**Heuristic Analysis**

**Option 0:**

This is basically the same as ID\_Improved, with score calculated as *#my\_moves - #opponent\_moves*, this is added for my own comparison purposes.

**Option 1:**

This is a more aggressive version of Option 0, with score calculated as *#my\_moves – 2 \* #opponent\_moves*. The reasoning behind it as that this heuristic can impose more penalty on the potential moves if this move does not have a large advantage over the opponent in terms of moves.

**Option 2:**

This heuristic considers the difference between the centre and the player’s current location with Euclidean distance function. A common way of thinking is that the shorter to the centre the better, because in centre it is easier to partition as well as gaining more moves.

**Option 3:**

This heuristic combines option 0 and 2 by adding the results of them, this might yield better result because it tries to compensate more for the loss of advantages of move choices in option 1 while gaining the advantage of closing to centre on the other hand.

RESULTS:

<There maybe randomness involved, so I ran the tournament three times for each of the evaluation functions 1 – 3 and took the average>

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Vs (Win vs Loss) | ID\_Improved | Student | | |
|  |  | Option 1 | Option 2 | Option 3 |
| Random | 17 vs 2.33 | 15.67 vs 4.32 | 16.33 vs 3.67 | 17.67 vs 2.33 |
| MM\_Null | 15.33 vs 4.67 | 14.33 vs 5.67 | 15.67 vs 4.33 | 15 vs 5 |
| MM\_Open | 12.67 vs 7.33 | 13 vs 7 | 12 vs 8 | 14.33 vs 5.67 |
| MM\_Improved | 13.33 vs 6.67 | 13.67 vs 6.33 | 12 vs 8 | 14 vs 6 |
| AB\_Null | 13.33 vs 6.67 | 15.33 vs 4.67 | 14.33 vs 5.67 | 15.67 vs 4.33 |
| AB\_Open | 13.67 vs 6.33 | 12.67 vs 7.33 | 12 vs 8 | 13.33 vs 6.67 |
| AB\_Improved | 11.33 vs 8.67 | 12.33 vs 7.67 | 10.33 vs 9.67 | 12.33 vs 7.67 |
| **summary** | 69.05% | 69.29% | 66.19% | **72.62%** |

Clearly, Option 3 is the most optimum one, although it is just overtaking the others by a few percentages, its overall performance for each of the tournaments is consistently or mostly better than the other options as well as ID\_Improved.

By adding the weight of option 0, we can see a key improvement here compared to option 2, in this case, it is observable that while closest\_to\_centre heuristics can help, its extra computational expenses actually lower its performance, but the expenses are recovered with the addition of option 0. Since it even outperforms ID\_Improved (option 0), I suggest there might be a ensemble relationship between the distance to centre and the number of moves to aid in the final result.