AtliQ Grand's Hospitallity Data Analytics

February 28, 2024

Insights from AtliQ Grand's Hospitallity Data Analytics

[112]:
```
import pandas as pd
import matplotlib.pyplot as plt
```

0- Dataset

There are five(5) `csv` files:

- **dim__hotels.csv** : contains the characteristics `(id, name,category location)` of all the hotels of the company.
- **dim__rooms.csv** : different rooms type available in each hotel `(Standart, Elite, Premium, Presidential)`
- **dim__date.csv** : contains metadatas `(month, year, day_type etc...)` of booking dates
- **fact__bookings.csv** : contains information about all booking transactions
- **fact__aggregated__booking.csv** : some statistics on every transactions in the database

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1- Data Exploration

---

[3]:
```
df_bookings = pd.read_csv("datasets/fact_bookings.csv")
df_bookings.head()
```

[3]:

	booking_id	property_id	booking_date	check_in_date	checkout_date	no_guests	room_category	booking_platform	ratings_given	booking_status
0	May012216558RT11	16558	27-04-22	1/5/2022	2/5/2022	-3.0	RT1	direct online	1.0	Checked Out
1	May012216558RT12	16558	30-04-22	1/5/2022	2/5/2022	2.0	RT1	others	NaN	Cancelled
2	May012216558RT13	16558	28-04-22	1/5/2022	4/5/2022	2.0	RT1	logtrip	5.0	Checked Out
3	May012216558RT14	16558	28-04-22	1/5/2022	2/5/2022					
4	May012216558RT15	16558	27-04-22	1/5/2022	2/5/2022					

```
3       -2.0           RT1           others            NaN      Cancelled
4        4.0           RT1    direct online            5.0    Checked Out

   revenue_generated  revenue_realized
0              10010             10010
1               9100              3640
2            9100000              9100
3               9100              3640
4              10920             10920
```

[4]:
```
df_bookings.shape
```

[4]:
```
(134590, 12)
```

[5]:
```
df_bookings.room_category.unique()
```

[5]:
```
array(['RT1', 'RT2', 'RT3', 'RT4'], dtype=object)
```

[6]:
```
df_bookings.booking_platform.unique()
```

[6]:
```
array(['direct online', 'others', 'logtrip', 'tripster', 'makeyourtrip',
       'journey', 'direct offline'], dtype=object)
```

[7]:
```
df_bookings[df_bookings['booking_platform']=='logtrip'].shape
```

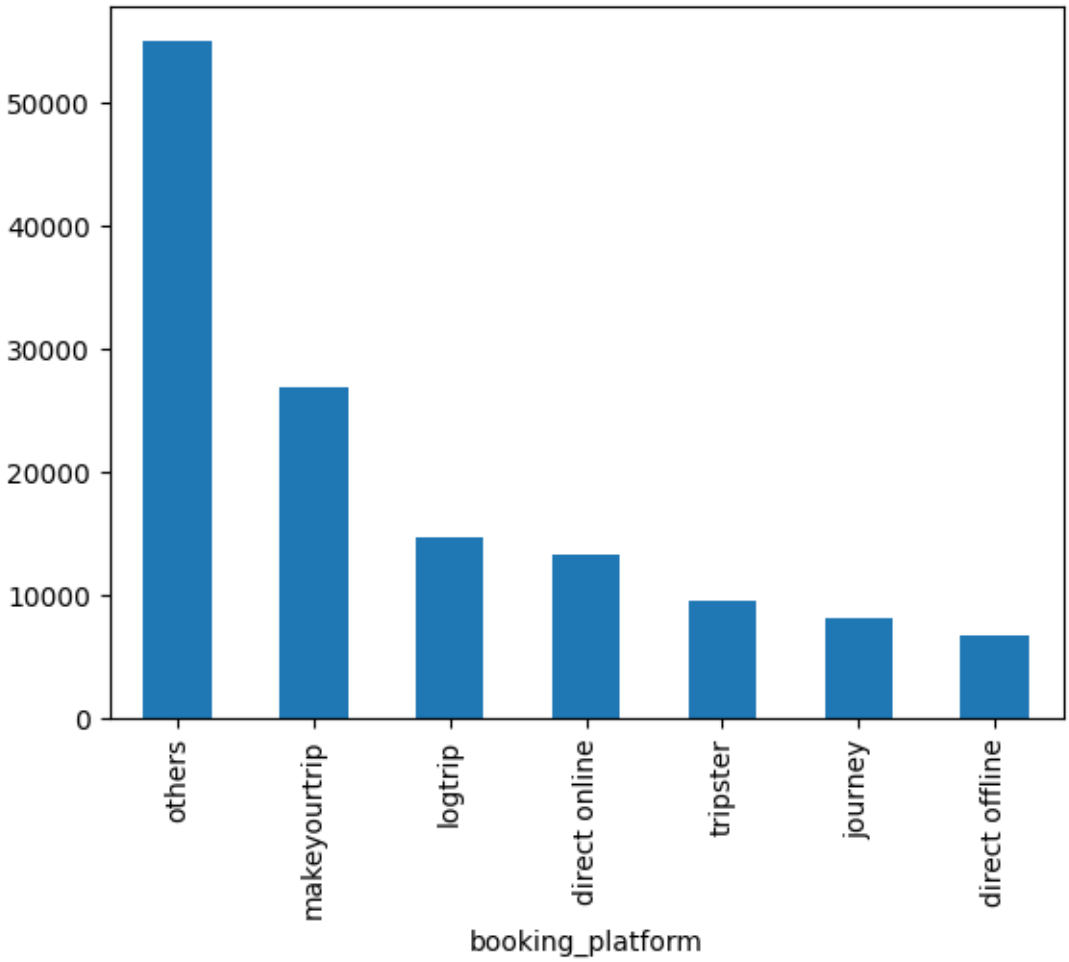
[7]:
```
(14756, 12)
```

[8]:
```
df_bookings.booking_platform.value_counts()
```

[8]:
```
booking_platform
others            55066
makeyourtrip      26898
logtrip           14756
direct online     13379
tripster           9630
journey            8106
direct offline     6755
Name: count, dtype: int64
```

[9]:
```
df_bookings.booking_platform.value_counts().plot(kind='bar')
```

[9]:
```
<Axes: xlabel='booking_platform'>
```



[10]:
```
df_bookings.describe()
```

[10]:

	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	
50%	17564.000000	2.000000	4.000000	1.350000e+04	
75%	18563.000000	2.000000	5.000000	1.800000e+04	
max	19563.000000	6.000000	5.000000	2.856000e+07	

```
25%         7600.000000
50%        11700.000000
75%        15300.000000
max        45220.000000
```

[11]:
```
df_bookings.booking_platform.describe()
```

[11]:
```
count     134590
unique         7
top       others
freq       55066
Name: booking_platform, dtype: object
```

[12]:
```
df_bookings.revenue_generated.min(),df_bookings.revenue_generated.max()
```

[12]:
```
(6500, 28560000)
```

[13]:
```
df_date = pd.read_csv('datasets/dim_date.csv')
df_hotels = pd.read_csv('datasets/dim_hotels.csv')
df_room = pd.read_csv('datasets/dim_rooms.csv')
df_agg_bookings = pd.read_csv('datasets/fact_aggregated_bookings.csv')
```

[14]:
```
df_hotels.head(3)
```

[14]:

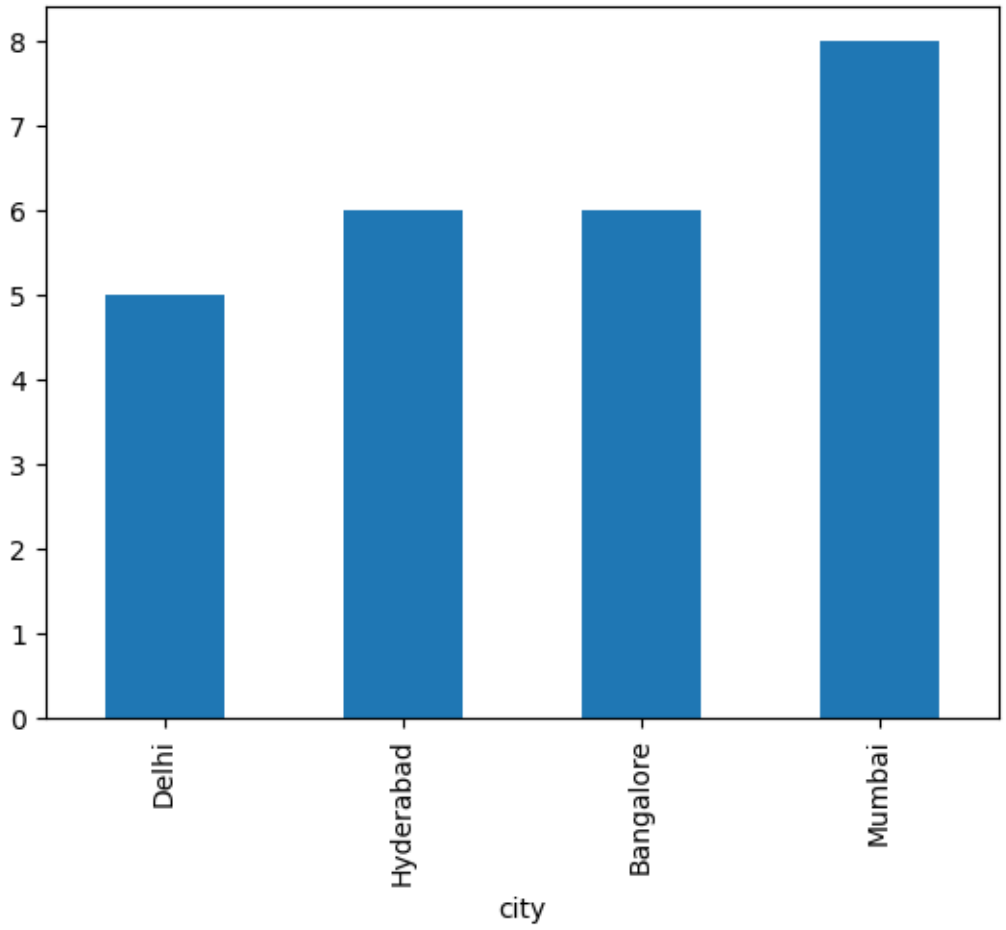
	property_id	property_name	category	city
0	16558	Atliq Grands	Luxury	Delhi
1	16559	Atliq Exotica	Luxury	Mumbai
2	16560	Atliq City	Business	Delhi

[15]:
```
df_hotels.category.value_counts()
```

[15]:
```
category
Luxury      16
Business     9
Name: count, dtype: int64
```

[16]:
```
df_hotels.city.value_counts().sort_values().plot(kind='bar')
```

[16]:
```
<Axes: xlabel='city'>
```



[ ]:

2- Data Cleaning

---

(1) Clean invalid guests

[17]:
```
df_bookings.describe()
```

[17]:

	property_id	no_guests	ratings_given	revenue_generated	\
count	134590.000000	134587.000000	56683.000000	1.345900e+05	
mean	18061.113493	2.036170	3.619004	1.537805e+04	
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	

```
75%     18563.000000       2.000000       5.000000       1.800000e+04
max     19563.000000       6.000000       5.000000       2.856000e+07
```

```
       revenue_realized
count     134590.000000
mean       12696.123256
std         6928.108124
min         2600.000000
25%         7600.000000
50%        11700.000000
75%        15300.000000
max        45220.000000
```

[18]:
```
# we notice that min value of no_guests is negative (-17)
```

[19]:
```
df_bookings[df_bookings['no_guests']<=0]
```

[19]:

	booking_id	property_id	booking_date	check_in_date	\
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	

	checkout_date	no_guests	room_category	booking_platform	ratings_given	\
0	2/5/2022	-3.0	RT1	direct online	1.0	
3	2/5/2022	-2.0	RT1	others	NaN	
17924	14-05-22	-10.0	RT4	direct online	NaN	
18020	14-05-22	-12.0	RT2	makeyourtrip	NaN	
18119	17-05-22	-6.0	RT3	direct offline	5.0	
18121	17-05-22	-4.0	RT3	direct online	NaN	
56715	13-06-22	-17.0	RT1	others	NaN	
119765	22-07-22	-1.0	RT2	others	NaN	
134586	1/8/2022	-4.0	RT4	logtrip	2.0	

	booking_status	revenue_generated	revenue_realized
0	Checked Out	10010	10010
3	Cancelled	9100	3640
17924	No Show	20900	20900
18020	Cancelled	9000	3600
18119	Checked Out	16800	16800
18121	Cancelled	14400	5760
56715	Checked Out	6500	6500

```
119765    Checked Out              13500             13500
134586    Checked Out              38760             38760
```

[20]:
```
# remove that datapoints as they are not huge ( just 12)
df_bookings = df_bookings[df_bookings['no_guests'] > 0]
df_bookings.shape
```

[20]:
```
(134578, 12)
```

(2) Outlier removal in revenue generated

[21]:
```
# looking at revenue_generated column and notice some issues
    # One can not paid 28560000 for a single booking.
df_bookings.revenue_generated.min(), df_bookings.revenue_generated.max()
```

[21]:
```
(6500, 28560000)
```

[22]:
```
# to tacle this issue, we gonna remove outlier ( datapoints that are greater
 ↪than 3*std)

#--> Getting avg, std of revenue_generated

avg, std = df_bookings.revenue_generated.mean(), df_bookings.revenue_generated.
 ↪std()
avg, std
```

[22]:
```
(15378.036937686695, 93040.1549314641)
```

[23]:
```
higher_limit = avg + 3*std # q_3
higher_limit
```

[23]:
```
294498.50173207896
```

[24]:
```
lower_limit = avg - 3*std #
lower_limit
```

[24]:
```
-263742.4278567056
```

[25]:
```
# Now, look at outliers : datapoints where revenue_generated > higher_limit
df_bookings[df_bookings['revenue_generated'] > higher_limit]
```

[25]:
```
                booking_id  property_id booking_date check_in_date  \
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
```

```
       checkout_date  no_guests room_category booking_platform  ratings_given  \
2          4/5/2022        2.0           RT1          logtrip            5.0
111        2/5/2022        6.0           RT3   direct online            NaN
315        4/5/2022        2.0           RT2  direct offline            3.0
562        2/5/2022        2.0           RT1          others            NaN
129176     29-07-22        2.0           RT2   direct online            3.0

       booking_status  revenue_generated  revenue_realized
2         Checked Out            9100000              9100
111       Checked Out           28560000             28560
315       Checked Out           12600000             12600
562         Cancelled            2000000              4420
129176    Checked Out           10000000             12600
```

[26]:
```
# Remove outliers from dataset
# As revenue generated is positive for all patapoints in our dataset, we don''t␣
 ↪care about lower_limit

df_bookings = df_bookings[df_bookings['revenue_generated'] < higher_limit]
df_bookings.shape
```

[26]:
```
(134573, 12)
```

[ ]:
```

```

[27]:
```
## Same analysis for revenue_realized column
df_bookings.revenue_realized.describe()
```

[27]:
```
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
```

[28]:
```
higher_limit_rev_realized = df_bookings['revenue_realized'].mean() +␣
 ↪3*df_bookings['revenue_realized'].std()
higher_limit_rev_realized
```

[28]:
```
33479.358661845814
```

[29]:
```
# Now, let's find out datapoints that are far from 'higher_limit_rev_realized'
### From the output, we can notice that there are many rows, and most of them␣
 ↪has 'RT4' as room_category
```

```
#### Thus, we can't consider this datapoints as outliers
#### Instead, let look at statics about 'RT4' room category

df_bookings[df_bookings['revenue_realized'] > higher_limit_rev_realized]
```

[29]:

```
               booking_id  property_id booking_date check_in_date  \
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

       checkout_date  no_guests room_category booking_platform  ratings_given  \
137          7/5/2022        4.0           RT4           others            NaN
139          2/5/2022        6.0           RT4         tripster            3.0
143          3/5/2022        3.0           RT4           others            5.0
149          7/5/2022        5.0           RT4          logtrip            NaN
222          3/5/2022        5.0           RT4           others            3.0
…               …          …            …               …            …
134328       2/8/2022        6.0           RT4    direct online            5.0
134331       1/8/2022        6.0           RT4           others            2.0
134467       1/8/2022        6.0           RT4     makeyourtrip            4.0
134474       6/8/2022        5.0           RT4   direct offline            5.0
134581       1/8/2022        4.0           RT4     makeyourtrip            4.0

       booking_status  revenue_generated  revenue_realized
137       Checked Out              38760             38760
139       Checked Out              45220             45220
143       Checked Out              35530             35530
149       Checked Out              41990             41990
222       Checked Out              34580             34580
…                 …                  …                 …
134328    Checked Out              39900             39900
134331    Checked Out              39900             39900
134467    Checked Out              39900             39900
134474    Checked Out              37050             37050
134581    Checked Out              38760             38760

[1299 rows x 12 columns]
```

[30]:

[31]:
```
#### let look at statics about 'RT4' room category
# First remark, 'RT4' room are 'Presidential' class
df_room
```

[31]:
```
  room_id    room_class
0     RT1      Standard
1     RT2         Elite
2     RT3       Premium
3     RT4  Presidential
```

[32]:
```
### Describe revenue_realized statistic for 'RT4' (presidential suit) from␣
 ↪df_bookings'

df_bookings[df_bookings.room_category =='RT4'].revenue_realized.describe()
```

[32]:
```
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
```

[33]:
```
# Remarks:
    # mean = 23439
    # max = 45220
    # std = 9048
    # higher_limit = mean + 3*std => higher_limit =
higher_limit_RT4 = 23439 + 3*9048
higher_limit_RT4
```

[33]:
```
50583
```

[34]:
```
# higher_limit_RT4 = 50583 means that outliers are datapoints where
    # revenue_realized > 50583
    # but, max = 45220; so there is no outlier for 'revenue_realized'
```

2-1 : Handling 'NaN' Values

[35]:
```
# It is ok to have 'NaN' values for 'ratings_given' as not every customers give␣
 ↪rating after in the hotel
# So, we don't remove them.
df_bookings.isnull().sum()
```

[35]:
```
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
```

[ ]:

3- Data Transformation

Create occupancy percentage column

[36]:
```
df_agg_bookings.head(3)
```

[36]:

	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

[37]:
```
df_agg_bookings["occ_pct"] = df_agg_bookings['successful_bookings']/
 ↪df_agg_bookings['capacity']
df_agg_bookings.head(3)
```

[37]:

	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	

	occ_pct
0	0.833333
1	0.933333
2	0.766667

Convert it to a percentage value

[38]:
```
# convert value to %
df_agg_bookings['occ_pct'] = df_agg_bookings.occ_pct.apply(lambda x:␣
 ↪round(x*100,2))
df_agg_bookings.head(3)
```

[38]:
```
   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

   occ_pct
0    83.33
1    93.33
2    76.67
```

[ ]:

4- Insights Generation

---

[111]:
```
# Utility function: convert amount to millio
def amount_to_million(amount):
    million_value = round(amount/10**6,2)
    return million_value
```

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

[39]:
```
df_agg_bookings.groupby('room_category').occ_pct.mean()
```

[39]:
```
room_category
RT1    58.224247
RT2    58.040278
RT3    58.028213
RT4    59.300461
Name: occ_pct, dtype: float64
```

[40]:
```
# let's do the samething and print Room names instead of their categories

df = pd.merge(df_agg_bookings, df_room, left_on='room_category',␣
 ↪right_on='room_id')
df.drop('room_id', axis=1, inplace=True)
df.head(3)
```

[40]:
```
   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

   occ_pct room_class
0    83.33   Standard
1    93.33   Standard
```

```
2    76.67   Standard
```

[41]:
```
df.groupby('room_class').occ_pct.mean().round(2)
```

[41]:
```
room_class
Elite           58.04
Premium         58.03
Presidential    59.30
Standard        58.22
Name: occ_pct, dtype: float64
```

b. Print average occupancy rate per city

[42]:
```
#city info isn't in df, so let's make join with hotel_df
df = pd.merge(df, df_hotels, on='property_id', how='left')
df.head(3)
```

[42]:
```
   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

   occ_pct room_class  property_name  category       city
0    83.33   Standard  Atliq Exotica    Luxury     Mumbai
1    93.33   Standard      Atliq Bay    Luxury  Bangalore
2    76.67   Standard   Atliq Palace  Business  Bangalore
```

[43]:
```
df.city.isnull().sum()
```

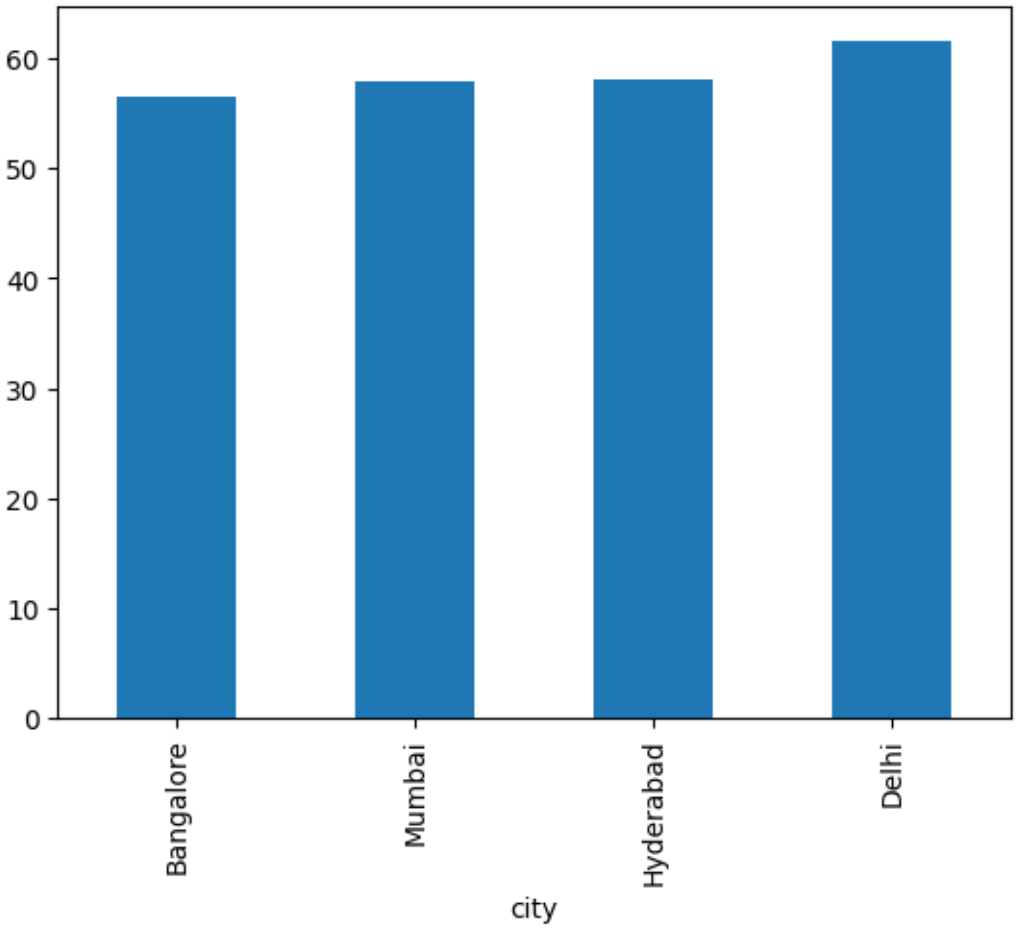
[43]:
```
0
```

[44]:
```
df.groupby('city').occ_pct.mean().round(2)
```

[44]:
```
city
Bangalore    56.59
Delhi        61.61
Hyderabad    58.14
Mumbai       57.94
Name: occ_pct, dtype: float64
```

[45]:
```
df.groupby('city').occ_pct.mean().round(2).sort_values().plot(kind='bar')
```

[45]:
```
<Axes: xlabel='city'>
```



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

[46]:
```
df_date.head(3)
```

[46]:

	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

[47]:
```
#daytype info is in df_date, so let's make join between df & df_date

df = pd.merge(df, df_date, left_on='check_in_date', right_on='date')
#df.drop('date'
df.head(3)
```

[47]:

	property_id	check_in_date	room_category	successful_bookings	capacity	\
0	18560	10-May-22	RT1	19	30.0	
1	19562	10-May-22	RT1	18	30.0	

```
2        19563     10-May-22           RT1                    16      30.0

   occ_pct room_class property_name  category       city       date  mmm yy  \
0    63.33   Standard    Atliq City  Business  Hyderabad  10-May-22  May 22
1    60.00   Standard     Atliq Bay    Luxury  Bangalore  10-May-22  May 22
2    53.33   Standard  Atliq Palace  Business  Bangalore  10-May-22  May 22

  week no  day_type
0    W 20  weekeday
1    W 20  weekeday
2    W 20  weekeday
```

[48]:
```
df.groupby('day_type').occ_pct.max()
```

[48]:
```
day_type
weekeday    145.83
weekend     128.21
Name: occ_pct, dtype: float64
```

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

[49]:
```
df['mmm yy'].unique()
```

[49]:
```
array(['May 22', 'Jun 22', 'Jul 22'], dtype=object)
```

[50]:
```
df_june = df[df['mmm yy']=='Jun 22']
df_june.groupby('city').occ_pct.mean().round(2)
```

[50]:
```
city
Bangalore    56.58
Delhi        62.47
Hyderabad    58.46
Mumbai       58.38
Name: occ_pct, dtype: float64
```

d: Add august datas

[51]:
```
df_august = pd.read_csv('datasets/new_data_august.csv')
df_august.shape
```

[51]:
```
(7, 13)
```

[52]:
```
df.shape
```

[52]:
```
(6500, 14)
```

[53]:
```
df.columns
```

[53]:
```
Index(['property_id', 'check_in_date', 'room_category', 'successful_bookings',
       'capacity', 'occ_pct', 'room_class', 'property_name', 'category',
       'city', 'date', 'mmm yy', 'week no', 'day_type'],
      dtype='object')
```

[54]:
```
df_august.columns
```

[54]:
```
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')
```

[55]:
```
latest_df = pd.concat([df, df_august], ignore_index=True, axis=0)
print(latest_df.shape)
df.head(3)
```

```
(6507, 15)
```

[55]:

	property_id	check_in_date	room_category	successful_bookings	capacity	occ_pct	room_class	property_name	category	city	date	mmm yy	week no	day_type
0	18560	10-May-22	RT1	19	30.0	63.33	Standard	Atliq City	Business	Hyderabad	10-May-22	May 22	W 20	weekeday
1	19562	10-May-22	RT1	18	30.0	60.00	Standard	Atliq Bay	Luxury	Bangalore	10-May-22	May 22	W 20	weekeday
2	19563	10-May-22	RT1	16	30.0	53.33	Standard	Atliq Palace	Business	Bangalore	10-May-22	May 22	W 20	weekeday

e- Print revenue realized per City

[56]:
```
df_bookings.head(2)
```

[56]:

	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
1	May012216558RT12	16558	30-04-22	1/5/2022	2/5/2022	2.0	RT1	others	NaN	Cancelled	9100	3640
4	May012216558RT15	16558	27-04-22	1/5/2022	2/5/2022	4.0	RT1	direct online	5.0	Checked Out	10920	10920

[57]:
```
df_hotels.sample(2)
```

[57]:
```
    property_id  property_name  category       city
13        18559  Atliq Exotica    Luxury  Hyderabad
2         16560     Atliq City  Business      Delhi
```

[58]:
```
# As cities infos aren't in df_bookings, we need to merge with df_hotels

df_full_bookings = pd.merge(df_bookings, df_hotels, on='property_id',␣
 ↪how='left')
df_full_bookings.sample(3)
```

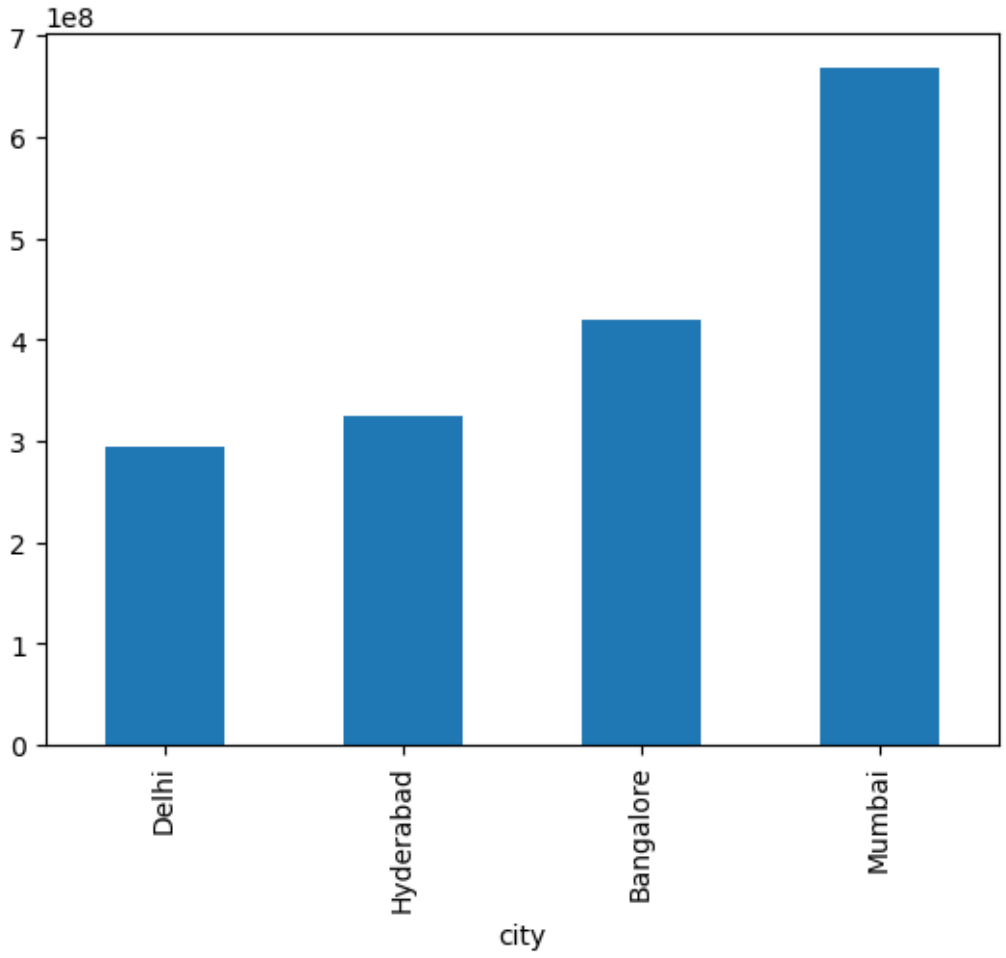
[58]:
```
             booking_id  property_id booking_date check_in_date checkout_date  \
44359  May302218562RT44        18562     25-05-22      30-05-22      1/6/2022
88660  Jun302217561RT11        17561     27-06-22      30-06-22      1/7/2022
21142  May142218561RT26        18561     7/5/2022      14-05-22      15-05-22

       no_guests room_category booking_platform  ratings_given booking_status  \
44359        2.0           RT4           others            5.0    Checked Out
88660        2.0           RT1           others            NaN      Cancelled
21142        3.0           RT2           others            NaN    Checked Out

       revenue_generated  revenue_realized property_name category       city
44359              19000             19000     Atliq Bay   Luxury  Hyderabad
88660              11050              4420     Atliq Blu   Luxury     Mumbai
21142               9900              9900     Atliq Blu   Luxury  Hyderabad
```

[59]:
```
df_full_bookings.groupby('city').revenue_realized.sum().sort_values()
```

[59]:
```
city
Delhi        294404488
Hyderabad    325179310
Bangalore    420383550
Mumbai       668569251
Name: revenue_realized, dtype: int64
```

[60]:
```
df_full_bookings.groupby('city').revenue_realized.sum().sort_values().
 ↪plot(kind='bar')
```

[60]:
```
<Axes: xlabel='city'>
```



f- Print month by month revenue

[61]:
```
df_full_bookings.sample(2)
```

[61]:

	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	property_name	category	city
125505	Jul242217564RT29	17564	24-07-22	24-07-22	27-07-22	1.0	RT2	direct online	NaN	Cancelled	15300	6120	Atliq Seasons		
64404	Jun132217559RT24	17559	24-05-22	13-06-22	16-06-22	2.0	RT2	tripster	5.0	Checked Out	15300	15300	Atliq Exotica		

```
125505  Business  Mumbai
64404     Luxury  Mumbai
```

[62]:
```
df_date['mmm yy'].unique()
```

[62]:
```
array(['May 22', 'Jun 22', 'Jul 22'], dtype=object)
```

[63]:
```
# date data are not in df_full_bookings,
pd.merge(df_full_bookings, df_date, left_on='check_in_date', right_on='date')
```

[63]:
```
Empty DataFrame
Columns: [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, property_name, category, city, date, mmm
yy, week no, day_type]
Index: []
```

[64]:
```
## We remark that the output from the previous merge is empty,
    # this is because date and check_in_date are in different format
    # let's tackle this issue
df_full_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
```

[65]:
```
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
```

[67]:
```
# we need to convert 'check_in_date' and 'date' columns to 'datetime'

df_date['date'] = pd.to_datetime(df_date['date'], format='mixed')
df_date.head(2)
```

[67]:
```
        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
```

[68]:
```
df_full_bookings['check_in_date'] = pd.
 ↪to_datetime(df_full_bookings['check_in_date'], format='mixed')
df_full_bookings.sample(5)
```

[68]:
```
              booking_id  property_id booking_date check_in_date  \
45373   May312218560RT213        18560     29-05-22    2022-05-31
87732    Jun292218563RT19        18563     27-06-22    2022-06-29
106394   Jul112217561RT16        17561     9/7/2022    2022-11-07
44850    May312216561RT12        16561     28-05-22    2022-05-31
34880   May242217561RT220        17561     21-05-22    2022-05-24

       checkout_date  no_guests room_category booking_platform  ratings_given  \
45373        1/6/2022        2.0           RT2           others            NaN
87732       30-06-22         1.0           RT1     makeyourtrip            5.0
106394      16-07-22         4.0           RT1          tripster           NaN
44850        2/6/2022        2.0           RT1    direct online            3.0
34880       30-05-22         3.0           RT2           others            NaN

       booking_status  revenue_generated  revenue_realized property_name  \
45373       Cancelled               9000              3600    Atliq City
87732     Checked Out               6500              6500  Atliq Palace
106394      Cancelled              13260              5304     Atliq Blu
44850     Checked Out               9100              9100     Atliq Blu
34880       Cancelled              16830              6732     Atliq Blu

        category       city
45373   Business  Hyderabad
87732   Business  Hyderabad
106394    Luxury     Mumbai
```

```
44850     Luxury      Delhi
34880     Luxury     Mumbai
```

[69]:
```
df_full_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  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
```

[70]:
```
df_full_bookings = pd.merge(df_full_bookings, df_date, left_on='check_in_date',␣
↪right_on='date')
```

[71]:
```
df_full_bookings.sample(2)
```

[71]:

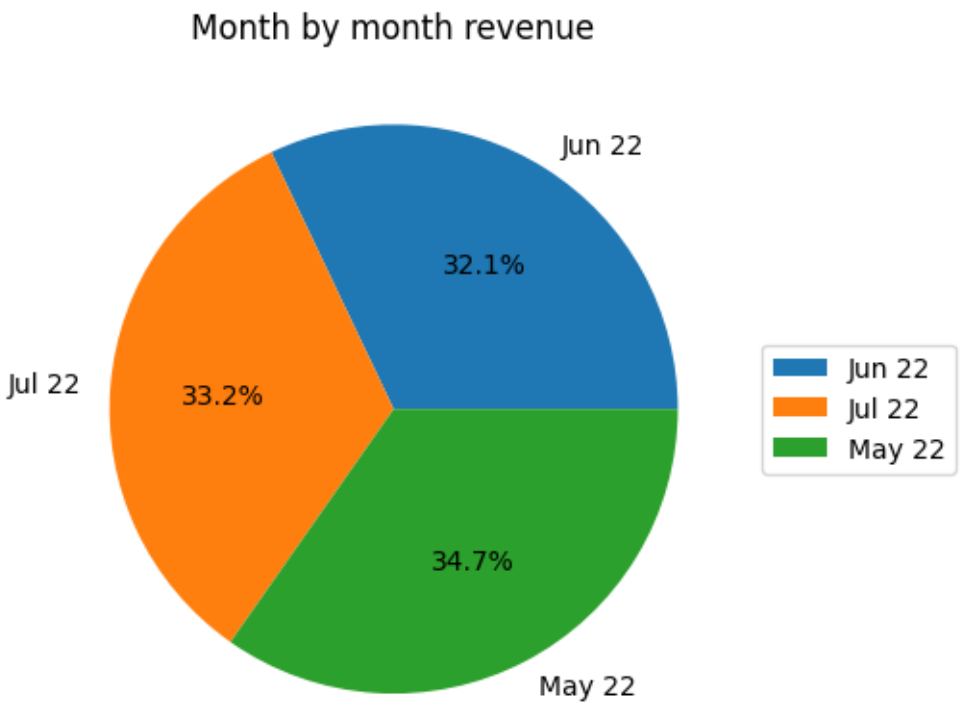
	booking_id	property_id	booking_date	check_in_date	checkout_date	no_guests	room_category	booking_platform	ratings_given	booking_status	revenue_generated	revenue_realized	property_name	category	city	date	mmm yy	week no	day_type
4519	May072219561RT23	19561	7/5/2022	2022-07-05	9/5/2022	4.0	RT2	others	NaN	Cancelled	16200	6480	Atliq Blu	Luxury	Bangalore	2022-07-05	Jul 22	W 28	weekeday
48211	Jun202218560RT24	18560	17-06-22	2022-06-20	21-06-22	4.0	RT2	others	NaN	No Show	10800	10800	Atliq City	Business	Hyderabad	2022-06-20	Jun 22	W 26	weekeday

[72]:
```
# month by month revenue
df_full_bookings.groupby('mmm yy').revenue_realized.sum().sort_values()
```

[72]:
```
mmm yy
Jun 22    377191229
Jul 22    389940912
May 22    408375641
Name: revenue_realized, dtype: int64
```

[79]:
```
#df_full_bookings.groupby('mmm yy').revenue_realized.sum().sort_values().
 ↪plot(kind='pie')
```

[78]:
```
import mpld3

# Group the data and calculate the sum of revenue_realized
grouped_data = df_full_bookings.groupby('mmm yy').revenue_realized.sum().
 ↪sort_values()

# Create a pie chart with matplotlib
fig, ax = plt.subplots()
ax.pie(grouped_data.values, labels=grouped_data.index, autopct='%1.1f%%')

# Add a legend
ax.legend(grouped_data.index, loc="center left", bbox_to_anchor=(1, 0, 0.5, 1))

# Add a tooltip
tooltip = mpld3.plugins.PointLabelTooltip(ax.patches, labels=grouped_data.index)
mpld3.plugins.connect(fig, tooltip)

# Remove x-axis and y-axis titles
ax.set_xlabel('')
ax.set_ylabel('')
ax.set_title('Month by month revenue')

plt.show()
```



g- Revenue by hotel Type

[81]:
```
df_bookings.sample()
```

[81]:
```
              booking_id  property_id booking_date check_in_date  \
87174  Jun292217559RT214        17559     23-06-22      29-06-22

      checkout_date  no_guests room_category booking_platform  ratings_given  \
87174      30-06-22        2.0           RT2          logtrip            NaN

      booking_status  revenue_generated  revenue_realized
87174      Cancelled              15300              6120
```

[82]:
```
df_hotels.sample()
```

[82]:
```
    property_id property_name category       city
18        19558  Atliq Grands   Luxury  Bangalore
```

[83]:
```
df_agg_bookings.sample()
```

[83]:
```
      property_id check_in_date room_category  successful_bookings  capacity  \
5152        19561     21-Jun-22           RT3                   11      29.0
```

```
      occ_pct
5152    37.93
```

[85]:
```
df_full_bookings.sample()
```

[85]:
```
              booking_id  property_id booking_date check_in_date  \
37036  Jun132216559RT311        16559    12/6/2022    2022-06-13

      checkout_date  no_guests room_category booking_platform  ratings_given  \
37036      19-06-22        2.0           RT3           others            NaN

      booking_status  revenue_generated  revenue_realized  property_name  \
37036      Cancelled              20400              8160  Atliq Exotica

      category    city       date  mmm yy week no  day_type
37036   Luxury  Mumbai 2022-06-13  Jun 22    W 25  weekeday
```

[87]:
```
df_full_bookings.groupby('room_category').revenue_realized.sum().sort_values()
```

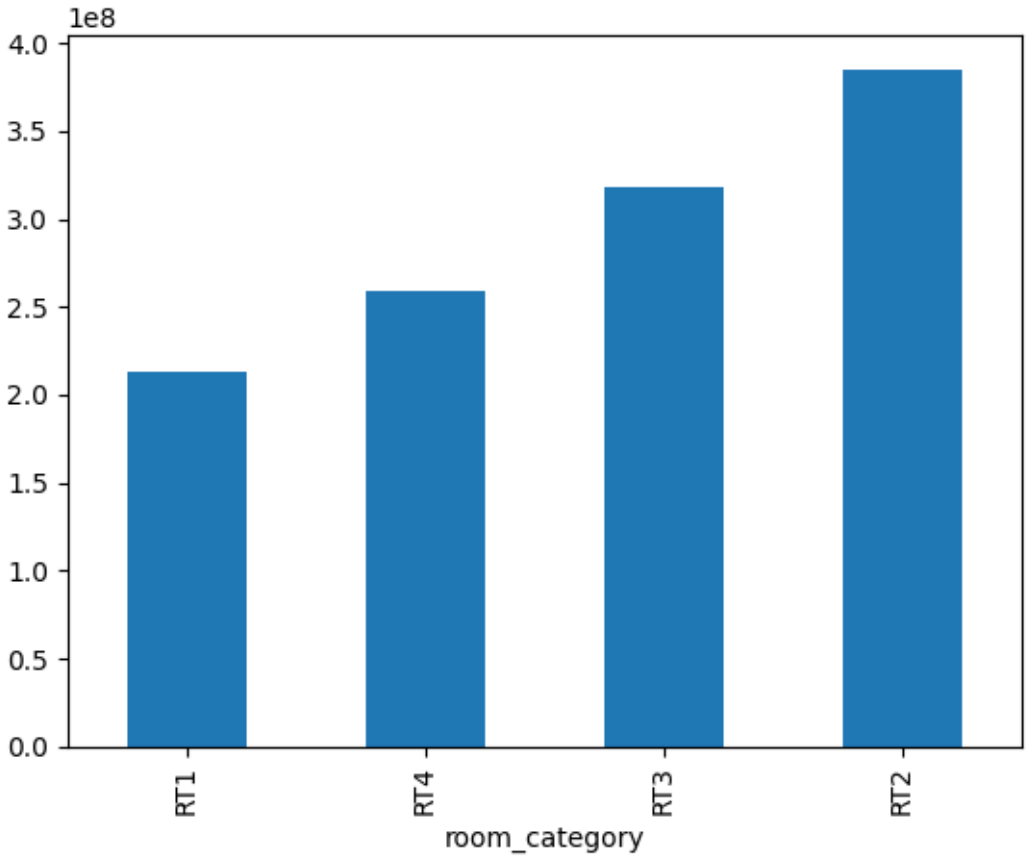
[87]:
```
room_category
RT1    212879394
RT4    258867172
RT3    318622920
RT2    385138296
Name: revenue_realized, dtype: int64
```

[89]:
```
df_full_bookings.groupby('room_category').revenue_realized.sum().sort_values().
  ↪apply(amount_to_million)
```

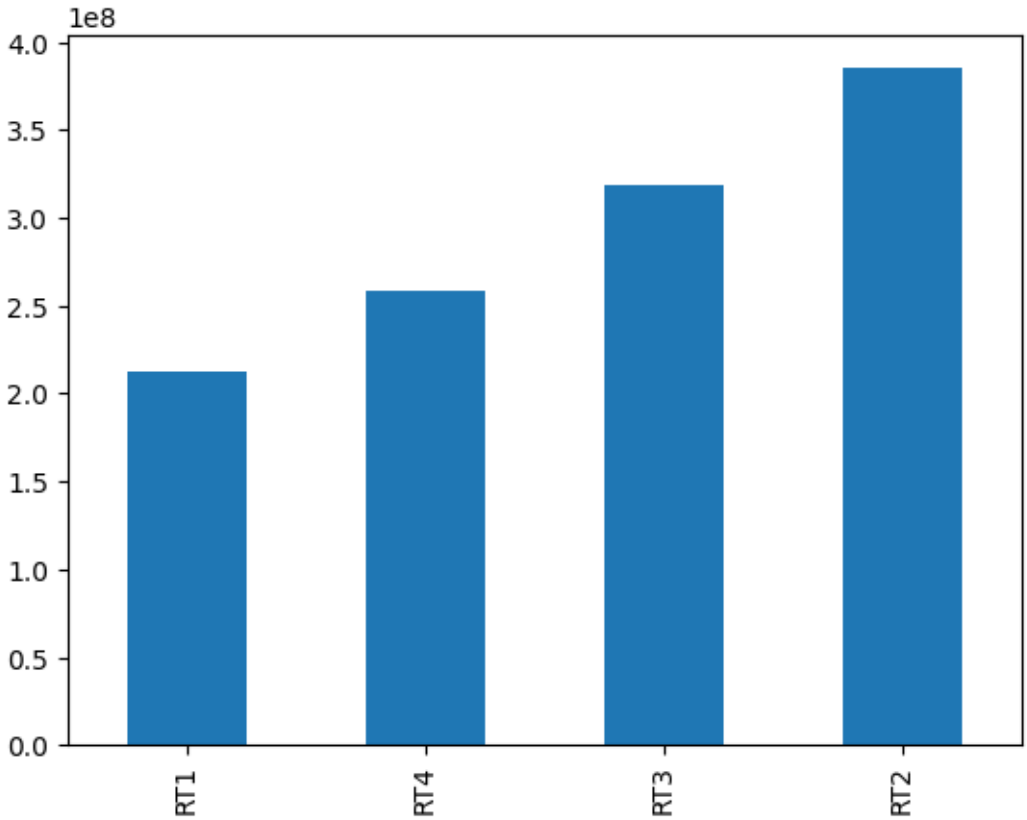
[89]:
```
room_category
RT1    212.88 M
RT4    258.87 M
RT3    318.62 M
RT2    385.14 M
Name: revenue_realized, dtype: object
```

[91]:
```
df_full_bookings.groupby('room_category').revenue_realized.sum().sort_values().
  ↪plot(kind='bar')
```

[91]:
```
<Axes: xlabel='room_category'>
```

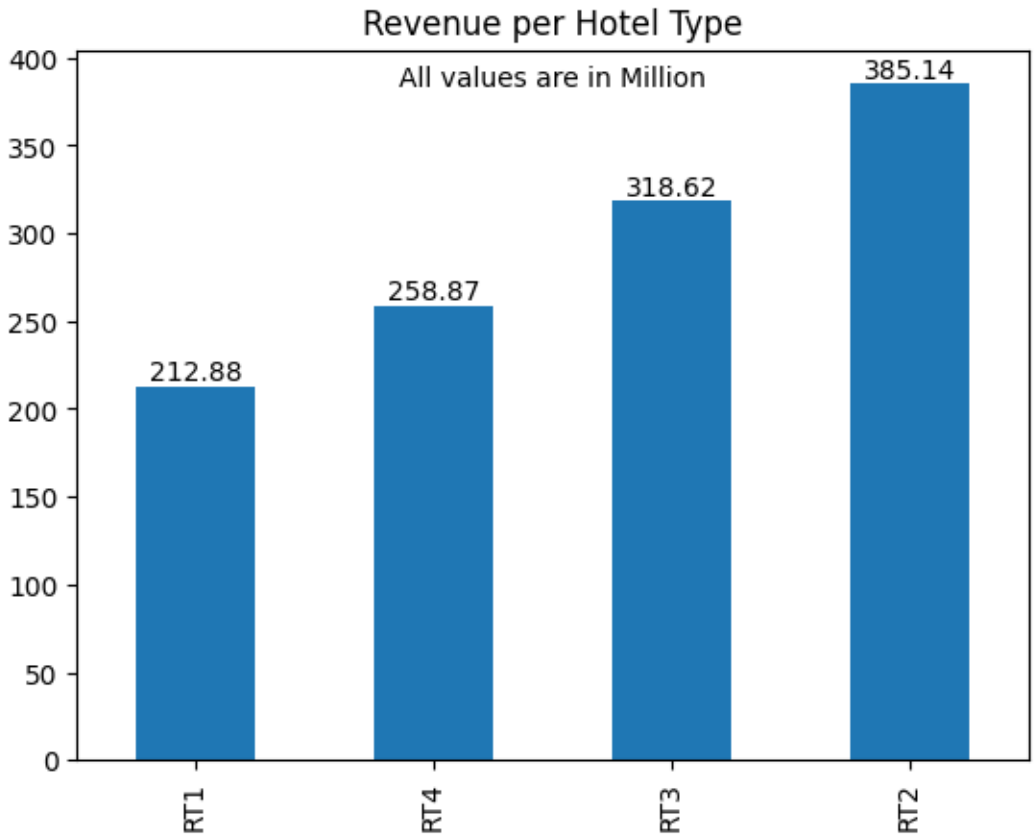


[93]:
```
import mplcursors

# Group the data and calculate the sum of revenue_realized
grouped_data = df_full_bookings.groupby('room_category').revenue_realized.sum().
  ↪sort_values()

# Create a bar plot with pandas
ax = grouped_data.plot(kind='bar')

# Add tooltips to the plot
mplcursors.cursor(hover=True)

# Remove x-axis and y-axis titles
ax.set_xlabel('')
ax.set_ylabel('')

plt.show()
```



[98]:
```
# Group the data and calculate the sum of revenue_realized
grouped_data = df_full_bookings.groupby('room_category').revenue_realized.sum().
 ↪sort_values().apply(amount_to_million)

# Create a bar plot with pandas
ax = grouped_data.plot(kind='bar')

# Add value labels to the bars
for i, v in enumerate(grouped_data.values):
    ax.text(i, v, f'{v}', ha='center', va='bottom')

# Add a comment to the plot
ax.text(0.5, 0.95, 'All values are in Million', transform=ax.transAxes,␣
 ↪fontsize=10, ha='center')

# Remove x-axis and y-axis titles
ax.set_xlabel('')
ax.set_ylabel('')
ax.set_title('Revenue per Hotel Type')
```

```
plt.show()
```



h- Average rating by City

[99]:
```
df_full_bookings.sample()
```

[99]:
```
              booking_id  property_id booking_date check_in_date  \
77693  Jul202219559RT110        19559     19-07-22    2022-07-20

      checkout_date  no_guests room_category booking_platform  ratings_given  \
77693      21-07-22        3.0           RT1    direct online            NaN

      booking_status  revenue_generated  revenue_realized  property_name  \
77693      Cancelled              10725              4290  Atliq Exotica

      category       city       date  mmm yy week no  day_type
77693   Luxury  Bangalore 2022-07-20  Jul 22    W 30  weekeday
```

[100]:
```
df_full_bookings.groupby('city').ratings_given.mean()
```

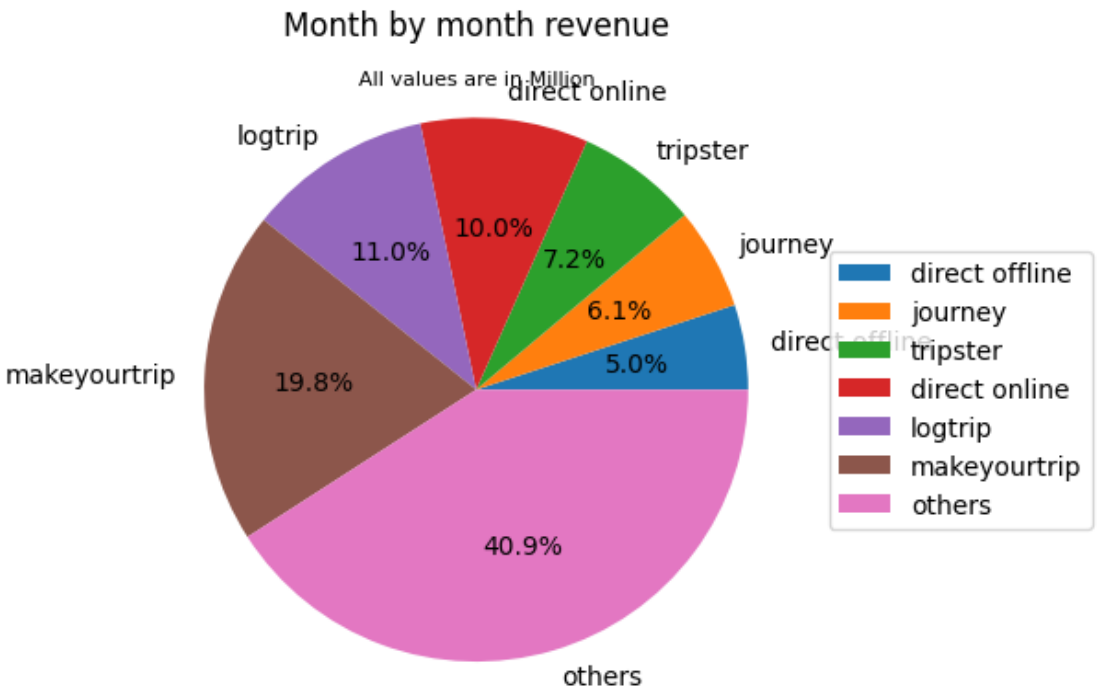
[100]:
```
city
Bangalore    3.403911
Delhi        3.775088
Hyderabad    3.664286
Mumbai       3.644350
Name: ratings_given, dtype: float64
```

i- Pie chart of revenue realized per booking platform

[103]:
```
df_full_bookings.groupby('booking_platform').revenue_realized.sum().
 ↪apply(amount_to_million)
```

[103]:
```
booking_platform
direct offline     59.30
direct online     117.25
journey            71.23
logtrip           129.04
makeyourtrip      233.13
others            480.70
tripster           84.87
Name: revenue_realized, dtype: float64
```

[110]:
```
# Group the data and calculate the sum of revenue_realized
grouped_data = df_full_bookings.groupby('booking_platform').revenue_realized.
 ↪sum().sort_values()

# Create a pie chart with matplotlib
fig, ax = plt.subplots()
ax.pie(grouped_data.values, labels=grouped_data.index, autopct='%1.1f%%')

# Add a legend
ax.legend(grouped_data.index, loc="center left", bbox_to_anchor=(1, 0, 0.5, 1))

# Add a tooltip
tooltip = mpld3.plugins.PointLabelTooltip(ax.patches, labels=grouped_data.index)
mpld3.plugins.connect(fig, tooltip)

ax.text(0.5, 0.95, 'All values are in Million', transform=ax.transAxes,␣
 ↪fontsize=8, ha='center')

# Remove x-axis and y-axis titles
ax.set_xlabel('')
ax.set_ylabel('')
ax.set_title('Month by month revenue')

plt.show()
```


Month by month revenue
All values are in Million
direct online
logtrip
tripster
journey
direct offline
makeyourtrip
others
10.0%
11.0%
7.2%
6.1%
5.0%
19.8%
40.9%
direct offline
journey
tripster
direct online
logtrip
makeyourtrip
others

[ ]: