Frankfurt University of Applied Sciences
OOP Java Project, WS22/23

Snakes AI

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1 PROJECT SCOPE

This project focuses on reestablishing Snakes, one of the most iconic cross-platform games, in a new light. The special feature here is that instead of moving one single snake manually on the playing field, two intelligent Snake bots compete against each other, which should be developed in the Java programming language. The aim of a bot is to be the last standing snake or score the highest number of points by eating apples in 3 minutes.
A framework consisting of 10 classes is available for the project. It ensures smooth gameplay and provides you with all the important information about
- the current position of the snake
- the current position of the opponent's snake
- the current position of the apple
- the playing field

Snakes AI has a very simple interface for creating bots. To create a working bot, all you have to do is to implement a class that implements the *Bot* interface. In a way, this class represents the "brain" of the bot. It contains one single method *chooseDirection()*, which returns the direction for the next step of the Snake *(up, down, left* or *right*). For the

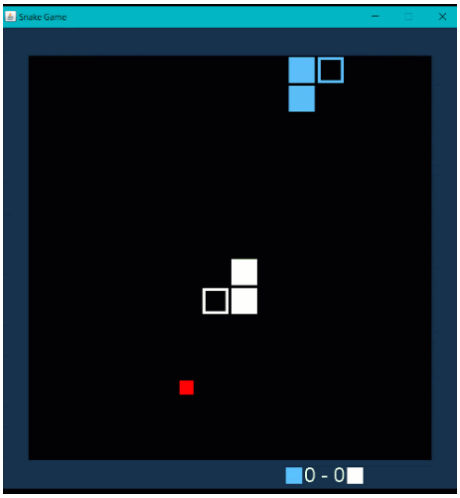

Figure 2: Snakes AI User Interface

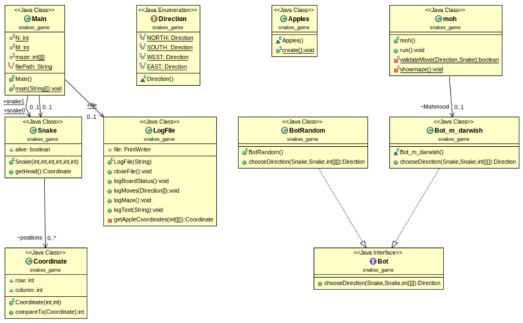

Figure 3: Snakes AI Framework Structure

implementation of the bot you should use algorithms from the fields of Artificial Intelligence and/or Machine Learning.

2 GAME RULES

The rules are described as follows:

Rule 1: A bot controls only the direction (going either north, south, east, or west) to be taken by its own snake.
Rule 2: Snakes always move simultaneously and forward. Their size increases by one position (i.e. pixel) after taking an apple.
Rule 3: A snake loses in any of these conditions:
a. If it leaves the board;
b. If it hits its own body;
c. If it hits the other snake's body;
d. If it takes more than one second to make a decision (i.e. which direction to take).
Rule 4: If snakes collide head to head, the longest snake wins the game.
Rule 5: Apples appear randomly at an unoccupied position of the board, and there is only one apple available at any time.
Rule 6: An apple will disappear if it is not eaten by either snake in 10 seconds and reappear somewhere else on the map.
Rule 7: At the end of the tournament, players are ranked according to the number of victories; then the number of draws; then the result of their matches. If they are still tied, they are considered as having the same position.

3 RESOURCES, TOOLS AND TUTORIALS

More information on how to develop your AI Snakes bot can be found at the following online resources:

- General Information about the contest:
  https://sites.google.com/view/ai-snakes-game/home
- GitHub repository (Snakes AI Framework):
  https://github.com/BeLuckyDaf/snakes-game-tutorial
- Playlist teaching from zero to hero:
  https://www.youtube.com/playlist?list=PLo1hWvSDW4TIE7mcCjnegYAgdBJP5BNnA
- Step-by-step tutorial:
  https://hackmd.io/xtYO1rSjQOC9vq0A5EH5FA?view

One last hint: The code already contains some fully implemented and simple bots, e.g. one that randomly chooses the next direction. They can be used for testing purposes to have your bot(s) fight against them.

And now we wish you success and lots of fun! :)

References

[1] IEEE CoG - AI Snakes GAME 2022. Accessed on 25 November 2022.
Available at: https://sites.google.com/view/ai-snakes-game/home.