Heuristic Analysis

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Project: AIND-Isolation

The three heuristics used in this analysis evaluate the opponents possible moves based on the distance from the center of the board and the opponent (furthest and closest).

Heuristic # 1

The first heuristic evaluates the best move by using the # of player1 moves – 2(# of player 2 moves) subtracting the shortest distance from the center.

The center square has the most moves possible on the board. The idea is that there will be more moves closest to the center than on the corners and the sides of the board. The move returns a higher heuristic score the higher number of moves available and closer it is to the center.

	0	1	2	3	4	5	6
0		P2(3)		D2 P2(3)	C	D3	
1	B2 P2(3)		P1(2)		P2(1)		D4
2	A		P2(2)	B3	D		
3	P2(3)	B	D1	P1(1)	P2(3)		D5
4		P2(3)		B4 D7 P2(3)		D6	
5	B1		B5				
6							

As Player 1 (active player), given the current board there are 4 possibilities:

A = (0,2)
B = (1,3)
C = (4,0)
D = (4,2)

The Player 2 (opponent player) has 7 possible moves.

Just by looking at the board we can see that the closest possible moves to the center are B and D, so we will focus on the best move out of the two.

Heuristic score for B = (5 – 2(7-2)) + (2*5) = 5

Heuristic score for D = (7 – 2(7-2)) + (2*5) = 7

D would be the best move based on this evaluation function.

Heuristic #2

This evaluation function returns the distance that is furthest from the opponent player. The further the active player is from the opponent player the active player ideally will have more moves and prevent the player from being trapped by the opponent.

	0	1	2	3	4	5	6
0	D1		D2,E2 P2(1)		E3		P2(6)
1		C1,E1		D3	P2	E4	
2		D	C2 P2(2)	E			P2(5)
3	C	A1,E6		D4 P2(3)	F	E5 P2(4)	
4	B1, D5		P1		E6		
5	A	C3		B2	G		

6		B	A2	H			

Heuristic score = (activeplayermoves – 2(opponentmoves)) + distance

A = 2 – 2(6) + 5 = 3
E = 6 – 2(6) + 5 = -1

The active player would choose A versus E

Heuristic #3

This evaluation function outputs a score equal to the negative equivalent to the distance your computer player is from the opponent player. The closer the distance, the higher the score. The idea is to stay close to the opponent to reduce the possibility of being trapped.

	0	1	2	3	4	5	6
0							
1							
2							
3							
4							
5							
6							