### KIRUTHIKA D

Perform the Below Tasks to complete the assignment:- Tasks:-

- 1. Download the dataset
- 2. Load the dataset.
- 3. Perform the Below Visualizations. Univariate Analysis Bi Variate Analysis Multi-Variate Analysis
- 4. Perform descriptive statistics on the dataset.
- 5. Handle the Missing values.

from google.colab import files
uploaded = files.upload()

Choose Files House Price India.csv

• House Price India.csv(text/csv) - 1524561 bytes, last modified: 3/27/2023 - 100% done Saving House Price India.csv to House Price India.csv

import pandas as pd
import seaborn as sns
import numpy as np
import io
df = pd.read\_csv('House Price India.csv')
df.head()

	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	number of views
	<b>0</b> 6762810145	42491	5	2.50	3650	9050	2.0	0	4
	<b>1</b> 6762810635	42491	4	2.50	2920	4000	1.5	0	0
:	<b>2</b> 6762810998	42491	5	2.75	2910	9480	1.5	0	0
;	<b>3</b> 6762812605	42491	4	2.50	3310	42998	2.0	0	0
	4 6762812919	42491	3	2.00	2710	4500	1.5	0	0

5 rows × 23 columns

df.tail()

	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	num vi
14615	6762830250	42734	2	1.5	1556	20000	1.0	0	
14616	6762830339	42734	3	2.0	1680	7000	1.5	0	
14617	6762830618	42734	2	1.0	1070	6120	1.0	0	
14618	6762830709	42734	4	1.0	1030	6621	1.0	0	
14619	6762831463	42734	3	1.0	900	4770	1.0	0	

5 rows × 23 columns

df

```
per number of living
                                                     lot number waterfront of num
                         number
                Date
                                 bathrooms
                                              area
                                                     area
                                                                     present
                       bedrooms
                                                          floors
                                                                               νi
    6762810145 42491
                                      2.50
                                              3650
                                                     9050
1
    6762810635 42491
                              4
                                      2.50
                                              2920
                                                     4000
                                                              1.5
                                                                           0
    6762810998 42491
                              5
                                              2910
2
                                      2.75
                                                     9480
                                                              1.5
                                                                           0
3
    6762812605 42491
                                      2.50
                                              3310 42998
                                                              2.0
                                                                            0
```

df.columns

```
Index(['id', 'Date', 'number of bedrooms', 'number of bathrooms',
    'living area', 'lot area', 'number of floors', 'waterfront present',
    'number of views', 'condition of the house', 'grade of the house',
    'Area of the house(excluding basement)', 'Area of the basement',
    'Built Year', 'Renovation Year', 'Postal Code', 'Lattitude',
    'Longitude', 'living_area_renov', 'lot_area_renov',
    'Number of schools nearby', 'Distance from the airport', 'Price'],
    dtype='object')
```

1/620 rowe x 23 columns

#### df.dtypes

id	int64
Date	int64
number of bedrooms	int64
number of bathrooms	float64
living area	int64
lot area	int64
number of floors	float64
waterfront present	int64
number of views	int64
condition of the house	int64
grade of the house	int64
Area of the house(excluding basement)	int64
Area of the basement	int64
Built Year	int64
Renovation Year	int64
Postal Code	int64
Lattitude	float64
Longitude	float64
living area renov	int64
lot_area_renov	int64
Number of schools nearby	int64
Distance from the airport	int64
Price	int64
dtype: object	
- · · · · · · · · · · · · · · · · · · ·	

# df.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 14620 entries, 0 to 14619
Data columns (total 23 columns):

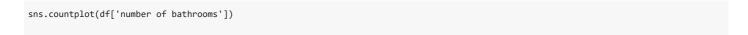
υατα	columns (total 23 columns):		
#	Column	Non-Null Count	Dtype
0	id	14620 non-null	int64
1	Date	14620 non-null	int64
2	number of bedrooms	14620 non-null	int64
3	number of bathrooms	14620 non-null	float64
4	living area	14620 non-null	int64
5	lot area	14620 non-null	int64
6	number of floors	14620 non-null	float64
7	waterfront present	14620 non-null	int64
8	number of views	14620 non-null	int64
9	condition of the house	14620 non-null	int64
10	grade of the house	14620 non-null	int64
11	Area of the house(excluding basement)	14620 non-null	int64
12	Area of the basement	14620 non-null	int64
13	Built Year	14620 non-null	int64
14	Renovation Year	14620 non-null	int64
15	Postal Code	14620 non-null	int64
16	Lattitude	14620 non-null	float64
17	Longitude	14620 non-null	float64
18	living_area_renov	14620 non-null	int64
19	lot_area_renov	14620 non-null	int64
20	Number of schools nearby	14620 non-null	int64
21	Distance from the airport	14620 non-null	int64
22	Price	14620 non-null	int64
dtype	es: float64(4), int64(19)		
memoi	ry usage: 2.6 MB		

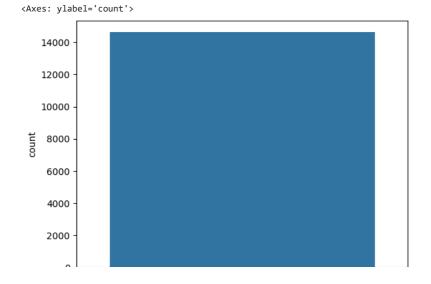
print(df.describe())

```
6.237575e+03
                        67.347991
                                             0.938719
                                                                   0.769934
       6.762810e+09 42491.000000
                                             1.000000
                                                                   0.500000
                                                                   1.750000
      6.762815e+09 42546.000000
                                             3.000000
50%
      6.762821e+09 42600.000000
                                             3.000000
                                                                   2.250000
      6.762826e+09 42662.000000
                                             4.000000
                                                                   2.500000
75%
                                            33.000000
max
      6.762832e+09 42734.000000
                                                                   8.000000
                         lot area number of floors waterfront present \
       living area
count
      14620.000000 1.462000e+04
                                       14620.000000
                                                            14620.000000
mean
        2098.262996 1.509328e+04
                                           1.502360
                                                                0.007661
         928.275721
                     3.791962e+04
                                           0.540239
                                                                0.087193
std
         370.000000
                     5.200000e+02
                                           1.000000
                                                                0.000000
25%
        1440.000000
                     5.010750e+03
                                           1.000000
                                                                0.000000
50%
       1930.000000 7.620000e+03
                                           1.500000
                                                                0.000000
75%
        2570.000000
                    1.080000e+04
                                           2.000000
                                                                0.000000
       13540.000000 1.074218e+06
                                           3.500000
                                                                1.000000
max
      number of views condition of the house
                                                       Built Year \
                                  14620.000000 ...
count
          14620.000000
                                                     14620.000000
mean
              0.233105
                                      3.430506
                                                      1970.926402
std
              0.766259
                                      0.664151
                                                         29.493625
                                                . . .
              0.000000
                                      1.000000
                                                       1900.000000
min
                                                . . .
              0.000000
                                      3.000000
                                                       1951.000000
25%
                                                . . .
50%
              0.000000
                                      3.000000
                                                       1975.000000
                                                . . .
75%
              0.000000
                                      4.000000
                                                       1997.000000
                                                . . .
              4.000000
                                      5.000000
                                                       2015.000000
max
                                                        Longitude
      Renovation Year
                          Postal Code
                                          Lattitude
         14620.000000
                         14620.000000 14620.000000
count
                                                     14620.000000
                                                       -114.404007
mean
             90.924008 122033.062244
                                          52.792848
std
            416.216661
                            19.082418
                                           0.137522
                                                         0.141326
min
              0.000000 122003.000000
                                          52.385900
                                                       -114.709000
25%
              0.000000
                        122017.000000
                                          52.707600
                                                       -114.519000
                                                      -114.421000
              0.000000
                       122032.000000
                                          52.806400
75%
              0.000000
                        122048.000000
                                          52.908900
                                                       -114.315000
           2015.000000 122072.000000
                                          53.007600
                                                      -113.505000
max
                                          Number of schools nearby
      living_area_renov lot_area_renov
            14620.000000
count
                            14620.000000
                                                      14620.000000
mean
             1996.702257
                            12753.500068
                                                           2.012244
std
              691.093366
                            26058.414467
                                                           0.817284
min
              460.000000
                              651.000000
                                                           1.000000
25%
             1490.000000
                             5097.750000
                                                           1.000000
50%
             1850.000000
                             7620.000000
                                                           2.000000
75%
             2380.000000
                            10125.000000
                                                           3.000000
max
             6110.000000
                           560617.000000
                                                           3.000000
      Distance from the airport
                                         Price
count
                    14620.000000 1.462000e+04
                       64.950958 5.389322e+05
mean
std
                        8.936008
                                  3.675324e+05
min
                       50.000000
                                  7.800000e+04
25%
                       57.000000
                                  3.200000e+05
50%
                       65.000000
                                 4.500000e+05
75%
                       73.000000
                                  6.450000e+05
                       80.000000 7.700000e+06
max
[8 rows x 23 columns]
```

import matplotlib.pyplot as plt
plt.hist(df['Price'])





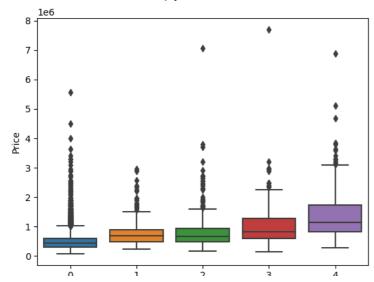


sns.boxplot(data=df,x="Price")

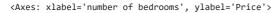
```
<Axes: xlabel='Price'>

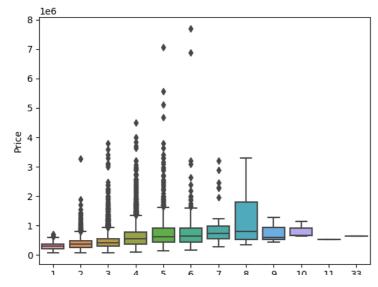
sns.boxplot(x=df['number of views'],y=df['Price'])
```

<Axes: xlabel='number of views', ylabel='Price'>



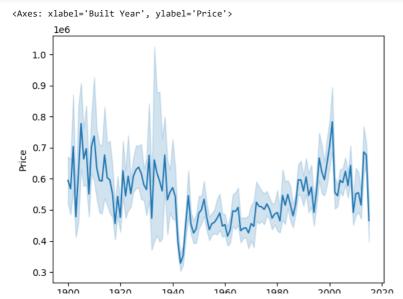
sns.boxplot(x=df['number of bedrooms'],y=df['Price'])



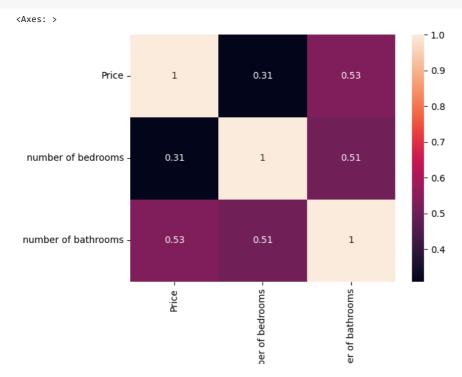


 $sns.lineplot(x=df.groupby('Built Year').mean().index, y=df.groupby('Built Year').mean()['Price']) \\ plt.show()$ 

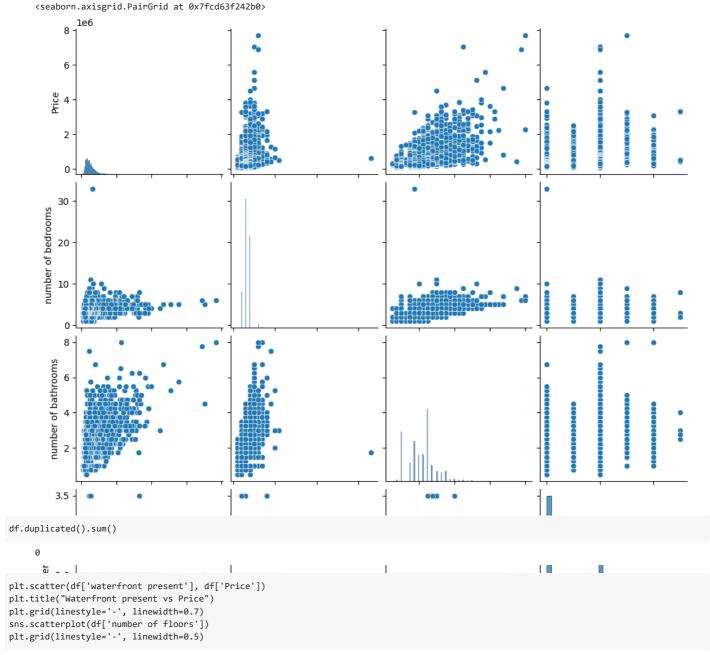


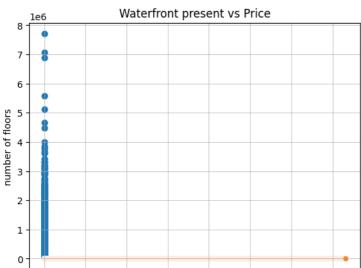






sns.pairplot(df[['Price', 'number of bedrooms', 'number of bathrooms', 'number of floors']])





```
plt.subplots(figsize=(15, 15))
sns.heatmap(df.drop(['id'], axis=1).corr(), linewidth=0.3, annot=True)
plt.show()
```

Date -	1	0.016	0.026	-0.022	0.0044	-0.01	0.012	0.0048	80.027	-0.033	-0.01€	-0.016	0.0059	0.012	0.018	-0.023	-0.018	-0.032	-5e-05	0.004:
number of bedrooms -	-0.016	1	0.51	0.57	0.034	0.18-	0.006:	0.079	0.027	0.35	0.47	0.3	0.15	0.016	-0.044	-0.013	0.14	0.39	0.029	0.0034
number of bathrooms -	-0.026	0.51	1	0.75	0.081	0.5	0.06	0.18	-0.13	0.66	0.68	0.29	0.5	0.05	-0.11	0.031	0.22	0.57	0.079	0.0022
living area -	-0.022	0.57	0.75	1	0.17	0.35	0.11	0.29	-0.063	0.76	0.88	0.44	0.31	0.059	-0.08	0.055	0.24	0.76	0.18	0.0024
lot area -	0.0044	0.034	0.081	0.17	1	0.004	ທ.026	0.078	0.008	50.11	0.18	0.02	0.052	0.0068	0.07	-0.091	0.22	0.15	0.71	-0.013
number of floors -	-0.01	0.18	0.5	0.35	0.004:	1	0.016	0.02	-0.27	0.46	0.53	-0.24	0.48	0.0067	-0.13	0.051	0.13	0.29	-0.01-	0.007
waterfront present -	0.012	0.006	30.06	0.11	0.026	0.016	1	0.4	0.019	0.08	0.072	0.085	0.024	0.086	0.038	-0.022	-0.048	0.086	0.032	0.001€
number of views -	0.0048	0.079	0.18	0.29	0.078	0.02	0.4	1	0.053	0.25	0.16	0.29	0.055	0.1	0.039	0.004	5-0.08	0.28	0.072	0.008
condition of the house -	-0.027	0.027	-0.13	-0.063	0.008	5-0.27	0.019	0.053	1	-0.15	-0.17	0.18	-0.38	-0.062	0.045	-0.003	-0.12	-0.1 -	0.004	0.006
grade of the house -	-0.033	0.35	0.66	0.76	0.11	0.46	0.08	0.25	-0.15	1	0.76	0.17	0.44	0.015	-0.15	0.12	0.2	0.72	0.120	.0009
Area of the house(excluding basement) -	-0.016	0.47	0.68	0.88	0.18	0.53	0.072	0.16	-0.17	0.76	1	-0.046	0.42	0.026	-0.084	3.8e-0	50.35	0.74	0.19-	0.0029
Area of the basement -	-0.016	0.3	0.29	0.44	0.02	-0.24	0.085	0.29	0.18	0.17	-0.046	1	-0.14	0.075	-0.011	0.11	-0.15	0.2	0.011	0.01
Built Year	0.0059	0.15	0.5	0.31	0.052	0.48	-0.024	-0.055	-0.38	0.44	0.42	-0.14	1	-0.23	-0.062	-0.14	0.41	0.33	0.073	0.001
Renovation Year -	-0.012	0.016	0.05	0.059	0.0068	0.0067	0.086	0.1	-0.062	0.015	0.026	0.075	-0.23	1	0.018	0.029	-0.08-	0.0020	9.005 <b>9</b>	.0008
Postal Code -	0.018	0.044	-0.11	-0.08	0.07	-0.13	0.038	0.039	0.045	-0.15	-0.084	-0.011	0.062	0.018	1	-0.31	-0.099	-0.11	0.077	0.011
Lattitude -	-0.023	-0.013	0.031	0.055	-0.091	0.051	-0.022	0.0046	0.003	0.12-	3.8e-0	50.11	-0.14	0.029	-0.31	1	-0.13	0.046	-0.092	0.015
Longitude -	-0.018	0.14	0.22	0.24	0.22	0.13	-0.048	-0.08	-0.12	0.2	0.35	-0.15	0.41	-0.08	-0.099	-0.13	1	0.34	0.26	-0.01-
living_area_renov -	-0.032	0.39	0.57	0.76	0.15	0.29	0.086	0.28	-0.1	0.72	0.74	0.2	0.33-	0.0020	5-0.11	0.046	0.34	1	0.19-	0.001
lot_area_renov -	-5e-05	0.029	0.079	0.18	0.71	-0.01	0.032	0.072	0.004	70.12	0.19	0.011	0.073	0.0059	0.077	-0.092	0.26	0.19	1	-0.025
Number of schools nearby -	0.004	0.0034	0.0022	0.0024	0.013	0.0070	0.001€	0.008	0.00&	90009	<b>3</b> .0029	0.01-	0.0010	5.0008	₿.011	0.015	-0.01-	0.001	20.025	1
Distance from the airport -	0.011	0.006	ð.0092	0.0025	0.0033	0.017	0.0014	0.001	0.002	0.0049	0.0012	0.0029	0.004	0.0053	0.012	0.0072	0.003	0.005 <sup>-</sup>	0.015	0.004
Price -	-0.028	0.31	0.53	_	0.082	0.26	0.26	0.4	0.041	0.67	0.62	0.33	0.05	0.13	-0.12	0.3	0.024	0.58	0.076	0.0099
	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	number of views	condition of the house	grade of the house	Area of the house(excluding basement)	Area of the basement	Built Year	Renovation Year	Postal Code	Lattitude	Longitude	living_area_renov	lot_area_renov	Number of schools nearby

## print(df.count())

id 14620
Date 14620
number of bedrooms 14620
number of bathrooms 14620
living area 14620

min

```
lot area
                                          14620
number of floors
                                          14620
waterfront present
                                          14620
number of views
                                          14620
condition of the house
                                          14620
grade of the house
                                          14620
Area of the house(excluding basement)
                                          14620
Area of the basement
                                          14620
Built Year
                                          14620
Renovation Year
                                          14620
Postal Code
                                          14620
Lattitude
                                          14620
Longitude
                                          14620
living_area_renov
                                          14620
                                          14620
lot_area_renov
Number of schools nearby
                                          14620
Distance from the airport
                                          14620
                                          14620
Price
dtype: int64
```

```
print(df.corr())
     Price
                                                - אטאכדדי א
                                                           0.29/490
                                                                       0.024414
                                             living_area_renov lot_area_renov \
     id
                                                      -0.599900
                                                                      -0.089604
     Date
                                                      -0.032495
                                                                      -0.000050
     number of bedrooms
                                                      0.389855
                                                                       0.029400
     number of bathrooms
                                                      0.570530
                                                                       0.078627
     living area
                                                      0.757571
                                                                       0.180312
     lot area
                                                      0.149744
                                                                       0.706812
     number of floors
                                                      0.285093
                                                                      -0.010120
     waterfront present
                                                      0.085743
                                                                       0.032055
     number of views
                                                      0.281452
                                                                       0.072300
     condition of the house
                                                      -0.099743
                                                                      -0.004748
     grade of the house
                                                      0.720019
                                                                       0.116725
     Area of the house(excluding basement)
                                                      0.737744
                                                                       0.194670
     Area of the basement
                                                      0.196403
                                                                       0.011283
     Built Year
                                                      0.328625
                                                                       0.072874
     Renovation Year
                                                      -0.002601
                                                                       0.005869
     Postal Code
                                                      -0.108454
                                                                       0.077483
     Lattitude
                                                      0.046148
                                                                      -0.091622
     Longitude
                                                      0.341221
                                                                       0.258066
     living_area_renov
                                                      1.000000
                                                                       0.189225
                                                      0.189225
                                                                       1.000000
     lot area renov
     Number of schools nearby
                                                      -0.001203
                                                                      -0.025014
                                                                      -0.014587
     Distance from the airport
                                                      -0.005673
     Price
                                                      0.584924
                                                                       0.075535
                                             Number of schools nearby
     id
                                                             -0.004821
     Date
                                                             -0.004071
     number of bedrooms
                                                              0.003397
     number of bathrooms
                                                              0.002180
     living area
                                                              0.002370
                                                             -0.012671
     lot area
     number of floors
                                                             -0.007579
     waterfront present
                                                              0.001563
                                                              0.008004
     number of views
     condition of the house
                                                             -0.006939
     grade of the house
                                                             0.000986
     Area of the house(excluding basement)
                                                             -0.002894
     Area of the basement
                                                              0.010284
     Built Year
                                                             -0.001631
     Renovation Year
                                                             -0.000826
     Postal Code
                                                              0.010605
     Lattitude
                                                              0.014949
                                                             -0.010163
     Longitude
                                                             -0.001203
     living_area_renov
                                                             -0.025014
     lot area renov
                                                             1.000000
     Number of schools nearby
     Distance from the airport
                                                              0.004035
     Price
                                                              0.009890
                                             Distance from the airport
     id
                                                              -0.004542 -0.773114
                                                               0.011457 -0.027919
     number of bedrooms
                                                              -0.006157 0.308460
     number of bathrooms
                                                              0.009206 0.531735
                                                               0.002511 0.712169
     living area
     lot area
                                                               0.003291 0.081992
print(df.describe())
     шсан
                                                                         0.769934
            6.237575e+03
                              67.347991
                                                   0.938719
     std
            6.762810e+09 42491.000000
                                                   1.000000
                                                                         0.500000
```

```
max
            6.762832e+09 42734.000000
                                                  33,000000
                                                                        8,000000
                              lot area number of floors waterfront present \
             living area
     count 14620.000000 1.462000e+04
                                            14620.000000
                                                                 14620.000000
             2098.262996
                          1.509328e+04
                                                1.502360
                                                                     0.007661
     mean
              928.275721
                          3.791962e+04
                                                 0.540239
                                                                     0.087193
     std
              370.000000
                          5.200000e+02
                                                1.000000
                                                                     0.000000
     min
             1440.000000 5.010750e+03
                                                1.000000
                                                                     0.000000
     25%
     50%
             1930,000000
                          7.620000e+03
                                                1,500000
                                                                     0.000000
     75%
             2570.000000 1.080000e+04
                                                 2,000000
                                                                     0.000000
     max
            13540.000000 1.074218e+06
                                                3.500000
                                                                     1.000000
            number of views condition of the house
                                                             Built Year
     count
               14620.000000
                                       14620.000000
                                                           14620.000000
                                                     . . .
                   0.233105
                                           3.430506
                                                           1970.926402
     mean
                                                     . . .
                                           0.664151
                                                              29.493625
     std
                   0.766259
                                                     . . .
     min
                   0.000000
                                           1.000000
                                                            1900.000000
                                                     . . .
                   0.000000
                                           3.000000
                                                            1951.000000
     25%
                                                     . . .
     50%
                   0.000000
                                           3,000000
                                                            1975.000000
                   9.999999
                                           4.000000
                                                            1997.000000
     75%
                                                            2015.000000
                   4.000000
                                           5.000000
     max
            Renovation Year
                               Postal Code
                                               Lattitude
                                                              Longitude
     count
               14620.000000
                              14620.000000 14620.000000 14620.000000
                  90.924008
                             122033.062244
                                               52.792848
                                                            -114.404007
     mean
                                                               0.141326
     std
                 416.216661
                                 19.082418
                                                0.137522
     min
                   0.000000
                             122003.000000
                                               52.385900
                                                            -114.709000
                   0.000000
                            122017.000000
                                               52.707600
                                                            -114.519000
     25%
                             122032.000000
     50%
                   0.000000
                                               52.806400
                                                            -114.421000
                             122048.000000
                                               52.908900
     75%
                   0.000000
                                                            -114.315000
                2015.000000 122072.000000
     max
                                               53.007600
                                                            -113.505000
            living_area_renov lot_area_renov
                                               Number of schools nearby
     count
                 14620.000000
                                 14620.000000
                                                            14620.000000
     mean
                  1996.702257
                                 12753.500068
                                                                2.012244
     std
                   691.093366
                                 26058.414467
                                                                0.817284
     min
                   460.000000
                                   651.000000
                                                                1.000000
     25%
                  1490.000000
                                  5097.750000
                                                                1.000000
     50%
                  1850.000000
                                  7620.000000
                                                                2.000000
                  2380.000000
                                 10125.000000
                                                                3.000000
     75%
                  6110.000000
                                560617.000000
                                                                3.000000
     max
            Distance from the airport
                                              Price
     count
                         14620.000000 1.462000e+04
     mean
                            64.950958
                                       5.389322e+05
     std
                             8.936008 3.675324e+05
                            50.000000
                                       7.800000e+04
     min
     25%
                            57.000000
                                      3.200000e+05
     50%
                            65.000000
                                       4.500000e+05
     75%
                            73.000000
                                      6.450000e+05
                            80.000000 7.700000e+06
     max
print(df['Number of schools nearby'].value_counts())
          4973
          4853
          4794
     Name: Number of schools nearby, dtype: int64
print('Mean:', df['Distance from the airport'].mean())
print('Median:', df['Area of the basement'].median())
print('Mode:', df['grade of the house'].mode())
     Mean: 64.95095759233926
     Median: 0.0
     Mode: 0
     Name: grade of the house, dtype: int64
df.dropna(inplace=True)
df.fillna(0, inplace=True)
df.interpolate(inplace=True)
from sklearn.preprocessing import StandardScaler
from sklearn.preprocessing import MinMaxScaler
x=df.drop(['Price','Date'],axis=1)
x.set_index(['id'],inplace=True)
y=df[['id','Price']]
x.head()
```

		number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	number of views	condition of the house	of the house	Area of the house(excluding basement)	Area of the basement	Built Year	Renov
	id													
	6762810145	5	2.50	3650	9050	2.0	0	4	5	10	3370	280	1921	
	6762810635	4	2.50	2920	4000	1.5	0	0	5	8	1910	1010	1909	
print	(df.isnull()	.sum())												
	id				0									
	Date				0									
	number of be	drooms			0									
	number of ba	throoms			0									
	living area				0									
	10+ 2002				α									

0 0 lot area number of floors waterfront present 0 0 number of views condition of the house 0 grade of the house 0 Area of the house(excluding basement) 0 Area of the basement Built Year 0 Renovation Year Postal Code Lattitude 0 Longitude 0 0 living\_area\_renov lot\_area\_renov Number of schools nearby Distance from the airport 0 0 0 0 Price dtype: int64

sc=StandardScaler()
sc=MinMaxScaler()
x=pd.DataFrame(sc.fit\_transform(x),columns=x.columns.values)
x.head()

	number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	number of views	condition of the house	grade of the house	Area of the house(excluding basement)	Area of the basement	Built Year	Renov
0	0.12500	0.266667	0.249051	0.007945	0.4	0.0	1.0	1.00	0.666667	0.331858	0.058091	0.182609	
1	0.09375	0.266667	0.193622	0.003241	0.2	0.0	0.0	1.00	0.444444	0.170354	0.209544	0.078261	
2	0.12500	0.300000	0.192863	0.008345	0.2	0.0	0.0	0.50	0.444444	0.280973	0.000000	0.339130	
3	0.09375	0.266667	0.223235	0.039562	0.4	0.0	0.0	0.50	0.555556	0.325221	0.000000	0.878261	
A	0 06350	0 200000	N 177677	0 003707	n 2	0.0	0.0	N 75	0.444444	N 167N35	0 172100	O 25217/	

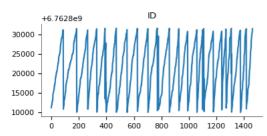
y.head()

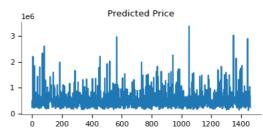
```
\blacksquare
                         Price
       0 6762810145 2380000
       1 6762810635 1400000
       2 6762810998
                       1200000
       3 6762812605
                        838000
       4 6762812919
                        805000
     Values
                                                                                             Price
             +6.76281e9
       3000
                                                                  2.0
       2000
                                                                  1.5
       1000
                                                                  1.0
                                                                                                               3.5
                   0.5
                              1.5
                                                                                                          3.0
                         1.0
                                          2.5
                                                     3.5
                                                           4.0
                                                                            0.5
                                                                                  1.0
                                                                                        1.5
                                                                                              2.0
                                                                                                    2.5
                                                                                                                     4.0
              0.0
                                    2.0
                                                3.0
                                                                       0.0
     Distributions
                                                                                               Price
         1.00
                                                                    2.0
       <sub>군</sub> 0.75
                                                                  ر
1.5
                                                                   1.0
       0.50
                                                                    0.5
         0.25
         0.00
                                                                    0.0
                                                   2500 300
+6.76281e9
                    500
                                   1500
                                                           3000
                                                                         0.8
                                                                              1.0
                                                                                    1.2
     2-d distributions
             1e6
         2.4
         2.2
         2.0
         1.8
       <u>9</u> 1.6 -
from sklearn.model_selection import train_test_split
from \ sklearn.ensemble \ import \ Random ForestRegressor
from sklearn.ensemble import GradientBoostingRegressor
from sklearn.metrics import r2_score
x_train,x_test,y_train,y_test = train_test_split(x , y['Price'],test_size =0.1,random_state=2)
\verb|model| = GradientBoostingRegressor(n_estimators= 400, \verb|max_depth=5|, \verb|min_samples_split=2|, learning_rate=0.1|) \\
model.fit(x_train,y_train)
y_pred = model.predict(x_test)
model.score(x_test,y_test)
     0.9111918507210961
r2_score(y_pred,y_test)
     0.900323276786278
y_pred
     \verb"array" ([497766.12740438, 244495.3776842 , 293819.40063242, \ldots,
             698495.60350629, 297006.00386358, 245881.76921871])
y_pred_list = y['id'][-len(y_pred):].tolist()
y_pred_df=pd.DataFrame(y_pred_list,columns=['ID'])
y_pred_df['Predicted Price'] = y_pred.round(2)
y_pred_df
```

	ID	Predicted Price	
0	6762811233	497766.13	11.
1	6762811403	244495.38	
2	6762811775	293819.40	
3	6762811861	397555.35	
4	6762812009	474843.29	
1457	6762830250	1041014.57	
1458	6762830339	317512.59	
1459	6762830618	698495.60	
1460	6762830709	297006.00	
1461	6762831463	245881.77	

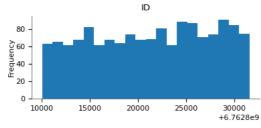
1462 rows × 2 columns

### Values





### Distributions





### 2-d distributions

