Heuristic Analysis

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As instructed in the project material, I have written 3 custome_score functions in order to evaluate the heuristic value of a game state from the point of view of the given player. The basic concept of those 3 function came from the previous course material (#my_moves - #opponent_moves), and was customised and improved in certain ways.

Function custom score:

This function is the best heuristic function for my project submission. This function is generally the combination of custom_score_2 & custom_score_3 (for the explanations of custom_score_2 & custom_score_3 functions please see the following parts). This function has the highest performance.

Function custom score 2:

This function makes the player aggressive due to the reason it only calculates advantage the player has based on how far ahead or how far behind by comparing the moves that the player has and the player's opponent has. In addition to this, I also applied power to the function, which enhances the advantages the player has. With this calculation implemented, the player would always try to maximise the returned value, which means it would always try to reduce the opponent's moves while the it has the most possible moves.

Function custom score 3:

This function is relatively similar to the first function, the only difference is that instead of enhancing the player's remaining moves, the function enhances the opponent's advantages so the player would be much less aggressive.

Please find performance screenshots in the following pages:

```
****** CODEOWNER
                          Playing Matches
                      ***** Eight Queens.gif
                                AB_Custom AB_Custom_2 AB_Custom_3
Match # Opponent
                     AB_Improved
                                 Won | Lost | Won | Lost | Won | Lost
                      Won | Lost
          Random
          MM_Open
                                             10
         MM_Center
                                           queeh
         MM_Improved
          AB_Center
         AB_Improved
                                   65.7% RE7104%E.md
Used: 13.0m 38.21866416931152
AMAC02V401WHTDG:~ hongru.liu$ python /Users/hongru.liu/Documents/ml/ml/ai_cou
This script evaluates the performance of the custom_score evaluation
function against a baseline agent using alpha-beta search and iterative wi
deepening (ID) called `AB_Improved`. The three `AB_Custom`oagentsnuseaints in
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
          Random
                                             10 | 0
          MM_Open
         MM_Center
          AB_Open
          AB_Center
         AB_Improved
          Win Rate:
                      67.1%
                                   65.7% © 2017 68.6%, Inc.
                                                          T.67-1% Prive
Used: 13.0m 39.14215111732483
```

```
you would like more information about Data Science Training, click the
                                                                        Playing Matches
Reserved this page.
                                   Opponent AB_Improved/o AB_Custom AB_Custom_2 AB_Custom_3 yperson?
   Match #
                                                                              Won | Lost Won | Lost Won | Lost
                                4
                                     AB_Open
             5
                                                                                 6 pagine 4 cur 8 us kig who sticks has pain; 1 7 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks has pain; 1 3 magine 4 cur 8 us kig who sticks have been supported by the sticks have been
                                    AB_Center
             6
                                 AB_Improved
                                                                                 p77.1%art disea71.4%nus you 70.0% the dec71.4% that you will try to remain
                                    Win Rate:
 There were 1.0 timeouts during the tournament -- make sure your agent handles search timeout correctly, and consid
er increasing the timeout margin for your agent, p with a general rule of classification.
 Your agents forfeited 120.0 games while there were still legal moves available to play.
```