Hotel Booking Dataset

This dataset contains booking data for two types of hotels, includes data such as when the booking was made, length of stay, the number of adults, children, and/or babies, and the number of available parking spaces, and more.

dataset

We didn't do any transformations to the data so the dataset remains the same. Explanations for each column is provided in the link for the dataset.

Binary Variables:

1. is_repeated_guest - if guest rebooked the hotel
2. hotel - there are two types of hotel (Resort Hotel or City Hotel)

Numerical variables:

1. lead_time - delta time between booking and arrival to hotel
2. adr - #lodging transactions / #nights stayed

We sample randomly (using a seed 42) 5000 rows from the dataset

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

hotel_data = pd.read_csv('hotel_bookings.csv').sample(n=5000, random_state=42)
hotel_data.head(5)
```

	hotel	is_canceled	lead_time	arrival_date_year	arrival_date_month	arrival_date_week_number	arrival_date_da
30946	Resort Hotel	0	203	2016	December	49	
40207	City Hotel	1	82	2015	July	29	
103708	City Hotel	0	25	2016	December	53	
85144	City Hotel	0	1	2016	March	11	
109991	City Hotel	0	70	2017	April	16	

5 rows × 32 columns

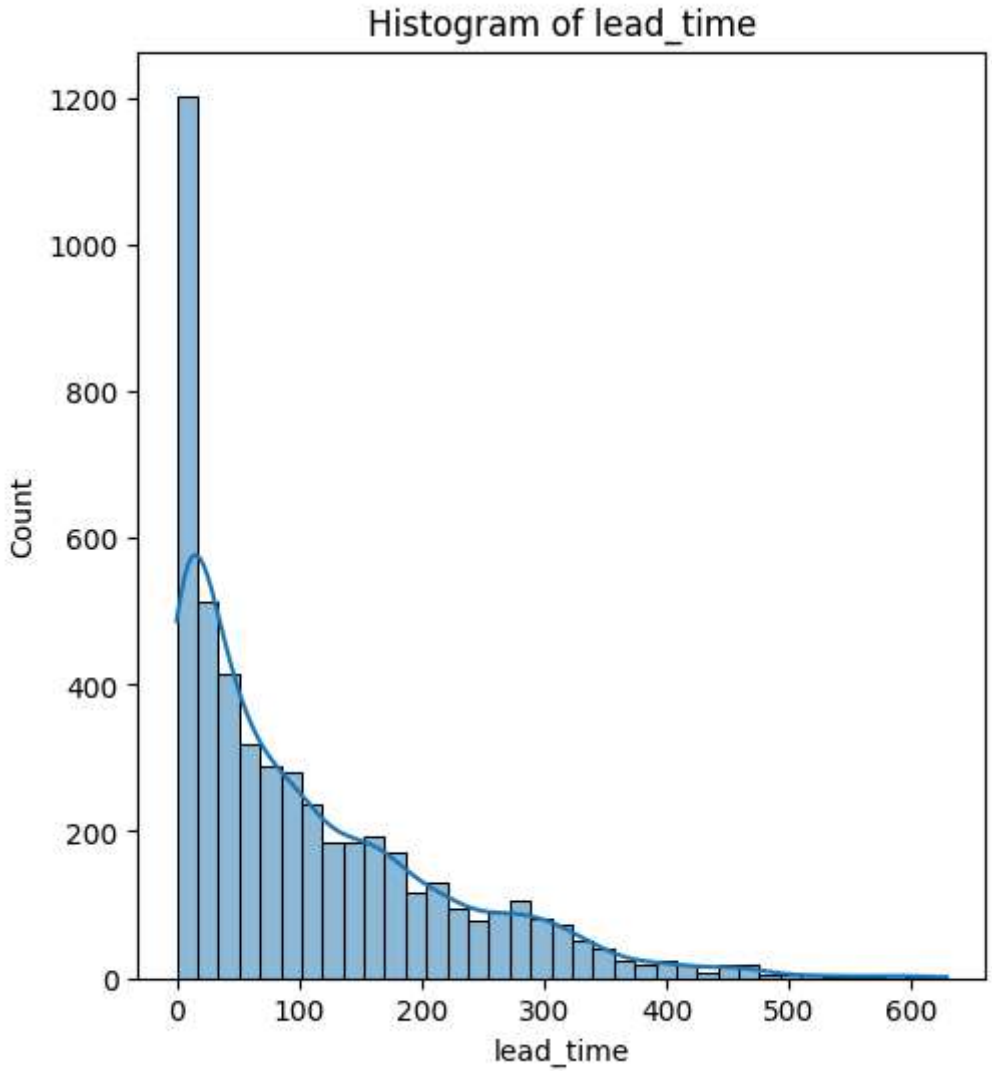
Summary on dataset given the four variables that we chose:

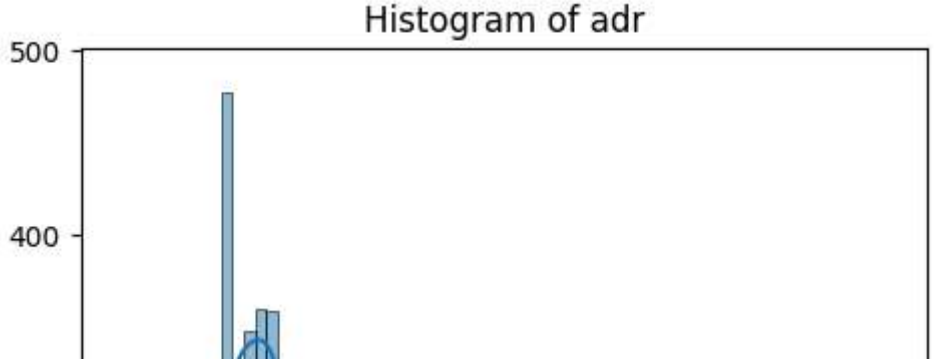
```
# Define numerical and binary variables
numerical_vars = ["lead_time", "adr"]
binary_vars = ["is_repeated_guest", "hotel"]

# Summary statistics and visualizations for numerical variables
numerical_summary = hotel_data[numerical_vars].describe()
binary_summary = hotel_data["is_repeated_guest"].value_counts()
hotel_summary = hotel_data["hotel"].value_counts()
print(f'{numerical_summary}\n')
print(f'{binary_summary}\n')
print(f'{hotel_summary}\n')
```

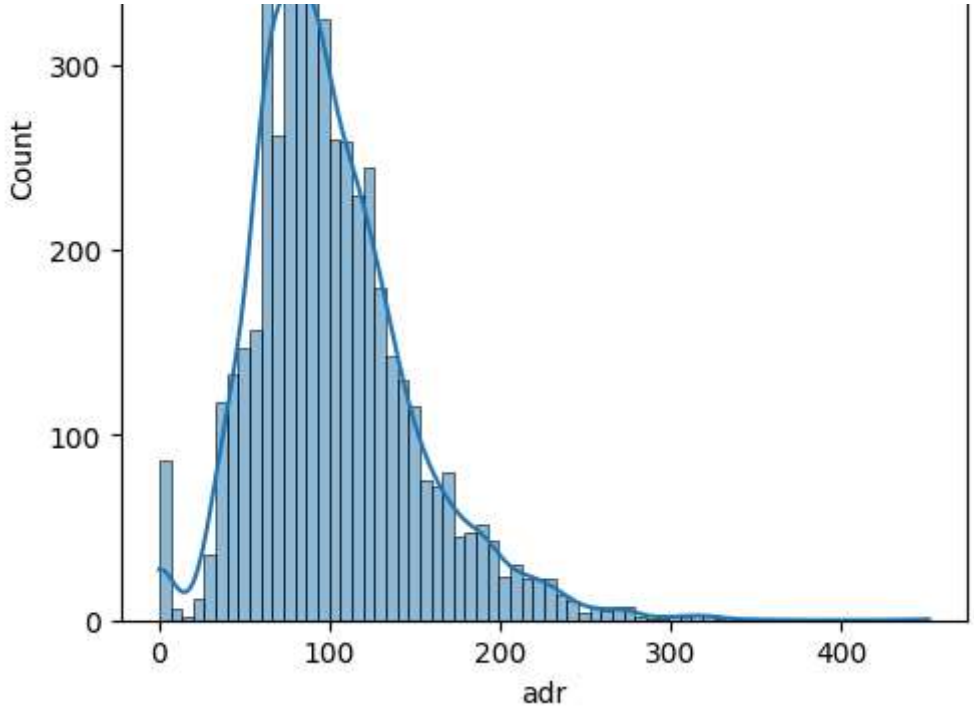
```
          lead_time          adr
count  5000.000000  5000.000000
mean    105.707400   100.802180
std     108.574166    47.568669
```

```
min       0.000000     0.000000
25%      18.000000    68.122500
50%      70.000000    92.750000
75%     164.000000   125.000000
max     629.000000   451.500000

is_repeated_guest
0    4837
1     163
Name: count, dtype: int64

hotel
City Hotel      3264
Resort Hotel    1736
Name: count, dtype: int64
```

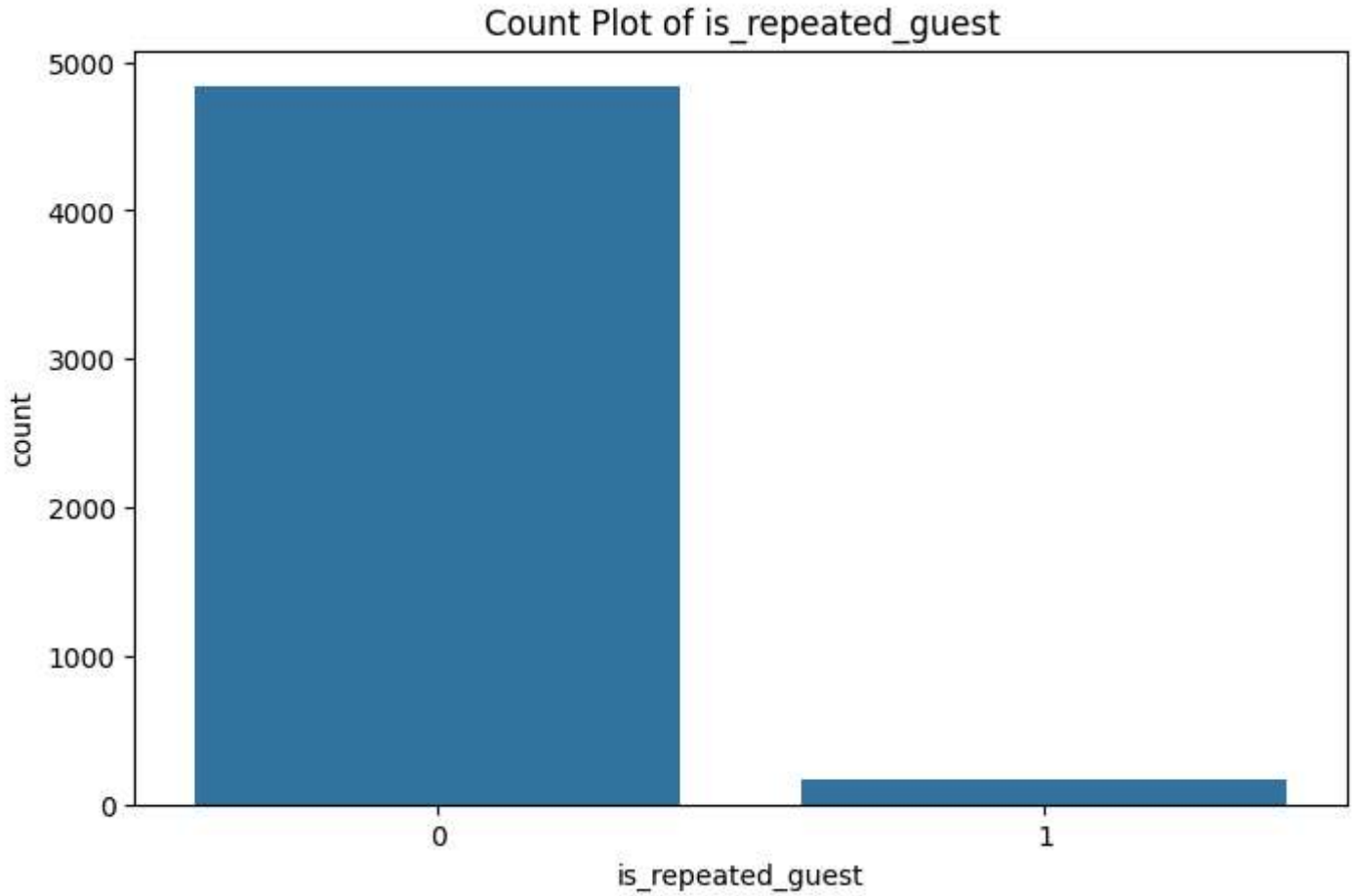
```
# Plot histograms and boxplots for numerical variables
for var in numerical_vars:
    plt.figure(figsize=(12, 6))
    plt.subplot(1, 2, 1)
    sns.histplot(hotel_data[var], kde=True)
    plt.title(f"Histogram of {var}")
```

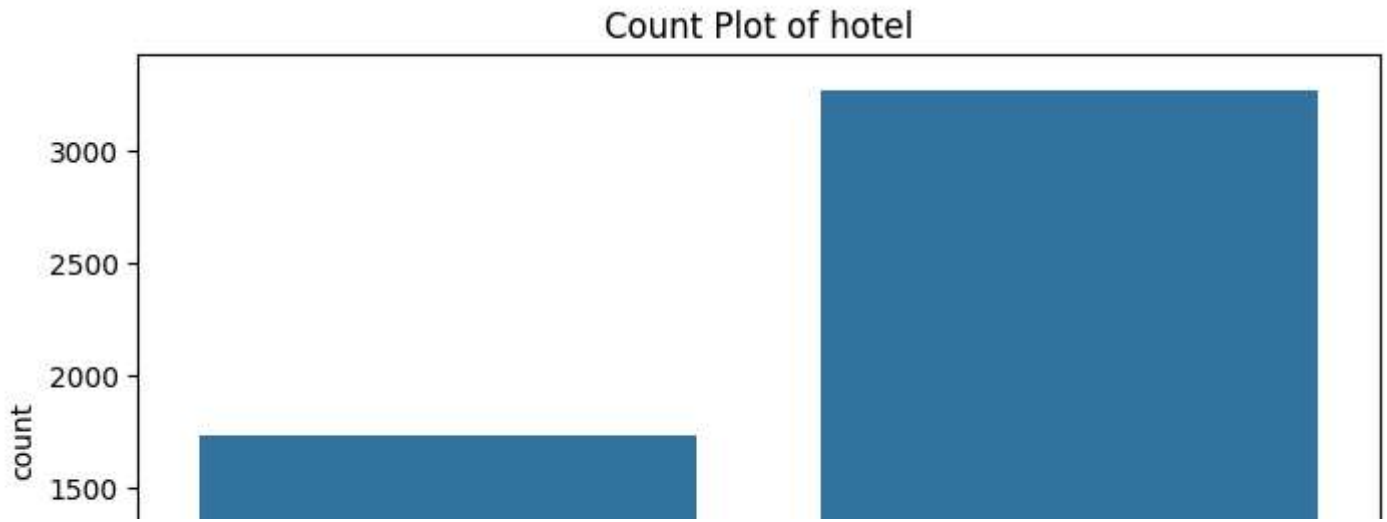

Histogram of lead_time
Count
lead_time
0
200
400
600
800
1000
1200
0
100
200
300
400
500
600

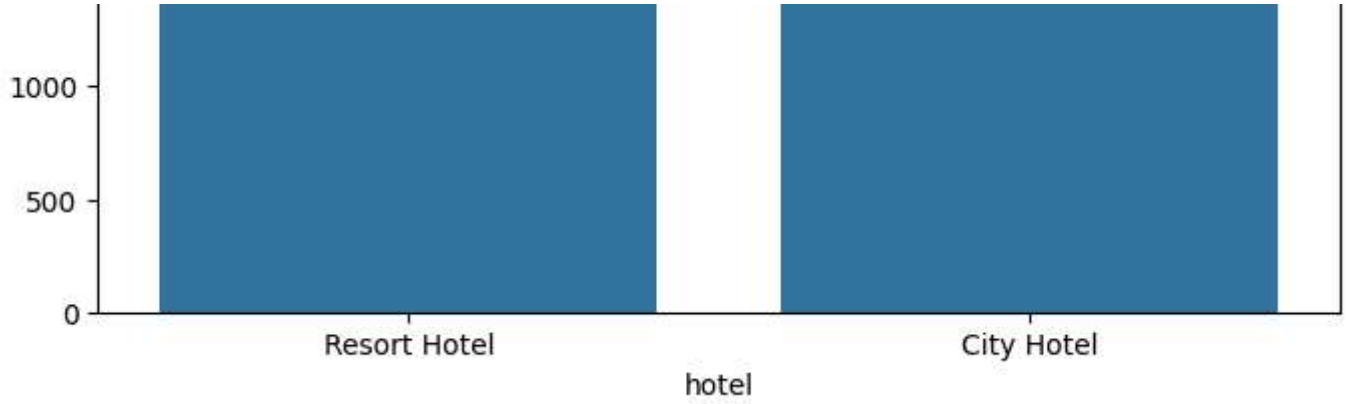

Histogram of adr
400
500




```
# Analysis and visualizations for binary variables
binary_summary = hotel_data[binary_vars].value_counts().unstack()

# Plot count plots for binary variables
for var in binary_vars:
    plt.figure(figsize=(8, 5))
    sns.countplot(data=hotel_data, x=var)
    plt.title(f"Count Plot of {var}")
    plt.show()
```


Count Plot of is_repeated_guest
5000
4000
3000
2000
1000
0
count
0
1
is_repeated_guest


Count Plot of hotel
3000
2500
2000
1500
count



Research questions:

1. If the value of lead_time increases then does the adr value decrease
2. Likelyhood that given the lower that adr is, the Probability that is_repeated_guest will be 1
3. Does the adr variable get affected when we look between the resort hotel and city hotel

```
print(hotel_data[numerical_vars + binary_vars].isnull().sum())
```

```
lead_time           0
adr                 0
is_repeated_guest   0
hotel               0
dtype: int64
```