B5 – Artificial Intelligence

B-IAR-500

Gomoku

Smart Bots for a Simple Game

{EPITECH.}
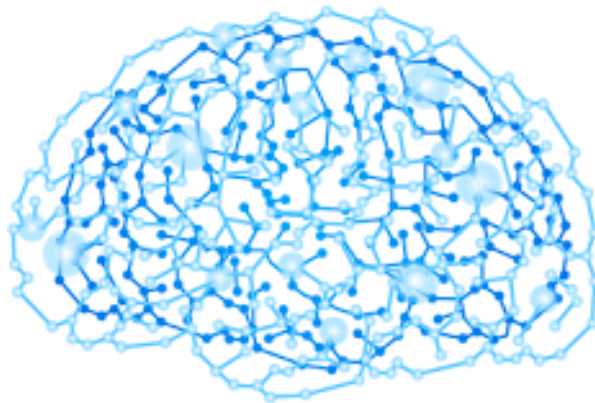
Gomoku

binary name:	pbrain-$CITY$ $-$LEADER-NAME.$LEADER-FORENAME.exe
repository name:	gomoku
repository rights:	ramassage-tek
language:	everything working on "the dump"
compilation:	python3 script called *compile.py*

- Your repository must contain the totality of your source files, but no useless files (binary, temp files, obj files,...).

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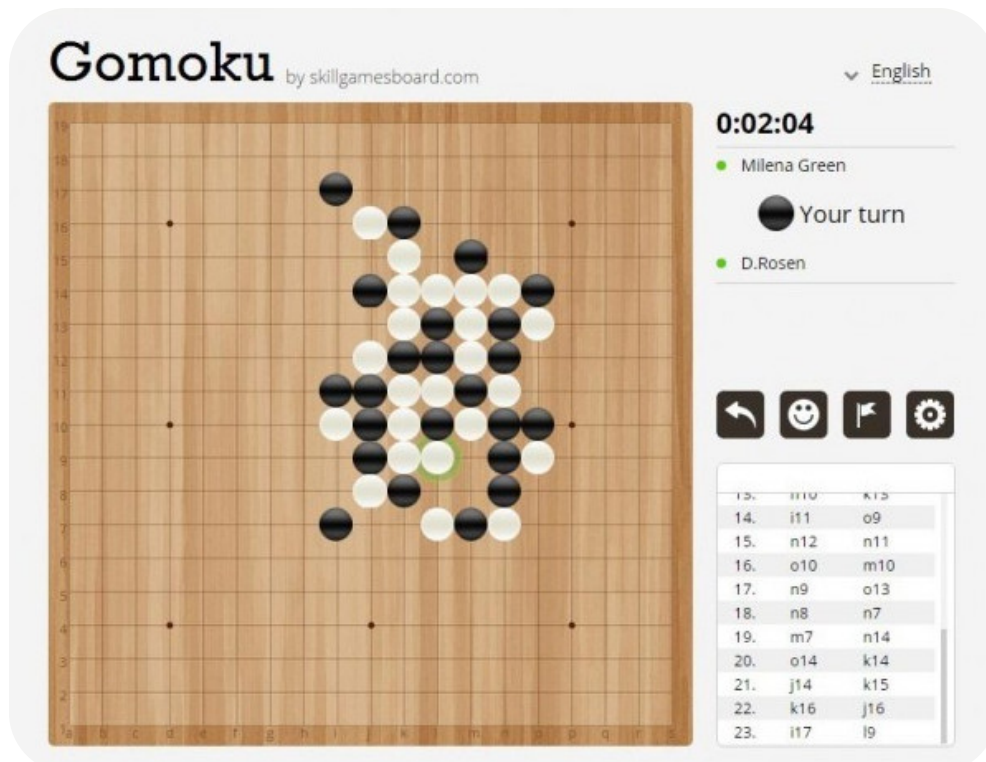
Feel free to implement an algorithm of your choice for your bot (Min-max, Monte-Carlo, Machine Learning or other). You will be evaluated on the efficiency of your bot, and on this criterion alone.

> 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:

- the name of the brain can contain only characters A-Z, a-z, O-9, dash, underscore, dot.
  The name is required **to begin with prefix "pbrain-"** *(directly quoted from the protocol web page)*.

> The name of your bot must formatted the following way:
> *pbrain-TOULOUSE-Norris.Chuck.exe*
> if ever Chuck is the group leader as defined on the Intranet.

- whatever development language you choose, your program must compile **on Windows** using your *compile.py* script that produces an executable (possibly calling Visual Studio 2017, pyinstaller or whichever tool you need).

- **only standard libraries are allowed.**

> Your program is to be compiled by your local intervenor on his/her own machine.
> If you really want to use any fancy language or compiler, discuss it beforehand with him/her!

+ Game Rules

This is a 2-player game that is played on a 19x19 game board (called **goban**). The rules are:

- the first player plays with black stones, the second with white stones;

- the first stone is placed anywhere on the goban;

- the players then alternately put one and only one of their stones on a free intersection;

- the first player to align at least 5 stones (horizontally, vertically or diagonally) wins the round.

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

Grand Tournament

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

- **play-off**
  In order to participate in qualifiers, each bot must pass this phase by beating very basic AIs.

- **qualifiers** (regional)
  Pools are formed, grouping bots from the same city. All the bots inside a pool meet each other. The best bots of each pool qualify for the national championship.

- **pool phase** of the national championship
  It is a round-robin.
  All qualified bots are grouped into 4 pools. The top 4 bots from each pool reach the final phase.

Group A

Rank	Participant	1. Match W-L-T	2. TB	3. Set Wins	Set Ties	4. Pts	Match History
1	Advanced 11	5 - 0 - 0	0	5	0	5	W W W W W
2	Advanced 12	4 - 1 - 0	0	4	0	4	W L W W W
3	Advanced 13	3 - 2 - 0	0	3	0	3	W W L L W
4	Advanced 14	2 - 3 - 0	0	2	0	2	L W W L L
5	15	1 - 4 - 0	0	1	0	1	L L L W L
6	16	0 - 5 - 0	0	0	0	0	L L L L L

Group B

Rank	Participant	1. Match W-L-T	2. TB	3. Set Wins	Set Ties	4. Pts	Match History
1	Advanced 21	5 - 0 - 0	0	5	0	5	W W W W W
2	Advanced 22	4 - 1 - 0	0	4	0	4	W L W W W
3	Advanced 23	3 - 2 - 0	0	3	0	3	W W L L W
4	Advanced 24	2 - 3 - 0	0	2	0	2	L W W L L
5	25	1 - 4 - 0	0	1	0	1	L L L W L
6	26	0 - 5 - 0	0	0	0	0	L L L L L

Group C

Rank	Participant	1. Match W-L-T	2. TB	3. Set Wins	Set Ties	4. Pts	Match History
1	Advanced 31	5 - 0 - 0	0	5	0	5	W W W W W
2	Advanced 32	4 - 1 - 0	0	4	0	4	W L W W W
3	Advanced 33	3 - 2 - 0	0	3	0	3	W W L L W
4	Advanced 34	2 - 3 - 0	0	2	0	2	L W W L L
5	35	1 - 4 - 0	0	1	0	1	L L L W L
6	36	0 - 5 - 0	0	0	0	0	L L L L L

Group D

Rank	Participant	1. Match W-L-T	2. TB	3. Set Wins	Set Ties	4. Pts	Match History
1	Advanced 41	5 - 0 - 0	0	5	0	5	W W W W W
2	Advanced 42	4 - 1 - 0	0	4	0	4	W L W W W
3	Advanced 43	3 - 2 - 0	0	3	0	3	W W L L W
4	Advanced 44	2 - 3 - 0	0	2	0	2	L W W L L
5	45	1 - 4 - 0	0	1	0	1	L L L W L
6	46	0 - 5 - 0	0	0	0	0	L L L L L

- **final phase** of the national championship
  It is a double elimination tournament, with loser brackets, starting in 8th-finals.

Tournament Rules

During the tournament, the rules are as follows:

- **5 seconds** maximum per move,

- **70 MB** of memory per bot,

- a forbidden move automatically leads to defeat,

- the qualifications and the round-robin of the national championship take place in **3 rounds**,

- the final phase of the championship takes place in **5 rounds**.

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