

Principle of Programming Language

Assignment - 7

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For the given family tree, do as directed using PROLOG:

Write the predicates using the following relations:

1. **parent/2**
2. **male/1**
3. **female/1**
4. **husband/2**

```
%female
female(mary) .
female(sandra) .
female(juliet) .
female(lisa) .

%male
male(peter) .
male(paul) .
male(dick) .
male(bob) .
male(harry) .

%parent
parent(bob, lisa) .
parent(bob, paul) .
parent(bob, mary) .
parent(juliet, lisa) .
parent(juliet, paul) .
parent(juliet, mary) .
parent(peter, harry) .
parent(lisa, harry) .
```

```
parent(mary, dick).  
parent(mary, sandra).
```

```
%husband  
husband(peter, lisa).  
husband(bob, juliet).
```

Write the rules using the above relations for the following:

- | | |
|--------------------|-------------------|
| 1. Child | 7. Brother |
| 2. Mother | 8. Sister |
| 3. Father | 9. Uncle |
| 4. Wife | 10. Aunt |
| 5. Son | 11. Nephew |
| 6. Daughter | 12. Niece |

```
%child  
child(X,Y) :- parent(Y,X).
```

```
%mother  
mother(X,Y) :-  
    female(X),  
    parent(X,Y), !.
```

```
%father  
father(X,Y) :-  
    male(X),  
    parent(X,Y), !.
```

```
%wife  
wife(X,Y) :- husband(Y,X), !.
```

```
%son  
son(X,Y) :-  
    male(X),
```

```
child(X,Y) .

%daughter
daughter(X,Y) :-
    female(X),
```

```
child(X,Y) .

%brother
brother(X,Y) :-
    male(X),
    parent(Z,X),
    parent(Z,Y),
    X \= Y.
```

```
%sister
sister(X,Y) :-
    female(X),
    parent(Z,X),
    parent(Z,Y),
    X \= Y.
```

```
%uncle
uncle(X,Y) :-
    male(X),
    parent(Z,Y),
    brother(X,Z) .
```

```
%aunt
aunt(X,Y) :-
```

```

    female(X),
    parent(Z,Y),
    sister(X,Z).

%nephew
nephew(X,Y) :-
    male(X),
    parent(Z,X),
    (brother(Y,Z);sister(Y,Z)).

%niece
niece(X,Y) :-
    female(X),
    parent(Z,X),
    (brother(Y,Z);sister(Y,Z)).

```

Execution:

```

?- consult('family.pl').
true.

?- child(mary,X).
X = bob ;
X = juliet.

?- mother(X,mary).
X = juliet.

?- father(X,mary).
X = bob.

?- wife(juliet,X).
X = bob.

?- son(dick,Y).
Y = mary.

?- daughter(sandra,Y).
Y = mary.

?- daughter(mary,Y).
Y = bob ;
Y = juliet.

?- brother(paul,Y).
Y = lisa ;
Y = mary .

?- sister(sandra,Y).
Y = dick .

```

```
?- uncle(X,dick).  
X = paul ;  
X = paul ;  
false.  
  
?- aunt(X,harry).  
X = mary ;  
X = mary ;  
false.  
  
?- nephew(paul,X).  
false.  
  
?- nephew(X,paul).  
X = dick ;  
X = dick ;  
X = harry ;  
X = harry ;  
false.  
  
?- niece(X,mary).  
false.  
  
?- niece(X,lisa).  
X = sandra ;  
X = sandra ;  
false.
```
