

Programming in Logic ProLog

- Prolog was first created in France at 1973
- Prolog has 3 Pillars:

Facts - Rules - Query

Class: you can create unlimited objects.

Each object has specific properties and functions.

Facts:

i- Property of an object is a fact.

Such as:

toyota is a car

In prolog we write that fact as:

car(toyota.(

And so on...

car(ford.(

Similar to the above example:

If you say:

ahmed is a man.

In prolog:

man(ahmed.(

If you say:

mona is a woman.

In prolog:

woman(mona.(

ii- Relation between two object is a fact.

If you say:

ahmed and mahmoud are brothers.

In prolog:

brothers(ahmed, mahmoud.(

If you say:

ahmad is a husband of mona.

In prolog:

husband(ahmed, mona.(

If you say:

ahmed and mona are married.

In Prolog:

married(ahmed, mona.(

married(mona, ahmed(

Rules:

If one or more facts are true and can implement another fact, we say that we have a rule for that new fact.

Example 1:

Assume we have a family tree like the following one:

Grand Parents: awad fatema otaby nora

Parents: abdallah khadega

Kids: ahmed hamed mona hoda

Facts:

male(awad.(

male(otaby.(

male(abdallah.(

male(ahmed.(

male(hamed.(

female(fatema.(

female(nora.(

female(khadega.(

female(mona.(

female(hoda.(

father(awad,abdallah.(

father(otaby,khadega.(

father(abdallah,ahmed.(

father(abdallah,hamed.(

father(abdallah,mona.(

father(abdallah,hoda.(

mother(fatema,abdallah.(

mother(nora,khadega.(

mother(khadega,ahmed.(

mother(khadega,hamed.(

mother(khadega,mona.(

mother(khadega,hoda.(

Rules:

brothers(W,V):-

male(W),male(V),father(Z,W),father(Z,V),mother(M,W),mother(M,V).

grandfather(X,Y):-

male(X), father(X,Z), father(Z,Y), male(Y).(

grandfather(X,Y:-

male(X), father(X,Z), father(Z,Y), female(Y).(

grandfather(X,Y:-

male(X), father(X,Z), mother(Z,Y), male(Y).(

grandfather(X,Y:-

male(X), father(X,Z), mother(Z,Y), female(Y).(

Query:

Is the output or the result of asking the prolog interpreter:

? brothers(W,V).(

W=ahmed;

V=hamid;

W=hamid;

V=ahmed.

True.

Example 2:

Facts:

male(ahmed).(

male(hamed).(

female(mona).(

female(hoda).(

loves(ahmed,mona).(

loves(hamed,mona).(

Rules:

jealous(X,Y):-male(X),male(Y),loves(X,Z),loves(Y,Z),female(Z).(

jealous(X,Y):-female(X),female(Y),loves(X,Z),loves(Y,Z),male(Z).(

Query:

? jealous(X,Y).(

X=hamed؛

Y=ahmed؛

X=ahmed؛

Y=hamed.

True

Example 3:

Rules:

max(X,Y,Z):-X>=Y,Z=X.

max(X,Y,Z):-Y>=X,Z=Y.

Query:

? max(3,4,Z) .(

Z = 4.

True.

? max(4,3,Z).(

Z=4.

True.