**Table representing players % win rate against other players :**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1 | 50 |  |  |  |  |  |  |
| 2 | 50.5 | 50 |  |  |  |  |  |
| 3 | 50.1 | 50.1 | 50 |  |  |  |  |
| 4 | 58.9 | 50.2 | 59 | 50 |  |  |  |
| 5 | 59 | 58.8 | 59 | 50 | 50 |  |  |
| 6 | 60.1 | 59.3 | 59.2 | 50.5 | 50.5 | 50 |  |
| 7 | 60.2 | 59.6 | 59.5 | 50.5 | 50.5 | 50 | 50 |

1 = [hsPlay]

2 = [safeDomPlay, hsPlay]

3 = [majority1Play,safeDomPlay,hsPlay]

4 = [playToN 61,majority1Play,safeDomPlay,hsPlay]

5 = [playToN 61,preventWinPlay,majority1Play,safeDomPlay,hsPlay]

6 = [playToN 61,preventWinPlay,playToN 59,majority1Play,safeDomPlay,hsPlay]

7 = [play54,playToN 61,preventWinPlay,playToN 59,majority1Play,safeDomPlay,hsPlay]

Table should be read from left to right, so if looking at player5 on row 5, column 2 would represent his win rate against player2, which is 58.8%.

As can be seen from above, each number is also a representative of how many tactics player has, which makes it easier to see how a player develops with additions of new tactics.

To test each player, I took 5 of a same seed and made them play 1000 games for each seed. And then averaged the results to get a good estimate of actual player performance. The 5 initial seeds I choose averaged out to exactly 50% win rate for hsdPlayer vs hsdPlayer which allowed for a good base value.

As can be seen from results, first few tactics only improved the win rate by less than 1% which is most likely caused by how basic their functionality is and for some, only called in extreme cases. However, they provided good bases for the rest of the tactics. The win rate jump dramatically after I’ve added play to win tactic, which is obvious as before the hsdPlayer would jump over 61 most of the times. Other tactics made more improvements but not as impactful. This could be because of relatively rare cases in which they are called. We can also observe that higher end players could only achieve 50% win rate again each other. I belive this is because most of the time I had to assume that opponent player is just playing hs domino in functions such as guessing opponent hand and looking into next few moves in safeDom function. Overall, every change I made improved my players knowledge of the game and had some impact on his performance, especially against hsdPlayer.