CS354N LAB 1

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Question 1

Code:

```prolog
≡ ques1.pl    ×

≡ ques1.pl
        You, 1 second ago | 1 author (You)
  1     lives(british, red).
  2     lives(diplomat, yellow).
  3     lives(norwegian, 1).
  4     lives(doctor, X) :- near(X, Y), owns(Z, fox), lives(Z, Y).
  5     lives(norwegian, X) :- near(X, blue).
  6
  7     owns(spanish, dog).
  8     owns(sculptor, snails).
  9
 10     drinks(X, coffee) :- lives(X, green).
 11     drinks(ukrainian, tea).
 12     drinks(X, milk) :- middle(X).
 13     drinks(violinist, orangejuice).
 14
 15     right(green, white).
 16     horse(X) :- near(X, diplomat), owns(X, horse).
 17     same(japanese, acrobat).
 18
 19     % assuming 5 houses , to get the middle house index
 20     house(1).
 21     house(2).
 22     house(3).
 23     house(4).
 24     house(5).
 25     middle(3).
 26
 27     % near can be used with index as well as other variables
 28     near(norwegian, blue).
 29     near(X,Y):- near(Y,X).
 30     near(X, Y) :- X is Y - 1.
 31     near(X, Y) :- X is Y + 1.
 32
 33     % queries -
 34     % drinks(X, water), owns(X, zebra).
 35     % drinks(X, water).
 36     % owns(X, zebra).
```

Output:

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS    POLYGLOT NOTEBOOK    GITLENS    SPELL CHECKER  3

arnav@arnav-IdeaPad-Gaming-3-15ACH6:~/Desktop/CI LAB/LAB 1$ prolog ques1.pl
Welcome to SWI-Prolog (threaded, 64 bits, version 9.2.9)
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Please run ?- license. for legal details.

For online help and background, visit https://www.swi-prolog.org
For built-in help, use ?- help(Topic). or ?- apropos(Word).

?- drinks(X , water) , owns(X,zebra).
false.

?- drinks(X , water).
false.

?- owns(X , zebra).
false.

?- ▮
```

Question 2

Code:

```prolog
ques2.pl   X

ques2.pl
      You, 10 minutes ago | 1 author (You)
  1   happy(X) :- parent(X, _).
  2   hastwochildren(X) :- parent(X, Y), parent(X,Z) , Y\=Z ,sister(Z, Y).
  3   grandchild(X, Y) :- parent(Y, Z), parent(Z, X).  % X is grandchild of Y
  4   aunt(X, Y) :- sister(X, Z), parent(Z, Y). % X is aunt of Y
```

Question 3

Code:

```prolog
≡ ques3.pl  ×

≡ ques3.pl
      You, 2 seconds ago | 1 author (You)
   1  female(mary).
   2  female(sandra).
   3  female(juliet).
   4  female(lisa).
   5
   6  male(peter).
   7  male(paul).
   8  male(john).
   9  male(bob).
  10  male(harry).
  11
  12  parent(bob, lisa).
  13  parent(bob, paul).
  14  parent(bob,mary).
  15  parent(juliet, lisa).
  16  parent(juliet, paul).
  17  parent(juliet, mary).
  18  parent(peter, harry).
  19  parent(lisa, harry).
  20  parent(mary, john).
  21  parent(mary, sandra).
  22
  23  father(X,Y):- parent(X,Y), male(X).
  24
  25  sister(X,Y):- parent(Z, X),parent(Z, Y),female(X), X \= Y.
  26
  27  grandmother(X, Y):- female(X), parent(X, Z), parent(Z,Y).
  28
  29
  30  cousin(X,Y):- parent(Z,X), parent(W, Y), parent(G,W) , parent(G , Z) , Z\=W.
  31
  32
  33  % queries:
  34  % father(x , lisa),
  35  % sister(paul,X).
  36  % grandmother(X , harry).
  37  % cousin(X,Y).
  38  % father(bob , lisa).
  39
```

Output:

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS    POLYGLOT NOTEBOOK    GITLENS    SPELL CHECKER

arnav@arnav-IdeaPad-Gaming-3-15ACH6:~/Desktop/CI LAB/LAB 1$ prolog ques3.pl
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For built-in help, use ?- help(Topic). or ?- apropos(Word).

?- father(X,lisa).
X = bob .

?- sister(paul,X).
false.

?- grandmother(X,harry).
X = juliet .

?- cousin(X,Y).
X = harry,
Y = john .

?- father(bob,lisa).
true .

?-
```

Question 4

Code:

```prolog
soldier(peckem, general).
soldier(cathcart, colonel).
soldier(moodus, colonel).
soldier(towser, sergeant).
soldier(knight, sergeant).
soldier(aardvark, captain).
soldier(dunbar,lieutenant).
soldier(flume, captain).
soldier(danby, major).

samerank(X , Y) :- soldier(X , R) , soldier(Y,R).

% query -
% samerank(aardvark , flume ).
```

Result:

```
arnav@arnav-IdeaPad-Gaming-3-15ACH6:~/Desktop/CI LAB/LAB 1$ prolog ques4
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For online help and background, visit https://www.swi-prolog.org
For built-in help, use ?- help(Topic). or ?- apropos(Word).

?- samerank(aardvark , flume ).
true.

?-
```

Question 5

Code:

```prolog
parent(chester,irvin).
parent(chester,clarence).
parent(chester,mildred).
parent(irvin,ron).
parent(irvin,ken).
parent(clarence,shirley).
parent(clarence,sharon).
parent(clarence,charlie).
parent(mildred,mary).

ancestor(X, Y):- parent(X, Y).
ancestor(X, Y):- parent(X, Z), ancestor(Z, Y).


% queries -
% parent(chester,mildred).
% parent(X,ron).
% parent(clarence,charlie).
```

Result:

```
PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS   POLYGLOT NOTEBOOK   GITLENS   SPELL CHECKER

arnav@arnav-IdeaPad-Gaming-3-15ACH6:~/Desktop/CI LAB/LAB 1$ prolog ques5.pl
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For online help and background, visit https://www.swi-prolog.org
For built-in help, use ?- help(Topic). or ?- apropos(Word).

?- parent(chester , mildred).
true.

?- parent(X , ron).
X = irvin.

?- parent(clarence , charlie).
true.

?-
```

Code Files can be found here:

https://github.com/arnavjain2710/Computational-Intelligence-Lab-CS354N/tree/main/LAB1