

TCG 2019 HW. 2 Algo.

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Observation: Overall

- If you have tried to auto-play between the 3 agents...

Observation on Baseline

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 - greedy does not beat random

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 - greedy sometimes even loses to random in a 10-round game ... OAO
 - conservative dominates random
 - However, greedy almost dominates conservative !!!? WTF
- **Domain knowledge** is crucial in traditional search

Observation: greedy

- greedy focus on concept of "attack/defense" based on Manhattan Distance
- Greedy does not sense on the concept "trading".
- In some sense, greedy is trying to **minimize** the game length.

Observation: conservative

- conservative only moves diagonally when it can eat an opponent piece
- Otherwise it only moves either horizontal or vertical
- In some sense, conservative is trying to **maximize** the game length.

Evaluating the game

- Overall game length
- Ways of winning
 - Eating all opponent pieces
 - Landing a smaller piece on diagonal than opponent
- Evaluation can effects your **UCB score** and your **variance** of sampling

Evaluating your MCTS

- Simulation count \propto Effectiveness of your MCTS
- Maximum tree depth is also an important indicator to your MCTS
- Variance of your leaf depth also represents how healthy is your tree

Implementation Detail

- TA code is inefficient
 - Find Position costs $O(N^2)$
 - **Memory leak** on cube structure (causing core dump)
- Space for constant speedup
- Move generation with less noise
- Better management of your memory
- Fix seed for reproduce-able observation