

Serie 10 - Logic Programming

Exercise 1

Answer the following questions about Logic Programming:

- When does Prolog backtrack and how does backtracking work?
- What is meant by "negation by failure"?
- In which cases does Prolog assume that the answer to a query is false?
- Is it possible to implement negation without both, cut and fail? What about leaving out one of them?

Exercise 2

We will build a genealogy that covers 3 generations of a family. Consider a genealogy database consisting of the following predicates (as in the lecture notes):

```
female(x), male(x), parent(x,y), sibling(x,y), mother(x,y), father(x,y),  
aunt(x,y), uncle(x,y), sister(x,y), brother(x,y)
```

Define rules allowing you to determine the following 12 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),  
niece(x,y), nephew(x,y), cousin(x,y)
```

Exercise 3

Define the following predicates to determine if a list:

- has an odd number of elements;
- is a permutation of another list;
- is formed by merging two lists;
- is a palindrome (i.e. it reads the same from left to right as it does from right to left).