Solution Logic Programming

Exercise 1

1. You need to build a genealogy that covers relations in a family. The following predicates must be considered in your database:

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female(X), male(X), parent(X,Y),
mother(X,Y), father(X,Y),
sister(X,Y), brother(X,Y)
```

Define rules allowing you to determine the following relations:

```
grandfather(X,Y), grandmother(X,Y), grandparent(X,Y),
son(X,Y), daughter(X,Y), child(X,Y),
grandson(X,Y), granddaughter(X,Y), grandchild(X,Y)
```

Answer:

```
% GENEALOGY DATABASE

female(anne).
female(diana).
female(elizabeth).
female(kate).
female(charlotte).

male(andrew).
male(charles).
male(edward).
male(harry).
male(philip).
male(william).
male(george).
male(loius).

parent(andrew, elizabeth).
parent(andrew, philip).
parent(anne, elizabeth).
parent(anne, philip).
parent(charles, elizabeth).
parent(charles, philip).
parent(edward, elizabeth).
parent(edward, philip).
parent(harry, charles).
parent(harry, diana).
parent(william, charles).
parent(william, diana).
parent(george, william).
parent(george, kate).
parent(charlotte, william).
parent(charlotte, kate).
parent(louis, william).
```

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parent(louis, kate).

mother(X, M) :- parent(X,M), female(M).
father(X, M) :- parent(X,M), male(M).

% FURTHER RELATIONS

grandfather(X, G) :- parent(X, P), parent(P, G), male(G).
grandmother(X, G) :- parent(X, P), parent(P, G), female(G).
grandparent(X, G) :- grandfather(X, G).
grandparent(X, G) :- grandmother(X, G).

son(X, S) :- parent(S, X), male(S).
daughter(X, D) :- parent(D, X), female(D).
child(X, C) :- parent(C, X).

grandson(X, S) :- grandparent(S, X), male(S).
granddaughter(X, D) :- grandparent(D, X), female(D).
grandchild(X, C) :- grandparent(C, X).
```