Hacker Rank Problem

Problem : To determines the property prices in Bengaluru.


```
In [1]:   #importing the necessary Libraries
          import re
          import pandas as pd
          import numpy as np
          import matplotlib.pyplot as plt
          import seaborn as sns

          pd.pandas.set_option('display.max_columns',None)
          pd.set_option('display.max_rows',None)
```

```
In [2]:   #Loading the dataset - this is on the train data
          data = pd.read_csv('Train.csv')
```

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

Out[3]:

	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

	area_type	availability	location	size	society	total_sqft	bath	balcony	price
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

Columns:

1. area_type - Describes the area

2. availability - Describes when it can be possessed or when it is ready(categorical and time-series)

3. location - Describes where the house is located in Bengaluru

4. size - in BHK or Bedroom (1-10 or more)

5. society - to which society it belongs

6. total_sqft - size of the property in sq.ft

7. bath - No. of bathrooms

8. balcony - No. of the balcony

9. Price - Value of the property in lakhs(INR)

=> Exploration of data

In [4]:
```python
print('There are:',data.shape[0],'rows and', data.shape[1],'cols')
```

There are: 13320 rows and 9 cols

In [5]:
```python
data.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 [6]:
```python
#total_sqft should be in numbers not object.
```

```
In [7]:   data['area_type'].value_counts()
```

```
Out[7]:   Super built-up  Area       8790
          Built-up  Area             2418
          Plot  Area                 2025
          Carpet  Area                 87
          Name: area_type, dtype: int64
```

```
In [8]:   data['availability'].value_counts()
```

```
Out[8]:   Ready To Move            10581
          18-Dec                     307
          18-May                     295
          18-Apr                     271
          18-Aug                     200
          19-Dec                     185
          18-Jul                     143
          18-Mar                     131
          18-Jun                      99
          20-Dec                      98
          21-Dec                      93
          19-Mar                      88
          18-Feb                      62
          18-Nov                      47
          18-Jan                      43
          18-Sep                      41
          19-Jun                      40
          18-Oct                      39
          19-Jan                      39
          19-Jul                      36
          17-Dec                      29
          20-Jan                      24
          17-Oct                      21
          19-Sep                      21
          22-Jun                      19
          19-Aug                      18
          21-Jun                      17
          19-Apr                      16
          Immediate Possession        16
          20-Aug                      16
          19-Oct                      15
          21-Mar                      14
          17-Jun                      13
          21-May                      12
          17-Jul                      12
          17-Nov                      12
          21-Jan                      12
          22-Dec                      11
          20-Jun                      11
          17-Sep                      11
          22-May                      10
          19-May                       9
          17-Aug                       9
          21-Jul                       8
          17-May                       8
          20-Oct                       7
          19-Nov                       7
          17-Apr                       7
          21-Feb                       6
          20-Sep                       6
          21-Oct                       6
          22-Jan                       6
          21-Sep                       6
```

```
        21-Aug                          5
        20-Jul                          5
        17-Mar                          5
        20-Nov                          4
        16-Dec                          4
        20-Apr                          4
        20-May                          4
        21-Nov                          3
        16-Mar                          3
        22-Mar                          3
        19-Feb                          3
        20-Mar                          2
        22-Nov                          2
        16-Sep                          2
        15-Oct                          2
        17-Feb                          2
        15-Nov                          2
        20-Feb                          2
        15-Jun                          1
        16-Jul                          1
        14-Nov                          1
        15-Dec                          1
        16-Oct                          1
        15-Aug                          1
        17-Jan                          1
        16-Nov                          1
        16-Jan                          1
        14-Jul                          1
        Name: availability, dtype: int64
```

In [9]:
```python
data['availability'].unique()
```

Out[9]:
```
array(['19-Dec', 'Ready To Move', '18-May', '18-Feb', '18-Nov', '20-Dec',
       '17-Oct', '21-Dec', '19-Sep', '20-Sep', '18-Mar', '20-Feb',
       '18-Apr', '20-Aug', '18-Oct', '19-Mar', '17-Sep', '18-Dec',
       '17-Aug', '19-Apr', '18-Jun', '22-Dec', '22-Jan', '18-Aug',
       '19-Jan', '17-Jul', '18-Jul', '21-Jun', '20-May', '19-Aug',
       '18-Sep', '17-May', '17-Jun', '21-May', '18-Jan', '20-Mar',
       '17-Dec', '16-Mar', '19-Jun', '22-Jun', '19-Jul', '21-Feb',
       'Immediate Possession', '19-May', '17-Nov', '20-Oct', '20-Jun',
       '19-Feb', '21-Oct', '21-Jan', '17-Mar', '17-Apr', '22-May',
       '19-Oct', '21-Jul', '21-Nov', '21-Mar', '16-Dec', '22-Mar',
       '20-Jan', '21-Sep', '21-Aug', '14-Nov', '19-Nov', '15-Nov',
       '16-Jul', '15-Jun', '17-Feb', '20-Nov', '20-Jul', '16-Sep',
       '15-Oct', '15-Dec', '16-Oct', '22-Nov', '15-Aug', '17-Jan',
       '16-Nov', '20-Apr', '16-Jan', '14-Jul'], dtype=object)
```

In [10]:
```python
data['location'].value_counts()
```

Out[10]:
```
Whitefield                              540
Sarjapur  Road                          399
Electronic City                         302
Kanakpura Road                          273
Thanisandra                             234
Yelahanka                               213
Uttarahalli                             186
Hebbal                                  177
Marathahalli                            175
Raja Rajeshwari Nagar                   171
Bannerghatta Road                       152
Hennur Road                             152
7th Phase JP Nagar                      149
Haralur Road                            142
Electronic City Phase II                132
```

Rajaji Nagar	107
Chandapura	100
Bellandur	96
KR Puram	91
Electronics City Phase 1	88
Hoodi	88
Yeshwanthpur	85
Begur Road	84
Sarjapur	82
Kasavanhalli	80
Harlur	79
Banashankari	75
Hormavu	74
Ramamurthy Nagar	73
Kengeri	73
JP Nagar	72
Hosa Road	72
Koramangala	72
Jakkur	71
Old Madras Road	71
Varthur	70
Kothanur	66
Kaggadasapura	64
Nagarbhavi	63
Thigalarapalya	62
Akshaya Nagar	62
TC Palaya	60
Malleshwaram	58
8th Phase JP Nagar	57
Rachenahalli	56
Hennur	55
Budigere	54
Jigani	54
HSR Layout	53
Jalahalli	52
Hulimavu	52
Bisuvanahalli	51
Panathur	51
Mysore Road	50
Ramagondanahalli	50
Hegde Nagar	49
Bhoganhalli	49
Gottigere	48
Kundalahalli	47
Brookefield	47
Hosur Road	47
Balagere	45
Devanahalli	45
Indira Nagar	44
9th Phase JP Nagar	43
Vidyaranyapura	43
Vittasandra	43
CV Raman Nagar	43
Subramanyapura	43
Vijayanagar	42
Kadugodi	42
Kanakapura	42
Horamavu Agara	42
Attibele	42
Yelahanka New Town	41
Kengeri Satellite Town	40
Talaghattapura	40
5th Phase JP Nagar	39
Kudlu Gate	39
Green Glen Layout	39
Sahakara Nagar	39

Channasandra	38
Bommasandra	37
Frazer Town	36
Lakshminarayana Pura	36
Anekal	36
Hosakerehalli	36
R.T. Nagar	36
Bommanahalli	35
Hebbal Kempapura	34
Old Airport Road	33
Kalena Agrahara	33
Tumkur Road	33
Mahadevpura	31
Basavangudi	31
Ambedkar Nagar	31
Doddathoguru	30
Kumaraswami Layout	30
Chikkalasandra	30
Ananth Nagar	30
Kudlu	29
BTM 2nd Stage	29
Dodda Nekkundi	29
Kammasandra	29
Padmanabhanagar	28
Somasundara Palya	28
Horamavu Banaswadi	28
Banashankari Stage III	27
Kodichikkanahalli	27
Ambalipura	27
Singasandra	27
Anandapura	27
Gubbalala	26
Choodasandra	26
Margondanahalli	26
Bommasandra Industrial Area	26
Kothannur	26
1st Phase JP Nagar	25
Iblur Village	25
Babusapalaya	25
Kogilu	25
Seegehalli	25
Magadi Road	25
Kambipura	24
Ardendale	24
Amruthahalli	24
Battarahalli	24
Abbigere	24
2nd Stage Nagarbhavi	24
Munnekollal	24
6th Phase JP Nagar	23
Lingadheeranahalli	23
EPIP Zone	23
Gunjur	22
Hoskote	22
Domlur	22
Kathriguppe	22
Kaval Byrasandra	22
Thubarahalli	22
Rayasandra	22
Sonnenahalli	22
Binny Pete	21
Basaveshwara Nagar	21
Ulsoor	21
HBR Layout	20
Poorna Pragna Layout	20
Yelachenahalli	20

Sanjay nagar	20
Kalyan nagar	19
HRBR Layout	19
OMBR Layout	19
Pai Layout	19
Kaggalipura	19
Garudachar Palya	18
Kannamangala	18
Bannerghatta	18
Billekahalli	18
BTM Layout	17
Nagavara	17
Kaikondrahalli	17
Malleshpalya	17
Sarjapura - Attibele Road	17
Chikka Tirupathi	17
Dasarahalli	17
Kammanahalli	17
Arekere	17
Banaswadi	16
Judicial Layout	16
Banashankari Stage VI	16
Cooke Town	16
Dasanapura	16
Parappana Agrahara	16
Banashankari Stage II	16
Begur	16
Kereguddadahalli	16
Kenchenahalli	16
Sector 2 HSR Layout	16
Anjanapura	16
Kasturi Nagar	16
Mallasandra	16
Varthur Road	15
Chamrajpet	15
Benson Town	15
Kodihalli	15
Nagavarapalya	15
Devarachikkanahalli	14
Jalahalli East	14
Doddakallasandra	14
Sarakki Nagar	14
Murugeshpalya	14
Sultan Palaya	14
1st Block Jayanagar	14
Giri Nagar	14
NRI Layout	14
NGR Layout	14
Vishveshwarya Layout	13
Yelenahalli	13
Cunningham Road	13
BEML Layout	13
Prithvi Layout	13
Sector 7 HSR Layout	13
Rajiv Nagar	13
Shampura	13
Chikkabanavar	13
Bommenahalli	13
Shivaji Nagar	13
Kodigehaali	13
Gollarapalya Hosahalli	13
Neeladri Nagar	13
Dommasandra	13
Konanakunte	13
ISRO Layout	13
Mahalakshmi Layout	13

Kadubeesanahalli	13
Badavala Nagar	12
Mico Layout	12
AECS Layout	12
Laggere	12
Cox Town	12
GM Palaya	12
Karuna Nagar	12
Vasanthapura	12
Doddaballapur	12
Banashankari Stage V	12
Sompura	12
Bharathi Nagar	12
Vishwapriya Layout	12
5th Block Hbr Layout	12
ITPL	12
Nagasandra	12
2nd Phase Judicial Layout	11
Banjara Layout	11
Tindlu	11
Kodigehalli	11
Nehru Nagar	11
Thyagaraja Nagar	11
Marsur	11
HAL 2nd Stage	11
Narayanapura	11
LB Shastri Nagar	11
Pattandur Agrahara	11
Kalkere	10
Gunjur Palya	10
Dodsworth Layout	10
BTM 1st Stage	10
Sadashiva Nagar	10
Naganathapura	10
1st Block Koramangala	10
Nagappa Reddy Layout	10
Nagadevanahalli	10
Ganga Nagar	10
Dairy Circle	10
Basapura	10
Vignana Nagar	9
Medahalli	9
Vishwanatha Nagenahalli	9
Kamakshipalya	9
Chandra Layout	9
Lingarajapuram	9
Richmond Town	9
2nd Phase JP Nagar	9
Gollahalli	9
Chennammana Kere	9
B Narayanapura	9
Ejipura	9
Kaverappa Layout	9
Sector 1 HSR Layout	9
Mathikere	9
Jakkur Plantation	9
Peenya	9
KUDLU MAIN ROAD	9
4th Block Koramangala	9
Yemlur	9
Volagerekallahalli	9
Banagiri Nagar	9
Nallurhalli	8
Roopena Agrahara	8
Cambridge Layout	8
Sarjapur Road,	8

Sathya Sai Layout	8
Vasanth nagar	8
Basavanapura	8
Shikaripalya	8
Hongasandra	8
Huskur	8
Gopalkrishna Nagar	8
Nelamangala	8
Sidedahalli	8
Seetharampalya	8
Outer Ring Road East	8
Akshayanagara East	8
Hoysalanagar	8
Jalahalli West	8
Thirumenahalli	8
Mahalakshmi Puram	8
Kanaka Nagar	8
MS Pallya	8
Dodda Nekkundi Extension	8
Akshaya Vana	8
Shanti Nagar	8
Dollars Colony	8
Ittamadu	8
Byadarahalli	8
Kodbisanhalli	8
1st Block HRBR Layout	8
Kattigenahalli	8
Manayata Tech Park	8
Reliaable Tranquil Layout	8
Vajarahalli	8
Doddakammanahalli	7
Richards Town	7
Ramakrishnappa Layout	7
2nd Block Hrbr Layout	7
Ambedkar Colony	7
Jeevan bima nagar	7
Hessarghatta	7
Singapura Village	7
Byrasandra	7
4th T block Jayanagar	7
Keshava Nagar	7
Maruthi Sevanagar	7
Doddabommasandra	7
Tejaswini Nagar	7
Basaveshwara Nagar Yelahanka	7
Hoodi Circle,	7
Byatarayanapura	7
Vijaya Bank Layout	7
Victoria Layout	7
Wilson Garden	7
8th block Koramangala	7
Kundalahalli Colony	7
Green View Layout	7
Channasandra Layout	7
Doctors Layout	7
Defence Colony	7
Austin Town	7
HOSUR MAIN ROAD	7
Madiwala	7
3rd Block Hrbr Layout	7
Ashwath Nagar	7
AGS Layout	7
Hennur Gardens	7
Bank Of Baroda Colony	7
Cholanayakanahalli	7
Canara Bank Colony	7

Jayanagar	7
RMV 2nd Stage	7
Devarabeesana Halli	6
Doddakannelli	6
Rajiv Gandhi Nagar	6
Bileshivale	6
Hennur Bande	6
Bagalakunte	6
Amblipura	6
Doddanakundi Industrial Area 2	6
Nagawara Junction	6
Siddapura	6
Ashwathnagar	6
Abbaiah Reddy Layout	6
New Thippasandra	6
Nayandanahalli	6
Doddanekundi	6
Suraksha Nagar	6
Bhuvaneshwari Nagar	6
Kacharakanahalli	6
Dodda Banaswadi	6
Varanasi	6
Kumara Park	6
Rustam Bagh Layout	6
Srinivasa Nagar	6
Samethanahalli	6
Chelekare	6
Meenakunte	6
Gopalapura	6
Shantiniketan Layout	6
Motappa Layout	6
Devasthanagalu	6
Anand Nagar	6
Shree Ananth Nagar Layout	6
Venkatapura	6
ITI Layout	6
Maragondanahalli	6
Ashirvad Colony	6
Byrathi Village	6
Srirampura	6
3rd Block Banashankari	5
VGP Layout	5
Doddabanahalli	5
Jakkuru Layout	5
1st Stage Indira Nagar	5
Shanthala Nagar	5
RMV Extension	5
Pattanagere	5
Virat Nagar	5
Hosahalli Extension	5
Raghuvanahalli	5
KR Garden	5
Bellari Road	5
Maruthi Nagar	5
Mallathahalli	5
7th Block Jayanagar	5
Srirampuram	5
Kada Agrahara	5
Silk Board	5
Chikkadunnasandra	5
Cottonpet	5
6th block Koramangala	5
Ramanjaneyanagar	5
Nagaraja Garden	5
Bagalur	5
A Narayanapura	5

Maithri Layout	5
Hiremath Layout	5
Munivenkatppa Layout	5
Attur Layout	5
Lavelle Road	5
Kallumantapa	5
Kurubarahalli	5
9th Block Jayanagar	5
Avalahalli	5
Kadabagere	5
Sunkadakatte	5
Stage-4 Bommanahalli	5
Devi Nagar	5
Byagadadhenahalli	5
Basavanagara	5
Vishwapriya Nagar	5
Govindpura	5
Jakkasandra Extension	5
New Gurappana Palya	5
Vasantha Vallabha Nagar	5
Nagashetty Halli	5
Amruthnagar	5
HMT Layout	5
Carmelaram	5
Doopanahalli	5
Nagondanahalli	5
Off Sarjapur Road,	5
Kadugondanahalli	5
Coconut Grove Layout	5
Akshya Nagar	5
Belathur	5
Kuvempu Nagar	4
Kamala Nagar	4
Chikkasandra	4
Jnanabharathi Layout	4
Silver Springs Layout	4
4th Block Jayanagar	4
Bikasipura	4
Kumarapalli	4
Kodathi	4
Raja Rajeshwari Nagar 5th Stage	4
Alfa Garden Layout	4
Upkar Layout	4
Konanakunte Cross	4
MCECHS layout	4
Gowdanapalya	4
Immadihalli	4
T Dasarahalli	4
Mysore Highway	4
Tata Nagar	4
Bagalur Main Road	4
BCC Layout	4
Chikkathoguru	4
BSM Extension	4
Chinnapanahalli	4
Suddaguntepalya	4
Kammagondahalli	4
Palace Guttahalli	4
Laxmi Sagar Layout	4
Udayapur Village	4
Tavarekere	4
Geddalahalli	4
Tala Cauvery Layout	4
Nyanappana Halli	4
Ngef Layout	4
Mylasandra	4

Basavanna Nagar	4
BEL Road	4
Langford Town	4
NS Palya	4
AMS Layout	4
Ramamurthy Nagar Extension	4
8th Block Jayanagar	4
Doddagubbi	4
tc.palya	4
Hanumanth Nagar	4
Moodalapalya	4
Vaishnavi Layout	4
Brooke Bond First Cross	4
Glass Factory Layout	4
Varsova Layout	4
Lakshmi Layout	4
Dooravani Nagar	4
RWF West Colony	4
Sector 6 HSR Layout	4
Udaya Nagar	4
Thanisandra main road	4
Poornapragna Housing Society Layout	4
Shankarapuram	4
2nd Block Jayanagar	4
JCR Layout	4
Judicial Layout, Kanakapura Road,	4
4th Phase JP Nagar	4
Lavakusha Nagar	4
Singena Agrahara	4
Pragathi Nagar	4
Manjunath Nagar	4
Harsha Layout	4
Sai Gardens	4
Herohalli	4
Puttanahalli	4
Chennappa Layout	4
Divya Unnathi Layout	4
Kirloskar Layout	4
Lake City	4
Vinayaka Nagar	4
OLd Gurappanapalya	4
Baba Nagar	3
Marasandra	3
Atmananda Colony	3
Bidadi	3
Thanisandra	3
Bethel Nagar	3
Sri Balaji Krupa Layout	3
Kodipalya	3
Ullal Uppanagar	3
Devara Jeevanahalli	3
Sarvabhouma Nagar	3
Hegganahalli	3
Jnana Ganga Nagar	3
Virupakshapura	3
Telecom Layout	3
Ankappa Layout	3
Coffee Board Layout	3
Kaveri Nagar	3
1st Block HBR Layout	3
Jayamahal	3
2nd Stage Arekere Mico Layout	3
Sathya Layout	3
Pampa Extension	3
Thanisandra Main Road,	3
Krishna Reddy Layout	3

Agrahara Dasarahalli	3
Ullal Road	3
Lottegolla Halli	3
Bhagyalakshmi Avenue	3
BTM 4th Stage	3
B Channasandra	3
Dasappa Layout	3
Arehalli	3
Nandini Layout	3
Sanjeevini Nagar	3
Kengeri Hobli	3
Venugopal Reddy Layout	3
Hanumantha Nagar	3
Rajankunte	3
Jayanti Nagar	3
Himagiri Meadows	3
Manorayana Palya	3
J C Nagar	3
Kithaganur	3
Rajarajeshwari Nagara	3
Lakshmipura	3
Vimanapura	3
Mangammanapalya	3
Jinkethimmanahalli	3
Rajarajeshwari nagar	3
Kenchenhalli	3
Kachanayakanahalli	3
Ramesh Nagar	3
Sampangi Rama Nagar	3
Devarachikkanahalli	3
Seshadripuram	3
5th Block Jayanagar	3
Crimson Layout	3
Vinayak Nagar	3
Konena Agrahara	3
Yeshwanthpur Industrial Suburb	3
Adityanagar	3
Esther Enclave Layout	3
Kothnur Narayanapura	3
3rd Phase JP Nagar	3
Hagadur	3
Ilyas Nagar	3
Bhuvaneswari Nagar	3
SMV layout	3
Govindapura	3
Nobo Nagar	3
Dinnur	3
RPC layout	3
Nanjappa Layout	3
Singanayakanahalli	3
Tirumanahalli	3
D Group Employees Layout	3
Brindavan Nagar	3
Domlur Layout	3
Gulimangala	3
Gkvk Layout	3
Dollars Layout	3
Anjappa Layout	3
T.C PALYA	3
Kamakya Layout	3
Gattahalli	3
Vittal Nagar	3
RMV	3
VHBCS Layout	3
Prashanth Nagar	3
Palanahalli	3

Chikka Banaswadi	3
Venkatadri Layout	3
Thippasandra	3
KR Layout	3
Kashi Nagar	3
Raghavendra Nagar	3
Weavers Colony	3
Kavika Layout	3
Devanahalli Int. Airport	3
KSRTC Layout	3
Belatur	3
Canara Bank Layout	3
Hosapalya	3
Makali	3
5th Stage BEML Layout	3
Bettahalsoor	3
Gokula Extension	3
P&T Layout	3
Sanne Amanikere	3
Narayana Nagar 1st Block	3
Veerannapalya	3
Sadaramangala	3
Mathikere Extension	3
Ashwini layout	3
Anantapura	3
Basava Nagar	3
Vadarpalya	3
Harappanahalli	3
BHEL Layout	3
Daadys Gaarden Layout	3
Arishinakunte	3
Surabhi Layout	3
3rd Block Jayanagar	3
Alur	3
Kumbena Agrahara	3
Tunganagara	3
Srinagar	3
Ferrar Nagar	3
Shettigere	3
Tasker Town	3
Ayappa Nagar	3
Thurahalli	3
Amam Enclave Layout	2
GD Layout	2
Marenahalli	2
Koppa	2
Green Woods Layout	2
Coconut Garden	2
JP Nagar 7th Phase,	2
Govindaraja Nagar Ward	2
Sneha Colony	2
Bidrahalli	2
Shingapura	2
Versova Layout	2
CQAL Layout	2
Celebrity Paradise Layout	2
Vibuthipura	2
Manjunatha Layout	2
Kyalasanahalli	2
Raghavendra Layout	2
Chikkakannalli	2
ECC Road, Whitefield,	2
cooketown	2
Phase 1 Kammasandra	2
Kannur	2
Anand nagar	2

Race Course Road	2
Akshayanagara West	2
Gaurava Nagar	2
Madavara	2
Nandi Hills	2
Varthur Road,	2
Rajasree Layout	2
Gattigere	2
KEB Colony	2
Garebhavipalya	2
Nanjappa Garden	2
Neelamangala	2
Devasandra Extension	2
Omkar Nagar	2
JP Nagar 8th Phase,	2
Rajarajeshwarinagar	2
Lakkasandra	2
Hadosiddapura	2
Brindavan Layout	2
Devanahalli Road	2
Ramchandrapuram	2
Classic Paradise Layout	2
Geleyara Balaga Layout	2
Electronic City	2
manyata park	2
Near International Airport	2
Guni Agrahara	2
Chamundi Nagar	2
Hallehalli	2
2nd Block Koramangala	2
Dwarka Nagar	2
Harohalli	2
V.V Puram	2
Vivek Nagar	2
Gandhi Bazar	2
Veer Sandra	2
RMV Extension Stage 2	2
Sadanand Nagar	2
Dena Bank Colony	2
Shirdi Sai Layout	2
Gidada Konnenahalli	2
Kothnoor Dinne	2
Guddadahalli	2
Vasanthpura	2
Upadhyaya Layout	2
Annaiah Reddy Layout	2
Bendiganahalli	2
Rest House Road	2
RR Layout	2
Anjana Nagar	2
Janatha Colony	2
Veersandra	2
Tigalarpalya	2
2nd Block Bel Layout	2
M V Extenstion	2
Shetty Halli	2
Krishna Nagar	2
Chokkanahalli	2
Omarbagh Layout	2
Whitefield,	2
Kempegowda Nagar	2
Vaderahalli	2
Teachers Colony	2
Hunasamaranahalli	2
Thomas Town	2
Annapurneshwari Nagar	2

Indra Nagar	2
Dodda Kempaiah Layout	2
Anugrah Layout	2
MLA Layout	2
Lal Bahadur Shastri Nagar	2
Naidu Layout	2
Dollar Scheme Colony	2
Electronic city Phase 1,	2
Ganesha Block	2
Aishwarya Crystal Layout	2
Srinivas Colony	2
Green Garden Layout	2
Subash Nagar	2
Sri Sai Layout	2
1st Block BEL Layout	2
Langford Gardens	2
Uday Nagar	2
Church Street	2
Kariyammana Agrahara	2
south	2
BCMC Layout	2
3rd Block Koramangala	2
Kempapura	2
Koramangala Industrial Layout	2
Hosakerehalli Layout	2
Someshwara Layout	2
Andrahalli	2
Billamaranahalli	2
Jyothi Nagar	2
Jaya Mahal layout	2
Mahaganapathy Nagar	2
Infantry Road	2
HAL 3rd Stage	2
frazertown	2
Sampigehalli	2
Mariyannapalya	2
Palace Road	2
Kathreguppe	2
Remco Bhel Layout	2
Yarandahalli	2
Vijinapura	2
Lakshmiamma Garden	2
Suragajakkanahalli	2
Kumbalgodu	2
Friends Colony	2
Soundarya Layout	2
Chennammanakere Achukattu	2
Dr Shivarama Karantha Nagar	2
Bhoopsandra	2
Muneshwara Nagar	2
SRINIVASAPURA	2
Muthurayya Swamy Layout	2
Vibhutipura Extension	2
Rajapura	2
Kadarenahalli	2
Green Domain Layout	2
Pulkeshi Nagar	2
Cleveland Town	2
Syndicate Bank Colony	2
Hennagara	2
Amarjyothi Colony	2
Ashok Nagar	2
Kullappa Colony	2
Doddabidrakallu	2
Chikku Lakshmaiah Layout	2
Vyalikaval	2

Postal Colony	2
Anwar Layout	2
Balaji Gardens Layout	2
Sri Venkateshpura Layout	2
Ramanashree Enclave	2
Nandi Durga Road	2
Jayamahal Extension	2
Shanthi Layout	2
Patelappa Layout	2
Panduranga Nagar	2
SBM Colony	2
Sunder Ram Shetty Nagar	2
Rachenahalli	2
Challaghatta	2
St. John's Road	2
Jai Bheema Nagar	2
Hoodi Layout	2
Gnana Bharathi	2
PNS Layout	1
Prasanna layout Herohalli	1
Kanakapur main road	1
Bilal Nagar	1
AGB Layout	1
Navodaya Nagar	1
T C Palya main Road	1
1 Immadihalli	1
Shauhardha Layout	1
Doctor Layout Rayasandra	1
Banasawadi,	1
Akash Nagar	1
Pillanna Gardens	1
SK Garden	1
Kanakapura Main Road	1
KAMAKIYA	1
Chellikere	1
akshaya nagar t c palya	1
Kengeri Satellite Town Stage II	1
BTM Layout 2nd Stage 1st Phase	1
Michael Palaya	1
Byrasandra Extension	1
Prasanti Nagar	1
4th Block HBR Layout	1
Banashankari Stage I	1
AECS LAYOUT A-BLOCK Singasandra	1
RBI Layout	1
Jakkasandra	1
Duvasapalya	1
Chaitanya Ananya	1
Suryanagar	1
Zuzuvadi	1
Subhash Nagar	1
Dominic Layout	1
Hommadevanahalli	1
LIC Colony	1
Ashraya Layout	1
vinayakanagar	1
Jaraganahalli Jp Nagar Post	1
Annapoorneshwari Layout, JP nagar 7th phase	1
adigondanhalli	1
Off Bannergatta Road	1
bsk 6th stage 2ad block near sri conversation hall	1
Yediyur	1
Neelasandra	1
Banashankari 3rd stage, Vivekanandanagar	1
manyata	1
CMH Road	1

Vijay Nagar	1
Ex-Servicemen Colony Dinnur Main Road R.T.Nagar	1
Kanakapura Rod	1
Richmond Road	1
Narayanappa Garden	1
Ganganahalli	1
Kamdhenu Nagar	1
MEI layout, Bagalgunte	1
Jeevanhalli	1
Sabari Nagar	1
Kanakapura main Road	1
Gubbi Cross, Hennur Main Road	1
Manonarayanapalya	1
Mudalpalaya	1
elachenahalli	1
Indira Nagar Stage 2	1
B K Nagar	1
T R Mill Road	1
mvj engineering college	1
Nagarbhavi Garden Villas Layout	1
Jaymahal Road	1
Sindhi Colony	1
Basaveswarnagar	1
Sector 1 HSR Layout	1
Maruthi nagar kogilu	1
Air View Colony	1
Punappa Layout	1
6th Block Jayanagar	1
Electronic city phase 1,	1
Vidhyanagar Cross	1
Masjid e Alkareem	1
Anathanagar	1
Veerabhadra Nagar	1
3rd Stage Raja Rajeshwari Nagar	1
Cubbon Road	1
KG Halli	1
Banashankari 6th stage , 2nd block	1
Basavangudi	1
Raja Rajashweri Nagar	1
Whitefield ECC Road	1
basaveshwarnagar	1
Mallappa Layout	1
Sampangirama Nagar	1
poornaprajna layout	1
Wheelers Road	1
Vinayaka Layout	1
Kanakapura Road,	1
2nd Block Hbr Layout	1
Hsr layout sector3	1
Gollarahatti	1
Millers Road	1
Rajarajesheari nagar	1
Asthagrama Layout	1
Jayanagar,	1
Thyagraj Nagar	1
Bharathnagar	1
Duddanahalli	1
Venkateswara Nagar	1
Konappana Agrahara	1
Dwaraka Nagar	1
HOSUR RMAIN ROAD	1
Hanuman Nagar	1
Chikkagubbi	1
Banashankari 2 nd Stage	1
Sarvobhogam Nagar	1
B Y Raveshwara Nagar	1

```
1Kasavanhalli                                              1
Chuchangatta Colony                                        1
Nanjappa Layout Vidyaranyapura                             1
12th cross srinivas nagar banshankari 3rd stage            1
Banagirinagar                                              1
SARJAPUR BAGALUR ROAD                                      1
Tilak Nagar                                                1
Maheswari Nagar                                            1
Rammana Layout                                             1
Doddanakunte                                               1
Virudhu Nagar                                              1
Vijaypura                                                  1
Kengeri Satellite Town KHB Apartment                       1
Jogupalya                                                  1
Aavalahalli                                                1
Soppahalli                                                 1
PC Palaya                                                  1
Javarandoddi                                               1
Bapuji Nagar                                               1
kamanahalli main road                                      1
BEML Layout 5th Stage                                      1
Pattegarhpalya                                             1
7th Block Koramangala                                      1
Pillahalli                                                 1
Prakash Nagar                                              1
1Hoysalanagar                                              1
Bharat Nagar                                               1
Kathriguppe IV Phase                                       1
Chambenahalli                                              1
Anantapuram                                                1
Yelahanka,MVIT college                                     1
Banashankari 6th Stage                                     1
arudi                                                      1
Allalasandra                                               1
Hal old airport road                                       1
Ramanagara Channapatna                                     1
Deepanjali Nagar                                           1
Medaralli                                                  1
 Banaswadi                                                 1
Somanna Garden                                             1
pavitra paradise                                           1
kg halli jalhalli west                                     1
beml layout, basaveshwara nagar                            1
Devarabeesana Halli                                        1
Bettadasanapura                                            1
Vasatha Vallbha Nagar                                      1
kadubisnahalli                                             1
HSR Layout 7th sector,                                     1
Rahmath Nagar                                              1
Chikkanahalli                                              1
BAGUR ROAD                                                 1
Balepet                                                    1
Annasandrapalya                                            1
Sadhguru Layout                                            1
RMC YARD                                                   1
Gulakamale                                                 1
MM Layout                                                  1
Bandepalya                                                 1
Halanayakanahalli                                          1
Panathur Road,                                             1
Behind Don Bosco Church                                    1
Park View Layout                                           1
Xavier Layout                                              1
Shanthi Pura                                               1
Sugama Layout                                              1
Viviani Road                                               1
```

Addischetan Layout	1
2 Bedroom Furnished Farm House in Kolar Road	1
Electronic City Phase 1,	1
Off Bannergatta road	1
Ananthapura, T C palaya Main Road	1
3rd Phase Iti Layout	1
Jagadish Nagar	1
RR Nagar	1
Beml layout, Rajarajeshwari nagar	1
Queens Road	1
Raja Rajeshwari Nagara	1
Thirupalya	1
Satyasaibaba Layout	1
Chikbasavanapura	1
Jay an agar 4 T Block	1
Old Mangammanapalya Road	1
SHANTHINAGAR	1
Udayagiri	1
Hoskote near	1
Vidya Nagar	1
HAL Layout	1
Havanur extension	1
Haralur Road,	1
Bande Nallasandra	1
Adugodi	1
Bhattarahalli	1
Gayathri Nagar	1
RK Colony	1
Chikkajala	1
Sunkan palya	1
Thirumalashettyhally	1
banashankari stage iii sa	1
2nd phase jp nagar, jp nagar	1
Sathanur	1
Bhoganhalli	1
ittamadu	1
Howthinarayanappa Garden	1
Cambridge road	1
Bahubali Nagar	1
Rajagopala Nagar	1
JakkurYelahanka	1
5th block Koramangala	1
Arasanakunte	1
Gaundanapalya	1
Kirloskar layout, Basaveshwarnagar	1
Sundar Ram Shetty Nagar	1
kanakapura road	1
Ramamohanapuram	1
Attiguppe	1
Sampige Layout	1
Sir M V Nagar	1
Chokkasandra	1
Sree Narayana Nagar	1
Maruthi Layout	1
Kenchanehalli R R Nagar	1
Agara Village	1
NR Colony	1
3rd Block HBR Layout	1
Lalbagh Road	1
Chowdeshwari Layout	1
IVC Road	1
1 Ramamurthy Nagar	1
Subramanyanagar	1
2Electronic City Phase II	1
Anekal	1
Virgonagar	1

Anekal - Hosur Road	1
Gopal Reddy Layout	1
Pulikeshi Nagar	1
RK Layout 2nd Stage	1
Sri Kanteshwara Nagar	1
BEL Layout	1
M C Layout	1
Off Sarjapur road,	1
J P Nagar 7th Phase Ramayya City	1
Kanakapura Road	1
Jp nagar 8th Phase .	1
Dhanalakshmi Layout	1
Maragondana Halli, kr puram, old madras road	1
Govindraja Nagar	1
T c palya	1
sankeswari	1
Chikkabettahalli	1
Kudlu Village,	1
Banashankari 6th Stage ,Subramanyapura	1
Popular Colony	1
Reliable Woods Layout	1
Huttanahalli	1
Ganga Nagar Extension	1
Keerthi Layout	1
BDS Layout	1
Viswajit Layout	1
Srigandada Kaval	1
Prestige Sunrise	1
Tippenahalli	1
Thavarekere	1
Banaswadi,	1
Sector 4 HSR Layout	1
Pai layout , Mahadevapura	1
T K Reddy Layout	1
Viswapriyanagar.begur Road.bommanahalli.	1
Chikkabidarakallu	1
P&T Colony	1
Prakruthi Nagar	1
Sulthangunta	1
6th block banashankari 3rd stage, 100 feet ORR	1
near Ramanashree California resort	1
Hosahalli	1
Papareddipalya	1
Marathalli bridge	1
K G Colony	1
Yemlur, Old Airport Road,	1
Bank Avenue	1
Ring Road Nagarbhavi	1
ITI Employees Layout	1
1 Giri Nagar	1
Amco Colony	1
Garden Layout	1
K N Extension	1
Binny Mills Employees Colony	1
Banashankari3rd stage bigbazar	1
Bull Temple Road	1
Sundara Nagar	1
Ncpr Industrial Layout	1
Mukkutam Nagar	1
Lakshminarayanapura, Electronic City Phase 2	1
CHIKKATIRUPATHI	1
Ramaswamy Palya - Kammanahalli Main Road	1
Kodanda Reddy Layout	1
Double Road	1
Tharabanahalli	1
Adarsh Nagar	1

Shivanagar	1
Sector 3 HSR Layout	1
Kalasipalya	1
4 Bedroom Farm House in Bagalur	1
Malimakanapura	1
KPC Layout	1
Bharath Housing Society Layout	1
Craig Park Layout	1
Maruthi HBCS Layout	1
Brigade Road	1
Kengeri Satellite Town (BDA SITE)	1
GB Palya	1
Hennur Busstop	1
Rukmaiah Layout	1
D Souza Layout	1
Defence Layout	1
T.C. Palya	1
Byappanahalli	1
Chikkaballapur	1
Iggalur	1
Jaya Nagar East	1
Williams Town	1
Grihalakshmi Layout	1
Bidere Agarahara, Behind Safal market	1
Mango Garden Layout	1
Narasapura	1
Binnamangala	1
Marathi Layout	1
Devarabisanahalli	1
sapthagiri Layout	1
M.G Road	1
BAGUR	1
Indiranagar HAL 2nd Stage	1
Narayanappa Layout	1
1Hanuman Nagar	1
Kumbhena Agrahara	1
Malur Hosur Road	1
Shettihalli	1
MRCR Layout	1
Arekempanahalli	1
CR Layout	1
Sonam Layout	1
Fraser town	1
NTI Layout	1
1A Block Koramangala	1
asha township, off hennur road	1
Escorts Colony	1
Rahat Bagh	1
Nagarbhavi BDA Complex	1
Rajanna Layout	1
Lakshmipura Vidyaanyapura	1
Rainbow Drive	1
Mailasandra	1
Shakthi Nagar	1
Kalkere Channasandra	1
Bellandur,	1
Seethappa Layout	1
Bennigana Halli	1
Prakruthi Township	1
ravindra nagar, T.dasarahalli peenya	1
RTO ullalu	1
Gokaula Extension	1
DUO Layout	1
anjananager magdi road	1
Ananthanagar Phase 1,Electronic City , phase 2	1
Puttappa Layout	1

Badrappa Layout	1
Gangondanahalli	1
Hullahalli	1
Jagajyothi layout	1
Lakkasandra Extension	1
sarjapura main road	1
Subramanya Nagar	1
KHB Colony Extension	1
Billapura	1
Amrita Nagar	1
Nrupathunga Nagar	1
Muthyala Nagar	1
Vikram Nagar	1
Chokkahalli	1
Nirman Layout	1
TR Mill Road, Chamarajpet	1
Chikka Gowdanapalya.	1
Kasthuri Nagar East Of NGEF	1
High grounds	1
Vittal Mallya Road	1
BTM Layout 1stage 9th Main	1
Whietfield,	1
5 Bedroom Farm House in Lakshmipura	1
Sadahalli	1
Doddabele	1
J.P.nagar 6th Phase.Sarakki Nagar	1
Mullur	1
Venkateshpuram	1
rr nagar	1
Gandhi Nagar	1
GKW Layout	1
T G extension	1
Chickpet	1
Kuvempu Layout	1
Basvasamithi Layout Vidyaranyapura	1
kanakapura main road	1
Indira Nagar 3rd Stage	1
RMV extension stage 2, rmv extension	1
Banashankari stage 2	1
Near Electronic City,	1
CQAL LAYOUT C BLOCK	1
manyata tech park	1
Handenahalli	1
Junnasandra	1
West of Chord Road	1
Prasanth Extension	1
Hanumagiri	1
Karnataka Shabarimala	1
JP nagar 9th Phase,	1
1 Annasandrapalya	1
Vijaya Bank Colony	1
Kalhalli	1
1st Stage Domlur	1
t.c palya	1
EPIP AREA, WHITEFIELD	1
Geetanjali Layout	1
Vayunandana Layout	1
Banashankari 2nd Stage	1
Ckikkakammana Halli	1
St Thomas Town	1
6th Block Rajaji Nagar	1
Goraguntepalya	1
P Krishnappa Layout	1
white field,kadugodi	1
Mathikere SBM colony	1
Sahyadri Layout	1

```
        Laxminarayana Layout                                    1
        Kanakadasa Layout                                       1
        Indranagar  100ft road defence colony                  1
        Wajid layout thanisandra                                1
        Achins Road                                             1
        Uvce Layout                                             1
        Manganahalli                                            1
        Housing Board Layout Vijay Nagar                        1
         Whitefield                                             1
        K R C kothanur                                          1
        1Channasandra                                           1
        Vijayabank bank layout                                  1
        Saptagiri Layout                                        1
        Near ullas theater                                      1
        Basnashankari,6th stage,                                1
        Milk Colony                                             1
        Jaladarsini Layout                                      1
        Madanayakahalli                                         1
        N R Layout                                              1
        Subbannaiah Palya                                       1
        whitefiled                                              1
        Medi Agrahara                                           1
        Sadduguntepalya                                         1
        Shirdi Sai Nagar                                        1
        S R Layout                                              1
        Meenakshi Layout                                        1
        Vidyapeeta                                              1
        Maruthi Extension                                       1
        Okalipura                                               1
        Old Town                                                1
        Vasantapura main road                                   1
        Bapuji Layout                                           1
        1st Stage Radha Krishna Layout                          1
        BEML Layout 5th stage                                   1
        singapura paradise                                      1
        Abshot Layout                                           1
        Name: location, dtype: int64
```

In [11]:
```python
data['society'].value_counts()
```

Out[11]:
```
GrrvaGr   80
PrarePa   76
Sryalan   59
Prtates   59
GMown E   56
Prtanha   51
Bhmesy    51
Prityel   50
PrityTr   49
Prarkun   49
Dhalsh    47
IBityin   45
SNity S   40
Soresea   39
Adeatlm   37
Soitya    36
Rosha I   35
Bhe 2ko   35
SunceEs   34
SNnia E   33
JRrnauv   30
MenueNo   29
Prlla C   28
PuandHi   28
RothaVa   27
```

```
Prncyrn     27
GoAirej     26
Aklia R     26
Raard B     26
PhestOn     26
Puachal     26
DLhtsnd     24
Dieldli     24
Itelaa      24
Soazak      24
Sodgere     23
ViistLa     23
Brnia G     23
PualeSk     23
Shitt S     23
Soiewre     22
Prrtht      21
DLhtsan     21
RInceeg     21
Brway G     21
SoechHa     21
DLhtsen     20
AsastDe     20
Eladero     20
Shthi S     20
Prersis     19
Magiaya     19
Jaades      19
Klark L     19
PueraRi     18
Brica E     17
SSestth     17
SaireSa     17
Oreldhi     17
Prensya     16
KHatsFl     16
Baowsig     16
SSthamh     16
Sariaat     15
BrlisCo     15
NRosete     15
Sosisic     15
GolusLi     15
Tavenew     14
Taonte      14
PuziaVe     14
BriumMi     14
Mayne A     14
Pyikad      14
Bregae      14
Sovar S     14
Mahosya     14
Unm 2El     14
Prcesvy     14
SMuilan     14
Shateor     14
Emine P     14
BrdgeNo     14
Koagati     14
Skacak      13
Somumys     13
GoityEt     13
UKe 2nz     13
Asintas     13
Mauner      13
MauilTr     13
```

```
Theanmp    13
Arcia S    13
Caycend    13
SLnssPr    13
Brglede    12
Alestrb    12
SLaceda    12
Ahriaup    12
BrontLa    12
SuVue S    12
Saitya     12
SLtias     12
G conTh    12
Skume R    12
Pruthg     12
Goues A    12
Maana E    12
Goateds    12
PuendWe    12
DNeremo    12
Niareum    12
Jae 1hu    12
ManceEl    11
SheldGr    11
Sahtsva    11
Peide L    11
Goted U    11
SoineC     11
SPavenc    11
Prionad    11
ProdsWe    11
Vrenty     11
Pronyt     11
Wiowsri    11
SrncyRe    11
NDionas    11
DNncasa    11
Itvir M    11
Maity W    10
Prldsri    10
SJityaz    10
AsNowre    10
Proodt     10
PrityFa    10
Brama P    10
Saageat    10
ViensRK    10
SoitaCa    10
Shestlo    10
Pu270a     10
She 2rk    10
SNontle    10
Saityat    10
SoisoCa    10
Soeurri    10
Neisei     10
Mahesr     10
Brium C     9
ShshaSa     9
NaensGa     9
Rarthne     9
Ceezey      9
Tahtsla     9
Asarqz      9
DNionfl     9
AWharde     9
```

DSgmax	9
MJtroty	9
SNbay G	9
Prone M	9
MBodsen	9
Sabixtt	9
AriosPa	9
GRhtiru	9
HMonymp	9
Sonviik	9
Prana S	9
PuoodSk	9
PaontWa	9
Usquaya	9
Prllsan	9
KHage G	9
HRaniIb	8
OriewLa	8
PuonsSe	8
SoystAm	8
Soianal	8
NRowse	8
Shestut	8
Suiseit	8
Brods W	8
KonteiT	8
Saite G	8
Assha A	8
Vaniai	8
Prowshi	8
DSingSt	8
AlEcone	8
ChionCo	8
Palleon	8
DSnjh S	8
Saesttt	8
Sothin	8
Sanzaat	8
Puallhi	8
MJeusyl	8
PrntaEn	8
Goty E	8
Saiewas	7
DSndsod	7
SosicCl	7
Adowslm	7
Keers S	7
Sondaka	7
DSera S	7
RatosAr	7
VBn 2lm	7
NiCodCa	7
Srrnasa	7
Malowr	7
Sowerew	7
PlhtsHe	7
Jae 2hu	7
RMcesa	7
Pehtsa	7
PrensKe	7
PrOakSi	7
Miitat	7
MJinele	7
GonumPl	7
Jaood G	7
Vaharvi	7

Gotis A	7
SStusan	7
ETens G	7
Shyas S	7
Ayaya A	7
SrEndPo	7
Srier P	7
Prrry M	7
Mileeou	7
MancyRe	6
Pride S	6
AritaFe	6
Mades G	6
Puodse	6
Puestol	6
ShdhiSa	6
MJarlPe	6
Mamespa	6
SrisePo	6
Myple M	6
K ncy R	6
Prhtsok	6
Saahaat	6
Contsci	6
Soionar	6
Reicace	6
Soweray	6
Hirio L	6
FoapeWa	6
ARureig	6
Sreat R	6
Roima A	6
Thessrm	6
Brens7	6
Soiniy	6
Collsrn	6
Ceiti I	6
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Blisera	1
Clint E	1
Sithand	1
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Vaows M	1
SLavena	1
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Sonet G      1
SantsAp      1
Niway G      1
SrnesSr      1
Suensda      1
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Ahhtser      1
Cestama      1
FoGemna      1
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DSdhiSa      1
Radhian      1
Cimeshw      1
VaarkMe      1
Villeka      1
MIalerd      1
Srowsee      1
Sancy R      1
ShentAp      1
UpowsMe      1
BModsen      1
Kelia R      1
AHavenc      1
Ajomaa       1
Ceise P      1
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Riodsri      1
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GathiVa      1
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Kiagar       1
Saaveas      1
Visic C      1
Sooutnu      1
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Kritel       1
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Srestve      1
Mancyhi      1
VaasaPr      1
Vayali       1
Sinde G      1
Jaers S      1
FlsicFl      1
JRichee      1
Asira E      1
Swers T      1
Jaanaa       1
Ikmesay      1
Gilleon      1
Niiman       1
UKanema      1
Pantym       1
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HivanBr      1
Hemai D      1
Reyle L      1
Solle V      1
Srayai       1
BMoldar      1
SatraNa      1
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WishiVa	1
AxinoCi	1
PaanaCh	1
Srthaa	1
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Krone S	1
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Darsh S	1
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LoentKr	1
SrarkSk	1
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BDlexHo	1

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             Srowsrj       1
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             Shine S       1
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             Pelle P       1
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             RKhipwn       1
             MaaveDu       1
             Soisy D       1
             K tlete       1
             Amionce       1
             JaghtDe       1
             Jauraht       1
             Brity U       1
             RSntsAp       1
             Name: society, dtype: int64
```

In [12]:
```python
data['size'].value_counts()
```

Out[12]:
```
2 BHK          5199
3 BHK          4310
4 Bedroom       826
4 BHK           591
3 Bedroom       547
1 BHK           538
2 Bedroom       329
5 Bedroom       297
6 Bedroom       191
1 Bedroom       105
8 Bedroom        84
7 Bedroom        83
5 BHK            59
9 Bedroom        46
6 BHK            30
7 BHK            17
1 RK             13
10 Bedroom       12
9 BHK             8
8 BHK             5
11 BHK            2
11 Bedroom        2
10 BHK            2
14 BHK            1
13 BHK            1
12 Bedroom        1
27 BHK            1
43 Bedroom        1
16 BHK            1
19 BHK            1
18 Bedroom        1
Name: size, dtype: int64
```

In [13]:
```python
data['size'].unique()
```

Out[13]:
```
array(['2 BHK', '4 Bedroom', '3 BHK', '4 BHK', '6 Bedroom', '3 Bedroom',
       '1 BHK', '1 RK', '1 Bedroom', '8 Bedroom', '2 Bedroom',
```

```
       '7 Bedroom', '5 BHK', '7 BHK', '6 BHK', '5 Bedroom', '11 BHK',
       '9 BHK', nan, '9 Bedroom', '27 BHK', '10 Bedroom', '11 Bedroom',
       '10 BHK', '19 BHK', '16 BHK', '43 Bedroom', '14 BHK', '8 BHK',
       '12 Bedroom', '13 BHK', '18 Bedroom'], dtype=object)
```

In [14]:
```python
data['total_sqft'].value_counts()
```

Out[14]:
```
1200            843
1100            221
1500            205
2400            196
600             180
1000            172
1350            133
1050            123
1300            117
1250            114
900             112
1400            108
1800            104
1150            101
1600            101
1140             91
2000             83
1450             70
1650             69
800              67
3000             66
1075             66
1020             63
2500             62
1550             60
1160             60
1125             60
950              59
1180             58
1700             58
1260             57
1255             56
1220             55
1080             55
1070             53
700              52
750              52
1225             48
4000             48
1175             48
1320             46
1240             46
2100             46
1230             45
1060             45
1210             44
850              43
1280             42
1270             41
1185             41
1190             40
1170             40
1410             40
1750             39
1330             38
1025             38
1290             37
1310             37
```

1850	37
1065	36
1194	36
1090	35
1215	35
500	34
1360	33
2700	33
1115	33
1900	32
3500	32
1120	32
1464	32
1530	31
1205	31
1340	31
2200	31
1430	31
1035	30
1560	30
1165	30
1128	29
3600	29
1130	29
1145	29
1275	28
2800	28
1355	28
1040	28
1155	27
1105	27
1680	27
1420	27
1460	25
650	25
1760	25
1590	25
1216	25
1245	25
1010	24
1305	24
1475	24
2600	24
883	23
1440	23
1030	23
1575	23
1110	23
1495	22
985	22
1246	22
3200	21
1243	21
1385	21
1470	21
525	21
1027	21
1015	21
1370	21
1315	21
1610	21
5000	21
1325	21
925	20
660	20
1480	20

550	20
1390	20
1540	20
1570	19
1365	19
1645	19
1640	19
1265	19
920	19
1520	19
1525	18
1196	18
1195	18
980	18
1012	18
1095	18
975	18
4800	18
1485	18
940	18
2072	18
1345	18
1820	18
1665	18
960	17
1157	17
1232	17
1375	17
400	17
1295	17
1490	16
1830	16
3300	16
1655	16
645	16
1235	16
1197	16
935	16
2300	16
1720	16
1425	16
1045	16
1418	16
1135	16
630	15
1152	15
1285	15
1153	15
1380	15
1740	15
4500	15
1116	15
1580	15
1660	15
1085	15
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1950	15
1141	14
1630	14
675	14
1445	14
450	14
1595	14
720	14
905	14
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840	13
1730	13
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1710	13
3800	13
3900	13
1625	13
2215	13
1875	13
1282	13
970	13
1510	13
1082	13
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1535	13
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1615	13
1435	12
1339	12
1033	12
1455	12
1296	12
1843	12
1151	12
1404	12
1890	12
1691	12
1056	12
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2900	12
1007	12
1252	12
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845	11
1206	11
1162	11
1804	11
965	11
1405	11
540	11
1346	11
1452	11
1515	11
1174	11
2150	11
1639	11
1685	11
984	11
1161	10
620	10
3400	10
3596	10
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770	10
880	10
1256	10
1415	10
930	10
1308	10
1555	10
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1810	10
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1092	9
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1041	7
1112	7
2050	7
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1096	7
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805	2
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1618	2
1823	2
1970	2
3198	2
2376	2
1688	2
1363	2
2520	2
3408	2
1808	2
2665	2
3170	2
381	2
3420	2
1468	2
2197	2
4300	2
3522	2
1381	2
1107.83	2
1421	2
1876	2
1431	2
551	2
10961	2
1492	2
2378	2
3425	2
4000 - 5249	2
1950.2	2
620 - 934	2
142.61Sq. Meter	2
1757	2
2260	2
882	2
2780	2
997	2
1002	2
1677	2
1763	2
1556	2
3035	2
1454	2
1804 - 2273	2
1552	2
2658	2
4003	2

1003	2
1666	2
876	2
693	2
3626	2
1414	2
2569	2
3565	2
509	2
1442	2
2849	2
2006	2
2041	2
686	2
1417	2
1746	2
1365 - 1700	2
734	2
1486	2
4260	2
1863	2
1674	2
1549	2
4700	2
4250	2
1103	2
1463	2
485	2
2540	2
2266	2
730	2
1348	2
2420	2
1721	2
1866	2
1601	2
3758	2
3657	2
2321	2
527	2
606	2
913	2
986	2
1728	2
3930	2
2720	2
3024	2
1894	2
2666	2
1493	2
1507	2
6652	2
1949	2
1366	2
1934	2
1814	2
655	2
1229	2
7800	2
3356	2
2268	2
2493	2
827	2
1948	2
1261	2
6136	2

2556	2
1239	2
2051	2
1390 - 1600	2
1388	2
2557	2
3453	2
2524	2
799	2
943	2
1622	2
1013	2
1214	2
3875	2
1542	2
1323	2
645 - 936	2
2259	2
3633	2
1581	2
1995	2
1548	2
2580 - 2591	2
2925	1
2429	1
2003	1
2122	1
1010 - 1300	1
2504	1
1324	1
855	1
4290	1
1691.2	1
750 - 800	1
1660 - 1805	1
2704	1
3760	1
3071	1
1100Sq. Meter	1
1547	1
3060	1
6830	1
3589	1
3692	1
1503	1
4408	1
2079	1
1962	1
4900	1
1568	1
4900 - 4940	1
873	1
616	1
1610 - 1880	1
2274.24	1
2023	1
755 - 770	1
3978	1
1719.3	1
3621	1
2008	1
2785	1
694	1
3508 - 4201	1
20000	1
5200	1

10200	1
15Acres	1
3990	1
2130	1
2501	1
3301.8	1
1450 - 1595	1
3204	1
3489	1
4166	1
2515	1
763 - 805	1
3307 - 3464	1
1.26Acres	1
5422	1
1542.14	1
3746	1
2144.6	1
1087	1
2134	1
2462 - 2467	1
540 - 740	1
3033	1
1181.7	1
1338	1
1217	1
1925 - 2680	1
4110	1
2533	1
2Acres	1
615 - 985	1
2297	1
1471	1
3855	1
7400	1
4170	1
1506	1
1872	1
5108	1
1393	1
2496	1
8400	1
1558	1
1054	1
2646	1
540 - 565	1
2736	1
3230	1
3197	1
2625	1
3293	1
1502	1
3870	1
4097	1
1450 - 1950	1
664 - 722	1
2380	1
3569	1
151.11Sq. Yards	1
947.55	1
3144	1
700 - 900	1
3602	1
596 - 861	1
2251	1
1998	1

3056	1
808	1
826	1
2317	1
3103 - 3890	1
666	1
3435	1
7514	1
1668	1
1370.07	1
1747	1
2019	1
893	1
6729	1
2162.03	1
614	1
5666 - 5669	1
8840	1
2035	1
1052 - 1322	1
3175	1
2787	1
2137	1
2400 - 2600	1
2406	1
1273	1
2615	1
772	1
2236	1
3729	1
120Sq. Yards	1
1783 - 1878	1
2171.66	1
712 - 938	1
2955	1
1681	1
2999.97	1
3671	1
3554	1
2176	1
1892	1
1377	1
1289	1
4040	1
1473	1
1589	1
3484 - 3550	1
3381	1
2150 - 2225	1
929 - 1078	1
3280	1
38Guntha	1
1139.7	1
1235 - 1410	1
1520 - 1759	1
1401	1
1879	1
2546	1
623	1
1886	1
777.4	1
2312	1
4450	1
1731	1
1215 - 1495	1
2415	1

4209	1
4304	1
1140 - 1250	1
6Acres	1
842	1
60	1
784	1
2695	1
2282	1
629 - 1026	1
302	1
4694	1
976	1
953	1
5515	1
24Sq. Meter	1
1437 - 1629	1
1200 - 1470	1
1557	1
1264	1
1701	1
30400	1
850 - 1060	1
2485	1
1369	1
1659	1
2206	1
911	1
2204 - 2362	1
2086	1
1932.47	1
7150	1
5665.84	1
2444	1
613	1
774	1
1133 - 1384	1
2758	1
1020 - 1130	1
2395	1
250	1
9200	1
2920	1
3124	1
1379	1
1648	1
2872	1
1331.95	1
6688	1
3290	1
754	1
1321	1
5480	1
2505	1
2453	1
4723	1
3504	1
866	1
5656	1
650 - 760	1
1400 - 1421	1
1623.29	1
475	1
2153	1
2031	1
2528 - 3188	1

1317	1
567	1
4350	1
1989	1
3734	1
1686	1
2295	1
2875	1
300Sq. Yards	1
4007	1
964	1
142.84Sq. Meter	1
1443	1
4000 - 4450	1
1916	1
1857	1
747	1
16335	1
886	1
1550 - 1590	1
1248.52	1
1609	1
1604	1
1907	1
2970	1
1389	1
2733	1
998	1
2185	1
799 - 803	1
45.06Sq. Meter	1
2223	1
2648	1
1791 - 4000	1
3117	1
717	1
1529	1
2125	1
4446	1
2470 - 2790	1
783 - 943	1
4041	1
2980	1
2247	1
857	1
3270	1
2437	1
3628	1
978	1
1905	1
5425	1
1522	1
2956	1
5150	1
1723	1
5384	1
1587	1
1792	1
612	1
2048	1
588	1
2041 - 2090	1
1816	1
1797	1
943 - 1220	1
1119	1

1230 – 1290	1
492	1
2015	1
2800 – 2870	1
1079 – 1183	1
1410 – 1710	1
3362	1
1861	1
1234.6	1
1902	1
3496	1
4560	1
2996	1
2940Sq. Yards	1
3560	1
706 – 716	1
1160 – 1315	1
1Grounds	1
2110	1
753	1
2249.81	1
534	1
4320	1
456	1
527 – 639	1
1763.25	1
2087	1
4278	1
4500 – 5540	1
660 – 780	1
2316	1
1383	1
516	1
581	1
2088	1
2916	1
488	1
4303	1
2064	1
896.9	1
2082	1
3075	1
2495	1
1230 – 1490	1
1626.6	1
1990	1
4550	1
2098	1
1748	1
1510 – 1670	1
3019	1
1200 – 1800	1
3535	1
1761	1
3410	1
1940	1
866.28	1
684 – 810	1
2507	1
1150 – 1194	1
4482	1
1189	1
524	1
2826	1
10030	1
1361	1

1733.5	1
1255 - 1375	1
3350	1
939	1
1688.12	1
2801.25	1
1642	1
691	1
2285	1
1669	1
1921	1
4382	1
4201	1
3005	1
10624	1
3092	1
499	1
959	1
2077	1
284	1
1287	1
2735	1
86.72Sq. Meter	1
1.25Acres	1
2650 - 2990	1
610 - 615	1
1981	1
2597	1
854 - 960	1
2404	1
1049	1
3913	1
132Sq. Yards	1
15	1
26136	1
2105	1
30000	1
3190	1
4460	1
3297	1
1255 - 1863	1
1300 - 1405	1
590	1
3161	1
871	1
3515	1
2026	1
3366	1
1562	1
1500 - 2400	1
2319	1
2167	1
117Sq. Yards	1
3045	1
904	1
977	1
2401	1
934 - 1437	1
980 - 1030	1
1564 - 1850	1
1452.19	1
3010	1
1446 - 1506	1
5530	1
11338	1
1776.42	1

1901	1
4850	1
1511	1
515	1
1753	1
3025	1
3309	1
1004 - 1204	1
361.33Sq. Yards	1
987	1
2121	1
11890	1
1646	1
6040	1
34.46Sq. Meter	1
668	1
596 - 804	1
1113.27	1
2710 - 3360	1
395	1
1629	1
451	1
1452.55	1
296	1
2023.71	1
714	1
351	1
2526	1
3436 - 3643	1
11	1
792	1
461.82	1
989	1
1145 - 1340	1
685	1
3530	1
1015 - 1540	1
3950	1
1205.47	1
3595	1
1482 - 1846	1
944	1
832	1
3259	1
858	1
1689.28	1
2805 - 3565	1
4428	1
1818	1
2912	1
2059	1
888	1
532	1
3227	1
1915	1
963	1
769	1
1712	1
2795	1
1918	1
2113	1
1828	1
2408	1
704 - 730	1
673	1
3016	1

2820	1
4772	1
5600	1
4051	1
2405	1
1777	1
2721	1
2220	1
1070 - 1315	1
1888	1
1520 - 1740	1
3040Sq. Meter	1
3640	1
1736	1
500Sq. Yards	1
2043	1
2779	1
1020.07	1
5965	1
2806 - 3019	1
3537	1
1909	1
956	1
1218	1
2363	1
885	1
1451.5	1
3245	1
8500	1
3293 - 5314	1
547.34 - 827.31	1
1114	1
3670	1
2090	1
3329	1
785	1
716Sq. Meter	1
3073	1
2181	1
445	1
1000Sq. Meter	1
764	1
340	1
2465	1
1160 - 1195	1
2489	1
4360	1
628	1
667	1
804.1	1
5270	1
580 - 650	1
1373	1
3680	1
2863	1
2424	1
3516	1
3770	1
1378	1
2195	1
3467.86	1
1005.03 - 1252.49	1
3606 - 5091	1
5.31Acres	1
3968	1
2169	1

3235	1
2112.95	1
315	1
633 - 666	1
30Acres	1
1824	1
1561	1
1637	1
650 - 665	1
24	1
2825	1
4634	1
4239	1
1445 - 1455	1
884 - 1116	1
1000 - 1285	1
850 - 1093	1
14000	1
1617	1
1440 - 1884	1
2842	1
1558.67	1
520 - 645	1
1100Sq. Yards	1
1606	1
2572	1
3425 - 3435	1
1337	1
2845	1
2204	1
2791	1
916	1
688	1
2172.65	1
961	1
3555	1
6150	1
671	1
581.91	1
1544	1
1250 - 1305	1
1195 - 1440	1
824	1
1269.72	1
2519	1
1673	1
670 - 980	1
1867	1
3584	1
2168	1
3125	1
5230	1
1775	1
1687	1
983	1
2039	1
1316	1
3042	1
2479.13	1
52272	1
5080	1
1266	1
4400 - 6800	1
817	1
1815	1
2118	1

35000	1
3090 - 5002	1
4400 - 6640	1
660 - 670	1
1193	1
1500Sq. Meter	1
620 - 933	1
2028	1
2611	1
1120 - 1145	1
1641	1
2695 - 2940	1
727	1
1722	1
2000 - 5634	1
4125Perch	1
469	1
1429	1
1574Sq. Yards	1
3606	1
3450 - 3472	1
2337	1
1563.05	1
2386	1
1567.2	1
2435	1
2563 - 2733	1
2005	1
605 - 624	1
4260 - 4408	1
2582	1
2663	1
2127	1
1349 - 3324	1
869	1
45	1
78.03Sq. Meter	1
1208.51	1
3300 - 3335	1
2328	1
2384	1
1180 - 1630	1
806	1
1628	1
1660.4	1
4075	1
1987	1
2245	1
1597	1
2423	1
3131	1
396	1
4273	1
3500 - 3600	1
941	1
906	1
2302	1
948	1
188.89Sq. Yards	1
797	1
2396	1
1939	1
3401	1
1469 - 1766	1
2246	1
4510	1

204Sq. Meter	1
1766	1
870 - 1080	1
3010 - 3410	1
45Sq. Yards	1
1014	1
2601	1
695	1
3160	1
1769	1
133.3Sq. Yards	1
1554.3	1
4920	1
627	1
3405.1	1
2570	1
881	1
951	1
1652.5	1
3532	1
122Sq. Yards	1
934	1
84.53Sq. Meter	1
1593	1
1408 - 1455	1
2901	1
4050 - 4075	1
1266.67	1
942 - 1117	1
2679	1
3044	1
1750 - 2640	1
790	1
2476	1
1877	1
1649	1
766	1
2100 - 2850	1
651	1
598 - 958	1
1631	1
1500Cents	1
1829	1
5720	1
2132	1
1412	1
1439	1
5924	1
552	1
2365	1
864	1
2293	1
505	1
2120	1
3463	1
1741	1
2.09Acres	1
1482 - 1684	1
583	1
981 - 1249	1
2108	1
2324	1
2968	1
1100 - 1225	1
1565 - 1595	1
2232	1

2932	1
3820	1
24Guntha	1
1831	1
1270 - 1275	1
840 - 1010	1
947	1
697Sq. Meter	1
1716	1
638	1
4856	1
3664	1
539	1
2173	1
655 - 742	1
1330.74	1
800 - 2660	1
1525.84	1
1548.3	1
1210 - 1477	1
3027	1
1053.4	1
540 - 670	1
315Sq. Yards	1
1650 - 2538	1
3445	1
2283	1
3815	1
4827	1
2894	1
833	1
669	1
3811	1
3860	1
1734	1
1462	1
704	1
2725 - 3250	1
2957 - 3450	1
1732.46	1
2592	1
4470	1
624	1
722	1
2775	1
706	1
4356	1
2138	1
910.2	1
607	1
2885	1
981	1
2776	1
892	1
4818	1
4355	1
908	1
3369 - 3464	1
1574	1
1042 - 1105	1
1125 - 1500	1
813	1
3884	1
3876	1
3067 - 8156	1
897	1

3480	1
1413	1
1	1
276	1
2372	1
167Sq. Meter	1
1076 - 1199	1
2651	1
2270	1
2497	1
2342	1
6600	1
1627.86	1
2215 - 2475	1
1874	1
4960	1
3179	1
2928	1
5700	1
787	1
660 - 700	1
6613	1
502	1
3339	1
1483	1
2162	1
1733	1
1974	1
385 - 440	1
2631	1
2792	1
2100 - 5405	1
2448	1
1932	1
770 - 841	1
2171	1
42000	1
1793	1
1551	1
3563	1
462	1
3Cents	1
1310 - 1615	1
36000	1
1113.12	1
1782 - 2000	1
621	1
3080	1
2383	1
4830	1
555	1
2182	1
2416	1
3905	1
2107	1
2431	1
2511	1
4640	1
818	1
9000	1
1288	1
1974 - 2171	1
300	1
1778	1
2006.8	1
1922	1

```
888 – 1290                    1
1467                          1
1360 – 1890                   1
2370                          1
5                             1
1004                          1
5985                          1
2466 – 2856                   1
3580                          1
2461                          1
1437                          1
2155                          1
4689                          1
Name: total_sqft, dtype: int64
```

=> Data Cleaning

In [15]:
```python
#knowing about the missing values
features_with_na = [features for features in data.columns if data[features].isnull().sum()

#calculating % of missing values each features has
for feature in features_with_na:
    print(feature,'is:',np.round(data[feature].isnull().mean()*100,2),'% of missing values
```

```
location is: 0.01 % of missing values
size is: 0.12 % of missing values
society is: 41.31 % of missing values
bath is: 0.55 % of missing values
balcony is: 4.57 % of missing values
```

In [16]:
```python
#replacing the Nan values with text- 'missing_society'
data['society'].fillna('Missing_society',inplace=True)
```

In [17]:
```python
data.isnull().sum()
```

Out[17]:
```
area_type        0
availability     0
location         1
size            16
society          0
total_sqft       0
bath            73
balcony        609
price            0
dtype: int64
```

In [18]:
```python
#since location has only 1 missing value we are going to remove the row
data.dropna(subset=['location'],inplace=True)
```

In [19]:
```python
data.isnull().sum()
```

Out[19]:
```
area_type        0
availability     0
location         0
size            16
society          0
total_sqft       0
bath            73
balcony        609
```

```
price                  0
dtype: int64
```

In [20]:
```
#filling the balcony and bath with the median value
# firstly grouping them wrt the location and as per that we will apply

data['bath'] = data.groupby(['location'])['bath'].transform(lambda x: x.fillna(x.median()))
data['balcony'] = data.groupby(['location'])['balcony'].transform(lambda x: x.fillna(x.med
print('Done replacing the nan values in bath and balcony by their median')
```

Done replacing the nan values in bath and balcony by their median

In [21]:
```
data.isnull().sum()
```

Out[21]:
```
area_type          0
availability       0
location           0
size              16
society            0
total_sqft         0
bath               1
balcony           45
price              0
dtype: int64
```

In [22]:
```
data['bath'].fillna(data['bath'].median(),inplace=True)
data['balcony'].fillna(data['balcony'].median(),inplace=True)
```

In [23]:
```
data.isnull().sum()
```

Out[23]:
```
area_type          0
availability       0
location           0
size              16
society            0
total_sqft         0
bath               0
balcony            0
price              0
dtype: int64
```

In [24]:
```
data['size'].unique()
```

Out[24]:
```
array(['2 BHK', '4 Bedroom', '3 BHK', '4 BHK', '6 Bedroom', '3 Bedroom',
       '1 BHK', '1 RK', '1 Bedroom', '8 Bedroom', '2 Bedroom',
       '7 Bedroom', '5 BHK', '7 BHK', '6 BHK', '5 Bedroom', '11 BHK',
       '9 BHK', nan, '9 Bedroom', '27 BHK', '10 Bedroom', '11 Bedroom',
       '10 BHK', '19 BHK', '16 BHK', '43 Bedroom', '14 BHK', '8 BHK',
       '12 Bedroom', '13 BHK', '18 Bedroom'], dtype=object)
```

In [25]:
```
# converting the size col to # of bedrooms / BHK
data['size'] = data['size'].apply(lambda x: str(x).split(' ')[0]).astype(float)
```

In [26]:
```
#now replacing all the null values in size by median
data['size'] = data.groupby('location')['size'].transform(lambda x: x.fillna(x.median()))
```

In [27]:
```
data['size'] = data['size'].fillna(data['size'].median())
```

```
In [28]:   data.isnull().sum()
```

```
Out[28]:   area_type      0
           availability   0
           location       0
           size           0
           society        0
           total_sqft     0
           bath           0
           balcony        0
           price          0
           dtype: int64
```

- Now there is no Null values in our dataset

```
In [29]:   data.head()
```

Out[29]:

	area_type	availability	location	size	society	total_sqft	bath	balcony	price
0	Super built-up Area	19-Dec	Electronic City Phase II	2.0	Coomee	1056	2.0	1.0	39.07
1	Plot Area	Ready To Move	Chikka Tirupathi	4.0	Theanmp	2600	5.0	3.0	120.00
2	Built-up Area	Ready To Move	Uttarahalli	3.0	Missing_society	1440	2.0	3.0	62.00
3	Super built-up Area	Ready To Move	Lingadheeranahalli	3.0	Soiewre	1521	3.0	1.0	95.00
4	Super built-up Area	Ready To Move	Kothanur	2.0	Missing_society	1200	2.0	1.0	51.00

```
In [30]:   data['total_sqft'].value_counts()
```

```
Out[30]:   1200    843
           1100    221
           1500    205
           2400    196
           600     180
           1000    172
           1350    133
           1050    123
           1300    117
           1250    114
           900     112
           1400    108
           1800    104
           1150    101
           1600    100
           1140     91
           2000     83
           1450     70
           1650     69
           800      67
           3000     66
           1075     66
           1020     63
           2500     62
           1550     60
           1160     60
           1125     60
           950      59
```

1180	58
1700	58
1260	57
1255	56
1220	55
1080	55
1070	53
700	52
750	52
1225	48
4000	48
1175	48
1320	46
1240	46
2100	46
1230	45
1060	45
1210	44
850	43
1280	42
1270	41
1185	41
1190	40
1170	40
1410	40
1750	39
1330	38
1025	38
1290	37
1310	37
1850	37
1065	36
1194	36
1090	35
1215	35
500	34
1360	33
2700	33
1115	33
1900	32
3500	32
1120	32
1464	32
1530	31
1205	31
1340	31
2200	31
1430	31
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1155	27
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1680	27
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650	25
1760	25

1590	25
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1245	25
1010	24
1305	24
1475	24
2600	24
883	23
1440	23
1030	23
1575	23
1110	23
1495	22
985	22
1246	22
3200	21
1243	21
1385	21
1470	21
525	21
1027	21
1015	21
1370	21
1315	21
1610	21
5000	21
1325	21
925	20
660	20
1480	20
550	20
1390	20
1540	20
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1365	19
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1640	19
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920	19
1520	19
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1196	18
1195	18
980	18
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1095	18
975	18
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1485	18
940	18
2072	18
1345	18
1820	18
1665	18
960	17
1157	17
1232	17
1375	17
400	17
1295	17
1490	16
1830	16
3300	16
1655	16
645	16
1235	16

1197	16
935	16
2300	16
1720	16
1425	16
1045	16
1418	16
1135	16
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1740	15
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1580	15
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1595	14
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1336	3
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912	3
1129	3
1347	3
1018	3
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823	3
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2325	3
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2259	2
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1581	2
1995	2
1548	2
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2429	1
2003	1
2122	1
1010 - 1300	1
2504	1
1324	1
855	1
4290	1
1691.2	1
750 - 800	1
1660 - 1805	1
2704	1

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1962	1
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4900 - 4940	1
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616	1
1610 - 1880	1
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755 - 770	1
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2008	1
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3307 - 3464	1
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2144.6	1
1087	1
2134	1
2462 - 2467	1
540 - 740	1
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2Acres	1
615 - 985	1
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540 - 565	1
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151.11Sq. Yards	1
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700 - 900	1
3602	1
596 - 861	1
2251	1
1998	1
3056	1
808	1
826	1
2317	1
3103 - 3890	1
666	1
3435	1
7514	1
1668	1
1370.07	1
1747	1
2019	1
893	1
6729	1
2162.03	1
614	1
5666 - 5669	1
8840	1
2035	1
1052 - 1322	1
3175	1
2787	1
2137	1
2400 - 2600	1
2406	1
1273	1
2615	1
772	1
2236	1
3729	1
120Sq. Yards	1
1783 - 1878	1
2171.66	1
712 - 938	1
2955	1
1681	1

2999.97	1
3671	1
3554	1
2176	1
1892	1
1377	1
1289	1
4040	1
1473	1
1589	1
3484 - 3550	1
3381	1
2150 - 2225	1
929 - 1078	1
3280	1
38Guntha	1
1139.7	1
1235 - 1410	1
1520 - 1759	1
1401	1
1879	1
2546	1
623	1
1886	1
777.4	1
2312	1
4450	1
1731	1
1215 - 1495	1
2415	1
4209	1
4304	1
1140 - 1250	1
6Acres	1
842	1
60	1
784	1
2695	1
2282	1
629 - 1026	1
302	1
4694	1
976	1
953	1
5515	1
24Sq. Meter	1
1437 - 1629	1
1200 - 1470	1
1557	1
1264	1
1701	1
30400	1
850 - 1060	1
2485	1
1369	1
1659	1
2206	1
911	1
2204 - 2362	1
2086	1
1932.47	1
7150	1
5665.84	1
2444	1
613	1
774	1

1133 - 1384	1
2758	1
1020 - 1130	1
2395	1
250	1
9200	1
2920	1
3124	1
1379	1
1648	1
2872	1
1331.95	1
6688	1
3290	1
754	1
1321	1
5480	1
2505	1
2453	1
4723	1
3504	1
866	1
5656	1
650 - 760	1
1400 - 1421	1
1623.29	1
475	1
2153	1
2031	1
2528 - 3188	1
1317	1
567	1
4350	1
1989	1
3734	1
1686	1
2295	1
2875	1
300Sq. Yards	1
4007	1
964	1
142.84Sq. Meter	1
1443	1
4000 - 4450	1
1916	1
1857	1
747	1
16335	1
886	1
1550 - 1590	1
1248.52	1
1609	1
1604	1
1907	1
2970	1
1389	1
2733	1
998	1
2185	1
799 - 803	1
45.06Sq. Meter	1
2223	1
2648	1
1791 - 4000	1
3117	1
717	1

1529	1
2125	1
4446	1
2470 - 2790	1
783 - 943	1
4041	1
2980	1
2247	1
857	1
3270	1
2437	1
3628	1
978	1
1905	1
5425	1
1522	1
2956	1
5150	1
1723	1
5384	1
1587	1
1792	1
612	1
2048	1
588	1
2041 - 2090	1
1816	1
1797	1
943 - 1220	1
1119	1
1230 - 1290	1
492	1
2015	1
2800 - 2870	1
1079 - 1183	1
1410 - 1710	1
3362	1
1861	1
1234.6	1
1902	1
3496	1
4560	1
2996	1
2940Sq. Yards	1
3560	1
706 - 716	1
1160 - 1315	1
1Grounds	1
2110	1
753	1
2249.81	1
534	1
4320	1
456	1
527 - 639	1
1763.25	1
2087	1
4278	1
4500 - 5540	1
660 - 780	1
2316	1
1383	1
516	1
581	1
2088	1
2916	1

488	1
4303	1
2064	1
896.9	1
2082	1
3075	1
2495	1
1230 - 1490	1
1626.6	1
1990	1
4550	1
2098	1
1748	1
1510 - 1670	1
3019	1
1200 - 1800	1
3535	1
1761	1
3410	1
1940	1
866.28	1
684 - 810	1
2507	1
1150 - 1194	1
4482	1
1189	1
524	1
2826	1
10030	1
1361	1
1733.5	1
1255 - 1375	1
3350	1
939	1
1688.12	1
2801.25	1
1642	1
691	1
2285	1
1669	1
1921	1
4382	1
4201	1
3005	1
10624	1
3092	1
499	1
959	1
2077	1
284	1
1287	1
2735	1
86.72Sq. Meter	1
1.25Acres	1
2650 - 2990	1
610 - 615	1
1981	1
2597	1
854 - 960	1
2404	1
1049	1
3913	1
132Sq. Yards	1
15	1
26136	1
2105	1

30000	1
3190	1
4460	1
3297	1
1255 - 1863	1
1300 - 1405	1
590	1
3161	1
871	1
3515	1
2026	1
3366	1
1562	1
1500 - 2400	1
2319	1
2167	1
117Sq. Yards	1
3045	1
904	1
977	1
2401	1
934 - 1437	1
980 - 1030	1
1564 - 1850	1
1452.19	1
3010	1
1446 - 1506	1
5530	1
11338	1
1776.42	1
1901	1
4850	1
1511	1
515	1
1753	1
3025	1
3309	1
1004 - 1204	1
361.33Sq. Yards	1
987	1
2121	1
11890	1
1646	1
6040	1
34.46Sq. Meter	1
668	1
596 - 804	1
1113.27	1
2710 - 3360	1
395	1
1629	1
451	1
1452.55	1
296	1
2023.71	1
714	1
351	1
2526	1
3436 - 3643	1
11	1
792	1
461.82	1
989	1
1145 - 1340	1
685	1
3530	1

1015 - 1540	1
3950	1
1205.47	1
3595	1
1482 - 1846	1
944	1
832	1
3259	1
858	1
1689.28	1
2805 - 3565	1
4428	1
1818	1
2912	1
2059	1
888	1
532	1
3227	1
1915	1
963	1
769	1
1712	1
2795	1
1918	1
2113	1
1828	1
2408	1
704 - 730	1
673	1
3016	1
2820	1
4772	1
5600	1
4051	1
2405	1
1777	1
2721	1
2220	1
1070 - 1315	1
1888	1
1520 - 1740	1
3040Sq. Meter	1
3640	1
1736	1
500Sq. Yards	1
2043	1
2779	1
1020.07	1
5965	1
2806 - 3019	1
3537	1
1909	1
956	1
1218	1
2363	1
885	1
1451.5	1
3245	1
8500	1
3293 - 5314	1
547.34 - 827.31	1
1114	1
3670	1
2090	1
3329	1
785	1

716Sq. Meter	1
3073	1
2181	1
445	1
1000Sq. Meter	1
764	1
340	1
2465	1
1160 - 1195	1
2489	1
4360	1
628	1
667	1
804.1	1
5270	1
580 - 650	1
1373	1
3680	1
2863	1
2424	1
3516	1
3770	1
1378	1
2195	1
3467.86	1
1005.03 - 1252.49	1
3606 - 5091	1
5.31Acres	1
3968	1
2169	1
3235	1
2112.95	1
315	1
633 - 666	1
30Acres	1
1824	1
1561	1
1637	1
650 - 665	1
24	1
2825	1
4634	1
4239	1
1445 - 1455	1
884 - 1116	1
1000 - 1285	1
850 - 1093	1
14000	1
1617	1
1440 - 1884	1
2842	1
1558.67	1
520 - 645	1
1100Sq. Yards	1
1606	1
2572	1
3425 - 3435	1
1337	1
2845	1
2204	1
2791	1
916	1
688	1
2172.65	1
961	1
3555	1

6150	1
671	1
581.91	1
1544	1
1250 - 1305	1
1195 - 1440	1
824	1
1269.72	1
2519	1
1673	1
670 - 980	1
1867	1
3584	1
2168	1
3125	1
5230	1
1775	1
1687	1
983	1
2039	1
1316	1
3042	1
2479.13	1
52272	1
5080	1
1266	1
4400 - 6800	1
817	1
1815	1
2118	1
35000	1
3090 - 5002	1
4400 - 6640	1
660 - 670	1
1193	1
1500Sq. Meter	1
620 - 933	1
2028	1
2611	1
1120 - 1145	1
1641	1
2695 - 2940	1
727	1
1722	1
2000 - 5634	1
4125Perch	1
469	1
1429	1
1574Sq. Yards	1
3606	1
3450 - 3472	1
2337	1
1563.05	1
2386	1
1567.2	1
2435	1
2563 - 2733	1
2005	1
605 - 624	1
4260 - 4408	1
2582	1
2663	1
2127	1
1349 - 3324	1
869	1
45	1

78.03Sq. Meter	1
1208.51	1
3300 - 3335	1
2328	1
2384	1
1180 - 1630	1
806	1
1628	1
1660.4	1
4075	1
1987	1
2245	1
1597	1
2423	1
3131	1
396	1
4273	1
3500 - 3600	1
941	1
906	1
2302	1
948	1
188.89Sq. Yards	1
797	1
2396	1
1939	1
3401	1
1469 - 1766	1
2246	1
4510	1
204Sq. Meter	1
1766	1
870 - 1080	1
3010 - 3410	1
45Sq. Yards	1
1014	1
2601	1
695	1
3160	1
1769	1
133.3Sq. Yards	1
1554.3	1
4920	1
627	1
3405.1	1
2570	1
881	1
951	1
1652.5	1
3532	1
122Sq. Yards	1
934	1
84.53Sq. Meter	1
1593	1
1408 - 1455	1
2901	1
4050 - 4075	1
1266.67	1
942 - 1117	1
2679	1
3044	1
1750 - 2640	1
790	1
2476	1
1877	1
1649	1

766	1
2100 - 2850	1
651	1
598 - 958	1
1631	1
1500Cents	1
1829	1
5720	1
2132	1
1412	1
1439	1
5924	1
552	1
2365	1
864	1
2293	1
505	1
2120	1
3463	1
1741	1
2.09Acres	1
1482 - 1684	1
583	1
981 - 1249	1
2108	1
2324	1
2968	1
1100 - 1225	1
1565 - 1595	1
2232	1
2932	1
3820	1
24Guntha	1
1831	1
1270 - 1275	1
840 - 1010	1
947	1
697Sq. Meter	1
1716	1
638	1
4856	1
3664	1
539	1
2173	1
655 - 742	1
1330.74	1
800 - 2660	1
1525.84	1
1548.3	1
1210 - 1477	1
3027	1
1053.4	1
540 - 670	1
315Sq. Yards	1
1650 - 2538	1
3445	1
2283	1
3815	1
4827	1
2894	1
833	1
669	1
3811	1
3860	1
1734	1
1462	1

704	1
2725 - 3250	1
2957 - 3450	1
1732.46	1
2592	1
4470	1
624	1
722	1
2775	1
706	1
4356	1
2138	1
910.2	1
607	1
2885	1
981	1
2776	1
892	1
4818	1
4355	1
908	1
3369 - 3464	1
1574	1
1042 - 1105	1
1125 - 1500	1
813	1
3884	1
3876	1
3067 - 8156	1
897	1
3480	1
1413	1
1	1
276	1
2372	1
167Sq. Meter	1
1076 - 1199	1
2651	1
2270	1
2497	1
2342	1
6600	1
1627.86	1
2215 - 2475	1
1874	1
4960	1
3179	1
2928	1
5700	1
787	1
660 - 700	1
6613	1
502	1
3339	1
1483	1
2162	1
1733	1
1974	1
385 - 440	1
2631	1
2792	1
2100 - 5405	1
2448	1
1932	1
770 - 841	1
2171	1

```
42000                    1
1793                     1
1551                     1
3563                     1
462                      1
3Cents                   1
1310 - 1615              1
36000                    1
1113.12                  1
1782 - 2000              1
621                      1
3080                     1
2383                     1
4830                     1
555                      1
2182                     1
2416                     1
3905                     1
2107                     1
2431                     1
2511                     1
4640                     1
818                      1
9000                     1
1288                     1
1974 - 2171              1
300                      1
1778                     1
2006.8                   1
1922                     1
888 - 1290               1
1467                     1
1360 - 1890              1
2370                     1
5                        1
1004                     1
5985                     1
2466 - 2856              1
3580                     1
2461                     1
1437                     1
2155                     1
4689                     1
Name: total_sqft, dtype: int64
```

In [31]:
```python
def processing_total_sqft(my_list):
    if len(my_list) == 1:

        try:
            return float(my_list[0])
        except:
            strings = ['Sq. Meter', 'Sq. Yards', 'Perch', 'Acres', 'Cents', 'Guntha', 'Gr
            split_list = re.split('(\d*.*\d)', my_list[0])[1:]
            area = float(split_list[0])
            type_of_area = split_list[1]

            if type_of_area == 'Sq. Meter':
                area_in_sqft = area * 10.7639
            elif type_of_area == 'Sq. Yards':
                area_in_sqft = area * 9.0
            elif type_of_area == 'Perch':
                area_in_sqft = area * 272.25
            elif type_of_area == 'Acres':
                area_in_sqft = area * 43560.0
            elif type_of_area == 'Cents':
```

```
                area_in_sqft = area * 435.61545
        elif type_of_area == 'Guntha':
                area_in_sqft = area * 1089.0
        elif type_of_area == 'Grounds':
                area_in_sqft = area * 2400.0
        return float(area_in_sqft)

    else:
        return (float(my_list[0]) + float(my_list[1]))/2.0
```

In [32]:
```
data['total_sqft'] = data['total_sqft'].str.split('-').apply(processing_total_sqft)
```

In [33]:
```
data.head()
```

Out[33]:

	area_type	availability	location	size	society	total_sqft	bath	balcony	price
0	Super built-up Area	19-Dec	Electronic City Phase II	2.0	Coomee	1056.0	2.0	1.0	39.07
1	Plot Area	Ready To Move	Chikka Tirupathi	4.0	Theanmp	2600.0	5.0	3.0	120.00
2	Built-up Area	Ready To Move	Uttarahalli	3.0	Missing_society	1440.0	2.0	3.0	62.00
3	Super built-up Area	Ready To Move	Lingadheeranahalli	3.0	Soiewre	1521.0	3.0	1.0	95.00
4	Super built-up Area	Ready To Move	Kothanur	2.0	Missing_society	1200.0	2.0	1.0	51.00

In [34]:
```
data.isnull().sum()
```

Out[34]:
```
area_type       0
availability    0
location        0
size            0
society         0
total_sqft      0
bath            0
balcony         0
price           0
dtype: int64
```

Feature Engineering

In [35]:
```
#adding the new col
df = data.copy()

#prices are in lakhs
df['price_per_sqft'] = df['price']*100000/df['total_sqft']
```

In [36]:
```
df.head()
```

Out[36]:

	area_type	availability	location	size	society	total_sqft	bath	balcony	price	price_p(
0	Super built-up Area	19-Dec	Electronic City Phase II	2.0	Coomee	1056.0	2.0	1.0	39.07	3699.8

	area_type	availability	location	size	society	total_sqft	bath	balcony	price	price_p
1	Plot Area	Ready To Move	Chikka Tirupathi	4.0	Theanmp	2600.0	5.0	3.0	120.00	4615.3
2	Built-up Area	Ready To Move	Uttarahalli	3.0	Missing_society	1440.0	2.0	3.0	62.00	4305.5
3	Super built-up Area	Ready To Move	Lingadheeranahalli	3.0	Soiewre	1521.0	3.0	1.0	95.00	6245.8
4	Super built-up Area	Ready To Move	Kothanur	2.0	Missing_society	1200.0	2.0	1.0	51.00	4250.0

In [37]:
```python
# Checking unique values of 'location' column
locations = list(df['location'].unique())
print(len(locations))
```

1305

In [38]:
```python
# Removing the extra spaces at the end
df.location = df.location.apply(lambda x: x.strip())

# Calulating all the unqiue values in 'location' column
location_stats = df['location'].value_counts().sort_values(ascending=False)
location_stats
```

Out[38]:
```
Whitefield                    541
Sarjapur  Road                399
Electronic City               304
Kanakpura Road                273
Thanisandra                   237
Yelahanka                     213
Uttarahalli                   186
Hebbal                        177
Marathahalli                  175
Raja Rajeshwari Nagar         171
Hennur Road                   152
Bannerghatta Road             152
7th Phase JP Nagar            149
Haralur Road                  142
Electronic City Phase II      132
Rajaji Nagar                  107
Chandapura                    100
Bellandur                      96
KR Puram                       91
Electronics City Phase 1       88
Hoodi                          88
Yeshwanthpur                   85
Begur Road                     84
Sarjapur                       82
Kasavanhalli                   80
Harlur                         79
Banashankari                   75
Hormavu                        74
Ramamurthy Nagar               73
Kengeri                        73
JP Nagar                       72
Hosa Road                      72
Koramangala                    72
Jakkur                         71
Old Madras Road                71
```

Varthur	70
Kothanur	66
Kaggadasapura	64
Nagarbhavi	63
Thigalarapalya	62
Akshaya Nagar	62
TC Palaya	60
Rachenahalli	58
Malleshwaram	58
8th Phase JP Nagar	57
Hennur	55
Jigani	54
Budigere	54
HSR Layout	53
Hulimavu	52
Jalahalli	52
Panathur	51
Bisuvanahalli	51
Mysore Road	50
Ramagondanahalli	50
Bhoganhalli	50
Hegde Nagar	49
Gottigere	48
Kundalahalli	47
Brookefield	47
Hosur Road	47
Devanahalli	45
Balagere	45
Indira Nagar	44
Vidyaranyapura	43
Subramanyapura	43
9th Phase JP Nagar	43
CV Raman Nagar	43
Vittasandra	43
Attibele	42
Vijayanagar	42
Horamavu Agara	42
Kadugodi	42
Kanakapura	42
Yelahanka New Town	41
Kengeri Satellite Town	40
Talaghattapura	40
5th Phase JP Nagar	39
Kudlu Gate	39
Green Glen Layout	39
Sahakara Nagar	39
Channasandra	38
Anekal	37
Bommasandra	37
R.T. Nagar	36
Hosakerehalli	36
Lakshminarayana Pura	36
Frazer Town	36
Bommanahalli	35
Hebbal Kempapura	34
Tumkur Road	33
Kalena Agrahara	33
Old Airport Road	33
Basavangudi	32
Ambedkar Nagar	31
Mahadevpura	31
Doddathoguru	30
Kumaraswami Layout	30
Ananth Nagar	30
Chikkalasandra	30
Kammasandra	29

BTM 2nd Stage	29
Dodda Nekkundi	29
Kudlu	29
Horamavu Banaswadi	28
Somasundara Palya	28
Padmanabhanagar	28
Ambalipura	27
Singasandra	27
Anandapura	27
Banashankari Stage III	27
Kodichikkanahalli	27
Margondanahalli	26
Gubbalala	26
Bommasandra Industrial Area	26
Kothannur	26
Choodasandra	26
Seegehalli	25
Magadi Road	25
Babusapalaya	25
Iblur Village	25
1st Phase JP Nagar	25
Kogilu	25
Abbigere	24
2nd Stage Nagarbhavi	24
Battarahalli	24
Amruthahalli	24
Munnekollal	24
Kambipura	24
Ardendale	24
EPIP Zone	23
6th Phase JP Nagar	23
Lingadheeranahalli	23
Domlur	22
Thubarahalli	22
Gunjur	22
Hoskote	22
Kathriguppe	22
Sonnenahalli	22
Rayasandra	22
Kaval Byrasandra	22
Binny Pete	21
Basaveshwara Nagar	21
Ulsoor	21
HBR Layout	20
Sanjay nagar	20
Poorna Pragna Layout	20
Yelachenahalli	20
Kalyan nagar	19
Pai Layout	19
OMBR Layout	19
HRBR Layout	19
Kaggalipura	19
Bannerghatta	18
Garudachar Palya	18
Kannamangala	18
Billekahalli	18
Malleshpalya	17
Dasarahalli	17
BTM Layout	17
Kammanahalli	17
Chikka Tirupathi	17
Arekere	17
Sarjapura - Attibele Road	17
Nagavara	17
Kaikondrahalli	17
Devarachikkanahalli	17

Banaswadi	17
Kereguddadahalli	16
Dasanapura	16
Mallasandra	16
Begur	16
Cooke Town	16
Kasturi Nagar	16
Anjanapura	16
Judicial Layout	16
Sector 2 HSR Layout	16
Kenchenahalli	16
Banashankari Stage II	16
Banashankari Stage VI	16
Parappana Agrahara	16
Chamrajpet	15
Varthur Road	15
Benson Town	15
Nagavarapalya	15
Kodihalli	15
NGR Layout	14
Giri Nagar	14
Sultan Palaya	14
NRI Layout	14
Jalahalli East	14
Doddakallasandra	14
1st Block Jayanagar	14
Murugeshpalya	14
Sarakki Nagar	14
BEML Layout	13
Gollarapalya Hosahalli	13
ISRO Layout	13
Prithvi Layout	13
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Cunningham Road	13
Dommasandra	13
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Chikkabanavar	13
Vishveshwarya Layout	13
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Rajiv Nagar	13
Cox Town	12
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Vasanthapura	12
Laggere	12
Badavala Nagar	12
GM Palaya	12
Karuna Nagar	12
Sompura	12
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Doddaballapur	12
AECS Layout	12
5th Block Hbr Layout	12
ITPL	12
Mico Layout	12
Nagasandra	12
Bharathi Nagar	12
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Narayanapura	11
Thyagaraja Nagar	11

HAL 2nd Stage	11
2nd Phase Judicial Layout	11
LB Shastri Nagar	11
Marsur	11
Kodigehalli	11
Tindlu	11
Banjara Layout	11
Nehru Nagar	11
Naganathapura	10
Ganga Nagar	10
Sadashiva Nagar	10
Dodsworth Layout	10
Nagadevanahalli	10
BTM 1st Stage	10
Kalkere	10
Gunjur Palya	10
1st Block Koramangala	10
Basapura	10
Nagappa Reddy Layout	10
Dairy Circle	10
Sector 1 HSR Layout	10
Kaverappa Layout	9
KUDLU MAIN ROAD	9
4th Block Koramangala	9
Vignana Nagar	9
Medahalli	9
Banagiri Nagar	9
Kamakshipalya	9
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Yemlur	9
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Richmond Town	9
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Reliaable Tranquil Layout	8
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Akshayanagara East	8
Ittamadu	8
Hongasandra	8
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Shikaripalya	8
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Sidedahalli	8
MS Pallya	8
Gopalkrishna Nagar	8
Roopena Agrahara	8
Dollars Colony	8
Akshaya Vana	8
Hoysalanagar	8
Mahalakshmi Puram	8
Shanti Nagar	8
Outer Ring Road East	8
Nelamangala	8
Huskur	8
Cambridge Layout	8
Manayata Tech Park	8

Sathya Sai Layout	8
Kodbisanhalli	8
Vajarahalli	8
1st Block HRBR Layout	8
Byadarahalli	8
Sarjapur Road,	8
Thirumenahalli	8
Jalahalli West	8
Seetharampalya	8
Vasanth nagar	8
Ambedkar Colony	7
Cholanayakanahalli	7
Kundalahalli Colony	7
Maruthi Sevanagar	7
Byatarayanapura	7
RMV 2nd Stage	7
Jayanagar	7
Ashwath Nagar	7
Defence Colony	7
Keshava Nagar	7
Bank Of Baroda Colony	7
3rd Block Hrbr Layout	7
Hoodi Circle,	7
8th block Koramangala	7
Ramakrishnappa Layout	7
Tejaswini Nagar	7
Green View Layout	7
Byrasandra	7
HOSUR MAIN ROAD	7
Doctors Layout	7
Vijaya Bank Layout	7
Wilson Garden	7
Victoria Layout	7
Basaveshwara Nagar Yelahanka	7
Jeevan bima nagar	7
Hessarghatta	7
Richards Town	7
Doddakammanahalli	7
Madiwala	7
2nd Block Hrbr Layout	7
Canara Bank Colony	7
4th T block Jayanagar	7
Channasandra Layout	7
Austin Town	7
AGS Layout	7
Doddabommasandra	7
Devarabeesana Halli	7
Singapura Village	7
Hennur Gardens	7
ITI Layout	6
Bileshivale	6
Chelekare	6
Bhuvaneshwari Nagar	6
Meenakunte	6
Venkatapura	6
Anand Nagar	6
Devasthanagalu	6
Siddapura	6
Abbaiah Reddy Layout	6
Nagawara Junction	6
Nayandanahalli	6
Srinivasa Nagar	6
Varanasi	6
Ashwathnagar	6
Srirampura	6
Byrathi Village	6

Doddanekundi	6
Doddakannelli	6
Ashirvad Colony	6
Shree Ananth Nagar Layout	6
Dodda Banaswadi	6
Shantiniketan Layout	6
Rajiv Gandhi Nagar	6
Kacharakanahalli	6
Motappa Layout	6
Doddanakundi Industrial Area 2	6
Samethanahalli	6
Kumara Park	6
Bagalakunte	6
Amblipura	6
Hennur Bande	6
Rustam Bagh Layout	6
New Thippasandra	6
Gopalapura	6
Maragondanahalli	6
Suraksha Nagar	6
Avalahalli	5
9th Block Jayanagar	5
Hosahalli Extension	5
Amruthnagar	5
Akshya Nagar	5
Maruthi Nagar	5
Vasantha Vallabha Nagar	5
HMT Layout	5
Chikkadunnasandra	5
Kurubarahalli	5
Doddabanahalli	5
1st Stage Indira Nagar	5
Kallumantapa	5
Sunkadakatte	5
RMV Extension	5
Cottonpet	5
7th Block Jayanagar	5
Ramanjaneyanagar	5
Vishwapriya Nagar	5
Bellari Road	5
Maithri Layout	5
A Narayanapura	5
Stage-4 Bommanahalli	5
Kadugondanahalli	5
Carmelaram	5
Bagalur	5
Pattanagere	5
6th block Koramangala	5
Kadabagere	5
Jakkuru Layout	5
Virat Nagar	5
Nagaraja Garden	5
Off Sarjapur Road,	5
Shanthala Nagar	5
Kada Agrahara	5
Silk Board	5
Doopanahalli	5
VGP Layout	5
New Gurappana Palya	5
Devi Nagar	5
Belathur	5
Nagondanahalli	5
Srirampuram	5
Munivenkatppa Layout	5
Raghuvanahalli	5
3rd Block Banashankari	5

Govindpura	5
Nagashetty Halli	5
KR Garden	5
Mallathahalli	5
Lavelle Road	5
Jakkasandra Extension	5
Attur Layout	5
Hiremath Layout	5
Byagadadhenahalli	5
Basavanagara	5
Coconut Grove Layout	5
Harsha Layout	4
Kirloskar Layout	4
Puttanahalli	4
Poornapragna Housing Society Layout	4
Lakshmi Layout	4
NS Palya	4
Suddaguntepalya	4
Ramamurthy Nagar Extension	4
Mylasandra	4
Lake City	4
Langford Town	4
Tala Cauvery Layout	4
Ngef Layout	4
Bikasipura	4
tc.palya	4
Manjunath Nagar	4
Herohalli	4
Divya Unnathi Layout	4
Singena Agrahara	4
JCR Layout	4
AMS Layout	4
RWF West Colony	4
Doddagubbi	4
Sector 6 HSR Layout	4
Varsova Layout	4
Hanumanth Nagar	4
Dooravani Nagar	4
Lavakusha Nagar	4
Judicial Layout, Kanakapura Road,	4
Udayapur Village	4
Moodalapalya	4
Sai Gardens	4
Vinayaka Nagar	4
Chennappa Layout	4
Bagalur Main Road	4
Shankarapuram	4
Glass Factory Layout	4
BEL Road	4
Laxmi Sagar Layout	4
Basavanna Nagar	4
OLd Gurappanapalya	4
BSM Extension	4
4th Phase JP Nagar	4
Alfa Garden Layout	4
Silver Springs Layout	4
Konanakunte Cross	4
Tavarekere	4
8th Block Jayanagar	4
BCC Layout	4
Kodathi	4
Vaishnavi Layout	4
Jnanabharathi Layout	4
Udaya Nagar	4
Chinnapanahalli	4
Chikkasandra	4

Immadihalli	4
Palace Guttahalli	4
2nd Block Jayanagar	4
Chikkathoguru	4
Kammagondahalli	4
Kuvempu Nagar	4
Thanisandra main road	4
Brooke Bond First Cross	4
Gowdanapalya	4
Upkar Layout	4
Pragathi Nagar	4
Nyanappana Halli	4
MCECHS layout	4
Geddalahalli	4
4th Block Jayanagar	4
Mysore Highway	4
Kamala Nagar	4
Kumarapalli	4
Raja Rajeshwari Nagar 5th Stage	4
T Dasarahalli	4
Tata Nagar	4
Vittal Nagar	3
D Group Employees Layout	3
Devanahalli Int. Airport	3
Venkatadri Layout	3
Palanahalli	3
Tirumanahalli	3
Ilyas Nagar	3
RPC layout	3
Brindavan Nagar	3
Kumbena Agrahara	3
3rd Phase JP Nagar	3
Vadarpalya	3
Devara Jeevanahalli	3
Gokula Extension	3
Singanayakanahalli	3
Domlur Layout	3
T.C PALYA	3
Marasandra	3
Sanne Amanikere	3
Sadaramangala	3
Manorayana Palya	3
5th Stage BEML Layout	3
Baba Nagar	3
3rd Block Jayanagar	3
Nanjappa Layout	3
Ullal Uppanagar	3
Gulimangala	3
Atmananda Colony	3
Thippasandra	3
Chikka Banaswadi	3
Adityanagar	3
Daadys Gaarden Layout	3
Sanjeevini Nagar	3
RMV	3
P&T Layout	3
Crimson Layout	3
Vinayak Nagar	3
Belatur	3
Makali	3
Coffee Board Layout	3
Anantapura	3
Konena Agrahara	3
Mathikere Extension	3
Anjappa Layout	3
Govindapura	3

Hegganahalli	3
Prashanth Nagar	3
Kodipalya	3
Yeshwanthpur Industrial Suburb	3
Nobo Nagar	3
Rajankunte	3
Harappanahalli	3
Srinagar	3
KSRTC Layout	3
Tasker Town	3
Dasappa Layout	3
BTM 4th Stage	3
Shettigere	3
Bethel Nagar	3
Ullal Road	3
Mangammanapalya	3
Hanumantha Nagar	3
Veerannapalya	3
Kavika Layout	3
Bettahalsoor	3
Kamakya Layout	3
Thurahalli	3
Jnana Ganga Nagar	3
Ramesh Nagar	3
Tunganagara	3
Virupakshapura	3
Surabhi Layout	3
Krishna Reddy Layout	3
Kithaganur	3
Pampa Extension	3
Jayanti Nagar	3
Gkvk Layout	3
Bhuvaneswari Nagar	3
Ayappa Nagar	3
Lakshmipura	3
Arishinakunte	3
J C Nagar	3
Kaveri Nagar	3
SMV layout	3
Agrahara Dasarahalli	3
Rajarajeshwari nagar	3
BHEL Layout	3
VHBCS Layout	3
Dollars Layout	3
Vimanapura	3
Rajarajeshwari Nagara	3
Jinkethimmanahalli	3
Telecom Layout	3
Venugopal Reddy Layout	3
Kashi Nagar	3
Basava Nagar	3
Ankappa Layout	3
2nd Stage Arekere Mico Layout	3
Bidadi	3
Canara Bank Layout	3
Sarvabhouma Nagar	3
Thanisandra Main Road,	3
Jayamahal	3
Sathya Layout	3
Weavers Colony	3
Hagadur	3
Arehalli	3
Raghavendra Nagar	3
B Channasandra	3
Himagiri Meadows	3
Lottegolla Halli	3

KR Layout	3
Sampangi Rama Nagar	3
Kothnur Narayanapura	3
Narayana Nagar 1st Block	3
5th Block Jayanagar	3
Nandini Layout	3
Dinnur	3
Seshadripuram	3
Ashwini layout	3
Kachanayakanahalli	3
1st Block HBR Layout	3
Alur	3
Sri Balaji Krupa Layout	3
Gattahalli	3
Ferrar Nagar	3
Kenchenhalli	3
Bhagyalakshmi Avenue	3
Kengeri Hobli	3
Esther Enclave Layout	3
Hosapalya	3
Pulkeshi Nagar	2
Muthurayya Swamy Layout	2
Kumbalgodu	2
Kariyammana Agrahara	2
Bhoopsandra	2
SRINIVASAPURA	2
Friends Colony	2
Doddabidrakallu	2
Billamaranahalli	2
Manjunatha Layout	2
Vyalikaval	2
Classic Paradise Layout	2
Green Woods Layout	2
Muneshwara Nagar	2
Versova Layout	2
Gaurava Nagar	2
Nandi Durga Road	2
Vibhutipura Extension	2
Suragajakkanahalli	2
Yarandahalli	2
Chokkanahalli	2
Jai Bheema Nagar	2
Race Course Road	2
Varthur Road,	2
Challaghatta	2
Green Garden Layout	2
Amam Enclave Layout	2
Remco Bhel Layout	2
Panduranga Nagar	2
Sri Venkateshpura Layout	2
Patelappa Layout	2
St. John's Road	2
Omkar Nagar	2
Infantry Road	2
Hunasamaranahalli	2
Hoodi Layout	2
Postal Colony	2
Dodda Kempaiah Layout	2
Someshwara Layout	2
Kathreguppe	2
HAL 3rd Stage	2
Sampigehalli	2
Teachers Colony	2
frazertown	2
Bidrahalli	2
Green Domain Layout	2

Cleveland Town	2
Shanthi Layout	2
Soundarya Layout	2
Syndicate Bank Colony	2
manyata park	2
Rajapura	2
V.V Puram	2
Amarjyothi Colony	2
Sunder Ram Shetty Nagar	2
Chennammanakere Achukattu	2
Dwarka Nagar	2
Hallehalli	2
Mariyannapalya	2
Shirdi Sai Layout	2
Palace Road	2
Lakshmiamma Garden	2
Jyothi Nagar	2
Bendiganahalli	2
Hennagara	2
Hosakerehalli Layout	2
Anwar Layout	2
Mahaganapathy Nagar	2
Andrahalli	2
Devasandra Extension	2
Kadarenahalli	2
ECC Road, Whitefield,	2
Jaya Mahal layout	2
Vijinapura	2
SBM Colony	2
Geleyara Balaga Layout	2
Coconut Garden	2
Vibuthipura	2
Kullappa Colony	2
Dr Shivarama Karantha Nagar	2
Annaiah Reddy Layout	2
Kempapura	2
Devanahalli Road	2
Sneha Colony	2
Shingapura	2
Balaji Gardens Layout	2
JP Nagar 7th Phase,	2
Dena Bank Colony	2
Vasanthpura	2
Veersandra	2
Gnana Bharathi	2
Guddadahalli	2
Jayamahal Extension	2
Dollar Scheme Colony	2
Rajarajeshwarinagar	2
Lakkasandra	2
Near International Airport	2
Upadhyaya Layout	2
Shetty Halli	2
Nandi Hills	2
Krishna Nagar	2
Gidada Konnenahalli	2
BCMC Layout	2
Ganesha Block	2
3rd Block Koramangala	2
south	2
Ramanashree Enclave	2
Marenahalli	2
Kempegowda Nagar	2
Kothnoor Dinne	2
Koppa	2
Ashok Nagar	2

Ramchandrapuram	2
2nd Block Bel Layout	2
Hadosiddapura	2
cooketown	2
Brindavan Layout	2
Chikku Lakshmaiah Layout	2
Tigalarpalya	2
Janatha Colony	2
Celebrity Paradise Layout	2
Kyalasanahalli	2
Koramangala Industrial Layout	2
MLA Layout	2
Rest House Road	2
RR Layout	2
Anjana Nagar	2
M V Extenstion	2
Whitefield,	2
Nanjappa Garden	2
Vaderahalli	2
Kannur	2
RMV Extension Stage 2	2
Govindaraja Nagar Ward	2
Akshayanagara West	2
Madavara	2
Anand nagar	2
Veer Sandra	2
Gandhi Bazar	2
Rajasree Layout	2
Chamundi Nagar	2
Sadanand Nagar	2
Harohalli	2
Omarbagh Layout	2
KEB Colony	2
CQAL Layout	2
Phase 1 Kammasandra	2
GD Layout	2
2nd Block Koramangala	2
Church Street	2
Garebhavipalya	2
Vivek Nagar	2
Neelamangala	2
Srinivas Colony	2
Langford Gardens	2
Uday Nagar	2
JP Nagar 8th Phase,	2
Thomas Town	2
Sri Sai Layout	2
Indra Nagar	2
Annapurneshwari Nagar	2
Subash Nagar	2
1st Block BEL Layout	2
Electronic city Phase 1,	2
Aishwarya Crystal Layout	2
Anugrah Layout	2
Lal Bahadur Shastri Nagar	2
Gattigere	2
Naidu Layout	2
Chikkakannalli	2
Guni Agrahara	2
Raghavendra Layout	2
T K Reddy Layout	1
Subramanyanagar	1
2Electronic City Phase II	1
Pai layout , Mahadevapura	1
Malimakanapura	1
Viswapriyanagar.begur Road.bommanahalli.	1

Garden Layout	1
Craig Park Layout	1
KPC Layout	1
Bharath Housing Society Layout	1
IVC Road	1
1 Ramamurthy Nagar	1
Sector 3 HSR Layout	1
Sundara Nagar	1
Byappanahalli	1
Chowdeshwari Layout	1
ITI Employees Layout	1
Ring Road Nagarbhavi	1
P&T Colony	1
Prakruthi Nagar	1
Shivanagar	1
Kalasipalya	1
4 Bedroom Farm House in Bagalur	1
Sulthangunta	1
6th block banashankari 3rd stage, 100 feet ORR	1
Bull Temple Road	1
Maruthi HBCS Layout	1
Arekempanahalli	1
Brigade Road	1
Indira Nagar 3rd Stage	1
Rahat Bagh	1
Escorts Colony	1
asha township, off hennur road	1
1A Block Koramangala	1
NTI Layout	1
Fraser town	1
Sonam Layout	1
CR Layout	1
near Ramanashree California resort	1
MRCR Layout	1
Gangondanahalli	1
Kanakadasa Layout	1
Kumbhena Agrahara	1
Kengeri Satellite Town (BDA SITE)	1
1 Giri Nagar	1
Chikkabidarakallu	1
T.C. Palya	1
Defence Layout	1
Amco Colony	1
D Souza Layout	1
Rukmaiah Layout	1
K N Extension	1
Binny Mills Employees Colony	1
Banashankari3rd stage bigbazar	1
Hennur Busstop	1
GB Palya	1
Indiranagar HAL 2nd Stage	1
Lalbagh Road	1
Hosahalli	1
BEL Layout	1
Chikkabettahalli	1
Gopal Reddy Layout	1
sankeswari	1
T c palya	1
Govindraja Nagar	1
Maragondana Halli, kr puram, old madras road	1
Dhanalakshmi Layout	1
Jp nagar 8th Phase .	1
Kanakapura Road	1
Nagarbhavi BDA Complex	1
Off Sarjapur road,	1
M C Layout	1

Sri Kanteshwara Nagar	1
Popular Colony	1
RK Layout 2nd Stage	1
Pulikeshi Nagar	1
Kodanda Reddy Layout	1
Narayanappa Layout	1
1Hanuman Nagar	1
Tippenahalli	1
Thavarekere	1
Banaswadi,	1
Sector 4 HSR Layout	1
Mukkutam Nagar	1
NR Colony	1
Agara Village	1
Banashankari 6th Stage ,Subramanyapura	1
Reliable Woods Layout	1
BAGUR	1
Grihalakshmi Layout	1
M.G Road	1
Papareddipalya	1
sapthagiri Layout	1
Devarabisanahalli	1
Marathalli bridge	1
K G Colony	1
Marathi Layout	1
Binnamangala	1
Yemlur, Old Airport Road,	1
Narasapura	1
Mango Garden Layout	1
Bidere Agarahara, Behind Safal market	1
Bank Avenue	1
Huttanahalli	1
Williams Town	1
Jaya Nagar East	1
Iggalur	1
Chikkaballapur	1
3rd Block HBR Layout	1
Ncpr Industrial Layout	1
Prestige Sunrise	1
Srigandada Kaval	1
Viswajit Layout	1
BDS Layout	1
Keerthi Layout	1
Ganga Nagar Extension	1
J P Nagar 7th Phase Ramayya City	1
J.P.nagar 6th Phase.Sarakki Nagar	1
Rajanna Layout	1
St Thomas Town	1
Uvce Layout	1
t.c palya	1
Achins Road	1
Indranagar 100ft road defence colony	1
Sahyadri Layout	1
Mathikere SBM colony	1
white field,kadugodi	1
P Krishnappa Layout	1
Goraguntepalya	1
6th Block Rajaji Nagar	1
Double Road	1
Tharabanahalli	1
Ckikkakammana Halli	1
Housing Board Layout Vijay Nagar	1
Banashankari 2nd Stage	1
Vayunandana Layout	1
Geetanjali Layout	1
EPIP AREA, WHITEFIELD	1

1st Stage Domlur	1
RMV extension stage 2, rmv extension	1
Kalhalli	1
Vijaya Bank Colony	1
1 Annasandrapalya	1
JP nagar 9th Phase,	1
Karnataka Shabarimala	1
Hanumagiri	1
Manganahalli	1
K R C kothanur	1
Lakshmipura Vidyaanyapura	1
Shirdi Sai Nagar	1
Maruthi Layout	1
singapura paradise	1
BEML Layout 5th stage	1
1st Stage Radha Krishna Layout	1
Bapuji Layout	1
Vasantapura main road	1
Old Town	1
Okalipura	1
Maruthi Extension	1
Vidyapeeta	1
Meenakshi Layout	1
S R Layout	1
Sadduguntepalya	1
1Channasandra	1
Adarsh Nagar	1
Medi Agrahara	1
whitefiled	1
Subbannaiah Palya	1
N R Layout	1
Madanayakahalli	1
Jaladarsini Layout	1
Milk Colony	1
Basnashankari,6th stage,	1
Near ullas theater	1
Saptagiri Layout	1
Vijayabank bank layout	1
Prasanth Extension	1
West of Chord Road	1
Junnasandra	1
Ananthanagar Phase 1,Electronic City , phase 2	1
Muthyala Nagar	1
Nrupathunga Nagar	1
Amrita Nagar	1
Billapura	1
KHB Colony Extension	1
Subramanya Nagar	1
Jagajyothi layout	1
Mailasandra	1
Hullahalli	1
Shettihalli	1
Badrappa Layout	1
Puttappa Layout	1
anjananager magdi road	1
Handenahalli	1
DUO Layout	1
Gokaula Extension	1
RTO ullalu	1
ravindra nagar, T.dasarahalli peenya	1
Prakruthi Township	1
Bennigana Halli	1
Seethappa Layout	1
Bellandur,	1
Kalkere Channasandra	1
Shakthi Nagar	1

Rainbow Drive	1
Malur Hosur Road	1
Vikram Nagar	1
Chokkahalli	1
Nirman Layout	1
TR Mill Road, Chamarajpet	1
manyata tech park	1
CQAL LAYOUT C BLOCK	1
Near Electronic City,	1
Wajid layout thanisandra	1
Laxminarayana Layout	1
kanakapura main road	1
Basvasamithi Layout Vidyaranyapura	1
Lakkasandra Extension	1
Kuvempu Layout	1
Chickpet	1
T G extension	1
GKW Layout	1
Gandhi Nagar	1
rr nagar	1
Venkateshpuram	1
Mullur	1
Doddabele	1
Sadahalli	1
5 Bedroom Farm House in Lakshmipura	1
Whietfield,	1
BTM Layout 1stage 9th Main	1
Vittal Mallya Road	1
High grounds	1
Kasthuri Nagar East Of NGEF	1
Chikka Gowdanapalya.	1
Kenchanehalli R R Nagar	1
Bharathnagar	1
Sree Narayana Nagar	1
Neelasandra	1
Hommadevanahalli	1
BTM Layout 2nd Stage 1st Phase	1
T C Palya main Road	1
MM Layout	1
1 Immadihalli	1
Navodaya Nagar	1
Wheelers Road	1
KAMAKIYA	1
Zuzuvadi	1
Dominic Layout	1
Kanakapura main Road	1
Yediyur	1
B K Nagar	1
bsk 6th stage 2ad block near sri conversation hall	1
Masjid e Alkareem	1
Bilal Nagar	1
3rd Stage Raja Rajeshwari Nagar	1
Chellikere	1
Jakkasandra	1
Annapoorneshwari Layout, JP nagar 7th phase	1
Nagarbhavi Garden Villas Layout	1
Subhash Nagar	1
Banashankari 6th stage , 2nd block	1
Doddanakunte	1
KG Halli	1
Cubbon Road	1
Indira Nagar Stage 2	1
beml layout, basaveshwara nagar	1
Chokkasandra	1
Banashankari 6th Stage	1
Electronic city phase 1,	1

Asthagrama Layout	1
Rajarajesheari nagar	1
Millers Road	1
2nd Block Hbr Layout	1
Shauhardha Layout	1
Akash Nagar	1
Dwaraka Nagar	1
Vinayaka Layout	1
RBI Layout	1
4th Block HBR Layout	1
Banashankari Stage I	1
AECS LAYOUT A-BLOCK Singasandra	1
T R Mill Road	1
Pillanna Gardens	1
Doctor Layout Rayasandra	1
2nd phase jp nagar, jp nagar	1
Chambenahalli	1
Kathriguppe IV Phase	1
Viviani Road	1
Shanthi Pura	1
1Hoysalanagar	1
Michael Palaya	1
Chikkajala	1
Gollarahatti	1
Jaymahal Road	1
Veerabhadra Nagar	1
Kengeri Satellite Town KHB Apartment	1
Duddanahalli	1
Banashankari 3rd stage, Vivekanandanagar	1
Chikkanahalli	1
12th cross srinivas nagar banshankari 3rd stage	1
Havanur extension	1
Manonarayanapalya	1
Rahmath Nagar	1
kadubisnahalli	1
pavitra paradise	1
BEML Layout 5th Stage	1
PNS Layout	1
Kamdhenu Nagar	1
Jogupalya	1
Chaitanya Ananya	1
Ganganahalli	1
Hanuman Nagar	1
Kengeri Satellite Town Stage II	1
basaveshwarnagar	1
Narayanappa Garden	1
LIC Colony	1
Duvasapalya	1
manyata	1
Raja Rajashweri Nagar	1
Vijay Nagar	1
mvj engineering college	1
Suryanagar	1
Kanakapur main road	1
Ex-Servicemen Colony Dinnur Main Road R.T.Nagar	1
Halanayakanahalli	1
Tilak Nagar	1
Prasanna layout Herohalli	1
SK Garden	1
Beml layout, Rajarajeshwari nagar	1
CMH Road	1
Vidhyanagar Cross	1
Chuchangatta Colony	1
6th Block Jayanagar	1
Punappa Layout	1
Electronic City Phase 1,	1

Chikbasavanapura	1
elachenahalli	1
Sadhguru Layout	1
Basaveswarnagar	1
Mudalpalaya	1
Udayagiri	1
Gulakamale	1
Mallappa Layout	1
AGB Layout	1
Kanakapura Main Road	1
akshaya nagar t c palya	1
Byrasandra Extension	1
Air View Colony	1
Sindhi Colony	1
Sarvobhogam Nagar	1
Xavier Layout	1
Pattegarhpalya	1
Park View Layout	1
Jayanagar,	1
Anathanagar	1
vinayakanagar	1
Sabari Nagar	1
SHANTHINAGAR	1
Jay an agar 4 T Block	1
Satyasaibaba Layout	1
Queens Road	1
Maruthi nagar kogilu	1
Whitefield ECC Road	1
RR Nagar	1
Jagadish Nagar	1
3rd Phase Iti Layout	1
Ananthapura, T C palaya Main Road	1
Deepanjali Nagar	1
Ashraya Layout	1
Gubbi Cross, Hennur Main Road	1
Behind Don Bosco Church	1
SARJAPUR BAGALUR ROAD	1
B Y Raveshwara Nagar	1
Jeevanhalli	1
MEI layout, Bagalgunte	1
Richmond Road	1
Kanakapura Rod	1
HOSUR RMAIN ROAD	1
Off Bannergatta Road	1
Konappana Agrahara	1
HAL Layout	1
Banasawadi,	1
Bande Nallasandra	1
Vidya Nagar	1
Prasanti Nagar	1
Sampangirama Nagar	1
Banashankari stage 2	1
Lakshminarayanapura, Electronic City Phase 2	1
Sir M V Nagar	1
Attiguppe	1
Sathanur	1
Ramamohanapuram	1
kanakapura road	1
Sundar Ram Shetty Nagar	1
sarjapura main road	1
Kirloskar layout, Basaveshwarnagar	1
Arasanakunte	1
5th block Koramangala	1
JakkurYelahanka	1
CHIKKATIRUPATHI	1
Rajagopala Nagar	1

Bahubali Nagar	1
Cambridge road	1
Howthinarayanappa Garden	1
ittamadu	1
banashankari stage iii sa	1
Ramaswamy Palya - Kammanahalli Main Road	1
Sampige Layout	1
Virgonagar	1
Kudlu Village,	1
Gaundanapalya	1
Anekal - Hosur Road	1
Sunkan palya	1
Medaralli	1
PC Palaya	1
Prakash Nagar	1
Vasatha Vallbha Nagar	1
Soppahalli	1
Aavalahalli	1
kg halli jalhalli west	1
2 Bedroom Furnished Farm House in Kolar Road	1
RK Colony	1
Virudhu Nagar	1
kamanahalli main road	1
Adugodi	1
Haralur Road,	1
7th Block Koramangala	1
Hoskote near	1
Off Bannergatta road	1
Bandepalya	1
Thirupalya	1
Bharat Nagar	1
Raja Rajeshwari Nagara	1
Yelahanka,MVIT college	1
Rammana Layout	1
Nanjappa Layout Vidyaranyapura	1
Pillahalli	1
Banashankari 2 nd Stage	1
Chikkagubbi	1
Annasandrapalya	1
RMC YARD	1
Panathur Road,	1
BAGUR ROAD	1
Balepet	1
Thirumalashettyhally	1
Jaraganahalli Jp Nagar Post	1
poornaprajna layout	1
Banagirinagar	1
Thyagraj Nagar	1
Hsr layout sector3	1
Maheswari Nagar	1
Somanna Garden	1
Ramanagara Channapatna	1
HSR Layout 7th sector,	1
Allalasandra	1
adigondanhalli	1
Bettadasanapura	1
Bapuji Nagar	1
Vijaypura	1
Javarandoddi	1
Addischetan Layout	1
Anantapuram	1
arudi	1
Hal old airport road	1
Kanakapura Road,	1
1Kasavanhalli	1
Bhattarahalli	1

```
           Old Mangammanapalya Road                              1
           Gayathri Nagar                                        1
           Venkateswara Nagar                                    1
           Sugama Layout                                         1
           Abshot Layout                                         1
           Name: location, dtype: int64
```

In [39]:
```python
# Checking locations with less than 10 values
print(len(location_stats[location_stats<=10]), len(df.location.unique()))
```

```
1053 1294
```

In [40]:
```python
#replacing the names of location with <10 value with 'Others'
locations_less_than_10 = location_stats[location_stats<=10]

df.location = df.location.apply(lambda x: 'other' if x in locations_less_than_10 else x)
len(df.location.unique())
```

Out[40]: 242

In [41]:
```python
#checking the availability col
dates = df['availability'].value_counts()
```

In [42]:
```python
is_not_ready = dates[dates<10000]
df['availability'] = df['availability'].apply(lambda x: 'Not Ready to Move' if x in is_not
len(df.availability.unique())
```

Out[42]: 2

In [43]:
```python
df['area_type'].value_counts()
```

Out[43]:
```
Super built-up  Area    8789
Built-up  Area          2418
Plot  Area              2025
Carpet  Area              87
Name: area_type, dtype: int64
```

- Since the column has only few unique values, we don't perform any operation

In [44]:
```python
df['price_per_sqft'].describe()
```

Out[44]:
```
count    1.331900e+04
mean     7.902289e+03
std      1.062532e+05
min      2.257423e+00
25%      4.262295e+03
50%      5.428571e+03
75%      7.312469e+03
max      1.200000e+07
Name: price_per_sqft, dtype: float64
```

In [45]:
```python
# Since there is a wide range for 'price_per_sqft' column, we remove the extreme ends usi
def remove_pps_outliers(df):

    df_out = pd.DataFrame()

    for key, sub_df in df.groupby('location'):
        m = np.mean(sub_df['price_per_sqft'])
```

```
        sd = np.std(sub_df['price_per_sqft'])
        reduce_df = sub_df[(sub_df['price_per_sqft']>(m-sd)) & (sub_df['price_per_sqft']<
        df_out = pd.concat([df_out, reduce_df], ignore_index=True)

    return df_out

df2 = remove_pps_outliers(df)
print(len(df), len(df2))
```

13319 11538

In [46]:
```python
# Here we observe that 3 BHK cost that same as 2 BHK in 'Hebbal' location hence removing s
def remove_bhk_outliers(df):
    exclude_indices = np.array([])

    for location, location_df in df.groupby('location'):
        bhk_stats = {}

        for bhk, bhk_df in location_df.groupby('size'):
            bhk_stats[bhk] = {
                'mean': np.mean(bhk_df.price_per_sqft),
                'std': np.std(bhk_df.price_per_sqft),
                'count': bhk_df.shape[0]
            }

        for bhk, bhk_df in location_df.groupby('size'):
            stats = bhk_stats.get(bhk-1)
            if stats and stats['count']>5:
                exclude_indices = np.append(exclude_indices, bhk_df[bhk_df.price_per_sqft<

    return df.drop(exclude_indices, axis='index')

df4 = remove_bhk_outliers(df2)
print(len(df2), len(df4))
```

11538 8090

In [47]:
```python
plt.hist(df4.price_per_sqft, rwidth=0.5)
plt.xlabel('Price Per Square Feet')
plt.ylabel('Count')
```

Out[47]: Text(0, 0.5, 'Count')
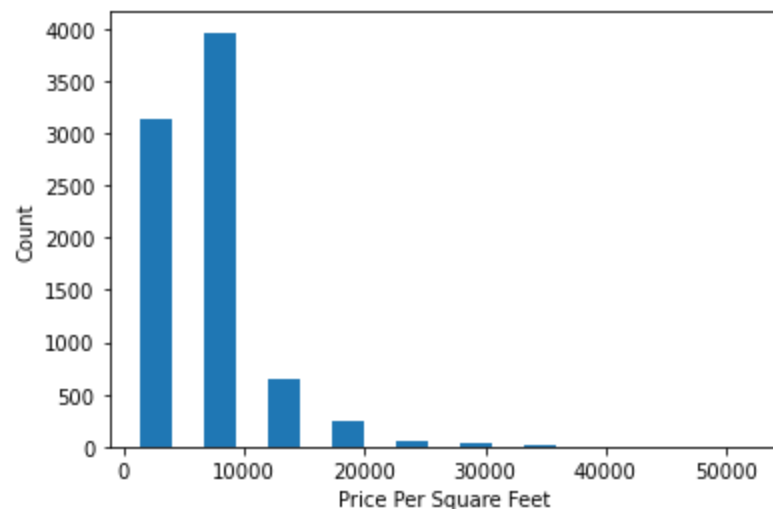
In [48]:
```python
plt.hist(df4.bath, rwidth=0.5)
plt.xlabel('Number of Bathrooms')
plt.ylabel('Count')
```

Out[48]: `Text(0, 0.5, 'Count')`
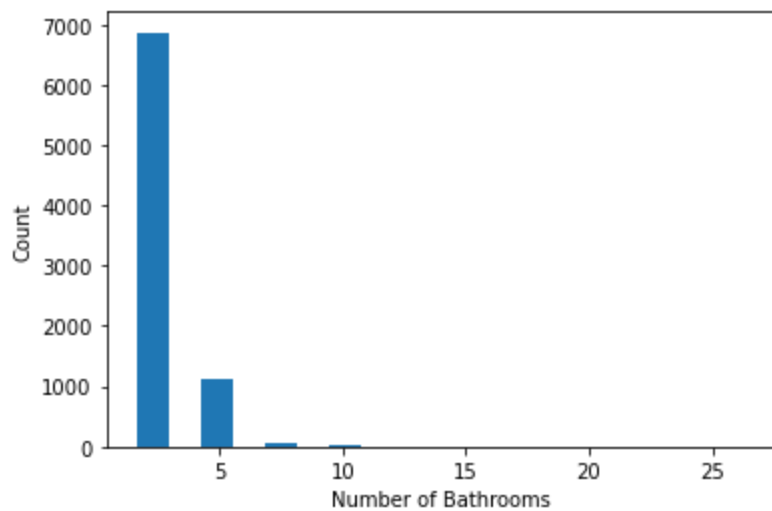
In [49]:
```python
# Removing the rows that have 'bath' greater than 'bhk'+2
df5 = df4[df4.bath<(df4.size+2)]
print(len(df4), len(df5))
```

8090 8090

In [50]:
```python
df5.head()
```

Out[50]:

	area_type	availability	location	size	society	total_sqft	bath	balcony	price	price_per_sqft
0	Super built-up Area	Not Ready to Move	1st Block Jayanagar	4.0	Missing_society	2850.0	4.0	1.0	428.0	15017.543860
1	Super built-up Area	Not Ready to Move	1st Block Jayanagar	3.0	Missing_society	1630.0	3.0	2.0	194.0	11901.840491
2	Super built-up Area	Not Ready to Move	1st Block Jayanagar	6.0	Missing_society	1200.0	6.0	2.0	125.0	10416.666667
3	Super built-up Area	Ready To Move	1st Block Jayanagar	3.0	Missing_society	1875.0	2.0	3.0	235.0	12533.333333
4	Plot Area	Ready To Move	1st Block Jayanagar	7.0	Missing_society	930.0	4.0	2.0	85.0	9139.784946

=> Modeling

In [51]:
```python
# Removing the unnecessary columns (columns that were added only for removing the outliers
df6 = df5.copy()
df6 = df6.drop('price_per_sqft', axis='columns')
```

In [52]:
```python
#converting categorical values to numerical values

#1st doing for location feature
dummy_cols = pd.get_dummies(df6['location']).drop('other', axis='columns')
df6 = pd.concat([df6,dummy_cols], axis = 'columns')
```

```
In [53]:   #2nd doing for area_type feature
           dummy_cols1 = pd.get_dummies(df6['area_type'],drop_first = True)
           df6 = pd.concat([df6,dummy_cols1],axis='columns')

In [54]:   #3rd doing for availability
           dummy_cols2 = pd.get_dummies(df6['availability'],drop_first=True)
           df6 = pd.concat([df6,dummy_cols2],axis='columns')

In [55]:   df6.head()
```

Out[55]:

	area_type	availability	location	size	society	total_sqft	bath	balcony	price	1st Block Jayanagar	1st Phas J Naga
0	Super built-up Area	Not Ready to Move	1st Block Jayanagar	4.0	Missing_society	2850.0	4.0	1.0	428.0	1	
1	Super built-up Area	Not Ready to Move	1st Block Jayanagar	3.0	Missing_society	1630.0	3.0	2.0	194.0	1	
2	Super built-up Area	Not Ready to Move	1st Block Jayanagar	6.0	Missing_society	1200.0	6.0	2.0	125.0	1	
3	Super built-up Area	Ready To Move	1st Block Jayanagar	3.0	Missing_society	1875.0	2.0	3.0	235.0	1	
4	Plot Area	Ready To Move	1st Block Jayanagar	7.0	Missing_society	930.0	4.0	2.0	85.0	1	

```
In [56]:   #dropping the unecessary cols
           df6.drop(['area_type','availability','location','society'],axis=1,inplace=True)

In [57]:   df6.head()
```

Out[57]:

	size	total_sqft	bath	balcony	price	1st Block Jayanagar	1st Phase JP Nagar	2nd Phase Judicial Layout	2nd Stage Nagarbhavi	5th Block Hbr Layout	5th Phase JP Nagar	6th Phase JP Nagar	Ph Na
0	4.0	2850.0	4.0	1.0	428.0	1	0	0	0	0	0	0	
1	3.0	1630.0	3.0	2.0	194.0	1	0	0	0	0	0	0	
2	6.0	1200.0	6.0	2.0	125.0	1	0	0	0	0	0	0	
3	3.0	1875.0	2.0	3.0	235.0	1	0	0	0	0	0	0	
4	7.0	930.0	4.0	2.0	85.0	1	0	0	0	0	0	0	

```
In [58]:   df6.shape

Out[58]:   (8090, 250)

In [59]:   #splitting the data into feature and label
           X = df6.drop('price',axis='columns')
```

```
y = df6['price']
```

In [60]:
```
X.head()
```

Out[60]:

	size	total_sqft	bath	balcony	1st Block Jayanagar	1st Phase JP Nagar	2nd Phase Judicial Layout	2nd Stage Nagarbhavi	5th Block Hbr Layout	5th Phase JP Nagar	6th Phase JP Nagar	7th Phase JP Nagar	P N
0	4.0	2850.0	4.0	1.0	1	0	0	0	0	0	0	0	
1	3.0	1630.0	3.0	2.0	1	0	0	0	0	0	0	0	
2	6.0	1200.0	6.0	2.0	1	0	0	0	0	0	0	0	
3	3.0	1875.0	2.0	3.0	1	0	0	0	0	0	0	0	
4	7.0	930.0	4.0	2.0	1	0	0	0	0	0	0	0	

In [61]:
```python
#using GridSearchCV to find the best algo for this prooblem.
from sklearn.model_selection import GridSearchCV
from sklearn.linear_model import LinearRegression
from sklearn.linear_model import Lasso
from sklearn.tree import DecisionTreeRegressor
from sklearn.model_selection import ShuffleSplit
```

Shuffle Split:

Random permutation cross-validator

Yields indices to split data into training and test sets.

Note: contrary to other cross-validation strategies, random splits do not guarantee that all folds will be different, although this is still very likely for sizeable datasets.

In [64]:
```python
# Creating a function for GridSearchCV

def find_best_model(X,y):
    models = {
        'linear_regression': {
            'model': LinearRegression(),
            'parameters': {
                'normalize': [True,False]
            }
        },

        'lasso': {
            'model': Lasso(),
            'parameters': {
                'alpha': [1,2],
                'selection': ['random', 'cyclic']
            }
        },

        'decision_tree': {
            'model': DecisionTreeRegressor(),
            'parameters': {
                'criterion': ['mse', 'friedman_mse'],
                'splitter': ['best', 'random']
            }
        },
```

```python
        'random_forest': {
            'model': RandomForestRegressor(),
            'parameters': {
                'n_jobs': [4],
                'n_estimators': [100,200,150],
                'verbose':[1,2,3,4],
                'max_features' : ['auto']
            }
        }
    }

    scores = []
    cv_X_y = ShuffleSplit(n_splits=5, test_size=0.20, random_state=0)

    for model_name, model_params in models.items():
        gs = GridSearchCV(model_params['model'], model_params['parameters'], cv=cv_X_y, re
        gs.fit(X,y)
        scores.append({
            'model': model_name,
            'best_parameters': gs.best_params_,
            'accuracy': gs.best_score_
        })

    return pd.DataFrame(scores, columns=['model', 'best_parameters', 'accuracy'])

 find_best_model(X, y)
```

```
/Users/mac/opt/anaconda3/lib/python3.8/site-packages/sklearn/linear_model/_base.py:141: Fu
tureWarning: 'normalize' was deprecated in version 1.0 and will be removed in 1.2.
If you wish to scale the data, use Pipeline with a StandardScaler in a preprocessing stag
e. To reproduce the previous behavior:

from sklearn.pipeline import make_pipeline

model = make_pipeline(StandardScaler(with_mean=False), LinearRegression())

If you wish to pass a sample_weight parameter, you need to pass it as a fit parameter to e
ach step of the pipeline as follows:

kwargs = {s[0] + '__sample_weight': sample_weight for s in model.steps}
model.fit(X, y, **kwargs)


  warnings.warn(
/Users/mac/opt/anaconda3/lib/python3.8/site-packages/sklearn/linear_model/_base.py:141: Fu
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havior of this estimator is to not do any normalization. If normalization is needed please
use sklearn.preprocessing.StandardScaler instead.
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  warnings.warn(
/Users/mac/opt/anaconda3/lib/python3.8/site-packages/sklearn/tree/_classes.py:359: FutureW
arning: Criterion 'mse' was deprecated in v1.0 and will be removed in version 1.2. Use `cr
iterion='squared_error'` which is equivalent.
  warnings.warn(
/Users/mac/opt/anaconda3/lib/python3.8/site-packages/sklearn/tree/_classes.py:359: FutureW
arning: Criterion 'mse' was deprecated in v1.0 and will be removed in version 1.2. Use `cr
iterion='squared_error'` which is equivalent.
  warnings.warn(
/Users/mac/opt/anaconda3/lib/python3.8/site-packages/sklearn/tree/_classes.py:359: FutureW
arning: Criterion 'mse' was deprecated in v1.0 and will be removed in version 1.2. Use `cr
iterion='squared_error'` which is equivalent.
  warnings.warn(
/Users/mac/opt/anaconda3/lib/python3.8/site-packages/sklearn/tree/_classes.py:359: FutureW
arning: Criterion 'mse' was deprecated in v1.0 and will be removed in version 1.2. Use `cr
iterion='squared_error'` which is equivalent.
  warnings.warn(
/Users/mac/opt/anaconda3/lib/python3.8/site-packages/sklearn/tree/_classes.py:359: FutureW
arning: Criterion 'mse' was deprecated in v1.0 and will be removed in version 1.2. Use `cr
iterion='squared_error'` which is equivalent.
  warnings.warn(
/Users/mac/opt/anaconda3/lib/python3.8/site-packages/sklearn/tree/_classes.py:359: FutureW
arning: Criterion 'mse' was deprecated in v1.0 and will be removed in version 1.2. Use `cr
iterion='squared_error'` which is equivalent.
  warnings.warn(
/Users/mac/opt/anaconda3/lib/python3.8/site-packages/sklearn/tree/_classes.py:359: FutureW
arning: Criterion 'mse' was deprecated in v1.0 and will be removed in version 1.2. Use `cr
iterion='squared_error'` which is equivalent.
  warnings.warn(
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  68 tasks      | elapsed:    2.8s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    3.3s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  42 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  76 tasks      | elapsed:    1.6s
```

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[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    1.9s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  42 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    1.9s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  42 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    1.8s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  42 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.1s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  76 tasks      | elapsed:    1.7s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    2.2s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  42 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  58 tasks      | elapsed:    1.4s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    2.1s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  33 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  89 tasks      | elapsed:    1.6s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    1.8s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  33 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  58 tasks      | elapsed:    1.3s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    2.1s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  33 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  89 tasks      | elapsed:    1.8s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    2.0s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  33 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  89 tasks      | elapsed:    1.7s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    1.9s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  33 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  40 tasks      | elapsed:    1.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    2.0s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  24 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  40 tasks      | elapsed:    0.8s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    2.1s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  24 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  56 tasks      | elapsed:    0.9s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    1.6s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
```

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[Parallel(n_jobs=4)]: Done  24 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  40 tasks       | elapsed:    0.9s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    2.5s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  24 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  40 tasks       | elapsed:    1.1s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    2.7s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  24 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  26 tasks       | elapsed:    0.7s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    2.1s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  17 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  90 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  26 tasks       | elapsed:    0.6s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    2.1s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  17 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  90 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  26 tasks       | elapsed:    0.5s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    1.7s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  17 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  90 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  26 tasks       | elapsed:    0.6s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    2.0s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  17 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  90 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  26 tasks       | elapsed:    0.6s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    1.8s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  17 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  90 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 100 out of 100 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done 128 tasks       | elapsed:    3.1s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    4.1s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  42 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 192 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  76 tasks       | elapsed:    1.8s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.7s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  42 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 192 tasks       | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  76 tasks       | elapsed:    1.5s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.7s finished
```

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[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  42 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 192 tasks      | elapsed:    0.1s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.1s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  76 tasks      | elapsed:    1.7s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.8s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  42 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 192 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done 128 tasks      | elapsed:    2.5s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.6s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  42 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 192 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  58 tasks      | elapsed:    1.6s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    4.1s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  33 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 154 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  58 tasks      | elapsed:    1.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.1s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  33 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 154 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  92 tasks      | elapsed:    1.6s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.5s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  33 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 154 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  92 tasks      | elapsed:    2.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.5s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  33 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 154 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  92 tasks      | elapsed:    1.8s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.4s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  33 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 154 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  40 tasks      | elapsed:    1.1s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.8s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  24 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 120 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.1s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
building tree 3 of 100
building tree 6 of 100
building tree 9 of 100
building tree 10 of 100
building tree 17 of 100
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building tree 18 of 100
building tree 25 of 100
building tree 26 of 100
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building tree 34 of 100
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building tree 83 of 100
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building tree 92 of 100
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building tree 82 of 100
building tree 89 of 100
building tree 90 of 100
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building tree 35 of 100
building tree 36 of 100
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[Parallel(n_jobs=4)]: Done  40 tasks      | elapsed:    1.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    4.7s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  24 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 120 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  40 tasks      | elapsed:    0.7s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.8s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  24 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 120 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.1s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  40 tasks      | elapsed:    0.9s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    4.2s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  24 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 120 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
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[Parallel(n_jobs=4)]: Done  56 tasks      | elapsed:    1.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.5s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  24 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 120 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.1s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  26 tasks      | elapsed:    0.6s
[Parallel(n_jobs=4)]: Done 172 tasks      | elapsed:    3.1s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.5s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  17 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  90 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  28 tasks      | elapsed:    0.6s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.1s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  17 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  90 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  28 tasks      | elapsed:    0.6s
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[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.4s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  17 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  90 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.1s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  26 tasks      | elapsed:    0.6s
[Parallel(n_jobs=4)]: Done 172 tasks      | elapsed:    3.4s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.9s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  17 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  90 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  26 tasks      | elapsed:    0.5s
[Parallel(n_jobs=4)]: Done 172 tasks      | elapsed:    3.2s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.7s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
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[Parallel(n_jobs=4)]: Done   17 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done   90 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  200 out of  200 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   76 tasks      | elapsed:    2.1s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    4.4s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   42 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   76 tasks      | elapsed:    1.9s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    3.2s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   42 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  128 tasks      | elapsed:    2.5s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    2.8s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   42 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   76 tasks      | elapsed:    1.7s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    3.2s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   42 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    0.1s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   76 tasks      | elapsed:    2.1s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    3.6s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   42 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   58 tasks      | elapsed:    1.3s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    3.0s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   33 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   58 tasks      | elapsed:    1.0s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    2.4s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   33 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   92 tasks      | elapsed:    1.9s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    3.0s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   33 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   58 tasks      | elapsed:    1.3s
[Parallel(n_jobs=4)]: Done  143 out of  150 | elapsed:    3.1s remaining:    0.2s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    3.3s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   33 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   58 tasks      | elapsed:    1.2s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    2.9s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   33 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  150 out of  150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done   56 tasks      | elapsed:    0.9s
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[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    2.3s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  24 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 120 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
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[Parallel(n_jobs=4)]: Done  40 tasks      | elapsed:    1.3s
[Parallel(n_jobs=4)]: Done 143 out of 150 | elapsed:    4.4s remaining:    0.2s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    4.5s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  24 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 120 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    0.1s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  40 tasks      | elapsed:    1.2s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    3.4s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  24 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 120 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  40 tasks      | elapsed:    1.0s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    2.9s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  24 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 120 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  56 tasks      | elapsed:    1.1s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    2.6s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  24 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 120 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  26 tasks      | elapsed:    0.6s
[Parallel(n_jobs=4)]: Done 143 out of 150 | elapsed:    2.8s remaining:    0.1s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    2.9s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  17 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  90 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    0.0s finished
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[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  26 tasks      | elapsed:    0.6s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    3.2s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  17 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  90 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  28 tasks      | elapsed:    0.7s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    2.8s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  17 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  90 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  26 tasks      | elapsed:    0.6s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    2.4s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  17 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  90 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend LokyBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  26 tasks      | elapsed:    0.6s
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[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    2.4s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  17 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done  90 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 150 out of 150 | elapsed:    0.0s finished
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
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[Parallel(n_jobs=4)]: Done  24 tasks      | elapsed:    0.5s
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[Parallel(n_jobs=4)]: Done 120 tasks      | elapsed:    2.4s
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[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    4.0s finished
```

Out[64]:

	model	best_parameters	accuracy
0	linear_regression	{'normalize': False}	0.171642
1	lasso	{'alpha': 1, 'selection': 'random'}	0.025789
2	decision_tree	{'criterion': 'friedman_mse', 'splitter': 'best'}	0.495246
3	random_forest	{'max_features': 'auto', 'n_estimators': 200, ...	0.682315

- Since we can wee that Decision Tree is giving us highest accuracy. Therefore we will be using this algo.

In [78]:
```python
from sklearn.model_selection import train_test_split

X_train,X_test,y_train,y_test = train_test_split(X,y,test_size=0.1,random_state=200)
```

In [79]:
```python
from sklearn.ensemble import RandomForestRegressor
```

```
In [80]:   regr = RandomForestRegressor(n_jobs = 4, random_state = 42, n_estimators = 200, verbose =

In [81]:   regr.fit(X_train, y_train)

           [Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
           [Parallel(n_jobs=4)]: Done  42 tasks      | elapsed:    0.8s
           [Parallel(n_jobs=4)]: Done 192 tasks      | elapsed:    3.7s
           [Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    3.8s finished
Out[81]:   RandomForestRegressor(n_estimators=200, n_jobs=4, random_state=42, verbose=1)

In [83]:   regr.score(X_train,y_train)

           [Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
           [Parallel(n_jobs=4)]: Done  42 tasks      | elapsed:    0.0s
           [Parallel(n_jobs=4)]: Done 192 tasks      | elapsed:    0.2s
           [Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.2s finished
Out[83]:   0.9449729922165004
```

Predicting the values using our trained model

```
In [84]:   X.columns

Out[84]:   Index(['size', 'total_sqft', 'bath', 'balcony', '1st Block Jayanagar',
                  '1st Phase JP Nagar', '2nd Phase Judicial Layout',
                  '2nd Stage Nagarbhavi', '5th Block Hbr Layout', '5th Phase JP Nagar',
                  ...
                  'Whitefield', 'Yelachenahalli', 'Yelahanka', 'Yelahanka New Town',
                  'Yelenahalli', 'Yeshwanthpur', 'Carpet  Area', 'Plot  Area',
                  'Super built-up  Area', 'Ready To Move'],
                 dtype='object', length=249)

In [85]:   # For finding the appropriate location
           np.where(X.columns=='1st Block Jayanagar')[0][0]

Out[85]:   4

In [86]:   # For finding the appropriate availability
           np.where(X.columns=='Ready To Move')[0][0]

Out[86]:   248

In [91]:   # Creating a fuction to predict values
           def prediction(location, bhk, bath, balcony, sqft, area_type, availability):

               loc_index, area_index, avail_index = -1,-1,-1

               if location!='other':
                   loc_index = int(np.where(X.columns==location)[0][0])

               if area_type!='Built-up  Area':
                   area_index = np.where(X.columns==area_type)[0][0]

               if availability!='Not Ready to Move':
                   avail_index = np.where(X.columns==availability)[0][0]

               x = np.zeros(len(X.columns))
```

```
        x[0] = bath
        x[1] = balcony
        x[2] = bhk
        x[3] = sqft

        if loc_index >= 0:
            x[loc_index] = 1
        if area_index >= 0:
            x[area_index] = 1
        if avail_index >= 0:
            x[avail_index] = 1

        return regr.predict([x])[0]
```

In [92]:
```
# Prediction 1
# Input in the form : Location, BHK, Bath, Balcony, Sqft, area_type, availability.
prediction('1st Block Jayanagar', 2, 2, 2, 1000, 'Built-up  Area', 'Ready To Move')
```

```
/Users/mac/opt/anaconda3/lib/python3.8/site-packages/sklearn/base.py:450: UserWarning: X d
oes not have valid feature names, but RandomForestRegressor was fitted with feature names
  warnings.warn(
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  42 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 192 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
```
Out[92]: 42.14404583333333

In [93]:
```
# Prediction 2
# Input in the form : Location, BHK, Bath, Balcony, Sqft, area_type, availability.
prediction('1st Phase JP Nagar', 4, 3, 1, 10000, 'Super built-up  Area', 'Not Ready to Mov
```

```
/Users/mac/opt/anaconda3/lib/python3.8/site-packages/sklearn/base.py:450: UserWarning: X d
oes not have valid feature names, but RandomForestRegressor was fitted with feature names
  warnings.warn(
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  42 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 192 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
```
Out[93]: 75.86751166666667

In [94]:
```
# Prediction 3
# Input in the form : Location, BHK, Bath, Balcony, Sqft, area_type, availability.
prediction('1st Phase JP Nagar', 6, 3, 2, 20000, 'Plot  Area', 'Not Ready to Move')
```

```
/Users/mac/opt/anaconda3/lib/python3.8/site-packages/sklearn/base.py:450: UserWarning: X d
oes not have valid feature names, but RandomForestRegressor was fitted with feature names
  warnings.warn(
[Parallel(n_jobs=4)]: Using backend ThreadingBackend with 4 concurrent workers.
[Parallel(n_jobs=4)]: Done  42 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 192 tasks      | elapsed:    0.0s
[Parallel(n_jobs=4)]: Done 200 out of 200 | elapsed:    0.0s finished
```
Out[94]: 100.44645833333335

In [ ]: