

Knowledge Representation Laboratory 3: Games in Prolog

CITS3005

This laboratory will involve writing some basic Prolog applications for playing games.

1 Continue tutorial...

Continue with the TutorialPoint Prolog Tutorial, to the end, working through the examples.

2 Countdown Number Problems

The TV quiz show *Countdown* or *Letters and Numbers* have a round where contestants are given 6 numbers and a target and they must form an arithmetic expression (using only addition, subtraction, multiplication, perfect division and each number at most once) that equals that target.

Implement a logic program that solves a given problem:

```
?- solve([25,75,10,4,3,6],X,371).  
X = add(add(multiply(add(25,10),4),multiply(75,3)),6) ? ;  
X = add(add(multiply(add(25,10),4),multiply(75,3)),6) ?
```

The solve function is given a list of numbers, the second argument is an arithmetic expression that uses each number at most once (to be found), and the final number is the target.

3 Logic Program and Games

Implement the tic tac toe playing agent discussed in the lectures and workshop.

- Can you design an agent play optimally?
- How long does your agent take to choose moves?
- Can you improve the efficiency of the agent?

4 Extension

Consider extending your agent to larger games like *Connect 4* https://en.wikipedia.org/wiki/Connect_Four. Can you design an agent that performs well on an arbitrary grid sizes?