

DATA130008 2019 Fall: Final Project

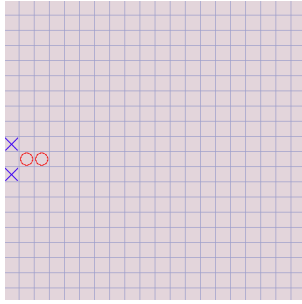
Gomoku

Submitting

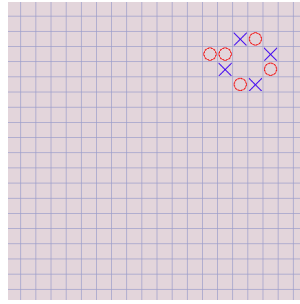
- Server address: <ftp://10.192.7.236/>
- Midterm:
 - Implement **Minimax with Alpha-Beta Pruning** in your agent.
 - Due: **December 11th, 2019**
- Final
 - Implement **MCTS** and improve your agents.
 - Due: **January 12th, 2019**
- Programming language: Python3 (No marks for other language)
- Uploaded file: No more than 20 MB space and named as id.zip
- **No marks for plagiarism!**

Gomoku Rule

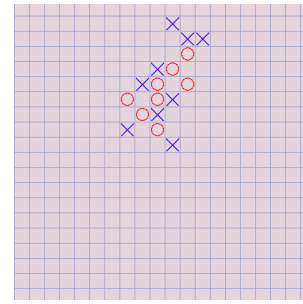
- Chessboard: 20×20 grid intersections.
- Free-style Gomoku: A row of five or more stones for a win.
- Openings: The competition should be started with three openings. The opening file can be downloaded from E-Learning.



Opening1



Opening2



Opening3

AI Agents

We will provide 12 agents for competition, including:

YIXIN17	WINE17	PELA17	ZETOR17	EULRING	SPARKLE
NOESIS	PISQ7	PUREROCKY	VALKYRIE	FIVEROW	MUSHROOM

And 12 matches will be conducted for you with each agent.

- Command line for Combat with AI agents:

```
piskvork.exe -p xxx.exe FIVEROW.zip -opening 1 -rule 0 -memory 512
-timeturn 15000 -timematch 90
```

Grading

- Midterm(30%)
 - Report(70%): No more than 6 pages;
 - Baseline(30%): Full marks if the rating of your AI agent (Minimax with Pruning) is higher than the rating of MUSHROOM;
- Final(70%)
 - Report(50%): No more than 6 pages;
 - Baseline(15%): Implement the MCTS. You need to describe the details and results of your MCTS in the report.

- Rating(35%): $(\text{your final rating} - \text{lowest rating}) / (\text{highest rating} - \text{lowest rating})$.
- * All ratings are calculated using [Bayesian Elo](#) with $\text{eloAdvantage} = 0$, $\text{eloDraw} = 0.01$, and default prior.
- * [Latest Ratings](#) can be found here! (<http://www.sdspeople.fudan.edu.cn/zywei/DATA130008/ranking.txt>)

Grouping

- The group consisting of no more than **two** people is encouraged, otherwise we will take **10%** off each student's grade in this group.
- Include names and IDs of **all** members in your group in the **report**.

Websites

- Gomocup: <http://gomocup.org/>
- Gomoku AI: <http://gomocup.org/download-gomoku-ai/>
- Gomoku manager: <http://gomocup.org/download-gomocup-manager/>
- Python Template: <https://github.com/stranskyjan/pbrain-pyrandom>

References

- (1) Go-moku and threat-space search(1993), Louis Victor Allis and HJ Van Den Herik.
- (2) Searching for Solutions in Games and Artificial Intelligence(1994), Louis Victor Allis.
- (3) Go-Moku Solved By New Search Techniques(1996), Louis Victor Allis, H. Jaap van den Herik, and M. P. H. Huntjens.
- (4) Self-teaching adaptive dynamic programming for Gomoku(2012), Dongbin Zhao, Zhen Zhang, and Yujie Dai.

- (5) Evolving Gomoku Solver by Genetic Algorithm(2014), Junru Wang and Lan Huang.
- (6) Effective Monte-Carlo tree search strategies for Gomoku AI(2016), J H Kang and H J Kim.
- (7) ADP with MCTS algorithm for Gomoku(2016), Zhentao Tang, Dongbin Zhao, Kun Shao, and Le Lv.

For more information, please check slide of lab2. If you have any questions, please contact:

- Li, Zejun, 16307130257@fudan.edu.cn, for platform questions.
- Lin, Xiaoqiang, 16307100046@fudan.edu.cn, for technic support.
- Wang, Siyuan, 18110980001@fudan.edu.cn, for rules and grades.