Assignment

In [12]:
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

Loading The dataset

In [3]:
```
dt=pd.read.csv("C:\Users\PRAVEEN\Downloads\House Price India.csv")
dt
```

Out[3]:

	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	number of views	condition of the house	...
0	6762810145	42491	5	2.50	3650	9050	2.0	0	4	5	...
1	6762810635	42491	4	2.50	2920	4000	1.5	0	0	5	...
2	6762810998	42491	5	2.75	2910	9480	1.5	0	0	3	...
3	6762812605	42491	4	2.50	3310	42998	2.0	0	0	3	...
4	6762812919	42491	3	2.00	2710	4500	1.5	0	0	4	...
...	...	...	...	...	...	...	...	...	...	...	...
14615	6762830250	42734	2	1.50	1556	20000	1.0	0	0	4	...
14616	6762830339	42734	3	2.00	1680	7000	1.5	0	0	4	...
14617	6762830618	42734	2	1.00	1070	6120	1.0	0	0	3	...
14618	6762830709	42734	4	1.00	1030	6621	1.0	0	0	4	...
14619	6762831463	42734	3	1.00	900	4770	1.0	0	0	3	...

14620 rows × 23 columns

Univariate Analysis

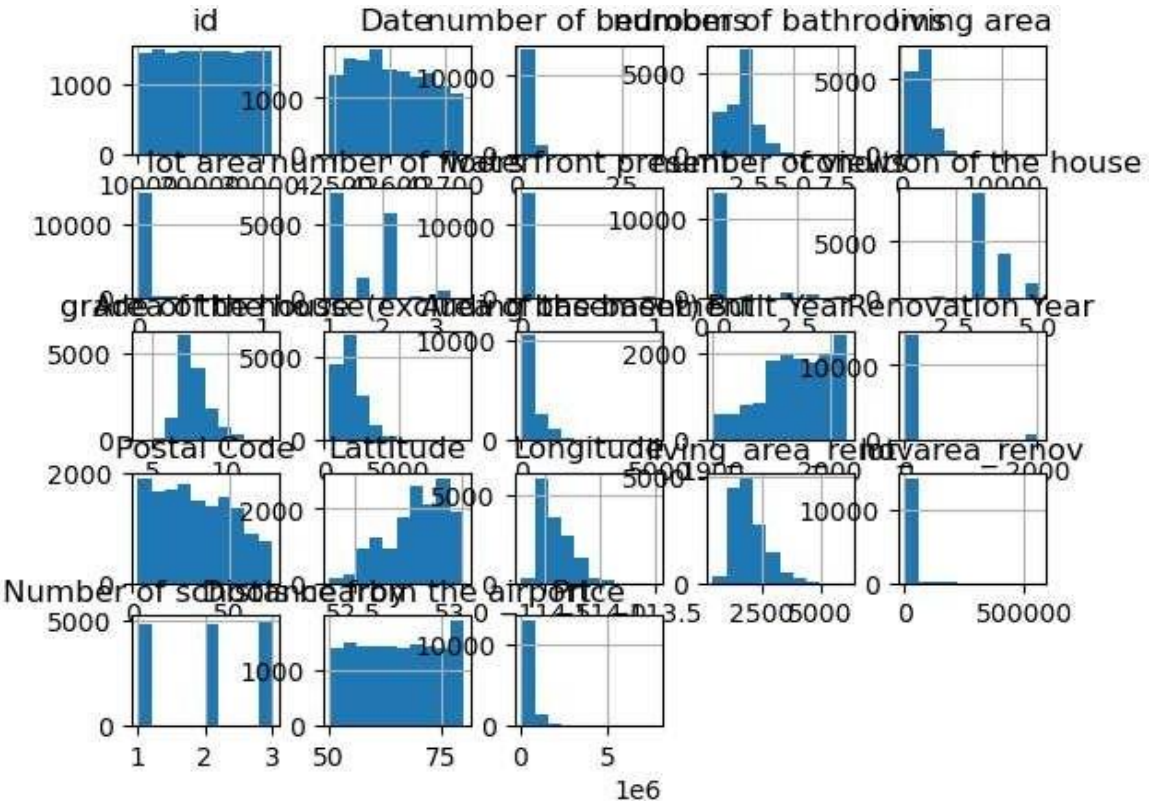
In [5]:
```
dt.describe()
```

Out[5]:

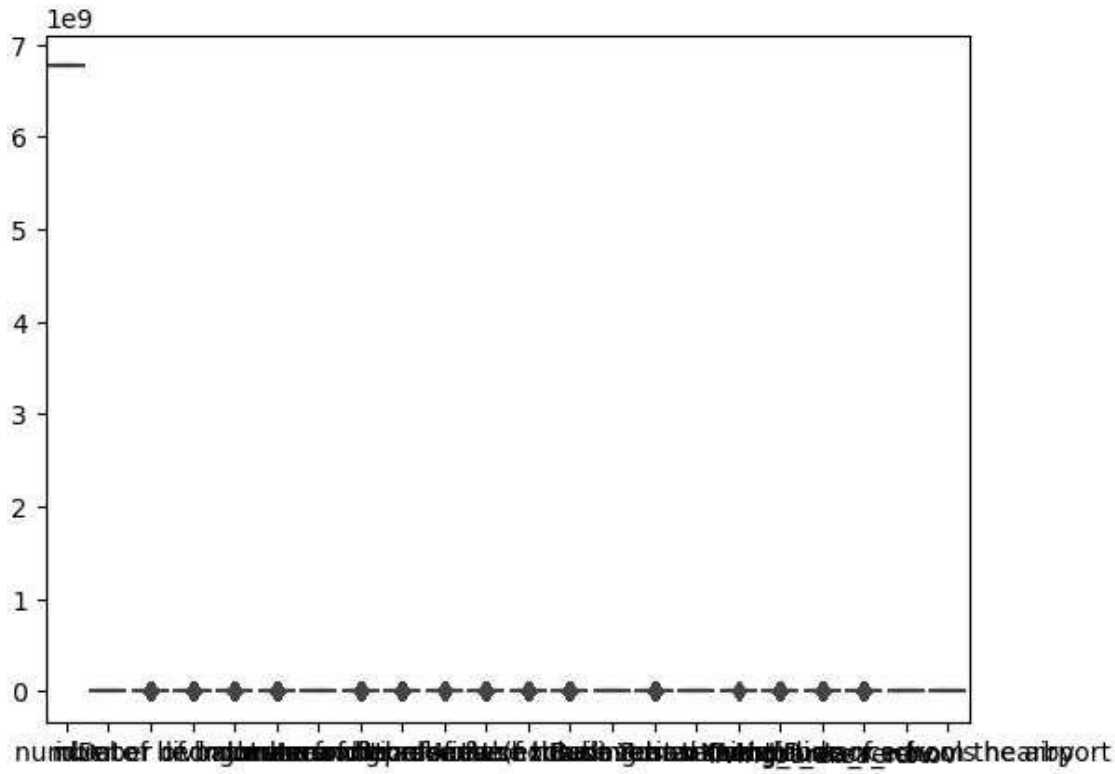
	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	1
count	1.462000e+04	14620.000000	14620.000000	14620.000000	14620.000000	1.462000e+04	14620.000000	
mean	6.762821e+09	42604.538646	3.379343	2.129583	2098.262996	1.509328e+04	1.502360	
std	6.237575e+03	67.347991	0.938719	0.769934	928.275721	3.791962e+04	0.540239	
min	6.762810e+09	42491.000000	1.000000	0.500000	370.000000	5.200000e+02	1.000000	
25%	6.762815e+09	42546.000000	3.000000	1.750000	1440.000000	5.010750e+03	1.000000	
50%	6.762821e+09	42600.000000	3.000000	2.250000	1930.000000	7.620000e+03	1.500000	
75%	6.762826e+09	42662.000000	4.000000	2.500000	2570.000000	1.080000e+04	2.000000	
max	6.762832e+09	42734.000000	33.000000	8.000000	13540.000000	1.074218e+06	3.500000	

8 rows × 23 columns

In [8]:
```
dt.hist()
plt.show()
```



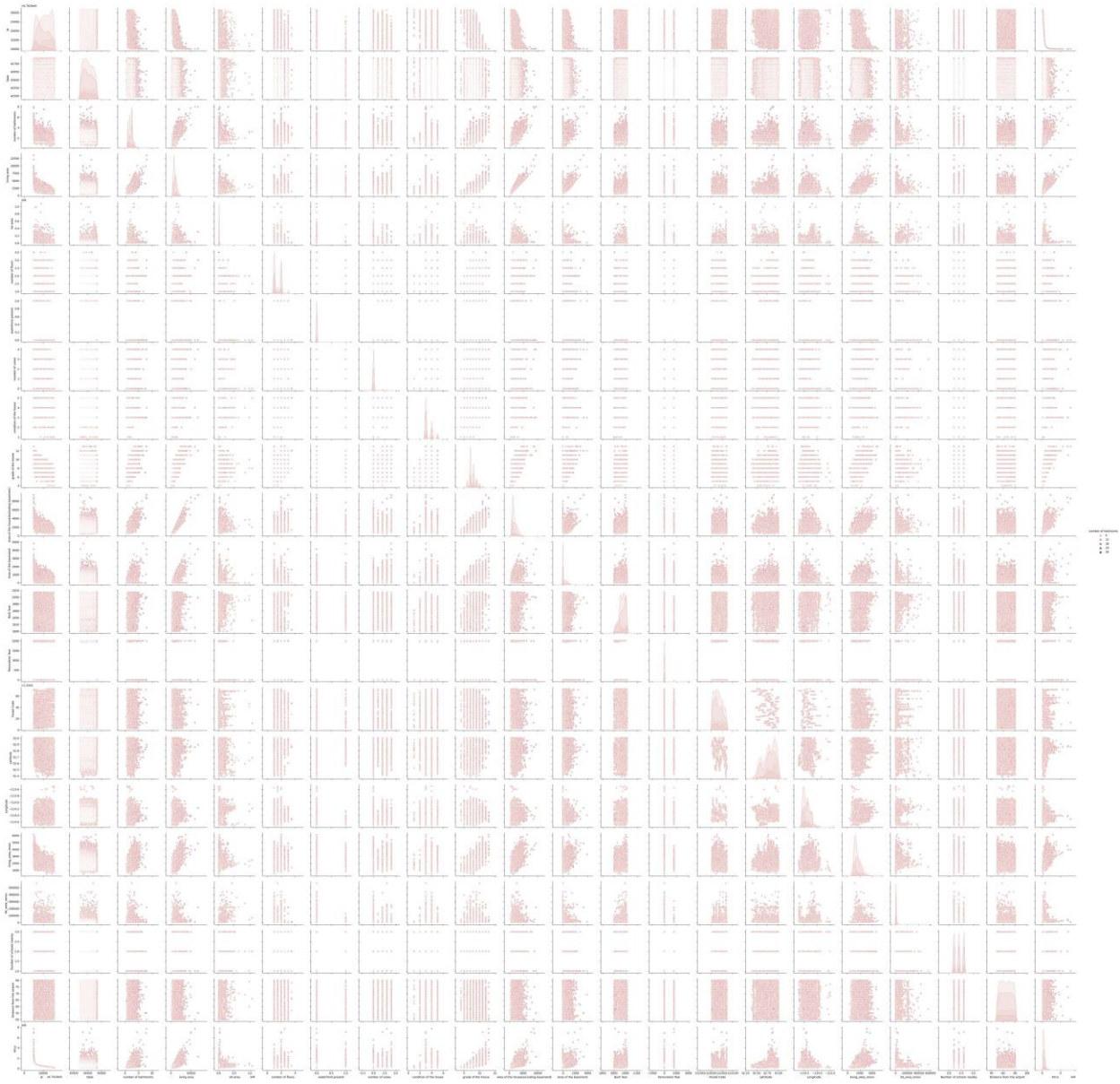
In [9]:
```
sns.boxplot(data=dt.iloc[:, :-1])
plt.show()
```



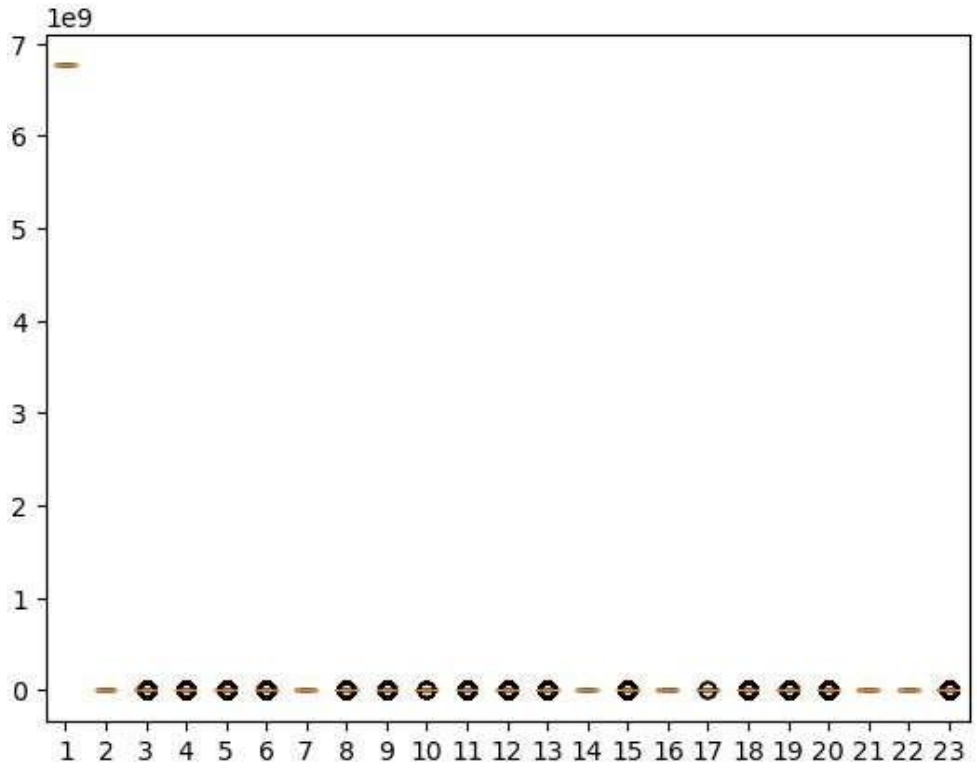
Bivariate Analysis

In [14]:
```
visual=sns.pairplot(dt,hue="number of bedrooms")
print(visual)
```

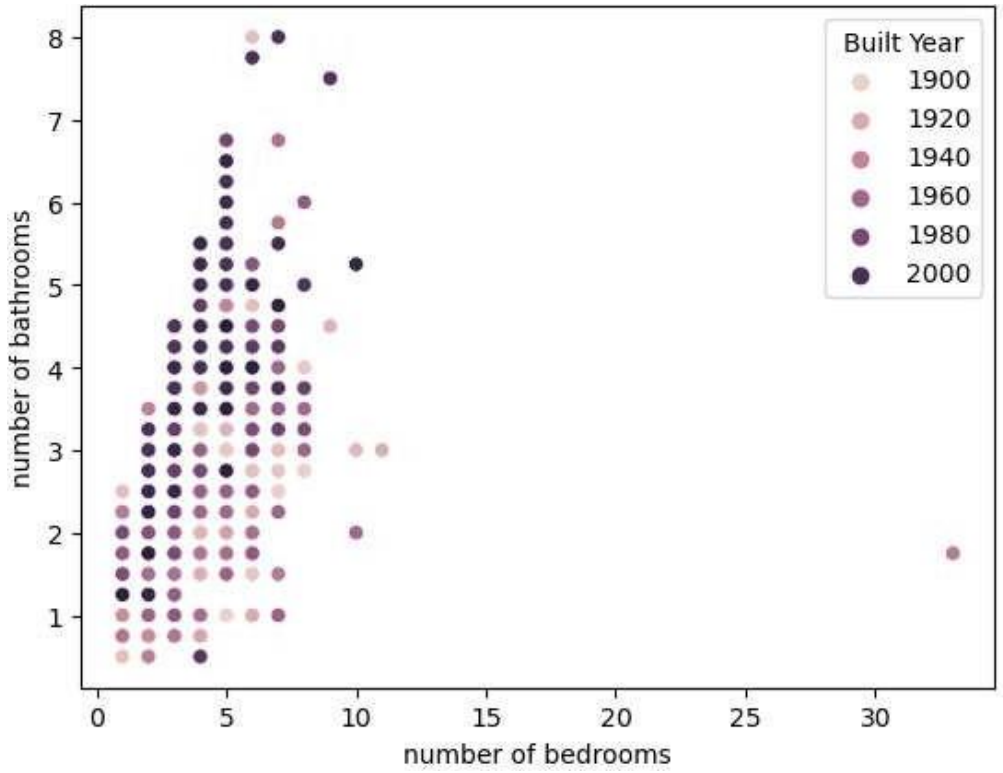
```
<seaborn.axisgrid.PairGrid object at 0x000001C3D46F8B80>
```



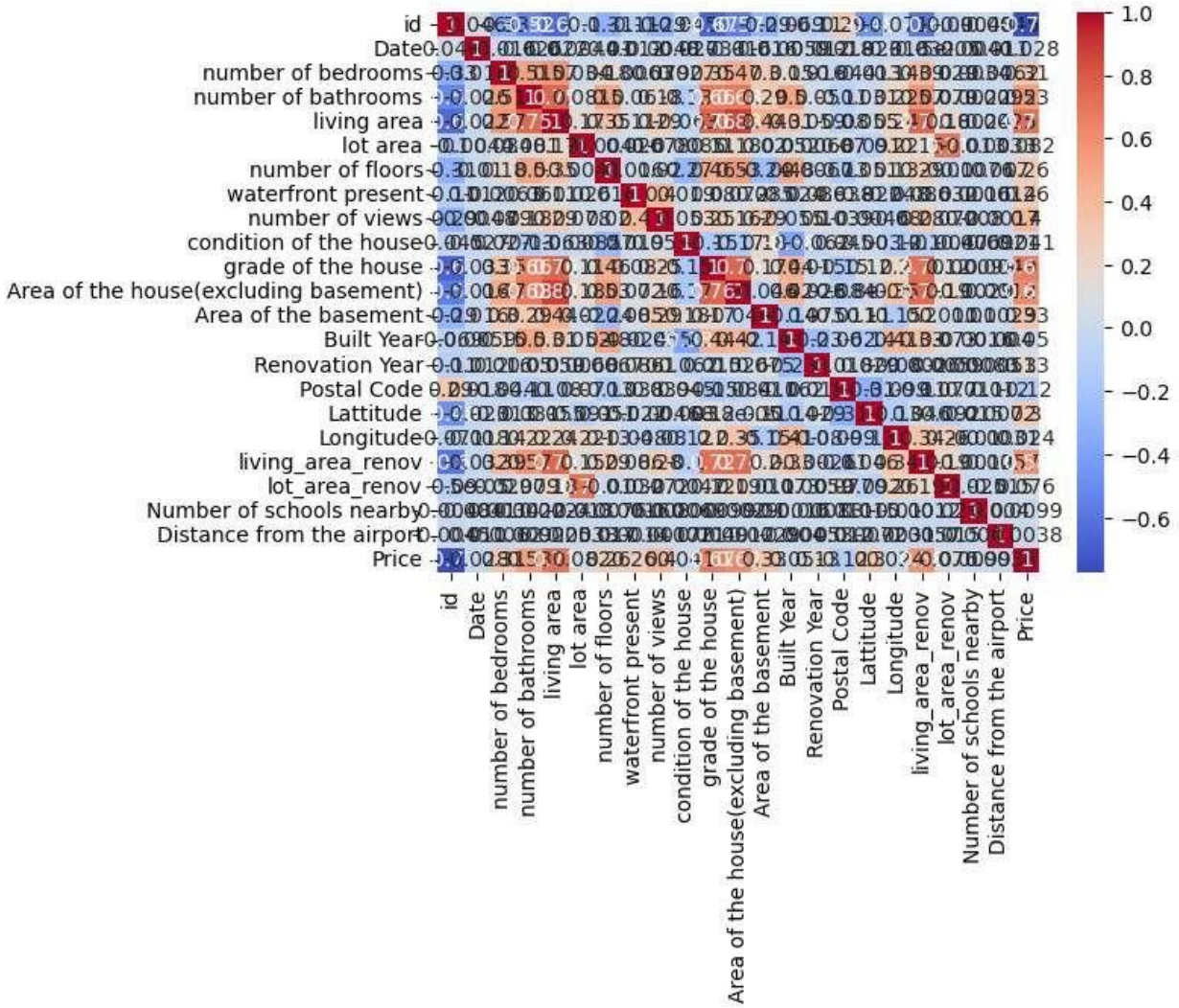
In [16]:
```
plt.boxplot(dt)
plt.show()
```



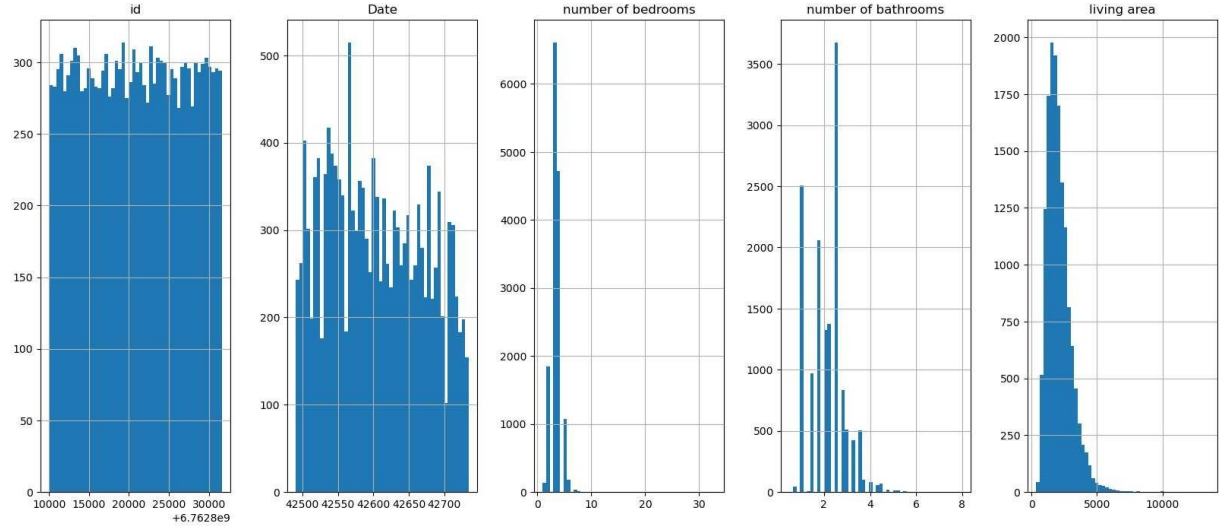
In [17]:
```
sns.scatterplot(x='number of bedrooms', y='number of bathrooms', data=dt, hue='Built Yea
plt.show()
```

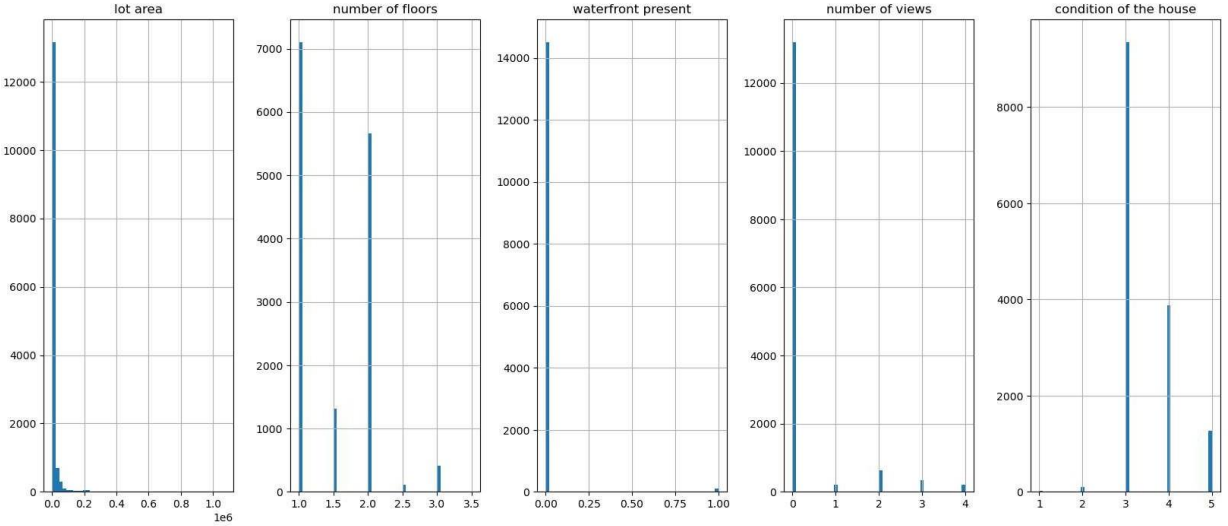


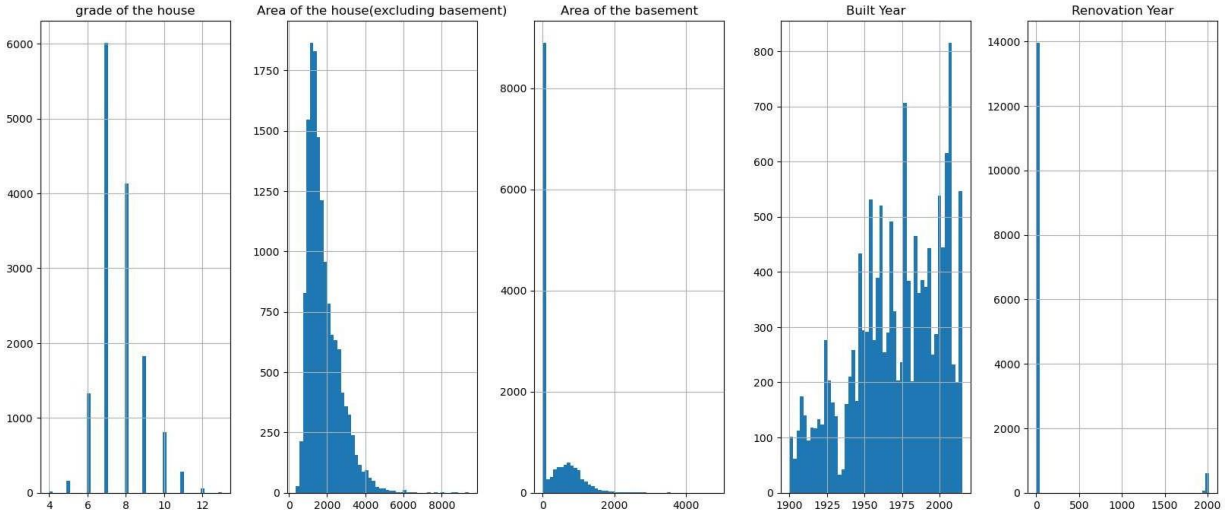
In [18]:
```
dt_corr = dt.corr()
sns.heatmap(dt_corr, annot=True, cmap='coolwarm')
plt.show()
```

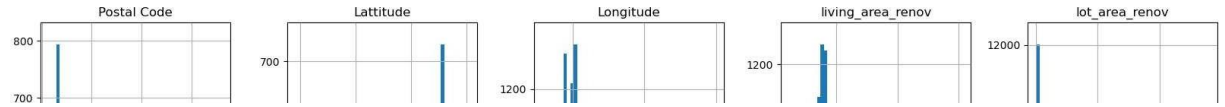


In [22]:
```
dt.hist(bins=50,figsize=(20,50));
```

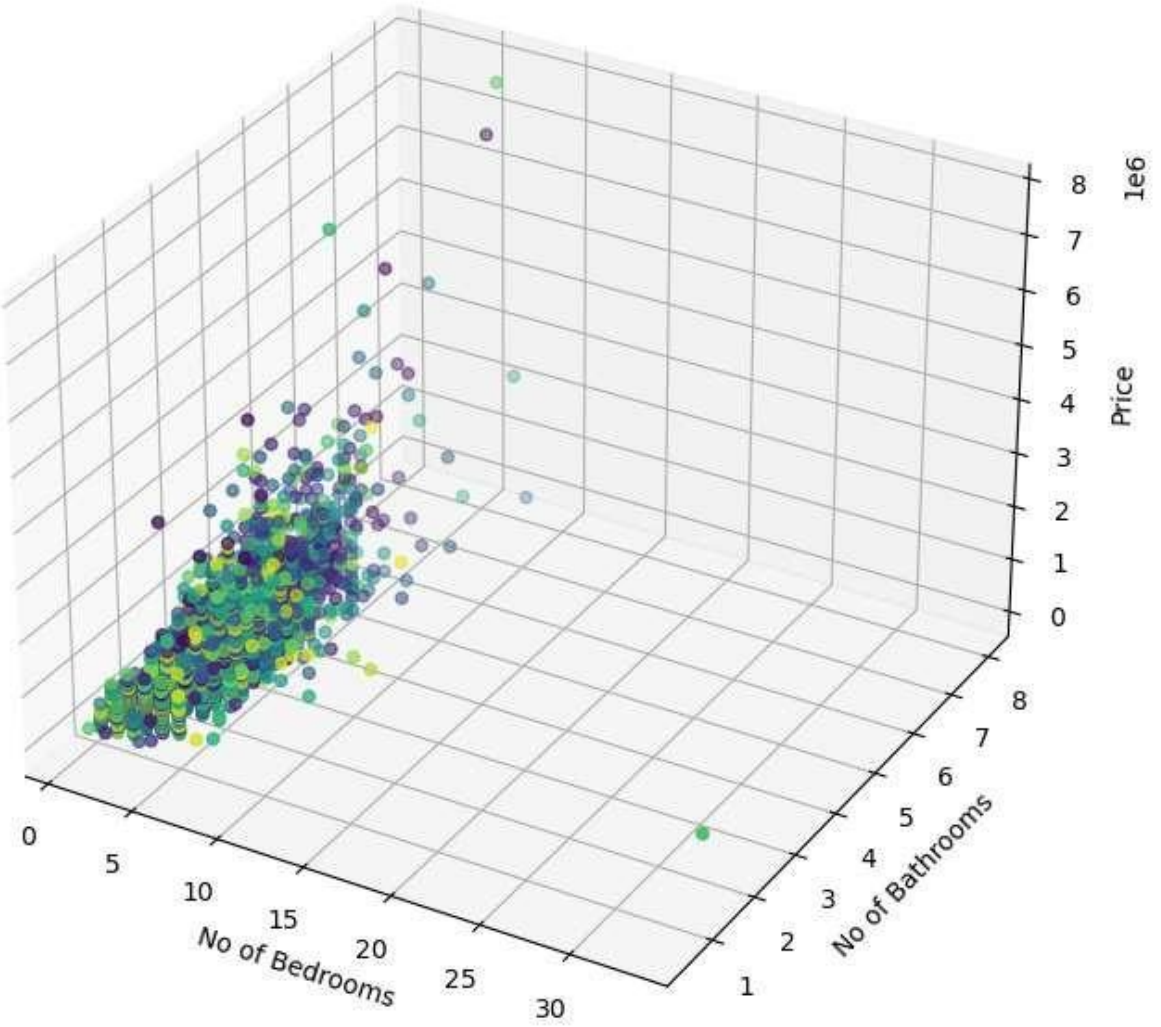

id
Date
number of bedrooms
number of bathrooms
living area


lot area
number of floors
waterfront present
number of views
condition of the house

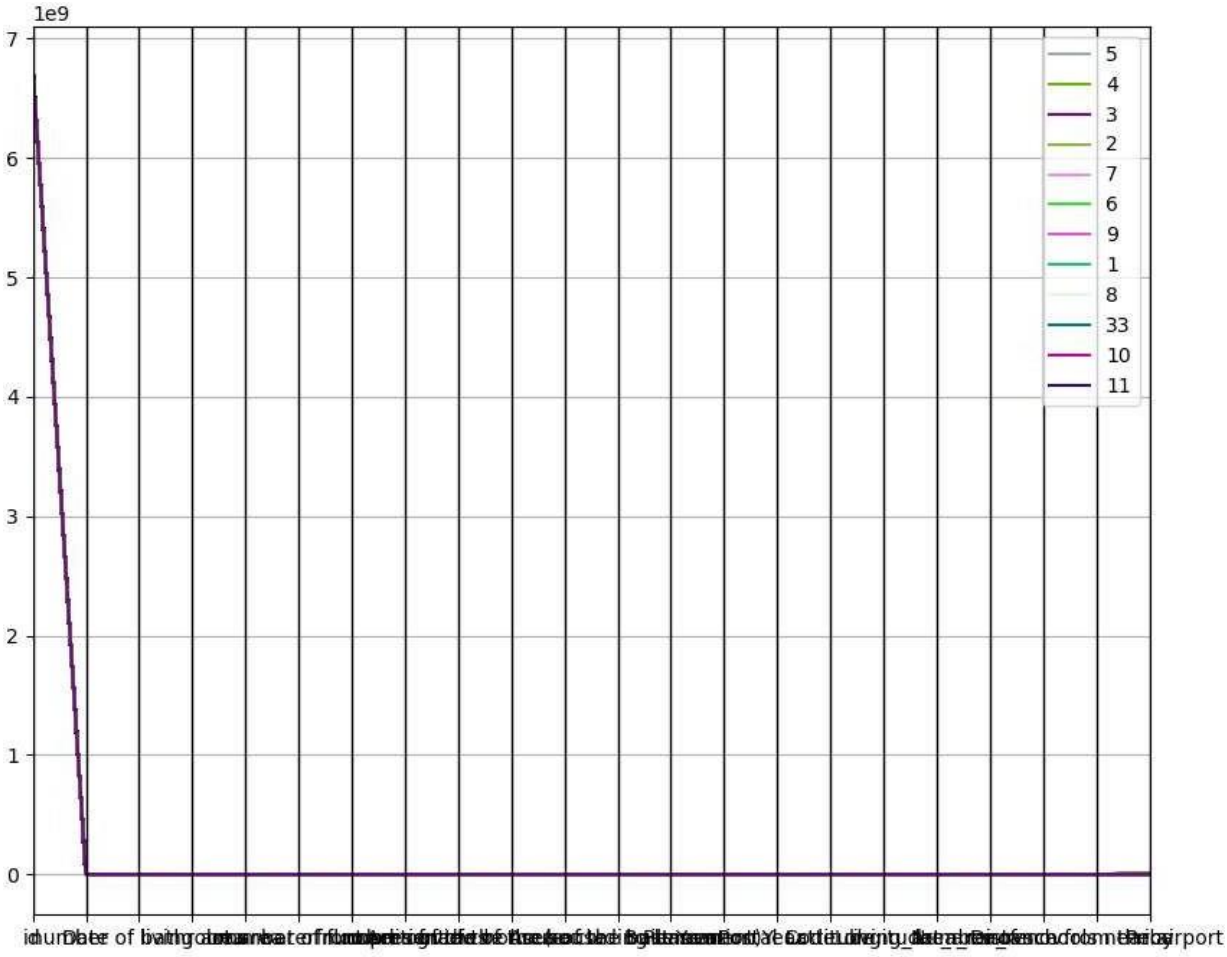

grade of the house
Area of the house(excluding basement)
Area of the basement
Built Year
Renovation Year


Postal Code
Lattitude
Longitude
living_area_renov
lot_area_renov

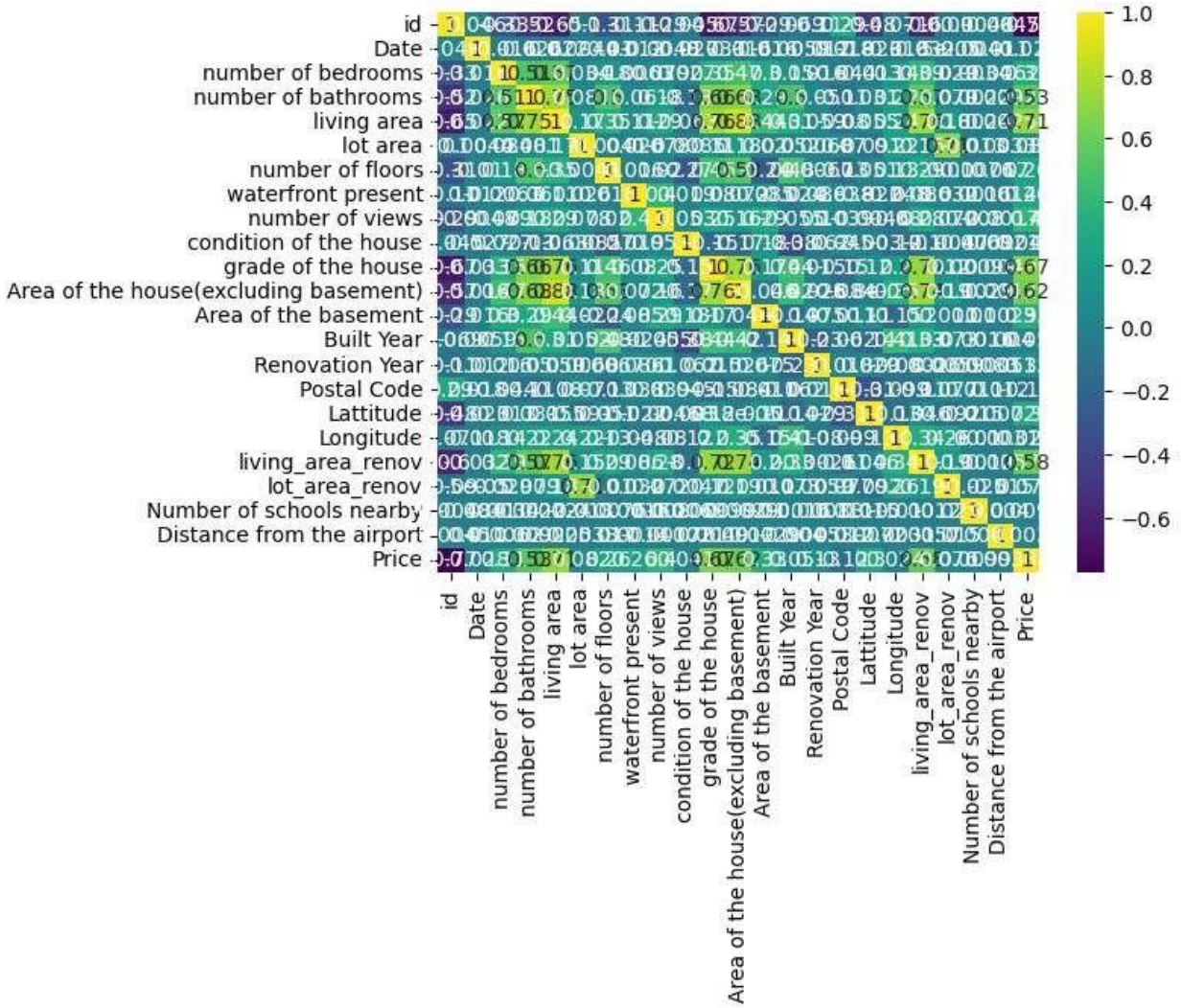
In [23]:
```
from mpl_toolkits.mplot3d import Axes3D

fig = plt.figure(figsize=(10,8))
ax = fig.add_subplot(111, projection='3d')
ax.scatter(dt['number of bedrooms'], dt['number of bathrooms'], dt['Price'], c=pd.factor
ax.set_xlabel('No of Bedrooms')
ax.set_ylabel('No of Bathrooms')
ax.set_zlabel('Price')
plt.show()
```



In [27]:
```
from pandas.plotting import parallel_coordinates
plt.figure(figsize=(10,8))
parallel_coordinates(dt, 'number of bedrooms')
plt.show()
```



In [28]:
```
dt_corr = dt.corr()
sns.heatmap(dt_corr, annot=True, cmap='viridis')
plt.show()
```



Descriptive Analysis

In [30]:
```
dt.describe()
```

Out[30]:

	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	1
count	1.462000e+04	14620.000000	14620.000000	14620.000000	14620.000000	1.462000e+04	14620.000000	
mean	6.762821e+09	42604.538646	3.379343	2.129583	2098.262996	1.509328e+04	1.502360	
std	6.237575e+03	67.347991	0.938719	0.769934	928.275721	3.791962e+04	0.540239	
min	6.762810e+09	42491.000000	1.000000	0.500000	370.000000	5.200000e+02	1.000000	
25%	6.762815e+09	42546.000000	3.000000	1.750000	1440.000000	5.010750e+03	1.000000	
50%	6.762821e+09	42600.000000	3.000000	2.250000	1930.000000	7.620000e+03	1.500000	
75%	6.762826e+09	42662.000000	4.000000	2.500000	2570.000000	1.080000e+04	2.000000	
max	6.762832e+09	42734.000000	33.000000	8.000000	13540.000000	1.074218e+06	3.500000	

8 rows × 23 columns

In [31]:
```
dt.skew()
```

Out[31]:
```
id                                    -0.000802
Date                                   0.143747
number of bedrooms                     2.663257
number of bathrooms                    0.556663

living area                            1.538337
lot area                              10.155206
number of floors                       0.586158
waterfront present                    11.294672
number of views                        3.409219
condition of the house                 1.018018
grade of the house                     0.777584
Area of the house(excluding basement)  1.436446
Area of the basement                   1.609744
Built Year                            -0.472049
Renovation Year                        4.359764
Postal Code                            0.227735
Lattitude                             -0.523831
Longitude                              0.873803
living_area_renov                      1.081959
lot_area_renov                         7.774206
Number of schools nearby              -0.022519
Distance from the airport              0.006114
Price                                  4.269298
dtype: float64
```

In [32]:
```
dt.kurtosis()
```

Out[32]:
```
id                                      -1.201221
Date                                    -1.130823
number of bedrooms                      69.240310
number of bathrooms                      1.588195
living area                              6.073617
lot area                               164.757273
number of floors                        -0.523576
waterfront present                     125.586791
number of views                         10.968839
condition of the house                   0.351359
grade of the house                       1.048022
Area of the house(excluding basement)    3.402258
Area of the basement                     3.139635
Built Year                              -0.673474
Renovation Year                         17.011306
Postal Code                             -1.058364
Lattitude                               -0.619219
Longitude                                0.950315
living_area_renov                        1.428944
lot_area_renov                          79.360403
Number of schools nearby                -1.502552
Distance from the airport               -1.203048
Price                                   40.321918
dtype: float64
```

In [36]:
```
dt.groupby("number of bedrooms").max()
```

Out[36]:

number of bedrooms	id	Date	number of bathrooms	living area	lot area	number of floors	waterfront present	number of views	condition of the house	grade of the house	..
1	6762831615	42733	2.50	3000	533610	3.0	1	4	5	9	..
2	6762831616	42734	3.50	6840	982278	3.5	1	4	5	12	..
3	6762831613	42734	4.50	6400	843309	3.5	1	4	5	13	..
4	6762831588	42734	5.50	7620	982998	3.0	1	4	5	13	..
5	6762831510	42734	6.75	10040	1074218	3.0	1	4	5	13	..
6	6762831191	42734	8.00	12050	248600	3.0	1	4	5	13	..
7	6762827935	42685	8.00	13540	307752	3.0	0	4	5	12	..
8	6762825321	42722	6.00	7710	20666	3.5	0	3	5	12	..
9	6762820817	42592	7.50	4050	6988	2.5	0	0	3	8	..
10	6762815290	42732	5.25	4590	11914	2.0	0	2	4	9	..
11	6762818607	42602	3.00	3000	4960	2.0	0	0	3	7	..
33	6762815473	42545	1.75	1620	6000	1.0	0	0	5	7	..

12 rows × 22 columns

In [37]:
```
dt.groupby("Built Year").max()
```

Out[37]:

Built Year	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	number of views	condition of the house	...
1900	6762831268	42726	6	4.00	4380	262231	2.5	0	3	5	...
1901	6762827764	42721	8	2.75	3440	7200	2.5	0	2	5	...
1902	6762828814	42686	6	3.00	4480	6000	2.5	0	0	5	...
1903	6762831286	42714	6	3.50	2800	46173	2.5	1	4	5	...
1904	6762830724	42733	8	4.00	7710	47044	3.5	0	1	5	...
...	...	...	...	...	...	...	...	...	...	...	...
2011	6762829355	42729	5	4.00	5635	77832	3.0	0	3	3	...
2012	6762831335	42726	6	4.50	4920	95950	3.0	0	3	3	...
2013	6762831396	42726	7	5.00	5310	64441	3.0	0	3	3	...
2014	6762831181	42734	6	5.00	5790	108865	3.0	1	4	3	...
2015	6762829970	42734	5	4.00	4460	9240	3.0	0	2	3	...

116 rows × 22 columns

In [38]:
```
dt.groupby("Built Year").mean()
```

Out[38]:

Built Year	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	r o
1900	6.762819e+09	42598.868852	3.311475	1.758197	1784.918033	12321.196721	1.483607	0.000000	0.
1901	6.762819e+09	42592.761905	3.571429	1.535714	1825.476190	4377.238095	1.619048	0.000000	0.
1902	6.762817e+09	42574.650000	3.700000	2.087500	2075.500000	4342.900000	1.825000	0.000000	0.
1903	6.762821e+09	42609.363636	3.212121	1.613636	1596.848485	6999.424242	1.484848	0.030303	0.
1904	6.762820e+09	42597.250000	3.000000	1.571429	1740.464286	6149.535714	1.357143	0.000000	0.
...	...	...	...	...	...	...	...	...	
2011	6.762820e+09	42604.408163	3.469388	2.660714	2342.326531	6385.693878	2.000000	0.000000	0.
2012	6.762821e+09	42601.970874	3.543689	2.645631	2395.242718	6329.757282	1.980583	0.000000	0.
2013	6.762818e+09	42592.592308	3.923077	2.869231	2691.600000	7792.353846	2.000000	0.000000	0.
2014	6.762818e+09	42617.628713	3.745050	2.729579	2634.391089	5566.292079	2.123762	0.004950	0.
2015	6.762821e+09	42598.000000	3.250000	2.416667	2195.833333	3899.333333	2.291667	0.000000	0.

116 rows × 22 columns

In [39]:
```
dt["Built Year"].value_counts()
```

Out[39]:
```
2014    404
2005    319
2006    300
2004    296
2003    295
       ...
1902     20
1935     18
1933     17
1934     15
2015     12
Name: Built Year, Length: 116, dtype: int64
```

In [42]:
```
dt.groupby("number of bedrooms").agg({'Built Year':'max'})
```

Out[42]:

number of bedrooms	Built Year
1	2015
2	2015
3	2015
4	2015
5	2015
6	2014
7	2013
8	1997
9	1996
10	2008
11	1918
33	1947

In [44]:
```
dt.groupby("number of bedrooms").agg({'Built Year':'min'})
```

Out[44]:

number of bedrooms	Built Year
1	1900
2	1900
3	1900
4	1900
5	1900
6	1900
7	1901
8	1901
9	1915
10	1913
11	1918
33	1947

Handling Missing Values

In [45]:
```
dt.duplicated()
```

Out[45]:
```
0        False
1        False
2        False
3        False
4        False
         ...
14615    False
14616    False
14617    False
14618    False
Length: 14620, dtype: bool
```

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

Out[46]:

	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	F
0	False	False	False	False	False	False	False	False	False	False	...	False	
1	False	False	False	False	False	False	False	False	False	False	...	False	
2	False	False	False	False	False	False	False	False	False	False	...	False	
3	False	False	False	False	False	False	False	False	False	False	...	False	
4	False	False	False	False	False	False	False	False	False	False	...	False	
...	...	...	...	...	...	...	...	...	...	...	...	...	
14615	False	False	False	False	False	False	False	False	False	False	...	False	
14616	False	False	False	False	False	False	False	False	False	False	...	False	
14617	False	False	False	False	False	False	False	False	False	False	...	False	
14618	False	False	False	False	False	False	False	False	False	False	...	False	
14619	False	False	False	False	False	False	False	False	False	False	...	False	

14620 rows × 23 columns

In [47]:
```
dt.dropna()
```

Out[47]:

	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	number of views	condition of the house	...
0	6762810145	42491	5	2.50	3650	9050	2.0	0	4	5	...
1	6762810635	42491	4	2.50	2920	4000	1.5	0	0	5	...
2	6762810998	42491	5	2.75	2910	9480	1.5	0	0	3	...
3	6762812605	42491	4	2.50	3310	42998	2.0	0	0	3	...
4	6762812919	42491	3	2.00	2710	4500	1.5	0	0	4	...
...	...	...	...	...	...	...	...	...	...	...	...
14615	6762830250	42734	2	1.50	1556	20000	1.0	0	0	4	...
14616	6762830339	42734	3	2.00	1680	7000	1.5	0	0	4	...
14617	6762830618	42734	2	1.00	1070	6120	1.0	0	0	3	...
14618	6762830709	42734	4	1.00	1030	6621	1.0	0	0	4	...
14619	6762831463	42734	3	1.00	900	4770	1.0	0	0	3	...

14620 rows × 23 columns