CMPM 146 P2 Experiment 2

For this experiment, we ran a series of 3 simulations of 100 games each between the vanilla MCTS implementation and the modified MCTS implementation. In the first round, both players had 100 nodes. In the second round, both players had 200 nodes. In the third round, both players had 1000 nodes. The modified version used a heuristic that prioritized moves that blocked opponents' wins.

In the simulations that we ran, the modified implementation had more wins for game trees with 100 and 200 nodes. However, for the 1000 node game tree, the Vanilla implementation outperformed the modified one.

The heuristic in the modified MCTS likely provides a significant advantage in smaller game trees by focusing on immediate threats, but as the tree size increases, the vanilla MCTS can explore the game space more thoroughly, allowing it to find deeper, more strategic plays that the heuristic might overlook. This highlights the trade-off between heuristic-driven prioritization and broader exploration.

	Player 1 (Vanilla) Wins	Player 2 (Modified) Wins	Draws	Seconds
Player 1 (Vanilla): 100 nodes Player 2 (Modified): 100 nodes	42	58	0	1354.99 s
Player 1 (Vanilla): 200 nodes Player 2 (Modified): 200 nodes	45	55	0	2651.58 s
Player 1 (Vanilla): 1000 nodes Player 2 (Modified): 1000 nodes	60	40	0	12539.84