Heuristic Analysis

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Build a Game-playing Agent

In Chess board game..

Custom Heuristic #1

```
if game.is_loser(player):
        return float("-inf")
    if game.is_winner(player):
        return float("inf")
    moves = len(game.get_legal_moves(player))
    prob_moves =
len(game.get_legal_moves(game.get_opponent(player)))
    return moves * moves - 1.5 * prob_moves * prob_moves
```

The intuition behind this heuristic is...

Custom Heuristic #2

```
if game.is_loser(player):
        return float("-inf")
    if game.is_winner(player):
        return float("inf")
    moves = len(game.get_legal_moves(player))
    opponent_moves =
len(game.get_legal_moves(game.get_opponent(player)))
    return 1.5 * moves * moves - opponent_moves * opponent_moves
```

The intuition behind this heuristic is..

Custom Heuristic #3

```
opponent = game.get_opponent(player)
    opponent_moves = game.get_legal_moves(opponent)
    p_moves = game.get_legal_moves()
    common_moves = opponent_moves and p_moves
    if not opponent_moves:
        return float("inf")
    if not p_moves:
        return float("-inf")
    move_convergence = 1 / (game.move_count + 1)
    inverse_convergence = 1 / move_convergence
    return float(len(common_moves) * move_convergence +
inverse_convergence * len(game.get_legal_moves()))
```

The intuition behind this heuristic is ..

Result:

This script evaluates the performance of the custom_score evaluation function against a baseline agent using alpha-beta search and iterative deepening (ID) called `AB_Improved`. The three `AB_Custom` agents use ID and alpha-beta search with the custom_score functions defined in game_agent.py.

```
**************************
   Playing Matches
**************************
```

Match #	Opponent	AB_Improved		AB_Custom		AB_Custom_2		AB_Custom_3	
		Won	Lost	Won	Lost	Won	Lost	Won	Lost
1	Random	9	1	9	1	8	2	7	3
2	MM_Open	8	2	7	3	8	2	6	4
3	MM_Center	6	4	8	2	8	2	7	3
4	MM_Improved	5	5	7	3	4	6	5	5
5	AB_Open	4	6	5	5	6	4	5	5
6	AB_Center	5	5	5	5	8	2	5	5
7	AB_Improved	4	6	6	4	5	5	2	8
	Win Rate:	58.6%		67.1%		67.1%		52.9%	

There were 5.0 timeouts during the tournament -- make sure your agent handles search timeout correctly, and consider increasing the timeout margin for your agent.

Your agents forfeited 153.0 games while there were still legal moves available to play.