

ECE650 Programming Assignment 2 - Bonus

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1 Program Description

This program first constructs a tree, and uses Tseitin's transform to create a vector of vectors where each of the subvectors are CNF clauses.

Since Tseitin's transform returns an equisatisfiable CNF, and DPLL is used to resolve formulas in CNF, DPLL is used. The DPLL function first calls a Boolean Constraint Propagation, BCP, function to remove variables that occur as unit clauses. If BCP returns a single unit clause, DPLL immediately returns SAT. Else if for a unit clause, p , there also exists a unit clause $\neg p$, DPLL returns UNSAT.

In the DPLL function, from the CNF returned from BCP, a variable, q , is chosen in order, and first q is set to True, and DPLL is called on this modified CNF where clause containing q is removed, and $\neg q$ is removed from clauses containing $\neg q$. If the DPLL of this CNF returns False, q is then set to False, and DPLL is called on this CNF. If this call to DPLL also returns false, DPLL returns UNSAT. Else, DPLL returns SAT.