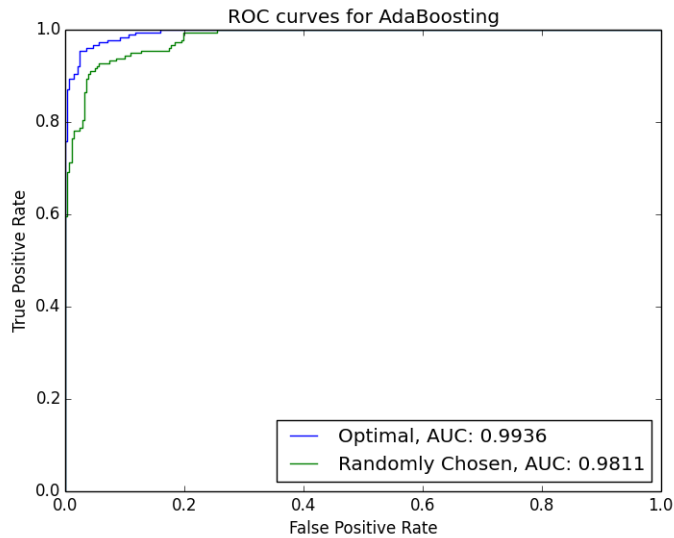# CS6140 Machine Learning Fall 2014 Homework 4, Wei Luo

PROBLEM 1

Weak Learning via "Optimal" Decision Stumps: accuracy is 0.9609
Weak Learning via "Randomly Chosen" Decision Stumps: accuracy is 0.9370
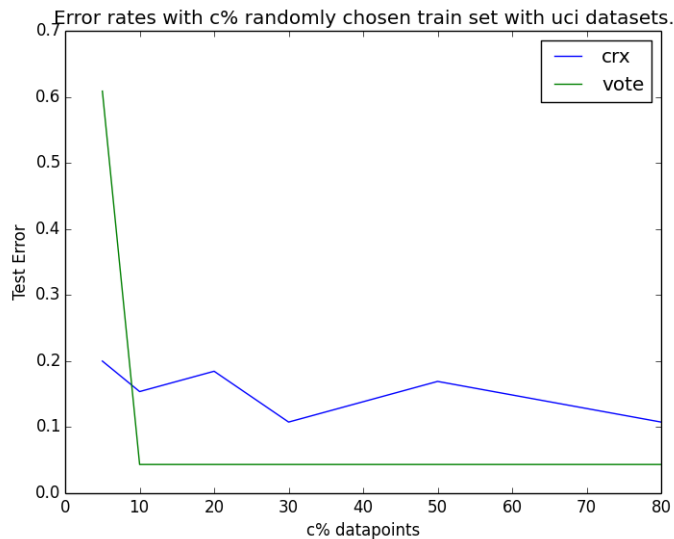The ROC curves for these result:

PROBLEM 2

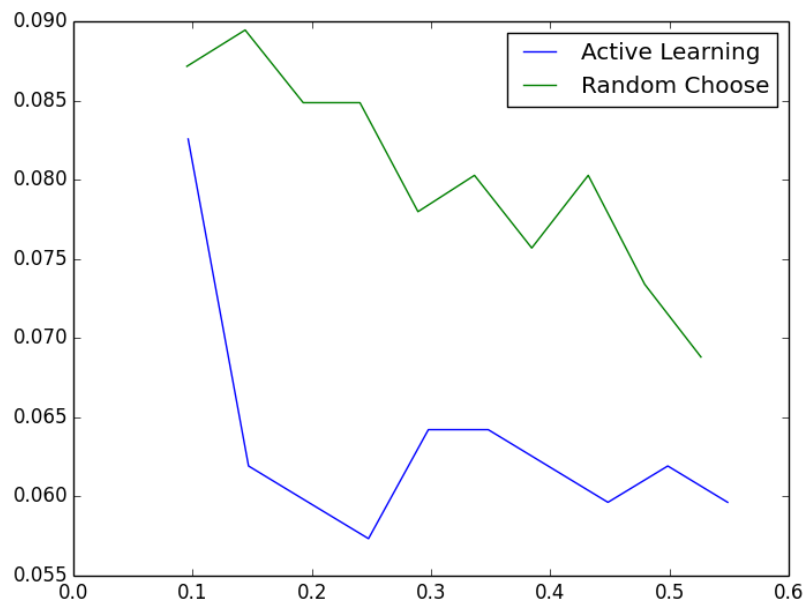Run adaboosting with 10 folds cross validation on crx dataset, average accuracy is 0.866923
Run adaboosting with 10 folds cross validation on vote dataset, average accuracy is 0.961594
Try adaboosting with different size of sample training dataset on crx and vote, err rates are:

PROBLEM 3

The results for active learning and randomly built on spambase dataset:

PROBLEM 4

Train the data with 20 random selected functions, 200 rounds for each adaboosting iteration, I obtained a result of accuracy 0.756107275624 .

PROBLEM 5

a) VC dimension for unions of two rectangles is 10.
b) VC dimension for circles is 3.
c) VC dimension for triangles is 7.
d) VC dimension for multidimensional "sphere" $f(x) = sing[(x - c)(x - c) - b]$
in m dimensions space $\mathbb{R}$ is $m + 1$.

PROBLEM 6

The accuracy of bagging with 50 decision trees is 0.9369.