Action Models

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1 Action model

1.1 Proposition

$p_{Hit}(x, y) = t$ iff "There is a part of any ship on grid(x,y)"
$p_{Ship_n}(x, y) =$ "There is a part of ship n on grid (x,y)"

There are 6 ships in 10x10 grid:
$Ship_1$ with size of 1x2
$Ship_2$ with size of 1x4
$Ship_3$ with size of 1x6
$Ship_4$ with size of 1x2
$Ship_5$ with size of 1x4
$Ship_6$ with size of 1x6

There are 3 ships in 5x5 grid:
$Ship_1$ with size of 1x2
$Ship_2$ with size of 1x3
$Ship_3$ with size of 1x4

There are 2 agents: $A = \{1, 2\}$
Then we have $L_P AC^2(A, P)$

$M = \{S, \pi, R_1, R_2\}$
where S is the all possible states s and $s = \{s_1, s_2\}$ where s_1 is the player1's broad and s_2 is the player2's broad and also $s_n = \{s_{(0,0)}, ...s_{(10,10)}\}$ where $s_{(x,y)}$ represent state of a particular position on the broad.
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$R_1 = (s_1(x, y), s_1(x, y))$ for all (x, y) and $(s_2(x, y), z_2(x, y))$ for all $z_2 \in S$
$R_2 = (s_2(x, y), s_2(x, y))$ for all (x, y) and $(s_1(x, y), z_1(x, y))$ for all $z_1 \in S$. In other words, relation represents reflection within its own broad state and all state with the same coordinate for other agent's broad.

1.2 Actions

we will be creating a action model:
$[pub(\varphi)]$ which is equivalent to $[\varphi]$
$[hit]\varphi$
$[miss] = [skip]$

1.3 Procedure

The game starts with both agents not knowing anything about the other agents' broad. so for an instance for state $s_1^0(x, y)$, it always holds that
$(M, s_1(x, y)) \models \neg K_2 P_{Hit}(x, y)$
From semantic definition of the knowledge operator
$(M, s_1(x, y)) \not\models K_2 P_{Hit}(x, y)$
$(M, t) \not\models P_{Hit}(x, y)$ for at least one of the states in t s.t. $(s_1(x, y), t) \in R_2$
and since there is are relation to all possible state $s_1(x, y)$ for agent2, there is a state that this formula holds.