



Fundamentals of AI

CCAI-221



Animal identification System

to choose the appropriate animal



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Problem description:

People face a problem in determining the appropriate animal for ownership. Our system facilitates the decision-making process, as it asks the user several questions and determines from his answers the appropriate animal for him according to the purpose and animal specifications.



Solution description:

Our goal is to write an expert system that helps us identify animals. It has some facts and rules for determining the appropriate animal. The system asks the user several questions to determine the appropriate animal for him, such as (the age of the user, the purpose, the size of the animal, etc..) and then it will recommend to the user what animal is appropriate for him.



Theoretical background:

We searched in several sources to write facts and rules and to know the characteristics of animals and their classification and purpose as well. We also searched for their prices and classified their cost into (high, medium, low). These are the sources:

<https://sciencetrek.org/sciencetrek/topics/predators/facts.cfm>

<https://animals.howstuffworks.com/animal-facts/10-predators.htm>

<https://www.javatpoint.com/list-of-pet-animals>

https://www.cse.iitd.ac.in/~saroj/LFP/LFP_2013/L16.pdf



AI approach:

Specific AI approach used to solve the problem:

Thinking rationally: Logical rules and inference mechanisms that are provably correct and guarantee an optimal solution.

Acting rationally: our system focuses on acting sufficiently and achieving the best outcome.

An example: would be a person's wish: suppose the user enters the input and his persona's wish is an "A pet, adoption" Based on this system, he will recommend different animals knowing that they will fit his desire exactly.



Factor Table

GENRE	ANIMAL	AIM	FOR AGE	SIZE	CHARACTERISTICS	COST
Predator	Dog	Protection	Adult	Small/ large	Fur	Low/ medium/ high
Predator	Lion	Hunt	Adult	Large	Fur	Low/ medium/ high
Predator	Wolf	Hunt	Adult	Small	Fur	Low/ medium/ high
Predator	Hawk	Hunt	Adult	Small	Feathers	Low/ medium/ high
Predator	Fox	Hunt	Adult	Small	Fur	Low/ medium/ high
Predator	Bear	Hunt	Adult	Large	Fur	Low/ medium/ high
Pet	Dog	Adoption	Adult / teenager	Small/ large	Fur	Low/ medium/ high
Pet	Rabbit	Adoption	Adult / teenager	Small/ large	Fur	Low/ medium/ high
Pet	Turtle	Adoption	Adult / teenager	Small	Leather	Low/ medium/ high
Pet	Cat	Breeding	Adult / teenager	Small/ large	Fur	Low/ medium/ high
Pet	Bird	Adoption	Adult / teenager	Small	Feathers	Low/ medium/ high
Pet	Fish	Adoption	Adult / teenager	Small	Leather	Low/ medium/ high



Here is the full code:

```
suggest(S) :- write('Are you an adult or a teenager?: '),read(P),  
           write('What genre of animal do you prefer?: '),read(G),  
           write('What is the purpose?:'),read(A),  
           write('Do you prefer an animal with fur or feathers or  
leather?:'),read(F),  
           write('What is the size of animal do you prefer?:'),read(Z),  
           write('What is the right cost for you? (low, medium, high):'),read(E),  
           animal(S,G,A,P,F,Z,E).
```

%Predator animals

```
animal(dog,G,A,P,fur,Z,E):- G = predator ,A = protection ,P=  
adult,(Z=(small);Z=(large)),(E=(low);E=(medium);E=(high)),!.
```

```
animal(lion,G,A,P,fur,Z,E):- G = predator ,A = hunt ,P= adult ,Z =  
large,(E=(low);E=(medium);E=(high)),!.
```

```
animal(wolf,G,A,P,fur,Z,E):- G= predator ,A = hunt ,P= adult ,Z =  
small,(E=(low);E=(medium);E=(high)),!.
```

```
animal(hawk,G,A,P,feathers,Z,E):- G= predator ,A = hunt ,P= adult ,Z =  
small,(E=(low);E=(medium);E=(high)),!.
```

```
animal(fox,G,A,P,fur,Z,E):- G= predator ,A = hunt ,P= adult ,Z =  
small,(E=(low);E=(medium);E=(high)),!.
```

```
animal(bear,G,A,P,fur,Z,E):- G= predator ,A = hunt ,P= adult ,Z =  
large,(E=(low);E=(medium);E=(high)),!.
```

%Pet animals

```
animal(dog,G,A,P,fur,Z,E):- G = pet ,A = adoption ,(P= (adult) ;  
P=(teenager)),(Z=(small);Z=(large)),(E=(low);E=(medium);E=(high)),!.
```

```
animal(rabbit,G,A,P,fur,Z,E):- G = pet ,A = adoption ,(P= (adult) ;  
P=(teenager)),(Z=(small);Z=(large)),(E=(low);E=(medium);E=(high)),!.
```

```
animal(turtle,G,A,P,leather,Z,E):- G = pet ,A = adoption ,(P= (adult) ;  
P=(teenager)),Z = small,(E=(low);E=(medium);E=(high)),!.
```

```
animal(cat,G,A,P,fur,Z,E):- G= pet, A = breeding ,(P= (adult) ;  
P=(teenager)),(Z=(small);Z=(large)),(E=(low);E=(medium);E=(high)),!.
```

```
animal(bird,G,A,P,feathers,Z,E):- G= pet, A = adoption ,(P= (adult) ;  
P=(teenager)),Z = small,(E=(low);E=(medium);E=(high)),!.
```

```
animal(fish,G,A,P,leather,Z,E):- G= pet, A = adoption ,(P= (adult) ;  
P=(teenager)),Z = small,(E=(low);E=(medium);E=(high)),!.
```

Code description:

The system asks the users several questions from the "suggest" rule. "Write" function is to display the question to the user and take the answer with the "read" function. Then, call the "animal" with all user answers. The system will search in the facts to decide and recommend the appropriate animal for the user.



The queries:

Query 1:

The screenshot shows the SWISH interface with the 'Program' tab selected. The code for the 'suggest(S)' query is displayed in the main window. The query asks for an animal that is an adult or a teenager, prefers protection, has fur, and is small. The system suggests a dog.

```
1 suggest(S) :- write('Are you an adult or a teenager?: '),read(P),
2   write('What genre of animal do you prefer?: '),read(G),
3   write('What is the purpose?:'),read(A),
4   write('Do you prefer an animal with fur or feathers or skin?:'),read(F),
5   write('What is the size of animal do you prefer?:'),read(Z),
6   write('What is the right cost for you? (low, medium, high):'),read(E),
7   animal(S,G,A,P,F,Z,E).
8
9 %predator animals
10 animal(dog,G,A,P,fur,Z,E):- G = predator, A = protection ,P= adult,(Z=(small);Z=(large)),(E=(low);
11 animal(lion,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = large,(E=(low);E=(medium);E=(large)
12 animal(wolf,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(large)
13 animal(hawk,G,A,P,feathers,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(large)
14 animal(fox,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(large)
15 animal(bear,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(large)
16 %pet animals
17 animal(dog,G,A,P,fur,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large)
18 animal(rabbit,G,A,P,fur,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large)
19 animal(turtle,G,A,P,leather,Z,E):- G = pet ,A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low);
20 animal(cat,G,A,P,fur,Z,E):- G = pet ,A = breeding ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large)
21 animal(bird,G,A,P,feathers,Z,E):- G = pet ,A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low);
22 animal(fish,G,A,P,leather,Z,E):- G = pet ,A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low)
```

The 'suggest(S)' dialog box shows the user input and the system's response:

- Are you an adult or a teenager?: adult
- What genre of animal do you prefer?: predator
- What is the purpose?: protection
- Do you prefer an animal with fur or feathers or skin?: fur
- What is the size of animal do you prefer?: small
- What is the right cost for you? (low, medium, high): low
- S = dog

An adult wants wanting predator animal for protection with fur and size small, the cost is low, the system suggest dog.

Query 2:

The screenshot shows the SWISH interface with the 'Program' tab selected. The code for the 'suggest(S)' query is displayed in the main window. The query asks for a predator animal that is a hunt, has fur, and is large. The system suggests a lion.

```
1 suggest(S) :- write('Are you an adult or a teenager?: '),read(P),
2   write('What genre of animal do you prefer?: '),read(G),
3   write('What is the purpose?:'),read(A),
4   write('Do you prefer an animal with fur or feathers or leather?:'),read(F),
5   write('What is the size of animal do you prefer?:'),read(Z),
6   write('What is the right cost for you? (low, medium, high):'),read(E),
7   animal(S,G,A,P,F,Z,E).
8
9 %predator animals
10 animal(dog,G,A,P,fur,Z,E):- G = predator, A = protection ,P= adult,(Z=(small);Z=(large)),(E=(low);
11 animal(lion,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = large,(E=(low);E=(medium);E=(large)
12 animal(wolf,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(large)
13 animal(hawk,G,A,P,feathers,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(large)
14 animal(fox,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(large)
15 animal(bear,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(large)
16 %pet animals
17 animal(dog,G,A,P,fur,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large)
18 animal(rabbit,G,A,P,fur,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large)
19 animal(turtle,G,A,P,leather,Z,E):- G = pet ,A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low);
20 animal(cat,G,A,P,fur,Z,E):- G = pet ,A = breeding ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large)
21 animal(bird,G,A,P,feathers,Z,E):- G = pet ,A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low);
22 animal(fish,G,A,P,leather,Z,E):- G = pet ,A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low)
```

The 'suggest(S)' dialog box shows the user input and the system's response:

- Are you an adult or a teenager?: adult
- What genre of animal do you prefer?: predator
- What is the purpose?: hunt
- Do you prefer an animal with fur or feathers or leather?: fur
- What is the size of animal do you prefer?: large
- What is the right cost for you? (low, medium, high): medium
- S = lion

An adult wants predator animal for hunt with fur and size large, the cost is medium, the system suggest lion.



Query 3:

The screenshot shows the SWISH interface with a program window and a query window.

Program Window:

```

1 suggest(S) :- write('Are you an adult or a teenager?: '),read(P),
2   write('What genre of animal do you prefer?: '),read(G),
3   write('What is the purpose?:'),read(A),
4   write('Do you prefer an animal with fur or feathers or leather?:'),read(F),
5   write('What is the size of animal do you prefer?:'),read(Z),
6   write('What is the right cost for you? (low, medium, high):'),read(E),
7   animal(S,G,A,P,F,Z,E).
8
9 %predator animals
10 animal(dog,G,A,P,fur,Z,E):- G = predator, A = protection ,P= adult,(Z=(small);Z=(large)),(E=(low);E=(medium);E=(high)).
11 animal(lion,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = large,(E=(low);E=(medium);E=(high)).
12 animal(wolf,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(high)).
13 animal(hawk,G,A,P,feathers,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(high)).
14 animal(fox,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(high)).
15 animal(bear,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = large ,(E=(low);E=(medium);E=(high)).
16 %pet animals
17 animal(dog,G,A,P,fur,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large)).
18 animal(rabbit,G,A,P,fur,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large)).
19 animal(turtle,G,A,P,leather,Z,E):- G = pet ,A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low);E=(medium);E=(high)).
20 animal(cat,G,A,P,fur,Z,E):- G = pet, A = breeding ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large)).
21 animal(bird,G,A,P,feathers,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low);E=(medium);E=(high)).
22 animal(fish,G,A,P,leather,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low);E=(medium);E=(high)).
    
```

Query Window:

Are you an adult or a teenager?: teenager
 What genre of animal do you prefer?: pet
 What is the purpose?: adoption
 Do you prefer an animal with fur or feathers or leather?: leather
 What is the size of animal do you prefer?: small
 What is the right cost for you? (low, medium, high): high
 S = turtle

?- suggest(S).

A teenager wants pet animal for adoption with leather and size small, the cost is high, the system suggest turtle.

Query 4:

The screenshot shows the SWISH interface with a program window and a query window.

Program Window:

```

1 ou an adult or a teenager?: ),read(P),
2 nimal do you prefer?: ),read(G),
3 pose?:),read(A),
4 n animal with fur or feathers or leather?:),read(F),
5 e of animal do you prefer?:),read(Z),
6 t cost for you? (low, medium, high):),read(E),
7
8
9
10 :- G = predator, A = protection ,P= adult,(Z=(small);Z=(large)),(E=(low);E=(medium);E=(large)),!.
11 :- G = predator, A = hunt ,P= adult ,Z = large,(E=(low);E=(medium);E=(large)),!.
12 :- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(large)),!.
13 :- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(large)),!.
14 :- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(large)),!.
15 :- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(large)),!.
16
17 :- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large)),(E=(low);E=(medium);E=(high)).
18 :- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large)),(E=(low);E=(medium);E=(high)).
19 :- G = pet ,A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low);E=(medium);E=(high)).
20 :- G = pet, A = breeding ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large)),(E=(low);E=(medium);E=(high)).
21 :- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low);E=(medium);E=(large)),!.
22 :- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low);E=(medium);E=(large)),!.
    
```

Query Window:

animal(X,pet,adoption,adult,fur,large,low).
 X = dog

?* animal(X,pet,adoption,adult,fur,large,low).

Find the animal from some characteristics.



Query 5:

The screenshot shows the SWISH interface with a program window containing the following Prolog code:

```

1 suggest(S) :- write('Are you an adult or a teenager?: '),read(P),
2   write('What genre of animal do you prefer?: '),read(G),
3   writeln('What is the purpose?:'),read(A),
4   writeln('Do you prefer an animal with fur or feathers or leather?:'),read(F),
5   writeln('What is the size of animal do you prefer?:'),read(Z),
6   writeln('What is the right cost for you? (low, medium, high):'),read(E),
7   animal(S,G,A,P,F,Z,E).
8
9 %predator animals
10 animal(dog,G,A,P,fur,Z,E):- G = predator, A = protection ,P= adult,(Z=(small);Z=(large)),(E=(low));
11 animal(lion,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = large,(E=(low);E=(medium);E=(large));
12 animal(wolf,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(large));
13 animal(hawk,G,A,P,feathers,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(large));
14 animal(fox,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(large));
15 animal(bear,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(large));
16 %pet animals
17 animal(dog,G,A,P,fur,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large));
18 animal(rabbit,G,A,P,fur,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large));
19 animal(turtle,G,A,P,leather,Z,E):- G = pet ,A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low));
20 animal(cat,G,A,P,fur,Z,E):- G = pet, A = breeding ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large));
21 animal(bird,G,A,P,feathers,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low));
22 animal(fish,G,A,P,leather,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low)).

```

A modal dialog box titled "animal(cat,X,Y,adult,fur,large,low)." is open, showing variables X = pet, Y = breeding, and the query ?* animal(cat,X,Y,adult,fur,large,low).

Find some characteristics of cat.

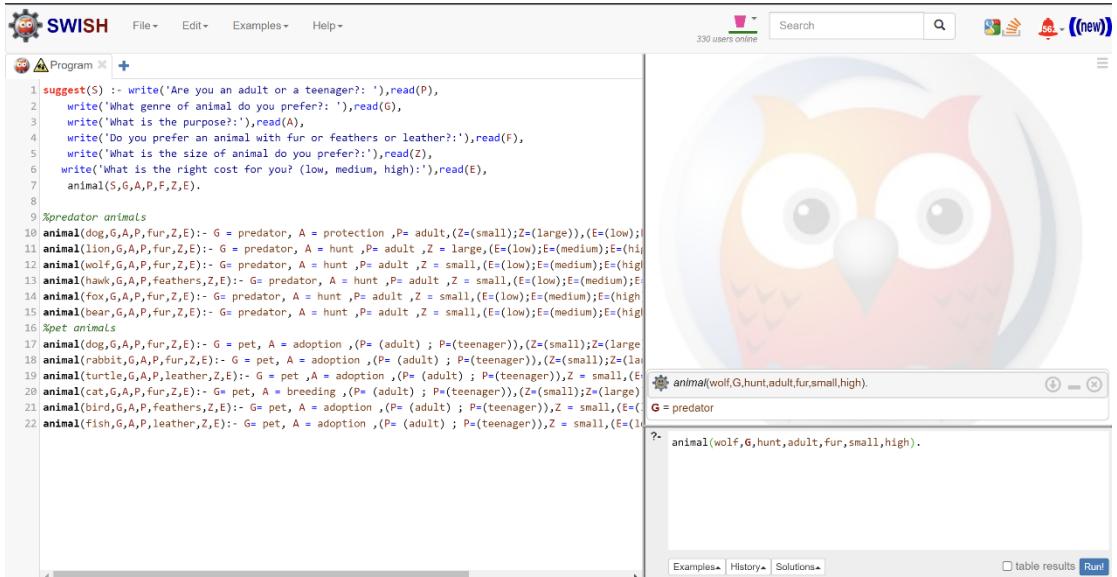
Query 6:

The screenshot shows the SWISH interface with a program window containing the same Prolog code as Query 5. A modal dialog box titled "animal(X.pet,adoption,adult,fur,large,low)." is open, showing variable X = dog and the query ?* animal(X,pet,adoption,adult,fur,large,low).

Find the animal from some characteristics.



Query 7:



The SWISH interface shows a program window with the following Prolog code:

```
1 suggest(S) :- write('Are you an adult or a teenager?: '),read(P),
2   write('What genre of animal do you prefer?: '),read(G),
3   write('What is the purpose?:'),read(A),
4   write('Do you prefer an animal with fur or feathers or leather?:'),read(F),
5   write('What is the size of animal do you prefer?:'),read(Z),
6   write('What is the right cost for you? (low, medium, high):'),read(E),
7   animal(S,G,A,P,F,Z,E),
8
9 %predator animals
10 animal(dog,G,A,P,fur,Z,E):- G = predator, A = protection ,P= adult,(Z=(small);Z=(large)),(E=(low);
11 animal(lion,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = large,(E=(low);E=(medium);E=(hi;
12 animal(wolf,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(high;
13 animal(hawk,G,A,P,feathers,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(high;
14 animal(fox,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(high;
15 animal(bear,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(high;
16 %pet animals
17 animal(dog,G,A,P,fur,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large
18 animal(rabbit,G,A,P,fur,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large;
19 animal(turtle,G,A,P,leather,Z,E):- G = pet ,A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(l;
20 animal(cat,G,A,P,fur,Z,E):- G = pet, A = breeding ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large;
21 animal(bird,G,A,P,feathers,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(l;
22 animal(fish,G,A,P,leather,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(l;
```

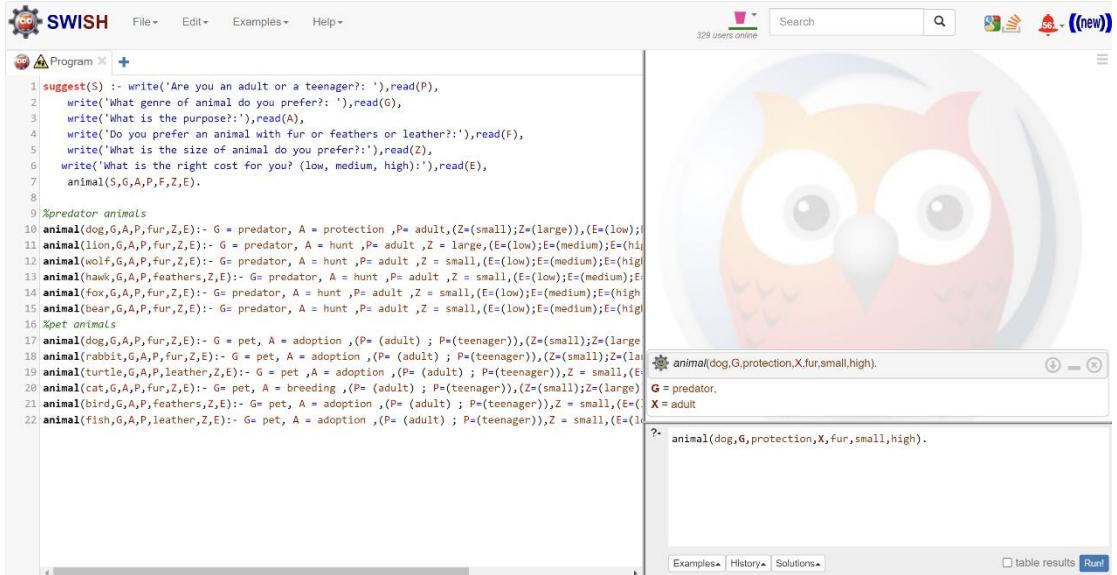
The results pane shows:

- animal(wolf,G,hunt,adult,fur,small,high).
- G = predator

Query 7 asks for characteristics of a wolf. The results show that a wolf is a predator, hunts, is an adult, has fur, and is small in size.

Find some characteristics of wolf.

Query 8:



The SWISH interface shows a program window with the same Prolog code as Query 7.

The results pane shows:

- animal(dog,G,protection,X,fur,small,high).
- G = predator,
- X = adult

Query 8 asks for characteristics of a dog. The results show that a dog is a predator, is an adult, and has protection, fur, and is small in size.

Find some characteristics of dog.



Query 9:

The SWISH interface shows a program window with the following code:

```

1 suggest(S) :- write('Are you an adult or a teenager?: '),read(P),
2   write('What genre of animal do you prefer?: '),read(G),
3   write('What is the purpose?:'),read(A),
4   write('Do you prefer an animal with fur or feathers or leather?:'),read(F),
5   write('What is the size of animal do you prefer?:'),read(Z),
6   write('What is the right cost for you? (low, medium, high):'),read(E),
7   animal(S,G,A,P,F,Z,E).
8
9 ^predator animals
10 animal(dog,G,A,P,fur,Z,E):- G = predator, A = protection ,P= adult,(Z=(small);Z=(large)),(E=(low);
11 animal(lion,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = large,(E=(low);E=(medium);E=(high);
12 animal(wolf,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(high);
13 animal(hawk,G,A,P,feathers,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(high);
14 animal(fox,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(high);
15 animal(bear,G,A,P,fur,Z,E):- G = predator, A = hunt ,P= adult ,Z = small,(E=(low);E=(medium);E=(high);
16 ^pet animals
17 animal(dog,G,A,P,fur,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large));
18 animal(rabbit,G,A,P,fur,Z,E):- G = pet, A = adoption ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large));
19 animal(turtle,G,A,P,leather,Z,E):- G = pet ,A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low));
20 animal(cat,G,A,P,fur,Z,E):- G = pet ,A = breeding ,(P=(adult) ; P=(teenager)),(Z=(small);Z=(large));
21 animal(bird,G,A,P,feathers,Z,E):- G = pet ,A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low));
22 animal(fish,G,A,P,leather,Z,E):- G = pet ,A = adoption ,(P=(adult) ; P=(teenager)),Z = small,(E=(low));

```

A modal dialog box displays the query `?* animal(bird,pet,adoption,teenager,feathers,X,low).` with the variable `X = small`.

Find some characteristics of bird.

Query 10:

The SWISH interface shows a program window with the same code as Query 9. A modal dialog box displays the query `?* animal(X,Z,breeding,teenager,Y,small,low).` with variables `X = cat`, `Y = fur`, and `Z = pet`.

Find the animal and some of his characteristics.

