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

Choose Files No file chosen Upload widget is only available when the cell has been executed in the current browser session. Please rerun this cell to enable.

Saving House Price India.csv to House Price India.csv

import pandas as pd

import numpy as np

import matplotlib.pyplot as plt

import seaborn as sns

import io df = pd.read_csv(io.BytesIO(uploaded['House Price
India.csv']))

df.head()

		number	number of	living	lot	number	number co waterfront				
id	l Date	bedrooms	of o	of	of bat	hrooms floors	area ar	eapresent views			
0 6762810145	42491	5	2.50	3650	9050	2.0	0	4			
1 6762810635	42491	4	2.50	2920	4000	1.5	0	0			
2 6762810998	42491	5	2.75	2910	9480	1.5	0	0			
3 6762812605	42491	4	2.50	3310	42998	2.0	0	0			
4 6762812919 rows × 23 colu	42491 mns	3	2.00	2710	4500	1.5	0	0			

df.tail()

			۰.۲	number of	number of living lot			ont	number Built Re	conditio novation I	of	of		
			OT	bedrooms			bathrooms area views house		area	area present		Year ·	floors	
14615	6762830250	42734	2	1.5	1556	20000	1.0	0	0	4		1957	0	12
14616	6762830339	42734	3	2.0	1680	7000	1.5	0	0	4		1968	0	12
14617	6762830618	42734	2	1.0	1070	6120	1.0	0	0	3		1962	0	12
14618	6762830709	42734	4	1.0	1030	6621	1.0	0	0	4		1955	0	12
14619	6762831463	42734	3	1.0	900	4770	1.0	0	0	3		1969	2009	12

5 rows × 23 columns

1£

ит			۰t	number of num	ber of l	iving	lot	number waterfr	ont	number Built Re	conditi novation	on Pos id Da	ateof	of
			01	bedrooms bat	athrooms			area house	area	present	Year	Year	C floors	views
0	6762810145	42491	5	2.50	3650	9050	2.0	0	4	5		1921	0	122
1	6762810635	42491	4	2.50	2920	4000	1.5	0	0	5		1909	0	122
2	6762810998	42491	5	2.75	2910	9480	1.5	0	0	3		1939	0	122

Area of the house(excluding basement) 14620 non-null

14620 non-null int64

14620 non-null float64

int64

8

11

15

16

number of views

10 grade of the house

12 Area of the basement

13 Built Year

14 Renovation Year

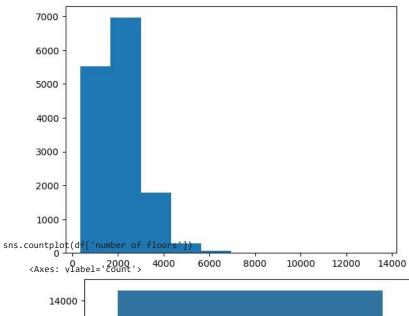
Postal Code

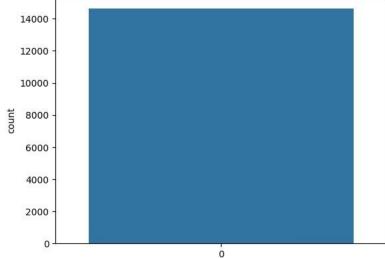
Lattitude

condition of the house

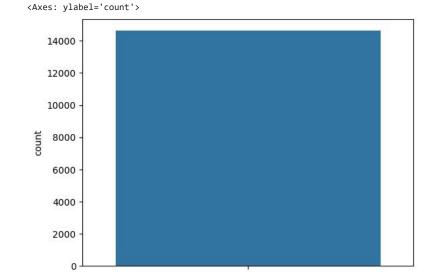
0

```
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 dtypes: float64(4), int64(19) memory usage: 2.6 MB
df.shape
    (14620, 23)
Univariate Analysis
print(df.describe())
                                Date number of bedrooms number of bathrooms \ count
    1.462000e+04 14620.000000
                                     14620.000000
                                                          14620.000000 mean
                                                                               6.762821e+09
    42604.538646
                           3.379343
                                                2.129583
                                                          std
                                                                 6.237575e+03
                                                                                  67.347991
                         0.769934 min
                                          6.762810e+09 42491.000000
                                                                               1,000000
    0.500000
                      6.762815e+09 42546.000000
                                                           3,000000
                                                                               1.750000
               25%
    50%
           6.762821e+09 42600.000000
                                                  3.000000
                                                                        2.250000
    75%
            6.762826e+09 42662.000000
                                                  4.000000
                                                                       2.500000
           6.762832e+09 42734.000000
                                               33,000000
                                                                    8,000000
    max
                              lot area number of floors waterfront present
    count 14620.000000 1.462000e+04
                                          14620.000000
                                                             14620.000000
                                                                           mean
                                                                 0.007661
    2098.262996 1.509328e+04
                                          1.502360
                                                                            std
    928.275721 3.791962e+04
                                         0.540239
                                                                 0.087193
                                                                             min
    370.000000
                 5.200000e+02
                                         1.000000
                                                                 0.000000
                                                                            25%
    1440.000000 5.010750e+03
                                      1.000000
                                                          0.000000
           1930.000000 7.620000e+03
                                             1.500000
                                                                 0.000000
                                                                                    2570.000000
                                                                            75%
    1.080000e+04
                          2.000000
                                             0.000000
                                                               13540.000000 1.074218e+06
                                                        max
                        1.000000
    3,500000
           number of views condition of the house
                                                         Built Year \ 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
                                                        25%
                                                                      0.000000
    3.000000
                    1951,000000
                  0.000000
                                         3.000000 ...
                                                        1975.000000
                                                                                    0.000000
    4.000000 ... 1997.000000 max
                                               4.000000
                                                                      5.000000 ...
                                                                                      2015.000000
           Renovation Year
                              Postal Code
                                               Lattitude
                                                                        \ count
                                                             Longitude
    14620.000000 14620.000000 14620.000000 14620.000000 mean
                                                                       90.924008
                     52.792848 -114.404007 std
    122033.062244
                                                       416.216661
                                                                       19.082418
    0.137522
                  0.141326 min
                                           0.000000 122003.000000
                                                                       52.385900
                              0.000000 122017.000000
     -114.709000
                 25%
                                                         52.707600
                                                                     -114.519000
                  0.000000 122032.000000
                                             52.806400
                                                         -114.421000 75%
                                                                                    0.000000
    122048.000000
                      52.908900 -114.315000
                                                          2015.000000 122072.000000
                                                                                        53,007600
                                              max
    -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
                                                                      1490.000000
                                                                                      5097.750000
    1.000000
                                7620.000000
                                                             2.000000
                 1850.000000
                                                                       75%
                                                                                    2380.000000
    10125.000000
                                 3.000000 max
                                                                      560617.000000
                                                         6110.000000
    3.000000
           Distance from the airport
                                                                      14620.000000 1.462000e+04
                                            Price count
                           64.950958 5.389322e+05 std
    mean
                                                                          8.936008 3.675324e+05
                           50.000000 7.800000e+04
                                                                         57.000000 3.200000e+05
    min
                           65.000000 4.500000e+05
    50%
    75%
                           73.000000 6.450000e+05
plt.hist(df['living area'])
    (array([5.530e+03, 6.958e+03, 1.779e+03, 2.770e+02, 5.500e+01, 1.400e+01,
            2.000e+00, 3.000e+00, 1.000e+00, 1.000e+00]),
     array([ 370., 1687., 3004., 4321., 5638., 6955., 8272., 9589.,
            10906., 12223., 13540.]),
     <BarContainer object of 10 artists>)
```





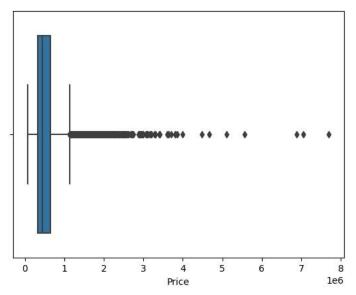
sns.countplot(df['number of bathrooms'])



sns.boxplot(x=df['Price'])

<Axes: xlabel='Price'>

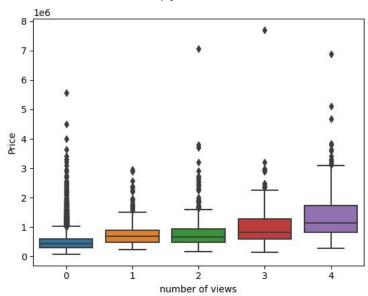
ò



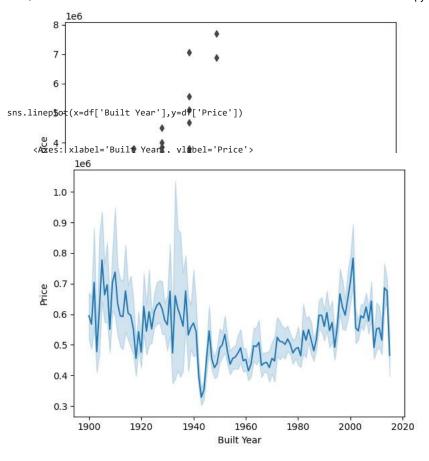
Bivariate Analysis

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

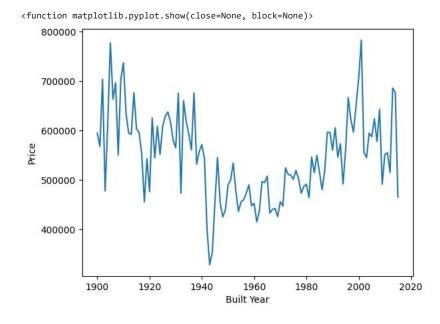
<Axes: xlabel='number of views', ylabel='Price'>



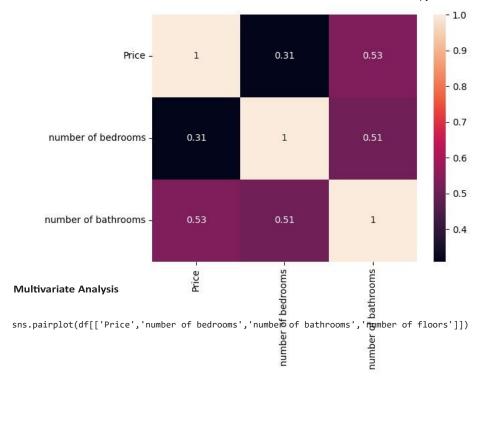
sns.boxplot(x=df['number of bedrooms'], y=df['Price']) < Axes: xlabel='number of bedrooms', ylabel='Price'>

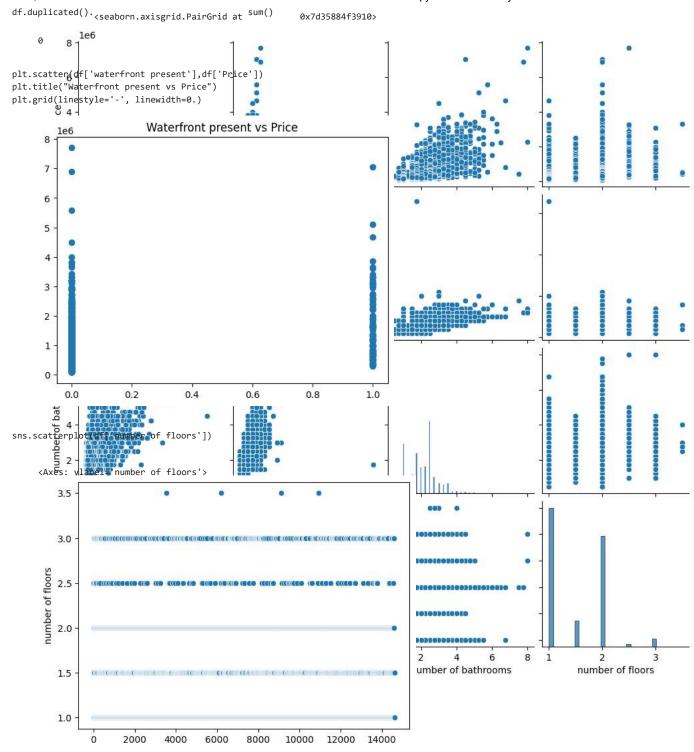


 $sns.lineplot(x=df.groupby('Built Year').mean().index, y=df.groupby('Built Year').mean()['Price']) \\ plt.show$

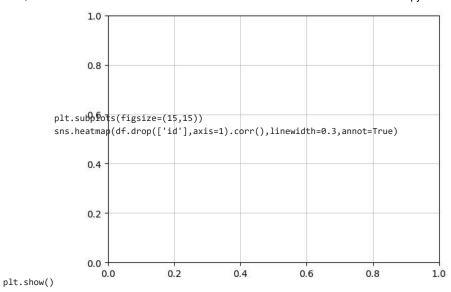


sns.heatmap(df[['Price','number of bedrooms','number of bathrooms']].corr(), annot=True) \$\$ <Axes: >





plt.grid(linestyle='-',linewidth=0.5)



```
print(df.describe())
```

```
id
                           Date number of bedrooms number of bathrooms \ count
1.462000e+04 14620.000000
                               14620.000000
                                                   14620.000000 mean 6.762821e+09
42604.538646
                      3.379343
                                        2.129583 std 6.237575e+03
                                                                          67.347991
                   0.769934 min
0.938719
                                    6.762810e+09 42491.000000
                                                                        1.000000
0.500000 25%
                6.762815e+09 42546.000000
                                                    3.000000
                                                                        1.750000
50%
      6.762821e+09 42600.000000
                                           3.000000
                                                                 2.250000
75%
      6.762826e+09 42662.000000
                                           4.000000
                                                                2.500000
      6.762832e+09 42734.000000
                                         33.000000
                                                             8.000000
       living area
                                  number of floors waterfront present \
                        lot area
count 14620.000000 1.462000e+04
                                   14620.000000
                                                      14620.000000 mean
2098.262996 1.509328e+04
                                                   0.007661
                                1.502360
```

std	928.275721	3.791962e+04	0	.5402	39		0.0	87193											
min	370.000000	5.200000e+02	1	.0000	90		0.0	00000											
25%	1440.000000	5.010750e+03Date	- 11	nanaa	เต กวล	ก กวว	0.044	ดดดเลด	0.013	n nn4s	เก กวร	V V33	0.016	n n16	0.054	n n12	0.018	-0.023	0 018
50%		7.620000e+03	1 1	5000	0.020	0.022	5.00-10	00000	0.012	3.0040	.0.027	0.055	0.010	5.016	3.003	0.012	0.016	0.023	0.010
				. 5000	00		0.0	99999											
75%	2570.000000	1.080000e+04	2	.0000	00		0.0	00000											
max	13540.000000ur	14b@74∂f1B@t0f6oms	-0.016	.5000	00 51	0.57	0.034	00000	0.006	າດ ດ 7 9	0 027	0.35	0.47	0.3	0.15	0.016	-0 044	-0.013	0 14
max.	13340.0000009[0]	HDC1-9HBCM90III3	0.010	. 5000	00.51	0.57	0.054	0000	J.000.	w.u / 5	0.027	0.55	0.47	0.5	0.13	0.010	0.044	0.013	0.14
	number of view	s condition of	the hou	se .		Built	Year	\											
count	14620.00000	Poer of bathrool 146	200 0000	00 5 1.	1 14	6207.50	000001	0.5	0.06	0.18	-0.13	0.66	0.68	0.29	0.5	0.05	-0 11	0.031	0.22
mean	0.23310			06 .		970.9		0.5	0.00	0.10	0.13	0.00		0.23	0.5	0.03	0.11	0.031	0.22
_																			
std	0.76625			51 .			93625												
min	0.00000	0 living area	10.0000	00.57.	0.75^{1}	900.0	00000	0.35	0.11	0.29	0.063	0.76	0.88	0.44	0.31	0.059	-0.08	0.055	0.24
25%	0.00000			00 .		951.0													
			2 0000																
50%	0.00000		3.0000		• •		00000												
75%	0.00000	0 lot area	-4.0040	0.034	0.081	99.7.70	00000	0.004	0.026	0.078	0.008	0.11	0.18	0.02	0.052	0.0068	0.07	-0.091	0.22
max	4.00000		5.0000				00000												
	Renovation Yea	rnumbertal floors	-0.01	0.18	de _{0.5}	o.ong	5 .004:	\1	0.016	0.02	-0.27	0.46	0.53	-0.24	0.48	0.0067	-0.13	0.051	0.13
count	14620.00000	0 14620.000000	14620	.0000	00 14	620.0	00000												
mean	90.92400	8 122033.062244	52	. 7928	48	114.4	94997												
					22	- 0 -1	11226												
std		aterfront plesent	-0.012	0.006	0.06	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
min	0.00000	0 122003.000000	52	.3859	90 -	114.7	09000												
25%	0.00000	0 122017.000000	52	.7076	90 -	114.5	19000												
50%			52	8064	00	114-4	21000			_									
		0nu 12863201 018899	0.004	ນ.ປ/ອ	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	9-0.08
75%		0 122048.000000	52	.9089	99 -	114.3	T2000												
max	2015.00000	0 122072.000000	53	.0076	90	113.5	05000												
		ition of the Laure	0.007	0 007	0.13	0.065	0.000	. ^ ~ ~	0.010	0.052	3	0.15	0.17	0.10	0.30	0.063	0.045	0.000	0.10
		ition of the house			-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
	<u> </u>	nov lot_area_re		mber	or sch	0012	nearby	1											
count	14620.000	000 14620.000	000		1	4620.	000000												
mean	1996.702	75de of 1 82530598	268 022	0.25	0.66	0.76	012244	0.46	0.00	0.25	-0.15	1	0.76	0.17	0.44	0.015	-0.15	0.13	0.3
				0.35	0.66	0.76	9 1.11	0.46	0.08	0.25	-0.15	1	0.76	0.17	0.44	0.015	-0.15	0.12	0.2
std	691.093						01/284												
min	460.000	000 651.000	900			1.	999999												
25%	of the house (exc	Ruding basement)	200 016	0.47	0.60	0.88	000000	0.53	0.073	0.16	0 17	0.76	1	0.046	0.43	0 026	0.004	000	-0.25
50%	1850.000	000 7620.000	20.010	0.47	0.68	2.	999999	0.55	0.072	0.16	-0.17	0.76	1	0.040	0.42	0.026	-0.064	3.8e-0	00.55
						۷.													
75%	2380.000					٥.	000000												
max	6110.000	Por the bastment	200 016	0.3	0.29	0.44	090990	-0.24	0.085	0.29	0.18	0.17	0 046	1	-0 14	0.075	0 011	0.11	-0.15
	Aice	of the basement	0.010	0.5	0.23	0.44	0.02	0.24	0.005	0.23	0.10	0.17	0.040	-	0.14	0.075	0.011	0.11	0.13
	Distance from	the sinnont	Desi	60															
	Distance from			-							كبي								
count	1	4620.000000 1.4 64.950958 5.3	62000et	9415	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
mean		64.950958 5.3	89322e	05	0.5	0.51	0.032	0.40	0.02-	0.055	0.50	0.44	0.42	0.14	1	-0.23	0.002	-0.14	0.41
std		8.936008 3.6		05															
min		50 000000 7 9	$\lambda \alpha \alpha \alpha \alpha \alpha \Delta \Delta$							A 1	0.063	0.015	0000	0.075		-			~ ~~
		Rendivation Year	20 017	0 016	0.05	0.059	า กกรร	กดดรา	ก กรร				ロロノロ	0.075	-0.23	1	กกาย	กกวจ	I-O OX-
25%		50,000000 7.8 57.000000 3.2	-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-
25%		57.000000 3.2	80000e+	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-
25% 50%		57.000000 3.20 65.000000 4.50	00000e+ 0 0000e+	0.016 05 05	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-
25%		57.000000 3.2	00000e+ 0 0000e+	0.016 05 05	0.05	0.059	0.0068	0.0067	0.086	0.1	0.002	0.015	0.026	0.075	0.23	0.018	0.018	0.029	0.08-
25% 50% 75%	ount())	57.000000 3.20 65.000000 4.50	00000e+ 0 0000e+	0.016 05 05 05	0.05	0.059	0.0068	0.0067	0.086	0.1	0.062	0.015	0.026	0.075	0.23	0.019	0.018	0.029	0.08-
25% 50%	ount())	57.000000 3.20 65.000000 4.50	00000e+ 0 0000e+	0.016 05 05	0.05	0.059	0.0068	0.0067	0.086	0.1	0.062	0.015	0.026	0.075	0.23	0.019	0.018	0.029	0.08-
25% 50% 75%	ount())	57.000000 3.20 65.000000 4.50	00000e+ 0 0000e+	0.016 05 05 05	0.05	0.059	0.0068	0.0067	0.086	0.1	0.062	0.015	0.026	0.075	0.23	0.019	0.018	0.029	0.08-
25% 50% 75% print(df.co	ount())	57.000000 3.20 65.000000 4.50	30000e+ 3 0000e+ 50000	05 05	0.05	0.059	0.0068	0.0067	0.086	0.1	0.062	0.015	0.026	0.075	0.23	0.019	0.018	0.029	0.08-
25% 50% 75% orint(df.co	ount())	57.000000 3.20 65.000000 4.50	146	05 05 05 04 20	0.05	0.059	0.0068	0.0067	0.086	0.1	0.062	0.015	0.026	0.075	0.23	0.019	0.018	0.029	0.08-
25% 50% 75% orint(df.co id Date	、 ,,	57.000000 3.20 65.000000 4.50	146	95 95 20 20	0.05	0.059	0.0068	0.0067	0.086	0.1	0.002	0.015	0.026	0.075	0.23	0.018	0.018	0.029	0.08-
25% 50% 75% orint(df.co id Date	ount()) r of bedrooms	57.000000 3.20 65.000000 4.50	146	95 95 20 20	0.05	0.059	0.0068	0.0067	0.086	0.1	0.062	0.015	0.026	0.075	0.23	0.019	0.018	0.029	0.08-
25% 50% 75% orint(df.co id Date number	r of bedrooms	57.000000 3.20 65.000000 4.50	146 146	20 20 20 20 20	0.05	0.059	0.0068	0.0067	0.086	0.1	0.045	0.015	0.026	0.075	0.063	0.010	0.018	0.029	0.08
25% 50% 75% print(df.co id Date number number	r of bedrooms r of bathrooms	57.000000 3.20 65.000000 4.50	146 146 146	20 20 20 20 20 20 20	0.05	0.059	0.0068	0.0067	0.086	0.1	0.045	0.015	0.026	0.075	-0.23	0.012	0.018	0.029	-0.08-
25% 50% 75% orint(df.co id Date number number	r of bedrooms r of bathrooms g area	57.000000 3.20 65.000000 4.50	146 146 146 146 146	20 20 20 20 20 20 20 20	0.05	0.059	0.0068	0.0067	0.086	0.1	0.045	0.015	0.026	0.075	0.063	0.012	0.018	0.029	-0.08-
25% 50% 75% orint(df.co id Date number number living lot ar	r of bedrooms r of bathrooms g area rea	57.000000 3.20 65.000000 4.50	146 146 146	20 20 20 20 20 20 20 20	0.05	0.059	0.0068	0.13	0.086	0.1	0.045	0.015	0.026	0.075	0.063	0.012	0.018	0.029	0.08
25% 50% 75% orint(df.co id Date number number living lot ar	r of bedrooms r of bathrooms g area	57.000000 3.20 65.000000 4.50	146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20	0.05	0.059	0.0068	0.13	0.086	0.1	0.045	0.015	0.026	0.075	0.063	0.010	0.018	0.029	0.00
25% 50% 75% orint(df.co id Date number number living lot ar number	r of bedrooms r of bathrooms g area rea r of floors	57.000000 3.20 65.000000 4.50	146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.0068	0.13	0.086	0.1	0.045	0.015	0.026	0.075	0.063	0.019	0.018	0.029	0.08
25% 50% 75% print(df.co id Date number number living lot ar number waterf	r of bedrooms r of bathrooms g area rea r of floors front present	57.000000 3.20 65.000000 4.50	146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.0068	0.0067	0.086	0.1	0.045	0.015	0.026	0.075	0.063	0.019	0.018	0.029	0.08
25% 50% 75% print(df.co id Date number number living lot ar number waterf number	r of bedrooms r of bathrooms g area rea r of floors front present r of views	57.000000 3.2 65.000000 4.5 73 <u>9299</u> 99 <u>6.4</u>	146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.0068	0.0067	0.086	0.1	0.045	0.015	0.026	0.075	0.063	0.010	0.018	0.029	0.08
25% 50% 75% print(df.co id Date number number living lot ar number waterf number	r of bedrooms r of bathrooms g area rea r of floors front present	57.000000 3.2 65.000000 4.5 73 <u>9299</u> 99 <u>6.4</u>	146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.0068	0.0067	0.036	0.1	0.045	0.015	0.026	0.075	0.063	0.032	0.018	0.029	0.08
25% 50% 75% print(df.co id Date number number living lot an number waterf number condit	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the hous	57.000000 3.2 65.000000 4.5 73 <u>9299</u> 99 <u>6.4</u>	146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.07	0.0067	0.086	0.1	0.045	0.015	0.026	0.075	0.060	0.019	0.018	0.029	0.08
25% 50% 75% print(df.co id Date number number living lot ar number waterf number condit grade	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the hous of the house	57.000000 3.2: 65.000000 4.5: 73 999999 5.14	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.0068	0.0067	0.086	0.1	0.045	0.015	0.026	0.075	0.063	0.012	0.018	0.029	-0.08-
25% 50% 75% print(df.co id Date number living lot an number waterf number condit grade Area o	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the hous of the house of the house(exc	57.000000 3.2 65.000000 4.5 73 <u>9299</u> 99 <u>6.4</u>	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.0068	0.0067	0.038	0.1	0.045	0.015	0.026	0.073	0.053	0.010	0.018	0.029	-0.08-
25% 50% 75% print(df.co id Date number number living lot ar number waterf number condit grade Area o	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the hous of the house(exc of the basement	57.000000 3.2: 65.000000 4.5: 73 999999 5.14	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.0068	0.0067	0.038	0.1	0.045	0.015	0.026	0.073	0.062	0.019	0.018	0.029	-0.08-
25% 50% 75% print(df.co id Date number living lot an number waterf number condit grade Area o	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the hous of the house(exc of the basement	57.000000 3.2: 65.000000 4.5: 73 999999 5.14	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.0068	0.0067	0.038	0.1	0.045	0.15	0.026	0.073	0.063	0.019	0.018	0.029	-0.08-
25% 50% 75% print(df.co id Date number number living lot ar number waterf number condit grade Area o Area o Built	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the hous of the house(exc of the basement	57.000000 3.2: 65.000000 4.5: 73 999999 5.14	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.0068	0.0067	0.038	0.120	0.045	0.15	0.026	0.073	0.062	0.010	0.018	0.029	0.00
25% 50% 75% print(df.co id Date number number living lot ar number waterf number condit grade Area o Area o Built Renova	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house(exc of the basement Year ation Year	57.000000 3.2: 65.000000 4.5: 73 999999 5.14	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.0068	0.13	0.036	0.030	0.045	0.015	0.020	0.073	0.063	0.018	0.018	0.029	0.000
25% 50% 75% print(df.co id Date number number living lot ar number condit grade Area o Area o Built Renova Postal	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house of the basement Year ation Year	57.000000 3.2: 65.000000 4.5: 73 999999 5.14	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.0068	0.13	0.036	0.030	0.045	0.15	0.026	0.073	0.063	0.013	0.018	0.029	0.000
25% 50% 75% orint(df.co id Date number number living lot ar number condit grade Area o Area o Built Renova Postal Lattit	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house of the basement Year ation Year l Code tude	57.000000 3.2: 65.000000 4.5: 73 999999 5.14	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.0068	0.13	0.038	0.030	0.045	0.15	0.026	0.073	0.062	0.013	0.018	0.029	0.000
25% 50% 75% print(df.co id Date number number living lot ar number condit grade Area o Area o Built Renova Postal	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house of the basement Year ation Year l Code tude	57.000000 3.2: 65.000000 4.5: 73 999999 5.14	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.0068	0.13	0.036	0.030	0.062	0.015	0.026	0.073	0.063	0.010	0.018	0.029	-0.08
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25% 50% 75% print(df.co id Date number living lot ar number condit grade Area o Area o Built Renova Postal Lattit Longit living lot_ar Number	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house(exc of the basement Year ation Year 1 Code tude tude tude g_area_renov rea_renov	57.000000 3.2 65.000000 4.5 73 000000 5.4	146 146 146 146 146 146 146 146 146 146	220 220 220 220 220 220 220 220 220 220	0.05	0.059	0.0068	0.13	0.038	0.030	0.045	0.15	0.026	0.073	0.062	0.013	0.018	0.029	0.000
25% 50% 75% rint(df.co id Date number number living lot ar number condit grade Area o Area o Built Renova Postal Lattit Longit living lot_ar Number Distan	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house of the basement Year ation Year 1 Code tude tude tude g_area_renov rea_renov r of schools nea	57.000000 3.2 65.000000 4.5 73 000000 5.4	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.0068	0.13	0.036	0.030	0.062	0.015	0.026	0.073	0.063	0.013	0.018	0.029	-0.08
25% 50% 75% orint(df.co id Date number living lot an number watenf number condit grade Area o Built Renova Postal Lattit Longit living lot_an Number	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house of the basement Year ation Year 1 Code tude tude tude tude g_area_renov rea_renov r of schools nea nce from the air	57.000000 3.2 65.000000 4.5 73 000000 5.4	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.0068	0.13	0.036	0.030	0.062	0.015	0.026	0.073	0.063	0.013	0.018	0.029	0.000
25% 50% 75% orint(df.co id Date number living lot an number watenf number condit grade Area o Built Renova Postal Lattit Longit living lot_an Number	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house of the basement Year ation Year 1 Code tude tude tude g_area_renov rea_renov r of schools nea	57.000000 3.2 65.000000 4.5 73 000000 5.4	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.05	0.059	0.0068	0.13	0.038	0.030	0.002	0.015	0.026	0.073	0.062		0.018	0.029	0.000
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25% 50% 75% orint(df.co id Date number living lot an number watenf number condit grade Area o Built Renova Postal Lattit Longit living lot_an Number	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house of the basement Year ation Year 1 Code tude tude tude tude g_area_renov rea_renov r of schools nea nce from the air	57.000000 3.2 65.000000 4.5 73 000000 5.4	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2		0.00	0.0068	012	0.030	0.030	0.045		۵.00.0	0.011	0.063	0.019	0.018	0.029	
25% 50% 75% orint(df.co id Date number living lot ar number condit grade Area o Area o Built Renova Postal Lattit Longit living lot_ar Number Distan Price dtype:	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house(exc of the basement Year ation Year 1 Code tude tude tude g_area_renov r of schools nea nce from the air : int64	57.000000 3.2 65.000000 4.5 73 000000 5.4	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2		0.00	0.0068	012	0.030	0.030	0.045		۵.00.0	0.011	0.062	0.019		0.029	0.000
25% 50% 75% orint(df.co id Date number living lot an number watenf number condit grade Area o Built Renova Postal Lattit Longit living lot_an Number	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house(exc of the basement Year ation Year 1 Code tude tude tude g_area_renov r of schools nea nce from the air : int64	57.000000 3.2 65.000000 4.5 73 000000 5.4	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2		0.00	0.0068	0.0067	0.030	o.1	0.045		۵.00.0	0.011	0.062	Renov		0.029	-0.08
25% 50% 75% orint(df.co id Date number living lot ar number condit grade Area o Area o Built Renova Postal Lattit Longit living lot_ar Number Distan Price dtype:	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house(exc of the basement Year ation Year 1 Code tude tude tude g_area_renov r of schools nea nce from the air : int64	57.000000 3.2 65.000000 4.5 73 000000 5.4	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2		0.00	0.07	numbe	waterfroi	numbe	0.045	grade of ·	۵.00.0	0.011	0.063	0.019		0.029	0.000
25% 50% 75% orint(df.co id Date number living lot ar number condit grade Area o Area o Built Renova Postal Lattit Longit living lot_ar Number Distan Price dtype:	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house(exc of the basement Year ation Year 1 Code tude tude tude g_area_renov r of schools nea nce from the air : int64	57.000000 3.2 65.000000 4.5 73 000000 5.4	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2		0.00	0.0068	numbe	waterfroi	numbe	0.045		۵.00.0	0.011	0.063	0.019		0.029	-0.08
25% 50% 75% orint(df.co id Date number living lot an number watenf number condit grade Area o Built Renova Postal Lattit Longit living lot_an Number Distan Price dtype:	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house(exc of the basement Year ation Year 1 Code tude tude tude g_area_renov r of schools nea nce from the air : int64	57.000000 3.2 65.000000 4.5 73 000000 5.4	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	number of t	te n	0.07	unmbe	o waterfroi	/ numbe	condition of		۵.00.0	Area of the	0.063	0.019		0.029	-0.08
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25% 50% 75% orint(df.co id Date number living lot ar number condit grade Area o Area o Built Renova Postal Lattit Longit living lot_ar Number Distan Price dtype:	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house(exc of the basement Year ation Year 1 Code tude tude tude g_area_renov r of schools nea nce from the air : int64	57.000000 3.2 65.000000 4.5 73 000000 5.4	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.000 0.000 0.000	te n	0.07	of be -0.	c o o o o o o o o o o o o o o o o o o o	numbe numbe	0.045		۵.00.0	0.011	0.063	0.019		0.029	-0.08
25% 50% 75% orint(df.co id Date number living lot ar number condit grade Area o Area o Built Renova Postal Lattit Longit living lot_ar Number Distan Price dtype:	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house(exc of the basement Year ation Year 1 Code tude tude tude g_area_renov r of schools nea nce from the air : int64	57.000000 3.2 65.000000 4.5 73 000000 5.4	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.000 0.000 0.000	te n	0.07	of be -0.	o oza Materiro Materiro Materiro Materiro	numbe numbe	0.045		۵.00.0	0.011	0.063	0.019		0.029	0.000
25% 50% 75% orint(df.co id Date number number living lot ar number condit grade Area o Built Renova Postal Lattit Longit living lot_ar Number Distan Price dtype: orint(df.co	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house(exc of the basement Year ation Year 1 Code tude tude tude g_area_renov r of schools nea nce from the air : int64	57.000000 3.2 65.000000 4.5 73 000000 5.4	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.0006 0.0006 0.0015	te n 66 600 63	0.07	of be- -01.	0 0330 0 0330 drooms 329034 015663	numbe /	0.045		۵.00.0	0.011	0.063	0.019		0.029	0.000
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25% 50% 75% orint(df.co id Date number living lot ar number condit grade Area o Area o Built Renova Postal Lattit Living lot_ar Number Distan Price dtype: orint(df.co	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house(exc of the basement Year ation Year 1 Code tude tude tude tude g_area_renov r of schools nea nce from the air : int64 prr()) r of bedrooms r of bathrooms g area	57.000000 3.2 65.000000 4.5 73 000000 5.4	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.0459 0.0459 0.0150 0.0264 0.0219	te n 666 63 85	0.07	equnu of be -00. 0. 0. 0. 0.	0 0330 drooms 329034 9000000 509784 570526	\ numbe	0.045		۵.00.0	0.011	0.063	0.019		0.029	0.000
25% 50% 75% orint(df.co id Date number living lot an number waterf number condit grade Area o Built Renova Postal Lattit Longit living lot_an Number Distan Price dtype: orint(df.co	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house(exc of the basement Year ation Year 1 Code tude tude tude g_area_renov r of schools nea nce from the air : int64 prr()) r of bedrooms r of bathrooms g area rea	57.000000 3.2 65.000000 4.5 73 000000 5.4	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	0.0459 0.0459 0.0150 0.0264 0.0219	te n 666 63 85	0.07	equnu of be -00. 0. 0. 0. 0.	0.033 drooms 329034 015663 000000	\ numbe	0.045		۵.00.0	0.011	0.063	0.019		0.029	0.000
25% 50% 75% orint(df.co id Date number living lot an number waterf number condit grade Area o Built Renova Postal Lattit Longit living lot_an Number Distan Price dtype: orint(df.co	r of bedrooms r of bathrooms g area rea r of floors front present r of views tion of the house of the house(exc of the basement Year ation Year 1 Code tude tude tude tude g_area_renov r of schools nea nce from the air : int64 prr()) r of bedrooms r of bathrooms g area	57.000000 3.2 65.000000 4.5 73 000000 5.4	146 146 146 146 146 146 146 146 146 146	20 20 20 20 20 20 20 20 20 20 20 20 20 2	7 Jo Jaguarda 1	te n 66 63 85 58	0.07	equnu of bee -00. 1. 0. 0. 0. 0.	0 0330 drooms 329034 9000000 509784 570526	/ numbe	0.045		0.004	0.011	0.063	0.019		0.029	-0.08

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-0.112937 0.012006
                                                                           -0.006257
    waterfront present
                                                                           0.078665
    number of views
                                            -0.293004 -0.004782
    condition of the house
                                            -0.045061 -0.027402
                                                                           0.026597
    grade of the house
                                            -0.673448 -0.033097
                                                                           0.352945
    Area of the house(excluding basement) -0.565116 -0.015994
                                                                           0.473599
    Area of the basement
                                           -0.290806 -0.015711
                                                                           0.300332
    Built Year
                                           -0.068645 -0.005869
                                                                           0.152954
                                           -0.109155 -0.011636
    Renovation Year
                                                                           0.016132
    Postal Code
                                            0.294709 0.018243
                                                                          -0.044156
    Lattitude
                                            -0.479334 -0.023327
                                                                           -0.013163
                                            -0.070841 -0.018231
                                                                           0.135712
    Longitude
    living area renov
                                            -0.599900 -0.032495
                                                                           0.389855
                                           -0.089604 -0.000050
                                                                           0.029400
    lot_area_renov
    Number of schools nearby
                                           -0.004821 -0.004071
                                                                           0.003397
    Distance from the airport
                                           -0.004542 0.011457
                                                                          -0.006157
    -0.773114 -0.027919
                                    0.308460
                                            number of bathrooms living area \
    id
                                                       -0.516909
                                                                    -0.648127
    Date
                                                       -0.026485
                                                                    -0.021958
    number of bedrooms
                                                       0.509784
                                                                     0.570526
    number of bathrooms
                                                       1.000000
                                                                     0.753517
    living area
                                                       0.753517
                                                                     1.000000
    lot area
                                                       0.080806
                                                                     0.174420
    number of floors
                                                       0.502924
                                                                     0.354743
    waterfront present
                                                       0.060104
                                                                     0.105837
    number of views
                                                       0.183789
                                                                     0.287728
    condition of the house
                                                       -0.128232
                                                                    -0.063358
    grade of the house
                                                                     0.761835
                                                       0.663054
    Area of the house(excluding basement)
                                                       0.684391
                                                                     0.875793
    Area of the basement
                                                       0.287190
                                                                     0.441491
    Built Year
                                                                     0.309602
                                                       0.498127
                                                       0.049669
                                                                     0.059400
    Renovation Year
    Postal Code
                                                       -0.105546
                                                                    -0.080303
    Lattitude
                                                                     0.054518
                                                       0.031156
    Longitude
                                                        0.223904
                                                                     0.240208
    living_area_renov
                                                        0.570530
                                                                     0.757571
                                                       0.078627
                                                                     0.180312
    lot area renov
    Number of schools nearby
                                                       0.002180
                                                                     0.002370
    Distance from the airport
                                                       0.009206
                                                                     0.002511
                                                                                Price
    0.531735
                 0.712169
                                            lot area number of floors \
    id
                                            -0.100269
                                                              -0.312305
                                                              -0.010335
    Date
                                            0.004392
    number of bedrooms
                                            0.034416
                                                               0.177294
    number of bathrooms
                                            0.080806
                                                               0.502924
    living area
                                            0.174420
                                                               0.354743
    lot area
                                            1.000000
                                                              -0.004138
         f fl
                  0 00 38 000000
print(df['Number of schools nearby'].value_counts())
         4973
    3
    2
         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
Handle the Missing values
print(df.isnull().sum())
    id
    number of bedrooms
    number of bathrooms
    living area
                                              a
```

0

0

a

lot area

number of floors

waterfront present

```
10/16/23, 3:48 PM
```

```
condition of the house
                                              0
     grade of the house
                                              0
     Area of the house(excluding basement)
    Area of the basement
                                              0
                                              0
     Built Year
    Renovation Year
                                              0
    Postal Code
                                              0
    Lattitude
                                              0
                                              0
     Longitude
     living_area_renov
                                              0
     lot_area_renov
                                              0
     Number of schools nearby
    Distance from the airport
                                              0
    Price
                                              0
     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']]
```

number number number condition Area of the Area of number of living lot waterfront Built Renovatio of of of the house(excluding the bathrooms area area present the Year Yea bedrooms views floors house basement) basement house 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 6762810998 5 2.75 2910 9480 1.5 0 0 3 8 2910 0 1939 6762812605 2.50 3310 42998 2.0 0 0 3 9 3310 0 2001 6762812919 3 2.00 2710 4500 1.5 0 0 4 8 1880 830 1929

y.head()

x.head()

```
id
                      Price
     0 6762810145
                     2380000
     1 6762810635
                     1400000
     2 6762810998
                     1200000
                     838000
     3 6762812605
     4 6762812919
                     805000
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestRegressor
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) model =
```

model.fit(x_train,y_train)

 $Gradient Boosting Regressor (n_estimators=400, max_depth=5, min_samples_split=2, learning_rate=0.1)$

```
r GradientBoostingRegressor

y_pred = model.predict(x_test)
model.score(x_test,y_test)

0.9130832899171425

r2_score(y_pred,y_test)
0.9024515293863141

y_pred

array([497766.12740438, 244495.3776842 , 293819.40063242, ...,
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 6762811403	497766.13 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 1462 rd	6762831463 ows × 2 columns	245881.77