Report

Logic Programming and Artificial Intelligence

Laboratory work #1

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Laboratory work #1

Prolog statements. Facts, Rules, Variables, Constants, Scopes, Predicate call. Prolog programs structure.

Goal:

The goal of the work is to train the abilities of working in the Prolog environment.

Task:

1. Elaborate a knowledge base, a Prolog program that consists of the facts of a family tree, using the following relationships: **parent, woman, man**.

Implementation:

```prolog
male(daniel).
male(victor).
male(oleg).
male(dumitru).
male(sergiu).
male(ion).
male(ilie).
male(mihail).
male(cornel).
male(andrei).

female(tamara).
female(larisa).
female(galina).
female(svetlana).
female(felicia).
female(mihaela).
female(rodica).
female(aurica).
female(mila).
female(corina).
female(olga).

parent(tamara, daniel).
parent(andrei, daniel).
parent(mila, dumitru).
parent(ion, dumitru).
parent(mila, sergiu).
parent(ion, sergiu).
parent(mila, cornel).
```

```prolog
parent(ion, cornel).
parent(svetlana, felicia).
parent(mihail, felicia).
parent(svetlana, mihaela).
parent(mihail, felicia).
parent(galina, rodica).
parent(ilie, rodica).
parent(galina, aurica).
parent(ilie, aurica).
parent(mila, corina).
parent(ion, corina).
parent(sergiu, tamara).
parent(olga, tamara).
parent(sergiu, ion).
parent(olga, ion).
parent(sergiu, ilie).
parent(olga, ilie).
parent(sergiu, mihail).
parent(olga, mihail).


father(X, Y) :-
    male(X),
    parent(X, Y).

mother(X, Y) :-
    female(X),
    parent(X, Y).

brother(X, Y) :-
    male(X),
    sibling(X, Y).

sister(X, Y) :-
    female(X),
    sibling(X, Y).

parents(L, X) :-
    bagof(A, parent(A, X), L).

sibling(X, Y) :-
    bagof(A, parent(A, X), L1),
    bagof(B, parent(B, Y), L2),
    L1 == L2,
    not(X = Y).

uncle_or_aunt(X, Y) :-
    bagof(A, parent(A, Y), L3),
    bagof(B, sibling(B, X), L4),
    intersection(L3, L4, C),
    length(C, Le),
```

```prolog
    Le > 0.

uncle(X, Y) :-
    male(X),
    uncle_or_aunt(X, Y).

aunt(X, Y) :-
    female(X),
    uncle_or_aunt(X, Y).

grandparent(X, Y, [H|T]) :-
    var(H) -> parents(T, Y),
    parent(X, H),
    grandparent(X, Y, T).
```

Conclusion:

During this laboratory work I've learned how to use Prolog statements in order to build programs with knowledge and fact bases and how to correctly query the programs.