

CS 355 Homework 4

Due Wednesday 3/26/2014

1. Reprogram **exactly** the first 6 steps in homework 3 in Prolog. You can use the following method to represent the state and clauses. For example,

State: `[[a,true],[b,true],...]`

Clauses: `[[a,[not,b],c],[c,[not,d],e],[a,[not,e],f]]`

Notice:

- It is ok to use some helper functions such as built-in prolog list manipulation functions as well as other utility functions (e.g., removing duplicates in a list) [http://www.swi-prolog.org/pldoc/doc_for?object=section\(2,'A.12',swi\('/doc/Manual/lists.html'\)\)](http://www.swi-prolog.org/pldoc/doc_for?object=section(2,'A.12',swi('/doc/Manual/lists.html'))) . Please state clearly what functions you use and their sources if they are not prolog built-in functions.

- **Basic** test cases:

`?- eval-var(b,[[a,true],[b,true]],X).`

`X = true ;`

`false.`

`?- eval-clause([[a,true],[b,false],[c,true],[d,false]],a,[not,b],c,X).`

`X = true ;`

`false.`

`?- get-vars([a,[not,b],c],X).`

`X = [a, b, c] ;`

`false.`

`?- get-all-vars([[a,[not,b],c],[c,[not,d],e],[a,[not,e],f]],X).`

`X = [b, c, d, a, e, f] ;`

`false.`

`?- unsat-clauses([[a,[not,b],c],[a,[not,b],[not,c]],a,[not,b],d],[[a,false],[b,true],[c,true],[d,false]],X).`

`X = [[a, [not, b], [not, c]], [a, [not, b], d]] ;`

`false.`

`?- flip-var(a,[[a,false],[b,true],[c,true],[d,false]],X).`

`X = [[a, true], [b, true], [c, true], [d, false]] ;`

`false.`

- When testing your code, make sure you use “;” to let Prolog search for all the results and make sure that only expected results should be returned. It will be incorrect if your program returns both correct and incorrect results.
- **Bonus:** 10 points each (total 20 points) for correct implementation of the 7th and 8th steps in homework 2.

Submission:

- Each function you write should have no side effects (i.e., no extra incorrect results).
- Test each function individually as you write them.
- Create a Readme.txt file that includes information that gives your name, email address, and a summary of the progress (e.g., what has been done, what is not working...etc).
- Comments **MUST** be provided for each function. The comments must explain the algorithm used in each function. Descriptions of variables used are also needed.
- Make sure your code works on a lab machine with *swipl*

This homework will be submitted electronically on Angel. Please double check the files (e.g., download and open them) after you submit. It is due at midnight on the due date.