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Accelerated Computer Science

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Applications of the Game of Life

The Game of Life is a mathematical game invented by John Conway. It is played on a infinite, two-dimensional grid of cells. Each cell’s state of living or dead is determined by its neighbors. A cell with two or three neighbors survives, a cell with more four or more neighbors or one or less neighbors dies. If an empty cell has exactly three neighbors, it comes back to life. Conway devised these rules such that the growth of the cell population is unpredictable. The Game of Life falls under the category of a class of simulations called cellular automatons, or grids of some shape that evolve according to a set of rules.

Although the Game of Life seems to be esoteric and abstract, in actuality, it has a multitude of applications in many different branches of science. The Game of Life was originally used as a way of modelling population growth, but researchers have used it to study epigenetics, or factors that regulate DNA without changing the DNA sequence. Mathematical models about epigenetics, such as one developed by Alan Turing, can be implemented using the Game of Life.

The Game of Life also has applications in computer science. Patterns created in the Game of Life can also simulate logic gates, which means that the Game of Life can also be used to construct a Turing machine, or a theoretical computer with tape and a head that can modify the tape. In fact, Paul Rendell created a model of the Turing machine using the Game of Life.

Sources(convert to citations later)

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