Use "5_realtor_data.csv" to answer the following questions

The data file should be saved in the project folder

Review the code we have learned in class when completing these questions

In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

In [2]:
```
df= pd.read_csv("5_realtor_data.csv")
df.head()
```

Out[2]:

	Home Type	Zip	Listing Price	Baths	Beds	SQFT	Year Built	Airbnb Cash on Cash
0	Single Family Residential	61822	685000	5.0	3	2840.0	2010.0	0.834059
1	Single Family Residential	61822	349900	3.0	4	1926.0	2016.0	1.349840
2	Townhouse	61822	194900	3.0	3	1600.0	2017.0	8.629820
3	Single Family Residential	61820	126900	2.0	3	1330.0	1959.0	14.517200
4	Single Family Residential	61822	369900	4.0	4	2336.0	2006.0	1.116810

In [3]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 296 entries, 0 to 295
Data columns (total 8 columns):
 #   Column               Non-Null Count  Dtype  
---  ------               --------------  -----  
 0   Home Type            296 non-null    object 
 1   Zip                  296 non-null    int64  
 2   Listing Price        296 non-null    int64  
 3   Baths                294 non-null    float64
 4   Beds                 296 non-null    int64  
 5   SQFT                 294 non-null    float64
 6   Year Built           273 non-null    float64
 7   Airbnb Cash on Cash  296 non-null    float64
dtypes: float64(4), int64(3), object(1)
memory usage: 18.6+ KB
```

In [4]:
```
# Convert Zip to categorical
df['Zip'] = df['Zip'].astype('category')

# Convert Baths to categorical
# First convert to string to preserve decimal values like 1.5 baths
df['Baths'] = df['Baths'].astype(str).astype('category')
```

```
# Convert Beds to categorical
df['Beds'] = df['Beds'].astype('category')
```

In [5]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 296 entries, 0 to 295
Data columns (total 8 columns):
 #   Column               Non-Null Count  Dtype
---  ------               --------------  -----
 0   Home Type            296 non-null    object
 1   Zip                  296 non-null    category
 2   Listing Price        296 non-null    int64
 3   Baths                296 non-null    category
 4   Beds                 296 non-null    category
 5   SQFT                 294 non-null    float64
 6   Year Built           273 non-null    float64
 7   Airbnb Cash on Cash  296 non-null    float64
dtypes: category(3), float64(3), int64(1), object(1)
memory usage: 13.2+ KB
```

1. Present summary statistics for all the numeric variables (min, max, mean, standard deviation).

In [6]:
```
df.describe()
```

Out[6]:

	Listing Price	SQFT	Year Built	Airbnb Cash on Cash
count	296.000000	294.000000	273.000000	296.000000
mean	225782.037162	2002.656463	1979.472527	7.371624
std	147640.909051	994.326109	30.089697	6.247464
min	77100.000000	704.000000	1855.000000	-1.125820
25%	119999.750000	1322.500000	1960.000000	2.284272
50%	172350.000000	1704.000000	1985.000000	5.056220
75%	285675.000000	2396.000000	2004.000000	12.357400
max	989000.000000	7040.000000	2017.000000	25.179400

2. How many listings are there for each "Home Type"?

In [9]:
```
df['Home Type'].value_counts()
```

Out[9]:
```
Single Family Residential    246
Condo/Coop                    39
Townhouse                     11
Name: Home Type, dtype: int64
```

3. What are the average and standard deviation of listing prices by zipcode? (use groupby method)

```
In [29]: print("Average")
         df.groupby('Zip')['Listing Price'].mean()
```

```
Average
```

```
Out[29]: Zip
         61820    193976.000000
         61821    148634.424528
         61822    295553.100000
         Name: Listing Price, dtype: float64
```

```
In [30]: print("Standard Deviation")
         df.groupby('Zip')['Listing Price'].std()
```

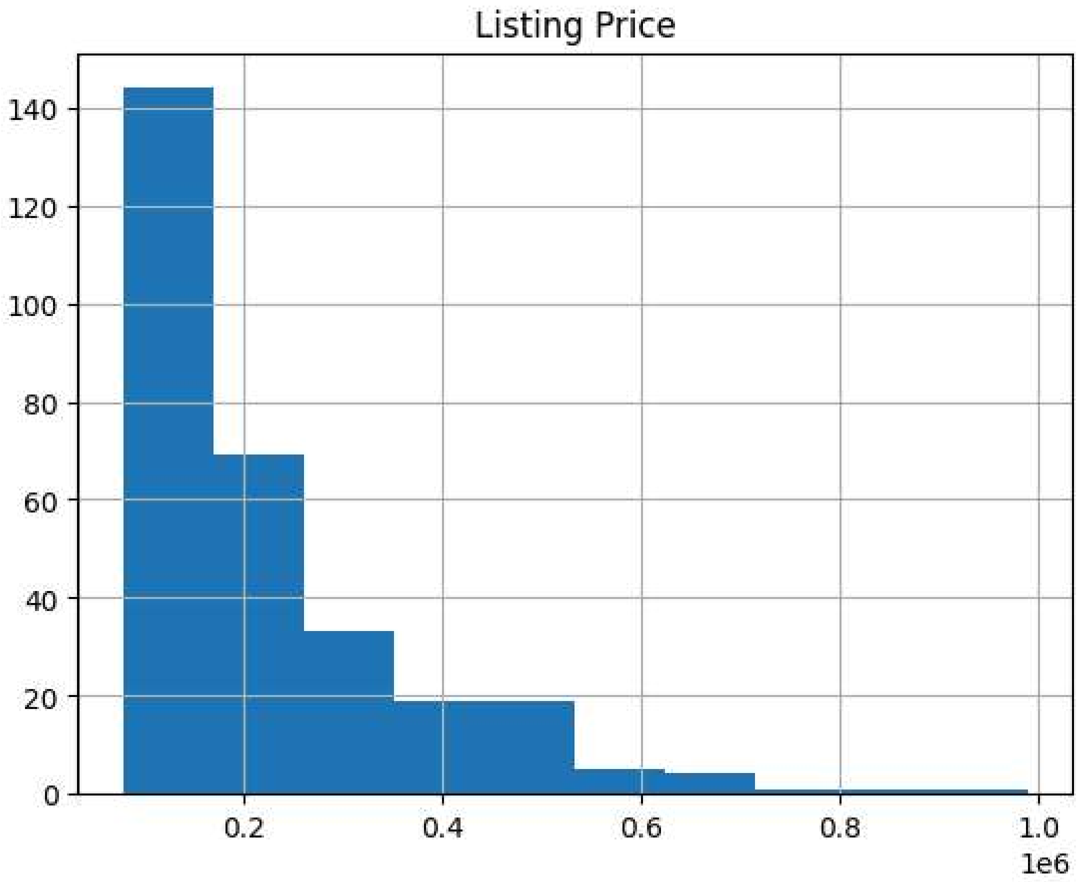
```
Standard Deviation
```

```
Out[30]: Zip
         61820    147340.310735
         61821     74111.616215
         61822    157016.011981
         Name: Listing Price, dtype: float64
```

4. Present histograms of listing price

```
In [16]: df[['Listing Price']].hist()
```

```
Out[16]: array([[<AxesSubplot:title={'center':'Listing Price'}>]], dtype=object)
```



5. How many 1,2,3,and 4 bedroom houses are listed in each Zip? (Crosstab)

In [17]:
```
pd.crosstab(df['Beds'], df['Zip'])
```

Out[17]:

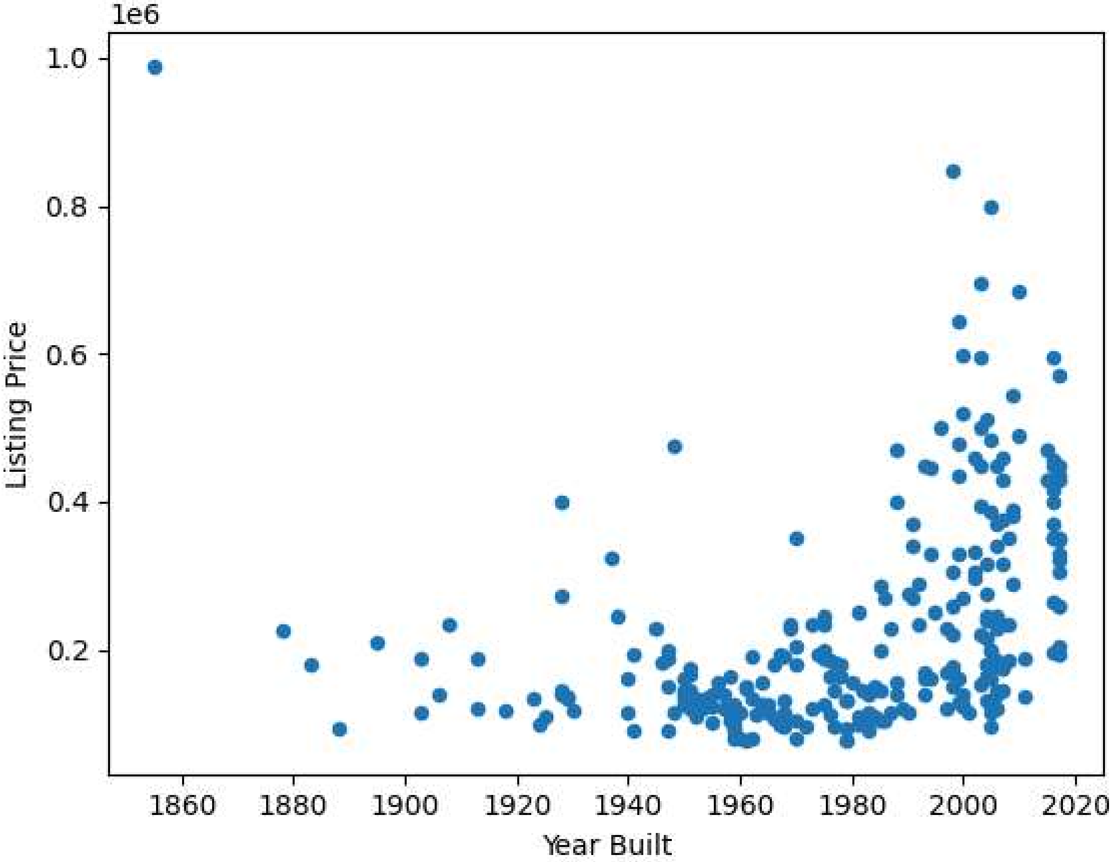
Zip	61820	61821	61822
Beds			
1	1	0	0
2	17	16	16
3	24	66	53
4	8	24	71

6. Present scatter plot for two variables, and briefly summarize what information you can learn from the plot

In [ ]:
```
df.plot(kind='scatter', x='Year Built', y='Listing Price')

# The scatter plot shows that houses built within the same years are more likely to
```

Out[ ]:
```
<AxesSubplot:xlabel='Year Built', ylabel='Listing Price'>
```



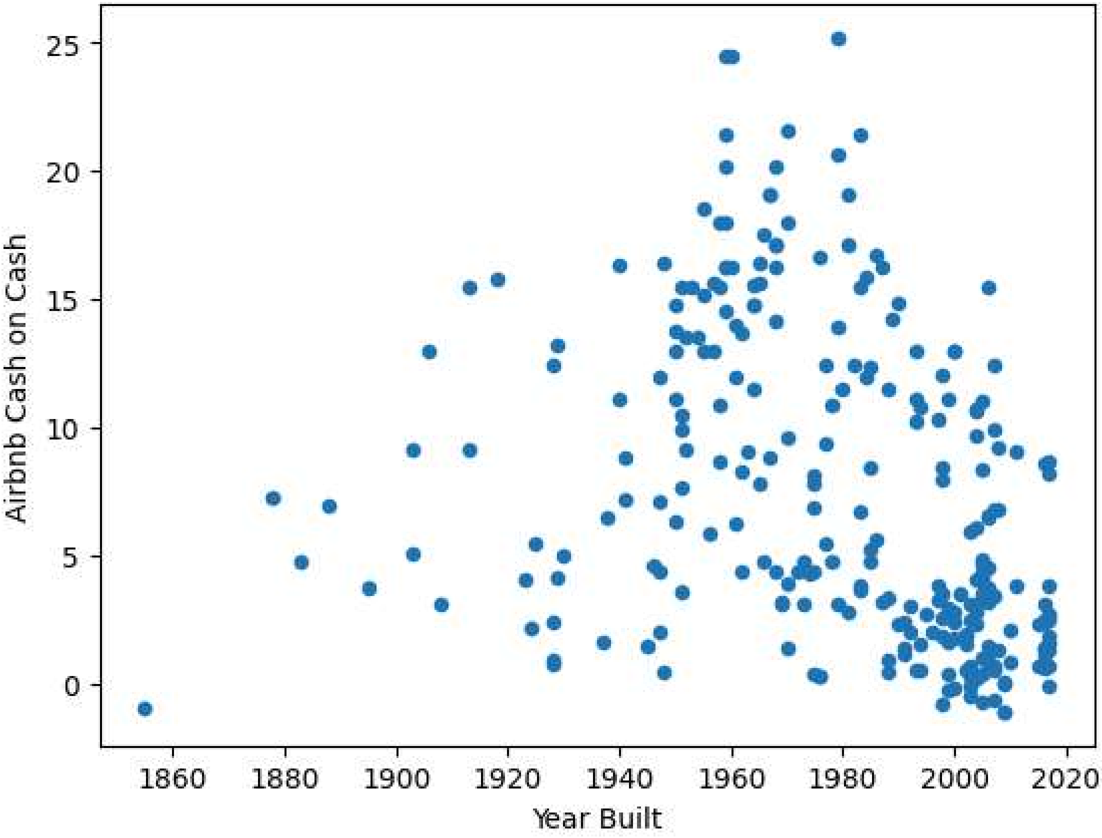
7. (Open-Ended Analysis) As a data analyst helping a client select a property for Airbnb investment,
   develop a data-driven search strategy. Use the available dataset to:

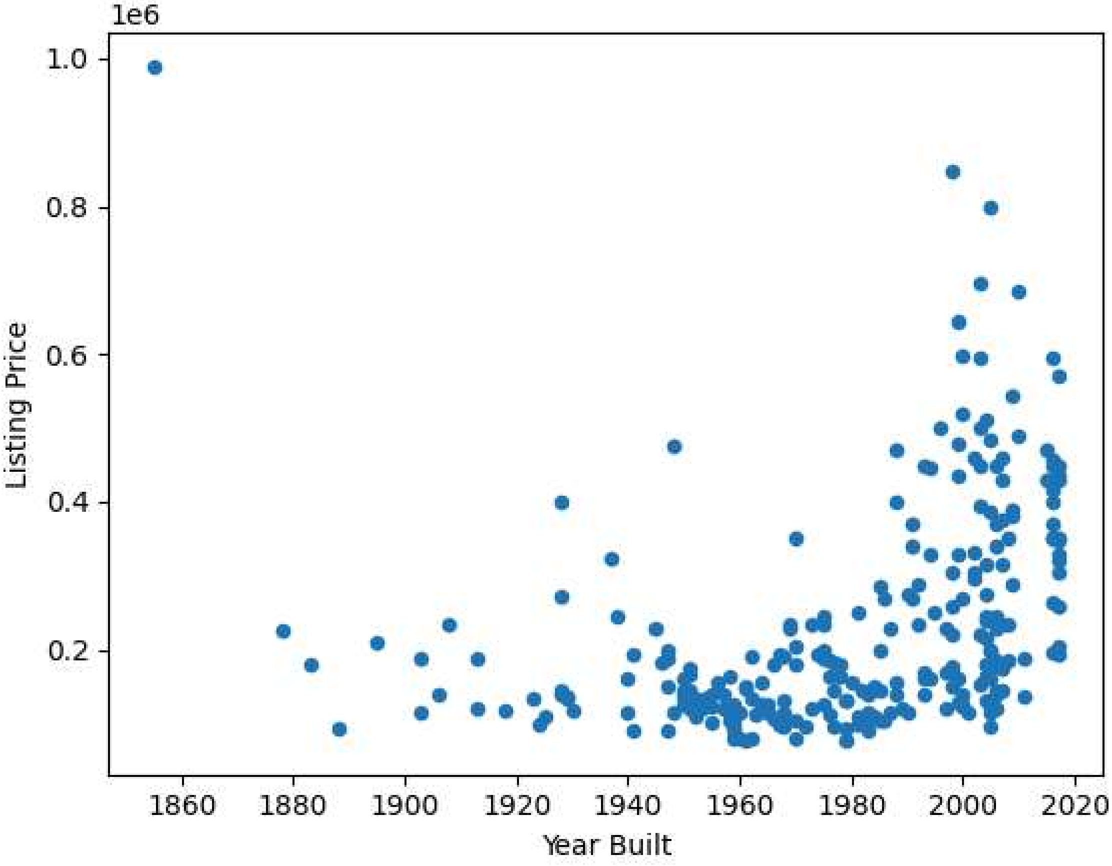
   Analyze relationships between property characteristics and potential returns
   Provide recommendations backed by statistical analysis
   Include visualizations and statistical evidence to support your recommendations.

In [ ]:
```
df.plot(kind='scatter', x='Year Built', y='Airbnb Cash on Cash')
df.plot(kind='scatter', x='Year Built', y='Listing Price')

# Based on the scatter plots your best return on investment would be to look for ho
# The reason this is the bet ROI is because the house built during this time period
```

Out[ ]:
```
<AxesSubplot:xlabel='Year Built', ylabel='Listing Price'>
```


Airbnb Cash on Cash
0
5
10
15
20
25
1860
1880
1900
1920
1940
1960
1980
2000
2020
Year Built


1e6
Listing Price
0.2
0.4
0.6
0.8
1.0
1860
1880
1900
1920
1940
1960
1980
2000
2020
Year Built