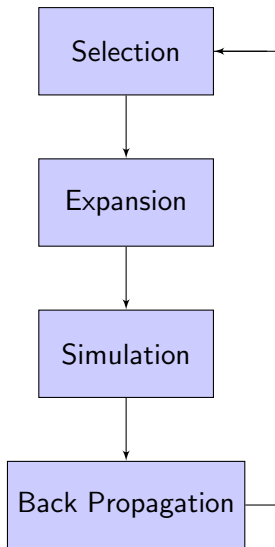# MCTS

Joe De Oliveira

June 2020

Monte Carlo Tree Search
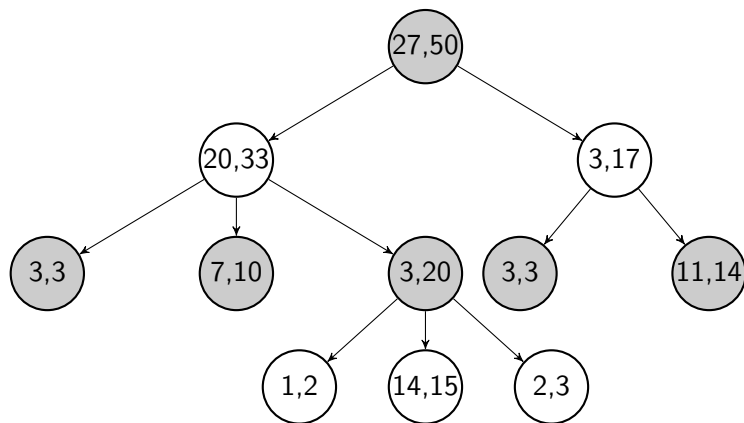
```
- used a lot in games
- build a decision tree using random playout
```

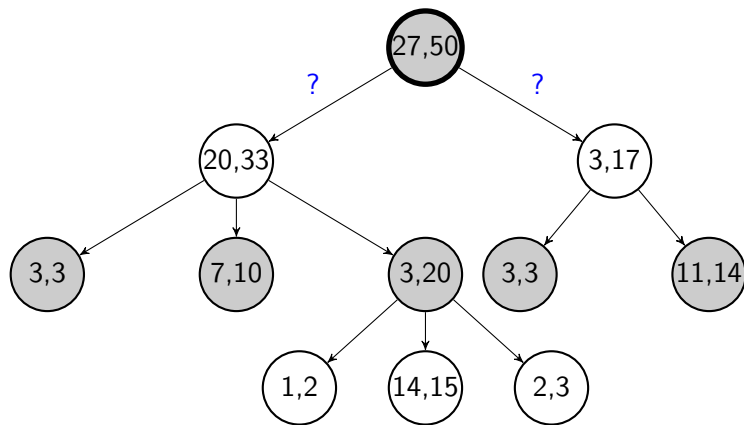# Monte Carlo Tree Search : 4 steps


```
- return a move to play
- any time algorithm
```

Monte Carlo Tree Search : selection
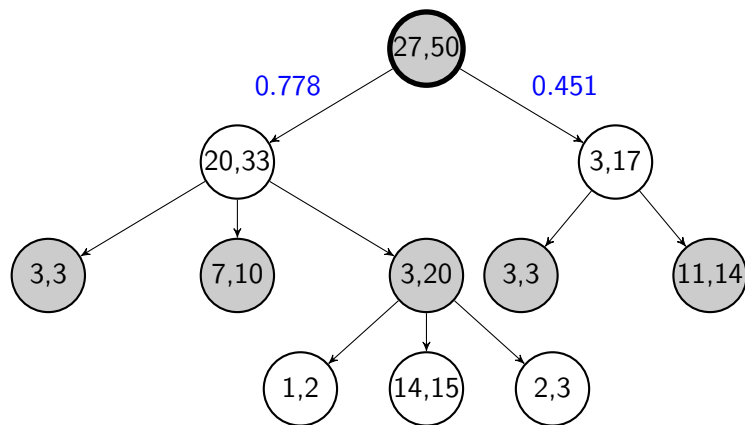
Monte Carlo Tree Search : selection
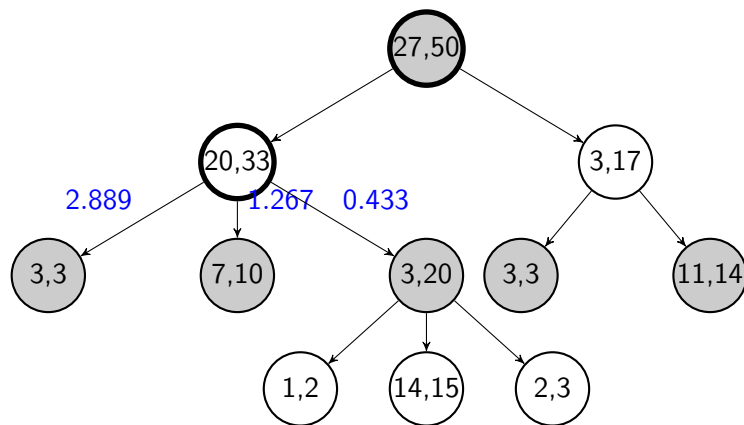
Monte Carlo Tree Search : selection

- Exploration VS Exploitation
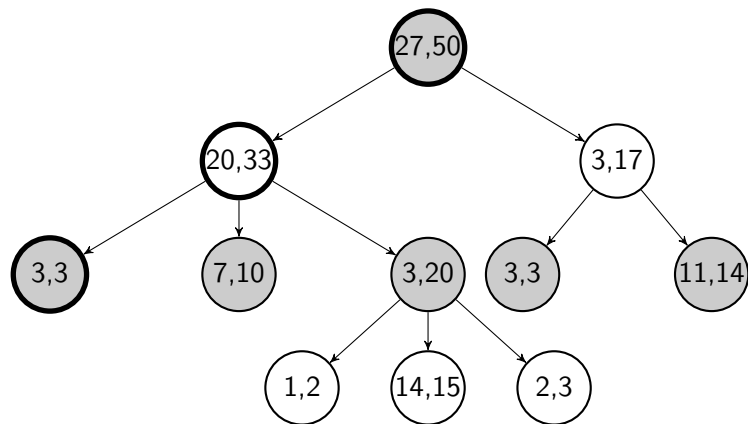
$$\frac{wi}{ni} + c\sqrt{\frac{ln(n)}{ni}}$$
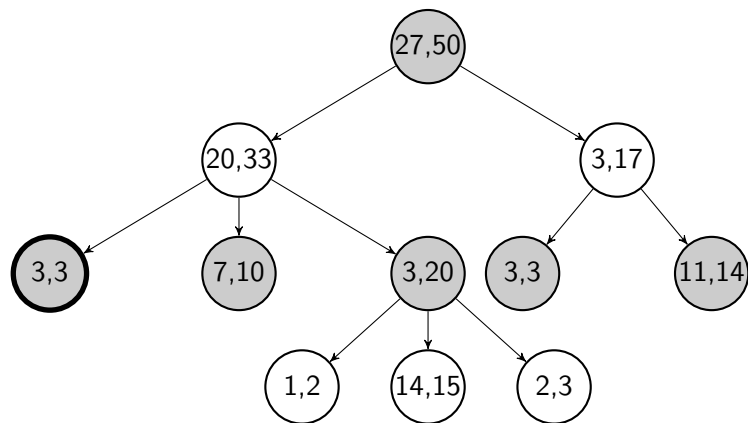
Monte Carlo Tree Search : selection

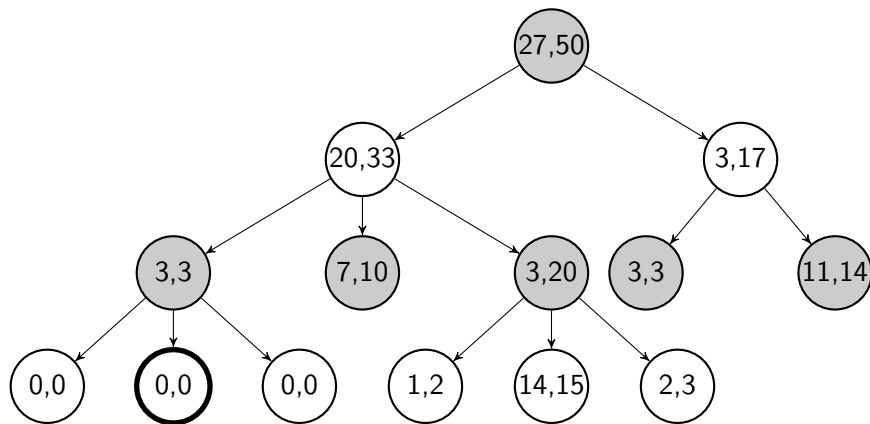# Monte Carlo Tree Search : selection

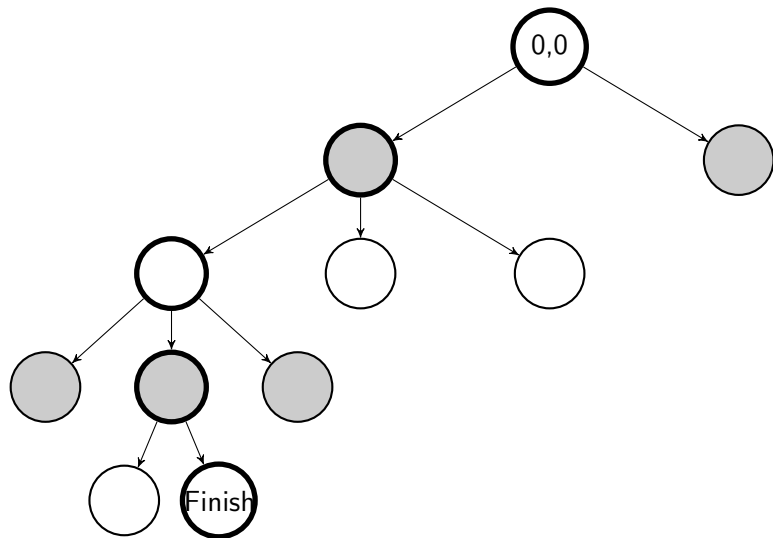# Monte Carlo Tree Search : selection
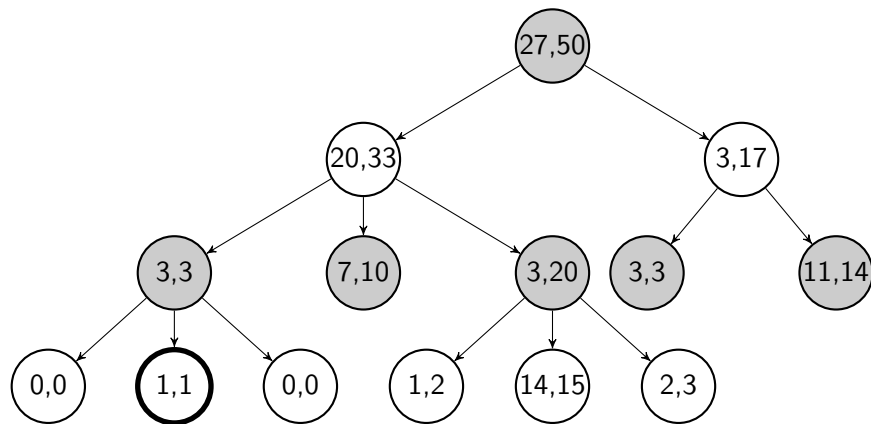
Monte Carlo Tree Search : expansion
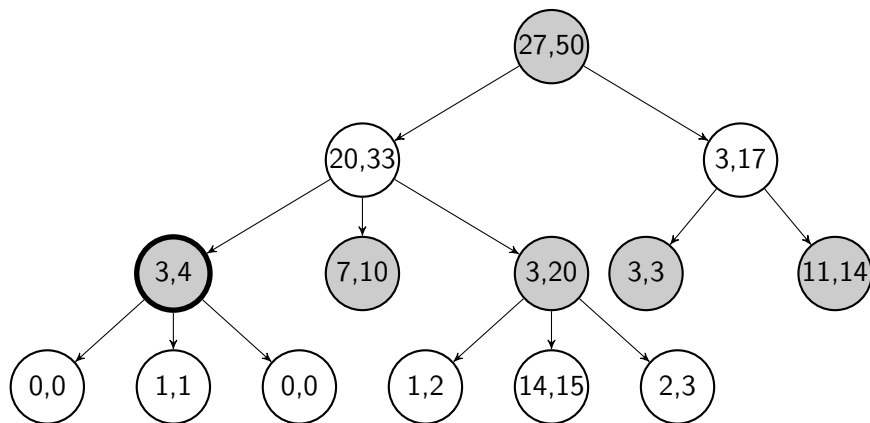
Monte Carlo Tree Search : expansion

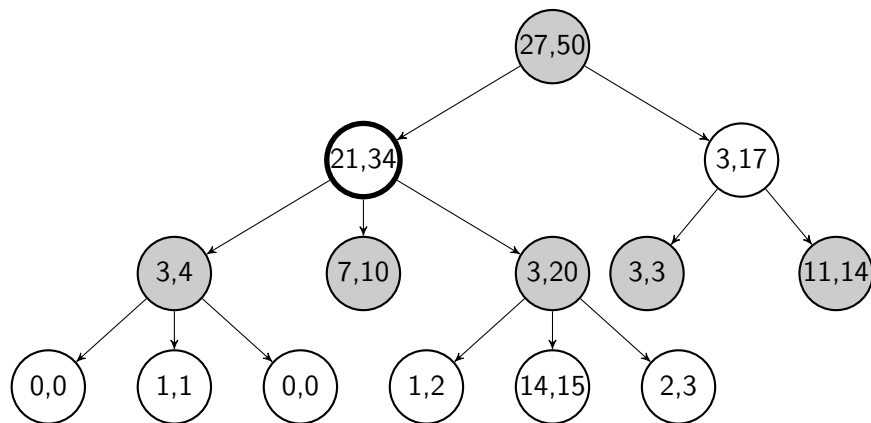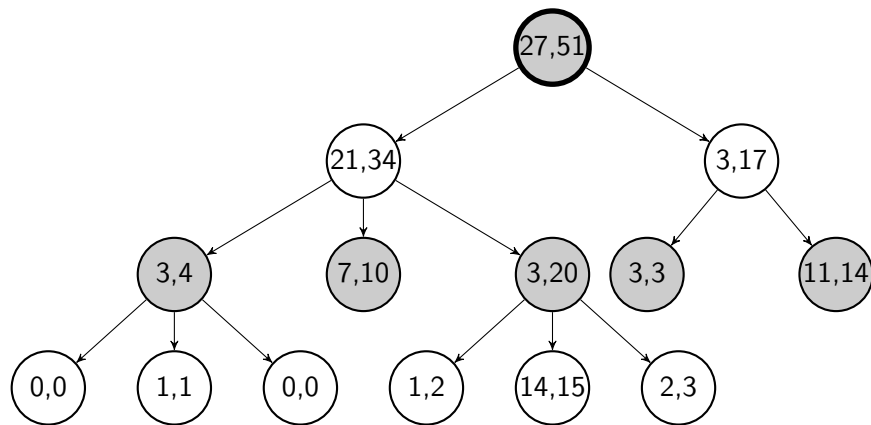# Monte Carlo Tree Search : simulation

Monte Carlo Tree Search : back propagation

Monte Carlo Tree Search : back propagation

Monte Carlo Tree Search : back propagation

Monte Carlo Tree Search : back propagation

Monte Carlo Tree Search

```
- at the end of the iterations we pick the move selected
the most time
advantages :
- scalable
- no need for an evaluation function
```