Karanjot Singh

In [36]:

```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
data=pd.read_csv('USA_Housing.csv')
data.head()
```

Out[36]:

	Avg. Area Income	Avg. Area House Age	Avg. Area Number of Rooms	Avg. Area Number of Bedrooms	Area Population	Price	A
0	79545.458574	5.682861	7.009188	4.09	23086.800503	1.059034e+06	208 Michael Fe 674\nLaurab
1	79248.642455	6.002900	6.730821	3.09	40173.072174	1.505891e+06	188 Johnsor Suite 079 Kathleer
2	61287.067179	5.865890	8.512727	5.13	36882.159400	1.058988e+06	9127 Eli Stravenue\nDani WI 0
3	63345.240046	7.188236	5.586729	3.26	34310.242831	1.260617e+06	USS Barnett\nF
4	59982.197226	5.040555	7.839388	4.23	26354.109472	6.309435e+05	USNS Raymonc AE

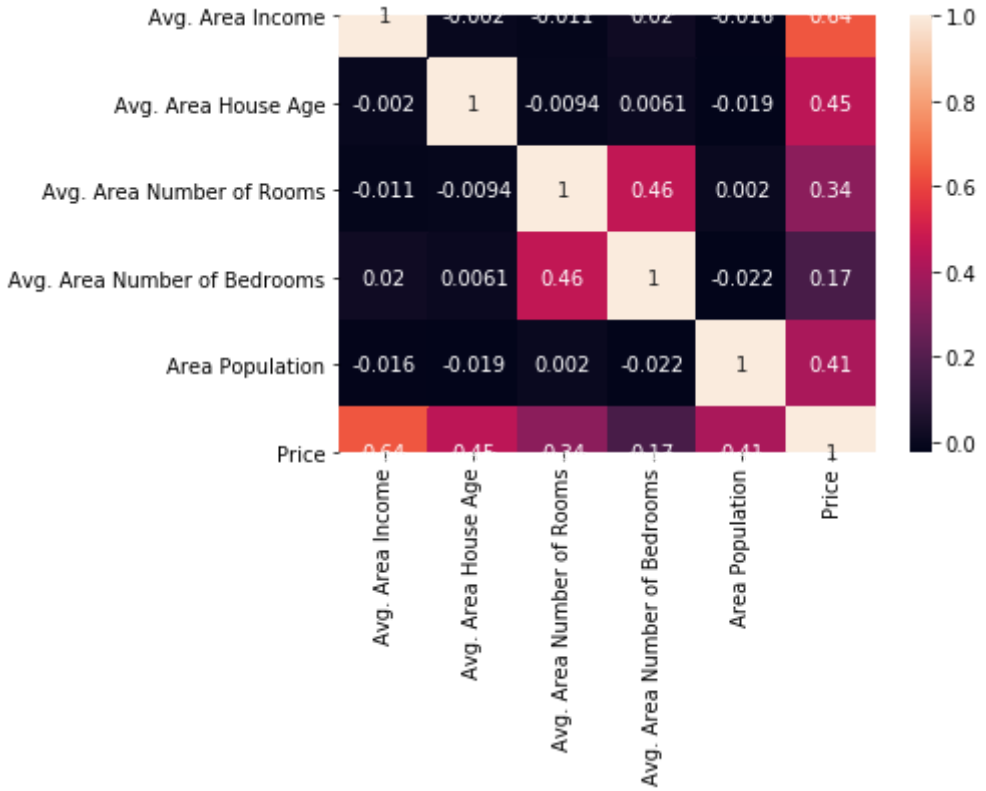
In [37]:

```
corr=data.corr()
print(corr)
sns.heatmap(corr,annot=True)
```

```
                             Avg. Area Income  Avg. Area House Age  \
Avg. Area Income                     1.000000            -0.002007
Avg. Area House Age                 -0.002007             1.000000
Avg. Area Number of Rooms           -0.011032            -0.009428
Avg. Area Number of Bedrooms         0.019788             0.006149
Area Population                     -0.016234            -0.018743
Price                                0.639734             0.452543

                             Avg. Area Number of Rooms  \
Avg. Area Income                             -0.011032
Avg. Area House Age                          -0.009428
Avg. Area Number of Rooms                     1.000000
Avg. Area Number of Bedrooms                  0.462695
Area Population                               0.002040
Price                                         0.335664

                             Avg. Area Number of Bedrooms  Area Populatio
n  \
Avg. Area Income                                 0.019788        -0.01623
4
Avg. Area House Age                              0.006149        -0.01874
3
Avg. Area Number of Rooms                        0.462695         0.00204
0
Avg. Area Number of Bedrooms                     1.000000        -0.02216
8
Area Population                                 -0.022168         1.00000
0
Price                                            0.171071         0.40855
6

                                Price
Avg. Area Income             0.639734
Avg. Area House Age          0.452543
Avg. Area Number of Rooms    0.335664
Avg. Area Number of Bedrooms 0.171071
Area Population              0.408556
Price                        1.000000
```

Out[37]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x243368f6688>
```

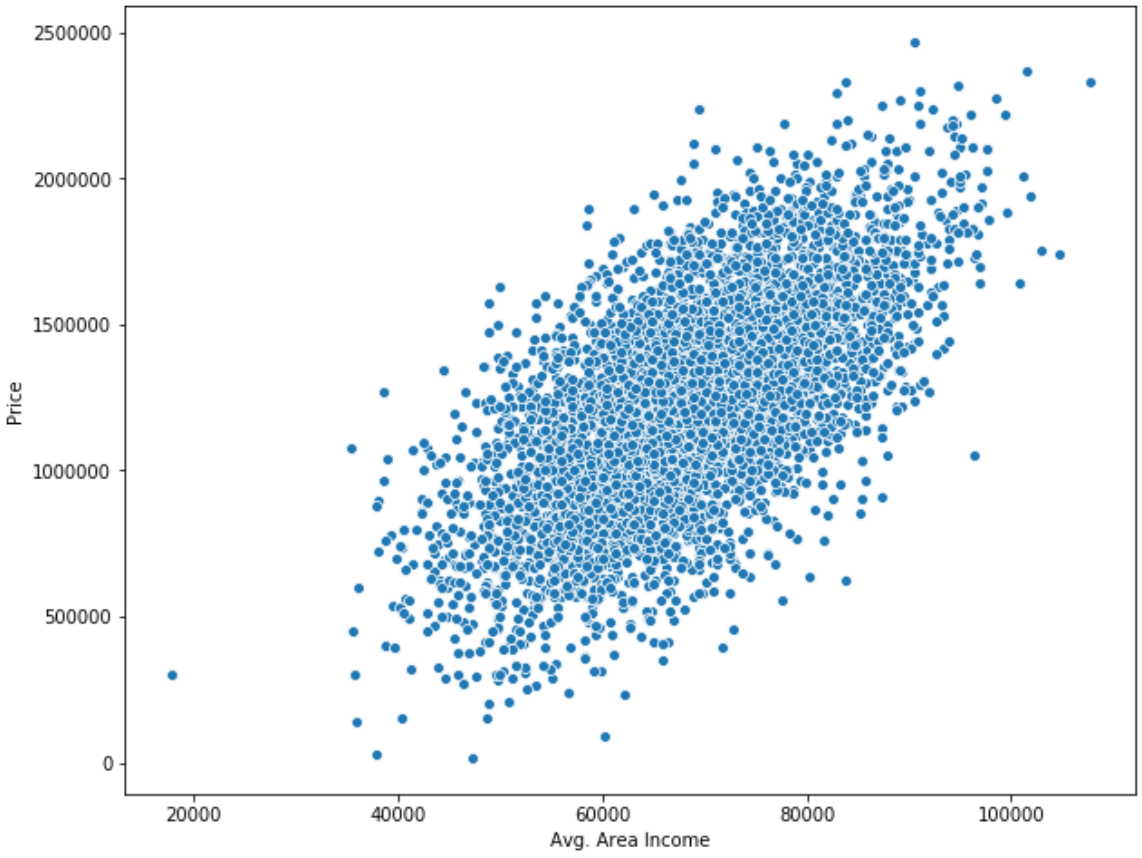


In [38]:

```
plt.figure(figsize=(10,8))
sns.scatterplot(data['Avg. Area Income'],data['Price'])
```

Out[38]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x24337b43588>
```



In [40]:

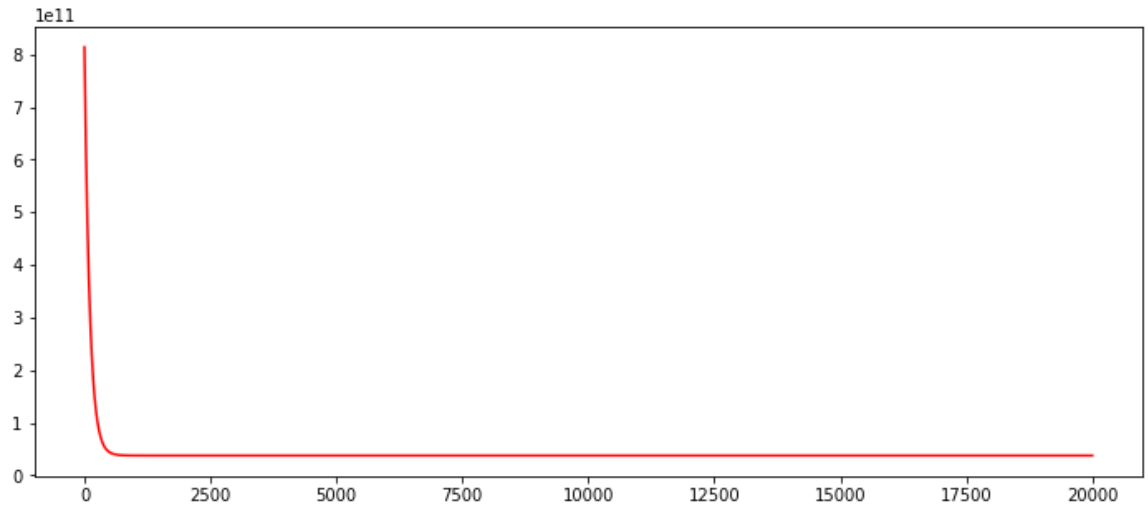
```
m=len(df)
O0=0
O1=0
alpha=0.000000000001
x=data['Avg. Area Income']
y=data['Price']
cost=[]
hist=[]
index=[]
for i in range(4*m):
    O0=O0-alpha*(1/m)*((O0+O1*x-y).sum())
    O1=O1-alpha*(1/m)*(((O0+O1*x-y)*x).sum())
    costfn=1/(2*m)*(((O0+O1*x-y)**2).sum())
    cost.append(costfn)
    hist.append([O0,O1])
    index.append(i)
```

In [41]:

```
plt.figure(figsize=(12,5))
sns.lineplot(index,cost,color = 'Red')
```

Out[41]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x24337bae288>
```



In [42]:

```
O=hist[cost.index(min(cost))]
```

In [44]:

```
plt.figure(figsize=(10,8))
#sns.lineplot(df['Avg. Area Income'],+O[0]+O[1]*df['Avg. Area Income'],color = 'Black')
sns.lineplot(x,+O[0]+O[1]*x,color = 'Black')
#sns.scatterplot(df['Avg. Area Income'],df['Price'],color = 'Purple')
sns.scatterplot(x,y,color = 'Purple')
plt.xlabel('Avg. Area Income')
plt.ylabel('Price')
```

Out[44]:

```
Text(0, 0.5, 'Price')
```