Prolog

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Batch C
TE Comps

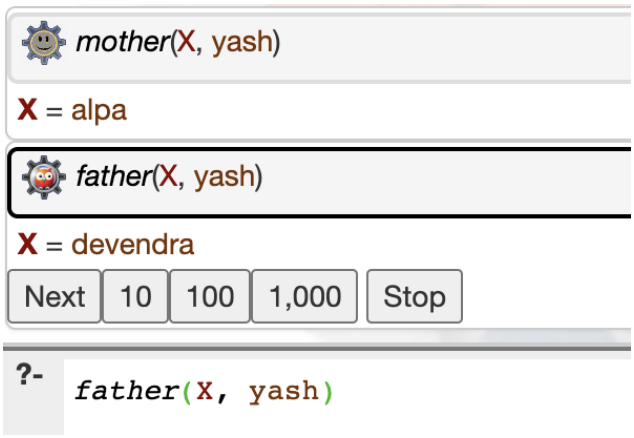
Program 1:

- Create a family tree using PROLOG. It should have rules for father, mother, brother, sister, grandparent, uncle, aunt, predecessors, successors.

Code:

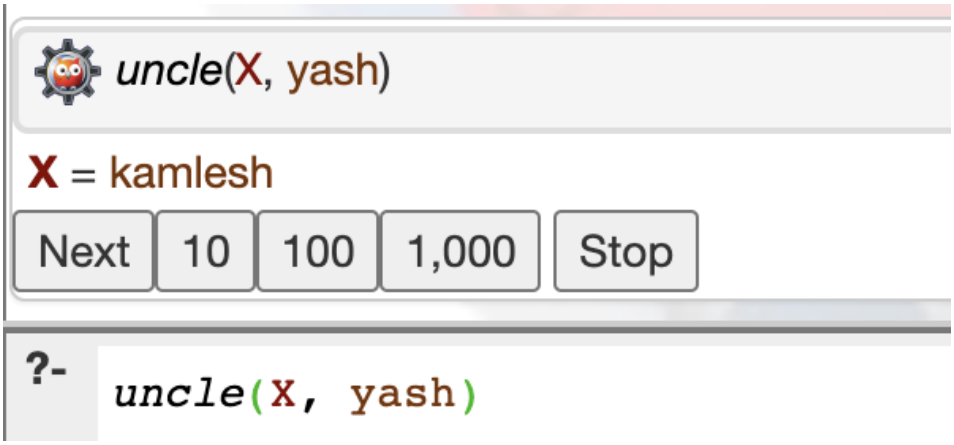
```
parent(usha, devendra).
parent(usha, kamlesh).
parent(dilip, devendra).
parent(dilip, kamlesh).
parent(devendra, yash).
parent(alpa, yash).

female(usha).
female(alpa).
female(sayali).
male(devendra).
male(yash).
male(dilip).
male(kamlesh).

mother(X, Y):- parent(X, Y), female(X).
father(X, Y):- parent(X, Y), male(X).

son(X, Y):- parent(Y, X), male(X).
daughter(X, Y):- parent(Y, X), female(X).

grandfather(X, Y):- parent(X, A), parent(A, Y), male(X).
grandmother(X, Y):- parent(X, A), parent(A, Y), female(X).

sister(X, Y):- parent(A, X), parent(A, Y), female(X), X \= Y.
brother(X, Y):- parent(A, X), parent(A, Y), male(X), X \= Y.

aunt(X, Y):- sister(X, Z), parent(Z, Y).
uncle(X, Y):- brother(X, Z), parent(Z, Y).

predecessor(X, Y) :- parent(X, Y).
predecessor(X, Y) :- parent(X, A),predecessor(A, Y).
```

successor(X, Y):- son(Y, X).
successor(X, Y):- daughter(Y, X).
successor(X, Y):- son(A, X), successor(A, Y).
successor(X, Y):- daughter(A, X), successor(A, Y).




predecessor(X, yash)
X = devendra
X = alpa
X = usha
X = dilip
Next
10
100
1,000
Stop
?-
predecessor(X, yash)


successor(dilip, X)
X = devendra
X = kamlesh
X = yash
Next
10
100
1,000
Stop
?-
successor(dilip, X)

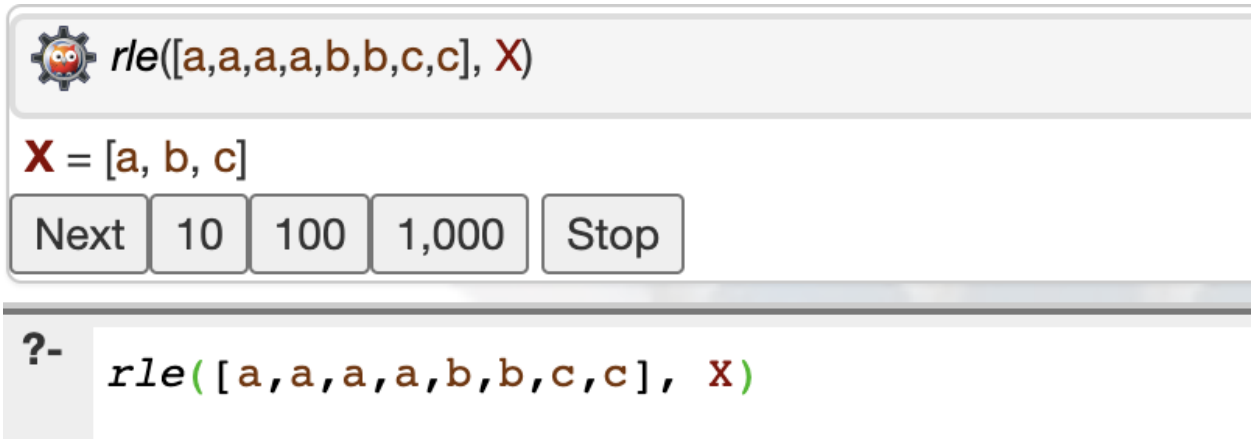

uncle(X, yash)
X = kamlesh
Next
10
100
1,000
Stop
?-
uncle(X, yash)

Program 2:

- Given a list
  [a,a,a,a,b,b,b,c,c]
- Write a function that does the following
  rle([a,a,a,a,b,b,c,c],X)
  X: [a,b,c]

Code:

```
rle([],[]).
rle([X],[X]).
rle([X, X|REMAINING],OUTPUT) :- rle([X|REMAINING],OUTPUT).
rle([X, Y|REMAINING], [X|OUTPUT_TAIL]) :- X \= Y, rle([Y|REMAINING], OUTPUT_TAIL).
```



Program 3:

- Given a list
  [a,b,c,d,e,f,g]
- Write a function that does the following
  slice([a,b,c,d,e,f,g],[2,5],X)
  X: [c,d,e,f]

Code:

```
slice([X|_], 1, 1, [X]).
slice([X|TAIL], 1, CURRENT_INDEX, [X|REM_TAIL]) :- CURRENT_INDEX > 1,
NEXT_INDEX is CURRENT_INDEX - 1, slice(TAIL, 1, NEXT_INDEX, REM_TAIL).
slice([_|TAIL], I, CURRENT_INDEX, OUTPUT) :- I > 1, I1 is I - 1, NEXT_INDEX is
CURRENT_INDEX - 1, slice(TAIL, I1, NEXT_INDEX, OUTPUT).
```