

Traae Bloxham
 Dr. Kerby
 CS 2235 Data Structures and Algorithms
 3/18/20

WAR

Glossary

- Turns - steps; rounds; each time the players reveal and compare cards.
- Wars - when the players tie for highest, and must ante up cards, then compare again.
- Nested War - double war; a war that happens at the comparison of a prior war.
- All Out War - a war involving all players. Only available for 3 and 4 players. As with 2 players, every war is all out, and above 4, is impossible, due there only being 4 of a card.
- War Depth - war many layers of wars get nested.
- Cease Fire - a tie game; draw, caused by hitting 1000 turn limit.

Totals for Across 10,000 games

Players	Turns	Wars	Nested	All Out War	Ceasefire
2	456,711	30,271	1,934	x	158
3	454,901	30,246	1,932	1,077	157
4	477,991	34,545	2,161	50	180

Averages per game across 10,000 games.

Number of Players	Turns /per game	Wars /per game	Nested Wars /per game	All Out Wars /per game	Maximum Nested War Depth	Number of Cease Fires
2	42	2	0	x	5	130
3	46	3	0	0	4	173
4	45	3	0	0	4	153
5	45	3	0	x	4	154
6	45	3	0	x	4	155
7	44	4	0	x	5	152
8	44	4	0	x	3	150

Each simulation was run for ten thousand games. Some things to consider about my sim: every ten games my players shuffle their decks; if the game goes for a thousand turns it ends in a draw; if a play goes into a war with only one card, they automatically lose and forfeit the card. All of these were implemented to avoid stagnation.

When operating with only the original shuffle at the start of the game, games would often end in a draw, from cards flowing linearly, and always playing out in a back and forth, but never enough gain to win. The additional shuffles solve this, but functional randomness can still lead to unending games, so the turn cap was implemented. To that same end, the games needed more end conditions, thus the 1 card rule, justified diegetically in game as, "no longer having war funds."

I think I should implement a system where the cards a player wins, are only shuffled into their deck upon running out of cards in their main deck. This way, every card must be played or anted before another is twice. For now the sim is complete