```python
# Sukanth K - 21BRS1617

#Tasks:-
# 1. Download the dataset:
# 2. Load the dataset.

#importing libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

#load the House Price India dataset
data = pd.read_csv('House_Price_India.csv')

#display the first 5 rows of the dataset
print(data.head())
```

```
           id   Date  number of bedrooms  number of bathrooms  living 
area  \
0  6762810145  42491                   5                 2.50          
3650   
1  6762810635  42491                   4                 2.50          
2920   
2  6762810998  42491                   5                 2.75          
2910   
3  6762812605  42491                   4                 2.50          
3310   
4  6762812919  42491                   3                 2.00          
2710   

   lot area  number of floors  waterfront present  number of views  \
0      9050               2.0                   0                4   
1      4000               1.5                   0                0   
2      9480               1.5                   0                0   
3     42998               2.0                   0                0   
4      4500               1.5                   0                0   

   condition of the house  ...  Built Year  Renovation Year  Postal 
Code  \
0                       5  ...        1921                0       
122003   
1                       5  ...        1909                0       
122004   
2                       3  ...        1939                0       
122004   
3                       3  ...        2001                0       
122005   
4                       4  ...        1929                0       
122006   
```

```
   Lattitude  Longitude  living_area_renov  lot_area_renov  \
0    52.8645   -114.557               2880            5400   
1    52.8878   -114.470               2470            4000   
2    52.8852   -114.468               2940            6600   
3    52.9532   -114.321               3350           42847   
4    52.9047   -114.485               2060            4500   

   Number of schools nearby  Distance from the airport    Price  
0                         2                         58  2380000  
1                         2                         51  1400000  
2                         1                         53  1200000  
3                         3                         76   838000  
4                         1                         51   805000  

[5 rows x 23 columns]
```

```
#checking for null values
print(data.isnull().sum())

#checking for duplicate rows
print(data.duplicated().sum())
#checking for duplicate columns
print(data.T.duplicated().sum())

#check for constant columns
print(data.columns[df.nunique()==1])
#check for constant rows
print(data[data.nunique(axis=1)==1])


#shape of the dataset
print(data.shape)
#columns of the dataset
print(data.columns)
#datatypes of the columns
print(data.dtypes)
#summary statistics of the dataset
print(data.describe())
```

```
id                                       0
Date                                     0
number of bedrooms                       0
number of bathrooms                      0
living area                              0
lot area                                 0
number of floors                         0
waterfront present                       0
number of views                          0
condition of the house                   0
```

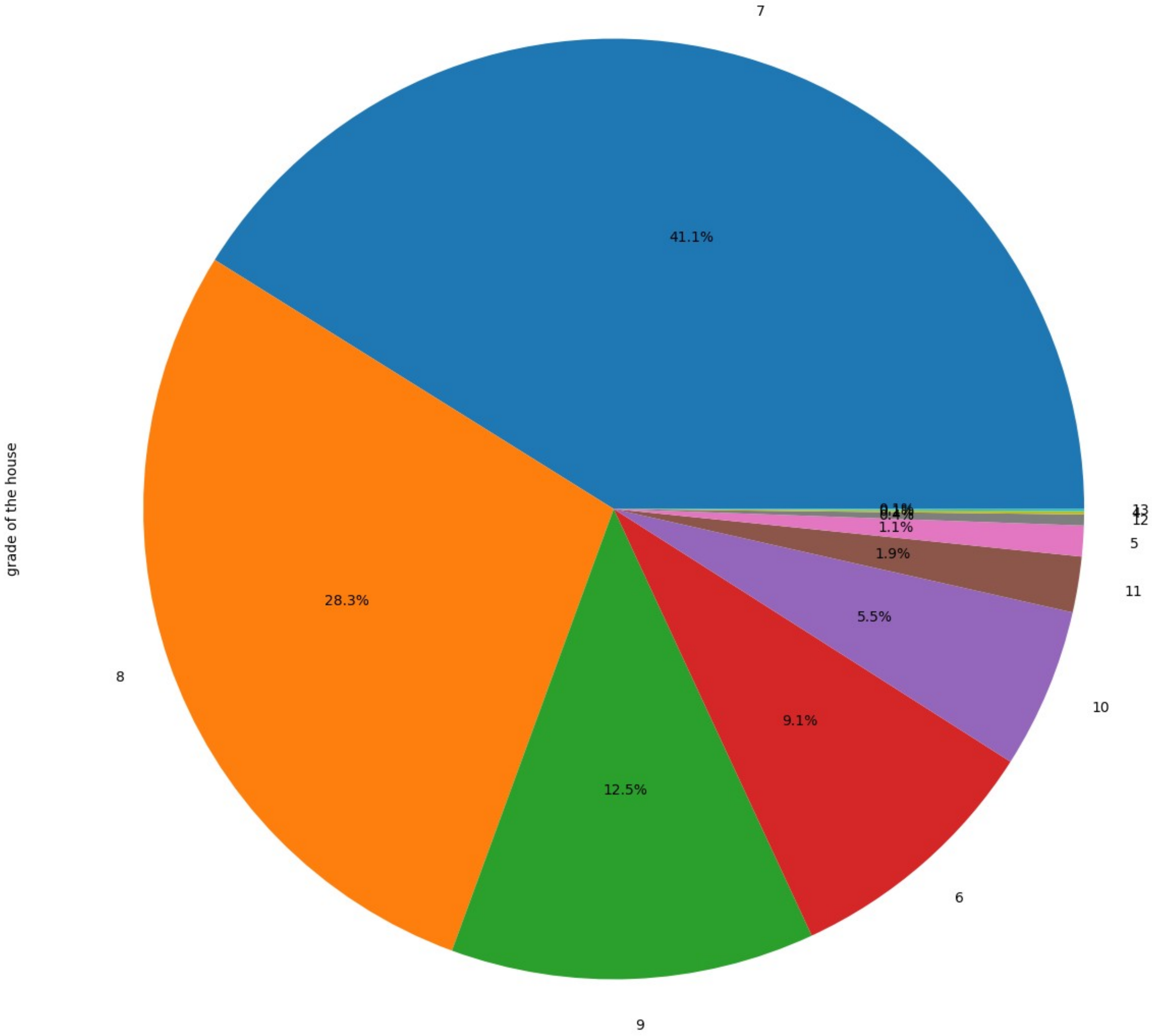
```
grade of the house                       0
Area of the house(excluding basement)    0
Area of the basement                     0
Built Year                               0
Renovation Year                          0
Postal Code                              0
Lattitude                                0
Longitude                                0
living_area_renov                        0
lot_area_renov                           0
Number of schools nearby                 0
Distance from the airport                0
Price                                    0
dtype: int64
0
0
Index([], dtype='object')
Empty DataFrame
Columns: [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]
Index: []

[0 rows x 23 columns]
(14620, 23)
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')
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
                 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
max                    80.000000  7.700000e+06

[8 rows x 23 columns]
```

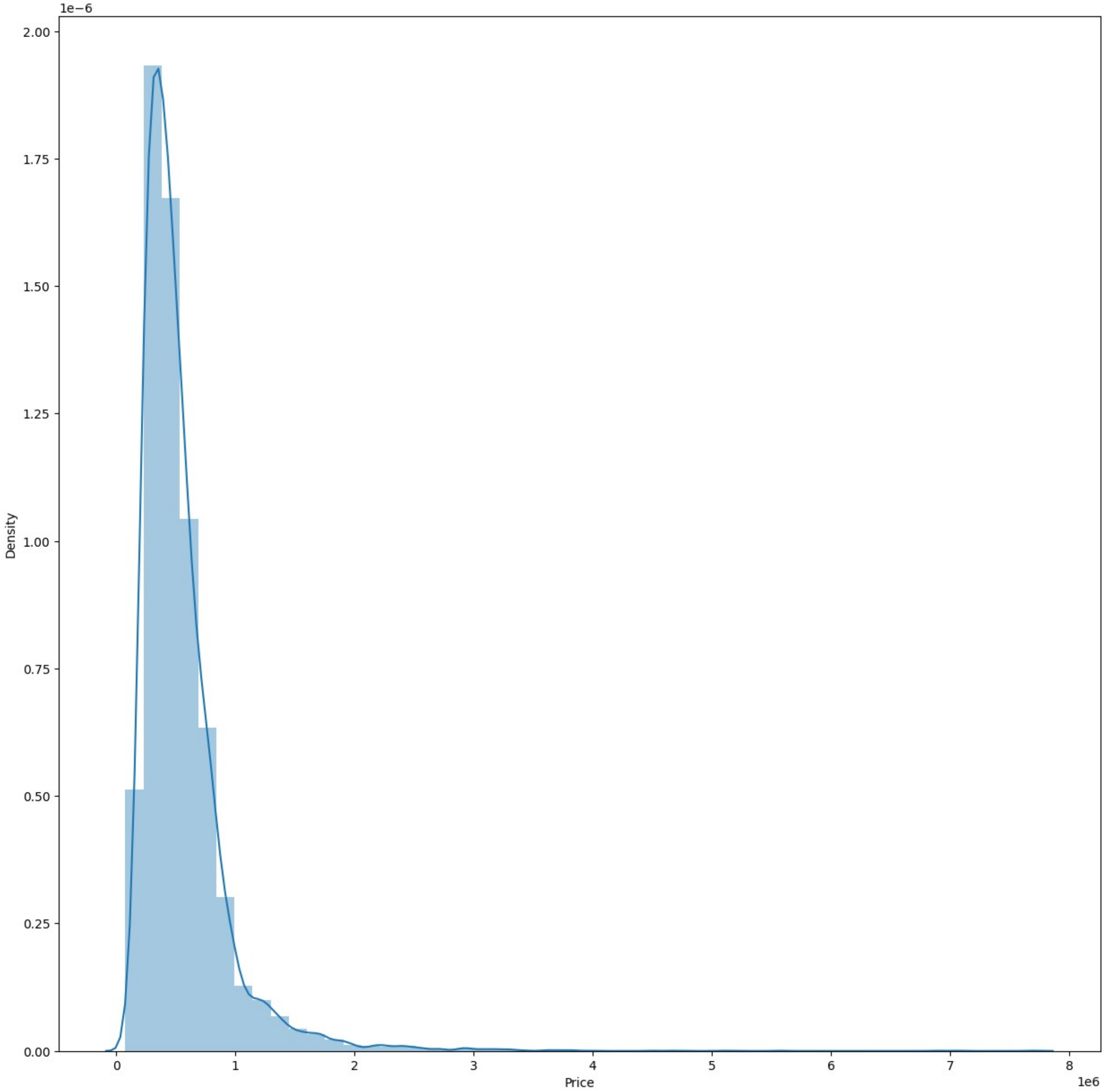
```
#1. Univariate analysis
#resizing the plot size paramaters
plt.rcParams['figure.figsize']=(15,15)
```

```
#display the pie chart of the target variable --  grade of the house
data['grade of the house'].value_counts().plot.pie(autopct='%1.1f%%')
plt.show()

#display the distribution plot of the target variable
sns.distplot(data['Price'])
```

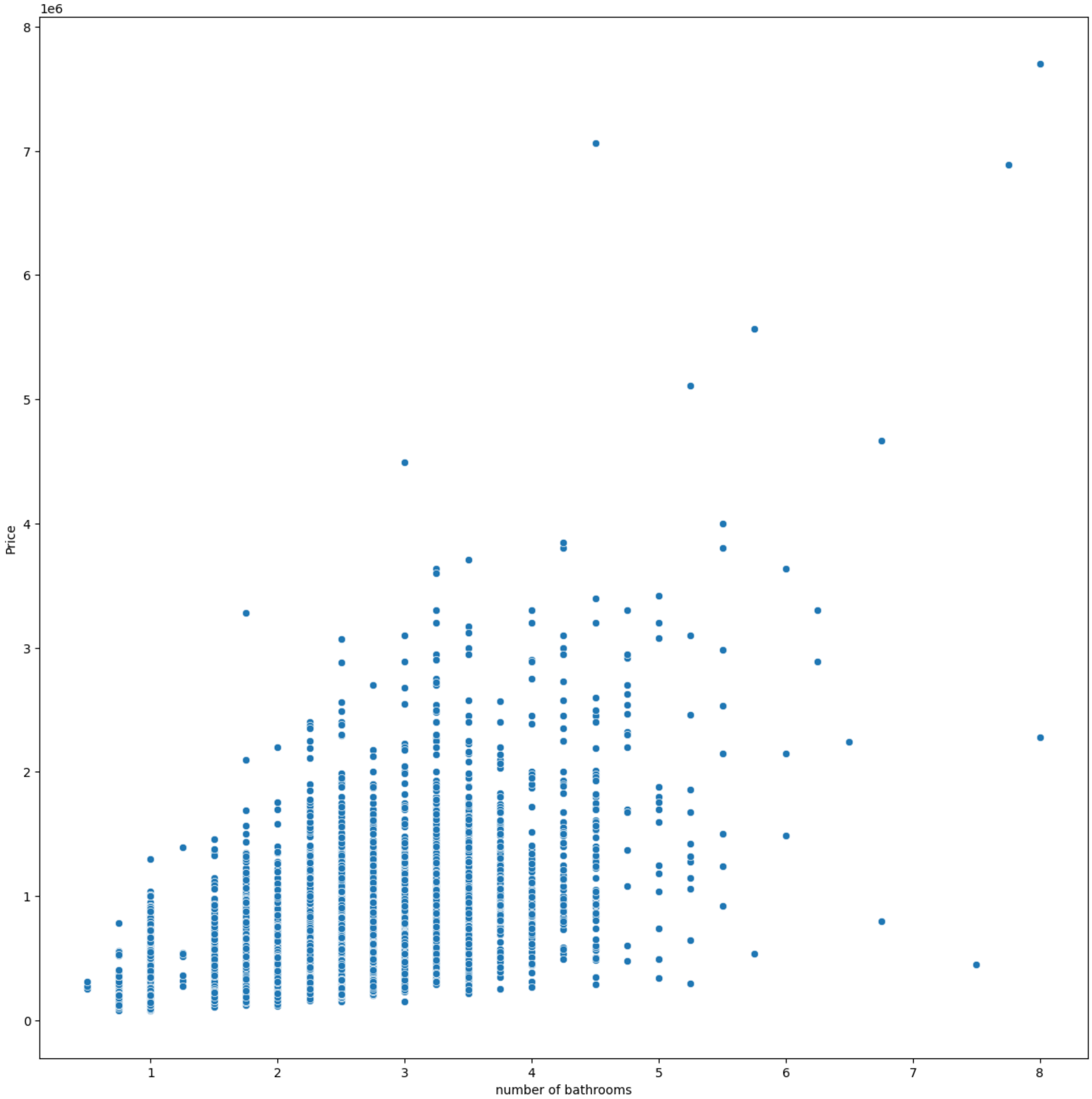


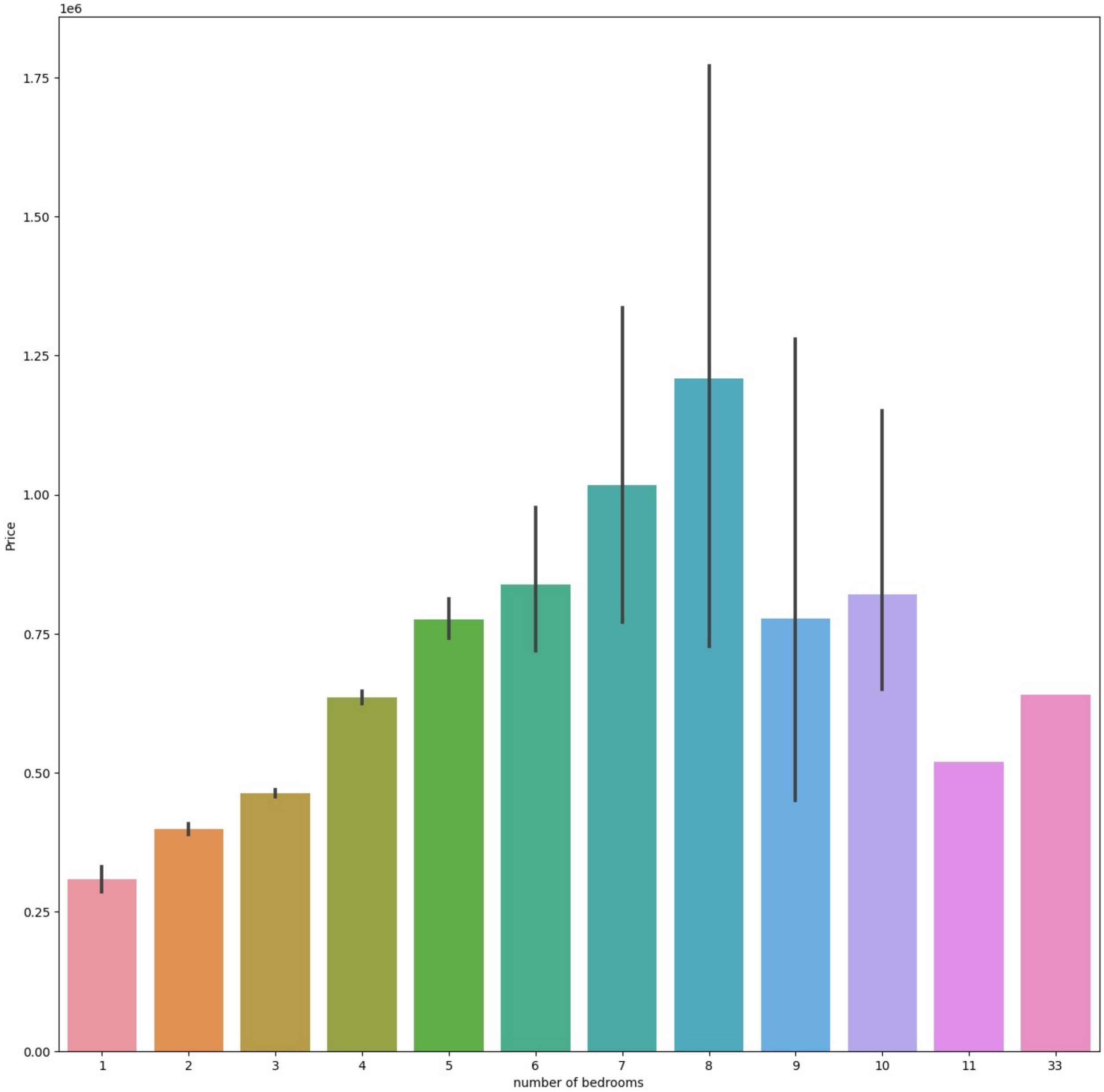
```
<ipython-input-8-4aeb0ec3a4b9>:10: UserWarning:

`distplot` is a deprecated function and will be removed in seaborn
v0.14.0.
```

```
Please adapt your code to use either `displot` (a figure-level
function with
similar flexibility) or `histplot` (an axes-level function for
histograms).

For a guide to updating your code to use the new functions, please see
https://gist.github.com/mwaskom/de44147ed2974457ad6372750bbe5751

  sns.distplot(data['Price'])

<Axes: xlabel='Price', ylabel='Density'>
```



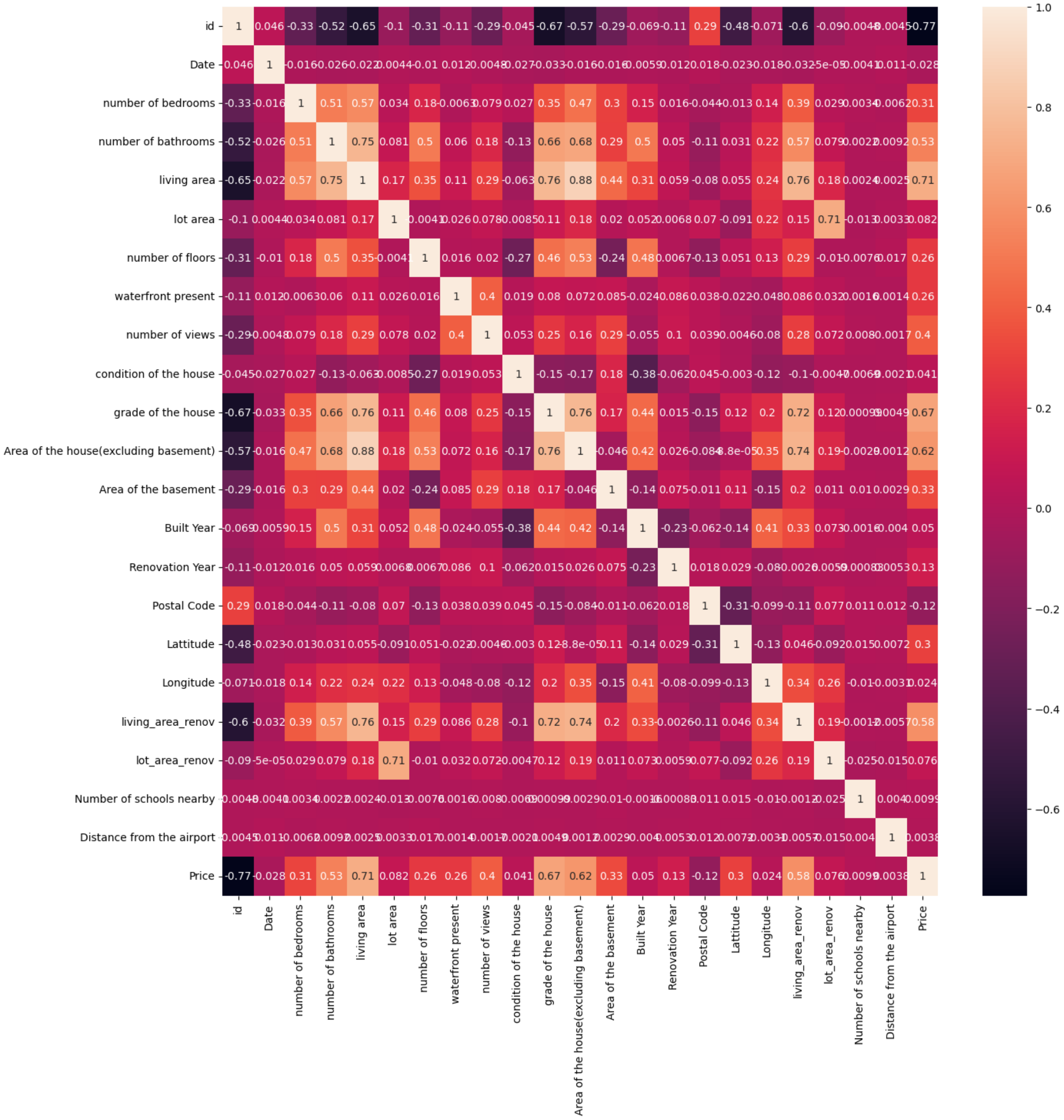
```python
#2. Bivariate analysis
#display the scatterplot of the independent variables with the target
variable - target var is Price and the independent var number of
bathrooms
sns.scatterplot(x='number of bathrooms',y='Price',data=data)
plt.show()

#do another bivariate analysis
#display the barplot of the independent variables with the target
variable - here the target var is Price and the independent var number
of bedrooms
sns.barplot(x='number of bedrooms',y='Price',data=data)
plt.show()
```

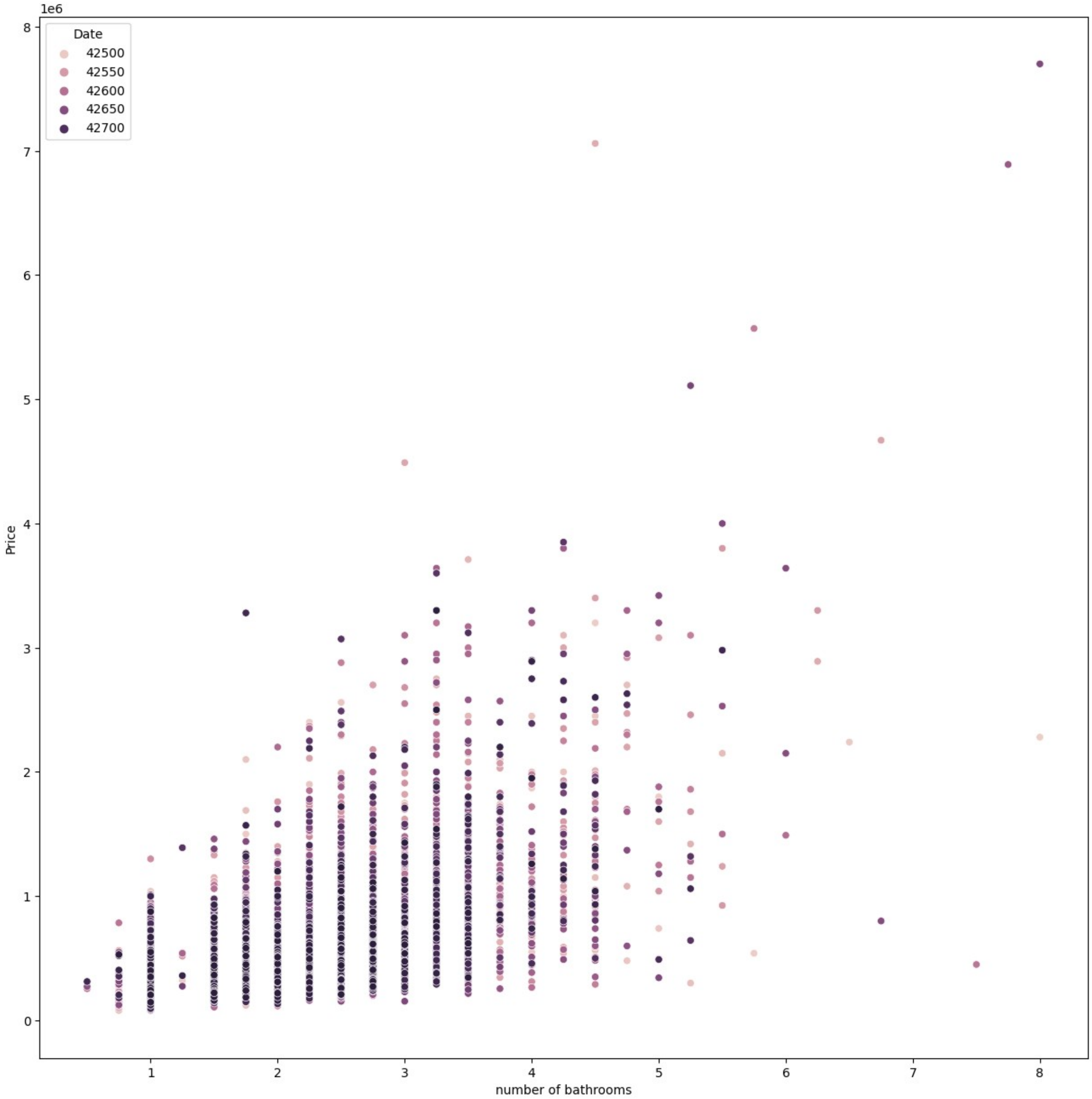

1e6
8
7
6
5
4
3
2
1
0
Price
1
2
3
4
5
6
7
8
number of bathrooms

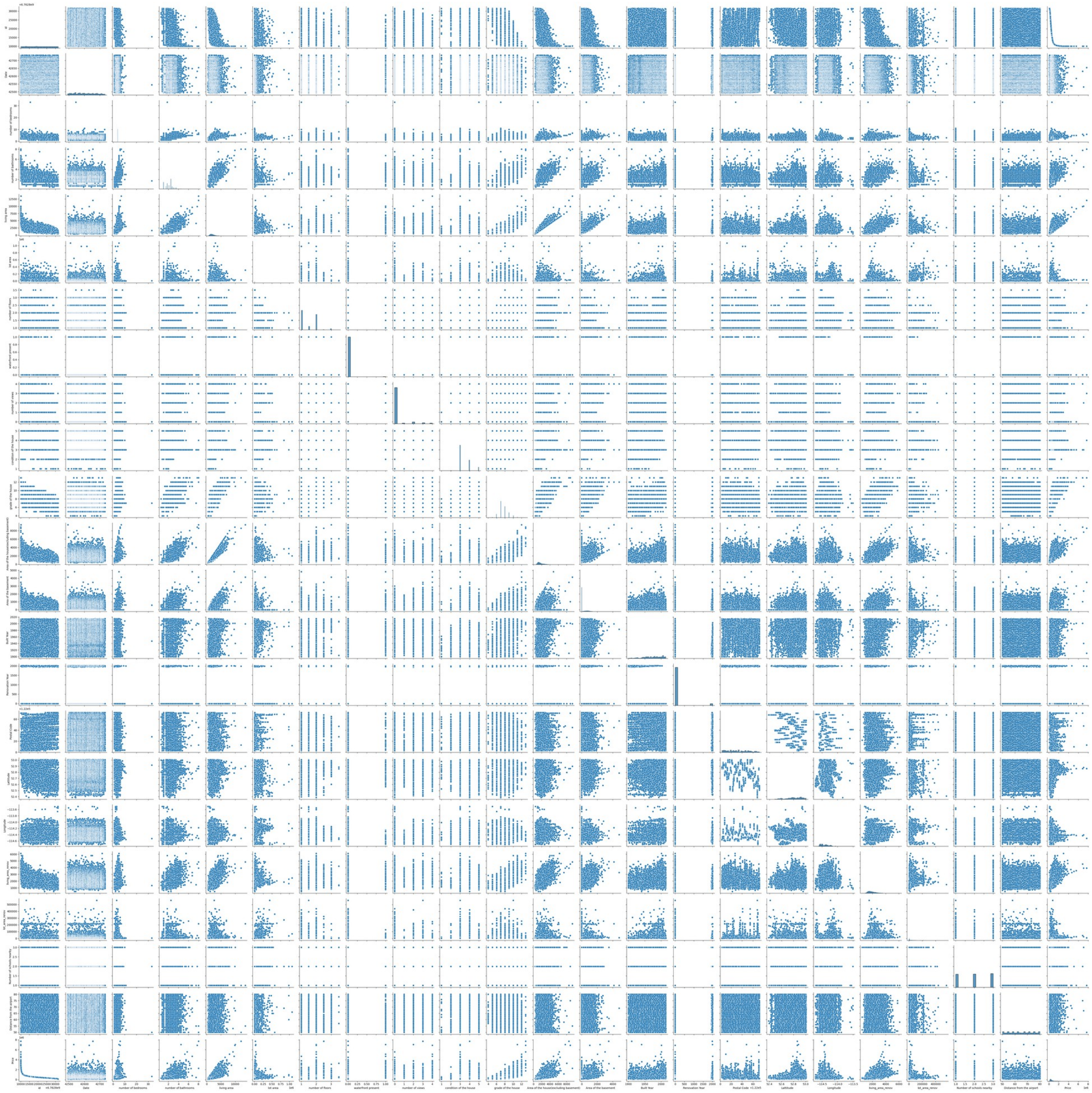


```
# 3. Multivariate Analysis

#Display the heatmap of the correlation matrix
sns.heatmap(df.corr(),annot=True)
plt.show()

#Perform another multivariate analysis on dataset

#display the scatterplot of the independent variables with the target
variable - Date column as the independent variable
sns.scatterplot(x='number of
bathrooms',y='Price',hue='Date',data=data)
```

```
#perform a pair plot on the dataset
sns.pairplot(data)
plt.show()
```




1e6
Date
42500
42550
42600
42650
42700
Price
0
1
2
3
4
5
6
7
8
number of bathrooms
1
2
3
4
5
6
7
8


id
+6.7628e9
Date
number of bedrooms
number of bathrooms
living area
lot area
1e6
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 +1.22e5
Lattitude
Longitude
living_area_renov
lot_area_renov
Number of schools nearby
Distance from the airport
Price
1e6