Parallelizing Conway's Game of Life

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Aim

The aim of the project was to implement Conway's Game of Life and speed up cell computations using CUDA (while simultaneously rendering the grid in a GUI).
For the rest of this presentation, we will do the following:

- Examine results for computation-only speedups
- Talk about challenges faced
- See Vimarsh play the GUI game (and see real time increases in FPS!)

Results

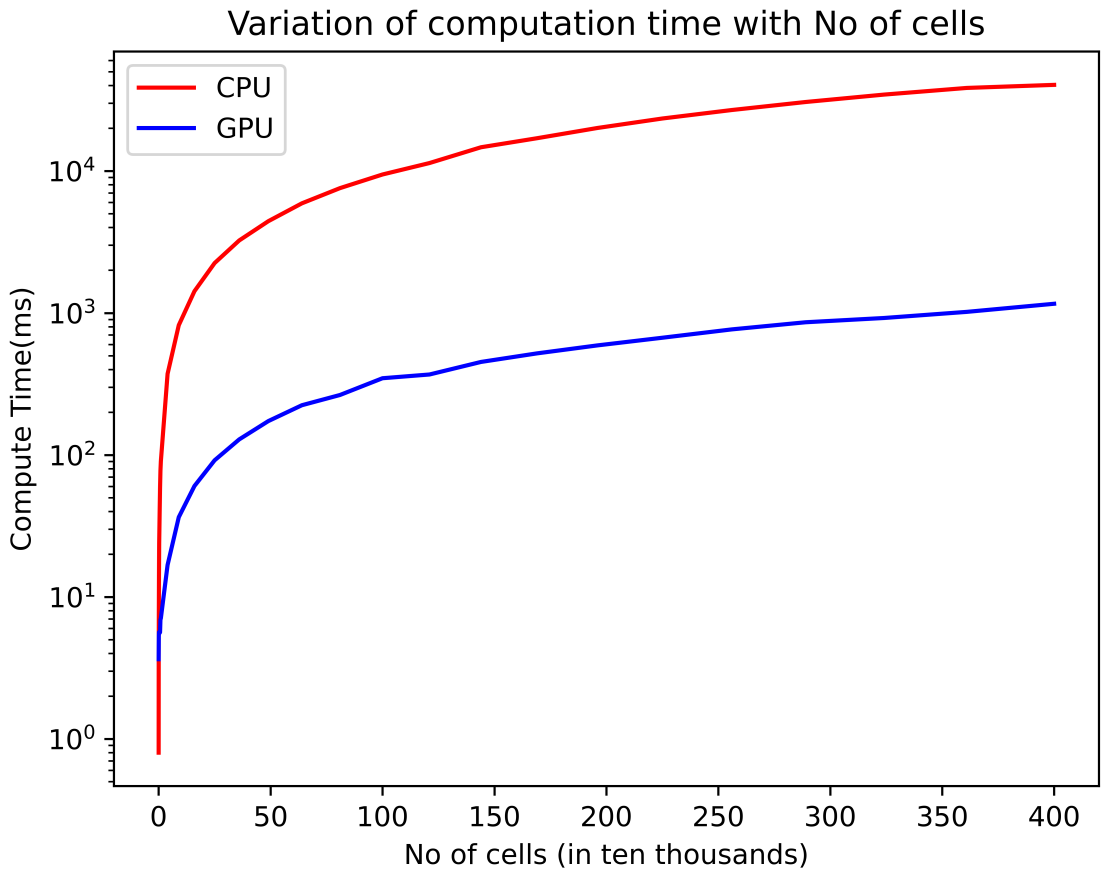

Figure 1: Graph showing computation time vs Number of grid cells for both CPU and GPU

Results - Continued

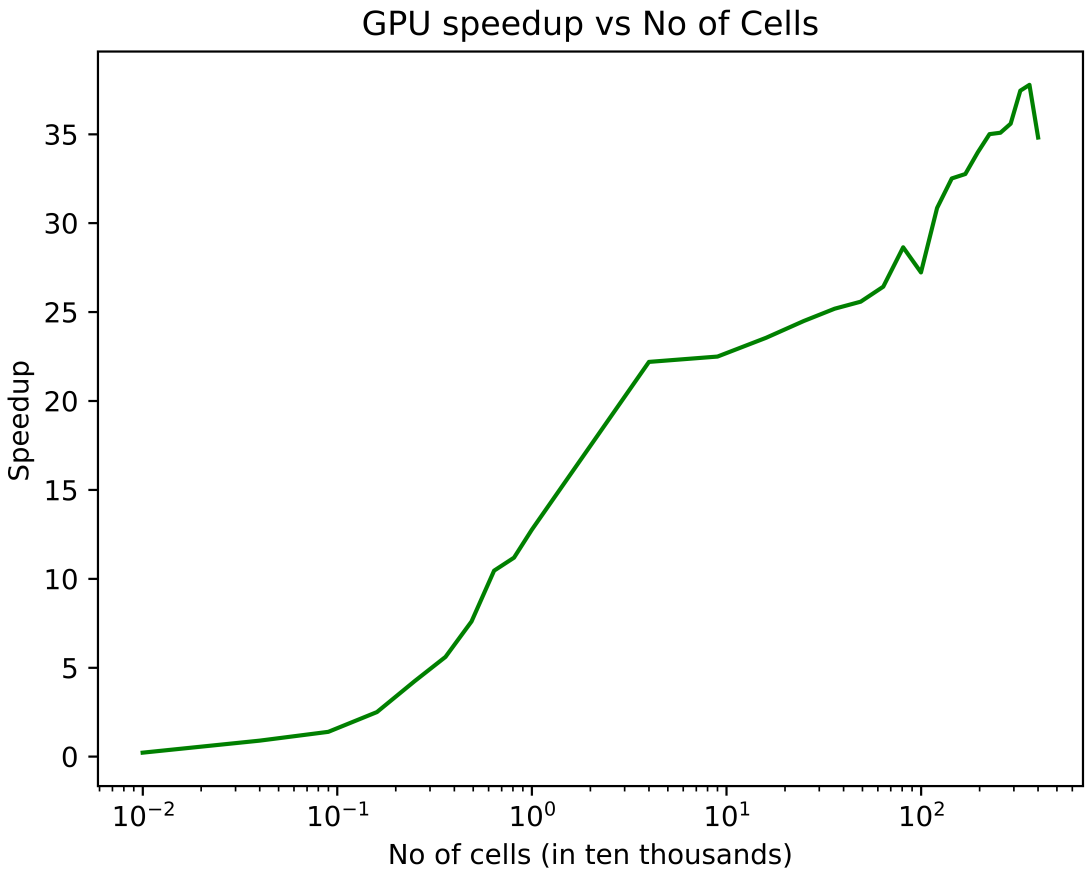

Figure 2: Graph showing GPU speedup

Challenges Faced

1. Complete Elimination of thread divergence when computing the next generation
2. Requirement for static callbacks in our the display engine (leading to bloat and code replication)
3. Optimization of GUI cell drawing from $O(n^2)$ to $O(1)$ using a 2D texture-based mapping in OpenGL