

Morpion Solitaire

Developer's guides

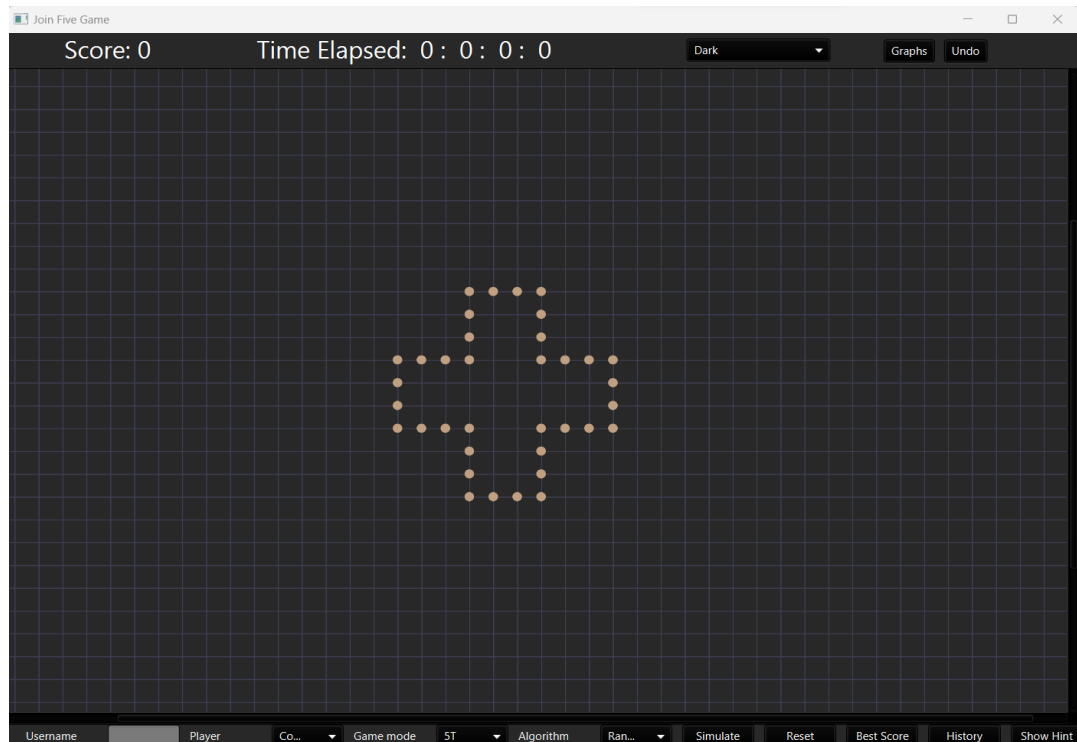
Quyen Linh TA

Ha Anh TRAN

1. Starting the game

To start a game, you need to run the JoinFiveApplication.java file

A game board will appear by default with the color "Dark" which you can change to "Light" by clicking on the small arrow.



2. Game setup :

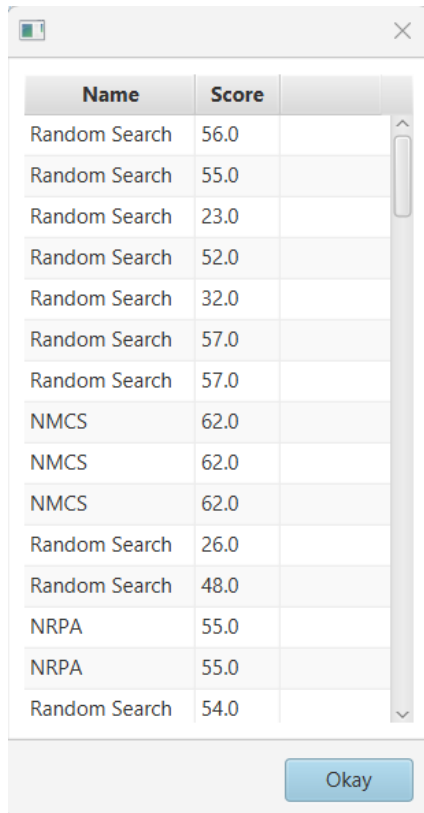
Start by choosing the game mode. You can choose between 2 modes in the "Player" tab: "Computer" mode, which will use implemented algorithms to play a game automatically, or "Human" mode, which will allow you to play. Depending on the game mode, you can configure the parameters of the game.

a. In common

As requested in the topic, you also have two different game modes which is 5T and 5D. The "Reset" button is used to restart a new game at any time during a game already in progress.

The "Best Score" button keeps the best score made by the human or the computer. As soon as there is a new best score, it is updated automatically.

The "History" button will show you the history of all games played in both game modes.



Name	Score	
Random Search	56.0	
Random Search	55.0	
Random Search	23.0	
Random Search	52.0	
Random Search	32.0	
Random Search	57.0	
Random Search	57.0	
NMCS	62.0	
NMCS	62.0	
NMCS	62.0	
Random Search	26.0	
Random Search	48.0	
NRPA	55.0	
NRPA	55.0	
Random Search	54.0	

Okay

The "Show Hint" button will give you hints that will allow you to make a 5 point line. These hints are updated automatically after each point you play. Normally this mode is only useful for the "Human" player profile. However, you can activate it when the computer is playing. The clues will always appear if you do not disable the button.

The "Undo" button allows you to backtrack as many times as you want to 0.

b. Player : Computer

If you choose the computer mode, you can choose which algorithm the computer will use. You can choose between: RandomSearch, NMCS and NRPA. All three algorithms have been implemented.

After deciding which algorithm it will use, click the "Simulate" button. The computer will start the game. While the computer is running the algorithm, the "Stop" button will appear and allow you to stop the game at any time during the game.

3. Description of the game board:

The "Graph" button gives you an overview of the performance of the three algorithms implemented in this project. The graphs are updated automatically after each game played.

You also have the Score tab which is updated after each point played. The tab "Time Elapsed" is only activated if the computer plays with the algorithms "NMCS" or "NRPA". It records the actual time that the computer plays.

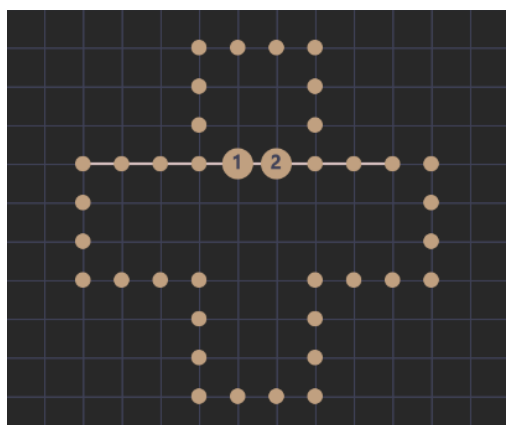
4. Game rules :

Morpion Solitaire is played on an infinite square lattice. Initially 36 crosses are drawn on lattice points so that they form a large cross shape with edge length 4 as shown in Figure 1. In this figure, a cross is denoted by a circle. (In this paper, the length of a line segment means the number of crosses covered by it.) A move consists of the following two steps applied in this order. The objective of this game is to maximize the number of moves. 1. Draw a new cross on a lattice point which is empty (no cross exists) on the current board. 2. Draw a segment of length 5 (called a line) that passes through exactly five consecutive crosses including the one drawn in step 1 of this move. Here, the line can be drawn in either one of the four directions, vertical, horizontal, or diagonal. Two lines in the same direction may not overlap.

There are two variants of this game depending on whether two lines in the same direction can touch (5T) or have to be disjoint (5D)

a. Mode 5T

Two lines on the same alignment can touch at the ends.



b. **Mode 5D**

Two lines on the same alignment cannot touch, they must be separated.

