IMPORT LIBRARIES

In [123…
```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
```

In [124…
```python
#LOADING THE DATASETS
```

In [125…
```python
df=pd.read_csv('hotel_bookings.csv' )
```

In [126…
```python
#EXPLOTARY DATA ANALYSIS AND DATA CLEANING
```

In [127…
```python
df.head()
```

Out[127]:

	hotel	is_canceled	lead_time	arrival_date_year	arrival_date_month	arrival_date_week_number	arrival_date_day_of_month	stays_in_weekend_nights	stays_in_week_nights	adults	...
0	Resort Hotel	0	342	2015	July	27	1	0	0	2	...
1	Resort Hotel	0	737	2015	July	27	1	0	0	2	...
2	Resort Hotel	0	7	2015	July	27	1	0	1	1	...
3	Resort Hotel	0	13	2015	July	27	1	0	1	1	...
4	Resort Hotel	0	14	2015	July	27	1	0	2	2	...

5 rows × 32 columns

In [128…
```python
df.tail()
```

Out[128]:

	hotel	is_canceled	lead_time	arrival_date_year	arrival_date_month	arrival_date_week_number	arrival_date_day_of_month	stays_in_weekend_nights	stays_in_week_nights	adults
119385	City Hotel	0	23	2017	August	35	30	2	5	2
119386	City Hotel	0	102	2017	August	35	31	2	5	3
119387	City Hotel	0	34	2017	August	35	31	2	5	2
119388	City Hotel	0	109	2017	August	35	31	2	5	2
119389	City Hotel	0	205	2017	August	35	29	2	7	2

5 rows × 32 columns

In [129…
```python
df.shape
```

Out[129]:
```
(119390, 32)
```

In [130…
```python
df.columns
```

Out[130]:
```
Index(['hotel', 'is_canceled', 'lead_time', 'arrival_date_year',
       'arrival_date_month', 'arrival_date_week_number',
       'arrival_date_day_of_month', 'stays_in_weekend_nights',
       'stays_in_week_nights', 'adults', 'children', 'babies', 'meal',
       'country', 'market_segment', 'distribution_channel',
       'is_repeated_guest', 'previous_cancellations',
       'previous_bookings_not_canceled', 'reserved_room_type',
       'assigned_room_type', 'booking_changes', 'deposit_type', 'agent',
       'company', 'days_in_waiting_list', 'customer_type', 'adr',
       'required_car_parking_spaces', 'total_of_special_requests',
       'reservation_status', 'reservation_status_date'],
      dtype='object')
```

In [131…
```python
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 119390 entries, 0 to 119389
Data columns (total 32 columns):
 #   Column                          Non-Null Count   Dtype
---  ------                          --------------   -----
 0   hotel                           119390 non-null  object
 1   is_canceled                     119390 non-null  int64
 2   lead_time                       119390 non-null  int64
 3   arrival_date_year               119390 non-null  int64
 4   arrival_date_month              119390 non-null  object
 5   arrival_date_week_number        119390 non-null  int64
 6   arrival_date_day_of_month       119390 non-null  int64
 7   stays_in_weekend_nights         119390 non-null  int64
 8   stays_in_week_nights            119390 non-null  int64
 9   adults                          119390 non-null  int64
 10  children                        119386 non-null  float64
 11  babies                          119390 non-null  int64
 12  meal                            119390 non-null  object
 13  country                         118902 non-null  object
 14  market_segment                  119390 non-null  object
 15  distribution_channel            119390 non-null  object
 16  is_repeated_guest               119390 non-null  int64
 17  previous_cancellations          119390 non-null  int64
 18  previous_bookings_not_canceled  119390 non-null  int64
 19  reserved_room_type              119390 non-null  object
 20  assigned_room_type              119390 non-null  object
 21  booking_changes                 119390 non-null  int64
 22  deposit_type                    119390 non-null  object
 23  agent                           103050 non-null  float64
 24  company                         6797 non-null    float64
 25  days_in_waiting_list            119390 non-null  int64
 26  customer_type                   119390 non-null  object
 27  adr                             119390 non-null  float64
 28  required_car_parking_spaces     119390 non-null  int64
 29  total_of_special_requests       119390 non-null  int64
 30  reservation_status              119390 non-null  object
 31  reservation_status_date         119390 non-null  object
dtypes: float64(4), int64(16), object(12)
memory usage: 29.1+ MB
```

In [132…
```python
df['reservation_status_date']=pd.to_datetime(df['reservation_status_date'])
```

In [133…
```python
df.describe(include='object')
```

Out[133]:

	hotel	arrival_date_month	meal	country	market_segment	distribution_channel	reserved_room_type	assigned_room_type	deposit_type	customer_type	reservation_status
count	119390	119390	119390	118902	119390	119390	119390	119390	119390	119390	119390
unique	2	12	5	177	8	5	10	12	3	4	3
top	City Hotel	August	BB	PRT	Online TA	TA/TO	A	A	No Deposit	Transient	Check-Out
freq	79330	13877	92310	48590	56477	97870	85994	74053	104641	89613	75166

In [134…
```python
for col in df.describe(include='object').columns:
    print(col)
    print(df[col].unique())
    print('-'*50)
```

```
hotel
['Resort Hotel' 'City Hotel']
--------------------------------------------------
arrival_date_month
['July' 'August' 'September' 'October' 'November' 'December' 'January'
 'February' 'March' 'April' 'May' 'June']
--------------------------------------------------
meal
['BB' 'FB' 'HB' 'SC' 'Undefined']
--------------------------------------------------
country
['PRT' 'GBR' 'USA' 'ESP' 'IRL' 'FRA' nan 'ROU' 'NOR' 'OMN' 'ARG' 'POL'
 'DEU' 'BEL' 'CHE' 'CN' 'GRC' 'ITA' 'NLD' 'DNK' 'RUS' 'SWE' 'AUS' 'EST'
 'CZE' 'BRA' 'FIN' 'MOZ' 'BWA' 'LUX' 'SVN' 'ALB' 'IND' 'CHN' 'MEX' 'MAR'
 'UKR' 'SMR' 'LVA' 'PRI' 'SRB' 'CHL' 'AUT' 'BLR' 'LTU' 'TUR' 'ZAF' 'AGO'
 'ISR' 'CYM' 'ZMB' 'CPV' 'ZWE' 'DZA' 'KOR' 'CRI' 'HUN' 'ARE' 'TUN' 'JAM'
 'HRV' 'HKG' 'IRN' 'GEO' 'AND' 'GIB' 'URY' 'JEY' 'CAF' 'CYP' 'COL' 'GGY'
 'KWT' 'NGA' 'MDV' 'VEN' 'SVK' 'FJI' 'KAZ' 'PAK' 'IDN' 'LBN' 'PHL' 'SEN'
 'SYC' 'AZE' 'BHR' 'NZL' 'THA' 'DOM' 'MKD' 'MYS' 'ARM' 'JPN' 'LKA' 'CUB'
 'CMR' 'BIH' 'MUS' 'COM' 'SUR' 'UGA' 'BGR' 'CIV' 'JOR' 'SYR' 'SGP' 'BDI'
 'SAU' 'VNM' 'PLW' 'QAT' 'EGY' 'PER' 'MLT' 'MWI' 'ECU' 'MDG' 'ISL' 'UZB'
 'NPL' 'BHS' 'MAC' 'TGO' 'TWN' 'DJI' 'STP' 'KNA' 'ETH' 'IRQ' 'HND' 'RWA'
 'KHM' 'MCO' 'BGD' 'IMN' 'TJK' 'NIC' 'BEN' 'VGB' 'TZA' 'GAB' 'GHA' 'TMP'
 'GLP' 'KEN' 'LIE' 'GNB' 'MNE' 'UMI' 'MYT' 'FRO' 'MMR' 'PAN' 'BFA' 'LBY'
 'MLI' 'NAM' 'BOL' 'PRY' 'BRB' 'ABW' 'AIA' 'SLV' 'DMA' 'PYF' 'GUY' 'LCA'
 'ATA' 'GTM' 'ASM' 'MRT' 'NCL' 'KIR' 'SDN' 'ATF' 'SLE' 'LAO']
--------------------------------------------------
market_segment
['Direct' 'Corporate' 'Online TA' 'Offline TA/TO' 'Complementary' 'Groups'
 'Undefined' 'Aviation']
--------------------------------------------------
distribution_channel
['Direct' 'Corporate' 'TA/TO' 'Undefined' 'GDS']
--------------------------------------------------
reserved_room_type
['C' 'A' 'D' 'E' 'G' 'F' 'H' 'L' 'P' 'B']
--------------------------------------------------
assigned_room_type
['C' 'A' 'D' 'E' 'G' 'F' 'I' 'B' 'H' 'P' 'L' 'K']
--------------------------------------------------
deposit_type
['No Deposit' 'Refundable' 'Non Refund']
--------------------------------------------------
customer_type
['Transient' 'Contract' 'Transient-Party' 'Group']
--------------------------------------------------
reservation_status
['Check-Out' 'Canceled' 'No-Show']
--------------------------------------------------
```

In [135…
```python
df.isnull().sum()
```

Out[135]:
```
hotel                                 0
is_canceled                           0
lead_time                             0
arrival_date_year                     0
arrival_date_month                    0
arrival_date_week_number              0
arrival_date_day_of_month             0
stays_in_weekend_nights               0
stays_in_week_nights                  0
adults                                0
children                              4
babies                                0
meal                                  0
country                             488
market_segment                        0
distribution_channel                  0
is_repeated_guest                     0
previous_cancellations                0
previous_bookings_not_canceled        0
reserved_room_type                    0
assigned_room_type                    0
booking_changes                       0
deposit_type                          0
agent                             16340
company                          112593
days_in_waiting_list                  0
customer_type                         0
adr                                   0
required_car_parking_spaces           0
total_of_special_requests             0
reservation_status                    0
reservation_status_date               0
dtype: int64
```

In [136…
```python
df.drop('agent',axis=1,inplace=True)
df.drop('company',axis=1,inplace=True)
```

In [141…
```python
df.isnull().sum()
```

Out[141]:
```
hotel                               0
is_canceled                         0
lead_time                           0
arrival_date_year                   0
arrival_date_month                  0
arrival_date_week_number            0
arrival_date_day_of_month           0
stays_in_weekend_nights             0
stays_in_week_nights                0
adults                              0
children                            4
babies                              0
meal                                0
country                           488
market_segment                      0
distribution_channel                0
is_repeated_guest                   0
previous_cancellations              0
previous_bookings_not_canceled      0
reserved_room_type                  0
assigned_room_type                  0
booking_changes                     0
deposit_type                        0
days_in_waiting_list                0
customer_type                       0
adr                                 0
required_car_parking_spaces         0
total_of_special_requests           0
reservation_status                  0
reservation_status_date             0
dtype: int64
```

In [86]:
```python
df.describe()
```

Out[86]:

	is_canceled	lead_time	arrival_date_year	arrival_date_week_number	arrival_date_day_of_month	stays_in_weekend_nights	stays_in_week_nights	adults	children	babies
count	217.000000	217.000000	217.000000	217.000000	217.000000	217.00000	217.000000	217.000000	217.000000	217.0
mean	0.078341	40.520737	2015.465438	38.198157	10.824885	1.56682	4.631336	1.410138	0.036866	0.0
std	0.269329	61.748375	0.720053	12.890292	7.582065	1.49270	3.552846	0.520406	0.232788	0.0
min	0.000000	0.000000	2015.000000	1.000000	1.000000	0.00000	0.000000	1.000000	0.000000	0.0
25%	0.000000	12.000000	2015.000000	33.000000	6.000000	0.00000	2.000000	1.000000	0.000000	0.0
50%	0.000000	27.000000	2015.000000	45.000000	9.000000	2.00000	4.000000	1.000000	0.000000	0.0
75%	0.000000	36.000000	2016.000000	46.000000	13.000000	2.00000	6.000000	2.000000	0.000000	0.0
max	1.000000	364.000000	2017.000000	53.000000	31.000000	9.00000	21.000000	3.000000	2.000000	0.0

In [142…
```python
df.dropna()
```

Out[142]:

	hotel	is_canceled	lead_time	arrival_date_year	arrival_date_month	arrival_date_week_number	arrival_date_day_of_month	stays_in_weekend_nights	stays_in_week_nights
0	Resort Hotel	0	342	2015	July	27	1	0	0
1	Resort Hotel	0	737	2015	July	27	1	0	0
2	Resort Hotel	0	7	2015	July	27	1	0	1
3	Resort Hotel	0	13	2015	July	27	1	0	1
4	Resort Hotel	0	14	2015	July	27	1	0	2
...	...	...	...	...	...	...	...	...	...
119385	City Hotel	0	23	2017	August	35	30	2	5
119386	City Hotel	0	102	2017	August	35	31	2	5
119387	City Hotel	0	34	2017	August	35	31	2	5
119388	City Hotel	0	109	2017	August	35	31	2	5
119389	City Hotel	0	205	2017	August	35	29	2	7

118898 rows × 30 columns

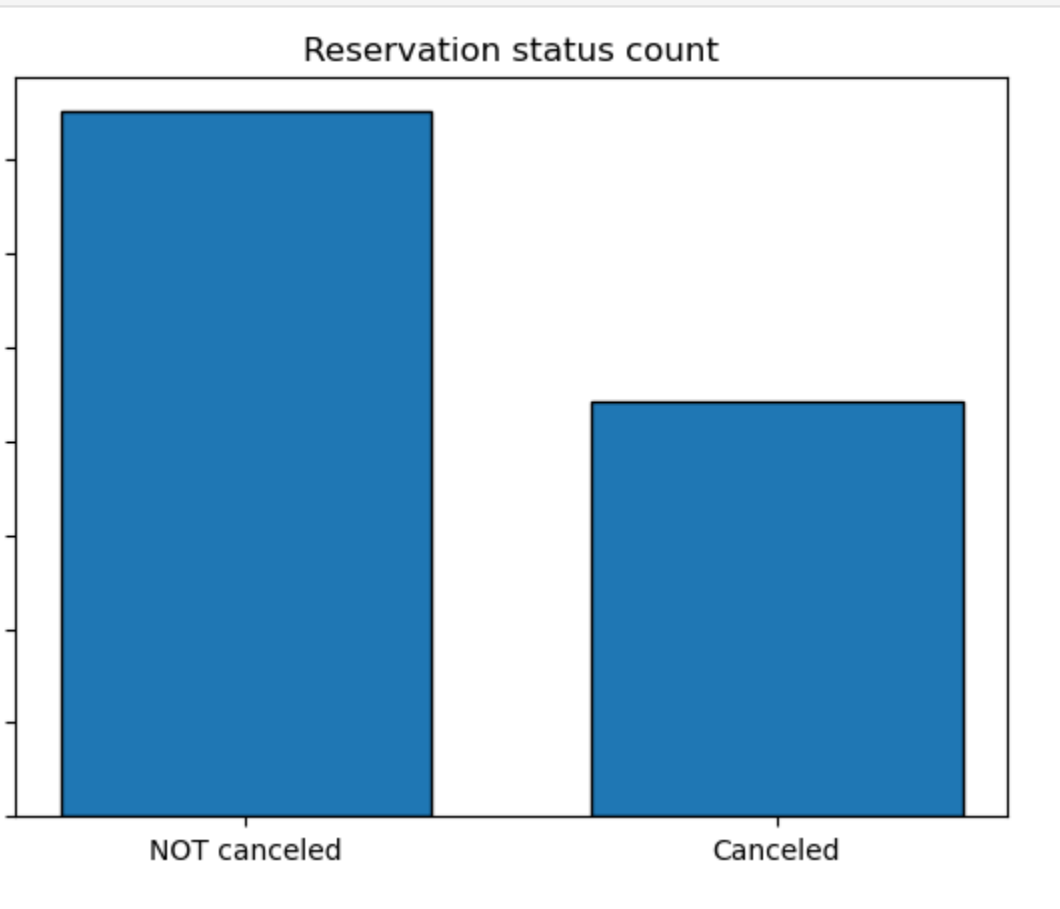
In [87]:
```python
df=df[df['adr']<5000]
```

ANALYSIS AND VISUALIZATION

In [143…
```python
cancelled_perc=df['is_canceled'].value_counts(normalize=True)
print(cancelled_perc)
```

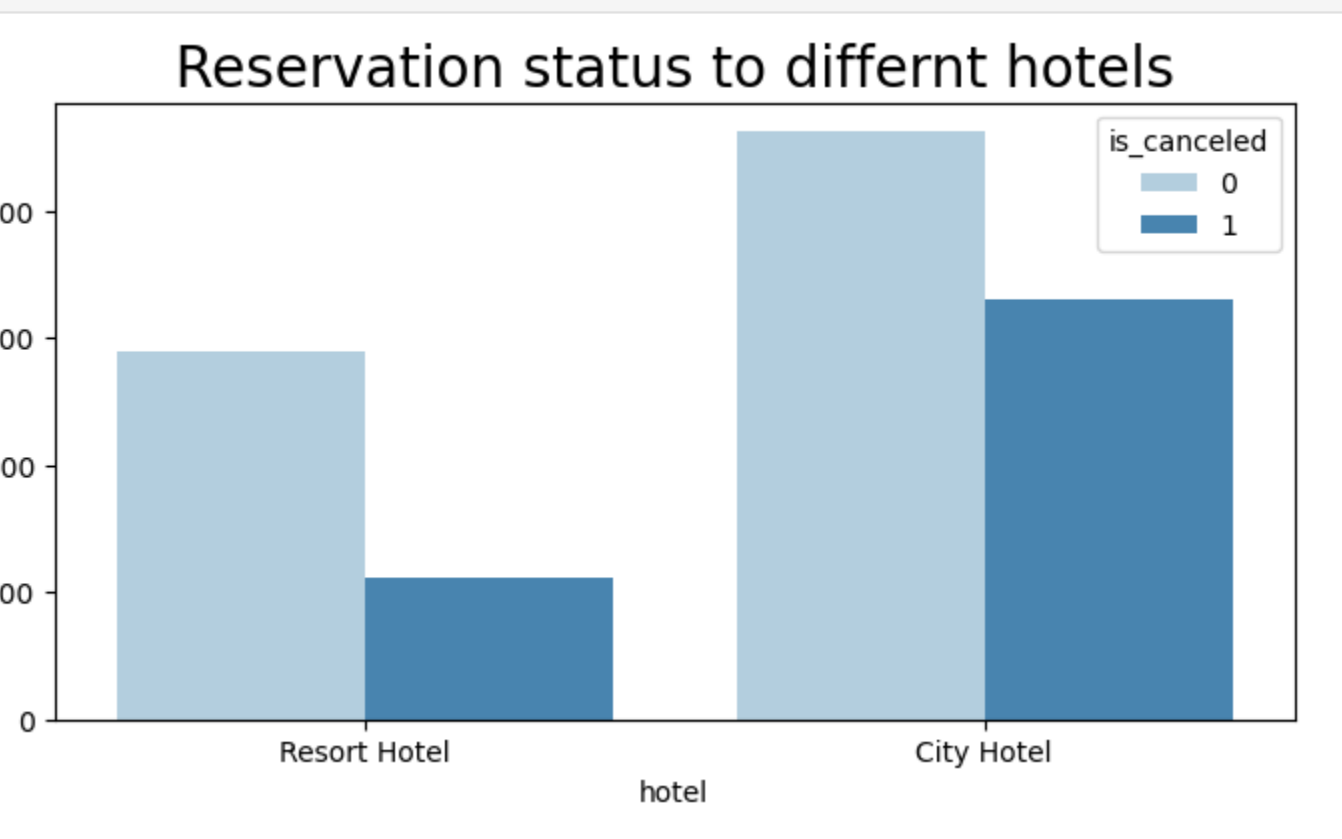
```
0    0.629584
1    0.370416
Name: is_canceled, dtype: float64
```

In [144…
```python
plt
plt.title('Reservation status count')
plt.bar(['NOT canceled','Canceled'],df['is_canceled'].value_counts(),edgecolor='k',width=0.7)
plt.show()
```



In [145…
```python
plt.figure(figsize=(8,4))
axl=sns.countplot(x='hotel',hue='is_canceled',data=df,palette='Blues')
legend_labels,_=axl.get_legend_handles_labels()

plt.title("Reservation status to differnt hotels",size=20)
plt.xlabel("hotel")
plt.ylabel("number of reservations")
plt.show()
```



In [146…
```python
resort_hotel=df[df['hotel']=='Resort Hotel']
resort_hotel['is_canceled'].value_counts(normalize=True)
```

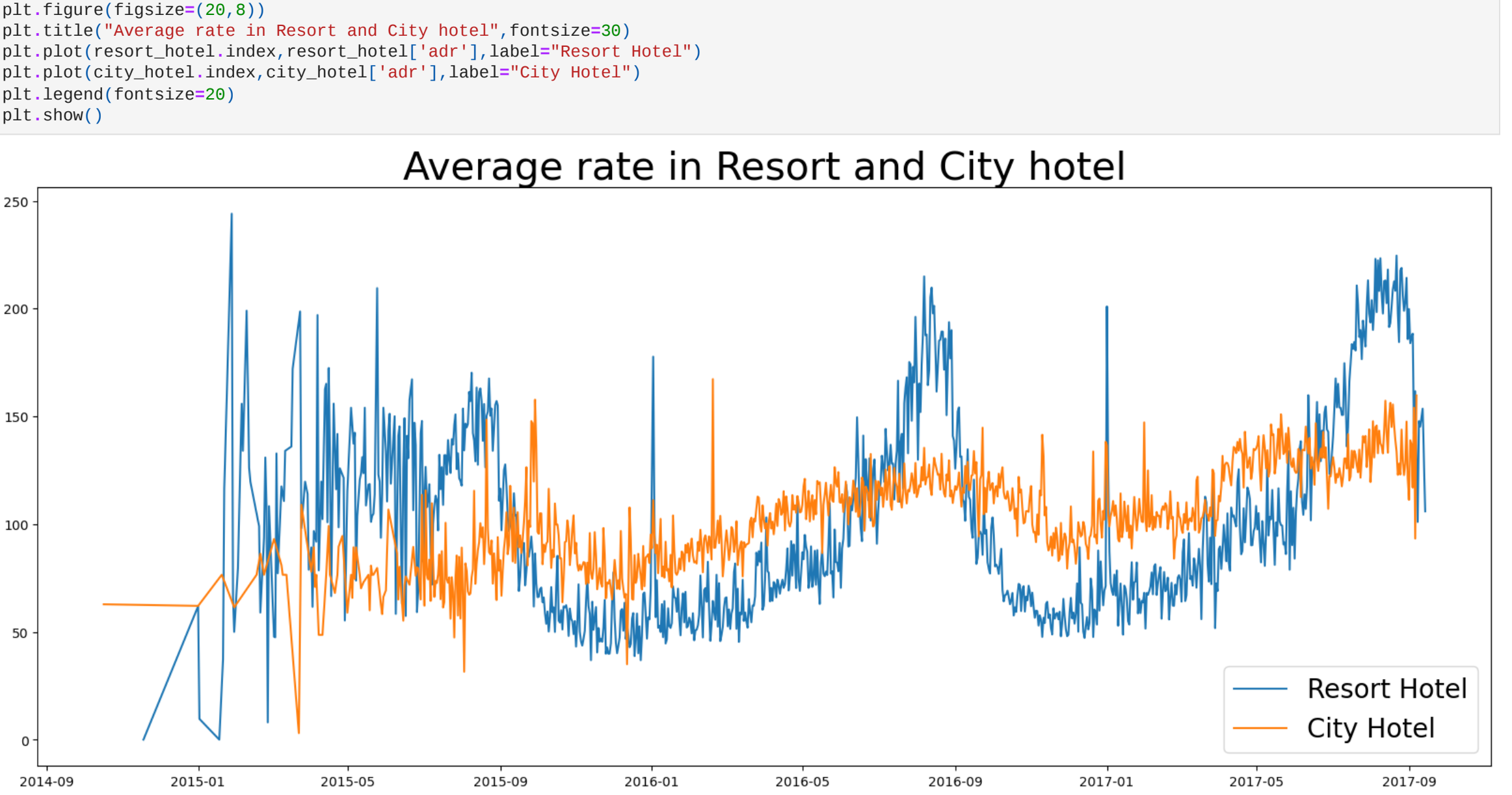
Out[146]:
```
0    0.722366
1    0.277634
Name: is_canceled, dtype: float64
```

In [147…
```python
city_hotel=df[df['hotel']=='City Hotel']
city_hotel['is_canceled'].value_counts(normalize=True)
```

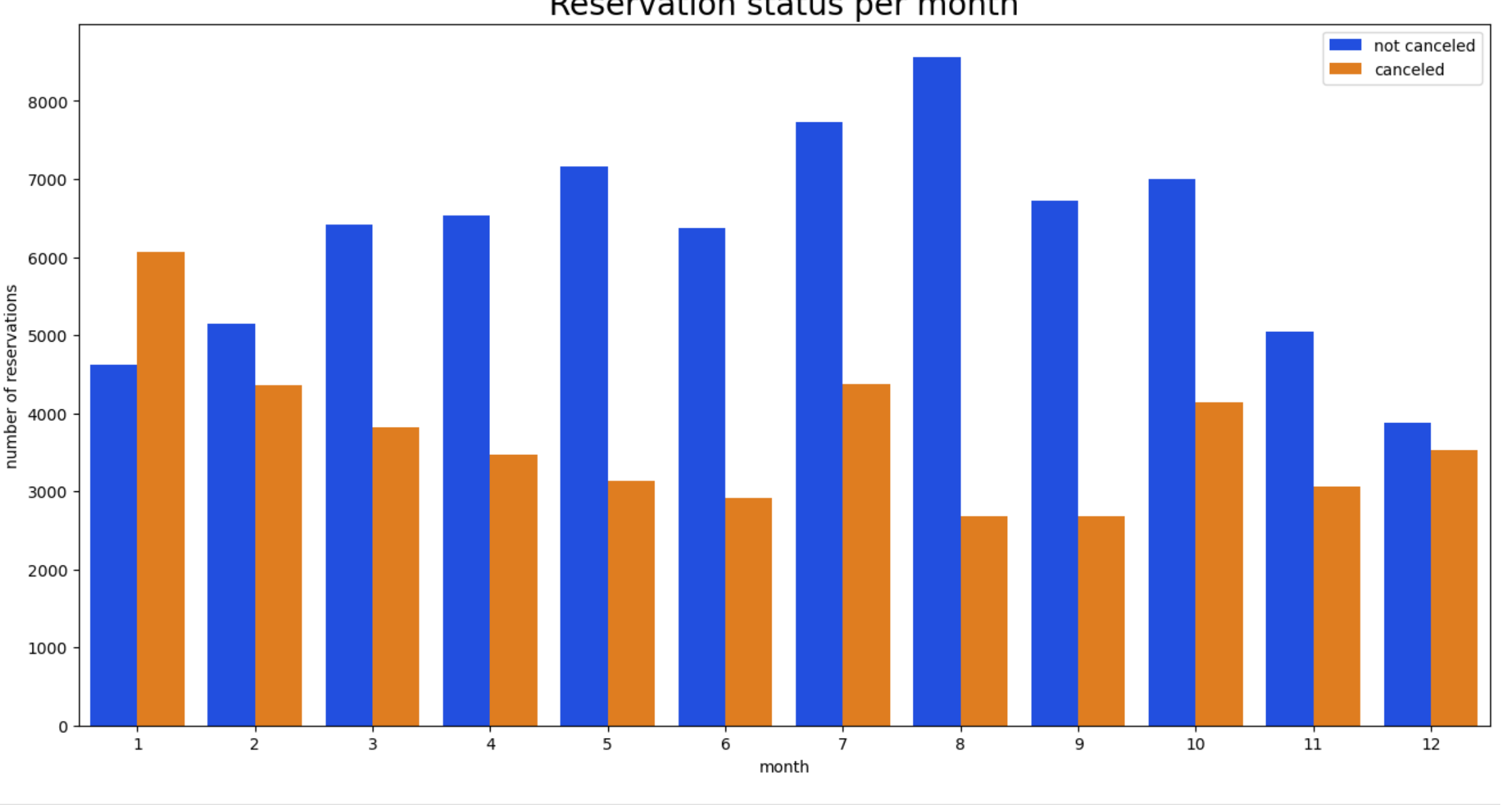
Out[147]:
```
0    0.58273
1    0.41727
Name: is_canceled, dtype: float64
```

In [148…
```python
resort_hotel=resort_hotel.groupby("reservation_status_date")[['adr']].mean()
city_hotel=city_hotel.groupby("reservation_status_date")[['adr']].mean()
```

In [149…
```python
plt.figure(figsize=(20,8))
plt.title("Average rate in Resort and City hotel",fontsize=30)
plt.plot(resort_hotel.index,resort_hotel['adr'],label="Resort Hotel")
plt.plot(city_hotel.index,city_hotel['adr'],label="City Hotel")
plt.legend(fontsize=20)
plt.show()
```

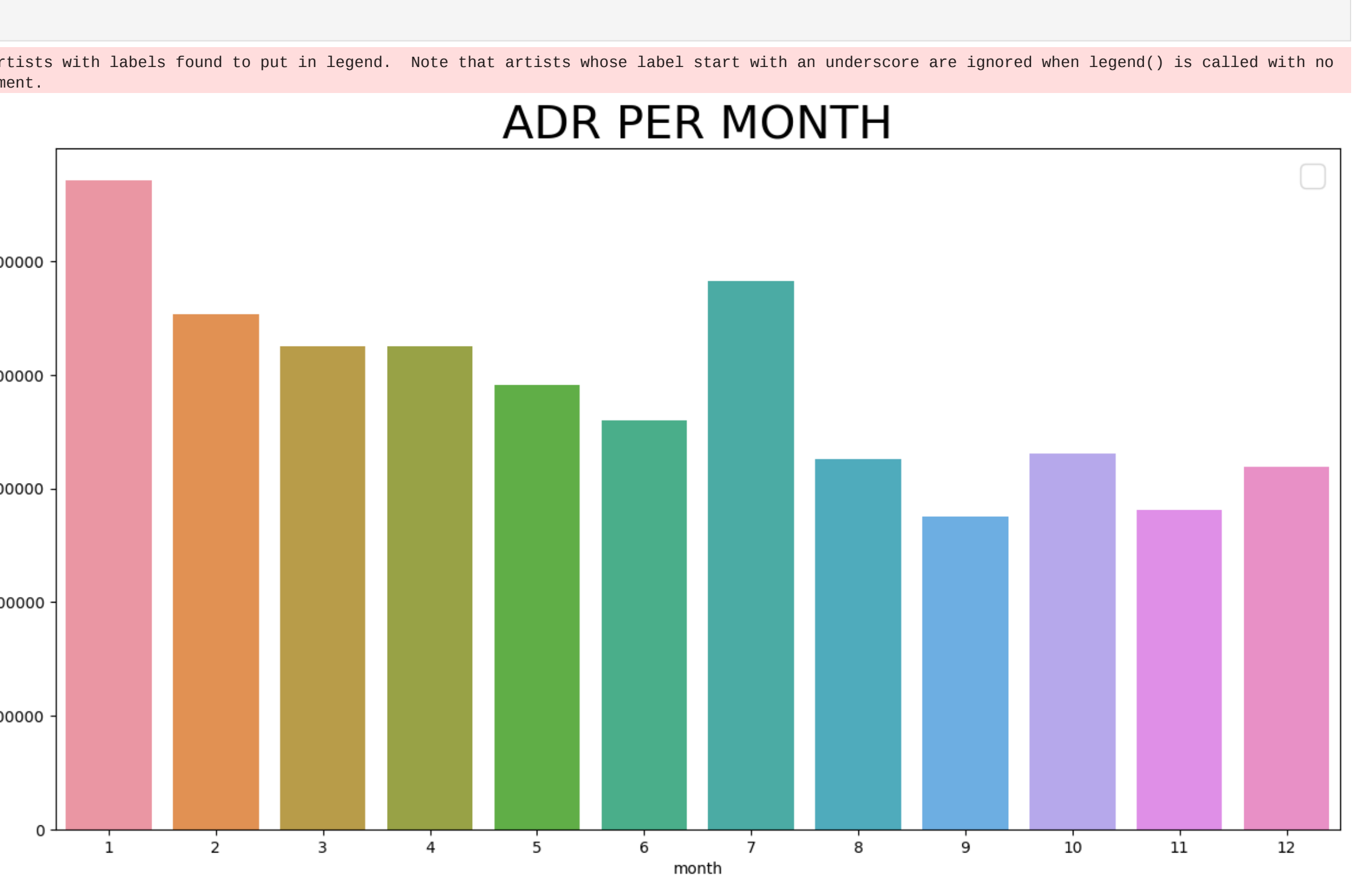


In [150…
```python
df['month']=df['reservation_status_date'].dt.month
plt.figure(figsize=(16,8))
ax1=sns.countplot(x='month',hue='is_canceled',data=df,palette='bright')
legend_labels,_=ax1.get_legend_handles_labels()
ax1.legend(bbox_to_anchor=(1,1))
plt.title("Reservation status per month", size=20)
plt.xlabel('month')
plt.ylabel('number of reservations')
plt.legend(['not canceled','canceled'])
plt.show()
```



In [162…
```python
plt.figure(figsize=(15, 8))
plt.title('ADR PER MONTH', fontsize=30)
sns.barplot(x='month', y='adr', data=df[df['is_canceled'] == 1].groupby('month')[['adr']].sum().reset_index())
plt.legend(fontsize=20)
plt.show()
```

```
No artists with labels found to put in legend.  Note that artists whose label start with an underscore are ignored when legend() is called with no argument.
```



In [ ]:

In [ ]: