```python
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

```python
df=pd.read_csv('Housing.csv')
```

```python
df.head()
```

	price	area	bedrooms	bathrooms	stories	mainroad	guestroom	basement	hotwaterheating	airconditioning	parking	prefarea	furnishingstatus
0	13300000	7420	4	2	3	yes	no	no	no	yes	2	yes	furnished
1	12250000	8960	4	4	4	yes	no	no	no	yes	3	no	furnished
2	12250000	9960	3	2	2	yes	no	yes	no	no	2	yes	semi-furnished
3	12215000	7500	4	2	2	yes	no	yes	no	yes	3	yes	furnished
4	11410000	7420	4	1	2	yes	yes	yes	no	yes	2	no	furnished

```python
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 545 entries, 0 to 544
Data columns (total 13 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   price             545 non-null    int64
 1   area              545 non-null    int64
 2   bedrooms          545 non-null    int64
 3   bathrooms         545 non-null    int64
 4   stories           545 non-null    int64
 5   mainroad          545 non-null    object
 6   guestroom         545 non-null    object
 7   basement          545 non-null    object
 8   hotwaterheating   545 non-null    object
 9   airconditioning   545 non-null    object
 10  parking           545 non-null    int64
 11  prefarea          545 non-null    object
 12  furnishingstatus  545 non-null    object
dtypes: int64(6), object(7)
```

```
    memory usage: 55.5+ KB
```

```
df.columns
```

```
Index(['price', 'area', 'bedrooms', 'bathrooms', 'stories', 'mainroad',
       'guestroom', 'basement', 'hotwaterheating', 'airconditioning',
       'parking', 'prefarea', 'furnishingstatus'],
      dtype='object')
```

```
X=df[['area', 'bedrooms', 'bathrooms']]
```

```
X
```

	area	bedrooms	bathrooms
0	7420	4	2
1	8960	4	4
2	9960	3	2
3	7500	4	2
4	7420	4	1
...	...	...	...
540	3000	2	1
541	2400	3	1
542	3620	2	1
543	2910	3	1
544	3850	3	1

545 rows × 3 columns

```
y=df['price']
```

```
y
```

	price
0	13300000
1	12250000
2	12250000
3	12215000
4	11410000
5	10850000
6	10150000
7	10150000
8	9870000
9	9800000
10	9800000
11	9681000
12	9310000
13	9240000
14	9240000
15	9100000
16	9100000
17	8960000
18	8890000
19	8855000
20	8750000
21	8680000
22	8645000
23	8645000
24	8575000

25	8540000
26	8463000
27	8400000
28	8400000
29	8400000
30	8400000
31	8400000
32	8295000
33	8190000
34	8120000
35	8080940
36	8043000
37	7980000
38	7962500
39	7910000
40	7875000
41	7840000
42	7700000
43	7700000
44	7560000
45	7560000
46	7525000
47	7490000
48	7455000
49	7420000
50	7420000
51	7420000

51	7420000
52	7350000
53	7350000
54	7350000
55	7350000
56	7343000
57	7245000
58	7210000
59	7210000
60	7140000
61	7070000
62	7070000
63	7035000
64	7000000
65	6930000
66	6930000
67	6895000
68	6860000
69	6790000
70	6790000
71	6755000
72	6720000
73	6685000
74	6650000
75	6650000
76	6650000
77	6650000

78	6650000
79	6650000
80	6629000
81	6615000
82	6615000
83	6580000
84	6510000
85	6510000
86	6510000
87	6475000
88	6475000
89	6440000
90	6440000
91	6419000
92	6405000
93	6300000
94	6300000
95	6300000
96	6300000
97	6300000
98	6293000
99	6265000
100	6230000
101	6230000
102	6195000
103	6195000

104	6195000
105	6160000
106	6160000
107	6125000
108	6107500
109	6090000
110	6090000
111	6090000
112	6083000
113	6083000
114	6020000
115	6020000
116	6020000
117	5950000
118	5950000
119	5950000
120	5950000
121	5950000
122	5950000
123	5950000
124	5950000
125	5943000
126	5880000
127	5880000
128	5873000
129	5873000
130	5866000

131	5810000
132	5810000
133	5810000
134	5803000
135	5775000
136	5740000
137	5740000
138	5740000
139	5740000
140	5740000
141	5652500
142	5600000
143	5600000
144	5600000
145	5600000
146	5600000
147	5600000
148	5600000
149	5600000
150	5600000
151	5565000
152	5565000
153	5530000
154	5530000
155	5530000
156	5523000

157	5495000
158	5495000
159	5460000
160	5460000
161	5460000
162	5460000
163	5425000
164	5390000
165	5383000
166	5320000
167	5285000
168	5250000
169	5250000
170	5250000
171	5250000
172	5250000
173	5250000
174	5250000
175	5250000
176	5250000
177	5243000
178	5229000
179	5215000
180	5215000
181	5215000
182	5145000

183	5145000
184	5110000
185	5110000
186	5110000
187	5110000
188	5075000
189	5040000
190	5040000
191	5040000
192	5040000
193	5033000
194	5005000
195	4970000
196	4970000
197	4956000
198	4935000
199	4907000
200	4900000
201	4900000
202	4900000
203	4900000
204	4900000
205	4900000
206	4900000
207	4900000
208	4900000
209	4900000

210	4900000
211	4900000
212	4893000
213	4893000
214	4865000
215	4830000
216	4830000
217	4830000
218	4830000
219	4795000
220	4795000
221	4767000
222	4760000
223	4760000
224	4760000
225	4753000
226	4690000
227	4690000
228	4690000
229	4690000
230	4690000
231	4690000
232	4655000
233	4620000
234	4620000
235	4620000

236	4620000
237	4620000
238	4613000
239	4585000
240	4585000
241	4550000
242	4550000
243	4550000
244	4550000
245	4550000
246	4550000
247	4550000
248	4543000
249	4543000
250	4515000
251	4515000
252	4515000
253	4515000
254	4480000
255	4480000
256	4480000
257	4480000
258	4480000
259	4473000
260	4473000
261	4473000
262	4445000

262	4445000
263	4410000
264	4410000
265	4403000
266	4403000
267	4403000
268	4382000
269	4375000
270	4340000
271	4340000
272	4340000
273	4340000
274	4340000
275	4319000
276	4305000
277	4305000
278	4277000
279	4270000
280	4270000
281	4270000
282	4270000
283	4270000
284	4270000
285	4235000
286	4235000
287	4200000
288	4200000

289	4200000
290	4200000
291	4200000
292	4200000
293	4200000
294	4200000
295	4200000
296	4200000
297	4200000
298	4200000
299	4200000
300	4200000
301	4200000
302	4200000
303	4200000
304	4193000
305	4193000
306	4165000
307	4165000
308	4165000
309	4130000
310	4130000
311	4123000
312	4098500
313	4095000
314	4095000

315	4095000
316	4060000
317	4060000
318	4060000
319	4060000
320	4060000
321	4025000
322	4025000
323	4025000
324	4007500
325	4007500
326	3990000
327	3990000
328	3990000
329	3990000
330	3990000
331	3920000
332	3920000
333	3920000
334	3920000
335	3920000
336	3920000
337	3920000
338	3885000
339	3885000
340	3850000
341	3850000

342	3850000
343	3850000
344	3850000
345	3850000
346	3850000
347	3836000
348	3815000
349	3780000
350	3780000
351	3780000
352	3780000
353	3780000
354	3780000
355	3773000
356	3773000
357	3773000
358	3745000
359	3710000
360	3710000
361	3710000
362	3710000
363	3710000
364	3703000
365	3703000
366	3675000
367	3675000

368	3675000
369	3675000
370	3640000
371	3640000
372	3640000
373	3640000
374	3640000
375	3640000
376	3640000
377	3640000
378	3640000
379	3633000
380	3605000
381	3605000
382	3570000
383	3570000
384	3570000
385	3570000
386	3535000
387	3500000
388	3500000
389	3500000
390	3500000
391	3500000
392	3500000
393	3500000

394	3500000
395	3500000
396	3500000
397	3500000
398	3500000
399	3500000
400	3500000
401	3500000
402	3500000
403	3500000
404	3493000
405	3465000
406	3465000
407	3465000
408	3430000
409	3430000
410	3430000
411	3430000
412	3430000
413	3430000
414	3423000
415	3395000
416	3395000
417	3395000
418	3360000
419	3360000
420	3360000
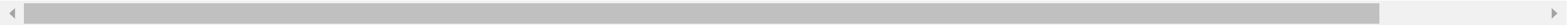
421	3360000
422	3360000
423	3360000
424	3360000
425	3360000
426	3353000
427	3332000
428	3325000
429	3325000
430	3290000
431	3290000
432	3290000
433	3290000
434	3290000
435	3290000
436	3290000
437	3290000
438	3255000
439	3255000
440	3234000
441	3220000
442	3220000
443	3220000
444	3220000
445	3150000
446	3150000

447	3150000
448	3150000
449	3150000
450	3150000
451	3150000
452	3150000
453	3150000
454	3143000
455	3129000
456	3118850
457	3115000
458	3115000
459	3115000
460	3087000
461	3080000
462	3080000
463	3080000
464	3080000
465	3045000
466	3010000
467	3010000
468	3010000
469	3010000
470	3010000
471	3010000
472	3010000
473	3003000

473	3003000
474	2975000
475	2961000
476	2940000
477	2940000
478	2940000
479	2940000
480	2940000
481	2940000
482	2940000
483	2940000
484	2870000
485	2870000
486	2870000
487	2870000
488	2852500
489	2835000
490	2835000
491	2835000
492	2800000
493	2800000
494	2730000
495	2730000
496	2695000
497	2660000
498	2660000
499	2660000

500	2660000
501	2660000
502	2660000
503	2660000
504	2653000
505	2653000
506	2604000
507	2590000
508	2590000
509	2590000
510	2520000
511	2520000
512	2520000
513	2485000
514	2485000
515	2450000
516	2450000
517	2450000
518	2450000
519	2450000
520	2450000
521	2408000
522	2380000
523	2380000
524	2380000
525	2345000

526	2310000
527	2275000
528	2275000
529	2275000
530	2240000
531	2233000
532	2135000
533	2100000
534	2100000
535	2100000
536	1960000
537	1890000
538	1890000
539	1855000
540	1820000
541	1767150
542	1750000
543	1750000
544	1750000

```
from sklearn.model_selection import train_test_split
X_train,X_test,y_train,y_test=train_test_split(X,y,test_size=20,random_state=42)


from sklearn.linear_model import LinearRegression
lr=LinearRegression()


lr.fit(X_train,y_train)
```

```
▾ LinearRegression
  LinearRegression()
```

```python
y_pred=lr.predict(X_test)
```

```python
y_pred
```

```
array([6504774.5440896 , 6332520.54804435, 3578975.56480286,
       4329959.60777193, 3944139.57648938, 4968046.58258537,
       5635812.02134362, 6167182.01671737, 3282190.92535475,
       3476703.76935861, 8945092.82754798, 3539651.60007598,
       3460261.70902361, 3625096.08908266, 3947849.38448248,
       6713895.39533145, 2822174.73421017, 4700940.40708207,
       4645293.28718555, 4306097.93145073])
```

```python
from sklearn.metrics import mean_absolute_error,mean_absolute_percentage_error,r2_score
```

```python
mean_absolute_error(y_test,y_pred)
```

```
1165534.030576608
```

```python
mean_absolute_percentage_error(y_test,y_pred)
```

```
0.32811095350239644
```

```python
r2_score(y_test,y_pred)
```

```
0.385832856304992
```

```python
sns.regplot(x='area',y='price',data=df)
```

<Axes: xlabel='area', ylabel='price'>