

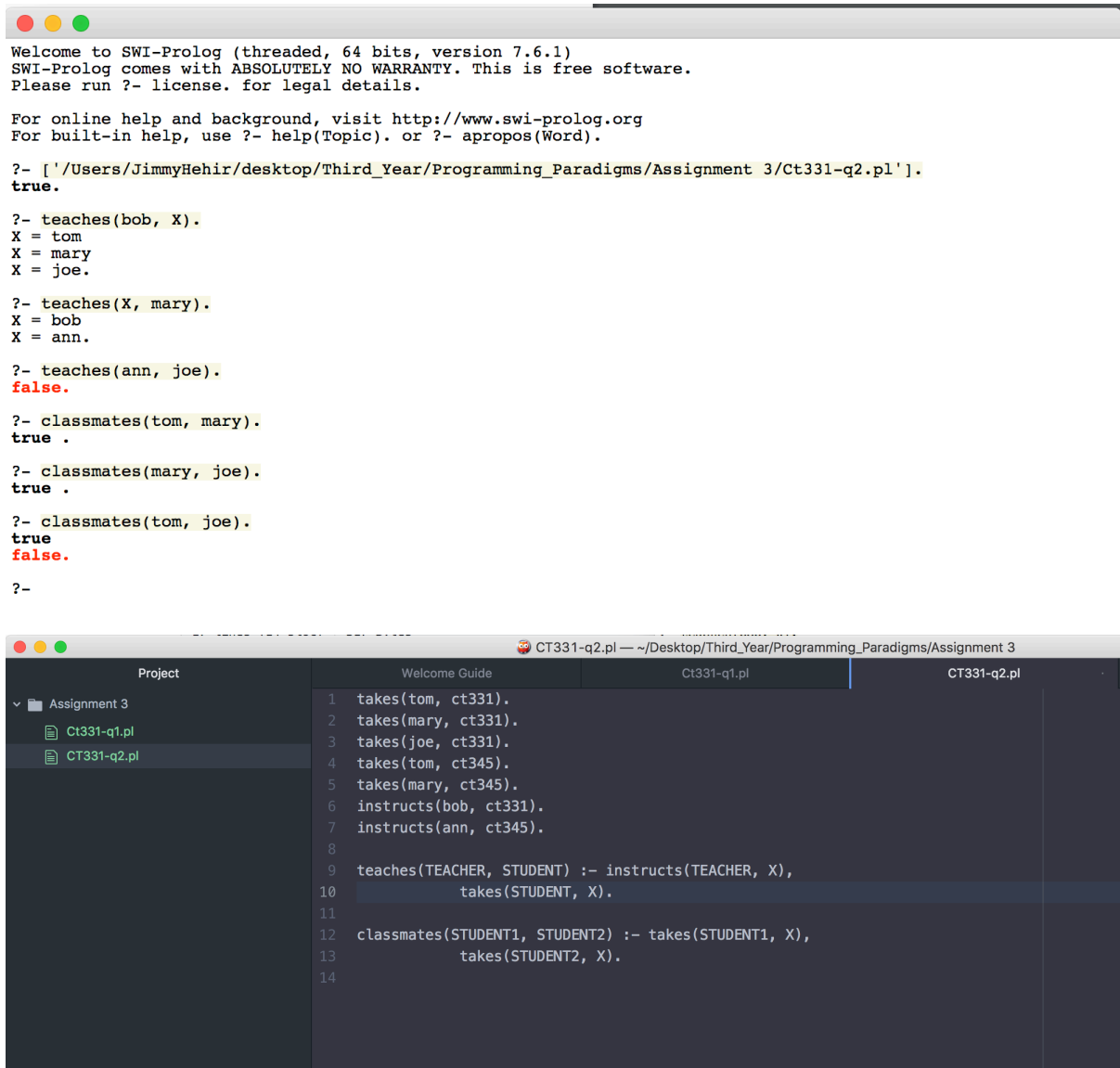
## Assignment 3 CT331 Assignment 3: Prolog Rules

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Question 1:

Q	Statement	Result
1	sunny AND warm	True
2	sunny AND cold	False
3	sunny OR cold	True
4	(sunny OR cold) AND warm	True
5	happy XOR sunny	False
6	warm XOR (NOT happy)	True
7	early NAND happy	False
8	(late NOR (NOT early)) AND (windy OR (NOT warm))	True
9	(cloudy AND windy) AND (warm AND early)	False
10	(cloudy AND windy) XOR (warm OR early)	True

## Question 2:



The image shows two windows from a macOS environment. The top window is a terminal running SWI-Prolog. It displays the welcome message, version information (7.6.1), and a license notice. It then loads a file 'Ct331-q2.pl' and executes several Prolog queries. The bottom window is a code editor showing the source code of 'Ct331-q2.pl', which defines a set of facts and rules for a teaching scenario.

```
Welcome to SWI-Prolog (threaded, 64 bits, version 7.6.1)
SWI-Prolog comes with ABSOLUTELY NO WARRANTY. This is free software.
Please run ?- license. for legal details.

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

?- ['Users/JimmyHehir/desktop/Third_Year/Programming_Paradigms/Assignment 3/Ct331-q2.pl'].
true.

?- teaches(bob, X).
X = tom
X = mary
X = joe.

?- teaches(X, mary).
X = bob
X = ann.

?- teaches(ann, joe).
false.

?- classmates(tom, mary).
true.

?- classmates(mary, joe).
true.

?- classmates(tom, joe).
true
false.

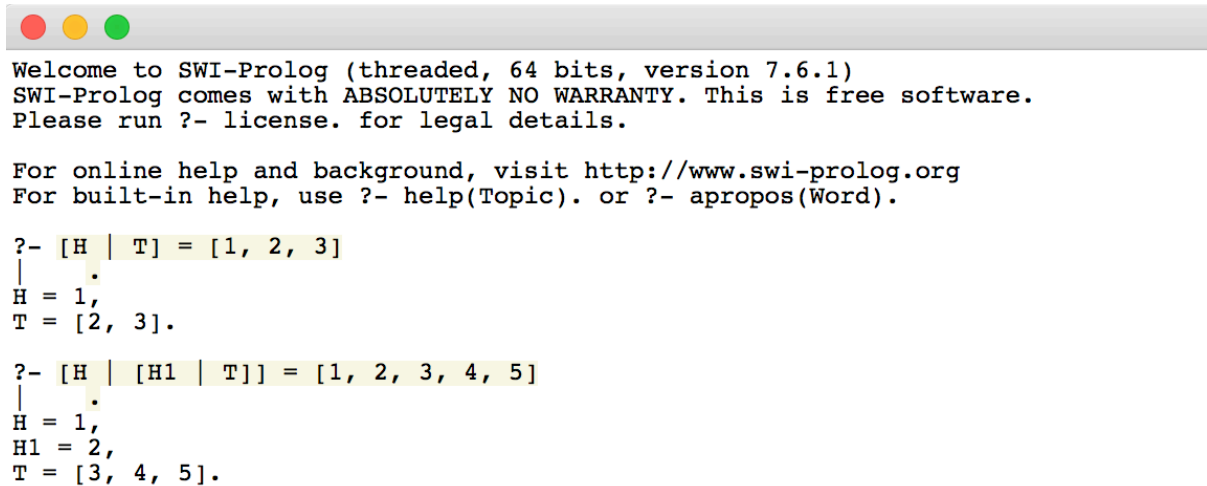
?-
```

The code editor window shows the following Prolog code:

```
1 takes(tom, ct331).
2 takes(mary, ct331).
3 takes(joe, ct331).
4 takes(tom, ct345).
5 takes(mary, ct345).
6 instructs(bob, ct331).
7 instructs(ann, ct345).
8
9 teaches(TEACHER, STUDENT) :- instructs(TEACHER, X),
10     takes(STUDENT, X).
11
12 classmates(STUDENT1, STUDENT2) :- takes(STUDENT1, X),
13     takes(STUDENT2, X).
14
```

Q4. It returns false because ann doesn't teach joe as defined in the facts.

### Question 3.



```
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?- [H | T] = [1, 2, 3]
|
.
H = 1,
T = [2, 3].

?- [H | [H1 | T]] = [1, 2, 3, 4, 5]
|
.
H = 1,
H1 = 2,
T = [3, 4, 5].
```

Figure 1\_ Q1 & Q2

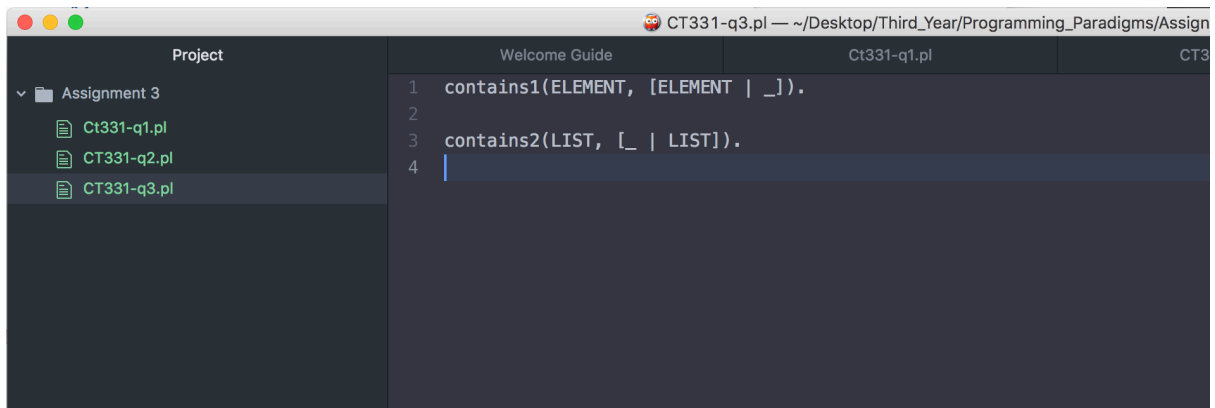
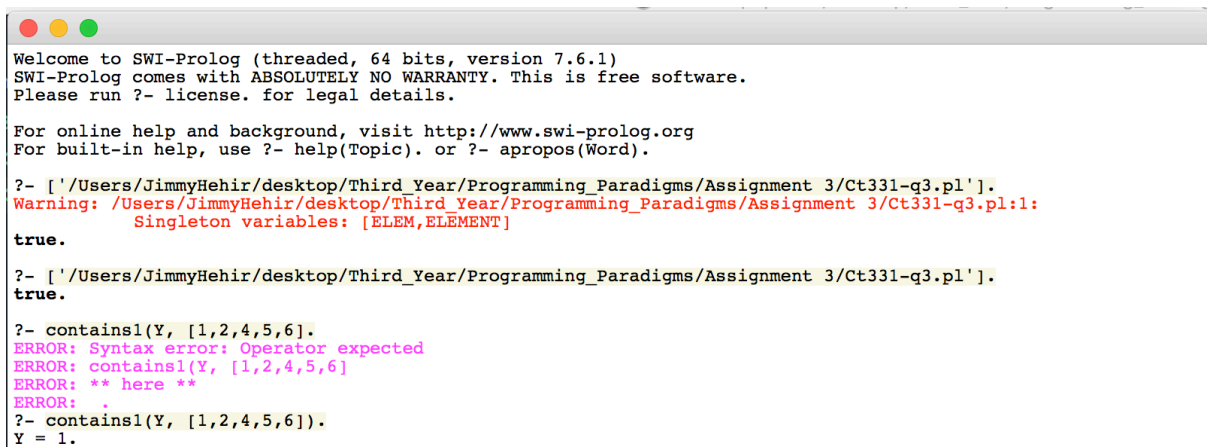


Figure 2\_ Q3 & Q4



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

?- [' /Users/JimmyHehir/desktop/Third_Year/Programming_Paradigms/Assignment_3/Ct331-q3.pl'].
Warning: /Users/JimmyHehir/desktop/Third_Year/Programming_Paradigms/Assignment_3/Ct331-q3.pl:1:
Singleton variables: [ELEM,ELEMENT]
true.

?- [' /Users/JimmyHehir/desktop/Third_Year/Programming_Paradigms/Assignment_3/Ct331-q3.pl'].
true.

?- contains1(Y, [1,2,4,5,6]).
ERROR: Syntax error: Operator expected
ERROR: contains1(Y, [1,2,4,5,6]
ERROR: ** here **
ERROR: .
?- contains1(Y, [1,2,4,5,6]).
Y = 1.
```

Figure 3\_ Q5