11. Game of Life

2010 데이터로 표현하는 세상 요약본
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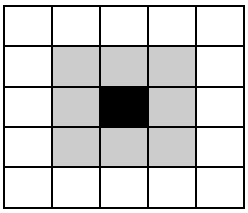
참고사이트, 시뮬레이터 www.math.com/students/wonders/life/life.html

간단한 2차원의 grid를 생각해보자.

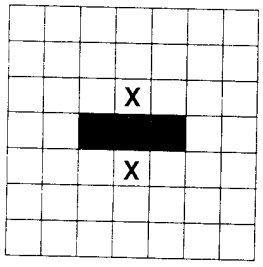


위의 grid에서 보듯이 한칸은 검정색으로 채워졌고, 그것의 8개의 이웃 칸들은 회색으로 그림자가 표시하였다. 이 보드는 시간이 진행함에 따라서 변환된다. 즉, 시간 t에서의 각 칸의 state(상태)들의 함수(function)에 의하여 시간 t+1 에서의 state들이 결정된다.

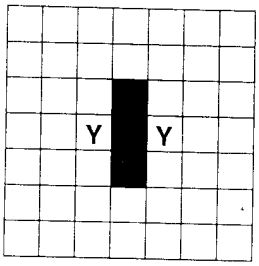
세 가지 simple rules들이 이 게임에서 사용된다.

1. If any square, occupied or not, has exactly three of its nearest neighbors occupied, it will be occupied at the next time period.
2. If any occupied squared has exactly two of its neighbors occupied, it will be occupied in the next time period.
3. For all other situations the square will not be occupied at the next time period.

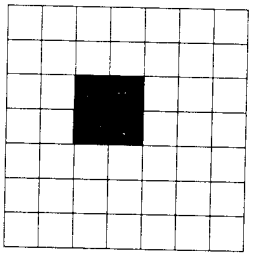
⇨ life at any location is a result of its own as well as its neighbors' life during the previous generation. Specifically, too dense a population of surrounding neighbors (more than three) or too sparse a neighboring population (less than two) at any time period will not allow life for the next generation.



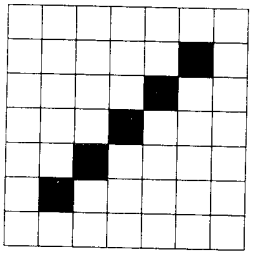
a.



b.

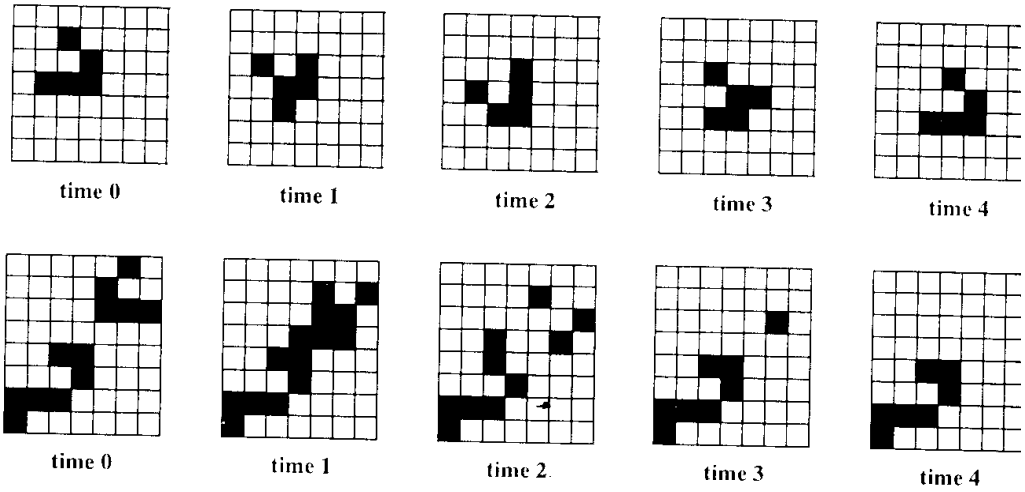


a.



b.

Because of their ability to produce rich collective behaviors through the interactions of simple cells, cellular automata have proven a powerful tools for studying the mathematics of the emergence of life from simple, in-animated components. *Artificial Life* is defined as *life made by human efforts rather than by nature*.



하나하나의 작은 생명은 그 자신과 그 이웃들에 의한 "간단한" 규칙에 의하여 움직이며, 그 작은 생명들로 이루어진 사회(society)는 우리가 쉽게 예상할 수 없는 거대한 규칙에 의하여 움직임을 알 수 있다.

Try your simulation www.math.com/students/wonders/life/life.html

Boids http://www.vergenet.net/~conrad/boids/

3개의 simple rules

1. Boids try to fly towards the centre of mass of neighbouring boids.
2. Boids try to keep a small distance away from other objects (including other boids).
3. Boids try to match velocity with near boids.

Pseudo code
http://www.vergenet.net/~conrad/boids/pseudocode.html

거리에서의 사람들의 행동
1. Lane formation in a street (http://www.trafficforum.org/somsstuff/pedapplets/Corridor.html)
2. Oscillating Pedestrian streams at a bottleneck (http://www.trafficforum.org/somsstuff/pedapplets/Door.html)
3. Pedestrians interacting at a crossing (http://www.trafficforum.org/somsstuff/pedapplets/Crossing.html)

그리고, 이것은
1. 교통 흐름 시뮬레이션 (http://www.traffic-simulation.de)
2. 좁은 통로에서 주위 환경에 따른 군중 심리 (http://www.panics.org)

자세한 내용은 http://www.soms.ethz.ch/research/Videos에

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