Yolah Board Game

Building a Two-Player Perfect-Information Game with AI Players

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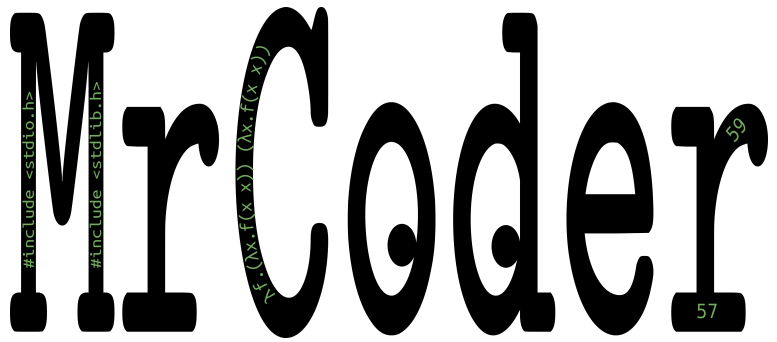
MrCoder
#include <stdio.h>
#include <stdlib.h>
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59
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C’est en forgeant qu’on devient forgeron

À Sarah, Hugo et Célya ❤

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Chapter 1

Introduction

1.1 The Yolah Game

I created the Yolah game to illustrate effective techniques for implementing board games and artificial intelligences for my students. I was inspired by the penguin game, whose box you can see in Figure 1.1 (I highly recommend it ☺)

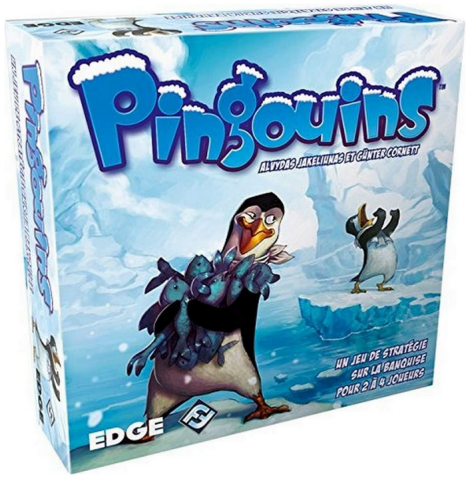

Figure 1.1: The Pingouins game box

Important

I have done my best with my current knowledge (*ars longa, vita brevis*) to implement my game and the associated AIs. But like any good scientist, you should look at my work with a critical eye. I wrote the book in French (easier for me) and asked an AI assistant (Claude [1]) to translate it for me.

I will now describe the rules of the game, then I will explain why I chose these rules, I will give an example of a game between two AIs and then I will present the rest of the book.

1.1.1 Game Rules

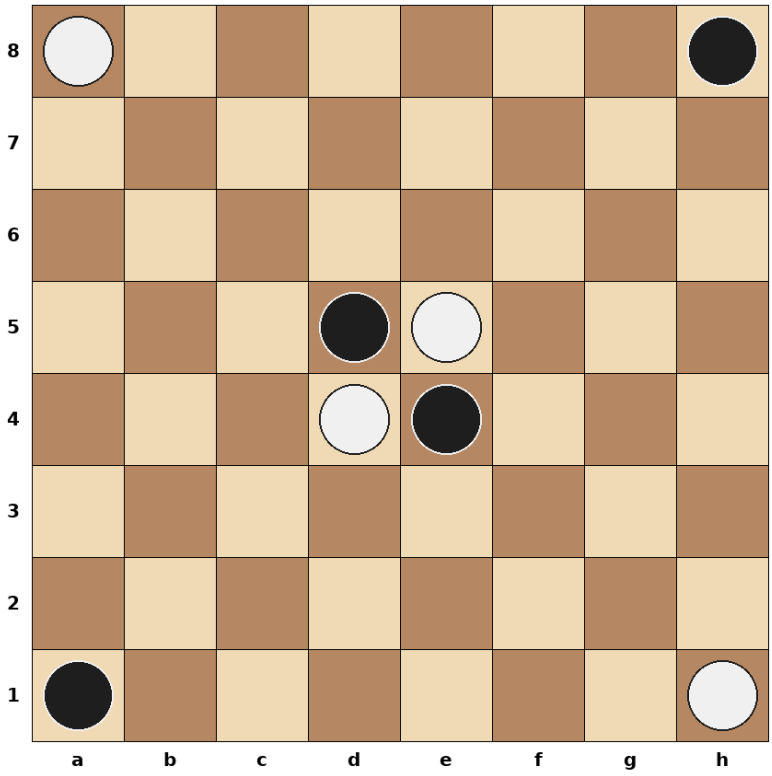

Figure 1.2: The initial configuration of the Yolah game

The Yolah game board is shown in Figure 1.2. You can see four black pieces and four white pieces placed symmetrically. Black starts by choosing one of their four pieces. A piece can never disappear from the board because Yolah is a game without captures. A piece moves in all eight directions as far as it wishes as long as it is not blocked by another piece or a hole (a concept we will soon discuss). For example, if black chooses to move their piece located at `d5`, the squares where it can land are indicated by small black crosses in Figure 1.3.

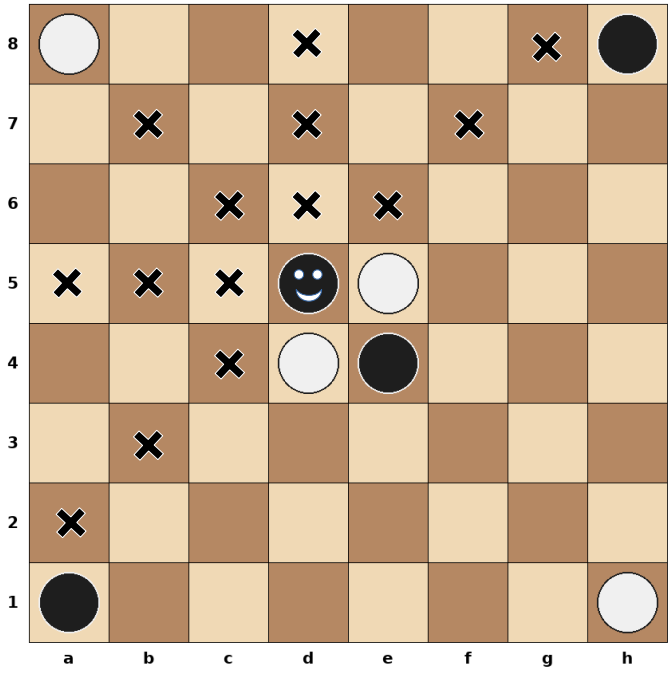

Figure 1.3: Possible moves (small black crosses) for the black piece identified by a smiley (square `d5`)

Now, if the black piece at `d5` moves to `b7`, which we will denote as `d5:b7`, we get the configuration shown in Figure 1.4. Notice that the starting square of the black piece disappears and becomes a hole! This square (this hole) becomes inaccessible and impassable for the rest of the game! This will create opportunities to block the opponent and try to create areas where the opponent cannot go.

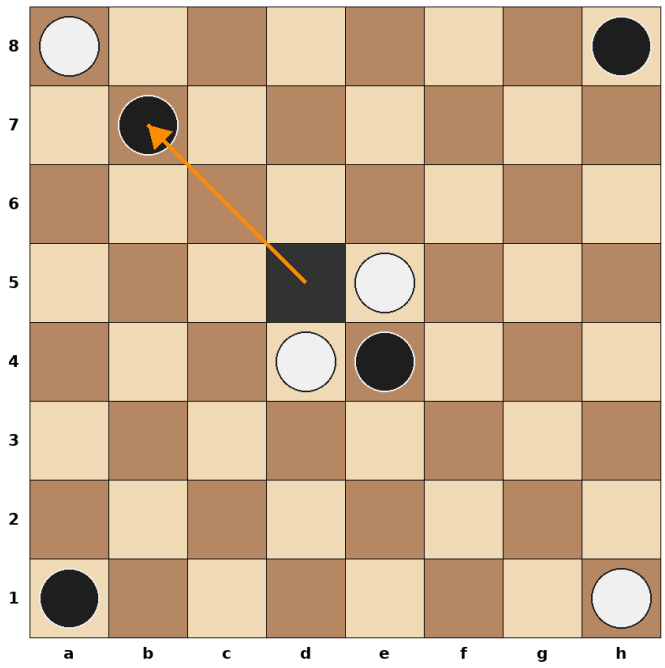

Figure 1.4: Black just moved from `d5` to `b7`. The starting square `d5` becomes inaccessible and impassable for the rest of the game

A move earns one point for the player who just moved. For example, in the configuration of Figure 1.4, the black player has one point and the white player who has not yet moved has zero points. The goal of the game is quite simple to summarize: you must move longer than your opponent!

Now it is white's turn to play. They must decide which white piece they will move. Suppose it is the piece at `e5`. The possible moves for this white piece are shown in Figure 1.5. If white decides to make the move `e5:f5`, we end up in the configuration of Figure 1.6 and the score is one point each (each player has played one move).

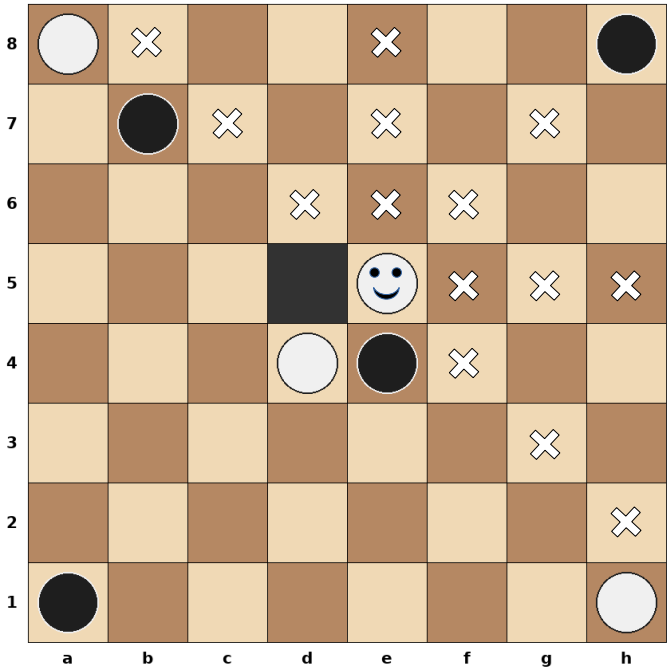

Figure 1.5: Possible moves (small white crosses) for the white piece identified by a smiley (square `e5`)

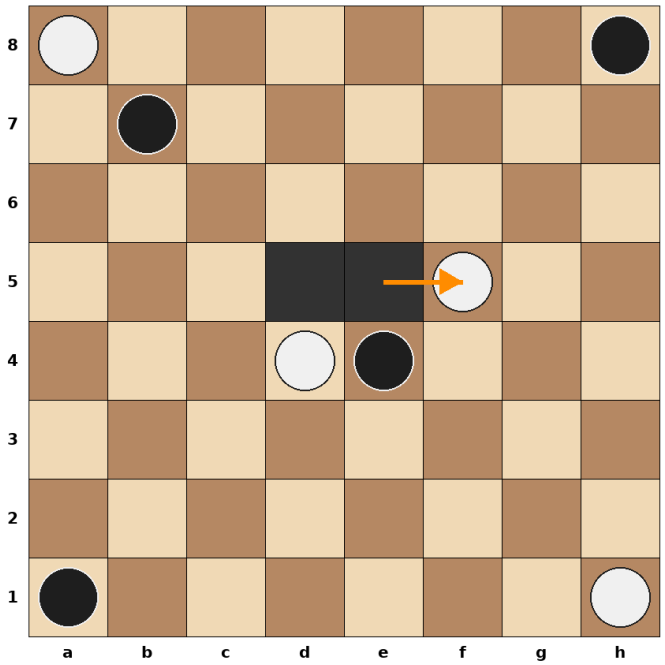

Figure 1.6: White just moved from `e5` to `f5`. The starting square `e5` becomes inaccessible and impassable for the rest of the game. The score is one point each (each player has moved once)

To summarize, the rules of Yolah are as follows:

- The game is a two-player game (black and white) played in turns.
- Each player has four pieces.
- On their turn, the player chooses one of the pieces that can still move; if no piece can move, they pass their turn (we will denote passing the turn by the move `a1:a1`).
- They must move the chosen piece in one of the eight directions, as many squares as desired, but must not land on or be blocked by a piece or a hole.
- After moving the chosen piece, the starting square of the move becomes a hole and can no longer be crossed or landed on.
- After each move, the player earns one point.
- The game ends when both players can no longer move.
- The player with the most points wins the game.
- If both players have the same number of points, the game is declared a draw.

1.1.2 Interesting Characteristics of Yolah for Developing AIs

1.1.3 Game Example

1.1.4 What's Next

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Chapter 8

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Chapter 9

Conclusion

Bibliography

[1] Anthropic. *Claude Sonnet 4.5*. https://www.anthropic.com/claude. Large Language Model. 2025.