

CSL665/CS765: Introduction to (Logic and Functional) Programming
I semester 2003-04

Assignment 3: Resolution-based tautology checker in Prolog

Here is a (grammatically incorrect but reasonably clear) specification of propositional tautology checker in **Prolog**.

```
atom(s) /* where s is a string */
not(P) /* where P, Q are Prolog variables representing Propositions */
and(P, Q)
or(P, Q)
imp(P, Q) /* denotes P -> Q */
eql(P, Q) /* denotes P <-> Q */

arg(PL, P) /* PL is a list propositions */

falsify(arg(PL, P), PLL) /* PLL is a list of list of Propositions */
valid (arg(PL, P), PLL)
end;
```

Design and implement a **resolution-based tautology checker** in *XSB Prolog* along the lines of the ML version of the tautology-checker that you have studied. For all other decisions and functions (such as `rewrite`, `cnf`) use the names given in the ML version of the tautology checker as far as possible. But your tautology checking should be resolution based and not as in the ML-based version.

Note:

1. You are *not* allowed to change any of the names given in the signature. You are not even allowed to change upper-case letters to lower-case letters or vice-versa.
2. You may define any new functions you like in the structure besides those mentioned in the signature.
3. Your program should work with the given signature.
4. You need to think of the *most efficient way* of implementing the various functions given in the signature so that the function results satisfy their definitions and properties.
5. Since the evaluator is going to look at your source code before evaluating it, you must explain your algorithms in the form of ML comments, so that the evaluator can understand what you have implemented.
6. Do *not* add any more decorations or functions or user-interfaces in order to impress the evaluator of the program. Nobody is going to be impressed by it.
7. There is a serious penalty for copying. If it is felt that there is too much similarity in the code between any two persons, then both are going to be penalized equally. So please set permissions on your directories, so that others cannot copy your programs.