SAT Solver - Variant 2

Lukas Kaas Andersen

What is it?

- Aims to solve the boolean satisfiability problem

- Determines whether a Boolean Formula (CNF) can be satisfied with boolean assignments

- NP-Complete - Nondeterministic polynomial time complete

Conjunctive Normal Form (CNF)

- Literals: Variable or its Negation

    - x, -x

- Clauses: Disjunction of Literals

    - x ∨ -y

- Conjunction (AND): A conjunction of clauses forming a CNF

    - (x ∨ y) ∧ (-x ∨ y ∨ z)

DPLL Algorithm

- David-Putman-Logemann-Loveland, names of researchers

- Algorithm for solving SAT

- Depth First Search, operates in CNF

- Decide (Variable and it's value), Deduce (Unit Clause), Resolve Conflict(Backtracking)

Variant 2 - Tuned to Randomly Generate imbalance Instances

- Variables in input CNF will appear more often in either polarity, different for each variable

- For examples:

  - x appears a lot more often than -x, and -y appears a lot more often than y in CNF

Next Steps

- Fully solidify my understanding of DPLL concepts, such as Backtracking, Decision heuristics and conflict resolution

- Plan requirements for my system

- Decide on techniques I will used and the structure of the SAT Solver

- Decide what technologies I would like to use

- Prepare to begin coding

Gantt Chart

	ID	Name	Start Date	End Date	Jan, 24	Feb, 24	Mar, 24	Apr, 24	May, 24	Jun, 24	Jul, 24	Aug, 24
	1	Initial Reading/Research	Jan 12, 2024	Feb 05, 2024								
	2	Decide on Technology to be Used	Feb 05, 2024	Feb 27, 2024								
	3	Plan Structure of the System and What Techniques to be Used	Feb 05, 2024	Feb 27, 2024								
	4	Code	Feb 27, 2024	Jun 17, 2024								
	5	Write Preliminary Project Report	Apr 01, 2024	Apr 22, 2024								
	6	Write Final Report	Jun 17, 2024	Aug 06, 2024								
	7	Create Video	Aug 01, 2024	Aug 08, 2024								