Prolog Recitation

This recitation uses the examples and diagrams from the book:

Learn Prolog Now! (http://www.let.rug.nl/bos/lpn/)

Terms

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1. Atoms
2. Numbers
3. Variables
4. Complex Terms

1. Atoms

- A string of characters made up of upper-case letters, lower-case letters, digits, and the underscore character, that begins with a lower-case letter. (jessica, middle_east_technical_university)
- An arbitrary sequence of character enclosed in single quotes. (‘The Gimp’, ‘hello world’)
- A string of special characters. (; or :-)

2. Numbers

- Integers (123, -100)
- Floats (1.618, 5.2)

3. Variables

A string of uppercase letters, lowercase letters, digits and underscore characters that starts either with an uppercase letter or with underscore. (X, Sarah, _hello)

4. Complex Terms

- Built out of a functor followed by a sequence of arguments.
- The functor **must** be an atom.
- loves(a, b)
- The number of arguments that a complex term has is called its arity. (loves/2)

Matching

Two terms match if ...

- They are equal or
- They contain variables that can be instantiated in such a way that resulting terms are equal.

In more detail

1. If term1 and term2 are constants, then term1 and term2 match if and only if they are the same atom, or the same number.

2. If term1 is a variable and term2 is any type of term, then term1 and term2 match, and term1 is instantiated to term2 and vice versa.

3. If term1 and term2 are complex terms, then they match if and only if
   a. they have the same functor and arity,
   b. all their corresponding arguments match,
   c. and the variable instantiations are compatible.

Proof Search

Proof search example

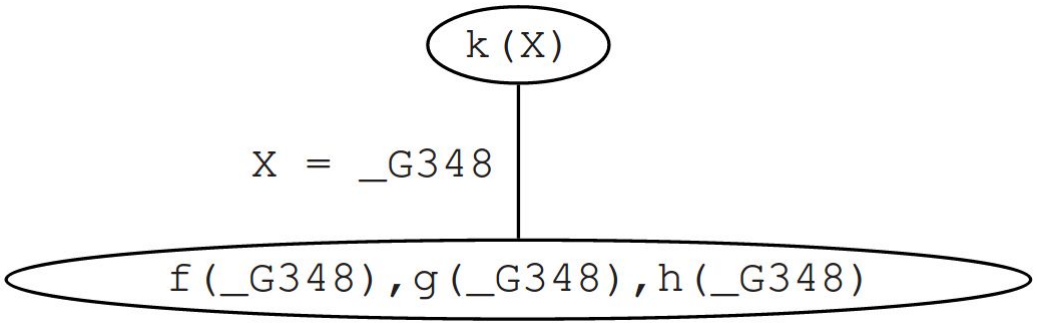
?- k(X).

f(a).
f(b).

g(a).
g(b).

h(b).

k(X) :- f(X), g(X), h(X).



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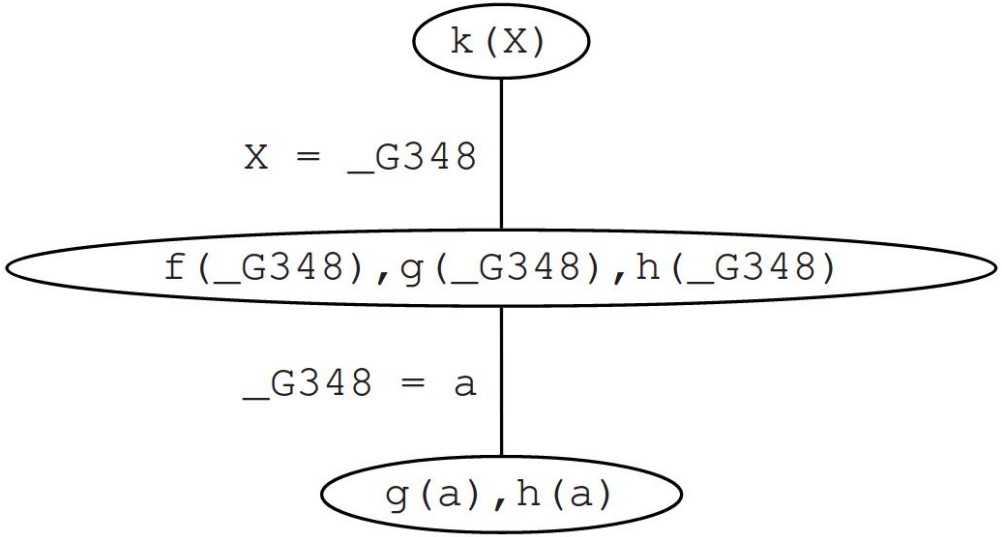

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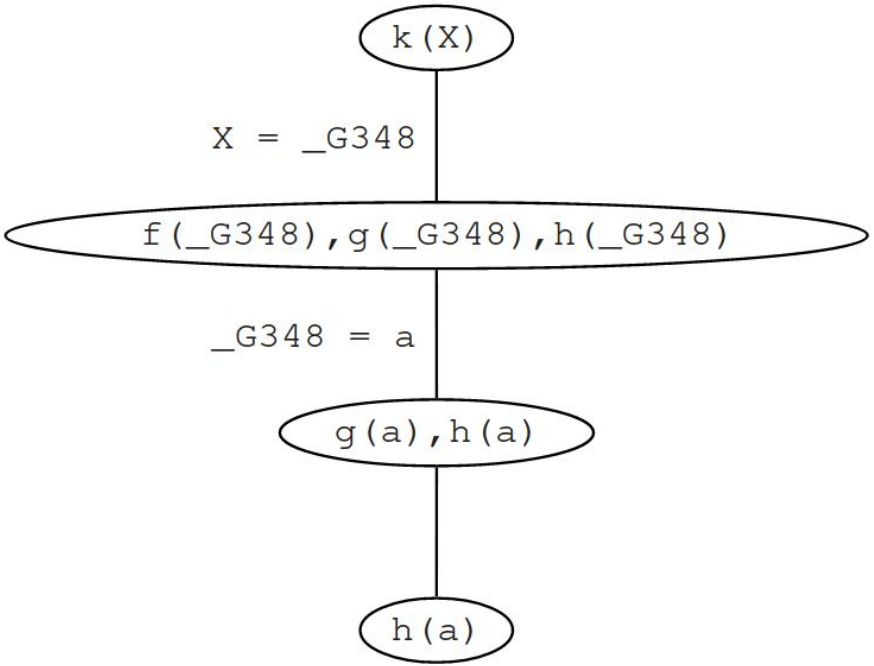

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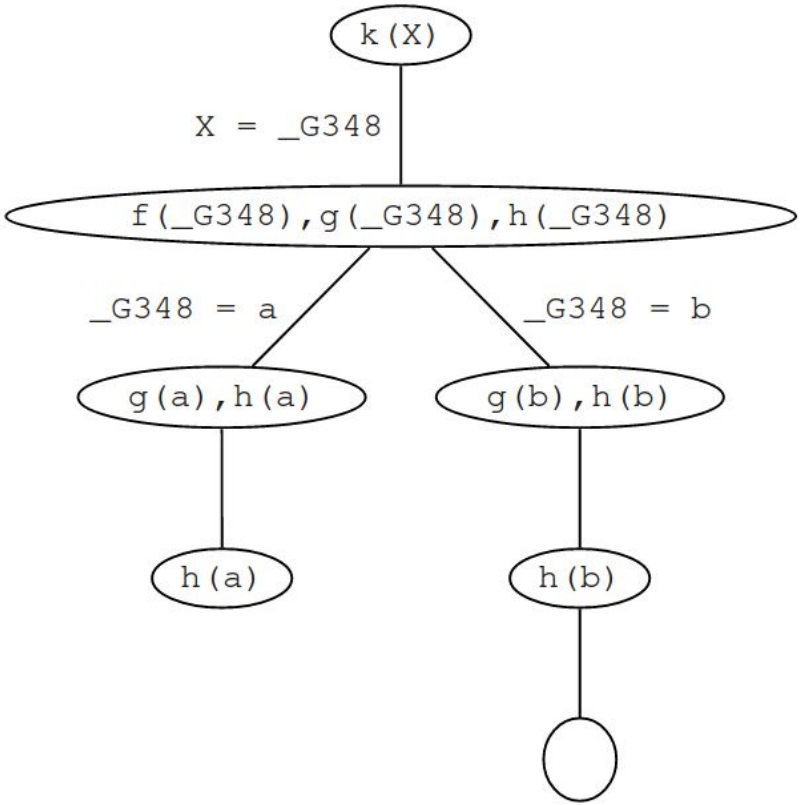

Arithmetic

Arithmetic examples	Prolog Notation
$6+2=8$	`8 is 6+2.`
$6*2=12$	`12 is 6*2.`
$6-2=4$	`4 is 6-2.`
$6-8=-2$	`-2 is 6-8.`
$6\div 2=3$	`3 is 6/2.`
$7\div 2=3$	`3 is 7/2.`
1 is the remainder when 7 is divided by 2	`1 is mod(7,2).`

Arithmetic examples	Prolog Notation
$x < y$	`X < Y.`
$x \leq y$	`X =< Y.`
$x = y$	`X =:= Y.`
$x \neq y$	`X =\= Y.`
$x \geq y$	`X >= Y`
$x > y$	`X > Y`