Angel Hernandez

Project 4

Code:

|  |
| --- |
| /\*  Forwards-chained Expert System using Many-valued logic  \*/  :-dynamic(fact/2).  :-dynamic(fact/1).  :-dynamic(p/1).  :-op(100,xfx,:).  :-op(150,xfx,is).  :-op(200,xfy,and).  :-op(300,xfy,or).  :-op(700,xfx,then).  :-op(800,fx,if).  fact(a).  if a then b.  if b then c.  if c then d.  think:- derive(fact(X)),!, write(X),nl, assert(fact(X)),think; write('no more').  derive(fact(Concl)):- if Cond then Concl, not(fact(Concl)), fact(Cond).  a.  newthink:- newderive(X),!, write(X),nl, assert(X),newthink; write(' no more').  newderive(Concl):- if Cond then Concl,not(clause(Concl,true)), Cond.  verify(Name) :-  Term =.. [Name],  call(Term).  if hall is wet and kitchen\_dry  then leak is in\_bathroom.  if hall\_wet and bathroom\_dry  then problem\_in\_kitchen.  if window\_closed or no\_rain  then no\_water\_from\_outside.  if problem\_in\_kitchen and no\_water\_from\_outside  then leak\_in\_kitchen.  start:-abolish(fact/2), enter\_facts, forward.  enter\_facts:-write('Is the hall wet? yes/no: '),read(X),write('What is the certainty of that? '),  read(Y),write('Y read'),assert(p(a)),write('p asserted'), nl,assert(fact(X,hall\_wet:Y)),  write('Is the bathroom dry? yes/no: '),read(X1),write('What is the certainty of that? '),  read(Y1),assert(fact(X1,bathroom\_dry:Y1)),  write('Is the window closed? yes/no: '), read(X2), write('What is the certainty of that? '),  read(Y2), assert(fact(X2,window\_closed:Y2)).  forward:- new\_derived\_fact(fact(yes,P:X)),!,write('Derived - '),  write(P),write(':'), write('\t'), write(X), nl,  assert(fact(yes,P:X)),  forward ; write('No more facts').  new\_derived\_fact(fact(yes,Concl:X)) :- if Cond then Concl,  not(fact(yes,Concl:X)), composed\_fact(fact(yes,Cond:X)).  composed\_fact(fact(yes,Cond:X)):- fact(yes,Cond:X).  composed\_fact(fact(yes,(Cond1 and Cond2):X)) :-  composed\_fact(fact(yes,Cond1:X1)),  composed\_fact(fact(yes,Cond2:X2)), min(X1,X2,X).  composed\_fact(fact(yes,(Cond1 or Cond2):X)) :-  composed\_fact(fact(yes,Cond1:X1)),  composed\_fact(fact(yes,Cond2:X2)), max(X1,X2,X).  min(X, Y, X) :- X =< Y, !.  min(X, Y, Y) :- Y =< X.  max(X, Y, Y) :- X =< Y, !.  max(X, Y, X) :- Y =< X. |

Test Case:

|  |
| --- |
| 1 ?- start.  Is the hall wet? yes/no: yes.  What is the certainty of that? |: 80.  Y readp asserted  Is the bathroom dry? yes/no: |: no.  What is the certainty of that? |: 45.  Is the window closed? yes/no: |: yes.  What is the certainty of that? |: 67.  No more facts  true. |