

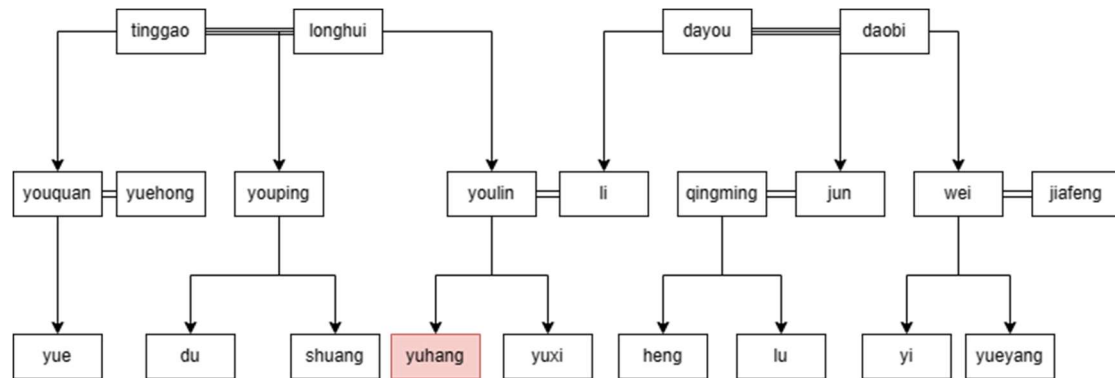
# Lab1

name: Zeng Yuhang

ID: 222320008



my family tree:



This is a simple version. The red one is me. = connects spouses. → connects parent and child.

The entire family tree knowledge shows below in text:

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father(youlin, yuhang).
father(tinggao, youlin).
father(dayou, li).
father(youlin, yuxi).
father(tinggao, youquan).
father(tinggao, youping).
father(dayou, jun).
father(dayou, wei).
father(youquan, yue).
father(tao, du).
father(qingming, lu).
father(qingming, heng).
father(wei, yi).
father(wei, yi).
father(shengqiang, anran).
father(hang, jiayan).
mother(li, yuhang).
mother(longhui, youlin).
mother(daobi, li).
mother(li, yuxi).
mother(longhui, youquan).
mother(longhui, youping).
mother(daobi, jun).
mother(daobi, wei).
mother(yuehong, yue).
mother(youping, du).
mother(youping, shuang).
mother(jun, lu).
mother(jun, heng).
mother(xiujuan, yi).
mother(xiujuan, yi).
mother(lu, anran).
mother(yi, jiayan).
lover(yesha, yuhang).
lover(jiefu, yue).
spouse(jiafeng, wei).
spouse(xiaoou, du).
  
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The rules I declare contain:

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male(X) :- father(X, Y).
female(X) :- mother(X, Y).
parent(X, Y) :- father(X, Y); mother(X, Y).
child(X, Y) :- father(Y, X); mother(Y, X).
son(X, Y) :- child(X, Y), male(X).
daughter(X, Y) :- child(X, Y), female(X).
grandfather(X, Y) :- father(X, Z), parent(Z, Y).
grandmother(X, Y) :- mother(X, Z), parent(Z, Y).
sibling(X, Y) :- parent(Z, X), parent(Z, Y), X\=Y.
uncle(X, Y) :- male(X), parent(Z, Y), sibling(X, Z).
aunt(X, Y) :- female(X), parent(Z, Y), sibling(X, Z).
cousin(X, Y) :- parent(Z, X), parent(W, Y), sibling(Z, W).
spouse(X, Y) :- child(Z, X), child(Z, Y), X\=Y.
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Then I test all above relations of me:

1 ?- parent(X,yuhang). X = youlin ; X = li.	6 ?- grandmother(X,yuhang). X = longhui ; X = daobi ; false.	9 ?- aunt(X,yuhang). X = youping ; X = youping ; X = jun ; X = jun ; X = youping ; X = youping ; X = youping ; X = youping ;
2 ?- child(yuhang, X). X = youlin ; X = li.	7 ?- sibling(yuhang,X). X = yuxi ; X = yuxi.	10 ?- cousin(yuhang,X). X = yue ; X = yue ; X = du ; X = du ; X = shuang ; X = shuang ;
3 ?- son(yuhang,X). X = youlin ; X = li ; false.	8 ?- uncle(X,yuhang). X = youquan ; X = youquan ; X = wei ; X = wei ; X = youquan ;	11 ?- spouse(yuhang,X) false.
4 ?- daughter(yuhang,X). false.	X = youquan ; X = wei ; X = wei ; X = wei ;	12 ?- lover(yuhang,X). false.
5 ?- grandfather(X,yuhang). X = tinggao ; X = dayou ; false.	X = wei ; X = wei ; false.	13 ?- lover(X,yuhang). X = yesha.

The main problem is when rules getting complex, there will be many redundant result inference from different logic lines. I have not found a solution right now.

Also, I forget to declare lover relation is reflexivity. Thus, question 12 and 13 return different results.