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Artificial Intelligence

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Project 5 Report

Specification Satisfaction

My dpll implementation has satisfied the spec entirely with one exception. The “testcase-aim-50-1_6-yes1-4.txt” test case, which is supposed to be satisfiable, cannot be satisfied by my implementation. It also cannot be satisfied by my WalkSAT implementation. I have talked to a large number of classmates about this, and it seems many people are struggling with that test in particular. I don’t have enough information to claim it is a faulty test, but I believe it should at least be investigated on the faculty side of things.

Not Implemented

Everything specified in the specification has been implemented to the best of my abilities, including the extra credit.

Implementations not Working Correctly

As stated above, everything is working and reporting correctly except for the “testcase-aim-50-1_6-yes1-4.txt” test case, which is reporting unsatisfiable.

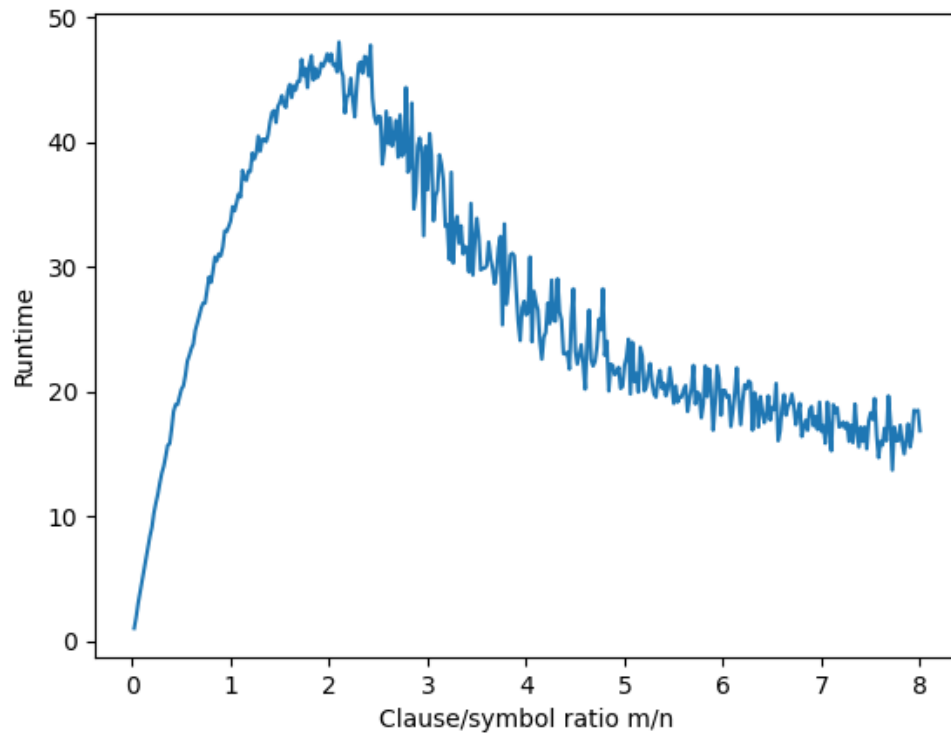
Easy/Difficult Implementations

Given the tremendous help the resources in the textbook provide when structuring the code, the majority of this project was fairly simple. The hard bit was converting the code provided in the textbook to something that worked with only AND and OR statements. It also had to be adapted to allow for numerical symbols instead of alphabetic ones. Once these two problems were figured out, the rest of the coding process went smoothly with only minor debugging needed for the complexity recursion presents.

Additional Test Cases

For testing I wrote a separate file that randomly generates sets of 3 variables in length clauses chosen randomly from a set of 50 variables. It then creates a cnf file with 1-400 of these clauses and runs each file through my implementations. It does this multiple times and then averages the results. Using the average results, I was able to generate a graph using a python module. The graph can be seen on the “Graph” section of this report.

Graph



The graph seen above was generated using a python module and the additional test cases described earlier. The graph does not look exactly like the one in the project specification, but the general curve is the same. I believe a difference in logic is to blame but that the graph is not incorrect seeing as I find correct answers for all testcases but one.