Assignment 1 in Artificial Intelligence
Project part autumn 2018

Daniel Aaron Salwerowicz

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Task 1

a

Distribution of wins is purely decided on chance and given how there are only three possible outcomes from each match: draw, player 1 wins, player 2 wins, and the draws are skipped over we get a situation where about 50% of matches are won by each player. One example is shown in figure 1.

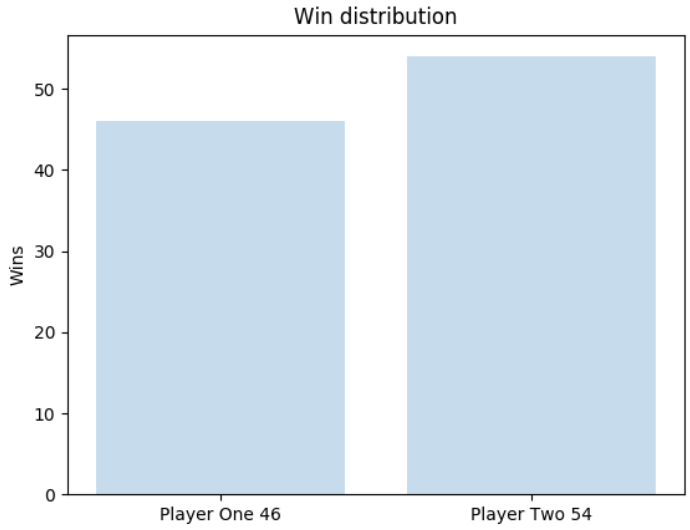

Figure 1: Example results for two player Rochambeau after 100 games.

b

When we add a third player that plays a fixed strategy of always choosing paper we get a following distribution of wins after 100 games, see figure 2.

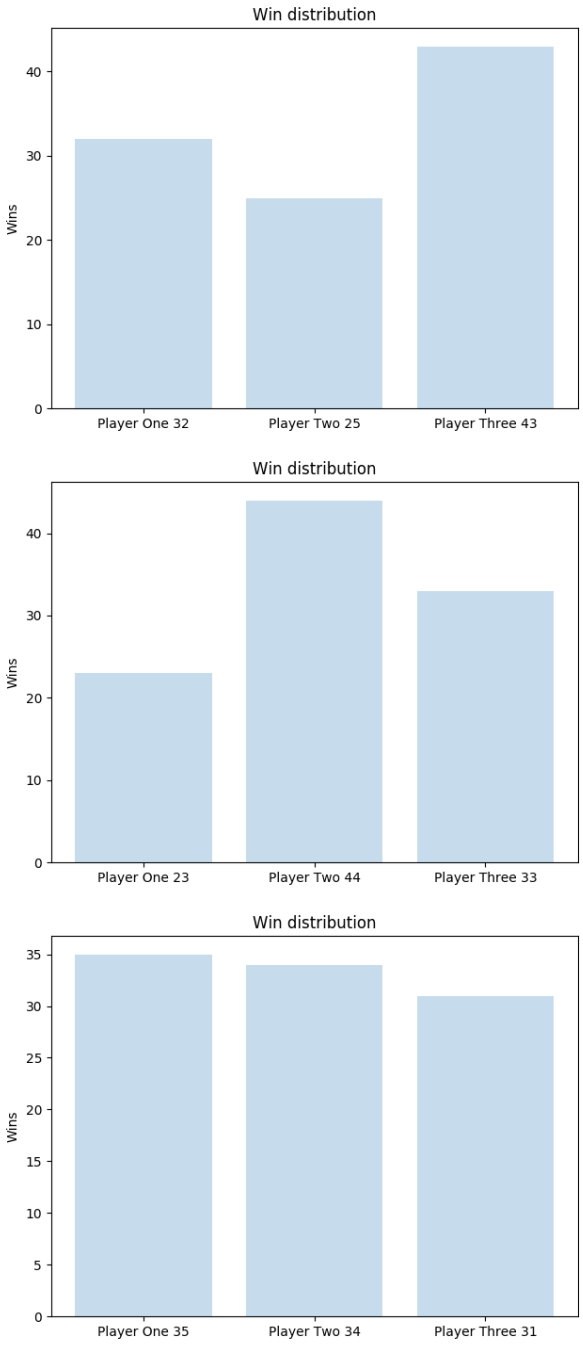

Figure 2: Example results for three player Rochambeau after 100 games.

c

This result is to be expected and after an infinite amount of games, no player will have advantage over another player. This is exemplified in figure 3

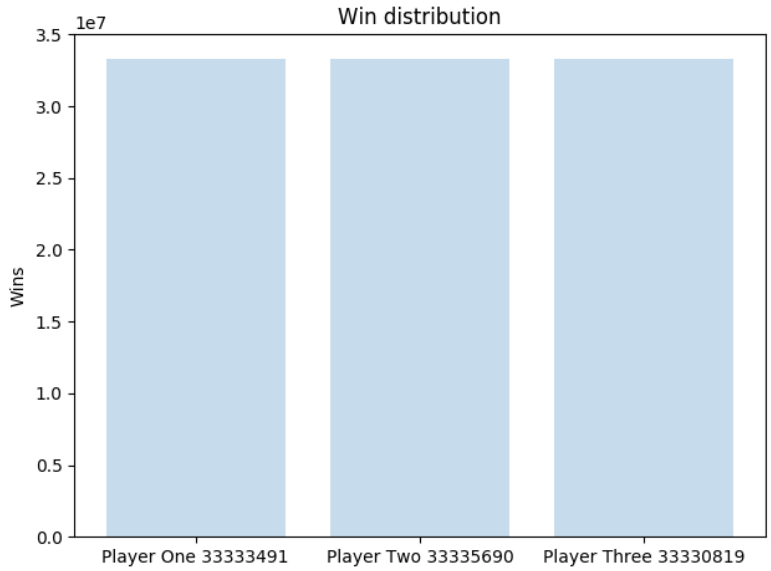

Figure 3: Example results for three player Rochambeau game after 100 million games.

The cause of it is engrained in the way the game is played. Following table 1 shows all possible outcomes for each game. As we can clearly see from it, every player has an equal chance of winning. So they will never manage to beat the one that plays a fixed strategy.

Player 1	**Player 2**	**Player 3**	**Outcome**
Rock	Rock	Paper	Player 3 wins
Rock	Paper	Paper	Draw
Rock	Scissors	Paper	Draw
Paper	Rock	Paper	Draw
Paper	Paper	Paper	Draw
Paper	Scissors	Paper	Player 2 wins
Scissors	Rock	Paper	Draw
Scissors	Paper	Paper	Player 1 wins
Scissors	Scissors	Paper	Draw

Table 1: Table of all possible outcomes when one player plays fixed strategy.

Only way for them to beat the player with fixed strategy would be to have some sort of learning algorithm that would let them remember last moves and results of the last matches, increase or decrease a possibility of a certain move based on that and lastly to decay that knowledge to remove an old bias.