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Prolog Programming Assignment

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Prolog Programming Assignment

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

→ ① The knowledge base is a database that contains everything known to be true to the running prolog program. Facts and rules are added to knowledge base with an assert predicate.

② In the kb.pl file, in swish.swi prolog we execute query using right bottom terminal. and in left terminal we write kb program.

③ When we write the queries, the data present is kb is mapped and according to that we get the output.

④ In kb.pl file, there is certain relationship between the predicate and based on that we get output.

e.g. ?- loves (X, mia)

o/p - X = vincent
X = marcellus

⑤ The kb.pl file also contain reflexive relation between some predicates and gives output according to that.

e.g. ?- jealous (X, Y)
X = Y, Y = vincent
X = vincent
Y = marcellus
X = marcellus
Y = vincent
X = Y, Y = marcellus

2). How does queries in list.pl file are executed?

→ ① The list.pl file contains some operations that are performed on the list such as suffix, prefix, sublist and it also demonstrates the timing.

② The query sublist([a,b,c,d,e],[c,d]) is executed and output is true. because sublist contains two lists and first list contains all the elements present in second list ie. nothing but the second list is sublist of first list

③ The query sublist([a,b,c,d,e],Ys) is executed and based on list.pl file it gives output as Ys.

④ Similarly query sublist(Xs,Ys) gives output as Ys = [] ie. empty list.

⑤ The query numlist(1,1000,-1), time(nrev([1000,...,1])). gives output as 67 inference, 0.000 CPU in 0.080 seconds (78% CPU, 4273772 Lips) ie. the memory interference in CPU as well as the time required for the execution of the query.

3) Programming create a prolog code to find Factorial of a number ?

→ Prolog code to find factorial of a number

```
fact(0,1):
fact(N,F):-
(
%. The below is for +ve factorial.
N>0 →
(
N1 is N-1,
fact(N1,F1),
F is N*F1
);
%. The below is for -ve factorial.
N<0 ->
(
N1 is N+1,
fact(N1,F1),
F is N*F1
)
).
```

o/p query :-

```
?- fact(6,R).
```

o/p :- R = 720

4.) In examples data set movies.pl write query strings and query execution of any of 5 Tasks:

- Answer the following questions

a. In which year was movie American Beauty released?

→ ?- movie (american_beauty, Y).

b. Find the movies released in year 2000.

→ ?- movie (M, 2000).

c. Find the movies released before 2000.

→ ?- movie (M, Y), Y =< 2000.

d. Find the movie released after 1999.

→ ?- movie (M, Y), Y > 1999.

e. Find an actor who has appeared in more than one movie.

→ ?- actor (M1, A, _), actor (M2, A, _), M1 @> M2.

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

→ ?- actress (M, Scarlett_johansson, _), director (M, D).

g. Find an actor who has also directed a movie.

→ ?- actor (_, A, _), director (_, A).

h. Find an actor or actress who has also directed a movie.

→ ?- (actor (_, A, _); actress (_, A, _)), director (_, A).

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4. Find the movie in which John Goodman and Jeff Bridges were co-stars.

→ ? - actor(M, john_goodman, _), actor(M, jeff_bridges, _).

5) Draw a family tree of you/any arbitrary family, which has 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 result on your KB.

→ /* Facts */

```
male (jack).
male (oliver).
male (ali).
male (james).
male (simon).
male (harry).
female ( helen).
female ( sophie).
female ( jess).
female (lily).

parent_of (jack, jess).
parent_of (jack, lily).
parent_of (helen, jess).
parent_of (helen, lily).
parent_of (oliver, james).
```

```
parent_of(sophie, james).
parent_of(jess, simon).
parent_of(ali, simon).
parent_of(lily, harry).
parent_of(james, harry).

/* Rules */
Father_of(X,Y) :- male(X),
    parent_of(X,Y).

mother_of(X,Y) :- female(X),
    parent_of(X,Y).

grandfather_of(X,Y) :- male(X),
    parent_of(X,Z),
    parent_of(Z,Y).

grandmother_of(X,Y) :- female(X),
    parent_of(X,Z),
    parent_of(Z,Y).

Sister_of(X,Y) :- %.(X,Y or Y,X) %.
    female(X),
    father_of(F,Y), father_of(F,X), X\=Y.

Sister_of(X,Y) :- female(X),
    mother_of(M,Y), mother_of(M,X), X\=Y.
```

aunt_of (X,Y) :- female (X),
parent_of (Z, Y), sister_of (Z, X), !.

brother_of (X,Y) :- %. (X,Y or Y, X) %.
male (X),
Father_of (F, Y), Father_of (F, X), X \= Y.

brother_of (X,Y) :- male (X),
mother_of (M, Y), mother_of (M, X), X \= Y.

Uncle_of (X,Y) :-
parent_of (Z, Y), brother_of (Z, X).

ancestor_of (X,Y) :- parent_of (X,Y).
ancestor_of (X,Y) :- parent_of (X,Z),
ancestor_of (Z,Y).

Queries :-

① ? - mother_of (jess, helen).

o/p - false

② ? - brother_of (james, simon).

o/p - false

③ ? - ancestor_of (jack, simon)

o/p - true

④ ?- mother_of (X, jess).

o/p - helen

⑤ ?- parent_of (X, simon).

o/p - X = jess

⑥ ?- sister_of (X, lily).

o/p - X = jess

⑦ ?- ancestor_of (X, lily)

o/p - X = jack

family Tree diagram :-