AtliQ Hotels Data Analysis Project

1) Data Import and Data Exploration

Datasets

We have 5 csv files:

- dim_date.csv
- dim_hotels.csv
- dim_rooms.csv
- fact_aggregated_bookings.csv
- fact_bookings.csv
- new_data_aug

Read all data files in different dataframes

In [108…

```
import pandas as pd

#importing all tables
df_bookings = pd.read_csv("datasets/fact_bookings.csv")
df_date = pd.read_csv("datasets/dim_date.csv")
df_hotels = pd.read_csv("datasets/dim_hotels.csv")
df_rooms = pd.read_csv("datasets/dim_rooms.csv")
df_agg_bookings = pd.read_csv("datasets/fact_aggregated_bookings.csv")
df_new_aug = pd.read_csv("datasets/new_data_august.csv")
```

Explore fact_bookings data

In [108…

```
df_bookings.describe()
```

Out[108…

	property_id	no_guests	ratings_given	revenue_generated	revenue_realized
count	134590.000000	134587.000000	56683.000000	1.345900e+05	134590.000000
mean	18061.113493	2.036170	3.619004	1.537805e+04	12696.123256
std	1093.055847	1.034885	1.235009	9.303604e+04	6928.108124
min	16558.000000	-17.000000	1.000000	6.500000e+03	2600.000000
25%	17558.000000	1.000000	3.000000	9.900000e+03	7600.000000
50%	17564.000000	2.000000	4.000000	1.350000e+04	11700.000000
75%	18563.000000	2.000000	5.000000	1.800000e+04	15300.000000
max	19563.000000	6.000000	5.000000	2.856000e+07	45220.000000

In [108…

```
df_bookings.columns
```

Out[108…

```
Index(['booking_id', 'property_id', 'booking_date', 'check_in_date',
       'checkout_date', 'no_guests', 'room_category', 'booking_platform',
       'ratings_given', 'booking_status', 'revenue_generated',
       'revenue_realized'],
      dtype='object')
```

In [108…

```
df_bookings.head(5)
```

Out[108…

	booking_id	property_id	booking_date	check_in_date	checkout_date	no_guests
0	May012216558RT11	16558	27-04-22	1/5/2022	2/5/2022	-3.0
1	May012216558RT12	16558	30-04-22	1/5/2022	2/5/2022	2.0
2	May012216558RT13	16558	28-04-22	1/5/2022	4/5/2022	2.0
3	May012216558RT14	16558	28-04-22	1/5/2022	2/5/2022	-2.0
4	May012216558RT15	16558	27-04-22	1/5/2022	2/5/2022	4.0

In [108…

```
df_bookings.room_category.value_counts()
```

Out[108…

```
room_category
RT2    49505
RT1    38446
RT3    30566
RT4    16073
Name: count, dtype: int64
```

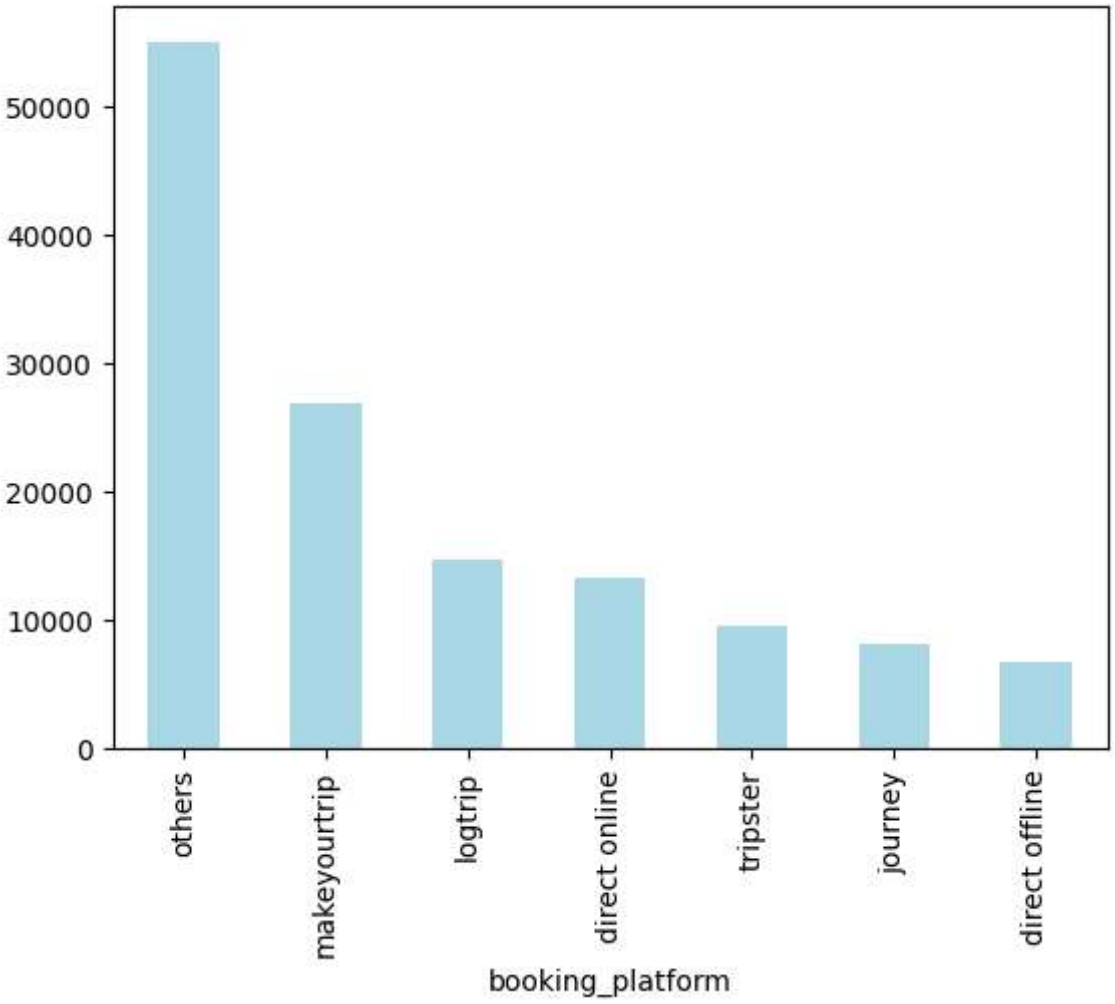
In [109…

```
df_bookings.booking_platform.value_counts()
```

Out[109…
```
booking_platform
others            55066
makeyourtrip      26898
logtrip           14756
direct online     13379
tripster           9630
journey            8106
direct offline     6755
Name: count, dtype: int64
```

In [116…
```
df_bookings.booking_platform.value_counts().plot(kind="bar",color="lightblue")
```

Out[116…
```
<Axes: xlabel='booking_platform'>
```



Exploring remaining datasets

In [109…
```
df_hotels.head()
```

Out[109…

	property_id	property_name	category	city
0	16558	Atliq Grands	Luxury	Delhi
1	16559	Atliq Exotica	Luxury	Mumbai
2	16560	Atliq City	Business	Delhi
3	16561	Atliq Blu	Luxury	Delhi
4	16562	Atliq Bay	Luxury	Delhi

In [109…

```
df_rooms.head()
```

Out[109…

	room_id	room_class
0	RT1	Standard
1	RT2	Elite
2	RT3	Premium
3	RT4	Presidential

In [109…

```
df_agg_bookings.head()
```

Out[109…

	property_id	check_in_date	room_category	successful_bookings	capacity
0	16559	1-May-22	RT1	25	30.0
1	19562	1-May-22	RT1	28	30.0
2	19563	1-May-22	RT1	23	30.0
3	17558	1-May-22	RT1	30	19.0
4	16558	1-May-22	RT1	18	19.0

In [109…

```
df_new_aug.head()
```

Out[109…

	property_id	property_name	category	city	room_category	room_class	check_in_
0	16559	Atliq Exotica	Luxury	Mumbai	RT1	Standard	01-Au
1	19562	Atliq Bay	Luxury	Bangalore	RT1	Standard	01-Au
2	19563	Atliq Palace	Business	Bangalore	RT1	Standard	01-Au
3	19558	Atliq Grands	Luxury	Bangalore	RT1	Standard	01-Au
4	19560	Atliq City	Business	Bangalore	RT1	Standard	01-Au

2) Data Cleaning

In [109…

```
#here we removed all 7 rows with negative no_guests
df_bookings = df_bookings[df_bookings.no_guests > 0]

#There are otliers for revenue_generated column. So to detect them we use 3*std app
#First check if there are any negative values

df_bookings[df_bookings.revenue_generated <0]
#There are no negative values
```

Out[109…

	booking_id	property_id	booking_date	check_in_date	checkout_date	no_guests	room_c

In [109…

```
avg, std = df_bookings.revenue_generated.mean(), df_bookings.revenue_generated.std(
upper_limit_1 = avg + 3*std
#lower limit is not required. Logically, 0 is the lower limit.
df_bookings[df_bookings.revenue_generated > upper_limit_1]
```

Out[109…

	booking_id	property_id	booking_date	check_in_date	checkout_date	no_
2	May012216558RT13	16558	28-04-22	1/5/2022	4/5/2022	
111	May012216559RT32	16559	29-04-22	1/5/2022	2/5/2022	
315	May012216562RT22	16562	28-04-22	1/5/2022	4/5/2022	
562	May012217559RT118	17559	26-04-22	1/5/2022	2/5/2022	
129176	Jul282216562RT26	16562	21-07-22	28-07-22	29-07-22	

In [109…
```
#removing all 5 rows with invalid revenue_generated values
df_bookings = df_bookings[df_bookings.revenue_generated < upper_limit_1]
upper_limit_1
```

Out[109… np.float64(294498.50173207896)

In [109…
```
df_bookings.shape
```

Out[109… (134573, 12)

In [110…
```
#Checking for column revenue_realized
df_bookings[df_bookings.revenue_realized <0]
```

Out[110…

booking_id	property_id	booking_date	check_in_date	checkout_date	no_guests	room_c

In [110…
```
#Check the outliers
upper_limit_2 = df_bookings.revenue_realized.mean() + 3 * df_bookings.revenue_reali
print("Upper Limit:",upper_limit_2)
df_bookings[df_bookings.revenue_realized > upper_limit_2]
```

Upper Limit: 33479.358661845814

Out[110…

	booking_id	property_id	booking_date	check_in_date	checkout_date	no_
137	May012216559RT41	16559	27-04-22	1/5/2022	7/5/2022	
139	May012216559RT43	16559	1/5/2022	1/5/2022	2/5/2022	
143	May012216559RT47	16559	28-04-22	1/5/2022	3/5/2022	
149	May012216559RT413	16559	24-04-22	1/5/2022	7/5/2022	
222	May012216560RT45	16560	30-04-22	1/5/2022	3/5/2022	
…	…	…	…	…	…	
134328	Jul312219560RT49	19560	31-07-22	31-07-22	2/8/2022	
134331	Jul312219560RT412	19560	31-07-22	31-07-22	1/8/2022	
134467	Jul312219562RT45	19562	28-07-22	31-07-22	1/8/2022	
134474	Jul312219562RT412	19562	25-07-22	31-07-22	6/8/2022	
134581	Jul312217564RT42	17564	31-07-22	31-07-22	1/8/2022	

1299 rows × 12 columns

One observation we can have in above dataframe is that all rooms are RT4 which means presidential suit. Now since RT4 is a luxurious room it is likely their rent will be higher. To make a fair analysis, we need to do data analysis only on RT4 room types

In [110…
```
df_bookings.room_category.value_counts()
```

Out[110…
```
room_category
RT2    49500
RT1    38441
RT3    30561
RT4    16071
Name: count, dtype: int64
```

In [110…
```
df_bookings[df_bookings.room_category == "RT4"].revenue_realized.describe()
```

Out[110…
```
count    16071.000000
mean     23439.308444
std       9048.599076
min       7600.000000
25%      19000.000000
50%      26600.000000
75%      32300.000000
max      45220.000000
Name: revenue_realized, dtype: float64
```

In [110…
```
23439 + 3 * 9048
```

Out[110…
```
50583
```

Here higher limit comes to be 50583 and in our dataframe above we can see that max value for revenue realized is 45220. Hence we can conclude that there is no outlier and we don't need to do any data cleaning on this particular column.

In [110…
```
df_bookings.isnull().sum()
```

Out[110…
```
booking_id              0
property_id             0
booking_date            0
check_in_date           0
checkout_date           0
no_guests               0
room_category           0
booking_platform        0
ratings_given       77897
booking_status          0
revenue_generated       0
revenue_realized        0
dtype: int64
```

In [110…
```
df_bookings.shape
```

Out[110…
```
(134573, 12)
```

Total values in our dataframe is 134573. Out of that 77899 rows has null rating. Since there are many rows with null rating, we should not filter these values. Also we should not replace this rating with a median or mean rating etc.

Now, Let's work on fact_aggregated_bookings

In [110…
```
df_agg_bookings.head()
```

Out[110…

	property_id	check_in_date	room_category	successful_bookings	capacity
0	16559	1-May-22	RT1	25	30.0
1	19562	1-May-22	RT1	28	30.0
2	19563	1-May-22	RT1	23	30.0
3	17558	1-May-22	RT1	30	19.0
4	16558	1-May-22	RT1	18	19.0

In [110…
```
df_agg_bookings.isnull().sum()
```

Out[110…
```
property_id            0
check_in_date          0
room_category          0
successful_bookings    0
capacity               2
dtype: int64
```

In [110…
```
df_agg_bookings[df_agg_bookings.capacity.isna()]
```

Out[110…

	property_id	check_in_date	room_category	successful_bookings	capacity
8	17561	1-May-22	RT1	22	NaN
14	17562	1-May-22	RT1	12	NaN

In [111…
```
df_agg_bookings.capacity.median()
```

Out[111…
```
np.float64(25.0)
```

In [111…
```
df_agg_bookings.fillna(df_agg_bookings.capacity.median(), inplace = True)
df_agg_bookings.isnull().sum()
```

Out[111…
```
property_id            0
check_in_date          0
room_category          0
successful_bookings    0
capacity               0
dtype: int64
```

**Finding out records that have successful_bookings value greater than capacity. Filtering those records.

In [111…
```
df_agg_bookings[df_agg_bookings.successful_bookings > df_agg_bookings.capacity]
```

Out[111…

	property_id	check_in_date	room_category	successful_bookings	capacity
3	17558	1-May-22	RT1	30	19.0
12	16563	1-May-22	RT1	100	41.0
4136	19558	11-Jun-22	RT2	50	39.0
6209	19560	2-Jul-22	RT1	123	26.0
8522	19559	25-Jul-22	RT1	35	24.0
9194	18563	31-Jul-22	RT4	20	18.0

In [111…
```
df_agg_bookings.shape
```

Out[111… `(9200, 5)`

In [111…
```
df_agg_bookings = df_agg_bookings[df_agg_bookings.successful_bookings<=df_agg_booki
df_agg_bookings.shape
```

Out[111… `(9194, 5)`

3) Data Transformation

Creating occupancy percentage column

In [111…
```
df_agg_bookings["occ_pct"] = df_agg_bookings.successful_bookings/df_agg_bookings.ca
df_agg_bookings["occ_pct"] = df_agg_bookings["occ_pct"].apply(lambda x: round(x*100
df_agg_bookings.head()
```

Out[111…

	property_id	check_in_date	room_category	successful_bookings	capacity	occ_pct
0	16559	1-May-22	RT1	25	30.0	83.33
1	19562	1-May-22	RT1	28	30.0	93.33
2	19563	1-May-22	RT1	23	30.0	76.67
4	16558	1-May-22	RT1	18	19.0	94.74
5	17560	1-May-22	RT1	28	40.0	70.00

4) Insights Generation

1. What is the average occupancy rate in each of the room categories?

In [111…
```
df_agg_bookings.groupby("room_category")["occ_pct"].mean()
```

Out[111…
```
room_category
RT1    57.889643
RT2    58.009756
RT3    58.028213
RT4    59.277925
Name: occ_pct, dtype: float64
```

In [111…
```
df_rooms
```

Out[111…

	room_id	room_class
0	RT1	Standard
1	RT2	Elite
2	RT3	Premium
3	RT4	Presidential

In [111…
```
#merging these two dataframes
pd.merge(df_rooms, df_agg_bookings.groupby("room_category")["occ_pct"].mean(), left
```

Out[111…

	room_id	room_class	occ_pct
0	RT1	Standard	57.889643
1	RT2	Elite	58.009756
2	RT3	Premium	58.028213
3	RT4	Presidential	59.277925

In [111…
```
#merging df_agg_bookings and df_rooms using the key room_id
df = pd.merge(df_agg_bookings,df_rooms, left_on = "room_category", right_on = "room
df.head()
```

Out[111…

	property_id	check_in_date	room_category	successful_bookings	capacity	occ_pct	roon
0	16559	1-May-22	RT1	25	30.0	83.33	
1	19562	1-May-22	RT1	28	30.0	93.33	
2	19563	1-May-22	RT1	23	30.0	76.67	
3	16558	1-May-22	RT1	18	19.0	94.74	
4	17560	1-May-22	RT1	28	40.0	70.00	

In [112…
```
df.shape
```

Out[112…
```
(9194, 8)
```

In [112…
```
df.drop("room_id", axis = 1, inplace= True)
df.head()
```

Out[112…

	property_id	check_in_date	room_category	successful_bookings	capacity	occ_pct	roon
0	16559	1-May-22	RT1	25	30.0	83.33	St
1	19562	1-May-22	RT1	28	30.0	93.33	St
2	19563	1-May-22	RT1	23	30.0	76.67	St
3	16558	1-May-22	RT1	18	19.0	94.74	St
4	17560	1-May-22	RT1	28	40.0	70.00	St

In [112…
```
df.groupby("room_class")["occ_pct"].mean()
```

Out[112…
```
room_class
Elite           58.009756
Premium         58.028213
Presidential    59.277925
Standard        57.889643
Name: occ_pct, dtype: float64
```

2. What is the average occupancy rate per city?

In [112…
```
df_hotels.head()
```

Out[112…

	property_id	property_name	category	city
0	16558	Atliq Grands	Luxury	Delhi
1	16559	Atliq Exotica	Luxury	Mumbai
2	16560	Atliq City	Business	Delhi
3	16561	Atliq Blu	Luxury	Delhi
4	16562	Atliq Bay	Luxury	Delhi

In [112…
```
df = pd.merge(df,df_hotels,on="property_id")
df.head()
```

Out[112…

	property_id	check_in_date	room_category	successful_bookings	capacity	occ_pct	roon
0	16559	1-May-22	RT1	25	30.0	83.33	St
1	19562	1-May-22	RT1	28	30.0	93.33	St
2	19563	1-May-22	RT1	23	30.0	76.67	St
3	16558	1-May-22	RT1	18	19.0	94.74	St
4	17560	1-May-22	RT1	28	40.0	70.00	St

In [112…

```
df.shape
```

Out[112…

```
(9194, 10)
```

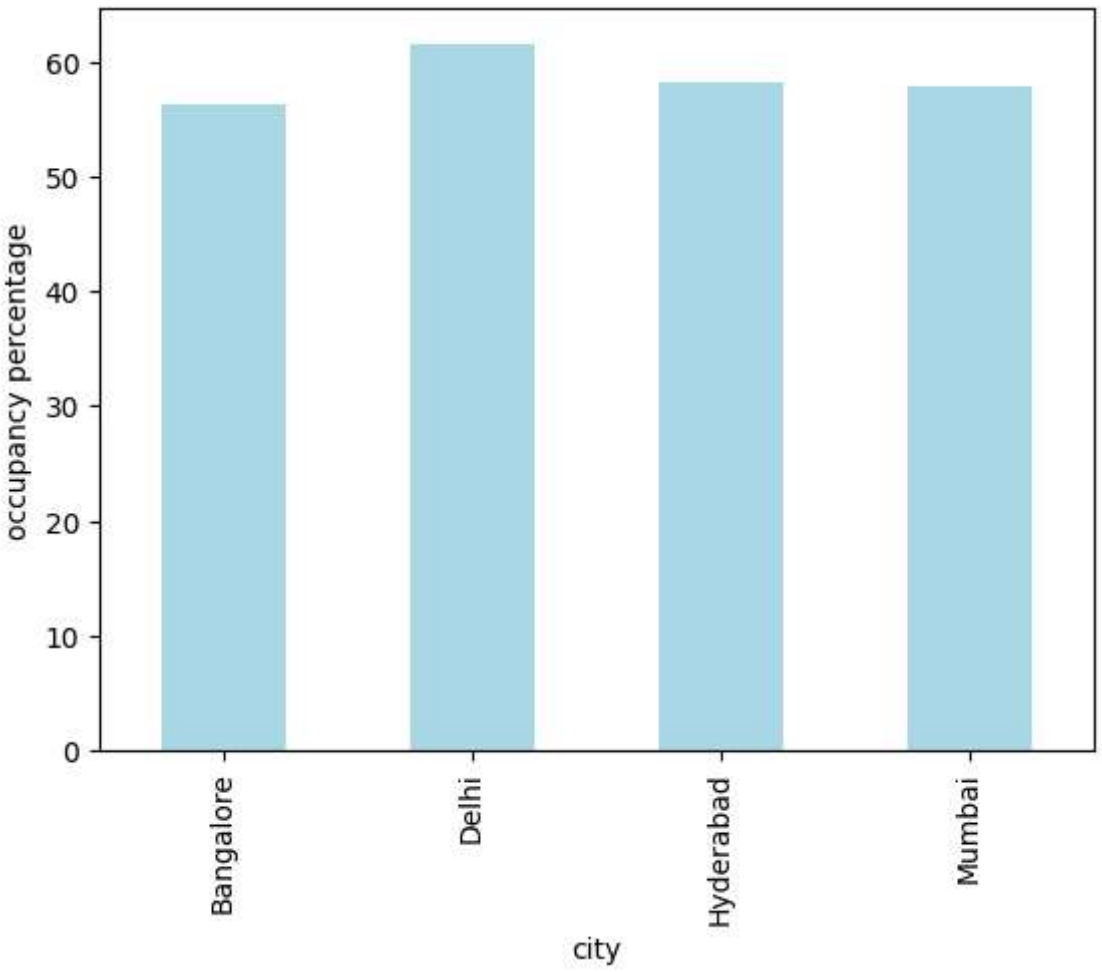
In [112…

```
print(df.groupby("city")["occ_pct"].mean())
df.groupby("city")["occ_pct"].mean().plot(kind="bar", ylabel = "occupancy percentag
```

```
city
Bangalore    56.332376
Delhi        61.507341
Hyderabad    58.120652
Mumbai       57.909181
Name: occ_pct, dtype: float64
```

Out[112…

```
<Axes: xlabel='city', ylabel='occupancy percentage'>
```



3. When was the occupancy better? Weekday or Weekend?

In [112…
```
df_date.head()
```

Out[112…

	date	mmm yy	week no	day_type
0	01-May-22	May 22	W 19	weekend
1	02-May-22	May 22	W 19	weekeday
2	03-May-22	May 22	W 19	weekeday
3	04-May-22	May 22	W 19	weekeday
4	05-May-22	May 22	W 19	weekeday

In [112…
```
df.head()
```

Out[112...

	property_id	check_in_date	room_category	successful_bookings	capacity	occ_pct	roon
0	16559	1-May-22	RT1	25	30.0	83.33	St
1	19562	1-May-22	RT1	28	30.0	93.33	St
2	19563	1-May-22	RT1	23	30.0	76.67	St
3	16558	1-May-22	RT1	18	19.0	94.74	St
4	17560	1-May-22	RT1	28	40.0	70.00	St

While merging df and df_date most of the rows might be dropped as date types in both the dataframes are inconsistent. So, we will first change them in the same date type.

In [112...

```
# Convert 'date' column in df_date to datetime
df_date["date"] = pd.to_datetime(df_date["date"], format="%d-%b-%y")

# Reformat the 'date' column in df_date to 'dd-MMM-yy' format
df_date['date'] = df_date['date'].dt.strftime('%d-%b-%y')

df_date.head()
```

Out[112...

	date	mmm yy	week no	day_type
0	01-May-22	May 22	W 19	weekend
1	02-May-22	May 22	W 19	weekeday
2	03-May-22	May 22	W 19	weekeday
3	04-May-22	May 22	W 19	weekeday
4	05-May-22	May 22	W 19	weekeday

In [113...

```
# Convert 'check_in_date' to datetime
df["check_in_date"] = pd.to_datetime(df["check_in_date"], format="%d-%b-%y")

# Reformat the 'check_in_date' to 'dd-MMM-yy' format
df['check_in_date'] = df['check_in_date'].dt.strftime('%d-%b-%y')

print(df.shape)
df.head()
```

```
(9194, 10)
```

Out[113…

	property_id	check_in_date	room_category	successful_bookings	capacity	occ_pct	roon
0	16559	01-May-22	RT1	25	30.0	83.33	St
1	19562	01-May-22	RT1	28	30.0	93.33	St
2	19563	01-May-22	RT1	23	30.0	76.67	St
3	16558	01-May-22	RT1	18	19.0	94.74	St
4	17560	01-May-22	RT1	28	40.0	70.00	St

In [113…

```
df = pd.merge(df, df_date, left_on = "check_in_date", right_on = "date", how = "lef
print(df.shape)
df.head()
```

```
(9194, 14)
```

Out[113…

	property_id	check_in_date	room_category	successful_bookings	capacity	occ_pct	roon
0	16559	01-May-22	RT1	25	30.0	83.33	St
1	19562	01-May-22	RT1	28	30.0	93.33	St
2	19563	01-May-22	RT1	23	30.0	76.67	St
3	16558	01-May-22	RT1	18	19.0	94.74	St
4	17560	01-May-22	RT1	28	40.0	70.00	St

In [113…

```
df.drop("date", axis = 1, inplace = True)
df.head(3)
```

Out[113…

	property_id	check_in_date	room_category	successful_bookings	capacity	occ_pct	roon
0	16559	01-May-22	RT1	25	30.0	83.33	St
1	19562	01-May-22	RT1	28	30.0	93.33	St
2	19563	01-May-22	RT1	23	30.0	76.67	St

In [113…
```
df.groupby("day_type")["occ_pct"].mean()
```

Out[113…
```
day_type
weekday    51.807975
weekend    73.960616
Name: occ_pct, dtype: float64
```

4: In the month of June, what is the mean occupancy for different cities?

In [113…
```
df["mmm yy"].unique()
```

Out[113…
```
array(['May 22', 'Jun 22', 'Jul 22'], dtype=object)
```

In [113…
```
df.check_in_date.unique()
```

Out[113…
```
array(['01-May-22', '02-May-22', '03-May-22', '04-May-22', '05-May-22',
       '06-May-22', '07-May-22', '08-May-22', '09-May-22', '10-May-22',
       '11-May-22', '12-May-22', '13-May-22', '14-May-22', '15-May-22',
       '16-May-22', '17-May-22', '18-May-22', '19-May-22', '20-May-22',
       '21-May-22', '22-May-22', '23-May-22', '24-May-22', '25-May-22',
       '26-May-22', '27-May-22', '28-May-22', '29-May-22', '30-May-22',
       '31-May-22', '01-Jun-22', '02-Jun-22', '03-Jun-22', '04-Jun-22',
       '05-Jun-22', '06-Jun-22', '07-Jun-22', '08-Jun-22', '09-Jun-22',
       '10-Jun-22', '11-Jun-22', '12-Jun-22', '13-Jun-22', '14-Jun-22',
       '15-Jun-22', '16-Jun-22', '17-Jun-22', '18-Jun-22', '19-Jun-22',
       '20-Jun-22', '21-Jun-22', '22-Jun-22', '23-Jun-22', '24-Jun-22',
       '25-Jun-22', '26-Jun-22', '27-Jun-22', '28-Jun-22', '29-Jun-22',
       '30-Jun-22', '01-Jul-22', '02-Jul-22', '03-Jul-22', '04-Jul-22',
       '05-Jul-22', '06-Jul-22', '07-Jul-22', '08-Jul-22', '09-Jul-22',
       '10-Jul-22', '11-Jul-22', '12-Jul-22', '13-Jul-22', '14-Jul-22',
       '15-Jul-22', '16-Jul-22', '17-Jul-22', '18-Jul-22', '19-Jul-22',
       '20-Jul-22', '21-Jul-22', '22-Jul-22', '23-Jul-22', '24-Jul-22',
       '25-Jul-22', '26-Jul-22', '27-Jul-22', '28-Jul-22', '29-Jul-22',
       '30-Jul-22', '31-Jul-22'], dtype=object)
```

In [113…
```
df[df["mmm yy"]=="Jun 22"].groupby("city")["occ_pct"].mean()
```

Out[113…
```
city
Bangalore    55.849527
Delhi        61.456367
Hyderabad    57.688917
Mumbai       57.789542
Name: occ_pct, dtype: float64
```

5: We got new data for the month of august. Append that to existing data

In [113…
```
df_new_aug
```

Out[113…

	property_id	property_name	category	city	room_category	room_class	check_in_
0	16559	Atliq Exotica	Luxury	Mumbai	RT1	Standard	01-Au
1	19562	Atliq Bay	Luxury	Bangalore	RT1	Standard	01-Au
2	19563	Atliq Palace	Business	Bangalore	RT1	Standard	01-Au
3	19558	Atliq Grands	Luxury	Bangalore	RT1	Standard	01-Au
4	19560	Atliq City	Business	Bangalore	RT1	Standard	01-Au
5	17561	Atliq Blu	Luxury	Mumbai	RT1	Standard	01-Au
6	17564	Atliq Seasons	Business	Mumbai	RT1	Standard	01-Au

In [113…
```
df.head(3)
```

Out[113…

	property_id	check_in_date	room_category	successful_bookings	capacity	occ_pct	roon
0	16559	01-May-22	RT1	25	30.0	83.33	St
1	19562	01-May-22	RT1	28	30.0	93.33	St
2	19563	01-May-22	RT1	23	30.0	76.67	St

In [113…
```
print(df_new_aug.shape,df.shape)
```

```
(7, 13) (9194, 13)
```

In [114…
```
df_new_aug.rename(columns={"occ%": "occ_pct"}, inplace=True)
```

In [114…
```
df_latest = pd.concat([df,df_new_aug],ignore_index = True)
df_latest.head(3)
```

Out[114…

	property_id	check_in_date	room_category	successful_bookings	capacity	occ_pct	roon
0	16559	01-May-22	RT1	25	30.0	83.33	St
1	19562	01-May-22	RT1	28	30.0	93.33	St
2	19563	01-May-22	RT1	23	30.0	76.67	St

In [114…
```
df_latest.shape
```

Out[114… (9201, 13)

6. Finding revenue realized per city

In [114…
```
print(df_bookings.shape)
df_bookings.head(3)
```

(134573, 12)

Out[114…

	booking_id	property_id	booking_date	check_in_date	checkout_date	no_guests
1	May012216558RT12	16558	30-04-22	1/5/2022	2/5/2022	2.0
4	May012216558RT15	16558	27-04-22	1/5/2022	2/5/2022	4.0
5	May012216558RT16	16558	1/5/2022	1/5/2022	3/5/2022	2.0

In [114…
```
df_hotels.head(3)
```

Out[114…

	property_id	property_name	category	city
0	16558	Atliq Grands	Luxury	Delhi
1	16559	Atliq Exotica	Luxury	Mumbai
2	16560	Atliq City	Business	Delhi

In [114…
```
df_bookings_merged = pd.merge(df_bookings,df_hotels, on = "property_id")
print(df_bookings_merged.shape)
df_bookings_merged.head(3)
```

(134573, 15)

Out[114...

	booking_id	property_id	booking_date	check_in_date	checkout_date	no_guests
0	May012216558RT12	16558	30-04-22	1/5/2022	2/5/2022	2.0
1	May012216558RT15	16558	27-04-22	1/5/2022	2/5/2022	4.0
2	May012216558RT16	16558	1/5/2022	1/5/2022	3/5/2022	2.0

In [114...
```
df_bookings_merged.groupby("city")["revenue_realized"].sum()
```

Out[114...
```
city
Bangalore    420383550
Delhi        294404488
Hyderabad    325179310
Mumbai       668569251
Name: revenue_realized, dtype: int64
```

7. Print month by month revenue

In [114...
```
df_date.head(3)
```

Out[114...

	date	mmm yy	week no	day_type
0	01-May-22	May 22	W 19	weekend
1	02-May-22	May 22	W 19	weekeday
2	03-May-22	May 22	W 19	weekeday

In [114...
```
df_bookings_merged.head(3)
```

Out[114...

	booking_id	property_id	booking_date	check_in_date	checkout_date	no_guests
0	May012216558RT12	16558	30-04-22	1/5/2022	2/5/2022	2.0
1	May012216558RT15	16558	27-04-22	1/5/2022	2/5/2022	4.0
2	May012216558RT16	16558	1/5/2022	1/5/2022	3/5/2022	2.0

In [114...
```
# Convert 'check_in_date' to datetime
df_bookings_merged["check_in_date"] = pd.to_datetime(df_bookings_merged["check_in_d

# Reformat the 'check_in_date' to 'dd-MMM-yy' format
df_bookings_merged['check_in_date'] = df_bookings_merged['check_in_date'].dt.strfti
```

In [115...
```
print(df_bookings_merged.shape)
df_bookings_merged.head(3)
```

```
(134573, 15)
```

Out[115…

	booking_id	property_id	booking_date	check_in_date	checkout_date	no_guests
0	May012216558RT12	16558	30-04-22	01-May-22	2/5/2022	2.0
1	May012216558RT15	16558	27-04-22	01-May-22	2/5/2022	4.0
2	May012216558RT16	16558	1/5/2022	01-May-22	3/5/2022	2.0

In [115…
```
df_bookings_merged = pd.merge(df_bookings_merged,df_date,left_on = "check_in_date",
```

In [115…
```
df_bookings_merged.drop("date", axis = 1, inplace = True)
```

In [115…
```
df_bookings_merged.head(3)
```

Out[115…

	booking_id	property_id	booking_date	check_in_date	checkout_date	no_guests
0	May012216558RT12	16558	30-04-22	01-May-22	2/5/2022	2.0
1	May012216558RT15	16558	27-04-22	01-May-22	2/5/2022	4.0
2	May012216558RT16	16558	1/5/2022	01-May-22	3/5/2022	2.0

In [115…
```
df_bookings_merged.groupby("mmm yy")["revenue_realized"].sum()
```

Out[115…
```
mmm yy
Jul 22    572843348
Jun 22    553925855
May 22    581767396
Name: revenue_realized, dtype: int64
```

In [115…
```
df_bookings_merged.revenue_realized.sum()
```

Out[115…
```
np.int64(1708536599)
```

8. Finding average ratings and revenue realized per hotel name.

In [115…
```
print(df_bookings_merged.groupby("property_name")["ratings_given"].mean())
print()
print(df_bookings_merged.groupby("property_name")["revenue_realized"].sum())
```

```
property_name
Atliq Bay        3.708943
Atliq Blu        3.959650
Atliq City       3.694799
Atliq Exotica    3.619241
Atliq Grands     3.099779
Atliq Palace     3.749545
Atliq Seasons    2.295033
Name: ratings_given, dtype: float64

property_name
Atliq Bay        259996918
Atliq Blu        260851922
Atliq City       285798439
Atliq Exotica    320258588
Atliq Grands     211462134
Atliq Palace     304081863
Atliq Seasons     66086735
Name: revenue_realized, dtype: int64
```

In [115…
```
df.head(3)
```

Out[115…

	property_id	check_in_date	room_category	successful_bookings	capacity	occ_pct	roon
0	16559	01-May-22	RT1	25	30.0	83.33	St
1	19562	01-May-22	RT1	28	30.0	93.33	St
2	19563	01-May-22	RT1	23	30.0	76.67	St

In [115…
```
print(df_bookings_merged.shape)
df_bookings_merged.head(3)
```

```
(134573, 18)
```

Out[115…

	booking_id	property_id	booking_date	check_in_date	checkout_date	no_guests
0	May012216558RT12	16558	30-04-22	01-May-22	2/5/2022	2.0
1	May012216558RT15	16558	27-04-22	01-May-22	2/5/2022	4.0
2	May012216558RT16	16558	1/5/2022	01-May-22	3/5/2022	2.0

In [115…
```
df_bookings_merged = pd.merge(df_bookings_merged,df_rooms, left_on = "room_category
```

In [116…
```
print(df_bookings_merged.shape)
df_bookings_merged.head(3)
```

```
(134573, 20)
```

Out[116…

	booking_id	property_id	booking_date	check_in_date	checkout_date	no_guests
0	May012216558RT12	16558	30-04-22	01-May-22	2/5/2022	2.0
1	May012216558RT15	16558	27-04-22	01-May-22	2/5/2022	4.0
2	May012216558RT16	16558	1/5/2022	01-May-22	3/5/2022	2.0

In [116…
```
df_bookings_merged.drop("room_id",axis=1,inplace=True)
print(df_bookings_merged.shape)
df_bookings_merged.head(3)
```

```
(134573, 19)
```

Out[116…

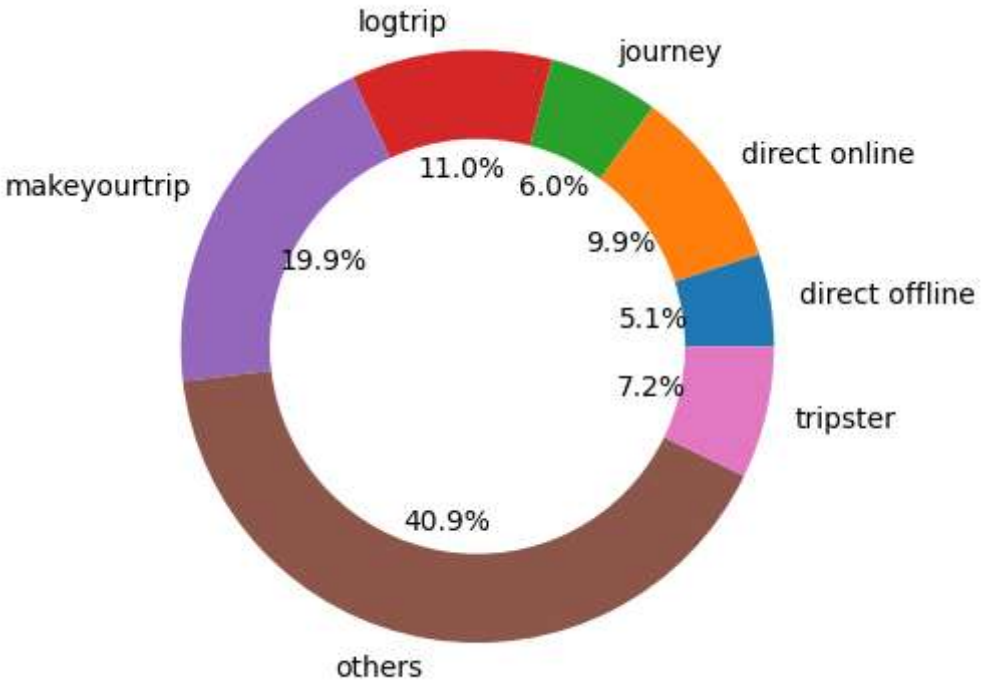
	booking_id	property_id	booking_date	check_in_date	checkout_date	no_guests
0	May012216558RT12	16558	30-04-22	01-May-22	2/5/2022	2.0
1	May012216558RT15	16558	27-04-22	01-May-22	2/5/2022	4.0
2	May012216558RT16	16558	1/5/2022	01-May-22	3/5/2022	2.0

5) Data Visualization

1. Pie chart of revenue realized per booking platform

In [118…
```
df_bookings_merged.groupby("booking_platform")["revenue_realized"].sum().plot(kind=
```

Out[118…
```
<Axes: >
```



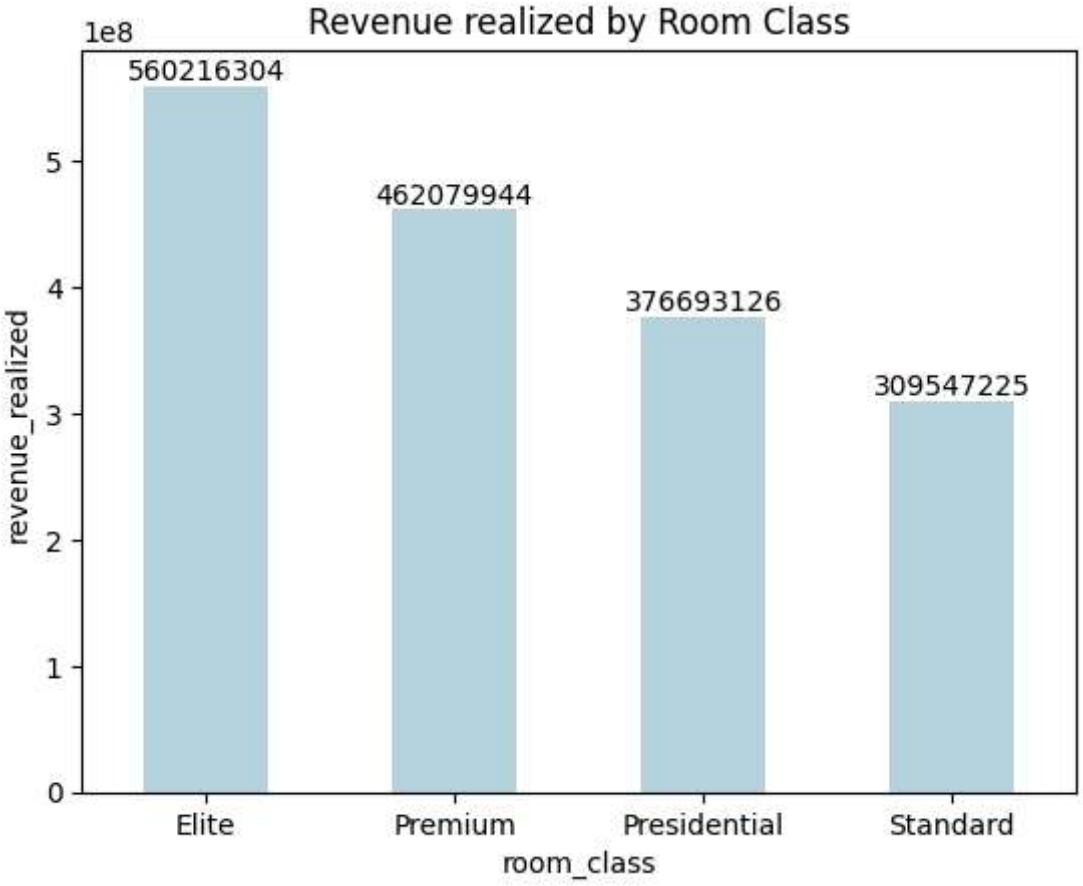
In [117…

```
a = (df_bookings_merged.groupby('room_class')['revenue_realized'].sum())/1000000
print(a.iloc[1])
print(a)
```

```
462.079944
room_class
Elite           560.216304
Premium         462.079944
Presidential    376.693126
Standard        309.547225
Name: revenue_realized, dtype: float64
```

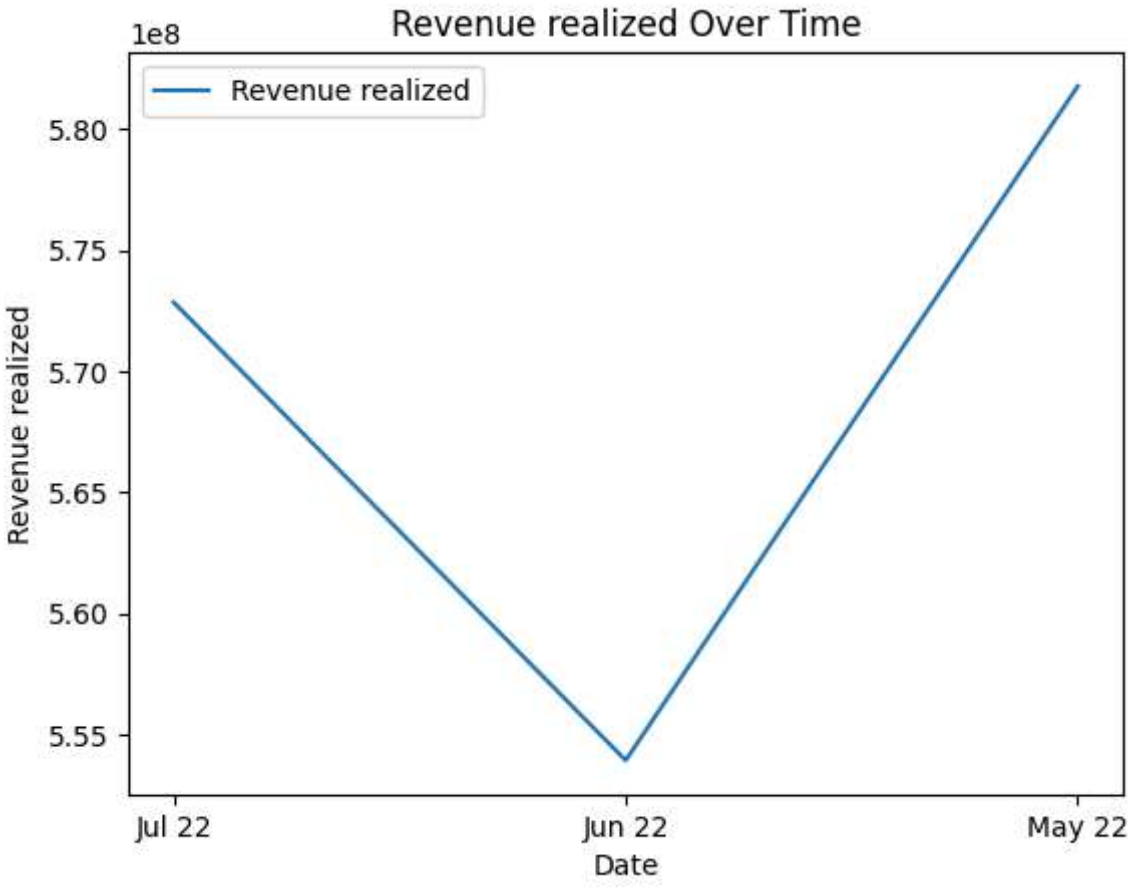
In [118…

```
import seaborn as sns

rcbyrr = df_bookings_merged.groupby('room_class',as_index=False)['revenue_realized'
# rcbyrr["revenue_realized"] = rcbyrr["revenue_realized"]/1000000
ax = sns.barplot(x='room_class', y="revenue_realized", data=rcbyrr, width = 0.5, co
plt.title('Revenue realized by Room Class')
for bar in ax.containers:
    ax.bar_label(bar, fmt='%.0f')
plt.show()
```



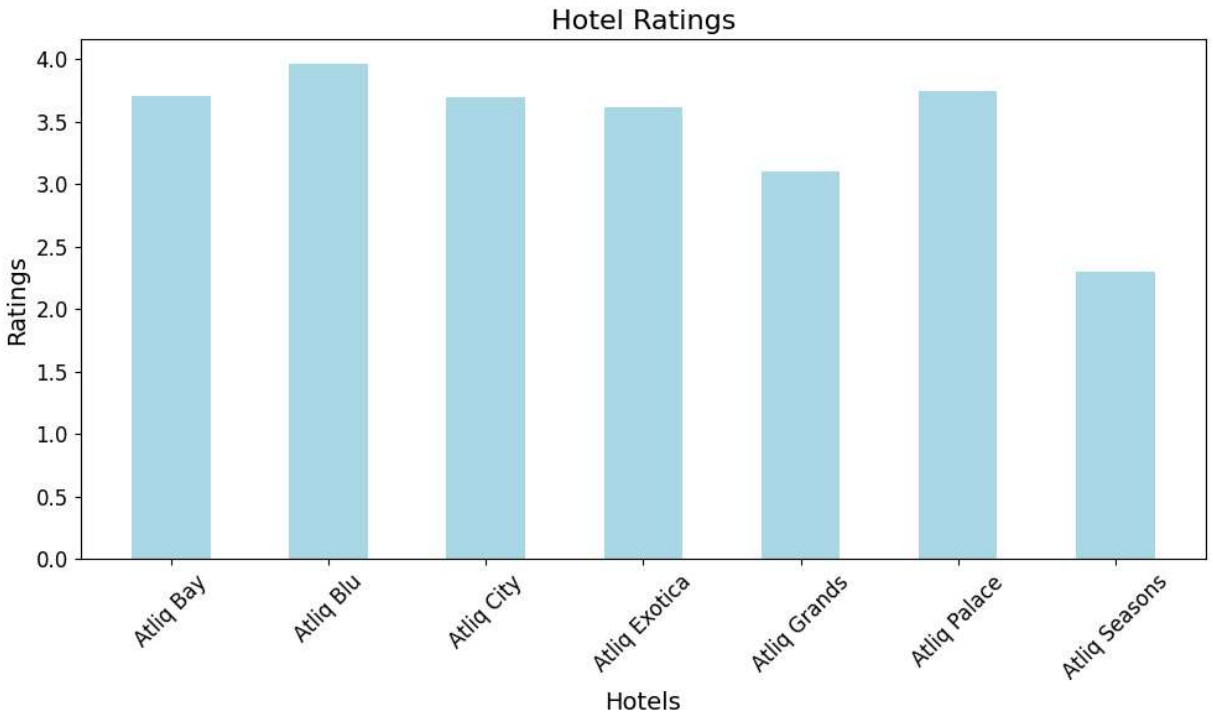
In [118…

```
import matplotlib.pyplot as plt

mybyrr = df_bookings_merged.groupby('mmm yy',as_index=False)['revenue_realized'].su
plt.plot(mybyrr['mmm yy'], mybyrr['revenue_realized'], label='Revenue realized')
plt.xlabel('Date')
plt.ylabel('Revenue realized')
plt.title('Revenue realized Over Time')
plt.legend()
plt.show()
```



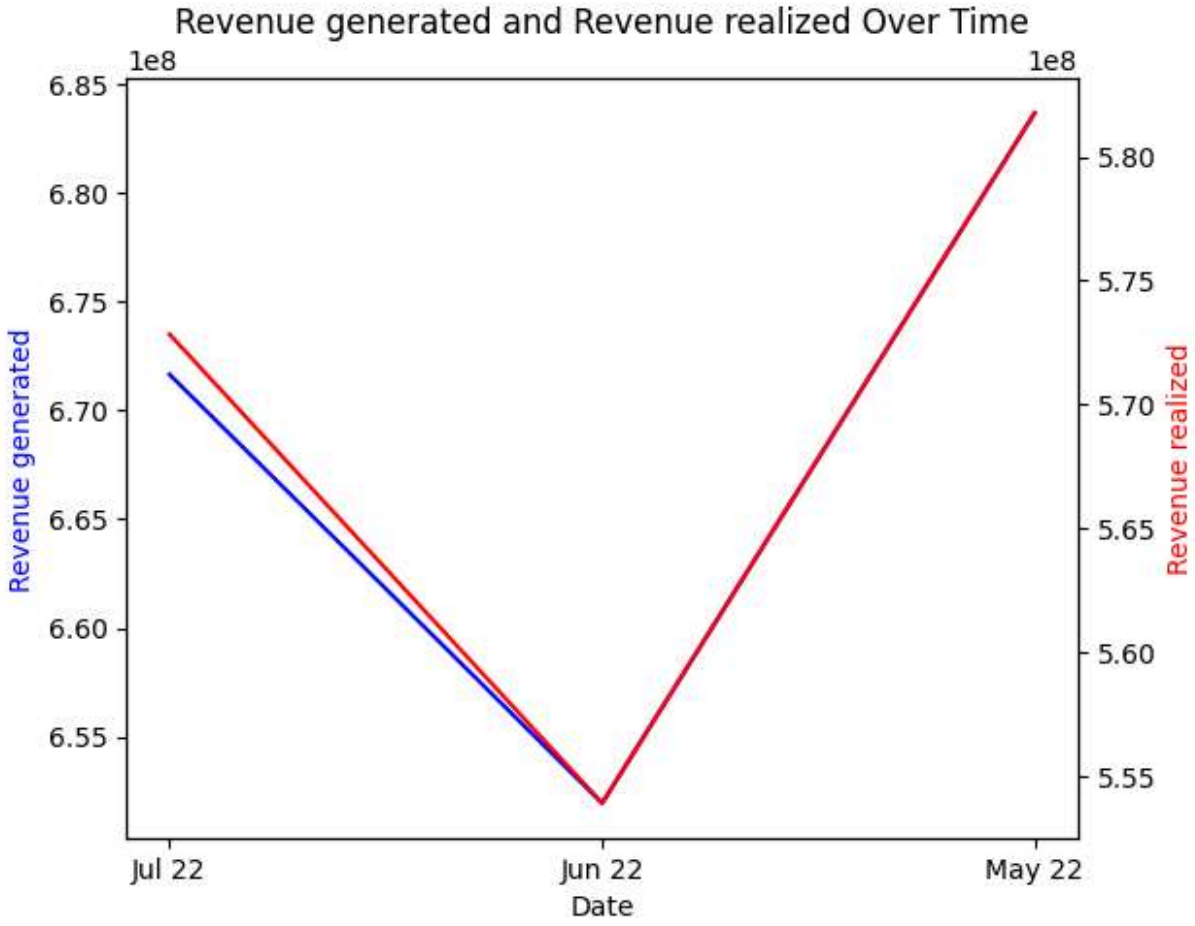
In [120…

```
plt.figure(figsize=(10, 6))  # Set the figure size

pnbyrg = df_bookings_merged.groupby("property_name", as_index = False)["ratings_giv
ax3 = plt.bar(pnbyrg["property_name"], pnbyrg["ratings_given"], color='lightblue',w

# Add labels and title
plt.title('Hotel Ratings', fontsize=16)
plt.xlabel('Hotels', fontsize=14)
plt.ylabel('Ratings', fontsize=14)

# Rotate x-axis labels for better readability
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)



# Show the chart
plt.tight_layout()  # Adjust layout to prevent overlap
plt.show()
```



In [119…

```
fig, ax1 = plt.subplots()

mybyrg = df_bookings_merged.groupby('mmm yy',as_index=False)['revenue_generated'].s
ax1.plot(mybyrg['mmm yy'], mybyrg['revenue_generated'], 'b-', label='Revenue Genera
ax1.set_xlabel('Date')
ax1.set_ylabel('Revenue generated', color='b')

mybyrr = df_bookings_merged.groupby('mmm yy',as_index=False)['revenue_realized'].su
ax2 = ax1.twinx()
ax2.plot(mybyrr['mmm yy'], mybyrr['revenue_realized'], 'r-', label='Revenue Realize
ax2.set_ylabel('Revenue realized', color='r')

fig.tight_layout()
plt.title('Revenue generated and Revenue realized Over Time')
plt.show()
```


Revenue generated and Revenue realized Over Time
1e8
1e8
6.85
6.80
6.75
6.70
6.65
6.60
6.55
5.80
5.75
5.70
5.65
5.60
5.55
Revenue generated
Revenue realized
Jul 22
Jun 22
May 22
Date

In [ ]: