

Prolog Programming Assignment

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Roll No. : 26

Batch : T-2

Subject : AI

1) How does the queries in Kb.pl files are executed?

→ Code : % Knowledge bases

loves ( Vincent , Mia )

loves ( Marcellus , Mia )

loves ( pumpkin , honey-bunny )

loves ( honey-bunny , pumpkin )

jealous ( X, Y ) :-

    loves ( X, Z ),

    loves ( Y, Z ).

Query : loves ( X, mia )

O/P : X = vincent

X = marcellus

Explanation : Here as we know Vincent loves  
Mia as well as Marcellus loves Mia.  
Thus the kb assumes that X is  
either Vincent or Marcellus.

B] Query 2 : ? - jealous (X,Y)

Output 2 : X = Y , Y = vincent

X = Vincent

Y = Marcellus

X = Marcellus

Y = Vincent

X = Y , Y = Marcellus.

X = Y , Y = pumpkin.

X = Y , Y = honey-bunny.

Explanation : As there is no fixed parameters in our query. The query will produce output of every jealous (X,Y) pair on our prolog code. The jealous( ) rule follows :

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

Initially, X & Y both were associated to vincent i.e. Self association. It then follows Reflexive property for the rest of the prolog code.

2] How does the queries in lists.pl are executed ?

→ Code : Suffix (X<sub>S</sub>, Y<sub>S</sub>) :-  
append (-Y<sub>S</sub>, X<sub>S</sub>)

Prefix (X<sub>S</sub>, Y<sub>S</sub>) :-  
append (Y<sub>S</sub>, -, X<sub>S</sub>)

Sublist (X<sub>S</sub>, X<sub>S</sub>) :-

Suffix (X<sub>S</sub>, Z<sub>S</sub>),

Prefix (Z<sub>S</sub>, Y<sub>S</sub>).

hrev ([ ], [ ])  
hrev ([H | T<sub>0</sub>], L) :-  
hrev (T<sub>0</sub>, T),  
append (T, [H], L)

Query 1 : ? - Sublist ([a,b,c,d,e], [c,d])

Output : True

Explanation : A sublist procedure looks for a match between the first elements of the sublist & the main list . Here [c,d] is the sublist of the main list [a,b,c,d,e] . As the main list contains the sublist [c,d] the output is true. Else the output would have been false.

Query 2 :- ?- suffix([a,b,c], Zs)

Output : Zs = [a,b,c]

Zs = [b,c]

Zs = [c]

Zs = []

Explanation : Suffix in general eliminates the front elements from a list. Here by using Suffix procedure, [a,b,c] elements are removed from a & continues until all the elements are removed. As there are no more elements in the list, the output will be displayed as 'false'

Q.3

Create a Prolog code to find factorial of a number

→

Factorial (0, 1)

Factorial (N, F) :-

N ≥ 0

N1 is N - 1

Factorial (N1, F1),

F is N \* F1

Query : ?- Factorial (3, W)

Output : W = 6

Q.4

In example dataset movies.pl write query strings & results of query execution for any 5 tasks



a) In which year was the movie American Beauty released

→ Query : ? - movie(american\_beauty, Y)

Output : Y = 1999

b) Find the movies released in year 2000

Query : ? - movie(M, 200)

Output : M = down\_from\_the\_mountain

M = o\_brother\_where\_art\_thou

M = ghost\_world

c) Find movie released before 2000

Query : ? - movie(M, Y), Y < 2000

Output : M = american\_beauty

Y = 1999

M = 1987

M = barton\_fint

Y = 1991 ....

d) Find the movie released after 1990

Query : ? - movie(M, Y), Y > 1990

Output : M = american\_beauty

Y = 1999

M = barton\_fint

Y = 1991

f) Find a director of a movie in which Scarlett Johansson appeared

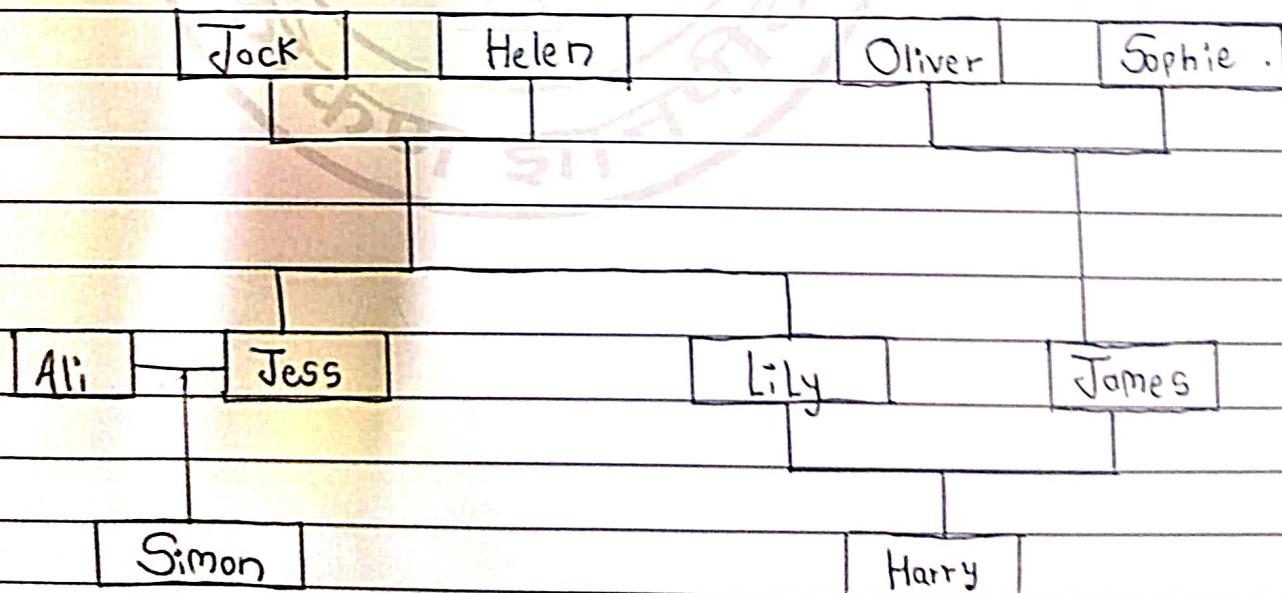
Query : ? - actress (m, scarlett\_johansson, -),  
director (m, o)

Output : O = peter\_webber

m = girl-with-a-pearl-earring

Q.5

Draw a family tree of your any arbitrary family.  
Which has following relations. mother, father, daughter,  
son, grandson, grandmothers, sibling, uncle, person,  
male, female. You need to convert it into KB and  
Write atleast 6 queries & Query results on your KB  
Diagram



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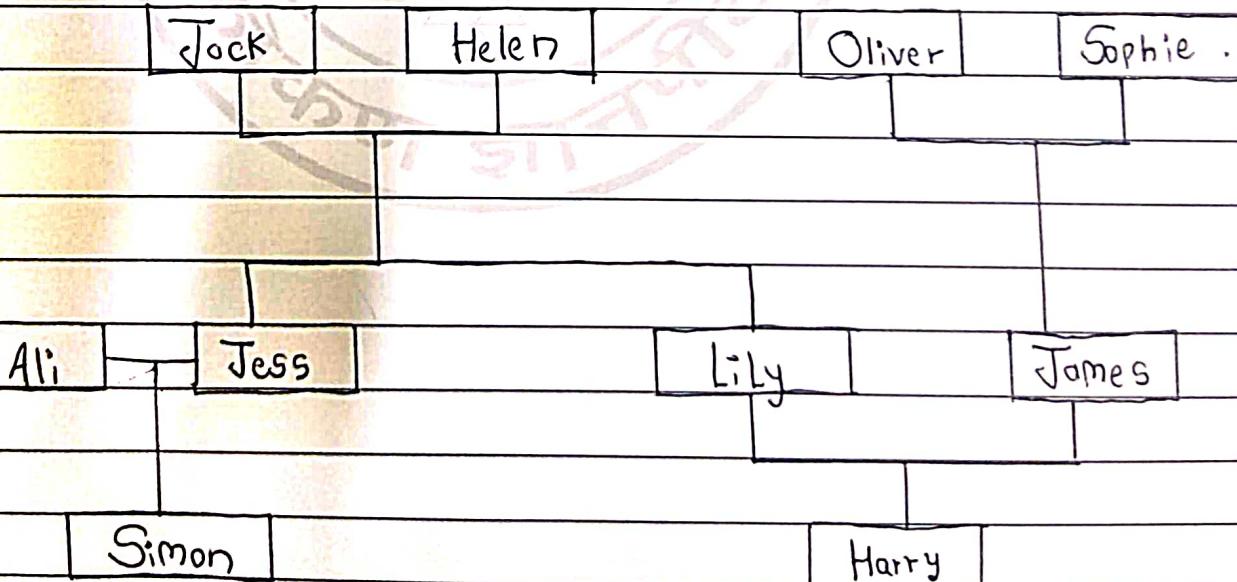
Query : ? - actress (m, scarlett - Johanson , -),  
director (m, o)

Output : O = peter - webber

m = girl - with - a - pearl - earring

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Diagram



Query 1 : ? - mother\_of (X, jess)  
 Output : X = helen

Query 2 : ? parent\_of (X, simon)  
 Output : X = jess

Query 3 : ? - sister\_of (X, lily)  
 Output : X = jess

Query 4 : ? - parent\_of (X, harry)  
 Output : X = lily  
           X = james

Query 5 : ? - aunt\_of (X, simon)  
 Output : X = lily

Query 6 : ? grandfather\_of (X, harry)  
 Output : X = jack