Exp-8

27.04.2021

Implementation of Knowledge Representation Schemas

Aim: To implement knowledge representation schemas using python.

Methodology:

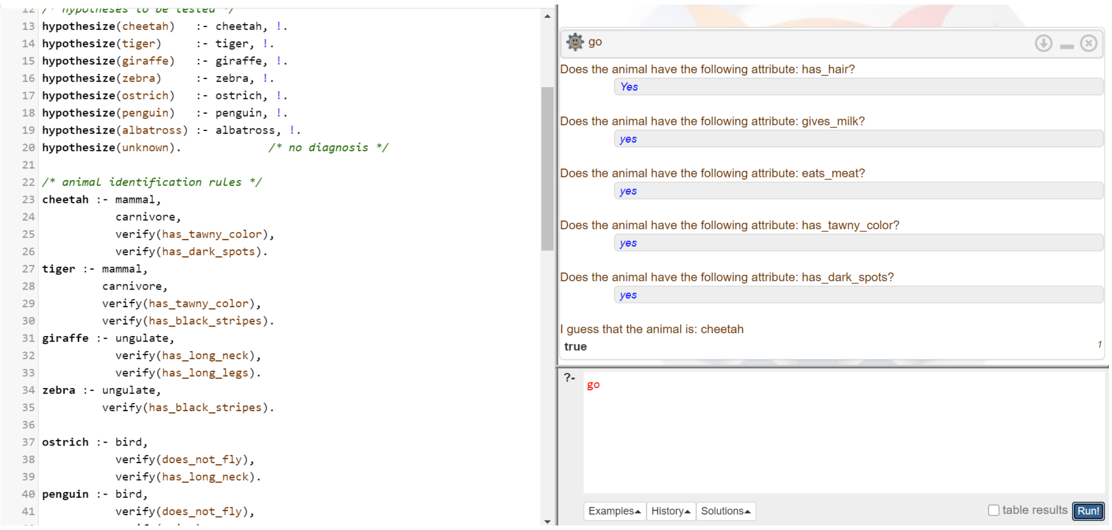
1. install SWI prolog.
2. open File->Consult-><select animal.pl file>
3. clauses will be loaded.
4. then in the prompt, give "?-go." and execute the program

Code:

```
go :- hypothesize(Animal),

    write('I guess that the animal is: '),
    write(Animal),
    nl,
    undo.

/* hypotheses to be tested */
hypothesize(cheetah)   :- cheetah, !.
hypothesize(tiger)     :- tiger, !.
hypothesize(giraffe)   :- giraffe, !.
hypothesize(zebra)     :- zebra, !.
hypothesize(ostrich)   :- ostrich, !.
hypothesize(penguin)   :- penguin, !.
hypothesize(albatross) :- albatross, !.
hypothesize(unknown).             /* no diagnosis */

/* animal identification rules */
cheetah :- mammal,
           carnivore,
           verify(has_tawny_color),
           verify(has_dark_spots).
tiger :- mammal,
         carnivore,
         verify(has_tawny_color),
         verify(has_black_stripes).
giraffe :- ungulate,
           verify(has_long_neck),
          verify(has_long_legs).
zebra :- ungulate,
        verify(has_black_stripes).

ostrich :- bird,
          verify(does_not_fly),
          verify(has_long_neck).
penguin :- bird,
          verify(does_not_fly),
          verify(swims),
          verify(is_black_and_white).
albatross :- bird,
           verify(appears_in_story_Ancient_Mariner),
           verify(flys_well).

/* classification rules */
mammal    :- verify(has_hair), !.
mammal    :- verify(gives_milk).
bird      :- verify(has_feathers), !.
bird      :- verify(flys),
           verify(lays_eggs).
carnivore :- verify(eats_meat), !.
carnivore :- verify(has_pointed_teeth),
           verify(has_claws),
           verify(has_forward_eyes).
ungulate :- mammal,
          verify(has_hooves), !.
ungulate :- mammal,
          verify(chews_cud).

/* how to ask questions */
ask(Question) :-
   write('Does the animal have the following attribute: '),
   write(Question),
   write('? '),
   read(Response),
   nl,
   ( (Response == yes ; Response == y)
     ->
      assert(yes(Question)) ;
      assert(no(Question)), fail).

:- dynamic yes/1,no/1.
```

```
/* How to verify something */
verify(S) :-
   (yes(S)
    ->
    true ;
    (no(S)
     ->
     fail ;
     ask(S))).

/* undo all yes/no assertions */
undo :- retract(yes(_)),fail.
undo :- retract(no(_)),fail.
undo.
```

Output:



```
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hypothesize(ostrich)   :- ostrich, !.
hypothesize(penguin)   :- penguin, !.
hypothesize(albatross) :- albatross, !.
hypothesize(unknown).             /* no diagnosis */

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ostrich :- bird,
           verify(does_not_fly),
           verify(has_long_neck).
penguin :- bird,
           verify(does_not_fly),
```
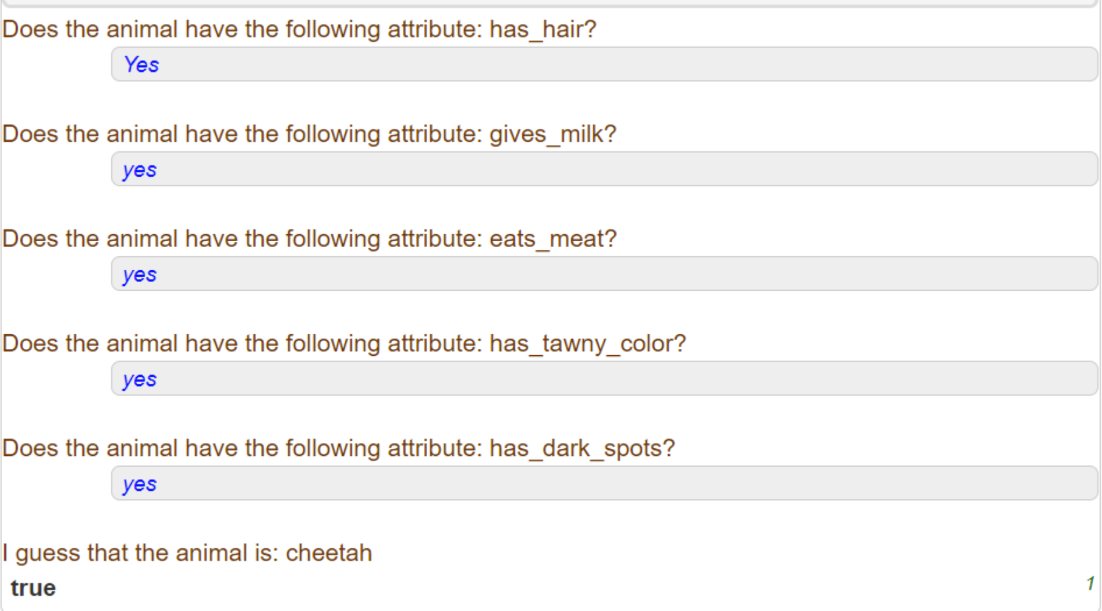

```
go
Does the animal have the following attribute: has_hair?
        Yes

Does the animal have the following attribute: gives_milk?
        yes

Does the animal have the following attribute: eats_meat?
        yes

Does the animal have the following attribute: has_tawny_color?
        yes

Does the animal have the following attribute: has_dark_spots?
        yes

I guess that the animal is: cheetah
true
?- go
```



```
Does the animal have the following attribute: has_hair?
            Yes

Does the animal have the following attribute: gives_milk?
            yes

Does the animal have the following attribute: eats_meat?
            yes

Does the animal have the following attribute: has_tawny_color?
            yes

Does the animal have the following attribute: has_dark_spots?
            yes

I guess that the animal is: cheetah
 true                                                                        1
```

Result: We have successfully implemented Knowledge Representation schemas.