Import libraries

In [3]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.datasets import load_boston
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, mean_absolute_error
from sklearn.preprocessing import StandardScaler
import warnings
warnings.filterwarnings("ignore")
%matplotlib inline
```

In [4]:
```
boston = load_boston()
boston.keys()
```

Out[4]:
```
dict_keys(['data', 'target', 'feature_names', 'DESCR', 'filename', 'data_modu
le'])
```

In [5]:
```
x = pd.DataFrame(boston.data, columns=boston.feature_names)
y = pd.DataFrame(boston.target, columns=['MEDV'])
```

In [6]:
```
x.head()
```

Out[6]:

	CRIM	ZN	INDUS	CHAS	NOX	RM	AGE	DIS	RAD	TAX	PTRATIO	B	LSTA
0	0.00632	18.0	2.31	0.0	0.538	6.575	65.2	4.0900	1.0	296.0	15.3	396.90	4.9
1	0.02731	0.0	7.07	0.0	0.469	6.421	78.9	4.9671	2.0	242.0	17.8	396.90	9.
2	0.02729	0.0	7.07	0.0	0.469	7.185	61.1	4.9671	2.0	242.0	17.8	392.83	4.(
3	0.03237	0.0	2.18	0.0	0.458	6.998	45.8	6.0622	3.0	222.0	18.7	394.63	2.9
4	0.06905	0.0	2.18	0.0	0.458	7.147	54.2	6.0622	3.0	222.0	18.7	396.90	5.3

In [7]:
```
x.shape, y.shape
```

Out[7]:
```
((506, 13), (506, 1))
```

Basic stats

In [8]:
```
x.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 506 entries, 0 to 505
Data columns (total 13 columns):
 #   Column   Non-Null Count  Dtype  
---  ------   --------------  -----  
 0   CRIM     506 non-null    float64
 1   ZN       506 non-null    float64
 2   INDUS    506 non-null    float64
 3   CHAS     506 non-null    float64
 4   NOX      506 non-null    float64
 5   RM       506 non-null    float64
 6   AGE      506 non-null    float64
 7   DIS      506 non-null    float64
 8   RAD      506 non-null    float64
 9   TAX      506 non-null    float64
 10  PTRATIO  506 non-null    float64
 11  B        506 non-null    float64
 12  LSTAT    506 non-null    float64
dtypes: float64(13)
memory usage: 51.5 KB
```

In [9]:
```
x.describe()
```

Out[9]:

	CRIM	ZN	INDUS	CHAS	NOX	RM	AGE	
count	506.000000	506.000000	506.000000	506.000000	506.000000	506.000000	506.000000	506
mean	3.613524	11.363636	11.136779	0.069170	0.554695	6.284634	68.574901	3
std	8.601545	23.322453	6.860353	0.253994	0.115878	0.702617	28.148861	2
min	0.006320	0.000000	0.460000	0.000000	0.385000	3.561000	2.900000	1
25%	0.082045	0.000000	5.190000	0.000000	0.449000	5.885500	45.025000	2
50%	0.256510	0.000000	9.690000	0.000000	0.538000	6.208500	77.500000	3
75%	3.677083	12.500000	18.100000	0.000000	0.624000	6.623500	94.075000	5
max	88.976200	100.000000	27.740000	1.000000	0.871000	8.780000	100.000000	12

In [10]:
```
y.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 506 entries, 0 to 505
Data columns (total 1 columns):
 #   Column  Non-Null Count  Dtype  
---  ------  --------------  -----  
 0   MEDV    506 non-null    float64
dtypes: float64(1)
memory usage: 4.1 KB
```

In [11]:
```
y.describe()
```

Out[11]:

	MEDV
count	506.000000
mean	22.532806
std	9.197104
min	5.000000
25%	17.025000
50%	21.200000
75%	25.000000
max	50.000000

In [12]:
```
x.isnull().sum()
```

Out[12]:
```
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
dtype: int64
```

In [13]:
```
y.isnull().sum()
```

Out[13]:
```
MEDV    0
dtype: int64
```

In [14]:
```
df = x
df["target"] = y
df.head()
```

Out[14]:

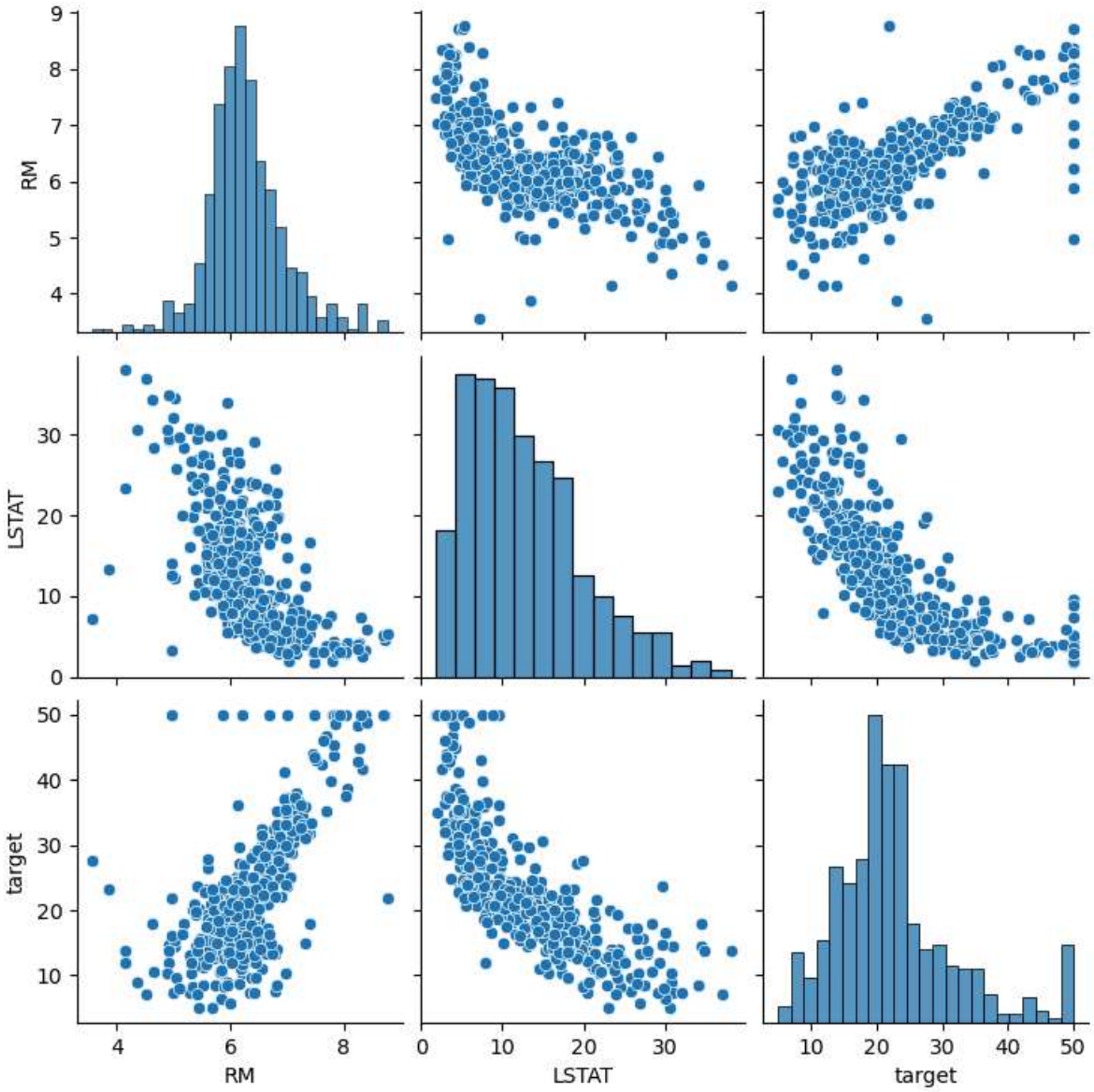
	CRIM	ZN	INDUS	CHAS	NOX	RM	AGE	DIS	RAD	TAX	PTRATIO	B	LSTA
0	0.00632	18.0	2.31	0.0	0.538	6.575	65.2	4.0900	1.0	296.0	15.3	396.90	4.9
1	0.02731	0.0	7.07	0.0	0.469	6.421	78.9	4.9671	2.0	242.0	17.8	396.90	9.
2	0.02729	0.0	7.07	0.0	0.469	7.185	61.1	4.9671	2.0	242.0	17.8	392.83	4.(
3	0.03237	0.0	2.18	0.0	0.458	6.998	45.8	6.0622	3.0	222.0	18.7	394.63	2.9
4	0.06905	0.0	2.18	0.0	0.458	7.147	54.2	6.0622	3.0	222.0	18.7	396.90	5.3

In [15]:
```
plt.figure(figsize=(15,10))
sns.heatmap(df.corr(), annot=True)
plt.show()
```

Considering only 'RM' and 'LSTAT' by considering correlation and multi-collinearity of other features

In [51]:
```
df = df[['RM', 'LSTAT', 'target']]
```

In [52]:
```
sns.pairplot(df)
plt.show()
```



In [63]:
```
x = df[['RM', 'LSTAT']]
y = df['target']
```

Scale the data

In [64]:
```
scaler = StandardScaler()
```

In [65]:
```
x = scaler.fit_transform(x)
```

Split the data

In [67]:
```
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.3, shuff
```

In [68]:
```
x_train.shape, x_test.shape, y_train.shape, y_test.shape
```

Out[68]:
```
((354, 2), (152, 2), (354,), (152,))
```

Linear Regression Modelling

In [69]:
```
model = LinearRegression(n_jobs=-1)
```

In [70]:
```
model.fit(x_train, y_train)
```

Out[70]:
```
LinearRegression(n_jobs=-1)
```

Make predictions

In [71]:
```
y_pred = model.predict(x_test)
```

In [72]:
```
mean_absolute_error(y_test, y_pred)
```

Out[72]:
```
3.701010266760501
```

In [73]:
```
mean_squared_error(y_test, y_pred)
```

Out[73]:
```
30.5001478179898
```

In [74]:
```
sns.regplot(y_test, y_pred, color='red')
plt.show()
```