Sat Solver

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Description

We have used DPLL Algorithm to get the satisfiability of the given formula Φ in CNF format provided in the DIMACS representation in a cnf file.
The algorithm works by selecting a variable and allotting it a truth value(in our case, we chose the first variable of the first clause, truth-value depending on its sign). Simplification in clauses is done on the basis of choice in above step and then the formula is checked for satisfiability recursively.
Simplification is done as follows:

Unit Propagation

If a clause has a single literal, that means, the literal must hold the truth value according to its sign, i.e., $True$ or $False$ for $+$ or $-$ respectively, for the formula to be satisfiable.
Then, we eliminate all the clauses which has that literal with same sign as that of the unit clause's literal, because those clauses will hold true, independently of the other literals present in that clause.
Also, we eliminate the literals from clauses if it is the same literal as that of the unit clauses' literal with opposite sign as it will not contribute to the satisfiability of that clause.

Assumptions

We have assumed that comments are only present in the beginning of the cnf file.

Limitations

It will take time to get the satisfiability of the given cnf file if it contains large number of variables and clauses.