**2D Project 50.001 Component – Group 25**

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**Implementation**

Our approach implements the **Davis–Putnam–Logemann–Loveland (DPLL)** algorithm for our SAT solver. Given a formula in conjunctive normal form (CNF), the algorithm will perform the following actions:

* If the formula has no clause, it is deemed trivially satisfiable.
* If there is at least one clause, we then find the smallest clause by number of literals.
  + If there is any empty clause, the clause list is unsatisfiable; we fail and backtrack to the previous level
  + If the smallest clause if of unit length (containing only one literal), we set the only literal to TRUE and use the substitute method to simplify the formula. We then recursively call the solve method on the formula.
  + Else, we will look for the next shortest clause, from which we pick an arbitrary literal and set it to TRUE. Similarly, we use substitute and recursively call solve method. If all clauses are satisfied, we have found a solution and formula is satisfactory. Else, we backtrack and set the assign literal to FALSE, and repeat the above procedure until we find a solution or exhaust our options.

**Outcome**

File: largeSat.cnf

Result: Satisfiable

Running time: 1551.4542 ms

Specification: Windows 10, processor with Intel Core i7 at 2.2 Ghz

