assignment-2-21bkt0006

September 5, 2023

TASK 1 and TASK 2

[7]:

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

```
<IPython.core.display.HTML object>
```

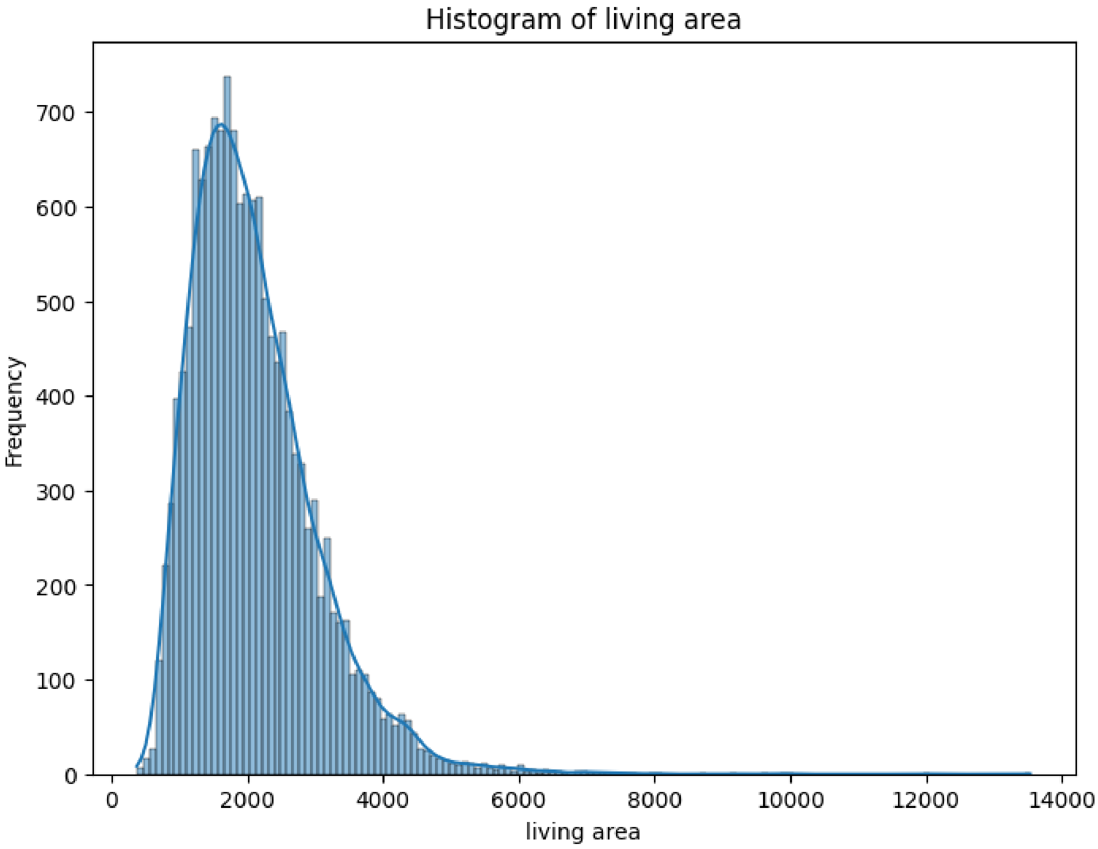
```
Saving House Price India 2.csv to House Price India 2 (1).csv
```

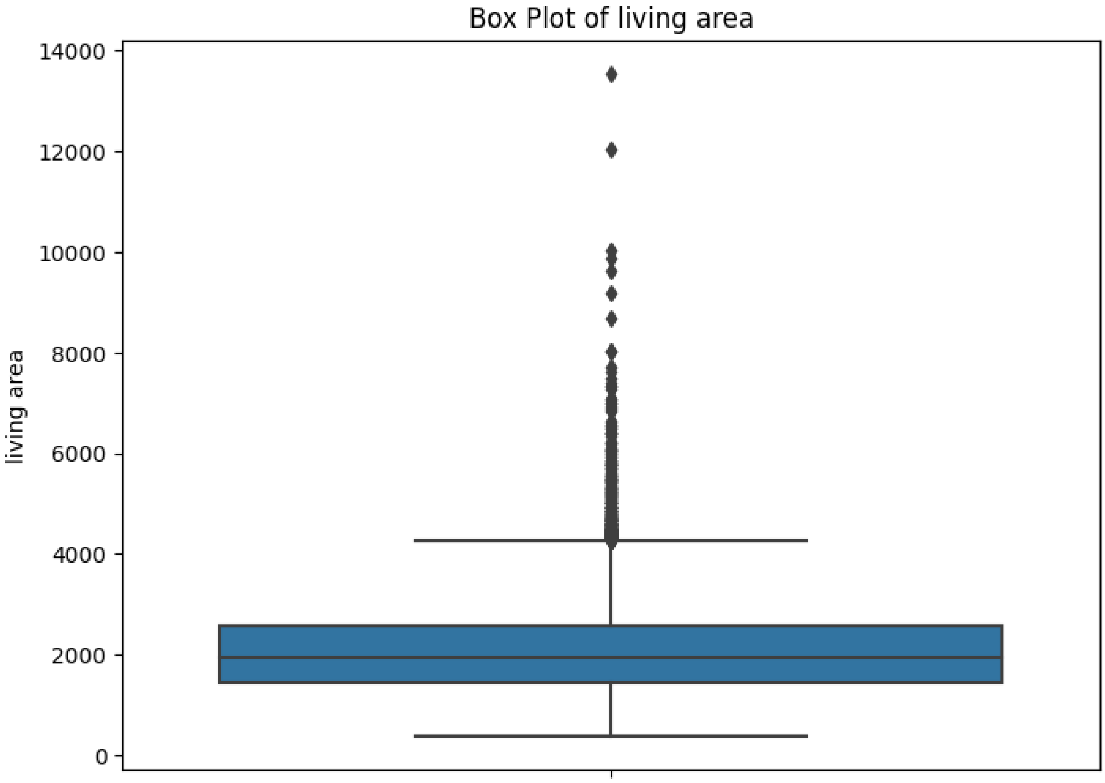
TASK 3- Performing Univariate Analysis

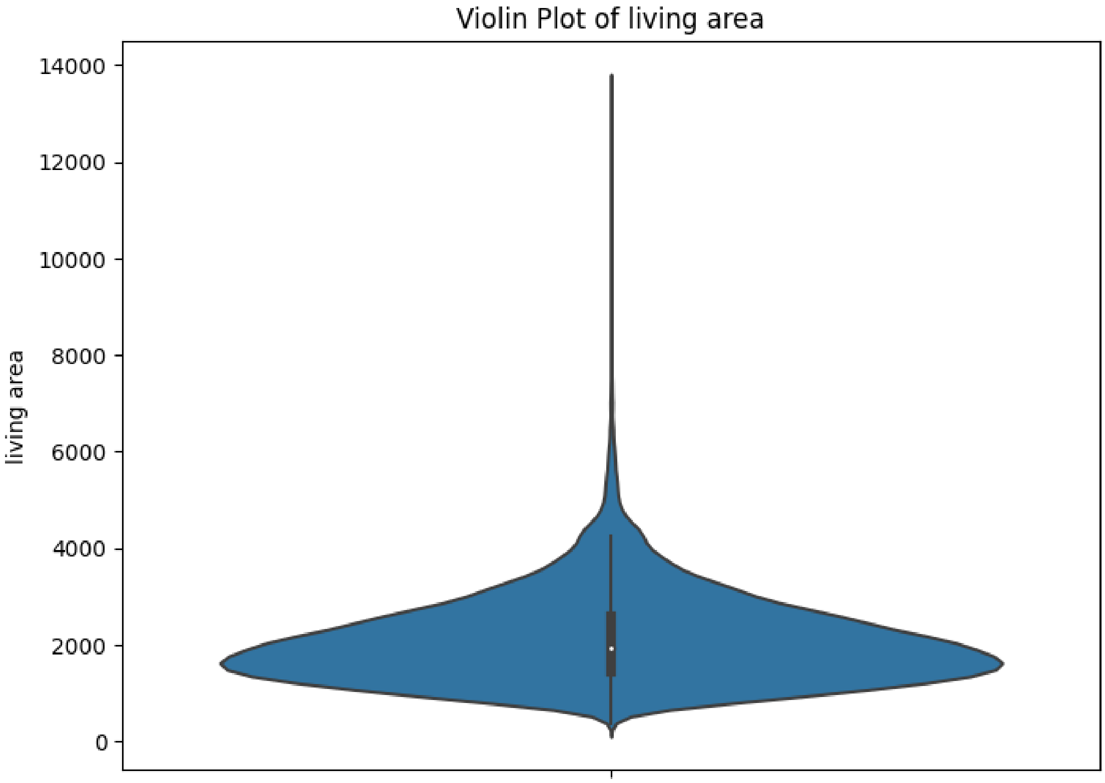
[3]:

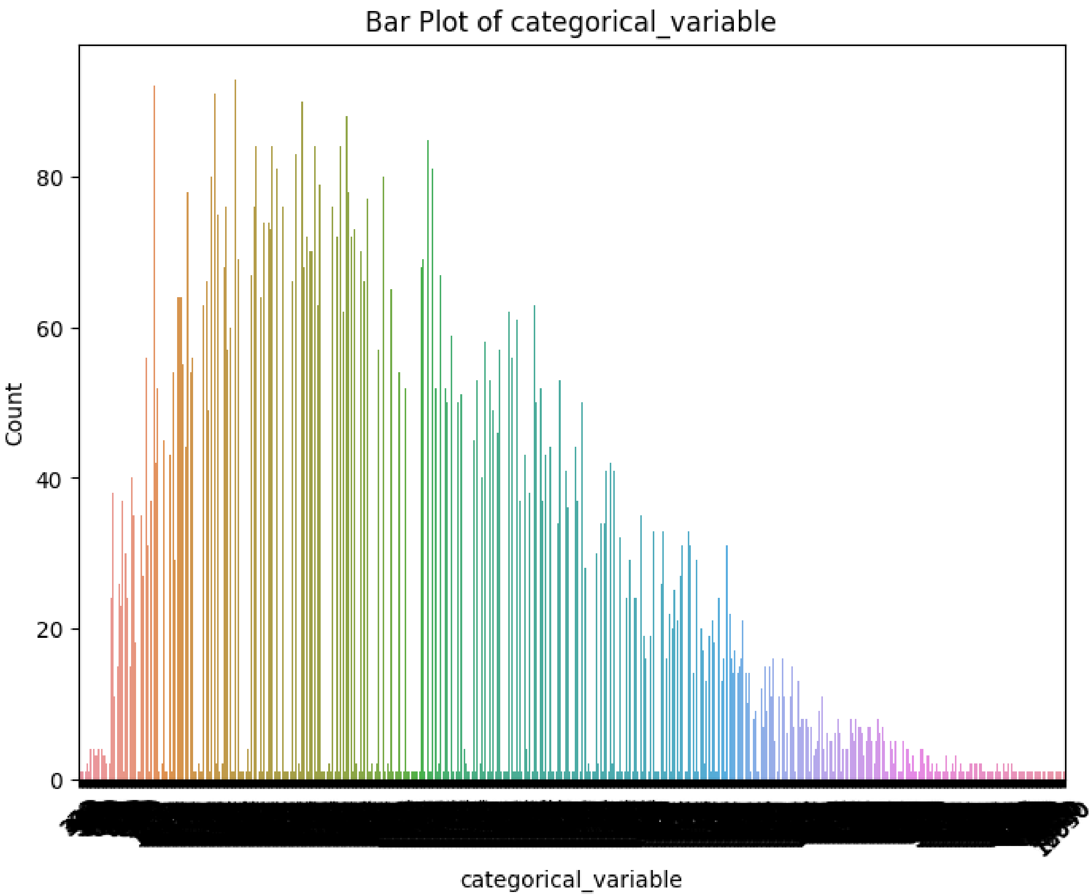
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

data = pd.read_csv('House Price India 2.csv')

column_name = 'living area'

summary_stats = data[column_name].describe()
print(summary_stats)

# Histogram
plt.figure(figsize=(8, 6))
sns.histplot(data=data, x=column_name, kde=True)
plt.title(f'Histogram of {column_name}')
plt.xlabel(column_name)
plt.ylabel('Frequency')
plt.show()

plt.figure(figsize=(8, 6))
sns.boxplot(data=data, y=column_name)
plt.title(f'Box Plot of {column_name}')
plt.ylabel(column_name)
plt.show()

plt.figure(figsize=(8, 6))
sns.violinplot(data=data, y=column_name)
plt.title(f'Violin Plot of {column_name}')
plt.ylabel(column_name)
plt.show()

categorical_column = 'categorical_variable'
plt.figure(figsize=(8, 6))
sns.countplot(data=data, x=column_name)
plt.title(f'Bar Plot of {categorical_column}')
plt.xlabel(categorical_column)
plt.ylabel('Count')
plt.xticks(rotation=45)
plt.show()
```

```
count    14620.000000
mean      2098.262996
std        928.275721
min        370.000000
25%       1440.000000
50%       1930.000000
75%       2570.000000
max      13540.000000
Name: living area, dtype: float64
```




Box Plot of living area
living area
14000
12000
10000
8000
6000
4000
2000
0


Violin Plot of living area
living area
14000
12000
10000
8000
6000
4000
2000
0



TASK 3- Performing Bi - Variate Analysis

[9]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

data = pd.read_csv('House Price India 2.csv')

x_variable = 'number of bedrooms'  # Replace with your first variable/column
y_variable = 'living area'  # Replace with your second variable/colu

# Scatter plot for numerical vs. numerical variables
if data[x_variable].dtype == 'float64' and data[y_variable].dtype == 'float64':
    plt.figure(figsize=(8, 6))
    sns.scatterplot(data=data, x=x_variable, y=y_variable)
    plt.title(f'Scatter Plot: {x_variable} vs. {y_variable}')
    plt.xlabel(x_variable)
    plt.ylabel(y_variable)
    plt.show()
```

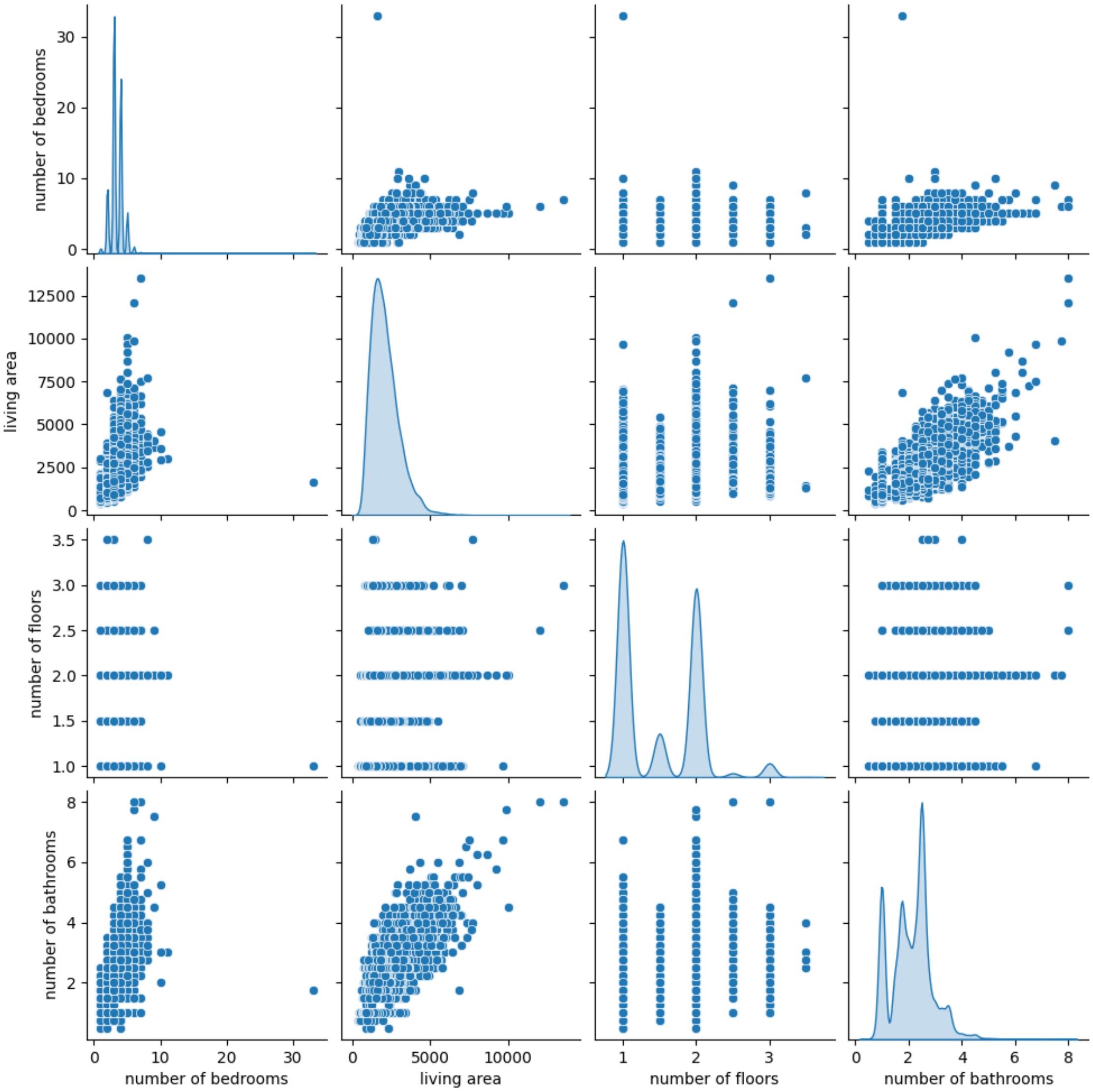
```
# Line plot for time series data (e.g., date vs. numerical value)
if data[x_variable].dtype == 'datetime64[ns]' and data[y_variable].dtype ==␣
 ↪'float64':
    plt.figure(figsize=(10, 6))
    sns.lineplot(data=data, x=x_variable, y=y_variable)
    plt.title(f'Line Plot: {x_variable} vs. {y_variable}')
    plt.xlabel(x_variable)
    plt.ylabel(y_variable)
    plt.xticks(rotation=45)
    plt.show()

# Box plot for categorical vs. numerical variables
if data[x_variable].dtype == 'object' and data[y_variable].dtype == 'float64':
    plt.figure(figsize=(8, 6))
    sns.boxplot(data=data, x=x_variable, y=y_variable)
    plt.title(f'Box Plot: {x_variable} vs. {y_variable}')
    plt.xlabel(x_variable)
    plt.ylabel(y_variable)
    plt.xticks(rotation=45)
    plt.show()

# Heatmap for numerical vs. numerical variables (correlation)
if data[x_variable].dtype == 'float64' and data[y_variable].dtype == 'float64':
    plt.figure(figsize=(8, 6))
    corr_matrix = data[[x_variable, y_variable]].corr()
    sns.heatmap(corr_matrix, annot=True, cmap='coolwarm')
    plt.title(f'Correlation Heatmap: {x_variable} vs. {y_variable}')
    plt.show()
```

TASK 3- Performing Multi-Variate Analysis

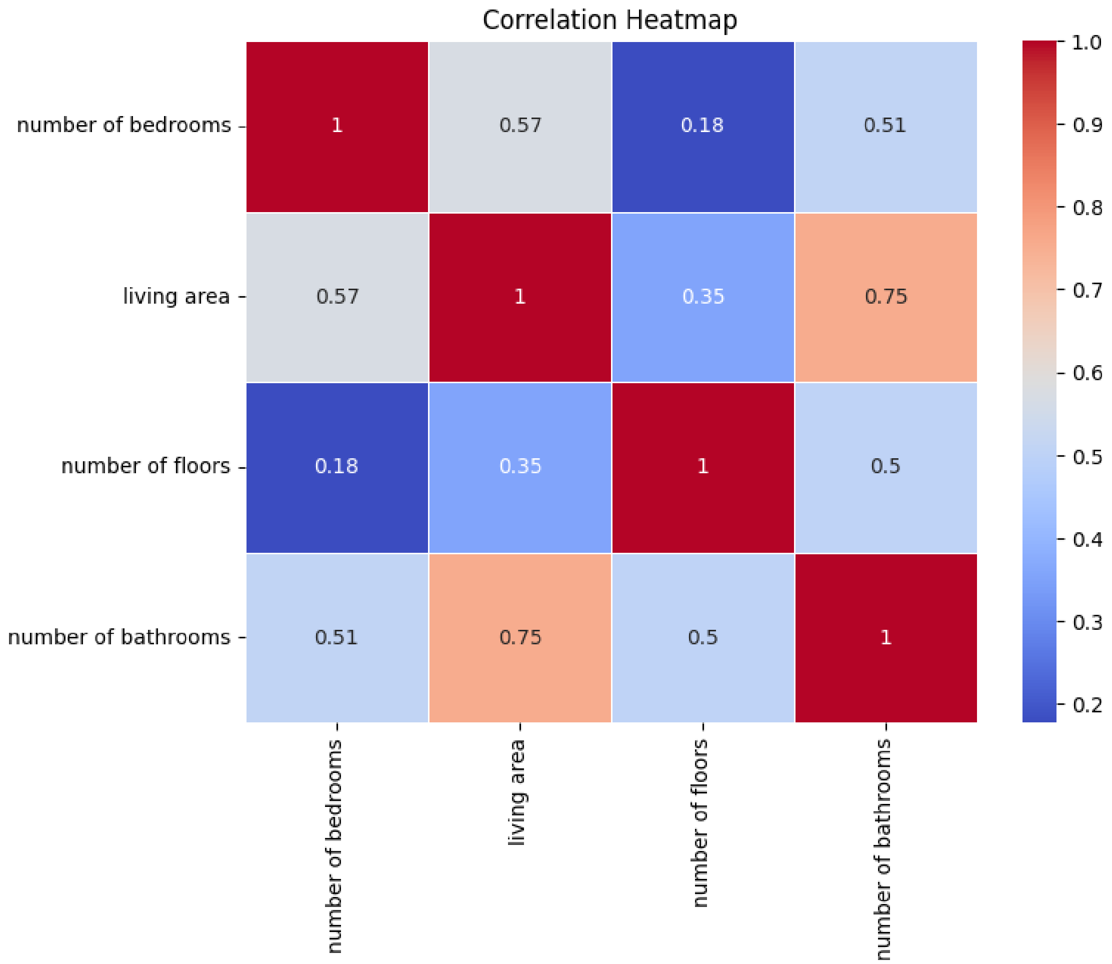
[11]:

```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import plotly.express as px

# Load your dataset (replace 'dataset.csv' with your data file)
data = pd.read_csv('House Price India 2.csv')

# Select variables for multivariate analysis
variables = ['number of bedrooms', 'living area', 'number of floors', 'number␣
 ↪of bathrooms']

# Pair plot (scatter plot matrix) for exploring relationships between numerical␣
 ↪variables
sns.pairplot(data[variables], diag_kind='kde')
```

```python
plt.suptitle('Pair Plot for Numerical Variables', y=1.02)
plt.show()

# Heatmap for correlation between numerical variables
correlation_matrix = data[variables].corr()
plt.figure(figsize=(8, 6))
sns.heatmap(correlation_matrix, annot=True, cmap='coolwarm', linewidths=0.5)
plt.title('Correlation Heatmap')
plt.show()

# 3D Scatter plot for exploring three numerical variables
fig = px.scatter_3d(data, x='number of bedrooms', y='living area', z='number of␣
 ↪floors', color='number of bathrooms')

fig.update_layout(title='3D Scatter Plot')
fig.show()
```



Pair Plot for Numerical Variables



TASK 4- Perform descriptive statistics on the dataset

```
[12]: import pandas as pd

data = pd.read_csv('House Price India 2.csv')

statistics = data.describe()

print(statistics)
```

```
                 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]
```

TASK 5-

[14]:
```
data.fillna(data.mean(), inplace=True)
data
```

[14]:
```
               id   Date  number of bedrooms  number of bathrooms  \
0      6762810145  42491                   5                 2.50
1      6762810635  42491                   4                 2.50
2      6762810998  42491                   5                 2.75
3      6762812605  42491                   4                 2.50
4      6762812919  42491                   3                 2.00
…           …    …                 …                  …
14615  6762830250  42734                   2                 1.50
14616  6762830339  42734                   3                 2.00
14617  6762830618  42734                   2                 1.00
14618  6762830709  42734                   4                 1.00
14619  6762831463  42734                   3                 1.00

       living area  lot area  number of floors  waterfront present  \
0             3650      9050               2.0                   0
1             2920      4000               1.5                   0
2             2910      9480               1.5                   0
3             3310     42998               2.0                   0
4             2710      4500               1.5                   0
…            …       …               …                 …
14615         1556     20000               1.0                   0
14616         1680      7000               1.5                   0
14617         1070      6120               1.0                   0
14618         1030      6621               1.0                   0
14619          900      4770               1.0                   0

       number of views  condition of the house  …  Built Year  \
0                    4                       5  …        1921
1                    0                       5  …        1909
2                    0                       3  …        1939
3                    0                       3  …        2001
4                    0                       4  …        1929
…                …                     …  …         …
14615                0                       4  …        1957
14616                0                       4  …        1968
14617                0                       3  …        1962
14618                0                       4  …        1955
```

```
14619                0                       3  …        1969

       Renovation Year  Postal Code  Lattitude  Longitude  living_area_renov  \
0                    0       122003    52.8645   -114.557               2880
1                    0       122004    52.8878   -114.470               2470
2                    0       122004    52.8852   -114.468               2940
3                    0       122005    52.9532   -114.321               3350
4                    0       122006    52.9047   -114.485               2060
…                …          …        …        …                …
14615                0       122066    52.6191   -114.472               2250
14616                0       122072    52.5075   -114.393               1540
14617                0       122056    52.7289   -114.507               1130
14618                0       122042    52.7157   -114.411               1420
14619             2009       122018    52.5338   -114.552                900

       lot_area_renov  Number of schools nearby  Distance from the airport  \
0                5400                         2                         58
1                4000                         2                         51
2                6600                         1                         53
3               42847                         3                         76
4                4500                         1                         51
…               …                       …                        …
14615           17286                         3                         76
14616            7480                         3                         59
14617            6120                         2                         64
14618            6631                         3                         54
14619            3480                         2                         55

         Price
0      2380000
1      1400000
2      1200000
3       838000
4       805000
…        …
14615   221700
14616   219200
14617   209000
14618   205000
14619   146000

[14620 rows x 23 columns]
```