EDA

Exploratory Data Analysis

Steps

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 [5]:

```
ubham\Desktop\Data Science\Data Science Class\Practice Datasets-20230508T093234Z-001\Practice Datasets\Bengaluru_House_Data.csv")
```

In [6]:

```
dt.head()
```

Out[6]:

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

Shape

In [6]:

```
dt.shape
```

Out[6]:

```
(13320, 9)
```

Columns

In [9]:

```
dt.columns
```

Out[9]:

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

Basic Information

In [10]:

```
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
```

Statistical summary

In [19]:
```
dt.describe().style.background_gradient(cmap='Reds',low=0.5,high=1.0,axis=1)
```

Out[19]:

	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 [20]:
```
dt.isna().sum()
```

Out[20]:
```
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, bat, balcony columns have the null values

Check for the duplicate values

In [22]:
```
dt.duplicated().sum()
```

Out[22]:
```
529
```

In [24]:
```
dt[dt.duplicated()]
```

Out[24]:

	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 [26]:
```
dt.drop_duplicates(inplace=True)
```

```
In [27]: dt.duplicated().sum()
```

```
Out[27]: 0
```

- We have successfully removed the duplicates.

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 [28]: dt.isna().sum()
```

```
Out[28]: area_type          0
         availability       0
         location           1
         size              16
         society         5328
         total_sqft         0
         bath              73
         balcony          605
         price              0
         dtype: int64
```

```
In [29]: dt.nunique()
```

```
Out[29]: area_type          4
         availability      81
         location        1305
         size              31
         society         2688
         total_sqft      2117
         bath              19
         balcony            4
         price           1994
         dtype: int64
```

Loaction

```
In [33]: dt.location.dtype
```

```
Out[33]: dtype('O')
```

```
In [45]: dt.location.fillna(dt.location.mode()[0],inplace=True)
```

```
In [46]: dt.location.isna().sum()
```

```
Out[46]: 0
```

```
In [43]: dt.location.mode()[0]
```

```
Out[43]: 'Whitefield'
```

Size

```
In [50]: dt['size'].dtype
```

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

```
In [51]: # Mode
```

```
In [60]: 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 [54]: dt['size'].fillna(dt['size'].mode()[0],inplace=True)
```

```
In [55]: dt.isna().sum()
```

```
Out[55]: area_type          0
         availability       0
         location           0
         size               0
         society         5328
         total_sqft         0
         bath              73
         balcony          605
         price              0
         dtype: int64
```

```
In [64]: dt.size
```

```
Out[64]: 115119
```

Society

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

```
In [69]: dt.society.isna().sum()*100/len(dt)
```

```
Out[69]: 41.654288171370496
```

```
In [72]: dt.drop('society',axis=1,inplace=True)
```

```
In [73]: dt.head()
```

Out[73]:

	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 [74]: dt.isna().sum()
```

```
Out[74]: area_type         0
         availability      0
         location          0
         size              0
         total_sqft        0
         bath             73
         balcony         605
         price             0
         dtype: int64
```

bath

```
In [75]: dt.bath.dtype
```

```
Out[75]: dtype('float64')
```

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

```
Out[76]: area_type          4
         availability      81
         location        1305
         size              31
         total_sqft      2117
         bath              19
         balcony            4
         price           1994
         dtype: int64
```

```
In [78]: dt.bath.fillna(dt.bath.mode()[0],inplace=True)
In [79]: dt.isna().sum()
```

```
Out[79]: area_type         0
         availability      0
         location          0
         size              0
         total_sqft        0
         bath              0
         balcony         605
         price             0
         dtype: int64
```

balcony

```
In [81]: dt.balcony.dtype
```

```
Out[81]: dtype('float64')
```

```
In [82]: dt.balcony.fillna(dt.balcony.mode()[0],inplace=True)
```

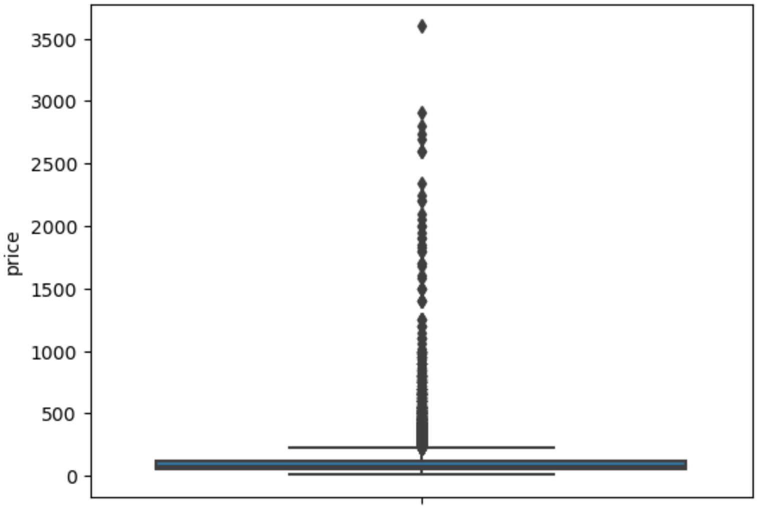
```
In [83]: dt.isna().sum()
```

```
Out[83]: area_type       0
         availability    0
         location        0
         size            0
         total_sqft      0
         bath            0
         balcony         0
         price           0
         dtype: int64
```

Outliers' Detection

Price

```
In [7]: sns.boxplot(y='price',data=dt)

        plt.show()
```



```
In [8]: dt.price.describe()
```

```
Out[8]: count    13320.000000
        mean       112.565627
        std        148.971674
        min          8.000000
        25%         50.000000
        50%         72.000000
        75%        120.000000
        max       3600.000000
        Name: price, dtype: float64
```

Total sqft

```
In [9]: dt.total_sqft.describe()
```

```
Out[9]: count     13320
        unique     2117
        top        1200
        freq        843
        Name: total_sqft, dtype: object
```

```
In [10]: dt.total_sqft.dtype
```

```
Out[10]: dtype('O')
```

```
In [11]: dt.total_sqft.unique()
```

```
Out[11]: array(['1056', '2600', '1440', ..., '1133 - 1384', '774', '4689'],
               dtype=object)
```

```
In [12]: ind=dt[dt.total_sqft.str.contains('-')].index
```

```
In [13]: ind
```

```
Out[13]: Int64Index([   30,    56,    81,   122,   137,   165,   188,   224,   549,
                       579,
                     ...
                     12544, 12791, 12861, 12955, 12975, 12990, 13059, 13240, 13265,
                     13299],
                    dtype='int64', length=201)
```

```
In [15]: s=dt[dt.total_sqft.str.contains('-')]['total_sqft'].str.split('-')
```

```
In [16]: lst=[]
         for i in s:
             lst.append((float(i[0])+float(i[1]))/2)
```

```
In [17]: 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, 1142.5, 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, 4
624.5, 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, 2856.0, 700.0, 155
9.0, 1352.5, 1800.0, 1950.0, 1185.5, 1005.0, 1707.0, 1476.0, 3181.0, 1192.5, 2912.5, 630.5, 1530.0, 717.0, 1664.0, 3185.0, 430
3.5, 1343.5, 3416.5, 1312.5, 1137.5, 458.0, 2345.0, 709.0, 605.0, 2094.0, 2987.5, 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, 4334.0, 2336.5, 1302.5, 3317.5, 140
5.0, 1532.5, 3550.0, 2856.0, 2856.0, 1583.0, 1115.0, 1162.5, 1580.0, 1272.5, 925.0, 2856.0, 698.5, 1730.0, 1431.5, 4062.5, 102
9.5, 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, 1745.0, 762.5, 693.0, 800.0, 728.5, 2302.5, 800.0, 1800.0, 552.5, 1495.0, 775.0, 1732.5, 1532.5, 1560.0, 1131.0, 2835.0, 126
0.0, 1081.5, 2065.5, 583.0, 790.5, 1237.5, 711.0, 2895.5, 801.0, 2630.0, 863.0, 5020.0, 1315.0, 1530.0, 612.5, 907.0, 2820.0, 4
58.0, 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, 2585.5, 82
7.5, 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, 2856.0]
```

```
In [18]: ind
```

```
Out[18]: Int64Index([   30,    56,    81,   122,   137,   165,   188,   224,   549,
                       579,
                     ...
                     12544, 12791, 12861, 12955, 12975, 12990, 13059, 13240, 13265,
                     13299],
                    dtype='int64', length=201)
```

```
In [19]: dt.loc[ind,'total_sqft']=lst
```

In [20]:
```
dt.loc[ind]
```

Out[20]:

	area_type	availability	location	size	society	total_sqft	bath	balcony	price
30	Super built-up Area	19-Dec	Yelahanka	4 BHK	LedorSa	2475.0	4.0	0.0	186.000
56	Built-up Area	20-Feb	Devanahalli	4 Bedroom	BrereAt	3210.0	NaN	NaN	192.000
81	Built-up Area	18-Oct	Hennur Road	4 Bedroom	Gollela	3203.5	NaN	NaN	224.500
122	Super built-up Area	18-Mar	Hebbal	4 BHK	SNontle	5611.5	4.0	0.0	477.000
137	Super built-up Area	19-Mar	8th Phase JP Nagar	2 BHK	Vaarech	1073.5	2.0	0.0	54.005
...	...	...	...	...	...	...	...	...	...
12990	Super built-up Area	18-May	Talaghattapura	3 BHK	Sodgere	2038.5	3.0	0.0	122.000
13059	Super built-up Area	Ready To Move	Harlur	2 BHK	Shodsir	1335.0	2.0	0.0	72.760
13240	Super built-up Area	Ready To Move	Devanahalli	1 BHK	Pardsri	1075.0	NaN	NaN	52.570
13265	Super built-up Area	20-Sep	Hoodi	2 BHK	Ranuetz	1258.5	2.0	0.0	59.135
13299	Super built-up Area	18-Dec	Whitefield	4 BHK	Prtates	2856.0	5.0	0.0	154.500

201 rows × 9 columns

In [21]:
```
dt.total_sqft.str.contains('-').sum()
```

Out[21]:
```
0
```

In [22]:
```
dt.isna().sum()
```

Out[22]:
```
area_type          0
availability       0
location           1
size              16
society         5502
total_sqft         0
bath              73
balcony          609
price              0
dtype: int64
```

In [23]:
```
dt.dtypes
```

Out[23]:
```
area_type        object
availability     object
location         object
size             object
society          object
total_sqft       object
bath            float64
balcony         float64
price           float64
dtype: object
```

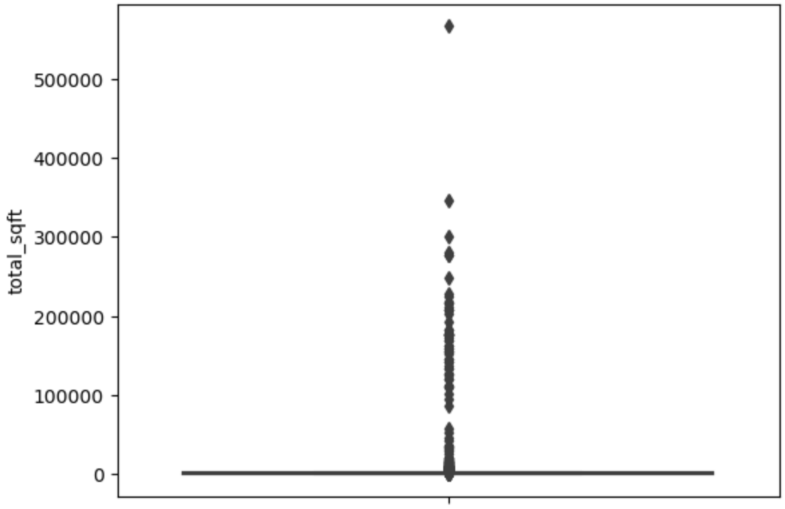
In [24]:
```
dt.total_sqft.replace('[A-Za-z. ]','',regex=True,inplace=True)
```

In [25]:
```
dt.total_sqft=dt.total_sqft.astype(float)
```

In [26]:
```
dt.dtypes
```

Out[26]:
```
area_type        object
availability     object
location         object
size             object
society          object
total_sqft      float64
bath            float64
balcony         float64
price           float64
dtype: object
```

In [27]:
```
sns.boxplot(y='total_sqft',data=dt)

plt.show()
```



In [104]:
```
lst=['150','250','350','450','50 sq. meter','50 meter']
x=list('abcdef')
```

In [106]:
```
data=pd.DataFrame({'Name':x,'Area':lst})
```

In [107]:
```
data
```

Out[107]:

	Name	Area
0	a	150
1	b	250
2	c	350
3	d	450
4	e	50 sq. meter
5	f	50 meter

In [108]:
```
data.dtypes
```

Out[108]:
```
Name    object
Area    object
dtype: object
```

In [111]:
```
data.Area.replace('[A-Za-z .]','',regex=True,inplace=True)
```

In [112]:
```
data
```

Out[112]:

	Name	Area
0	a	150
1	b	250
2	c	350
3	d	450
4	e	50
5	f	50

In [113]:
```
data.dtypes
```

Out[113]:
```
Name    object
Area    object
dtype: object
```

In [114]:

```
data.Area.astype(int)
```

Out[114]:

```
0    150
1    250
2    350
3    450
4     50
5     50
Name: Area, dtype: int32
```

In [115]:

```
city=['New York', 'new Delhi', 'Mumbai', 'Beijing', 'Hanoi']
country=['USA','India','India','China','Vietnam']
```

In [116]:

```
ct=pd.DataFrame({'City':city,'Country':country})
```

In [117]:

```
ct
```

Out[117]:

	City	Country
0	New York	USA
1	new Delhi	India
2	Mumbai	India
3	Beijing	China
4	Hanoi	Vietnam

In [118]:

```
ct.City.replace('New York','New_York')
```

Out[118]:

```
0     New_York
1    new Delhi
2       Mumbai
3      Beijing
4        Hanoi
Name: City, dtype: object
```

In [121]:

```
ct.City.replace('[Nn]ew ','New_',regex=True)
```

Out[121]:

```
0     New_York
1    New_Delhi
2       Mumbai
3      Beijing
4        Hanoi
Name: City, dtype: object
```

In [122]:

```
import re
```

In [133]:

```
text='New York neW Delhi Mumbai Chennai NEw Orleans'

pat='[Nn][eE][wW] '

for i in re.finditer(pat,text):
    print(i)
```

```
<re.Match object; span=(0, 4), match='New '>
<re.Match object; span=(9, 13), match='neW '>
<re.Match object; span=(34, 38), match='NEw '>
```

In [135]:

```
text='New York neW Delhi Mumbai Chennai NEw Orleans'

pat='[Nn][eE][wW] '

re.sub(pat,'New_',text)
```

Out[135]:

```
'New_York New_Delhi Mumbai Chennai New_Orleans'
```

In [151]:

```
dt.head()
```

Out[151]:

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

Outliers' Removal

IQR method

In [148]:

```
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 [156]:

```
print(upper_bound)
print(lower_bound)
# print(q1,q3)
```

```
2600.0
200.0
```

In [145]:

```
dt.total_sqft.describe()
```

Out[145]:

```
count     12751.000000
mean       2436.581412
std       13206.996703
min           1.000000
25%        1100.000000
50%        1285.000000
75%        1700.000000
max      566584.000000
Name: total_sqft, dtype: float64
```

In [152]:

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

In [153]:

```
dt.head()
```

Out[153]:

	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 [155]:

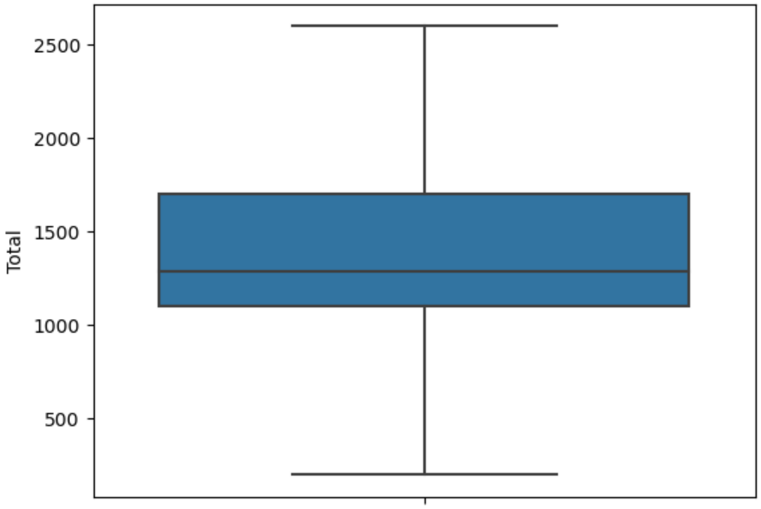
```
dt[['total_sqft','Total']].describe()
```

Out[155]:

	total_sqft	Total
count	12751.000000	12751.000000
mean	2436.581412	1445.561218
std	13206.996703	551.105820
min	1.000000	200.000000
25%	1100.000000	1100.000000
50%	1285.000000	1285.000000
75%	1700.000000	1700.000000
max	566584.000000	2600.000000

In [157]:
```
sns.boxplot(y='Total',data=dt)
```

Out[157]:
```
<AxesSubplot:ylabel='Total'>
```



In [161]:
```
dt['New_Price']=outlier(dt.price)
```

In [162]:
```
dt.head()
```

Out[162]:

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

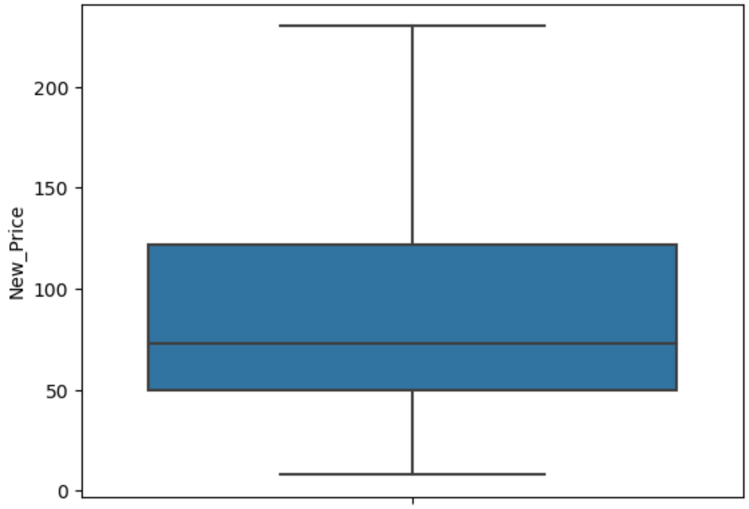
In [163]:
```
dt[['price','New_Price']].describe()
```

Out[163]:

	price	New_Price
count	12751.000000	12751.000000
mean	114.492961	94.929162
std	151.676492	61.225221
min	8.000000	8.000000
25%	50.000000	50.000000
50%	73.000000	73.000000
75%	122.000000	122.000000
max	3600.000000	230.000000

In [165]:

```
sns.boxplot(y='New_Price',data=dt)
plt.show()
```

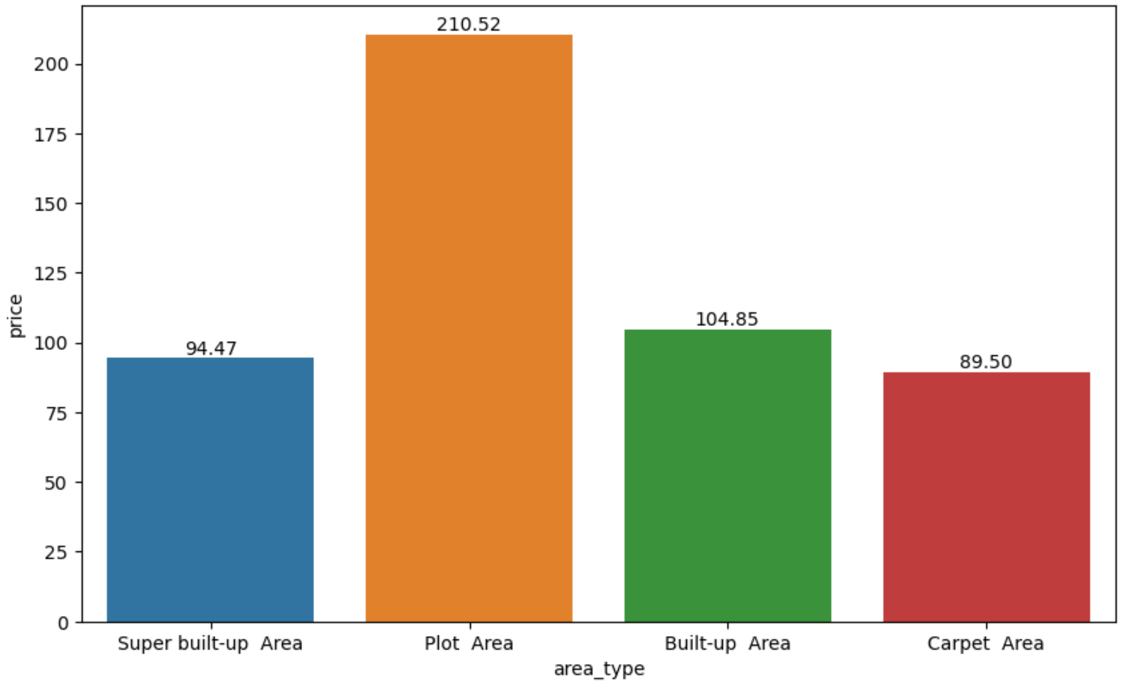


Analysis

Average price according to the area type

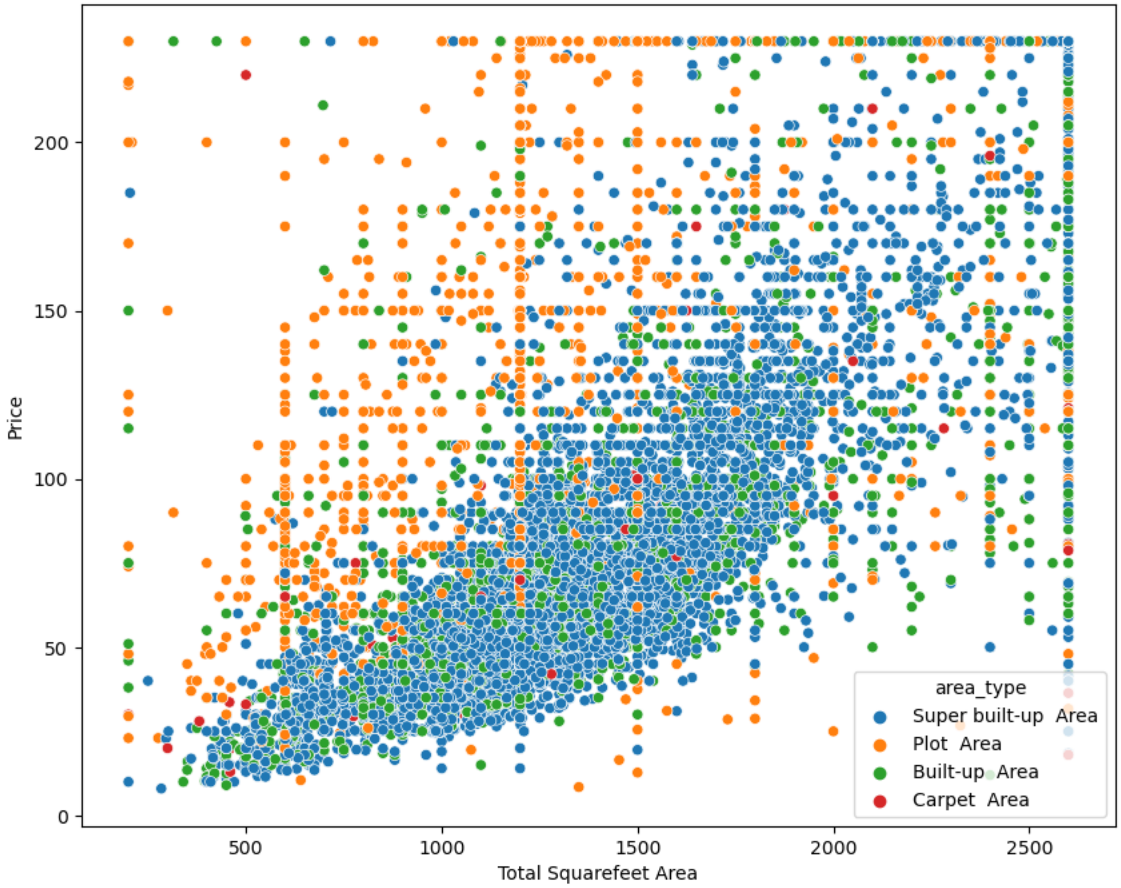
In [176]:

```
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

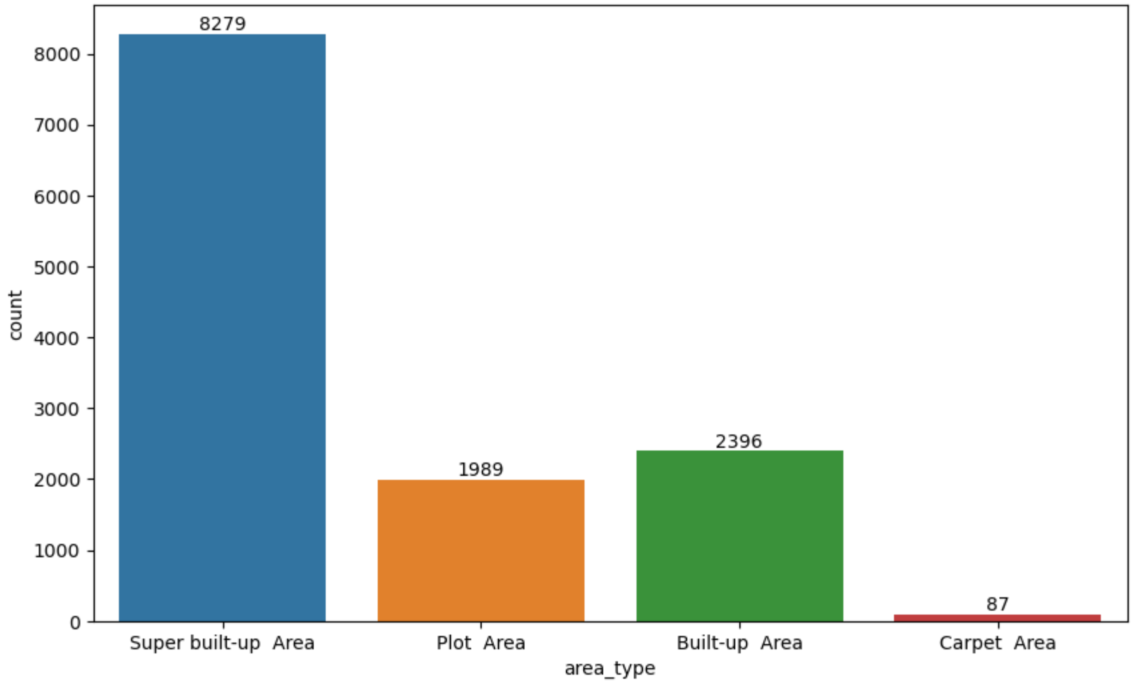
In [182]:
```
plt.figure(figsize=(10,8),dpi=100)
sns.scatterplot(x='Total',y='New_Price',hue='area_type',data=dt)
plt.xlabel('Total Squarefeet Area')
plt.ylabel('Price')

plt.show()
```



Observations according to the area type

In [187]:

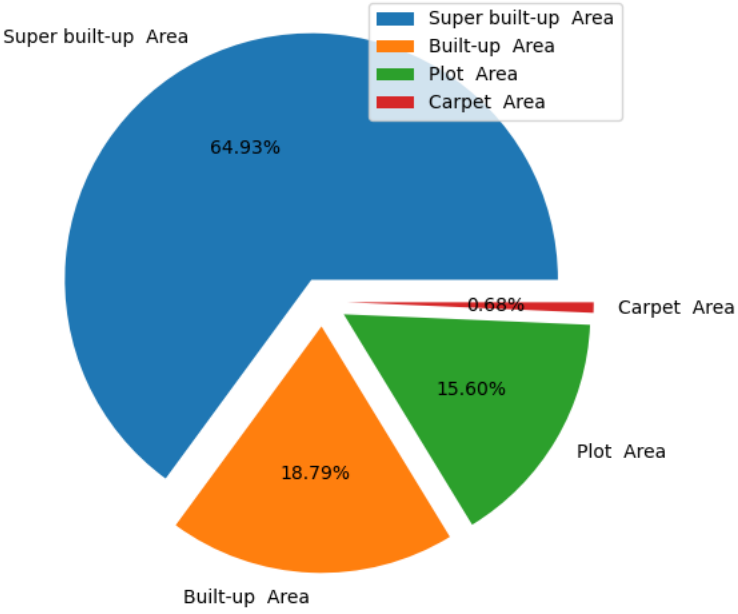
```
plt.figure(figsize=(10,6),dpi=100)
ax=sns.countplot(x='area_type',data=dt)

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



Ratio of the areatype

In [197]:

```
plt.figure(figsize=(10,6),dpi=100)
plt.pie(dt.area_type.value_counts(),labels=dt.area_type.value_counts().index,autopct='%.2f%%',explode=(0.1,0.1,0.1,0.1))
plt.legend()
plt.show()
```



```
In [198]: dt.head()
```

Out[198]:

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

Average price of 2bhk, 3bhk and 4bhk

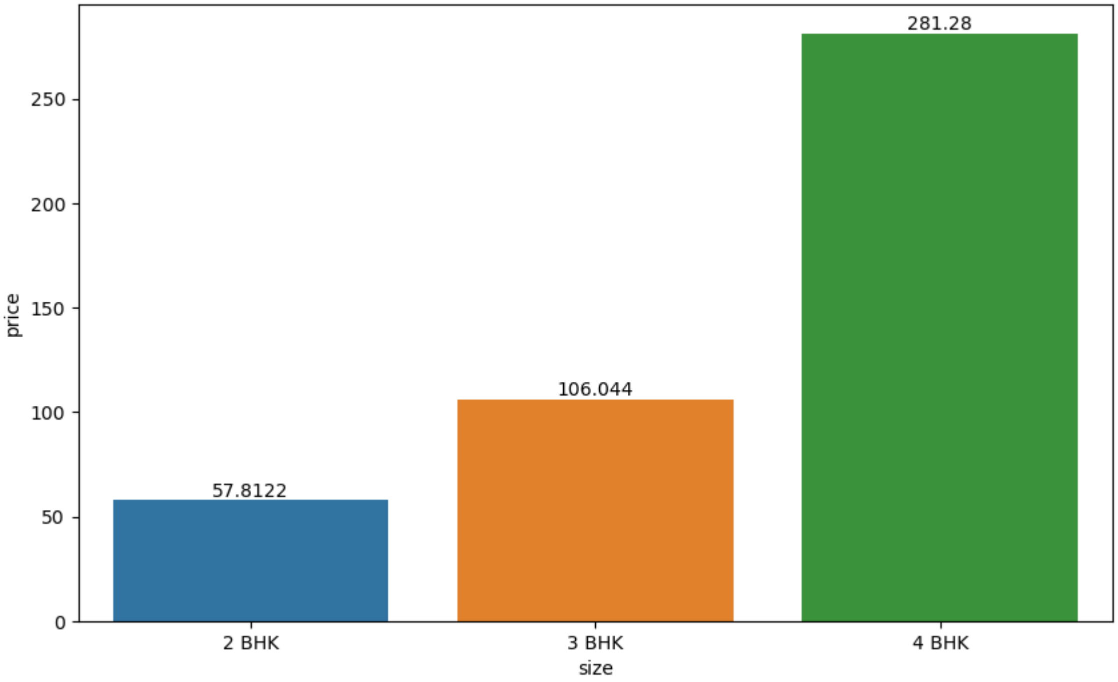
```
In [205]: x=dt[(dt['size']=='2 BHK') | (dt['size']=='3 BHK') | (dt['size']=='4 BHK')]
          x
```

Out[205]:

	area_type	availability	location	size	total_sqft	bath	balcony	price	Total	New_Price
0	Super built-up Area	19-Dec	Electronic City Phase II	2 BHK	1056.0	2.0	1.0	39.07	1056.0	39.07
2	Built-up Area	Ready To Move	Uttarahalli	3 BHK	1440.0	2.0	3.0	62.00	1440.0	62.00
3	Super built-up Area	Ready To Move	Lingadheeranahalli	3 BHK	1521.0	3.0	1.0	95.00	1521.0	95.00
4	Super built-up Area	Ready To Move	Kothanur	2 BHK	1200.0	2.0	1.0	51.00	1200.0	51.00
5	Super built-up Area	Ready To Move	Whitefield	2 BHK	1170.0	2.0	1.0	38.00	1170.0	38.00
...	...	...	...	...	...	...	...	...	...	...
13312	Super built-up Area	Ready To Move	Bellandur	2 BHK	1262.0	2.0	2.0	47.00	1262.0	47.00
13314	Super built-up Area	Ready To Move	Green Glen Layout	3 BHK	1715.0	3.0	3.0	112.00	1715.0	112.00
13316	Super built-up Area	Ready To Move	Richards Town	4 BHK	3600.0	5.0	2.0	400.00	2600.0	230.00
13317	Built-up Area	Ready To Move	Raja Rajeshwari Nagar	2 BHK	1141.0	2.0	1.0	60.00	1141.0	60.00
13318	Super built-up Area	18-Jun	Padmanabhanagar	4 BHK	4689.0	4.0	1.0	488.00	2600.0	230.00

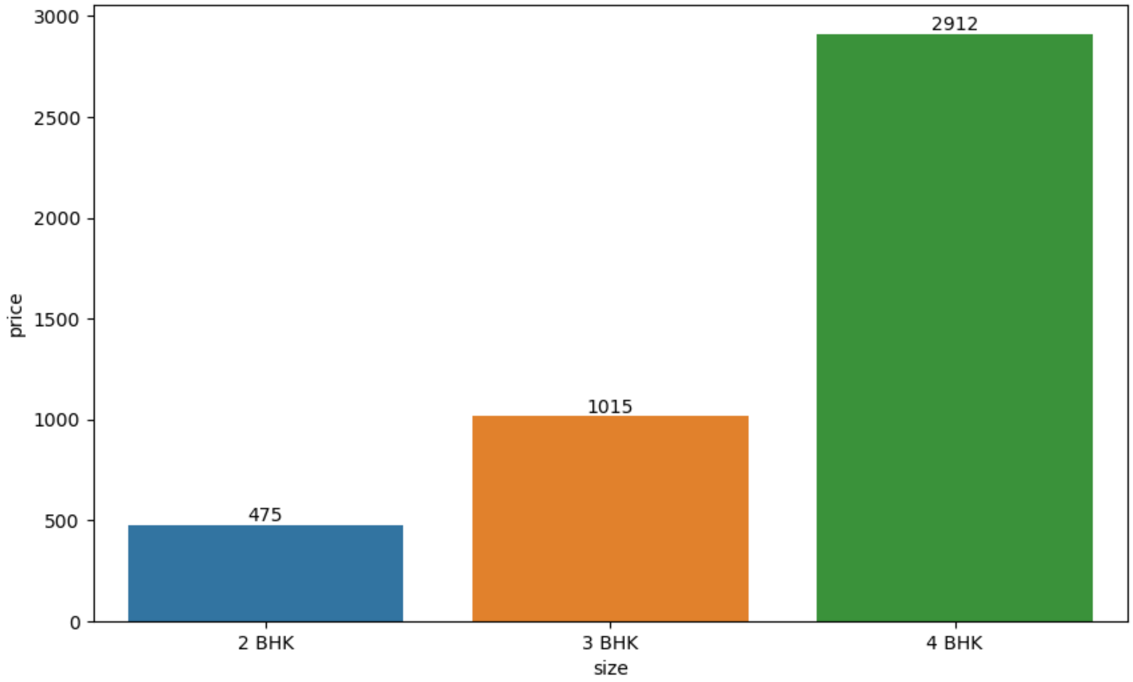
9601 rows × 10 columns

```
In [211]: 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()
```



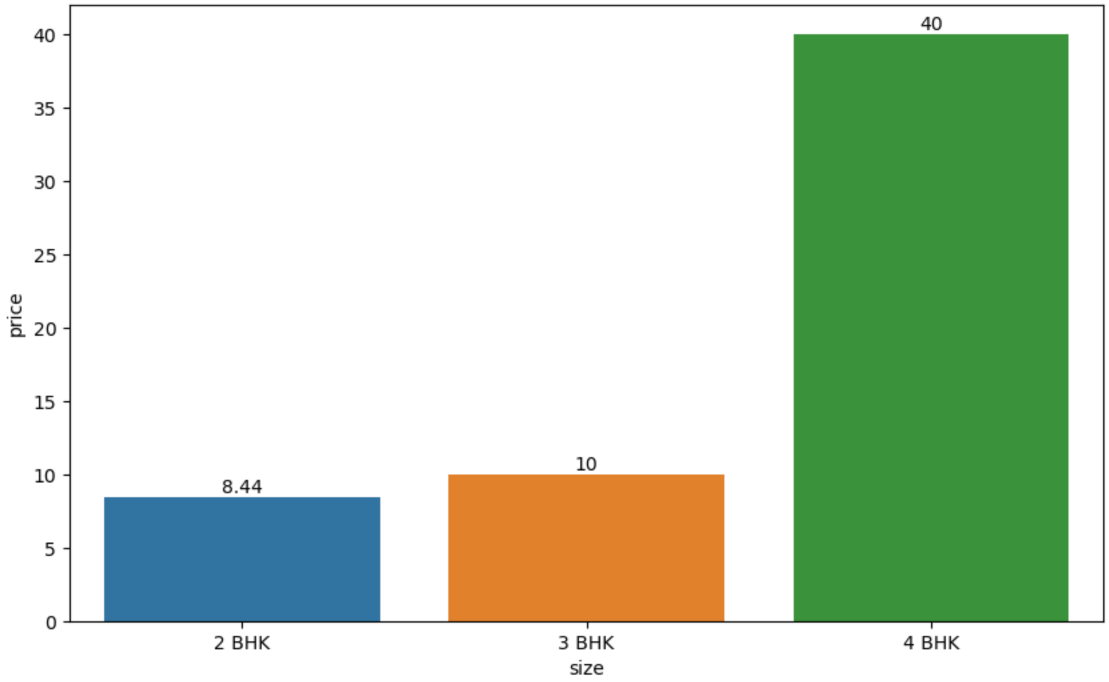
Maximum price of 2bhk, 3bhk and 4bhk

In [217]:
```
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 [218]:
```
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()
```



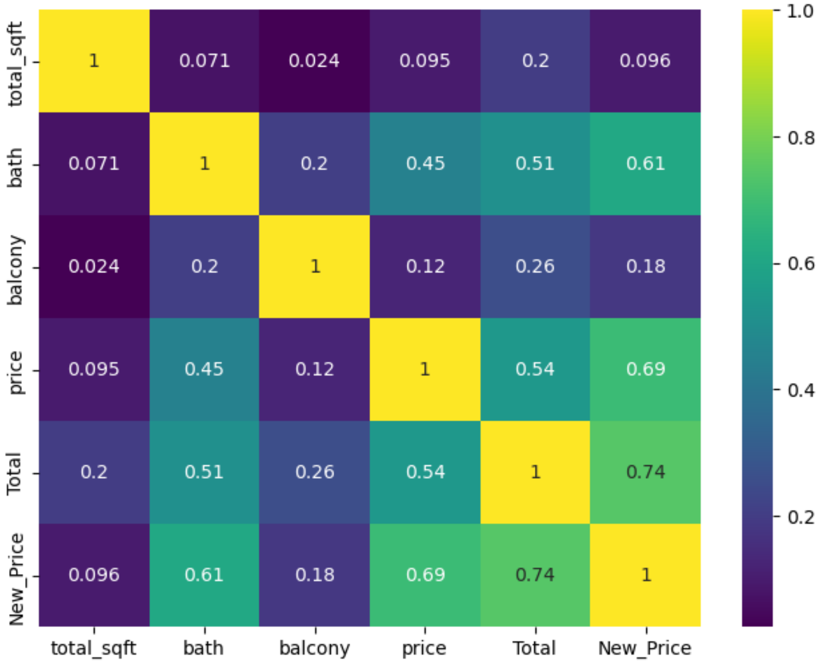
Coorelation

In [219]:
```
dt.corr()
```

Out[219]:

	total_sqft	bath	balcony	price	Total	New_Price
total_sqft	1.000000	0.070651	0.024289	0.095442	0.199018	0.096206
bath	0.070651	1.000000	0.204597	0.450915	0.510562	0.610747
balcony	0.024289	0.204597	1.000000	0.123514	0.256576	0.182605
price	0.095442	0.450915	0.123514	1.000000	0.544568	0.688234
Total	0.199018	0.510562	0.256576	0.544568	1.000000	0.741639
New_Price	0.096206	0.610747	0.182605	0.688234	0.741639	1.000000

In [226]:
```
plt.figure(figsize=(8,6),dpi=100)
sns.heatmap(dt.corr(),annot=True,cmap='viridis')
plt.show()
```


total_sqft
bath
balcony
price
Total
New_Price
total_sqft
bath
balcony
price
Total
New_Price