

Karanjot Singh

In [6]:

```
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[6]:

	Avg. Area Income	Avg. Area House Age	Avg. Area Number of Rooms	Avg. Area Number of Bedrooms	Area Population	Price	Address
0	79545.458574	5.682861	7.009188	4.09	23086.800503	1.059034e+06	208 Michael Fei 674\nLaurabi
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 [7]:

```
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[7]:

<matplotlib.axes._subplots.AxesSubplot at 0x273102f2f88>



In []:

```

m=len(data)
O0,O1,O2,O3 = 0,0,0,0
alpha=0.000000000001
x1 = data['Avg. Area Income']
x2 = data["Avg. Area House Age"]
x3 = data["Area Population"]
y=data['Price']
cost=[]
hist=[]
index=[]
for i in range(4*m):
    O0=O0-alpha*(1/m)*((O0+O1*x1+O2*x2+O3*x3-y).sum())
    O1=O1-alpha*(1/m)*(((O0+O1*x1+O2*x2+O3*x3-y)*x1).sum())
    O2=O2-alpha*(1/m)*(((O0+O1*x1+O2*x2+O3*x3-y)*x2).sum())
    O3=O3-alpha*(1/m)*(((O0+O1*x1+O2*x2+O3*x3-y)*x3).sum())
    costfn=1/(2*m)*(((O0+O1*x1+O2*x2+O3*x3-y)**2).sum())
    cost.append(costfn)
    hist.append([O0,O1,O2,O3])
    index.append(i)

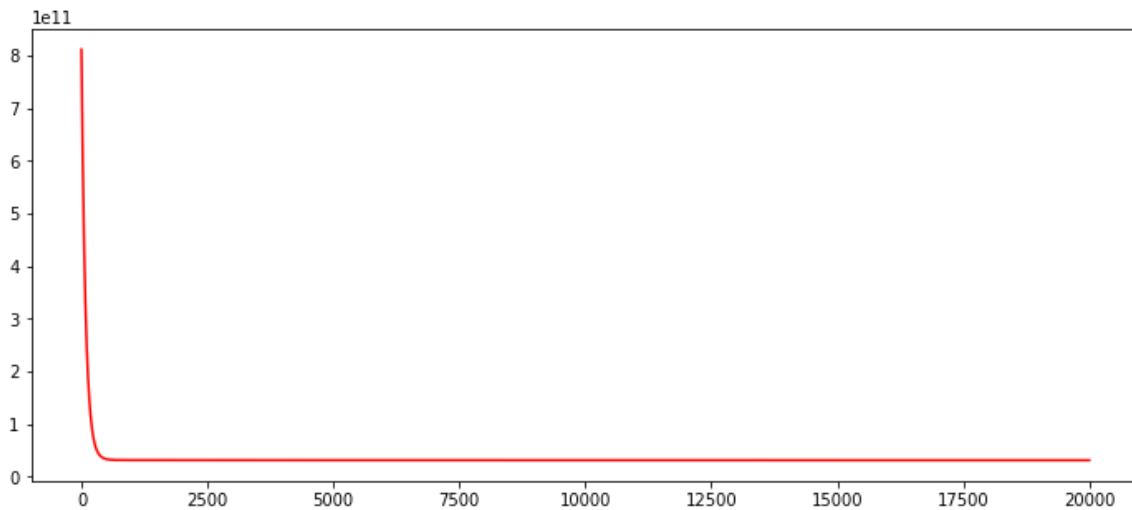
```

In [30]:

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

Out[30]:

<matplotlib.axes._subplots.AxesSubplot at 0x27313bc2b08>

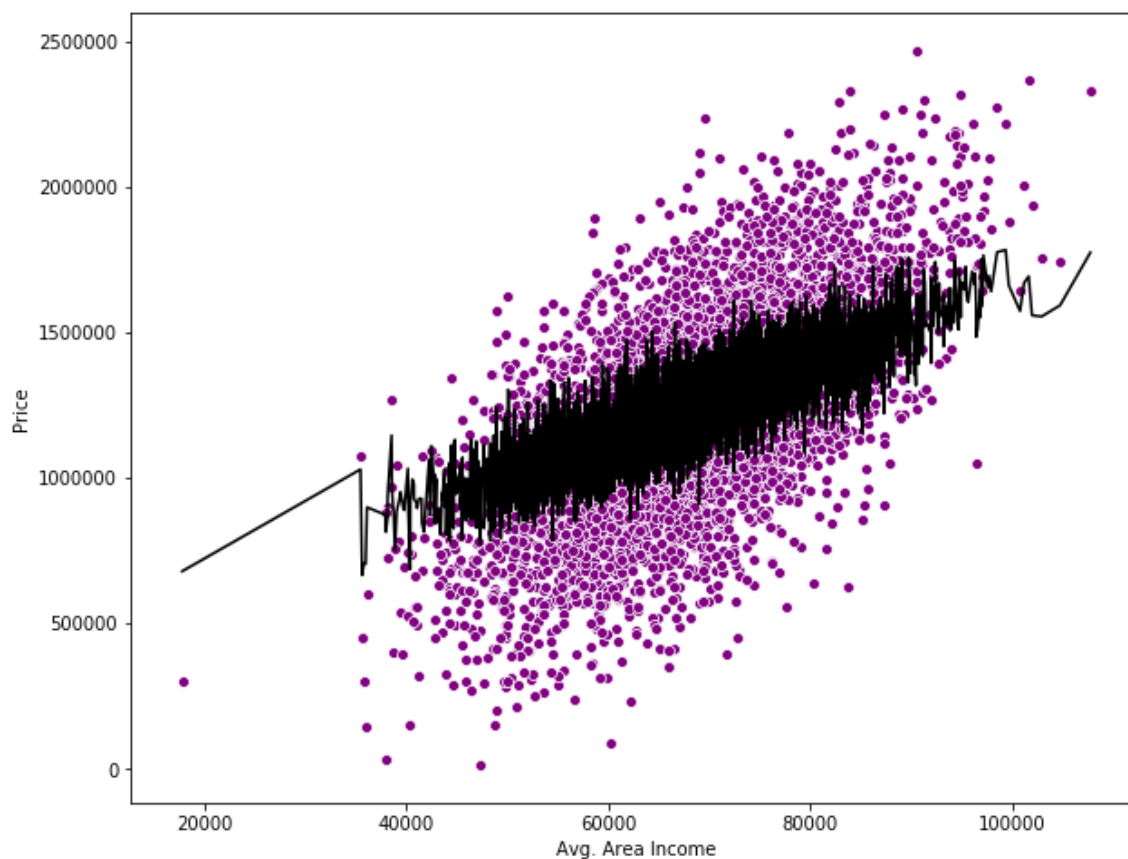


In [23]:

```
plt.figure(figsize=(10,8))  
sns.lineplot(x1,(00+01*x1+02*x2+03*x3),color = 'Black')  
sns.scatterplot(x1,y,color = 'Purple')  
plt.xlabel('Avg. Area Income')  
plt.ylabel('Price')
```

Out[23]:

Text(0, 0.5, 'Price')

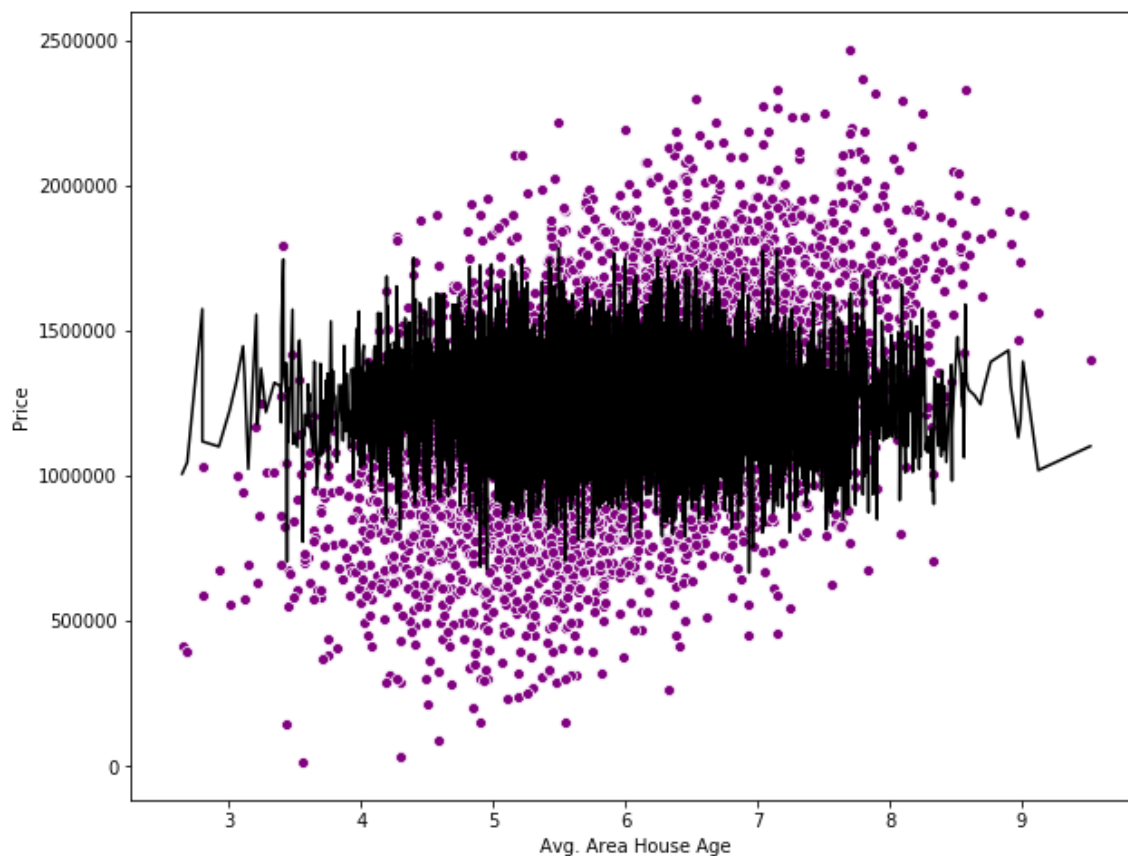


In [28]:

```
plt.figure(figsize=(10,8))  
sns.lineplot(x2,(00+01*x1+02*x2+03*x3),color = 'Black')  
sns.scatterplot(x2,y,color = 'Purple')  
plt.xlabel('Avg. Area House Age')  
plt.ylabel('Price')
```

Out[28]:

Text(0, 0.5, 'Price')



In [27]:

```
plt.figure(figsize=(10,8))  
sns.lineplot(x3,(00+01*x1+02*x2+03*x3),color = 'Black')  
sns.scatterplot(x3,y,color = 'Purple')  
plt.xlabel('Area Population')  
plt.ylabel('Price')
```

Out[27]:

Text(0, 0.5, 'Price')

