AI4Games 2020
Exercise 1
Ultimate Tic Tac Toe

10 points
Deadline: 21.10

Your task in this exercise is to write an agent that will play Ultimate Tic Tac Toe[1] using Monte Carlo Tree Search with some additional enhancements.

Base algorithm [3p.]

Implement Flat MC, and pure MCTS with UCT selection policy and random simulation policy.

Write a report (in pdf format) that will contain information about your algorithm's efficiency, i.e., the average number of simulations per second from the initial state of the game (for both Flat MC and MCTS). Shortly describe the experiment setup (programming language used, where was the test performed – CodinGame / own machine, the number of samples gathered / number of seconds running).

Enhancements [2p.]

Implement at least two enhancements among the following ones: MAST, PPA, RAVE, GRAVE, SHOT, NST.

Parameter tuning [2p.]

Tune parameters of the implemented enhancements.

Present in the report the values you tested and achieved results (and experiment setup). Proposed methodology is to check winrate (based on a number of plays) against some common reference agent – either offline using CG Brutaltester[2], or online against some other CodinGamer using CG Benchmark[3].

Method comparison [3p.]

Compare all implemented algorithm combinations (with each and both enhancement on and off) with their best parameters against each other.

Show obtained results and describe the experiment setup in the report. Discuss the results, providing some intuition why they look in the way they look.

Late days [-2p.]

You can still send your solution one week after the main deadline, but the number of received points will be reduced by 2.

[1] https://www.codingame.com/multiplayer/bot-programming/tic-tac-toe
[2] https://github.com/dreignier/cg-brutaltester
[3] https://github.com/s-vivien/CGBenchmark