

## Assignment \_N0-4

### 1 Assignment No:04

Import libraries and create alias for Pandas, Numpy

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

```
[ ]: import numpy as np
```

```
[ ]: from google.colab import files
```

```
[ ]: files.upload()
```

<IPython.core.display.HTML object>

Saving Boston\_housing.csv to Boston\_housing.csv

```
[ ]: {'Boston_housing.csv': b' ,CRIM,ZN,INDUS,CHAS,NOX,RM,AGE,DIS,RAD,TAX,PTRATIO,B,LS
TAT,MEDV\n0,0.00632,18.0,2.31,0.0,0.538,6.575,65.2,4.09,1,296,15.3,396.9,4.98,24
.0\n1,0.02731,0.0,7.07,0.0,0.469,6.421,78.9,4.9671,2,242,17.8,396.9,9.14,21.6\n2
,0.02729,0.0,7.07,0.0,0.469,7.185,61.1,4.9671,2,242,17.8,392.83,4.03,34.7\n3,0.0
3237,0.0,2.18,0.0,0.458,6.998,45.8,6.0622,3,222,18.7,394.63,2.94,33.4\n4,0.06905
,0.0,2.18,0.0,0.458,7.147,54.2,6.0622,3,222,18.7,396.9,12.715432098765433,36.2\n
5,0.02985,0.0,2.18,0.0,0.458,6.43,58.7,6.0622,3,222,18.7,394.12,5.21,28.7\n6,0.0
8829,12.5,7.87,0.06995884773662552,0.524,6.012,66.6,5.5605,5,311,15.2,395.6,12.4
3,22.9\n7,0.14455,12.5,7.87,0.0,0.524,6.172,96.1,5.9505,5,311,15.2,396.9,19.15,2
7.1\n8,0.21124,12.5,7.87,0.0,0.524,5.631,100.0,6.0821,5,311,15.2,386.63,29.93,16
.5\n9,0.17004,12.5,7.87,0.06995884773662552,0.524,6.004,85.9,6.5921,5,311,15.2,3
86.71,17.1,18.9\n10,0.22489,12.5,7.87,0.0,0.524,6.377,94.3,6.3467,5,311,15.2,392
.52,20.45,15.0\n11,0.11747,12.5,7.87,0.0,0.524,6.009,82.9,6.2267,5,311,15.2,396.
9,13.27,18.9\n12,0.09378,12.5,7.87,0.0,0.524,5.889,39.0,5.4509,5,311,15.2,390.5,
15.71,21.7\n13,0.62976,0.0,8.14,0.0,0.538,5.949,61.8,4.7075,4,307,21.0,396.9,8.2
6,20.4\n14,0.63796,0.0,8.14,0.06995884773662552,0.538,6.096,84.5,4.4619,4,307,21
.0,380.02,10.26,18.2\n15,0.62739,0.0,8.14,0.0,0.538,5.834,56.5,4.4986,4,307,21.0
,395.62,8.47,19.9\n16,1.05393,0.0,8.14,0.0,0.538,5.935,29.3,4.4986,4,307,21.0,38
6.85,6.58,23.1\n17,0.7842,0.0,8.14,0.0,0.538,5.99,81.7,4.2579,4,307,21.0,386.75,
14.67,17.5\n18,0.80271,0.0,8.14,0.0,0.538,5.456,36.6,3.7965,4,307,21.0,288.99,11
.69,20.2\n19,0.7258,0.0,8.14,0.0,0.538,5.727,69.5,3.7965,4,307,21.0,390.95,11.28
```

```
,18.2\n20,1.25179,0.0,8.14,0.0,0.538,5.57,98.1,3.7979,4,307,21.0,376.57,21.02,13
.6\n21,0.85204,0.0,8.14,0.0,0.538,5.965,89.2,4.0123,4,307,21.0,392.53,13.83,19.6
\n22,1.23247,0.0,8.14,0.0,0.538,6.142,91.7,3.9769,4,307,21.0,396.9,18.72,15.2\n2
3,0.98843,0.0,8.14,0.0,0.538,5.813,100.0,4.0952,4,307,21.0,394.54,19.88,14.5\n24
,0.75026,0.0,8.14,0.0,0.538,5.924,94.1,4.3996,4,307,21.0,394.33,16.3,15.6\n25,0.
84054,0.0,8.14,0.0,0.538,5.599,85.7,4.4546,4,307,21.0,303.42,16.51,13.9\n26,0.67
191,0.0,8.14,0.0,0.538,5.813,90.3,4.682,4,307,21.0,376.88,14.81,16.6\n27,0.95577
,0.0,8.14,0.0,0.538,6.047,88.8,4.4534,4,307,21.0,306.38,17.28,14.8\n28,0.77299,0
.0,8.14,0.0,0.538,6.495,94.4,4.4547,4,307,21.0,387.94,12.8,18.4\n29,1.00245,0.0,
8.14,0.0,0.538,6.674,87.3,4.239,4,307,21.0,380.23,11.98,21.0\n30,1.13081,0.0,8.1
4,0.0,0.538,5.713,94.1,4.233,4,307,21.0,360.17,22.6,12.7\n31,1.35472,0.0,8.14,0.
0,0.538,6.072,100.0,4.175,4,307,21.0,376.73,13.04,14.5\n32,1.38799,0.0,8.14,0.0,
0.538,5.95,82.0,3.99,4,307,21.0,232.6,27.71,13.2\n33,1.15172,0.0,8.14,0.0,0.538,
5.701,95.0,3.7872,4,307,21.0,358.77,18.35,13.1\n34,1.61282,0.0,8.14,0.0,0.538,6.
096,96.9,3.7598,4,307,21.0,248.31,20.34,13.5\n35,0.06417,0.0,5.96,0.0,0.499,5.93
3,68.2,3.3603,5,279,19.2,396.9,12.715432098765433,18.9\n36,0.09744,0.0,11.083991
769547325,0.0,0.499,5.841,61.4,3.3779,5,279,19.2,377.56,11.41,20.0\n37,0.08014,0
.0,5.96,0.0,0.499,5.85,41.5,3.9342,5,279,19.2,396.9,8.77,21.0\n38,0.17505,0.0,5.
96,0.0,0.499,5.966,30.2,3.8473,5,279,19.2,393.43,10.13,24.7\n39,0.02763,75.0,2.9
5,0.0,0.428,6.595,21.8,5.4011,3,252,18.3,395.63,4.32,30.8\n40,0.03359,75.0,2.95,
0.0,0.428,7.024,15.8,5.4011,3,252,18.3,395.62,1.98,34.9\n41,0.12744,0.0,6.91,0.0
,0.448,6.77,2.9,5.7209,3,233,17.9,385.41,4.84,26.6\n42,0.1415,0.0,6.91,0.0,0.448
,6.169,6.6,5.7209,3,233,17.9,383.37,5.81,25.3\n43,0.15936,0.0,6.91,0.06995884773
662552,0.448,6.211,6.5,5.7209,3,233,17.9,394.46,7.44,24.7\n44,0.12269,0.0,6.91,0
.0,0.448,6.069,40.0,5.7209,3,233,17.9,389.39,9.55,21.2\n45,0.17142,0.0,6.91,0.0,
0.448,5.682,33.8,5.1004,3,233,17.9,396.9,10.21,19.3\n46,0.18836,0.0,6.91,0.0,0.4
48,5.786,33.3,5.1004,3,233,17.9,396.9,14.15,20.0\n47,0.22927,0.0,11.083991769547
325,0.0,0.448,6.03,85.5,5.6894,3,233,17.9,392.74,18.8,16.6\n48,0.25387,0.0,6.91,
0.0,0.448,5.399,95.3,5.87,3,233,17.9,396.9,30.81,14.4\n49,0.21977,0.0,6.91,0.0,0
.448,5.602,62.0,6.0877,3,233,17.9,396.9,16.2,19.4\n50,0.08873,21.0,5.64,0.0,0.43
9,5.963,45.7,6.8147,4,243,16.8,395.56,13.45,19.7\n51,0.04337,21.0,11.08399176954
7325,0.0,0.439,6.115,63.0,6.8147,4,243,16.8,393.97,9.43,20.5\n52,0.0536,21.0,5.6
4,0.0,0.439,6.511,21.1,6.8147,4,243,16.8,396.9,5.28,25.0\n53,3.6118739711934156,
21.0,5.64,0.0,0.439,5.998,21.4,6.8147,4,243,16.8,396.9,8.43,23.4\n54,0.0136,75.0
,4.0,0.0,0.41,5.888,47.6,7.3197,3,469,21.1,396.9,14.8,18.9\n55,0.01311,90.0,1.22
,0.0,0.403,7.249,21.9,8.6966,5,226,17.9,395.93,4.81,35.4\n56,0.02055,85.0,0.74,0
.0,0.41,6.383,35.7,9.1876,2,313,17.3,396.9,5.77,24.7\n57,0.01432,100.0,1.32,0.0,
0.411,6.816,40.5,8.3248,5,256,15.1,392.9,3.95,31.6\n58,0.15445,25.0,5.13,0.0,0.4
53,6.145,29.2,7.8148,8,284,19.7,390.68,6.86,23.3\n59,0.10328,25.0,5.13,0.0,0.453
,5.927,47.2,6.932,8,284,19.7,396.9,9.22,19.6\n60,0.14932,25.0,5.13,0.0,0.453,5.7
41,66.2,7.2254,8,284,19.7,395.11,13.15,18.7\n61,0.17171,25.0,5.13,0.0,0.453,5.96
6,93.4,6.8185,8,284,19.7,378.08,14.44,16.0\n62,0.11027,25.0,5.13,0.0,0.453,6.456
,67.8,7.2255,8,284,19.7,396.9,6.73,22.2\n63,0.1265,25.0,5.13,0.0,0.453,6.762,43.
4,7.9809,8,284,19.7,395.58,9.5,25.0\n64,0.01951,17.5,1.38,0.0,0.4161,7.104,59.5,
9.2229,3,216,18.6,393.24,8.05,33.0\n65,0.03584,80.0,3.37,0.0,0.398,6.29,17.8,6.6
115,4,337,16.1,396.9,4.67,23.5\n66,0.04379,80.0,3.37,0.0,0.398,5.787,31.1,6.6115
,4,337,16.1,396.9,10.24,19.4\n67,0.05789,12.5,6.07,0.0,0.409,5.878,21.4,6.498,4,
```

345,18.9,396.21,8.1,22.0\n68,0.13554,12.5,6.07,0.0,0.409,5.594,36.8,6.498,4,345,  
18.9,396.9,13.09,17.4\n69,0.12816,12.5,6.07,0.0,0.409,5.885,33.0,6.498,4,345,18.  
9,396.9,8.79,20.9\n70,0.08826,0.0,10.81,0.0,0.413,6.417,6.6,5.2873,4,305,19.2,38  
3.73,6.72,24.2\n71,0.15876,0.0,10.81,0.0,0.413,5.961,17.5,5.2873,4,305,19.2,376.  
94,9.88,21.7\n72,0.09164,0.0,10.81,0.0,0.413,6.065,7.8,5.2873,4,305,19.2,390.91,  
5.52,22.8\n73,0.19539,0.0,10.81,0.0,0.413,6.245,6.2,5.2873,4,305,19.2,377.17,12.  
715432098765433,23.4\n74,0.07896,0.0,12.83,0.0,0.437,6.273,68.51851851851852,4.2  
515,5,398,18.7,394.92,6.78,24.1\n75,0.09512,0.0,12.83,0.0,0.437,6.286,45.0,4.502  
6,5,398,18.7,383.23,8.94,21.4\n76,0.10153,0.0,12.83,0.0,0.437,6.279,74.5,4.0522,  
5,398,18.7,373.66,11.97,20.0\n77,0.08707,0.0,12.83,0.0,0.437,6.14,45.8,4.0905,5,  
398,18.7,386.96,10.27,20.8\n78,0.05646,0.0,12.83,0.0,0.437,6.232,53.7,5.0141,5,3  
98,18.7,386.4,12.34,21.2\n79,0.08387,0.0,12.83,0.0,0.437,5.874,36.6,4.5026,5,398  
18.7,396.06,12.715432098765433,20.3\n80,0.04113,25.0,4.86,0.0,0.426,6.727,33.5,  
5.4007,4,281,19.0,396.9,5.29,28.0\n81,0.04462,25.0,4.86,0.0,0.426,6.619,70.4,5.4  
007,4,281,19.0,395.63,7.22,23.9\n82,0.03659,25.0,4.86,0.0,0.426,6.302,32.2,5.400  
7,4,281,19.0,396.9,6.72,24.8\n83,0.03551,25.0,4.86,0.0,0.426,6.167,46.7,5.4007,4  
281,19.0,390.64,7.51,22.9\n84,0.05059,0.0,4.49,0.0,0.449,6.389,48.0,4.7794,3,24  
7,18.5,396.9,9.62,23.9\n85,0.05735,0.0,4.49,0.0,0.449,6.63,56.1,4.4377,3,247,18.  
5,392.3,6.53,26.6\n86,0.05188,0.0,4.49,0.0,0.449,6.015,45.1,4.4272,3,247,18.5,39  
5.99,12.86,22.5\n87,0.07151,0.0,4.49,0.0,0.449,6.121,56.8,3.7476,3,247,18.5,395.  
15,12.715432098765433,22.2\n88,0.0566,0.0,3.41,0.0,0.489,7.007,86.3,3.4217,2,270  
17.8,396.9,5.5,23.6\n89,0.05302,0.0,3.41,0.0,0.489,7.079,63.1,3.4145,2,270,17.8  
396.06,5.7,28.7\n90,0.04684,0.0,3.41,0.0,0.489,6.417,66.1,3.0923,2,270,17.8,392  
18.8,81,22.6\n91,0.03932,0.0,3.41,0.0,0.489,6.405,73.9,3.0921,2,270,17.8,393.55  
8.2,22.0\n92,0.04203,11.2119341563786,15.04,0.0,0.464,6.442,53.6,3.6659,4,270,1  
8.2,395.01,8.16,22.9\n93,0.02875,28.0,15.04,0.0,0.464,6.211,28.9,3.6659,4,270,18  
2,396.33,6.21,25.0\n94,0.04294,28.0,15.04,0.0,0.464,6.249,77.3,3.615,4,270,18.2  
396.9,10.59,20.6\n95,0.12204,0.0,2.89,0.0,0.445,6.625,57.8,3.4952,2,276,18.0,35  
7.98,6.65,28.4\n96,0.11504,0.0,2.89,0.0,0.445,6.163,69.6,3.4952,2,276,18.0,391.8  
3,11.34,21.4\n97,0.12083,0.0,2.89,0.0,0.445,8.069,76.0,3.4952,2,276,18.0,396.9,4  
21.38,7\n98,0.08187,0.0,2.89,0.0,0.445,7.82,36.9,3.4952,2,276,18.0,393.53,3.57,  
43.8\n99,0.0686,0.0,2.89,0.0,0.445,7.416,62.5,3.4952,2,276,18.0,396.9,6.19,33.2\n100,0.14866,0.0,8.56,0.0,0.52,6.727,79.9,2.7778,5,384,20.9,394.76,9.42,27.5\n101,0.11432,0.0,8.56,0.0,0.52,6.781,71.3,2.8561,5,384,20.9,395.58,7.67,26.5\n102,0  
2.2876,0.0,8.56,0.0,0.52,6.405,85.4,2.7147,5,384,20.9,70.8,10.63,18.6\n103,0.211  
61,0.0,8.56,0.0,0.52,6.137,68.51851851851852,2.7147,5,384,20.9,394.47,13.44,19.3  
104,0.1396,0.0,8.56,0.0,0.52,6.167,90.0,2.421,5,384,20.9,392.69,12.33,20.1\n105,0.13262,0.0,8.56,0.0,0.52,5.851,96.7,2.1069,5,384,20.9,394.05,16.47,19.5\n106,  
0.1712,0.0,8.56,0.0,0.52,5.836,91.9,2.211,5,384,20.9,395.67,18.66,19.5\n107,0.13  
117,0.0,8.56,0.0,0.52,6.127,85.2,2.1224,5,384,20.9,387.69,14.09,20.4\n108,0.1280  
2,0.0,8.56,0.0,0.52,6.474,97.1,2.4329,5,384,20.9,395.24,12.27,19.8\n109,0.26363,  
0.0,8.56,0.0,0.52,6.229,91.2,2.5451,5,384,20.9,391.23,15.55,19.4\n110,0.10793,0.  
0,8.56,0.0,0.52,6.195,54.4,2.7778,5,384,20.9,393.49,13.0,21.7\n111,0.10084,0.0,1  
0.01,0.0,0.547,6.715,81.6,2.6775,6,432,17.8,395.59,10.16,22.8\n112,0.12329,0.0,1  
0.01,0.0,0.547,5.913,92.9,2.3534,6,432,17.8,394.95,16.21,18.8\n113,0.22212,0.0,1  
0.01,0.0,0.547,6.092,95.4,2.548,6,432,17.8,396.9,17.09,18.7\n114,0.14231,0.0,10.  
01,0.0,0.547,6.254,84.2,2.2565,6,432,17.8,388.74,10.45,18.5\n115,3.6118739711934

156,0.0,10.01,0.0,0.547,5.928,88.2,2.4631,6,432,17.8,344.91,15.76,18.3\n116,0.13  
158,0.0,10.01,0.0,0.547,6.176,72.5,2.7301,6,432,17.8,393.3,12.715432098765433,21  
2\n117,0.15098,0.0,10.01,0.0,0.547,6.021,82.6,2.7474,6,432,17.8,394.51,10.3,19.  
2\n118,0.13058,11.2119341563786,10.01,0.0,0.547,5.872,73.1,2.4775,6,432,17.8,338  
.63,15.37,20.4\n119,0.14476,0.0,10.01,0.06995884773662552,0.547,5.731,65.2,2.759  
2,6,432,17.8,391.5,13.61,19.3\n120,0.06899,0.0,25.65,0.0,0.581,5.87,69.7,2.2577,  
2,188,19.1,389.15,14.37,22.0\n121,0.07165,0.0,25.65,0.0,0.581,6.004,84.1,2.1974,  
2,188,19.1,377.67,14.27,20.3\n122,0.09299,0.0,25.65,0.0,0.581,5.961,92.9,2.0869,  
2,188,19.1,378.09,17.93,20.5\n123,0.15038,0.0,11.083991769547325,0.0,0.581,5.856  
97,0.1,9444,2,188,19.1,370.31,25.41,17.3\n124,0.09849,0.0,25.65,0.0,0.581,5.879  
95,8.2,0063,2,188,19.1,379.38,17.58,18.8\n125,0.16902,0.0,25.65,0.0,0.581,5.986  
88,4,1.9929,2,188,19.1,385.02,14.81,21.4\n126,0.38735,0.0,25.65,0.0,0.581,5.613  
68.51851851851852,1.7572,2,188,19.1,359.29,27.26,15.7\n127,0.25915,0.0,21.89,0.  
0,0.624,5.693,96.0,1.7883,4,437,21.2,392.11,17.19,16.2\n128,0.32543,0.0,21.89,0.  
0,0.624,6.431,98.8,1.8125,4,437,21.2,396.9,15.39,18.0\n129,0.88125,0.0,21.89,0.0  
0,624,5.637,94.7,1.9799,4,437,21.2,396.9,18.34,14.3\n130,0.34006,0.0,21.89,0.0,  
0.624,6.458,98.9,2.1185,4,437,21.2,395.04,12.6,19.2\n131,1.19294,0.0,21.89,0.0,0  
.624,6.326,97.7,2.271,4,437,21.2,396.9,12.26,19.6\n132,0.59005,0.0,21.89,0.0,0.6  
24,6.372,97.9,2.3274,4,437,21.2,385.76,11.12,23.0\n133,0.32982,11.2119341563786,  
11.083991769547325,0.0,0.624,5.822,95.4,2.4699,4,437,21.2,388.69,15.03,18.4\n134  
0,97617,0.0,21.89,0.0,0.624,5.757,98.4,2.346,4,437,21.2,262.76,17.31,15.6\n135,  
0.55778,0.0,21.89,0.0,0.624,6.335,98.2,2.1107,4,437,21.2,394.67,16.96,18.1\n136,  
0.32264,0.0,21.89,0.0,0.624,5.942,93.5,1.9669,4,437,21.2,378.25,16.9,17.4\n137,0  
.35233,0.0,21.89,0.0,0.624,6.454,98.4,1.8498,4,437,21.2,394.08,14.59,17.1\n138,0  
.2498,0.0,21.89,0.0,0.624,5.857,68.51851851851852,1.6686,4,437,21.2,392.04,21.32  
13,3.2\n139,0.54452,0.0,21.89,0.0,0.624,6.151,97.9,1.6687,4,437,21.2,396.9,18.46,  
17.8\n140,0.2909,0.0,21.89,0.0,0.624,6.174,93.6,1.6119,4,437,21.2,388.08,24.16,1  
4.0\n141,1.62864,0.0,21.89,0.0,0.624,5.019,100.0,1.4394,4,437,21.2,396.9,34.41,1  
4.4\n142,3.32105,0.0,19.58,1.0,0.871,5.403,100.0,1.3216,5,403,14.7,396.9,26.82,1  
3.4\n143,4.0974,0.0,19.58,0.0,0.871,5.468,100.0,1.4118,5,403,14.7,396.9,26.42,15  
.6\n144,2.77974,0.0,19.58,0.0,0.871,4.903,97.8,1.3459,5,403,14.7,396.9,29.29,11.  
8\n145,2.37934,0.0,19.58,0.0,0.871,6.13,100.0,1.4191,5,403,14.7,172.91,27.8,13.8  
146,2.15505,11.2119341563786,19.58,0.0,0.871,5.628,100.0,1.5166,5,403,14.7,169  
.27,16.65,15.6\n147,2.36862,0.0,11.083991769547325,0.0,0.871,4.926,95.7,1.4608,5  
403,14.7,391.71,29.53,14.6\n148,2.33099,0.0,11.083991769547325,0.0,0.871,5.186,  
93.8,1.5296,5,403,14.7,356.99,28.32,17.8\n149,2.73397,0.0,19.58,0.0,0.871,5.597,  
94.9,1.5257,5,403,14.7,351.85,21.45,15.4\n150,1.6566,0.0,19.58,0.0,0.871,6.122,6  
8.51851851851852,1.618,5,403,14.7,372.8,14.1,21.5\n151,1.49632,0.0,19.58,0.0,0.8  
71,5.404,100.0,1.5916,5,403,14.7,341.6,13.28,19.6\n152,1.12658,0.0,19.58,0.06995  
884773662552,0.871,5.012,88.0,1.6102,5,403,14.7,343.28,12.12,15.3\n153,2.14918,0  
0,19.58,0.0,0.871,5.709,98.5,1.6232,5,403,14.7,261.95,15.79,19.4\n154,1.41385,0  
.0,19.58,1.0,0.871,6.129,96.0,1.7494,5,403,14.7,321.02,15.12,17.0\n155,3.53501,0  
0,19.58,1.0,0.871,6.152,68.51851851851852,1.7455,5,403,14.7,88.01,15.02,15.6\n1  
56,2.44668,0.0,19.58,0.0,0.871,5.272,94.0,1.7364,5,403,14.7,88.63,16.14,13.1\n15  
7,1.22358,11.2119341563786,19.58,0.0,0.605,6.943,97.4,1.8773,5,403,14.7,363.43,4  
59,41.3\n158,1.34284,0.0,19.58,0.0,0.605,6.066,100.0,1.7573,5,403,14.7,353.89,6  
.43,24.3\n159,1.42502,0.0,19.58,0.0,0.871,6.51,100.0,1.7659,5,403,14.7,364.31,7.

39,23.3\n160,1.27346,0.0,19.58,1.0,0.605,6.25,92.6,1.7984,5,403,14.7,338.92,5.5,  
27.0\n161,1.46336,0.0,19.58,0.0,0.605,7.489,90.8,1.9709,5,403,14.7,374.43,1.73,5  
0.0\n162,1.83377,0.0,19.58,1.0,0.605,7.802,98.2,2.0407,5,403,14.7,389.61,1.92,50  
0\n163,1.51902,0.0,19.58,1.0,0.605,8.375,68.51851851851852,2.162,5,403,14.7,388  
.45,3.32,50.0\n164,2.24236,0.0,19.58,0.0,0.605,5.854,91.8,2.422,5,403,14.7,395.1  
1,11.64,22.7\n165,2.924,0.0,19.58,0.0,0.605,6.101,93.0,2.2834,5,403,14.7,240.16,  
9.81,25.0\n166,2.01019,0.0,19.58,0.0,0.605,7.929,96.2,2.0459,5,403,14.7,369.3,3.  
7,50.0\n167,1.80028,11.2119341563786,19.58,0.0,0.605,5.877,79.2,2.4259,5,403,14.  
7,227.61,12.14,23.8\n168,2.3004,0.0,19.58,0.0,0.605,6.319,96.1,2.1,5,403,14.7,29  
7.09,11.1,23.8\n169,2.44953,0.0,19.58,0.0,0.605,6.402,95.2,2.2625,5,403,14.7,330  
.04,11.32,22.3\n170,1.20742,0.0,19.58,0.0,0.605,5.875,94.6,2.4259,5,403,14.7,292  
.29,14.43,17.4\n171,2.3139,0.0,19.58,0.0,0.605,5.88,97.3,2.3887,5,403,14.7,348.1  
3,12.03,19.1\n172,0.13914,0.0,4.05,0.0,0.51,5.572,88.5,2.5961,5,296,16.6,396.9,1  
4.69,23.1\n173,0.09178,0.0,11.083991769547325,0.0,0.51,6.416,68.51851851851852,2  
.6463,5,296,16.6,395.5,9.04,23.6\n174,0.08447,0.0,4.05,0.0,0.51,5.859,68.7,2.701  
9,5,296,16.6,393.23,9.64,22.6\n175,0.06664,0.0,4.05,0.0,0.51,6.546,33.1,3.1323,5  
,296,16.6,390.96,5.33,29.4\n176,0.07022,0.0,4.05,0.0,0.51,6.02,47.2,3.5549,5,296  
,16.6,393.23,10.11,23.2\n177,0.05425,0.0,11.083991769547325,0.0,0.51,6.315,73.4,  
3.3175,5,296,16.6,395.6,6.29,24.6\n178,0.06642,0.0,4.05,0.0,0.51,6.86,74.4,2.915  
3,5,296,16.6,391.27,6.92,29.9\n179,0.0578,0.0,2.46,0.0,0.488,6.98,58.4,2.829,3,1  
93,17.8,396.9,5.04,37.2\n180,0.06588,0.0,2.46,0.0,0.488,7.765,83.3,2.741,3,193,1  
7.8,395.56,7.56,39.8\n181,0.06888,0.0,2.46,0.0,0.488,6.144,62.2,2.5979,3,193,17.  
8,396.9,9.45,36.2\n182,0.09103,0.0,2.46,0.0,0.488,7.155,92.2,2.7006,3,193,17.8,3  
94.12,4.82,37.9\n183,3.6118739711934156,0.0,2.46,0.0,0.488,6.563,95.6,2.847,3,19  
3,17.8,396.9,5.68,32.5\n184,0.08308,0.0,2.46,0.0,0.488,5.604,89.8,2.9879,3,193,1  
7.8,391.0,13.98,26.4\n185,0.06047,0.0,2.46,0.0,0.488,6.153,68.8,3.2797,3,193,17.  
8,387.11,13.15,29.6\n186,0.05602,11.2119341563786,2.46,0.0,0.488,7.831,53.6,3.19  
92,3,193,17.8,392.63,4.45,50.0\n187,0.07875,45.0,3.44,0.0,0.437,6.782,41.1,3.788  
6,5,398,15.2,393.87,6.68,32.0\n188,0.12579,45.0,3.44,0.0,0.437,6.556,29.1,4.5667  
,5,398,15.2,382.84,4.56,29.8\n189,0.0837,45.0,3.44,0.0,0.437,7.185,38.9,4.5667,5  
,398,15.2,396.9,5.39,34.9\n190,0.09068,45.0,3.44,0.0,0.437,6.951,21.5,6.4798,5,3  
98,15.2,377.68,5.1,37.0\n191,3.6118739711934156,45.0,3.44,0.0,0.437,6.739,30.8,6  
.4798,5,398,15.2,389.71,4.69,30.5\n192,3.6118739711934156,45.0,3.44,0.0,0.437,7.  
178,26.3,6.4798,5,398,15.2,390.49,2.87,36.4\n193,0.02187,60.0,2.93,0.0,0.401,6.8  
,68.51851851851852,6.2196,1,265,15.6,393.37,5.03,31.1\n194,0.01439,60.0,2.93,0.0  
,0.401,6.604,18.8,6.2196,1,265,15.6,376.7,4.38,29.1\n195,0.01381,80.0,0.46,0.0,0  
.422,7.875,32.0,5.6484,4,255,14.4,394.23,2.97,50.0\n196,3.6118739711934156,80.0,  
1.52,0.0,0.404,7.287,34.1,7.309,2,329,12.6,396.9,4.08,33.3\n197,0.04666,80.0,1.5  
2,0.0,0.404,7.107,36.6,7.309,2,329,12.6,354.31,8.61,30.3\n198,0.03768,80.0,1.52,  
0.0,0.404,7.274,38.3,7.309,2,329,12.6,392.2,6.62,34.6\n199,0.0315,95.0,1.47,0.0,  
0.403,6.975,15.3,7.6534,3,402,17.0,396.9,4.56,34.9\n200,0.01778,95.0,1.47,0.0,0.  
403,7.135,13.9,7.6534,3,402,17.0,384.3,4.45,32.9\n201,0.03445,82.5,2.03,0.0,0.41  
5,6.162,38.4,6.27,2,348,14.7,393.77,7.43,24.1\n202,0.02177,82.5,2.03,0.0,0.415,7  
.61,15.7,6.27,2,348,14.7,395.38,3.11,42.3\n203,0.0351,95.0,2.68,0.0,0.4161,7.853  
,33,2,5.118,4,224,14.7,392.78,3.81,48.5\n204,0.02009,95.0,2.68,0.0,0.4161,8.034,  
31.9,5.118,4,224,14.7,390.55,2.88,50.0\n205,0.13642,11.2119341563786,10.59,0.0,0  
.489,5.891,22.3,3.9454,4,277,18.6,396.9,10.87,22.6\n206,0.22969,0.0,10.59,0.0699

5884773662552,0.489,6.326,52.5,4.3549,4,277,18.6,394.87,10.97,24.4\n207,0.25199,  
0.0,10.59,0.0,0.489,5.783,72.7,4.3549,4,277,18.6,389.43,12.715432098765433,22.5\  
n208,0.13587,0.0,10.59,1.0,0.489,6.064,59.1,4.2392,4,277,18.6,381.32,14.66,24.4\  
n209,0.43571,0.0,10.59,1.0,0.489,5.344,100.0,3.875,4,277,18.6,396.9,23.09,20.0\n210,0.17446,11.2119341563786,10.59,1.0,0.489,5.96,92.1,3.8771,4,277,18.6,393.25,  
17.27,21.7\n211,0.37578,0.0,10.59,1.0,0.489,5.404,88.6,3.665,4,277,18.6,395.24,2  
3.98,19.3\n212,0.21719,0.0,10.59,1.0,0.489,5.807,53.8,3.6526,4,277,18.6,390.94,1  
6.03,22.4\n213,0.14052,0.0,10.59,0.0,0.489,6.375,32.3,3.9454,4,277,18.6,385.81,9  
.38,28.1\n214,0.28955,0.0,10.59,0.0,0.489,5.412,9.8,3.5875,4,277,18.6,348.93,29.  
55,23.7\n215,0.19802,0.0,10.59,0.0,0.489,6.182,68.51851851851852,3.9454,4,277,18  
.6,393.63,9.47,25.0\n216,0.0456,0.0,13.89,1.0,0.55,5.888,56.0,3.1121,5,276,16.4,  
392.8,13.51,23.3\n217,0.07013,0.0,13.89,0.0,0.55,6.642,85.1,3.4211,5,276,16.4,39  
2.78,9.69,28.7\n218,0.11069,0.0,13.89,1.0,0.55,5.951,93.8,2.8893,5,276,16.4,396.  
9,17.92,21.5\n219,0.11425,0.0,11.083991769547325,1.0,0.55,6.373,92.4,3.3633,5,27  
6,16.4,393.74,10.5,23.0\n220,0.35809,0.0,6.2,1.0,0.507,6.951,88.5,2.8617,8,307,1  
7.4,391.7,9.71,26.7\n221,0.40771,0.0,6.2,1.0,0.507,6.164,91.3,3.048,8,307,17.4,3  
95.24,21.46,21.7\n222,0.62356,0.0,6.2,1.0,0.507,6.879,77.7,3.2721,8,307,17.4,390  
.39,9.93,27.5\n223,0.6147,0.0,6.2,0.0,0.507,6.618,80.8,3.2721,8,307,17.4,396.9,7  
.6,30.1\n224,0.31533,0.0,6.2,0.0,0.504,8.266,78.3,2.8944,8,307,17.4,385.05,4.14,  
44.8\n225,0.52693,0.0,6.2,0.0,0.504,8.725,83.0,2.8944,8,307,17.4,382.0,4.63,50.0  
\n226,0.38214,0.0,6.2,0.0,0.504,8.04,86.5,3.2157,8,307,17.4,387.38,12.7154320987  
65433,37.6\n227,0.41238,0.0,6.2,0.0,0.504,7.163,79.9,3.2157,8,307,17.4,372.08,6.  
36,31.6\n228,0.29819,0.0,6.2,0.0,0.504,7.686,17.0,3.3751,8,307,17.4,377.51,12.71  
5432098765433,46.7\n229,3.6118739711934156,0.0,6.2,0.0,0.504,6.552,21.4,3.3751,8  
,307,17.4,380.34,3.76,31.5\n230,0.537,0.0,6.2,0.0,0.504,5.981,68.1,3.6715,8,307,  
17.4,378.35,11.65,24.3\n231,0.46296,0.0,6.2,0.0,0.504,7.412,76.9,3.6715,8,307,17  
.4,376.14,5.25,31.7\n232,0.57529,0.0,6.2,0.0,0.507,8.337,73.3,3.8384,8,307,17.4,  
385.91,2.47,41.7\n233,0.33147,0.0,6.2,0.0,0.507,8.247,68.51851851851852,3.6519,8  
,307,17.4,378.95,3.95,48.3\n234,0.44791,0.0,6.2,1.0,0.507,6.726,66.5,3.6519,8,30  
7,17.4,360.2,8.05,29.0\n235,0.33045,0.0,6.2,0.0,0.507,6.086,61.5,3.6519,8,307,17  
.4,376.75,10.88,24.0\n236,3.6118739711934156,0.0,6.2,1.0,0.507,6.631,76.5,4.148,  
8,307,17.4,388.45,9.54,25.1\n237,0.51183,0.0,6.2,0.0,0.507,7.358,71.6,4.148,8,30  
7,17.4,390.07,4.73,31.5\n238,0.08244,11.2119341563786,4.93,0.0,0.428,6.481,18.5,  
6.1899,6,300,16.6,379.41,6.36,23.7\n239,0.09252,30.0,4.93,0.0,0.428,6.606,42.2,6  
.1899,6,300,16.6,383.78,7.37,23.3\n240,0.11329,30.0,4.93,0.06995884773662552,0.4  
28,6.897,54.3,6.3361,6,300,16.6,391.25,11.38,22.0\n241,3.6118739711934156,30.0,4  
.93,0.0,0.428,6.095,65.1,6.3361,6,300,16.6,394.62,12.4,20.1\n242,0.1029,30.0,4.9  
3,0.0,0.428,6.358,52.9,7.0355,6,300,16.6,372.75,11.22,22.2\n243,0.12757,30.0,4.9  
3,0.0,0.428,6.393,7.8,7.0355,6,300,16.6,374.71,5.19,23.7\n244,0.20608,22.0,5.86,  
0.0,0.431,5.593,76.5,7.9549,7,330,19.1,372.49,12.5,17.6\n245,0.19133,22.0,11.083  
991769547325,0.06995884773662552,0.431,5.605,70.2,7.9549,7,330,19.1,389.13,18.46  
,18.5\n246,0.33983,22.0,5.86,0.0,0.431,6.108,34.9,8.0555,7,330,19.1,390.18,9.16,  
24.3\n247,0.19657,22.0,5.86,0.0,0.431,6.226,79.2,8.0555,7,330,19.1,376.14,10.15,  
20.5\n248,0.16439,22.0,5.86,0.0,0.431,6.433,49.1,7.8265,7,330,19.1,374.71,9.52,2  
4.5\n249,0.19073,22.0,5.86,0.0,0.431,6.718,17.5,7.8265,7,330,19.1,393.74,6.56,26  
.2\n250,0.1403,22.0,5.86,0.0,0.431,6.487,13.0,7.3967,7,330,19.1,396.28,5.9,24.4\  
n251,0.21409,22.0,5.86,0.0,0.431,6.438,8.9,7.3967,7,330,19.1,377.07,3.59,24.8\nn2

52,0.08221,22.0,5.86,0.0,0.431,6.957,6.8,8.9067,7,330,19.1,386.09,3.53,29.6\n253  
,0.36894,22.0,5.86,0.0,0.431,8.259,8.4,8.9067,7,330,19.1,396.9,3.54,42.8\n254,0.  
04819,80.0,3.64,0.06995884773662552,0.392,6.108,32.0,9.2203,1,315,16.4,392.89,6.  
57,21.9\n255,0.03548,80.0,3.64,0.0,0.392,5.876,19.1,9.2203,1,315,16.4,395.18,9.2  
5,20.9\n256,0.01538,90.0,3.75,0.0,0.394,7.454,34.2,6.3361,3,244,15.9,386.34,3.11  
,44.0\n257,0.61154,20.0,3.97,0.0,0.647,8.704,86.9,1.801,5,264,13.0,389.7,5.12,50  
.0\n258,0.66351,20.0,3.97,0.0,0.647,7.333,100.0,1.8946,5,264,13.0,383.29,7.79,36  
.0\n259,0.65665,20.0,3.97,0.0,0.647,6.842,100.0,2.0107,5,264,13.0,391.93,6.9,30.  
1\n260,0.54011,20.0,3.97,0.0,0.647,7.203,81.8,2.1121,5,264,13.0,392.8,9.59,33.8\  
n261,0.53412,20.0,3.97,0.0,0.647,7.52,89.4,2.1398,5,264,13.0,388.37,7.26,43.1\n2  
62,3.6118739711934156,20.0,3.97,0.0,0.647,8.398,91.5,2.2885,5,264,13.0,386.86,5.  
91,48.8\n263,0.82526,20.0,3.97,0.0,0.647,7.327,94.5,2.0788,5,264,13.0,393.42,11.  
25,31.0\n264,0.55007,20.0,3.97,0.0,0.647,7.206,91.6,1.9301,5,264,13.0,387.89,8.1  
,36.5\n265,0.76162,20.0,3.97,0.0,0.647,5.56,62.8,1.9865,5,264,13.0,392.4,10.45,2  
2.8\n266,0.7857,11.2119341563786,3.97,0.0,0.647,7.014,84.6,2.1329,5,264,13.0,384  
.07,14.79,30.7\n267,0.57834,20.0,3.97,0.0,0.575,8.297,67.0,2.4216,5,264,13.0,384  
.54,7.44,50.0\n268,0.5405,20.0,3.97,0.0,0.575,7.47,52.6,2.872,5,264,13.0,390.3,3  
.16,43.5\n269,0.09065,20.0,6.96,1.0,0.464,5.92,61.5,3.9175,3,223,18.6,391.34,13.  
65,20.7\n270,0.29916,20.0,6.96,0.0,0.464,5.856,42.1,4.429,3,223,18.6,388.65,13.0  
,21.1\n271,0.16211,20.0,6.96,0.0,0.464,6.24,16.3,4.429,3,223,18.6,396.9,12.71543  
2098765433,25.2\n272,0.1146,20.0,6.96,0.0,0.464,6.538,58.7,3.9175,3,223,18.6,394  
.96,7.73,24.4\n273,0.22188,20.0,6.96,1.0,0.464,7.691,51.8,4.3665,3,223,18.6,390.  
77,6.58,35.2\n274,0.05644,40.0,6.41,1.0,0.447,6.758,32.9,4.0776,4,254,17.6,396.9  
,3.53,32.4\n275,0.09604,40.0,6.41,0.0,0.447,6.854,42.8,4.2673,4,254,17.6,396.9,2  
.98,32.0\n276,0.10469,40.0,6.41,1.0,0.447,7.267,49.0,4.7872,4,254,17.6,389.25,6.  
05,33.2\n277,0.06127,40.0,6.41,1.0,0.447,6.826,27.6,4.8628,4,254,17.6,393.45,12.  
715432098765433,33.1\n278,0.07978,40.0,6.41,0.0,0.447,6.482,32.1,4.1403,4,254,17  
.6,396.9,7.19,29.1\n279,0.21038,20.0,3.33,0.0,0.4429,6.812,32.2,4.1007,5,216,14.  
9,396.9,4.85,35.1\n280,0.03578,20.0,3.33,0.0,0.4429,7.82,64.5,4.6947,5,216,14.9,  
387.31,3.76,45.4\n281,0.03705,20.0,3.33,0.0,0.4429,6.968,68.51851851851852,5.244  
7,5,216,14.9,392.23,4.59,35.4\n282,0.06129,20.0,3.33,1.0,0.4429,7.645,49.7,5.211  
9,5,216,14.9,377.07,3.01,46.0\n283,0.01501,90.0,1.21,1.0,0.401,7.923,24.8,5.885,  
1,198,13.6,395.52,3.16,50.0\n284,0.00906,90.0,2.97,0.0,0.4,7.088,20.8,7.3073,1,2  
85,15.3,394.72,7.85,32.2\n285,0.01096,55.0,2.25,0.0,0.389,6.453,31.9,7.3073,1,30  
0,15.3,394.72,8.23,22.0\n286,0.01965,80.0,1.76,0.0,0.385,6.23,68.51851851851852,  
9.0892,1,241,18.2,341.6,12.93,20.1\n287,0.03871,52.5,5.32,0.0,0.405,6.209,31.3,7  
.3172,6,293,16.6,396.9,7.14,23.2\n288,3.6118739711934156,52.5,5.32,0.0,0.405,6.3  
15,45.6,7.3172,6,293,16.6,396.9,7.6,22.3\n289,0.04297,52.5,5.32,0.0,0.405,6.565,  
22.9,7.3172,6,293,16.6,371.72,9.51,24.8\n290,0.03502,80.0,4.95,0.0,0.411,6.861,2  
7.9,5.1167,4,245,19.2,396.9,3.33,28.5\n291,0.07886,80.0,4.95,0.0,0.411,7.148,27.  
7,5.1167,4,245,19.2,396.9,3.56,37.3\n292,0.03615,80.0,11.083991769547325,0.0,0.4  
11,6.63,23.4,5.1167,4,245,19.2,396.9,4.7,27.9\n293,0.08265,0.0,13.92,0.0,0.437,6  
.127,18.4,5.5027,4,289,16.0,396.9,8.58,23.9\n294,0.08199,0.0,13.92,0.06995884773  
662552,0.437,6.009,42.3,5.5027,4,289,16.0,396.9,10.4,21.7\n295,0.12932,0.0,13.92  
,0.0,0.437,6.678,31.1,5.9604,4,289,16.0,396.9,6.27,28.6\n296,0.05372,0.0,13.92,0  
.0,0.437,6.549,51.0,5.9604,4,289,16.0,392.85,7.39,27.1\n297,0.14103,0.0,11.08399  
1769547325,0.0,0.437,5.79,58.0,6.32,4,289,16.0,396.9,15.84,20.3\n298,0.06466,70.

0,2.24,0.0,0.4,6.345,20.1,7.8278,5,358,14.8,368.24,4.97,22.5\n299,0.05561,70.0,2  
.24,0.0,0.4,7.041,10.0,7.8278,5,358,14.8,371.58,4.74,29.0\n300,0.04417,70.0,2.24  
,0.0,0.4,6.871,47.4,7.8278,5,358,14.8,390.86,6.07,24.8\n301,0.03537,11.211934156  
3786,6.09,0.0,0.433,6.59,40.4,5.4917,7,329,16.1,395.75,9.5,22.0\n302,3.611873971  
1934156,34.0,6.09,0.0,0.433,6.495,18.4,5.4917,7,329,16.1,383.61,8.67,26.4\n303,0  
.1,11.2119341563786,6.09,0.0,0.433,6.982,17.7,5.4917,7,329,16.1,390.43,4.86,33.1  
\n304,0.05515,33.0,2.18,0.0,0.472,7.236,41.1,4.022,7,222,18.4,393.68,6.93,36.1\n305,0.05479,33.0,11.083991769547325,0.0,0.472,6.616,58.1,3.37,7,222,18.4,393.36,  
8.93,28.4\n306,0.07503,33.0,2.18,0.0,0.472,7.42,71.9,3.0992,7,222,18.4,396.9,6.4  
7,33.4\n307,0.04932,33.0,2.18,0.0,0.472,6.849,70.3,3.1827,7,222,18.4,396.9,7.53,  
28.2\n308,0.49298,0.0,9.9,0.0,0.544,6.635,82.5,3.3175,4,304,18.4,396.9,4.54,22.8  
\n309,0.3494,0.0,9.9,0.0,0.544,5.972,76.7,3.1025,4,304,18.4,396.24,9.97,20.3\n31  
0,2.63548,0.0,9.9,0.0,0.544,4.973,37.8,2.5194,4,304,18.4,350.45,12.64,16.1\n311,  
0.79041,0.0,9.9,0.0,0.544,6.122,52.8,2.6403,4,304,18.4,396.9,5.98,22.1\n312,0.26  
169,0.0,9.9,0.0,0.544,6.023,90.4,2.834,4,304,18.4,396.3,11.72,19.4\n313,0.26938,  
0.0,9.9,0.0,0.544,6.266,82.8,3.2628,4,304,18.4,393.39,7.9,21.6\n314,0.3692,0.0,9  
.9,0.0,0.544,6.567,87.3,3.6023,4,304,18.4,395.69,9.28,23.8\n315,0.25356,0.0,9.9,  
0.0,0.544,5.705,77.7,3.945,4,304,18.4,396.42,11.5,16.2\n316,0.31827,0.0,9.9,0.0,  
0.544,5.914,68.51851851851852,3.9986,4,304,18.4,390.7,18.3,17.8\n317,0.24522,0.  
0,9.9,0.0,0.544,5.782,71.7,4.0317,4,304,18.4,396.9,15.94,19.8\n318,0.40202,0.0,9  
.9,0.0,0.544,6.382,67.2,3.5325,4,304,18.4,395.21,10.36,23.1\n319,0.47547,0.0,9.9  
0.0,0.544,6.113,58.8,4.0019,4,304,18.4,396.23,12.73,21.0\n320,0.1676,0.0,7.38,0  
.0,0.493,6.426,52.3,4.5404,5,287,19.6,396.9,7.2,23.8\n321,0.18159,0.0,7.38,0.0,0  
.493,6.376,54.3,4.5404,5,287,19.6,396.9,6.87,23.1\n322,0.35114,0.0,7.38,0.0,0.49  
3,6.041,49.9,4.7211,5,287,19.6,396.9,7.7,20.4\n323,0.28392,0.0,7.38,0.0,0.493,5.  
708,74,3,4.7211,5,287,19.6,391.13,11.74,18.5\n324,0.34109,0.0,7.38,0.0,0.493,6.4  
15,40.1,4.7211,5,287,19.6,396.9,6.12,25.0\n325,0.19186,0.0,7.38,0.0,0.493,6.431,  
14.7,5.4159,5,287,19.6,393.68,5.08,24.6\n326,0.30347,0.0,7.38,0.0,0.493,6.312,28  
.9,5.4159,5,287,19.6,396.9,6.15,23.0\n327,0.24103,0.0,7.38,0.0,0.493,6.083,43.7,  
5.4159,5,287,19.6,396.9,12.79,22.2\n328,0.06617,0.0,3.24,0.0,0.46,5.868,25.8,5.2  
146,4,430,16.9,382.44,9.97,19.3\n329,0.06724,0.0,3.24,0.0,0.46,6.333,17.2,5.2146  
,4,430,16.9,375.21,7.34,21.0\n330,0.04544,11.2119341563786,3.24,0.0,0.46,6.144,3  
2.2,5.8736,4,430,16.9,368.57,9.09,19.8\n331,0.05023,35.0,6.06,0.0,0.4379,5.706,2  
8.4,6.6407,1,304,16.9,394.02,12.43,17.1\n332,0.03466,11.2119341563786,6.06,0.0,0  
.4379,6.031,23.3,6.6407,1,304,16.9,362.25,7.83,19.4\n333,0.05083,0.0,5.19,0.0,0.  
515,6.316,38.1,6.4584,5,224,20.2,389.71,5.68,22.2\n334,0.03738,0.0,5.19,0.0,0.51  
5,6.31,38.5,6.4584,5,224,20.2,389.4,6.75,20.7\n335,0.03961,0.0,5.19,0.0,0.515,6.  
037,34.5,5.9853,5,224,20.2,396.9,8.01,21.1\n336,0.03427,0.0,5.19,0.0,0.515,5.869  
,46.3,5.2311,5,224,20.2,396.9,9.8,19.5\n337,0.03041,0.0,5.19,0.0,0.515,5.895,59.  
6,5.615,5,224,20.2,394.81,10.56,18.5\n338,0.03306,0.0,5.19,0.0,0.515,6.059,37.3,  
4.8122,5,224,20.2,396.14,8.51,20.6\n339,0.05497,0.0,5.19,0.0,0.515,5.985,45.4,4.  
8122,5,224,20.2,396.9,9.74,19.0\n340,0.06151,0.0,5.19,0.0,0.515,5.968,58.5,4.812  
2,5,224,20.2,396.9,9.29,18.7\n341,0.01301,35.0,1.52,0.0,0.442,7.241,49.3,7.0379,  
1,284,15.5,394.74,5.49,32.7\n342,0.02498,0.0,1.89,0.0,0.518,6.54,59.7,6.2669,1,4  
22,15.9,389.96,8.65,16.5\n343,0.02543,55.0,3.78,0.0,0.484,6.696,56.4,5.7321,5,37  
0,17.6,396.9,7.18,23.9\n344,0.03049,55.0,11.083991769547325,0.0,0.484,6.874,28.1  
,6.4654,5,370,17.6,387.97,4.61,31.2\n345,0.03113,0.0,4.39,0.0,0.442,6.014,48.5,8

.0136,3,352,18.8,385.64,10.53,17.5\n346,0.06162,0.0,4.39,0.0,0.442,5.898,52.3,8.  
0136,3,352,18.8,364.61,12.67,17.2\n347,0.0187,85.0,4.15,0.0,0.429,6.516,27.7,8.5  
353,4,351,17.9,392.43,6.36,23.1\n348,0.01501,80.0,2.01,0.0,0.435,6.635,29.7,8.34  
4,4,280,17.0,390.94,5.99,24.5\n349,0.02899,40.0,1.25,0.0,0.429,6.939,34.5,8.7921  
,1,335,19.7,389.85,12.715432098765433,26.6\n350,0.06211,11.2119341563786,1.25,0.  
0,0.429,6.49,44.4,8.7921,1,335,19.7,396.9,12.715432098765433,22.9\n351,0.0795,60  
.0,1.69,0.0,0.411,6.579,35.9,10.7103,4,411,18.3,370.78,5.49,24.1\n352,0.07244,60  
.0,1.69,0.0,0.411,5.884,18.5,10.7103,4,411,18.3,392.33,7.79,18.6\n353,0.01709,90  
.0,2.02,0.0,0.41,6.728,36.1,12.1265,5,187,17.0,384.46,4.5,30.1\n354,0.04301,80.0  
,1.91,0.0,0.413,5.663,21.9,10.5857,4,334,22.0,382.8,8.05,18.2\n355,0.10659,11.21  
19341563786,1.91,0.0,0.413,5.936,68.51851851851852,10.5857,4,334,22.0,376.04,5.5  
7,20.6\n356,8.98296,0.0,18.1,1.0,0.77,6.212,97.4,2.1222,24,666,20.2,377.73,17.6,  
17.8\n357,3.8497,0.0,18.1,1.0,0.77,6.395,91.0,2.5052,24,666,20.2,391.34,13.27,21  
.7\n358,5.20177,0.0,18.1,1.0,0.77,6.127,83.4,2.7227,24,666,20.2,395.43,11.48,22.  
7\n359,4.26131,0.0,11.083991769547325,0.0,0.77,6.112,81.3,2.5091,24,666,20.2,390  
.74,12.67,22.6\n360,4.54192,0.0,18.1,0.0,0.77,6.398,88.0,2.5182,24,666,20.2,374.  
56,7.79,25.0\n361,3.83684,0.0,18.1,0.0,0.77,6.251,91.1,2.2955,24,666,20.2,350.65  
,14.19,19.9\n362,3.67822,0.0,18.1,0.0,0.77,5.362,96.2,2.1036,24,666,20.2,380.79,  
10.19,20.8\n363,4.22239,0.0,18.1,1.0,0.77,5.803,89.0,1.9047,24,666,20.2,353.04,1  
4.64,16.8\n364,3.47428,0.0,18.1,1.0,0.718,8.78,82.9,1.9047,24,666,20.2,354.55,5.  
29,21.9\n365,4.55587,0.0,18.1,0.0,0.718,3.561,87.9,1.6132,24,666,20.2,354.7,7.12  
,27.5\n366,3.69695,0.0,18.1,0.0,0.718,4.963,91.4,1.7523,24,666,20.2,316.03,14.0,  
21.9\n367,13.5222,0.0,18.1,0.06995884773662552,0.631,3.863,100.0,1.5106,24,666,2  
0.2,131.42,13.33,23.1\n368,4.89822,0.0,18.1,0.0,0.631,4.97,68.51851851851852,1.3  
325,24,666,20.2,375.52,3.26,50.0\n369,3.6118739711934156,0.0,18.1,1.0,0.631,6.68  
3,96.8,1.3567,24,666,20.2,375.33,3.73,50.0\n370,6.53876,0.0,18.1,1.0,0.631,7.016  
,97.5,1.2024,24,666,20.2,392.05,2.96,50.0\n371,9.2323,0.0,18.1,0.0,0.631,6.216,1  
00.0,1.1691,24,666,20.2,366.15,9.53,50.0\n372,8.26725,0.0,18.1,1.0,0.668,5.875,8  
9.6,1.1296,24,666,20.2,347.88,8.88,50.0\n373,11.1081,0.0,18.1,0.0,0.668,4.906,10  
0.0,1.1742,24,666,20.2,396.9,34.77,13.8\n374,18.4982,0.0,18.1,0.0,0.668,4.138,10  
0.0,1.137,24,666,20.2,396.9,37.97,13.8\n375,19.6091,11.2119341563786,18.1,0.0,0.  
671,7.313,97.9,1.3163,24,666,20.2,396.9,13.44,15.0\n376,15.288,0.0,18.1,0.069958  
84773662552,0.671,6.649,93.3,1.3449,24,666,20.2,363.02,12.715432098765433,13.9\n377,9.82349,0.0,18.1,0.0,0.671,6.794,98.8,1.358,24,666,20.2,396.9,21.24,13.3\n378,23.6482,0.0,18.1,0.0,0.671,6.38,96.2,1.3861,24,666,20.2,396.9,23.69,13.1\n379,  
17.8667,0.0,18.1,0.0,0.671,6.223,100.0,1.3861,24,666,20.2,393.74,21.78,10.2\n380  
,88.9762,0.0,18.1,0.0,0.671,6.968,91.9,1.4165,24,666,20.2,396.9,17.21,10.4\n381,  
15.8744,0.0,18.1,0.0,0.671,6.545,99.1,1.5192,24,666,20.2,396.9,21.08,10.9\n382,9  
.18702,0.0,18.1,0.0,0.7,5.536,100.0,1.5804,24,666,20.2,396.9,23.6,11.3\n383,7.99  
248,0.0,18.1,0.0,0.7,5.52,100.0,1.5331,24,666,20.2,396.9,12.715432098765433,12.3  
\n384,20.0849,0.0,18.1,0.0,0.7,4.368,91.2,1.4395,24,666,20.2,285.83,30.63,8.8\n3  
85,16.8118,0.0,18.1,0.0,0.7,5.277,98.1,1.4261,24,666,20.2,396.9,30.81,7.2\n386,2  
4.3938,0.0,18.1,0.0,0.7,4.652,100.0,1.4672,24,666,20.2,396.9,28.28,10.5\n387,22.  
5971,0.0,18.1,0.0,0.7,5.0,89.5,1.5184,24,666,20.2,396.9,31.99,7.4\n388,14.3337,0  
.0,18.1,0.06995884773662552,0.7,4.88,100.0,1.5895,24,666,20.2,372.92,30.62,10.2  
\n389,8.15174,0.0,18.1,0.0,0.7,5.39,98.9,1.7281,24,666,20.2,396.9,20.85,11.5\n390  
,6.96215,0.0,18.1,0.0,0.7,5.713,97.0,1.9265,24,666,20.2,394.43,17.11,15.1\n391,5

.29305,0.0,18.1,0.0,0.7,6.051,82.5,2.1678,24,666,20.2,378.38,18.76,23.2\n392,11.  
5779,0.0,18.1,0.0,0.7,5.036,97.0,1.77,24,666,20.2,396.9,25.68,9.7\n393,3.6118739  
711934156,0.0,18.1,0.0,0.693,6.193,92.6,1.7912,24,666,20.2,396.9,15.17,13.8\n394  
,3.6118739711934156,0.0,18.1,0.0,0.693,5.887,94.7,1.7821,24,666,20.2,396.9,16.35  
,12.7\n395,8.71675,0.0,18.1,0.0,0.693,6.471,98.8,1.7257,24,666,20.2,391.98,17.12  
,13.1\n396,5.87205,0.0,18.1,0.0,0.693,6.405,96.0,1.6768,24,666,20.2,396.9,19.37,  
12.5\n397,7.67202,0.0,18.1,0.0,0.693,5.747,98.9,1.6334,24,666,20.2,393.1,19.92,8  
.5\n398,38.3518,0.0,18.1,0.0,0.693,5.453,100.0,1.4896,24,666,20.2,396.9,30.59,5.  
0\n399,9.91655,0.0,18.1,0.0,0.693,5.852,77.8,1.5004,24,666,20.2,338.16,29.97,6.3  
\n400,25.0461,0.0,18.1,0.0,0.693,5.987,100.0,1.5888,24,666,20.2,396.9,26.77,5.6  
\n401,14.2362,0.0,18.1,0.06995884773662552,0.693,6.343,100.0,1.5741,24,666,20.2,3  
96.9,20.32,7.2\n402,9.59571,0.0,18.1,0.0,0.693,6.404,100.0,1.639,24,666,20.2,376  
.11,20.31,12.1\n403,24.8017,0.0,18.1,0.0,0.693,5.349,96.0,1.7028,24,666,20.2,396  
.9,19.77,8.3\n404,41.5292,0.0,18.1,0.0,0.693,5.531,85.4,1.6074,24,666,20.2,329.4  
6,27.38,8.5\n405,67.9208,0.0,18.1,0.0,0.693,5.683,100.0,1.4254,24,666,20.2,384.9  
7,22.98,5.0\n406,20.7162,0.0,11.083991769547325,0.0,0.659,4.138,100.0,1.1781,24,  
666,20.2,370.22,23.34,11.9\n407,11.9511,0.0,18.1,0.0,0.659,5.608,100.0,1.2852,24  
,666,20.2,332.09,12.715432098765433,27.9\n408,7.40389,0.0,18.1,0.0,0.597,5.617,9  
7.9,1.4547,24,666,20.2,314.64,26.4,17.2\n409,3.6118739711934156,0.0,18.1,0.0,0.5  
97,6.852,100.0,1.4655,24,666,20.2,179.36,19.78,27.5\n410,51.1358,0.0,18.1,0.0,0.  
597,5.757,100.0,1.413,24,666,20.2,2.6,10.11,15.0\n411,14.0507,0.0,18.1,0.0,0.597  
,6.657,100.0,1.5275,24,666,20.2,35.05,21.22,17.2\n412,18.811,0.0,18.1,0.0,0.597,  
4.628,100.0,1.5539,24,666,20.2,28.79,34.37,17.9\n413,28.6558,0.0,18.1,0.0,0.597,  
5.155,100.0,1.5894,24,666,20.2,210.97,20.08,16.3\n414,45.7461,0.0,18.1,0.0,0.693  
,4.519,100.0,1.6582,24,666,20.2,88.27,36.98,7.0\n415,18.0846,0.0,18.1,0.0,0.679,  
6.434,100.0,1.8347,24,666,20.2,27.25,29.05,7.2\n416,10.8342,0.0,18.1,0.0,0.679,6  
.782,90.8,1.8195,24,666,20.2,21.57,25.79,7.5\n417,25.9406,0.0,18.1,0.0,0.679,5.3  
04,89.1,1.6475,24,666,20.2,127.36,26.64,10.4\n418,73.5341,0.0,18.1,0.0,0.679,5.9  
57,100.0,1.8026,24,666,20.2,16.45,20.62,8.8\n419,11.8123,0.0,18.1,0.0,0.718,6.82  
4,76.5,1.794,24,666,20.2,48.45,22.74,8.4\n420,11.0874,0.0,18.1,0.0,0.718,6.411,1  
00.0,1.8589,24,666,20.2,318.75,15.02,16.7\n421,7.02259,0.0,18.1,0.0,0.718,6.006,  
95.3,1.8746,24,666,20.2,319.98,15.7,14.2\n422,12.0482,0.0,18.1,0.0,0.614,5.648,8  
7.6,1.9512,24,666,20.2,291.55,14.1,20.8\n423,7.05042,0.0,18.1,0.0,0.614,6.103,68  
.51851851851852,2.0218,24,666,20.2,2.52,23.29,13.4\n424,8.79212,0.0,18.1,0.0,0.5  
84,5.565,70.6,2.0635,24,666,20.2,3.65,17.16,11.7\n425,15.8603,0.0,18.1,0.0,0.679  
,5.896,95.4,1.9096,24,666,20.2,7.68,24.39,8.3\n426,3.6118739711934156,0.0,18.1,0  
.0,0.584,5.837,59.7,1.9976,24,666,20.2,24.65,15.69,10.2\n427,37.6619,11.21193415  
63786,18.1,0.0,0.679,6.202,78.7,1.8629,24,666,20.2,18.82,14.52,10.9\n428,7.36711  
,0.0,18.1,0.0,0.679,6.193,78.1,1.9356,24,666,20.2,96.73,21.52,11.0\n429,9.33889,  
0.0,18.1,0.0,0.679,6.38,68.51851851851852,1.9682,24,666,20.2,60.72,24.08,9.5\n430  
3.6118739711934156,0.0,18.1,0.0,0.584,6.348,86.1,2.0527,24,666,20.2,83.45,17.6  
4,14.5\n431,10.0623,0.0,18.1,0.0,0.584,6.833,94.3,2.0882,24,666,20.2,81.33,19.69  
,14.1\n432,6.44405,0.0,18.1,0.0,0.584,6.425,74.8,2.2004,24,666,20.2,97.95,12.03,  
16.1\n433,5.58107,0.0,18.1,0.0,0.713,6.436,87.9,2.3158,24,666,20.2,100.19,16.22,  
14.3\n434,13.9134,0.0,18.1,0.0,0.713,6.208,95.0,2.2222,24,666,20.2,100.63,15.17,  
11.7\n435,11.1604,0.0,18.1,0.0,0.74,6.629,94.6,2.1247,24,666,20.2,109.85,23.27,1  
3.4\n436,14.4208,0.0,18.1,0.0,0.74,6.461,93.3,2.0026,24,666,20.2,27.49,18.05,9.6

```

\n437,15.1772,0.0,18.1,0.0,0.74,6.152,100.0,1.9142,24,666,20.2,9.32,26.45,8.7\n4
38,13.6781,0.0,18.1,0.0,0.74,5.935,87.9,1.8206,24,666,20.2,68.95,34.02,8.4\n439,
9.39063,0.0,18.1,0.0,0.74,5.627,93.9,1.8172,24,666,20.2,396.9,22.88,12.8\n440,22
.0511,0.0,18.1,0.0,0.74,5.818,92.4,1.8662,24,666,20.2,391.45,12.715432098765433,
10.5\n441,9.72418,0.0,18.1,0.0,0.74,6.406,97.2,2.0651,24,666,20.2,385.96,12.7154
32098765433,17.1\n442,5.66637,0.0,18.1,0.06995884773662552,0.74,6.219,100.0,2.00
48,24,666,20.2,395.69,16.59,18.4\n443,9.96654,0.0,18.1,0.0,0.74,6.485,100.0,1.97
84,24,666,20.2,386.73,18.85,15.4\n444,12.8023,0.0,18.1,0.0,0.74,5.854,96.6,1.895
6,24,666,20.2,240.52,23.79,10.8\n445,10.6718,0.0,18.1,0.0,0.74,6.459,94.8,1.9879
,24,666,20.2,43.06,23.98,11.8\n446,6.28807,0.0,18.1,0.0,0.74,6.341,96.4,2.072,24
,666,20.2,318.01,17.79,14.9\n447,9.92485,0.0,18.1,0.0,0.74,6.251,96.6,2.198,24,6
66,20.2,388.52,16.44,12.6\n448,9.32909,0.0,18.1,0.0,0.713,6.185,98.7,2.2616,24,6
66,20.2,396.9,18.13,14.1\n449,7.52601,0.0,18.1,0.0,0.713,6.417,98.3,2.185,24,666
,20.2,304.21,19.31,13.0\n450,6.71772,0.0,18.1,0.06995884773662552,0.713,6.749,92
.6,2.3236,24,666,20.2,0.32,17.44,13.4\n451,5.44114,0.0,18.1,0.0,0.713,6.655,68.5
1851851851852,2.3552,24,666,20.2,355.29,17.73,15.2\n452,5.09017,0.0,18.1,0.0,0.7
13,6.297,91.8,2.3682,24,666,20.2,385.09,17.27,16.1\n453,8.24809,0.0,11.083991769
547325,0.0,0.713,7.393,99.3,2.4527,24,666,20.2,375.87,16.74,17.8\n454,9.51363,0.
0,18.1,0.0,0.713,6.728,94.1,2.4961,24,666,20.2,6.68,18.71,14.9\n455,4.75237,0.0,
18.1,0.0,0.713,6.525,86.5,2.4358,24,666,20.2,50.92,18.13,14.1\n456,4.66883,0.0,1
8.1,0.0,0.713,5.976,87.9,2.5806,24,666,20.2,10.48,19.01,12.7\n457,8.20058,0.0,18
.1,0.0,0.713,5.936,80.3,2.7792,24,666,20.2,3.5,16.94,13.5\n458,7.75223,11.211934
1563786,11.083991769547325,0.0,0.713,6.301,83.7,2.7831,24,666,20.2,272.21,16.23,
14.9\n459,6.80117,0.0,18.1,0.0,0.713,6.081,84.4,2.7175,24,666,20.2,396.9,14.7,20
.0\n460,3.6118739711934156,0.0,18.1,0.0,0.713,6.701,90.0,2.5975,24,666,20.2,255.
23,16.42,16.4\n461,3.69311,0.0,18.1,0.0,0.713,6.376,88.4,2.5671,24,666,20.2,391.
43,14.65,17.7\n462,6.65492,0.0,18.1,0.0,0.713,6.317,83.0,2.7344,24,666,20.2,396.
9,13.99,19.5\n463,5.82115,0.0,18.1,0.0,0.713,6.513,89.9,2.8016,24,666,20.2,393.8
2,10.29,20.2\n464,7.83932,0.0,18.1,0.0,0.655,6.209,65.4,2.9634,24,666,20.2,396.9
,13.22,21.4\n465,3.6118739711934156,0.0,18.1,0.06995884773662552,0.655,5.759,48.
2,3.0665,24,666,20.2,334.4,14.13,19.9\n466,3.77498,0.0,11.083991769547325,0.0,0.
655,5.952,84.7,2.8715,24,666,20.2,22.01,17.15,19.0\n467,4.42228,0.0,18.1,0.0,0.5
84,6.003,94.5,2.5403,24,666,20.2,331.29,21.32,19.1\n468,15.5757,0.0,18.1,0.0,0.5
8,5.926,71.0,2.9084,24,666,20.2,368.74,18.13,19.1\n469,13.0751,0.0,18.1,0.0,0.58
,5.713,56.7,2.8237,24,666,20.2,396.9,14.76,20.1\n470,4.34879,0.0,18.1,0.0,0.58,6
.167,84.0,3.0334,24,666,20.2,396.9,16.29,19.9\n471,4.03841,0.0,18.1,0.0,0.532,6.
229,90.7,3.0993,24,666,20.2,395.33,12.87,19.6\n472,3.56868,0.0,18.1,0.0,0.58,6.4
37,75.0,2.8965,24,666,20.2,393.37,14.36,23.2\n473,4.64689,0.0,18.1,0.0,0.614,6.9
8,67.6,2.5329,24,666,20.2,374.68,12.715432098765433,29.8\n474,8.05579,0.0,18.1,0
.0,0.584,5.427,95.4,2.4298,24,666,20.2,352.58,18.14,13.8\n475,6.39312,0.0,18.1,0
.0,0.584,6.162,97.4,2.206,24,666,20.2,302.76,24.1,13.3\n476,4.87141,0.0,18.1,0.0
,0.614,6.484,93.6,2.3053,24,666,20.2,396.21,18.68,16.7\n477,15.0234,0.0,18.1,0.0
,0.614,5.304,97.3,2.1007,24,666,20.2,349.48,24.91,12.0\n478,10.233,0.0,18.1,0.0,
0.614,6.185,96.7,2.1705,24,666,20.2,379.7,18.03,14.6\n479,14.3337,0.0,18.1,0.069
95884773662552,0.614,6.229,88.0,1.9512,24,666,20.2,383.32,13.11,21.4\n480,5.8240
1,0.0,18.1,0.0,0.532,6.242,64.7,3.4242,24,666,20.2,396.9,10.74,23.0\n481,5.70818
,0.0,18.1,0.0,0.532,6.75,74.9,3.3317,24,666,20.2,393.07,7.74,23.7\n482,5.73116,0

```

```

.0,18.1,0.06995884773662552,0.532,7.061,77.0,3.4106,24,666,20.2,395.28,7.01,25.0
\n483,2.81838,0.0,18.1,0.0,0.532,5.762,40.3,4.0983,24,666,20.2,392.92,10.42,21.8
\n484,2.37857,0.0,18.1,0.0,0.583,5.871,41.9,3.724,24,666,20.2,370.73,13.34,20.6\
n485,3.67367,0.0,18.1,0.0,0.583,6.312,51.9,3.9917,24,666,20.2,388.62,10.58,21.2\
n486,5.69175,0.0,18.1,0.0,0.583,6.114,79.8,3.5459,24,666,20.2,392.68,14.98,19.1\
n487,4.83567,0.0,18.1,0.0,0.583,5.905,53.2,3.1523,24,666,20.2,388.22,11.45,20.6\
n488,0.15086,0.0,27.74,0.0,0.609,5.454,92.7,1.8209,4,711,20.1,395.09,18.06,15.2\
n489,0.18337,0.0,27.74,0.0,0.609,5.414,98.3,1.7554,4,711,20.1,344.05,23.97,7.0\
n490,0.20746,0.0,27.74,0.0,0.609,5.093,98.0,1.8226,4,711,20.1,318.43,29.68,8.1\
n491,0.10574,0.0,27.74,0.0,0.609,5.983,98.8,1.8681,4,711,20.1,390.11,18.07,13.6\
n492,0.11132,0.0,27.74,0.0,0.609,5.983,83.5,2.1099,4,711,20.1,396.9,13.35,20.1\
n493,0.17331,0.0,9.69,0.0,0.585,5.707,54.0,2.3817,6,391,19.2,396.9,12.01,21.8\
n494,0.27957,0.0,9.69,0.0,0.585,5.926,42.6,2.3817,6,391,19.2,396.9,13.59,24.5\
n495,0.17899,0.0,9.69,0.0,0.585,5.67,28.8,2.7986,6,391,19.2,393.29,17.6,23.1\
n496,0.2896,0.0,9.69,0.0,0.585,5.39,72.9,2.7986,6,391,19.2,396.9,21.14,19.7\
n497,0.26838,0.0,9.69,0.0,0.585,5.794,70.6,2.8927,6,391,19.2,396.9,14.1,18.3\
n498,0.23912,0.0,9.69,0.0,0.585,6.019,65.3,2.4091,6,391,19.2,396.9,12.92,21.2\
n499,0.17783,0.0,9.69,0.0,0.585,5.569,73.5,2.3999,6,391,19.2,395.77,15.1,17.5\
n500,0.22438,0.0,9.69,0.0,0.585,6.027,79.7,2.4982,6,391,19.2,396.9,14.33,16.8\
n501,0.06263,0.0,11.93,0.0,0.573,6.976,91.0,2.1675,1,273,21.0,396.9,5.64,23.9\
n504,0.10959,0.0,11.93,0.0,0.573,6.03,68.51851851851852,2.505,1,273,21.0,396.9,7.88,11.9\
n' }

```

```
[ ]: df=pd.read_csv("Boston_housing.csv")
```

```
[ ]: df
```

```

[ ]:      Unnamed: 0      CRIM      ZN      INDUS      CHAS      NOX      RM      AGE      DIS \
0      0      0.00632      18.0      2.31      0.0      0.538      6.575      65.200000      4.0900
1      1      0.02731      0.0      7.07      0.0      0.469      6.421      78.900000      4.9671
2      2      0.02729      0.0      7.07      0.0      0.469      7.185      61.100000      4.9671
3      3      0.03237      0.0      2.18      0.0      0.458      6.998      45.800000      6.0622
4      4      0.06905      0.0      2.18      0.0      0.458      7.147      54.200000      6.0622
..      ...      ...      ...      ...      ...      ...      ...      ...
501      501      0.06263      0.0      11.93      0.0      0.573      6.593      69.100000      2.4786
502      502      0.04527      0.0      11.93      0.0      0.573      6.120      76.700000      2.2875
503      503      0.06076      0.0      11.93      0.0      0.573      6.976      91.000000      2.1675
504      504      0.10959      0.0      11.93      0.0      0.573      6.794      89.300000      2.3889
505      505      0.04741      0.0      11.93      0.0      0.573      6.030      68.518519      2.5050

      RAD      TAX      PTRATIO      B      LSTAT      MEDV
0      1      296      15.3      396.90      4.980000      24.0
1      2      242      17.8      396.90      9.140000      21.6
2      2      242      17.8      392.83      4.030000      34.7
3      3      222      18.7      394.63      2.940000      33.4

```

```

4      3  222      18.7  396.90  12.715432  36.2
..    ..    ..    ..    ..    ..    ..
501    1  273      21.0  391.99  12.715432  22.4
502    1  273      21.0  396.90  9.080000  20.6
503    1  273      21.0  396.90  5.640000  23.9
504    1  273      21.0  393.45  6.480000  22.0
505    1  273      21.0  396.90  7.880000  11.9

```

[506 rows x 15 columns]

```
[ ]:
```

Basic operations

```
[ ]: df.head(30)
```

```

[ ]:      Unnamed: 0      CRIM      ZN      INDUS      CHAS      NOX      RM      AGE      DIS  \
0              0  0.00632  18.0      2.31  0.000000  0.538  6.575  65.2  4.0900
1              1  0.02731   0.0      7.07  0.000000  0.469  6.421  78.9  4.9671
2              2  0.02729   0.0      7.07  0.000000  0.469  7.185  61.1  4.9671
3              3  0.03237   0.0      2.18  0.000000  0.458  6.998  45.8  6.0622
4              4  0.06905   0.0      2.18  0.000000  0.458  7.147  54.2  6.0622
5              5  0.02985   0.0      2.18  0.000000  0.458  6.430  58.7  6.0622
6              6  0.08829  12.5      7.87  0.069959  0.524  6.012  66.6  5.5605
7              7  0.14455  12.5      7.87  0.000000  0.524  6.172  96.1  5.9505
8              8  0.21124  12.5      7.87  0.000000  0.524  5.631  100.0  6.0821
9              9  0.17004  12.5      7.87  0.069959  0.524  6.004  85.9  6.5921
10             10  0.22489  12.5      7.87  0.000000  0.524  6.377  94.3  6.3467
11             11  0.11747  12.5      7.87  0.000000  0.524  6.009  82.9  6.2267
12             12  0.09378  12.5      7.87  0.000000  0.524  5.889  39.0  5.4509
13             13  0.62976   0.0      8.14  0.000000  0.538  5.949  61.8  4.7075
14             14  0.63796   0.0      8.14  0.069959  0.538  6.096  84.5  4.4619
15             15  0.62739   0.0      8.14  0.000000  0.538  5.834  56.5  4.4986
16             16  1.05393   0.0      8.14  0.000000  0.538  5.935  29.3  4.4986
17             17  0.78420   0.0      8.14  0.000000  0.538  5.990  81.7  4.2579
18             18  0.80271   0.0      8.14  0.000000  0.538  5.456  36.6  3.7965
19             19  0.72580   0.0      8.14  0.000000  0.538  5.727  69.5  3.7965
20             20  1.25179   0.0      8.14  0.000000  0.538  5.570  98.1  3.7979
21             21  0.85204   0.0      8.14  0.000000  0.538  5.965  89.2  4.0123
22             22  1.23247   0.0      8.14  0.000000  0.538  6.142  91.7  3.9769
23             23  0.98843   0.0      8.14  0.000000  0.538  5.813  100.0  4.0952
24             24  0.75026   0.0      8.14  0.000000  0.538  5.924  94.1  4.3996
25             25  0.84054   0.0      8.14  0.000000  0.538  5.599  85.7  4.4546
26             26  0.67191   0.0      8.14  0.000000  0.538  5.813  90.3  4.6820
27             27  0.95577   0.0      8.14  0.000000  0.538  6.047  88.8  4.4534
28             28  0.77299   0.0      8.14  0.000000  0.538  6.495  94.4  4.4547
29             29  1.00245   0.0      8.14  0.000000  0.538  6.674  87.3  4.2390

```

```

RAD  TAX  PTRATIO      B      LSTAT  MEDV
0    1  296      15.3  396.90  4.980000  24.0
1    2  242      17.8  396.90  9.140000  21.6
2    2  242      17.8  392.83  4.030000  34.7
3    3  222      18.7  394.63  2.940000  33.4
4    3  222      18.7  396.90  12.715432  36.2
5    3  222      18.7  394.12  5.210000  28.7
6    5  311      15.2  395.60  12.430000  22.9
7    5  311      15.2  396.90  19.150000  27.1
8    5  311      15.2  386.63  29.930000  16.5
9    5  311      15.2  386.71  17.100000  18.9
10   5  311      15.2  392.52  20.450000  15.0
11   5  311      15.2  396.90  13.270000  18.9
12   5  311      15.2  390.50  15.710000  21.7
13   4  307      21.0  396.90  8.260000  20.4
14   4  307      21.0  380.02  10.260000  18.2
15   4  307      21.0  395.62  8.470000  19.9
16   4  307      21.0  386.85  6.580000  23.1
17   4  307      21.0  386.75  14.670000  17.5
18   4  307      21.0  288.99  11.690000  20.2
19   4  307      21.0  390.95  11.280000  18.2
20   4  307      21.0  376.57  21.020000  13.6
21   4  307      21.0  392.53  13.830000  19.6
22   4  307      21.0  396.90  18.720000  15.2
23   4  307      21.0  394.54  19.880000  14.5
24   4  307      21.0  394.33  16.300000  15.6
25   4  307      21.0  303.42  16.510000  13.9
26   4  307      21.0  376.88  14.810000  16.6
27   4  307      21.0  306.38  17.280000  14.8
28   4  307      21.0  387.94  12.800000  18.4
29   4  307      21.0  380.23  11.980000  21.0

```

```
[ ]: df.info()
```

```

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 506 entries, 0 to 505
Data columns (total 15 columns):
#   Column      Non-Null Count  Dtype
---  ---
0   Unnamed: 0  506 non-null    int64
1   CRIM        506 non-null    float64
2   ZN          506 non-null    float64
3   INDUS       506 non-null    float64
4   CHAS        506 non-null    float64
5   NOX         506 non-null    float64
6   RM          506 non-null    float64

```

```

7 AGE      506 non-null float64
8 DIS      506 non-null float64
9 RAD      506 non-null int64
10 TAX     506 non-null int64
11 PTRATIO 506 non-null float64
12 B       506 non-null float64
13 LSTAT   506 non-null float64
14 MEDV    506 non-null float64
dtypes: float64(12), int64(3)
memory usage: 59.4 KB

```

```
[ ]: df.describe()
```

```

[ ]:      Unnamed: 0      CRIM      ZN      INDUS      CHAS      NOX  \
count  506.000000  506.000000  506.000000  506.000000  506.000000  506.000000
mean    252.500000    3.611874   11.211934   11.083992    0.069959    0.554695
std     146.213884    8.545770   22.921051    6.699165    0.250233    0.115878
min         0.000000    0.006320    0.000000    0.460000    0.000000    0.385000
25%     126.250000    0.083235    0.000000    5.190000    0.000000    0.449000
50%     252.500000    0.290250    0.000000    9.900000    0.000000    0.538000
75%     378.750000    3.611874   11.211934   18.100000    0.000000    0.624000
max     505.000000   88.976200  100.000000   27.740000    1.000000    0.871000

      RM      AGE      DIS      RAD      TAX      PTRATIO  \
count  506.000000  506.000000  506.000000  506.000000  506.000000  506.000000
mean     6.284634   68.518519   3.795043    9.549407   408.237154   18.455534
std     0.702617   27.439466   2.105710    8.707259   168.537116    2.164946
min     3.561000   2.900000   1.129600    1.000000   187.000000   12.600000
25%     5.885500   45.925000   2.100175    4.000000   279.000000   17.400000
50%     6.208500   74.450000   3.207450    5.000000   330.000000   19.050000
75%     6.623500   93.575000   5.188425   24.000000   666.000000   20.200000
max     8.780000  100.000000  12.126500   24.000000  711.000000   22.000000

      B      LSTAT      MEDV
count  506.000000  506.000000  506.000000
mean   356.674032   12.715432   22.532806
std    91.294864    7.012739    9.197104
min     0.320000    1.730000    5.000000
25%    375.377500   17.230000   17.025000
50%    391.440000   11.995000   21.200000
75%    396.225000   16.570000   25.000000
max    396.900000   37.970000   50.000000

```

```
#Data Preprocessing
```

```
[ ]: df.isna()
```

```

[ ]:      Unnamed: 0      CRIM      ZN      INDUS      CHAS      NOX      RM      AGE      DIS  \
0      False      False      False      False      False      False      False      False      False
1      False      False      False      False      False      False      False      False      False
2      False      False      False      False      False      False      False      False      False
3      False      False      False      False      False      False      False      False      False
4      False      False      False      False      False      False      False      False      False
..      ...      ...      ...      ...      ...      ...      ...      ...      ...
501     False      False      False      False      False      False      False      False      False
502     False      False      False      False      False      False      False      False      False
503     False      False      False      False      False      False      False      False      False
504     False      False      False      False      False      False      False      False      False
505     False      False      False      False      False      False      False      False      False

```

```

      RAD      TAX      PTRATIO      B      LSTAT      MEDV
0      False      False      False      False      False      False
1      False      False      False      False      False      False
2      False      False      False      False      False      False
3      False      False      False      False      False      False
4      False      False      False      False      False      False
..      ...      ...      ...      ...      ...      ...
501     False      False      False      False      False      False
502     False      False      False      False      False      False
503     False      False      False      False      False      False
504     False      False      False      False      False      False
505     False      False      False      False      False      False

```

```
[506 rows x 15 columns]
```

```
[ ]: df.isna().sum()
```

```

[ ]: Unnamed: 0      0
      CRIM          0
      ZN          0
      INDUS        0
      CHAS          0
      NOX          0
      RM          0
      AGE          0
      DIS          0
      RAD          0
      TAX          0
      PTRATIO       0
      B           0
      LSTAT        0
      MEDV         0
dtype: int64

```

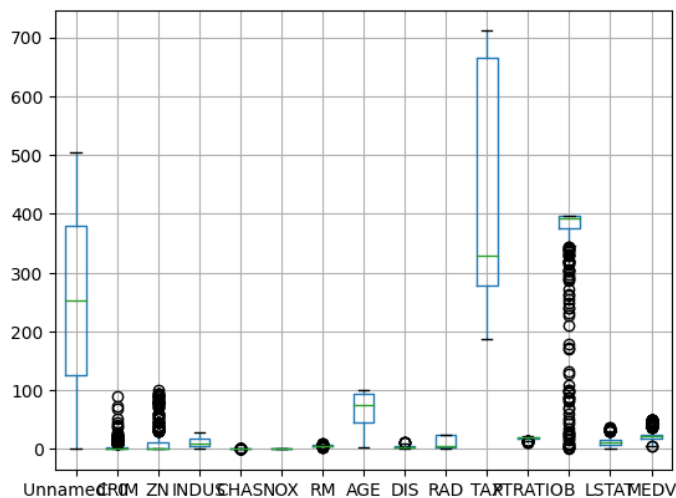


Checking for Outliers

```
[ ]: import seaborn as sns
import matplotlib.pyplot as plt
```

```
[ ]: df.boxplot()
```

```
[ ]: <Axes: >
```



```
[ ]: Q1 = df['MEDV'].quantile(0.25)
Q3 = df['MEDV'].quantile(0.75)
IQR = Q3 - Q1
Lower_limit = Q1 - 1.5 * IQR
Upper_limit = Q3 + 1.5 * IQR
print(f'Q1 = {Q1}, Q3 = {Q3}, IQR = {IQR}, Lower_limit = {Lower_limit}, Upper_limit = {Upper_limit}')
```

```
Q1 = 17.025, Q3 = 25.0, IQR = 7.975000000000001, Lower_limit = 5.062499999999999, Upper_limit = 36.962500000000006
```

```
[ ]: outliers_medv=[]
for i in df.MEDV:
    if i<Lower_limit or i>Upper_limit:
```

```
outliers_medv.append(i)
print("outliers are",outliers_medv)
```

```
outliers are [38.7, 43.8, 41.3, 50.0, 50.0, 50.0, 50.0, 37.2, 39.8, 37.9, 50.0, 37.0, 50.0, 42.3, 48.5, 50.0, 44.8, 50.0, 37.6, 46.7, 41.7, 48.3, 42.8, 44.0, 50.0, 43.1, 48.8, 50.0, 43.5, 45.4, 46.0, 50.0, 37.3, 50.0, 50.0, 50.0, 50.0, 50.0, 5.0, 5.0]
```

```
[ ]: df[df.MEDV<Lower_limit].index
```

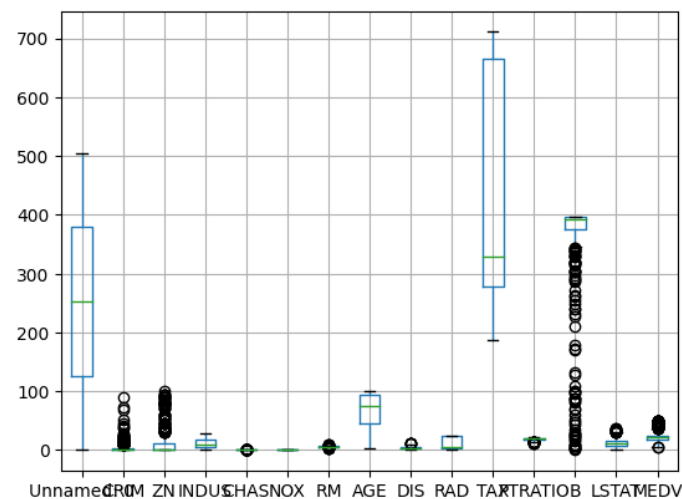
```
[ ]: Int64Index([398, 405], dtype='int64')
```

```
[ ]: df1=df.drop(df[df.MEDV<Lower_limit].index & df[df.MEDV>Upper_limit].index)
```

```
<ipython-input-20-a2400eefca7a>:1: FutureWarning: Index.__and__ operating as a set operation is deprecated, in the future this will be a logical operation matching Series.__and__. Use index.intersection(other) instead.
df1=df.drop(df[df.MEDV<Lower_limit].index & df[df.MEDV>Upper_limit].index)
```

```
[ ]: df1.boxplot()
```

```
[ ]: <Axes: >
```



Preparing the data for training the model

```
[ ]: X = df.drop(['MEDV'], axis = 1) #independent variables
     Y = df['MEDV'] #dependent variables
```

```
[ ]: X
```

```
[ ]: Unnamed: 0      CRIM      ZN      INDUS      CHAS      NOX      RM      AGE      DIS \
0          0  0.00632  18.0    2.31    0.0    0.538  6.575  65.200000  4.0900
1          1  0.02731   0.0    7.07    0.0    0.469  6.421  78.900000  4.9671
2          2  0.02729   0.0    7.07    0.0    0.469  7.185  61.100000  4.9671
3          3  0.03237   0.0    2.18    0.0    0.458  6.998  45.800000  6.0622
4          4  0.06905   0.0    2.18    0.0    0.458  7.147  54.200000  6.0622
..      ...
501        501  0.06263   0.0   11.93    0.0    0.573  6.593  69.100000  2.4786
502        502  0.04527   0.0   11.93    0.0    0.573  6.120  76.700000  2.2875
503        503  0.06076   0.0   11.93    0.0    0.573  6.976  91.000000  2.1675
504        504  0.10959   0.0   11.93    0.0    0.573  6.794  89.300000  2.3889
505        505  0.04741   0.0   11.93    0.0    0.573  6.030  68.518519  2.5050
```

```
      RAD  TAX  PTRATIO      B      LSTAT
0         1  296    15.3  396.90  4.980000
1         2  242    17.8  396.90  9.140000
2         2  242    17.8  392.83  4.030000
3         3  222    18.7  394.63  2.940000
4         3  222    18.7  396.90  12.715432
..      ...
501        1  273    21.0  391.99  12.715432
502        1  273    21.0  396.90  9.080000
503        1  273    21.0  396.90  5.640000
504        1  273    21.0  393.45  6.480000
505        1  273    21.0  396.90  7.880000
```

[506 rows x 14 columns]

```
[ ]: Y
```

```
[ ]: 0      24.0
     1      21.6
     2      34.7
     3      33.4
     4      36.2
     ...
501    22.4
502    20.6
503    23.9
504    22.0
```

```
505      11.9
Name: MEDV, Length: 506, dtype: float64
```

Splitting the data into training and testing sets

```
[ ]: from sklearn.model_selection import train_test_split
     xtrain, xtest, ytrain, ytest = train_test_split(X, Y, test_size =0.
     ~2, random_state = 0)
```

Training and testing the model

```
[ ]: import sklearn
     from sklearn.linear_model import LinearRegression
     lm = LinearRegression()
```

```
[ ]: model=lm.fit(xtrain, ytrain)
```

```
[ ]: model
```

```
[ ]: LinearRegression()
```

Predict the y\_pred for all values of train\_x and test\_x

```
[ ]: ytrain_pred = lm.predict(xtrain)
     ytest_pred = lm.predict(xtest)
     ytrain_pred
```

```
[ ]: array([32.81311732, 22.59285562, 27.99228066, 23.95801611,  6.48919687,
          14.09086134, 21.66762269, 29.18518046, 32.64247713, 13.04706855,
          20.39287447, 21.64650684, 13.27281042, 23.93698727,  5.91093077,
          19.28486113,  9.22745418, 45.26891144, 30.82181868, 17.40173659,
          17.97892153, 21.52494015, 23.24616629, 19.24247982, 34.89711624,
          13.71707597, 21.15223649, 35.52855633, 19.14925327, 13.65485436,
          13.74362446, 22.37210349, 14.99382113, 31.63219947, 25.38375494,
          16.19954413, 24.79758417,  9.76399303, 15.04127642, 21.40008464,
          33.04500293, 28.43002048, 25.14727115, 15.69062724, 31.91941907,
          25.49100247, 14.20061604,  7.86764569, 27.80099607, 25.59429509,
           5.11278297, 28.18226676, 17.05255151, 29.85588981, 19.37235156,
          16.46700339, 18.56895878, 13.10226966,  8.90261082, 19.44093614,
          33.87671079, 32.84343025, 24.03926149, 19.9668276 , 22.78281473,
          26.79208079, 21.19958973, 17.77949426, 32.39200824, 10.47985478,
          19.09213401, 31.71742431, 18.79105646, 15.82304869, 18.59449812,
          14.76346969, 24.0403686 , 23.77513132, 17.29119121, 13.22444946,
          20.30875385, 24.25579584, 17.67223286, 25.25614125, 23.0240047 ,
          27.91602835, 36.7446593 , 16.42684582, 12.04918718, 34.95510801,
          31.41658291, 20.29218738, 39.77862616, 28.7508426 , 28.41851631,
          17.51598081, 26.67117052, 40.36804604, 27.67542427, 17.24904894,
          37.44715313, 35.85421585, 14.16155354, 27.86304661, 22.04494892,
```

```

24.86707059, 21.14024419, 23.5066229 , 28.09395694, 29.54600855,
13.97176838, 26.36304482, 22.8081161 , 13.50414448, 14.14879243,
25.71311329, 19.56374427, 30.75655153, 10.01958069, 24.3401924 ,
17.34664411, 17.08699962, 22.78321009, 21.78731639, 12.35813462,
25.33935977, 28.39080031, 20.88629682, 12.33537917, 24.94036961,
26.51019347, 25.69363016, 23.68554725, 25.92724441, 19.37672388,
20.86151643, 36.0485522 , 21.24580436, 36.43205868, 25.69959571,
20.86856078, 15.66896363, 32.06946255, 21.39878442, 28.0073226 ,
14.82930128, 32.66495146, 14.49759695, 1.63617473, 19.50246502,
13.8690706 , 37.66533072, 16.40821139, 14.69516707, 26.71114367,
23.65265524, 18.09413407, 31.29094562, 25.07848893, 27.54053246,
24.7338705 , 22.80629365, 22.62443522, 11.11156119, 21.08768248,
11.73191838, 17.52090607, 12.42033984, 27.70955386, 15.34695622,
15.92477537, 28.51636384, 14.51294731, 21.41980889, 12.66968692,
14.55668366, 23.32528627, 21.41565907, 14.78225921, 17.25397428,
13.20490994, 24.1785951 , 12.47029156, 35.41176561, 13.99599511,
43.27576949, 31.65805217, 34.78904666, 22.17588285, 15.97443071,
26.82186758, 29.20538928, 13.86122327, 26.87222614, 36.34794955,
16.82683638, 11.38692405, 34.6685182 , 35.94176066, 18.04361285,
21.36229114, 18.34290236, 24.33120351, 19.78122488, 27.10667584,
-4.36213759, 20.52015115, 32.59996892, 35.71824374, 25.29734762,
26.47451583, 20.20732483, 21.52609401, 16.04439095, 17.92498581,
21.3026883 , 27.92226263, 20.07751545, 6.95084656, 16.31976288,
32.33713417, 35.41215728, 16.51577609, 18.75023732, 21.92819238,
6.29088672, 21.53660321, 23.35713743, 15.94974719, 18.6617665 ,
22.92693837, 27.0538829 , 25.79808944, 32.82227206, 14.85950403,
29.16589238, 25.05556922, 21.06476961, 38.54854087, 20.32046686,
23.7924752 , 22.67218571, 11.95307757, 19.94019035, 33.34902305,
24.6422943 , 17.78858846, 33.26317393, 22.04796731, 28.87021853,
32.03060743, 36.51977709, 22.09466919, 24.18457288, 23.19842557,
31.90965447, 22.43237991, 18.2766533 , 22.11874232, 29.29161678,
22.73404901, 22.19356004, 17.15048559, 17.37841636, 16.99334332,
16.93254337, 16.7537439 , 32.03123942, 23.49073021, 17.54254409,
19.40112662, 34.25709374, 14.29034366, 26.08793347, 16.98693923,
30.92945569, 30.07060287, 21.33424392, 20.33195429, 36.18879402,
20.3660625 , 33.2900504 , 20.93191618, 31.58834981, 30.37914983,
37.39315381, 26.07330464, 21.01766192, 29.24253422, 15.89847147,
26.21582763, 21.65351253, 29.89912736, 10.57465537, 31.14672528,
6.19747028, 15.27425013, 20.47104299, 35.5770489 , 31.9178623 ,
12.11969062, 13.68298773, 21.76023224, 34.76429586, 18.85939486,
18.71877161, 14.88318114, 25.06141149, 40.94969602, 25.19385215,
42.13230746, 25.53787237, 21.12499173, 11.82180286, 15.84336134,
14.15153456, 18.48234043, 3.01898018, 27.80465939, 26.55454391,
41.63887783, 21.77585498, 21.16144862, 34.02141179, 33.15943999,
9.6230867 , 24.68765128, 43.74101279, 21.85416225, 17.65627057,
26.32063336, 18.69069526, 6.34873533, 18.84833389, 35.57374501,
16.27911231, 23.94254936, 13.16515921, 24.54504811, 18.27279239,

```

```

17.15422685, 18.57463353, 32.94507083, 19.64004666, 29.7691586 ,
32.03839692, 41.72538931, 18.55498485, 16.037751 , 38.33202537,
17.91190403, 10.69857314, 14.86051024, 25.28528015, 19.39814291,
16.43225805, 26.57912893, 13.37793727, 5.90660578, 18.67757697,
10.8861992 , 28.39026301, 4.68960057, 28.66478738, 32.8970624 ,
22.41627955, 16.40187146, 17.91615805, 20.9349613 , 34.05620487,
28.2252698 , 19.30423927, 20.58339329, 6.76131383, 28.88043978,
25.18987646, 22.24592143, 13.89499506, 24.83663458, 19.23765293,
8.71288591, 26.79230071, 15.77590707, 31.79688643, 31.96631865,
25.01479778, 18.46322712, 30.69309066, 21.22649259, 26.09634655,
24.39423043, 31.13189182, 24.54081491, 31.31955106, 17.56320701,
19.97749055, 18.74856961, 41.39314728, 25.558767 , 19.14181302,
33.48991385, 23.82668099, 18.39222559, 23.23313284])

```

```
[ ]: ytrain
```

```

[ ]: 220 26.7
      71 21.7
      240 22.0
      6 22.9
      417 10.4
      ...
      323 18.5
      192 36.4
      117 19.2
      47 16.6
      172 23.1
Name: MEDV, Length: 404, dtype: float64

```

```
[ ]: ytest
```

```

[ ]: 329 22.6
      371 50.0
      219 23.0
      403 8.3
      78 21.2
      ...
      56 24.7
      455 14.1
      60 18.7
      213 28.1
      108 19.8
Name: MEDV, Length: 102, dtype: float64

```

Model evaluation

```
[ ]: from sklearn.metrics import mean_squared_error
mse = mean_squared_error(ytrain, ytrain_pred)
print("The model performance for training set")
print("-----")
print('MSE is {}'.format(mse))
print("\n")
```

The model performance for training set

-----  
MSE is 20.003837579318024

```
[ ]: mse = mean_squared_error(ytest, ytest_pred)
print("The model performance for testing set")
print("-----")
print('MSE is {}'.format(mse))
print("\n\n")
```

The model performance for testing set

-----  
MSE is 34.836745559085536

```
[ ]: from sklearn.metrics import mean_absolute_error

# Assuming ytrain and ytrain_pred are your actual and predicted values,
# respectively
mae = mean_absolute_error(ytrain, ytrain_pred)

print("The model performance for training set")
print("-----")
print('MAE is {}'.format(mae))
print("\n")
```

The model performance for training set

-----  
MAE is 3.146473740056485

```
[ ]: mae = mean_absolute_error(ytest, ytest_pred)

print("The model performance for training set")
```

```
print("-----")
print('MAE is {}'.format(mae))
print("\n")
```

The model performance for training set

-----  
MAE is 3.9595421344408983

```
[ ]: from sklearn.metrics import r2_score
rmse = (np.sqrt(mean_squared_error(ytrain, ytrain_pred)))
r2 = r2_score(ytrain, ytrain_pred)
print("The model performance for training set")
print("-----")
print('RMSE is {}'.format(rmse))
print('R2 score is {}'.format(r2))
print("\n")
```

The model performance for training set

-----  
RMSE is 4.472564988831132  
R2 score is 0.7650579804734076

```
[ ]: # model evaluation for testing set
#y_test_predict = lin_model.predict(X_test)
rmse = (np.sqrt(mean_squared_error(ytest, ytest_pred)))
r2 = r2_score(ytest, ytest_pred)
```

```
[ ]: print("The model performance for testing set")
print("-----")
print('RMSE is {}'.format(rmse))
print('R2 score is {}'.format(r2))
```

The model performance for testing set

-----  
RMSE is 5.902266137602195  
R2 score is 0.57217962224962

Plotting the linear regression model

```
[ ]: plt.scatter(ytrain, ytrain_pred, c='blue', marker='o', label='Training data')
plt.scatter(ytest, ytest_pred, c='lightgreen', marker='s', label='Test data')
plt.xlabel('True values')
plt.ylabel('Predicted')
plt.title("True value vs Predicted value")
```

```
plt.legend(loc= 'upper left')  
#plt.hlines(y=0,xmin=0,xmax=50)  
plt.plot()  
plt.show()
```

