Румянцева Елизавета Ивановна КВБО-01-21

1.3.1 Задание

СОздать матрицу 8x8 и заполнить её в шахматном порядке нулями и единицами

In [2]:
```
import numpy as np
x = np.ones((3,3))
x = np.zeros((8,8),dtype=int)
x[1::2,::2] = 1
x[::2,1::2] = 1
print(x)
```

```
[[0 1 0 1 0 1 0 1]
 [1 0 1 0 1 0 1 0]
 [0 1 0 1 0 1 0 1]
 [1 0 1 0 1 0 1 0]
 [0 1 0 1 0 1 0 1]
 [1 0 1 0 1 0 1 0]
 [0 1 0 1 0 1 0 1]
 [1 0 1 0 1 0 1 0]]
```

1.3.2 Задание

Создать 5x5 матрицу со значениям в строках от 0 до 4. Для создания необходимо использовать функцию arrange

In [4]:
```
import numpy as np
x = np.zeros((5,5))
print(x)
x += np.arange(5)
print(x)
```

```
[[0. 0. 0. 0. 0.]
 [0. 0. 0. 0. 0.]
 [0. 0. 0. 0. 0.]
 [0. 0. 0. 0. 0.]
 [0. 0. 0. 0. 0.]]
[[0. 1. 2. 3. 4.]
 [0. 1. 2. 3. 4.]
 [0. 1. 2. 3. 4.]
 [0. 1. 2. 3. 4.]
 [0. 1. 2. 3. 4.]]
```

1.3.3 Задание

Создать массив 3x3x3 со случайными значениями.

In [5]:
```
import numpy as np
x = np.random.random((3,3,3))
print(x)
```

```
[[[0.98039893 0.32324522 0.77474913]
  [0.99124734 0.70892177 0.94913296]
  [0.28509611 0.3056153  0.48023926]]

 [[0.55069498 0.65658093 0.64084519]
  [0.36770385 0.302962   0.87139646]
  [0.02247916 0.73756478 0.60114327]]

 [[0.47173596 0.80779656 0.95170412]
  [0.46535999 0.03319642 0.02929463]
  [0.52954788 0.24380598 0.72048134]]]
```

1.3.4 Задание

Создать матрицу с 0 внутри, и 1 на границах

In [8]:
```
x = np.zeros((5,5))
print(x)
for i in range(5):
    for j in range(5):
        if(i==0)or(j==0)or(i==4)or(j==4):
            x[i][j]=1
print(x)
```

```
[[0. 0. 0. 0. 0.]
 [0. 0. 0. 0. 0.]
 [0. 0. 0. 0. 0.]
 [0. 0. 0. 0. 0.]
 [0. 0. 0. 0. 0.]]
[[1. 1. 1. 1. 1.]
 [1. 0. 0. 0. 1.]
 [1. 0. 0. 0. 1.]
 [1. 0. 0. 0. 1.]
 [1. 1. 1. 1. 1.]]
```

1.3.5 Задание

Создайте массив и отсортируйте его по убыванию.

In [12]:
```
import random
m=10
numbers_list = []
for i in range(m):
    numbers_list.append(random.randint(3,9))
print(f'До сортировки: {numbers_list}')
numbers_list.sort()
print(f'После сортировки:  {numbers_list}')
```

```
Before sorting: [4, 6, 4, 8, 4, 3, 4, 8, 5, 3]
After sorting:  [3, 3, 4, 4, 4, 4, 5, 6, 8, 8]
```

1.3.6 Задание

Создайте матрицу, выведите ее форму, размер и размерность.

In [14]:
```
x = np.zeros((5,5))
print(x)
for i in range(5):
    for j in range(5):
        x[i][j]=random.randint(3,9)
print(x)
print(x.shape)
```

```
[[0. 0. 0. 0. 0.]
 [0. 0. 0. 0. 0.]
 [0. 0. 0. 0. 0.]
 [0. 0. 0. 0. 0.]
 [0. 0. 0. 0. 0.]]
[[8. 7. 5. 9. 7.]
 [4. 4. 6. 9. 4.]
 [8. 8. 6. 7. 4.]
 [5. 7. 6. 8. 8.]
 [4. 8. 7. 7. 8.]]
(5, 5)
```

2.3.1 Задание

Найдитн евклидово расстояние между двумя Series (точками) a и b, не используя встроенную формулу.

In [21]:
```
import pandas as pd
a = pd.Series([2, 4, 6, 8])
b = pd.Series([1, 3, 5, 7])
print(sum((a - b)**2)**.5)
```

```
2.0
```

2.3.2 Задание

Найдите в Интернете ссылку на любой csv файл и сформируйте из него фрейм данных (например, коллекцию фреймов данных можно найти здесь: https://github.com/akmand/datasets).

In [42]:
```
import pandas as pd

url="https://raw.githubusercontent.com/akmand/datasets/main/boston_housing.csv"
c=pd.read_csv(url)
pd.set_option('display.max_rows', None)
pd.set_option('display.max_columns', None)
pd.set_option('display.max_colwidth', None)
print(c)
```

```
      crim    zn  indus  chas    nox     rm   age     dis  rad  tax  \
0    0.006  18.0   2.31     0  0.538  6.575  65.2   4.090    1  296
```

1	0.027	0.0	7.07	0	0.469	6.421	78.9	4.967	2	242
2	0.027	0.0	7.07	0	0.469	7.185	61.1	4.967	2	242
3	0.032	0.0	2.18	0	0.458	6.998	45.8	6.062	3	222
4	0.069	0.0	2.18	0	0.458	7.147	54.2	6.062	3	222
5	0.030	0.0	2.18	0	0.458	6.430	58.7	6.062	3	222
6	0.088	12.5	7.87	0	0.524	6.012	66.6	5.560	5	311
7	0.145	12.5	7.87	0	0.524	6.172	96.1	5.950	5	311
8	0.211	12.5	7.87	0	0.524	5.631	100.0	6.082	5	311
9	0.170	12.5	7.87	0	0.524	6.004	85.9	6.592	5	311
10	0.225	12.5	7.87	0	0.524	6.377	94.3	6.347	5	311
11	0.117	12.5	7.87	0	0.524	6.009	82.9	6.227	5	311
12	0.094	12.5	7.87	0	0.524	5.889	39.0	5.451	5	311
13	0.630	0.0	8.14	0	0.538	5.949	61.8	4.707	4	307
14	0.638	0.0	8.14	0	0.538	6.096	84.5	4.462	4	307
15	0.627	0.0	8.14	0	0.538	5.834	56.5	4.499	4	307
16	1.054	0.0	8.14	0	0.538	5.935	29.3	4.499	4	307
17	0.784	0.0	8.14	0	0.538	5.990	81.7	4.258	4	307
18	0.803	0.0	8.14	0	0.538	5.456	36.6	3.796	4	307
19	0.726	0.0	8.14	0	0.538	5.727	69.5	3.796	4	307
20	1.252	0.0	8.14	0	0.538	5.570	98.1	3.798	4	307
21	0.852	0.0	8.14	0	0.538	5.965	89.2	4.012	4	307
22	1.232	0.0	8.14	0	0.538	6.142	91.7	3.977	4	307
23	0.988	0.0	8.14	0	0.538	5.813	100.0	4.095	4	307
24	0.750	0.0	8.14	0	0.538	5.924	94.1	4.400	4	307
25	0.841	0.0	8.14	0	0.538	5.599	85.7	4.455	4	307
26	0.672	0.0	8.14	0	0.538	5.813	90.3	4.682	4	307
27	0.956	0.0	8.14	0	0.538	6.047	88.8	4.453	4	307
28	0.773	0.0	8.14	0	0.538	6.495	94.4	4.455	4	307
29	1.002	0.0	8.14	0	0.538	6.674	87.3	4.239	4	307
30	1.131	0.0	8.14	0	0.538	5.713	94.1	4.233	4	307
31	1.355	0.0	8.14	0	0.538	6.072	100.0	4.175	4	307
32	1.388	0.0	8.14	0	0.538	5.950	82.0	3.990	4	307
33	1.152	0.0	8.14	0	0.538	5.701	95.0	3.787	4	307
34	1.613	0.0	8.14	0	0.538	6.096	96.9	3.760	4	307
35	0.064	0.0	5.96	0	0.499	5.933	68.2	3.360	5	279
36	0.097	0.0	5.96	0	0.499	5.841	61.4	3.378	5	279
37	0.080	0.0	5.96	0	0.499	5.850	41.5	3.934	5	279
38	0.175	0.0	5.96	0	0.499	5.966	30.2	3.847	5	279
39	0.028	75.0	2.95	0	0.428	6.595	21.8	5.401	3	252
40	0.034	75.0	2.95	0	0.428	7.024	15.8	5.401	3	252
41	0.127	0.0	6.91	0	0.448	6.770	2.9	5.721	3	233
42	0.141	0.0	6.91	0	0.448	6.169	6.6	5.721	3	233
43	0.159	0.0	6.91	0	0.448	6.211	6.5	5.721	3	233
44	0.123	0.0	6.91	0	0.448	6.069	40.0	5.721	3	233
45	0.171	0.0	6.91	0	0.448	5.682	33.8	5.100	3	233
46	0.188	0.0	6.91	0	0.448	5.786	33.3	5.100	3	233
47	0.229	0.0	6.91	0	0.448	6.030	85.5	5.689	3	233
48	0.254	0.0	6.91	0	0.448	5.399	95.3	5.870	3	233
49	0.220	0.0	6.91	0	0.448	5.602	62.0	6.088	3	233
50	0.089	21.0	5.64	0	0.439	5.963	45.7	6.815	4	243
51	0.043	21.0	5.64	0	0.439	6.115	63.0	6.815	4	243
52	0.054	21.0	5.64	0	0.439	6.511	21.1	6.815	4	243
53	0.050	21.0	5.64	0	0.439	5.998	21.4	6.815	4	243
54	0.014	75.0	4.00	0	0.410	5.888	47.6	7.320	3	469
55	0.013	90.0	1.22	0	0.403	7.249	21.9	8.697	5	226
56	0.021	85.0	0.74	0	0.410	6.383	35.7	9.188	2	313
57	0.014	100.0	1.32	0	0.411	6.816	40.5	8.325	5	256
58	0.154	25.0	5.13	0	0.453	6.145	29.2	7.815	8	284
59	0.103	25.0	5.13	0	0.453	5.927	47.2	6.932	8	284
60	0.149	25.0	5.13	0	0.453	5.741	66.2	7.225	8	284
61	0.172	25.0	5.13	0	0.453	5.966	93.4	6.818	8	284
62	0.110	25.0	5.13	0	0.453	6.456	67.8	7.225	8	284
63	0.126	25.0	5.13	0	0.453	6.762	43.4	7.981	8	284
64	0.020	17.5	1.38	0	0.416	7.104	59.5	9.223	3	216
65	0.036	80.0	3.37	0	0.398	6.290	17.8	6.611	4	337
66	0.044	80.0	3.37	0	0.398	5.787	31.1	6.611	4	337
67	0.058	12.5	6.07	0	0.409	5.878	21.4	6.498	4	345
68	0.136	12.5	6.07	0	0.409	5.594	36.8	6.498	4	345
69	0.128	12.5	6.07	0	0.409	5.885	33.0	6.498	4	345
70	0.088	0.0	10.81	0	0.413	6.417	6.6	5.287	4	305
71	0.159	0.0	10.81	0	0.413	5.961	17.5	5.287	4	305
72	0.092	0.0	10.81	0	0.413	6.065	7.8	5.287	4	305
73	0.195	0.0	10.81	0	0.413	6.245	6.2	5.287	4	305
74	0.079	0.0	12.83	0	0.437	6.273	6.0	4.251	5	398
75	0.095	0.0	12.83	0	0.437	6.286	45.0	4.503	5	398
76	0.102	0.0	12.83	0	0.437	6.279	74.5	4.052	5	398
77	0.087	0.0	12.83	0	0.437	6.140	45.8	4.090	5	398
78	0.056	0.0	12.83	0	0.437	6.232	53.7	5.014	5	398
79	0.084	0.0	12.83	0	0.437	5.874	36.6	4.503	5	398
80	0.041	25.0	4.86	0	0.426	6.727	33.5	5.401	4	281
81	0.045	25.0	4.86	0	0.426	6.619	70.4	5.401	4	281
82	0.037	25.0	4.86	0	0.426	6.302	32.2	5.401	4	281
83	0.036	25.0	4.86	0	0.426	6.167	46.7	5.401	4	281
84	0.051	0.0	4.49	0	0.449	6.389	48.0	4.779	3	247
85	0.057	0.0	4.49	0	0.449	6.630	56.1	4.438	3	247
86	0.052	0.0	4.49	0	0.449	6.015	45.1	4.427	3	247
87	0.072	0.0	4.49	0	0.449	6.121	56.8	3.748	3	247
88	0.057	0.0	3.41	0	0.489	7.007	86.3	3.422	2	270
89	0.053	0.0	3.41	0	0.489	7.079	63.1	3.414	2	270

90	0.047	0.0	3.41	0	0.489	6.417	66.1	3.092	2	270
91	0.039	0.0	3.41	0	0.489	6.405	73.9	3.092	2	270
92	0.042	28.0	15.04	0	0.464	6.442	53.6	3.666	4	270
93	0.029	28.0	15.04	0	0.464	6.211	28.9	3.666	4	270
94	0.043	28.0	15.04	0	0.464	6.249	77.3	3.615	4	270
95	0.122	0.0	2.89	0	0.445	6.625	57.8	3.495	2	276
96	0.115	0.0	2.89	0	0.445	6.163	69.6	3.495	2	276
97	0.121	0.0	2.89	0	0.445	8.069	76.0	3.495	2	276
98	0.082	0.0	2.89	0	0.445	7.820	36.9	3.495	2	276
99	0.069	0.0	2.89	0	0.445	7.416	62.5	3.495	2	276
100	0.149	0.0	8.56	0	0.520	6.727	79.9	2.778	5	384
101	0.114	0.0	8.56	0	0.520	6.781	71.3	2.856	5	384
102	0.229	0.0	8.56	0	0.520	6.405	85.4	2.715	5	384
103	0.212	0.0	8.56	0	0.520	6.137	87.4	2.715	5	384
104	0.140	0.0	8.56	0	0.520	6.167	90.0	2.421	5	384
105	0.133	0.0	8.56	0	0.520	5.851	96.7	2.107	5	384
106	0.171	0.0	8.56	0	0.520	5.836	91.9	2.211	5	384
107	0.131	0.0	8.56	0	0.520	6.127	85.2	2.122	5	384
108	0.128	0.0	8.56	0	0.520	6.474	97.1	2.433	5	384
109	0.264	0.0	8.56	0	0.520	6.229	91.2	2.545	5	384
110	0.108	0.0	8.56	0	0.520	6.195	54.4	2.778	5	384
111	0.101	0.0	10.01	0	0.547	6.715	81.6	2.677	6	432
112	0.123	0.0	10.01	0	0.547	5.913	92.9	2.353	6	432
113	0.222	0.0	10.01	0	0.547	6.092	95.4	2.548	6	432
114	0.142	0.0	10.01	0	0.547	6.254	84.2	2.256	6	432
115	0.171	0.0	10.01	0	0.547	5.928	88.2	2.463	6	432
116	0.132	0.0	10.01	0	0.547	6.176	72.5	2.730	6	432
117	0.151	0.0	10.01	0	0.547	6.021	82.6	2.747	6	432
118	0.131	0.0	10.01	0	0.547	5.872	73.1	2.477	6	432
119	0.145	0.0	10.01	0	0.547	5.731	65.2	2.759	6	432
120	0.069	0.0	25.65	0	0.581	5.870	69.7	2.258	2	188
121	0.072	0.0	25.65	0	0.581	6.004	84.1	2.197	2	188
122	0.093	0.0	25.65	0	0.581	5.961	92.9	2.087	2	188
123	0.150	0.0	25.65	0	0.581	5.856	97.0	1.944	2	188
124	0.098	0.0	25.65	0	0.581	5.879	95.8	2.006	2	188
125	0.169	0.0	25.65	0	0.581	5.986	88.4	1.993	2	188
126	0.387	0.0	25.65	0	0.581	5.613	95.6	1.757	2	188
127	0.259	0.0	21.89	0	0.624	5.693	96.0	1.788	4	437
128	0.325	0.0	21.89	0	0.624	6.431	98.8	1.812	4	437
129	0.881	0.0	21.89	0	0.624	5.637	94.7	1.980	4	437
130	0.340	0.0	21.89	0	0.624	6.458	98.9	2.118	4	437
131	1.193	0.0	21.89	0	0.624	6.326	97.7	2.271	4	437
132	0.590	0.0	21.89	0	0.624	6.372	97.9	2.327	4	437
133	0.330	0.0	21.89	0	0.624	5.822	95.4	2.470	4	437
134	0.976	0.0	21.89	0	0.624	5.757	98.4	2.346	4	437
135	0.558	0.0	21.89	0	0.624	6.335	98.2	2.111	4	437
136	0.323	0.0	21.89	0	0.624	5.942	93.5	1.967	4	437
137	0.352	0.0	21.89	0	0.624	6.454	98.4	1.850	4	437
138	0.250	0.0	21.89	0	0.624	5.857	98.2	1.669	4	437
139	0.545	0.0	21.89	0	0.624	6.151	97.9	1.669	4	437
140	0.291	0.0	21.89	0	0.624	6.174	93.6	1.612	4	437
141	1.629	0.0	21.89	0	0.624	5.019	100.0	1.439	4	437
142	3.321	0.0	19.58	1	0.871	5.403	100.0	1.322	5	403
143	4.097	0.0	19.58	0	0.871	5.468	100.0	1.412	5	403
144	2.780	0.0	19.58	0	0.871	4.903	97.8	1.346	5	403
145	2.379	0.0	19.58	0	0.871	6.130	100.0	1.419	5	403
146	2.155	0.0	19.58	0	0.871	5.628	100.0	1.517	5	403
147	2.369	0.0	19.58	0	0.871	4.926	95.7	1.461	5	403
148	2.331	0.0	19.58	0	0.871	5.186	93.8	1.530	5	403
149	2.734	0.0	19.58	0	0.871	5.597	94.9	1.526	5	403
150	1.657	0.0	19.58	0	0.871	6.122	97.3	1.618	5	403
151	1.496	0.0	19.58	0	0.871	5.404	100.0	1.592	5	403
152	1.127	0.0	19.58	1	0.871	5.012	88.0	1.610	5	403
153	2.149	0.0	19.58	0	0.871	5.709	98.5	1.623	5	403
154	1.414	0.0	19.58	1	0.871	6.129	96.0	1.749	5	403
155	3.535	0.0	19.58	1	0.871	6.152	82.6	1.745	5	403
156	2.447	0.0	19.58	0	0.871	5.272	94.0	1.736	5	403
157	1.224	0.0	19.58	0	0.605	6.943	97.4	1.877	5	403
158	1.343	0.0	19.58	0	0.605	6.066	100.0	1.757	5	403
159	1.425	0.0	19.58	0	0.871	6.510	100.0	1.766	5	403
160	1.273	0.0	19.58	1	0.605	6.250	92.6	1.798	5	403
161	1.463	0.0	19.58	0	0.605	7.489	90.8	1.971	5	403
162	1.834	0.0	19.58	1	0.605	7.802	98.2	2.041	5	403
163	1.519	0.0	19.58	1	0.605	8.375	93.9	2.162	5	403
164	2.242	0.0	19.58	0	0.605	5.854	91.8	2.422	5	403
165	2.924	0.0	19.58	0	0.605	6.101	93.0	2.283	5	403
166	2.010	0.0	19.58	0	0.605	7.929	96.2	2.046	5	403
167	1.800	0.0	19.58	0	0.605	5.877	79.2	2.426	5	403
168	2.300	0.0	19.58	0	0.605	6.319	96.1	2.100	5	403
169	2.450	0.0	19.58	0	0.605	6.402	95.2	2.262	5	403
170	1.207	0.0	19.58	0	0.605	5.875	94.6	2.426	5	403
171	2.314	0.0	19.58	0	0.605	5.880	97.3	2.389	5	403
172	0.139	0.0	4.05	0	0.510	5.572	88.5	2.596	5	296
173	0.092	0.0	4.05	0	0.510	6.416	84.1	2.646	5	296
174	0.084	0.0	4.05	0	0.510	5.859	68.7	2.702	5	296
175	0.067	0.0	4.05	0	0.510	6.546	33.1	3.132	5	296
176	0.070	0.0	4.05	0	0.510	6.020	47.2	3.555	5	296
177	0.054	0.0	4.05	0	0.510	6.315	73.4	3.317	5	296
178	0.066	0.0	4.05	0	0.510	6.860	74.4	2.915	5	296

179	0.058	0.0	2.46	0	0.488	6.980	58.4	2.829	3	193
180	0.066	0.0	2.46	0	0.488	7.765	83.3	2.741	3	193
181	0.069	0.0	2.46	0	0.488	6.144	62.2	2.598	3	193
182	0.091	0.0	2.46	0	0.488	7.155	92.2	2.701	3	193
183	0.100	0.0	2.46	0	0.488	6.563	95.6	2.847	3	193
184	0.083	0.0	2.46	0	0.488	5.604	89.8	2.988	3	193
185	0.060	0.0	2.46	0	0.488	6.153	68.8	3.280	3	193
186	0.056	0.0	2.46	0	0.488	7.831	53.6	3.199	3	193
187	0.079	45.0	3.44	0	0.437	6.782	41.1	3.789	5	398
188	0.126	45.0	3.44	0	0.437	6.556	29.1	4.567	5	398
189	0.084	45.0	3.44	0	0.437	7.185	38.9	4.567	5	398
190	0.091	45.0	3.44	0	0.437	6.951	21.5	6.480	5	398
191	0.069	45.0	3.44	0	0.437	6.739	30.8	6.480	5	398
192	0.087	45.0	3.44	0	0.437	7.178	26.3	6.480	5	398
193	0.022	60.0	2.93	0	0.401	6.800	9.9	6.220	1	265
194	0.014	60.0	2.93	0	0.401	6.604	18.8	6.220	1	265
195	0.014	80.0	0.46	0	0.422	7.875	32.0	5.648	4	255
196	0.040	80.0	1.52	0	0.404	7.287	34.1	7.309	2	329
197	0.047	80.0	1.52	0	0.404	7.107	36.6	7.309	2	329
198	0.038	80.0	1.52	0	0.404	7.274	38.3	7.309	2	329
199	0.031	95.0	1.47	0	0.403	6.975	15.3	7.653	3	402
200	0.018	95.0	1.47	0	0.403	7.135	13.9	7.653	3	402
201	0.034	82.5	2.03	0	0.415	6.162	38.4	6.270	2	348
202	0.022	82.5	2.03	0	0.415	7.610	15.7	6.270	2	348
203	0.035	95.0	2.68	0	0.416	7.853	33.2	5.118	4	224
204	0.020	95.0	2.68	0	0.416	8.034	31.9	5.118	4	224
205	0.136	0.0	10.59	0	0.489	5.891	22.3	3.945	4	277
206	0.230	0.0	10.59	0	0.489	6.326	52.5	4.355	4	277
207	0.252	0.0	10.59	0	0.489	5.783	72.7	4.355	4	277
208	0.136	0.0	10.59	1	0.489	6.064	59.1	4.239	4	277
209	0.436	0.0	10.59	1	0.489	5.344	100.0	3.875	4	277
210	0.174	0.0	10.59	1	0.489	5.960	92.1	3.877	4	277
211	0.376	0.0	10.59	1	0.489	5.404	88.6	3.665	4	277
212	0.217	0.0	10.59	1	0.489	5.807	53.8	3.653	4	277
213	0.141	0.0	10.59	0	0.489	6.375	32.3	3.945	4	277
214	0.290	0.0	10.59	0	0.489	5.412	9.8	3.587	4	277
215	0.198	0.0	10.59	0	0.489	6.182	42.4	3.945	4	277
216	0.046	0.0	13.89	1	0.550	5.888	56.0	3.112	5	276
217	0.070	0.0	13.89	0	0.550	6.642	85.1	3.421	5	276
218	0.111	0.0	13.89	1	0.550	5.951	93.8	2.889	5	276
219	0.114	0.0	13.89	1	0.550	6.373	92.4	3.363	5	276
220	0.358	0.0	6.20	1	0.507	6.951	88.5	2.862	8	307
221	0.408	0.0	6.20	1	0.507	6.164	91.3	3.048	8	307
222	0.624	0.0	6.20	1	0.507	6.879	77.7	3.272	8	307
223	0.615	0.0	6.20	0	0.507	6.618	80.8	3.272	8	307
224	0.315	0.0	6.20	0	0.504	8.266	78.3	2.894	8	307
225	0.527	0.0	6.20	0	0.504	8.725	83.0	2.894	8	307
226	0.382	0.0	6.20	0	0.504	8.040	86.5	3.216	8	307
227	0.412	0.0	6.20	0	0.504	7.163	79.9	3.216	8	307
228	0.298	0.0	6.20	0	0.504	7.686	17.0	3.375	8	307
229	0.442	0.0	6.20	0	0.504	6.552	21.4	3.375	8	307
230	0.537	0.0	6.20	0	0.504	5.981	68.1	3.671	8	307
231	0.463	0.0	6.20	0	0.504	7.412	76.9	3.671	8	307
232	0.575	0.0	6.20	0	0.507	8.337	73.3	3.838	8	307
233	0.331	0.0	6.20	0	0.507	8.247	70.4	3.652	8	307
234	0.448	0.0	6.20	1	0.507	6.726	66.5	3.652	8	307
235	0.330	0.0	6.20	0	0.507	6.086	61.5	3.652	8	307
236	0.521	0.0	6.20	1	0.507	6.631	76.5	4.148	8	307
237	0.512	0.0	6.20	0	0.507	7.358	71.6	4.148	8	307
238	0.082	30.0	4.93	0	0.428	6.481	18.5	6.190	6	300
239	0.093	30.0	4.93	0	0.428	6.606	42.2	6.190	6	300
240	0.113	30.0	4.93	0	0.428	6.897	54.3	6.336	6	300
241	0.106	30.0	4.93	0	0.428	6.095	65.1	6.336	6	300
242	0.103	30.0	4.93	0	0.428	6.358	52.9	7.035	6	300
243	0.128	30.0	4.93	0	0.428	6.393	7.8	7.035	6	300
244	0.206	22.0	5.86	0	0.431	5.593	76.5	7.955	7	330
245	0.191	22.0	5.86	0	0.431	5.605	70.2	7.955	7	330
246	0.340	22.0	5.86	0	0.431	6.108	34.9	8.055	7	330
247	0.197	22.0	5.86	0	0.431	6.226	79.2	8.055	7	330
248	0.164	22.0	5.86	0	0.431	6.433	49.1	7.826	7	330
249	0.191	22.0	5.86	0	0.431	6.718	17.5	7.826	7	330
250	0.140	22.0	5.86	0	0.431	6.487	13.0	7.397	7	330
251	0.214	22.0	5.86	0	0.431	6.438	8.9	7.397	7	330
252	0.082	22.0	5.86	0	0.431	6.957	6.8	8.907	7	330
253	0.369	22.0	5.86	0	0.431	8.259	8.4	8.907	7	330
254	0.048	80.0	3.64	0	0.392	6.108	32.0	9.220	1	315
255	0.035	80.0	3.64	0	0.392	5.876	19.1	9.220	1	315
256	0.015	90.0	3.75	0	0.394	7.454	34.2	6.336	3	244
257	0.612	20.0	3.97	0	0.647	8.704	86.9	1.801	5	264
258	0.664	20.0	3.97	0	0.647	7.333	100.0	1.895	5	264
259	0.657	20.0	3.97	0	0.647	6.842	100.0	2.011	5	264
260	0.540	20.0	3.97	0	0.647	7.203	81.8	2.112	5	264
261	0.534	20.0	3.97	0	0.647	7.520	89.4	2.140	5	264
262	0.520	20.0	3.97	0	0.647	8.398	91.5	2.288	5	264
263	0.825	20.0	3.97	0	0.647	7.327	94.5	2.079	5	264
264	0.550	20.0	3.97	0	0.647	7.206	91.6	1.930	5	264
265	0.762	20.0	3.97	0	0.647	5.560	62.8	1.986	5	264
266	0.786	20.0	3.97	0	0.647	7.014	84.6	2.133	5	264
267	0.578	20.0	3.97	0	0.575	8.297	67.0	2.422	5	264

268	0.540	20.0	3.97	0	0.575	7.470	52.6	2.872	5	264
269	0.091	20.0	6.96	1	0.464	5.920	61.5	3.917	3	223
270	0.299	20.0	6.96	0	0.464	5.856	42.1	4.429	3	223
271	0.162	20.0	6.96	0	0.464	6.240	16.3	4.429	3	223
272	0.115	20.0	6.96	0	0.464	6.538	58.7	3.917	3	223
273	0.222	20.0	6.96	1	0.464	7.691	51.8	4.366	3	223
274	0.056	40.0	6.41	1	0.447	6.758	32.9	4.078	4	254
275	0.096	40.0	6.41	0	0.447	6.854	42.8	4.267	4	254
276	0.105	40.0	6.41	1	0.447	7.267	49.0	4.787	4	254
277	0.061	40.0	6.41	1	0.447	6.826	27.6	4.863	4	254
278	0.080	40.0	6.41	0	0.447	6.482	32.1	4.140	4	254
279	0.210	20.0	3.33	0	0.443	6.812	32.2	4.101	5	216
280	0.036	20.0	3.33	0	0.443	7.820	64.5	4.695	5	216
281	0.037	20.0	3.33	0	0.443	6.968	37.2	5.245	5	216
282	0.061	20.0	3.33	1	0.443	7.645	49.7	5.212	5	216
283	0.015	90.0	1.21	1	0.401	7.923	24.8	5.885	1	198
284	0.009	90.0	2.97	0	0.400	7.088	20.8	7.307	1	285
285	0.011	55.0	2.25	0	0.389	6.453	31.9	7.307	1	300
286	0.020	80.0	1.76	0	0.385	6.230	31.5	9.089	1	241
287	0.039	52.5	5.32	0	0.405	6.209	31.3	7.317	6	293
288	0.046	52.5	5.32	0	0.405	6.315	45.6	7.317	6	293
289	0.043	52.5	5.32	0	0.405	6.565	22.9	7.317	6	293
290	0.035	80.0	4.95	0	0.411	6.861	27.9	5.117	4	245
291	0.079	80.0	4.95	0	0.411	7.148	27.7	5.117	4	245
292	0.036	80.0	4.95	0	0.411	6.630	23.4	5.117	4	245
293	0.083	0.0	13.92	0	0.437	6.127	18.4	5.503	4	289
294	0.082	0.0	13.92	0	0.437	6.009	42.3	5.503	4	289
295	0.129	0.0	13.92	0	0.437	6.678	31.1	5.960	4	289
296	0.054	0.0	13.92	0	0.437	6.549	51.0	5.960	4	289
297	0.141	0.0	13.92	0	0.437	5.790	58.0	6.320	4	289
298	0.065	70.0	2.24	0	0.400	6.345	20.1	7.828	5	358
299	0.056	70.0	2.24	0	0.400	7.041	10.0	7.828	5	358
300	0.044	70.0	2.24	0	0.400	6.871	47.4	7.828	5	358
301	0.035	34.0	6.09	0	0.433	6.590	40.4	5.492	7	329
302	0.093	34.0	6.09	0	0.433	6.495	18.4	5.492	7	329
303	0.100	34.0	6.09	0	0.433	6.982	17.7	5.492	7	329
304	0.055	33.0	2.18	0	0.472	7.236	41.1	4.022	7	222
305	0.055	33.0	2.18	0	0.472	6.616	58.1	3.370	7	222
306	0.075	33.0	2.18	0	0.472	7.420	71.9	3.099	7	222
307	0.049	33.0	2.18	0	0.472	6.849	70.3	3.183	7	222
308	0.493	0.0	9.90	0	0.544	6.635	82.5	3.317	4	304
309	0.349	0.0	9.90	0	0.544	5.972	76.7	3.102	4	304
310	2.635	0.0	9.90	0	0.544	4.973	37.8	2.519	4	304
311	0.790	0.0	9.90	0	0.544	6.122	52.8	2.640	4	304
312	0.262	0.0	9.90	0	0.544	6.023	90.4	2.834	4	304
313	0.269	0.0	9.90	0	0.544	6.266	82.8	3.263	4	304
314	0.369	0.0	9.90	0	0.544	6.567	87.3	3.602	4	304
315	0.254	0.0	9.90	0	0.544	5.705	77.7	3.945	4	304
316	0.318	0.0	9.90	0	0.544	5.914	83.2	3.999	4	304
317	0.245	0.0	9.90	0	0.544	5.782	71.7	4.032	4	304
318	0.402	0.0	9.90	0	0.544	6.382	67.2	3.532	4	304
319	0.475	0.0	9.90	0	0.544	6.113	58.8	4.002	4	304
320	0.168	0.0	7.38	0	0.493	6.426	52.3	4.540	5	287
321	0.182	0.0	7.38	0	0.493	6.376	54.3	4.540	5	287
322	0.351	0.0	7.38	0	0.493	6.041	49.9	4.721	5	287
323	0.284	0.0	7.38	0	0.493	5.708	74.3	4.721	5	287
324	0.341	0.0	7.38	0	0.493	6.415	40.1	4.721	5	287
325	0.192	0.0	7.38	0	0.493	6.431	14.7	5.416	5	287
326	0.303	0.0	7.38	0	0.493	6.312	28.9	5.416	5	287
327	0.241	0.0	7.38	0	0.493	6.083	43.7	5.416	5	287
328	0.066	0.0	3.24	0	0.460	5.868	25.8	5.215	4	430
329	0.067	0.0	3.24	0	0.460	6.333	17.2	5.215	4	430
330	0.045	0.0	3.24	0	0.460	6.144	32.2	5.874	4	430
331	0.050	35.0	6.06	0	0.438	5.706	28.4	6.641	1	304
332	0.035	35.0	6.06	0	0.438	6.031	23.3	6.641	1	304
333	0.051	0.0	5.19	0	0.515	6.316	38.1	6.458	5	224
334	0.037	0.0	5.19	0	0.515	6.310	38.5	6.458	5	224
335	0.040	0.0	5.19	0	0.515	6.037	34.5	5.985	5	224
336	0.034	0.0	5.19	0	0.515	5.869	46.3	5.231	5	224
337	0.030	0.0	5.19	0	0.515	5.895	59.6	5.615	5	224
338	0.033	0.0	5.19	0	0.515	6.059	37.3	4.812	5	224
339	0.055	0.0	5.19	0	0.515	5.985	45.4	4.812	5	224
340	0.062	0.0	5.19	0	0.515	5.968	58.5	4.812	5	224
341	0.013	35.0	1.52	0	0.442	7.241	49.3	7.038	1	284
342	0.025	0.0	1.89	0	0.518	6.540	59.7	6.267	1	422
343	0.025	55.0	3.78	0	0.484	6.696	56.4	5.732	5	370
344	0.030	55.0	3.78	0	0.484	6.874	28.1	6.465	5	370
345	0.031	0.0	4.39	0	0.442	6.014	48.5	8.014	3	352
346	0.062	0.0	4.39	0	0.442	5.898	52.3	8.014	3	352
347	0.019	85.0	4.15	0	0.429	6.516	27.7	8.535	4	351
348	0.015	80.0	2.01	0	0.435	6.635	29.7	8.344	4	280
349	0.029	40.0	1.25	0	0.429	6.939	34.5	8.792	1	335
350	0.062	40.0	1.25	0	0.429	6.490	44.4	8.792	1	335
351	0.079	60.0	1.69	0	0.411	6.579	35.9	10.710	4	411
352	0.072	60.0	1.69	0	0.411	5.884	18.5	10.710	4	411
353	0.017	90.0	2.02	0	0.410	6.728	36.1	12.126	5	187
354	0.043	80.0	1.91	0	0.413	5.663	21.9	10.586	4	334
355	0.107	80.0	1.91	0	0.413	5.936	19.5	10.586	4	334
356	8.983	0.0	18.10	1	0.770	6.212	97.4	2.122	24	666

357	3.850	0.0	18.10	1	0.770	6.395	91.0	2.505	24	666
358	5.202	0.0	18.10	1	0.770	6.127	83.4	2.723	24	666
359	4.261	0.0	18.10	0	0.770	6.112	81.3	2.509	24	666
360	4.542	0.0	18.10	0	0.770	6.398	88.0	2.518	24	666
361	3.837	0.0	18.10	0	0.770	6.251	91.1	2.295	24	666
362	3.678	0.0	18.10	0	0.770	5.362	96.2	2.104	24	666
363	4.222	0.0	18.10	1	0.770	5.803	89.0	1.905	24	666
364	3.474	0.0	18.10	1	0.718	8.780	82.9	1.905	24	666
365	4.556	0.0	18.10	0	0.718	3.561	87.9	1.613	24	666
366	3.697	0.0	18.10	0	0.718	4.963	91.4	1.752	24	666
367	13.522	0.0	18.10	0	0.631	3.863	100.0	1.511	24	666
368	4.898	0.0	18.10	0	0.631	4.970	100.0	1.332	24	666
369	5.670	0.0	18.10	1	0.631	6.683	96.8	1.357	24	666
370	6.539	0.0	18.10	1	0.631	7.016	97.5	1.202	24	666
371	9.232	0.0	18.10	0	0.631	6.216	100.0	1.169	24	666
372	8.267	0.0	18.10	1	0.668	5.875	89.6	1.130	24	666
373	11.108	0.0	18.10	0	0.668	4.906	100.0	1.174	24	666
374	18.498	0.0	18.10	0	0.668	4.138	100.0	1.137	24	666
375	19.609	0.0	18.10	0	0.671	7.313	97.9	1.316	24	666
376	15.288	0.0	18.10	0	0.671	6.649	93.3	1.345	24	666
377	9.823	0.0	18.10	0	0.671	6.794	98.8	1.358	24	666
378	23.648	0.0	18.10	0	0.671	6.380	96.2	1.386	24	666
379	17.867	0.0	18.10	0	0.671	6.223	100.0	1.386	24	666
380	88.976	0.0	18.10	0	0.671	6.968	91.9	1.416	24	666
381	15.874	0.0	18.10	0	0.671	6.545	99.1	1.519	24	666
382	9.187	0.0	18.10	0	0.700	5.536	100.0	1.580	24	666
383	7.992	0.0	18.10	0	0.700	5.520	100.0	1.533	24	666
384	20.085	0.0	18.10	0	0.700	4.368	91.2	1.439	24	666
385	16.812	0.0	18.10	0	0.700	5.277	98.1	1.426	24	666
386	24.394	0.0	18.10	0	0.700	4.652	100.0	1.467	24	666
387	22.597	0.0	18.10	0	0.700	5.000	89.5	1.518	24	666
388	14.334	0.0	18.10	0	0.700	4.880	100.0	1.589	24	666
389	8.152	0.0	18.10	0	0.700	5.390	98.9	1.728	24	666
390	6.962	0.0	18.10	0	0.700	5.713	97.0	1.926	24	666
391	5.293	0.0	18.10	0	0.700	6.051	82.5	2.168	24	666
392	11.578	0.0	18.10	0	0.700	5.036	97.0	1.770	24	666
393	8.645	0.0	18.10	0	0.693	6.193	92.6	1.791	24	666
394	13.360	0.0	18.10	0	0.693	5.887	94.7	1.782	24	666
395	8.717	0.0	18.10	0	0.693	6.471	98.8	1.726	24	666
396	5.872	0.0	18.10	0	0.693	6.405	96.0	1.677	24	666
397	7.672	0.0	18.10	0	0.693	5.747	98.9	1.633	24	666
398	38.352	0.0	18.10	0	0.693	5.453	100.0	1.490	24	666
399	9.917	0.0	18.10	0	0.693	5.852	77.8	1.500	24	666
400	25.046	0.0	18.10	0	0.693	5.987	100.0	1.589	24	666
401	14.236	0.0	18.10	0	0.693	6.343	100.0	1.574	24	666
402	9.596	0.0	18.10	0	0.693	6.404	100.0	1.639	24	666
403	24.802	0.0	18.10	0	0.693	5.349	96.0	1.703	24	666
404	41.529	0.0	18.10	0	0.693	5.531	85.4	1.607	24	666
405	67.920	0.0	18.10	0	0.693	5.683	100.0	1.425	24	666
406	20.716	0.0	18.10	0	0.659	4.138	100.0	1.178	24	666
407	11.951	0.0	18.10	0	0.659	5.608	100.0	1.285	24	666
408	7.404	0.0	18.10	0	0.597	5.617	97.9	1.455	24	666
409	14.438	0.0	18.10	0	0.597	6.852	100.0	1.465	24	666
410	51.136	0.0	18.10	0	0.597	5.757	100.0	1.413	24	666
411	14.051	0.0	18.10	0	0.597	6.657	100.0	1.527	24	666
412	18.811	0.0	18.10	0	0.597	4.628	100.0	1.554	24	666
413	28.656	0.0	18.10	0	0.597	5.155	100.0	1.589	24	666
414	45.746	0.0	18.10	0	0.693	4.519	100.0	1.658	24	666
415	18.085	0.0	18.10	0	0.679	6.434	100.0	1.835	24	666
416	10.834	0.0	18.10	0	0.679	6.782	90.8	1.819	24	666
417	25.941	0.0	18.10	0	0.679	5.304	89.1	1.647	24	666
418	73.534	0.0	18.10	0	0.679	5.957	100.0	1.803	24	666
419	11.812	0.0	18.10	0	0.718	6.824	76.5	1.794	24	666
420	11.087	0.0	18.10	0	0.718	6.411	100.0	1.859	24	666
421	7.023	0.0	18.10	0	0.718	6.006	95.3	1.875	24	666
422	12.048	0.0	18.10	0	0.614	5.648	87.6	1.951	24	666
423	7.050	0.0	18.10	0	0.614	6.103	85.1	2.022	24	666
424	8.792	0.0	18.10	0	0.584	5.565	70.6	2.063	24	666
425	15.860	0.0	18.10	0	0.679	5.896	95.4	1.910	24	666
426	12.247	0.0	18.10	0	0.584	5.837	59.7	1.998	24	666
427	37.662	0.0	18.10	0	0.679	6.202	78.7	1.863	24	666
428	7.367	0.0	18.10	0	0.679	6.193	78.1	1.936	24	666
429	9.339	0.0	18.10	0	0.679	6.380	95.6	1.968	24	666
430	8.492	0.0	18.10	0	0.584	6.348	86.1	2.053	24	666
431	10.062	0.0	18.10	0	0.584	6.833	94.3	2.088	24	666
432	6.444	0.0	18.10	0	0.584	6.425	74.8	2.200	24	666
433	5.581	0.0	18.10	0	0.713	6.436	87.9	2.316	24	666
434	13.913	0.0	18.10	0	0.713	6.208	95.0	2.222	24	666
435	11.160	0.0	18.10	0	0.740	6.629	94.6	2.125	24	666
436	14.421	0.0	18.10	0	0.740	6.461	93.3	2.003	24	666
437	15.177	0.0	18.10	0	0.740	6.152	100.0	1.914	24	666
438	13.678	0.0	18.10	0	0.740	5.935	87.9	1.821	24	666
439	9.391	0.0	18.10	0	0.740	5.627	93.9	1.817	24	666
440	22.051	0.0	18.10	0	0.740	5.818	92.4	1.866	24	666
441	9.724	0.0	18.10	0	0.740	6.406	97.2	2.065	24	666
442	5.666	0.0	18.10	0	0.740	6.219	100.0	2.005	24	666
443	9.966	0.0	18.10	0	0.740	6.485	100.0	1.978	24	666
444	12.802	0.0	18.10	0	0.740	5.854	96.6	1.896	24	666
445	10.672	0.0	18.10	0	0.740	6.459	94.8	1.988	24	666

446	6.288	0.0	18.10	0	0.740	6.341	96.4	2.072	24	666
447	9.925	0.0	18.10	0	0.740	6.251	96.6	2.198	24	666
448	9.329	0.0	18.10	0	0.713	6.185	98.7	2.262	24	666
449	7.526	0.0	18.10	0	0.713	6.417	98.3	2.185	24	666
450	6.718	0.0	18.10	0	0.713	6.749	92.6	2.324	24	666
451	5.441	0.0	18.10	0	0.713	6.655	98.2	2.355	24	666
452	5.090	0.0	18.10	0	0.713	6.297	91.8	2.368	24	666
453	8.248	0.0	18.10	0	0.713	7.393	99.3	2.453	24	666
454	9.514	0.0	18.10	0	0.713	6.728	94.1	2.496	24	666
455	4.752	0.0	18.10	0	0.713	6.525	86.5	2.436	24	666
456	4.669	0.0	18.10	0	0.713	5.976	87.9	2.581	24	666
457	8.201	0.0	18.10	0	0.713	5.936	80.3	2.779	24	666
458	7.752	0.0	18.10	0	0.713	6.301	83.7	2.783	24	666
459	6.801	0.0	18.10	0	0.713	6.081	84.4	2.717	24	666
460	4.812	0.0	18.10	0	0.713	6.701	90.0	2.597	24	666
461	3.693	0.0	18.10	0	0.713	6.376	88.4	2.567	24	666
462	6.655	0.0	18.10	0	0.713	6.317	83.0	2.734	24	666
463	5.821	0.0	18.10	0	0.713	6.513	89.9	2.802	24	666
464	7.839	0.0	18.10	0	0.655	6.209	65.4	2.963	24	666
465	3.164	0.0	18.10	0	0.655	5.759	48.2	3.066	24	666
466	3.775	0.0	18.10	0	0.655	5.952	84.7	2.871	24	666
467	4.422	0.0	18.10	0	0.584	6.003	94.5	2.540	24	666
468	15.576	0.0	18.10	0	0.580	5.926	71.0	2.908	24	666
469	13.075	0.0	18.10	0	0.580	5.713	56.7	2.824	24	666
470	4.349	0.0	18.10	0	0.580	6.167	84.0	3.033	24	666
471	4.038	0.0	18.10	0	0.532	6.229	90.7	3.099	24	666
472	3.569	0.0	18.10	0	0.580	6.437	75.0	2.896	24	666
473	4.647	0.0	18.10	0	0.614	6.980	67.6	2.533	24	666
474	8.056	0.0	18.10	0	0.584	5.427	95.4	2.430	24	666
475	6.393	0.0	18.10	0	0.584	6.162	97.4	2.206	24	666
476	4.871	0.0	18.10	0	0.614	6.484	93.6	2.305	24	666
477	15.023	0.0	18.10	0	0.614	5.304	97.3	2.101	24	666
478	10.233	0.0	18.10	0	0.614	6.185	96.7	2.170	24	666
479	14.334	0.0	18.10	0	0.614	6.229	88.0	1.951	24	666
480	5.824	0.0	18.10	0	0.532	6.242	64.7	3.424	24	666
481	5.708	0.0	18.10	0	0.532	6.750	74.9	3.332	24	666
482	5.731	0.0	18.10	0	0.532	7.061	77.0	3.411	24	666
483	2.818	0.0	18.10	0	0.532	5.762	40.3	4.098	24	666
484	2.379	0.0	18.10	0	0.583	5.871	41.9	3.724	24	666
485	3.674	0.0	18.10	0	0.583	6.312	51.9	3.992	24	666
486	5.692	0.0	18.10	0	0.583	6.114	79.8	3.546	24	666
487	4.836	0.0	18.10	0	0.583	5.905	53.2	3.152	24	666
488	0.151	0.0	27.74	0	0.609	5.454	92.7	1.821	4	711
489	0.183	0.0	27.74	0	0.609	5.414	98.3	1.755	4	711
490	0.207	0.0	27.74	0	0.609	5.093	98.0	1.823	4	711
491	0.106	0.0	27.74	0	0.609	5.983	98.8	1.868	4	711
492	0.111	0.0	27.74	0	0.609	5.983	83.5	2.110	4	711
493	0.173	0.0	9.69	0	0.585	5.707	54.0	2.382	6	391
494	0.280	0.0	9.69	0	0.585	5.926	42.6	2.382	6	391
495	0.179	0.0	9.69	0	0.585	5.670	28.8	2.799	6	391
496	0.290	0.0	9.69	0	0.585	5.390	72.9	2.799	6	391
497	0.268	0.0	9.69	0	0.585	5.794	70.6	2.893	6	391
498	0.239	0.0	9.69	0	0.585	6.019	65.3	2.409	6	391
499	0.178	0.0	9.69	0	0.585	5.569	73.5	2.400	6	391
500	0.224	0.0	9.69	0	0.585	6.027	79.7	2.498	6	391
501	0.063	0.0	11.93	0	0.573	6.593	69.1	2.479	1	273
502	0.045	0.0	11.93	0	0.573	6.120	76.7	2.287	1	273
503	0.061	0.0	11.93	0	0.573	6.976	91.0	2.167	1	273
504	0.110	0.0	11.93	0	0.573	6.794	89.3	2.389	1	273
505	0.047	0.0	11.93	0	0.573	6.030	80.8	2.505	1	273

	ptratio	bbtown	lstat	medv
0	15.3	396.898	4.98	24.0
1	17.8	396.898	9.14	21.6
2	17.8	392.828	4.03	34.7
3	18.7	394.629	2.94	33.4
4	18.7	396.898	5.33	36.2
5	18.7	394.119	5.21	28.7
6	15.2	395.600	12.43	22.9
7	15.2	396.898	19.15	27.1
8	15.2	386.629	29.93	16.5
9	15.2	386.709	17.10	18.9
10	15.2	392.520	20.45	15.0
11	15.2	396.898	13.27	18.9
12	15.2	390.500	15.71	21.7
13	21.0	396.898	8.26	20.4
14	21.0	380.020	10.26	18.2
15	21.0	395.619	8.47	19.9
16	21.0	386.850	6.58	23.1
17	21.0	386.750	14.67	17.5
18	21.0	288.988	11.69	20.2
19	21.0	390.949	11.28	18.2
20	21.0	376.568	21.02	13.6
21	21.0	392.529	13.83	19.6
22	21.0	396.898	18.72	15.2
23	21.0	394.539	19.88	14.5
24	21.0	394.328	16.30	15.6
25	21.0	303.420	16.51	13.9
26	21.0	376.879	14.81	16.6

27	21.0	306.379	17.28	14.8
28	21.0	387.939	12.80	18.4
29	21.0	380.229	11.98	21.0
30	21.0	360.170	22.60	12.7
31	21.0	376.729	13.04	14.5
32	21.0	232.600	27.71	13.2
33	21.0	358.770	18.35	13.1
34	21.0	248.310	20.34	13.5
35	19.2	396.898	9.68	18.9
36	19.2	377.559	11.41	20.0
37	19.2	396.898	8.77	21.0
38	19.2	393.430	10.13	24.7
39	18.3	395.629	4.32	30.8
40	18.3	395.619	1.98	34.9
41	17.9	385.408	4.84	26.6
42	17.9	383.369	5.81	25.3
43	17.9	394.459	7.44	24.7
44	17.9	389.389	9.55	21.2
45	17.9	396.898	10.21	19.3
46	17.9	396.898	14.15	20.0
47	17.9	392.738	18.80	16.6
48	17.9	396.898	30.81	14.4
49	17.9	396.898	16.20	19.4
50	16.8	395.559	13.45	19.7
51	16.8	393.969	9.43	20.5
52	16.8	396.898	5.28	25.0
53	16.8	396.898	8.43	23.4
54	21.1	396.898	14.80	18.9
55	17.9	395.930	4.81	35.4
56	17.3	396.898	5.77	24.7
57	15.1	392.898	3.95	31.6
58	19.7	390.680	6.86	23.3
59	19.7	396.898	9.22	19.6
60	19.7	395.109	13.15	18.7
61	19.7	378.078	14.44	16.0
62	19.7	396.898	6.73	22.2
63	19.7	395.578	9.50	25.0
64	18.6	393.238	8.05	33.0
65	16.1	396.898	4.67	23.5
66	16.1	396.898	10.24	19.4
67	18.9	396.209	8.10	22.0
68	18.9	396.898	13.09	17.4
69	18.9	396.898	8.79	20.9
70	19.2	383.729	6.72	24.2
71	19.2	376.939	9.88	21.7
72	19.2	390.908	5.52	22.8
73	19.2	377.170	7.54	23.4
74	18.7	394.920	6.78	24.1
75	18.7	383.229	8.94	21.4
76	18.7	373.658	11.97	20.0
77	18.7	386.959	10.27	20.8
78	18.7	386.398	12.34	21.2
79	18.7	396.059	9.10	20.3
80	19.0	396.898	5.29	28.0
81	19.0	395.629	7.22	23.9
82	19.0	396.898	6.72	24.8
83	19.0	390.639	7.51	22.9
84	18.5	396.898	9.62	23.9
85	18.5	392.299	6.53	26.6
86	18.5	395.988	12.86	22.5
87	18.5	395.148	8.44	22.2
88	17.8	396.898	5.50	23.6
89	17.8	396.059	5.70	28.7
90	17.8	392.180	8.81	22.6
91	17.8	393.549	8.20	22.0
92	18.2	395.010	8.16	22.9
93	18.2	396.328	6.21	25.0
94	18.2	396.898	10.59	20.6
95	18.0	357.979	6.65	28.4
96	18.0	391.828	11.34	21.4
97	18.0	396.898	4.21	38.7
98	18.0	393.529	3.57	43.8
99	18.0	396.898	6.19	33.2
100	20.9	394.760	9.42	27.5
101	20.9	395.578	7.67	26.5
102	20.9	70.800	10.63	18.6
103	20.9	394.469	13.44	19.3
104	20.9	392.689	12.33	20.1
105	20.9	394.049	16.47	19.5
106	20.9	395.670	18.66	19.5
107	20.9	387.689	14.09	20.4
108	20.9	395.238	12.27	19.8
109	20.9	391.229	15.55	19.4
110	20.9	393.488	13.00	21.7
111	17.8	395.590	10.16	22.8
112	17.8	394.949	16.21	18.8
113	17.8	396.898	17.09	18.7
114	17.8	388.738	10.45	18.5
115	17.8	344.908	15.76	18.3

116	17.8	393.299	12.04	21.2
117	17.8	394.510	10.30	19.2
118	17.8	338.629	15.37	20.4
119	17.8	391.500	13.61	19.3
120	19.1	389.148	14.37	22.0
121	19.1	377.670	14.27	20.3
122	19.1	378.090	17.93	20.5
123	19.1	370.309	25.41	17.3
124	19.1	379.379	17.58	18.8
125	19.1	385.020	14.81	21.4
126	19.1	359.289	27.26	15.7
127	21.2	392.109	17.19	16.2
128	21.2	396.898	15.39	18.0
129	21.2	396.898	18.34	14.3
130	21.2	395.039	12.60	19.2
131	21.2	396.898	12.26	19.6
132	21.2	385.760	11.12	23.0
133	21.2	388.689	15.03	18.4
134	21.2	262.760	17.31	15.6
135	21.2	394.670	16.96	18.1
136	21.2	378.250	16.90	17.4
137	21.2	394.078	14.59	17.1
138	21.2	392.039	21.32	13.3
139	21.2	396.898	18.46	17.8
140	21.2	388.078	24.16	14.0
141	21.2	396.898	34.41	14.4
142	14.7	396.898	26.82	13.4
143	14.7	396.898	26.42	15.6
144	14.7	396.898	29.29	11.8
145	14.7	172.909	27.80	13.8
146	14.7	169.270	16.65	15.6
147	14.7	391.709	29.53	14.6
148	14.7	356.988	28.32	17.8
149	14.7	351.850	21.45	15.4
150	14.7	372.799	14.10	21.5
151	14.7	341.600	13.28	19.6
152	14.7	343.279	12.12	15.3
153	14.7	261.949	15.79	19.4
154	14.7	321.020	15.12	17.0
155	14.7	88.010	15.02	15.6
156	14.7	88.630	16.14	13.1
157	14.7	363.430	4.59	41.3
158	14.7	353.889	6.43	24.3
159	14.7	364.309	7.39	23.3
160	14.7	338.920	5.50	27.0
161	14.7	374.430	1.73	50.0
162	14.7	389.609	1.92	50.0
163	14.7	388.449	3.32	50.0
164	14.7	395.109	11.64	22.7
165	14.7	240.159	9.81	25.0
166	14.7	369.299	3.70	50.0
167	14.7	227.609	12.14	23.8
168	14.7	297.090	11.10	23.8
169	14.7	330.039	11.32	22.3
170	14.7	292.289	14.43	17.4
171	14.7	348.129	12.03	19.1
172	16.6	396.898	14.69	23.1
173	16.6	395.500	9.04	23.6
174	16.6	393.229	9.64	22.6
175	16.6	390.959	5.33	29.4
176	16.6	393.229	10.11	23.2
177	16.6	395.600	6.29	24.6
178	16.6	391.270	6.92	29.9
179	17.8	396.898	5.04	37.2
180	17.8	395.559	7.56	39.8
181	17.8	396.898	9.45	36.2
182	17.8	394.119	4.82	37.9
183	17.8	396.898	5.68	32.5
184	17.8	391.000	13.98	26.4
185	17.8	387.109	13.15	29.6
186	17.8	392.629	4.45	50.0
187	15.2	393.869	6.68	32.0
188	15.2	382.840	4.56	29.8
189	15.2	396.898	5.39	34.9
190	15.2	377.680	5.10	37.0
191	15.2	389.709	4.69	30.5
192	15.2	390.488	2.87	36.4
193	15.6	393.369	5.03	31.1
194	15.6	376.699	4.38	29.1
195	14.4	394.229	2.97	50.0
196	12.6	396.898	4.08	33.3
197	12.6	354.309	8.61	30.3
198	12.6	392.199	6.62	34.6
199	17.0	396.898	4.56	34.9
200	17.0	384.299	4.45	32.9
201	14.7	393.770	7.43	24.1
202	14.7	395.379	3.11	42.3
203	14.7	392.779	3.81	48.5
204	14.7	390.549	2.88	50.0

205	18.6	396.898	10.87	22.6
206	18.6	394.869	10.97	24.4
207	18.6	389.430	18.06	22.5
208	18.6	381.318	14.66	24.4
209	18.6	396.898	23.09	20.0
210	18.6	393.250	17.27	21.7
211	18.6	395.238	23.98	19.3
212	18.6	390.939	16.03	22.4
213	18.6	385.809	9.38	28.1
214	18.6	348.930	29.55	23.7
215	18.6	393.629	9.47	25.0
216	16.4	392.799	13.51	23.3
217	16.4	392.779	9.69	28.7
218	16.4	396.898	17.92	21.5
219	16.4	393.738	10.50	23.0
220	17.4	391.699	9.71	26.7
221	17.4	395.238	21.46	21.7
222	17.4	390.389	9.93	27.5
223	17.4	396.898	7.60	30.1
224	17.4	385.049	4.14	44.8
225	17.4	382.000	4.63	50.0
226	17.4	387.379	3.13	37.6
227	17.4	372.078	6.36	31.6
228	17.4	377.510	3.92	46.7
229	17.4	380.340	3.76	31.5
230	17.4	378.350	11.65	24.3
231	17.4	376.139	5.25	31.7
232	17.4	385.908	2.47	41.7
233	17.4	378.949	3.95	48.3
234	17.4	360.199	8.05	29.0
235	17.4	376.750	10.88	24.0
236	17.4	388.449	9.54	25.1
237	17.4	390.068	4.73	31.5
238	16.6	379.408	6.36	23.7
239	16.6	383.779	7.37	23.3
240	16.6	391.250	11.38	22.0
241	16.6	394.619	12.40	20.1
242	16.6	372.750	11.22	22.2
243	16.6	374.709	5.19	23.7
244	19.1	372.488	12.50	17.6
245	19.1	389.129	18.46	18.5
246	19.1	390.180	9.16	24.3
247	19.1	376.139	10.15	20.5
248	19.1	374.709	9.52	24.5
249	19.1	393.738	6.56	26.2
250	19.1	396.279	5.90	24.4
251	19.1	377.068	3.59	24.8
252	19.1	386.090	3.53	29.6
253	19.1	396.898	3.54	42.8
254	16.4	392.889	6.57	21.9
255	16.4	395.180	9.25	20.9
256	15.9	386.340	3.11	44.0
257	13.0	389.699	5.12	50.0
258	13.0	383.289	7.79	36.0
259	13.0	391.930	6.90	30.1
260	13.0	392.799	9.59	33.8
261	13.0	388.369	7.26	43.1
262	13.0	386.859	5.91	48.8
263	13.0	393.420	11.25	31.0
264	13.0	387.889	8.10	36.5
265	13.0	392.398	10.45	22.8
266	13.0	384.068	14.79	30.7
267	13.0	384.539	7.44	50.0
268	13.0	390.299	3.16	43.5
269	18.6	391.340	13.65	20.7
270	18.6	388.648	13.00	21.1
271	18.6	396.898	6.59	25.2
272	18.6	394.959	7.73	24.4
273	18.6	390.770	6.58	35.2
274	17.6	396.898	3.53	32.4
275	17.6	396.898	2.98	32.0
276	17.6	389.250	6.05	33.2
277	17.6	393.449	4.16	33.1
278	17.6	396.898	7.19	29.1
279	14.9	396.898	4.85	35.1
280	14.9	387.309	3.76	45.4
281	14.9	392.229	4.59	35.4
282	14.9	377.068	3.01	46.0
283	13.6	395.520	3.16	50.0
284	15.3	394.719	7.85	32.2
285	15.3	394.719	8.23	22.0
286	18.2	341.600	12.93	20.1
287	16.6	396.898	7.14	23.2
288	16.6	396.898	7.60	22.3
289	16.6	371.719	9.51	24.8
290	19.2	396.898	3.33	28.5
291	19.2	396.898	3.56	37.3
292	19.2	396.898	4.70	27.9
293	16.0	396.898	8.58	23.9

294	16.0	396.898	10.40	21.7
295	16.0	396.898	6.27	28.6
296	16.0	392.850	7.39	27.1
297	16.0	396.898	15.84	20.3
298	14.8	368.238	4.97	22.5
299	14.8	371.578	4.74	29.0
300	14.8	390.859	6.07	24.8
301	16.1	395.750	9.50	22.0
302	16.1	383.609	8.67	26.4
303	16.1	390.430	4.86	33.1
304	18.4	393.680	6.93	36.1
305	18.4	393.359	8.93	28.4
306	18.4	396.898	6.47	33.4
307	18.4	396.898	7.53	28.2
308	18.4	396.898	4.54	22.8
309	18.4	396.238	9.97	20.3
310	18.4	350.449	12.64	16.1
311	18.4	396.898	5.98	22.1
312	18.4	396.299	11.72	19.4
313	18.4	393.389	7.90	21.6
314	18.4	395.689	9.28	23.8
315	18.4	396.420	11.50	16.2
316	18.4	390.699	18.33	17.8
317	18.4	396.898	15.94	19.8
318	18.4	395.209	10.36	23.1
319	18.4	396.229	12.73	21.0
320	19.6	396.898	7.20	23.8
321	19.6	396.898	6.87	23.1
322	19.6	396.898	7.70	20.4
323	19.6	391.129	11.74	18.5
324	19.6	396.898	6.12	25.0
325	19.6	393.680	5.08	24.6
326	19.6	396.898	6.15	23.0
327	19.6	396.898	12.79	22.2
328	16.9	382.439	9.97	19.3
329	16.9	375.209	7.34	22.6
330	16.9	368.568	9.09	19.8
331	16.9	394.020	12.43	17.1
332	16.9	362.250	7.83	19.4
333	20.2	389.709	5.68	22.2
334	20.2	389.398	6.75	20.7
335	20.2	396.898	8.01	21.1
336	20.2	396.898	9.80	19.5
337	20.2	394.809	10.56	18.5
338	20.2	396.139	8.51	20.6
339	20.2	396.898	9.74	19.0
340	20.2	396.898	9.29	18.7
341	15.5	394.738	5.49	32.7
342	15.9	389.959	8.65	16.5
343	17.6	396.898	7.18	23.9
344	17.6	387.969	4.61	31.2
345	18.8	385.639	10.53	17.5
346	18.8	364.609	12.67	17.2
347	17.9	392.430	6.36	23.1
348	17.0	390.939	5.99	24.5
349	19.7	389.850	5.89	26.6
350	19.7	396.898	5.98	22.9
351	18.3	370.779	5.49	24.1
352	18.3	392.328	7.79	18.6
353	17.0	384.459	4.50	30.1
354	22.0	382.799	8.05	18.2
355	22.0	376.039	5.57	20.6
356	20.2	377.729	17.60	17.8
357	20.2	391.340	13.27	21.7
358	20.2	395.430	11.48	22.7
359	20.2	390.738	12.67	22.6
360	20.2	374.559	7.79	25.0
361	20.2	350.648	14.19	19.9
362	20.2	380.789	10.19	20.8
363	20.2	353.039	14.64	16.8
364	20.2	354.549	5.29	21.9
365	20.2	354.699	7.12	27.5
366	20.2	316.029	14.00	21.9
367	20.2	131.420	13.33	23.1
368	20.2	375.520	3.26	50.0
369	20.2	375.328	3.73	50.0
370	20.2	392.049	2.96	50.0
371	20.2	366.148	9.53	50.0
372	20.2	347.879	8.88	50.0
373	20.2	396.898	34.77	13.8
374	20.2	396.898	37.97	13.8
375	20.2	396.898	13.44	15.0
376	20.2	363.020	23.24	13.9
377	20.2	396.898	21.24	13.3
378	20.2	396.898	23.69	13.1
379	20.2	393.738	21.78	10.2
380	20.2	396.898	17.21	10.4
381	20.2	396.898	21.08	10.9
382	20.2	396.898	23.60	11.3

383	20.2	396.898	24.56	12.3
384	20.2	285.828	30.63	8.8
385	20.2	396.898	30.81	7.2
386	20.2	396.898	28.28	10.5
387	20.2	396.898	31.99	7.4
388	20.2	372.920	30.62	10.2
389	20.2	396.898	20.85	11.5
390	20.2	394.430	17.11	15.1
391	20.2	378.379	18.76	23.2
392	20.2	396.898	25.68	9.7
393	20.2	396.898	15.17	13.8
394	20.2	396.898	16.35	12.7
395	20.2	391.979	17.12	13.1
396	20.2	396.898	19.37	12.5
397	20.2	393.100	19.92	8.5
398	20.2	396.898	30.59	5.0
399	20.2	338.158	29.97	6.3
400	20.2	396.898	26.77	5.6
401	20.2	396.898	20.32	7.2
402	20.2	376.109	20.31	12.1
403	20.2	396.898	19.77	8.3
404	20.2	329.459	27.38	8.5
405	20.2	384.969	22.98	5.0
406	20.2	370.219	23.34	11.9
407	20.2	332.090	12.13	27.9
408	20.2	314.639	26.40	17.2
409	20.2	179.359	19.78	27.5
410	20.2	2.600	10.11	15.0
411	20.2	35.050	21.22	17.2
412	20.2	28.790	34.37	17.9
413	20.2	210.970	20.08	16.3
414	20.2	88.270	36.98	7.0
415	20.2	27.250	29.05	7.2
416	20.2	21.570	25.79	7.5
417	20.2	127.360	26.64	10.4
418	20.2	16.450	20.62	8.8
419	20.2	48.450	22.74	8.4
420	20.2	318.750	15.02	16.7
421	20.2	319.979	15.70	14.2
422	20.2	291.549	14.10	20.8
423	20.2	2.520	23.29	13.4
424	20.2	3.650	17.16	11.7
425	20.2	7.680	24.39	8.3
426	20.2	24.650	15.69	10.2
427	20.2	18.820	14.52	10.9
428	20.2	96.730	21.52	11.0
429	20.2	60.720	24.08	9.5
430	20.2	83.450	17.64	14.5
431	20.2	81.330	19.69	14.1
432	20.2	97.950	12.03	16.1
433	20.2	100.190	16.22	14.3
434	20.2	100.630	15.17	11.7
435	20.2	109.850	23.27	13.4
436	20.2	27.490	18.05	9.6
437	20.2	9.320	26.45	8.7
438	20.2	68.950	34.02	8.4
439	20.2	396.898	22.88	12.8
440	20.2	391.449	22.11	10.5
441	20.2	385.959	19.52	17.1
442	20.2	395.689	16.59	18.4
443	20.2	386.729	18.85	15.4
444	20.2	240.520	23.79	10.8
445	20.2	43.060	23.98	11.8
446	20.2	318.010	17.79	14.9
447	20.2	388.520	16.44	12.6
448	20.2	396.898	18.13	14.1
449	20.2	304.209	19.31	13.0
450	20.2	0.320	17.44	13.4
451	20.2	355.289	17.73	15.2
452	20.2	385.090	17.27	16.1
453	20.2	375.869	16.74	17.8
454	20.2	6.680	18.71	14.9
455	20.2	50.920	18.13	14.1
456	20.2	10.480	19.01	12.7
457	20.2	3.500	16.94	13.5
458	20.2	272.209	16.23	14.9
459	20.2	396.898	14.70	20.0
460	20.2	255.229	16.42	16.4
461	20.2	391.430	14.65	17.7
462	20.2	396.898	13.99	19.5
463	20.2	393.818	10.29	20.2
464	20.2	396.898	13.22	21.4
465	20.2	334.398	14.13	19.9
466	20.2	22.010	17.15	19.0
467	20.2	331.289	21.32	19.1
468	20.2	368.738	18.13	19.1
469	20.2	396.898	14.76	20.1
470	20.2	396.898	16.29	19.9
471	20.2	395.328	12.87	19.6

```
472     20.2  393.369  14.36  23.2
473     20.2  374.680  11.66  29.8
474     20.2  352.578  18.14  13.8
475     20.2  302.760  24.10  13.3
476     20.2  396.209  18.68  16.7
477     20.2  349.479  24.91  12.0
478     20.2  379.699  18.03  14.6
479     20.2  383.318  13.11  21.4
480     20.2  396.898  10.74  23.0
481     20.2  393.068   7.74  23.7
482     20.2  395.279   7.01  25.0
483     20.2  392.920  10.42  21.8
484     20.2  370.729  13.34  20.6
485     20.2  388.619  10.58  21.2
486     20.2  392.680  14.98  19.1
487     20.2  388.219  11.45  20.6
488     20.1  395.090  18.06  15.2
489     20.1  344.049  23.97   7.0
490     20.1  318.430  29.68   8.1
491     20.1  390.109  18.07  13.6
492     20.1  396.898  13.35  20.1
493     19.2  396.898  12.01  21.8
494     19.2  396.898  13.59  24.5
495     19.2  393.289  17.60  23.1
496     19.2  396.898  21.14  19.7
497     19.2  396.898  14.10  18.3
498     19.2  396.898  12.92  21.2
499     19.2  395.770  15.10  17.5
500     19.2  396.898  14.33  16.8
501     21.0  391.988   9.67  22.4
502     21.0  396.898   9.08  20.6
503     21.0  396.898   5.64  23.9
504     21.0  393.449   6.48  22.0
505     21.0  396.898   7.88  11.9
```

2.3.3 Задания

Проделайте с получившемся из предыдущего задания фреймом данных следующие действия

1)Вывести первые 3 строки с помощью метода head.

2)Вывести последние 3 строки можно с помощью функции tail

3)Вывести количество строк и столбцов: dataframe.shape.

4)Используя метод describe, мы можем получить описательную статистику для любых числовых столбцов.

5)Выберите индивидуальные данные или срезы фрейма данных

6)Требуется отобрать строки фрейма данных на основе некоторого условия. Необходимо сформировать новый фрейм данных из людей старше 90

In [58]:
```
import pandas as pd
url="https://raw.githubusercontent.com/akmand/datasets/main/boston_housing.csv"
pd.set_option('display.max_rows', None)
pd.set_option('display.max_columns', None)
pd.set_option('display.max_colwidth', None)
c=np.round(pd.read_csv(url),decimals=2)
print(c.head(3))
print(c.tail(3))
print("\n")
print(c.shape)
print("\n")
print(c.describe().round(2))
print("\n")
print(c.loc[1::500])
print("\n")
print(c[c['age']>99])
```

```
   crim    zn  indus  chas   nox    rm   age   dis  rad  tax  ptratio  bbtown  \
0  0.01  18.0   2.31     0  0.54  6.58  65.2  4.09    1  296     15.3  396.90
1  0.03   0.0   7.07     0  0.47  6.42  78.9  4.97    2  242     17.8  396.90
2  0.03   0.0   7.07     0  0.47  7.18  61.1  4.97    2  242     17.8  392.83

   lstat  medv
0   4.98  24.0
1   9.14  21.6
2   4.03  34.7
```

```
     crim   zn  indus  chas   nox    rm   age   dis  rad  tax  ptratio  \
503  0.06  0.0  11.93     0  0.57  6.98  91.0  2.17    1  273     21.0
504  0.11  0.0  11.93     0  0.57  6.79  89.3  2.39    1  273     21.0
505  0.05  0.0  11.93     0  0.57  6.03  80.8  2.50    1  273     21.0

     bbtown  lstat  medv
503  396.90   5.64  23.9
504  393.45   6.48  22.0
505  396.90   7.88  11.9


(506, 14)


          crim       zn   indus    chas     nox      rm     age     dis     rad  \
count  506.00  506.00  506.00  506.00  506.00  506.00  506.00  506.00  506.00
mean     3.61   11.36   11.14    0.07    0.55    6.28   68.57    3.80    9.55
std      8.60   23.32    6.86    0.25    0.12    0.70   28.15    2.11    8.71
min      0.01    0.00    0.46    0.00    0.38    3.56    2.90    1.13    1.00
25%      0.08    0.00    5.19    0.00    0.45    5.88   45.02    2.10    4.00
50%      0.26    0.00    9.69    0.00    0.54    6.21   77.50    3.21    5.00
75%      3.68   12.50   18.10    0.00    0.62    6.62   94.07    5.19   24.00
max     88.98  100.00   27.74    1.00    0.87    8.78  100.00   12.13   24.00

           tax  ptratio  bbtown   lstat    medv
count   506.00   506.00  506.00  506.00  506.00
mean    408.24    18.46  356.67   12.65   22.53
std     168.54     2.16   91.29    7.14    9.20
min     187.00    12.60    0.32    1.73    5.00
25%     279.00    17.40  375.38    6.95   17.02
50%     330.00    19.05  391.44   11.36   21.20
75%     666.00    20.20  396.22   16.96   25.00
max     711.00    22.00  396.90   37.97   50.00


     crim   zn  indus  chas   nox    rm   age   dis  rad  tax  ptratio  \
1    0.03  0.0   7.07     0  0.47  6.42  78.9  4.97    2  242     17.8
501  0.06  0.0  11.93     0  0.57  6.59  69.1  2.48    1  273     21.0

     bbtown  lstat  medv
1    396.90   9.14  21.6
501  391.99   9.67  22.4


      crim    zn  indus  chas   nox    rm    age   dis  rad  tax  ptratio  \
8     0.21  12.5   7.87     0  0.52  5.63  100.0  6.08    5  311     15.2
23    0.99   0.0   8.14     0  0.54  5.81  100.0  4.10    4  307     21.0
31    1.36   0.0   8.14     0  0.54  6.07  100.0  4.18    4  307     21.0
141   1.63   0.0  21.89     0  0.62  5.02  100.0  1.44    4  437     21.2
142   3.32   0.0  19.58     1  0.87  5.40  100.0  1.32    5  403     14.7
143   4.10   0.0  19.58     0  0.87  5.47  100.0  1.41    5  403     14.7
145   2.38   0.0  19.58     0  0.87  6.13  100.0  1.42    5  403     14.7
146   2.15   0.0  19.58     0  0.87  5.63  100.0  1.52    5  403     14.7
151   1.50   0.0  19.58     0  0.87  5.40  100.0  1.59    5  403     14.7
158   1.34   0.0  19.58     0  0.60  6.07  100.0  1.76    5  403     14.7
159   1.42   0.0  19.58     0  0.87  6.51  100.0  1.77    5  403     14.7
209   0.44   0.0  10.59     1  0.49  5.34  100.0  3.88    4  277     18.6
258   0.66  20.0   3.97     0  0.65  7.33  100.0  1.90    5  264     13.0
259   0.66  20.0   3.97     0  0.65  6.84  100.0  2.01    5  264     13.0
367  13.52   0.0  18.10     0  0.63  3.86  100.0  1.51   24  666     20.2
368   4.90   0.0  18.10     0  0.63  4.97  100.0  1.33   24  666     20.2
371   9.23   0.0  18.10     0  0.63  6.22  100.0  1.17   24  666     20.2
373  11.11   0.0  18.10     0  0.67  4.91  100.0  1.17   24  666     20.2
374  18.50   0.0  18.10     0  0.67  4.14  100.0  1.14   24  666     20.2
379  17.87   0.0  18.10     0  0.67  6.22  100.0  1.39   24  666     20.2
381  15.87   0.0  18.10     0  0.67  6.54   99.1  1.52   24  666     20.2
382   9.19   0.0  18.10     0  0.70  5.54  100.0  1.58   24  666     20.2
383   7.99   0.0  18.10     0  0.70  5.52  100.0  1.53   24  666     20.2
386  24.39   0.0  18.10     0  0.70  4.65  100.0  1.47   24  666     20.2
388  14.33   0.0  18.10     0  0.70  4.88  100.0  1.59   24  666     20.2
398  38.35   0.0  18.10     0  0.69  5.45  100.0  1.49   24  666     20.2
400  25.05   0.0  18.10     0  0.69  5.99  100.0  1.59   24  666     20.2
401  14.24   0.0  18.10     0  0.69  6.34  100.0  1.57   24  666     20.2
402   9.60   0.0  18.10     0  0.69  6.40  100.0  1.64   24  666     20.2
405  67.92   0.0  18.10     0  0.69  5.68  100.0  1.42   24  666     20.2
406  20.72   0.0  18.10     0  0.66  4.14  100.0  1.18   24  666     20.2
407  11.95   0.0  18.10     0  0.66  5.61  100.0  1.28   24  666     20.2
409  14.44   0.0  18.10     0  0.60  6.85  100.0  1.46   24  666     20.2
410  51.14   0.0  18.10     0  0.60  5.76  100.0  1.41   24  666     20.2
411  14.05   0.0  18.10     0  0.60  6.66  100.0  1.53   24  666     20.2
412  18.81   0.0  18.10     0  0.60  4.63  100.0  1.55   24  666     20.2
413  28.66   0.0  18.10     0  0.60  5.16  100.0  1.59   24  666     20.2
414  45.75   0.0  18.10     0  0.69  4.52  100.0  1.66   24  666     20.2
415  18.08   0.0  18.10     0  0.68  6.43  100.0  1.84   24  666     20.2
418  73.53   0.0  18.10     0  0.68  5.96  100.0  1.80   24  666     20.2
420  11.09   0.0  18.10     0  0.72  6.41  100.0  1.86   24  666     20.2
437  15.18   0.0  18.10     0  0.74  6.15  100.0  1.91   24  666     20.2
442   5.67   0.0  18.10     0  0.74  6.22  100.0  2.00   24  666     20.2
443   9.97   0.0  18.10     0  0.74  6.48  100.0  1.98   24  666     20.2
```

```
453   8.25   0.0  18.10     0  0.71  7.39   99.3  2.45   24  666     20.2

     bbtown  lstat  medv
8    386.63  29.93  16.5
23   394.54  19.88  14.5
31   376.73  13.04  14.5
141  396.90  34.41  14.4
142  396.90  26.82  13.4
143  396.90  26.42  15.6
145  172.91  27.80  13.8
146  169.27  16.65  15.6
151  341.60  13.28  19.6
158  353.89   6.43  24.3
159  364.31   7.39  23.3
209  396.90  23.09  20.0
258  383.29   7.79  36.0
259  391.93   6.90  30.1
367  131.42  13.33  23.1
368  375.52   3.26  50.0
371  366.15   9.53  50.0
373  396.90  34.77  13.8
374  396.90  37.97  13.8
379  393.74  21.78  10.2
381  396.90  21.08  10.9
382  396.90  23.60  11.3
383  396.90  24.56  12.3
386  396.90  28.28  10.5
388  372.92  30.62  10.2
398  396.90  30.59   5.0
400  396.90  26.77   5.6
401  396.90  20.32   7.2
402  376.11  20.31  12.1
405  384.97  22.98   5.0
406  370.22  23.34  11.9
407  332.09  12.13  27.9
409  179.36  19.78  27.5
410    2.60  10.11  15.0
411   35.05  21.22  17.2
412   28.79  34.37  17.9
413  210.97  20.08  16.3
414   88.27  36.98   7.0
415   27.25  29.05   7.2
418   16.45  20.62   8.8
420  318.75  15.02  16.7
437    9.32  26.45   8.7
442  395.69  16.59  18.4
443  386.73  18.85  15.4
453  375.87  16.74  17.8
```

3.3.2 Задание

Загрузить фрейм данных по ссылке: https://raw.githubusercontent.com/akmand/datasets/master/iris.csv. Необходимо выполнить нормализацию первого числового признака (sepal_length_cm) с использованием минимаксного преобразования, а второго (sepal_width_cm) с задействованием z-масштабирования.

In [4]:
```
import pandas as pd
url="https://raw.githubusercontent.com/akmand/datasets/master/iris.csv"
pd.set_option('display.max_rows', None)
pd.set_option('display.max_columns', None)
pd.set_option('display.max_colwidth', None)
c=pd.read_csv(url)
print(c.head(5))
def get_minmax(s):
    return (s-c['sepal_length_cm'].min())/(c['sepal_length_cm'].max()-c['sepal_length_cm'].min())
def zMethod(s):
    return (s-c.sepal_width_cm.mean())/c.sepal_width_cm.std()
c['sepal_length_cm']=c['sepal_length_cm'].apply(get_minmax)
c['sepal_width_cm']=c['sepal_width_cm'].apply(zMethod)
print(c.head(5))
```

```
   sepal_length_cm  sepal_width_cm  petal_length_cm  petal_width_cm species
0              5.1             3.5              1.4             0.2  setosa
1              4.9             3.0              1.4             0.2  setosa
2              4.7             3.2              1.3             0.2  setosa
3              4.6             3.1              1.5             0.2  setosa
4              5.0             3.6              1.4             0.2  setosa
   sepal_length_cm  sepal_width_cm  petal_length_cm  petal_width_cm species
0         0.222222        1.028611              1.4             0.2  setosa
1         0.166667       -0.124540              1.4             0.2  setosa
2         0.111111        0.336720              1.3             0.2  setosa
3         0.083333        0.106090              1.5             0.2  setosa
4         0.194444        1.259242              1.4             0.2  setosa
```

In [ ]:
```
```