Deena 20104016

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

Problem Statement

a real estate agent wants to help to predict the house price for regions in USA. He gave us the dataset to work on to use the linear regression model.Create a model that helps to determine it.

LINEAR REGRESSION

In [2]:
```
a = pd.read_csv("Housing.csv")
```

Out[2]:

	Avg. Area Income	Avg. Area House Age	Avg. Area Number of Rooms	Avg. Area Number of Bedrooms	Area Population	Price	Addr
0	79545.45857	5.682861	7.009188	4.09	23086.80050	1.059034e+06	208 Michael Ferry A 674\nLaurabury, 37(
1	79248.64245	6.002900	6.730821	3.09	40173.07217	1.505891e+06	188 Johnson Vi Suite 079\nL Kathleen, C
2	61287.06718	5.865890	8.512727	5.13	36882.15940	1.058988e+06	9127 Elizat Stravenue\nDanielto WI 064
3	63345.24005	7.188236	5.586729	3.26	34310.24283	1.260617e+06	USS Barnett\nFPO 44
4	59982.19723	5.040555	7.839388	4.23	26354.10947	6.309435e+05	USNS Raymond\nF AE 09
...	...	...	...	...	...	...	
4995	60567.94414	7.830362	6.137356	3.46	22837.36103	1.060194e+06	USNS Williams\nF AP 30153-7
4996	78491.27543	6.999135	6.576763	4.02	25616.11549	1.482618e+06	PSC 9258, 8489\nAPO 42991-3
4997	63390.68689	7.250591	4.805081	2.13	33266.14549	1.030730e+06	4215 Tracy Gar Suite 076\nJoshuala VA (
4998	68001.33124	5.534388	7.130144	5.44	42625.62016	1.198657e+06	USS Wallace\nFPO 73
4999	65510.58180	5.992305	6.792336	4.07	46501.28380	1.298950e+06	37778 George Rid Apt. 509\nEast H NV

5000 rows × 7 columns

HEAD

In [3]:

Out[3]:

	Avg. Area Income	Avg. Area House Age	Avg. Area Number of Rooms	Avg. Area Number of Bedrooms	Area Population	Price	Address
0	79545.45857	5.682861	7.009188	4.09	23086.80050	1.059034e+06	208 Michael Ferry Apt. 674\nLaurabury, NE 3701...
1	79248.64245	6.002900	6.730821	3.09	40173.07217	1.505891e+06	188 Johnson Views Suite 079\nLake Kathleen, CA...
2	61287.06718	5.865890	8.512727	5.13	36882.15940	1.058988e+06	9127 Elizabeth Stravenue\nDanieltown, WI 06482...
3	63345.24005	7.188236	5.586729	3.26	34310.24283	1.260617e+06	USS Barnett\nFPO AP 44820
4	59982.19723	5.040555	7.839388	4.23	26354.10947	6.309435e+05	USNS Raymond\nFPO AE 09386

Data Cleaning and Preprocessing

In [4]:

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5000 entries, 0 to 4999
Data columns (total 7 columns):
 #   Column                       Non-Null Count  Dtype  
---  ------                       --------------  -----  
 0   Avg. Area Income             5000 non-null   float64
 1   Avg. Area House Age          5000 non-null   float64
 2   Avg. Area Number of Rooms    5000 non-null   float64
 3   Avg. Area Number of Bedrooms 5000 non-null   float64
 4   Area Population              5000 non-null   float64
 5   Price                        5000 non-null   float64
 6   Address                      5000 non-null   object 
dtypes: float64(6), object(1)
memory usage: 273.6+ KB
```

In [5]:

Out[5]:

	Avg. Area Income	Avg. Area House Age	Avg. Area Number of Rooms	Avg. Area Number of Bedrooms	Area Population	Price
count	5000.000000	5000.000000	5000.000000	5000.000000	5000.000000	5.000000e+03
mean	68583.108984	5.977222	6.987792	3.981330	36163.516039	1.232073e+06
std	10657.991214	0.991456	1.005833	1.234137	9925.650114	3.531176e+05
min	17796.631190	2.644304	3.236194	2.000000	172.610686	1.593866e+04
25%	61480.562390	5.322283	6.299250	3.140000	29403.928700	9.975771e+05
50%	68804.286405	5.970429	7.002902	4.050000	36199.406690	1.232669e+06
75%	75783.338665	6.650808	7.665871	4.490000	42861.290770	1.471210e+06
max	107701.748400	9.519088	10.759588	6.500000	69621.713380	2.469066e+06

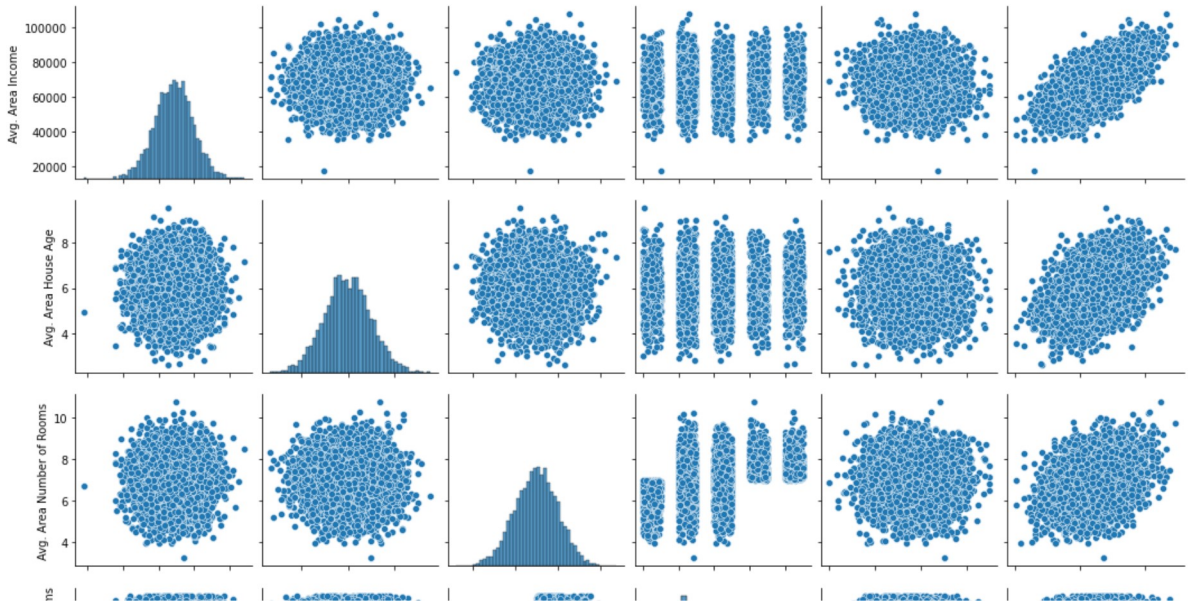
To display heading

In [6]:

Out[6]:
```
Index(['Avg. Area Income', 'Avg. Area House Age', 'Avg. Area Number of Rooms
',
       'Avg. Area Number of Bedrooms', 'Area Population', 'Price', 'Address
'],
      dtype='object')
```

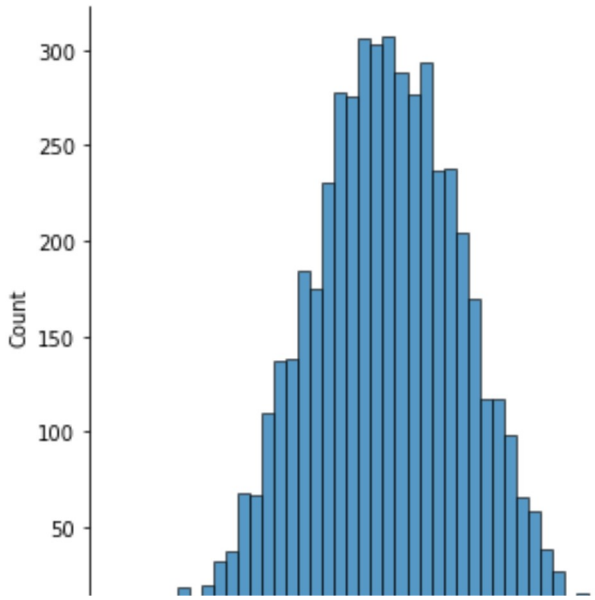
In [7]:

Out[7]: <seaborn.axisgrid.PairGrid at 0x16145a626a0>



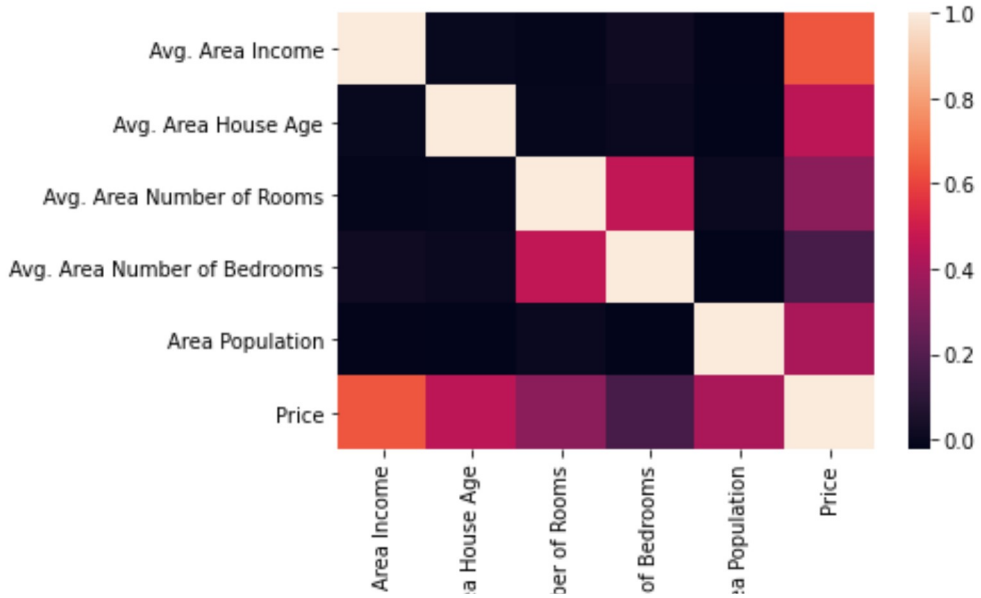
In [8]:

Out[8]: <seaborn.axisgrid.FacetGrid at 0x16141c9e3d0>



In [9]:

Out[9]: <AxesSubplot:>



TO TRAIN THE MODEL - MODEL BUILDING

we are going to train Linear Regression Model; we need to split data into two variables x and y where x is independent variable (input) and y is dependent on x (output) we could ignore address column as it is not required for our model

In [15]:
```
x = a[['Avg. Area Income', 'Avg. Area House Age', 'Avg. Area Number of Rooms',
       'Avg. Area Number of Bedrooms', 'Area Population']]
y = a['Price']
```

In [11]:
```
# to split my dataset into training and test data
from sklearn.model_selection import train_test_split
```

In [12]:
```
from sklearn.linear_model import LinearRegression
lr = LinearRegression()
```

Out[12]:
```
LinearRegression()
```

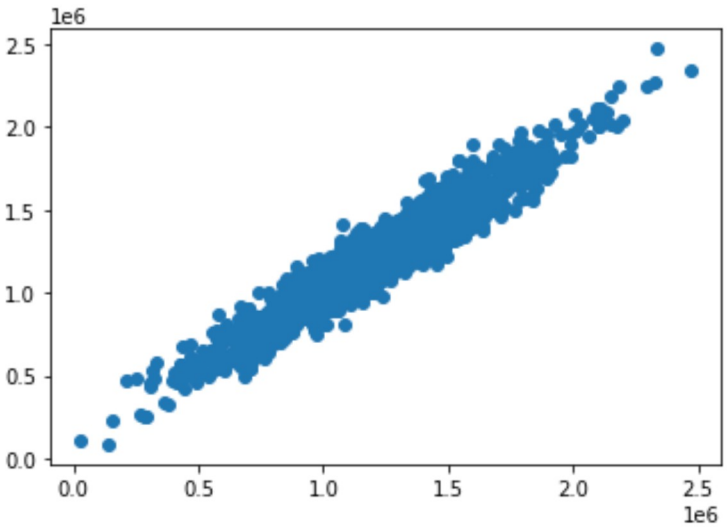
In [13]:
```
coeff = pd.DataFrame(lr.coef_,x.columns,columns=['Co-efficient'])
```

Out[13]:

	Co-efficient
Avg. Area Income	21.510614
Avg. Area House Age	165159.515641
Avg. Area Number of Rooms	120199.808566
Avg. Area Number of Bedrooms	1794.457238
Area Population	15.145425

In [18]:
```
prediction= lr.predict(x_test)
```

Out[18]:
```
<matplotlib.collections.PathCollection at 0x1614a53dbb0>
```



In [19]:
```
```

Out[19]:
```
0.9152862766648122
```