Cellular Automata Introduction

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# Introduction

Cellular automata are mathematical idealizations of physical systems in which space and time are discrete, and physical quantities take on a finite set of discrete values. A cellular automaton consists of a regular uniform ***lattice*** ( or ***array***), usually extending infinitely with discrete variable at each ***site*** (or ***cell***). The ***state*** of a cellular automaton is completely specified by the values of the variables at each site. A cellular automaton evolves in discrete time steps, with the value of the variable at one site being affected by the values of variables at sites in its ***neighborhood*** on the previous time step. The neighborhood of a site is typically taken to be the site itself and all immediately adjacent sites. The variables at each site are updated ***simultaneously*** (or ***synchronously***), based on the values of the variables in their neighborhood at the preceding time step, and according to a definite set of ***local rules***.

***Elementary cellular automata***: one dimensional cellular automata with two possible values of the variable at each site (base 2) and in which the neighborhood of a given site is simply the site itself and the sites immediately adjacent to it on the left and on the right.

# References

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