Conway's Game of Life

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March 21, 2024

Introduction

Algorithm

Input

- Square binary grid OR grid size (for random grid)
- Number of evolution timesteps
- Save interval
- Number of MPI ranks
- Number of OpenMP threads
- IF POSSIBLE: number of neighbours determining the rules?
- **SJS: fraction of live cells in random initialization**

Output

- Grid at fixed intervals determined by Input
- Some kind of report

Implementation

I did make extensive use of chatGPT, but only to ask specific questions on how to do something (similar to looking something up on Stack Overflow). Used it for:

- I/O handling

Furthermore I obviously also made heavy use of StackOverflow.

I ran into an error with memory usage, that I managed to resolve through the use of `valgrind`. Concretely, this led me to introduce the `copy_into` member function instead of `overwrite`, which ended up curing the problem[1]. The latter takes an array, whereas the former takes a pointer to an array.

Structure

[1] I must admit that the exact reason this fixed it is still somewhat of a mystery, however …

The grid at all times consists of binary integers.

To decide on: data structure to save the grid, domain decomposition

Hard parts: counting live neighbours

Profiling

Optimisiation

Separable 2D convolution

Conclusion