

Adversarial Game Playing Agent Report

For this project I chose to implement the Monte Carlos Tree Search agent to play the game Knight Isolation.

After that, I run match between this agent against Minimax, Greedy and Random Agent. The result is show in the table below:

Opponent agent	Number of fair matches	Win rate of MCTS agent
Random	40	100%
Greedy	40	91.2%
Minimax	40	90%

As you can see in the table, Monte Carlo Tree Search (MCTS) outperforms all other agent.

- Random agent: Since random agent have no knowledge of the state of game (except the move it can take), MCTS can easily beat it by exploring multiple paths and evaluate the consequences of each move.
- Greedy & Minimax agents: These agents have better decision than the random one, therefore they can win some matches against MCTS agent. The reason behind this is MCTS is still not perfect and the time might not be enough for MCTS to figure out the best path. However, MCTS is able to win $\geq 90\%$ because MCTS are able to explore much deeper into the game tree, and it only focuses on promising branches.