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Lab 5 – Prolog Programming

1. **Answer**:
    a. tell me which of the individuals you know about is a woman.

    —?- woman(X).

    X = mia ;

    X = jody ;

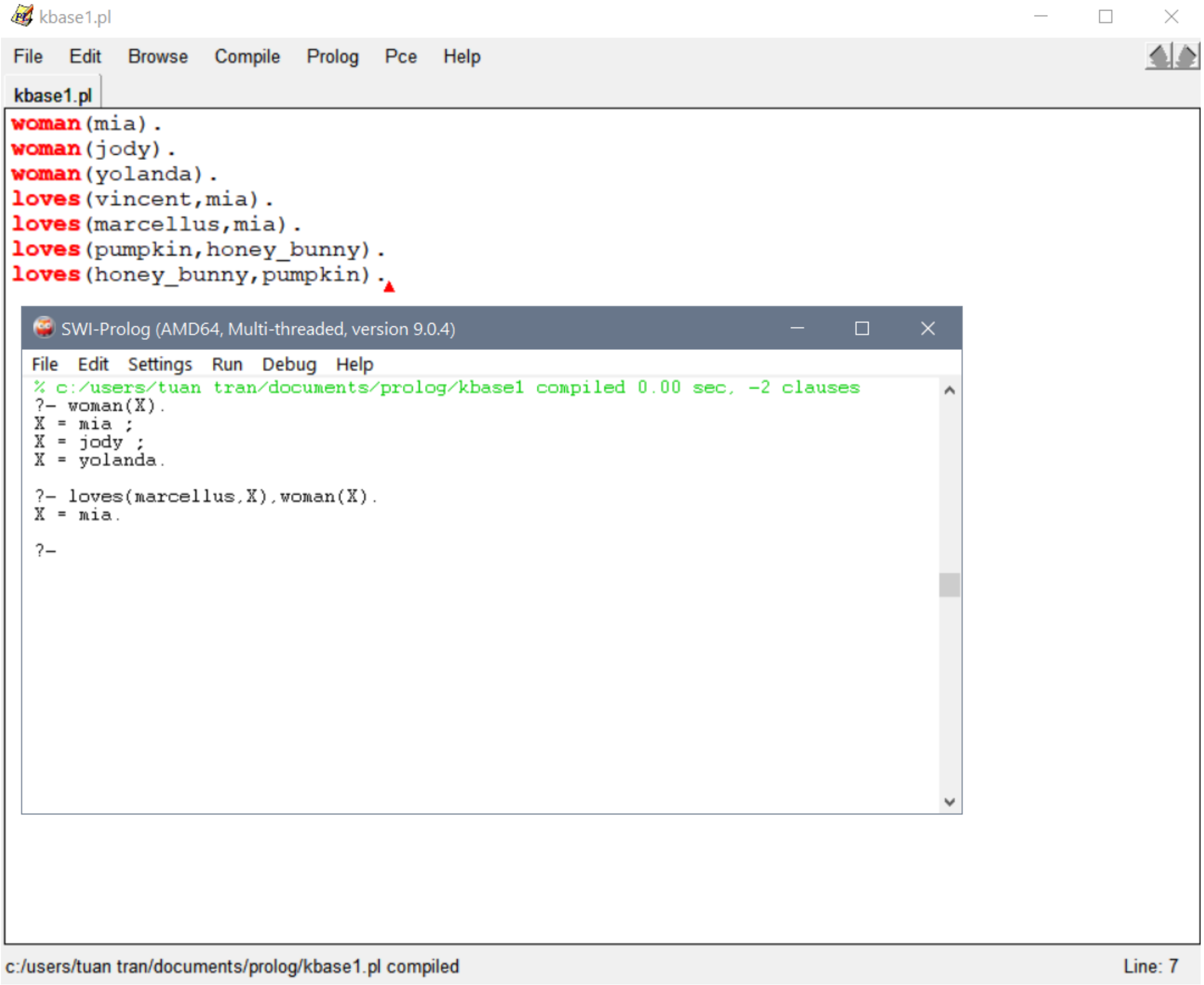
    X = Yolanda .

    b. Is there any individual X such that Marcellus loves X and X is a woman?

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

    X = mia.

Output:


kbase1.pl
File Edit Browse Compile Prolog Pce Help
kbase1.pl
SWI-Prolog (AMD64, Multi-threaded, version 9.0.4)
File Edit Settings Run Debug Help
c:/users/tuan tran/documents/prolog/kbase1.pl compiled
Line: 7

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

```
% c:/users/tuan tran/documents/prolog/kbase1 compiled 0.00 sec, -2 clauses
?- woman(X).
X = mia ;
X = jody ;
X = yolanda.

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

?-
```

2. **Answer**:

   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.

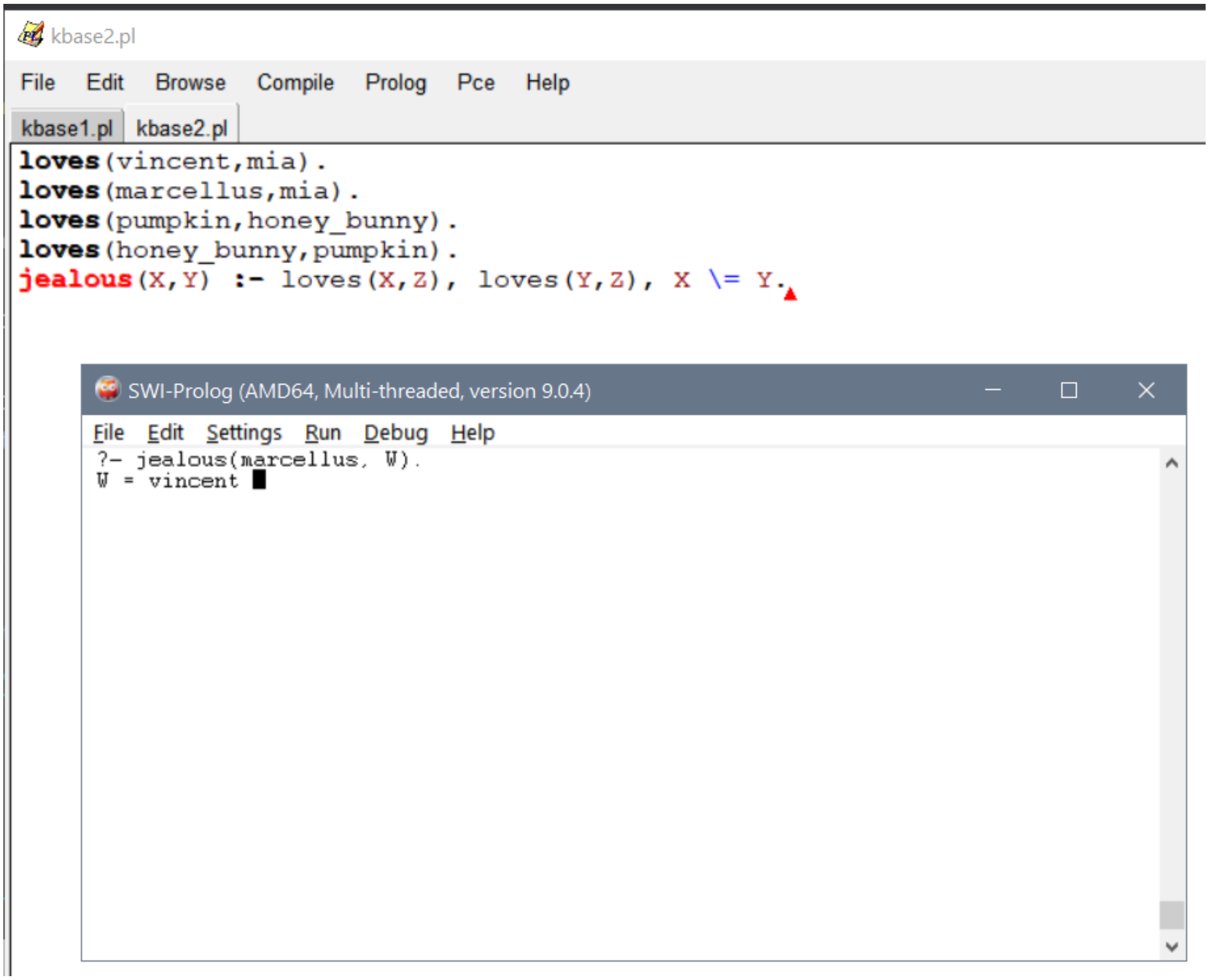
      Rule: jealous(X,Y) :- loves(X,Z), loves(Y,Z), X \= Y.

   b. Create the following query:

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

      ?- jealous(marcellus, W).

Output:


kbase2.pl
File Edit Browse Compile Prolog Pce Help
kbase1.pl kbase2.pl

```
loves(vincent,mia).
loves(marcellus,mia).
loves(pumpkin,honey_bunny).
loves(honey_bunny,pumpkin).
jealous(X,Y) :- loves(X,Z), loves(Y,Z), X \= Y.
```

SWI-Prolog (AMD64, Multi-threaded, version 9.0.4)
File Edit Settings Run Debug Help

```
?- jealous(marcellus, W).
W = vincent
```

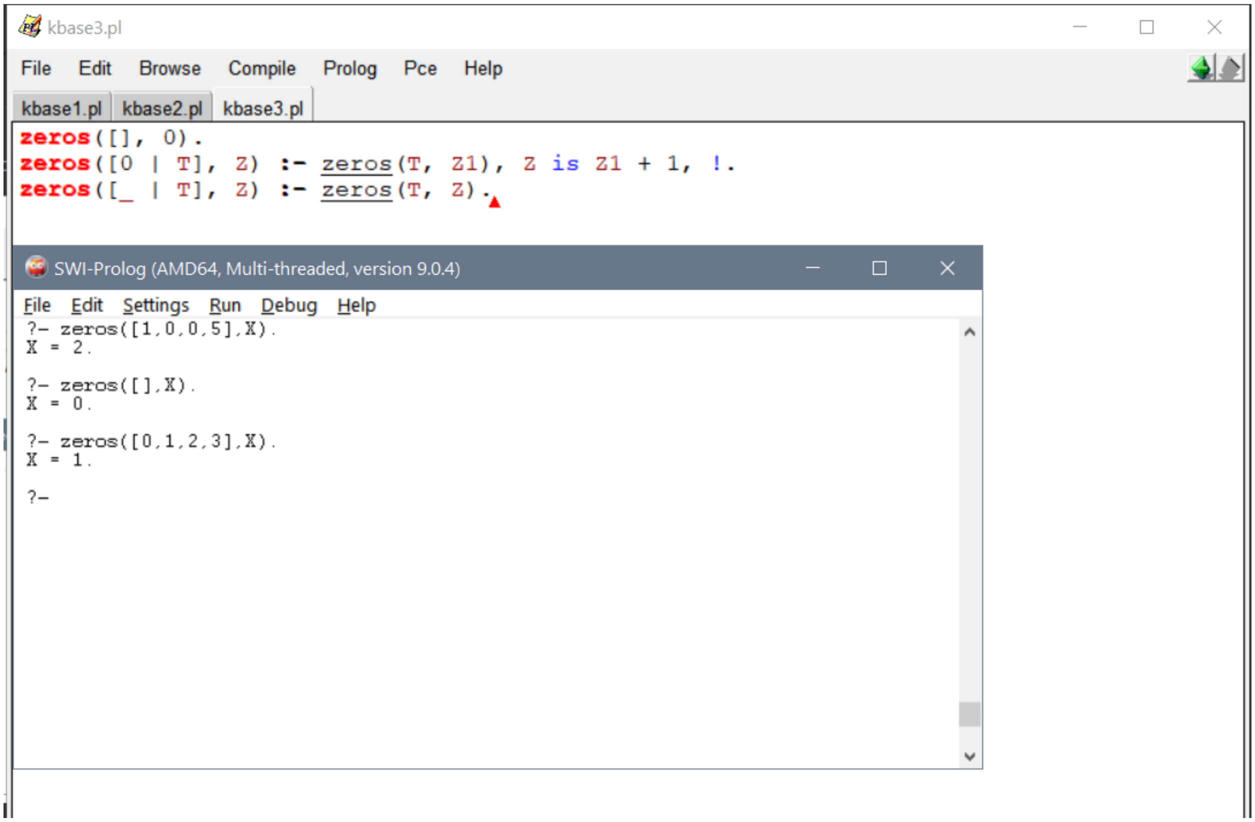
3. **Answer**:

```
zeros([], 0).
zeros([0 | T], Z) :- zeros(T, Z1), Z is Z1 + 1, !.
zeros([_ | T], Z) :- zeros(T, Z).
```

Query:

```
?- zeros([1,0,0,5],X).
?- zeros([],X).
?- zeros([0,1,2,3],X).
```

Output:



kbase3.pl
File Edit Browse Compile Prolog Pce Help
kbase1.pl kbase2.pl kbase3.pl
SWI-Prolog (AMD64, Multi-threaded, version 9.0.4)
File Edit Settings Run Debug Help

```
zeros([], 0).
zeros([0 | T], Z) :- zeros(T, Z1), Z is Z1 + 1, !.
zeros([_ | T], Z) :- zeros(T, Z).
```

```
?- zeros([1,0,0,5],X).
X = 2.

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

?- zeros([0,1,2,3],X).
X = 1.

?-
```

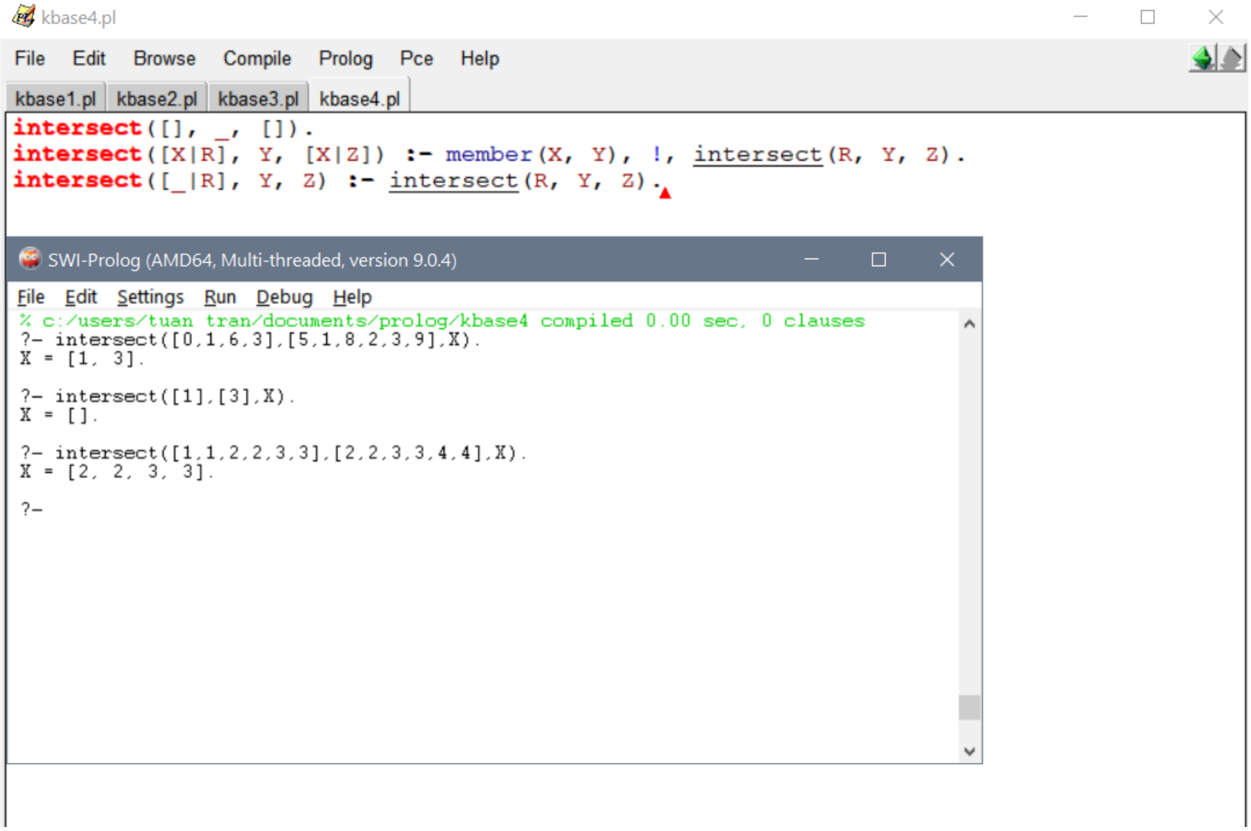
4. **Answer**:

   intersect([], _, []).
   intersect([X|R], Y, [X|Z]) :- member(X, Y), !, intersect(R, Y, Z).
   intersect([_|R], Y, Z) :- intersect(R, Y, Z).

   Query:

   ?- intersect([0,1,6,3],[5,1,8,2,3,9],X).
   ?- intersect([1],[3],X).
   ?- intersect([1,1,2,2,3,3],[2,2,3,3,4,4],X).

   Output:



```
intersect([], _, []).
intersect([X|R], Y, [X|Z]) :- member(X, Y), !, intersect(R, Y, Z).
intersect([_|R], Y, Z) :- intersect(R, Y, Z).
```

```
% c:/users/tuan tran/documents/prolog/kbase4 compiled 0.00 sec, 0 clauses
?- intersect([0,1,6,3],[5,1,8,2,3,9],X).
X = [1, 3].

?- intersect([1],[3],X).
X = [].

?- intersect([1,1,2,2,3,3],[2,2,3,3,4,4],X).
X = [2, 2, 3, 3].

?-
```