1.) Description

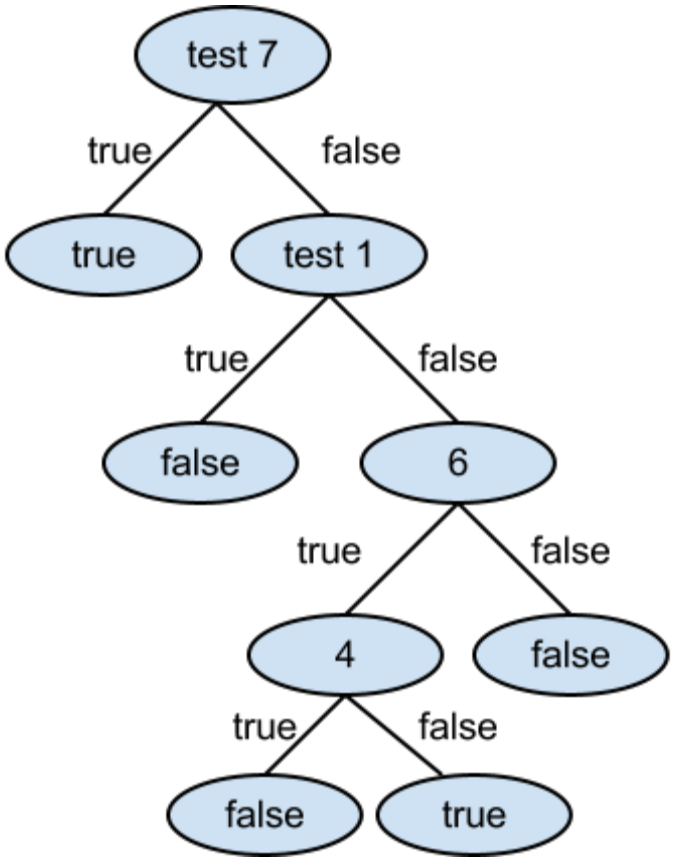
Included is a driver program called p3_driver that takes as an argument the path to a file containing all the configuration information necessary to create and test an ID3 decision tree. The tree is constructed by helper function in the driver program with the help of data structures in DTreeNode.h and patterns.h/cc. It is programmed in c and c++. The program prints tree construction related information to stdout and prints the actual output vectors and error values to the file specified in the config file passed from the commandline.

2.) Trace - I'm not sure if you want to include the output in here, since I dont actually print the output to stdout im going to first paste what the program prints to stdout then past the stuff it prints to the file. Also I output my tree differently from the example because the example was hard for me to read. And the decision values print before the tree are 0 based, in actuallity they are zero based in memory at all times but I added 1 when I printed it to make it match the log file.

```
jlusby@Manon:~/code/machine-learning/p3/code$ ./p3_driver ../test/lenses-dtl.cfg
decision:6
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
1
decision:0
0 2 4 5 7 10 11 14
0
decision:5
0 2 4 5 7
decision:3
2 4 7
0
1
0
7 false then
  1 false then
    6 false then
       FALSE
    6 true then
      4 false then
         TRUE
      4 true then
         FALSE
  1 true then
     FALSE
7 true then
   TRUE
```

0 0 1 1 0 0 0 0 1 1
0 0 1 1 0 0 1 1 1 0
0 0 1 1 0 1 1 1 1 0
0 1 0 0 1 1 1 1 1 0
0 1 0 1 0 0 0 0 0 0
0 1 0 1 0 1 0 0 0 0
1 0 0 0 1 0 1 1 1 0
1 0 0 1 0 0 0 0 0 0
0.125

3.) graphical representation of the tree (from trace)



7 false then
  1 false then
    6 false then
      FALSE
    6 true then
      4 false then
        TRUE
      4 true then
        FALSE
  1 true then

FALSE
7 true then
TRUE

4.) Analysis of the likely true error of the learned decision tree based on performance on testing set

5.) brief summary of what was learned
Learned about decision learning trees, which was cool. This project is probably my favorite so far. I got to play around with autoconf and automake some more which was fun. I kinda skimmed through it though because I was a little afraid I would be strapped for time on this project. As always got lots of good practice with vim and git.

6.) Citations
David Noelle - for source code for pattern set. also used some lines from his compilation files to get mine set up quicker.
The textbook - for an in depth explanation of the ID3 decision learning algorithm
Machine Learning class - general knowledge
Stefan Achleitner - Compared output with his once we had both finished our code to ensure we were both getting the same tree for testing set.