Solution Logic programming

- Exercises are given every week on the PL page of the SCG website
  (http://scg.unibe.ch/teaching/pl)

- Solutions to each assignment must be sent to **mohammadreza.hazhirpasand@inf.unibe.ch**

- The solutions of the assignments are to be delivered before every Thursday at 11 PM. Solutions
  handed in later than the specified time will not be accepted. In case of serious reasons send an
  e-mail to **mohammadreza.hazhirpasand@inf.unibe.ch**

Exercise (6 points)

1. We will build a genealogy that covers relations in a family. Consider a genealogy database consisting of the following predicates: (3 pts)

   ```
   female(X), male(X), parent(X,Y)
   ```

   Define rules allowing you to determine the following relations:

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

   Answer:
   female(Olivia).
   female(Emma).
   female(Ava).
   female(reyhan).
   female(fateme).

   male(Oliver).
   male(James).
   male(reza).
   male(alireza).
   male(vihan).
   male(arshia).

   parent(James, reza).
   parent(James, alireza).
   parent(James, Emma).
   parent(Olivia, reza).
   parent(Olivia, alireza).
   parent(Olivia, Emma).

parent(alireza, vihan).
parent(reyhan, vihan).

parent(Emma, Ava).
parent(Oliver, Ava).

parent(reza, arshia).
parent(fatemeh, arshia).

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

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

2. Using the following weekly schedule, write the necessary facts and a rule in order to output days as well as the associated programs and difficulty levels. (3 pts)

```
monday – english – simple
tuesday – programming – medium
tuesday – ai – hard
wednesday – hacking – hard
thursday – networking – medium
friday – pl – easiest
```

Answer:

program(monday,english).
program(tuesday,programming).
program(tuesday,ai).
program(wednesday,hacking).
program(thursday,networking).
program(friday,pl).

difficulty(english,simple).
difficulty(programming,medium).
difficulty(ai,hard).
difficulty(hacking,hard).

```
difficulty(networking,medium).
difficulty(pl,easiest).

showit(Day,Class,Diff) :- program(Day,Class), difficulty(Class,Diff).
```