AtliQ_Hotel_Data_analysis

May 16, 2024

AtliQ Hotels Data Analysis

[94]:
```
import pandas as pd
```

0.0.1 ==> 1. Data Import and Data Exploration

0.0.2 Datasets

We have 5 csv file

- dim_date.csv

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

Read bookings data in a datagrame

[95]:
```
df_bookings = pd.read_csv('datasets/fact_bookings.csv')
```

Explore bookings data

[96]:
```
df_bookings.head()
```

[96]:
```
          booking_id  property_id booking_date check_in_date checkout_date  \
0  May012216558RT11        16558     27-04-22      1/5/2022      2/5/2022
1  May012216558RT12        16558     30-04-22      1/5/2022      2/5/2022
2  May012216558RT13        16558     28-04-22      1/5/2022      4/5/2022
3  May012216558RT14        16558     28-04-22      1/5/2022      2/5/2022
4  May012216558RT15        16558     27-04-22      1/5/2022      2/5/2022

   no_guests room_category booking_platform  ratings_given booking_status  \
0       -3.0           RT1   direct online            1.0    Checked Out
1        2.0           RT1          others            NaN      Cancelled
2        2.0           RT1         logtrip            5.0    Checked Out
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
```

```
[97]: df_bookings.shape
```

```
[97]: (134590, 12)
```

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

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

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

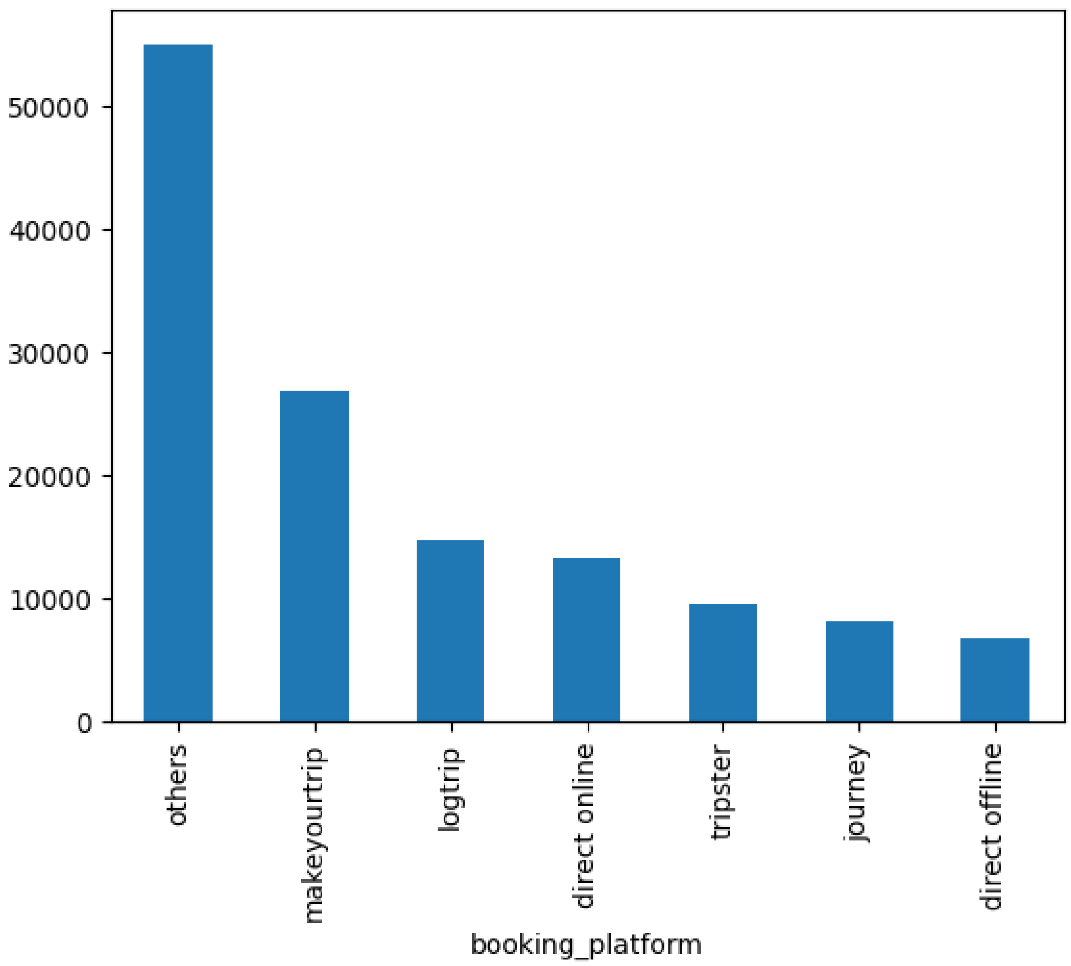
```
[99]: array(['direct online', 'others', 'logtrip', 'tripster', 'makeyourtrip',
             'journey', 'direct offline'], dtype=object)
```

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

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

```
[101]: df_bookings.booking_platform.value_counts().plot(kind="bar")
```

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



[102]:
```
df_bookings.describe()
```

[102]:
```
         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
```

Read rest of the files

```
[103]: 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')
```

```
[104]: df_hotels.shape
```

```
[104]: (25, 4)
```

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

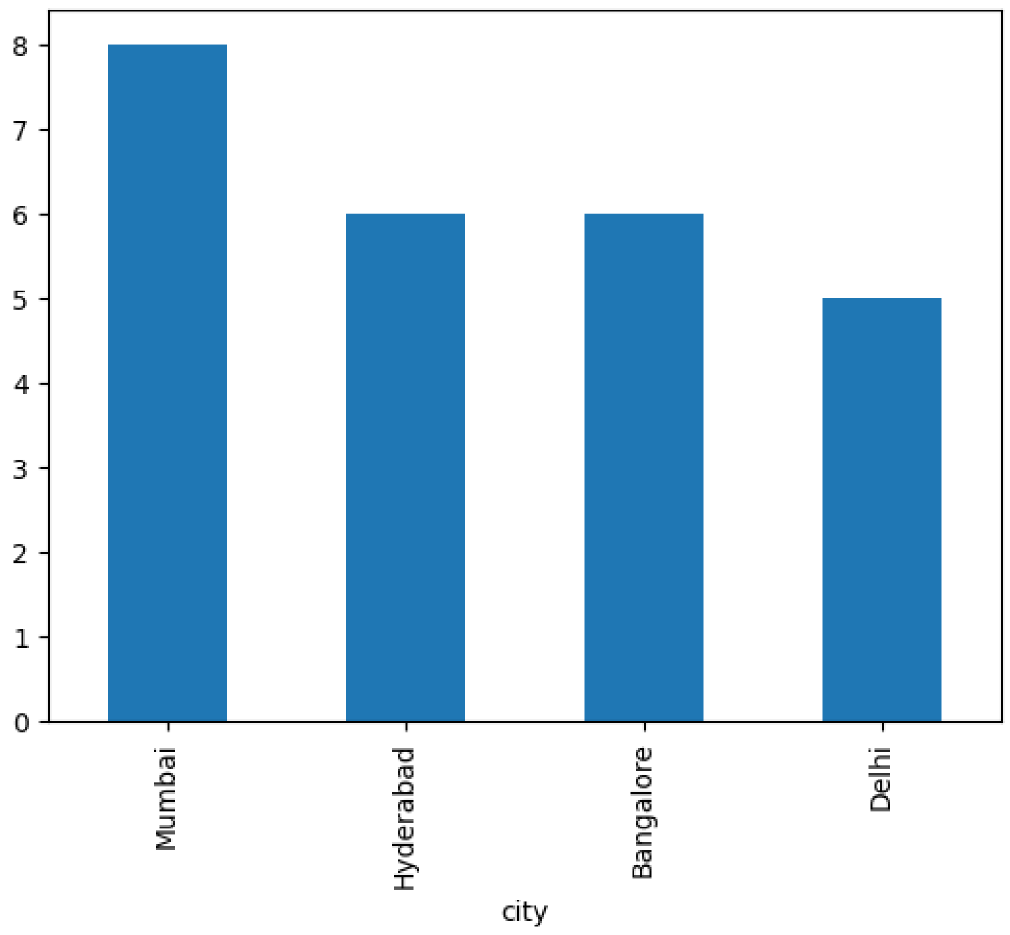
```
[105]:    property_id  property_name  category    city
       0        16558   Atliq Grands    Luxury   Delhi
       1        16559  Atliq Exotica    Luxury  Mumbai
       2        16560     Atliq City  Business   Delhi
```

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

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

```
[107]: df_hotels.city.value_counts().plot(kind="bar")
```

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



Explore aggregate bookings ***

[15]:
```
df_agg_bookings.head(3)
```

[15]:
```
   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
```

Find out unique property ids in aggregate bookings dataset

[16]:
```
df_agg_bookings.property_id.unique()
```

[16]:
```
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)
```

Find out total bookings per property_id

```
[17]: df_agg_bookings.groupby("property_id")["successful_bookings"].sum()
```

```
[17]: property_id
      16558    3153
      16559    7338
      16560    4693
      16561    4418
      16562    4820
      16563    7211
      17558    5053
      17559    6142
      17560    6013
      17561    5183
      17562    3424
      17563    6337
      17564    3982
      18558    4475
      18559    5256
      18560    6638
      18561    6458
      18562    7333
      18563    4737
      19558    4400
      19559    4729
      19560    6079
      19561    5736
      19562    5812
      19563    5413
      Name: successful_bookings, dtype: int64
```

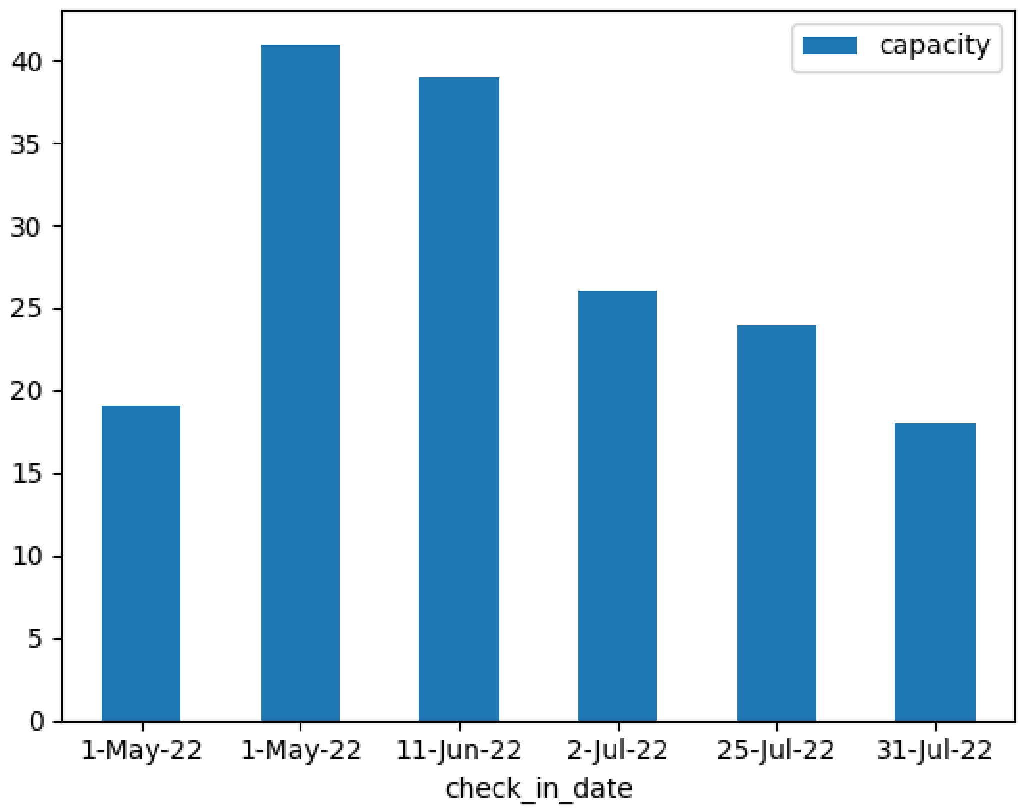
Find out days on which bookings are greater than capacity

```
[18]: df_agg_bookings[df_agg_bookings.successful_bookings>df_agg_bookings.capacity]
```

```
[18]:       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
```

```
[109]: df_agg_bookings[df_agg_bookings.successful_bookings>df_agg_bookings.capacity].
         ↪plot.bar(x="check_in_date",y="capacity", rot=0)
```

```
[109]: <Axes: xlabel='check_in_date'>
```



Exercise-4. Find out properties that have highest capacity

```
[110]: df_agg_bookings.capacity.max()
```

```
[110]: 50.0
```

```
[111]: df_agg_bookings[df_agg_bookings.capacity==df_agg_bookings.capacity.max()]
```

```
[111]:       property_id check_in_date room_category  successful_bookings  capacity
      27          17558      1-May-22           RT2                   38      50.0
      128         17558      2-May-22           RT2                   27      50.0
      229         17558      3-May-22           RT2                   26      50.0
      328         17558      4-May-22           RT2                   27      50.0
      428         17558      5-May-22           RT2                   29      50.0
      …             …            …          …                    …        …
      8728        17558     27-Jul-22           RT2                   22      50.0
      8828        17558     28-Jul-22           RT2                   21      50.0
      8928        17558     29-Jul-22           RT2                   23      50.0
      9028        17558     30-Jul-22           RT2                   32      50.0
      9128        17558     31-Jul-22           RT2                   30      50.0
```

```
[92 rows x 5 columns]
```

0.0.3 ==> 2. Data Cleaning

---

[112]:
```
df_bookings.describe()
```

[112]:
```
         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
```

(1) Clean invalid guests

[113]:
```
df_bookings[df_bookings.no_guests<=0]
```

[113]:
```
                 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
```

As you can see above, number of guests having less than zero value represents data error. We can ignore these records.

[114]:
```
df_bookings = df_bookings[df_bookings.no_guests>0]
```

[115]:
```
df_bookings.shape
```

[115]:
```
(134578, 12)
```

(2) Outlier removal in revenue generated

[116]:
```
df_bookings.revenue_generated.min(), df_bookings.revenue_generated.max()
```

[116]:
```
(6500, 28560000)
```

[117]:
```
df_bookings.revenue_generated.mean(), df_bookings.revenue_generated.median()
```

[117]:
```
(15378.036937686695, 13500.0)
```

[118]:
```
avg, std = df_bookings.revenue_generated.mean(), df_bookings.revenue_generated.
 ↪std()
```

[119]:
```
higher_limit = avg + 3*std
higher_limit
```

[119]:
```
294498.50173207896
```

[120]:
```
lower_limit = avg - 3*std
lower_limit
```

[120]:
```
-263742.4278567056
```

[121]:
```
df_bookings[df_bookings.revenue_generated<=0]
```

[121]:
```
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]
Index: []
```

[122]:
```
df_bookings[df_bookings.revenue_generated>higher_limit]
```

[122]:
```
                 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
```

[123]:
```
df_bookings = df_bookings[df_bookings.revenue_generated<=higher_limit]
df_bookings.shape
```

[123]:
```
(134573, 12)
```

[124]:
```
df_bookings.revenue_realized.describe()
```

[124]:
```
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
```

```
[125]: higher_limit = df_bookings.revenue_realized.mean() + 3*df_bookings.
         ↪revenue_realized.std()
       higher_limit
```

```
[125]: 33479.358661845814
```

```
[126]: df_bookings[df_bookings.revenue_realized>higher_limit]
```

```
[126]:              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]
```

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

[127]:
```
df_bookings[df_bookings.room_category=="RT4"].revenue_realized.describe()
```

[127]:
```
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
```

[128]:
```
# mean + 3*standard deviation
23439+3*9048
```

[128]:
```
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

[129]:
```
df_bookings[df_bookings.booking_id=="May012216558RT213"]
```

[129]:
```
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]
Index: []
```

[130]:
```
df_bookings.isnull().sum()
```

[130]:
```
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 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

```
[ ]:
```

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)

```
[131]: df_agg_bookings.isnull().sum()
```

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

```
[132]: df_agg_bookings[df_agg_bookings.capacity.isna()]
```

```
[132]:     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
```

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

```
[133]: 25.0
```

```
[134]: df_agg_bookings.capacity.fillna(df_agg_bookings.capacity.median(), inplace=True)
```

```
C:\Users\hp\AppData\Local\Temp\ipykernel_6192\625765049.py:1: FutureWarning: A
value is trying to be set on a copy of a DataFrame or Series through chained
assignment using an inplace method.
The behavior will change in pandas 3.0. This inplace method will never work
because the intermediate object on which we are setting values always behaves as
a copy.

For example, when doing 'df[col].method(value, inplace=True)', try using
'df.method({col: value}, inplace=True)' or df[col] = df[col].method(value)
instead, to perform the operation inplace on the original object.


  df_agg_bookings.capacity.fillna(df_agg_bookings.capacity.median(),
inplace=True)
```

```
[135]: df_agg_bookings.loc[[8,15]]
```

[135]:
```
    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
```

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

[136]:
```
df_agg_bookings[df_agg_bookings.successful_bookings>df_agg_bookings.capacity]
```

[136]:
```
      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
```

[46]:
```
df_agg_bookings.shape
```

[46]:
```
(9200, 5)
```

[137]:
```
df_agg_bookings = df_agg_bookings[df_agg_bookings.
 ↪successful_bookings<=df_agg_bookings.capacity]
df_agg_bookings.shape
```

[137]:
```
(9194, 5)
```

[ ]:
```

```

0.0.4 ==> 3. Data Transformation

Create occupancy percentage column

[138]:
```
df_agg_bookings.head(3)
```

[138]:
```
   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
```

[139]:
```
df_agg_bookings['occ_pct'] = df_agg_bookings.apply(lambda row:␣
 ↪row['successful_bookings']/row['capacity'], axis=1)
```

You can use following approach to get rid of SettingWithCopyWarning

```
[140]: new_col = df_agg_bookings.apply(lambda row: row['successful_bookings']/
        ↪row['capacity'], axis=1)
       df_agg_bookings = df_agg_bookings.assign(occ_pct=new_col.values)
       df_agg_bookings.head(3)
```

```
[140]:    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

```
[141]: df_agg_bookings['occ_pct'] = df_agg_bookings['occ_pct'].apply(lambda x:␣
        ↪round(x*100, 2))
       df_agg_bookings.head(3)
```

```
[141]:    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
```

```
[142]: df_bookings.head()
```

```
[142]:          booking_id  property_id booking_date check_in_date checkout_date  \
       1  May012216558RT12        16558     30-04-22      1/5/2022      2/5/2022
       4  May012216558RT15        16558     27-04-22      1/5/2022      2/5/2022
       5  May012216558RT16        16558     1/5/2022      1/5/2022      3/5/2022
       6  May012216558RT17        16558     28-04-22      1/5/2022      6/5/2022
       7  May012216558RT18        16558     26-04-22      1/5/2022      3/5/2022

          no_guests room_category booking_platform  ratings_given booking_status  \
       1        2.0           RT1           others            NaN      Cancelled
       4        4.0           RT1    direct online            5.0    Checked Out
       5        2.0           RT1           others            4.0    Checked Out
       6        2.0           RT1           others            NaN      Cancelled
       7        2.0           RT1          logtrip            NaN        No Show

          revenue_generated  revenue_realized
```

```
1            9100          3640
4           10920         10920
5            9100          9100
6            9100          3640
7            9100          9100
```

[143]:
```
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
```

0.0.5 ==> 4. Insights Generation

---

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

[144]:
```
df_agg_bookings.head(3)
```

[144]:
```
   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
```

[145]:
```
df_agg_bookings.groupby("room_category")["occ_pct"].mean()
```

[145]:
```
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

```
[146]: df = pd.merge(df_agg_bookings, df_rooms, left_on="room_category",␣
        ↪right_on="room_id")
       df.head(4)
```

```
[146]:    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

          occ_pct room_id room_class
       0    83.33     RT1   Standard
       1    93.33     RT1   Standard
       2    76.67     RT1   Standard
       3    94.74     RT1   Standard
```

```
[147]: df.drop("room_id",axis=1, inplace=True)
       df.head(4)
```

```
[147]:    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

          occ_pct room_class
       0    83.33   Standard
       1    93.33   Standard
       2    76.67   Standard
       3    94.74   Standard
```

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

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

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

```
[149]: 57.88964285714285
```

2. Print average occupancy rate per city

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

```
[150]:    property_id  property_name  category    city
       0        16558   Atliq Grands    Luxury   Delhi
       1        16559  Atliq Exotica    Luxury  Mumbai
       2        16560     Atliq City  Business   Delhi
```

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

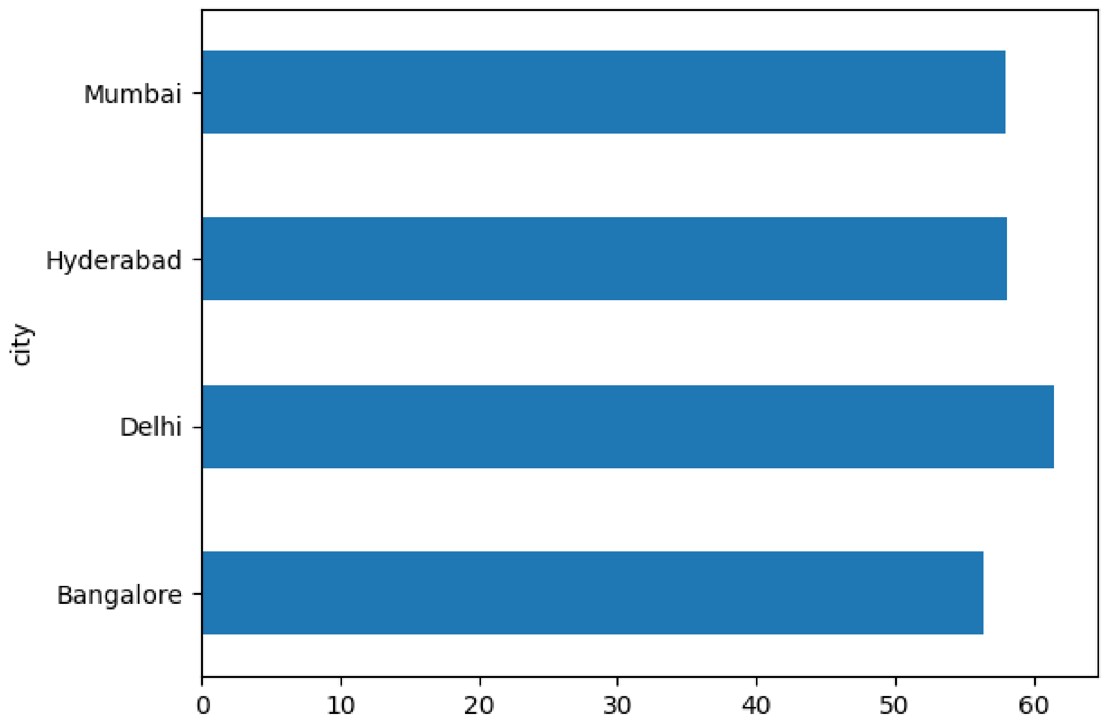
```
[151]:    property_id check_in_date room_category  successful_bookings  capacity  \
       0        16559       1-May-22           RT1                   25      30.0
       1        19562       1-May-22           RT1                   28      30.0
       2        19563       1-May-22           RT1                   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
```

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

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

```
[156]: df.groupby("city")["occ_pct"].mean().plot(kind="barh")
```

```
[156]: <Axes: ylabel='city'>
```



```
[ ]:
```

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

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

```
[157]:         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
```

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

```
[158]:    property_id check_in_date room_category  successful_bookings  capacity  \
       0        19563     10-May-22           RT3                   15      29.0
       1        18560     10-May-22           RT1                   19      30.0
       2        19562     10-May-22           RT1                   18      30.0

          occ_pct room_class property_name  category       city       date  mmm yy  \
       0    51.72    Premium  Atliq Palace  Business  Bangalore  10-May-22  May 22
       1    63.33   Standard    Atliq City  Business  Hyderabad  10-May-22  May 22
       2    60.00   Standard     Atliq Bay    Luxury  Bangalore  10-May-22  May 22
```

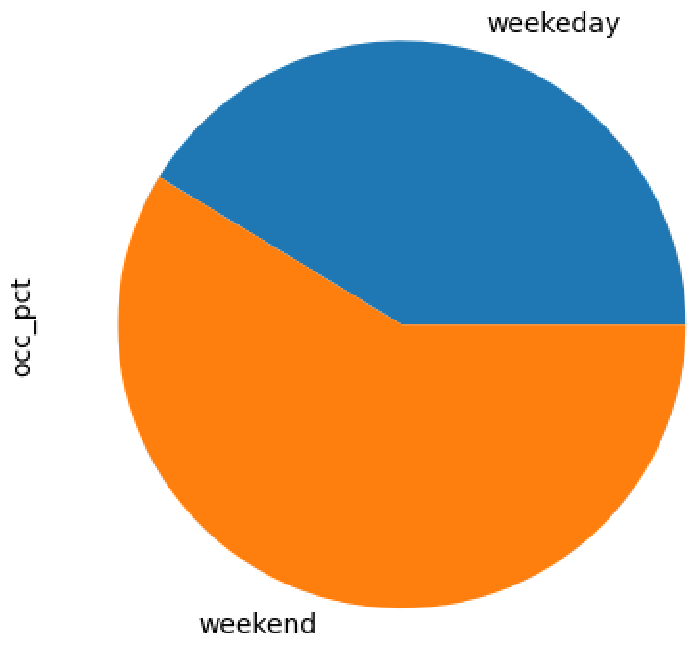
```
  week no  day_type
0    W 20  weekeday
1    W 20  weekeday
2    W 20  weekeday
```

[159]:
```
df.groupby("day_type")["occ_pct"].mean().round(2)
```

[159]:
```
day_type
weekeday    50.88
weekend     72.34
Name: occ_pct, dtype: float64
```

[160]:
```
df.groupby("day_type")["occ_pct"].mean().round(2).plot(kind="pie")
```

[160]:
```
<Axes: ylabel='occ_pct'>
```



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

[161]:
```
df_june_22 = df[df["mmm yy"]=="Jun 22"]
df_june_22.head(4)
```

[161]:
```
      property_id check_in_date room_category  successful_bookings  capacity  \
2200        16559     10-Jun-22           RT1                   20      30.0
2201        19562     10-Jun-22           RT1                   19      30.0
```

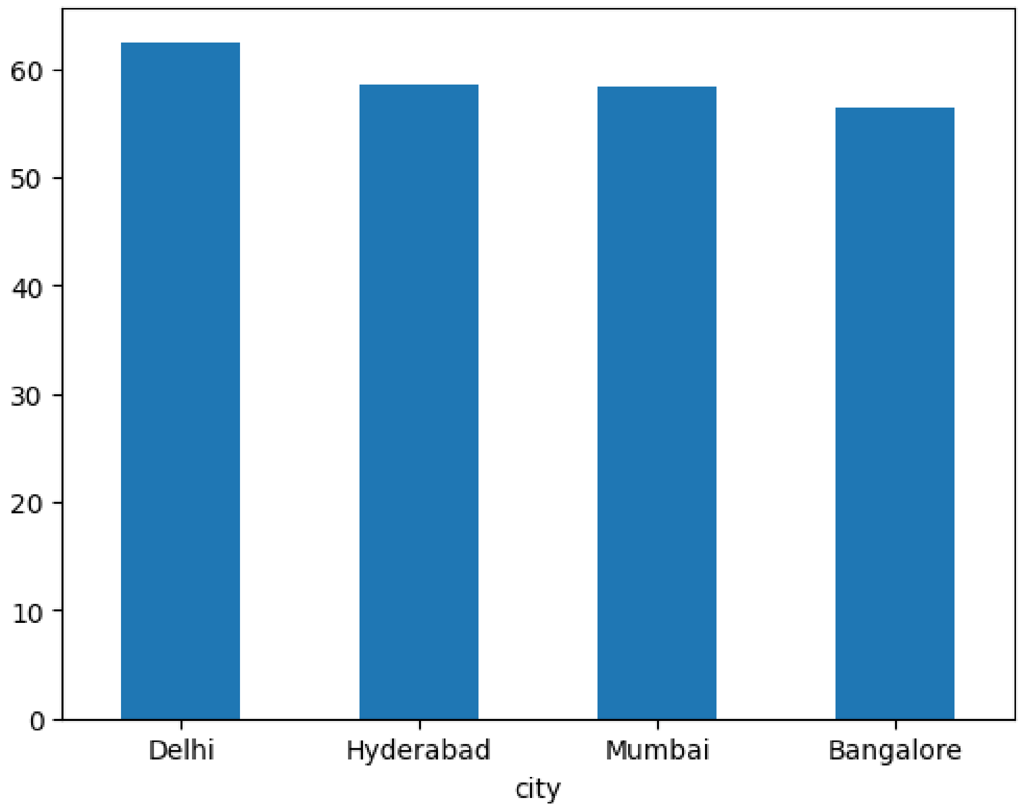
```
2202        19563     10-Jun-22           RT1                  17      30.0
2203        17558     10-Jun-22           RT1                   9      19.0

      occ_pct room_class  property_name  category       city       date  \
2200    66.67   Standard  Atliq Exotica    Luxury     Mumbai  10-Jun-22
2201    63.33   Standard      Atliq Bay    Luxury  Bangalore  10-Jun-22
2202    56.67   Standard   Atliq Palace  Business  Bangalore  10-Jun-22
2203    47.37   Standard   Atliq Grands    Luxury     Mumbai  10-Jun-22

      mmm yy week no  day_type
2200  Jun 22    W 24  weekeday
2201  Jun 22    W 24  weekeday
2202  Jun 22    W 24  weekeday
2203  Jun 22    W 24  weekeday
```

[162]:
```
df_june_22.groupby('city')['occ_pct'].mean().round(2).
 ↪sort_values(ascending=False)
```

[162]:
```
city
Delhi        62.47
Hyderabad    58.46
Mumbai       58.38
Bangalore    56.44
Name: occ_pct, dtype: float64
```

[190]:
```
df_june_22.groupby('city')['occ_pct'].mean().round(2).
 ↪sort_values(ascending=False).plot(kind="bar",rot=0)
```

[190]:
```
<Axes: xlabel='city'>
```



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

[164]:
```
df_august = pd.read_csv("datasets/new_data_august.csv")
df_august.head(3)
```

[164]:
```
   property_id  property_name  category       city room_category room_class  \
0        16559  Atliq Exotica    Luxury     Mumbai           RT1   Standard
1        19562      Atliq Bay    Luxury  Bangalore           RT1   Standard
2        19563   Atliq Palace  Business  Bangalore           RT1   Standard

  check_in_date  mmm yy week no  day_type  successful_bookings  capacity  \
0     01-Aug-22  Aug-22    W 32  weekeday                   30        30
1     01-Aug-22  Aug-22    W 32  weekeday                   21        30
2     01-Aug-22  Aug-22    W 32  weekeday                   23        30

     occ%
0  100.00
1   70.00
2   76.67
```

[165]:
```
df_august.columns
```

```
[165]: 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')
```

```
[166]: df.columns
```

```
[166]: 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')
```

```
[167]: df_august.shape
```

```
[167]: (7, 13)
```

```
[168]: df.shape
```

```
[168]: (6497, 14)
```

```
[169]: latest_df = pd.concat([df, df_august], ignore_index = True, axis = 0)
       latest_df.tail(10)
```

```
[169]:       property_id check_in_date room_category  successful_bookings  capacity  \
       6494        17558     31-Jul-22           RT4                    3       6.0
       6495        19563     31-Jul-22           RT4                    3       6.0
       6496        17561     31-Jul-22           RT4                    3       4.0
       6497        16559     01-Aug-22           RT1                   30      30.0
       6498        19562     01-Aug-22           RT1                   21      30.0
       6499        19563     01-Aug-22           RT1                   23      30.0
       6500        19558     01-Aug-22           RT1                   30      40.0
       6501        19560     01-Aug-22           RT1                   20      26.0
       6502        17561     01-Aug-22           RT1                   18      26.0
       6503        17564     01-Aug-22           RT1                   10      16.0

             occ_pct    room_class property_name  category       city       date  \
       6494     50.0  Presidential  Atliq Grands    Luxury     Mumbai  31-Jul-22
       6495     50.0  Presidential  Atliq Palace  Business  Bangalore  31-Jul-22
       6496     75.0  Presidential     Atliq Blu    Luxury     Mumbai  31-Jul-22
       6497      NaN      Standard Atliq Exotica    Luxury     Mumbai        NaN
       6498      NaN      Standard     Atliq Bay    Luxury  Bangalore        NaN
       6499      NaN      Standard  Atliq Palace  Business  Bangalore        NaN
       6500      NaN      Standard  Atliq Grands    Luxury  Bangalore        NaN
       6501      NaN      Standard    Atliq City  Business  Bangalore        NaN
       6502      NaN      Standard     Atliq Blu    Luxury     Mumbai        NaN
       6503      NaN      Standard Atliq Seasons  Business     Mumbai        NaN

             mmm yy week no  day_type    occ%
```

```
6494   Jul 22    W 32   weekend      NaN
6495   Jul 22    W 32   weekend      NaN
6496   Jul 22    W 32   weekend      NaN
6497   Aug-22    W 32  weekeday  100.00
6498   Aug-22    W 32  weekeday   70.00
6499   Aug-22    W 32  weekeday   76.67
6500   Aug-22    W 32  weekeday   75.00
6501   Aug-22    W 32  weekeday   76.92
6502   Aug-22    W 32  weekeday   69.23
6503   Aug-22    W 32  weekeday   62.50
```

[170]:
```
latest_df.shape
```

[170]:
```
(6504, 15)
```

Check this post for codebasics resume project challange winner entry: https://www.linkedin.com/posts/ashishbabaria_codebasicsresumeprojectchallenge-data-powerbi-activity-6977940034414886914-dmoJ?utm_source=share&utm_medium=member_desktop

6. Print revenue realized per city

[171]:
```
df_bookings.head()
```

[171]:
```
         booking_id  property_id booking_date check_in_date checkout_date  \
1  May012216558RT12        16558     30-04-22      1/5/2022      2/5/2022
4  May012216558RT15        16558     27-04-22      1/5/2022      2/5/2022
5  May012216558RT16        16558     1/5/2022      1/5/2022      3/5/2022
6  May012216558RT17        16558     28-04-22      1/5/2022      6/5/2022
7  May012216558RT18        16558     26-04-22      1/5/2022      3/5/2022

   no_guests room_category booking_platform  ratings_given booking_status  \
1        2.0           RT1           others            NaN      Cancelled
4        4.0           RT1    direct online            5.0    Checked Out
5        2.0           RT1           others            4.0    Checked Out
6        2.0           RT1           others            NaN      Cancelled
7        2.0           RT1          logtrip            NaN        No Show

   revenue_generated  revenue_realized
1               9100              3640
4              10920             10920
5               9100              9100
6               9100              3640
7               9100              9100
```

[172]:
```
df_hotels.head(3)
```

[172]:
```
   property_id  property_name  category   city
0        16558   Atliq Grands    Luxury  Delhi
```

```
1        16559  Atliq Exotica    Luxury  Mumbai
2        16560     Atliq City  Business   Delhi
```

[173]:
```
df_bookings_all = pd.merge(df_bookings, df_hotels, on="property_id")
df_bookings_all.head(3)
```

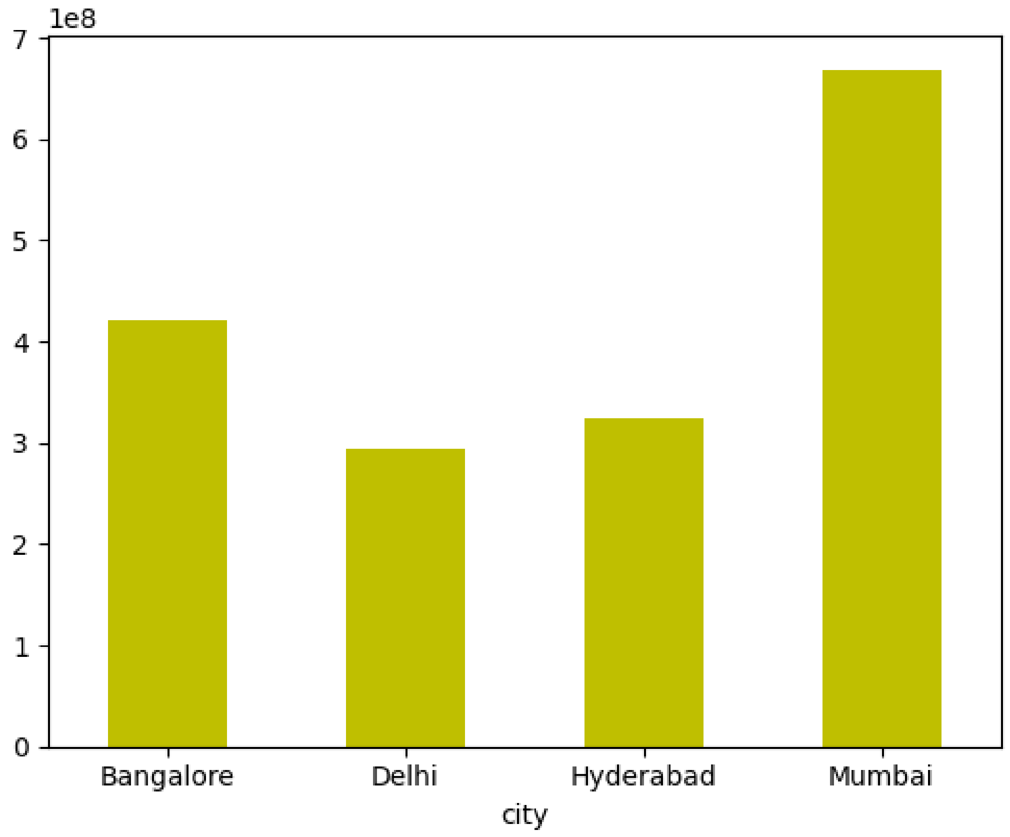
[173]:
```
        booking_id  property_id booking_date check_in_date checkout_date  \
0  May012216558RT12        16558     30-04-22      1/5/2022      2/5/2022
1  May012216558RT15        16558     27-04-22      1/5/2022      2/5/2022
2  May012216558RT16        16558     1/5/2022      1/5/2022      3/5/2022

   no_guests room_category booking_platform  ratings_given booking_status  \
0        2.0           RT1           others            NaN      Cancelled
1        4.0           RT1    direct online            5.0    Checked Out
2        2.0           RT1           others            4.0    Checked Out

   revenue_generated  revenue_realized property_name category   city
0               9100              3640  Atliq Grands   Luxury  Delhi
1              10920             10920  Atliq Grands   Luxury  Delhi
2               9100              9100  Atliq Grands   Luxury  Delhi
```

[174]:
```
df_bookings_all.groupby("city")["revenue_realized"].sum()
```

[174]:
```
city
Bangalore    420383550
Delhi        294404488
Hyderabad    325179310
Mumbai       668569251
Name: revenue_realized, dtype: int64
```

[175]:
```
df_bookings_all.groupby("city")["revenue_realized"].sum().
  ↪plot(kind="bar",color="y",rot=0)
```

[175]:
```
<Axes: xlabel='city'>
```



7. Print month by month revenue

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

```
[176]:         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
```

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

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

```
[178]: df_bookings_all.head(3)
```

```
[178]:          booking_id  property_id booking_date check_in_date checkout_date  \
       0  May012216558RT12        16558     30-04-22      1/5/2022      2/5/2022
       1  May012216558RT15        16558     27-04-22      1/5/2022      2/5/2022
       2  May012216558RT16        16558     1/5/2022      1/5/2022      3/5/2022

          no_guests room_category booking_platform  ratings_given booking_status  \
0        2.0           RT1           others            NaN     Cancelled
1        4.0           RT1    direct online            5.0   Checked Out
2        2.0           RT1           others            4.0   Checked Out

   revenue_generated  revenue_realized property_name category   city
0               9100              3640  Atliq Grands   Luxury  Delhi
1              10920             10920  Atliq Grands   Luxury  Delhi
2               9100              9100  Atliq Grands   Luxury  Delhi
```

[179]:
```
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
```

[180]:
```
df_date["date"] = pd.to_datetime(df_date["date"])
df_date.head(3)
```

```
C:\Users\hp\AppData\Local\Temp\ipykernel_6192\173964601.py:1: UserWarning: Could
not infer format, so each element will be parsed individually, falling back to
`dateutil`. To ensure parsing is consistent and as-expected, please specify a
format.
  df_date["date"] = pd.to_datetime(df_date["date"])
```

[180]:
```
        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
```

[181]:
```
df_bookings_all.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
```

```
[182]: df_bookings_all["check_in_date"] = pd.
        ↪to_datetime(df_bookings_all["check_in_date"],format="mixed")
       df_bookings_all.head(4)
```

```
[182]:          booking_id  property_id booking_date check_in_date checkout_date  \
       0  May012216558RT12        16558     30-04-22    2022-01-05      2/5/2022
       1  May012216558RT15        16558     27-04-22    2022-01-05      2/5/2022
       2  May012216558RT16        16558     1/5/2022    2022-01-05      3/5/2022
       3  May012216558RT17        16558     28-04-22    2022-01-05      6/5/2022

          no_guests room_category booking_platform  ratings_given booking_status  \
       0        2.0           RT1           others            NaN      Cancelled
       1        4.0           RT1    direct online            5.0    Checked Out
       2        2.0           RT1           others            4.0    Checked Out
       3        2.0           RT1           others            NaN      Cancelled

          revenue_generated  revenue_realized property_name category   city
       0               9100              3640  Atliq Grands   Luxury  Delhi
       1              10920             10920  Atliq Grands   Luxury  Delhi
       2               9100              9100  Atliq Grands   Luxury  Delhi
       3               9100              3640  Atliq Grands   Luxury  Delhi
```

```
[183]: df_bookings_all = pd.merge(df_bookings_all, df_date, left_on="check_in_date",␣
        ↪right_on="date")
       df_bookings_all.head(3)
```

```
[183]:          booking_id  property_id booking_date check_in_date checkout_date  \
       0  May052216558RT11        16558     15-04-22    2022-05-05      7/5/2022
       1  May052216558RT12        16558     30-04-22    2022-05-05      7/5/2022
       2  May052216558RT13        16558     1/5/2022    2022-05-05      6/5/2022

          no_guests room_category booking_platform  ratings_given booking_status  \
       0        3.0           RT1         tripster            5.0    Checked Out
       1        2.0           RT1           others            NaN      Cancelled
```

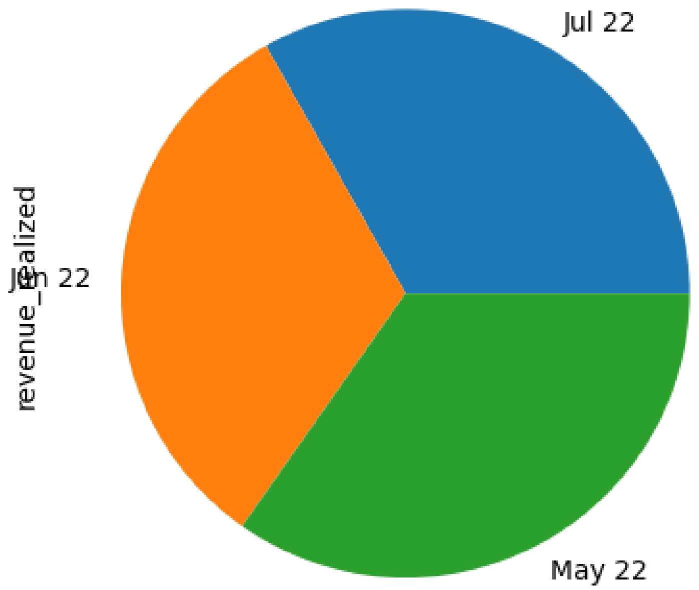
```
2        3.0           RT1    direct offline            5.0    Checked Out

   revenue_generated  revenue_realized property_name category   city  \
0              10010             10010  Atliq Grands   Luxury  Delhi
1               9100              3640  Atliq Grands   Luxury  Delhi
2              10010             10010  Atliq Grands   Luxury  Delhi

        date  mmm yy week no  day_type
0 2022-05-05  May 22    W 19  weekeday
1 2022-05-05  May 22    W 19  weekeday
2 2022-05-05  May 22    W 19  weekeday
```

[184]:
```
df_bookings_all.groupby("mmm yy")["revenue_realized"].sum()
```

[184]:
```
mmm yy
Jul 22    389940912
Jun 22    377191229
May 22    408375641
Name: revenue_realized, dtype: int64
```

[185]:
```
df_bookings_all.groupby("mmm yy")["revenue_realized"].sum().plot(kind="pie")
```

[185]:
```
<Axes: ylabel='revenue_realized'>
```



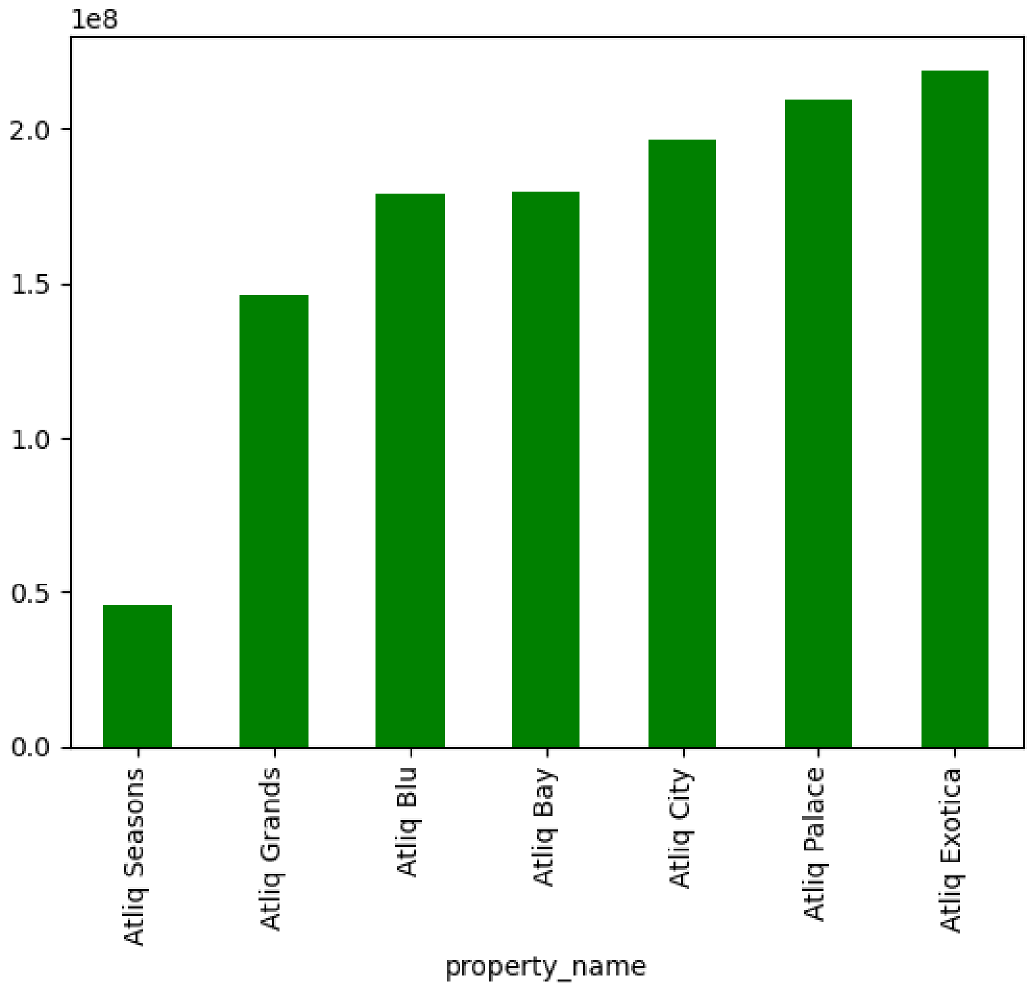
Print revenue realized per hotel type

```
[90]: df_bookings_all.property_name.unique()
```

```
[90]: array(['Atliq Grands', 'Atliq Exotica', 'Atliq City', 'Atliq Blu',
             'Atliq Bay', 'Atliq Palace', 'Atliq Seasons'], dtype=object)
```

```
[187]: df_bookings_all.groupby("property_name")["revenue_realized"].sum().round(2).
        ↪sort_values().plot(kind="bar",color="g")
```

```
[187]: <Axes: xlabel='property_name'>
```



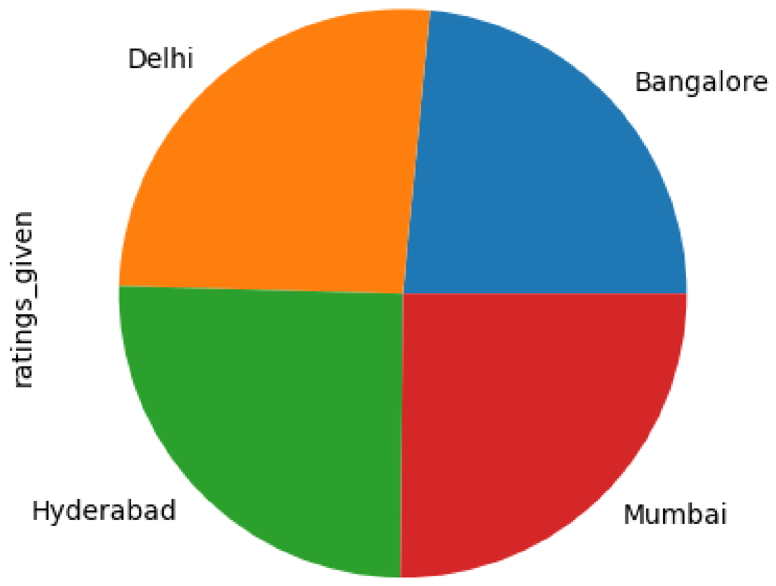
Print average rating per city

```
[92]: df_bookings_all.groupby("city")["ratings_given"].mean().round(2)
```

```
[92]: city
      Bangalore    3.40
      Delhi        3.78
      Hyderabad    3.66
      Mumbai       3.64
      Name: ratings_given, dtype: float64
```

```
[188]: df_bookings_all.groupby("city")["ratings_given"].mean().round(2).
         ↪plot(kind="pie")
```

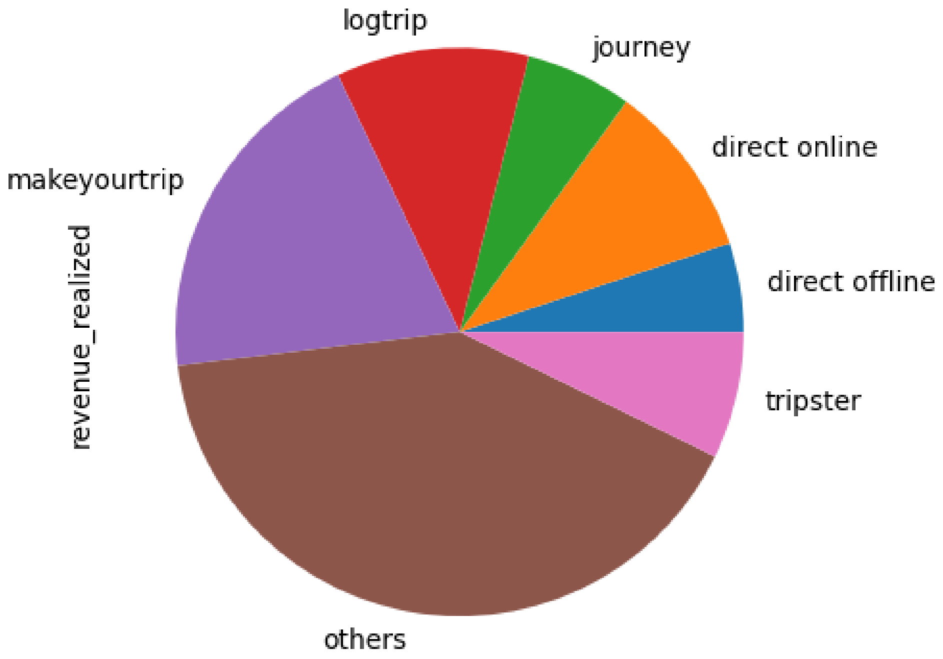
```
[188]: <Axes: ylabel='ratings_given'>
```



Print a pie chart of revenue realized per booking platform

```
[189]: df_bookings_all.groupby("booking_platform")["revenue_realized"].sum().
         ↪plot(kind="pie")
```

```
[189]: <Axes: ylabel='revenue_realized'>
```


logtrip
journey
direct online
makeyourtrip
revenue_realized
direct offline
tripster
others