

Assignment 2 - Propositional calculus theorem prover

CS386 - Artificial Intelligence

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1 Specs

1. Given an expression E , detect if it is well formed i.e $S \rightarrow F|P|(S \rightarrow S)$
2. Detect if E is a theorem in the system. Halt with "yes" or "no"
3. Show the inference path (Use deduction theorem)
4. Parse the expression to get constituents. User should be able to use $\sim, \vee, \wedge, \rightarrow, (,)$
5. After getting the constituents, the expression E should be of the form $(A_1 \rightarrow (A_2 \rightarrow (A_3 \rightarrow \dots (A_n \rightarrow B))))$
6. Used deduction theorem and show $A_1, A_2, \dots, A_n \vdash B$. Output should be an obvious set of modus ponens rules
7. **Challenging part:** The theorem prover must also ask for help in the form of
 - a previously proved theorem
 - a sub-expression proved and used through the application of axioms
8. System has to halt on a non-theorem saying "no"
9. The length of the proof will be considered.