An Investigation of Cellular Automata Dynamics

Timmy Hunter-Kilmer
TJHSST Computer Systems Lab 2006-2007

Introduction

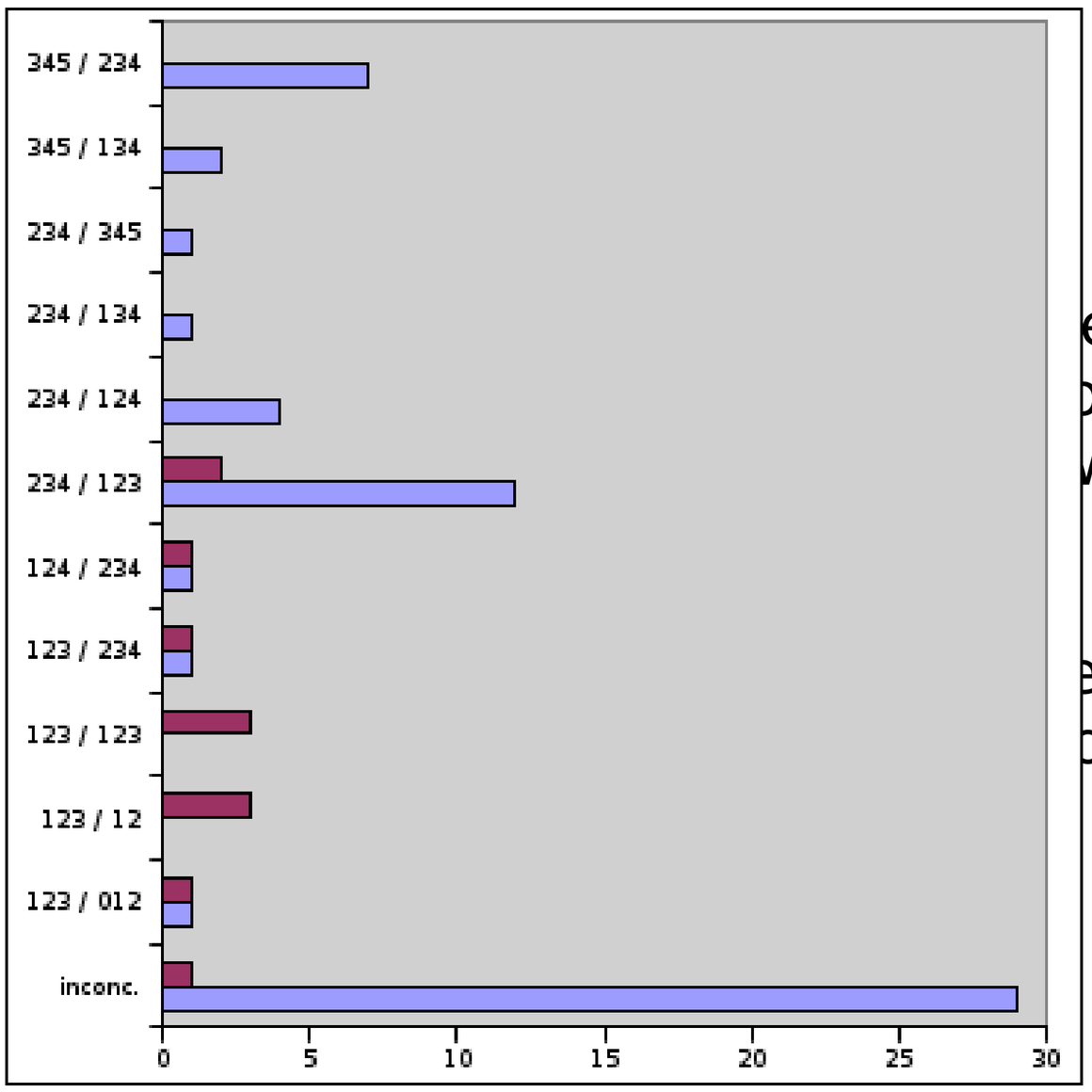
John Conway's Game of Life consists of a field of square cells, each of which can be alive or dead and has eight cells around it. Under his rules, every living cell that had exactly two or three living neighbors would survive into the next generation. Every dead cell with exactly three living neighbors would be alive in the next generation. This project enables different cells to have different rulesets; every cell that is born inherits its rules from the cells around it, but can also mutate, based on a probability partially inherited from its neighbors.

Abstract

John Conway's Game of Life showed that simple rules can generate amazingly complex patterns. Using variations of the rules he devised, one can learn about the advantages of different sets of rules and the implications for simple evolution and chaos theory.

Procedures

The field is initially set with two or more rulesets active; each cell is randomly set to be alive or dead, and its neighbors share its rules. After one set dominates the board, it and its opponents are recorded. This data will be used to judge the success of different rulesets in different situations.



Conclusions

It has already been

e successful on
oard; for example, cells
which require few neighors to survive do
better than cells that need
However,
ends
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