

Question One

Mary-step-sister-of-Ann \leftarrow (Mary-father-Ed \wedge Ann-father-Sam) \wedge (Mary-mother-Sue \wedge Ann-Mother-Sue) \wedge mary-is-female

Question Two

All Z, X, W, parentOf(Z, I) \wedge parentOf(Z, A) \wedge female(I) \wedge (parentOf(X, I) \wedge parentOf(W, A)) \wedge not(= (Z, X)) \wedge not(= (W, X)) \wedge not(= (Z, W))

Question Three

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/* knowledge base */

female(sara).
female(sue).
female(zoe).
female(anna).
female(isabelle).
female(helen).

parentOf(helen, isabelle).
parentOf(kerry, isabelle).

parentOf(helen, anna).
parentOf(jeffy, anna).

/* Function */
half_sister_of(I,A) :-
    parentOf(Z, I), parentOf(Z, A), female(I), (parentOf(X, I), parentOf(W, A)), not(Z =
X), not(X = W), not(Z = W).
```

Question Four

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:- use_module(library(lists)). %% to load permutation/2 no idea what this does
/*
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Hints:
* the Brit lives in the red house
* the Swede keeps dogs as pets
* the Dane drinks tea
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- * the green house is on the left of the white house
- * the green house's owner drinks coffee
- * the person who smokes Pall Mall rears birds
- * the owner of the yellow house smokes Dunhill
- * the man living in the center house drinks milk
- * the Norwegian lives in the first house
- * the man who smokes blends lives next to the one who keeps cats
- * the man who keeps horses lives next to the man who smokes Dunhill
- * the owner who smokes BlueMaster drinks beer
- * the German smokes Prince
- * the Norwegian lives next to the blue house
- * the man who smokes blend has a neighbor who drinks water

Pets

- * cats
- * dogs

Drinks

- * Tea
- * Coffee
- * Milk
- * Beer
- * Water

Houses

- * Red
- * Green
- * White
- * Yellow
- * Blue

Nationality

- * Norwegian
- * Brit
- * Swede
- * Dane
- * German

Cigar

```

* Pallmall
* Dunhill
* Blends
* BlueMaster
* Prince
*/

solution(Persons) :-
    /* We need a way to tell the houses order so we can get what ones are next to each
other */

    Persons = [
        personObj(1, Nat1, Color1, Pet1, Drinks1, Smokes1),
        personObj(2, Nat2, Color2, Pet2, Drinks2, Smokes2),
        personObj(3, Nat3, Color3, Pet3, Drinks3, Smokes3),
        personObj(4, Nat4, Color4, Pet4, Drinks4, Smokes4),
        personObj(5, Nat5, Color5, Pet5, Drinks5, Smokes5)
    ],
    /* Hints */
    /* the Brit lives in the red house */
    member(personObj(_, brit, red, _, _, _), Persons),
    /* the Swede keeps dogs as pets */
    member(personObj(_, swede, _, dog, _, _), Persons),
    /* the Dane drinks tea */
    member(personObj(_, dane, _, _, tea, _), Persons),
    /* the green house is on the left of the white house */
    member(personObj(A, _, green, _, _, _), Persons),
    member(personObj(B, _, white, _, _, _), Persons),
    left_of(A, B),
    /* the green house's owner drinks coffee */
    member(personObj(_, _, green, _, coffee, _), Persons),
    /* the person who smokes Pall Mall rears birds */
    member(personObj(_, _, _, birds, _, pall_mall), Persons),
    /* the owner of the yellow house smokes Dunhill */
    member(personObj(_, _, yellow, _, _, dunhill), Persons),
    /* the man living in the center house drinks milk */
    member(personObj(3, _, _, _, milk, _), Persons),
    /* the Norwegian lives in the first house */
    member(personObj(1, norweigan, _, _, _, _), Persons),
    /* the man who smokes blends lives next to the one who keeps cats */
    member(personObj(C, _, _, _, _, blend), Persons),

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member(personObj(D, _, _, cats, _, _), Persons),
next_to(C, D),
/* the man who keeps horses lives next to the man who smokes Dunhill */
member(personObj(E, _, _, horse, _, _), Persons),
member(personObj(F, _, _, _, dunhill, _), Persons),
next_to(E, F),
/* the German smokes Prince */
member(personObj(_, german, _, _, _, prince, _), Persons),
/* the owner who smokes BlueMaster drinks beer */
member(personObj(_, _, _, _, beer, bluemaster, _), Persons),
/* the Norwegian lives next to the blue house */
member(personObj(G, norwegian, _, _, _, _), Persons),
member(personObj(H, _, blue, _, _, _), Persons),
next_to(G, H),
/* the man who smokes blend has a neighbor who drinks water */
member(personObj(I, _, _, _, _, blend), Persons),
member(personObj(J, _, _, _, water, _), Persons),
next_to(I, J),
/* WHO OWNS THAT FISH BOI?! */
member(personObj(_, FishOwner, _, fish, _, _), Persons).

ownerOfFish(Persons, FishOwner) :-
member(personObj(_, FishOwner, _, fish, _, _), Persons).

/* Use ids to date the left and right person */
right_of(A, B) :-
A is B + 1.
left_of(A, B) :-
A is B - 1.

/* They could be to the left or right of the other person */
next_to(A, B) :-
right_of(A, B).
next_to(A, B) :-
left_of(A, B).

```