Prolog Programming Assignment

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1] How does the queries in kb.pl file are executed?

→ Code:

```
loves(vincent, mia).
loves(marcellus, mia).
loves(pumpkin, honey-bunny).
loves(honey-bunny, pumpkin).

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

Query 1: ?- loves(X, mia).

output: X = vincent
X = marcellus

Here as we know vincent loves mia as well as marcellus loves mia. Thus the kb assumes that X is either vincent or marcellus.

Query 2: ?- jealous(X,Y)

X = Y, X = vincent
X = vincent
Y = marcellus
X = marcellus
X = Y, Y = marcellus
X = Y, Y = pumpkin

x = y, y = Honey-bunny.

As there is no fixed parameter 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 file are executed?

→ Code:

```
suffix (xs, ys) :-
append (_, ys, xs).

prefix ( xs, ys) :-
append (ys, _, xs).

sublist (xs, ys) :-
suffix (xs, zs),
prefix (zs, ys).

mrev ([], []).
mrev ([H|T], L) :-
```

rev(T0, T),
append(T, [H], L).

Query 1: ?- sublist([a,b,c,d,e],[c,d]).
Output: True

A sublist procedure looks for a match between the first elements of the sublist & the main-list. Here, [c,d] is the sub-list 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 = []
false

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'.

3] Programming Create a prolog code to find factorial of a number?

→ Code: factorial (0,1).
factorial (N,F):-
N>0,
N1 is N-1,
factorial (N1, F1),
N is N * F1.

Query: ?- factorial (3,W).
Output: W= 6

4] In examples data set movies.pl write query strings & results of query execution for any of 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, 2000).
Output: M= down_from_the_mountain
M= O_brother_where_art_thou

M= ghost_world

a] Find movies released before 2000.

Query: ?- movie (M, y), y < 2000
Output: M= american_beauty
y = 1999

M = anna
y = 1987

M = barton_fink
y = 1991

d] Find the movies released after 1990

Query: ?- movie (M, y), y > 1990
Output: M= american_beauty
y = 1999

M = barton_finks
y = 1991

e] Find a director of a movie in which Scarlett Johansson appeared.

Query: ?- address (M ; Scarlett_Johansson)-),
director (M, O)
Output: O = Peter_webber
M = girl_with_a_pearl_earring

5] Draw a family tree of you/any arbitrary family. Which has the following relations mother, father, daughter, son, grandson, grandmother, sibling, uncle, person, male, female. You need to convert it into KB & write atleast 6 queries & Query results on your KB.

→ Diagram:

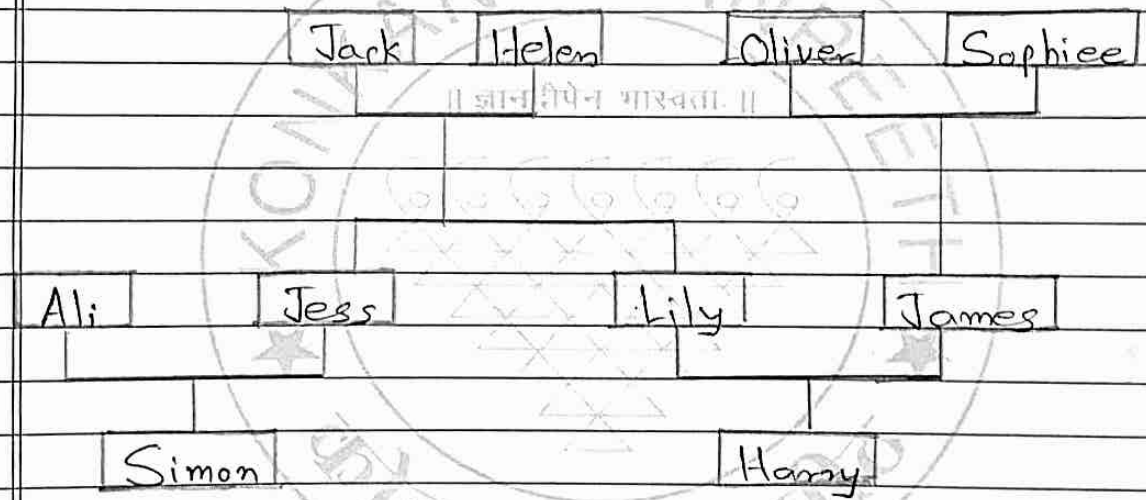

fig: family Tree

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: ?- grand-father_of (x, harry)
Output: x= jack