one type of chocolate. Looks like I need to bring a food pack with me.',
 'The food box can be improved. It is was not the best for me.',
 'We were told the flight had very limited selection and when it got to row 42 there was not much left. Had I known I would have purchased food in the airport.',
 'Food (all choices) was disgusting. Could only eat a cookie for a 7 1/2 flight to Ireland <😞><😞><😞><😞>. Multiple of us was disgusted airline food was still that BAD. For the price of a ticket you would think any of the choices for dinner and breakfast would be edible but all of them were gross.',
 'Food was not that great. I believe there are 30 seats in business and they were only four servings of fish. If you offer three items, you would think United would have at least 1/3 of each. For the price of the ticket, your food really is pretty awful. And when are you going to acknowledge gluten intolerance?',
 'Limited choices even when pre-ordering on the app - why?. When you have a day or two notice, there should be more choices. No motivation to use the app and preorder. Also, the quality of the food could be better. I fly international so I know this is possible.',
 'Food selections are a bit too complex. Simple sandwich or scramble preferred.',
 'Offer simpler food options eg a cheese sandwich and fruit.',
 'Even first class. Pretzels. No thanks. Food is limited.',
 'The chicken entree was a thai chicken noodle. The problem is that food tends to contain peanuts and neither of the stewardesses knew if this entree contained peanuts which is important because my son has a peanut allergy.',
 'As I said earlier, the food from London to Denver was better than the food Denver to London.',
 'I was able to purchase food on the plane that I was not allowed to purchase 3 days before the flight.',
 'Again, I was not awakened when breakfast was served, thus missed the food, coffee, and water.',
 'Also, the lunch service was served so late that I only had 5 minutes to eat a cheeseburger before having my plate cleared for landing-not sure why that happened when the flight was nearly 10 hours. The lounge in Rome was awful. I think it was called Prima Vista right by our gate E41 at FCO. It was terrible food and service and WAY below the standard for the Polaris class tickets we bought for our 25th anniversary.',
 'Fish entree was so so!. Ok!. It is airline food!.',
 'No food and/or beverages served.',
 'On this flight we were not offered any food or beverages.',
 'It was the same options as I had from SFO to CDG in May. You need to vary the options so it is not always the same. I was quite surprised it was the exact same choice. And the food was barely room temperature.',
 'Food selection is so limited . Each flight should serve different sandwiches as an option instead of just snack boxes.',
 'It was a limited selection of the food.',
 'The food selection could be improved given I had paid business class so expected a bit more.',
 'Hoping for food in first class but short flight I guess.',
 'The special meal was served way before the others. I do not like the feeling of eating long before others get their food. Less separation in time would be preferable.',
 'Food preordered in f class was good and appropriately hot.',
 'The service was good. food was ok.',
 'It would be nice to offer more of a variety of food items to purchase that are more healthy.']
```

```
In [11]: # Extract sample comments that mention the word "snack"
snack_related_comments = comments_df[comments_df['verbatim_text'].str.contains("snack", case=False, na=False)]

# Display a sample of these comments
sample_snack_comments = snack_related_comments['verbatim_text'].sample(30).tolist()
sample_snack_comments
```

```
['Would have liked some snack.',
 'Fantastic to get a selection of snacks in addition to the snack box!!.',
 'I appreciate the option of ordering a snack due to my Premier 1K status.',
 'I was very surprised to not receive a snack on this flight. I have flown this same route many times before and previously received a snack.',
 'On a flight that long, the flight attendants should come around more than once to offer snacks or drinks.',
 'Our lunch entry was very good. It was chicken in a creamy mushroom sauce. The meal also had scalloped potatoes and green beans. For our last snack we had a warm pretzel bun filled with turkey and cheese.',
 'It would have been nice to provide a small snack (even crackers or pretzels). All that was served was a beverage.',
 'I am 1k and flying in first class, confuses me why there would not be a gluten free option. Meanwhile if I fly in economy. I have the complimentary snack option and can obtain GF. If I ask for GF in first class, thus missed the food, coffee, and water.',
 'New Orleans to Houston is a very short flight, so did not expect food/beverage. But this is my only chance to comment that there was no food/snack on any of the other 3 legs of this trip when the flights were longer.',
 'No snacks, unless I was supposed to ask or pay for them?.',
 'We were not offered any snacks or given the option to purchase any items which is unusual for that flight.']
```