Theory of Computer Games (Fall 2020)
14th NTU CSIE Cup of Computer Chinese Dark Chess

NTU CSIE

Due: 09:00 (UTC+8), January 21, 2021

Outline

Chinese Dark Chess (CDC)

- The game rule could be found here
  https://homepage.iis.sinica.edu.tw/~tshsu/tcg/2020/hwks/rules.pdf
- Final project files can be downloaded from
  https://www.csie.ntu.edu.tw/~tcg/2020/final.php

Outline

Requirements

HW Requirements

1. Implement an agent of **Chinese Dark Chess (CDC)** using NegaScout algorithm.
2. Beat the random AI and the conservative AI.
3. Provide the source code and an executable file on the competition day.
4. Write a report.

Part I: CDC Agent

Basic Requirements

Your agent must have at least the following 6 features (TA will trace your code):

1. Be able to complete a game normally
2. NegaScout algorithm
3. Chance node search
4. Hash table
5. Move ordering
6. End game heuristic

Tournament Rules I

Swiss System

1. The number of rounds is predetermined (8-10)
2. Players are never eliminated
3. In every round, a player is paired against an opponent who has the same or similar points
4. Each round consists of 2 games with alternating first player
5. You can get $S, S \in \{0, 0.5, 1\}$ points for each game
   - Win: $+1$ point
   - Draw: $+0.5$ point
   - Lose: 0 point

Tournament Rules II

1. Time limit for each game: 15 minutes
2. Threefold repetition rule: A game is considered draw if the same position occurs three times
3. 60-move rule: If no capture has occured in the last 60 moves (by both players), the game is automatically a draw
4. You lose if your program crash 2 times in a game
5. In case of any violation, the referee has the right to decide the result of a game or if it may be restarted
6. No appeal against the decision of the referee is allowed

Part II: Report

Report Structure

Your report should include but not limited to:

1. Implementation
   - How to compile and run your code in linux.
   - What algorithms and heuristics you implemented.
   - System overview and structure of your code.
2. Experiments
   - What heuristics/algorithms are useful and/or not useful
   - Provide the winning rate of your agent
3. Discussion
   - What have you learned from this project.
   - Possible improvement of your code.
4. ≥ 5 pages in suitable font size.

Outline

Submission

- Directory hierarchy:
  - student_id // e.g. r08922166 (lowercase)
    - Makefile // make your code
    - src // a folder contains all your codes
    - report.pdf // your report
    - student_id // your executable file, e.g. r08922166
- Compress your folder into a zip file and submit to https://www.csie.ntu.edu.tw/~tcg/2020/final.php.
- Due to server limitation, the file size is restricted to 2 MB.

Important Dates

- Competition date: 2021/01/21 09:30-16:30 at CSIE 204.
- Source code and executable file submission due date: 2021/01/21 09:00
- Report submission due date: 2021/01/22 09:00

Grading Policy

1. Satisfy basic requirements (20 points)
2. Beat the baselines (10 points)
   - Beat Random Agent (5 points)
   - Beat Simple Conservative Agent (5 points)
3. Report (10 points)
4. Bonus
   - Depends on the tournament performance

Beat the Baselines

- One round consists of 2 games with alternating first player.
- We will calculate the total net score of 3 rounds between your agent and the baseline agents
- We consider total net score no less than three as beating the baseline.

Grading Policy

Warning

In the following situation, your score will be very low:

- You claim something you have done, but you didn't.
- Your program cannot be compiled.
- Your program cannot be executed.
- Your program cannot finish a game normally.
- You didn't do anything nontrivial and just upload the template code with slight modification.

Cheating and code copying is against the NTU official code of ethic! Don't try it.