

Assignment 4

Consider the following family tree:

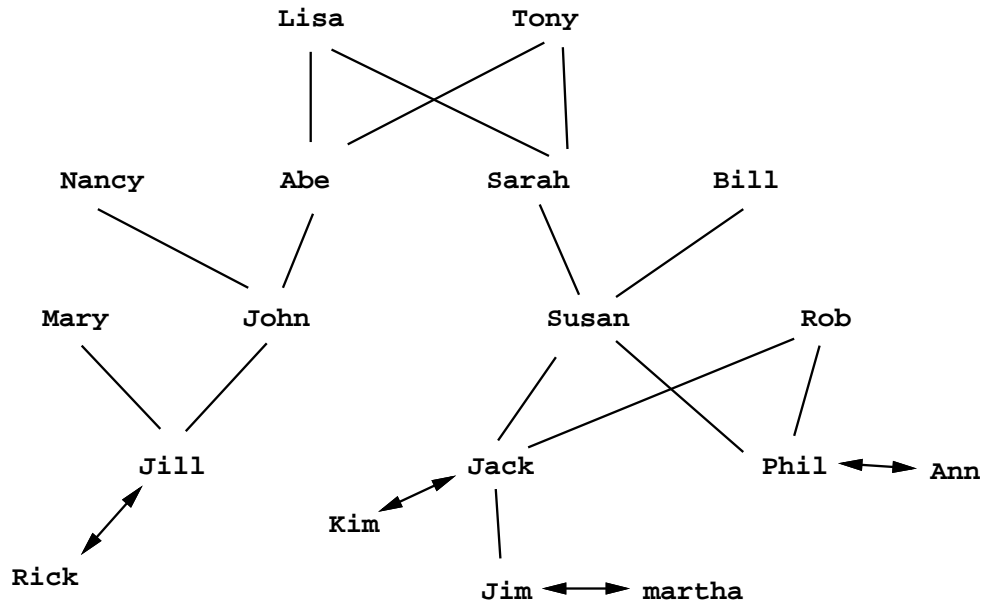


Figure 1: Family Tree

1. Transcribe the above diagram into father and mother relationships as Prolog facts. Also add facts describing gender.
2. Define rules for the following relationships:
 - (a) `fcousin(X,Y)`: X and Y are first cousins
 - (b) `scousin(X,Y)`: X and Y are second cousins
 - (c) `aunt(X,Y)`: X is an aunt of Y.
 - (d) `grtaunt(X,Y)`: X is a great aunt of Y.
 - (e) `fanc(X,Y)`: X is a female ancestor of Y.
3. Define a rule for checking if X and Y are “cousins of the same generation,” i.e., X and Y are descendents of a common person and both are same no. of links down from the common ancestor.
4. Suppose the double arrows depict the relationship “married.” Two individuals are also married if they have a common offspring. Write a rule for finding out if X is the spouse of the nephew of Y.

5. Draw the search tree that Prolog will create for the query `fanc(A,jim)` using your definition in Q 1.
6. Implement the programs discussed in class for plus, times, and greaterthan using the successor representation.
7. Write a program for computing the quotient and remainder of two numbers (use the successor representation of numbers).
8. Write a logic program to define the relation `fib(N,F)` to determine the Nth Fibonacci number (use the successor representation of numbers).

Note that all problems have to be programmed in Prolog.