Search
DD2380

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1. **Describe the possible states, initial state, transition function of the *KTH-fishing derby* game.**
   A state is defined by the position of the hooks and the fish, so the initial state is determined by the initial position of the hooks and the initial position of the fish.
   The transition function is defined by the possible moves of the players' hooks. The function maps the current state to one of the (up to) 5 possible successor states, one for each action: $\mu : PxS \rightarrow \mathcal{P}(S)$, where P is the set of players, S is the set of all possible states and $\mathcal{P}(S)$ is the set of possible successor states to the previous state.

2. **Describe the terminal states of the KTH fishing derby game.**
   The terminal states are those in which the game ends: either because there are no fish left to be caught, or because the game timer expires.

3. **Why is $v(A, s) = Score(Greenboat) - Score(Redboat)$ a good heuristic function for the KTH fishing derby (knowing that A plays the green boat and B plays the red boat)?**
   It is a good heuristic because it encourages moves that maximize A's score and minimize B's score, which is the end goal of the game.

4. **When does v best approximate the utility function, and why?**
   The given heuristic function approximates the utility function the best when the state we calculate it in is a final state, because then the result of the heuristic coincides with the utility function. With this, the closer we are to a final state, the more the heuristic function resembles the utility function.

5. **Can you provide an example of a state s where $v(A, s) > 0$ and B wins in the following turn?** (Hint: recall that fish from different types yield different scores).
   An example of this situation would be a state for which A has a higher score than B and, in the following turn, B catches a fish whose score is enough to surpass A's score.

6. **Will η suffer from the same problem (referred to in Q5) as the evaluation function v? If so, can you provide an example?** (Hint: note how such a heuristic could be problematic in the game of chess, as shown in Figure 2.2).
   Yes, η will suffer from the same problem as v. An example would be a binary tree in which one node leads to 2 terminal states in which A wins, so $\eta(s_1) = 2$, and the other node leads to a terminal state in which B wins plus another node where the tree keeps on expanding, eventually leading to 4 terminal states where A wins, so $\eta(s_2) = 3$. You can see the graph for this example in Figure 1. In this case, an algorithm driven by η would choose s_2, which would lead to B winning in the following move.

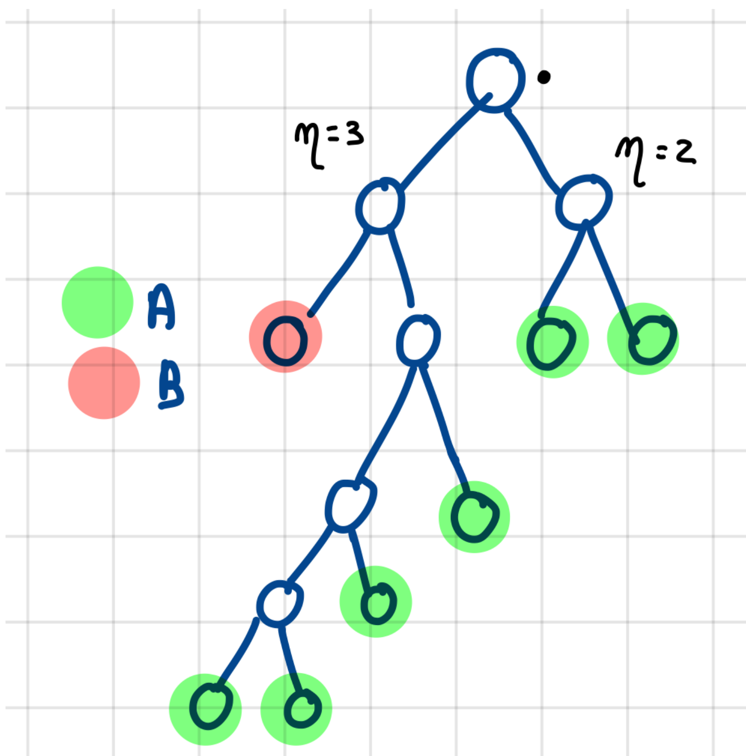

Figure 1: Tree representing an example in which η yields a positive result but B wins in the next move.