

# B5 - Artificial Intelligence

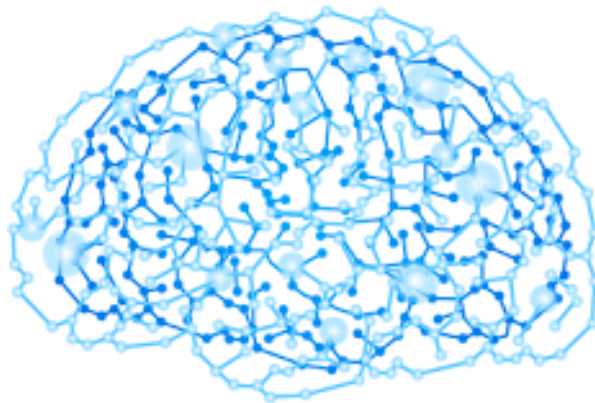
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B-AIA-500

## Gomoku

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Smart Bots for a Simple Game



# Gomoku

binary name: pbrain-gomoku-ai  
language: C, C++, python3.7 (only standard distribution)  
compilation: via Makefile, including re, clean and fclean



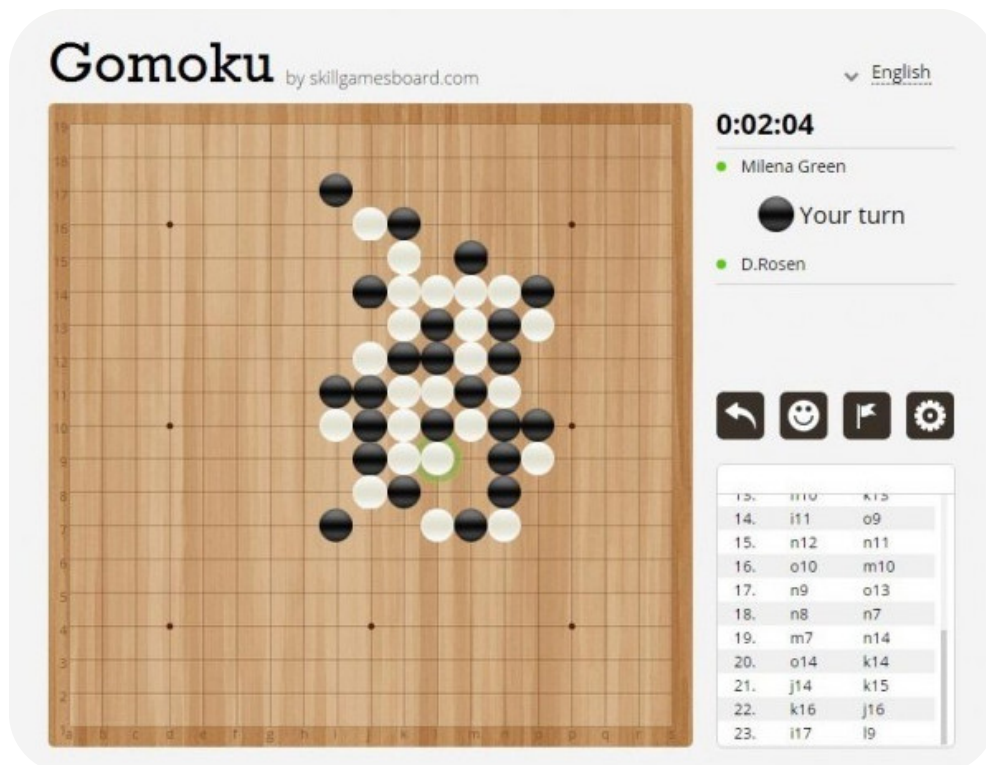
- The totality of your source files, except all useless files (binary, temp files, obj files,...), must be included in your delivery.
- All the bonus files (including a potential specific Makefile) should be in a directory named *bonus*.

The goal of this project is to implement a *Gomoku Narabe* game bot (also called *Wuzi Qi*, *Slope*, *Darpion* or *Five in a Row*), focusing on the performance of its artificial intelligence.

Your bot must be compliant with the [communication protocol](#), but **only the mandatory part**.



Piskvork is freely available on the Internet, along with some bots.  
Challenge them to evaluate your bot's strength!



Feel free to implement an algorithm of your choice for your bot (Min-max, Monte-Carlo, Machine Learning or other). You will be evaluated on the efficiency of your bot, and on this criterion alone.



You may need to develop a rules management algorithm; do not hesitate to enrich your board representation and your data structures to optimize this algorithm!

There are some technical constraints you must comply with:

- whatever development language you choose, your program must compile both **on Windows** (for the final tournament) and **on Linux** (for the automated tests) using your makefile
- **only standard libraries are allowed. No tensorflow or scikit-learn here**



Your program is to be compiled and tested versus other programs automatically

## GAME RULES

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This is a 2-player game that is played on a 20x20 game board (called **goban**). We use a very simplified version of the game. Every player plays a stone at his/her turn, and the game ends as soon as one has a 5 stones in a row (vertically, horizontally or diagonally) - and thus wins.



Watch out! The goban size on Piskvork is 20x20 (and not 19x19) by default...

## GRAND TOURNAMENT

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Your bot will be evaluated based on its results in actual game playing, via a 3-step process:

- **play to win**  
In order to validate the module, your program is intended to understand some winning situations and play the right move.
- **outsmart local bots**  
Programs are matched against bots of low to medium levels. The aim is to maximize your number of victories. Those who accumulate enough victories qualify for the tournament
- **tournament phase (maybe)**  
It is a pool with the 16 best bots based on the evaluation on previous steps. Every pair is matched, and the best score wins the tournament (length of game breaks ties)



## TOURNAMENT RULES

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During the whole process, the rules are as follows:

- **5 seconds** maximum per move,
- **70 MB** of memory per bot,
- a forbidden move automatically leads to defeat,
- the use of a forbidden library leads to elimination.