SAT Solver – Variant 2

Progress Slides 4

Next Steps from Progress Slides 3

- Keep Coding!
- Get Unit Propagation fully functional
- Start integrating other decision heuristics into my solver that are more tailored to my variant of unbalanced instances
- In the end, have a strong and efficient solver for large CNF formula benchmarks, tailored to my variant

Process

- I struggled with getting my DPLL to solve formulas consistently fast, and be able to solve larger than 100 clauses
- This was as my solver kept running into the same conflicts
- Started researching CDCL and built a CDCL solver instead, so I could compare

Current Stage

- I have two fully functional solvers, one following DPLL and on following CDCL
- Both solvers use DLIS to decide which literal to make a decision on, and assigns it true or false, depending on which polarity it appears more frequently in
  - For example, it the literal A appears more as A than –A, it will assign A to TRUE
- My DPLL solver can solve regular and imbalanced formulas with 100 clauses very quickly majority of the time
- My CDCL solver solves formulas more quickly, and can solve formulas with up to 500 clauses and 150 literals

Testing

- Both solves can solve imbalanced CNF formulas faster than regular formulas
- My solvers also solve faster when using my heuristic compared to random decisions and assignments
- As mentioned earlier, my CDCL solves faster and can solve larger formulas compared to my DPLL, as my CDCL is an improvement of my DPLL
- I'm getting my test cases from UBC, with their SATLIB- Benchmark Problems (https://www.cs.ubc.ca/~hoos/SATLIB/benchm.html)
  - I adjust formulas to make them imbalanced

Next Stages

- I have begun writing my report and plan to finish it in the next few weeks