Lisp in Summer Projects Submission

Submission Date	2013-10-01 17:21:56
Full Name	Margit Szendrei (in Hungarian: Szendrei Margit)
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Project Name	Propositional Logic
Type of software	library
General category	library
LISP dialect	Scheme (MIT, Gambit, Chicken, Guile ...)
GitHub URL	https://github.com/szem06/propositional-logic
Did you start this project?	Yes, all the code is written by me
Project Description	I want to describe my project in this form.
Purpose	New algorithms for classic problems of propositional logic: satisfiability checking, model searching, logical reasoning, evaluation.
Function	There is a description of the usual definitions and rewriting algorithms of logical expressions and normal forms completed with the idea of minimal normal forms and their applications, a working code to implement the algorithms and some tests to give examples.
Motivation	I missed the idea of minimal normal forms from propositional logic.
Audience	No idea. The suggestion of learning propositional logic came from a mathematician friend of mine, but even he has lost his interest seeing my approach and difficulties.
Methodology	The code (pl.scm) follows the description (pl.pdf), which includes the algorithms based on clear definitions and proved equivalences. It begins with the representation of logical expressions. They are represented as lists, so there are some list operations and basic procedures to handle the expressions as well.

	After the basic definitions and procedures there is an implementation of the classic way of evaluation. It is not really necessary for the purpose of the project, but you can hardly imagine anything about propositional logic without it, and it is still more efficient than the alternative way (evaluate-2) at the end of the code. Then come procedures for NNF/CNF/DNF transformation and CNF/DNF minimization. Finally you can find the applications: satisfiability checking, model searching, logical reasoning, evaluation, etc. For further details see: https://github.com/szem06/propositional-logic/blob/master/pl.pdf
Conclusion	The code is the first working version of the algorithms, so it shows, how they work, but it is not efficient and it is not user-friendly. Future direction may be improving efficiency and usability.
Build Instructions	Just open the files.
Test Instructions	The file tests-and-notes-pl.scm gives some examples of tests.
Execution Instructions	Choose a procedure and try it.
Describe any bugs or caveats	Begin with the description (pl.pdf).
Official	I have read rules and have abided by them. I am 18 years of age or older. I am not living in Brazil, Quebec, Saudi Arabia, Cuba, Iran, Myanmar (Burma), North Korea, Sudan, or Syria.