- Question 6 (describe why decision tree performed as it did with accuracy and tree size)
    - The first dummy set had a tree size of 3 with an accuracy of 100%, whereas the second dummy set had a tree size of 11 and accuracy of 65% (both with input size of 20). For the dummy set 1, the 1.0 correlation comes from the labels matching up with the data, which is not the case for dummy set 2.
    - The connect 4 problem has 67557 examples and the tree size is 41521 with an accuracy of 76% (75.935% over all runs). The cars problem has (1728) examples with a tree size of 408 and an accuracy of 94% (94.25% over all runs). The cars tree is orders of magnitude smaller than the connect 4 tree, and the problem also had less example data. I think the reason the cars tree is more accurate than the connect 4 tree is because the data is correlated with the classifications better. The car safety attribute seems to be a large indicator of an acceptable car, whereas the connect 4 tree is harder to read and the dataset probably has a little noise. There is no easily identifiable attribute in the decision tree to partition the data.
- Question 7 (practical uses of a decision tree)
    - Companies that sell products online like Craigslist, Ebay, and Amazon may have ratings for what denotes a good product vs. bad product. These may include seller location, sales made, product price, bid time, etc, for which a decision tree could be really useful in taking these attributes and classifying products.
    - For a Connect 4 agent, one may think of backtracking, BFS, A* search, which could benefit from the speedup of a nice and admissible heuristic. A decision tree classifier may be useful in determining a heuristic for certain moves or positions being beneficial. Since Connect 4 is a two-person game, it can also be applied to minimax and alpha-beta pruning. Here, the decision tree could similarly determine whether certain states are likely to be beneficial or not (in depth limited search).
    - Note: In fact, one of my friends had a subproject during an internship to produce text classifications of companies for market research. They used a random forest model (ensemble of decision trees) as a robust model to classify whether classifications were good or bad.