EDA

Exploratory Data Analysis

- It is the process to know more about the data.
- It is exploring the data.
- It is the process to have a look upon the data from different angles and perspectives.
- It is the process to understand the different aspects of the data.

Steps involved in EDA:

- Check the Shape of the dataframe.
- Check the basic information(datatypes) of the various columns in the dataframe to get to know about the numeric and object columns that we have in the dataframe.
- Check the column names in the dataframe and drop the columns which is not required or used for data analysis.
- See the statistical summary of the dataframe variables/columns.
- Check for the duplicate rows in the dataframe.
- Check for the null values in all the columns of the dataframe.
- Check for the outliers in the all columns of the dataframe.
- Treat the duplicate rows in the dataframe.
- Treat the columns that have null values in the dataframe.
- Treat the columns that have outliers in the dataframe.
- Check for correlation b/w the variables/columns of the dataframe.
- Analyze the dataframe using visualization tools.

Importing the libraries

In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

Loading the dataset

In [2]:
```
dt=pd.read_csv("Bengaluru_House_Data.csv")
```

In [3]:
```
dt.head()
```

Out[3]:

	area_type	availability	location	size	society	total_sqft	bath	balcony	pri
0	Super built-up Area	19-Dec	Electronic City Phase II	2 BHK	Coomee	1056	2.0	1.0	39.(
1	Plot Area	Ready To Move	Chikka Tirupathi	4 Bedroom	Theanmp	2600	5.0	3.0	120.(
2	Built-up Area	Ready To Move	Uttarahalli	3 BHK	NaN	1440	2.0	3.0	62.(
3	Super built-up Area	Ready To Move	Lingadheeranahalli	3 BHK	Soiewre	1521	3.0	1.0	95.(
4	Super built-up Area	Ready To Move	Kothanur	2 BHK	NaN	1200	2.0	1.0	51.(

Shape

In [4]:
```
dt.shape
```

Out[4]:
```
(13320, 9)
```

In [5]:
```
# - We have 13320 rows and 9 columns
```

Columns

In [6]:
```
dt.columns
```

Out[6]:
```
Index(['area_type', 'availability', 'location', 'size', 'society',
       'total_sqft', 'bath', 'balcony', 'price'],
      dtype='object')
```

Basic Information

In [7]:
```
dt.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 13320 entries, 0 to 13319
Data columns (total 9 columns):
 #   Column        Non-Null Count  Dtype  
---  ------        --------------  -----  
 0   area_type     13320 non-null  object 
 1   availability  13320 non-null  object 
 2   location      13319 non-null  object 
 3   size          13304 non-null  object 
 4   society       7818 non-null   object 
 5   total_sqft    13320 non-null  object 
 6   bath          13247 non-null  float64
 7   balcony       12711 non-null  float64
 8   price         13320 non-null  float64
dtypes: float64(3), object(6)
memory usage: 936.7+ KB
```

In [8]:
```
# - Object columns- 6
# - Numeric columns- 3
```

Statistical summary

In [9]:
```
dt.describe().style.background_gradient(cmap='Reds',low=0.5,high=1.0,axis=1
```

Out[9]:

	bath	balcony	price
count	13247.000000	12711.000000	13320.000000
mean	2.692610	1.584376	112.565627
std	1.341458	0.817263	148.971674
min	1.000000	0.000000	8.000000
25%	2.000000	1.000000	50.000000
50%	2.000000	2.000000	72.000000
75%	3.000000	2.000000	120.000000
max	40.000000	3.000000	3600.000000

Check for the null values

In [10]:
```
dt.isna().sum()
```

Out[10]:
```
area_type          0
availability       0
location           1
size              16
society         5502
total_sqft         0
bath              73
balcony          609
price              0
dtype: int64
```

- Location, size, society, bath, balcony columns have the null values

Check for the duplicate values

In [11]:
```
dt.duplicated().sum()
```

Out[11]:
```
529
```

In [12]:
```
dt[dt.duplicated()]
```

Out[12]:

	area_type	availability	location	size	society	total_sqft	bath	balcony	price
971	Super built-up Area	Ready To Move	Haralur Road	3 BHK	NRowse	1464	3.0	2.0	56.0
1115	Super built-up Area	Ready To Move	Haralur Road	2 BHK	NaN	1027	2.0	2.0	44.0
1143	Super built-up Area	Ready To Move	Vittasandra	2 BHK	Prlla C	1246	2.0	1.0	64.5
1290	Super built-up Area	Ready To Move	Haralur Road	2 BHK	NaN	1194	2.0	2.0	47.0
1394	Super built-up Area	Ready To Move	Haralur Road	2 BHK	NaN	1027	2.0	2.0	44.0
...	...	...	...	...	...	...	...	...	...
13285	Super built-up Area	Ready To Move	VHBCS Layout	2 BHK	OlarkLa	1353	2.0	2.0	110.0
13299	Super built-up Area	18-Dec	Whitefield	4 BHK	Prtates	2830 - 2882	5.0	0.0	154.5
13311	Plot Area	Ready To Move	Ramamurthy Nagar	7 Bedroom	NaN	1500	9.0	2.0	250.0
13313	Super built-up Area	Ready To Move	Uttarahalli	3 BHK	Aklia R	1345	2.0	1.0	57.0
13319	Super built-up Area	Ready To Move	Doddathoguru	1 BHK	NaN	550	1.0	1.0	17.0

529 rows × 9 columns

- We have 529 rows as duplicate rows.

Dropping the duplicates

In [13]:
```
dt.drop_duplicates(inplace=True)
```

In [14]:
```
dt.duplicated().sum()
```

Out[14]:
```
0
```

- We have successfully removed the duplicate rows from the dataframe 'dt'.

In [15]:
```
dt.shape
```

Out[15]:
```
(12791, 9)
```

In [16]:
```
#After removing the duplicates rows from the the dataframe 'dt' we have 12
```

Treating the null values

- 1- We can drop the null values
- 2- We can impute the null values (filling the null values with some other values)
- Before filling the null values we have to check whether a column is discrete or cataegorical

In [17]:
```
dt.isna().sum()
```

Out[17]:
```
area_type          0
availability       0
location           1
size              16
society         5328
total_sqft         0
bath              73
balcony          605
price              0
dtype: int64
```

In [18]:
```
dt.nunique()
```

Out[18]:
```
area_type          4
availability      81
location        1305
size              31
society         2688
total_sqft      2117
bath              19
balcony            4
price           1994
dtype: int64
```

In [19]:
```
# As a thumb rule object column having a very small number of unique values
# Object column in the dataframe will be treated as categorical.
# Numerical column maybe discrete or categorical.
```

In [20]:
```
# If the column is categorical then we generally fill the null values with
# If the column is discrete then we generally fill the null values with mea
```

Location column

In [21]:
```
# "location" column has 1305 unique values and the number of rows in the da
# type, we consider it as categorical. Therefore all the NA/null values in
# The 'location' is categorical
# because we can group houses based on 'location'.

dt.location.dtype
```

Out[21]: dtype('O')

In [22]:
```
dt.location.fillna(dt.location.mode()[0],inplace=True)
```

In [23]:
```
dt.location.isna().sum()
```

Out[23]: 0

In [24]:
```
dt.location.mode()[0]
```

Out[24]: 'Whitefield'

Size

In [25]:
```
# 'size' column has 31 unique values. Since 'size' is of object type, so we
# Therefore we replace the NA/null values in 'size' column by the mode valu
dt['size'].dtype
```

Out[25]: dtype('O')

In [26]:
```
# Mode
```

In [27]:
```
x=dt['size'].mode()
print(x,type(x))
print(x[0])
```

```
0    2 BHK
Name: size, dtype: object <class 'pandas.core.series.Series'>
2 BHK
```

In [28]:
```
dt['size'].fillna(dt['size'].mode()[0],inplace=True)
```

In [29]:
```
dt.isna().sum()
```

Out[29]:
```
area_type          0
availability       0
location           0
size               0
society         5328
total_sqft         0
bath              73
balcony          605
price              0
dtype: int64
```

In [30]:
```
# Note: 'size' is the column name in the dataframe 'dt', size is also an at
```

In [31]:
```
dt.size
```

Out[31]:
```
115119
```

Society

- If any column has more than 30% values as null values, we drop that column.

In [32]:
```
dt.society.isna().sum()*100/len(dt)
```

Out[32]:
```
41.654288171370496
```

In [33]:
```
# Since 41% values are null values so we can drop the 'society' column.
```

In [34]:
```
dt.drop('society',axis=1,inplace=True)
```

In [35]:
```
dt.head()
```

Out[35]:

	area_type	availability	location	size	total_sqft	bath	balcony	price
0	Super built-up Area	19-Dec	Electronic City Phase II	2 BHK	1056	2.0	1.0	39.07
1	Plot Area	Ready To Move	Chikka Tirupathi	4 Bedroom	2600	5.0	3.0	120.00
2	Built-up Area	Ready To Move	Uttarahalli	3 BHK	1440	2.0	3.0	62.00
3	Super built-up Area	Ready To Move	Lingadheeranahalli	3 BHK	1521	3.0	1.0	95.00
4	Super built-up Area	Ready To Move	Kothanur	2 BHK	1200	2.0	1.0	51.00

In [36]:
```
dt.isna().sum()
```

Out[36]:
```
area_type         0
availability      0
location          0
size              0
total_sqft        0
bath             73
balcony         605
price             0
dtype: int64
```

bath

In [37]:
```
# 'bath' is numeric column. Since 'bath' is of object type, it is considere
# Therefore we will fill the NA/null values in 'bath' column by the mode.

dt.bath.dtype
```

Out[37]:
```
dtype('float64')
```

In [38]:
```
dt.nunique()
```

Out[38]:
```
area_type          4
availability      81
location        1305
size              31
total_sqft      2117
bath              19
balcony            4
price           1994
dtype: int64
```

In [39]:
```
dt.bath.fillna(dt.bath.mode()[0],inplace=True)
```

In [40]:
```
dt.isna().sum()
```

Out[40]:
```
area_type         0
availability      0
location          0
size              0
total_sqft        0
bath              0
balcony         605
price             0
dtype: int64
```

balcony

In [41]:
```
# 'balcony' is numeric column. Since 'balcony' is of object type, it is cor
# Therefore the NA/null values in "balcony" column are filled by the mode v

dt.balcony.dtype
```

Out[41]:
```
dtype('float64')
```

In [42]:
```
dt.balcony.fillna(dt.balcony.mode()[0],inplace=True)
```

In [43]:
```
dt.isna().sum()
```

Out[43]:
```
area_type       0
availability    0
location        0
size            0
total_sqft      0
bath            0
balcony         0
price           0
dtype: int64
```

- We have successfully treated the null values.

In [ ]:
```

```

In [44]:
```
# Outliers' Detection
# Outliers' Removal
# Analysis
# Data Transformation
```

Outliers Detection

Outlier :

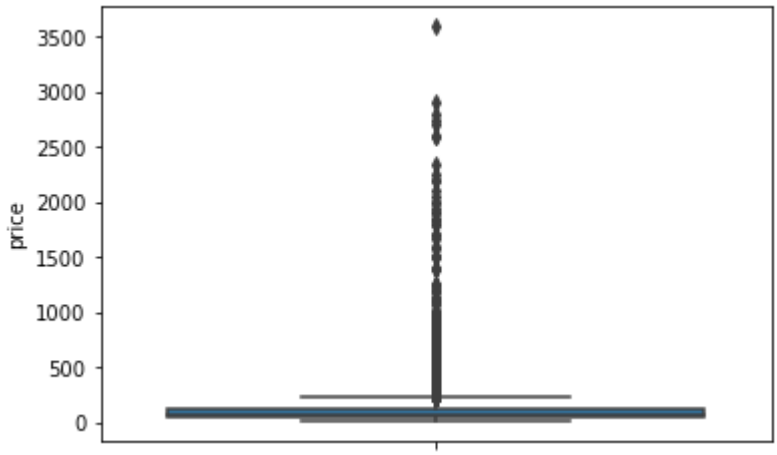
- A few data points those are significantly different from rest of the data points.
- If any data point is far from the mean value can be treated as an outlier.

In [45]:
```
# To detect outliers we use boxplot
```

Price

In [46]:
```
sns.boxplot(y='price',data=dt)

plt.show()
```



In [47]:
```
dt.price.describe()
```

Out[47]:
```
count    12791.000000
mean       114.317646
std        151.480310
min          8.000000
25%         50.000000
50%         73.000000
75%        121.000000
max       3600.000000
Name: price, dtype: float64
```

Total sqft

In [49]:
```
dt.total_sqft.describe()
```

Out[49]:
```
count     12791
unique     2117
top        1200
freq        808
Name: total_sqft, dtype: object
```

In [50]:
```
dt.total_sqft.dtype
```

Out[50]:
```
dtype('O')
```

In [51]:
```
dt.total_sqft.unique()
```

Out[51]:
```
array(['1056', '2600', '1440', ..., '1133 - 1384', '774', '4689'],
      dtype=object)
```

In [52]:
```
# series.str returns a String Method object which we can use to apply the s
dt.total_sqft.str
```

Out[52]:
```
<pandas.core.strings.accessor.StringMethods at 0x221e92524c0>
```

In [53]:
```
dt.total_sqft.str.contains(' - ')
```

Out[53]:
```
0        False
1        False
2        False
3        False
4        False
         ...
13314    False
13315    False
13316    False
13317    False
13318    False
Name: total_sqft, Length: 12791, dtype: bool
```

In [54]:
```
# Here we store the indexes of the rows in dataframe 'dt' where the value f
# as a boolean series.

ind=dt[dt.total_sqft.str.contains('-')].index
ind
```

Out[54]:
```
Int64Index([   30,    56,    81,   122,   137,   165,   188,   224,   549,
              579,
            ...
            12435, 12544, 12791, 12861, 12955, 12975, 12990, 13059, 13240,
            13265],
           dtype='int64', length=200)
```

In [55]:
```
# So 200 values are there in 'total_sqft' where the values contain ' - '
# Since a range has been given rather than the exact value for 'total_sqft'
# average value.
dt.total_sqft.str.contains(' - ').sum()
```

Out[55]: 200

In [56]:
```
x1 = dt[dt.total_sqft.str.contains(' - ')]
x1
```

Out[56]:

	area_type	availability	location	size	total_sqft	bath	balcony	price
30	Super built-up Area	19-Dec	Yelahanka	4 BHK	2100 - 2850	4.0	0.0	186.000
56	Built-up Area	20-Feb	Devanahalli	4 Bedroom	3010 - 3410	2.0	2.0	192.000
81	Built-up Area	18-Oct	Hennur Road	4 Bedroom	2957 - 3450	2.0	2.0	224.500
122	Super built-up Area	18-Mar	Hebbal	4 BHK	3067 - 8156	4.0	0.0	477.000
137	Super built-up Area	19-Mar	8th Phase JP Nagar	2 BHK	1042 - 1105	2.0	0.0	54.005
...	...	...	...	...	...	...	...	...
12975	Super built-up Area	20-Aug	Whitefield	2 BHK	850 - 1060	2.0	0.0	38.190
12990	Super built-up Area	18-May	Talaghattapura	3 BHK	1804 - 2273	3.0	0.0	122.000
13059	Super built-up Area	Ready To Move	Harlur	2 BHK	1200 - 1470	2.0	0.0	72.760
13240	Super built-up Area	Ready To Move	Devanahalli	1 BHK	1020 - 1130	2.0	2.0	52.570
13265	Super built-up Area	20-Sep	Hoodi	2 BHK	1133 - 1384	2.0	0.0	59.135

200 rows × 8 columns

In [57]:
```
# Here we find those rows from the dataframe 'dt' that contain ' - ' in the
# and then fetch the series 'total_sqft' from it and then we split this ser

s=dt[dt.total_sqft.str.contains('-')]['total_sqft'].str.split('-')
```

In [58]:
```
lst=[]
for i in s:
    lst.append((float(i[0])+float(i[1]))/2)
```

In [59]:
```
print(lst)
```

```
[2475.0, 3210.0, 3203.5, 5611.5, 1073.5, 1242.5, 1277.5, 1630.0, 1317.5,
1800.0, 1132.5, 5520.0, 4046.0, 5600.0, 1177.5, 4624.5, 1122.5, 582.5, 11
42.5, 4348.5, 657.5, 649.5, 1450.0, 1000.0, 971.5, 1662.0, 687.325, 615.
0, 3430.0, 2038.5, 3715.0, 665.0, 4624.5, 776.5, 2817.5, 3817.0, 3461.0,
1277.5, 825.0, 1128.76, 3715.0, 1104.0, 790.5, 3035.0, 3181.0, 3539.5, 28
56.0, 700.0, 1559.0, 1352.5, 1800.0, 1950.0, 1185.5, 1005.0, 1707.0, 147
6.0, 3181.0, 1192.5, 2912.5, 630.5, 1530.0, 717.0, 1664.0, 3185.0, 4303.
5, 1343.5, 3416.5, 1312.5, 1137.5, 458.0, 2345.0, 709.0, 605.0, 2094.0, 2
987.5, 2072.5, 1089.0, 1625.0, 2661.0, 680.0, 412.5, 3752.5, 805.5, 709.
0, 1462.5, 1891.0, 1617.5, 1302.5, 975.0, 2585.5, 630.5, 2648.0, 614.5, 4
334.0, 2336.5, 1302.5, 3317.5, 1405.0, 1532.5, 3550.0, 2856.0, 2856.0, 15
83.0, 1115.0, 1162.5, 1580.0, 1272.5, 925.0, 2856.0, 698.5, 1730.0, 1431.
5, 4062.5, 1029.5, 2195.0, 1495.0, 778.0, 1155.0, 3496.5, 1700.0, 1522.5,
784.0, 3385.5, 777.0, 2464.5, 640.0, 1773.5, 3854.5, 3181.0, 4920.0, 174
5.0, 762.5, 693.0, 800.0, 728.5, 2302.5, 800.0, 1800.0, 552.5, 1495.0, 77
5.0, 1732.5, 1532.5, 1560.0, 1131.0, 2835.0, 1260.0, 1081.5, 2065.5, 583.
0, 790.5, 1237.5, 711.0, 2895.5, 801.0, 2630.0, 863.0, 5020.0, 1315.0, 15
30.0, 612.5, 907.0, 2820.0, 458.0, 1360.0, 3715.0, 720.0, 1773.5, 1172.0,
747.0, 1500.0, 1590.0, 1570.0, 1322.5, 3517.0, 1003.5, 2187.5, 1639.5, 25
85.5, 827.5, 1355.0, 1195.0, 2500.0, 1187.0, 5667.5, 777.0, 825.0, 1830.
5, 2858.0, 705.0, 1410.5, 4225.0, 1122.5, 2283.0, 1533.0, 955.0, 2038.5,
1335.0, 1075.0, 1258.5]
```

In [60]:
```
ind
```

Out[60]:
```
Int64Index([   30,    56,    81,   122,   137,   165,   188,   224,   54
9,
              579,
            ...
            12435, 12544, 12791, 12861, 12955, 12975, 12990, 13059, 1324
0,
            13265],
           dtype='int64', length=200)
```

In [61]:
```
# Replacing the values in 'total_sqft' which contains ' - ' with the corres

dt.loc[ind,'total_sqft']=lst
```

In [62]:
```
dt.loc[ind]
```

Out[62]:

	area_type	availability	location	size	total_sqft	bath	balcony	price
30	Super built-up Area	19-Dec	Yelahanka	4 BHK	2475.0	4.0	0.0	186.000
56	Built-up Area	20-Feb	Devanahalli	4 Bedroom	3210.0	2.0	2.0	192.000
81	Built-up Area	18-Oct	Hennur Road	4 Bedroom	3203.5	2.0	2.0	224.500
122	Super built-up Area	18-Mar	Hebbal	4 BHK	5611.5	4.0	0.0	477.000
137	Super built-up Area	19-Mar	8th Phase JP Nagar	2 BHK	1073.5	2.0	0.0	54.005
...	...	...	...	...	...	...	...	...
12975	Super built-up Area	20-Aug	Whitefield	2 BHK	955.0	2.0	0.0	38.190
12990	Super built-up Area	18-May	Talaghattapura	3 BHK	2038.5	3.0	0.0	122.000
13059	Super built-up Area	Ready To Move	Harlur	2 BHK	1335.0	2.0	0.0	72.760
13240	Super built-up Area	Ready To Move	Devanahalli	1 BHK	1075.0	2.0	2.0	52.570
13265	Super built-up Area	20-Sep	Hoodi	2 BHK	1258.5	2.0	0.0	59.135

200 rows × 8 columns

In [63]:
```
# All the values from the 'total_sqft column containing ' - ' have been rep
# limit.

dt.total_sqft.str.contains('-').sum()
```

Out[63]:
```
0
```

In [64]:
```
dt.isna().sum()
```

Out[64]:
```
area_type       0
availability    0
location        0
size            0
total_sqft      0
bath            0
balcony         0
price           0
dtype: int64
```

In [65]:
```
dt.dtypes
```

Out[65]:
```
area_type        object
availability     object
location         object
size             object
total_sqft       object
bath            float64
balcony         float64
price           float64
dtype: object
```

In [66]:
```
dt.total_sqft.replace('[A-Za-z. ]','',regex=True,inplace=True)
```

In [67]:
```
dt.total_sqft=dt.total_sqft.astype(float)
```

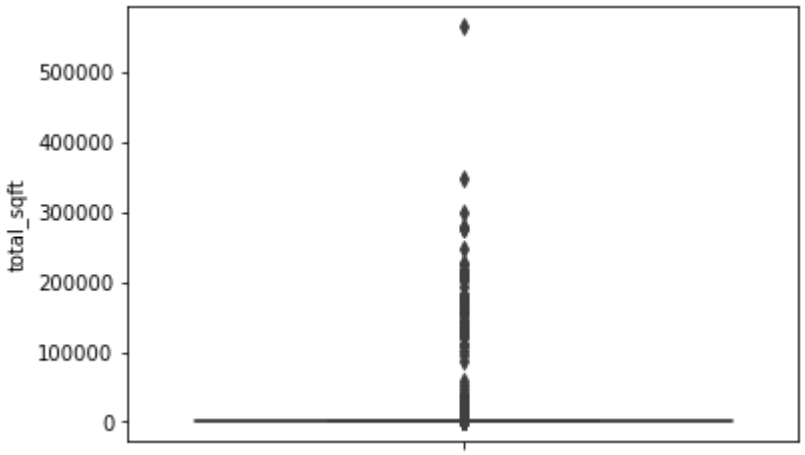
In [68]:
```
dt.dtypes
```

Out[68]:
```
area_type        object
availability     object
location         object
size             object
total_sqft      float64
bath            float64
balcony         float64
price           float64
dtype: object
```

- Now we have successfully converted the 'total_sqft' column to float type.

In [69]:
```
# checking for outliers
sns.boxplot(y='total_sqft',data=dt)

plt.show()
```



Outliers Removal

IQR method

In [70]:
```
# We cap the values between the upper bound and lower bound
```

In [71]:
```
# upper bound= q3 + 1.5*iqr
# lower bound=q1 - 1.5*iqr
# iqr = q3 - q1
# q3 = 75th percentile value
# q1 = 25th percentile value
```

In [72]:
```
def outlier(data):

    q1=data.quantile(0.25)
    q3=data.quantile(0.75)

    iqr=q3-q1
    upper_bound=q3+1.5*iqr
    lower_bound=q1-1.5*iqr

    return data.clip(upper_bound,lower_bound)
```

In [73]:
```
dt.total_sqft.describe()
```

Out[73]:
```
count     12791.000000
mean       2432.812492
std       13186.508638
min           1.000000
25%        1100.000000
50%        1283.000000
75%        1700.000000
max      566584.000000
Name: total_sqft, dtype: float64
```

In [74]:
```
# np.where() can be used to cap the values
# np.clip() can be used to cap the values
```

In [75]:
```
dt['Total']=outlier(dt.total_sqft)
```

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

Out[76]:

	area_type	availability	location	size	total_sqft	bath	balcony	price	Total
0	Super built-up Area	19-Dec	Electronic City Phase II	2 BHK	1056.0	2.0	1.0	39.07	1056.0
1	Plot Area	Ready To Move	Chikka Tirupathi	4 Bedroom	2600.0	5.0	3.0	120.00	2600.0
2	Built-up Area	Ready To Move	Uttarahalli	3 BHK	1440.0	2.0	3.0	62.00	1440.0
3	Super built-up Area	Ready To Move	Lingadheeranahalli	3 BHK	1521.0	3.0	1.0	95.00	1521.0
4	Super built-up Area	Ready To Move	Kothanur	2 BHK	1200.0	2.0	1.0	51.00	1200.0

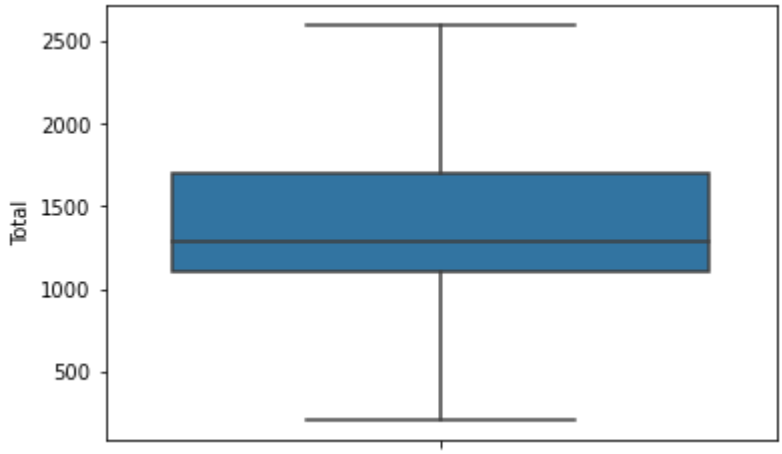
In [77]:
```
dt[['total_sqft','Total']].describe()
```

Out[77]:

	total_sqft	Total
count	12791.000000	12791.000000
mean	2432.812492	1444.891415
std	13186.508638	550.576060
min	1.000000	200.000000
25%	1100.000000	1100.000000
50%	1283.000000	1283.000000
75%	1700.000000	1700.000000
max	566584.000000	2600.000000

In [78]:
```
sns.boxplot(y='Total',data=dt)
```

Out[78]: <AxesSubplot:ylabel='Total'>



In [79]:
```
dt['New_Price']=outlier(dt.price)
```

In [80]:
```
dt.head()
```

Out[80]:

	area_type	availability	location	size	total_sqft	bath	balcony	price	Total
0	Super built-up Area	19-Dec	Electronic City Phase II	2 BHK	1056.0	2.0	1.0	39.07	1056.0
1	Plot Area	Ready To Move	Chikka Tirupathi	4 Bedroom	2600.0	5.0	3.0	120.00	2600.0
2	Built-up Area	Ready To Move	Uttarahalli	3 BHK	1440.0	2.0	3.0	62.00	1440.0
3	Super built-up Area	Ready To Move	Lingadheeranahalli	3 BHK	1521.0	3.0	1.0	95.00	1521.0
4	Super built-up Area	Ready To Move	Kothanur	2 BHK	1200.0	2.0	1.0	51.00	1200.0

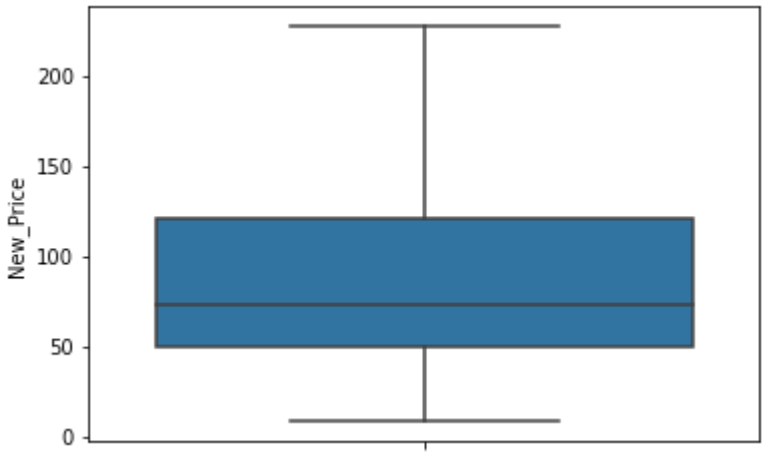
In [81]:
```
# Note: min value for 'price' and 'New_Price' are same because using IQR me
# is showing as -ve which is less than the min value in 'price'
# Hence the lower bound is same as the min value in 'price'.

dt[['price','New_Price']].describe()
```

Out[81]:

	price	New_Price
count	12791.000000	12791.000000
mean	114.317646	94.570090
std	151.480310	60.646174
min	8.000000	8.000000
25%	50.000000	50.000000
50%	73.000000	73.000000
75%	121.000000	121.000000
max	3600.000000	227.500000

In [82]:
```
sns.boxplot(y='New_Price',data=dt)
plt.show()
```

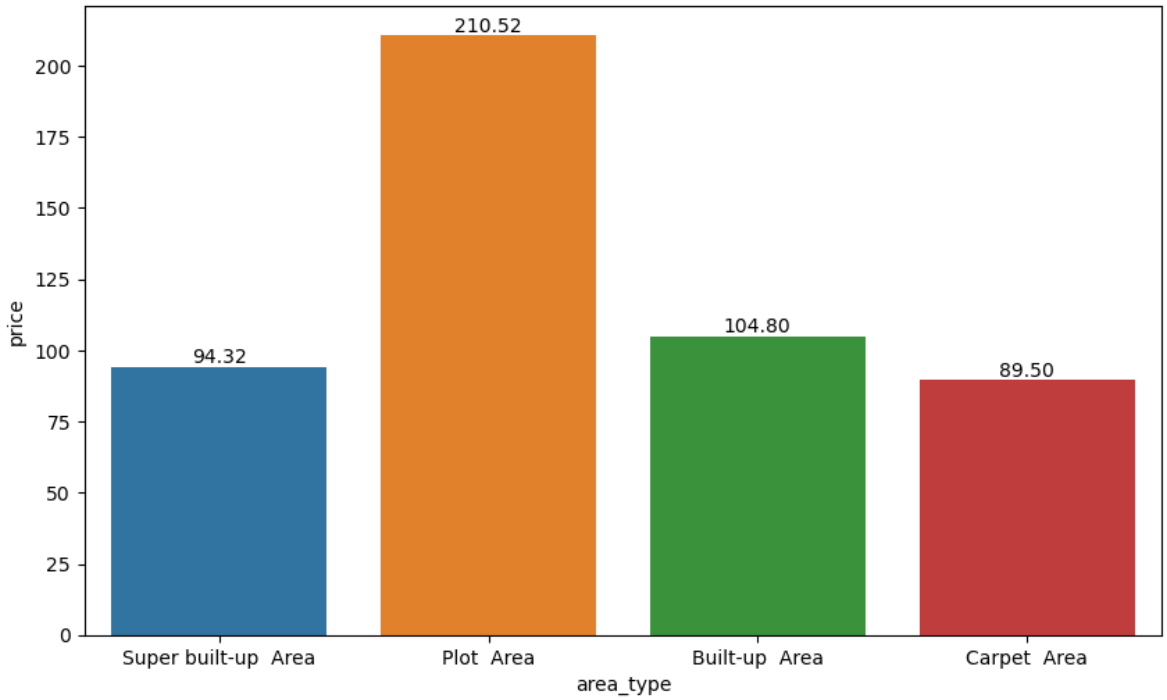


Analysis:

Average price according to the area type

In [83]:
```
# Here the x-variable is 'price' which is categorical, so by default, the b
# in each category.
plt.figure(figsize=(10,6),dpi=100)
ax=sns.barplot(x='area_type',y='price',data=dt,ci=False)
for i in ax.containers:
    ax.bar_label(i,fmt='%.2f')

plt.show()
```



Relationship between price and total squareft

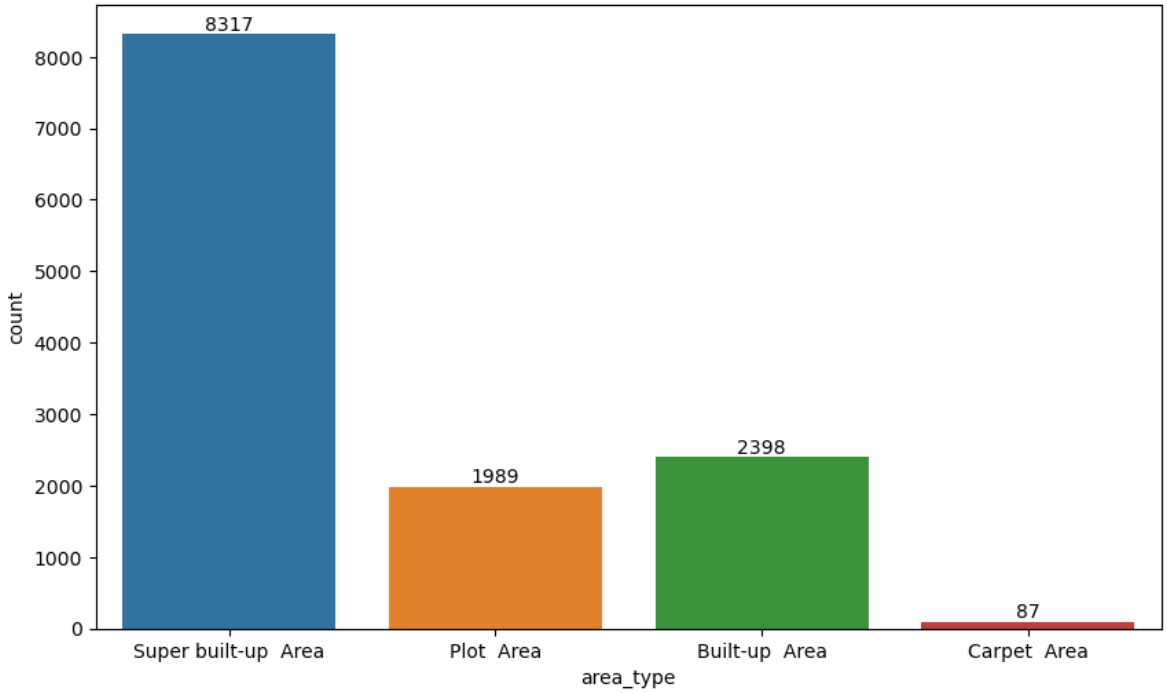
In [84]:
```
plt.figure(figsize=(10,8),dpi=100)
sns.scatterplot(x='Total',y='New_Price',hue='area_type',data=dt)
plt.xlabel('Total Squarefeet Area')
plt.ylabel('Price')

plt.show()
```

Observations according to the area type

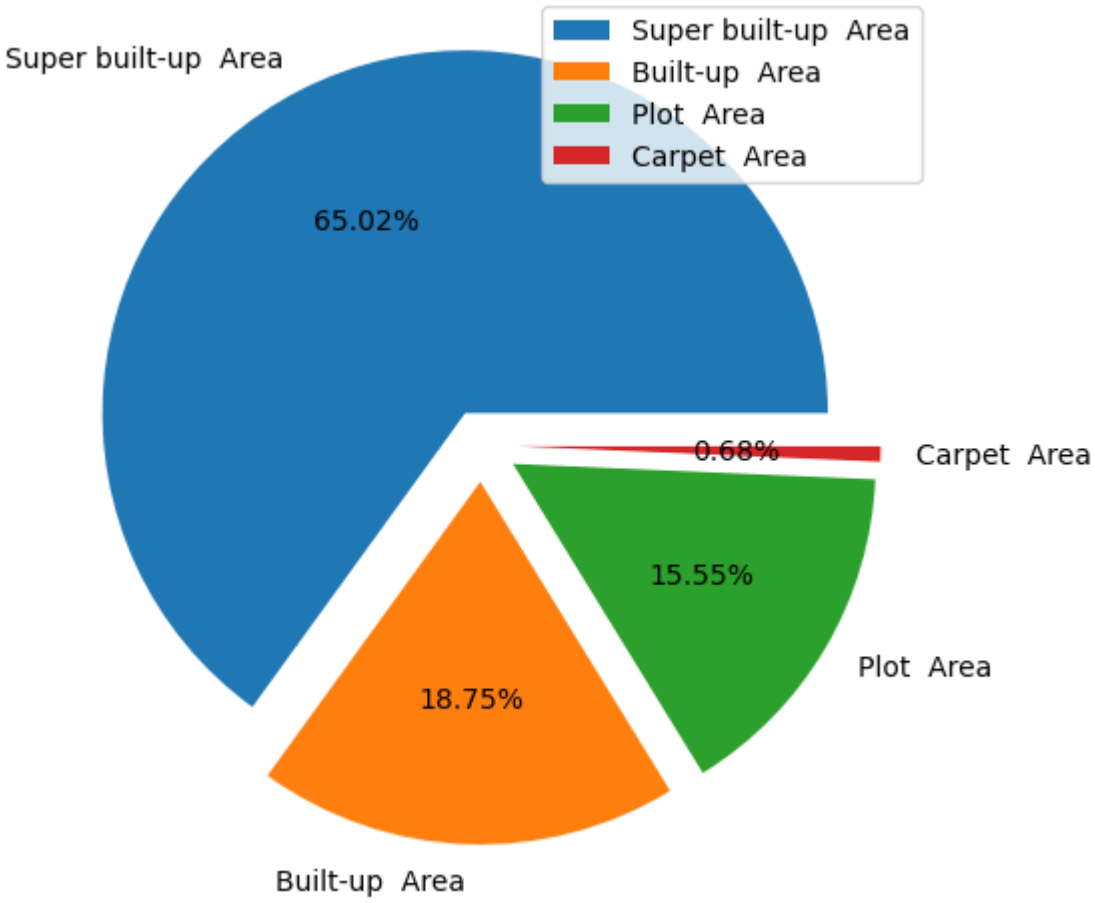
In [85]:
```
plt.figure(figsize=(10,6),dpi=100)
ax=sns.countplot(x='area_type',data=dt)

for i in ax.containers:
    ax.bar_label(i)
```



Ratio of the areatype

In [86]:
```
plt.figure(figsize=(10,6),dpi=100)
plt.pie(dt.area_type.value_counts(),labels=dt.area_type.value_counts().inde
plt.legend()
plt.show()
```



In [87]:
```
dt.head()
```

Out[87]:

	area_type	availability	location	size	total_sqft	bath	balcony	price	Total
0	Super built-up Area	19-Dec	Electronic City Phase II	2 BHK	1056.0	2.0	1.0	39.07	1056.0
1	Plot Area	Ready To Move	Chikka Tirupathi	4 Bedroom	2600.0	5.0	3.0	120.00	2600.0
2	Built-up Area	Ready To Move	Uttarahalli	3 BHK	1440.0	2.0	3.0	62.00	1440.0
3	Super built-up Area	Ready To Move	Lingadheeranahalli	3 BHK	1521.0	3.0	1.0	95.00	1521.0
4	Super built-up Area	Ready To Move	Kothanur	2 BHK	1200.0	2.0	1.0	51.00	1200.0

Average price of 2bhk, 3bhk and 4bhk

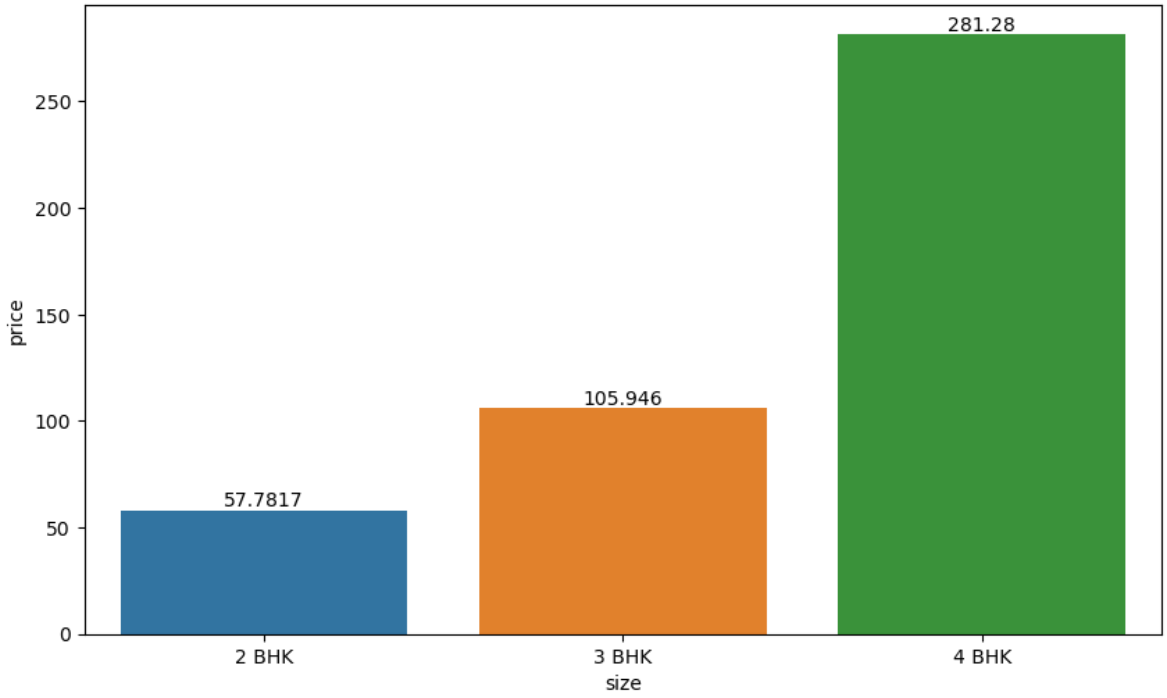
In [88]:
```
x=dt[(dt['size']=='2 BHK') | (dt['size']=='3 BHK') | (dt['size']=='4 BHK')]
x
```

Out[88]:

	area_type	availability	location	size	total_sqft	bath	balcony	price	Total
0	Super built-up Area	19-Dec	Electronic City Phase II	2 BHK	1056.0	2.0	1.0	39.07	1056.0
2	Built-up Area	Ready To Move	Uttarahalli	3 BHK	1440.0	2.0	3.0	62.00	1440.0
3	Super built-up Area	Ready To Move	Lingadheeranahalli	3 BHK	1521.0	3.0	1.0	95.00	1521.0
4	Super built-up Area	Ready To Move	Kothanur	2 BHK	1200.0	2.0	1.0	51.00	1200.0
5	Super built-up Area	Ready To Move	Whitefield	2 BHK	1170.0	2.0	1.0	38.00	1170.0
...	...	...	...	...	...	...	...	...	...
13312	Super built-up Area	Ready To Move	Bellandur	2 BHK	1262.0	2.0	2.0	47.00	1262.0
13314	Super built-up Area	Ready To Move	Green Glen Layout	3 BHK	1715.0	3.0	3.0	112.00	1715.0
13316	Super built-up Area	Ready To Move	Richards Town	4 BHK	3600.0	5.0	2.0	400.00	2600.0
13317	Built-up Area	Ready To Move	Raja Rajeshwari Nagar	2 BHK	1141.0	2.0	1.0	60.00	1141.0
13318	Super built-up Area	18-Jun	Padmanabhanagar	4 BHK	4689.0	4.0	1.0	488.00	2600.0

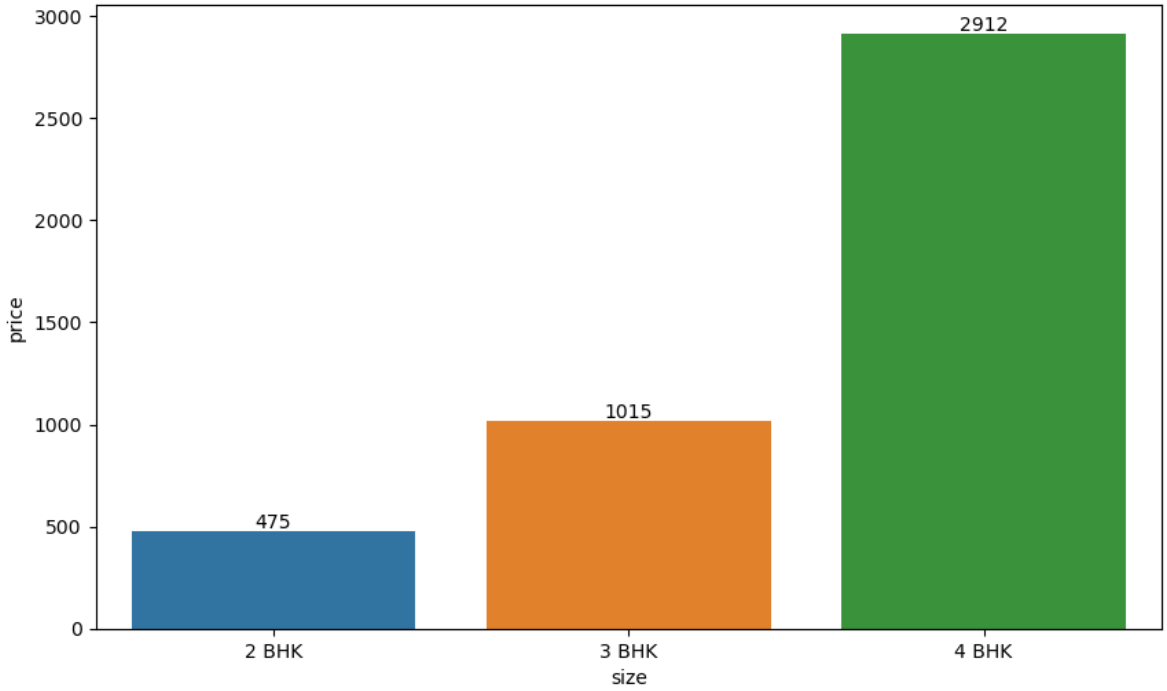
9641 rows × 10 columns

In [89]:
```
plt.figure(figsize=(10,6),dpi=100)
ax=sns.barplot(x='size',y='price',data=x,ci=False)
for i in  ax.containers:
    ax.bar_label(i)
plt.show()
```



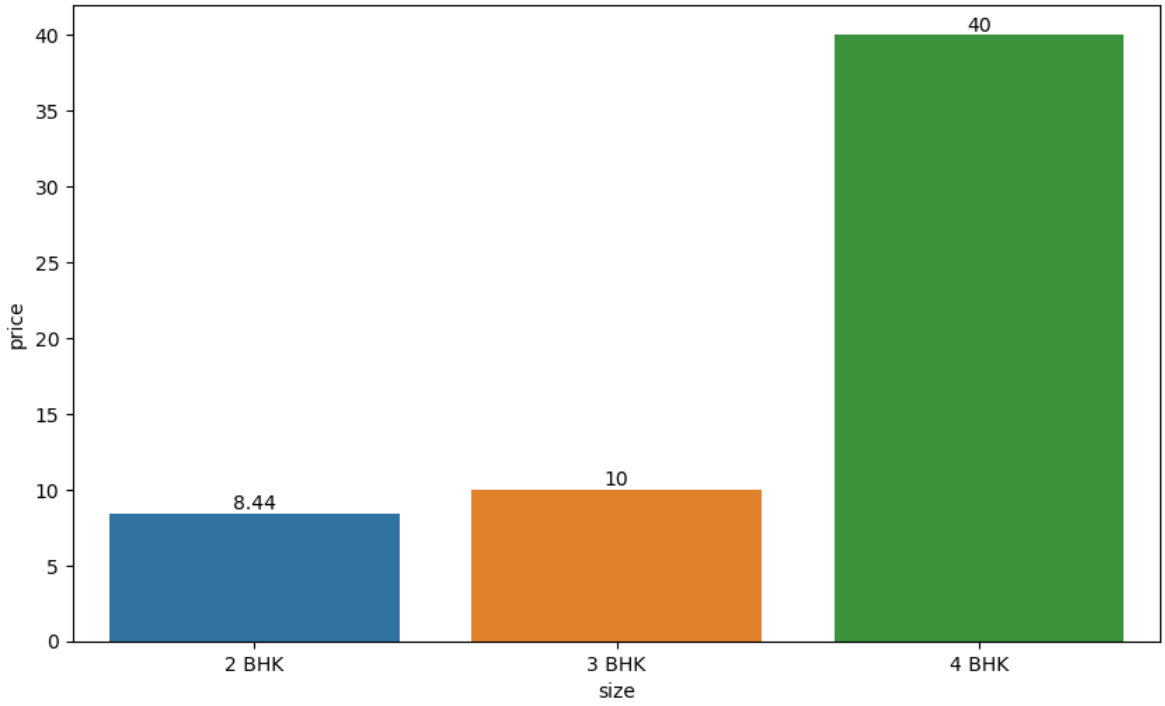
Maximum price of 2bhk, 3bhk and 4bhk

In [90]:
```
plt.figure(figsize=(10,6),dpi=100)
ax=sns.barplot(x='size',y='price',data=x,ci=False,estimator=np.max)
for i in  ax.containers:
    ax.bar_label(i)
plt.show()
```



Maximum price of 2bhk, 3bhk and 4bhk

In [91]:
```
plt.figure(figsize=(10,6),dpi=100)
ax=sns.barplot(x='size',y='price',data=x,ci=False,estimator=np.min)
for i in  ax.containers:
    ax.bar_label(i)
plt.show()
```



Coorelation

In [92]:
```
dt.corr()
```

Out[92]:

	total_sqft	bath	balcony	price	Total	New_Price
total_sqft	1.000000	0.070755	0.024316	0.095530	0.199037	0.096261
bath	0.070755	1.000000	0.204692	0.451203	0.510815	0.611388
balcony	0.024316	0.204692	1.000000	0.123589	0.256743	0.183047
price	0.095530	0.451203	0.123589	1.000000	0.544778	0.686123
Total	0.199037	0.510815	0.256743	0.544778	1.000000	0.741887
New_Price	0.096261	0.611388	0.183047	0.686123	0.741887	1.000000

In [93]:
```
plt.figure(figsize=(8,6),dpi=100)
sns.heatmap(dt.corr(),annot=True,cmap='viridis')
plt.show()
```