

User's Manual

Start the Program

- Start the server
 - Compile the `server.pl` file in the `prolog` folder and start it by executing the predicate `server` (i.e., if the file was compiled using *SICStus Prolog*, by typing: `server.` (including the period mark))
 - The server can be terminated by closing the *SICStus Prolog* window or by typing `localhost:8081/quit` in a web browser. This sends the *quit* command to server, closing it.
- Run the source code
 - This can be done by executing the application *Mongoose* in the folder with the source code. This should open a window in the computer's default browser with the program running.
 - This can be done before or after the start of the server, as long as the server is running when the user starts a new game. If the server is not running when the user starts a new game, a notification will inform the user of this fact. The user can, then, start the server a start a new game without the need of rerunning the source code.
 - The user can then edit the game options and start the game

Game Rules

Eigenstate is an abstract strategy game for two players.

Each player controls six pieces. The objective of the game is to reduce the number of the opponent's pieces to one. As a secondary objective, when both players control exactly two pieces each, both players should, instead of following the main objective (which would be unattainable, unless one player chooses to lose on purpose), to fill one of their pieces with pins. This way, the game can never end in a draw.

Each piece starts with two pins. The central pin represents the piece's current position in the board and the other pin allows the piece to be moved one space forward.

The players alternate taking turns. In a player's turn, that player should move one of their pieces and, after that, add two pins to any one or two of their pieces, increasing this way the number of available moves of those pieces during future turns. Players may relinquish one or both of their pin placements. The pins in a piece, excluding the central pin, represent the possible moves of that piece relative to its current position in the board.

- Pins placed in a piece can never be removed. This way, a piece can, at least, always move forward
- Pieces can jump over other pieces
- Pieces cannot move outside of the board
- Pieces cannot be rotated

- Pieces cannot move backwards, barring having a pin placed in them allowing them to do so
- When a piece is moved to a square already occupied by another piece (regardless of which player's piece that is), that piece is removed from the game (being, in most situations, unadvisable to capture your own pieces)
- Pins must be placed in the available spaces in the player's pieces that are still in the game. Pins placed in the same turn may be placed in different pieces or in the same piece

User Instructions

- Piece movement and pin placement
 - Piece movement and pin placement are both done using the mouse
 - Pieces can be moved by, first, being selected when they appear highlighted, followed by selecting one of the highlighted squares that show the available moves of that piece. Players can choose to change the selected piece by selecting another one, as long as it remains highlighted.
 - Pins can be placed by selecting one of the highlighted pins. Players can relinquish one of their pin placements by selecting an already pinned space
- Button Functionality
 - Number keys – Change between the different themes
 - N key – Start a new game
 - U key – Undo last play
 - V key – Start game film animation
- GUI
 - Options
 - Mode – Change between different game modes (Player vs Player, Player vs AI and AI vs AI)
 - Difficulty – Change AI level (i.e., AI's tree search depth – levels 1, 2 and 3)
 - Time to Move – Change the amount of seconds a player has to complete its turn (from 30 to 900)
 - Look
 - Theme – Change between the different themes
 - New Game – Start a new game
 - Undo – Undo last play
 - Game Film – Start game film animation