```
Script started on Tue Mar  6 20:57:39 2012
bash-3.2$ cat -n ein\007stein.pl
     1  % $Id: einstein.pl,v 1.3 2011-05-19 19:53:59-07 - - $ */
     2
     3  %
     4  % ------------------------------------------------------------------
     5  %
     6  %                           Einstein's Riddle
     7  %
     8  % * General Problem:
     9  %   - There are 5 houses in a row
    10  %   - Each house is a different color.
    11  %   - In each house lives a person with a different nationality.
    12  %   - The 5 owners
    13  %        + drink a certain type of beverage,
    14  %        + smoke a certain brand of cigar, and
    15  %        + keep a certain pet.
    16  %   - No owners have the same pet, smoke the same brand of cigar or
    17  %     drink the same beverage.
    18  %
    19  % * Specific Facts:
    20  %   - The Brit lives in the red house.
    21  %   - The Swede keeps dogs as pets.
    22  %   - The Dane drinks tea.
    23  %   - The green house is on the left of the white house.
    24  %   - The green house's owner drinks coffee.
    25  %   - The person who smokes Pall Mall rears birds.
    26  %   - The owner of the yellow house smokes Dunhill.
    27  %   - The man living in the center house drinks milk.
    28  %   - The Norwegian lives in the first house.
    29  %   - The man who smokes Blends lives next to the one who keeps cats.
    30  %   - The man with the horse lives next to the man who smokes Dunhill.
    31  %   - The owner who smokes Bluemasters drinks beer.
    32  %   - The German smokes Prince.
    33  %   - The Norwegian lives next to the blue house.
    34  %   - The man who smokes Blends has a neighbor who drinks water.
    35  %
    36  % * Question:
    37  %   - Who owns the fish?
    38  %
    39  % ------------------------------------------------------------------
    40  %
    41
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44:     42  %
45:     43  % Is the first house in a pair next to the second?
46:     44  %/
47:     45  left_of( Left, Right, [Left, Right | _]).
48:     46  left_of( Left, Right, [_ | Others]) :- left_of( Left, Right, Others).
49:     47
50:     48  %
51:     49  % Are the two houses in a pair next to each other?
52:     50  %/
53:     51  next_to( Left, Right, Houses) :- left_of( Left, Right, Houses).
54:     52  next_to( Left, Right, Houses) :- left_of( Right, Left, Houses).
55:     53
56:     54  %
57:     55  % Are each of the facts true about the houses?
58:     56  %/
59:     57  map_member( [], _).
60:     58  map_member( [Fact | Facts], Houses) :-
61:     59     member( Fact, Houses),
62:     60     map_member( Facts, Houses).
63:     61
64:     62  %
65:     63  % Apply each pair of relations (left_of or next_to) to the houses.
66:     64  %/
67:     65  map_pairs( _, [], _).
68:     66  map_pairs( Relation, [First, Second | Rest], Houses) :-
69:     67     call_with_args( Relation, First, Second, Houses),
70:     68     map_pairs( Relation, Rest, Houses).
71:     69
```

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 72:     70  %
 73:     71  % Statement of Einstein's riddle in Prolog.
 74:     72  %/
 75:     73  einstein( Houses, Fish) :-
 76:     74     /*        house( nation   , color , drink , smoke      , pet  ) */
 77:     75     /*               ---------, ------, ------, -----------, -----  */
 78:     76     Houses = [house( norwegian, _     , _     , _          , _    ),
 79:     77               _,
 80:     78               house( _        , _     , milk  , _          , _    ),
 81:     79               _,
 82:     80               _
 83:     81     ],
 84:     82     Facts =  [house( brit     , red   , _     , _          , _    ),
 85:     83               house( swede    , _     , _     , _          , dogs ),
 86:     84               house( dane     , _     , tea   , _          , _    ),
 87:     85               house( _        , green , coffee, _          , _    ),
 88:     86               house( _        , _     , _     , pallmall   , birds),
 89:     87               house( _        , yellow, _     , dunhill    , _    ),
 90:     88               house( _        , _     , beer  , bluemasters, _    ),
 91:     89               house( german   , _     , _     , prince     , _    ),
 92:     90               house( Fish     , _     , _     , _          , fish )
 93:     91     ],
 94:     92     Left =   [house( _        , green , _     , _          , _    ),
 95:     93               house( _        , white , _     , _          , _    )
 96:     94     ],
 97:     95     Next =   [house( _        , _     , _     , blends     , _    ),
 98:     96               house( _        , _     , _     , _          , cats ),
 99:     97               house( _        , _     , _     , _          , horse),
100:     98               house( _        , _     , _     , dunhill    , _    ),
101:     99               house( norwegian, _     , _     , _          , _    ),
102:    100               house( _        , blue  , _     , _          , _    ),
103:    101               house( _        , _     , _     , blends     , _    ),
104:    102               house( _        , _     , water , _          , _    )
105:    103     ],
106:    104     map_member( Facts, Houses),
107:    105     map_pairs( left_of, Left, Houses),
108:    106     map_pairs( next_to, Next, Houses).
109:    107
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  110:    108  %
  111:    109  % Code to print out the answer to the riddle.
  112:    110  %/
  113:    111
  114:    112  riddle :-
  115:    113     einstein( Houses, Fish),
  116:    114     write_houses( Houses), nl,
  117:    115     write_fish( Fish), nl,
  118:    116     write( '--------------------------------------------------'),
  119:    117     nl, nl.
  120:    118
  121:    119  write_fish( Fish) :-
  122:    120     write( 'The '), write( Fish), write( ' owns the fish.'), nl.
  123:    121
  124:    122  write_houses( []).
  125:    123  write_houses( [House | Houses]) :-
  126:    124     write_house( House),
  127:    125     write_houses( Houses).
  128:    126
  129:    127  write_house( house( Nation, Color, Drink, Smoke, Pet)) :-
  130:    128     write_label( 'House', Nation, comma),
  131:    129     write_label( 'Color', Color, comma),
  132:    130     write_label( 'Drink', Drink, comma),
  133:    131     write_label( 'Smoke', Smoke, comma),
  134:    132     write_label( 'Pet', Pet, period).
  135:    133
  136:    134  write_label( Label, Object, Punct) :-
  137:    135     write( Label), write( ': '), write( Object), call( Punct).
  138:    136
  139:    137  comma :- write( ', ').
  140:    138  period :- write( '.'), nl.
  141:    139
  142:    140  %
  143:    141  % Automatically print out the answer to the riddle.
  144:    142  %/
  145:    143
  146:    144  % TEST: riddle.
  147:    145
  148: bash-3.2$ gprolog
  149: GNU Prolog 1.3.1
  150: By Daniel Diaz
  151: Copyright (C) 1999-2009 Daniel Diaz
  152: | ?- [einstein].
  153: compiling /afs/cats.ucsc.edu/courses/cmps112-wm/Languages/prolog/Examples/einste
in.pl for byte code...
  154: /afs/cats.ucsc.edu/courses/cmps112-wm/Languages/prolog/Examples/einstein.pl comp
iled, 145 lines read - 9165 bytes written, 10 ms
  155:
  156: yes
  157: | ?- riddle.
  158: House: norwegian, Color: yellow, Drink: water, Smoke: dunhill, Pet: cats.
  159: House: dane, Color: blue, Drink: tea, Smoke: blends, Pet: horse.
  160: House: brit, Color: red, Drink: milk, Smoke: pallmall, Pet: birds.
  161: House: german, Color: green, Drink: coffee, Smoke: prince, Pet: fish.
  162: House: swede, Color: white, Drink: beer, Smoke: bluemasters, Pet: dogs.
  163:
  164: The german owns the fish.
  165:
  166: --------------------------------------------------
  167:
  168:
  169: true ?
  170:
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171: (1 ms) yes
172: | ?-
173:
174: bash-3.2$ exit
175:
176: Script done on Tue Mar  6 20:58:07 2012
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