EECS 3401

ASSIGNMENT 2 SOLUTIONS

Deadline March. 7, 2016

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PROBLEM 1.

- (1) X is a grandfather of Z, if X is the father of Y and Y is a parent of Z.
- (2) The father of Y is a parent of Y.
- (3) The mother of Y is a parent of Y.

Given the following facts:

- (4) adam is the father of beth and bill.
- (5) beth is the mother of chris.
- (6) bill is the father of ann.

A. Convert (1)-(6) into clauses.

Use the following predicates:

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gf(X,Y) - to denote the fact that X is a grandfather of Y; f(X,Y) - to denote the fact that X is the father of Y; m(X,Y) - to denote the fact that X is the mother of Y; p(X,Y) - to denote the fact that X is a parent of Y;
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A.sol

- $\begin{array}{c} (1) \ \ C1. \ \ gf(X,Y) \ \text{->} \ (f(X,Y) \ \& \ p(Y,Z)) \\ gf(X, \ Z) \ \text{:-} \ f(X, \ Y), \ p(Y, \ Z). \end{array}$
- (2) C2. f(X, Y) := p(X, Y).
- (3) C3. m(X, Y) := p(X, Y).
- (4) C4.1. f(adam, beth). C4.2. f(adam, bill).
- (5) C5. m(beth, chris).

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(6) C6. f(bill, ann).
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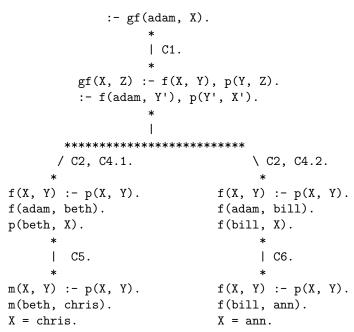
B. Formulate an appropriate query to solve the problem

B.sol: find all A's such that adam is the grandparent

Q. gf(adam, X).

C. Construct a complete SLD search tree

C.sol:



PROBLEM 2.

Specification of merge(L1,L2,L)

CASE 1: If the empty lists.

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%%%%
merge([],[],[]).
%%%%
CASE 2: The lists contain 1 element
%%%%
merge([],[Y],[Y|L]) :- merge([],[],L).
merge([X],[],[X|L]) :- merge([],[],L).
%%%%
 CASE 3: The first element, X, in L1 is less than the first element, Y, in L2, add X to L a
merge([X|L1],[Y|L2],[X|L]) :- lt(X, Y), merge(L1,[Y|L2],L).
%%%%
CASE 4: The first element, X, in L1 is greater than or equal to the first element, Y, in L2
%%%%
merge([X|L1],[Y|L2],[Y|L]) :- merge([X|L1],L2,L).
%% Helper Predicates %%
% True \ if \ X < Y \ is \ true.
lt(X, Y) := X < Y.
```

Specification of delete(X,L,L1)

PROBLEM 3

PROBLEM 4