

CECS 342 - Lab Assignment 6 - Prolog Programming

Due Date: Sunday, May 5

Team Members: Bryan Tineo & Maxwell Guillermo

Completion of Lab Assignment:

Both team members contributed equally and collaborated throughout the completion of the lab assignment.

Code:

Question 1 Code:

1. [5 points] Create the following knowledge base. Name the program kbase1.

```
woman(mia).  
woman(jody).  
woman(yolanda).
```

```
loves(vincent,mia).  
loves(marcellus,mia).  
loves(pumpkin,honey_bunny).  
loves(honey_bunny,pumpkin).
```

Create the following queries:

- a. tell me which of the individuals you know about is a woman.
- b. Is there any individual X such that Marcellus
loves X and X is a woman?

% Define the knowledge base with facts about women and relationships of love

```
woman(mia).  
woman(jody).  
woman(yolanda).  
loves(vincent, mia).  
loves(marcellus, mia).  
loves(pumpkin, honey_bunny).  
loves(honey_bunny, pumpkin).
```

Question 2 Code:

2. [5 points] Create the following knowledge base. Name the program kbase2.

```
loves(vincent,mia).
loves(marcellus,mia).
loves(pumpkin,honey_bunny).
loves(honey_bunny,pumpkin).
```

a. Create a rule:

It says that an individual X will be jealous of an individual Y if there is some individual Z that X loves, and Y loves that same individual Z too.

b. Create the following query:

Can you find an individual w such that Marcellus is jealous of w?

% Define the knowledge base with facts about women and relationships of love

```
loves(vincent,mia).
```

```
loves(marcellus,mia).
```

```
loves(pumpkin,honey_bunny).
```

```
loves(honey_bunny,pumpkin).
```

% Create a rule for an individual X will be jealous of an

% individual Y if there is some individual Z that X loves,

% and Y loves that same individual Z too.

```
jealous(X, Y) :- loves(X, Z), loves(Y, Z), X \= Y.
```

Question 3 Code:

3. [5 points] Write a Prolog relation that accepts a list of integers, and counts the number of zeros in the list, e.g.,

% Base case: An empty list has zero count of zeros.

```
zeros([], 0).
```

% Recursive case 1: The head of the list is 0.

% Increment the count and recurse on the tail.

```
zeros([0 | T], Z) :-
```

```
    zeros(T, Z1),
```

```
    Z is Z1 + 1.
```

% Recursive case 2: The head of the list is not 0.

% Do not increment the count and recurse on the tail.

```
zeros([H | T], Z) :-
```

```
    H \= 0, % Make sure the head is not 0
```

```
    zeros(T, Z).
```

Question 4 Code:

4. [5 points] Write a Prolog relation "intersect(L1, L2, R)" that succeeds if R is the intersection of L1 and L2. (*Assume no duplicates*), e.g.,

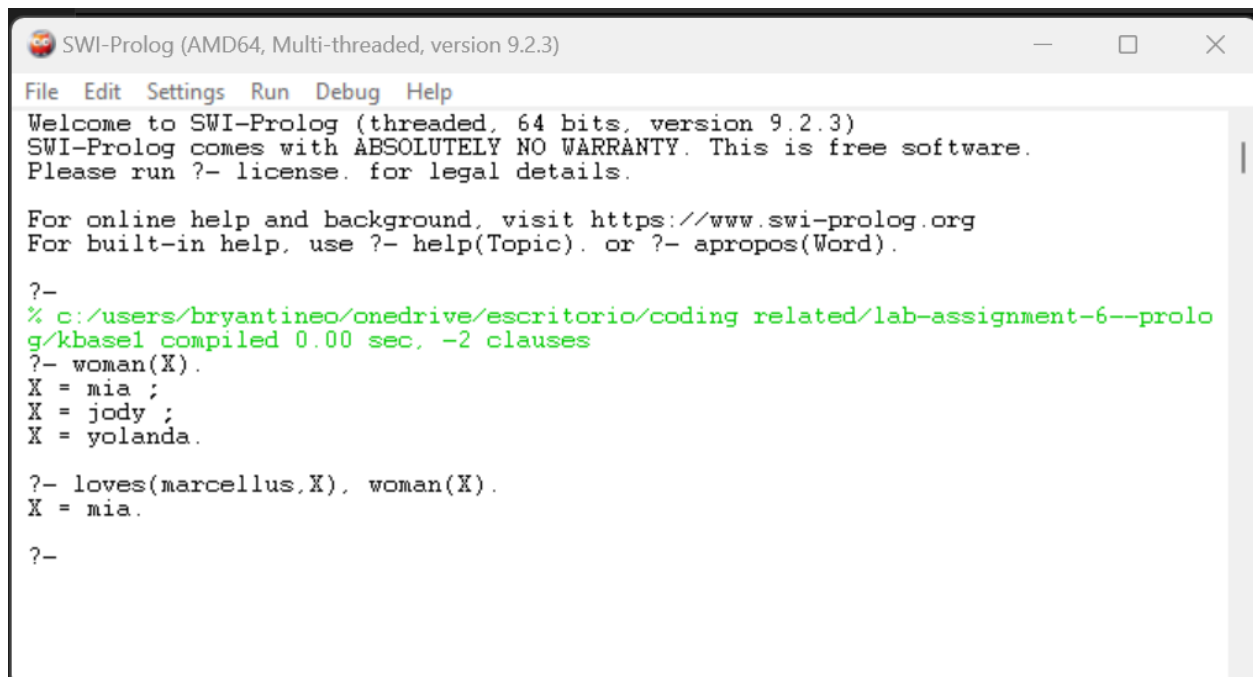
```
% Base case: If the first list is empty, the intersection is empty.
intersect([], _, []).

% If the head of the first list is a member of the second list,
% include it in the result list and continue with the tail of the first list.
intersect([X|R1], L2, [X|R3]) :- member(X, L2), !, intersect(R1, L2, R3).

% If the head of the first list is not a member of the second list,
% continue with the tail of the first list.
intersect(_R1, L2, R3) :- intersect(R1, L2, R3).
```

Output:

Question 1 Output:



```
SWI-Prolog (AMD64, Multi-threaded, version 9.2.3)
File Edit Settings Run Debug Help
Welcome to SWI-Prolog (threaded, 64 bits, version 9.2.3)
SWI-Prolog comes with ABSOLUTELY NO WARRANTY. This is free software.
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).

?-
% c:/users/bryantineo/onedrive/escritorio/coding related/lab-assignment-6--prolog/kbase1 compiled 0.00 sec, -2 clauses
?- woman(X).
X = mia ;
X = jody ;
X = yolanda.

?- loves(marcellus,X), woman(X).
X = mia.

?-
```

Question 2 Output:


`jealous(marcellus, W).`

W

vincent

1

Next

10

100

1,000

Stop


?- `jealous(marcellus, W).`

Examples▲ History▲ Solutions▲

☒ table results

Run!

Question 3 Output:


SWI-Prolog (AMD64, Multi-threaded, version 9.2.3)

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 For built-in help, use `?- help(Topic).` or `?- apropos(Word).`

`?-`
`% c:/users/bryantineo/onedrive/escritorio/coding related/lab-assignment-6--prolog/kbase3 compiled 0.00 sec, -1 clauses`
`?- zeros([1, 0, 0, 5], X).`
`X = 2.`

`?- zeros([], X).`
`X = 0.`

`?-`

Question 4 Output:

 `intersect([0, 1, 6, 3], [5, 1, 8, 2, 3, 9], X).`

X

[1, 3]

1

?- intersect([0, 1, 6, 3], [5, 1, 8, 2, 3, 9], X).

Examples▲

History▲

Solutions▲

☒ table results

Run!