Heuristics Analysis

Artificial Intelligent Nanodegree Program

Project 2: Building a Game Playing Agent

Jeanne Sim

17 July 2017

The heuristics methods I used for this project consist:

1) custom_score

```
if game.is_loser(player):
      return float("-inf")
if game.is_winner(player):
      return float("inf")
return float(len(game.get_legal_moves(player)))
```

This method gets any legal moves of the player.

2) custom_score2

```
if game.is_loser(player):
      return float("-inf")
if game.is_winner(player):
      return float("inf")
my_moves = len(game.get_legal_moves(player))
opp_moves = len(game.get_legal_moves(game.get_opponent(player)))
return float(my_moves - opp_moves)
```

This method is the less aggressive method where the the computer player seeks moves with the most options while trying to get in the way of the opponent's move.

3) custom_score3

```
if game.is_loser(player):
      return float("-inf")
if game.is_winner(player):
      return float("inf")
my_moves = len(game.get_legal_moves(player))
opp_moves = len(game.get_legal_moves(game.get_opponent(player)))
return float(my_moves - 2 * opp_moves)
```

Unlike custom_score2, this method is more aggressive where the computer player chases after the player.

Best Evaluation Function

Custom_score3 works as a better function than the rest.

1. An aggressive method was used where the computer player chases the opponent
2. Winning rate is not fantastic as algorithms used are rather basic

Results:

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

Match #   Opponent    AB_Improved   AB_Custom   AB_Custom_2  AB_Custom_3
                      Won | Lost   Won | Lost   Won | Lost   Won | Lost
   1       Random      0  |  10     0  |  10     0  |  10     0  |  10
   2       MM_Open     0  |  10     0  |  10     0  |  10     0  |  10
   3      MM_Center    0  |  10     0  |  10     0  |  10     0  |  10
   4     MM_Improved   0  |  10     0  |  10     0  |  10     0  |  10
   5       AB_Open     4  |   6     6  |   4     8  |   2     7  |   3
   6      AB_Center    6  |   4     8  |   2     4  |   6     7  |   3
   7     AB_Improved   6  |   4     4  |   6     6  |   4     7  |   3
--------------------------------------------------------------------------
          Win Rate:      22.9%        25.7%        25.7%        30.0%
```