```
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()
```

	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	number of views	condition of the house	...	Built Year	Renovation Year
0	6762810145	42491	5	2.50	3650	9050	2.0	0	4	5	...	1921	0
1	6762810635	42491	4	2.50	2920	4000	1.5	0	0	5	...	1909	0
2	6762810998	42491	5	2.75	2910	9480	1.5	0	0	3	...	1939	0
3	6762812605	42491	4	2.50	3310	42998	2.0	0	0	3	...	2001	0
4	6762812919	42491	3	2.00	2710	4500	1.5	0	0	4	...	1929	0

5 rows × 23 columns

```
df.tail()
```

	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	number of views	condition of the house	...	Built Year	Renovat Y
14615	6762830250	42734	2	1.5	1556	20000	1.0	0	0	4	...	1957	
14616	6762830339	42734	3	2.0	1680	7000	1.5	0	0	4	...	1968	
14617	6762830618	42734	2	1.0	1070	6120	1.0	0	0	3	...	1962	
14618	6762830709	42734	4	1.0	1030	6621	1.0	0	0	4	...	1955	
14619	6762831463	42734	3	1.0	900	4770	1.0	0	0	3	...	1969	2

5 rows × 23 columns

```
df
```

	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	number of views	condition of the house	...	Built Year	Renovation Year	Postal Code	Lattitude	Longitude	living_area_renov	lot_
0	6762810145	42491	5	2.50	3650	9050	2.0	0	4	5	...	1921	0	122003	52.8645	-114.557	2880	
1	6762810635	42491	4	2.50	2920	4000	1.5	0	0	5	...	1909	0	122004	52.8878	-114.470	2470	
2	6762810998	42491	5	2.75	2910	9480	1.5	0	0	3	...	1939	0	122004	52.8852	-114.468	2940	
3	6762812605	42491	4	2.50	3310	42998	2.0	0	0	3	...	2001	0	122005	52.9532	-114.321	3350	
4	6762812919	42491	3	2.00	2710	4500	1.5	0	0	4	...	1929	0	122006	52.9047	-114.485	2060	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
14615	6762830250	42734	2	1.50	1556	20000	1.0	0	0	4	...	1957	0	122066	52.6191	-114.472	2250	
14616	6762830339	42734	3	2.00	1680	7000	1.5	0	0	4	...	1968	0	122072	52.5075	-114.393	1540	
14617	6762830618	42734	2	1.00	1070	6120	1.0	0	0	3	...	1962	0	122056	52.7289	-114.507	1130	
14618	6762830709	42734	4	1.00	1030	6621	1.0	0	0	4	...	1955	0	122042	52.7157	-114.411	1420	
14619	6762831463	42734	3	1.00	900	4770	1.0	0	0	3	...	1969	2009	122018	52.5338	-114.552	900	

14620 rows × 23 columns

```
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')
```

```
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):
 #   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  
dtypes: float64(4), int64(19)
memory usage: 2.6 MB
```

```
df.shape
```

```
(14620, 23)
```

Univariate Analysis

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

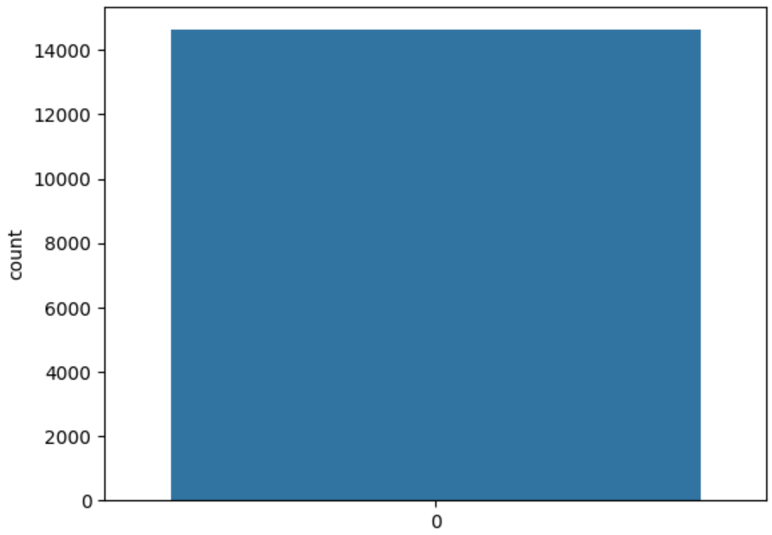
```
                 id          Date  number of bedrooms  number of bathrooms  \
count  1.462000e+04  14620.000000        14620.000000         14620.000000   
mean   6.762821e+09  42604.538646            3.379343             2.129583   
std    6.237575e+03     67.347991            0.938719             0.769934   
min    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   
max    6.762832e+09  42734.000000           33.000000             8.000000   

        living area      lot area  number of floors  waterfront present  \
count  14620.000000  1.462000e+04      14620.000000        14620.000000   
mean    2098.262996  1.509328e+04          1.502360            0.007661   
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   
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   
mean          0.233105                3.430506  ...   1970.926402   
std           0.766259                0.664151  ...     29.493625   
min           0.000000                1.000000  ...   1900.000000   
25%           0.000000                3.000000  ...   1951.000000   
50%           0.000000                3.000000  ...   1975.000000   
75%           0.000000                4.000000  ...   1997.000000   
max           4.000000                5.000000  ...   2015.000000   

       Renovation Year    Postal Code     Lattitude     Longitude  \
count     14620.000000   14620.000000  14620.000000  14620.000000   
mean         90.924008  122033.062244     52.792848   -114.404007   
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   
50%           0.000000  122032.000000     52.806400   -114.421000   
75%           0.000000  122048.000000     52.908900   -114.315000   
max        2015.000000  122072.000000     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   
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  
mean                   64.950958  5.389322e+05  
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  
```

```
plt.hist(df['Area of the house(excluding basement)'])
```

```
(array([4.479e+03, 6.255e+03, 2.653e+03, 9.190e+02, 2.440e+02, 4.600e+01,
        1.800e+01, 1.000e+00, 2.000e+00, 3.000e+00]),
 array([ 370., 1274., 2178., 3082., 3986., 4890., 5794., 6698., 7602.,
```

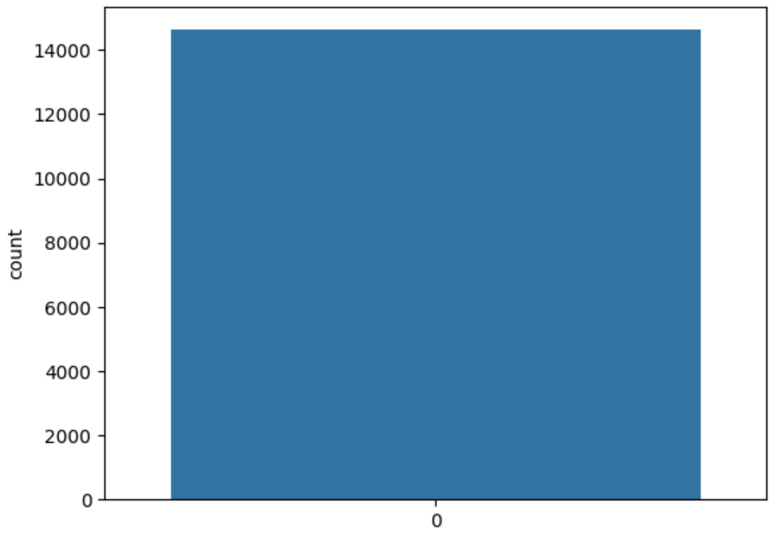
```
sns.countplot(df['number of bathrooms'])
```

```
<Axes: ylabel='count'>
```



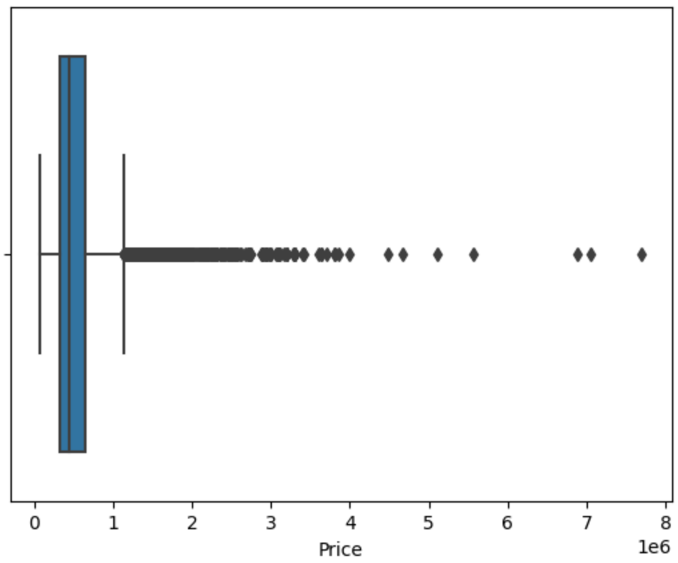
```
sns.countplot(df['number of floors'])
```

```
<Axes: ylabel='count'>
```



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

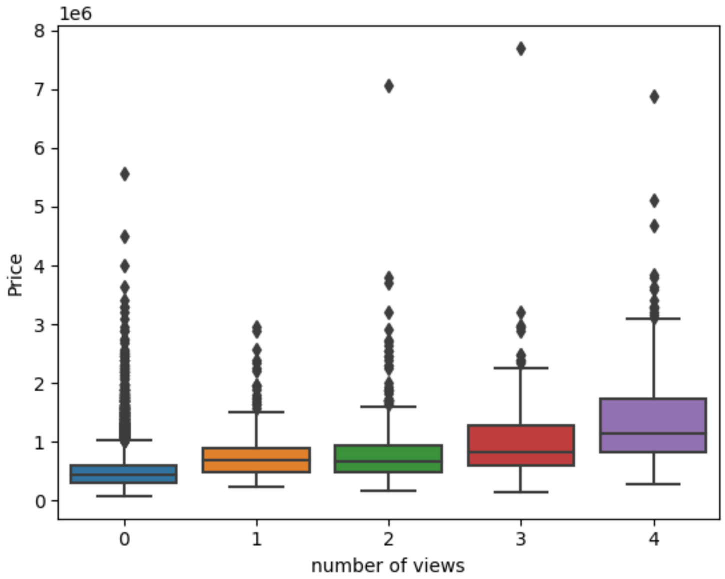
```
<Axes: xlabel='Price'>
```



Bivariate Analysis

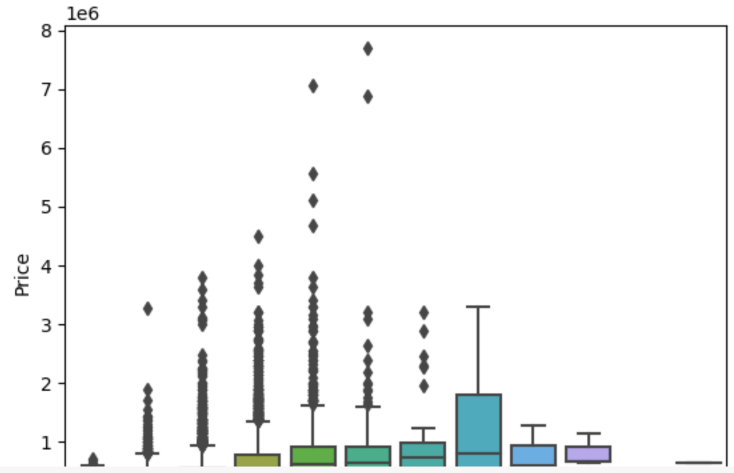
```
sns.boxplot(x=df['number of views'],y=df['Price'])
```

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



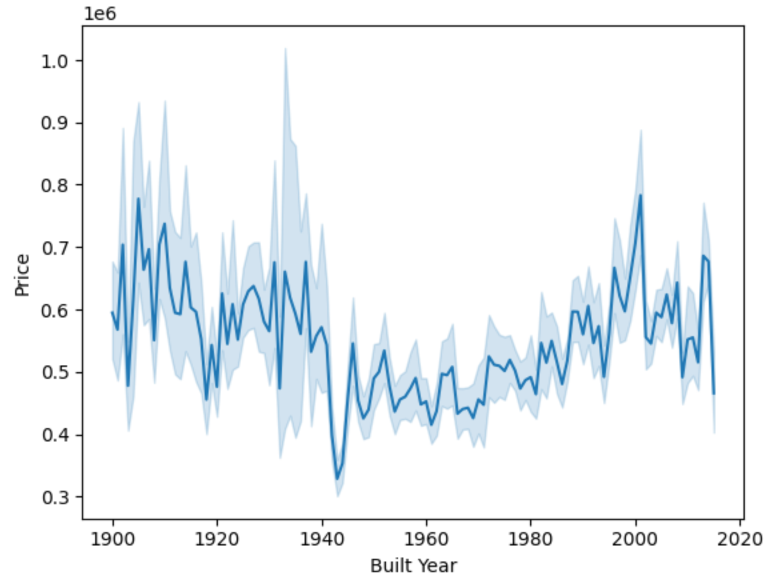
```
sns.boxplot(x=df['number of bedrooms'],y=df['Price'])
```

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



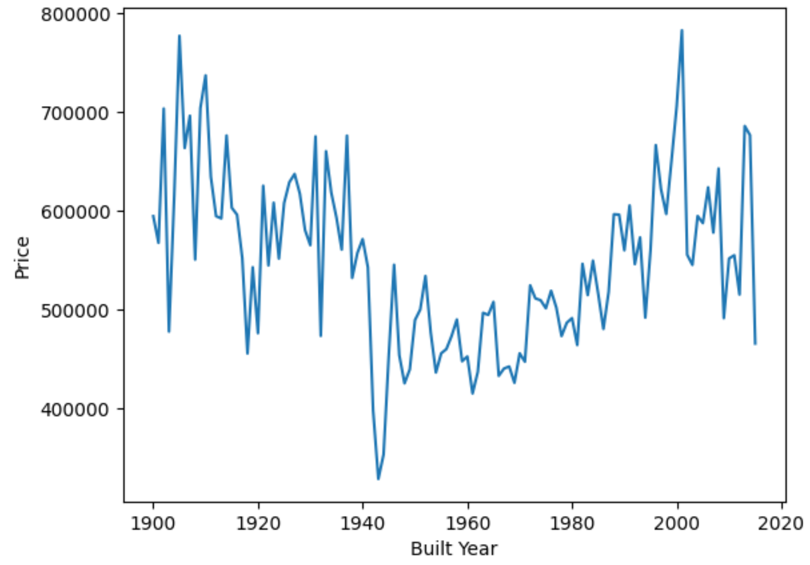
```
sns.lineplot(x=df['Built Year'],y=df['Price'])
```

```
<Axes: xlabel='Built Year', ylabel='Price'>
```



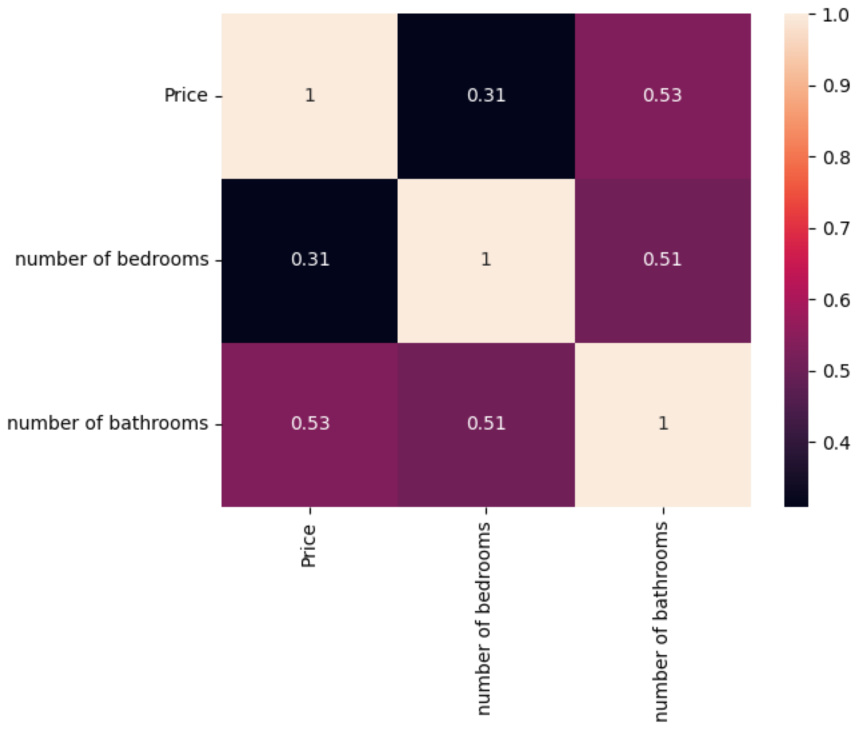
```
sns.lineplot(x=df.groupby('Built Year').mean().index,y=df.groupby('Built Year').mean()['Price'])
plt.show
```

```
<function matplotlib.pyplot.show(close=None, block=None)>
```



```
sns.heatmap(df[['Price','number of bedrooms','number of bathrooms']].corr(),annot=True)
```

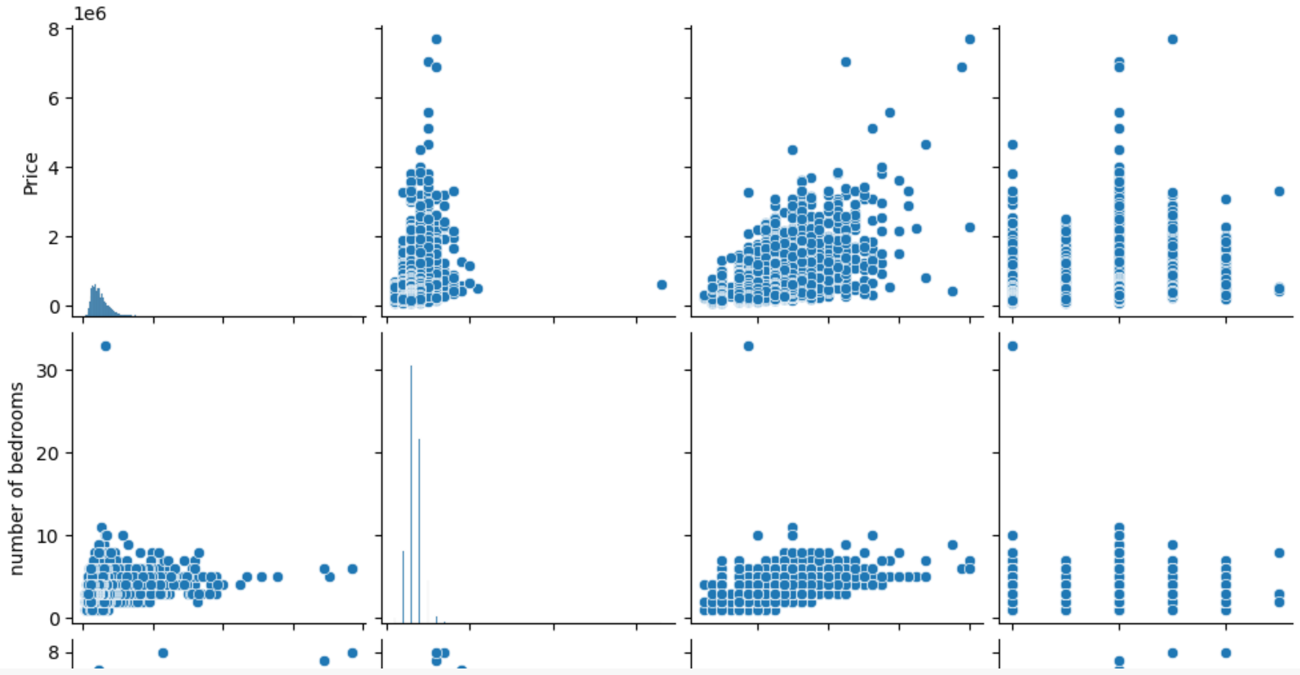
```
<Axes: >
```



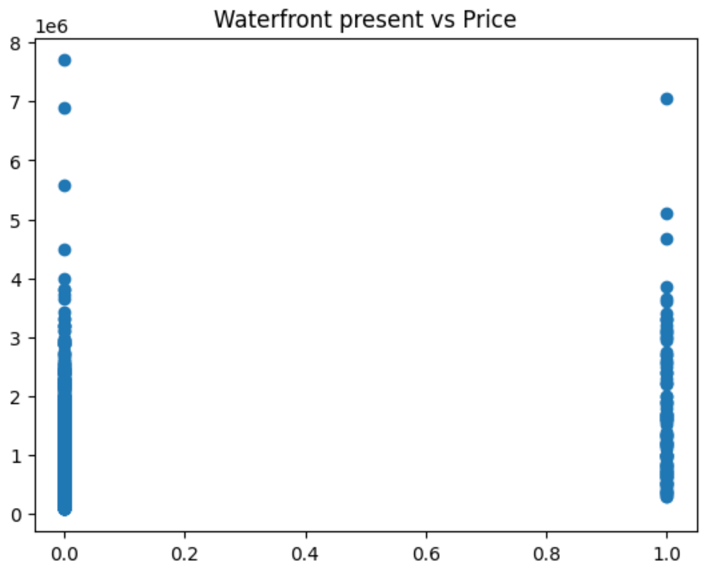
Multivariate Analysis

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

```
<seaborn.axisgrid.PairGrid at 0x790cc98e8280>
```

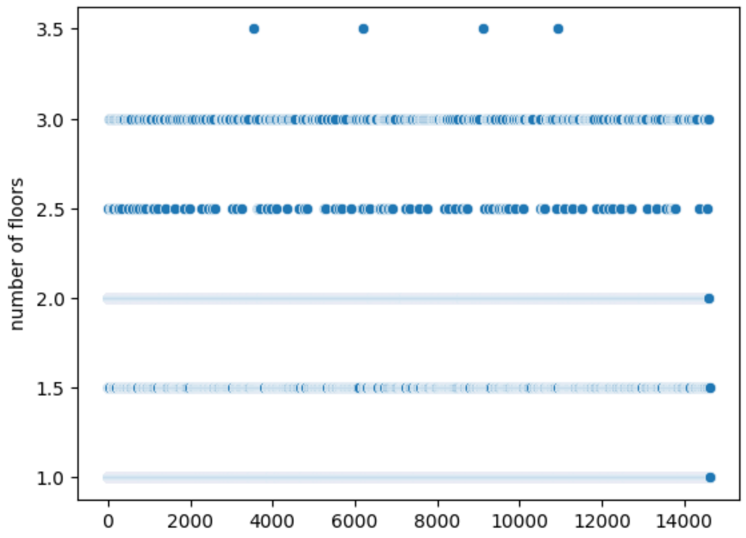


```
plt.scatter(df['waterfront present'],df['Price'])
plt.title("Waterfront present vs Price")
plt.grid(linestyle='-', linewidth=0.)
```



```
sns.scatterplot(df['number of floors'])
```

```
<Axes: ylabel='number of floors'>
```



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

```
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            0.938719             0.769934   
min    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   
max    6.762832e+09  42734.000000           33.000000             8.000000   

        living area      lot area  number of floors  waterfront present  \
count  14620.000000  1.462000e+04      14620.000000        14620.000000   
mean    2098.262996  1.509328e+04          1.502360            0.007661   
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   
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   
mean          0.233105                3.430506  ...   1970.926402   
std           0.766259                0.664151  ...     29.493625   
min           0.000000                1.000000  ...   1900.000000   
25%           0.000000                3.000000  ...   1951.000000   
50%           0.000000                3.000000  ...   1975.000000   
75%           0.000000                4.000000  ...   1997.000000   
max           4.000000                5.000000  ...   2015.000000   

       Renovation Year    Postal Code     Lattitude     Longitude  \
count     14620.000000   14620.000000  14620.000000  14620.000000   
mean         90.924008  122033.062244     52.792848   -114.404007   
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   
50%           0.000000  122032.000000     52.806400   -114.421000   
75%           0.000000  122048.000000     52.908900   -114.315000   
max        2015.000000  122072.000000     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   
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  
mean                   64.950958  5.389322e+05  
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  
```

```
print(df.count())
```

```
id                                       14620
Date                                     14620
number of bedrooms                       14620
number of bathrooms                      14620
living area                              14620
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
lot_area_renov                           14620
Number of schools nearby                 14620
Distance from the airport                14620
Price                                    14620
dtype: int64
```

```
print(df.corr())
```

```
                                             id      Date  number of bedrooms  \
id                                     1.000000  0.045966           -0.329034   
Date                                   0.045966  1.000000           -0.015663   
number of bedrooms                    -0.329034 -0.015663            1.000000   
number of bathrooms                   -0.516909 -0.026485            0.509784   
living area                           -0.648127 -0.021958            0.570526   
lot area                              -0.100269  0.004392            0.034416   
number of floors                      -0.312305 -0.010335            0.177294   
waterfront present                    -0.112937  0.012006           -0.006257   
number of views                       -0.293004 -0.004782            0.078665   
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   
Renovation Year                       -0.109155 -0.011636            0.016132   
Postal Code                            0.294709  0.018243           -0.044156   
Lattitude                             -0.479334 -0.023327           -0.013163   
Longitude                             -0.070841 -0.018231            0.135712   
living_area_renov                     -0.599900 -0.032495            0.389855   
lot_area_renov                        -0.089604 -0.000050            0.029400   
Number of schools nearby              -0.004821 -0.004071            0.003397   
Distance from the airport             -0.004542  0.011457           -0.006157   
Price                                 -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                                0.663054     0.761835   
Area of the house(excluding basement)             0.684391     0.875793   
Area of the basement                              0.287190     0.441491   
Built Year                                        0.498127     0.309602   
```

```
    Renovation Year                                  0.049669     0.059400
    Postal Code                                     -0.105546    -0.080303
    Lattitude                                        0.031156     0.054518
    Longitude                                        0.223904     0.240208
    living_area_renov                                0.570530     0.757571
    lot_area_renov                                   0.078627     0.180312
    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
    Date                                  0.004392         -0.010335
    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
    number of floors                     -0.004138          1.000000
```

```
print(df['Number of schools nearby'].value_counts())
```

```
    3    4973
    2    4853
    1    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    7
    Name: grade of the house, dtype: int64
```