

COP4020 Homework Assignment 8

1. Textbook exercise 11.1.
2. Textbook exercise 11.6.
3. Consider the following tic-tac-toe board positions:

X	O	O
	X	X
O		

That is, the program database holds the following facts (in this order):

- x (1)
- x (5)
- x (6)
- o (2)
- o (3)
- o (7)

Show a trace of the execution of sub-goals to solve the goal `'move (X) .'`.

Note: use the tic-tac-toe program shown in the lecture notes, not the one in the textbook, which is slightly different. You can download the program from:

<http://www.cs.fsu.edu/~lacher/courses/COP4020/tictactoe.gz>

On linprog, start Prolog with `'p1'` and load the program with `\[tictactoe] .'` (don't forget the period to terminate the command). Type `'move (X) .'` to query the system, but notice that the starting board positions are different in this demo. Use `'listing.'` to show the program database. Use `'trace.'` to activate the tracer before you enter a goal (use ? for help and type ENTER to creep through the trace). The tracer will help you with this assignment, but in addition you have to write down the trace depth (indentation), show failures, and redos.

4. Now change the position `o(7)` into `o(9)` in the program and trace `'move(X) .'`.

You will notice it takes more steps to find the winning spot for the X.

Let's change the program to see if we can speed it up. Try changing the `move` clause definition into:

```
move(A) :- empty(A), good(A), !.
```

Try `'move(X) .'`. What happens and why?

5. Fix the program so that the new `'move'` clause works. Hint: you might want to change the definition of `'empty'` so that it instantiates the variable to the position of an empty spot.