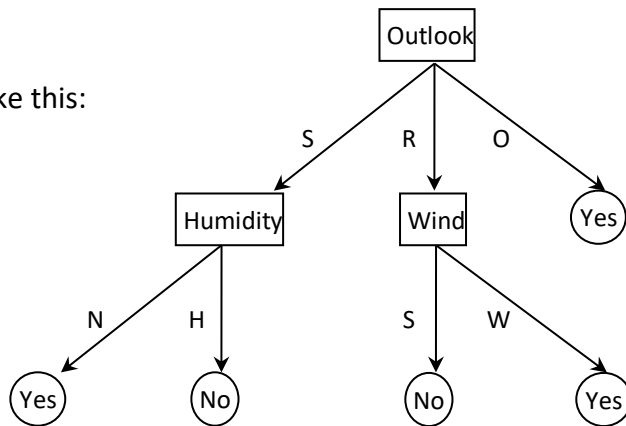


# Decision trees: examples for self-study—solutions

Prepared for CMSC 678, Fall 2020.

*This is a derivative work. All original content © Dr. Cynthia Matuszek, 2020. Reminder: this material is prepared for use in this class only. Sharing or reposting this material outside this class is a violation of the class academic integrity policy.*

**Q1.** You should be looking at a tree like this:



This is a classic problem with many, many writeups, drawn mostly from Mitchell, so you should be able to find more information on any part of it. [Here's one.](#) [Here's another](#) that is clear on entropy and gives more detail, but beware, it uses different data!

**Q3.** This is *exactly* the same as Q1. The features have been replaced by anonymous feature variables. The values just make it clear that there are three binary variables (and one trinary one), but  $v_1$  having some binary meaning for one feature has no relation to any other feature. For building decision trees, the actual values taken by the features have very little meaning.

My intent with this question was to help bridge the conceptual and theoretical gap. It's easier to make decision trees about meaningful features until you realize how these connect (afterwards, I hope, they're both easier).

**Q6.** This is a small problem, with very few features and a small amount of data. There are so few features that if the data was very large, it would necessarily get duplicative. (How many possible different data points are there? Think combinations and permutations.) It will not take very long to build and it will run basically instantaneously on predictions, so having the most efficient tree you can easily get is wasted effort—unless you've already implemented C4.5!