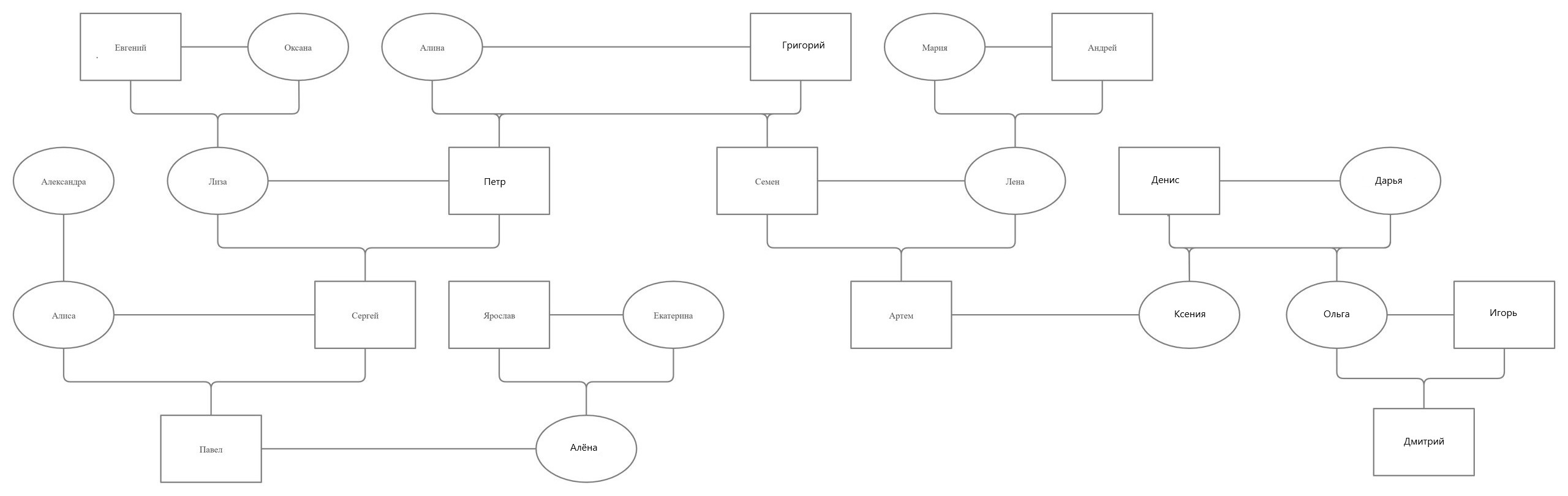
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| Федеральное государственное бюджетное  образовательное учреждение высшего образования «Новосибирский государственный технический университет» | | | |
|  | | | |
| Кафедра прикладной математики | | | |
|  | | | |
| Практическое задание № 1 | | | |
| по дисциплине «Введение в искусственный интеллект и логическое программирование» | | | |
| **Линейные списки** | | | |
|  | | | |
|  | Группа | ПМ-04 |
| Бригада | 4 |
|  | пуерова ксения |
|  | сальников дмитрий |
|  |  |
| Преподаватель | Целебровская Марина Юрьевна |
| Дата | 16.09.2022 |

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1. **Текст задания**

Разработка простейшей программы на языке ПРОЛОГ на примере разработки базы знаний предметной области «Родственные отношения».

1. **Генеалогическое дерево**

****

1. **Перевод генеалогического дерева в базу фактов**

male(symbol)

female(symbol)

father(symbol,symbol)

mother(symbol,symbol)

parent(symbol, symbol)

wife(symbol,symbol)

husband(symbol, symbol)

daughter(symbol,symbol)

son(symbol,symbol)

sister(symbol,symbol)

brother(symbol,symbol)

grandson(symbol, symbol)

granddoughter(symbol, symbol)

greatgrandson(symbol, symbol)

greatgranddoughter(symbol, symbol)

aunt(symbol, symbol)

nephewF(symbol, symbol)

nephewM(symbol, symbol)

uncle(symbol, symbol)

cousinM(symbol, symbol)

cousinF(symbol, symbol)

grandPa(symbol, symbol)

grandMa(symbol, symbol)

shurin(symbol, symbol)

dever(symbol, symbol)

zolovka(symbol, symbol)

svoyachniza(symbol, symbol)

techa(symbol, symbol)

test(symbol, symbol)

zyat(symbol, symbol)

nevestka(symbol, symbol)

male("evgen").

male("petr").

male("grigoriy").

male("semen").

male("sergey").

male("pavel").

male("andrey").

male("denis").

male("artem").

male("yaroslav").

male("igor").

male("dmitriy").

female("oksana").

female("lisa").

female("alina").

female("aleksandra").

female("alica").

female("alena").

female("elena").

female("ekaterina").

female("daria").

female("maria").

female("kseniia").

female("olga").

father("evgen","lisa").

father("grigoriy","semen").

father("andrey","elena").

father("grigoriy","petr").

father("petr","sergey").

father("semen","artem").

father("denis","kseniia").

father("denis","olga").

father("sergey","pavel").

father("yaroslav","alena").

father("igor", "dmitriy").

mother("oksana","lisa").

mother("alina","semen").

mother("alina","petr").

mother("lisa","sergey").

mother("aleksandra", "alica").

mother("maria","elena").

mother("elena","artem").

mother("alica","pavel").

mother("ekaterina","alena").

mother("daria","kseniia").

mother("daria","olga").

mother("olga", "dmitriy").

wife("alina", "grigoriy").

wife("oksana", "evgen").

wife("maria", "andrey").

wife("lisa", "petr").

wife("elena", "semen").

wife("daria", "denis").

wife("kseniia", "artem").

wife("alica", "sergey").

wife("ekaterina", "yaroslav").

wife("alena", "pavel").

wife("olga", "igor").

husband("evgen", "oksana").

husband("grigoriy", "alina").

husband("andrey", "maria").

husband("petr", "lisa").

husband("semen", "elena").

husband("denis", "daria").

husband("artem", "kseniia").

husband("sergey", "alica").

husband("yaroslav", "ekaterina").

husband("pavel", "alena").

husband("igor", "olga").

1. **Составление правил искомых родственных связей в базе знаний**

parent(Who, Z) :-

father(Who, Z) or mother(Who, Z).

daughter(Who, Parent) :-

female(Who) and parent(Parent, Who).

son(Who, Parent) :-

male(Who) and parent(Parent, Who).

sister(Who, Z) :-

daughter(Who, Parent) and parent(Parent, Z).

brother(Who, Z) :-

son(Who, Parent) and parent(Parent, Z).

grandson(Who, Ded) :-

son(Who, Parent) and parent(Ded, Parent).

granddoughter(Who, Ded) :-

daughter(Who, Parent) and parent(Ded, Parent).

greatgrandson(Who, GreatDed) :-

son(Who, Grandson) and grandson(Grandson, GreatDed) or son(Who, Granddoughter) and granddoughter(Granddoughter, GreatDed).

greatgranddoughter(Who, GreatDed) :-

daughter(Who, Grandson) and grandson(Grandson, GreatDed) or daughter(Who, Granddoughter) and granddoughter(Granddoughter, GreatDed).

aunt(Who, Nephew) :-

sister(Who, Parents) and parent(Parents, Nephew).

nephewF(Who, Z) :-

daughter(Who, Mother) and sister (Z, Mother) or daughter(Who, Mother) and brother (Z, Mother).

nephewM(Who, Z) :-

son(Who, Mother) and sister (Z, Mother) or son(Who, Mother) and brother (Z, Mother).

uncle(Who, Nephew) :-

brother(Who, Parents) and parent(Parents, Nephew).

cousinM(Who, Z) :-

son(Who, Aunts) and sister(Parents, Aunts) and parent(Parents, Z) or son(Who, Uncles) and brother(Parents, Uncles) and parent(Parents, Z).

cousinF(Who, Z) :-

daughter(Who, Aunts) and sister(Parents, Aunts) and parent(Parents, Z) or daughter(Who, Uncles) and brother(Parents, Uncles) and parent(Parents, Z).

grandPa(Who, Grandchild) :-

father(Who, Parents) and parent(Parents, Grandchild).

grandMa(Who, Grandchild) :-

mother(Who, Parents) and parent(Parents, Grandchild).

shurin(Who, Husband):-

brother(Who, Wife) and wife(Wife, Husband).

dever(Who, Wife) :-

brother(Who, Husband) and husband(Husband, Wife).

zolovka(Who, Wife):-

sister(Who, Husband) and husband(Husband, Wife).

svoyachniza(Who, Husband ):-

sister(Who, Wife) and wife(Wife, Husband).

techa(Who, Husband) :-

mother(Who, Wife) and wife(Wife, Husband).

test(Who, Husband) :-

father(Who, Wife) and wife(Wife, Husband).

zyat(Who, Parent) :-

husband(Who, Wife) and doughter(Wife, Parent).

nevestka(Who, Parent) :-

wife(Who, Husband) and son(Husband, Parent).

1. **Примеры запросов к базе знаний и ее ответов**

GOAL grandPa(Who, "pavel").

1. **Листинг разработанной базы знаний на языке ПРОЛОГ**

predicates

nondeterm male(symbol)

nondeterm female(symbol)

nondeterm father(symbol,symbol)

nondeterm mother(symbol,symbol)

nondeterm parent(symbol, symbol)

nondeterm wife(symbol,symbol)

nondeterm husband(symbol, symbol)

nondeterm daughter(symbol,symbol)

nondeterm son(symbol,symbol)

nondeterm sister(symbol,symbol)

nondeterm brother(symbol,symbol)

nondeterm grandson(symbol, symbol)

nondeterm granddoughter(symbol, symbol)

nondeterm greatgrandson(symbol, symbol)

nondeterm greatgranddoughter(symbol, symbol)

nondeterm aunt(symbol, symbol)

nondeterm nephewF(symbol, symbol)

nondeterm nephewM(symbol, symbol)

nondeterm uncle(symbol, symbol)

nondeterm cousinM(symbol, symbol)

nondeterm cousinF(symbol, symbol)

nondeterm grandPa(symbol, symbol)

nondeterm grandMa(symbol, symbol)

nondeterm shurin(symbol, symbol)

nondeterm dever(symbol, symbol)

nondeterm zolovka(symbol, symbol)

nondeterm svoyachniza(symbol, symbol)

nondeterm techa(symbol, symbol)

nondeterm test(symbol, symbol)

nondeterm zyat(symbol, symbol)

nondeterm nevestka(symbol, symbol)

clauses

male("evgen").

male("petr").

male("grigoriy").

male("semen").

male("sergey").

male("pavel").

male("andrey").

male("denis").

male("artem").

male("yaroslav").

male("igor").

male("dmitriy").

female("oksana").

female("lisa").

female("alina").

female("aleksandra").

female("alica").

female("alena").

female("elena").

female("ekaterina").

female("daria").

female("maria").

female("kseniia").

female("olga").

father("evgen","lisa").

father("grigoriy","semen").

father("andrey","elena").

father("grigoriy","petr").

father("petr","sergey").

father("semen","artem").

father("denis","kseniia").

father("denis","olga").

father("sergey","pavel").

father("yaroslav","alena").

father("igor", "dmitriy").

mother("oksana","lisa").

mother("alina","semen").

mother("alina","petr").

mother("lisa","sergey").

mother("aleksandra", "alica").

mother("maria","elena").

mother("elena","artem").

mother("alica","pavel").

mother("ekaterina","alena").

mother("daria","kseniia").

mother("daria","olga").

mother("olga", "dmitriy").

wife("alina", "grigoriy").

wife("oksana", "evgen").

wife("maria", "andrey").

wife("lisa", "petr").

wife("elena", "semen").

wife("daria", "denis").

wife("kseniia", "artem").

wife("alica", "sergey").

wife("ekaterina", "yaroslav").

wife("alena", "pavel").

wife("olga", "igor").

husband("evgen", "oksana").

husband("grigoriy", "alina").

husband("andrey", "maria").

husband("petr", "lisa").

husband("semen", "elena").

husband("denis", "daria").

husband("artem", "kseniia").

husband("sergey", "alica").

husband("yaroslav", "ekaterina").

husband("pavel", "alena").

husband("igor", "olga").

parent(Who, Z) :-

father(Who, Z) or mother(Who, Z).

daughter(Who, Parent) :-

female(Who) and parent(Parent, Who).

son(Who, Parent) :-

male(Who) and parent(Parent, Who).

sister(Who, Z) :-

daughter(Who, Parent) and parent(Parent, Z).

brother(Who, Z) :-

son(Who, Parent) and parent(Parent, Z).

grandson(Who, Ded) :-

son(Who, Parent) and parent(Ded, Parent).

granddoughter(Who, Ded) :-

daughter(Who, Parent) and parent(Ded, Parent).

greatgrandson(Who, GreatDed) :-

son(Who, Grandson) and grandson(Grandson, GreatDed) or son(Who, Granddoughter) and granddoughter(Granddoughter, GreatDed).

greatgranddoughter(Who, GreatDed) :-

daughter(Who, Grandson) and grandson(Grandson, GreatDed) or daughter(Who, Granddoughter) and granddoughter(Granddoughter, GreatDed).

aunt(Who, Nephew) :-

sister(Who, Parents) and parent(Parents, Nephew).

nephewF(Who, Z) :-

daughter(Who, Mother) and sister (Z, Mother) or daughter(Who, Mother) and brother (Z, Mother).

nephewM(Who, Z) :-

son(Who, Mother) and sister (Z, Mother) or son(Who, Mother) and brother (Z, Mother).

uncle(Who, Nephew) :-

brother(Who, Parents) and parent(Parents, Nephew).

cousinM(Who, Z) :-

son(Who, Aunts) and sister(Parents, Aunts) and parent(Parents, Z) or son(Who, Uncles) and brother(Parents, Uncles) and parent(Parents, Z).

cousinF(Who, Z) :-

daughter(Who, Aunts) and sister(Parents, Aunts) and parent(Parents, Z) or daughter(Who, Uncles) and brother(Parents, Uncles) and parent(Parents, Z).

grandPa(Who, Grandchild) :-

father(Who, Parents) and parent(Parents, Grandchild).

grandMa(Who, Grandchild) :-

mother(Who, Parents) and parent(Parents, Grandchild).

shurin(Who, Husband):-

brother(Who, Wife) and wife(Wife, Husband).

dever(Who, Wife) :-

brother(Who, Husband) and husband(Husband, Wife).

zolovka(Who, Wife):-

sister(Who, Husband) and husband(Husband, Wife).

svoyachniza(Who, Husband ):-

sister(Who, Wife) and wife(Wife, Husband).

techa(Who, Husband) :-

mother(Who, Wife) and wife(Wife, Husband).

test(Who, Husband) :-

father(Who, Wife) and wife(Wife, Husband).

zyat(Who, Parent) :-

husband(Who, Wife) and daughter(Wife, Parent).

nevestka(Who, Parent) :-

wife(Who, Husband) and son(Husband, Parent).

%bloodRelatives(Who,Relative)

GOAL techa(Who, "petr").