DHAKA UNIVERSITY OF ENGINEERING & TECHNOLOGY, GAZIPUR

Department of Computer Science and Engineering

Course No.: CSE-4624

Course Title: Artificial Intelligence Sessional

Knowledge Representation Lab Homework 1

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Problem-1: Solution

1.Which furniture is in the room?furniture(desk).

furniture(chair).
furniture(wardrobe).
furniture(bed).
furniture(bookshelf).

is_in_room(Furniture) :-
   furniture(Furniture),
   write(Furniture), write(' is in the room.'), nl.

Output:


```
is_in_room(_)                                                        ⊕ − ⊗
desk is in the room.
 true                                                                       1
chair is in the room.
wardrobe is in the room.
bed is in the room.
bookshelf is in the room.
?-  is_in_room(_)
```


2.How many doors, windows, tables, ... are in the room?

num_doors(1).
num_windows(2).
num_tables(0).
count_items_in_room(Doors, Windows, Tables) :-
   num_doors(Doors),
   num_windows(Windows),
   num_tables(Tables).

Output:

mysolver(Doors, Windows, Tables)			
Doors	**Windows**	**Tables**	
1	2	0	*1*

```
?-  mysolver(Doors, Windows, Tables)
```

3. Where is the table, the chair, ... ?

location(table, room).
location(chair, room).

mysolver(Item, Location) :-
   location(Item, Location),
   write('The '), write(Item), write(' is '), write(Location), write('.').

Output:

The table is room.

Location	
room	*1*
room	*2*

The chair is room.

```
?-  mysolver(_, Location).
```

4.What is to the left (right) of the table, ... (with respect to the center of the room)?

furniture(table).
furniture(window2).

left_of(window2, table).

mysolver(Item, LeftItem) :-
   left_of(LeftItem, Item),
   write('To the left of the '), write(Item), write(' is the '), write(LeftItem), write('.').

Output:

```
To the left of the table is the window2.
```

Left_Item	
window2	1

```
?-  mysolver(table,Left_Item)
```

6.What is in the corner 1, ... ?

in_corner(wardrobe, 1).

mysolver(Corner, Object) :-
   in_corner(Object, Corner).

Output:

```
    mysolver(1, X).
```

X	
wardrobe	1

```
?-  mysolver(1, X).
```

Problem-2:Solution

```prolog
likes(Person, Animal) :- owns(Person, Animal).  % If someone owns an animal, they like it

enjoys(Animal, Action) :- animal(Animal).      % Animals enjoy some action (unspecified here)

does(Person, Action) :- likes(Person, X),  enjoys(X, Action).

owns(mary, fido).                 % Mary owns Fido

animal(fido).                     % Fido is an animal
```
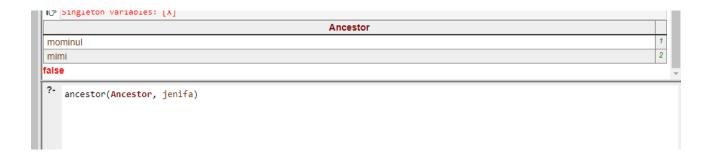
Problem-3 Solution

```prolog
% here is Facts
man(mominul).
man(shohag).
man(sumon).
woman(selina).
woman(jenifa).
woman(farhana).

father(mominul, shohag).
father(mominul, sumon).
mother(selina, shohag).
mother(selina, sumon).
father(mominul, jenifa).
mother(mimi,jenifa).

% here is my Rules
parent(P, C) :- father(P, C).
parent(P, C) :- mother(P, C).

parents(F, M, C) :- father(F, C), mother(M, C).
```

child(C, P) :- parent(P, C).

son(S, P) :- child(S, P), man(S).

daughter(D, P) :- child(D, P), woman(D).

grandfather(GP, GC) :- father(GP, P), parent(P, GC).

grandmother(GM, GC) :- mother(GM, P), parent(P, GC).

grandchild(GC, G) :- child(GC, P), child(P, G).

brother(B, SB) :- man(B), parent(P, B), parent(P, SB), B \= SB.

sister(S, SB) :- woman(S), parent(P, S), parent(P, SB), S \= SB.

uncle(U, N) :- man(U), parent(P, N), brother(U, P).

aunt(A, N) :- woman(A), parent(P, N), sister(A, P).

ancestor(A, X) :- parent(A, X).
ancestor(A, X) :- parent(P, X), ancestor(A, P).

descendant(D, X) :- child(D, X).
descendant(D, X) :- child(D, P), descendant(D, P).

related(X, Y) :- ancestor(A, X), ancestor(A, Y), X \= Y.

Output:

Problem-4:Solution

% Base case: Fibonacci of 0 is 0
fibo(0, 0).

% Base case: Fibonacci of 1 is 1
fibo(1, 1).

fibo(N, F) :-
   N > 1,
   N1 is N - 1,
   N2 is N - 2,
   fibo(N1, F1),
   fibo(N2, F2),
   F is F1 + F2.

Output:

Result	
21	1
Next 10 100 1,000 Stop	

```
?-  fibo(8, Result).
```