ECE454 - Report V

Arthur Borges de Oliveira Sousa – 1001880084
Vinicius Dantas de Lima Melo – 1001879880

December 2014

First of all, besides some hand code optimizations, we did a better cell representation by saving the number of neighbors in the bits that were wasted in each tile.

Before, only the less significant bit was used at each tile, but now we are also using the most significant bits to save the number of live neighbors. With only a right shift we can access this number. It gave us a better performance, because, by the heuristic of the problem, it's uncommon to have either a cell changing its state or being alive. Therefore, our implementation do not need to calculate the number of neighbors every iteration, which optimized both the memory usage and the running time by not wasting time calculating the number of neighbors, which is not a necessary work.

To make it possible, when a cell dies or borns, a specific function is called. This function modify the number of live neighbors of each neighbor cell, it is similar to a broadcast. Our functions use the spatial locality of cells, which optimized the cache use.