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«Национальный исследовательский университет ИТМО»

**Системы искусственного интеллекта**

Лабораторная работа 1

Знакомство с Prolog

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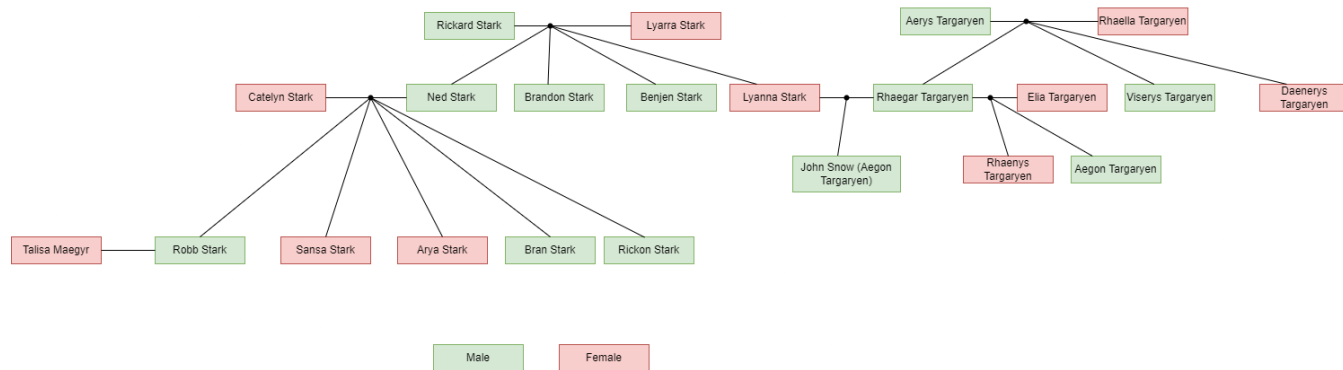
2022г.

## 1. Задание

Составить базу знаний на языке Пролог, которая будет содержать генеалогическое дерево семьи с указанием родственных отношений (например, папа, бабушка и т.д.), опираясь на два первичных факта: родитель и супруг.

База знаний должна состоять не менее чем из 50 фактов и не менее чем 10 правил.

## 2. Картинка с родословным деревом



[https://github.com/Maybenex1me/AI\\_System\\_ITMO/blob/main/Lab1/Tree.png](https://github.com/Maybenex1me/AI_System_ITMO/blob/main/Lab1/Tree.png)

Исходный код:

Факты:

```
1  male('Rickard Stark').
2  male('Ned Stark').
3  male('Brandon Stark').
4  male('Benjen Stark').
5  male('Robb Stark').
6  male('Bran Stark').
7  male('Rickon Stark').
8  male('John Snow').
9  male('Aerys Targaryen').
10 male('Rhaegar Targaryen').
11 male('Viserys Targaryen').
12 male('Aegon Targaryen').
13
14 female('Lyarra Stark').
15 female('Catelyn Stark').
16 female('Talisa Maegyr').
17 female('Sansa Stark').
18 female('Arya Stark').
19 female('Lyanna Stark').
20 female('Rhaella Targaryen').
21 female('Elia Targaryen').
22 female('Rhaenys Targaryen').
23 female('Daenerys Targaryen').
24
25 spouse('Rickard Stark','Lyarra Stark').
26 spouse('Ned Stark','Catelyn Stark').
27 spouse('Lyanna Stark','Rhaegar Targaryen').
28 spouse('Robb Stark','Talisa Maegyr').
29 spouse('Rhaegar Targaryen','Elia Targaryen').
30 spouse('Aerys Targaryen','Rhaella Targaryen').
31
32 parent('Rickard Stark','Ned Stark').
33 parent('Rickard Stark','Brandon Stark').
34 parent('Rickard Stark','Benjen Stark').
35 parent('Rickard Stark','Lyanna Stark').
36 parent('Lyarra Stark','Ned Stark').
37 parent('Lyarra Stark','Brandon Stark').
38 parent('Lyarra Stark','Benjen Stark').
39 parent('Lyarra Stark','Lyanna Stark').
40 parent('Ned Stark','Robb Stark').
41 parent('Ned Stark','Sansa Stark').
42 parent('Ned Stark','Arya Stark').
43 parent('Ned Stark','Bran Stark').
```

```

44 parent('Ned Stark','Rickon Stark').
45 parent('Catelyn Stark','Robb Stark').
46 parent('Catelyn Stark','Sansa Stark').
47 parent('Catelyn Stark','Arya Stark').
48 parent('Catelyn Stark','Bran Stark').
49 parent('Catelyn Stark','Rickon Stark').
50 parent('Lyanna Stark','John Snow').
51 parent('Rhaegar Targaryen','John Snow').
52 parent('Aerys Targaryen','Rhaegar Targaryen').
53 parent('Aerys Targaryen','Daenerys Targaryen').
54 parent('Aerys Targaryen','Viserys Targaryen').
55 parent('Rhaella Targaryen','Rhaegar Targaryen').
56 parent('Rhaella Targaryen','Daenerys Targaryen').
57 parent('Rhaella Targaryen','Viserys Targaryen').
58 parent('Rhaegar Targaryen','Rhaenys Targaryen').
59 parent('Elia Targaryen','Aegon Targaryen').
60 parent('Rhaegar Targaryen','Aegon Targaryen').
61 parent('Elia Targaryen','Rhaenys Targaryen').

```

## Правила:

```

63 wife(X,Y):-female(X), (spouse(X,Y); spouse(Y,X)).
64 husband(X,Y):-male(X), (spouse(X,Y); spouse(Y,X)).
65 mother(X,Y):-female(X), parent(X,Y).
66 father(X,Y):-male(X), parent(X,Y).
67 sister(X,Y):-female(X), parent(Z,X), parent(Z,Y), X\=Y.
68 brother(X,Y):-male(X), parent(Z,X), parent(Z,Y), X\=Y.
69 uncle(X,Y):-brother(X,Z), parent(Z,Y), X\=Z.
70 aunt(X,Y):-sister(X,Z), parent(Z,Y), X\=Z.
71 nephew(X,Y):-male(X),(uncle(Y,X);aunt(Y,X)).
72 niece(X,Y):-female(X),(uncle(Y,X);aunt(Y,X)).
73 haschild(X):-parent(X, _).

```

[https://github.com/Maybenex1me/AI\\_System\\_ITMO/blob/main/Lab1/AI1.pl](https://github.com/Maybenex1me/AI_System_ITMO/blob/main/Lab1/AI1.pl)

### 3. Пример:

- wife(X,Y):

The image shows a Prolog query interface with the following sequence of events:

- A query `wife('Ned Stark','Catelyn Stark').` is entered. The result is `false`.
- A query `?- wife('Ned Stark','Catelyn Stark').` is entered. The result is `true`.
- A query `?- wife('Catelyn Stark','Ned Stark').` is entered. The result is `false`.
- A query `?- wife('Catelyn Stark','Rhaella Targaryen').` is entered. The result is `false`.

- aunt(X,Y):

The image shows a Prolog query interface with the following sequence of events:

- A query `aunt('Daenerys Targaryen','John Snow').` is entered. The result is `true`. Below the result are buttons: `Next`, `10`, `100`, `1,000`, and `Stop`.
- A query `?- aunt('Daenerys Targaryen','John Snow').` is entered. The result is `false`.
- A query `?- aunt('Daenerys Targaryen','Aerys Targaryen').` is entered. The result is `false`.
- A query `?- aunt('Daenerys Targaryen',X).` is entered. The results are:
  - `X = 'John Snow'`
  - `X = 'Rhaenys Targaryen'`
  - `X = 'Aegon Targaryen'`Below the results are buttons: `Next`, `10`, `100`, `1,000`, and `Stop`.
- A query `?- aunt('Daenerys Targaryen',X).` is entered.
- A query `- haschild(X):` is entered.
- A query `haschild('Ned Stark').` is entered. The result is `true`. Below the result are buttons: `Next`, `10`, `100`, `1,000`, and `Stop`.
- A query `?- haschild('Ned Stark').` is entered.

```
haschild('Rob Stark').  
  
false  
  
?- haschild('Rob Stark').|
```

-husband(X,Y):

```
husband('Rhaegar Targaryen',X).  
  
X = 'Elia Targaryen'  
X = 'Lyanna Stark'  
  
?- husband('Rhaegar Targaryen',X).
```

-uncle(X,Y):

```
uncle('Benjen Stark',X).  
  
X = 'Robb Stark'  
X = 'Sansa Stark'  
X = 'Arya Stark'  
X = 'Bran Stark'  
X = 'Rickon Stark'  
X = 'John Snow'  
  
Next 10 100 1,000 Stop  
  
?- uncle('Benjen Stark',X).
```

#### 4. Вывод:

Я знаком с языком логического программирования (Пролог), а также знаю, как создать простую базу данных с помощью Пролога.