

Can Julia win the Game of Life?

Florian Schröder

Supervisor: Gerasimos Chourdakis

Abstract. This paper gives an overview of Conway's Game of Life (and cellular automata in general) and various implementations of it in the Julia programming language. It is mostly based on Daniel Shiffman's Nature of Code [[Shi25](#)].

1 Introduction

2 Cellular Automata

2.1 Understanding cellular automata (1D)

Grid, states, neighborhood, function which creates the new state

2.2 Jump to 2D cellular automata (Game of Life)

The theory of moving to 2D (now where displaying the "history" by using an animation)

3 Implementation

3.1 Implementation of 1D in Julia

Here I'll also include specific design decisions and discuss the implications of these choices.

3.2 Implementation of 2D (Game of Life) in Julia

Here I'll differentiate between simple solutions (like a bool matrix for storing) and an object-oriented approach which may be even complexer

3.3 Various interesting Game of Life patterns

Stable/oscillating/moving patterns which can be destroyed by a single tile (which shows how sensitive such a system might be)

3.4 Comparison with other programming languages

Here I compare the performance with languages, I think I'll choose JavaScript and Python. I don't think that I'll provide implementations with these languages, rather a brief overview of them.

4 Discussion

5 Conclusions

Here I will summarize the findings and implications of the research conducted.

References

Shi25. Daniel Shiffman. The Nature of Code, Chapter 7: Cellular Automata. <https://natureofcode.com/cellular-automata/>, 2025. Accessed: 2025-05-12. 1