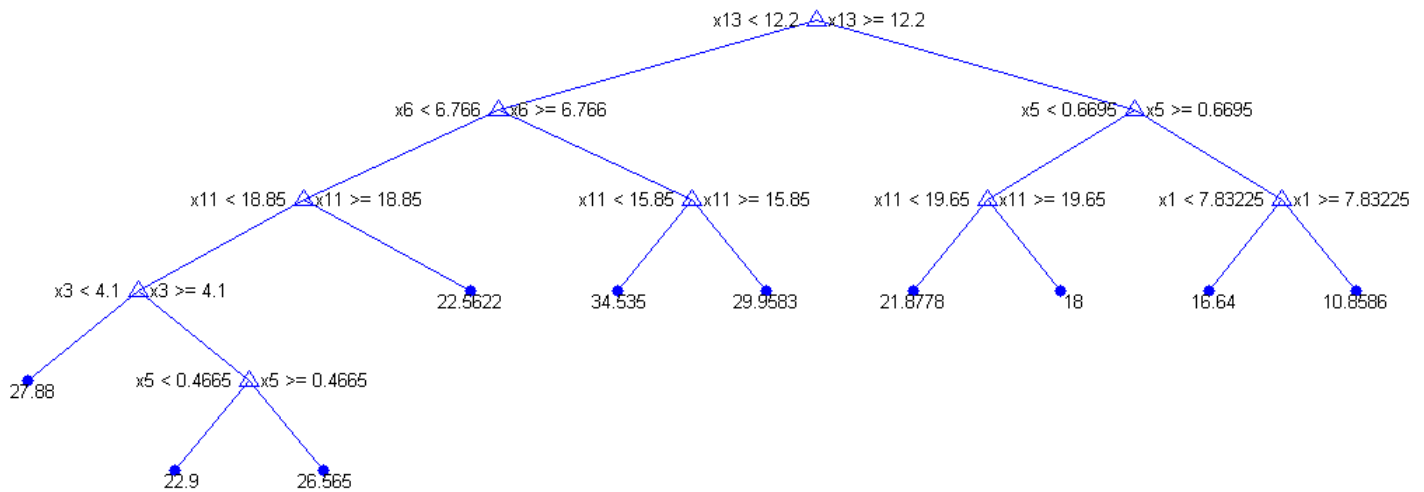

Matlab 3

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1 EXPLORING BOSTON HOUSING DATA WITH REGRESSION TREES

The regression tree generated from the training data can be seen here:

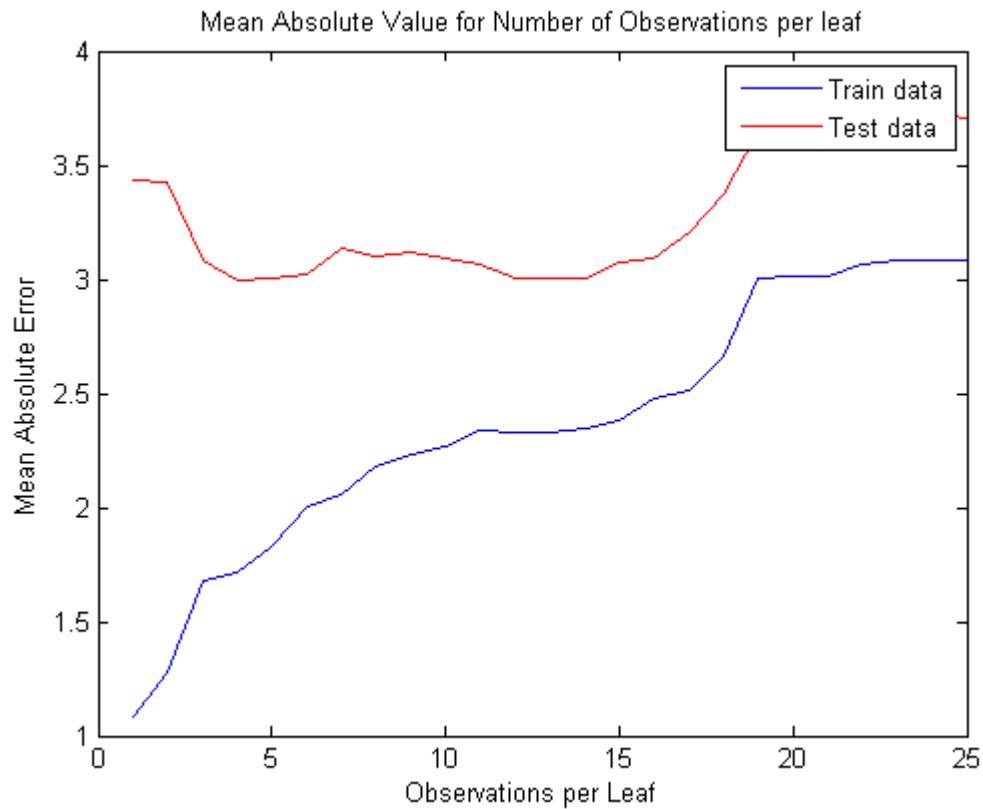


Using the input vector:

[5, 18, 2.31, 1, 0.5440, 2, 64, 3.7, 1, 300, 15, 390, 10]

We get an output $MEDV = 22.047619$.

If we plot the Mean Absolute Error for both the training and testing sets, using different numbers of observations per leaf, you get the following graph:



From the graph we can see that when the number of observations are low, we essentially memorize the training data, making the training error almost 0, while having a high testing error. As we increase the number of observations, training error starts to steadily increase, while the testing error drops to a lower plateau. For a large number of observations, the testing error is constant, meaning the number of observations is not a deciding factor in the accuracy of the tree in this case. However, after a certain point, each leaf is making too many observations, generalizing the results too much, causing a large increase in both training and testing error.

2 ORDINARY LEAST SQUARES VERSUS ROBUST LINEAR REGRESSION

3 OVERFITTING AND RIDGE REGRESSION

4 LASSO VS RIDGE