Hotels Data Analysis Project

In [120…
```
import pandas as pd
```

1. Data Import and Data Exploration

Datasets

Datasets

We have 5 csv file

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

1.1 Read bookings data in a dataframe

In [121…
```
df_bookings = pd.read_csv('datasets/fact_bookings.csv')
```

1.2 Explore bookings data

In [122…
```
df_bookings.head()
```

Out[122…

	booking_id	property_id	booking_date	check_in_date	checkout_dat
0	May012216558RT11	16558	27-04-22	1/5/2022	2/5/202
1	May012216558RT12	16558	30-04-22	1/5/2022	2/5/202
2	May012216558RT13	16558	28-04-22	1/5/2022	4/5/202
3	May012216558RT14	16558	28-04-22	1/5/2022	2/5/202
4	May012216558RT15	16558	27-04-22	1/5/2022	2/5/202

In [123…
```
df_bookings.shape
```

Out[123…
```
(134590, 12)
```

1.3 Room Category Unique Records

In [124…
```
df_bookings.room_category.unique()
```

Out[124…
```
array(['RT1', 'RT2', 'RT3', 'RT4'], dtype=object)
```

1.4 Booking Platform Unique Records

In [125…
```
df_bookings.booking_platform.unique()
```

Out[125…
```
array(['direct online', 'others', 'logtrip', 'tripster', 'makeyourtrip',
       'journey', 'direct offline'], dtype=object)
```

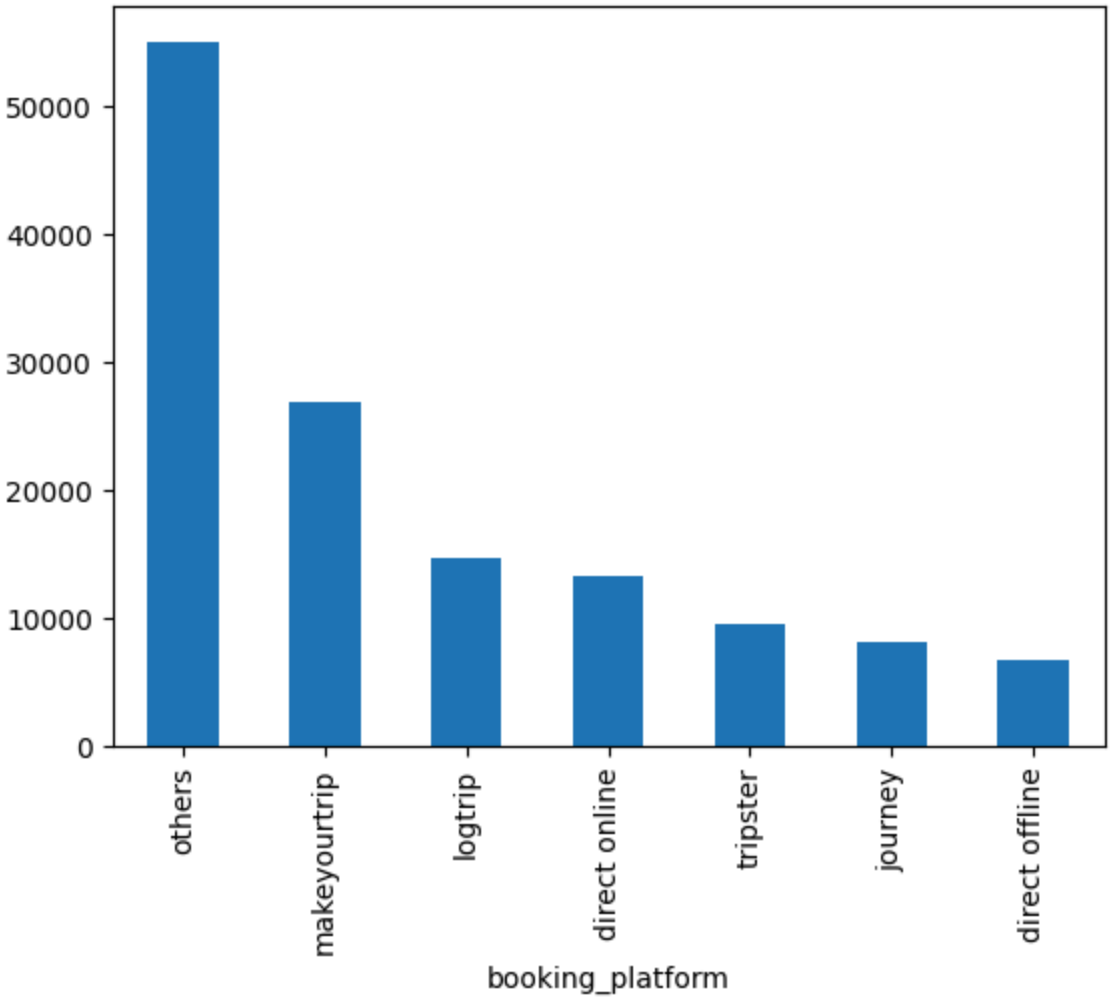
1.5 Booking Platform Wise Count

In [126…
```
df_bookings.booking_platform.value_counts()
```

Out[126…
```
booking_platform
others            55066
makeyourtrip      26898
logtrip           14756
direct online     13379
tripster           9630
journey            8106
direct offline     6755
Name: count, dtype: int64
```

In [127…
```
df_bookings.booking_platform.value_counts().plot(kind="bar")
```

Out[127… <Axes: xlabel='booking_platform'>



1.6 Describe Table df_bookings

In [128… `df_bookings.describe()`

Out[128…

	property_id	no_guests	ratings_given	revenue_generated	rever
count	134590.000000	134587.000000	56683.000000	1.345900e+05	13
mean	18061.113493	2.036170	3.619004	1.537805e+04	1
std	1093.055847	1.034885	1.235009	9.303604e+04	
min	16558.000000	-17.000000	1.000000	6.500000e+03	
25%	17558.000000	1.000000	3.000000	9.900000e+03	
50%	17564.000000	2.000000	4.000000	1.350000e+04	1
75%	18563.000000	2.000000	5.000000	1.800000e+04	1
max	19563.000000	6.000000	5.000000	2.856000e+07	4

1.7 Read rest of the files

In [129…
```
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')
```

In [130…
```
df_hotels.shape
```

Out[130…
```
(25, 4)
```

In [131…
```
df_hotels.head()
```

Out[131…

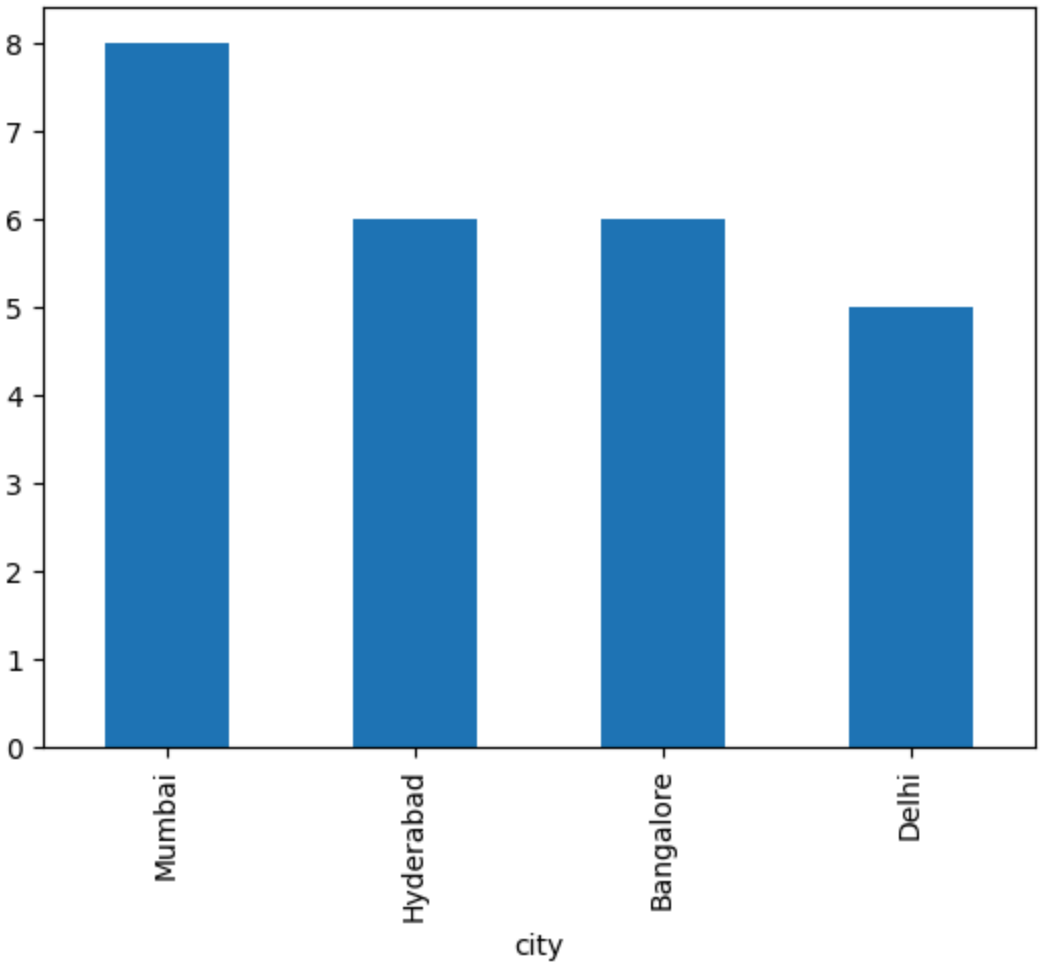
	property_id	property_name	category	city
0	16558	Atliq Grands	Luxury	Delhi
1	16559	Atliq Exotica	Luxury	Mumbai
2	16560	Atliq City	Business	Delhi
3	16561	Atliq Blu	Luxury	Delhi
4	16562	Atliq Bay	Luxury	Delhi

In [132…
```
df_hotels.category.value_counts()
```

Out[132…
```
category
Luxury      16
Business     9
Name: count, dtype: int64
```

In [133…
```
df_hotels.city.value_counts().plot(kind="bar")
```

Out[133…
```
<Axes: xlabel='city'>
```



1.8 Explore aggregate bookings

In [134…
```
df_agg_bookings.head(3)
```

Out[134…

	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

1.9 Find out unique property ids in aggregate bookings dataset

In [135…
```
df_agg_bookings.property_id.unique()
```

Out[135…
```
array([16559, 19562, 19563, 17558, 16558, 17560, 19558, 19560, 17561,
       16560, 16561, 16562, 16563, 17559, 17562, 17563, 18558, 18559,
       18561, 18562, 18563, 19559, 19561, 17564, 18560], dtype=int64)
```

1.10 Find out total bookings per property_id

In [17]:
```
df_agg_bookings.property_id.value_counts()
```

Out[17]:
```
property_id
16559    368
17559    368
17564    368
19561    368
19559    368
18563    368
18562    368
18561    368
18559    368
18558    368
17563    368
17562    368
16563    368
19562    368
16562    368
16561    368
16560    368
17561    368
19560    368
19558    368
17560    368
16558    368
17558    368
19563    368
18560    368
Name: count, dtype: int64
```

1.11 Find out days on which bookings are greater than capacity

In [18]:
```
df_agg_bookings[df_agg_bookings.successful_bookings > df_agg_bookings.capaci
```

Out[18]:

	property_id	check_in_date	room_category	successful_bookings	capaci
3	17558	1-May-22	RT1	30	19
12	16563	1-May-22	RT1	100	41
4136	19558	11-Jun-22	RT2	50	39
6209	19560	2-Jul-22	RT1	123	26
8522	19559	25-Jul-22	RT1	35	24
9194	18563	31-Jul-22	RT4	20	18

In [19]:
```
df_agg_bookings.check_in_date[df_agg_bookings.successful_bookings > df_agg_b
```

Out[19]:
```
3        1-May-22
12       1-May-22
4136    11-Jun-22
6209     2-Jul-22
8522    25-Jul-22
9194    31-Jul-22
Name: check_in_date, dtype: object
```

1.12 Find out properties that have highest capacity

In [20]:
```
df_agg_bookings.property_id[df_agg_bookings.capacity.max()]
```

Out[20]:
```
18560
```

2. Data Cleaning

2.1 Describe Table df_bookings

In [21]:
```
df_bookings.describe()
```

Out[21]:

	property_id	no_guests	ratings_given	revenue_generated	rever
count	134590.000000	134587.000000	56683.000000	1.345900e+05	13
mean	18061.113493	2.036170	3.619004	1.537805e+04	1
std	1093.055847	1.034885	1.235009	9.303604e+04	
min	16558.000000	-17.000000	1.000000	6.500000e+03	
25%	17558.000000	1.000000	3.000000	9.900000e+03	
50%	17564.000000	2.000000	4.000000	1.350000e+04	1
75%	18563.000000	2.000000	5.000000	1.800000e+04	1
max	19563.000000	6.000000	5.000000	2.856000e+07	4

2.2 Clean invalid guests

In [22]:
```
df_bookings[df_bookings.no_guests<0]
```

Out[22]:

	booking_id	property_id	booking_date	check_in_date	checkc
0	May012216558RT11	16558	27-04-22	1/5/2022	
3	May012216558RT14	16558	28-04-22	1/5/2022	
17924	May122218559RT44	18559	12/5/2022	12/5/2022	
18020	May122218561RT22	18561	8/5/2022	12/5/2022	
18119	May122218562RT311	18562	5/5/2022	12/5/2022	
18121	May122218562RT313	18562	10/5/2022	12/5/2022	
56715	Jun082218562RT12	18562	5/6/2022	8/6/2022	
119765	Jul202219560RT220	19560	19-07-22	20-07-22	
134586	Jul312217564RT47	17564	30-07-22	31-07-22	

In the Above table we can Easily see that guests having less than zero is an error. We have to ignore these records

In [23]:
```
df_bookings = df_bookings[df_bookings.no_guests > 0]
```

In [24]:
```
df_bookings.shape
```

Out[24]: (134578, 12)

2.3 Outlier removal in revenue generated

In [25]:
```
df_bookings.revenue_generated.min(),df_bookings.revenue_generated.max()
```

Out[25]: (6500, 28560000)

2.4 Calculate Mean & Median

In [26]:
```
df_bookings.revenue_generated.mean(),df_bookings.revenue_generated.median()
```

Out[26]: (15378.036937686695, 13500.0)

2.5 Average & Standard Deviation

In [27]:
```
avg,std = df_bookings.revenue_generated.mean(),df_bookings.revenue_generatec
```

In [28]:
```
higher_limit = avg + 3*std
higher_limit
```

Out[28]: 294498.50173207896

In [29]:
```
lower_limit = avg - 3*std
lower_limit
```

Out[29]: -263742.4278567056

In [30]:
```
df_bookings[df_bookings.revenue_generated<=0]
```

Out[30]:

booking_id	property_id	booking_date	check_in_date	checkout_date	no_gu

In [31]:
```
df_bookings[df_bookings.revenue_generated>higher_limit]
```

Out[31]:

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

In [32]:
```
df_bookings = df_bookings[df_bookings.revenue_generated<=higher_limit]
df_bookings.shape
```

Out[32]: (134573, 12)

In [33]:
```
df_bookings.revenue_realized.describe()
```

Out[33]:
```
count    134573.000000
mean      12695.983585
std        6927.791692
min        2600.000000
25%        7600.000000
50%       11700.000000
75%       15300.000000
max       45220.000000
Name: revenue_realized, dtype: float64
```

In [34]:
```
higher_limit = df_bookings.revenue_realized.mean() + 3*df_bookings.revenue_r
higher_limit
```

Out[34]: 33479.358661845814

In [35]:
```
df_bookings[df_bookings.revenue_realized>higher_limit]
```

Out[35]:

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

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

2.6 Category=RT4

In [36]:
```
df_bookings[df_bookings.room_category=="RT4"].revenue_realized.describe()
```

Out[36]:
```
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
```

2.7 Mean + 3*standard deviation

In [37]:
```
23439+3*9048
```

Out[37]:
```
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 [38]:
```
df_bookings.isnull().sum()
```

Out[38]:
```
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
```

Total values in our dataframe is 134576. Out of that 77897 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

2.8 In aggregate bookings find columns that have null values. Fill these null values with whatever you think is the appropriate subtitute (possible ways is to use mean or median)

In [39]:
```
df_agg_bookings.isnull().sum()
```

Out[39]:
```
property_id            0
check_in_date          0
room_category          0
successful_bookings    0
capacity               2
dtype: int64
```

In [40]:
```
df_agg_bookings[df_agg_bookings['capacity'].isnull()]
```

Out[40]:

	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 [41]:
```
df_agg_bookings.capacity.median()
```

Out[41]:
```
25.0
```

In [42]:
```
df_agg_bookings.capacity.fillna(df_agg_bookings.capacity.median(),inplace=Tr
```

In [43]:
```
df_agg_bookings.loc[[8,15]]
```

Out[43]:

	property_id	check_in_date	room_category	successful_bookings	capacity
8	17561	1-May-22	RT1	22	25.0
15	17563	1-May-22	RT1	21	25.0

2.9 In aggregate bookings find out records that have successful_bookings value greater than capacity. Filter those records

In [44]:
```
df_agg_bookings[df_agg_bookings.successful_bookings>df_agg_bookings.capacity
```

Out[44]:

	property_id	check_in_date	room_category	successful_bookings	capaci
3	17558	1-May-22	RT1	30	19
12	16563	1-May-22	RT1	100	41
4136	19558	11-Jun-22	RT2	50	39
6209	19560	2-Jul-22	RT1	123	26
8522	19559	25-Jul-22	RT1	35	24
9194	18563	31-Jul-22	RT4	20	18

In [45]:
```
df_agg_bookings.shape
```

Out[45]:
```
(9200, 5)
```

In [46]:
```
df_agg_bookings = df_agg_bookings[df_agg_bookings.successful_bookings <= df_
df_agg_bookings.shape
```

Out[46]:
```
(9194, 5)
```

3. Data Transformation

3.1 Create occupancy percentage column

In [47]:
```
df_agg_bookings.head(3)
```

Out[47]:

	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

3.2 Create Occ_Pct Column Using Function

In [48]:
```
df_agg_bookings['occ_pct'] = df_agg_bookings.apply(lambda row: row['successf
```

3.3 Displaying the top 3 rows

In [49]:
```
df_agg_bookings.head(3)
```

Out[49]:

	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

3.4 Convert it into Percentage

In [50]:
```
df_agg_bookings['occ_pct'] = df_agg_bookings['occ_pct'].apply(lambda x: rour
df_agg_bookings.head(3)
```

Out[50]:

	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

In [51]:
```
df_bookings.head()
```

Out[51]:

	booking_id	property_id	booking_date	check_in_date	checkout_dat
1	May012216558RT12	16558	30-04-22	1/5/2022	2/5/202
4	May012216558RT15	16558	27-04-22	1/5/2022	2/5/202
5	May012216558RT16	16558	1/5/2022	1/5/2022	3/5/202
6	May012216558RT17	16558	28-04-22	1/5/2022	6/5/202
7	May012216558RT18	16558	26-04-22	1/5/2022	3/5/202

In [52]:
```
df_agg_bookings.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 9194 entries, 0 to 9199
Data columns (total 6 columns):
 #   Column               Non-Null Count  Dtype  
---  ------               --------------  -----  
 0   property_id          9194 non-null   int64  
 1   check_in_date        9194 non-null   object 
 2   room_category        9194 non-null   object 
 3   successful_bookings  9194 non-null   int64  
 4   capacity             9194 non-null   float64
 5   occ_pct              9194 non-null   float64
dtypes: float64(2), int64(2), object(2)
memory usage: 502.8+ KB
```

There are various types of data transformations that you may have to perform based on the need. Few examples of data transformations are,

1. Creating new columns
2. Normalization
3. Merging data
4. Aggregation

4. Insights Generation

4.1 What is an average occupancy rate in each of the room categories?

In [53]:
```
df_agg_bookings.head(3)
```

Out[53]:

	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

In [54]:
```
df_agg_bookings.groupby("room_category")["occ_pct"].mean()
```

Out[54]:
```
room_category
RT1    57.889643
RT2    58.009756
RT3    58.028213
RT4    59.277925
Name: occ_pct, dtype: float64
```

I don't understand RT1, RT2 etc. Print room categories such as Standard, Premium, Elite etc along with average occupancy percentage

In [55]:
```
df_rooms.head(3)
```

Out[55]:

	room_id	room_class
0	RT1	Standard
1	RT2	Elite
2	RT3	Premium

4.2 Join Tables: df_agg_bookings & df_rooms

In [56]:
```
df = pd.merge(df_agg_bookings,df_rooms,left_on="room_category",right_on="roc
df.head(4)
```

Out[56]:

	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	16558	1-May-22	RT1	18	19.0

4.3 Group By - Room Class

In [57]:
```
df.groupby("room_class")["occ_pct"].mean()
```

Out[57]:
```
room_class
Elite           58.009756
Premium         58.028213
Presidential    59.277925
Standard        57.889643
Name: occ_pct, dtype: float64
```

In [58]:
```
df[df.room_class=="Standard"].occ_pct.mean()
```

Out[58]:
```
57.88964285714285
```

4.4 Print average occupancy rate per city

In [59]:
```
df_hotels.head(3)
```

Out[59]:

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

4.5 Table Join: df & df_hotels

In [60]:
```
df = pd.merge(df,df_hotels,on="property_id")
df.head(3)
```

Out[60]:

	property_id	check_in_date	room_category	successful_bookings	capacity
0	16559	1-May-22	RT1	25	30.0
1	16559	2-May-22	RT1	20	30.0
2	16559	3-May-22	RT1	17	30.0

4.6 City Wise Occupnacy % Mean

In [61]:
```
df.groupby("city")["occ_pct"].mean()
```

Out[61]:
```
city
Bangalore    56.332376
Delhi        61.507341
Hyderabad    58.120652
Mumbai       57.909181
Name: occ_pct, dtype: float64
```

4.7 When was the occupancy better? Weekday or Weekend?

In [62]:
```
df_date.head(3)
```

Out[62]:

	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

4.8 Left Join Table df With df_date

In [63]:
```
df = pd.merge(df,df_date,left_on="check_in_date",right_on="date")
df.head(3)
```

Out[63]:

	property_id	check_in_date	room_category	successful_bookings	capacity
0	16559	10-May-22	RT1	18	30.0
1	16559	10-May-22	RT2	25	41.0
2	16559	10-May-22	RT3	20	32.0

4.9 Calculating Mean of day type

In [64]:
```
df.groupby("day_type")["occ_pct"].mean().round(2)
```

Out[64]:
```
day_type
weekeday    50.88
weekend     72.34
Name: occ_pct, dtype: float64
```

4.10 In the month of June, what is the occupancy for different cities

In [65]:
```
df["mmm yy"].unique()
```

Out[65]:
```
array(['May 22', 'Jun 22', 'Jul 22'], dtype=object)
```

In [66]:
```
df_june =df[df["mmm yy"] == "Jun 22"]
df_june.head(4)
```

Out[66]:

	property_id	check_in_date	room_category	successful_bookings	capaci
2200	16559	10-Jun-22	RT1	20	30
2201	16559	10-Jun-22	RT2	26	41
2202	16559	10-Jun-22	RT3	20	32
2203	16559	10-Jun-22	RT4	11	18

4.11 City Wise Occupancy Percentage in Descending Order

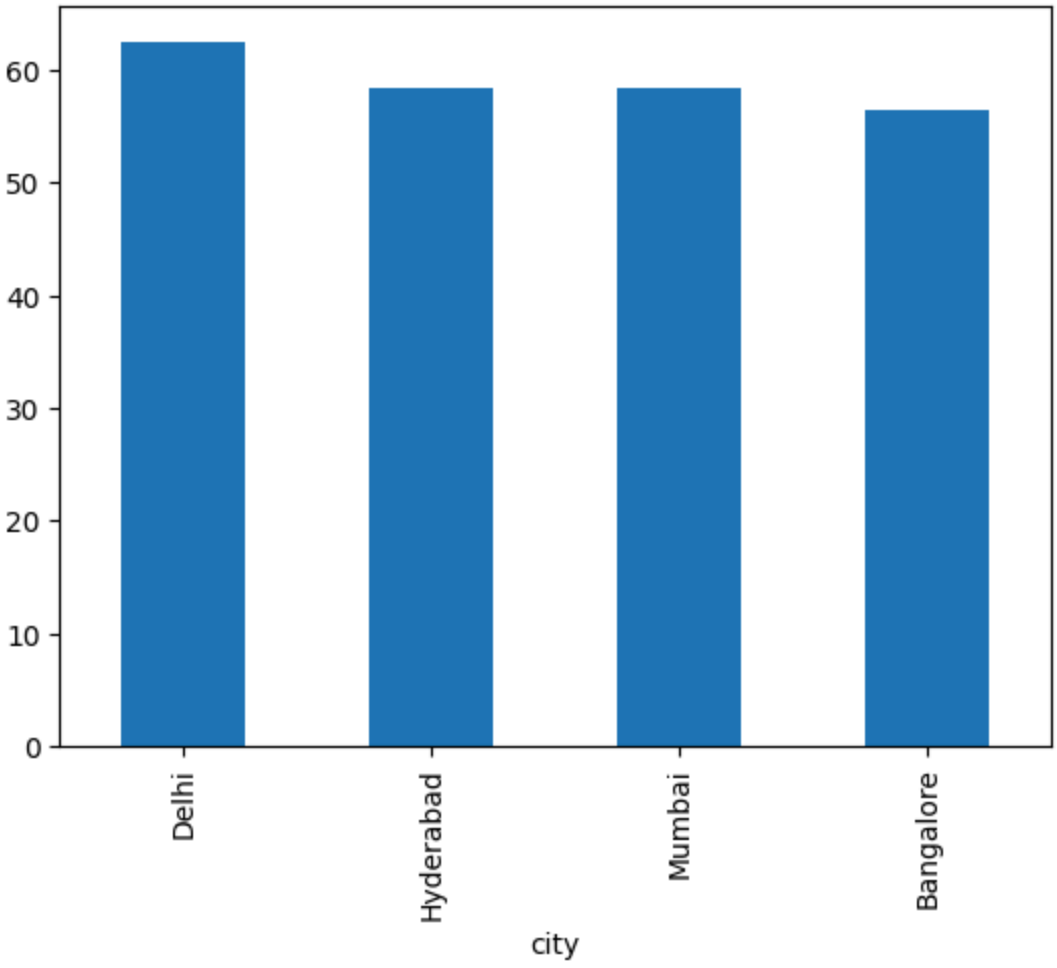
In [67]:
```
df_june.groupby("city")["occ_pct"].mean().round(2).sort_values(ascending=Fal
```

Out[67]:
```
city
Delhi        62.47
Hyderabad    58.46
Mumbai       58.38
Bangalore    56.44
Name: occ_pct, dtype: float64
```

4.12 City Wise Occupancy Percentage in Descending Order(PLotting Bar Graph)

In [68]:
```
df_june.groupby("city")["occ_pct"].mean().round(2).sort_values(ascending=Fal
```

Out[68]:
```
<Axes: xlabel='city'>
```



4.13 Reading new csv file of the month of August

In [69]:
```
df_august = pd.read_csv("datasets/new_data_august.csv")
df_august.head(3)
```

Out[69]:

	property_id	property_name	category	city	room_category	room_clas
0	16559	Atliq Exotica	Luxury	Mumbai	RT1	Standar
1	19562	Atliq Bay	Luxury	Bangalore	RT1	Standar
2	19563	Atliq Palace	Business	Bangalore	RT1	Standar

In [70]:
```
df_august.columns
```

Out[70]:
```
Index(['property_id', 'property_name', 'category', 'city', 'room_category',
       'room_class', 'check_in_date', 'mmm yy', 'week no', 'day_type',
       'successful_bookings', 'capacity', 'occ%'],
      dtype='object')
```

In [71]:
```
df.columns
```

Out[71]:
```
Index(['property_id', 'check_in_date', 'room_category', 'successful_booking
s',
       'capacity', 'occ_pct', 'room_id', 'room_class', 'property_name',
       'category', 'city', 'date', 'mmm yy', 'week no', 'day_type'],
      dtype='object')
```

In [72]:
```
df_august.shape
```

Out[72]:
```
(7, 13)
```

In [73]:
```
df.shape
```

Out[73]:
```
(6497, 15)
```

4.14 Concatinating df, df_august file

In [116…
```
latest_df = pd.concat([df,df_august],ignore_index=True,axis=0)
latest_df.tail(10)
```

Out[116…

	property_id	check_in_date	room_category	successful_bookings	capaci
6494	16563	31-Jul-22	RT2	32	38
6495	16563	31-Jul-22	RT3	14	20
6496	16563	31-Jul-22	RT4	13	18
6497	16559	01-Aug-22	RT1	30	30
6498	19562	01-Aug-22	RT1	21	30
6499	19563	01-Aug-22	RT1	23	30
6500	19558	01-Aug-22	RT1	30	40
6501	19560	01-Aug-22	RT1	20	26
6502	17561	01-Aug-22	RT1	18	26
6503	17564	01-Aug-22	RT1	10	16

In [75]:
```
latest_df.shape
```

Out[75]: (6504, 16)

4.15 Print revenue realized per city

In [76]:
```
df_bookings.head()
```

Out[76]:

	booking_id	property_id	booking_date	check_in_date	checkout_dat
1	May012216558RT12	16558	30-04-22	1/5/2022	2/5/202
4	May012216558RT15	16558	27-04-22	1/5/2022	2/5/202
5	May012216558RT16	16558	1/5/2022	1/5/2022	3/5/202
6	May012216558RT17	16558	28-04-22	1/5/2022	6/5/202
7	May012216558RT18	16558	26-04-22	1/5/2022	3/5/202

In [77]:
```
df_hotels.head(3)
```

Out[77]:

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

4.16 Merge df_bookings, df_hotels

In [78]:
```
df_new_bookings = pd.merge(df_bookings,df_hotels,on="property_id")
df_new_bookings.head(4)
```

Out[78]:

	booking_id	property_id	booking_date	check_in_date	checkout_dat
0	May012216558RT12	16558	30-04-22	1/5/2022	2/5/202
1	May012216558RT15	16558	27-04-22	1/5/2022	2/5/202
2	May012216558RT16	16558	1/5/2022	1/5/2022	3/5/202
3	May012216558RT17	16558	28-04-22	1/5/2022	6/5/202

4.17 City wise revenue

In [79]:
```
df_new_bookings.groupby('city')['revenue_realized'].sum()
```

Out[79]:
```
city
Bangalore    420383550
Delhi        294404488
Hyderabad    325179310
Mumbai       668569251
Name: revenue_realized, dtype: int64
```

4.18 Print month by month revenue

In [80]:
```
df_date.head(3)
```

Out[80]:

	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

4.19 Unique Entries of mmm yy

In [81]:
```
df_date["mmm yy"].unique()
```

Out[81]:
```
array(['May 22', 'Jun 22', 'Jul 22'], dtype=object)
```

4.20 Display df_new_bookings

In [82]:
```
df_new_bookings.head(3)
```

Out[82]:

	booking_id	property_id	booking_date	check_in_date	checkout_dat
0	May012216558RT12	16558	30-04-22	1/5/2022	2/5/202
1	May012216558RT15	16558	27-04-22	1/5/2022	2/5/202
2	May012216558RT16	16558	1/5/2022	1/5/2022	3/5/202

4.21 Column info

In [83]:
```
df_date.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 92 entries, 0 to 91
Data columns (total 4 columns):
 #   Column    Non-Null Count  Dtype 
---  ------    --------------  ----- 
 0   date      92 non-null     object
 1   mmm yy    92 non-null     object
 2   week no   92 non-null     object
 3   day_type  92 non-null     object
dtypes: object(4)
memory usage: 3.0+ KB
```

In [84]:
```
df_new_bookings.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 134573 entries, 0 to 134572
Data columns (total 15 columns):
 #   Column             Non-Null Count   Dtype  
---  ------             --------------   -----  
 0   booking_id         134573 non-null  object 
 1   property_id        134573 non-null  int64  
 2   booking_date       134573 non-null  object 
 3   check_in_date      134573 non-null  object 
 4   checkout_date      134573 non-null  object 
 5   no_guests          134573 non-null  float64
 6   room_category      134573 non-null  object 
 7   booking_platform   134573 non-null  object 
 8   ratings_given      56676 non-null   float64
 9   booking_status     134573 non-null  object 
 10  revenue_generated  134573 non-null  int64  
 11  revenue_realized   134573 non-null  int64  
 12  property_name      134573 non-null  object 
 13  category           134573 non-null  object 
 14  city               134573 non-null  object 
dtypes: float64(2), int64(3), object(10)
memory usage: 15.4+ MB
```

4.22 Specify the date format using the format parameter

In [88]:
```
df_date["date"] = pd.to_datetime(df_date["date"], format="%Y-%m-%d")
df_date.head(3)
```

Out[88]:

	date	mmm yy	week no	day_type
0	2022-05-01	May 22	W 19	weekend
1	2022-05-02	May 22	W 19	weekeday
2	2022-05-03	May 22	W 19	weekeday

In [89]:
```
df_new_bookings.head(3)
```

Out[89]:

	booking_id	property_id	booking_date	check_in_date	checkout_dat
0	May012216558RT12	16558	30-04-22	1/5/2022	2/5/202
1	May012216558RT15	16558	27-04-22	1/5/2022	2/5/202
2	May012216558RT16	16558	1/5/2022	1/5/2022	3/5/202

Handle Parsing Errors: If some rows contain invalid dates, you can use the **errors='coerce'** parameter to convert them to NaT (Not a Time):

In [97]:
```
df_new_bookings["check_in_date"] = pd.to_datetime(df_new_bookings["check_in_
df_new_bookings.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 134573 entries, 0 to 134572
Data columns (total 15 columns):
 #   Column             Non-Null Count   Dtype         
---  ------             --------------   -----         
 0   booking_id         134573 non-null  object        
 1   property_id        134573 non-null  int64         
 2   booking_date       134573 non-null  object        
 3   check_in_date      55790 non-null   datetime64[ns]
 4   checkout_date      134573 non-null  object        
 5   no_guests          134573 non-null  float64       
 6   room_category      134573 non-null  object        
 7   booking_platform   134573 non-null  object        
 8   ratings_given      56676 non-null   float64       
 9   booking_status     134573 non-null  object        
 10  revenue_generated  134573 non-null  int64         
 11  revenue_realized   134573 non-null  int64         
 12  property_name      134573 non-null  object        
 13  category           134573 non-null  object        
 14  city               134573 non-null  object        
dtypes: datetime64[ns](1), float64(2), int64(3), object(9)
memory usage: 15.4+ MB
```

In [99]:
```
df_new_bookings = pd.merge(df_new_bookings,df_date,left_on="check_in_date",r
df_new_bookings.head(3)
```

Out[99]:

	booking_id	property_id	booking_date	check_in_date	checkout_dat
0	May052216558RT11	16558	15-04-22	2022-05-05	7/5/202
1	May052216558RT12	16558	30-04-22	2022-05-05	7/5/202
2	May052216558RT13	16558	1/5/2022	2022-05-05	6/5/202

In [100…
```
df_new_bookings.groupby("mmm yy")["revenue_realized"].sum()
```

Out[100…
```
mmm yy
Jul 22    60278496
Jun 22    52903014
May 22    60961428
Name: revenue_realized, dtype: int64
```

4.23 Print revenue realized per hotel type

In [138…
```
df_new_bookings.groupby("category")["revenue_realized"].sum()
```

Out[138…
```
category
Business     66665827
Luxury      107477111
Name: revenue_realized, dtype: int64
```

In [139…
```
df_rooms.head()
```

Out[139…

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

In [140…
```
df_new_bookings.head()
```

Out[140…

	booking_id	property_id	booking_date	check_in_date	checkout_dat
0	May052216558RT11	16558	15-04-22	2022-05-05	7/5/202
1	May052216558RT12	16558	30-04-22	2022-05-05	7/5/202
2	May052216558RT13	16558	1/5/2022	2022-05-05	6/5/202
3	May052216558RT14	16558	3/5/2022	2022-05-05	6/5/202
4	May052216558RT15	16558	30-04-22	2022-05-05	10/5/202

In [141…
```
df_new_bookings = pd.merge(df_new_bookings,df_rooms,left_on="room_category",
```

In [142…
```
df_new_bookings.head(3)
```

Out[142…

	booking_id	property_id	booking_date	check_in_date	checkout_dat
0	May052216558RT11	16558	15-04-22	2022-05-05	7/5/202
1	May052216558RT12	16558	30-04-22	2022-05-05	7/5/202
2	May052216558RT13	16558	1/5/2022	2022-05-05	6/5/202

3 rows × 21 columns

In [143…
```
df_new_bookings.groupby("room_class")["revenue_realized"].sum()
```

Out[143…
```
room_class
Elite           56984850
Premium         47181288
Presidential    38269306
Standard        31707494
Name: revenue_realized, dtype: int64
```

4.24 Print average rating per city

In [145…
```
df_new_bookings.groupby("city")["ratings_given"].mean()
```

Out[145…
```
city
Bangalore    3.410464
Delhi        3.785784
Hyderabad    3.653743
Mumbai       3.629671
Name: ratings_given, dtype: float64
```

4.25 Print a pie chart of revenue realized per booking platform

In [146…
```
df_new_bookings.groupby("booking_platform")["revenue_realized"].sum().plot(k
```

Out[146…
```
<Axes: ylabel='revenue_realized'>
```