In [1]:

```
import numpy as np
import pandas as pd
```

In [2]:

```
from sklearn.datasets import load_boston
from sklearn.tree import DecisionTreeRegressor
```

In [3]:

```
data=load_boston()
data
```

Out[3]:

```
{'data': array([[6.3200e-03, 1.8000e+01, 2.3100e+00, ..., 1.5300e+01, 3.96
90e+02,
         4.9800e+00],
        [2.7310e-02, 0.0000e+00, 7.0700e+00, ..., 1.7800e+01, 3.9690e+02,
         9.1400e+00],
        [2.7290e-02, 0.0000e+00, 7.0700e+00, ..., 1.7800e+01, 3.9283e+02,
         4.0300e+00],
        ...,
        [6.0760e-02, 0.0000e+00, 1.1930e+01, ..., 2.1000e+01, 3.9690e+02,
         5.6400e+00],
        [1.0959e-01, 0.0000e+00, 1.1930e+01, ..., 2.1000e+01, 3.9345e+02,
         6.4800e+00],
        [4.7410e-02, 0.0000e+00, 1.1930e+01, ..., 2.1000e+01, 3.9690e+02,
         7.8800e+00]]),
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        20.3, 22.5, 29. , 24.8, 22. , 26.4, 33.1, 36.1, 28.4, 33.4, 28.2,
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        21. , 23.8, 23.1, 20.4, 18.5, 25. , 24.6, 23. , 22.2, 19.3, 22.6,
        19.8, 17.1, 19.4, 22.2, 20.7, 21.1, 19.5, 18.5, 20.6, 19. , 18.7,
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       15.2, 16.1, 17.8, 14.9, 14.1, 12.7, 13.5, 14.9, 20. , 16.4, 17.7,
       19.5, 20.2, 21.4, 19.9, 19. , 19.1, 19.1, 20.1, 19.9, 19.6, 23.2,
       29.8, 13.8, 13.3, 16.7, 12. , 14.6, 21.4, 23. , 23.7, 25. , 21.8,
       20.6, 21.2, 19.1, 20.6, 15.2,  7. ,  8.1, 13.6, 20.1, 21.8, 24.5,
       23.1, 19.7, 18.3, 21.2, 17.5, 16.8, 22.4, 20.6, 23.9, 22. , 11.
9]),
 'feature_names': array(['CRIM', 'ZN', 'INDUS', 'CHAS', 'NOX', 'RM', 'AG
E', 'DIS', 'RAD',
        'TAX', 'PTRATIO', 'B', 'LSTAT'], dtype='<U7'),
 'DESCR': ".. _boston_dataset:\n\nBoston house prices dataset\n-----------
----------------\n\n**Data Set Characteristics:**  \n\n    :Number of Inst
ances: 506 \n\n    :Number of Attributes: 13 numeric/categorical predictiv
e. Median Value (attribute 14) is usually the target.\n\n    :Attribute In
formation (in order):\n        - CRIM     per capita crime rate by town\n
- ZN       proportion of residential land zoned for lots over 25,000 sq.f
t.\n        - INDUS    proportion of non-retail business acres per town\n
- CHAS     Charles River dummy variable (= 1 if tract bounds river; 0 othe
rwise)\n        - NOX      nitric oxides concentration (parts per 10 milli
on)\n        - RM       average number of rooms per dwelling\n        - AG
E      proportion of owner-occupied units built prior to 1940\n        - D
IS      weighted distances to five Boston employment centres\n        - RA
D      index of accessibility to radial highways\n        - TAX      full-
value property-tax rate per $10,000\n        - PTRATIO  pupil-teacher rati
o by town\n        - B        1000(Bk - 0.63)^2 where Bk is the proportion
of blacks by town\n        - LSTAT    % lower status of the population\n
- MEDV     Median value of owner-occupied homes in $1000's\n\n    :Missing
Attribute Values: None\n\n    :Creator: Harrison, D. and Rubinfeld, D.L.\n
\nThis is a copy of UCI ML housing dataset.\nhttps://archive.ics.uci.edu/m
l/machine-learning-databases/housing/\n\n\nThis dataset was taken from the
StatLib library which is maintained at Carnegie Mellon University.\n\nThe
Boston house-price data of Harrison, D. and Rubinfeld, D.L. 'Hedonic\npric
es and the demand for clean air', J. Environ. Economics & Management,\nvo
l.5, 81-102, 1978.   Used in Belsley, Kuh & Welsch, 'Regression diagnostic
s\n...', Wiley, 1980.   N.B. Various transformations are used in the table
on\npages 244-261 of the latter.\n\nThe Boston house-price data has been u
sed in many machine learning papers that address regression\nproblems.
\n     \n.. topic:: References\n\n   - Belsley, Kuh & Welsch, 'Regression
diagnostics: Identifying Influential Data and Sources of Collinearity', Wi
ley, 1980. 244-261.\n   - Quinlan,R. (1993). Combining Instance-Based and
Model-Based Learning. In Proceedings on the Tenth International Conference
of Machine Learning, 236-243, University of Massachusetts, Amherst. Morgan
Kaufmann.\n",
 'filename': 'G:\\anaconda\\lib\\site-packages\\sklearn\\datasets\\data\\b
oston_house_prices.csv'}
```

In [4]:

```
features=data['data']
labels=data['target']
```

In [5]:

```
from sklearn.model_selection import train_test_split
```

In [6]:

```
x_train, x_test, y_train, y_test = train_test_split(features,labels)
```

In [7]:

```
data['feature_names']
```

Out[7]:

```
array(['CRIM', 'ZN', 'INDUS', 'CHAS', 'NOX', 'RM', 'AGE', 'DIS', 'RAD',
       'TAX', 'PTRATIO', 'B', 'LSTAT'], dtype='<U7')
```

In [8]:

```
print(data['DESCR'])
```

```
.. _boston_dataset:

Boston house prices dataset
---------------------------

**Data Set Characteristics:**

    :Number of Instances: 506

    :Number of Attributes: 13 numeric/categorical predictive. Median Value
(attribute 14) is usually the target.

    :Attribute Information (in order):
        - CRIM     per capita crime rate by town
        - ZN       proportion of residential land zoned for lots over 25,000
sq.ft.
        - INDUS    proportion of non-retail business acres per town
        - CHAS     Charles River dummy variable (= 1 if tract bounds river;
0 otherwise)
        - NOX      nitric oxides concentration (parts per 10 million)
        - RM       average number of rooms per dwelling
        - AGE      proportion of owner-occupied units built prior to 1940
        - DIS      weighted distances to five Boston employment centres
        - RAD      index of accessibility to radial highways
        - TAX      full-value property-tax rate per $10,000
        - PTRATIO  pupil-teacher ratio by town
        - B        1000(Bk - 0.63)^2 where Bk is the proportion of blacks by
town
        - LSTAT    % lower status of the population
        - MEDV     Median value of owner-occupied homes in $1000's

    :Missing Attribute Values: None

    :Creator: Harrison, D. and Rubinfeld, D.L.

This is a copy of UCI ML housing dataset.
https://archive.ics.uci.edu/ml/machine-learning-databases/housing/ (https://
archive.ics.uci.edu/ml/machine-learning-databases/housing/)


This dataset was taken from the StatLib library which is maintained at Carne
gie Mellon University.

The Boston house-price data of Harrison, D. and Rubinfeld, D.L. 'Hedonic
prices and the demand for clean air', J. Environ. Economics & Management,
vol.5, 81-102, 1978.   Used in Belsley, Kuh & Welsch, 'Regression diagnostic
s
...', Wiley, 1980.   N.B. Various transformations are used in the table on
pages 244-261 of the latter.

The Boston house-price data has been used in many machine learning papers th
at address regression
problems.

.. topic:: References

   - Belsley, Kuh & Welsch, 'Regression diagnostics: Identifying Influential
```

```
Data and Sources of Collinearity', Wiley, 1980. 244-261.
   - Quinlan,R. (1993). Combining Instance-Based and Model-Based Learning. I
n Proceedings on the Tenth International Conference of Machine Learning, 236
-243, University of Massachusetts, Amherst. Morgan Kaufmann.
```

In [9]:

```
data.keys()
```

Out[9]:

```
dict_keys(['data', 'target', 'feature_names', 'DESCR', 'filename'])
```

In [14]:

```
y_pred = dtr.predict(x_test)
```

In [11]:

```
dtr = DecisionTreeRegressor()
dtr.fit(x_train, y_train)
```

Out[11]:

```
DecisionTreeRegressor()
```

In [15]:

```
from sklearn.metrics import mean_squared_error,r2_score
mean_squared_error(y_pred, y_test)
r2_score(y_pred, y_test)
```

Out[15]:

```
0.8637379166892709
```

In [ ]:

```

```

In [ ]:

```

```