

```
In [1]: import pandas as pd
```

```
In [2]: df=pd.read_csv('g:/dataset/analysis/restaurant.csv')
df
```

```
Out[2]:   total_bill  tip  gender  smoker  day    time  size
```

	total_bill	tip	gender	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
...
239	29.03	5.92	Male	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2
241	22.67	2.00	Male	Yes	Sat	Dinner	2
242	17.82	1.75	Male	No	Sat	Dinner	2
243	18.78	3.00	Female	No	Thur	Dinner	2

244 rows × 7 columns

```
In [3]: df[['day','gender','total_bill']]
```

```
Out[3]:   day  gender  total_bill
```

	day	gender	total_bill
0	Sun	Female	16.99
1	Sun	Male	10.34
2	Sun	Male	21.01
3	Sun	Male	23.68
4	Sun	Female	24.59
...
239	Sat	Male	29.03
240	Sat	Female	27.18
241	Sat	Male	22.67
242	Sat	Male	17.82
243	Thur	Female	18.78

244 rows × 3 columns

```
In [4]: df.head()
```

```
Out[4]:    total_bill  tip  gender  smoker  day    time  size
```

0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4

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

```
Out[5]:    total_bill  tip  gender  smoker  day    time  size
```

239	29.03	5.92	Male	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2
241	22.67	2.00	Male	Yes	Sat	Dinner	2
242	17.82	1.75	Male	No	Sat	Dinner	2
243	18.78	3.00	Female	No	Thur	Dinner	2

```
In [6]: df.head(3)
```

```
Out[6]:    total_bill  tip  gender  smoker  day    time  size
```

0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3

```
In [7]: df.tail(3)
```

```
Out[7]:    total_bill  tip  gender  smoker  day    time  size
```

241	22.67	2.00	Male	Yes	Sat	Dinner	2
242	17.82	1.75	Male	No	Sat	Dinner	2
243	18.78	3.00	Female	No	Thur	Dinner	2

```
In [10]: df.sample(n=20)
```

Out[10]:

	total_bill	tip	gender	smoker	day	time	size
202	13.00	2.00	Female	Yes	Thur	Lunch	2
221	13.42	3.48	Female	Yes	Fri	Lunch	2
27	12.69	2.00	Male	No	Sat	Dinner	2
85	34.83	5.17	Female	No	Thur	Lunch	4
195	7.56	1.44	Male	No	Thur	Lunch	2
220	12.16	2.20	Male	Yes	Fri	Lunch	2
227	20.45	3.00	Male	No	Sat	Dinner	4
170	50.81	10.00	Male	Yes	Sat	Dinner	3
74	14.73	2.20	Female	No	Sat	Dinner	2
92	5.75	1.00	Female	Yes	Fri	Dinner	2
45	18.29	3.00	Male	No	Sun	Dinner	2
40	16.04	2.24	Male	No	Sat	Dinner	3
22	15.77	2.23	Female	No	Sat	Dinner	2
90	28.97	3.00	Male	Yes	Fri	Dinner	2
18	16.97	3.50	Female	No	Sun	Dinner	3
177	14.48	2.00	Male	Yes	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
113	23.95	2.55	Male	No	Sun	Dinner	2
160	21.50	3.50	Male	No	Sun	Dinner	4
226	10.09	2.00	Female	Yes	Fri	Lunch	2

In [14]:

```
df.sample(n=5)
```

Out[14]:

	total_bill	tip	gender	smoker	day	time	size
168	10.59	1.61	Female	Yes	Sat	Dinner	2
194	16.58	4.00	Male	Yes	Thur	Lunch	2
105	15.36	1.64	Male	Yes	Sat	Dinner	2
5	25.29	4.71	Male	No	Sun	Dinner	4
164	17.51	3.00	Female	Yes	Sun	Dinner	2

In [27]:

```
df1=df.sample(frac=.2)  
df1
```

Out[27]:

	total_bill	tip	gender	smoker	day	time	size
43	9.68	1.32	Male	No	Sun	Dinner	2
26	13.37	2.00	Male	No	Sat	Dinner	2
168	10.59	1.61	Female	Yes	Sat	Dinner	2
230	24.01	2.00	Male	Yes	Sat	Dinner	4
66	16.45	2.47	Female	No	Sat	Dinner	2
169	10.63	2.00	Female	Yes	Sat	Dinner	2
132	11.17	1.50	Female	No	Thur	Lunch	2
166	20.76	2.24	Male	No	Sun	Dinner	2
118	12.43	1.80	Female	No	Thur	Lunch	2
165	24.52	3.48	Male	No	Sun	Dinner	3
59	48.27	6.73	Male	No	Sat	Dinner	4
160	21.50	3.50	Male	No	Sun	Dinner	4
209	12.76	2.23	Female	Yes	Sat	Dinner	2
128	11.38	2.00	Female	No	Thur	Lunch	2
208	24.27	2.03	Male	Yes	Sat	Dinner	2
3	23.68	3.31	Male	No	Sun	Dinner	2
8	15.04	1.96	Male	No	Sun	Dinner	2
138	16.00	2.00	Male	Yes	Thur	Lunch	2
225	16.27	2.50	Female	Yes	Fri	Lunch	2
18	16.97	3.50	Female	No	Sun	Dinner	3
16	10.33	1.67	Female	No	Sun	Dinner	3
213	13.27	2.50	Female	Yes	Sat	Dinner	2
50	12.54	2.50	Male	No	Sun	Dinner	2
238	35.83	4.67	Female	No	Sat	Dinner	3
120	11.69	2.31	Male	No	Thur	Lunch	2
150	14.07	2.50	Male	No	Sun	Dinner	2
159	16.49	2.00	Male	No	Sun	Dinner	4
73	25.28	5.00	Female	Yes	Sat	Dinner	2
171	15.81	3.16	Male	Yes	Sat	Dinner	2
134	18.26	3.25	Female	No	Thur	Lunch	2
75	10.51	1.25	Male	No	Sat	Dinner	2
88	24.71	5.85	Male	No	Thur	Lunch	2
92	5.75	1.00	Female	Yes	Fri	Dinner	2
199	13.51	2.00	Male	Yes	Thur	Lunch	2
25	17.81	2.34	Male	No	Sat	Dinner	4
219	30.14	3.09	Female	Yes	Sat	Dinner	4

	total_bill	tip	gender	smoker	day	time	size
173	31.85	3.18	Male	Yes	Sun	Dinner	2
35	24.06	3.60	Male	No	Sat	Dinner	3
243	18.78	3.00	Female	No	Thur	Dinner	2
83	32.68	5.00	Male	Yes	Thur	Lunch	2
143	27.05	5.00	Female	No	Thur	Lunch	6
148	9.78	1.73	Male	No	Thur	Lunch	2
121	13.42	1.68	Female	No	Thur	Lunch	2
23	39.42	7.58	Male	No	Sat	Dinner	4
177	14.48	2.00	Male	Yes	Sun	Dinner	2
55	19.49	3.51	Male	No	Sun	Dinner	2
72	26.86	3.14	Female	Yes	Sat	Dinner	2
77	27.20	4.00	Male	No	Thur	Lunch	4
20	17.92	4.08	Male	No	Sat	Dinner	2

In [28]: `df1.shape`

Out[28]: (49, 7)

In [29]: `df1.dtypes`

Out[29]:

total_bill	float64
tip	float64
gender	object
smoker	object
day	object
time	object
size	int64
dtype:	object

In [31]: `df.size`

Out[31]: 1708

In [32]: `df.sample(n=250)`

```
-----  
ValueError  
Cell In[32], line 1  
----> 1 df.sample(n=250)  
  
File ~\anaconda3\Lib\site-packages\pandas\core\generic.py:5773, in NDFrame.sample  
(self, n, frac, replace, weights, random_state, axis, ignore_index)  
 5770 if weights is not None:  
 5771     weights = sample.preprocess_weights(self, weights, axis)  
-> 5773 sampled_indices = sample.sample(obj_len, size, replace, weights, rs)  
 5774 result = self.take(sampled_indices, axis=axis)  
 5776 if ignore_index:  
  
File ~\anaconda3\Lib\site-packages\pandas\core\sample.py:150, in sample(obj_len, s  
ize, replace, weights, random_state)  
 147     else:  
 148         raise ValueError("Invalid weights: weights sum to zero")  
--> 150 return random_state.choice(obj_len, size=size, replace=replace, p=weight  
s).astype(  
 151     np.intp, copy=False  
 152 )  
  
File mtrand.pyx:984, in numpy.random.mtrand.RandomState.choice()  
  
ValueError: Cannot take a larger sample than population when 'replace=False'
```

In [33]: `df.sample(n=250, replace=True)`

Out[33]:

	total_bill	tip	gender	smoker	day	time	size
163	13.81	2.00	Male	No	Sun	Dinner	2
101	15.38	3.00	Female	Yes	Fri	Dinner	2
34	17.78	3.27	Male	No	Sat	Dinner	2
170	50.81	10.00	Male	Yes	Sat	Dinner	3
231	15.69	3.00	Male	Yes	Sat	Dinner	3
...
175	32.90	3.11	Male	Yes	Sun	Dinner	2
21	20.29	2.75	Female	No	Sat	Dinner	2
52	34.81	5.20	Female	No	Sun	Dinner	4
111	7.25	1.00	Female	No	Sat	Dinner	1
18	16.97	3.50	Female	No	Sun	Dinner	3

250 rows × 7 columns

In [35]: `df.sample(n=10, replace=True)`

```
Out[35]:
```

	total_bill	tip	gender	smoker	day	time	size
8	15.04	1.96	Male	No	Sun	Dinner	2
93	16.32	4.30	Female	Yes	Fri	Dinner	2
218	7.74	1.44	Male	Yes	Sat	Dinner	2
114	25.71	4.00	Female	No	Sun	Dinner	3
231	15.69	3.00	Male	Yes	Sat	Dinner	3
49	18.04	3.00	Male	No	Sun	Dinner	2
85	34.83	5.17	Female	No	Thur	Lunch	4
62	11.02	1.98	Male	Yes	Sat	Dinner	2
99	12.46	1.50	Male	No	Fri	Dinner	2
62	11.02	1.98	Male	Yes	Sat	Dinner	2

```
In [36]:
```

```
df
```

```
Out[36]:
```

	total_bill	tip	gender	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
...
239	29.03	5.92	Male	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2
241	22.67	2.00	Male	Yes	Sat	Dinner	2
242	17.82	1.75	Male	No	Sat	Dinner	2
243	18.78	3.00	Female	No	Thur	Dinner	2

244 rows × 7 columns

```
In [37]:
```

```
df.select_dtypes(include='float')
```

Out[37]:

	total_bill	tip
0	16.99	1.01
1	10.34	1.66
2	21.01	3.50
3	23.68	3.31
4	24.59	3.61
...
239	29.03	5.92
240	27.18	2.00
241	22.67	2.00
242	17.82	1.75
243	18.78	3.00

244 rows × 2 columns

In [38]:

```
df.select_dtypes(exclude='float')
```

Out[38]:

	gender	smoker	day	time	size
0	Female	No	Sun	Dinner	2
1	Male	No	Sun	Dinner	3
2	Male	No	Sun	Dinner	3
3	Male	No	Sun	Dinner	2
4	Female	No	Sun	Dinner	4
...
239	Male	No	Sat	Dinner	3
240	Female	Yes	Sat	Dinner	2
241	Male	Yes	Sat	Dinner	2
242	Male	No	Sat	Dinner	2
243	Female	No	Thur	Dinner	2

244 rows × 5 columns

In [39]:

```
df.select_dtypes(include=['float', 'int'])
```

```
Out[39]:
```

	total_bill	tip	size
0	16.99	1.01	2
1	10.34	1.66	3
2	21.01	3.50	3
3	23.68	3.31	2
4	24.59	3.61	4
...
239	29.03	5.92	3
240	27.18	2.00	2
241	22.67	2.00	2
242	17.82	1.75	2
243	18.78	3.00	2

244 rows × 3 columns

```
In [41]: df.select_dtypes(include='object')
```

```
Out[41]:
```

	gender	smoker	day	time
0	Female	No	Sun	Dinner
1	Male	No	Sun	Dinner
2	Male	No	Sun	Dinner
3	Male	No	Sun	Dinner
4	Female	No	Sun	Dinner
...
239	Male	No	Sat	Dinner
240	Female	Yes	Sat	Dinner
241	Male	Yes	Sat	Dinner
242	Male	No	Sat	Dinner
243	Female	No	Thur	Dinner

244 rows × 4 columns

```
In [42]: df[df['day']=='Sun']
```

Out[42]:

	total_bill	tip	gender	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
...
186	20.90	3.50	Female	Yes	Sun	Dinner	3
187	30.46	2.00	Male	Yes	Sun	Dinner	5
188	18.15	3.50	Female	Yes	Sun	Dinner	3
189	23.10	4.00	Male	Yes	Sun	Dinner	3
190	15.69	1.50	Male	Yes	Sun	Dinner	2

76 rows × 7 columns

In [43]:

```
df[(df['day']=='Sun') & (df['time']=='Dinner')]
```

Out[43]:

	total_bill	tip	gender	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
...
186	20.90	3.50	Female	Yes	Sun	Dinner	3
187	30.46	2.00	Male	Yes	Sun	Dinner	5
188	18.15	3.50	Female	Yes	Sun	Dinner	3
189	23.10	4.00	Male	Yes	Sun	Dinner	3
190	15.69	1.50	Male	Yes	Sun	Dinner	2

76 rows × 7 columns

In [44]:

```
df[(df['day']=='Sat') & (df['time']=='Dinner')]
```

```
Out[44]:
```

	total_bill	tip	gender	smoker	day	time	size
19	20.65	3.35	Male	No	Sat	Dinner	3
20	17.92	4.08	Male	No	Sat	Dinner	2
21	20.29	2.75	Female	No	Sat	Dinner	2
22	15.77	2.23	Female	No	Sat	Dinner	2
23	39.42	7.58	Male	No	Sat	Dinner	4
...
238	35.83	4.67	Female	No	Sat	Dinner	3
239	29.03	5.92	Male	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2
241	22.67	2.00	Male	Yes	Sat	Dinner	2
242	17.82	1.75	Male	No	Sat	Dinner	2

87 rows × 7 columns

```
In [47]: df[(df['day']=='Sat') | (df['day']=='Sun')].shape
```

```
Out[47]: (163, 7)
```

```
In [48]: df.day
```

```
Out[48]:
```

0	Sun
1	Sun
2	Sun
3	Sun
4	Sun
...	
239	Sat
240	Sat
241	Sat
242	Sat
243	Thur

Name: day, Length: 244, dtype: object

```
In [49]: df.size
```

```
Out[49]: 1708
```

```
In [52]: df['size']
```

```
Out[52]:
```

0	2
1	3
2	3
3	2
4	4
...	
239	3
240	2
241	2
242	2
243	2

Name: size, Length: 244, dtype: int64

```
In [53]: df[df.gender=='Female']
```

```
Out[53]:
```

	total_bill	tip	gender	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
11	35.26	5.00	Female	No	Sun	Dinner	4
14	14.83	3.02	Female	No	Sun	Dinner	2
16	10.33	1.67	Female	No	Sun	Dinner	3
...
226	10.09	2.00	Female	Yes	Fri	Lunch	2
229	22.12	2.88	Female	Yes	Sat	Dinner	2
238	35.83	4.67	Female	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2
243	18.78	3.00	Female	No	Thur	Dinner	2

87 rows × 7 columns

```
In [55]: df2=df.sort_values(by='total_bill')
```

```
In [57]: df2['total_bill']
```

```
Out[57]:
```

67	3.07
92	5.75
111	7.25
172	7.25
149	7.51
...	
182	45.35
156	48.17
59	48.27
212	48.33
170	50.81

Name: total_bill, Length: 244, dtype: float64

```
In [58]: df.sort_values(by='total_bill')[['total_bill']]
```

```
Out[58]: total_bill
```

67	3.07
92	5.75
111	7.25
172	7.25
149	7.51
...	...
182	45.35
156	48.17
59	48.27
212	48.33
170	50.81

244 rows × 1 columns

```
In [60]: df.sort_values(by=['total_bill', 'tip'], ascending=False)
```

```
Out[60]: total_bill tip gender smoker day time size
```

170	50.81	10.00	Male	Yes	Sat	Dinner	3
212	48.33	9.00	Male	No	Sat	Dinner	4
59	48.27	6.73	Male	No	Sat	Dinner	4
156	48.17	5.00	Male	No	Sun	Dinner	6
182	45.35	3.50	Male	Yes	Sun	Dinner	3
...
149	7.51	2.00	Male	No	Thur	Lunch	2
172	7.25	5.15	Male	Yes	Sun	Dinner	2
111	7.25	1.00	Female	No	Sat	Dinner	1
92	5.75	1.00	Female	Yes	Fri	Dinner	2
67	3.07	1.00	Female	Yes	Sat	Dinner	1

244 rows × 7 columns

```
In [61]: df
```

```
Out[61]:
```

	total_bill	tip	gender	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
...
239	29.03	5.92	Male	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2
241	22.67	2.00	Male	Yes	Sat	Dinner	2
242	17.82	1.75	Male	No	Sat	Dinner	2
243	18.78	3.00	Female	No	Thur	Dinner	2

244 rows × 7 columns

```
In [62]: df.rename({'total_bill':'bill'},axis=1)
```

```
Out[62]:
```

	bill	tip	gender	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
...
239	29.03	5.92	Male	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2
241	22.67	2.00	Male	Yes	Sat	Dinner	2
242	17.82	1.75	Male	No	Sat	Dinner	2
243	18.78	3.00	Female	No	Thur	Dinner	2

244 rows × 7 columns

```
In [63]: df.rename({1:500},axis=0)
```

```
Out[63]:
```

	total_bill	tip	gender	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
500	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
...
239	29.03	5.92	Male	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2
241	22.67	2.00	Male	Yes	Sat	Dinner	2
242	17.82	1.75	Male	No	Sat	Dinner	2
243	18.78	3.00	Female	No	Thur	Dinner	2

244 rows × 7 columns

```
In [64]: df.rename({1:0},axis=0)
```

```
Out[64]:
```

	total_bill	tip	gender	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
0	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
...
239	29.03	5.92	Male	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2
241	22.67	2.00	Male	Yes	Sat	Dinner	2
242	17.82	1.75	Male	No	Sat	Dinner	2
243	18.78	3.00	Female	No	Thur	Dinner	2

244 rows × 7 columns

```
In [72]: df.rename({1:"india"},axis=0,inplace=True)
```

```
In [73]: df.at['india','total_bill']
```

```
Out[73]: 10.34
```

```
In [74]: df.iat[1,0]
```

```
Out[74]: 10.34
```

```
In [75]: df.iat[-243,-7]
```

```
Out[75]: 10.34
```

```
In [76]: df.iat[1,0]=12
```

```
In [77]: df
```

```
Out[77]:   total_bill  tip  gender  smoker  day  time  size
```

	total_bill	tip	gender	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
india	12.00	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
...
239	29.03	5.92	Male	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2
241	22.67	2.00	Male	Yes	Sat	Dinner	2
242	17.82	1.75	Male	No	Sat	Dinner	2
243	18.78	3.00	Female	No	Thur	Dinner	2

244 rows × 7 columns

```
In [78]: df.at['india','total_bill']=14
```

```
In [79]: df
```

```
Out[79]:   total_bill  tip  gender  smoker  day  time  size
```

	total_bill	tip	gender	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
india	14.00	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
...
239	29.03	5.92	Male	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2
241	22.67	2.00	Male	Yes	Sat	Dinner	2
242	17.82	1.75	Male	No	Sat	Dinner	2
243	18.78	3.00	Female	No	Thur	Dinner	2

244 rows × 7 columns

```
In [80]: df.index
```

```
Out[80]: Index([      0, 'india',      2,      3,      4,      5,      6,      7,
                  8,         9,
                  ...
                 234,     235,     236,     237,     238,     239,     240,     241,
                 242,     243],
                 dtype='object', length=244)
```

```
In [81]: df.columns
```

```
Out[81]: Index(['total_bill', 'tip', 'gender', 'smoker', 'day', 'time', 'size'], dtype='object')
```

```
In [ ]:
```